HANG TUAH UNIVERSITY

FACULTY OF DENTISTRY PRESENT

INTERNATIONAL SCIENTIFIC MEETING

PROCEEDING BOOK

Dentisphere 3

Dentistry Update & Scientific Atmosphere

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Current Concepts and Technology in Improving Dental and Oral Health Care

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PROCEEDING BOOK INTERNATIONAL SCIENTIFIC MEETING

3rd DENTISPHERE (DENTISTRY UPDATE & SCIENTIFIC ATMOSPHERE) CURRENT CONCEPTS AND TECHNOLOGY IN IMPROVING DENTAL AND ORAL HEALTH CARE

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DEAN OF FACULTY DENTISTRY HANG TUAH UNIVERSITY WELCOME NOTE

Welcome to Surabaya!
Is a great honor for us to welcome you all at the International Seminar “Dentisphere 2016”. This international seminar is the third time we have held at the Shangri La Hotel Surabaya. This Seminar which held on 26-27 August 2016 is one of my pride as the Dean of Dentistry Faculty of Hang Tuah University. This is also proofing one of Hang Tuah University’s contribution both nationally and internationally in the field of dentistry.

The theme of International Seminar 3rd Dentisphere is "Current Concepts and Technology in Improving Dental and Oral Health Care", which aim is to provide a new generation of dentists who are experts and professionals with the knowledge that continues to grow for the Indonesian nation and the world. We hope that through this event we can raise the professionalism in the field of dentistry for all participants.

I would like to say a very big thanks to our speakers from home and abroad: Japan, Korea, Thailand, and Singapore. Thanks for all contributions and participation and your willingness to come and share your knowledge and experience in dentistry. It is an honor for us that the events will also have an important role in the quality control mechanisms to ensure stability and increased periodically in the field of dentistry.

Also for all the participants, thank you very much for joining the International Seminar 3rd Dentisphere, I hope you can all enjoy the entire summary of the seminar. Hopefully this seminar that we held useful for the advancement of knowledge of dentistry you all peers. I apologize if there are less pleasing for the organization of this seminar.

Enjoy the 3rd international seminar Dentisphere!

CHAIRMAN 3RD DENTISPHERE WELCOME NOTE

Hello Dentists!
Welcome to the International Seminar 3rd Dentisphere. It's an honor for us, Dentistry Faculty of Hang Tuah University to host the International Seminar 3rd Dentisphere. We are welcoming all of our sponsors, speakers and participants from both inside and outside Indonesia who contribute to this International event. Welcome to Surabaya!

The theme of this time seminar is "Current Concepts and Technology in Improving Dental and Oral Health Care", as the committee we offers a place to learn and exchange dental knowledge with national and international facilitators. International Seminar 3rd Dentisphere will also provide a unique opportunity for participants to develop the knowledge, skills and professionalism with the interaction with other participants. Do not miss the opportunity to interact directly and do hands on with the speakers and experts which are amazingly competent in the field of dentistry from different countries (Indonesia, Japan, Korea, Singapore, and Thailand).

After all, we apologize if if there are less pleasing for the organization of this seminar . Enjoy the beauty of the city of Surabaya while you also explore the dental sciences!

God bless us always.

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MAIN LECTURER

ML 1

Occlusal Scheme for Complete Dentures

Fumiaki Kawano
Department of Comprehensive Dentistry Faculty of Dentistry Tokushima University

ABSTRACT

Restorative dentistry has made many advances, and superb materials and techniques have been develop to make our patients both esthetics and function well. Implant dentistry has added treatment options for many edentulouspatients, yet many may not be candidate for this therapy because of medical limitation, anatomic contraindications, or financial problems.
The methods for conventional treatment of edentulous patients have not improved substantially, and advancements have not been made at the rate experienced in other dental disciplines. Many dental schools still teach complete denture techniques much the same way they were taught generations ago, and as a result many dentists practice using outdated philosophies. There are also a number of dentists who have chosen not to treat edentulous patients. This has often eroded the public's confidence in complete denture and has frustrated even experienced dentists.
The increasing use of dental implant system has offered new alternatives for fixed and removable prosthesis design. However, the complete denture treatment is the basic treatment of the edentulous patients.
In the construction of complete denture, we must consider the denture stability and the restorationof physiologic functions such as mastication and speech. The arrangement of the artificial teeth and occlusal scheme are most important factors for denture stability and function. Many types of posterior teethand occlusal schemehave been used in completedenture. Many investigatorshave evaluated the effectiveness of them.
In this presentation, I will explain the necessity of the bilateral balanced occlusion for the complete denture and introduceLingualizedOcclusion.

ML 2

Lecture Topic: "Achieving Aesthetics and Excellence with Modern Composite"

Anthony Tay

ABSTRACT

Dental composite has been an increasingly popular treatment modality, since its introduction in the 1970s. With the constant development and evolution of modern dental composite, the material has improved in strength and aesthetics considerably. This has provided clinicians with the greater flexibility to manage the common clinical scenarios, in a minimally invasive way. In this lecture, the speaker will share his day-to-day experience with clinical case illustrations, and discuss factors on achieving success in a predictable manner.

ML 3

Porous Titanium For Bone Substitute Materials

Yoshihito Naito
Oral Implant Center, Tokushima University Hospital, Japan

ABSTRACT

Titanium is widely used in orthopedic and dental implants because of its several advantages, including excellent biocompatibility, high bone conduction, and good mechanical properties. However, some drawbacks remain: for example, the elastic modulus of titanium is far higher than that of cortical bone, and the mismatch induces problems such as debonding at the bone–titanium interface and bone desorption. One of the methodologies to overcome this issue is to apply porosity to the titanium material. Moreover, the bone integrates into the pores structure of the titanium, which provides high interlocking capacity between the bone and the titanium. In these background, we developed two new fabrication methods of porous titanium for bone substitute materials. We would like to introduce these methods and advantages of clinical applications.

ML 4

Dentistry's role in mass disaster

Ahmad Fauzi

ABSTRACT

The occurrences of disaster cannot be predicted. It will come suddenly. It is impossible to predict if, when, and where the next disaster will occur. Owever, we must be ready to respond when it strikes. Preparedness is very important. The Dentistry of the dentist have an important role in mass disaster management. The role that dentist play in such disaster varies throughout the world and the response to a disaster may also differ from various responders. Based on their knowledge and skills, dentist can work together with other medical teams in helping survivor and evacuation the victims. On the other hand, the role of dentist in identification process of the dead bodies is very dominant. Dental identification is on of three of the primary identifier methods. The accuracy of dental identification is very high. However, there are some obstacles of dental identification through dental analysis method. Preparation, including knowledge and skill of human resources of The Forensic Dental Identification Team should already be in place before disaster occur.

ML 5

Basic Research For The Development Of Oral Hygiene Products

Joong-Ki Kook
Korean Collection for Oral Microbiology and Department of Oral Biochemistry, School of Dentistry, Chosun University, Gwangju, Republic of Korea

ABSTRACT

Dental caries and periodontal diseases are major oral infectious diseases caused by bacteria colonizing on the tooth. The major causative bacteria of dental caries are mutans group streptococci, such as Streptococcus mutans and Streptococcus sobrinus, in the case of humans. The major causative agents of periodontal diseases are gram-negative anaerobic bacteria, such as Porphylomonas gingivalis, Treponema denticola, Tannerella forsythia, Aggregatibacter actimonycetemcomitans, and Fusobacterium nucleatum. Dental plaque control is an essential strategy for preventing dental caries and periodontal diseases. Tooth-brushing and gargling are the most accepted and effective methods for controlling plaque. Recently, many studies have attempted to identify effective chemicals or natural extracts from plants that can be used as antimicrobial agents to develop oral hygiene products such as toothpaste or gargling solution. To investigate the antimicrobial activity of candidate chemicals or natural extracts for using ingredients of oral hygiene products, evaluation of minimum inhibitory concentration (MIC) and/or minimum bactericidal concentration (MBC) were performed with cytotoxicity tests for them. The MIC is the lowest concentration of antimicrobial agent that inhibits growth; the MBC is the lowest concentration of antimicrobial agent that reduces the viability of the initial bacterial inoculum by ≥ 99.9%. Cytotoxicity test is performed by MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide, a tetrazole) assay which is a colorimetric assay for assessing the metabolic activity of NAD(P)H-dependent cellular oxidoreductase enzymes may, under defined conditions, reflect the number of viable cells present. In the presentation, it will be introduced that the research results for the antimicrobial activities of chemicals or natural extracts for using ingredients of toothpaste and/or gargling solution for preventing dental caries and periodontitis.

ML 6

Dental Readiness In Military Dentistry

Kolonel Laut (K) drg. Ridwan Purwanto, MARS
Ladokgi

ABSTRACT

Threats against a nation's sovereignty will never fade for as long as it exists. Indonesia is no exception. In an effort to protect its sovereignty and dignity, the Law No. 3 year 2002 on State Defense was passed by the lawmakers. The Law No. 34 year 2004 on the Indonesian Military, which supports the noble cause, guarantees access for welfare to the soldiers through official support, in which comprehensive health care is part of it, including Oral Health field treatment to achieve dental fitness through a set of military dentistry programs.

Within the field of dentistry, military dentistry today is an inter-disciplined dentistry practice which has an organization, named Ipadokgimil, with a chairman who holds the title of ex-officio Kaladokgi TNI-AL R.E. Martadinata.

This organization, other than being a vessel of communication for military or non-military dentists, also works together in developing and advancing military dentistry through education and training programs, research and development. The unit has designed for the future an education for a master's degree program by emphasizing on promotive and preventive management. A series of activities has been developed, including: a health screening test for soldiers, comprehensive health services to reach dental fitness, antemortem data retrieval for soldiers and continuing medical training.

ML 7

Occlusion Updated - A Whole Elephant Perspective

Yue Weng Cheu
Clinical Director of DP Denta

ABSTRACT

We are familiar with the usual emphasis of occlusion in the aspect of how our teeth come together. In a broader perspective, the impact of our bite to our airway, joints and muscles, neurology and its relation to postures are not commonly discussed. Airway plays a significant role in influencing the oro-facial development and its relation to TMD will be presented with cases illustrating the management from children to adults. The related headaches, pain in the neck and shoulders and even ringing sounds in the ears could have their origin from certain cranio-mandibular relationship. Conventional and differing approaches to understanding and management of Temporo-mandibular Disorder (TMD) has stopped many from engaging in this subject. This lecture will provide the audience a broad base view of the occlusion with a Gneuromuscular perspective and offer an elegant solution to managing different types of pain issues. To support TMD treatment, myofunctional training and laser biostimulation will also be utilized to improve outcome.

ML 8

Things About Root Canal Dilacerations

Marino Sutedjo

ABSTRACT

The unique morphology of dilacerated root canals often give challenges in their endodontic management. Common causes of failures in such cases are primarily related to procedural errors such as ledges, fractured instruments, canal blockages, zip and elbow creations. Knowledge of dental anatomy and its variations is essential for the success of endodontic treatment. A clinician is required to have an insight of the morphology of tooth related to its shape, form and structure before commencing treatment. Routine periapical radiographs aids in assessing these morphological variations in the root canal system. This lecture will discuss things about dilacerated canals from it's definition, identification to management.

ML 9

Irrigation at The One-Third of The Apical Root

H.M Bernard O Iskandar

ABSTRACT

Success in endodontic treatment depends to a great extent on chemomechanical debridement of the canals. Although instruments remove most of the canal contents in the main root canal area, irrigation plays an indispensable role in all areas of the root canal system, in particular those parts that are inaccessible for instrumentation. Since irrigation is an important phase of endodontic treatment, and addition to antimicrobial effects and tissue dissolution, microorganisms and debris are flushed out of the root canal by the washing action of the irrigant. Irrigants must be brought into direct contact with the entire canal area and especially with the apical portions of narrow root canals for optimal effectiveness. The penetration and flushing action of the irrigant depend not only on the anatomy of the root canal system but also on the system of delivery, the volume and fluid properties of the irrigant, and the size, type, and insertion depth of the irrigation needle. Sodium hypochlorite is the most commonly used endodontic irrigant because of its well known antimicrobial and tissue-dissolving activity. The dissolving capability of sodium hypochlorite relies on its concentration, volume, and contact time of the solution but also on the surface area of the exposed tissue. However, high concentrations are potentially toxic for periapical tissue. Also, changes in mechanical properties such as decreased microhardness and increased roughness of radicular dentin have been reported after exposure to sodium hypochlorite in concentrations of 2.5% and 5.25%. Possible ways to improve the efficacy of hypochlorite preparations in tissue dissolution are increasing the pH, and the temperature of the solutions, ultrasonic activation, and prolonged working time. General consensus that increased temperature enhances the effectiveness of hypochlorite solutions. It has been suggested that preheating low-concentration solutions improves their tissue-dissolving capacity with no effect on their short-term stability. Also, systemic toxicity is lower compared with the higher-concentration solutions (at a lower temperature) with the same efficacy. Conventional irrigation with syringes has been a recommended method of irrigant delivery before the advent of passive ultrasonic activation. This technique, which involves dispensing an irrigant into a canal through needles of different sizes, is still widely accepted by both general practitioners and endodontists. Needles are designed to dispense the irrigant through their most distal end or laterally through side-vented channels. The latter design has been proposed to improve the hydrodynamic activation of an irrigant and to reduce the chance of apical extrusion. The impact of mechanical agitation of the hypochlorite solutions on tissue dissolution was found to be very important that the great impact of violent fluid flow and shearing forces caused by ultrasound on the ability of hypochlorite to dissolve tissue. That high surface tension could affect the ability of NaOCl to penetrate into dentine and thus reduce its antibacterial effectiveness within dentinal tubules. Finally, a hypochlorite solution was added with surface active agent. These agent are lowering the surface tension of the irrigant, and on the other hand increase the wettability of the irrigant on solid dentin. The irrigants for endodontic use should have very low surface tension. The wettability of the solution governs the

capability of its penetration both into the main and lateral canals, and into the dentinal tubules. By improving the wettability, an irrigant solution could increase its protein solvent capability and enable better antimicrobial activity in uninstrumented areas of RCS. Sodium hypochlorite 5.25% is the most common irrigant used in endodontics, but it is ineffective in removing smear layer and the use of a second irrigant, like EDTA or citric acid (active against inorganic debris), is required. To achieve optimal wettability, the surface energy of the substrate must be as high as possible, and the surface tension of the liquid contacted with the substrate must be as low as possible. Surface tension as a condition of intramolecular attraction at the liquid surface prevents the spreading of the solution over a surface. When this intramolecular attraction is destroyed, the surface tension decreases. A low surface tension could increase the penetration of irrigants into the uninstrumented areas of the RCS, lateral canals and dentinal tubules and thus increase their contact with the dentine walls. Surface tension might be reduced by using heat or adding chemicals known as surfactants. To better understand the dynamics of irrigation in the one third of apical root, all information will be discuss on this presentation.

ML 10

Emulating Nature : Dental Photography and Clinical Connection

Onny Eryanto
Dental practicioner

ABSTRACT

Tooth form a complex optical medium for light as it passes through enamel, dentin-enamel complex and dentin. Furthermore, this behaviour evolves over years as tissues change and adapt in morphology and composition. Comprehension of basic natural anatomy and characteristics from a tooth structure is essential to succeed when selecting the proper translucency, value and chromaticity for direct or in-direct restorative materials. Dental photography is one of the best tool to analyze all of this characterization and transfer all the information into our restoration. This lecture aims to bring this knowledge into clinical approach in anterior restoration to get a lifelike appearance with seamless integration every time.

ML 11

Restorative Chalenges and Treatment Option for Primary Teeth

S. Nagarajan M.P.Sockalingam
Head of postgraduate programme in paediatric dentistry di National University of Malaysia

ABSTRACT

Providing restorative care for children can be very challenging for clinicians. Three main factors, namely the tooth factor, patient's factor and parents' related factor may dictate the type of restorative care to be given. This is further confounded by the availability of many different types of materials found in the ever-expanding dental product field. Often clinicians prefer materials which are easy to handle, sets fast, good aesthetics, reasonable price and that last lifelong of the tooth. However to find a material that can fulfil all these needs of the clinicians can be an impossible task. This presentation will touch on the challenges commonly faced by clinicians to restore primary teeth and materials that are well used for specific restorative conditions to optimise the expected outcomes.

ML 12

Biological Response around Implant and Graft

Ika Dewi Ana[1]
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ABSTRACT

In the area of dentistry and medicine in general, tissue regeneration is very crucial issue to enhance quality of life. A bio-inspired design is very important key to induce tissue regeneration within physiological condition. With respect to bone regeneration, for example, inter-connective porous composite with Ca/P ratio closer to the original bone with the ability to promote bone formation and facilitate mass transfer management in the body is a critical aspect in the design of bone substitute. Meanwhile, an implant with bio-inspired design is also crucial aspect to consider. In this review, we aimed to provide some experimental data of our research group related to in vitro, in vivo and some clinical success rate of carbonate apatite (CHA) composite to the regeneration of alveolar bone, as an example of biomimetics, bioactive and biodegradable scaffold used in bone tissue regeneration. We also aimed to provide other data from our research group related to surface modification of the implant to understand biological response around implant

ML 13

Current Concepts Of Dental Caries In Children

Udijanto Tedjosasongko
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Universitas Airlangga

ABSTRACT

Dental caries is a multi-factorial disease that involves tooth structure, oral microbiota, and dietary carbohydrates, "tooth decay" results in the dissolution of the mineral content of teeth and must be thought of as dependent on its key contributing factors. It affects many people, including children. Indonesia launched national oral health program, "The Indonesian free of dental caries in 2030". Many efforts should be done to rearch the goal. One of them is by understanding the dental caries in children. The current paradigm for management of dental caries is evidence-based and favors non-invasive therapies to prevent and/or arrest the progression of the disease, with traditional surgical intervention reserved for circumstances of irreversible tooth structure loss. Prevention and management of dental caries today will depend heavily upon accurate/regular caries risk assessment, appropriate behavior modification, and judicious use of non-invasive evidence-based modalities like fluoride and sealants to prevent and arrest acute caries lesions. The time invested in prevention during childhood represents a real benefit for the future adult's oral health. Many a dental problems can be avoided if dental decay management relies on the link between medical science and every day practice.

ML 14

Exploration Of Marine Biota And Hyperbaric Oxygen Therapy In Dentistry

Dian Mulawarmanti
Department of Oral Biology
Faculty of Dentistry Hang Tuah University

ABSTRACT

The use of natural resources and development of some strategic therapy in dentistry is needed to be improved to gain the optimizing of oral health. Some marine biota are natural source that have been consumed as healthy food or folk medicine and recent studies showed its potential bioactive compounds in medical benefits. Sea cucumber have been known to have pharmacological activities of anti-inflammatory, antimicrobial, antioxidant, antitumor and wound healing. Hyperbaric oxygen therapy (HBOT) have been increasingly used in medical practice regarding to its benefits. HBOT is defined as administration of 100% oxygen in certain pressure that could increase the oxygen tension in the tissue and blood circulation, it could be potentially use in some cases in dentistry. This presentation will introduce some researches of sea cucumber and hyperbaric oxygen therapy in dentistry to highlight the potential of its exploration in oral health.

ML 16

Timing Of Treatment Of Growth Modification

Retno Widayati
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Faculty of Dentistry, University of Indonesia, Jakarta

ABSTRACT

Growth modification required movement of teeth or correction of malrelationships and malformations of related structures by the adjustment of relationships between and among teeth and facial bones by the application of forces and or the stimulation and redirection of the functional forces within the craniofacial complex. The time to begin growth modification becomes very important for the success of orthodontic treatment. The purpose of this presentation is to understand the knowledge of growth and development of craniofacial and skeletal maturation in connection with orthopedic orthodontic treatment. The use of orthopedic appliance such as Face mask, Functional appliance, Herbst, Head Gear, Chin Cup, and Rapid Palatally Expansion should consider the maxillary and mandibulary growth. Orthodontist should understand growth and development of craniofacial growth including several indicators of growth associated with the time to start the growth modification treatment.

SHORT LECTURER ORAL PRESENTATION

SL 1.1

RESEARCH ARTICLE

Effect of Piper betle L. Leaves Extract In The Formation of Dental Plaque: Literature Review

Poetry Oktanauli*, Radinda Myrna Andiani**
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** Post Graduated Student, Faculty of Dentistry University Prof. DR. Moestopo (Beragama), Jakarta

ABSTRACT

Background: *Dental plaque has a strong relationship with the development of caries and periodontal disease.* ***Purpose:*** *This article was written in the purpose of showing that betle leaf controlled the development of dental plaque by minimizing the growth of bacterial cells and proliferation.* ***Case:*** *Exploitation of natural ingredients as medicine was proved to be minimal in bringing about adverse effect.* ***Case management:*** *Betle leaf is known as natural medicinal plants with a wide range of peculiar properties to the health of body and oral cavity. It is catechins, derivative of phenol contained in betle leaf that capable to hampering the growth of Streptococcus mutans, which is, on the other hand, known as prominent bacteria in the development of dental plaque. This antiplaque activity takes a significant role in the failure of bacterial attachment to tooth surface.* ***Conclusion:*** *Betle leaf definitely can be used as an alternative in preventing the formation of dental plaque in order to obtain and maintain oral health optimally*

Keywords: *Betle leaf, dental plaque*

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BACKGROUND

Healthy teeth and oral cavity is one of the important things that need to be considered by each individual. One way to achieve healthy teeth and oral cavity is to prevent the formation of dental plaque. Dental plaque has a strong relationship with the development of caries and periodontal disease.[1] Most patients with poor plaque control, tend to be more susceptible to gum disease.[2] Plaque is a soft layer formed from a mixture of macrophages, leucocytes, enzymes, inorganic components, matrix extracellular, the epithelium of the oral cavity, food debris and bacteria attached on the tooth surface.[3] Betle leaf is a plant with a wide range of benefits. This plant has been used as traditional medicine, because betle leaf is also an antiseptic. Betle leaf contains antioxidant compounds called catechins. Catechins can affect oral bacteria that can cause the formation of dental plaque.[4.5] Knowing that betle leaf has many benefits, it is important for the public to realize that traditional plant betle leaves can be used as an alternative in preventing the formation of dental plaque

LITERATURE REVIEW

Betle Leaf (Piper betle L.)

Betle leaf is a tropical plant that grows in many areas of Southeast Asia. [6] Indonesian betle is a native plant that grows vines or leaning on another tree and can reach tens of meters. [7,8] Betle plant has the Latin name Piper betle. [8] The betle leaf has been widely recognized in various areas, so it has a name according to its own country, betle (Indonesia), send or sedah (Java), seureuh (Sunda), ju jiang (China), bethel (France), betlehe or vitele (Portugal).[9]

There are several types of betle classified into Java betle, banda betle, clove betle, black betle, red betle and yellow betle. Various betle can be distinguished by the shape of leaves and the aroma or taste. Java betle (figure 1), dark green leafy and feels less sharp; banda betle with large leafy, dark green and yellow in some parts, sharper taste and aroma. Clove betle has small leaves and yellow, flavors such as clove, whereas black betle (figure 2) with heart-shaped leaves, the taste is very strong. Red betle (figure 3), green leaf patterned grayish-white color on the top and bright red heart on the bottom, while the yellow betle have a yellow leaves. [10,11] Here is Piper betle Linn taxonomy (table 1): [12]

Table 1. Piper betle Linn Taxonomy. [12]

Kingdom	**Plantae**
Sub Kingdom	Tracheobionta
Super Division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Sub Class	Magnoliidae
Order	Piperales
Family	Piperaceae
Genus	Piper
Species	Piper betle Linn

Figure 1. Java betle.[12]

Figure 2. Black betle.[11]

Figure 3. Red betle. [13]

Ingredients and Benefits Betle Leaf Extract

Green betle leaf (Piper betle L.) have content that is good for health, among others, the essential oil which is the main component of phenol, besides betle leaf also contains carotene, thiamine, riboflavin, nicotinic acid, tannin, starch, vitamin A, vitamin C, amino acids and sugars.[11] The content of betle leaf that acts as an antiseptic is essential oil, which contains phenolic compounds with antibacterial activity. [14] Flavonida compounds also contained in the betle leaf, this compound has efficacy as an antioxidant, anti-inflammatory, and antibacterial. Tannin contained in the betle leaf serves as an antidiarrheal, antiseptic, and antifungal.[8] Another source said that betle leaf contain chemicals that can destroy bacteria, also as an antioxidant, and anti-fungal. [11]

Indonesian society have taken advantage of Piper betle for some medicinal purposes related to the oral cavity, among others, to overcome bad breath (halitosis), gingival bleeding and stop the pain of cavities. Betle leaf with a spicy taste and its strong aromatic betle leaf widely consumed as a mouth freshener. [9,16] The betle leaf is often used in Javanese tradition that aims to strengthen teeth by chewing betle leaf. [9,10]

Dental Plaque

Dental plaque is a soft deposit that forms biofilm on the surface of the teeth and on hard surfaces in the oral cavity, such as fixed and removable restorations. [17] In thin layers, plaque almost invisible and can only be seen using a disclosing agent. [18] Dental plaque comprised of bacteria in a matrix of salivary glycoproteins and extracellular polysaccharides like glucans and fructans. This matrix makes it impossible to rinse plaque away with water, it must be removed mechanically by means of hand instruments, the toothbrush or other oral hygiene aids. [19]

DISCUSSION

Dental plaque can lead to the development of oral diseases such as dental caries and periodontal diseases, so the formation of dental plaque should be inhibited. [4,5] By preventing or limiting bacterial adhesion and their subsequent growth on the tooth surface, the severity of the diseases can be reduced. The public is now increasingly interested in the herbal or

natural ingredients because it was proved to be minimal in bringing about adverse effect. Currently, various studies have been conducted to develop natural ingredients so they can be used in oral health products. One of the natural ingredients that have been researched and has beneficial effects on the oral cavity is Piper betle leaf. [20]

Piper betle leaf is one of the plants that have a wide range of benefits for human health, including in maintaining oral health. Betle leaf has been known as a plant that is rich in alkaloids and have a beneficial biological effect. [21] One of the efficacy of betle leaf in oral health is an anticariogenic agent. It has been demonstrated from betle leaf effectiveness in inhibiting acid production by salivary bacteria.

Betle leaf contain essential oils whose main components are phenols which can destroy bacterial cell protein. [11,14] The betle leaf has a distinctive aroma and flavor, caused by chavicol and betlephenol contained in essential oils, so it can provide a fresh sensation in the mouth. Essential oils in the betle leaf capable against gram-positive and gram-negative bacteria. Betle leaf extract has been found in some oral hygiene products such as toothpaste and mouthwash. [14] In addition, betle leaf extract has been shown to have significant activity against Streptococcus mutans and inhibit the early plaque formation. Antimycotic activity, antimicrobial, antiprotozoal are also found in betle leaf extract. [21]

A study conducted by D. Pradhan et al prove that betle leaf extract can inhibit the production of acids that alter the structure of pathogenic oral bacteria such as Streptococci, Lactobacilli, Staphylococci, Corynebacteria, Porphyromonas gingivalis and Treponema denticola. Therefore, the betle leaf is one of the natural substances that contribute as oral health. [23]

In 2003, Fathilah Abdul Razak et al conducted a study of anti-adhesive effect of betle leaf extract on early plaque adhesion to the tooth surface. In the study, betle leaf extract prepared by a betle leaf cleaned and dried with paper towels, then the leaves at were cut in small pieces. Pieces of leaves boiled in distilled water for several hours until the volume of the last third of the initial volume, then put in a centrifuge to eliminate the sediment. The substance of the results of centrifugation put into microfuge tubes (1 ml / tube), then use the speed-vacuum concentrators, dried for one night. The dry extract is stored and weighed again to be used in the research analysis. The results showed that the betle leaf extract has caused a reduction in the initial attachment of plaque bacteria which include Streptococcus mitis, Streptococcus sanguinis, and Actinomyces sp. on the surface of the tooth. Through the results of this study concluded that, anti-adhesive effect mechanism involves a change of betle leaves hydrophobic bond between bacteria and salivary components that cover the surface of the tooth. [22]

In 2006, studies about the effects of betle leaf extract is also made to the virulence properties of Streptococcus mutans by Nalina T et al. The results showed the effect of betle leaf extract can reduce the growth of S. mutans, the bacteria inherent ability, and glucosyltransferase activity and cell surface hydrophobicity of Streptococcus mutans. Based on these

results, we can conclude that betle leaf extract has anti-virulence against Streptococcus mutans. [24]

In 2009, A.R. Fathilah et al conducted a study of betle leaf extract. In the study, betle leaf extract prepared by concentrating fresh betle leaf stew using speed-vacuum concentrator. The dried extract is stored -80C in the refrigerator before use in experiments. Dry extract weighed into sterile microfuge bottles and prepared into solution using sterile distilled water as a solvent. The extract was destroyed by means of ultrasonic sonicator. This study shows the extract of Piper betle bacteriostatic effect on dental plaque bacteria like S. sanguinis, S. mitis, and Actinomyces sp. Betle leaf extract to create an environment that causes bacterial biological functions become abnormal and eventually stopped spreading. In some circumstances can control the development of dental plaque ecologically. Therefore, betle leaf extract can be used as an active ingredient in a variety of oral health products. [25]

In 2010, A.R. Fathilah et al conducted a research to find new substances from plant extracts that can be used as a control of dental plaque. This study looked at the effects of betle leaf extract against Streptococcus sanguinis, Streptococcus mitis, and Actinomyces sp. which is the main bacteria in the initial phase of plaque formation. The results of this study showed positive antimicrobial activity against all three bacteria. In this study, tested the betle leaf extract activity against bacterial adhesion. The result showed anti-adherence activity were positive and the ability to lower the bacterial cell surface hydrophobicity.[20]

Betle leaf extract also acts as an antiplaque agent, starting with modifying properties aquired pellicle. Betle leaf extract reduced the hydrophobicity of the surface of bacterial cells. Therefore, the attachment of bacteria to aquired pellicle on the tooth surface will be reduced. Effect of betle leaf extract in inhibiting the growth of plaque can control the development of plaque to minimize bacterial cell growth and proliferation. [20]

In 2011, Zubaidah Haji A.R. et al conducted a study about the effects of extracts of betle leaf (Piper betle L.) against Streptococcus mutans. Betle leaf extract prepared by weighing, crushing and dissolving dried betle leaf using distilled water, followed by filtration. This study proved that extract of betle leaf (Piper betle L.) has the effect of reducing cell adhesion and cell growth and extracellular appearance of Streptococcus mutans. Betle leaves have an influence to the bacterial cell surface in dental plaque. This study also shows the betle leaf extract would cause a reduction in the bacteria's ability to use nutrients efficiently, so that the growth will become slower. [26]

In 2012, research by Nuniek N.F. et al proved that betle leaves boiled water will decreased aerobic and anaerobic bacteria in the mouth. This showed that betle leaves are effective as an antiseptic. Antiseptic required to improve oral hygiene, because it is a compound that can inhibit the growth and development of microorganisms as well as an antibacterial.[14]

Research in 2014 by Dr. Varunkumar et al, describes the relationship of plaque and saliva plays a role in modifying the pH of dental plaque. This will directly affect the ionic composition of the plaque.

salivary pH has a significant effect on the quality of plaque. Results showed that saliva samples without betle leaf or NaF showed a pH of less than pH 5.5 or critical. A decrease in salivary pH have an effect, either directly or indirectly on the balance of ion composition of dental saliva, dental plaque, and plaque-saliva relationship. This can lead to email demineralization and increased dental caries. Betle leaf is also showing the effect of inhibiting the growth, acid production, and adhesion of Streptococcus mutans. [21]

Through the results of this study concluded that, betle leaves have significant potential in reducing acid by salivary microbes. The effectiveness of the betle leaves is comparable with sodium fluoride which is an established agent which inhibits the acid production. Betle leaf is also showing the effect of inhibiting the growth, acid production, and adhesion of Streptococcus mutans. [21]

In 2014, Pramita Dyah P. conduct a research about the effects of betle leaf stew preparations towards hydrophobicity of Streptococcus mutans. Hydrophobicity of the surface of S. mutans is important in cell adhesion of bacteria to the acquired pellicle on the tooth surface. The results showed differences in the hydrophobicity of S. mutans after exposed with 10% green betle leaf decoction. This indicates that exposure stew of green betle leaf (Piper betle L.) 10% are able to decrease hydrophobicity of Streptococcus mutans. [27]

Based on several studies that have been done, betle leaf (Piper betle L.) can be used as an active ingredient of antiplaque agent in oral hygiene products such as mouthwash and toothpaste. [14,21,24] Today, the popularity of drugs and oral hygiene product containing natural ingredients are increasing. As already known, the betle leaf is one of the natural ingredients that do not have adverse effects in the mouth. Products containing betle leaf extract has been used by the public as one of the options in inhibiting plaque formation on teeth.

CONCLUSSION

Betle leaf (Piper betle L.) is a plant with a wide range of beneficial properties for the body. Extracts of betle leaf (Piper betle L.) has an antiplaque activity by inhibiting the growth of bacteria in the early stages of plaque formation. In addition, the betle leaf extract can also inhibit the production of acid oral pathogens that can alter the structure of bacteria, such as Streptococci, Lactobacilli, Staphylococci, Corynebacteria, Porphyromonas gingivalis and Treponema denticola.

Currently there are oral health products that contain active ingredients of betle leaf, such as toothpaste and mouthwash. Hopefully that people can take advantage of oral hygiene products containing betle leaf as an alternative in maintaining oral health.

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SL 1.2

CASE REPORT

Treatment of Temporomandibular Disorder Using Full Occlusal Splint

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ABSTRACT

Background: *Muscle pain caused by temporomandibular disorder is frequently found in dental practice. However, many dentists do not have capability to diagnose and treat this case. Local muscle soreness is the most common muscle pain case and it is catagorized as a primary noninflammatorymyogenous pain disorder.* ***Purpose:*** *To know how to manage local muscle soreness with full occlusal splint.* ***Case:*** *Man, 19 years, came to Clinic Specialist of Prostodontic, Faculty of Dentistry, Airlangga University, with complaining muscle pain on his temple when he woke up in the morning and clicking sound when he opened his mouth widely. Patient had malocclusion. Beside of that, patient also complained pain on posterior teeth. Patient had bruxism habit while sleeping and never had treatment or medication to solve his problem.* ***Case management:*** *After diagnosing had been done, a conservative treatment was applied by telling the patient to practice N-position movement to relax the muscle. Then taking registration both maxilla and mandible arch for fabrication of full occlusal splint. The splint made of acrylic in order of releasing both arch from occluding so the temporomandibular joint will be deprogrammed and the muscle will be relaxed. Full occlusal splint was commanded to be wore all day and night except meal time for less than four months.* ***Result:*** *Patient felt that the chief complaint was getting better, the pain was reduced, also clicking sound was disappeared, but bruxism habit was still remained.* ***Conclusion:*** *Full occlusal splint can be used as alternative of treatment for patient with local muscle soreness.*

Keywords: *Full occlusal splint, muscle pain, temporomandibular disorder*

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BACKGROUND

Temporomandibular disorder is the most common case that happened although research of the statistic of the case was rarely done. This is due to few patients that came to the dentist. They only look after treatment when the disturbing complains exist. The major complains are muscle pain, clicking and limited opening mouth [1].

Temporomandibula disorder is a complex diseases and its nature has not been completely understood yet. The major difficulty for identifying the temporomandibular disorder (TMD) arises from its complex relationship with other structures of the head, neck and scapular girdle, in addition to the great variety signs and symptoms that can be related to temporomandibular joint (TMJ) by these strustures and vice-versa [2].

One of the symptoms that is complained by patients with temporomandibular disorders is masticatory muscle pain. Local muscle soreness is the most common muscle pain case and it is catagorized as a primary noninflammatory myogenous pain disorder [3].

CASE AND CASE MANAGEMENT

Man, 19 years, came to Clinic Specialist of Prostodontic, Faculty of Dentistry, Airlangga University, with complaining muscle pain on his temple when he woke up in the morning and clicking sound on the right jaw when he opened his mouth widely. Based on method of visual analog scale of pain (VAS), with criteria 0 is zero-pain and 10 is the most painful, the patient felt that the scale of pain is 3. Beside of that, patient also complained pain on posterior teeth. Patient had bruxism habit while sleeping and never had treatment or medication to solve his problem. The patient admit that he never had injuries involved his jaw area. On clinical examination, there are no anomalies on the extraoral appearance but on the intraoral, there is malocclusion on anterior teeth and mild abrasion on occlusal of posterior teeth. The maximum unassisted opening mouth was 49 mm, pain-free unassisted opening was 43 mm, and maximum unassisted opening was 46 mm. Lateral opening mouth to the right was 5 mm and to the left was 5 mm.

Fig 1. The profile of patient (a) Frontal view (b) Lateral view

Fig 2. Intraoral view (a) frontal (b) right side (c) left side

On the frontal facial view, the mandible appeared to be deviated slightly about 3 mm to the right. There is a pain when load testing was applied by placing cotton roll on anterior and posterior teeth, after 4 minutes. The endfeel distance was elastic. There is pain when palpating on right temporalis posterior, right medial pterygoid, also clicking sound and pain when the patient opened his mouth.

Based on anamnesis and clinical examinations that had been done, the patient was diagnosed as having local muscle soreness. The treatment plan was muscle exercise and fabricating of full occlusal splint.

The first step was training the patient to do masticatory muscle exercise, which is N-position movement. The patient told to place his tongue on the roof of the mouth and keeping the tongue thereat thereby defining an N-position; opening and closing the mouth several times while maintaining the N-position thereby defining a series. A series consists of four to six times, two series in a day [4].

After that, taking registration both maxilla and mandible arch for fabrication of full occlusal splint using alginate. The cast model was mounted on articulator in centric position. Opening the occlusal vertical dimension of the articulator by extending the incisal pin downward 4 mm. Thus, there is interocclusal space 4 mm anteriorly and $1^{1}/_{3}$ mm posteriorly [5].

Fig 3. Fabrication of full occlusal splint (a) Mounted model on articulator with extending the incisal pin. Note the marking pencil on facial of maxillary teeth (b) Wax model of splint

The next step was making wax model on maxilla with horse shoe form and the occlusal of maxillary teeth was covered 1-2 mm coronally on facial and 3-4 mm on lingual [5,6]. A proper occlusal splint should be made of highly polished hard acrylic resin and should provide smooth, wide areas of continuous occlusal contact for all opposing teeth. It should not have any occlusal indentations or cuspal impressions into which opposing teeth can lock and exert heavy lateral or thrusting forces [5]. The occlusal surface is flat except for two inclined planes placed labial to the canine teeth. It is not necessary for all cusps on opposing teeth to contact the flat surface if this causes surface of the splint to be too irregular [7].

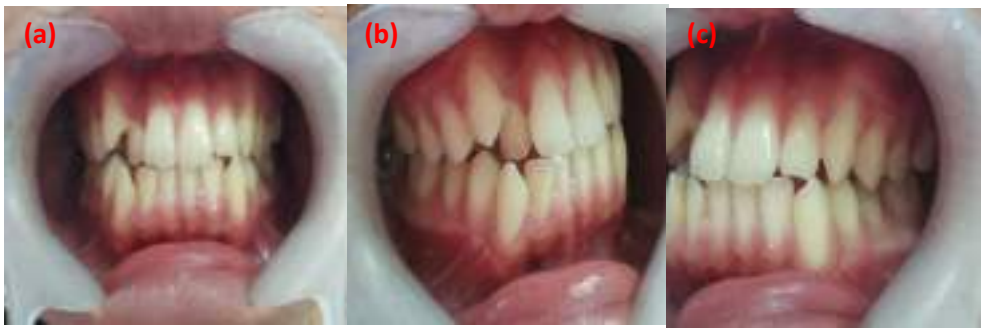

Fig 4. Full occlusal occlusal made by hard acrylic. The surface of splint not contact with all cusp of antagonis teeth due to malocclusion (a) frontal view (b) lateral view

The full occlusal splint was instructed to be wore all day and night except meal time for less than four mo nths. Then, the patient was recalled after next two weeks to maintain the progress of treatment periodically.

DISCUSSION

Occlusal splint is considered as a conservative and a reversible therapy for patients with TMD, reducing or even eliminating the pain [8]. There are two major orthopedic appliances that are commonly used for management of TMD: repositioning and stabilizing splints. Stabilization appliances, also termed 'flat plane', 'muscle relaxation splints' or occlusal splints', are designed to provide joint stabilization, protect the teeth, relax the elevator muscles, redistribute forces and decrease bruxism [9]. Stabilizing splints are thought to stabilize physiologically static and dynamic occlusion, relax the masticatory muscles, and stabilize the physiological stress relationships in joint structures. However, successfull treatment with splints may also be influenced by physiological effects and spontaneous remission of the symptoms [10].

The occlusal splint made by hard acrylic resin because it appears more effective in reduction of the muscular hyperactivity than the soft occlusal splint. Partial occlusal splint can increase the risk of irreversible dental migration (extrusion, intrusion, and laterotrusion) resulting from the absence of stabilization with antagonis arch. Besides of that, partial occlusal splint has possibility to be inhalated during sleep and only can be used in very limited time. Thus, the full

occlusal splint are therefore recommended. However, wearing the full occlusal splint must not exceed a few moths because with his parafunctional habits, the patient gets used to the occlusal splint and a negative dependence can be created [11].

The splints should reduce the load on the temporomandibular joints by modifying the location of clenching along the occlusal arch. Indeed, when compared with a maximum clenching performed on the posterior teeth, a maximum clenching on the anterior can theoretically increment the load on each temporomandibular joint. Moreover, when the activity of temporal muscles is relatively larger than the activity of masseter muscles, the same bite force will provoke a larger load on each joint [12]. Thus, a well constructed full occlusal splint not only can reduce TMD pain, but reduces the electrical activity of the anterior temporal and the masseter muscles, and provides a balance between both sides of the muscles [8].

RESULT

After insertion of full occlusal splint and muscle exercise for two weeks, the patient felt that the chief complaint was getting better, the pain was reduced, also clicking sound was disappeared. There is increment of opening mouth distance over periodic control. However bruxism habit was still remained.

CONCLUSION

Full occlusal splint can be used as alternative of treatment for patient with local muscle soreness.

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SL 1.4

CASE REPORT

Impression Technique Using Split Impression Tray in Scleroderma's Patient (Case Report)

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ABSTRACT

Background: *Prosthetic treatment for scleroderma's patient require special attention, because it also manifest in oral cavity, facial, and hand/finger. Scleroderma is a progressive autoimmune disease of the connective tissue, characterized by the formation of scar tissue (fibrosis) in the skins and organs of the body resulting in the thickness and stiffness of the areas involved. Clinically patients with scleroderma have a classic orofacial signs and symptoms, like a pinched nose, thin atrophie lips with tight perioral skin, microstomia and limitation of mouth aperture. With this condition, the first challenge for the prostodontist is how to make preliminary impression.* ***Purpose:*** *This case report aim to describe how to make preliminary impression using a split impression tray.* ***Conclusion :*** *Limited mouth opening often complicates and compromises the prosthodontic patient's treatment. The overall bulk and the height of impression trays make the recording of impressions exceptionally difficult, if not possible, because the paths of insertion and removal of impressions are compromised by lack of clearance. A split impression tray can be used to make an impression for patient with limited mouth opening.*

Keywords : *microstomia, sectional tray, scleroderma*

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BACKGROUND

Prosthetic patients with history of certain systemic or autoimune diseases are require special attention, especially if there are manifestations in their oral cavity. For example in scleroderma's patient, because it manifest in oral cavity, facial, and hand/finger. Scleroderma is a rheumatic autoimmune disorder of the connective tissue, characterized by the formation of scar tissue (fibrosis) in the skin and organs of the body, which result in thickness and firmness of the areas involved. Clinically patients with scleroderma have a classic orofacial signs and symptoms, like a pinched nose, thin atrophie lips with tight perioral skin, microstomia and limitation of mouth aperture. With this condition, the first challenge for the prostodontist is make preliminary impression. This case report describes how to make preliminary impression using a sectional impression tray.

SCLERODERMA

The word "scleroderma" comes from two Greek words: "sclero" meaning hard, and "derma" meaning skin. Scleroderma is typically described as a rheumatic autoimmune disorder of the connective tissue, marked by a change in the skins, blood vessels, skeletal muscles, and internal organs. Scleroderma is characterized by the formation of scar tissue (fibrosis) in the skins and organs of the body, which result in thickness and firmness of the areas involved. The disease has been called "progressive systemic sclerosis," but the use of that term has been discouraged since it has been found that scleroderma is not necessarily progressive. The disease varies from patient-to-patient. [1,2,3]

Clinical Manifestation

There are two main types of scleroderma: Localized and Systemic. The localized forms are morphea and linear. They affect only the skins (and sometimes the underlying tissues) but do not affect the internal organs, or reduce one's life expectancy in any way. The widespread type of scleroderma involves internal organs in addition to the skin. This type, called systemic sclerosis, is subcategorized by the extent of skin involvement as either diffuse or limited. The diffuse form of scleroderma (diffuse systemic sclerosis) involves symmetric skin thickening of the extremities, face, and trunk (chest, back, abdomen, or flank) that can rapidly progress to hardening after an early inflammatory phase. Organ disease can occur early on, be serious and significantly decrease life expectancy.[1,4]

The limited form of scleroderma tends to have far less skin involvement with skin thickening confined to the skin of the finger, hand, and face. The skin changes and other features of disease tend to occur more slowly than in the diffuse form. Because characteristic clinical features can occur in patients with the limited form of scleroderma, this form has taken another name that is composed of the first initials of the common components. Thus, this form is also called the "CREST" variant of scleroderma associated with Calcinosis cutis, Raynaud's phenomenon, Esophageal dysfunction, Sclerodactyly, and Telangiectasias[1,4,5] (see Figure 1).

Figure. 1 CREST syndrome[5]

Patients with limited systemic sclerosis can have variations of CREST with differing manifestations, for example, CRST, REST, or ST. Occasionally, patients can have initial illness with features of CREST that evolve into the diffuse form of scleroderma. Some patients have "overlaps" of scleroderma and other connective tissue diseases, such as rheumatoid arthritis,systemic lupus erythematosus, and polymyositis. When features of scleroderma are present along with features of polymyositis, systemic lupus erythematosus, and certain abnormal blood tests, the condition is referred to as mixed connective tissue disease (MCTD).[6]

Orofacial Manifestation

In addition to the signs elsewhere in the body, scleroderma exhibits some clinical symptoms in the mouth and jaws that are important for dental treatment. Subcutaneous collagen deposition in facial skin results in a characteristic smooth, taut, mask-like face and lack of expression. Nasal alae may become atrophied and result in "mouse-like" face. The lips become thin and rigid, producing microstomia. Due to the sclerotic changes in the tongue, it may become hard and boardlike, making difficult to speak and swallow. Tongue mobility was impaired because of the thickening and shortening of the lingual frenum. Absence of the taste buds were also noted. The soft palate was thinned and tauted, and could occur multiple telangietacsias. In some patients, mandibular bone resorption may be encountered in edentulous areas. Resorption of the mandible caused by facial skin tightening, constricting blood vessels and muscles that direct the continuous pressure on

the mandible. In case of involvement of the temporomandibular joint, the narrowing of oral opening increases. Other important orofacial manifestations include fibrosis of the salivary and lacrimal glands, and the symptoms consistent with dry mouth or xerostomia. Patients may develop dry eyes with keratoconjunctivitis sicca or xerophthalmia. Inadequate salivary flow compromises buffering within the oral cavity and allows the acidity produced by bacterial metabolism and GERD to erode the dentition. [7,8,9,10]

The most common oral radiographic manifestation of scleroderma, which occurs in about two-thirds of patients, is an increase in the width of the PDL around the teeth. Widening of the PDL affects both anterior and posterior teeth, although it is more pronounced around the posterior teeth. Enlargement of the PDL space is related to the fibrotic thickening of the PDL. Accentuation of periodontal disease also occurs, believed to be due not only to poor oral hygiene but also to the vascular changes associated with the disease itself. With disease progression may come a uniform widening of the periodontal ligaments of all teeth. Oral hygiene of scleroderma's patients are generally poor (many of caries, calculus, gingivitis, gingival recession) because of the difficulty cleaning the oral cavity due to stiff and retracts finger (sclerodactily) as well as a result of erosion caused by acid reflux. Due to fibrosis and atrophy of the major salivary glands, they are also experience xerostomia that can increase the risk of caries, periodontal disease, as well as fungal infection.[8,10,11]

Oral manifestation in patient with scleroderma[12]

Xerostomia	Fibrosis of the soft and hard palate
Enamel erosion	Periodontal ligament space widening
Microstomia	Mucosal telangiectasias
Increased risk of periodontal disease and dental caries	Trigeminal neuralgia
Mandibular resorption	Dysphagia

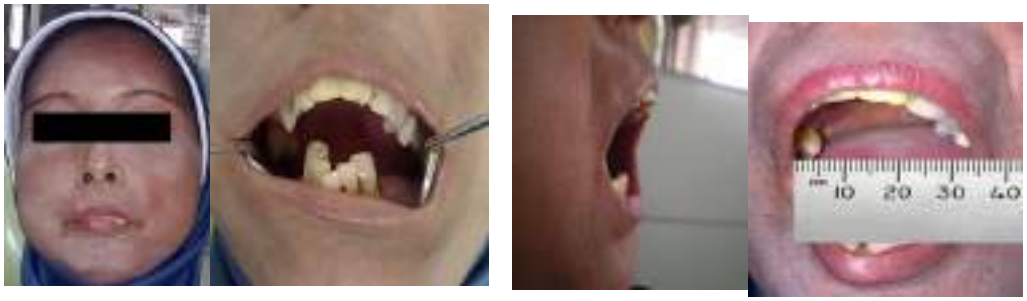
CASE REPORT

A 37-year-old female patient was referred by General Dentist to the Prosthodontics Department Faculty of Dentisry University of Indonesia for prosthetic rehabilitation. Patient was suffering from scleroderma since 2004. There were no complications to internal organs. Clinical manifestation that occur in this patient was sclerodactily that causes impairment of mobility (Figure 1). Additionally began to happen stiffness in the joints, especially the knee joints.

Figure 1. Sclerodactily of fingers

Extra-oral examination show signs and symptoms of a classic orofasial of scleroderma. There were pinched nose, thin lips with tight perioral skin, microstomia and limited mouth opening of 33 mm (Figures 2). Examination of intra-oral and panoramic radiograph showed the presence of diseased, mobile and

missing teeth, plaque deposits, and gingival recessions around the remaining teeth (Figure 3 and 4). Tongue mobility impaired due to thickening and shortening of lingual frenulum (Figure 4)



Pinched nose Thin lips with tight peioral skin Microstomia and Limited mouth opening of 33 mm

Figure 2. Extra oral signs

Maxillary Mandibulary

Right side Front Left side

Figure 3. Intra oral

Figure 4. Panoramic radiograph

Figure 5. Thickening and shortening of lingual frenulum

Because perioral skin had lost its elasticity and there was limited mouth opening, it's difficult to make impressions using conventional methods. Smallest metal stock tray (size "5") and also sectional plastic stock tray could not be used. So, modified sectional impression trays were fabricated by duplicating a size "5" maxillary and mandibular metal stock tray in acrylic (Figure 6).

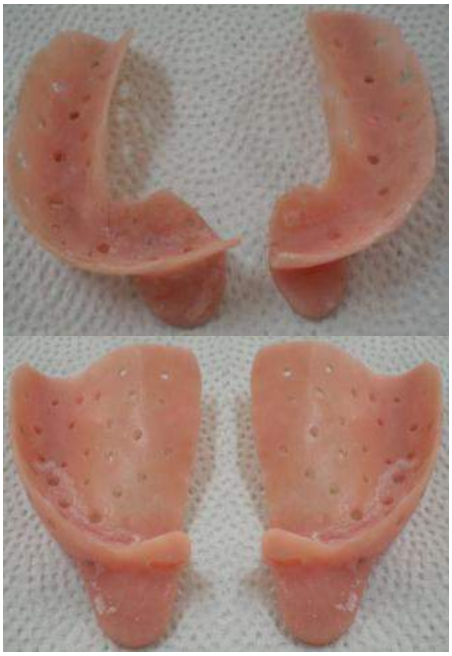


Figure 6. Maxillary and mandibular modified impression tray

The first trays for each jaw (No. 1) were cut anteroposteriorly in 2 sections with a disk following a line that pass to the right side of the midline. The larger section of the tray included the handle. This tray was made as wide as the mouth opening of the patient to allow ease of insertion to the oral cavity. At the same time, it was large enough to register as much of the oral structures beyond the midline as possible. The second trays (No. 2) for both arches were cut anteroposteriorly to the left side of the midline. The width of these trays were similar to the No. 1.

The preliminary impression of the left side of the maxillary arch was made with alginate (Aroma Fine Plus, GC) by using tray No. 1. Tray No. 2 was used to accomplish the impression of the right side (Figure 7). First, the left side of the impression was poured with die stone type IV (Glastone® 2000, Dentsply). After it was set, the left side of the cast was positioned on the right side of impression and poured carefully not to displace the cast seated in the impression and held with finger pressure until stone set. The mandibular impression was made and poured in the same manner (Figure 8).

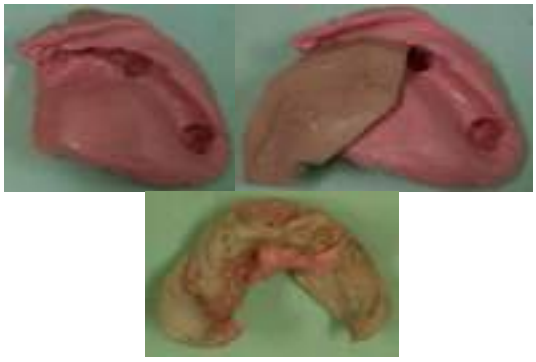


Figure 7. Sectional prelimenary impression

Figure 8. Completed maxillary and mandibular preliminary cast

The treatment plan of this patient was included extraction for mobile and disease teeth (17, 24, 27, 31, 32 and 42), non vital pulpectomy in 25, vital pulpectomy in 33 and 43 for overdenture abutment, and composite filling in 13 and 23. In maxillary we made removable partial denture and in mandibular we made telescopic overdenture with short coping with post in 33 and 43 (Figure 9). Second impression was made with individual tray from acrylic with size maximum to the mouth opening. Maxillary was taken with alginate and mandibula with rubber base (Figure 10). Jaw relations record and trial of waxed up denture was done by conventional method. Maxillary removable partial denture and mandibular overdenture were acrylised using conventional procedure. Patient was satisfied with her protheses (Figure 11).

Figure 9. Short coping with post in 33 and 43

Figure 10. Second impression

Figure 11. Insertion of the denture

DISCUSSION

Prosthodontic treatment in scleroderma's patients with manifestations in various organs, especially in the oral cavity, require special attention and proper treatment plan. There are some difficulties encountered in the effort of making prostheses. Their oral hygiene are generally poor with a lot of caries, calculus, mobile tooth, and gingival recession. This may be due to difficulties to brush their teeth because of the condition of their fingers which sclerodactily and the presence of esophageal reflux. Scleroderma's patients also have microstomia that make challenge at all stages in prosthodontic treatment, right from the preliminary impressions to insertion of prostheses. Because such patients have small oral opening it may be extremely difficult to make impressions and fabricate dentures using conventional methods.

Recommended techniques to make preliminary impressions for patients with constricted oral openings have included (1) the use of stock impression trays of each half of the mouth for sectional impressions with heavy and light body silicone impression materials, (2) flexible impression trays made with silicone putty. The use of modeling plastic impression compound has also been described to make sectional impressions of edentulous arches. The mechanisms to connect sectional custom trays include hinges, plastic building blocks, orthodontic expansion screws or locking levers. Individual trays, except for the horizontal locking system, were connected only at the handle.[13]

A sectional stock tray system for making preliminary impressions was described by Robert. J. Luebke. Improved fit of the tray was possible for the individual dental arch because the two halves separately fitted to each side of the arch thus achieving better anatomical adaptation to the teeth and soft tissues. The tray halves were connected extra orally, and the impression was made. Using the above mentioned technique, impression making may be easier for patients with constricted oral openings because the two halves could be inserted independently, removed separately and reassembled extra orally. [14]

There are some modification of sectional tray such as Cura et al.,[15] Yenisey et.al.,[16] Geckili et al.,[17] and others made. In this case report, we made an individual stock tray from acrylic. Two stock trays were symmetrically reduced the minimum amount necessary to allow oral insertion, as reported by Moghadam.[18] The impressions were then made using irreversible hydrocolloid (Aroma Fine,GC). Die stone was poured into one of the impressions. The resulting cast was seated on the second impression. The remaining empty section of the second impression was then filled with stone.[18,19]

Patient with microstomia may undergo surgical enlargement of oral aperture, but it has its own adverse effects that a scar may result. Without surgical intervention, it is very difficult to perform prosthetic treatment especially when the mouth circumference length is less than 160 mm square. Conservative management of microstomia has been described in the literature and includes the use of microstomia orthoses to expand the oral opening. Limited mandibular

opening can pose a major dental problem and the general difficulties of reduced access become even more apparent when providing prosthesis. The overall bulk and the height of impression trays make the recording of impressions exceptionally difficult if not impossible because the paths of insertion and removal of impressions are compromised by lack of clearance. The use of sectional impression, which may be recorded in two or more parts and then relocated outside the mouth, is a useful technique to adopt for such patients. The trays can be provided with fins, pins, Lego pieces stepped or butt joints to facilitate relocations. Use of flexible impression tray is another option. [20]

Overdenture design that was chosen was telescopic overdenture, where the remaining teeth were kept covered with a coping to protect it from caries. This design was chosen because the patient has difficulty in maintain her oral hygiene due to the condition of her fingers. We also selected short coping with post because limited space available due to microstomia. Sectional and collapsible dentures were generally used to provide prosthodontic treatment to patients with limited intra-oral access. But finger deformities (sclerodactyly) could make denture insertion and removal difficult. So by considering the condition of her fingers, we decided to make a conventional acrylic denture with a maximum size that could fit into her oral cavity. For the second impression, we made conventional individual tray from acrylic with size maximum to the mouth opening. The impression was taken with alginate for maxila and rubber base for mandibula.

Periodic control is very important to see the changes that occur with the passage of the disease, so we can do adjustment if necessary. The use of mechanical toothbrush, caregiver trained in oral hygiene in case of inability of patient, dietary counseling, and stretching exercise to maintain oral opening also can be recommended for patient with scleroderma.[12]

CONCLUSION

Limited mouth opening, that can be happened in scleroderma's patient, often complicates and compromises the prosthodontic patient's treatment. The overall bulk and the height of impression trays make the recording of impressions exceptionally difficult, if not possible, because the paths of insertion and removal of impressions are compromised by lack of clearance. Sectional impression tray can be used to make an impression for patient with limited mouth opening.

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SL 1.5

RESEARCH REPORT

Effect of Denture Disinfection with Microwave to Dimensional Change and Water Sorption

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ABSTRACT

Background: *After denture insertion dentist always give an instruction to clean the denture. Disinfection methods with microwave is an effective method because it is lethal to several microorganism, does not change colour, and non allergic. Not too many research about the effect of microwave to chemical properties of denture base acrylic resin heat polymerization.* ***Purpose:*** *This study aims to determine the effect of disinfection time with microwave to dimensional change and water sorption of denture base acrylic resin heat polymerization.* ***Methods:*** *This study was laboratory experimental, twelve disk-shaped of heat cured resin acrylic with diameter 50 mm x 2 mm that sterilized by 800 Watt microwave irradiation. The samples were made of diskshaped acrylic of resin heat polymerization 50 mm x 2 mm and measuring stick 65 mm x 10 mm x 2,5 mm. The total number of samples are 24 samples divided to 6 groups. Every two groups (A-B) immersed for 3 minutes, (C-D) immersed for 4 minutes and (E-F) control using 800 Watt microwave. These samples were calculated by weight of water and dimensional measurements, then were calculated by statistical analysis ANOVA test, LSD and pearson test. There were significant results among the tested groups.* ***Result:*** *The result of this study showed that water sorption in 3 minutes cleaning with micowave 800 Watt was in tolerance threshold and effectively clean denture base acrylic resin heat polymerization.*

Keywords: *Disinfection, denture, microwave, dimensional change, water sorption*

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BACKGROUND

Complete dentures are the most common treatment for total loss of teeth in a dental arch. Denture base were divided into two groups, they were a logam and non logam denture base. Today, we commonly used non logam denture base like polymer denture base.[1,2] Heat-cured acrylic resin polymethyl methacrylate is the most used and characterized as being strong, copying oral tissue appearance, showing low water resorption, and having good dimensional stability. Although acrylic resin is the most commonly used material, it is subject to polymerization shrinkage and distortion.[3] Takashi et al found that water molecules spread between the macromolecules of material, forcing them apart. This behaviour affects dimensional behaviour and denture stability; therefore, water sorption and solubility of these material should be as low as possible.[4]

After denture insertion dentist always give an instruction to clean the denture. Dentures can be cleaned mechanically, chemically, or through a combination of these. [5,6] Microwave disinfection has been used as an alternative method to disinfection because is lethal to several microorganism, does not change colour, and non allergic. [7] It is known that denture cleansing can be done in many ways, one of them is chemically. Cleansing by chemical can be done using natrium hypochlorite, acid, effervscent, chlorhexidine, and microwave disinfection. Using microwave disinfection is widely used after a few studies showing it has significant effect on denture hygiene. [8]

Acrylic resin tends to be hydrofilic, the higher temperature of water may have enhaced the diffusion of the remaining residual monomer molecules to the active sites of the polymer chain.[6] Consequently, further polymerization may have occured, thus increasing the dimensional change of the acrylic denture base.[11] Pavan et al (2005) proved that the dimension change depends on the time and microwave disinfection used.[9] Using the microwave 604 Watt for 10 minutes causes dimension change on maxillary basis dan also the cast, which is affected by the time and microwave disinfection used. 500 watt microwave use for 3 minutes does not create any significant change.[10] Fleck et all (2007) shows that repeated disinfection with a 690 watt microwave for 6 minutes causes adaptation changes on denture basis.[11] Hussen et al (2008) states that disinfection using water bathed microwave on 650 Watt for 6 minutes causes linear dimentional change as much as 0,35mm.[12] Ritonga (2013) states that the use of an 800 Watt microwave for 3 minutes is effectively cleansing and does not cause significant dimentional chage, but if used for 4 minutes can create a significant dimentional change for exceeding the 0,32% threshold form the initial sample measurement.[13]

MATERIALS AND METHODS

This type of research was experimental laboratory, the sample was made of heat cured acrylic resin measured 50 mm x 2 mm and 65 mm x 10 mm x 2.5 mm.[11] The total number of samples are 24 samples divided to 6 groups. Every two groups (A-B) immersed for 3 minutes, (CD) immersed for 4 minutes and (E-F)

control using 800 Watt microwave. These samples were calculated by

Fig 1. Samples for watersorption

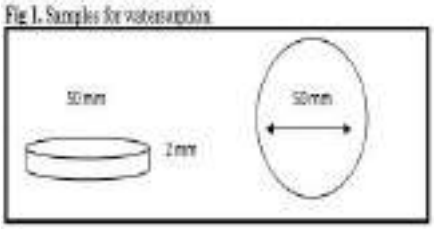
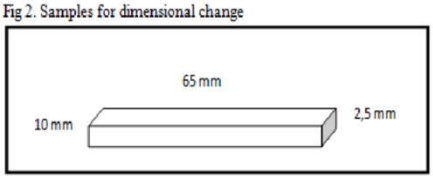


Fig 2. Samples for dimensional change



weight of water and dimensional measurements, then were calculated by statistical analysis ANOVA test, LSD and pearson test to have a result of correlation between the water sorption and dimensional changes for each group.[10]

RESULTS AND DISCUSSIONS

Table 1. Anova and LSD Test for mean of water sorption of group A, B, and C

Group	n	Water sorption		p
		mean	SD	
A	4	0,022	0,009	0,001*
B	4	0,152	0,084	
C	4	0,370	0,053	
Mean of water sorption :				
Group A with Group B				0,011*
Group A with Group C				0,001*

*significant

Table 2. Anova and LSD Test for mean of dimensional change of group A, B, and C

Group	n	Water sorption		p
		mean	SD	
A	4	0,078	0,011	0,001*
B	4	0,185	0,034	
C	4	0,344	0,093	
Mean of water sorption :				
Group A with Group B				0,029*
Group A with Group C				0,001*

*significant

Table 3. Pearson test for correlation between group A, B, and C

Group	Correlation	
	r	P
A	-0,238	0,762
B	0,615	0,385
C	0,526	0,474

Table 1 shows that there are significant differences in water sorption (p = 0,001), hence there is effects of time taken for disinfection with microwave disinfection towards heat cured acrylic resin denture base water sorption properties based on LSD test. Significant changes was found between group A and B (p = 0,001), and group C (p = 0,001).

Table 2 shows that there are significant difference in dimentional changes (p=0,001), the time on disinfection and microwave disinfection effects dimentional changes on heat cured acrylic resin denture base and based on LSD test significant difference is found between group A and B (p=0,029), and also group C (p=0,001). Looking at the p scores on every group disinfection if comparet to group A, there are significant difference, but in group B with mean score still on tolerated threshold, are more significant if compared to group C. This may be correlated to the disinfection time using microwave.[13] Disinfection for 4 minutes with the base inside the microwave longer, will cause more friction between water molecules which will create heat.[9] This makes higher amount of water molecules diffusing to the base, and will cause larger changes in the base compared to time length used lower than 4 minutes.[12]

Table 3 shows correlation between water sorption and dimentional change on group A (r=-0,238 and p=0,762), group B (r = 0,615 and P = 0,385), and group C (r = 0,526 dan P = 0,474). Based on statistical analysis for every group shows that there are no significant correlation (p>0,05), but the correlation of coefficient score (r) in group B and C is a positively strong correlation, especially on group B. This shows there are tendency of one way relationship between water sorption and dimentional change, which means if the amount of water sorption is large the dimentional change will also be large, where as the correlation of coefficient score (r) on group A is negative which shows the relationship between water sorption and dimentional change is weak.[14] The result of this study shows the longer the lenght of time on disinfection and the microwave disinfection used is very effective on water sorption and dimentional changes in heat cured acrylic resin denture base.

Significant relationship is not seen on Group A,B and C, because the P score found on every group is more than >0,05. This is probably caused by data collected for correlation test is accurate for water sorption and dimentional change variable are both individual data from different samples, so the date does not have the same tendencies, because while some of the sample is used for water sorption measurement, the rest is used for dimentional changes measurements and also because there is only a minimum amount of samples.[15]

The results obtained under the conditions of this study support the hypothesis that dimensional stability could be affected by immersion in water during microwave disinfection.[16]

The dimensional change may be related to the entry water among the polymethylmetacrylate molecules when absorbed during the polymerization. Or it may be related to the fact that water started to boil after approximately 90 seconds of microwave disinfection.[17]. The higher temperature of water may have enhanced the diffusion of the remaining residual monomer molecules to the active sites of the polymer chain.[18]

Microwaves cause the water molecules to vibrate 2 to 3 billion times / second, thus producing fricition that results in the heating of the water. and the high temperatures associated with the movements of molecules probably cause the water molecules to diffuse more rapidly into the polymer. The uptake of water may cause swelling that affects the dimensions of the restoration. [19,20]

CONCLUSIONS

The result obtained from this study, water sorption when compared to the control group is quite significant on 3 and 4 minutes, but dimentional changes in 3 minutes is still in the tolerance threshold on heat cured acrylic resin denture base.

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SL 2.1

CASE REPORT

Orthodontic Treatment with Removable Appliance

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ABSTRACT

Background: *Popularity of orthodontic treatment with fixed appliance has played a significant role in decreasing the orthodontic treatment with removable appliance. Most of dentist and orthodontist were not sure about the capability of removable appliance in overcoming problems of malocclusion of their patients. Fixed appliance was believed as the only and best tools to handle almost all of orthodontic problems even the simple one like Angle class I malocclusion with mild crowding. This article was written with a purpose to remind us on the existency and capability of orthodontic treatment with removable appliance which is probably less expensive with still more predictable result as long as the diagnosis done correctly. Through the intensive digging of orthodontic literature and some application in simple case of malocclusion, it was revealed that the result still quite satisfying.* ***Conclusion:*** *Based on the facts found it was concluded that removable appliance should be considered as an alternative in orthodontic treatment as indicated*

Keywords: *orthodontic treatment, removable appliance*

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BACKGROUND

As known, the orthodontic treatment not only using fixed appliances, but also with removable appliances. Generally, the appliance is separated into three types: simple removable appliance, myofungsional appliance and removable retention. As the name implies, this appliances can be removed or inserted by patients themselves.[1,2] This causes the appliance can not work optimally when the patients more often to take off than to wear it in the mouth. For appliance used in orthodontic treatment, there are certain characteristics that need to be considered, namely: due to its ability to be removed by patients themselves,] their use is considered as part-time, so it can work as expected when its use is continuous and for these, patients should have enthusiasm and cooperative in wearing it. This is possible when design of the appliance such that it can be tolerated by the patient.[1,3] So this should be easily installed and removed from the mouth and when positioned in the mouth, the appliance must be stabilized in a good position, so it felt comfortable by the patient. The appliances should not cause pain and are too big / thick that it interferes with the patient as well.
Most of these appliances are used in the upper jaw and only in certain cases, it can also be used to produce a simple tooth movements in the lower jaw. The use of the appliance in the upper and lower jaws simultaneously will cause a feeling of fullness in the mouth and uncomfortable for the patient, so it is usually not recommended. Based on this consideration, the main indication of the appliance is especially for the treatment in the upper jaw when the conditions in the lower jaw does not need treatment or treatment with extraction only and treatment with fixed appliance (combination). [2.4] In connection with the movement of teeth, removable appliance has limitations, in the sense that not all types of tooth movement can be achieved. Some types of tooth movement can be done easily, others with a certain difficulty level and even other types of movement is not possible at all to do with this appliance. (Figures 1 and 2)

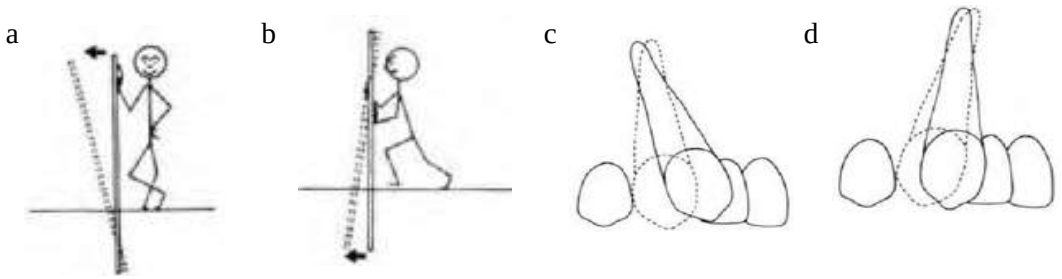

Figure 1: a) Tilting movement can be done easily using the removable appliance, b) complex movement (roots movement) is more difficult to do using removable appliance, C) canines malposition who have mesial inclination will be corrected properly (retracted) by using removable appliance, d) canines malposition who have distal inclination is not suitable for correcting (retracted) with removable appliance.[1]

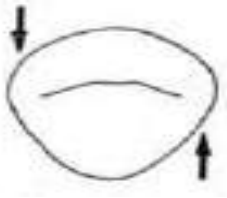

Figure 2 Rotational movement, especially on canines and premolars, can not be done with removable appliance.[1]

However, rotational movement of the teeth that have flat surfaces such as incisors is still possible with a simple removable appliance (Figure 3). Tooth with up to approximately 45° rotation still possible to be corrected through the application of force couple with simple removable appliance. The apical movement and bodily tooth movement is also not possible with simple removable appliance, while the intrusive and extrusive movement are very difficult to do using simple removable appliance and generally should be helped with the use of button that is bonded directly to the tooth to be moved. The tooth movement commonly done with a simple removable appliance is tipping, especially in antero-posterior direction dan this can be on one or more teeth (Figure 4). When these movement is used for correction of anterior cross bites, then a simple removable appliance is often combined with an additional bite raiser to facilitate the movement of the teeth toward labial. Conversely when it is used to generate the tipping movement to palatal or lingual, then this simple removable appliance can be used without bite raiser, but it should be noted that this tipping movement to the palatal can be accompanied by deepening the bite (increased overbite), as a consequence of the moments resulting from force applications from labial direction (Figure 4).[2,5] In this situation, selection of cases with considering to the overbite needs to be done prior to the application of tipping force to the palatal or lingual. For cases with deep curves of spee, the use of simple removable appliances is usually not possible, but the use of a bite raiser can help, through the extrusion of molars / posterior teeth. Orthodontic cases with severe crowding, which has an arch length discrepancy of 9 mm, generally require extractions and tooth movement with the aim of space closing. In this case, the use of simple removable appliance is very difficult except in cases of diastema with increased overjet, where the space closure is part of the tooth movements to reduce that horizontal overlap.[1]

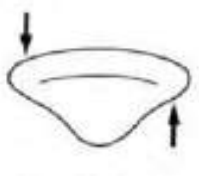

Figure 3 Tooth with a flat surface such as central incisors and laterals that were rotated can be corrected with simple removable appliance.[1]

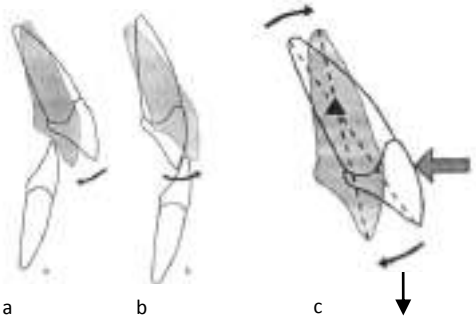

Figure 4 Tipping movement toward labial (a) and palatal or lingual (b) can be generated easily using simple removable orthodontic appliances. Tipping movement generated by the application of force from labial direction will produce a clockwise moment of rotation accompanied by deepening the bite (increased overbite) (c).[1]

The limitations of movement generated by the simple removable appliance is caused by the patterns of force application exerted by most of these appliance through its active components (clasps).[2] Application of force generated by most design of the clasps of removable orthodontic appliance is in the form of single contact point, ie the part of clasp in contact with the tooth surface which, when activated, will cause the tooth tipped / tilted to the mesial, distal, buccal, lingual or palatal. Another consideration is that the degree of wire flexibility required for insertion and removal of the appliance from the mouth as well as to provide a light orthodontic force to the teeth cause difficulty or even impossibility of maintaining a constant point of force application in the correct position.

This article was written with the aims to raise awareness of non-specialist practitioner colleagues about the use of removable orthodontic appliances in orthodontic treatment for simple cases. The use of simple removable orthodontic appliances accompanied by proper case selection in a compliance patients is expected to inspire its benefit in daily practice.

CASES AND CASE MANAGEMENT

Case 1:

KY, a female patient aged 22 years and 5 months came to the Dental Hospital School of Dentistry Uiversity of Prof. Dr. Moestopo with complaints would like to have her upper front rotated teeth corrected (figure 5). In extra-oral examination, seen in the anterior region, the right and left central incisor experienced malposition in distolabio version. The amount of arch length discrepancy in the upper jaw is -2.5 mm, the overjet (anterior horizontal overlap) is normal and the overbite (anterior vertical overlap) is 4.5 mm. Diagnosis of the case is dental malocclusion Angle class I. The treatment plan is to reduce the overbite using simple removable orthodontic appliance with anterior bite raiser. After overbite correction, the active labial bow is activated while at the palatal side, a passive closed bumper was added to maintain the position of mesial aspects of central incisors. (Figure 6). Post-treatment, malposition of the central incisors was corrected nicely (figure 7).

a b

Figure 5 The upper right and left central incisors are seen having malposition (disto-labio version). (Photo: private collection)

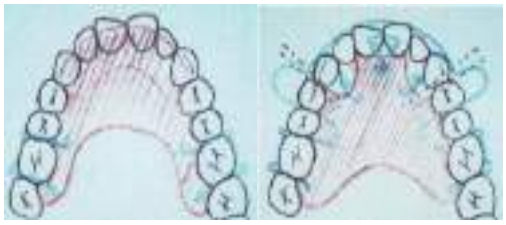

Figure 6. A Removable orthodontic appliance with anterior bite raiser for bite correction in this case, followed by the activation of the active labial bow for correction of distal aspects of the central incisor. The teeth 11,21 are rotated to labial (disto-labial version). Photo: private collection

Figure 7. Post-treatment - the disto-labio version on central incisors is corrected. Photo: private collection.

Case 2

MKB, a 13-year-old female patient came to the Dental Hospital School of Dentistry University of Prof. Dr. Moestopo with complaints would like to have orthodontic treatment for her upper front teeth. In intra oral examination, a cross bites (palato version) seen on the teeth 12 and 22 (Figure 8). The arch length discrepancy in the upper jaw is -5 mm. The overjet (anterior horizontal overlap) and overbite (anterior vertical overlap) are normal. Diagnosis of the case is dental malocclusion Angle Class I type 3 modification of Martin Dewey. The treatment plan is to correct the anterior cross bites using removable orthodontic appliance with posterior bite raiser (figure 9). The activation of active closed bumper on teeth 12 and 22 at the palatalside allow the correction the anterior cross bites, by pushing the teeth 12 and 22 toward labial (Figure 10). Post-treatment, malposition of the upper right and left lateral incisors were corrected and smiles changes that accompany the correction was as patient expectation (Figure 11)

a b

Figure 8 The upper right and left lateral incisors are in malposition (palato version) (a) maxillary occlusal view, (b) fontral view of intra oral photograph of the patient. Photo: private collection.

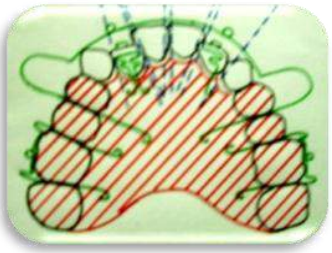

Figure 9. The treatment plan is correction of anterior cross bites using removable orthodontic appliance with posterior bite raiser. Active bumper used to push the teeth 12 and 22 to the labial direction. Photo: private collection.

a b

Figure 10. Intra-oral photographs, occlusal view (a) and frontal view (b) show the result of cross bite correction with a simple removable orthodontic appliances. Furthermore, the position of the teeth can be improved by activation of the active labial bow. Photo: private collection.

a b

Figure 11 Patient's smile before treatment (a) and after treatment (b) shows the important of correction of dental malposition. In this case, correction of cross bites can create a confident smile of the patients. Photo: private collection.

DISCUSSION

An efficient and effective simple removable orthodontic appliance is an appliance that is designed carefully, taking into account the treatment objectives to be achieved. Orthodontic appliance can be viewed as a drug in the treatment of a disease, so that proper diagnosis is needed as the basis for preparing a treatment plan so that treatment goals can be achieved. As with drugs, orthodontic appliances will be effective only when the patient shows co-operative usage.[6]

In the orthodontic treatment, the magnitude and direction of force is a factor that we can control to help achieve the goal of orthodontic treatment. We control the magnitude and direction of force through the design of active part of the appliance (clasps) used in a simple removable orthodontic appliance. Thus a simple removable orthodontic appliance that is efficient and effective must consider the following factors: the selection of the active components, passive components including retentive or anchorage clasps and the base plate which can improve patient co-operation in its usage so that the success of treatment can be achieved. In this regard, a simple removable orthodontic off simple should also have qualities such as: simple and easy to clean, cheap and easy to make, it is painless and does not interfere with the function of speech of the users, easily installed, activated and removed and is quite aesthetic and capable of producing the desired tooth movement.

Providing a simple removable orthodontic appliance that is comfortable for the patient also includes consideration to only use active components as needed. The use of active components in excess will make the removable orthodontic appliance uncomfortable for users and will end up with the loss of co-operation. It will also result in failure of treatment because the treatment objectives will not be achieved. The usage of active components as required also means fully realize the advantages and disadvantages that exist in simple removable orthodontic appliance in producing tooth movement. In the end, the important thing here is related to the cases selection, since cases requiring complex tooth movements that are impossible to achieve with a simple removable orthodontic appliance, even if it used by patients who are co-operative, will not produce a correction as expected.

Selection of cases that provide great opportunities to succeed in orthodontic treatment using simple removable appliance is the case with mild crowding which is characterized by minimal or less than four millimeters arch length discrepancy which is clinically only be seen as mild dental crowding in the anterior region. In this case the space requirements can be obtained through interproximal reduction on the mesial and distal surface in minimum quantity with regard to dental midline on the upper and lower jaw, as well as right and left canine relationships in Angle Class I malocclusion. Another important factor to consider is the routine control or regular visit for activation the active component by the dentist. An appropriate design of active component in even a compliance patients will not work properly without regular activation. Activation on a simple removable orthodontic appliance must be done by a dentist, according to their competencies. Regular controls are usually carried out in a span of two to three weeks and this simple removable orthodontic appliance must be worn for at least six hours after activated in order to move the teeth effectively.

CONCLUSION

In the midst of the orthodontic treatment using fixed appliances, satisfactory results from treatment by simple removable orthodontic appliances is still possible if applied in an appropriate case. In this regard, a proper case selection will be the deciding factor, in addition to the correct design as requirements and regular controls. Orthodontic treatment with simple removable appliance included in the area of competence of a general dentist and can therefore be used in daily practice to handle cases of Angle Class I malocclusion with mild crowding.

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SL 2.4

CASE REPORT

Orthodontic Treatment Disharmony Dento Maxillare (DDM) by Extraction 4 First Premolare

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ABSTRACT

Background: *DDM is a type of orthodontic abnormalities that often in the present, this is already happening because of race mixture. Most orthodontic treatment with DDM disorder requires the premolar tooth extraction for supplying place. In this case report will be elaborated on the case of DDM.* ***Purpose:*** *Correction crowded teeth up and down, shifting the median line, cusp to cusp bite.* ***Case and case management:*** *Patients age 20 years with clinical appearances crowded the upper and lower teeth, shifting the median line, and cups to cups bite. Installation of fixed appliance roth 0,018 slots. The first stage of leveling and aligning with NiTi wire 0.012; 0,014; 0.016 and SS 0, 016. The second phase of canine retraction with elastic chain using wire SS 0.016 x 0.016. The third stage anterior retraction with T loop with wire SS 0.016 x 0.022. The fourth stage finishing and detailing the ups and downs of elastic and SS wire 0.016 x 0.022.The fifth stage of the passive phase with SS 0,017 x 0,025 Retention by Hawley retainer. Crowded up and down teth, shifting the median line, cusp to cups bites was correction.* ***Conclusion:*** *Overall all treatment goals have been achieved and patient was setisfied*

Keyword: *DDM, extraction, premolar*

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BACKGROUND

Disharmony Dento Maxillare (DDM) is a disporpotion between large teeth and dental arch. Etiology DDM is a hereditary factor. Clinical situation that can be seen with diastema thorough arch teeth when the teeth are small and dental arch normal, though rare. The situation is often encountered is a large tooth with normal dental arch or small teeth with small dental arch that caused a dental crowding. Although the DDM obtained crowded teeth but not all teeth crowding due to DDM. Typical signs of DDM from the anterior region, namely the absence of diastema physiological phases firstborn teeth will cause tooth crowding of permanent teeth when erupsi.[1]

Other clinical signs at the time of the permanent central insisivi would eruption, tooth root will repsobtion eldest central insisivi and eldest lateral insisivi so eldest insisivi lateral will be premature loss. The central insisivi permanently growing in the normal position due to get a pretty place. When the location of the permanent central insisivi normal not mean the cause is not a pure DDM but there are other causes. When insisivi will permanently lateral eruptions can occur two possibilities. First possibity lateral insisivi permanen resorbtion root of eldest canines so eldest canines will get premature loss and permanent lateral insisivi will grow in the normal layout because it's pretty space. Furthermore, the permanent canine teeth will grow beyond the arc (usually in buccal) for not getting enough place that has been partially occupied by permanent lateral insisivi. In cases with a shortage insisivi lateral distal side in contact with the permanent first molar mesial side. Second possibility is not resorbtion root permanent lateral insisivi but grew on palatal oldest canine. Furthermore, the permanent canines grow normally. [1]

Tooth extraction in the case of severe crowding will provide room for correction, greater stability of the final results of orthodontic treatment is done, and the resulting positive effect of changes in facial aesthetic patients. Tooth extraction in orthodontic treatment is a shortage of less than 4 mm when encountered savere protrusivi insisivi teeth, shortage of places 5 to 9 mm depending on the characteristics of the revocation of hard and soft tissue and a shortage of more than 10 mm of tooth extraction is always necessary. Extraction options are four first premolars.[2]

Extraction first premolar is the best option that is used to correct alligning anterior tooth crowding. Extraction first premolar on the age of the child's growth will give a spontaneous movement of the crowded teeth mainly mandible canine having a mesial angulation and maxillary canines located in buccal.[3]

CASE

Case History

Patients 19 years of Indonesian Javanese woman came to complain of crowded teeth and wanted his teeth trimmed with fixed orthodontic treatment. Extra-oral examination known type straight profile, type mesosefalik head, face and head shape is symmetrical, competent lips. Intra oral examination obtained relation neutroklusi left right canine and the

right molar relationship neutroklusi left cusp to cusp. Looks crowded teeth in the maxilla and mandible. Normal transverse relation except reverse bite in the region of 13 to 43 and 14 to 44. There is a shift of the midline of the face of the upper jaw and left 2 mm to 3 mm lower jaw to the right. Overjet - 2 mm (reduced) except in the 11 to 41 and 21 to 31 cups to cusp. Overbite normal bite 2 mm except 11 to 41 and 21 to 31 bites cusp.

Figure 1. The extra-oral photos before orthodontic treatment

Figure 2. The intra-oral photos before orthodontic treatment

DIAGNOSIS

Angle Class I malocclusion with anterior crowding RA and RB,cusp to cusp bite with median lines shift maxilla to the left and mandible to the right.

Continued examination

Discrepancy model of maxillary deficiency and a 12 mm lower jaw shortage of places 10 mm, 2 mm positif curve of Spee

Analysis Cefalometri

Analysis showed that the cefalometri in patients with facial type and type orthognatik straight profile (<85 FH-NP o, <NAP 4o). Maxillary

and mandibular relation to the skull base attribute class I skeletal pattern (<SNA 88o, <SNB 85o, <ANB 3 O)

Etiology

Possible etiology DDM, premature loss 52, 62, 81

The goal of treatment

Eliminating crowded anterior maxilla and mandible. Correcting the midline shift gears line up the midline of the face. Fixing cusp to cusp bite. Stabilization of care treatment.

CASE MANAGEMENT

Extraction of teeth 14, 24, 34, and 44 to provide rooms used for the correction of dental crowding the anterior and posterior. Installation of Pre-adjusted fixed appliance 0,018 slots, molar bands with Walding tube at 16, 26, 36, 46. Trans Palatal Arch for maxillary and mandibular lingual arch to be used as an additional anchoring.

The first phase is the phase of leveling and alligning using NiTi wire 0,012 for two months. The use of this 0,014 NiTi wire takes two months. 0.016 NiTi wire installed during the first month after it was replaced NiTi wire 0,016 x 0,016 to complete the phase of leveling and alligning this for two months.

The second stage of retraction of teeth 13, 23, 33 and 43 by using the power chain and the bond continues in the teeth 32 to 42 teeth, teeth 16-17, 26- 27 teeth, teeth 36-37 and 46-47 teeth and stop at the mesial tube the teeth 16, 26, 36, and 46 are used as an additional anchoring. This second stage wearing a wire SS 0,016 x 0,016 for 6 months.

The third stage is lower anterior retraction using T SS wire loop with 0,016 x 0,016 with a stop in front of the tube 2 mm teeth 36 and 46. Activation is done by giving the bond on the hook tube 36 and 46 to stop so that the T-loop below will be active and retract gear 32 to 42. After the lower anterior teeth retracted 1 to 2 mm, do the activation T-loop on activation of T in the same way under the loop. Activation of T loop above is done by providing the hook tube bonding 16 and 26 to stop so that the T-loop below will be active and retract the gear 12 to the third 22.Tahap this takes 6 months.

The fourth stage is interdigitation upper and lower teeth by using wire SS 0.016 x 0.016 coordinated top down after 2 months adan replaced SS wire 0.016 x 0.022 as the ideal arch. At this stage interdigitation used elastic box on the left and right buccal occlusion to achieve good. This interdigitation stages take 5 months. Passive stabilization after treatment for 6 months, brecket removed and installed Hawley retainer up and down to keep no relaps.Total active treatment time requires 2 years and 1 month.

RESULTS TREATMENT

After 2 years 1 month orthodontic tooth crowding maxilla and mandible corrected. Relationships canine and molar relations into relations of class I, the midline of the upper teeth in line with the median line of the face.Cusp to cusp bites can be corrected. Profile of patients get better.

Figure 3. extra-oral photos after orthodontic treatment

Figure 4. intra-oral photos after orthodontic treatment

DISCUSSION

DDM dental care during mixed dentition usually done by starting with the lifting of the serial extraction eldest canine and then eldest first molar tooth expected to be corrected spontaneous anterior crowding. The movement of the teeth in the buccal segments will happen when the first premolar extracted so that will correct the teeth crowded on the segment buccal.[4]

Extraction first premolar leave the room by 7.3 mm each quardan and need a place for canine retraction of 3.8 mm. The movement towards the second premolar mesial require a 3.6 mm.[5]

According to the analysis model of the study note that discrepancies in patients in the upper jaw of 12 mm and 10 mm on the lower jaw. Shortage of places 10 mm or more require extraction. Extraction four first premolar is an option to consider the space required for leveling and alligning, anterior retracted and protracted dental posterior.[2]

Discrepancy of the upper jaw and the lower jaw 12 mm 10 mm require a strong anchorage. Canine retraction and anterior retraction is done separately is done to reduce the burden retracted so that does not happen mesial movement of posterior teeth.

Anchoring with four first premolar extraction cases must involve anchoring balanced between left and right regions and involving the second molar. If the second molar was not involved in the space time clousure will cause the posterior teeth to move into mesial.[4]

Selected additional anchorage in the maxillary arch trans palatal and lingual mandibular arch. Additional anchorage is necessary in order posterior to anterior tooth movement in a minimum hold at canine retraction and retraction of anterior teeth.

Continus bond options on gear teeth 42,41,31,32 12,11,21,22 and expected additional anchorage during canine retraction.

CONCLUSION

DDM case with huge discrepancies and accompanied by the extraction of four premolars require a strong anchorage. The use of strong anchoring to avoid movement of the posterior teeth during space clousure stages.

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SL 2.5

RESEARCH ARTICLE

Complete Temporom Madibularandibular Examination For Detecting Temporomandibular Disorders

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ABSTRACT

Background: *Sometimes patient comes to a dentist complaining about pain in the temporomandibular joint. Through history taking, a dentist can obtain data concerning the location of pain, pain characteristics, and factors that may cause pain. Clinical examination of patients with temporomandibular joint disorders include examination of the nerves around the face, examination of the muscles around the head and face, temporomandibular joint examination, and examination of the teeth. Detection of temporomandibular joint disorders also requires investigation in the form of radiographic examination. A careful and thorough examination will help the dentist in establishing the correct diagnosis and appropriate treatment plan.*

Keywords: *temporomandibular joint disorder, history taking, clinical examination, supporting examination*

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BACKGROUND

The number of patients with temporomandibular joint disorders is increasing. Abnormalities in the temporomandibular joint can occur in children, adolescents and adult patients. Patients' compliance can be headache, pain when opening and closing the mouth, difficulty when opening the mouth, or sounds when opening and closing the mouth.[1]

According to Gazit et al., approximately 56.4% of school children in Israel have one or more abnormalities in the jaw joints. Abnormalities include sounds in the jaw joints and discomfort in the joints.[2] Nebbe and Major found temporomandibular joint disc shift in the group of Canadian teenagers who will receive orthodontic treatment. The disc shifts are both unilateral and bilateral.[3] Himawan, Kusdhany, and Ariani found that trismus, sound and pain around the temporomandibular joint, deviation when opening and closing the mouth can occur in elderly patients in Indonesia.[4]

Sometimes a patient can express discomfort feeling but cannot explain and describe the location of the pain. A dentist should be able to do history-taking and clinical examination in order to analyze the temporomandibular joint disorder and cure the disorders. This paper presents techniques for analyzing temporomandibular joint disorders.

LITERATURE REVIEW

Anamnesis

Before examining the temporomandibular joint disorder, dentists are advised to first investigate the symptoms experienced by the patient. Dentists can ask some simple questions like the following[567] :

1. Does the patient feel pain or have difficulty when yawning, chewing food, and talking? Can the patient move the jaw?
2. Does the patient hear the sound around the jaw joints?
3. Does patient often feel pain around the ears, head, teeth, or neck?
4. Does the patient feel the jaw become hard or stiff?
5. Did the patient have a collision on the head, neck, or jaw?
6. Did the patient have treatment to relieve the pain of unknown source?

If the dentist feels sure about the joint disorders in patients, he should discover a history of disorders in more detail with questionnaire filling techniques. Dentist should accompany the patient to fill the questionnaire in a quiet place. Questions in the questionnaire consist of the main complaint of the patient, the patient's health history, systemic conditions, and psychological conditions. [7]

Patient's chief complaint should be the first concern. If there are complaints of pain in several places, each one must be evaluated. The ability of the patient to determine the location of the pain is very important in analyzing the temporomandibular joint disorders. Dentist should carefully analyze where the pain comes from. Dentist needs to ask the patient what causes the pain. [7]

Characteristics of pain need to be explored. It is necessary to ask whether the pain is sharp, blunt, itching, or burning. The frequency of the onset of pain is different, there is occasional pain but there is also

frequently arise pain. The duration of the onset of pain is different, there is persistent pain but there is also the momentary pain. Location of the pain is also a concern. The pain can be localized, spreading, expanding, or migrating. The intensity of pain should also be noted. It is better to create a scale to describe the intensity of pain. Other symptoms that appear with the pain also should be noted.[7]

Sometimes the pain increases or decreases due to certain factors, such as moving the head, jaw, or agency. On the other hand, the pain can also arise due to the movement or light touch on the skin, lips, face or tongue. Patient needs to be asked about the effects of heat and cold to pain. Effects of massage on pain also needs to be asked. Record is also made for the history of medicine ever undertaken to heal the pain, including the large dose received. Although the level of emotional stress is difficult, it is to be noted. Even the patient's sleep quality should be noted. Any treatments received by patients need to be worth explored as consideration for the next treatment.[7]

After searching all the things associated with patient's chief complaint, dentist should also record the patient's medical history, including the record of the systemic condition. Another thing that needs attention is the psychological condition of the patient.

Clinical Examination

After history-taking and recording the complaint history of a patient, the dentist can proceed with clinical examination. Clinical examination aims to identify abnormalities directly. The first thing to be considered is whether the patient's face is symmetrical. Then we can proceed with the examination of cranial nerves, eyes, ears, and neck. Cranial nerves examination conducts on the twelfth nerves there. Eye exam is done to check whether there are impairments in patient. Generally, patient is asked to read the article with the right or left eye alternately. Ear examination includes examination of auditory function and infection in the ear surface and inside ear. Examination of the neck is done by asking the patient to look to the extreme right and the extreme left, look upward and downward, also bend the neck to the right and to the left. Then it is followed by clinical examination that relates directly to the muscles, temporomandibular joints and dentition. [6]

Muscle examination can be done by palpation and functional examination when the patient's mouth is in a resting position and during opening and closing movement. Palpation is usually done by using the palmar surface of the middle finger and index finger on the muscles of the temporalis, masseter, and sternocleidomastoid either right or left. Palpation is performed by pressing the muscle gently and doing the twist slowly while asking the patient whether palpation causes pain or discomfort. Functional examination is conducted to check the inferior lateral pterygoid, superior lateral pterygoid and medial pterygoid muscles because these three muscles are interrelated at the time of opening and closing movement[7 8]

Temporomandibular joint examination is conducted by digital palpation, palpation using the tip of the index finger on the area in front of the tragus. Patient is asked to perform the

movement of opening and closing the mouth several times. Dentist should be able to feel the condyle sliding downward and forward across the articular eminences. When the patient opens up his mouth, the tip of the index finger is moved to the posterior of condyle. Then the patient is asked about the existing pain and the degree of pain. Examination is continued by using a stethoscope to listen to the sound in the temporomandibular joint. Joint sounds are either clicks or crepitation.[678]

Examination of the patient's dentition includes the examination of tooth mobility, presence or absence of pulpitis, the use of the teeth, dental abfraction, and examination of dental occlusion. Tooth mobility is usually associated with periodontal tissue damage and the excessive chewing burden or traumatic occlusion. Pain in the teeth must be distinguished whether the pain is from the muscles or caused by pulpitis. The use of the teeth produces a clear pattern in the mouth and describe any abnormality occlusion. Occlusal examination is conducted on the dental examinations in relation centric, intercuspal position, protrusive movement and lateral movement to the right and left.[7]

Additional Examination

Additional examination which is often used to establish the diagnosis of temporomandibular joint disorders is imaging. Imaging technique usually depends on the specific signs and abnormalities which is found during the history-taking and clinical examination. Therefore, the dentist has to have the ability to read the imaging result. There are several options of imaging techniques that can be used to make the diagnosis of temporomandibular joint disorders, such as panoramic radiography, transcranial radiography, tomography, arthrotomography, arthrography with videofluoroscopy, magnetic resonance imaging (MRI), computed tomography. [9]

Panoramic radiography

This imaging technique can detect a broad anatomical structure such as the mandible, maxilla, sinuses, temporomandibular joints, and lesions around the joints. This technique is very easy to do for adults and children. Patients only receive low radiation. With this imaging technique, condyle looks like a round elongated and stretched across the superoposterior of the ramus of the mandible. Condyle articulates with the glenoid fossa in the superior part. Anterior to glenoid fossa, articular eminence appears like a round bone shaped.[10]

Transcranial radiography

This technique is most often used because it is easy and economical. The imaging can be used with a standard X-ray machines. This technique can see the pathological changes that occur on the articulation surface. The technique is used when patients have complaints of noise or discomfort in the jaw joint and there is suspicion of pathological changes in the normal anatomical structures. Transcranial radiography is performed in three positions, when the patient shuts mouth lightly, when the patient shuts the mouth with maximal intercuspation position, and when the patient opens his mouth wide.[9]

Tomography

Tomography is a radiographic technique which produces a series of

image pieces forming clear bone structure picture with no visible overlap between anatomical structures. This technique cretaes condyle and bone changes image clearly. Imaging is done in the sagittal plane by taking several pictures when the mouth is closed at the position of maximal intercuspation and on the wide open mouth position.[11]

Arthrotomography

This technique is a developed from tomography technique. In this technique radiopaque contrast material is injected into the gap in the jaw joint, and then the imaging is done. With this technique, we can check the position of the meniscus against condyle, discus dislocation, perforation, and changes in the anatomic structure.[9]

Arthrography with videofluoroscopy

This technique is a combination of arthrography and videofluoroscopy techniques. The technique is used to examine the shape and movement of the disc against the condyle when the jaw is in the closed position, translational, and open. This technique is highly appropriate to see perforations in disc.[9]

Magnetic resonance imaging (MRI)

This technique uses magnet and radio frequency wave to create pieces of digital images. This technique can produce image of soft tissues such as the articular disc. MRI techniques can produce sagittal and coronal slice images without changing the patient's position. Imaging is done when the patient closes and opens the mouth. MRI technique should not be performed on pregnant patient, patient with a pacemaker, and patient with systemic tool which contains metal.[12] [11]

Computed tomography

This technique provides an overview of the jaw joint shape and internal structure of the bone in three dimensions. This imaging technique is also able to detect soft tissue around the temporomandibular joint but unable to produce accurate images of articular disc. The development of this technique is the cone beam computed tomography (CBCT). With CBCT, patients receives lower radiation than conventional computed tomography. The images taking can be done for investigating in the condition of closed and opened mouth. The images can be manipulated so that the dentist can investigate on the sagittal and koronal plane.[11]

DISCUSSION

Temporomandibular joint disorder may affect anyone, children, adolescents, adults, and the elderly. The disorders can be a headache, pain when opening and closing the mouth, difficulty when opening and closing the mouth, or sound of the jaw joints during opening and closing the mouth. It often happens that the patient has difficulty in determining the location of the abnormality. Dentist needs to find the location of abnormalities or deformities.

Detailed anamnesis gathers about 70% of data required for diagnosis. Anamnesis aims to identify signs associated with abnormalities of patients. The patient's complaints are usually pain associated with masticatory system. The first thing to do is trying to describe the pain.

Location of pain can be more than one. All complaints should be recorded and must be traced one by one carefully. Treatment history in the past, systemic conditions, the psychological condition of the patients is a necessary consideration. According to Manfredini, Bucci, and Nardini, a psychological examination of patients may help for the diagnosis and treatment plan. [13]

Stomatognathic system is a very complex system. Therefore, careful clinical examination should be performed to detect abnormalities. Pain in the temporomandibular joint is associated with the nerves that send information to the brain and receive motor commands from the brain to the muscles around the face. Generally, 70% of patients with temporomandibular joint disorders also complain of interference with the hearing. The pain when moving the head may be related to temporomandibular joint disorder. If the working muscle increases, blood flow will decrease. This causes a reduction of nutrients and accumulation of the remains of cell metabolism. This condition causes pain in the muscles around the face. Muscle palpation examination is carried out by using the middle finger and index finger. Pain on palpation recorded in accordance with the classification of the degree of pain. Functional examination is carried out for the muscles of the inferior lateral pterygoid, superior lateral pterygoid and medial pterygoid because of their location in the inner surface. Palpation is difficult to do and may cause discomfort to the patient. Palpation is also performed for temporomandibular joint inspection at the time of mouth closed and while opening and closing the mouth dinamically. Sound detection in the joints is done by using a stethoscope, not by palpation. The condition of the teeth is also related to pain. Dentist should be able to distinguish whether the pain produced by abnormalities of the teeth or joint disorders. Injury to the teeth due to bruxism describe excessive muscular work. It can also cause pain.

Abnormalities of the temporomandibular joint anatomical structures can be detected by using tools in the additional examination. There are many imaging techniques that can be used to find the location of abnormality. Generally, these tools can produce radiation that has a negative impact on the patient's body. Therefore, the use of these tools should be in appropriate indications and stick to the principle of ALARA (As Low As Reasonably Achievable). Panoramic radiography can be used to evaluate mandible asymmetries in the posterior vertically but this technique can not be used to compare the height of left and right condyle.[14] Transcranial radiography suits to see the structure changes and position of the lateral third of condyle and mandible fossa.[15] Tomography produces better quality picture than transcranial radiography, the weakness is more expensive price. Magnetic Resonance Imaging and Computed Tomography is appropriate to evaluate the articular disc. But the cost is a very expensive. If surgery is required, arthrotomography and arthrography with videofluoroscopy are good an options.

CONCLUSION

Examination of temporomandibular joint disorder

systematically consists of complete anamnesis, careful clinical examination and appropriate additional examination. The correct diagnosis can be used to plan appropriate treatment.

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SL 2.6

STUDY LITERATURE

Radiography Role In Forensic Identification On Disaster

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ABSTRACT

Background: *Indonesia is a country demographically and geologically consists of various ethnic, religious and located in the Pacific Ring of Fire, which is prone to mass disasters. Forensic identification is required to be able to reveal the identity of victims both living and dead. Identification can be justified by the law to obtain primary data antemortem and postmortem namely DNA, fingerprint and dental, and supported by secondary data. A person's identity can be obtained from the results of radiographic examination, radiography can provide detailed information about the estimated age of a person, the state of the teeth and jaw bones that are specifically different in each individual that can help reveal a person's identity.* ***Aim:*** *Explaining the role of radiography in the forensic identification of the disaster and the ordinance of radiographic interpretation for the purposes of forensic identification to the clinicians so hopefully they can apply it during a disaster.* ***Discussion:*** *Radiography may reveal the identity of someone who is not obtained from the clinical examination. Radiographs can provide information that estimate a person's age, show the thorough and detaild anatomical structure crown roots, periodontal tissue, variations of normal anatomy and deformities as well as bone structure of the jaw where each individual has different characteristics, by analyzing the radiographs data and comparing the antemortem and postmortem data so a person's identity can be determined and justified legally.* ***Conclusion:*** *Radiography has an important role in forensic identification. Radiographs can provide detailed information about the age, the particular characteristic of a person's teeth and jaws so that a person's identity can be determined.*

Keywords: *Radiography, forensic identification*

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BACKGROUND

Generally, it is a fact that disasters are caused by natural disaster or an act made by human (man-made disaster). Geographically, Indonesia is an archipelago located in the juncture of four tectonic slabs, they are: Asia and Australia continents, and Hindia and pacific ocean. In the southern and eastern parts of Indonesia are volcanic arc that extends from Sumatra, Java, Nusa Tenggara, and Sulawesi, in which parts of volcanic mountains and lowlands partly dominated by swamps.

Indonesia's tropical climate obviously can cause a lot of unstable ground. Tropical climate with high rainfall creates corrosion. Natural disasters such as landslides, because rainfall is quite high in these potential conditions and proneness to disasters such as volcanic eruptions, earthquakes, tsunamis, floods and landslides. A data shows that Indonesia is a country that has a high level of seismicity in the world, and the seismicity level is 10 times more than in United States. Human factor also plays a role of disastrous. Surely, this leads to floods or landslides due to deforestation, traffic accidents and terrorism.

Forensic identification is an attempt to determine the identity of a person devoted to forensic interest. This process aims to a judicial regulation. The main objective of identification examination in the case of a mass disaster or disaster is to recognize the victim, to determine the identity and authenticity in order to uphold the truth for the sake of the law relating the marital status of a person, property, inheritance, insurance and allowance. Using a proper identification needs several caring efforts, pray and family supports.

Determining a person's identity precisely is very crucial in the investigation because some errors might happen into a fatal judicial process. The role of dentistry forensic in the identification of bodies, especially the unknown corpse which are characterized as damaged, decayed, burned and mass accidents, natural disasters, riots which resulted in many deaths, as well as pieces of human bodies or skeletons. Furthermore, forensic identification also plays a role in various other cases such as the abduction of children, babies swapped, or a baby with unidentified parents. The identity of someone who can be confirmed if at least two methods give positive results.

The principle is to compare the data antemortem identification (during the lifetime of the data) and data postmortem (data after death) in people who are not identified. Data alleged missing persons are sometimes incomplete, in fact, forensic odontology is one method of determining the identity of an individual. The advantages of this identification technique is not only due to the high precision that is almost equal to the accuracy of fingerprint technique, but because of the fact that the teeth and bone is a biological material that is most resistant to Teeth are used as an identification because it has the advantage because the teeth resistant environmental changes and protected. Teeth is a means of identification that can be trusted if the recorded data is made properly and correctly.

AIM

The Aim of this paper is to explain the clinician's role in the identification of forensic radiography in disaster and the ordinance of radiographic interpretation for the purpose of forensic identification so hopefully clinicians can apply and may play significant role during a disaster.

Forensic dentistry

Forensic dentistry includes two parts, namely dental examination and dental radiology fornesic. Fingerprints, dental and DNA profiles are included primary data of identification, including the secondary data is visual, photographic, property corpse, medical, anthropology (height etc). Forensic Radiology is part of forensic medicine that studies the human identification using radiography postmortem of the body parts of different factors including skeletons, skulls, and teeth. The identification is done by comparing the data of radiographic postmortem (PM) with the data antemortem radiographs (AM).

Teeth as a means of identification

To impact and has a high resistance to the effects of temperature and will become ashes when it burns at temperatures above 450 °C. Moreover, the teeth can be used to determine the forecast of age, race, gender, blood type, facial profile and expression.

The basic principle used for radiographic examinations of postmortem.

When radiographs examination of postmortem are done in order to compare the data of antemortem radiographs then "Identical Projection" should be achieved by the same magnification, factor exposure, and angulation with the data antemortem radiographs of the individual, so that the data obtained are identical with antemortem radiographs. This is done by using various projection angles and varying technical factors.

The role of radiography in forensic identification on disaster

Radiology forensic dentistry is part of the forensic odontology that has an important role and becomes widely determine the cause of death and the second is the determination of an individual's identification during a disaster. Nortje (1986) states "the radiographic appearance of the teeth and facial bones is a permanent record of network, even when the teeth and bone fragments removed for forensic examination histopatologi. Radiology has been recognized and widely applied to solve the diverse legal issues, among others, to check the presence of foreign objects or broken bones or another injuries lain. In postmortem, the use of radiography in identification is valuable if reasonably available antemortem records. Various morphological and pathological changes can be learned from the radiographs, the morphology of the crown and root, tooth fracture, stage of wound healing in post-extraction sockets, the stage of the formation of roots, jaw bone with trabecular pattern will help in identification. Radiography panoramic and carpal are very helpful in providing information on a person's age, and to assess the stage of tooth eruption on panoramic radiographs forecasts determination. The age of a person can be determined

by using dental age estimation method that can be grouped into intra-uterine phases, the phase of children, adolescents and adults. there are several methods for determining a person's age by radiography include Ubelaker methods, Demirjian, Schour-Massler, AlQhatani, currently used on Interpol DVI is using an Alqahtani method.

There are many parts of the human skeleton, which is due to the variability of their anatomy is very useful for the identification process. Schuller was the first to discover that radiograph of the frontal sinus is an excellent tool to identify a person by comparing the data antemortem and postmortem radiographs and tomografi. Observation of the frontal sinus pattern is a technique that has been recognized in individual identification in forensic anthropology. Variations in the size, shape, symmetry, border line, and the number and presence of septa compared to ante - mortem and post-mortem radiographic images and tomografi.

Yoshino et al. has classified based on the size of the frontal sinus, bilateral asymmetry, location or position, the upper boundary line, the partial septa and supraorbital cell, and to report criminal cases in which the frontal sinuses is used to identify a person. Variations of the frontal sinus radiographs could be shown that each individual are different. Frontalis Sinus is not visible at early birth and began to develop between the second and third years, according Bensimon & Eloit, frontal sinus radiographs can not be detected before the age of six on human, the faster development frontal sinus is in puberty, and probably finishes at the age of 20. In men is usually greater than in women, and in women the upper limit (upper borders) of the frontal sinus deeper.

Skull radiographs may be used to assist the identification of individuals by means of superimposing the data antemortem radiographs with fotografi. Skull radiographs may also be used in the identification of the skull with suture patterns in which each individual does not have the same, from the examination of 320 skulls collected at random ectocranial suture patterns reveal highly individualistic and there are no two skulls can never have the same pattern. Skull radiographs may provide information on the cause of death of a person. In the case of intentional skull fractures in infants, usually simple, linear, unilateral, affecting the parietal bone and not a branch or cross sutura. Skull radiographs may provide evidence of a bullet or foreign body in soft tissue in the incidence of firearms and explosions, so the cause of the accident can be explained by radiographs, for example, opaque object in the soft tissue, it is because of metal contamination of air, radiopaque irregularly shaped.

Computed tomography (CT) is recommended to detect subarachnoid hemorrhage, while magnetic resonance imaging (MRI) is superior in revealing subdural hematoma, injuries concussive and shear injury. CT and MRI are equally efficient for demonstrative epidural hematoma. CT and CBCT to detect fractures.

Panoramic radiographs can provide information on all parts of the cranium and skeleton face of the left side to the right that covers the teeth (crown shape, restorations, caries, form of the pulp chamber, forms of the root, root canal treatment is the position of the third molar), the

anatomical structure of the alveolar bone (pattern resorbsi vertical or horizontal), trabecular pattern, maxilla and mandible (the base of the orbit, the shape and extension of the right and left maxillary sinus, nasal cavity base, mandibular canal, condyle head shape, line, location and position of the fracture).

Bitewing radiographs can provide information regarding interproximal caries, overhanging fillings assess restoration eg, secondary caries and periodontal view network state (alveolar bone resorption, laminadura thickening and widening of periodontal ligament space). Radiografi lateral cephalometric provides information on the sex organs when it's already broken that it can not recognize a person's identity. In general, the skulls of men are identified as having the characteristics of stronger than female skulls from its structure. All backbone, crests, and smaller processes and smooth to the skull of women than in men, especially in the temporal line, mastoid processes, nuchal lines, external occipital protuberance, and superciliary arches. Frankfort horizontal parts and basion to the nation as the reference lines are commonly used in lateral cephalometric radiographic analysis. Thus, the characteristics of the skull morphometry super- structure and intracranial structures are easily assessed.

Intra-oral radiographs can show the presence of infection or inflammation in the apical region, presence of periodontal disorders, trauma to the teeth and their alveolar bone, Seeing any abnormality in the position of teeth that have not grown, showing the morphology of the tooth root, endodontic treatment, post-implant.

Sample case Sukhoi SJ100A accident cases in Salak mountain panoramic radiographs antemortem data obtained from one of the victims.

Then It is applied the postmortem examination periapical radiographs: Data postmotem periapical radiographs.

18, 17

16,15,14.

24, 25, 26.

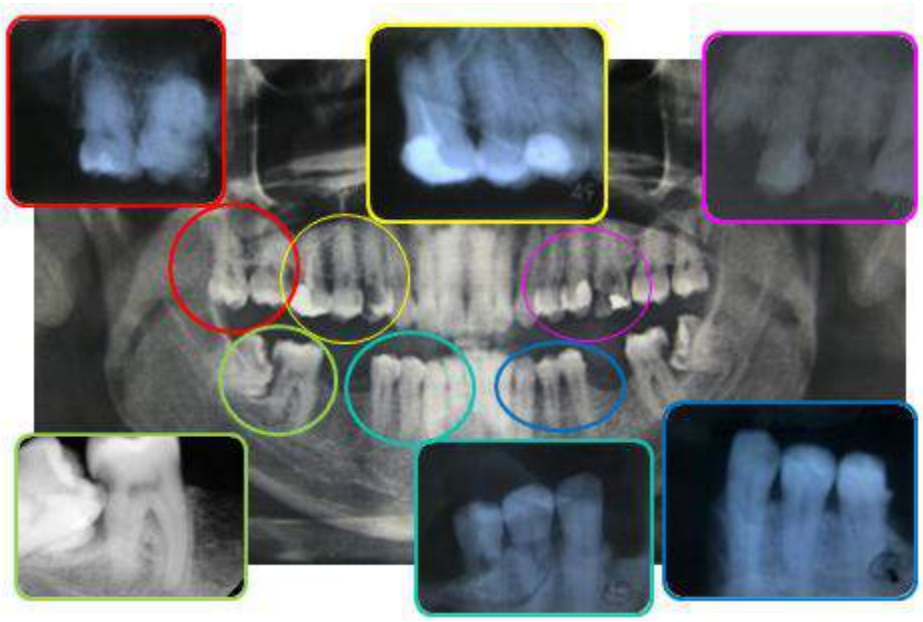
35, 34, 33.

43,44,45.

47,48.

and postmortem radiographs, the steps as follows: first, the data antemortem and postmortem radiographs compared by noting similarities and differences. The latest film is checked because they will show the greatest similarity to the status of teeth and jaws postmortem. Applying comparisons on: The number and arrangement of the teeth, examined teeth missing teeth, tooth rotation, diastema, Checked for caries, if any dental caries log anywhere caries, caries location (occlusal, mesial, distal) and to a depth where (enamel, dentin, pulp penetrate), If there are any dental restoration log, then analyzes the shape, pattern and location restoration, dikoronal, mesial, distal, or interproximal. if there is a restoration that is not visible clinically (which can be seen radiographically), (if there are any implants, root canal treatment, the peg), Resorption of the alveolar bone crest, involving dental record anywhere, record the pattern of resorption (vertical, horizontal, angular), how many resorption (measured from the roots of the teeth in question, for example, 1/2 root of cemento enamel junction, Damage to the jaw bone, note the location, form of bone damage, the state of periodontal tissues, can be checked if there are widening periodontal spase, state laminadura whether there is thickening, break or disappear. Anatomy of the tooth, if there are anomalies, the anatomy of the pulp chamber, crown roots, comparison of crown roots, the number of roots and number of root canals, root canal treatment. - anatomical trabecular bone pattern : anatomy bone landmarks, The maxillary sinus and nasal aperture, The frontal sinus, - The estimated age of the radiographic gigi. With the increasing age, the size of the dental pulp cavity is reduced as a result of secondary dentin deposit so that measurement of this reduction can be used as an indicator of age.

Radiographic analysis sukhoi SJ 100A



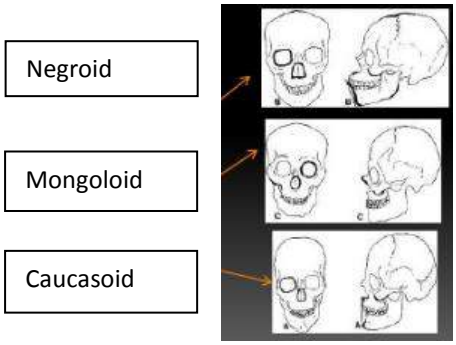
DISCUSSION

Radiography may reveal the identity of a person who is not obtained from the clinical examination Radiographs and can provide information that estimate a person's age, furthermore, it can show the anatomical structure crown roots, periodontal tissue, variations of normal anatomy and deformities as well as bone structure of the jaw thorough and detail where every individual have different characteristics, to analyze the data and compare the data antemortem radiographs and postmortem person's identity can be determined and can be justified legally.[11]

Habits and dental appearances, a number of lifestyle habits have an effect on the dental tissues. This can be useful in the search for an individual – information such that the individual was a pipe smoker can facilitate the ante-mortem record search and prompt people who may have known them. Habitually, pipe smokers place the pipe stem in the same location and thus create, over time, a wear pattern in this area.. The recognition of smoking stains can also be of use in the placement of a cigarette in an artist's impression.[11]

Abnormalities of tooth formation and eruption there is a range of rare conditions that affect the developing dentition that lead to distinctive hard tissue appearances. Many of the conditions are associated with severe medical conditions and it is likely that extensive medical and dental records (often in specialist practices) will be available for such individuals. Their unique physical and dental appearances are easily recognizable to witnesses, relatives and family members. As many of these conditions have a genetic basis, a family history may be available.[20]

Race, image basically for skull, negroid : elongated cranium, mongoloid : rounden cranium, caucasoid : head is curved at the top, not complitelly flat, the chin is prominent.[12]



CONCLUSION

Radiography has an important role in forensic identification. Radiographs can provide detailed information about the age, the particular characteristic of a person's teeth and jaws so that a person's identity can be determined.

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SL 2.8

CASE REPORT

Biologic Width Concept In Gingivectomy Surgery

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ABSTRACT

Background: *Adequate relationship between periodontal tissue and aesthetic considerations is an important thing to determine the form, function and aesthetics. For orthodontic cases with gingival enlargement, using the biogical width concept in gingivectomy to facilitate an optimal oral hygiene maintenance, function and aesthetic. Bone sounding before gingival recontouring , is dictated by the distance from the gingival crest to alveolar crest. Recommended distance between the restoration margins and alveolar bone crest to avoid breaching the biologic width is 3 mm.* ***Case and Case management:*** *Case 1 : Woman , 21 years old with gingival enlargement in upper front teeth after treated with fixed orthodontic for 1.5 years . PBI : 1,6. Bone sounding 11-15, 21-25 = 7mm . Gingivectomy without ostectomy. Case 2 : Male , 24 years old , with gingival enlargement in upper front teeth while treated with fixed orthodontic. Bone sounding 13-23 = 6 mm . PBI : 0,0 . Gingivectomy without ostectomy .* ***Conclusion:*** *The purpose of this case report is to provide a diagnostic rationale for gingival recontouring. When gingivectomy is determined, the concept of biological width must be applied achieve a harmonious gingival contour with an optimal oral hygiene maintenance.*

Keyword : *Biologic width, gingival recontouring, orthodontic treatment*

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BACKGROUND

Biological width defined as the dimension of space that the healthy gingival tissue occupy above the alveolar bone.[1] It is also a dimension of the soft tissue, which is attached to the coronal tooth towards the crest of the alveolar bone. It can be identified for each individual patient by probing to the bone level and substracting the sulcus depth from the resultant measurement.[2] The biologic width is commonly stated to be 2.04 mm, which represents the sum of the epithelial and connective tissue measurements.[1]

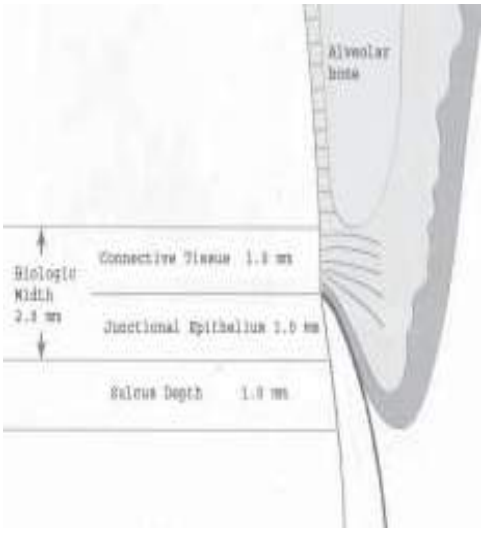


Figure 1. Biologic Width on upper teeth[2]

There is a definite proportional relationship between the alveolar crest, the connective tissue attachment, the epithelial attachment, and the sulcus depth. Adequate relationship between periodontal tissue and aesthetic considerations is an important thing to determine the form, function and aesthetics. They reported the following mean dimensions: A sulcus depth of 0.69 mm, an epithelial attachment of 0.97 mm, and a connective tissue attachment of 1.07 mm. It has been shown that 3mm between the preparation margin and alveolar bone maintains periodontal health for 4 to 6 months.[3] It is essential for preservation of periodontal health and removal of irritation that might damage the periodontium. The millimeter that is needed from the bottom of the junctional epithelium to the tip of the alveolar bone is held responsible for the lack of inflammation and bone resorption, and as such the development of periodontitis, which in turn may impact our approach to surgical intervention.[1]

Bone Sounding

The biologic width can be identified by probing under local anesthesia to the bone level (referred to as "sounding to bone") and subtracting the sulcus depth from the resulting measurement. If this distance is less than 2 mm at one or more locations, a diagnosis of biologic width violation can be confirmed. This measurement must be performed on teeth with healthy gingival tissues and should be repeated on more than one tooth to ensure accurate assessment, and reduce individual and site variations.[1]

Correction of biologic width violation

Biologic width violations can be corrected by either surgically removing bone away from proximity to the restoration margin, or orthodontically extruding the tooth thus moving the margin away from the bone. Surgical crown lengthening is designed to increase the clinical crown length.[2]

Indications[4]

1. Inadequate clinical crown for retention due to extensive caries, subgingival caries or tooth fracture, root perforation, or root resorption within the cervical 1/3rd of the root in teeth with adequate periodontal attachment.
2. Short clinical crowns.
3. Placement of sub gingival restorative margins.
4. Unequal, excessive or unaesthetic gingival levels for esthetics.
5. Planning veneers or crowns on teeth with the gingival margin coronal to the cemeto enamel junction (delayed passive eruption).
6. Teeth with excessive occlusal wear or incisal wear.
7. Teeth with inadequate interocclusal space for proper restorative procedures due to supraeruption.
8. Restorations which violate the biologic width.
9. In conjunction with tooth requiring hemisection or root resection.
10. Assist with impression accuracy by placing crown margins more supragingivally.

Contraindications[4]

1. Deep caries or fracture requiring excessive bone removal.
2. Post surgery creating unaesthetic outcomes.
3. Tooth with inadequate crown root ratio (ideally 2:1 ratio is preferred)
4. Non restorable teeth.
5. Tooth with increased risk of furcation involvement.
6. Unreasonable compromise of esthetics.
7. Unreasonable compromise on adjacent alveolar bone support.

External bevel gingivectomy

Gingivectomy is a very successful and predictable surgical procedure for reconstruction of biologic width; however, it can be used only in situations with hyperplasia or pseudopocketing (> 3 mm of biologic width) and presence of adequate amount of keratinized tissue.[5]

Internal bevel gingivectomy

Reduction of excessive pocket depth and exposure of additional coronal tooth structure in the absence of a sufficient zone of attached gingiva with or without the need for correction of osseous abnormalities requires internal-bevel gingivectomy.[2]

Gingival Overgrowth

The use of orthodontic appliances, as well as other mechanical procedures, prone to cause a response in the gingival soft tissue. Such a response can be positive as facilitate the movement of teeth, or the negative of which are generally obtained from the attachment of orthodontic appliances on teeth that resulted ineffective of removal of plaque biofilm. Inflammation of the gingival may cause inflammation of periodontal, but gingival inflammation not always became a periodontitis. Patients with orthodontic treatment also experience inflammation of the gingival tissue at risk of damage periodontal.[6]

Gingival overgrowth during orthodontic treatment is generally recognized as gingival inflammation caused by the accumulation of plaque and bacteria, also caused by the difficulty of maintaining oral hygiene in patients with orthodontic treatment, the volume of gingival enlargement can occur in patients with good oral hygiene, with no clinical signs such as inflammation of the gingiva.[7] Gingival enlargement during orthodontic treatment may inhibit the maintenance of oral hygiene, furthermore may cause damage to the tissues periodontal.[8] In esthetic areas, a longer healing period is recommended to prevent recession. In cases where the gingival enlargement becomes more fibrous , surgical treatment may be determined.[1] Generally, surgical treatments were selected in the case of gingival enlargement is gingivectomy and gingivoplasti, which is one of the periodontal surgical technique using a scalpel under local anesthesia, followed by the disposal of mechanical plaque and also control oral hygiene.[9] Shobha et al. in a study on clinical evaluation of crown lengthening procedure had concluded that the biologic width can be reestablished to its original vertical dimension along with 2mm gain of coronal tooth structure at the end of six months.[10] This case report will discuss the importance of applying the concept of biologic width in surgical procedures gingivectomy and management of the case.

CASE AND CASE MANAGEMENT

Case 1 : Woman , 21 yo with gingiva enlargement in upper front teeth after treated with fixed orthodontic for 1.5 years . PBI : 1,6. Case management : Bone sounding 11-15, 21-25 = 7mm . Gingivectomy without ostectomy.

Diagnosis :
Gingival enlargement caused by plaque and calculus , exacerbated by the pressure of the orthodontic appliance
Oral Hygiene :
PB I: 1.6
Pl I: 0.4
OHIS : 0.6 (good)
CI : 0.2

Treatment Plan:

Phase 1: Initial Therapy: DHE / Skeling

Phase IV: Maintenance

Phase II : Surgery: Gingivektomi → Phase III: Reconstruction

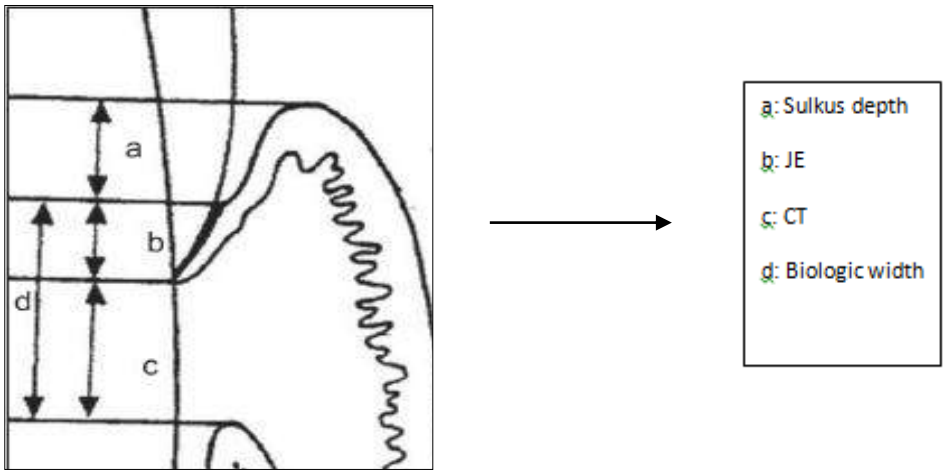
5 4 3 21 | 1 2 3 4 5
5 4 3 2 1 | 1 2 3 4

36 : Implant/Bridge work

Bone Sounding

Gigi 11-15	Mesio Labial	Mid Labial	Disto Labial
Pocket Depth	5 mm	5 mm	5 mm
Bone Sounding	7 mm	7 mm	7 mm

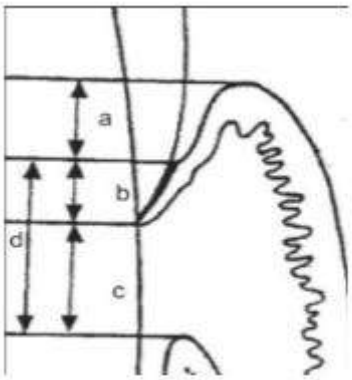
Gigi 21-25	Mesio Labial	Mid Labial	Disto Labial
Pocket Depth	5 mm	5 mm	5 mm
Bone Sounding	7 mm	7 mm	7 mm



Based on that, **a = 5mm d = 2mm**, then the structure of the tooth to be exposed is **3mm**

Case 2: Male , 24 yo , with gingival enlargement in upper front teeth while treated with fixed orthodontic. Case management : Bone sounding 13-23 = 6 mm . PBI : 0,0 . Gingivectomy without ostectomy .

Diagnosis:
Gingival enlargement by plaque and calculus with aggravated factors orthodontic force and deep bite in anterior region



Oral hygiene:

PB. I : 0,0

Pl. I: 1,03

CI. I: 0,9

OHI-S: 1,93 (sedang)

Treatment plan

Phase 1: Initial: DHE, Skeling

↓

Phase IV: Maintenance

⇄ Phase II: Bedah

765321 | 12356 Alveolektomi danGingivektomi

5321 | 1235

⇄ Phase III: Rekonstruksi

Bone Sounding

Gigi 13-23	Mesio labial	Mid labial	Disto Labial
Pocket Depth	4 mm	4 mm	4 mm
Bone sounding	6 mm	6 mm	6 mm

Based on that, **a =4** **d=2**, then the structure of the tooth be exposed is **2mm**

DISCUSSION

Gingivectomy surgery with the concept of biologic width is selected for the case in periodontal disorders with gingival enlargement. This clinical case clearly illustrates the gingivectomy surgery with esthetic demands with recounturing gingiva. Tbe instrument used to accomplish tbe gingival recontouring-knife. This result is dictated by the level of the underlying alveolar crest.

CONCLUSION

The purpose of this case report is to provide a diagnostic rationale for

gingival recontouring. When gingivectomy is determined, the concept of biological width must be applied to achieve a harmonious gingival contour with an optimal oral hygiene maintenance.

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SL 2.9

CASE REPORT

Effect of Smoking on Gingival Melanin Pigmentation

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ABSTRACT

Background: *Melanin is a pigment derived from melanocytes and gives color to tissues such as skin, eyes, hair, and gingival. Gingival melanin pigmentation increased on smokers and often called smoker's melanosis. Removal of gingival pigmentation can be carried out with a variety of techniques, such as using scalpel, laser, abrasion with a diamond bur, gingivectomy, gingivectomy with free gingival graft, cryosurgery, electrosurgery, chemical methods using alcohol and phenol.* ***Purpose:*** *This case report describes depigmentation gingiva using a scalpel.* ***Case report and management.*** *A male patient, with history of smoking, complaining his black gingival. Patient has a good oral hygiene. Gingival depigmentation performed with a scalpel, by scrapping the blade on the gingival under a local anesthetic. The wound then covered with periodontal pack.* ***Conclusion.*** *This case report shows that the use of scalpel provide a satisfactory aesthetic results in removing gingival melanin pigmentation with a favorable wound healing and without infection.*

Keywords: *smoking, melanin pigmentation, gingival, scalpel.*

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BACKGROUND

Gingiva is part of the oral mucosa which covers the alveolar process and surrounds the cervical teeth.[1] The color of gingiva is influence by the thickness of epithelium, keratinization degree, the quantity and width of capillary vessels in the gingiva, the presence and amount of intraepithelial melanin, and the underlying connective tissue will determine the color of gingival.[1-3] The frequently used description for the color of normal gingiva is coral pink. According to Dummet, the color of healthy gingiva varies from pale pink to bluish purple. There are differences colors of gingiva in some races, such as pale pink and coral pink in Caucasians to brown and blue black areas in Africans or Asians.[4] Pigmentation of gingiva is derived from melanin pigment.

Melanin is a granular endogenous nonhaemoglobinic pigment, which synthesized inside the melanosomes by cells melanocytes and gives a brown or black color to tissues such as skin, eyes, hair, and gingival.[2-5] The other function of melanin pigment is photoprotection, protecting the DNA from UV rays.[2] Melanin pigment is present in the basal and suprabasal cell layers of the epithelium.[6-7]

The amount of melanin pigment on gingiva increased on smokers and often called smoker's melanosis.[2-3] Nicotine on tobacco can activate melanocytes to produce melanin. Smoker's melanosis has been reported in 22% of smokers and is dose-dependent.[2] The severity of gingival pigmentation decrease after smoking cessation, related to the number of years after discontinuation of smoking.[3] Gingival pigmentation usually is not a medical problem, but for some people it is an aesthetic consideration.[3-4] However, when malignancy is suspected, it will required a biopsy to determine the clinical diagnosis.[2] Gingival melanin pigmentation is mostly located in the anterior labial gingival and affecting females more than males.[2,7]

Removal of gingival pigmentation, called gingival depigmentation is a periodontal plastic surgery which removes or reduce the melanin pigment with various techniques, such as using scalpel, laser, abrasion with a diamond bur, gingivectomy, gingivectomy with free gingival graft, cryosurgery, electrosurgery, chemical methods using alcohol and phenol. [2-4] The particular indication for gingival depigmentation is the demand by a person to improved aesthetic, mainly he/she who has a gummy smile or excessive gingival display while smiling.[4,6] This case report describes depigmentation gingiva using a scalpel.

CASE & CASE MANAGEMENT

A 31 year old male patient, with history of smoking, complaining his black gingival. Patient has a good oral hygiene and systemically healthy. He had quit smoking since 2 years ago, with history of smoked one pack per day for five years. Since he stopped smoking, he noticed the darkening gingiva at upper and lower jaw. There were no abnormalities from extraoral examination. From intraoral examination, there was melanin hyperpigmentation on attached gingiva from teeth 13 to 23 and 33 to 43

(Figure 1). There were no symptoms and no history of taking medication. Patient was requested to take blood tests, and the result showed everything was normal. The diagnosis for his condition is smoker's melanosis based on smoking history.

Phase I therapy was carried out during first visit. A traditional technique was chosen for gingival depigmentation, using a scalpel. Local anesthetic using infiltration technique with 2% lidocaine was administered. Gingival abrasion was done by scrapping the blade on the gingival. After the surgical procedure, the wound then covered with periodontal dressing. Patient was given post operative instruction. An analgesic, namely mefenamic acid was prescribed to subdue the post operative pain, and chlorhexidine gargle to help the oral hygiene. One week after surgery, the patient was called for evaluation. Patient has not felt any post operative pain, swelling, or other complications. Periodontal dressing was removed and gingiva showed a healing process. Patient was called for follow-up at one and three months after surgery, and there were no signs of melanin repigmentation (Figure 2 and 3).

DISCUSSION

Gingival epithelium consists of a continuous lining of stratified squamous epithelium and divided into keratinized, i.e. oral epithelium and non-keratinized, i.e. junctional and sulcular epithelium. The gingival epithelium composed of four layers: stratum basale (basal layer), stratum

Figure 1. Intraoral examination pre

Figure 2. One month post operative

Figure 3. Three month post operative.

spinosum (prickle cell layer), stratum granulosum (granular layer), and stratum corneum (cornified layer) (Figure 4).[1-3]

Melanin pigment is a natural brown pigment, produced by melanocytes and located in basal and suprabasal layer.[6,7] The activity of the melanocytes and the amount of melanin in basal layer is one of the things which can influence the color of gingiva.[3,8]

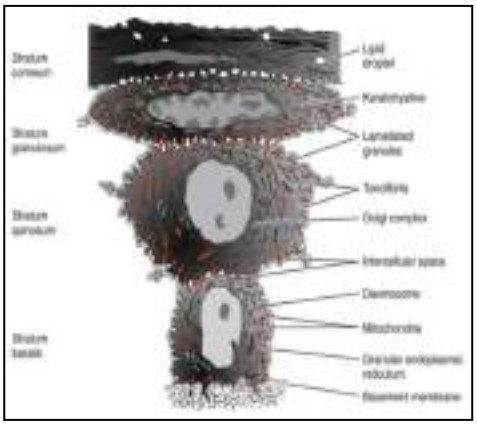

Figure 4. Layers of gingival epithelium.[1]

The gingival color is also affect by inflammation, exposure to ultraviolet rays, drugs, smoking, and endocrinological diseases, such as Addison's disease.[3] Melanin pigmentation is first observed six months after the initiation of smoking.[3] Hedin et al. described a benign limited melanin pigmentation occurring in the attached gingiva of tobacco smokers, this condition called smoker's melanosis.[2,5] Smoking cause the activation of melanocytes to produce melanin through a stimulation of polycyclic amines.[2,7] The degree of smoker's melanosis is increased within one year of smoking initiation[3], and related to the duration of smoking also number of cigarettes consumed.[7] According to Kistiakovsky, smoking cessation can resulting a normal gingival color after five months.[3] However, in this case report, the melanin pigmentation was seen even two years after smoking cessation.

Gingival melanin pigmentation is a physiologic process and does not require a treatment, but may affect the appearance of a person, especially someone with gummy smile.[2-4] There are various techniques to treat gingival melanin pigmentation. This report showed gingival depigmentation using a scalpel, which remove the gingival epithelium and some part of connective tissue.[9] Scalpel surgical technique has advantages compare to other techniques, such as its simplicity, faster wound healing, and no need for long appointments, also more economical compared to other techniques which require more armamentarium.[9-11] The disadvantages of using scalpel technique is cause unpleasant bleeding during and after operation, therefore it is necessary to use local anesthesia with epinephrine

to control the bleeding, and cover the surgical site with periodontal dressing.[10,11] In this particular case, the gingiva showed healing process one week post operative, and the patient did not feel any pain, swelling, or other complications. On three months post operative, there was no recurrence of pigmentation and gave satisfactory results to both clinician and patient.

The limitation in this case report was the observation time; it should have been longer to observe in case of recurrence the melanin pigmentation. Some studies reported recurrence of melanin pigment, and the exact mechanism of repigmentation is not known.[7,10] The timing of repigmentation is different from many studies, it takes about 1,5-3 years.[10] Smokers was tend to have repigmentation when they restarting smoking again within four months.[3,11]

CONCLUSION

This case report shows that the use of scalpel provide a satisfactory aesthetic results in removing gingival melanin pigmentation with a favorable wound healing and without infection. The scalpel surgical technique was easy to perform for the clinician, and from the patient perspective, he felt no pain or any discomfort.

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SL 2.10

CASE REPORT

The Influence of Interproximal Interface Towards Periodontal Tissue

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ABSTRACT

Background: *Interproximal interface is the joint attrition facet between two adjacent teeth in the same arch. An intact and firm interproximal interface relationship precludes the forceful wedging of food to gingival embrasure area which damaged the periodontal tissue, called food impaction. The proximity of the contact point to occlusal plane and the contour of occlusal surface serves to deflect food from interproximal area and prevents food impaction.****Case and case management****: First case, Male, 50 years old, with food impaction in 36-37 region. Clinical examination featuring a spontaneous gingival bleeding and swelling. The second case, Male, 29 years old, with food impaction in 46-47 region after molar band removed post orthodontic treatment. Clinical examination presenting no proximal contact and remnants of food stuck in that area. Management of these cases by using a sectional matrix composite restorations to restore proximal contact and prevent food impaction.* ***Conclusion****:Long-term stability of the periodontium is affected by several local and systemic predisposing factors. Ideal interproximal interface prevents food impaction and maintaining the periodontal tissues integrity.*

Keywords:

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BACKGROUND

The phrase '**form follows function**' reflects a concept of inter-relating the shape with its function. In dentistry, the phrase indicates the entire masticatory function, acting as biomechanical system for the reduction of food. The form of teeth and their position and arrangement in jaws are related to inscing or crushing food (i.e... mastication) without causing damage to its supporting structures. But however, any alteration in form of teeth can bring variation in its function which may induce injury to periodontium also.[1]

'Periodontium' is the general term that describes the tissues that surround and support the tooth structure. The periodontal tissues include the gums, the cementum, the periodontal ligament and the alveolar bone.[2] Periodontal tissues form the foundation for proper esthetics, function, and comfort of the dentition. All prosthetic and restorative therapies generally require a healthy periodontium as a prerequisite for successful outcome.[3]

Periodontitis is a chronic inflammation of the teeth supporting tissues that involves the destruction of periodontal ligament and alveolar bone, caused by disruption of homeostatic balance between pathogen and host response. Tooth location is considered important in the initiation and development of disease. Malaligned teeth predispose individuals to plaque accumulation with resultant inflammation in children and may predispose to clinical attachment loss in adults, especially when associated with poor oral hygiene habits. In addition, open contacts have been associated with increased loss of alveolar bone, most probably through food impaction.[4]

Food impaction is the phenomenon appearing in the chewing course when the food dregs or fibers are pushed into the clearance (interdental area) by occlusal force or owing to the gingival shrinkage. The interdental gingiva, composed of the facial and lingual papillae and gingival col, is a unique area anatomically. It fills the interproximal space supported by alveolar. Food impaction is a clinical situation that arises from a complex interaction process involving age, periodontal disease, caries and excessive attrition and so on.[3]

Clinical impressions suggest loose or open proximal contacts to be contributing factors to periodontal pocket formation. Hancock et al. (1980) evaluated 40 naval recruits to determine the relationship of interdental contacts on periodontal status. Results revealed no significant relationship between contact type and gingival index or probing depth. However, a significant relationship was seen between food impaction and contact type (greater food impaction at sites with open or loose contacts), and between food impaction and probing depth. These findings help support the notion that food impaction contributes to periodontal disease.[5]

A correct interproximal interference enables balanced mesiodistal forces and provides resistance against food impaction at marginal interproximal ridges. The objective of this case report is to provide a clinical findings of food impaction towards periodontal tissues due to loss of interproximal interference and to suggest an emergency treatment to relieve the patient's complaint.

Case and Case Management

Case 1

Male, 50 years old, present with throbbing pain when eating on the lower right back teeth since 2 days ago. The food was pushed into the gums and can't be cleaned. Patient also felt his gums swelling and bleeding spontaneously. Patient already taken anti-inflammatory drug but the complaint doesn't getting better.

Clinical examination presented trapped food fibers and spontaneous bleeding in interdental 36-37. Inflammation of gingiva due to the remnants of food stuck and impacted. The tooth had been restored with combination of amalgam and composite, but the composite already chipped. (Figures 1a and 1b)

(a) (b)

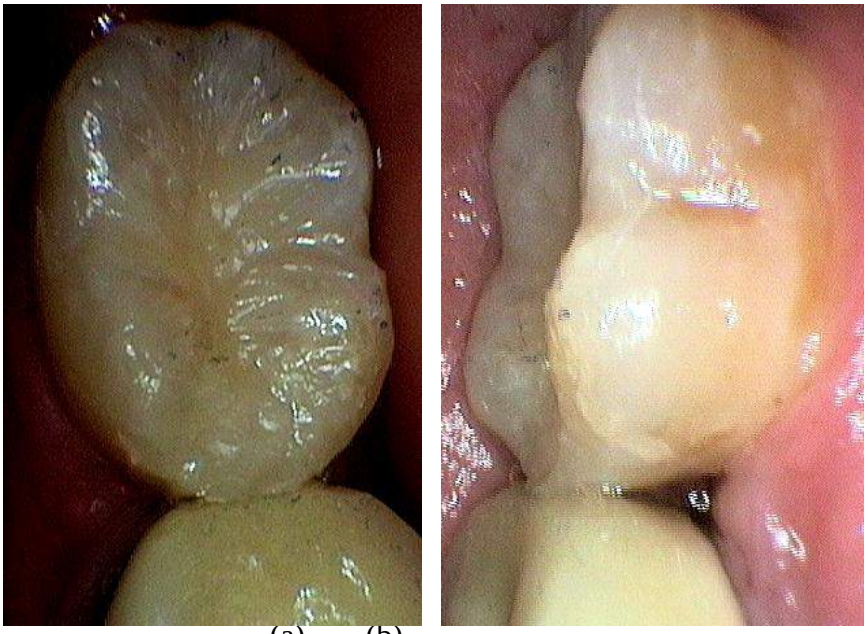
Figure 1. (a) The first visit of the patient presenting a combination of amalgam and composite restorations; (b) The second visit patient showed a chipped composite restoration, spontaneously gingival bleeding due to impaction of food and unequal marginal ridge.

(a) (b)

Figure 2. (a) After the restoration removed, there was a periodontal pocket due to food impaction at interdental embrasure. (B)Tooth preparation is complete, a distinct equi gingival cavo-surface margin to prevent overhanging filling.

Diagnosis of this case is food impaction. The etiology of this case are loss of interproximal interface and unequal marginal ridge. Treatment of

this case is restoration of proximal contact and marginal ridge using sectional matrix. The first step is the removing the old restorations (Figures 2a and 2b) then placing the sectional matrix and wedge to form embrasure and the cavity is filled with composite. (Figures 3a and 3b).



(a) (b)

Figure 3. (a) From occlusal view, the anatomical contours and interproximal interference had been restored. (B) From the buccal view, a smooth transition from the cavity margin to restoration margin and an equal marginal ridge. Interdental embrasure was provided to facilitate periodontal maintenance.

Case 2

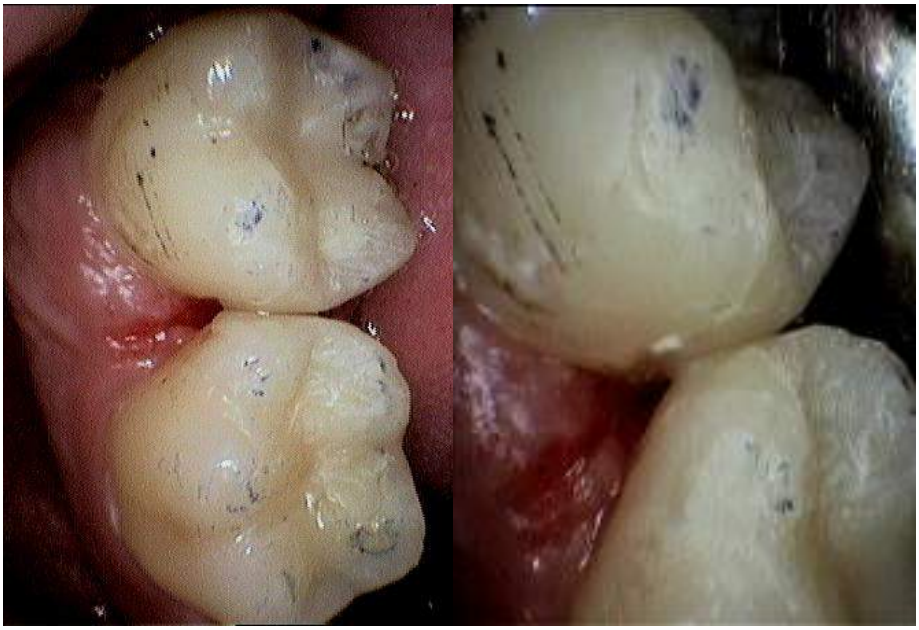
Male, 29 years old, complained about food easily stuck at the lower right back teeth and was hard to be cleaned. That area was often painful when the patient consumed meat. This incident had lasted several months since the patient completed orthodontic treatment.

Clinical examination showed residual food stuck and the absence of interproximal interference of tooth 46 and 47. Slightly gingival inflammation was presented, but the marginal ridge was equal. The residual of molar band cement was presented too. (Figure 4a and 4b).

The diagnosis of this case is food retention. The etiology of this case is loss of interproximal interface. The ideal management for this case is orthodontic treatment to close the gap between these teeth. But the patient prefer rehabilitating the interproximal contact using sectional matrix due to single visit and cost-efficient treatment. (Figure 5a and 5b).

(a) (b)

Figure 4. (a) The initial clinical features when residual food hadn't been removed. Soft deposit and residual molar band cement were presented. (B) Clinical features when cleaned using three way syringe, gingival appeared normal and no interproximal interference was presented.



(a) (b)

Figure 5. (a) The occlusal view, rehabilitation of interproximal interference while considering marginal ridge both of the tooth. (B) The buccal view, a tight contact between the teeth and a smooth emergence profile to prevent plaque retention.

DISCUSSION

Teeth serve four main functions: (1) mastication, (2) esthetics, (3) speech, and (4) protection of supporting tissues. Normal tooth form and proper alignment ensure efficiency in the incising and reduction of food with the various tooth classes-incisors, canines, premolars, and molars—performing specific functions in the masticatory process and in the

coordination of the various muscles of mastication.[6]

Facial and lingual surfaces possess a degree of convexity that affords protection and stimulation of supporting tissues during mastication. Normal tooth contours act in deflecting food only to the extent that the passing food stimulates (by gentle massage) and does not irritate supporting tissues. If these curvatures are too great, tissues usually receive inadequate stimulation by the passage of food. Too little contour may result in trauma to the attachment apparatus. Over-contouring is the worst offender, usually resulting in increased plaque retention that leads to a chronic inflammatory state of the gingiva.[6] (Figure 6)

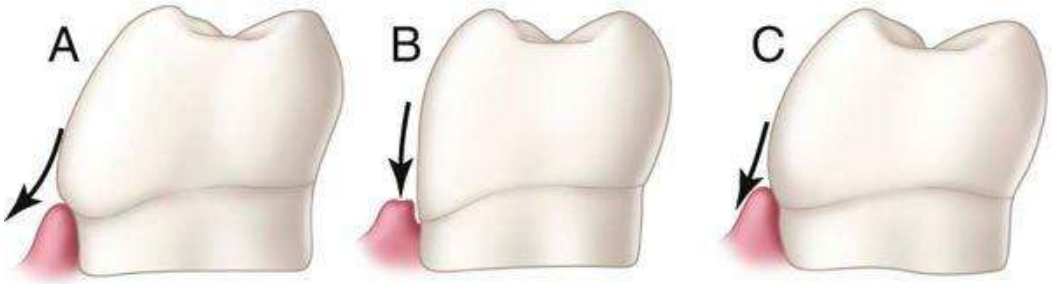


Figure 6. Arrows show pathways of food passing over facial surface of mandibular molar during mastication. A, Over-contour deflects food from gingiva and results in under-stimulation of supporting tissues. B, Under-contour of tooth may result in irritation of soft tissue. C, Correct contour permits adequate stimulation for supporting tissue, resulting in healthy condition.[6]

The proper form of the proximal surfaces of teeth is just as important to the maintenance of periodontal tissue as is the proper form of facial and lingual surfaces. The proximal height of contour serves to provide (1) contacts with the proximal surfaces of adjacent teeth, thus preventing food impaction, and (2) adequate embrasure (figure 7) space apical to the contacts for gingival tissue, supporting bone, blood vessels, and nerves that serve the supporting structures.[6] (Figure 8)

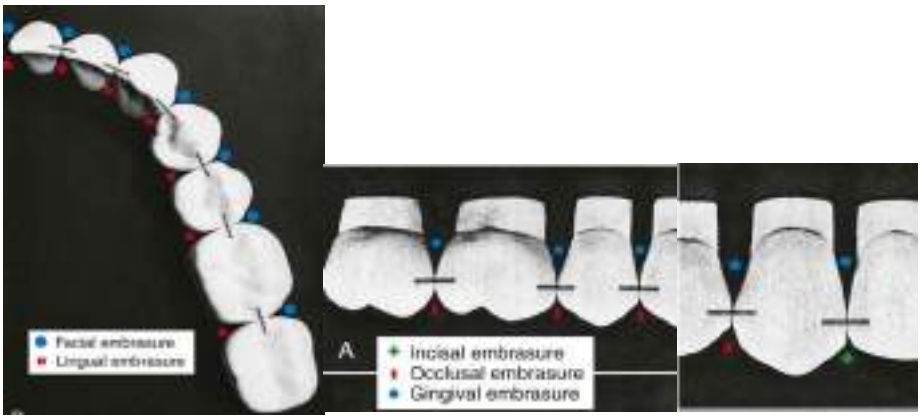
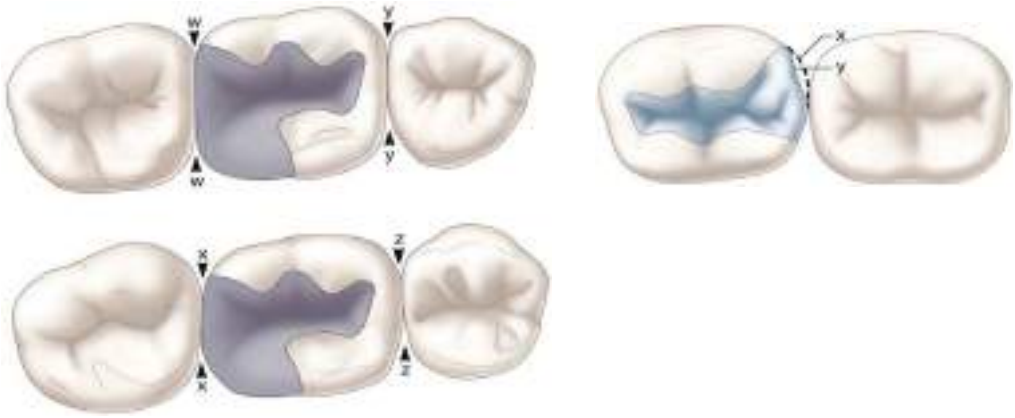


Figure 7. Proximal contact areas. Black lines show positions of contacts incisogingivally and occlusogingivally. Incisal, occlusal, and gingival embrasures are indicated.[6]



(a) (b)

Figure 8. (a) Embrasure form. *w*, Improper embrasure form caused by over-contouring of restoration resulting in unhealthy gingiva from lack of stimulation. *x*, Good embrasure form. *y*, Frictional wear of contact area has resulted in decrease of embrasure dimension. *z*, When the embrasure form is good, supporting tissues receive adequate stimulation from foods during mastication. (b) Embrasure form. *x*, Portion of tooth that offers protection to underlying supporting tissue during mastication. *y*, Restoration fails to establish adequate contour for good embrasure form.[6]

The term "interproximal interface" (IPI) relates to the common boundary area of two adjacent teeth. This boundary is dynamic and varies with age, teeth alignment, crowding, masticatory force, etc. We prefer to use the term IPI to describe the joint attrition facet between two adjacent teeth in the same arch and the term contact area (CA) to describe the facet on the proximal wall of a tooth that underwent attrition due to physiological activity.[7]

CA and IPI most often differ from each other, only a certain portion of the CA of each of the two adjacent teeth build up the IPI. For example, the concave/convex pattern of the CAs when occlusally viewed that occasionally appears in the posterior dentition. Here, the CA differs between the two adjacent teeth; however, the size of the IPI remains the same. Physiologically, contacts between teeth allow dissipation of masticatory forces along the dental arch, preventing mesial migration of teeth, protecting arch integrity, and avoiding food impaction.[7]

Food impaction is the forceful wedging of food into the periodontium by occlusal force. It may occur interproximally or in relation the facial or lingual tooth surfaces. Food impaction is distinct from food lodgment (food retention), later being just a mere lodgment of food particle, which get washed away even after normal mouth rinsing.[1] Firm contacts normally exist between teeth (in the middle third for posterior teeth and in the incisal third for anterior teeth), which force food to be broken down into two parts and distributed down the facial and lingual surfaces of the teeth. If there is no contact, biting pressure forces food between the teeth and gingiva. The food can cause irritation, which may lead to inflammation and infection.[3]

Food impaction may be vertical or horizontal. Vertical food impaction

as the name suggests is the impaction from occlusal direction due to action of opposing tooth. This can be due to[3]:

i. Open contact between adjacent teeth this obviously causes food

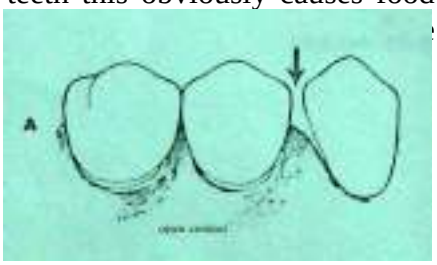


Figure 1: Open contact

ii. Irregular or level difference between adjacent marginal ridges (Figure 2). This causes the food to remain on the occlusal surface.

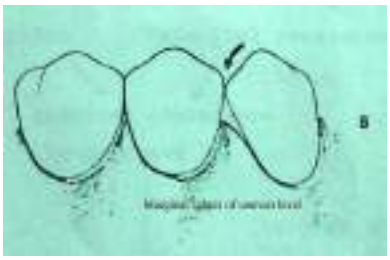


Figure 2: Irregular marginal ridge

iii. Plunger cusps as the name suggest is the cusp which plunges between two opposing teeth.

Hirschfeld (1930) have documented several conditions and factors responsible for food impaction and gave classification of factors causing food impaction as follows[1,3,8]:

- Class I: Occlusal wear
  - Type A: Wedging action produced by transformation of occlusal convexities into oblique facets, exaggerating the action of plunger cusp.
  - Type B: Remaining obliquely worn cusp of a maxillary tooth overhanging the distal surface of its functional antagonist.
  - Type C: Obliquely worn mandibular tooth overlapping the distal surface of its functional Antagonist.
- Class II: Loss of proximal contact

Type A: Loss of distal support through the removal of a distally adjacent tooth.

Type B: Loss of mesial support due to extraction of mesial tooth.

Type C: Oblique drifting due to nonreplacement of a missing tooth.

Type D: Permanent occlusal openings to interdental spaces.

- Class III: Extrusion beyond the occlusal plane

  Extrusion of a tooth which was previously retaining contiguity with the adjacent mesial and distal teeth result in occlusal step deformity between marginal ridges of extruded and non-extruded teeth, thus disturbing proximal contact relationship and favoring food impaction.
- Class IV: Congenital morphological abnormality

  Any congenital morphologic abnormalities in size, shape, form and position of tooth leading to open proximal contact, is conducive to food impaction.

  Type A: position of a tooth in torsion.

  Type B: emphasized embrasure between thick neck teeth.

  Type C: facio-lingual tilting.

Type D: lingual or buccal position of the tooth.

- Class V: Improperly constructed restorations
  Type A: Loss of contact point in restoration.
  Type B: Improper location of contact point.
  Type C: Improper occlusal contour.

In the first case, vertical impaction occurs due to loss of interproximal interface and uneven marginal ridge contour result of chipped composite fillings. Other clinical findings that along with it are the fibers of food that stuck between two teeth that can't be cleaned, bleeding and swelling of the gingiva, periodontal pocket, as well as patient complaints about continously pain, describe a characteristic of food impaction. This is in accordance with the classification of food impaction Class V Type C Hirschfield.[1,3,8]

In the second case, what happens is the food retention (food lodging). Although the loss of interproximal interface occurs, similar to the first case, other accompanying clinical circumstances do not support the hallmark of food impaction. Soft deposit of food stuck in the interdental area can be cleaned using the three way syringe, normal gingiva appearance, the absence of a periodontal pocket, and pain that occurs only on certain types of food illustrates the characteristic of retention of food.[1]

Disease is defined as an attribute or a characteristic of a person, and diagnosis is the clinician's belief that the person has the attribute.[9] Diagnosis between food impaction and food retention is very important to determine the treatment needs to be done. The history and specific clinical findings are the main factors that differentiate the two diagnoses. Therefore, the importance of a clinician explore information, determine the success of the treatment.[9]

Food impaction, with its clinical findings, causing discomfort to the patient and limiting patient activity, need emergency treatment compared to food retention. The ideal management of both cases is the restoration of the interproximal interface to provide ideal food pathways.[7] Treatment options for the first case is the sectional matrix composite restorations. As for the second case, because it isn't an emergency case, the ideal management is orthodontic treatment, but the grounds of cost and time, patient prefer minimally invasive treatments through the sectional matrix composite restorations.

The evolution of dental materials properties and adhesive systems along with patients' esthetic requirements has increased the use of resin composite restorations for posterior teeth. However, resin composite restorative procedures present some technical difficulties, such as the establishment of proximal contacts. A correct proximal contact enables balanced mesiodistal forces and provides resistance against food impaction at marginal interproximal ridges. Preformed matrices and separating rings combined with wedges have produced good results, with adequate contour and form to the restoration.[10]

A natural tooth is suspended by PDL. The mean values of axial displacement of teeth in the socket are

25–100 mm. A natural tooth moves rapidly 56–108 mm and rotates at the apical third of the root upon a lateral load, and the lateral force on the tooth is diminished immediately from the crest of bone along the root.[11] Sectional matrix along with it's separation ring provides a tight contact (separation from 0,27-0,55 kg/mm) to overcome tooth displacement during mastication and prevents food impaction.[12,13]

CONCLUSION

Interproximal interface is a composition of certain portion of the contact area of both adjacent tooth. This interface along with natural tooth anatomy provides a tight contact and a spillway for food during mastication, thus prevent food impaction, allowing stimulation of periodontal structure and maintaining periodontal health. Food impaction and food retention are common phenomenon for losing interproximal interface, resulting periodontal tissue destruction. Sectional matrix and it's separation rings provides a tight proximal contact to facilitate a proper restoration of interproximal interface.

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CASE REPORT

Tissue Movement for Better Results in Preprosthetic Reconstructive Surgery

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ABSTRACT

Background*: Alveolar bony defects can occur due to advance periodontal disease. These defects often cause a significant problems in dental treatment and rehabilitation. Many techniques exist for hard tissue augmentation. These techniques are based on specific procedures to perform preprosthetic rehabilitation. This article presents case report of preprosthetic surgery with severe bone loss in two different techniques.* ***Purpose:*** *To determine the superior techniques of two methods in preprosthetic surgery with severe bone loss.* ***Case and case management:*** *A nonsmoker 40 years old male was first examined in author's department in August 2015with severe anterior mandible bone loss. The diagnosis was chronic periodontitis. His treatment plan included tooth extraction of hopeless teeth, bone augmentation and implant. Nonsurgical treatment was performed on all teeth, preprosthetic surgery with severe bone loss performed in anterior mandible. The first technique, incision made circularly right on each tooth sulcus without any horizontal incision on the apical of interdental papillae. Whereas the second technique, horizontal and vertical incision on the apical of interdental papillae was performed.* ***Results:*** *Three months post surgery, clinically the alveolar ridge level has increased. Radiographic evaluation: there are better bone formation after the second surgery either increasing of bone level condition as well as bone density and periodontal space recovery.* ***Conclusion****: The surgical technique with incision right on each sulcus of tooth and incision horizontally and vertically on the apical of interdental papillae led to novel possibilities to regenerate alveolar bone.*

Keywords: *Alveolar bony defects, chronic periodontitis, preprosthetic surgery techniques*

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BACKGROUND

The hallmarks of periodontal disease are inflammation and alveolar bone loss. Gingival inflammation can resolve but alveolar bone loss leads to eventual tooth loss. Resorption of alveolar bone is a common sequel of tooth loss and presents a clinical problem, especially in the esthetic zone.[1] Advanced alveolar bone loss (>7 mm) may result in esthetically and functionally compromised dental prosthesis like removable and fixed partial dentures and ideal implant placement in prosthetically driven position.[2] The deficient alveolar ridges always present with numerous challenges to the clinician for achieving predictable augmentation.[3-9] The end goal of the therapy is to provide a functional restoration that is in harmony with the adjacent natural dentition. Thus augmentation of bone is often necessary. [1] Advances in biologic understanding of different bone regenerating materials and continuous innovations in surgical techniques have led to increased predictability in reconstruction of alveolar ridge defect.[10]

Bone is a dynamic structure with a continuous remodeling to ensure renewal of form and function.[1] Although bone tissue exhibits a large regeneration potential and may restore its original structure and function completely, bony defects may often fail to heal with bone tissue.[11] In order to facilitate and/or promote regeneration of lost bone, a variety of techniques may be employed, including particulate grafting, membrane use, block grafting, and distraction osteogenesis, either alone or in combination.[1] The biologic mechanisms forming the basis of bone augmentation include three basic processes: osteogenesis, osteoconduction, and osteoinduction. [11] Bone augmentation techniques may be used for the applications of extraction socket defect grafting, horizontal ridge augmentation, vertical ridge augmentation, and sinus augmentation.[1] Many of these reconstructive efforts are limited in the efficacy due to inadequate flap coverage and vascular perfusion. Procedures to prevent the collapse of the alveolar ridge are highly technique sensitive and require different surgical designs depending upon the size of the defect.[12] Several flap techniques have a general concept associated with alveolar ridge augmentation. This include generating blood supply, protected shape of bone growth and achieving tension free flap in wound closure. [13] In this article we presents two different techniques of flap design in preprosthetic surgery with severe alveolar bone loss for optimizing dental implant placement.

CASE REPORT

A nonsmoker 40-years-old male patient was first examined in Author's department in August 2015 with mobility in central incisors of mandible since 6 months, due to trauma wanted a permanent replacement of his mobile teeth. Clinical examination [Figure 1], radiographs [Figure 2], and a thorough history were obtained from the patient. On clinical examination were found as follows: grade III mobility of #32, grade II mobility of #34, generalized probing pocket depth 6-8mm of teeth on the mandible, missing teeth of #36 and #46 and generalized malposition

of teeth. The mandible anterior ridge deficiency was noticed. To evaluate the bone loss, panoramic radiographs was performed. The condition of periodontal tissues were found to be as followed: lack of bone density and supraposition of #32 and angular bone loss of #34. A final diagnosis of Generalized Chronic Periodontitis with severe bone loss on the mandible was established.

We decided his treatment plan included dental health education, scaling and root planning, splinting, occlusal adjustment, tooth extraction of hopeless 32, bone augmentation and dental implant. Finding that the available bone condition was inadequate for an implant, we decided to horizontally augment the implant recipient site which is on region 32 with a suitable substitute. Either on 34, we decided to horizontally augment the angular bone loss. The complete treatment plan was explained to the patient and signed informed consent was obtained. After completion of initial treatment, surgical procedure was carried out at a later appointment.

Figure 1. clinical examination on first examined

Figure 2. radiographic examination before treatment

CASE MANAGEMENT

Surgical Procedure was performed 1 week after nonsurgical procedure.
Procedure of surgical I, bone augmentation on #32

1. After local anesthesia, a full thickness flap was performed which is incision made right on sulcus of #33 [Figure 3,4]. An incision at the sulcus was used to preserve interdental papillae.
2. #31 was extracted [Figure 5], followed by curettage of granulation tissue in tooth socket post extraction.
3. Incision was performed using Gracey curette instrument. While at incised, smoothing and scrapping was performed to get rid of existing granulation tissue on the root surface using Gracey.
4. Bovine bone grafts, product of tissue bank of Dr. Soetomo Hospital Surabaya, was applied after all soft tissues were thoroughly removed from the recipient site. Once properly positioned, grafts was covered by released mucosa and then sutured [Figure 6,7].
5. For oral administration, amoxicillin 500mg t.i.d 3 days, doxycycline 20mg b.i.d 30 days, mefenamic acid 500 mg t.i.d Bio ATP s.i.d, calcitrol s.i.d and hyaluronic acid gel, were initiated.

Figure 3. flap incision using Gracey curette on the sulcus of #33

Figure 4. flap incision on the sulcus

Figure 5. The socket post extraction of #32

Figure 6. Bone grafts applied into the socket post removal of granulation tissues

Procedure of surgical I of bone augmentation #34

Bone augmentation on #34 was perfomed 3 weeks after augmentation #32. The flap design and techniques of bone augmentation #34 was similar to #32 augmentation. The incisision of flap was made right on each sulcus on #33 and #34 using Gracey curette followed by smoothing and scrapping on the tooth surface. This flap design was used to preserve te interdental papillae [Figure 8,9].

Figure 7. sutured using non absorbable silk 5.0

Figure 8. Tthe flap incision on #33 and #34

Figure 9. bone grafts applied after removal of granulation tissues

After 5 months of healing post first surgery, on clinical evaluation there is a concave shape on the labial side of region #32 [Figure 10,11]. This means still has bone defect on the labial side of region #32. On radiographic evaluation, the alveolar bone density on region #32 has not increased. The alveolar bone on #34 has increased [Figure 12]. Based on these results, we decided to perform second surgery of alveolar bone augmentation on region #32 and #34 in order to achieve adequate ridge width and bone density to facilitate the placement of implant.

Figure 10. the result after 5 months post first surgery. Clinically there is concave shape on the labial side (arrow)

Figure 11. the result after 5 months post first surgery. Clinically there is concave shape on the labial side (arrow)

Procedure of surgery II, bone augmentation of region #32

1. After local anesthesia, a full thickness flap was performed which is incision made horizontally along alveolar ridge of region #32 [Figure 13] using blade number 15C. The vertical incision was made 5mm apically from the margin gingiva of #31 [Figure 14]. After the flap was reflected there was still bone defect on region #32 which this

made a concave shape on the labial side of the bone.

2. Bone grafts was applied after all soft tissues were thoroughly removed from the recipient site. Bone grafts was applied at the concave shape on the labial side [figure 15,16]. Once properly positioned, grafts was covered by released mucosa and then sutured [Figure 17]

Figure 13. flap was performed with horizontal incision on along alveolar

Figure 14. vertical flap incision on 5 mm apically from the margin gingiva of

Figure 15. the process of applying bone graft into the concave shape on the labial side of bone defect

Figure 16. bone graft on properly position before sutured

Figure 17. the flap was sutured using non absorbable suture

Procedure of surgery II, bone augmentation on #34

1. After adequate local anesthesia, a full thickness flap was performed with incision made horizontally along #33, #34, #35 included 3 mm apically of interdental papillae [Figure 18].
3. Bone graft was applied after all soft tissues were thoroughly removed from the recipient site [Figure 19]. Once properly positioned, grafts was covered by released mucosa and then sutured [Figure 20].

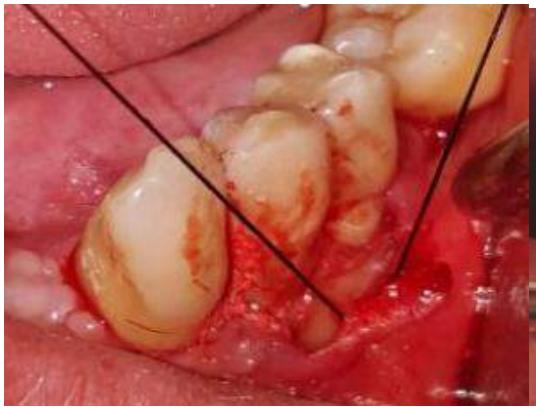

Figure 18. flap design on augmentation II of #34. A full thickness flap was performed with incision made horizontally along #33, #34, #35 included 3 mm apically of interdental papillae

Figure 19. The process of applying bone graft on the defect

Figure 20. sutured using non absorbable suture

RESULTS

The results of 3 months after second surgery of region #32 and #34 were as followed:

1. On clinical evaluation, there was an increased of alveolar ridge level on region #32 [Figure 21,22] and there was not any concave shape on the labial side on the region #32 [Figure 23,24]

Figure 21. The result 4 months after first surgery

Figure 22. The result 3 months after second surgery

Figure 23. The concave shape post first surgery

Figure 24. there is no concave shape after second surgery

2. On radiographic evaluation, there was an increased of bone density on region #32 and there was a significant alveolar bone and periodontal space recovery on #34 compare to the results of first surgery [Figure 25, 26, 27]

Figure 25. The radiographic examination before treatment

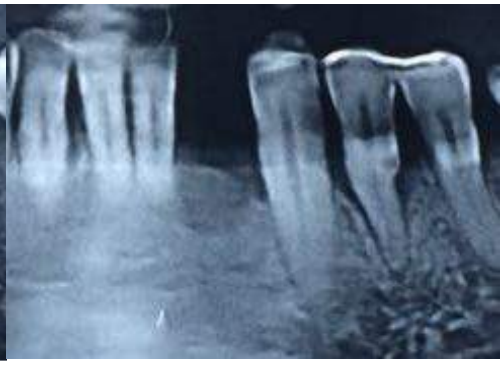

Figure 26. The radiographic evaluation 4 months post first surgery

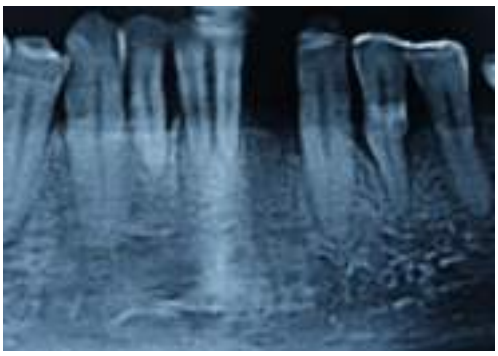

Figure 27. The radiographic evaluation 3 months post second surgery

3. On CBCT evaluation, the width of alveolar bone (axial) is 5.98 mm, 5.90 (coronal). There is severe bone loss on the interdental of #31 and #33. Intedental space between #31 and #33 is 5.93 mm. The average of bone profile with the region of interest 17x35 is 906.4 HU

Figure 28. The width of alveolar bone is 5.98 mm (CBCT evaluation, axial)

Figure 29. The width of alveolar bone is 5.90 mm (CBCT evaluation, coronal). .

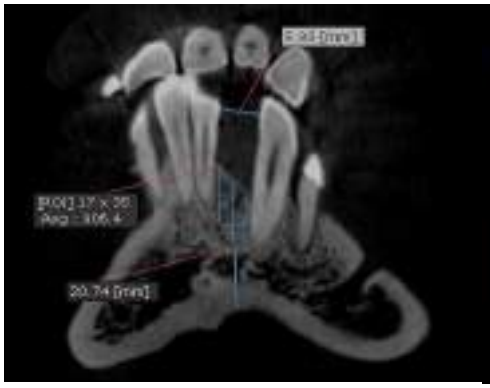

Figure 30. There is severe bone loss on the interdental of #31 and #33. Intedental space between #31 and #33 is 5.93 mm. The average of bone profile with the region of interest 17x35 is 906.4 HU

Figure 31. The 3D profile of present alveolar bone on region #32 and #34

DISCUSSION

The purpose of the present case report was to compare two different flap designs in preprosthetic surgery in the treatment of advanced alveolar bone defect. The treatment plan of this case after tooth loss is included dental implant. The clinician is obligated to perform augmentation procedures to reconstruct lost bone in order to achieve adequate ridge width to facilitate the placement of implant in a prosthetically driven positioned. Surgical reconstructive procedure in preprosthetic surgery have become more numerous and complex. Depending on the size and morphology of the defect, various augmentation procedure can be used including particulate grafting, membrane use, block grafting, and distraction osteogenesis, either alone or in combination. All the proven techniques must be followed to achieve good results including the flap management techniques. These include generating a blood supply, maintaining a stable, protected space of bone growth and achieveing tension-free flap wound closure.

On the first surgery, the clinician was intended making a minimally invasive surgery in order to save more blood supply so there was not any vertical incision performed. This include one of general concept for flap management associated with alveolar ridge augmentation. The use of vertical incisions, although often required for surgical access, should be minimized. The absence of horizontal and vertical incision on the first surgery may either interfered the flap tension while at wound closure which led to unsatisfied results. On the second surgery, either horizontal and vertical incision were performed. This flap design was intended to open more access for smoothing and scrapping the root surface and bone defects from granulation tissues, easier bone graft placement and also reduce the tension of flap. Wound closure depends on how to adapt wound edges with suturing techniques. Good sutured depends on the free flap tension which is increase flap elasticity. This permits complete closure without stress on the wound margin. V.

Soft tissue management is a critical aspect of bone augmentation procedures. Incisions, reflection and manipulation should be design to optimized blood supply and wound closure. The design and management of mucoperiosteal flap must consider to increased dimensions of the ridge after augmentations as well as esthetics and approximation of the wound margins. Various surgical techniques have been investigated with the aim of achieving simultaneous complete wound closure of preprosthetic surgery and perfectly normal appearance related to the tissue of the adjacent teeth. Selection of the appropriate surgical technique depends on different factors, some of which are related to the patients while others related to anatomical characteristics of the defect. The surgical procedure must be executed with the utmost of care in order to preserve the vascularity of the flap and to minimized tissue injury.[13] In this case, the flap design performed on second surgery which is included vertical and horizontal incision is more superior than flap design on the first surgery. The results of the second surgery is more significant than on the first surgery. The formation of alveoar bone included bone density and recovery of

periodontal space is better on the second surgery. The surgical technique performed with horizontal and vertical flap design led to novel possibilities to regenerate alveolar bone.

CONCLUSION

The surgical technique performed with vertical and horizontal flap design led to novel possibilities to regenerate alveolar bone.

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SL 2.14

RESEARCH ARTICLE

Distribution of Candida Species in Oral Candidiasis on Injection Drug User

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ABSTRACT

Background: *Injection drug user is associated with a multitude of health risk, especially HIV/AIDS infection and other opportunistic infection. Oral Candidiasis is an opportunistic infection affecting the oral mucosa and high related during the course of HIV infection. Among these, Candida albicans is the most frequently isolated species, followed by Candida glabrata, Candida tropicalis, Candida parapsilosis, Candida dubliniensis, Candida guilliemondii, Candida krusei and Candida keyfr are responsible for Oral Candidiasis. Identification of the Candida species is beneficial in choosing the proper treatment and management of the oral candidiasis. Related to this, Candida non-albicans species have been increasingly found associated with antifungal drug resistance.* ***Purpose:*** *The aims of this study were to evaluate the prevalence of Oral Candidiasis and to determine distribution Candida albicans and non-albicans species on Oral Candidiasis in injection drug user.* ***Materials and Methods:*** *Fifty five injection drug users were examined and evaluated of Oral Candidiasis. Oral swab sample was obtained and cultured on Sabouraud's dextrose agar to know Candida colonization.* ***Results:*** *Fifty five percent of injection drug users were suspected suffer Oral Candidiasis and the growth rate of yeast was 53.33%. All of injection drug users suffer Oral Candidiasis was diagnosed HIV positive. The most frequently isolated Candida was Candida albicans (68.75%), Candida glabrata (18.75%), Candida tropicalis (6.25%), and Candida parapsilosis (6.25%).* ***Conclusion:*** *Candida albicans was still the predominant species on Oral Candidiasis in injection drug user.*

Keywords: *injection drug user, HIV infection, oral candidiasis*

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BACKGROUND

Although the primary mode of Human Immunodeficiency Virus (HIV) transmission in Indonesia is heterosexual contact, injection drug use is now recognized as a risk factor for HIV infection. It is well known that, unlike other high-risk populations where HIV transmission is mainly driven by unprotected sexual intercourse, HIV infection among injection drug user (IDU) is mainly transmitted via the sharing of unsterile syringes.[1,2,3]

Injection drug user (IDU) is associated with a multitude of health risk, especially HIV infection. HIV attacks the body's immune system. If left untreated, HIV makes the person more likely to get infections. Over time, HIV can destroy so many of these cells that the body can't fight off infections and disease. These opportunistic infections take advantage of a very weak immune system and signal that the person has Acquired Immunodeficiency Syndrome (AIDS), the last state of HIV infection.[4]

Oral Candidiasis is the most common human fungal infection that is known as common opportunistic oral cavity infection in the immunocompromised patient. More than 90% of HIV infection patients have had Oral Candidiasis during the course of their HIV infection, and the infection is considered a portent of AIDS development. The most common types of Oral Candidiasis in conjunction with HIV are pseudomembranous candidiasis, erythematous candidiasis, angular cheilitis and chronic plaque-like candidiasis.[4]

Candida albicans is the most frequently isolated species, followed by *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, *Candida dubliniensis*, *Candida guilliemondii*, *Candida krusei* and *Candida keyfr* are responsible for Oral Candidiasis.

Oral Candidiasis is superficial *Candida* infection which is more common in elderly age, immunocompromised host, denture wearer, and people with xerostomia.[4,5] Identification of the *Candida* species is beneficial in choosing the proper treatment and management of the Oral Candidiasis. Presently, there are many identification methods for *Candida* species, for example, phenotypic and molecular technique. The phenotypic method includes chromogenic medium and carbohydrate assimilation. The molecular technique for discrimination of *Candida* species have been continuously developed such as multiplex polymerase chain reaction (PCR), PCR restriction fragment length polymorphism (PCR-RFLP), and real-time PCR. Related to this, *Candida non-albicans* species have been increasingly found associated with antifungal drug resistance, especially *Candida glabrata, Candida krusei, and Candida tropicalis*.[6]

PURPOSE

The aims of this study were to evaluate the prevalence of Oral Candidiasis and to determine distribution *Candida albicans* and *non-albicans* species on Oral Candidiasis in injection drug user (IDU).

MATERIALS AND METHODS

This research is using the observational descriptive study with

cross-sectional method. Fifty five injection drug users (IDU) from Our Right to be Independent (Orbit) organization in Surabaya, Indonesia were examined and evaluated of Oral Candidiasis, during the period from July to December 2015. Oral swab sample was obtained and cultured on Sabouraud dextrose agar (SDA) overnight at 37 °C. Candida species were identified by colony morphology on Sabouraud dextrose agar (SDA), microscopic morphology showing budding yeast cell, germ tube test and carbohydrate fermentation test. Statistical analysis was performed by using Statistical Product and Service Solutions (SPSS) for Windows version 17.0 with statistical descriptive chi-square test.

RESULT

Fifty five percent of injection drug users (IDU) were suspected suffer Oral Candidiasis. There is Pseudomembranous Candidiasis, Erythematous Candidiasis, and Chronic Hyperplastic Candidiasis. The growth rate of yeast on Sabouraud dextrose agar (SDA) was 53.33%. Based on the clinical finding, Pseudomembranous Candidiasis has 53%, then Chronic Hyperplastic Candidiasis (34%) and Erythematous Candidiasis (13%).

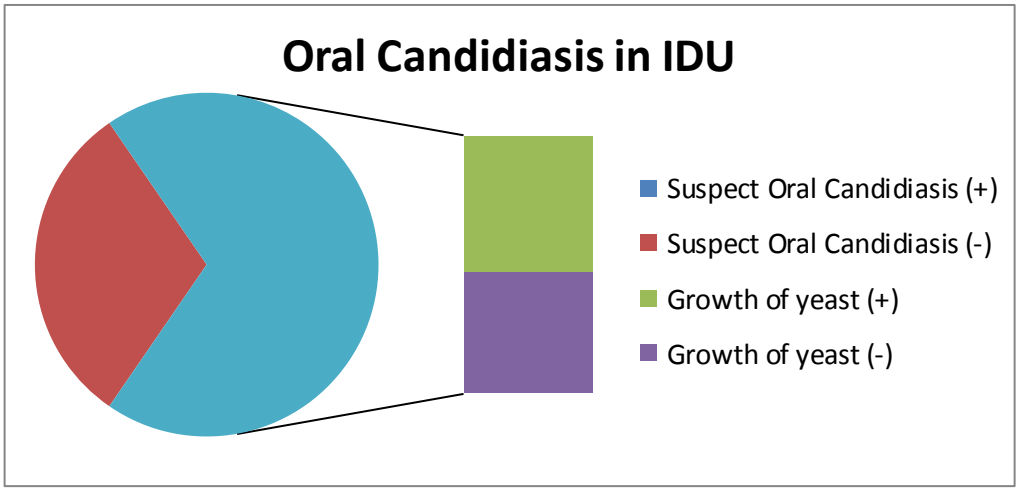

Figure 1. Oral Candidiasis in IDU.

Figure 2. Oral Candidiasis based on the clinical finding, a. Pseudomembranous Candidiasis, b. Erythematous Candidiasis, and c. Chronic Hyperplastic Candidiasis.

Injection drug user (IDU) suffer Oral Candidiasis consisted of 100% male with the mean of age 38.88. All of injection drug user (IDU) suffer Oral Candidiasis was diagnosed HIV positive. It is demonstrated through medical record all of injection drug user (IDU) with range 1-17 years (7.69 ± 5.02).

Candida species were identified by colony morphology on Sabouraud dextrose agar (SDA), microscopic morphology showing budding yeast cell, germ tube test and carbohydrate fermentation test. And the result is the most frequently isolated Candida was *Candida albicans* (68.75%), *Candida glabrata* (18.75%), *Candida tropicalis* (6.25%), and *Candida parapsilosis* (6.25%).

Table 1. Risk Factor to Oral Candidiasis in IDU.

Variables		Frequency
Age		33-48 years (38.88 ± 4,55)
Gender	Male	100%
	Female	0%
Duration of IDU		7-23 years (16.37 ± 4.88)
HIV infection	Yes	100%
	No	0%
Duration of HIV infection		1-17 years (7.69 ± 5.02)

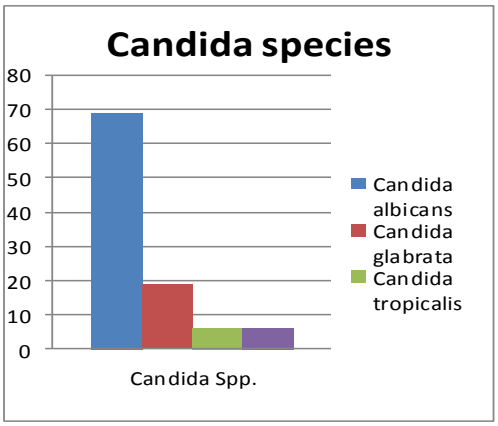

Figure 3. Distribution of *Candida* Spp.

DISCUSSION

Our study demonstrated that *Candida albicans* was responsible for approximately 68.75% of Oral Candidiasis. Whereas in the previous two decades, *Candida albicans* represented all over 90% isolates from all forms of human Oral Candidiasis. This indicates the increasing frequency of *Candida non-albicans* in oral *Candida* infection. All of injection drug user (IDU) suffer Oral Candidiasis was diagnosed HIV positive. This indicates the increasing HIV/AIDS infection in injection drug user (IDU) because Oral Candidiasis is an opportunistic infection in people who infected HIV/AIDS and the infection is considered a portent of AIDS development. Injection drug user (IDU) is mainly transmitted via the sharing of unsterile syringes. Heroin, methamphetamine, amphetamine and cocaine were drugs frequently use. Actually, injection drug user (IDU) life style was so high, supported by alcoholism and free sex. So, injection drug user (IDU) was risk factor behaviors of HIV/AIDS infection.[2,3,4]

HIV attacks the body's immune system, specifically the CD4 cells, which help the immune system fight off infections. If left untreated, HIV reduces the number of CD4 cells in the body, making the person more likely to get infections. Over time, HIV can destroy so many of these cells that the body can't fight off infections and disease. These opportunistic infections take advantage of a very weak immune system and signal that the person has AIDS.[3,4]

Among *Candida non-albicans* species isolated from the oral cavity in injection drug user (IDU), *Candida glabrata* was the most frequent species, followed by *Candida tropicalis* and *Candida parapsilosis.* The growing number of *Candida non-albicans* species might be associated with previous exposure to azole and polyene drugs, malignancy disease and indwelling medical devices. Nevertheless, the distribution of *Candida non-albicans* species may vary according to age groups and geographic areas. For example, *Candida glabrata* has a high incidence in America, North and Central Europe. *Candida tropicalis* is commonly isolated in South America and Asia. Moreover, *Candida glabrata* predominates in the elderly. *Candida parapsilosis* is a significant pathogen in neonate bloodstream infection, especially prematurity and low birth weight. *Candida dubliniensis* is associated with an oral opportunistic pathogen in patients infected with HIV.[7,8,9,10]

The increasing frequency of *Candida non-albicans* species in oral *Candida* infection is important. Identification of the *Candida* species is beneficial in choosing the proper treatment and management of the Oral

Candidiasis. Related to this, *Candida non-albicans* species have been increasingly found associated with antifungal drug resistance, especially *Candida glabrata*, *Candida tropicalis*, and *Candida krusei*.[4,5] Because of the different susceptibility of *Candida* species to antifungal agents, it is important to identify the causative *Candida* to the species level correctly. This study could be represented to develop the proper antifungal each *Candida* species. In HIV/AIDS infection, it can be useful for increasing the quality of their life.[11]

In conclusion, *Candida albicans* was still the predominant species on Oral Candidiasis in injection drug user. But a proportion of *Candida albicans* and *Candida non-albicans* species in oral candidiasis patients is changing from the past. The frequency of *Candida non-albicans* species were found to be gradually increased.

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SL 2.15

CASE REPORT

Comprehensive Approach of Severe Early Childhood Caries in Child with Post-palatoplasty: A Case Report

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ABSTRACT

Background: *Severe early childhood caries (S-ECC) is a particularly virulent form of dental caries that is characterized by an overwhelming infectious challenge and is associated with unusual dietary practices. This can happen on patients post-palatoplasty, caused by their food pattern and a difficulty way to clean their teeth. S-ECC initially shows a pattern of development which is defined and symmetrical, influence on the cervical third of labial surface of maxillary anterior teeth. Then, decay appears on the occlusal surfaces of the primary maxillary first molars as the disease progresses, with subsequent spread to other primary teeth, resulting in the eventual destruction of the primary dentition. Accordingly, it can damage speech, swallowing, feeding, aesthetic and self-esteem of the child.* ***Purpose:*** *To optimalize the mastication function and estetic so that can increase the quality of life.* ***Case:*** *Patient a girl aged 3.5 years old post-palatoplasty came with severe caries almost on whole teeth maxillary and mandibular.* ***Case Management:*** *Initially, treatment was done with Dental Health Education and rontgen. All phasing treatments were done by filled up with GIC on 53, 55, 63, 65, nonvital pulpectomy on 52, 62, posterior strip crown restoration on 54, 64, extraction 51, 61, bridge fixed denture 51-52 and 61-62. On last treatment, the patient was given by topically fluoride and diet counseling.* ***Conclusion:*** *It is important for dentist to diagnose and treat ECC. The treatment should provide a positive psycho-social impact, not only by oral health recovering but also the quality of life by reestablishment both tooth function and aesthetic. The other tooth 53, 63, 72, 71, 74, 75, 81, 82, 83, 84, 85 are having treatments.*

Keyword*: Severe early childhood caries, post-palatoplasty, endodontic treatment and primary teeth restoration*

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BACKGROUND

Childhood and early adolescence are crucial periods in the development of healthy dentition. Severe early childhood caries (S-ECC) is a major public health problem, being the most common chronic infectious childhood disease, which is difficult to control. The term S-ECC was in an attempt to focus attention on the multiple factors such as socioeconomic, culture, behavioral, nutrition, biological risk factor and psychosocial that contribute to caries at such early ages that are associated with its initiation and progression.[1,3,6,7] Thus, it is thought that there may be distinctive risk factors involved in the progression of ECC. ECC was historically attributed to inappropriate and prolonged bottle use or breastfeeding. The use of the bottle, especially at bedtime, is believed to be associated with increased risk for caries, but this might not be the only factor in caries development in early childhood. Caries lesion are produced from the interaction of cariogenic microorganisms, fermentable carbohydrates, and susceptible tooth surface.[1,2,9]

While not life-threatening, its impact on individuals and communities is considerable, resulting in pain, impairment of function, deleterious influence on the child's growth rate, thus reducing quality of life. Treatment should be instituted immediately and specifically to prevent further tooth destruction and encourage better overall health. [1]

Severe ECC can lead to the loss of the child's front teeth at an early age. The child may suffer further developmental articulatio disruption, while these years are critical for speech development. Children with S-ECC can also experience delays in physical development, especially in height and weight. The pain caused by ECC may lead to a decrease in appetite, ultimately resulting in malnutrition. In fact, early extraction or loss of teeth often can result psychological trauma, even may lead to poor self-esteem. [1,2,11]

Furthermore, severe ECC was adopted in lieu of rampant caries, that have characteristic such as caries on a tooth surface in children younger than 3 years of age. Besides, dmft score > 4 (age 3), > 5 (age 4), or > 6 (age 5) also constitutes S-ECC. [1,9] Caries lesions also affect almost all teeth including lower incisors. This condition is rampant and generally involves tooth surface/s that are immune caries e.g. mandibular incisors. [1,7,9]

The initial clinical sign of caries is the presence of opaque and white spots. If not controlled, the process evolves to the appearance of cavities, and this can lead to the destruction of all tooth crown and initiate infectious root processes because of pulp involvement. ECC initiates on the cervical third of the labial surfaces of the maxillary anterior teeth and concomitantly affects the occlusal surface of the maxillary and mandibular first molars, maxillary and mandibular canines and second molars. At more advanced stages, type III, severe early childhood caries, it affects also the mandibular incisors. [2,3,6] Considering the impact on the quality of life and the possibility to prevent, arrest or even treat S-ECC, it could be great importance that the dentists especially pediatric dentists, must able to diagnose and treat this

pathology, returning the oral health and smile aesthetics to these children. [2,11]

Cleft lip and/or palate are the most common orofacial malformations. [4,5,8,10] Enviromental factor that cause cleft palate an/or lip was a multifactorial, such as chemical substance shelf, radiation, maternal hypoxia, teratogenic drugs, nutrition deficiency, physical obstruction and genetic factor.[12] Complicated during pregnancy i.e amniotic bands and oligohydramnions on first trimester also cause many defects. 75% mother that have rubella during pregnancy can cause defect on her baby. Thaliodom, anti-epilepsy drugs such as diphenylhydantoin, hormone drugs, quinine, valproic acid monotheraphy dan anti-mitotic drugs were drugs that can increase the insidence of cleft or other congenital anomaly. [13,14,15] Besides, the etiology of cleft palate or/and lip can be affected by B6 vitamin deficiency, iron, environmental exposure such as organic solvent, ambient air pollutant, and agriculture chemical substance.[13] Children with cleft anomaly also susceptible to have hearing disruption.[14,15]

Moreover, children with cleft palate also have speech disruption, caused by uncompetent velopharingeal, oronasal fistule, anterior or posterior crossbite, and other wrong behavior. [14,15] Mechanism of this valve restricts the resonance into mouth. Patient with cleft palate have an uncomplete velopharingeal closure, so that cause disappearance intraoral pressure while formating consonant voice. [16] There are anomaly on this patient such as agenese, supernumerary teeth, morfogenesis abnormality i.e size and shape, incisor hypoplasia, especially on teeth that adjacent with cleft, permanent teeth delay eruption, feeding difficulty, overbite and anterior crossbite. [15,17]

Various treatment planning of severe eraly childhood caries did comprehensively. Many destruction that involved the pulp must have root treatment first then will be restorated by glass ionomer, strip crown or stainless steel crown. In majority of cases, the destruction of the tooth structure involves almost the entire crown, leaving just the root and little crown portion, hence, only dentine left for bonding of the restorative materials. Thus in majority of cases the only option left is to extract these teeth.[11] Another simpler method to provide support to fabricate strip crown is to use omega loops, which provide a quick, inexpensive and efficient option. The technique of placing omega loops is quiet simple, it involves the placement of an omega shaped stainless steel wire extension into the entrance of the root canal prior to restoring the crown.[11] Behaviour management is also being a part of treatment planning.[1,11]

Therefore, the aim of this study was to report a treatment severe early childhood caries in child with post palatoplasty, which is to gain mastication function and aesthetic in order to increase quality of life as a final goal.

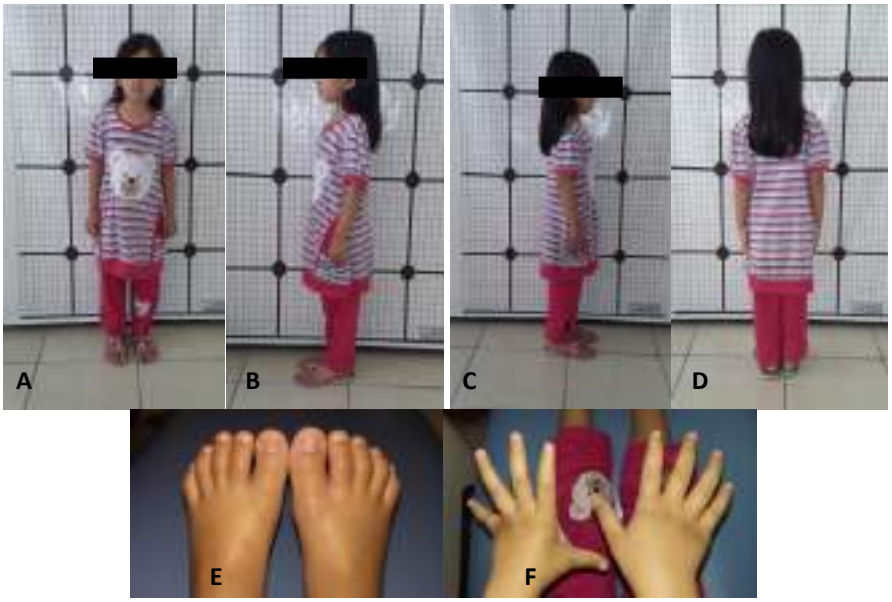
CASE REPORT

A three years five months old female reported came with her mother to the Cleft Center University Padjadjaran with a chief complaint of

decayed teeth and felt pain. Then, patient referenced to Department of Pedodontic University Padjadjaran for having further examinations. Parents informed that the child was born with cleft palate. Based on anamnese, known that child was born with weight 2.7 kg, height 49 cm, normally. Patient was known that having cleft palate on 8 days aged and undergone palatoplasty on 19 months aged.

Based on prenatal history, her mother was 36 years old during pregnancy, did not consume any drugs, no smoke, but consumed traditional herb. Perinatal history revealed that baby was born with a full term, normal delivery, and baby cried. Her general health revealed no systemic. Medical history revealed when baby was 5 days old became yellow, was caused by dehidration and cleft palate. Cleft palate did not happen on parentss, siblings, grandfather either grandmother. Diet history revealed that patient had a history of ASI breastfeedng as long as 2 months and had bottle feeding until now, on demand sweet and soft meal. Patient brushes her teeth once a day.

Physical examination showed patient on weight 13,5 kg and height 93 cm. Non-syndrome, no other difference, no systemic, foot and hand finger normal. Extraoral examination showed straight facial form, bilateral symmetrical, positive lip seal, straight body posture, low set lip tendency. Intraoral examination showed as set of mixed dentition, cleft palate complete closure, no gingivitis, no stomatitis, no fistule. Dental caries almost on maxillary and mandibular teeth, radix 51,61, pulp necrose 54, 52, 62, 64, 85, irreversibel pulpitis 72, 71, 81, 82, reversibel pulpitis 53, 55, 63, 65, 75, 74, 83, 84. Panoramic radiograph examination revealed agenese 15 and 25.



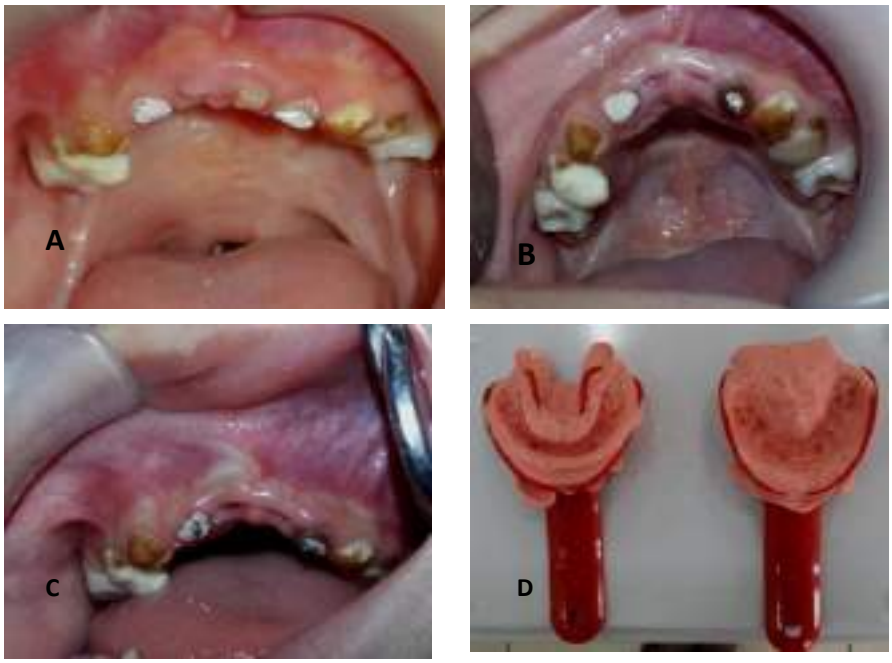
Picture 1. A,B,C,D Profil photograph. E,F Showing normal foot and hand finger

Picture 2. A,B. Profile picture showing low set lip. C. Palate complete closure post-palatoplasty D. Panoramic radiograph

Picture 3. A,B,C Intraoral photograph showing dental caries almost on maxilaary and mandibular teeth, diagnosed severe early childhood caries

CASE MANAGEMENT

On fisrt treatment involved introduce patient and her parents, anamnese, physical, extraoral, intraoral examination. Panoramic radiograph, Dental Health Education were done. Parents was told about treatment planning such as nonvital pulpectomy of 52, 62, extraction of 51, 61, strip crown posterior of 54, 64, and bridge fixed denture of 51-52 and 61-62. Glass ionomer cement restoration for 53, 55, 63, 65, 75 were done. On next treatment, nonvital pulpectomy of 52, 62, extraction of 51, 61 were carried out. Procedure of pulpectomy was done by toilet cavity, pulp, irigation, root canal sterilization one week, and root canal was filled up with Zinc Oxide Eugenol. Omega loop was used to made retention, because of a little healthy teeth left over. Omega loop was placed on incisal, and then wire arm was adaptable with mesial-distal wide of teeth. Omega loop was as a post, made by stainless steel wire 0,14 mm. The core was built up with glass ionomer core. Maxillary and mandibular moulding, work and study model with stone gyps were done, in relation to made acrylic bridge fixed denture. Afterthat, acrylic bridge fixed denture was cemented on 51-52 and 61-62. Strip crown posterior was used to rebuild 54, 64. The occlusion was checked and patient was advised to come for regular checkup.



Picture 4. A Open accsess,extirpation of 52,62. B. Control after 1 week, esxtraction of 51,61. C. Root canal was filled up, omega loop attachment and core built up D. Maxillary and mandibular moulding

Picture 5. A,B Study and work model. C,D Posterior strip crown 54,64, glass ionomer restoration 53,63 and acrylic bridge fixed denture of 51-52 and 61-62

DISCUSSION

Severe early childhood caries involves tooth surface caries lession, with or without cavity, usually occured on child 3-5 years old. Caries term affects more than 5 primary teeth surface, was initiated from maxillary incisors, maxillary and mandibular molar, and almost all erupted teeth even in mandibula incisors. If the lession did not treat early, caries lession could develop rapidly.

This patient was have cleft palate history, and had palatoplasty while 19 days old. Based on anamnese, patient with no systemic, and non-syndromic. Prenatal history revealed that patient was born normally weight, and no history with her mother. Perinatal history revealed that there was no cleft palate on her siblings, parents, grandfather either grandmother. Mother was 36 years old while pregnancy, which is the risk factor having baby with orofacial malformation.[1] Intraoral examination and anamnese showed that there was cleft palate on secondary palate (remnant of hard and soft palate), as a mild cleft palate. Secondary cleft palate was caused by the fusion failure of palatine shelf.[10] It was revealed that the etiology of cleft palate occured on last development, and sproradic.[2]

Through panoramic radiograph revealed agenese maxillary permanent second premolar (15, 25). These could relate with manifestation of cleft palate. Based on intraoral examination revealed that caries involved almost on all teeth. There is lesion on mandibular incisors, left and right maxillary canine with hypoplasia enamel, so that was diagnosed as a severe early childhood caries. It was related on orofacial malformation manifestation. Besides, the severe early childhood caries that occured in patient, was related on sweet and soft meal, bottle feeding, and ASI breastfeeding just until 2 months old. Selenium was known in ASI, so that can protect from caries on baby. Formula milk causing more caries lesion risks than baby with exclusive 6 months breastfeeding. [18]

Based on rontgen radiograph and clinical featrures showed in relation of 52, 62 must have nonvital pulpectomy

and extraction radix of 51, 61 that was covered by gingiva. Parents and patient were cooperative during treatment. Glass ionomer and strip crown posterior used as a restoration.[1,3,11] Many studies used metal-post, non-metal post such as polyethylene, glass-fiber, carbon fiber, but in some cases, these material have limitations such as sensitive tehnique, and expensive.[3,19]

In this case, was used simple method by omega loop stainless steel wire 0,14 mm. Wire arm omega loop was placed on incisal, adaptable on mesial-distal and loop as a post, which was a retention for final restoration. Besides, this material was inexpensive, simple method application, and did not affect on primary root resorption. Glass ionomer core was used to build up the core.

The aesthetic was made by acrylic bridge fixed denture on 51-52 and 61-62. This restoration was selected with consideration that 51, 61 were indefensible and 52, 62 were defensible as a pontic. Strip crown anterior restoration was not selected because of its limited strength. Acrylic bridge fixed denture was expected to give aesthetic function, strength, and help mastication until the eruption of permanent maxillary incisors. These treatment could be a choise, in case pulp involvement with grossly extensive crown destruction. These technique could cover the remnant teeth intact and decreased possibility for new caries lesion.

Stainless steel crown did not use to reconstruction of 54, 64, because there was no appropriate stainless steel crown, and so do onlay restoration did not use because of the extensive teeth destruction. One of the latest tehniques to restore these teeth, strip crown improve a flexural strength of glass ionomer, so do glass ionomer can release fluoride. Due to the reason, the crown was reconstructed by strip crown posterior with glass ionomer.

CONCLUSION

Severe early childhood caries affects almost all teeth including mandibular incisor. This condition could be happened on patient with post-palatoplasty, because of their way to eat and difficult to clean teeth. As a dentist, especially pediatric dentist, could able to diagnose and treat properly. Comprehensive treatment of a child with severe early childhood caries is challenging for dentist. Treatment must be done by appropriate anamnese, in relation for rehabilitation tooth function, improvement aesthetic and self-esteem. On this case, patient is having continued treatment for other teeth.

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SL 2.17

CASE REPORT

The Artistic Value Of Gummy Smile Treatment

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ABSTRACT

Gingival level plays an important role on a beautiful smile of an individual. Disproportionate gingival level or referred as 'gummy smiles' can heavily obstruct a person's smile, an important aspect that will lead into detrimental psychological factors of a person. Advances in dentistry technology may treat gummy smiles to achieve esthetically pleasant smiles with concise methods. In this particular case, flap gingivectomy and conturing both the bone and the gum are used to achieve the desired esthetic smile of the patient. After two weeks, remarkable results on the patient's smile can be observed for the intended research. This research shows to the reader the importance and usage of periodontology disciple to achieve esthetic results with affluence, accuracy and desired results.

This case underwent particularly on tooth 13, 12, 11, 21, 22, and 23. Surgical crown lenghtening was the step to achieve this goal. The patient satisfied with her teeth, and the smile was in harmony with her face.

Keywords: *Smile design, crown lenghtening, gummy smile*

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BACKGROUND

End result of any comprehensive periodontal therapy involves provision of a "physiologically balanced periodontal tissues". The main objective in therapeutic approach is to provide patient in two major aspects, which are function and esthetics. Also an emphasis on a cimbined periodontal-orthodontic approach cannot be ruled out in bringing the best results in smile design procedures. Those who have a well balanced poeriodontium along with good set of teeth in desires occlusion, does not pose a problem in their smile design. Smile desgining is a complex, interdisciplinary approach to multifactorial problems in most of the cases.[3]

Esthetic smile design is complex, simplified by breaking the problem down into component parts. The teeth are the picture, the the gingiva is the frame, and the lips are the movable curtains[3]. From periodontal aspect, gingival levels for each individual tooth is the key in the creation of harmonious smile. The cervical gingival height (position or level) of the centrals should be symmetrical. The maxillary centrals should exhibit a gingival shape that is more elliptical.[1]

In general, women tend to show slightly more gingiva than men. Excessive gingival display is a condition characterized by excessive exposure of the maxillary gingiva during smiling, commonly called "gummy smile". Proper treatment can be selected only after the diagnosis and etiology is determined. But gummy smile is often more esthetic than a smile with diminished tooth display. [3]

CASE

A 27-year-old female presented to University of Airlangga, Faculty of Dentistry for a better looking anterior upper teeth. The patient didn't feel confident about her labial bone anatomical which are exostosises . Based on clinical examination, there was uneven gingival margin on the labial, with big exostosises on the labial bone which could be able to make the smile not beautiful. The patient's medical history was noncontributory, and she denied for having systemic diseases, and allergy.

Figure 1. Patient's smile before the treatment

Figure 2. Patient's intraoral

Figure 3. Right and Left side of patient's intraoral

METHOD

The procedure was surgical crown lenghtening to adjust the bone at labial and also the gingival margin to remove the gummy smile. The patient had uneven gingival margin at the maxillary centrals which requires this procedure to be undertaken when the orthodontic treatment has been done. There was no probing depth on these uneven gingival margin. The steps are anesthesia on labial fold, and palatinum with local anesthetic injection (2% lidocain); crevicular incision is made around on tooth 13, 12, 11, 21, 22 and 23 at labial area with incisions across the interdental papilla, and vertical incisions at distal of 13, and 23 with Bard-Parker handle No 15 blade; remove the bone margin on tooth 21 in order to be the same level with bone margin tooth 11 at the labial area, and also to contour and sublimate the bone margin, and exostosises at labial area; then irigate with saline; the gingival margin was countoured 2 mm apically from cemento-enamel junction; then suture on interdental 13 and 12, 12 and 11, 11 and 21, 21 and 22, 22 and 23, also the vertical incision with 5-0 silk sutures in simple interrupted technique; apply periodontal pack at labial area. Amoxycillin 500 mg, and Mefenamic Acid 500 mg 3 times per day was given for 3 days to the patient. Post-operative instruction to the patient are the patient is not allowed to give anything to the surgical site.

One week later, the patient presented to be controlled. There was no pain, but there were uedematous, and inflammation. The surgical site then was unpack, unsutured, and carefully irigated with saline.

Figure 4. One week after the treatment

Two weeks later, the patient presented to be controlled. There was no pain, no uedematous, and no inflammation. The surgical site then was carefully irigated with saline.

Figure 5. Two weeks after the treatment

Figure 6. Two weeks after treatment from right side

Figure 7. Two weeks after treatment from left side

Figure 8. Patient's smile

DISCUSSION

According to Mechanic, only one of two persons who feel satisfied with their smile. When people say the real need of beauty means that the person is in need of a beautiful smile, and they deserve to look and feel better with theirselves.[5]

The two main objectives in dental esthetics are: to create teeth of pleasing inherent proportion and proportion to each other, and to create a pleasing tooth arrangement in harmony with the patient's lips, gingiva, and face. The esthetic dentist must clearly realize the inter-relationship between these components to effectively create an esthethically functional smile such as proportion, symmetry, and balance.[5]

The most important point in designing a smile, intraoral features contribute significantly to the smile's overall value which is the gingival in tissues surrounding the dentition. Gingival architecture differs from one patient to the next. What is consistent in the esthetic gingival patterns is the location of gingival margin being parallel to the bipupilary line, with the lateral incisor zenith being at or below the line drawn between the central incisor and the canine. When gingival asymmetry or imbalance occurs, balance must be created through either simple (laser contouring) or more involved surgical means.[5]

Some reasons for gummy smile are:[3]

- Excessive maxillary growth
- Shorter upper lips
- Excessive eruption of the maxillary teeth
- Delayed apical migration of gingival margin over maxillary anterior teeth
- Tooth malposition

Gingival element in smile design is a vital parameter in designing the treatment plan in improving or enhancing a patient's smile, include concept of gingival shape, and contours.[3]

The gingival design for crown lenghtening need to be considered these things, which are:[2]

1. Gingival margin tooth 11 and 21 must be at the same level
2. Gingival margin tooth 1 must be more apically than tooth 2, and at the same level with the canine
3. The form of labial gingival margin should be at the same point with the tooth's Cemento Enamel Junction
4. The papilla must be in between of each tooth, and the length of the papilla tip must be at half of incisal edge, and labial gingiva

Periodontium forms the foundation for teeth and their restoration and should be the first consideration in any restorative plan[3].

CONCLUSION

The result was good, we achieved even gingival margin at maxillary anterior, beautiful smile, and

the patient feel really satisfied with her smile. At this flap gingivectomy, we achieved to enhance the beautiful smile of the patient.

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SL 2.18

CASE REPORT

Management of Post Stroke Complete Edentulous Patient Using Suction Effective Method

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ABSTRACT

Background. *Post stroke patient usually have motoric impairment, including maxillofacial muscles and tounge. It is a challenge for the clinician especially to obtain a good final impression and bite registration.* ***Purpose.*** *To obtain a final impression that appropiate with patient's muscle movement, so the denture have stability and retention.* ***Case.*** *Patient, male, 42 years old, requested a complete denture to improve appearance and function. He had a maxillofacial and tounge impaired movement because of stroke 13 years ago.* ***Case Management.*** *At the first coming, a preliminary impression and determination of VDO have been done. Centric tray used to preliminary bite registration and preliminary cast mounting guidance. A custom tray with wax rim and poles made for final impression and bite registration steps. This tray enable to a suction effective method in a close mouth. Then, a wax denture try in did before fitting the finish denture.* ***Conclusion.*** *Suction effective method can be used as an alternative method to make a complete denture, especially for patient with motoric disorder, to get a stability and retention.*

Keywords: *Complete Denture, Post Stroke, Suction Effective*

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BACKGROUND

Stroke remains a major cause of disability in this world. A number of neurological functions are impaired by stroke, especially a motor diasability contralateral to the stroke lesion side.[1] Oral hygiene can be a challanging task for those who have impairments after stroke attack. Physical weakness, lack of coordination an the cognitive problems in the people who have post stroke may prevent a person from maintaining good oral hygiene by their self.[2] Dry mouth, oral ulcer and stomatitis may be because of the medication, which further impact on oral health. Due to poor oral hygiene, the risk of periodontal disease, dental caries and early loss teeth can increase.[3] The diagnosis and fabrication of complete denture is often a very difficult beacause of the uniqueness of the average denture patient's physical and mental condition. This difficuties especially at the final impression and bite registration stage. [4] It's also happened at the post stroke patient with motoric disorder, including maxillofacial muscles and tounge.

CASE

Patient, male, 42 years old, came to Prosthodontic Clinic, RSGMP Faculty of Dentistry, Airlangga University (Figure 1). He had a complete edentulous both maxilla and mandibula jaw (Figure 2). Although maxilla ridge asymetrical, the tuber maxilla is large both side, this condition is benefit for denture retention later. The lingual ridge is flat, but the sublingual regio is rich a spongy tissue and mylohyoid area is deep. Patient want to improve appearance and function, so he requested to make a complete denture. He had a maxillofacial and tounge impaired movement because of stroke 13 years ago. Now, he has no medication or therapy for his condition

Figure 1. Profile view

Figure 2. Intraoral condition

Figure 1. The patient is asked to bite down to the determined VDO

Figure 4. Maxillary and mandibulary custom tray with wax rim and poles

CASE MANAGEMENT

At the first coming, a preliminary impression was made from irreversible hydrocolloid material and this impression will be cast into preliminary cast. Then, a vertical dimention occlusion (VDO) was determined and preliminary bite was taken with the centic tray appropiate with the VDO (Figure 3). Centric tray allows for simple bite registration immediately after preliminary impression have been taken. It saves the patient a lot of time in the dental chair for reducing the need to adjust ill-fitting custom tray with wax rim later.[5] This centric tray with preliminary bite registration used to preliminary cast mounting guidance into articulator. After preliminary cast mounted, a custom tray with wax rim and poles was made for the final impression and bite registration later.

A custom tray with wax rim and poles addition (in mandibular tray) was made for achieving suction effective methode (Figure 4). This tray was try in into the patient to make sure that VDO is correct before final impression taken. The border molding was taken with Honigum® Mono Phase in maxillary and mandibulary one by one. Then, the final impression taken simultaneously with suction effective method. A medium elastomer used for the final impression. Patient asked to bite custom tray until the right position and do suction motion with close mouth. Patient also asked to say "woo" and "wee" for active muscle trimming. The final impression have been neat before bite registration taken (Figure 5).

The final impression was casting to make a final cast. This final cast mounted into semi-adjustable articulator with bite registration for guidance. Then, a wax rim was made to set denture teeth. The denture teeth was set using 2D template one by one. If the wax denture finished, patient asked to try in denture wax before contouring and processing into acrylic denture (Figure 6). After acrylic denture was made, the denture fit into the patient. A little corection might be needed to achieve denture stability and retention (Figure 7). If the denture was stable dan retentive, patient was educated to keep a good oral hygiene and after care treatment. He alsoasked to routine control to make sure a good oral hygiene and the denture still in a good condition.

Figure 5. Final impression and bite registration

Figure 6. Wax denture try in denture

Figure 7. Fitting and finishing acrylic

DISCUSSION

Geriatric health care is a critical part of health care system due to the rapidly increasing elderly population. Dentist plays an important role in geriatric health care and can contribute significantly in restoring the quality of life. Several disease of the elderly population is neurological disorder. Stroke, is a one of neurological disorder that affects into motoric function.[1] In this case, patient have a motoric impairment at extremitas regio dextra. The motoric impairment also affected a maxillofacial muscle and tounge. Patient couldn't move tounge easily, whereas it needed to make a good final impression. Although the patient have limitedness of tounge and jaw movement, he could do a suction motion. Because of this reason, we decided to use suction effective method to achieve stability and retention of complete denture.

Suction effective method is a modification technique of close mouth method. The difference is a number of poles which set up at mandibular wax rim. This design is use to achieve a suction motion when a final impression taken. With the suction motion, an active muscle trimming did simultaneously. It purpose to get a good pheripheral seal, so the denture were stable and retentive later. Rich of spongy tissue in sublingual regio, the contact between denture border and mucosa in the sublingual fold regio is maintained even during tounge movement. This condition providing a stable and strong seal in mandibular denture.

Maxilofacial muscle motoric impairment which occur at the patient, will influence a "habitual motion" of jaw movement. Because of this condition, a bite registration followed his "habitual motion", so the denture will be harmony with the patient's jaw movement. The effective complete denture rehabilitation for post stroke patient will help in alleviating both psycologycal and physical debilities to significant extent. After care follow-up is critical for successful rehabilitation. It's helpful for continousmonitoring, evaluation and correction of the denture.

RESULT

Suction effective method can be used as an alternative method to make

a complete denture, especially for patient with motoric disorder, to get a denture stability and retention. Patient motivation, education and post treatment follow-up are critical for the successful treatment outcome.

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SL 2.19

RESEARCH ARTICLE

Preschool Caries With Pufa Index In Sumbersari Districts Jember

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ABSTRACT

Background: *Pufa index used to assess the condition of the oral cavity as a result of untreated caries, consisting of pulpiptis, ulcerative, fistula and abscess.* ***Methods:*** *An observational study with cross sectional approach in District SumbersariJember in November 2015 in children aged 4-5 years (294 infants) with cluster random sampling (n=176 infants). The research variable is dental caries (with pufa index). Data analyzed descriptively and presented with a table.* ***Results:*** *The results showed pulpitis cases are the first (1064 teeth), 22 cases of ulcerative teeth, abscesses 18 cases of tooth and the final sequence is a case of fistula are 7 teeth. Its shows a lot of dental caries and disorders as a result of untreated caries (ulcerative, fistula and abscess).*

Keywords: *pulpitis, ulcerative, fistula, abses*

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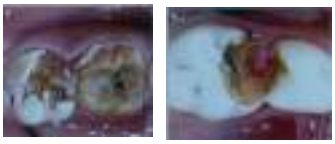
BACKGROUND

Dental cavity which has already reached enamel cannot undergo recalcification because there's no suitable matrix available for the crystal to grow.[1]Poor oral hygiene promotes further tooth decay. Dental caries tends to grow in severity and spreads to adjacent teeth. A severe dental caries that left untreated will be able to cause pulpitis, sepsis, and infections that could potentially spread to the periodontal tissues, sometimes it can cause serious complications such as cellulitis and cerebral abscesses.[2]

The reported prevalence of rampant caries case was as high as 90%.[3]A number of sources stated that the prevalence of 5 years old children dental caries was 29% in Denmark, 39% in Norway, 40% in England, 43% in Greece, and 55% in Scotland.[4]While early childhood caries (ECC) prevalence in England, Finland, USA, West China, Hongkong, Taiwan, and Indonesia were reported as 4%; 6%; 20,2%; 20,2%; 31,5%; 56%, and 48%.[5]

There are variety of index to measure teeth and oral diseases. Pufa index provides information about clinical consequences of dental cariesif left untreated, such as pulp abscesses which could pose a bigger threat than the cavity itself on one or more subjects.Pufa index observes of the advance stages of an untreated dental caries and the involvement of the pulp tissues. Pufa is an index that used to evaluate oral condition the resulted from an untreated dental caries. Pufa index scores any exposed pulp, ulceration of oral mucosa caused by root fragments, fistules or abcesses. The lesions on surrounding tissues which aren't tooth and pulp related viewed as the unnoted effect of dental caries. The evaluation are conducted visually without any instruments. Just one score given for each tooth, evaluation based on pulp involvement. If any primary teeth and permanent teeth present at the moment and they are odontogenically infected then both teeth shall be taken into account. Capital letters are used to evaluate the permanent teeth and lower cases for the primary dentition. The codes and criteria for pufa index are listed below:

a. P/p:
   Pulp involvement recorded when the pulp chamber is exposed or when the crown structure was devoured by the dental caries process and only root or root fragments that left intact. Probing are not conducted to diagnose pulp tissue involvement.



b. U/u:
   Ulceration due to trauma caused by sharp edges of the teeth. Those sharp edges are dislocated with pulp involvement and the root fragments caused traumatic ulcer in the surrounding soft tissues, i.e tongue or buccal mucosa.

c. F/f:
   Fistules are evaluated when there's a teeth related

suppuration with pulp involvements.

d. A/a: Abcesses evaluated when aswollen tissue filled with pus is present and is tooth related with pulp involvement.

6,7,8,9

Individual pufa score is calculated with the same method with DEF-T and represents the number of teeth that matches the diagnostic criteria for pufa. Pufa for primary and permanent teeth are reported separately. So the pufa score for an individual ranges from 0-20 for primary teeth and 0-32 for permanent teeth. Pufa index possess an advantage compared the other dental caries indexes, this index can measure the severity of tooth decay (can be used as a complement to DEF-T index), easier to use (can be performed by non-dentists), safer, faster, and requires no additional instruments.[6]

Sumbersari is a subdistrict that situated in the center of Jember city with the greatest number of householders and children under age of five. Data recapitulation of family statistics in Sumbersarisubdistrict in 2014 recorded as much as 6779 householders and 2173 children below age of 5.[10]On the age of 4-5 children begin to favor and consume lot of sweet treats but their parents aren't paying much attention to their children's teeth brushing habit, this phenomenon resulted in increased vulnerability of dental caries in children's primary teeth.[11]

MATERIAL AND METHODS

Observational descriptive research method with cross sectional approach in Sumbersari district of Jember in November 2015. Research populations were the children of age 4-5 years old (294 samples). Cluster random sampling (n=176 childrens) method was used in the research. The research variable was the dental caries. Additional instrument used was *dental mirror, dental explorers, neirbekken, dappen glass, tampon, cotton rolls,* alcohol, latex gloves, surgical masks,gargling water cup, tissue, *headlamp*. Data were analyzed descriptively and served in tables.

RESULT

The data of 176 children aged 4-5 years old in Jember'sSumbersarisubdistrict are shown in the table below:

Table 1.

Case	Numbers (teeth)
Pulpitis	1064
Ulcers	22
Fistules	7
Abscesses	18
Total	1111

Table 1 above shows that pulpitis was the most prominent case with 1064 infected teeth, ulcerative of oral tissues as many as 22 incidents, abscesses on 18 teeth, and fistules in 7

teeth. Those statistics shows a widespread of dental caries case in children and some complication of severe dental caries (ulcers, fistules, and abscesses) were also found.

DISCUSION

Harris *et al.,* (2004) published asystematic *review*about risk factors and significant indicators that related to the prevalence or incident of a primary teeth decay. They identified 106 factors that were compiled in demographic factors (education, parents, birth order), diet (sugar consumption frequency, softdrinks, snacks, sweet food and drinks consumed at night), factors related to mothers' breastfeeding and nursing bottle (duration of usage of the nursing bottle and breastfeed frequency), factors linked with oral hygiene (brushing frequency, plaque accumulation), factors related to the oral bacteria (*Streptococcus mutans, Lactobacilli),* and other factors as parent's attitude toward oral health, and the age when their children had their first dental examination.[12]

A healthy tooth that has it hygiene neglected combined by a high sugar diet resulted in a decay by the bacterial fermentation of food remains. When a cavity formed and not immediately treated it can grow in severity.At first a dental caries is asymptomatic; there is no pain because the decay hasn't reached thepulp yet while the inflammation process continues.[13]Dental caries marked by a decay on the enamel and dentine. If the lesion is not immediately treated, the lesion can progress further until it reaches the pulp and develops as pulpitis, ulcer, fistules, and abscesses.

Dental caries that already reaches *dentinoenamel junction* is going to grow rapidly in lateral way because *dentinoenamel junction*is not durable against dental caries. Demineralization of primary teeth elements that already passed through the outer enamel layer is going to grow rapidly in the progressivity. The caries process in dentine is twice as fast compared in the enamel because there is a lot of organic substances in this structure. The difficulty in eliminating the plaques from the rough and porous surfaces promotes the replication of bacteria. A continuing caries will cause an inflammation of the pulp, infection of the pulp with apical ailments, and potentially progresses toward necrosis.[14]

The usage of pufa index has been showed this index's relevance to treat a consequence of untreated dental caries. The collected pufa data can be used to plan, monitor, and evaluate health programs in the health centers.

CONCLUSION

The pulpitis is the most prevalence case, followed by ulcerative, abscesses, and fistules. This shows the high prevalence of dental caries in children below 5 years old and complications on untreated teeth with caries.

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SL 2.20

CASE REPORT

The Use of Pekkton® on Telescopic Crowns in Complete Overdenture: a Clinical Case

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ABSTRACT

Background: *Prosthetic rehabilitation of a partially edentulous patient can be established by using wide range of treatment options. Telescopic crowns have been used in removable partial dentures in order to connect the remaining dentition to the denture. They may also be designated as retainers in tooth-tissue supported cases. As the latest generation of polymers, PEKK (Poly-Ether-Kethone-Kethone) or known as Pekkton® claims to have the similar properties to biological materials that provides the patient a natural feeling.* ***Purpose*** *: The following case report discusses the use of combination of Pekkton® and metal framework on telescopic overdenture.* ***Case:*** *A 68-year-old male patient came to Department of Prosthodontics, Teaching Hospital of Dental Faculty, Airlangga University, for his esthetic problems and chewing inability. Intraoral examination revealed that only 13, 22, and 23 numbered teeth remained at upper jaw and 33, 32, 31, 41, 42 23 numbered teeth remained at lower jaw. He never had a denture and needed to make a new one.* ***Case Management:*** *Clinical and radiographic examination along with the preliminary impression were taken on the first visit. Secondary coping were made from Pekkton®. The fit of the secondary copings over the primary copings was evaluated in the patient's mouth. After the primary copings were cemented with a luting cement, dentures were delivered to the patient.* ***Conclusion:*** *The use of Pekkton® as a secondary copings could enhance the natural feeling for the patient because it has similar characteristics to those of human bone. It allows better biomechanical integration than typical non-precious metals.*

Keyword: *Telescopic crown, overdenture, Pekkton®*

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BACKGROUND

Partially edentuluous patient can have many problems during mastication. Therefore a denture may help increase their natural feeling of chewing. Conventional removable partial denture (RPD), teeth/implant supported overdentures,fixed partial dentures, and implant supported fixed or partial dentures are the most preffered prosthetic treatment approach(1). However, the traditional retention systems such as metallic clasps, frequently used in these conventional removable dentures, impose lateral forces on remaining abutments, increase abrasive wear, and cause unaesthetic appearance(2).

According to the M. M. Devan dictum, "It is essential to retain that is present originally in oral cavity than to replace what is lost due to any reason" still rings true. Overdenture is a definitely a better option as compared to a removable complete denture prosthesis. Overdenture is one of the most practical measures used in preventive dentistry. Study by Renner *et al*. said that 50% of the roots used as overdenture abutments remained immobile even after 4 years (3). Double crown-retained prostheses have been successfully used in partially edentulous patients. This type of retainer provides guidance, support, and protection from dislodging movement, and it transfers bite forces along the long axis of the abutment teeth (4). Telescopic crowns or known as double crown consist of three different kinds of structure. They are distinguishing from each other by their different retention mechanism. However, the basic principal of telescopic dentures contains, inner coping, which is cemented to prepared abutment tooth and an external or secondary telescopic coping, which is merged with the telescopic framework. The inner coping defends the prepared abutment tooth from decay and also provide stabilization to the prosthesis. It is materialized since there is inner and the outer crown coping tenso-friction mechanism. The outer coping employs the inner copings to form a securely attached unit, and it provides retention and stability to the prosthesis, by tenso-friction mechanism (5-7).

As the latest generation of polymers, PEKK (Poly-Ether-Kethone-Kethone) or known as Pekkton® claims to have the similar properties to biological materials that provides the patient a natural feeling. The following case report discusses the use of combination of Pekkton® and metal framework on telescopic overdenture.

CASE

A 68-year-old male patient came to Department of Prosthodontics, Teaching Hospital of Dental Faculty, Airlangga University, for his esthetic problems and chewing inability. Intraoral examination revealed that only 13, 22, and 23 numbered teeth remained at upper jaw and all of them had bone enlargement surround it. At lower jaw, 33, 32, 31, 41, 42 23 numbered teeth remained.

Figure 3. Pre operative view. Natural remaining teeth

Figure 4. Preliminary teeth arrangement

The radiographs were taken to evaluate the condition of the teeth to be retained for overdenture. The clinical and radiographic examination revealed that the teeth had no periapical pathology. The teeth were periodontally sound, with no mobility. There was sufficient interarch space for the copings, the denture base and the teeth arrangement. It was decided to perform a tooth supported telescopic overdenture for maxillary arch and conventional removable partial denture for mandibular arch.

CASE MANAGEMENT

Clinical and radiographic examination along with the preliminary impression were taken on the first visit. The next visit was taking bite registration of wax rims. Wax rims were made according to patient's VDO. These were transferred to a semiadjustable articulator for arrangement of artificial teeth (Fig 2). This preliminary teeth arrangement was used for wax up and guidance for dental technicians.

Figure 5. silicone impression to fabricate the primary copings.

The abutment teeth then prepared with a tapered round end diamond rotary bur with a chamfer finish line for the primary coping. The finish line had to be prepared subgingivally. The long abutments had to be prepared with tapered walls and the short abutments had to be prepared with parallel walls. After the preparation of the abutments, the impression was made by using a polyvinyl siloxane elastomeric impression material (reguler body). The silicone impression was poured in a die material to fabricate the primary copings. The provisional restorations were fabricated for abutment teeth by using direct provisional restorative material (Luxatemp, DMG, USA) and cemented with eugenol-free zinc oxide cement (Freegenol, GC, Japan). After examined primary copings intraorally

(Fig. 4), second impressions were made to fabricate secondary copings and framework (Fig. 5).

Figure 6. Primary copings examined intra orally

Figure 7. Second impression

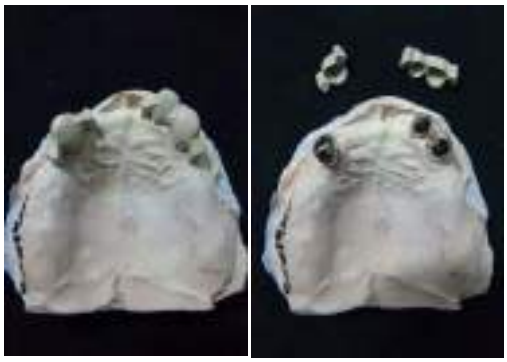

Figure 8. Primary and secondary copings on the model

Secondary copings were made from Pekkton®. The fit of the secondary copings over the primary copings was evaluated in the patient's mouth. The frictional contact between the primary and secondary copings helped in the retention of the prosthesis.

Copings and framework then were sent to dental laboratory for arrangement of artificial teeth according to wax up. Patient had a trial denture arrangement and evaluated intraorally for phonetics, aesthetics, occlusal vertical dimension and centric relation. the dentures were processed, finished, and polished. After the primary copings were cemented with a luting cement, dentures were delivered to the patient.

Figure 9. Copings and framework on the model

Figure 10. Copings and framework intra oral

Figure 11. Trial denture arrangement.

Figure 12. Processed denture on the model

Figure 13. View of completed maxillary denture with secondary coping

Figure 14. Intraoral view of denture

DISCUSSION

Total or partial edentulism not only leads to patient's impairment of oral function but also influences facial appearance and psychological conditions (1). The most preferred restoration options like removable partial or complete dentures have several limitations.

Telescopic crowns have been used mainly in RPDs to connect dentures to the remaining dentition (8, 9), but they may also be designated as retainers in totally abutment-borne detachable prostheses (10). Telescopic crowns have also been used successfully in RPDs and CDs, supported by endosseous implants, in combination with the natural teeth, which includes the overdentures (11).

In the current study, according to the periodontal condition, the distribution, and the number of remaining teeth, teeth supported overdenture would be the most appropriate treatment option for maxillary partial edentulism. The main advantage of the telescopic overdenture in the present case is providing balanced stress distribution between teeth soft tissues. The telescopic retainers decrease the

proportion of most traumatic lateral forces and transmit the occlusal forces in the direction of the long axis of the abutment teeth (5). Careful assessment of the interarch space is very important for the successful fabrication of the telescopic dentures. Sufficient space must be present to accommodate the primary and secondary copings, to have a sufficient denture base thickness to avoid fracture, space for the arrangement of the teeth to fulfill the aesthetic requirements and to have an interocclusal gap. Which is why VDO measurement has done earlier.

The contours and the degree of taper of the outer aspect of the primary coping determine the path of insertion and the amount of retention of the prosthesis. The essential requirements for the long service of the telescopic prosthesis are, to provide adequate height of the vertical walls (at least 4mm), sufficient thickness of the copings (never less than 0.7mm for each casting) and a taper of around 6º's (5, 9).

Patients with natural teeth can masticate more effectively due in part to their degree of accuracy in the functional jaw movements. The proprioceptive nerve endings in the periodontal ligaments feed information into the neuromuscular mechanism. In the absence of teeth, this information is missing. By retaining the roots of some teeth, it may be possible to use this proprioceptive apparatus with complete dentures. If this is so, a higher degree of accuracy in the jaw movements and the masticatory performance could result and makes the patient more comfortable with the denture(5). Furthermore, due to the well stress distribution and continued proprioceptive sensation, telescopic overdenture also prevents residual alveolar bone resorption (12).

Pekkton® ivory is the latest generation of PEKK. PEKK is the abbreviation for Polyether Ketone Ketone PEKK is a part of the high Performance of Poly Aryl Ether Ketone (PAEK) polymer family. The other PAEK polymers are PEEEK, PEK and PEEK. The difference in the characteristics of the PAEK polymer family is a result of the sequence and ratio of keto (k) to ether (e) synthetic linkages (13).

Polyetherketoneketone (PEKK) has high heat resistance, chemical resistance and the ability to withstand high mechanical loads (14).

The high performance polymer Pekkton® ivory is the solution for definitive, aesthetic, patient-friendly restorations in dentistry. This polymer has similar characteristics to those of human bone with tensile strength at 115 MPa. Pekkton® ivory has 246 MPa compressive strength that is comparable to human dentine and cortical bone. It allows better biomechanical integration and better shock absorption than typical non-precious metals. It also light-weight and gave a natural feeling for the patient.(14)

Pekkton® ivory is indicated for (15):

- Definitive supported, veneered and screw-retained crowns and bridges on dental implants, with maximum two pontics. Can be veneered with bonded press crowns, with composites or prefabricated acrylic teeth and veneers.
- Definitive supported, veneered single crowns and bridges with maximum one pontic on natural teeth.

- Unveneered parts e.g. crown margins and backings.
- Unveneered crowns and bridges in the posterior region for a maximum wearing period of 12 months.
- Removable restorations such as secondary constructions on bars and telescopic crowns, transversal connectors, occlusal splints and denture bases.

Pekkton® ivory is contraindicated when (15):

- Patients have a known allergy to one or more components of the material.
- Patients with parafunctions e.g. bruxism.
- Crowns and bridges with less than 1.3 mm of occlusal space.
- When the minimum dimensions of the framework cannot be maintained:
  - Minimum circular wall thickness less than 0.6 mm.
  - Minimum occlusal wall thickness less than 0.8 mm.
- Connector dimensions of front (anterior) bridges less than 12 mm2.
- Connector dimensions of side (posterior) bridges less than 14 mm2.
- Bridges on implants with more than two intermediate elements or extensions.
- Bridges on natural teeth with more than one intermediate element or extension.
- Unveneered crowns and bridges with a wearing period of more than 12 months.

The responsibility for the use of custom-made products beyond the described indications lies with the dentist.

RESULTS

Tooth supported overdentures with telescopic crowns may be preferred in the rehabilitation of partial edentulous patients to the conventional removable dentures, because of their advantages such as better retention, stability, stable occlusion, and chewing function due to the conservation of proprioception feedback. Also, the rate of the residual ridge resorption was decreased because of the transfer of compressive forces into the tensile forces by the periodontal ligament and better stress distribution. Furthermore, the use of Pekkton® that has similar characteristics to those of human dentin and bone can maximize telescopic crown's feature and enhance patient's comfort.

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SL 2.21

CASE REPORT

Treatment Of Patients Amelogenesis Imperfecta With Full Veneer Metal Porcelain Crown

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ABSTRACT

Background: *Complete rehabilitation in patients with amelogenesis imperfecta with decreased occlusal vertical dimension due to structural abnormalities of the email is a challenge to built its restoration. The treatment plan and the selection of appropriate materials are expected to improve the situation. Restoration options can vary among other composite fillings or crowns. This case report describes the 25-year-old female patient with amelogenesis imperfecta whole tooth and rehabilitated using full metal porcelain crown. In these patients there are abnormalities of teeth brown and yellow spots as well as family background makes this a amelogenesis imperfecta. Restoration wearing full metal imitation porcelain crowns because of the damage that occurs over the whole tooth and with the consideration that retention, resistance, and aesthetic required in these patients. Treatment is done gradually adjusted regio teeth. Tooth preparation is done according to the needs aesthetic and gradually raising the vertical dimension of the patient. At the time of the first control patients unfamiliar with the crown of her teeth and felt strange when she bite. The second and third control no complaints from patients.* ***Conclusions:*** *Patients with amelogenesis imperfecta can be rehabilitated with full metal porcelain crown. Restoration achieve a satisfactory outcome for the patient is satisfied with her performance today and masticatory function can be achieved to the fullest.*

Keywords: *amelogenesis imperfecta, full imitation metal porcelain crown, occlusal vertical dimension.*

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BACKGROUND

Amelogenesis imperfecta (AI) is a disorder that results in damage to email. The level of damage varies from several teeth until the whole tooth, both the primary and permanent teeth, and these abnormalities cause the quantity and quality of the email variety. AI can be found as a pattern of hereditary and is generally divided into four types based on clinical and radiological namely: 1) hypoplastic where the email looks good but is reduced in quantity, 2) Hipomaturation where the final process of mineralization is not perfect, 3) Hipocalsification where the email has been formed but lacking mineralization, 4) Hipomaturation-hypoplastic a combination of circumstances no 1 and 2. The most common problems associated with the patient complained of esthetics, dentine sensitivity and irritation khemis and mechanical, as well as a decrease in the vertical dimension. AI also often broadly defined as progressive root resorption and dental crowns, pulp calcification, taurodontism, root malformations, and also not the eruption of teeth. [1]

AI is a hereditary disorder that causes damage to the email. Clinically visible characteristics is the presence of a disorder or abnormality. [2, 3] This may occur during the period of primary teeth and permanent teeth. AI prevalence between 1: 700-1: 14000 [2] AI is caused by a gene mutation causing autosomal dominant and recessive transmission. There are also patients with no family history but there is this mutation. [3] Prosthodontic treatment needs of these patients varies greatly from preventative care such as maintaining oral hygiene instruction, until further dental restorations such as composite fillings, porcelain veneers, porcelain or metal crowns and all porcelain crowns. Restoration in some patients a little difficult but very important to try to achieve maximum performance and function. Profile should be considered in conjunction with the patient's socioeconomic status, age, and type of AI. In some cases it is necessary to do advanced research in the long term so as to get the maximum restoration. In some cases need to be tried with a variety of available treatments to achieve optimal results.

FULL VENEER CROWN [4]

Restoration is made to cover the entire surface of the tooth crown. Practitioners believe that this restoration is more beneficial in terms of retention than the partial restoration. Selection of restoration is based on how much damage occurred and retention needs, resistance and aesthetic needs. Metal porcelain or porcelain all can be custom appearance.

Preparation of anterior teeth labial parts do with flat end tapered diamond bur depth of 1-2 mm and adapted to the inclination of the teeth. Incisal surfaces of anterior teeth also prepared with flat end tapered diamond bur. Part palatal with small diamond wheel bur, not too much done taking, because it can affect retention. The proximal portion of long thin diamond bur. Preparation of the final (rounded

corners) with chamfer on the palatal and labial parts with radial fissure bur.

Preparation section posterior occlusal with round end tapered diamond bur along with functional cusp bevel. Part buccal with flat end tapered diamond bur. Reduction of the proximal portion with thin dimond short bur. Preparation of the final (rounded corners) with chamfer on the palatal and labial wear parts radial fissure bur

CASE

A 25-year old female patient came to the Hospital with the intent to improve the appearance and her mastication. Patients are embarrassed by their teeth were brown and often ache . Patients say that as a child was often sick and was given medication by a doctor . Dad patients also experienced the same thing with the state of her teeth . In the intra-oral examination : vitality (+) , sounding (+) , and percussion (-) . On the first visit the patient directly performed radiologically as shown in Figure 1. The state of intra oral patients can be seen in Figure 2.

Figure 1. Radiological state of the patient's mouth

Figure. 2

Figure . 3

Figure 2 and 3. The state of the patient's intra oral

CASE MANAGEMENT

On the first visit made doing impression with alginate and casting is done to study models and temporary crowns. Model studies were analyzed in order to make a metal porcelain crowns. Patients given informed consent about the actions that will

done. Stage work to be done is to create a full crown remained gradual per tooth region, while increasing the vertical dimension of the patient. It is depend on the patient a limited time as a student. Patients are requested to do maintenance on the upper anterior teeth because its appearance is compromised, then the first step would be making a full metal porcelain crown in the six maxillary anterior teeth. Model studies were sent to a laboratoratory to make temporary crown.

On the second visit, do preparation on maxillary anterior region. Patients were prepared on the dental unit and do preparation as in the description above. Previous temporary crown has been obtained from the laboratory. After completion of the preparation is carried impression wear rubber base and sent to the laboratory. Patients go home wearing temporary crown while being cemented with temporary cement.

The third visit, the temporary crown removed with crown removal, and full metal porcelain crown cemented with GIC cement as in Figure 4. The patient is asked to come back two weeks later.

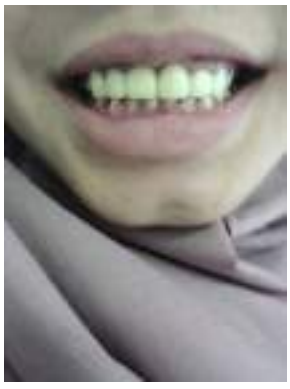

Figure 4. Patients with metal porcelain crown anterior maxilla

On the fourth visit, the patient was satisfied with his performance and is willing to continue the treatment of his teeth. Dimensional measurements of physiological do wear facial methods of measurement, specify any two points, on the chin and nose and then the patient is asked to swallow in a physiological rest position. Calliper is used to measure the distance of the two points and the result was reached 59 mm. Patients were asked centric occlusion is then measured and obtained 52 mm. The difference is about 7 mm it will be minus 3 mm, to raise the height of bite patients. Bite registration is done wearing heavy rubber base body, wherein the base and mixed until a homogeneous catalyst, untwisted shaped coil, placed above the occlusal surface. Patients were asked occlusion and measured using calipers to measure reached 54 mm. Prepare preparation for the region molars top and bottom, right and left regions. Preparation was done according the description above and do impression. The printed along with the bite registration is sent to a laboratory to make a full crown. Patients go home wearing a temporary crown while in the region of molar teeth.

On the fifth visit, temporary crown removed and a full metal porcelain crowns inserted on all teeth molar. Sixth visit, do the same thing in the anterior region below, where do the preparation, temporary crown fitted afterward, and the results sent to the laboratory preparation. Seventh visit, full metal porcelain crown mandibular anterior installed. (See figure 5)

Figure 5. Model studies premolar

The same is done on the eighth patient visits, which is done in the region of premolars preparation, impressed with a rubber base, was sent to the laboratory. Patients wear a temporary crown while at home. Visits to nine , full metal porcelain crown premolar mounted in the patient's mouth . Control patients can do depends a great time there . The first control is done one week thereafter . At the time of the first control patients unfamiliar with the crown of her teeth and felt strange when they bite . Checking of wear articulating paper and color are thicker in the region of the premolars that do grinding in the region . The second and third control carried out a month later , the results are no complaints from patients.

Figure 6. Full Veneers Metal Porcelain crowns in patients

DISCUSSION

Prosthetic rehabilitation in patients with AI on yore include revocation or manufacture a full denture. Prevention efforts are often contradictory in terms of the patient's psychological. Nowadays there are a variety of materials and methods that can be used to make a number of choices for practitioners. Treatment of patients with AI involves many factors such as age, socioeconomic status, type and damage to AI, oral manifestations and the aesthetic and functional needs teeth. [3]

Typically AI patients had abnormal anterior open bite, damage

severe caries, impacted teeth, as well as a combination of everything. [1] In these patients there is no such abnormalities except the condition of the teeth brown and yellow spots on the tooth structure as well as the background of family lineage.

Some patients only require only oral hygiene care while others need care of his teeth. Practitioners should consider the request of the patient to his performance, the strength of the restoration, protection against the rest of the teeth and also the livelihood restoration program. Treatment of AI may include the manufacture of adhesive restoration technique, over denture, full metal porcelain crowns, dentures bridges, full porcelain crowns, or inlay or onlay restorations. [2,3] These patients wear full metal porcelain crown as used by Mete JJ et al. These crown full use because of the damage that occurs over the whole tooth and with the consideration that retention, resistance, and aesthetic required in these patients. It is as suggested Shillingburg to manufacture a full crown.

Patient's need for his performance filled with care prior to the six maxillary anterior teeth. The accuracy of the edge of the marginal gingiva and crown color accuracy in patient satisfaction and can increase self-confidence. One advantage of this treatment is to improve the patient's psychological factors as a result of the affected tooth AI . [1 5] This causes the patient to continue treatment at all her teeth in order to perform better .

Patients with AI clearly shows a decrease in the vertical dimension that requires thorough care. This happens because the emails structure and open dentin. This decrease was due to the loss of the enamel surface that caused posterior occlusal vertical dimension down. This effect can be reduced by raising the bite in the posterior region . In these patients do bite elevation of 3 mm the same as that done by Rajesh P et al . [6]

CONCLUSION

This case report is made in patients with amelogenesis imperfecta using full metal porcelain crown. Restoration achieve a satisfactory outcome for the patient is satisfied with her performance today and masticatory function can be achieved to the fullest .

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SL 2.22

CASE REPORT

Restoring Facial Harmony and Chewing Function of Post Maxillectomy Patients: Rehabilitation of Maxillofacial Patients

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ABSTRACT

Background: *Rehabilitation using maxillofacial prostheses in this case is necessary on a 53 years old male patient, before undergoing surgery in the upper jaw, the patient lose some teeth (15 to 25) therefore post surgery maxillofacial prostheses are required, in addition to aid healing also to replace parts of the maxillary lost because of the surgery. Difficulties to be acquired is the making of definitive prostheses whose function is to restore esthetics and chewing function, which at the stage of bite note (catatangigit) and teeth arrangement is no longer supported by hard and soft tissues under the alveolar ridge anterior and part of the posterior maxilla, so that in addition to the need for coordination with the surgeon prior to surgery to maintain the part that is a retention and stabilization of a prosthesis, it is also necessary to determine bite BACKGROUND, multiple trial of the prostheses, and arrangement of the dentures beyond the arch to obtain prostheses that can restore the harmony of the face and chewing function.*

Keyword: *Maksillofacial, protheses, bite recording*

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BACKGROUND

Maxillofacial prosthese is a study field related to prosthetic restoration of stomaghtognatic function and facial structure. [1] Rehabilitation using maxillofacial prosthese in this case is necessary in a 56 year old, male patient, undergoing surgery in the upper jaw area causing loss of some of his teeth (15 to 25), therefore post surgery a maxillofacial prosthese is needed, not only to help recovery but also to replace the missing parts of maxilla due to surgey.[2.3]

It is expected that after the definitive partial prosthesis insertion ater the wound is healed that the facial structure and esthetic will be restored, mastication efficiency and ability is improved, therefore improving the patients quality of life by decreasing functional and psychological problem.[1,4]

CASE REPORT

A 56 year-old male patient, member of the army, was undergoing upper jaw surgery causing the patient to lose part of the teeth (15 to 25) Aramany IV classification maxillectomy because of a tumor. The surgeon referred the patient to prosthodontist because after surgery a maxillofacial prosthetic is necessary to help the healing and also to replace part of the lost maxilla due to the surgery[5]. After the wound is healed, definitive prosthetics are planned so that the patient can do his normal routines.[2,6]

CASE MANAGEMENT

Before the tumor surgery, a pre-surgical care is done consisting removing tartar, removal of residual root, and dental carries care. After that, molding is done for post surgery prosthetics.

Pic 1

Pic.2

The resection area is determined and drawn on to the study model.
Making temporary bite block to maintain vertical and horizontal relation and to ease dentures arrangement, then choosing the anterior teeth elements according to facial and jaw shape that will be lost after surgery.[7]
The result of temporary "vertical and horizontal relation" is saved, the resection area is determined and drawn on working model (picture 1 & 2). Then the teeth in the resection area is radired to the cervical border and the surrounding processus alveolaris is reduced to ± 6mm.

Making wax base with the thickness of 2 sheets ended at the resection border (picture 3), done in the working model. Then the post surgery prosthetic (surgical obturator) is made using acrylic resin heat cured material.

Obturator insertion to the patient was done soon after surgery by the oral and maxillofacial surgeon, and patient was instructed to use the surgical obturator for 5-7 days. (Pic 4)

Pic. 4

Patient condition 6 month post-surgery and definitive prosthetics preparation (Pig 5) and model (Pig 6)

pic.5

Pic. 6

The previous bite record[7] was trialed to the patient, and some occlusion adjustments inside and outside the oral cavity was done before dentures arrangement

Pic 7

The vestibulum depth and ridge shape is very impactful to the retention and stability of a prosthetic,[2.6]

In this case, the wing position of the wax " bite block" cannot be placed between moving mucose and fixed mucose, therefore the edge of wings the bite block is placed in the moving part of the mucosa. (Pic 7)

Bite block was trialed on the patients several times to get the position that can increase retention and stability by gradually cutting the wax " bite block ", while paying attention to mesio distal width antero-posterior of the dentures that are going to be placed.

Post maxillectomy with class VI Armani classification, the anterior denture arrangement was done paying attention to inclination, every denture has mesio-distal tendency and anterio-posterior inclination. The dentures arrangement was done according to the condition of alveolar ridge in region 15 14 13 12 11 21 22 23 24 25 so that the base from " bite block" is placed more anteriorly and posteriorly of the labial buccal. (Pig.8)

Pic 9.

The plug try (in) stage was done several times until adequate retention and stability was achieved, and still paying attention to dental arrangements therefore facial harmony and masticatory effisient function can be restored without disturbing retention and stability.(Ref Itjining . B) (Pig.9)

Insertion of the definitive prosthetics, the patient was satisfied and was instructed to come back for follow-up 1 day, 3 days, and a week after the insertion.

DISCUSSION

The making of good prosthetics can restore esthetic, talking, and masticatory function[2,6]. In this post maxillectomy case, there is difficulty to reach retention and stabilization, therefore to restore esthetic and masticatory function, an alternative technique is necessary. A preliminary bite record (catatan gigit) is taken before the surgery in order to maintain vertical dimension and dentures arrangement.[8]

The edge of the prosthetics base is made from clay functioning to add retention and stabilization of a detachable dentures prosthetics [2,8] cannot be made according to vestibulum depth placed between mobile and immobile mucose, therefore the "galangan gigit" is placed in the mobile mucose, and extra accuracy is needed to pay attention to parts that hold to the base of the dentures so that it is more stable and retentive, preventing from falling off at the mouth opening.[9]

Post maxillectomy surgery with Aramany class IV classification, the upper jaw dentures arrangement is done more to the buccal and labial, on the outside rim of alveolar ridge, while keeping attention to the anteroposterior dentures inclination preventing the lips to look droopy and inwards, for the esthetic function[8,9]. Plug in trial is needed several times to acquire the maximum esthetics, retention and stability. Therefore the purpose of definitive prosthetics insertion in this patient which is to restore facial harmony and masticatory function can be achieved. Follow up is needed 1 day after insertion to see if there is pain and parts that are too compressive, after that 3 days and 7 days after follow up to check for the occlusion, retention, and stability.

As conclusion, coordination is needed between the prosthodontist and oral surgeon to make maxillofacial definitive prosthetics, before and after surgery in the upper jaw using class IV Aramany classification. Preliminary bite record and dentures arrangement outside the jaw rim is necessary to obtain definitive prosthetics that can

restore facial harmony and masticatory function.

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SL 2.24

CASE REPORT

Zirconia All-Ceramic Bridge For Aesthetic Restoration

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ABSTRACT

Background *: Zirconia based ceramic is one of all-ceramic systems which can be used as alternatives to metal ceramic systems. It is suitable as esthetic restorative materials for crown and fixed partial dentures. These system have better mechanical properties rather than glass based ceramic.* ***Case Report and Management*** *: A 48-year-old female patient looked for dental treatment complaining about her poor dental aesthetics and mouth odor. She had partial denture on maxilla made by illegal practice of dental technician. The intraoral examination revealed the unsatisfactory anterior partial denture mounted into the gingiva in front of teeth #11 and #21 which erupted palatoversion, and decay on teeth #22. After clinical and radiographic evaluation, the mock up of temporary bridge on teeth # 12, #11, #21 and #22 were made on diagnostic model. On the next visit, the poor partial denture were removed and continued with sectioning the clinical crown of teeth #11 and #21 about 1mm above the gingival margin, while teeth #12 and #22 were prepared for the crown. After taking functional impression for working cast, the direct temporary bridge were inserted. Finally the zirconia all-ceramic bridge were choose for fixed prosthetis as it had better aesthetic and mechanical properties.* ***Conclusion :*** *Prosthodontic treatment should solved the patient's complain as well as their expectation. The use of zirconia all-ceramic bridge which subtituted the poor partial denture could provide the acceptable aesthetic in the restoration of anterior teeth. Patient was satisfied with the treatment and her favorable appearance.*

Keywords *: Aesthetic, fixed prosthetic, zirconia*

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INTRODUCTION

The rehabilitation of the mouth should consider with both functional and aesthethics view. As a dentist we should manage the patient's complain as well as their expectation. Fixed partial dentures (FPDs) have been the treatment of choice for the replacement of missing teeth for some year. Missing teeth can be replaced with fixed prostheses that will improve patient comfort and masticatory ability, maintain the health and integrity of the dental arches and elevate the patient's self-image. Fixed prosthodontics is the art and science of restoring damaged teeth with cast metal, metal-ceramic, or all-ceramic restorations, and of replacing missing teeth with fixed prostheses. Successfully treating a patient by means of fixed prosthodontics requires a thoughtful combination of many aspects of dental treatment: patient education and the prevention of further dental disease, sound diagnosis, periodontal therapy, operative skills, occlusal considerations, and sometimes, placement of removable complete or partial prostheses and endodontic treatment[1].

The strength and reasonable aesthethic have made the metal ceramic restoration became popular, but patient's demand for improved aesthetics has led to the development of metal-free restoration in challenging anterior teeth restoration[2]. All-ceramic systems can be used as alternatives to metal ceramic systems, as esthetics restorative materials for crowns and fixed partial dentures. These all-ceramic systems can be categorized broadly into two groups, based on the ceramic core of them, they are translucent core, and opaque core [3].

The aim of this study was to report the treatment of female patient who wanted to restore her bad-old denture in maxillary anterior.

CASE REPORT AND MANAGEMENT

A 48-years-old woman came into private dental practice (G Dental Work Art) to restore her denture. During the anamnesis, the patient reported that she used the denture made by illegal practice of dental technician. She also complained about her poor dental aesthethics as bad as her mouth odor.

The intraoral examination revealed the unsatisfactory anterior partial denture mounted into the gingiva in front of teeth #11 and #21 which erupted palatoversion, and decay on teeth #22 (Figure 1A, 1B, 1C and 1D). The treatment proposed was to restore the teeth through fixed partial denture.

Figure 1. A. Frontal view of the occlusion; B. Maxillary occlusal view; C. Right lateral view; D. Left lateral view

Figure 2. Diagnostic wax (mock-up) on study model

At the first appointment, alginate impression were executed to obtain diagnostic cast. Then it used to perform the diagnostic waxing (mock-up) on teeth # 12, #11, #21 and #22 (Figure 2).

At the second appointment, patient agreed with the treatment planning showed by mock-up on diagnostic cast. Then one-visit-endodontic treatment was performed on teeth #11 and #21, continued with decapitated the clinical crown about 1mm above the gingival margin. Tooth color was selected through Vitta, resulting in the shade A3 for cervical, and A2 for body.

The temporary crown bridge was prepared before the third appointment. At this time, the old denture was removed and ready for preparation of abutment teeth (#12 and #22). The caries was cleaned up and continued with reduction of teeth. The incisal reduction about 2.0mm, while labial and lingual reduction about 1.5mm, then the finish line will chamfer with rounded internal line (Figure 3). After preparation of abutment teeth, we performed functional impression using silicone putty and light body. Then the temporary crown bridge was inserted immediately (Figure 4).

Figure 3. Teeth preparation on #11, #12, #21, and #22

Figure 4. Temporary crown bridge insertion

Figure 5. All-zirconia crown and bridge on working cast

Figure 6. Gingival retraction

One week after temporary crown and bridge insertion, the patient called back to perform the cementation of all zirconia crown and bridge (Figure 5). The temporary bridge was removed, and the retraction cord was inserted into subgingiva of abutment teeth (Figure 6).

The all-ceramic zirconia crown and bridges then cemented with adhesive resin cement (Figure 7). The final restoration, Zirconia based crown, showing natural appearance with a correct gingival architecture was performed using the CAD/CAM technology (Figure 8A-8D). The dentist and patient were satisfied by the result. Two weeks later patient was called back to control, and it showed the harmony of gingival margin and patient was satisfied with her aesthethic view.

Figure 7. All zirconia crown and bridges on working cast

Figure 8. A. All-Zirconia crown and bridges in frontal view of occlusion; B. Maxillary occlusal view;
C. Right lateral view; D. Left lateral view

DISCUSSION

This patient was used unappropriate fixed partial denture which made by illegal practice of dental technician. The heat-cured-acrylic resin which is for removable partial denture was mounted permanently into the gingiva. By the time passed, it caused bad mouth odor, and also poor aesthetic. Dentist should solved both problem, and choose the best treatment for patient.

In order to solve her problem, we recommended the use of fixed partial denture with metal-free restoration. There are many variety of metal-free restorations, which lead clinicians to

have to be aware of their various properties in order to ensure that they select the right restoration for a given case. There are two basic families of all-ceramic system to choose. They are Low strength, etchable, glass based ceramics, and High strength, non-etchable, alumina or zirconia based ceramics [4] . For anterior full coverage restorations, where aesthetics is the prime concern, all ceramic crowns with a translucent core are an excellent choice. All-ceramic crown with opaque cores are have good strength and aesthethics. It also can be used for anterior and posterior teeth[2,5]. The use of a metal-free post and core systems has facilitated the aesthetic restoration of endodontically treated teeth.. In addition to the biocompatibility of the restoration, it allows the preservation of maximum coronal and root structure[4].

Crown with zirconia core materials are the strongest among all the metal-free restorations, compare with leucite core, lithium disilicate core, and alumina core[2]. Zirconia-based restorations are best alternative to metal-based restoration which show excellent clinical performance based on medium-term observation and in vitro experiment[4]. In general, the alumina or zirconia based ceramics have better mechanical properties, but the glass based ceramics have better optical properties[4]. Some studies have compared the adaptation of zirconia-based fixed partial dentures fabricated with different CAD/CAM systems, that Procera (Nobel Biocare) system showed better marginal adaptation than the Lava (3M ESPE) system[6.7].

Treatment planning of fixed partial denture together with decaputation of teeth #11 and #21 were choosen in order to solve the unaesthethic problem of her palatoversion teeth. It also could solve her complained about bad mouth odor caused by tooth decay. The decapitation of those teeth allowed patient to clean her mouth easily and efficiently.

The use of zirconia all-ceramic bridge which subtituted the poor partial denture could provide the acceptable aesthetic in the restoration of anterior teeth. Patient was satisfied with the treatment and her favorable appearance.

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SL 2.26

RESEARCH ARTICLE

Sticophus Hermanii Extract Affected The Eepression Of TLR 4 And TNF-A In Periodontitis Induced By *Porphyromonas Gingivalis*

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ABSTRACT

Background *: Porphyromonas gingivalis is one of major pathogens associated with chronic periodontitis. Toll-like receptor (TLR) 4 recognize bacterial lipopolysaccharides and tumor necrosis factor (TNF)- α the inflamatory cytokine, both play important role in pathogenesis of periodontitis. Sea cucumber (Sticophus hermanii) possess antibacterial and antiinflammatory properties which potentially to be explored as strategic therapy.* ***Purpose*** *: This study was aimed to examine the effect of Sticophus hermanii extract to the expression of TLR-4 and TNF- α in periodontitis.* ***Methods*** *: The study was an experimental laboratories research with post test only control group design. Twenty four male wistar rats aged 8-10 weeks were divided equally into 4 groups. Group-1 was normal group, while group 2-4 were periodontitis group induced by 10^9 Porphyromonas gingivalis ATCC 33277 three times in 4 days. Treatment groups were given Sticophus hermanii extract by the route of : per oral 0,025mg/gBW (group-3) and applied topically 0.01ml on gingival sulcus with 3% extract gel (group-4). Control groups (group-1 and 2) were given 0.2% CMC Na only, all were done once daily for 14 consecutive days. The expression of TLR 4 and TNF-α on mandibular periodontal ligament were examined by immunohistochemistry.* ***Result :*** *The expression of TLR-4 and TNF-α were raised on group-2 compare to group-1 ($p<0.05$). Treatment with Sticophus hermanii extract not significantly decreased the expression of TLR 4 and TNF-α ($p>0.05$) on group-3 but decreased those on group-4 ($p<0.05$).* ***Conclusion*** *: Sticophus hermanii extract decreased the expression of TLR 4 and TNF-α in periodontitis induced by P. gingivalis.*

Keywords *: Stichopus hermanii, TLR-4,TNF- α, periodontitis, Porphyromonas gingivalis*

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BACKGROUND

Periodontitis has been defined as "an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss, and bone loss[1,2]. The bacterial complex named "red complex" and composed of Porphyromonas gingivalis, Treponema denticola, and Tannerella forsythia has been strongly associated with advanced periodontal lesions. Impairment of homeostatic balance leads the destructive inflammation in periodontitis.

Porphyromonas gingivalis -the Gram-negative oral anaerobe- has been recognized statistically involved and strongly correlated with chronic periodontitis.[3,4] It implicated as a major periodontal pathogen by orchestrates inflammation through manipulation of host immunity and periodontal microbiota and that periodontal disease is initiated by polymicrobial synergy and dysbiosis.[5] Studies stated that P. gingivalis have been could act as a keystone pathogen, which reshapes an otherwise harmless periodontal microbiota into a disease-provoking microbiota in dysbiosis and because it has an ability to exploit complement and Toll-like receptor (TLRs).[4,5]

Toll-like receptors (TLRs) are type I transmembrane proteins found on the surface of mammalian cells A broad variety of pathogen-associated molecular patterns (PAMPs) could interact with high specificity with TLRs, which leads to the secretion of proinflammatory cytokines, anti-inflammatory cytokines and chemokines, and initiates inflammation processes.[1,6] Upon interaction with these PAMPs, TLRs activate the innate immunecells through intracellular signaling pathways.

Research has established that TLRs are also expressed in periodontal tissues and plays an important role in the innate immune response and and provide first line of defense in maintaining periodontal health.[7] Surface components of P. gingivalis, such as LPS, lipoproteins, and fimbriae, interact with TLR2 and TLR4 expressed by host cells and stimulate production of proinflammatory cytokine.[1,4,5] However, over-production of proinflammatory cytokines due to chronic stimulation of TLRs may lead to tissue destruction. It can be stated that TLRs act as a double-edged sword, not only maintaining periodontal health but also contributing to periodontal tissue destruction.[7]

Destructive periodontal diseases, when left untreated could become a chronic inflammatory condition. Periodontally associated inflammatory processes contribute to an increase in the levels of local and systemic inflammatory mediators,including tumor necrosis factor alpha (TNF-α).[2] Bacterial lipopolysaccharides (LPSs) of *P. gingivalis* can induce TNF-α production, this cytokine has a fundamental role in the immune response. TNF-α increases the activity of phagocytes, such as neutrophils, mediates cell and tissue turnover by inducing matrixmetalloproteinase secretion and by stimulating the development of cells of the myeloid lineage (e.g. osteoclasts). It also limits tissue repair by the induction of apoptosis in fibroblasts. Periodontal pathogens can stimulate excessive production of TNF-a leading to

periodontal tissue destruction.[2,8] Regarding to the immune response, pointing at primary receptor of periodontal pathogens and inhibition of infammatory cytokine may provide an efficacious therapeutic strategy.

Sea cucumber have may variety is species and it has been known to have beneficial medical properties.[9.10] The result of our previous study stated that extract of sea cucumber Sticohus hermanii possessed antibacterial activity against *P. gingivalis* in vitro.11 Golden sea cucumber (*Sticophus hermanii*) extract have been known to have antibacterial,[9,10,11] antioxidant, [12,13] and anti-inflammatory[9,10,13] Sea cucumber (*Sticophus hermanii)* possess antibacterial and antiinflammatory properties which potentially to be explored as strategic therapy. This study was aimed to examine the effect of *Sticophus hermanii* extract to the expression of TLR-4 and TNF- α in periodontiti

MATERIAL AND METHODS

The study was an experimental laboratories research with post test only control group design. Sample of sea cucumber *Sticophus hermanii* were collected from Sumenep coastal. *Sticophus hermanii* extract was prepared from sea cucumber bodywall that have been freeze dried and powdered, formulated with 135mg/ kg BW in 0.2% CMC Na for peroral route and 3% extract gel for topical use.

Twenty four male wistar rats aged 8-10 weeks were divided into 4 groups. Group 1 was normal group, while group 2-4 were periodontitis groups. Oral preconditioning were set up by the administration of 0,1% chlorhexidine topically and 20 mg Kanamycin and Ampicilin/ rat in the drinking water as once daily for 4 consecutive days.[14] Periodontitis induction were performed by innoculation of *P. gingivalis* ATCC 33277 bacterial suspension containing 10^9 CFU/ml in 2 ml PBS by peroral administration with nasogastric tube, swabbed in buccal/labial-palatal gingiva along molar to molar regio and anal regio. The administration of *P. gingivalis* were done 3 times in 4 days. After 3 weeks periodontitis condition was achieved[15] and were started to get the treatment.

Treatment groups were given *Sticophus hermanii* extract by the route of : per oral 0,025mg/gBW (group-3) and applied topically 0.01ml on gingival sulcus with 3% extract gel (group-4). Control groups (group-1 and 2) were given 0.2% CMC Na only, all were done once daily for 14 consecutive days.. Mandibular section were performed and the expression of TLR-4 and TNF-α on mandibular periodontal ligament were examined by immunohistochemistry. Data were analyzed by Manova and LSD test.

RESULT

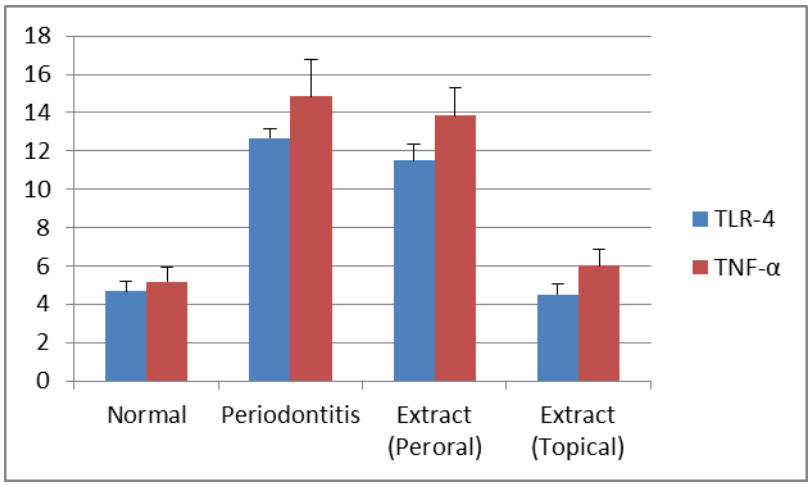
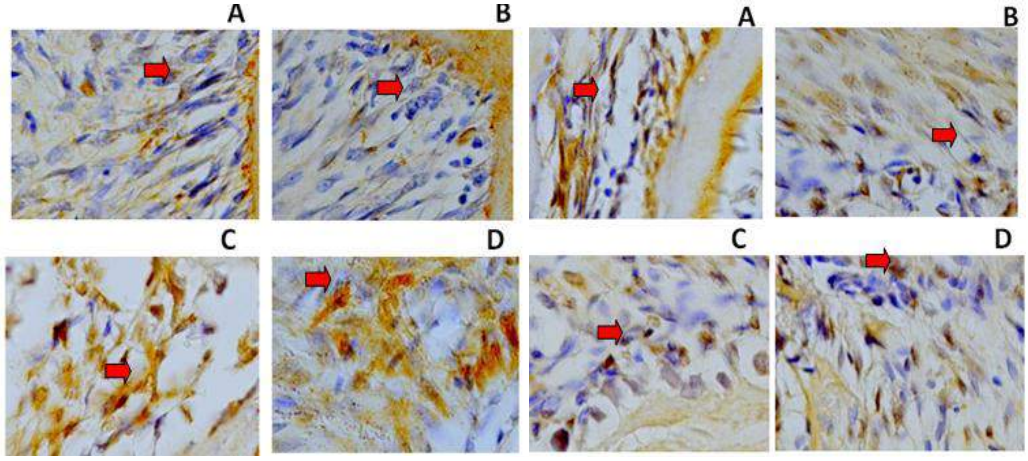


Fig 1. Mean of TLR-4 and TNF expression on macrophage of Wistar rat mandibular periodontal ligament given extract of *Sticophus hermanii* peroral and topical on sulcus gingiva

The expression of TLR-4 and TNF-α were raised on periodontitis untreated group compare to normal group ($p<0.05$). Treatment with *Sticophus hermanii* extract perorally on group 3 were not significantly decreased the expression of TLR-4 and TNF-α ($p>0.05$) while treatment with *Sticophus hermanii* extract perorally on group 4 were decreased the expression of TLR-4 and TNF-α ($p<0.05$).



TLR-4 **TNF**

Fig 2. The expression of TLR-4 and TNF-α on macrophage of mandibular periodontal ligament

A. The expression of TLR-4 / TNF-α in normal group (group 1)
B. The expression of TLR-4/ TNF-α in periodontitis untreated group (group 2)
C. The expression of TLR-4/ TNF-α in periodontitis treated by extract of *Sticophus hermanii* peroral ly(group 3)
D. The expression of TLR-4/ TNF-α in periodontitis treated by extract of *Sticophus hermanii* topically (group 4)

DISCUSSION

The Toll-like receptor plays an instructive role in innate immune responses against microbial pathogens as well as the subsequent induction of adaptive immune.[16] In periodontitis, bacteria and pathogen-associated molecular patterns are sensed by Toll-like receptors (TLRs), which initiate intracellular signaling cascades that may lead to host inflammation.[6,17] Both healthy and periodontitis gingival tissues expressed all TLRs except TLR-10. In patients with periodontitis, epithelial cells showed increased TLR expression towards the basal layer. In the connective tissue, consistently higher TLR expression was found within the periodontitis group compared to the healthy group.[17]

Fig 1. showed the increasing of TLR 4 and TNF-α expression on periodontitis untreated group compare to normal group ($p<0.05$). Induction of *P. gingivalis* ATCC 33277 bacterial suspension proved to lead to periodontitis condition and raised the recognition of host receptors as periodontitis immune response. Lipopolysaccharide is an essential macromolecule that comprises the outer surface of gram-negative bacteria. Numerous studies have shown that P. gingivalis lipopolysaccharide is less potent than that of E. coli and also elicits a different repertoire of inflammatory mediators in innate immune cells. Lipid A from P. gingivalis is unique in that it exhibits remarkable structural heterogeneity. Four lipid A structural subgroups have been identified in P. gingivalis which, remarkably, can be stimulatory, inert or antagonistic with respect to Toll-like receptor 4 activation.[18]

TLR 4 functions as the principal innate sensor for lipopolysaccharide of Gram-negative bacteria in mammals. The expression of TLR 4 has been confirmed in some cell types in periodontal tissues, such as gingival fibroblasts and gingival epithelial cells and might be very important in the progress of periodontitis. Sun *et al*[6], stated that expression of TLR 4 was detected on human periodontal ligament cells (HPDLCs). Lipopolysaccharide treatment may change the gene expression pattern of HPDLCs via TLR4 signaling and may control homeostasis in periodontal tissues. It also indicates that the NFkB and MAPK pathways may be involved in the regulation of periodontitis development.

One of the main consequences of signaling via pattern-recognition receptors is the modified synthesis, processing and secretion of cytokines that serve to transmit, modulate and amplify the host immune responses. Cytokines are central to the initiation, organization and maintenance of immune responses in periodontal disease and represent key diagnostic and therapeutic targets. TNF-α is one of major inflammatory cytokine[8]. The increasing expression of TNF-α in group-2 ($p<0.05$) showed the periodontitis condition as it has been known that the level of TNF-α are raised in periodontal diseases compare to the healthy ones. 1,2,8 periodontal diseases are infectious inflammatory conditions, and recent studies have demonstrated that cytokines (TNF-α and IFN-γ) considered harmful in the context of tissue destruction play

important roles in the control of periodontal infection.20

Manipulating TLR4 signaling may potentially become one of the recognized therapies for periodontitis. Recently, host modulation therapies are being proposed and developed to bring down excessive levels of enzymes, cytokines, prostanoids, as well modulate osteoclast functions.[21]

Administration of *Sticophus hermanii* extract in both treatment groups resulted in decreasing TLR 4 and TNF-α expression, significant in topical use as gel in sulcus gingival (group 4) ($p< 0.05$) but not significant in per oral mode (group 3) ($p> 0.05$). In the previous study, *Sticophus hermanii* extract have been known to have antibacterial activity to periodontopathogen bacteria[18] and *P.gingivalis*.[11.] Some sea cucumber extract has been known to have antibacterial properties regarding its content of saponin and triterpene glycoside. [18] Sea cucumbers are rich in glycosides, particularly triterpene glycosides which are proven to have antibacterial and antitumor activities Mechanism of terpenoid or triterpene as antibacterial agent is to interact with porin in the bacterial outer membrane to form the strong polimer bond that make destruction to the porin that will reduce the cell wall permeability then caused the lost of nutrition which lead to the inhibition in bacterial growth.[9,10,11,18] The antibacterial activity of the extract may reduce the number of *P. gingivalis* thus reduce the PAMPs that will be recognized by TLR 4. The decreasing expression of TLR 4 may implicated in less production of abundant inflammatory cytokines that will lead to periodontal tissue destruction.

One of the main consequences of signaling via pattern-recognition receptors is the modified synthesis, processing and secretion of cytokines that serve to transmit, modulate and amplify the host immune responses.[8] The decreasing expression of TLR 4 may affect to the TNF-α production. Administration with antagonist TNF-α have been known to be strategic therapy in host modulation and decrease periodontal tissue damage.[21] The bioactive content of *Sticophus hermanii* extract triterpene glycoside may have the role to enhance the macrophage phagocyte activity and flavonoid had its role as anti inflammatory component.[9,10] *Sticophus hermanii* bodywall contain the component of glysin, arginine and collagen. Glysin could stimulate the release of IL-12 and B cell that enhance phagocytosis and arginin enhance T cell activity and proliferation.[9,10]

Administration of *Sticophus hermanii* extract as topical use in group 4 yield the better significant result than per oral mode in group [3]. It has been observed that the local route of drug delivery can attain 100-fold higher concentrations of an antimicrobial agent in subgingival sites compared with a systemic drug regimen. This
reduces the total patient dose by over 400 fold thereby reducing the potential problems with the use of systemic drug regimen.[22] In conjunction with scaling and root planing, the adjunctive use of local drug delivery may enhance the results of periodontitis therapy.

CONCLUSION

Sticophus hermanii extract decreased the expression of TLR 4 and TNF-α in periodontitis induced by *P. gingivalis.*

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RESEARCH ARTICLE

Integrin A2β1 And Bmp-2 Regulated In Bone Remodelling To Accelerate Orthodontic Tooth Movement By Giving Stichopus Hermanii

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ABSTRACT

Background: *Orthodontic tooth movement is a continual and balanced process between bone deposition and bone resorption on pressure and tension sites. Integrin α2β1 is the major collagen type 1 receptor and BMP-2 is the parameter of osteoblast proliferation that have role in bone remodeling. Stichopus hermanii is one of the best fishery commodities in Indonesia, its contain various active ingredients such as hyaluronic acid,chondroitin sulphate,cell growth factor, EPA DHA, flavonoid that might have role in orthodontic tooth movement.* ***Objectives:*** *The aim of this study is to investigate Integrin α2β1 and BMP-2 regulated in bone remodelling to accelerate orthodontic tooth movement by giving Stichopus hermanii.* ***Material and Method:*** *Thirty two male Cavia Cobaya were divided into four groups. K(-) group as negative control group (without treatment), K(+) group as positive control group which were applied separator rubber for orthodontic tooth movement, and P1, P2 groups, were applied for orthodontic tooth movement and Stichopus hermanii 3 % and 3,5 %. After treatment the cavia cobaya were sacrificed. Integrin α2β1 and BMP2 expression were examined with immunohistochemistry.* ***Results:*** *This study showed Integrin α2β1 means and SD in K(-), K(+), P1,and P2 are 7,5±1,77; 3±1,07; 11,1±3,3 and 14,13±4,55. BMP-2 have means and SD : 5,38±2,72; 2,62±1,77; 10,88±3,64 and 18,63±1,5. Integrin was significantly increased in P2 and P1 compare to K(+), K(-), while BMP2 increased too.* ***Conclusion :*** *Stichopus hermanii active component could increase integrin α2β1 and BMP2 that regulate bone remodelling,while 3,5 % Stichopus hermanii had the best to accelerate orthodontic tooth movement.*

Keywords*: Stichopus hermanii, Integrin α2β1, BMP-2, orthodontic tooth movement.*

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BACKGROUND

Orthodontic tooth movement occurs in the presence of a mechanical stimuli sequenced by remodeling of the alveolar bone and periodontal ligament (PDL). Bone remodeling is a process of both bone resorption on the pressure site and bone formation on the tension site. Orthodontic tooth movement can be controlled by the size of the applied force and the biological responses from the PDL. The force applied on the teeth will cause changes in the microenvironment around the PDL due to alterations of blood flow, leading to the secretion of different inflammatory mediators such as cytokines, growth factors, neurotransmitters, colony-stimulating factors, and arachidonic acid metabolites. As a result of these secretions, remodeling of the bone occurs. [1,2]

Today, it is challenging to reduce the duration of orthodontic treatments. Long orthodontic treatment have potensial risk such as caries, gingival recession and root resorption. There are many ways to accelerate orthodontic tooth movement based on phases of tooth movement. There are three phases of tooth movement: the initial phase, which is characterized by rapid movement after the application of force; followed by a lag period, where little or no movement, and the last phase, where gradual or sudden increase of movement occurs. The early phase of tooth movement involves acute inflammatory responses characterized by leucocytes migrating out of blood capillaries and producing cytokines, which stimulates the excretion of prostaglandins and growth factors. The acute phase is followed by the chronic phase that involves the proliferation of fibroblast, endothelial cells, osteoblasts, and alveolar bone marrow cells remodeling process. [1, 2, 3]

High concentration of cytokines such as interleukins IL-1, IL-2, IL-3 IL-6, IL-8, and tumor necrosis factor alpha (TNF) were found to play a major role in bone remodeling; moreover, interleukin-1 (IL-1) stimulates osteoclast function through its receptor on osteoclasts. [4,5] Other cytokines which are also involved in the acceleration of tooth movement are RANKL, which is a membrane-bound protein on the osteoblasts that bind to the RANK on the osteoclasts and causes osteoclastogenesis.[6] Prostaglandins (PGs) are inflammatory mediator and a paracrine hormone that acts on nearby cells; it stimulates bone resorption by increasing directly the number of osteoclasts. *In vivo* and *in vitro* experiments were conducted to show clearly the relation between PGs, applied forces, and the acceleration of tooth movement. [7] Another set of investigators has made an experiment where they have injected vitamin D metabolite on the PDL of cats for several weeks; it was found that vitamin D had accelerated tooth movement at 60% more than the control group due to the increasement of osteoclasts on the pressure site.[8] Integrin α2β1 and BMP-2 regulate bone remodelling in last phase / chronic phase.

Many but there is no natural has been used for accelerating orthodontic tooth movement. Stichopus hermanii is one of the best fishery commodities in Indonesia. It is natural and contain various active ingredient such as collagen, hyaluronic acid, chondroitin sulphate,cell growth factor, EPA DHA, flavonoid that has been proved as [9] that might reduce relapse

orthodontic. Previous research showed that stichopus hermanii stimulated the activation and proliferation of fibroblasts, and enhanced rapid production of collagen fiber network with shorter healing time. The level of proinflammatory cytokines; IL-1α, IL-1β, and IL-6, were significantly reduced in Stichopus hermanii treated wounds and stimulation tissue regeneration. [10] Stichopus hermanii at 5 mg/ml and 10 mg/ml can increased osteoblast cell function. The other study show that studies have shown that the extract of Stichopus species also affects viability or proliferation of human fibroblasts and osteoclast cells in a negative manner. [11] So, in this study, we investigate Integrin α2β1 and BMP-2 regulated in bone remodelling to accelerate orthodontic tooth movement by giving Stichopus hermanii

MATERIAL AND METHOD:

This study was performed on 32 male Cavia Cobaya 2,5 months old with 200-300 g weight. The Wistar rats was divided into 4 groups. K(-) group as negative control group (without treatment), K(+) group as positive control group which were applied with relaps orthodontic forces, and the other groups P1, P2, were applied with relaps orthodontic forces and Stichopus hermanii 2,5 % and 3 %.

Preparation of orthodontic tooth movement

Orthodontic forces was applied with giving applied separator by separating plier in mesial left insisivus maxilla cavia cobaya 14 days to produce orthodontic tooth movement. Separator forces was 0,0474 kN, measured by autograph

Preparation of Powder Stichopus Hermanii

Stichopus hermanii were used in this study from coastal regions around Sumenep, East Java Indonesia. Stichopus hermanii was cleaned by making a longitudinal incision 3-5 cm on the ventral side of stichopus hermanii without damaging the internal organs using scalpel. Sticopus hermanii was dried but not be in direct sunlight for 7 days. After this, Stichopus hermanii was blender until get the powder.

Preparation and Applied Stichopus Hermanii gel

Stichopus hermanii gel 2,5% was made from 0,25 gr Stichopus hermanii powder was diluted with NaCMC 2% in DMSO 5 % until 10 ml. Stichopus hermanii gel 3% was made from 0,3 gr Stichopus hermanii powder was diluted with NaCMC 2% in DMSO 5 % until 10 ml. Stichopus hermanii gel was applied in gingival sulcus with insulin syringe 0,025 ml once per day

The research was conducted in Biochemistry Laboratory Medical Faculty of Airlangga University. After 14 days of treatment. the cavia cobaya were sacrificed. The jaw was sectioned. Integrin α2β1 and BMP-2 (Bone Morphogenetic Protein-2) expression were examined with immunohistochemistry method in tension side.

The research data result tabulated and planned to analyze by descriptive statistic test, normality distribution test to know if the data that obtained come from population with normal distribution, ANOVA test

(analysis of varians) to analyze the difference of each variable compared with control. Then the data were tested with LSD Test

RESULTS

The aim of this study is to investigate Integrin α2β1 and BMP-2 regulated in bone remodelling to accelerate orthodontic tooth movement by giving Stichopus hermanii. The result in this experiment show the the expression of integrin α2β1 in accelerating orthodontic tooth movement as shown as table 1

Table 1 : Integrin α2β1 in accelerating orthodontic tooth movement applied with Stichopus hermanii

Group	Mean± Standart Deviation
K(-)	7,5±1,77
K(+)	3±1,07
P1	11,1±3,3
P2	14,13±4,55

Table 1 show means and SD in K(-), K(+), P1,and P2 are 7,5±1,77; 3±1,07; 11,1±3,3 and 14,13±4,55.Then the data were tested with normality test, homogenity test and show the data was homogen and have a normal distribution. ANOVA test (p=0.05) for the expression of integrin α2β1 in accelerating orthodontic tooth movement applied with Stichopus hermanii showed significantly differences. With the LSD test, showed that integrin α2β1 expression : P1 and P2 showed increased integrin α2β1 expression whether P2 has the best expression as seen as table 2

Table 2 : LSD Test expression in relaps orthodontics Cavia Cobaya applied with Stichopus hermanii

Group	**K(-)**	**K(+)**	**P1**	**P2**
K(-)		0,006*	0,022*	0,000*
K(+)	0,006*		0,000*	0,000*
P1	0,022*	0,000*		0,055
P2	0,000*	0,000*	0,055	

*Significantly different

So, the expression of Integrin α2β1 was significantly increased in P2 and P1 compare to K(+) and K(-).

The result showed BMP-2 expresion were increased in accelerating orthodontic tooth movement by giving Stichopus hermanii as sees as table 3

Table 3 : The Expression BMP-2 as osteoblast activity in accelerating orthodontics tooth movement applied with Stichopus hermanii

Group	Mean± Standart Deviation
K(-)	5,38±2,72
K(+)	2,62±1,77
P1	10,88±3,64
P2	18,63±1,5

Table 3 show means and SD in K(-), K(+), P1,and P2 are 5,38±2,72; 2,62±1,77; 10,88±3,64 and 18,63±1,5 Then the data were tested with normality test, homogenity test and show the data was homogen and have a normal distribution. ANOVA test (p=0.05) for the expression of BMP-2 as osteoblast activity in accelerating orthodontic tooth movement applied with Stichopus hermanii showed significantly differences. With the LSD test, showed that BMP-2 expression : P1 and P2 showed increased BMP-2 expression whether P2 has the best expression as seen as table 4

Table 4 : LSD Test expression BMP-2 as osteoblast activity in accelerating orthodontics tooth movement applied with Stichopus hermanii

Group	K(-)	K(+)	P1	P2
K(-)		0,004*	0,000*	0,000*
K(+)	0,004*		0,000*	0,000*
P1	0,000*	0,000*		0,000*
P2	0,000*	0,000*	0,000*	

*Significantly different

So, the expression of BMP-2 was significantly increased in P2 compare to K(+), K(-) and P1.

DISCUSSION

The aim to this study was to investigate integrin α2β1 and BMP-2 regulated in bone remodelling to accelerate orthodontic tooth movement by giving Stichopus hermanii. This study showed the result Integrin α2β1expression means and SD in K(-), K(+), P1,and P2 were 7,5±1,77; 3±1,07; 11,1±3,3 and 14,13±4,55. BMP-2 had means and SD : 5,38±2,72; 2,62±1,77; 10,88±3,64 and 18,63±1,5. Integrin was significantly increased in P2 and P1 compare to K(+), K(-), while BMP2 increased too.

Orthodontic tooth movement in cavia cobaya models occurs when separator rubber applying in the left first insisivus compressed towards the distal side during 14 days orthodontic tooth movement. Increasing integrin and BMP-2 expresion by applying Stichopus hermanii during orthodontic tooth movement means there are processes for bone remodeling because integrin and BMP-2 plays a central role for alveolar bone osteogenesis.

Integrins are cell surface receptors composed of α- and β-subunits. Integrins enable cell adhesion (cell-matrix, cell-cell) and transduce both chemical and mechanical signals. Certain integrins have function to mediate mechanical stress-induced proliferation, shear stress activated extracellular regulated-protein kinases (ERKs) and c-Jun kinases (JNKs) and integrin may function as mechanotranduction.[12] A2β1 integrin is the major collagen type 1 receptor expressed on Th 17 cells that mediates attachment of collagen type 1.[13] α2β1 integrin increases collagen type 1 synthesis and turnover.[14]

The bone morphogenetic proteins (BMPs) included BMP-2, is the second family of growth factors, unique: these are the growth factors involved in the process of osteoblast differentiation that drive the process of bone formation and mineralization. Since the late 1980s, BMPs have been known to stimulate new bone formation. BMPs represent molecular targets used to identify and develop new agents to simulate the bone-forming process. Much is understood about the signal transduction pathway for the BMPs. BMP-2 stimulates the differentiation of mesenchymal cells into osteoblasts and chondrocytes. BMP-2 binds to its receptor, a Ser/Thr kinase, which phosphorylates and activates the intracellular signaling molecules Smad 1 and Smad 5. This in turn leads to the expression of the transcription factor Cbfa1 (Runx2), which results in the expression of several proteins critical for bone formation. Wnt/LRP5 pathway is also linked to the BMP pathway by a cascade of anabolic transcriptional events. The signal starts at the Hedgehog signaling pathway, moving through the BMPs and Wnt/LRP5, and ultimately leads to expression of the critical genes involved in osteoblast differentiation. This pathway provides multiple potential molecular targets that may be manipulated in the process

of bone formation. [15] The process that been needed to accelerated orthodontic tooth movement.

Stichopus hermanii contain various active ingredient such as collagen, hyaluronic acid, chondroitin sulphate,cell growth factor, EPA DHA, flavonoid.[9] In a previous in-vitro study showed that there was a positive promoting effect of stichopus hermanii water extract on osteoblast functional activity when 1.6mg/ml, 3.1mg/ml, 6.3mg/ml, 12.5mg/ml, and 25mg/ml of stichopus hermanii concentrations were used. Microscopic examination showed adequate cell confluency in the wells with stichopus hermanii concentration from 1.6 mg/ml up to 25mg/ml. Previous studies showed that the water extract of Stichopus contains high amino acid concentrations (37%)34 as well as calcium, magnesium, iron and zinc that may play an important role in osteoblast molecular activities. [11]

Previous study showed that increasing integrin α2β1 mediates cell adhesion to and spreading on fibrillary collagen. Integrin α2β1 also can mediate collagen gel contraction and promote the integrin-mediated formation of long cellular projections typically that has role in mechanical tension. Condroitin Sulphate on the surface of bone matrix binds to cell adhesion molecule such as integrin. Ascorbic acid is also can promote collagen integrin.[16] Collagen type 1 is a major type for matrix composition in alveolar bone formation of orthodontic tooth movement.

Flavonoid, inhibits osteoclast differentiation and bone resorption in vitro but also stimulates human osteoblast differentiation. In vivo, flavonoid increases bone mass in immobilized rats and also the biomechanical properties of rat bone.[15,17] Flavonoid treatment resulted in a significant elevation of alkaline phosphatase (ALP) activity, collagen contents and osteoblast differentiation genes [ALP, collagen, osteopontin (OPN), osteoprotegerin (OPG) and osteocalcin (OC)] and bone morphogenetic protein (BMP) genes (BMP2, BMP4 and BMP7). [18] Flavonoid activated BMP signaling by inducing Smad1, 5 phosphorylation, as well as Id1 and Id2 protein expression in a dose-dependent manner. [19]

The effect of glycosaminoglycan (GAG) such as chondroitin sulphate, oral administration had been shown to increase the total calcium pool and intestinal absorption of calcium, which may lead to an increased capacity for injured bone to regenerate during osteogenesis.[11] Condroitin Sulphate on the surface of osteoblasts or bone matrix binds to cell adhesion molecule such as integrin on the pre-osteoclastic cells and inhibits the differentiation into osteoclasts so bone formation can occurred. [16]

Stichopus hermanii accelerate tooth movement through integrin α2β1 and BMP-2 in bone remodelling cycle. Stichopus hermanii Bone remodeling process is a last phase in orthodontic tooth movement that occur after rapid movement stops. When tooth movement occurs, bone resorption have role in bone remodeling. Bone formation is a phase after bone resorption. Increasing integrin α2β1 and BMP2 regulate bone formation process. Bone formation process increasing so that bone remodelling cycle.

CONCLUSION

Stichopus hermanii active component could increase integrin α2β1 and BMP2 that regulate bone remodelling,while 3,5 % Stichopus hermanii had the best to accelerate bone remodelling in orthodontic tooth movement.

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RESEARCH ARTICLE

The Expression Of Macrophage Cell On Wound Healing Process In Rattus Norvegicus Using Chitosan Gel With Different Molecular Weight

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ABSTRACT

Objectives: *The infiltration of macrophage cell on wound healing process has important role to release a number of cytokines and synthesize extracellular matrix. The aim of this study was to account the the expression of macrophage cell on wound healing process of dental extraction in Rattus norvegicus for 3 and 4 days using chitosan gel with different molecular weight.* ***Methods:*** *Rattus nornegicus strain wistar male, aged 8-16 weeks, divided into 3 groups, namely group 1 which given chitosan gel 1% with high molecular weight, group II which given chitosan gel 1% with low molecular weight and group III as control which were not given chitosan gel. Chitosan gel 1% were applied into the socket of dental extraction. Rat was decaputated 3 and 4 days after chitosan gel application and the jaw in the treated regions and control group were cut for immunohistochemical examination using macrophage cell monoclonal antibody to observethe expression of macrophage cell. Data were analyzed using ANOVA test.* ***Results:*** *The expression of macrophage cells were found higher in the group which given chitosan gel 1% with high molecular weight. The result showed significant differences in expression of macrophage cell for 3 and 4 days observation compared to control group ($p<0,05$).* ***Conclusion:*** *The application chitosan gel 1 % with high molecular weight stimulates macrophages cells on wound healing process of dental extraction.*

Keywords: *Chtosan gel 1 %, molecular weight, macrophage cell*

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BACKGROUND

The macrophage is important inflammatory cell in wounds healing process. The macrophage cells have role to many functions in wound healing, including host defense, promotion of inflammation and support of cell proliferation on wound healing process.[1] It include the following growth factors that promote cellular proliferation and protein synthesis, proteases and extra-cellular matrix molecules. It produce a large number of mediators and cytokines including interleukin-1, interleukin-6, interleukin-12, TNFα, and inducible nitric oxide synthase (iNOS). The macrophage cell stimulate the production of growth factors such as TGF-beta1, vascular endothelial growth factor (VEGF), and insulin-like growth factor (IGF)-1. These growth factor promote the proliferation cells in wound healing process.[1,2,3]

Chitosan is naturally derived polysaccharide that have many application in tissue engineering due to its antimicrobial activity ,biocompatibility and having some properties to accelerate wound healing process.[4] In recent study the application of chitosan gel on wound healing process of dental extraction can increase the number of type 1 collagen on remodeling process of dental extraction.[5] Kojima *et al*. reported that chitosan is able to stimulates Platelets derived growth factor (PDGF). It can stimulates the migration and proliferation of macrophages and fibroblast cell on wound healing. Futhermore, PDGF activates the synthesis of Tranforming growth factor beta (TGF β) in macrofag, which also activates the synthesis of collagen in fibroblast.[5,6,7] The application of chitosan depends on the characteristic of chitosan include the molecular weight and deacetylation degree.[8,9]

The infiltration of macrophage cell on wound healing process has important role to release cytokines, some mediator and synthesize extracellular matrix. Chitosan gel is property to accelerate wound healing process of dental extraction. The aim of this study was to account the the expression of macrophage cell on wound healing process of dental extraction in Rattus norvegicus for 3 and 4 days using chitosan gel with different molecular weight**.**

MATERIALS AND METHODS

The material in this experiment were Chitosan powder purchased from Sigma chemical, St. Louis, USA. The degree of deacetylation was more than 75 %. Chitosan with high molecular weight (Product number: 419419, Lot number: MKBH5816V) and chitosan with low molecular weight (Product number= 448869, Lot number= MKBH7256V), asetat acid 2 % p.a (Merck, Germany), buffer formalin 4% and 10% , ketamin (Ketalar,Pfzer), xylazine, alkohol 80%, alkohol 95 %, alkohol 100 % (absolute), xylene, buffer Parafin, EDTA 10 % (JT Baker, USA), NaSO4 2 % (Merck, Germany), PBS,Tripsin 0,125 %, H_20_2 0,5 %, methanol (Merck, Germany), NaOH 1,25 % and Macrophage monoclonal antibody. The tools used in this experiment were Becker glass, Stirer, pipette pasteur, Autoclave (Foundry), 5 cc syringe injection (Terumo), 1 cc syringe tuberculin (Terumo), pinset, elevator, Needle holder, non resorbable silk sutures,

Bekker glass, Incubator memmert W Germany, Rotary microtome, Label, slide, cover glass, petri disk Poly-L-lysine, deck glass and mikroskop trinokuler Olympus CX 31 Japan).

Chitosan gel 1 % (w/v) was made with diluted one gram of chitosan powder in acetic acid 2 %. It added with NaOH 1,25 % solution to get neutral pH. The mixture was stirred until the gel was completely formed. After homogenization, the gels were stored in closed containers at ambient temperature until use. The characteristic of chitosan gel was evaluated includes solubility, pH, viscosity, physical characteristic, homogeneity, consistency, and duration of storage time. The homogeneity test of gel carried out using glass plates after the powder diluted in acetic acid 2 %. It should be observed on optimized homogeneous. Consistency test could be done by using a penetrometer or mechanically sentrifugator. Gel without precipitation will produce a good consistency. Physical characteristic test or Organoleptic analysis during the storage time includes change of colour, form of formulation gel and odorless.[10,11]

The research was an experimental laboratory study. Rattus nornegicus strain wistar male, aged 8-16 weeks, divided into 3 treatment groups namely group 1 which given chitosan gel 1 % with high molecular weight dan high viscosity. Group 2 given chitosan gel 1 % with low molecular weight and low viscosity, and group III as control which were not given chitosan gel. Chitosan gel were applied into the socket of dental extraction. Rat was decaputated 3 and 4 days after chitosan gel application and the jaw in the treated regions and control group were cut for immunohistochemical examination to analyze expression of Macrophage cell. Fixation was performed using 10 % buffer formalin and decalcification applying EDTA. Further process was dehydration and continued by clearance. The tissue could be cut using microtome in 4-6 µm thickness. Deparafin and rehydration were subsequently performed. Bone morphogenetic protein-2 monoclonal antibody was diluted by antibody diluents. Next, it was washes by PBS. Streptavidin-biotin was dropped and incubated for 30 minutes, washed by PBS. Counterstained using haematoxyline and washed by flowing water and dried. It was given entelan and covered by cover glass. Light microscope was applied and the evaluation was done. The measuring result were analyzed using ANOVA test. It analyzed the comparison between chitosan treated with high molecular weight group, lower molecular weight group and the control groups ($P<0,05$).

RESULTS

The mean and standard deviation of each group at 3 and 4 days after treatment. The expression of macrophage cell in 3 and 4 days after treatment using chitosan with high molecular weight and high viscosity more higher compared to group using chitosan with low molecular weight and low viscosity. The data was analysized using kolmogorov-smirnov statatistical test. It showed normal distribution ($p>0.05$) in which fulfiiling the requirement of parametric test. ANOVA test showed there were

significant difference ($p<0.05$) in all group.

Table 1. The mean and standard deviation of each group at 3 and 4 days after treatment

Variable	Treatment	3 days	4 days
		Mean± SD	**Mean± SD**
The expression of macrophage cell	Chitosan high MW,visco	16.00±2.37	22.00±2.00
	Chitosan low MW,visco	12.40±2.30	13.33±2.25
	Control	2.83±0.98	3.40±1.14

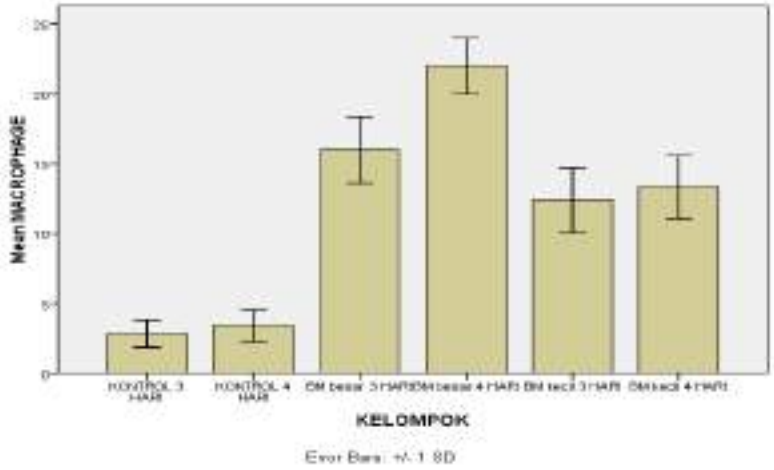

Figure 1. The graphic of expression macrophage cell on 3 and 4 days using chitosan with high molecular weight, lower molecular weight and control group

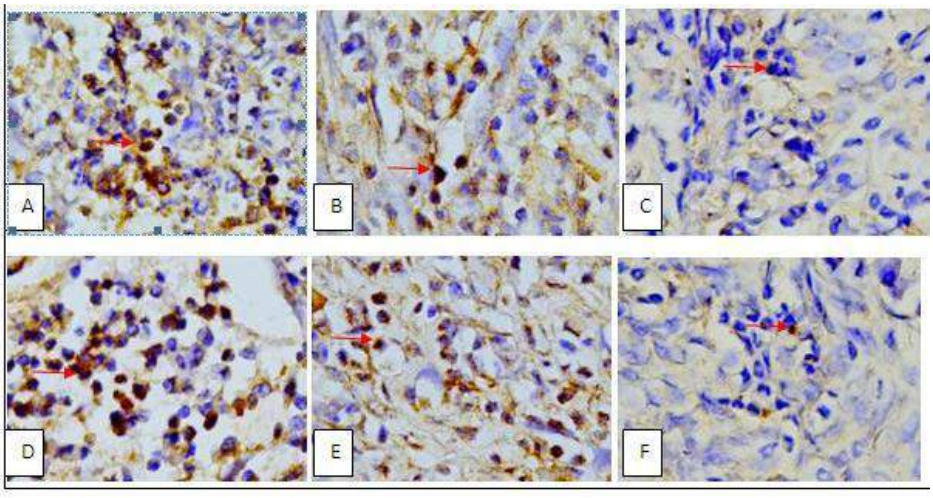

Figure 2. The expression of macrophage cell at 3 days observation: (A) Chitosan with high molecular weight and high viscosity, (B) Chitosan with low molecular weight and low viscosity, (C) Control group, without using chitosan; The expression of macrophage cell at 4days observation: (D) Chitosan with high molecular weight and high viscosity, (E) Chitosan with low molecular weight and low viscosity, (F) Control group, without using chitosan

The expression of macrophage cell on wound healing process of dental extraction using chitosan gel shown in figure 2. Figure 2 showing the expression of macrophage cell in 3 and 4 days after dental extraction. In our study, the expression of macrophage cell on wound healing process of dental extraction using chitosan was more higher compared to control group. The expression of macrophage cell in 3 and 4 days using chitosan gel with high molecular weight and high viscosity was more higher than using chitosan with low molecular weight and low viscosity.

DISCUSSION

Macrophage cell appear In inflammatory phase of wound healing process, 48 until 72 hours after injury and continue the process phagocytosis. These cells Attracted to the wound site by chemoattractive agents, including clotting factors, complement components, cytokines such as PDGF, TGF-β and platelet factor IV, as well as elastin and collagen. Macrophages cells have a longer lifespan than neutrophils. It has important role as regulatory cells and providing an abundant reservoir of potent tissue growth factors, TGF-β, as well as other mediators (TGF-α, heparin binding epidermal growth factor, fibroblast growth factor [FGF], collagenase), activating keratinocytes, fibroblasts and endothelial cells. If there no macrophage cell would cause delayed fibroblast proliferation, angiogenesis and maturation[2,12].

In our study the expression of macrophage cell in 3 and 4 days after treatment using chitosan gel have more higher than the treatment of group control. Chitosan exhibits several valuable properties such as antibacterial, antifungal, nontoxic, hemostatic, biodegradable as well as hydrogel formation properties. Which these properties, chitosan applications has important role in many fields for tissue engineering.[13] Chitosan gel also acts as an ideal wound dressing and more importantly chitosan gel accelerates wound healing.[14] Chitosan is metabolized by certain human enzymes, such as lysozyme. Thus, chitosan is biodegradable. It has structural similarities to glycosaminoglycans and is hydrophilic. Chitosan's monomeric unit, *N*-acetylglucosamine is an extracellular macromolecule that is important in wound healing.[14,15] When chitosan is applied to the wound, it biodegraded by lysozymes, Chitosan modulates macrophage function and the secretion of numerous enzymes collagenase and cytokines include interleukins and tumor necrosis factor during the wound healing process. Chitosan structurally glycosaminoglycans (GAG), which have long-chain, unbranched, repeating disaccharide units maintaining cell morphology, differentiation and function. Glycosaminoglycans and proteoglycans are widely distributed throughout modulate cytokines and growth factors, including heparin and heparan sulfate. Hence, the cell-binding and cell-activating properties of chitosan are important for wound healing. Moreover, *N*-acetylglucosamine is an anti-inflammatory drug and is synthesized in the human body from

glucose.[15] It is incorporated into glycosaminoglycans and glycoproteins. Chitosan exerts anti-inflammatory effects by inhibiting prostaglandin E2 (PGE2) and cyclooxygenase-2 (COX-2) protein expression. The application of chitosan increases the expression of the anti-inflammatory cytokine. The degradation of chitosan into monomers and oligomers at a wound site significantly accelerates the wound healing process. [13,15]

The characteristic of chitosan is related with its molecular weight. The expression of macrophage cell after treatment using chitosan gel with high molecular weight and high viscosity shown more higher than treatment using chitosan gel with low molecular weight and low viscosity. Chitosan gel has a strong tissue-adhesive property. When chitosan dissolved in acidic solution gives viscous solutions.The viscosity of chitosan is influenced by its molecular weight**.** The monomers of chitosan powder with high molecular weight and high viscosity were directly effective because it monomers more quickly absorbed and biodegraded by some enzymes. N-acetyl-D-glucosamine dimer active of chitosan cross-linked with glycosaminoglycan and glycoprotein that part of matrix macromolecules extracellular as well as stimulate increased.[16,17,18] The macrophage cell is key of inflmatory process in wound healing process. It produces some mediators, sitokin and growth factor which crucial role in wound healing process of dental extraction.[2] Chitosan gel were found to stimulate the expression of macrophage cell, significantly it could promote the the wound healing process of dental extraction.

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RESEARCH ARTICLE

Effects Of *Stichopus Hermanii* Ethanolic Extract On Tlr-2 And Il-17 Expression In Rats With Oral Candidiasis Immunosupressed Model

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ABSTRACT

Background: *TLR-2 and IL-17 play important role in signaling of C.albicans infection. Stichopus hermanii ethanolic extract have potency as inhibitor against C.albicans.* ***Purpose:*** *To find out the effect of stichopus hermanii ethanolic extract on the expression of TLR-2 and IL-17 in rats with oral candidiasis immunosupressed models.* ***Methods:*** *This study was true experimental with post test only control group design. Wistar rats were imunosupressed with dexamethasone and tetracycline peroral then induced by C.albicans ATCC 10231 $6x10^8$ on the tongue of rats for14 day. Groups were divided into : healthy (K1), candidiasis (K2), and two treatment groups P1: candidiasis+ 3% Stichopus hermanii ethanolic extract, P2: candidiasis+nystatin, P1 and P2 were treated for 14 days after induction of C.albicans. The expression of TLR-2 and IL-17in tongue specimen were examined by immunohistochemistry. Data were analyzed with One-way ANOVA and LSD-test.* ***Results:*** *The expression of TLR-2 were increased in candidiasis group ($p<0.05$) while no significant different in IL-17 expression compare to normal ($p>0.05$). Treatment with Sticophus hermanii and Nystatin both increased TLR-2 and IL-17 expression compare to candidasis group ($p<0.05$).* ***Conclusion:*** *Stichopus hermanii ethanolic extract of could increase the expression of TLR-2 and IL-17 in rats with oral Candidiasis immunosupressed model.*

Keywords : *immunosupressed, oral candidiasis, TLR-2, IL-17, Stichopus hermanii*

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BACKGROUND

Candida species are the most common fungal pathogens of humans and can cause life threatening infections in immunocompromised individuals.[1,2] *Candida* infections common in patients with HIV/AIDS, diabetes mellitus, HIV disease, chronic systemic corticosteroid usage, or chemotherapy-induced neutropenia are predisposed to cutaneous candidiasis, mucosal diseases in the elderly and edentulous individuals, such as *Candida*-associated denture stomatitis.[1,3] *Candida albicans* as the common caused is a polymorphic fungus that present as a commensal of mucosal tissues in approximately 40–80% of individuals.[4]

Immune responses directed against C. albicans, as host defense against this pathogen involves complex coordination of both innate and acquired immune responses. Pattern recognition of organisms via TLRs (Toll like Receptors) have significantly contributed to the complex mechanism recognition of microorganisms by the innate immune system. TLR-2 and TLR-4 known as the main TLRs involved in the signalling cascades induced by *C. Albicans.*[3,5] TLR2 signaling pathways activation in antigen-presenting cells (APCs) by ligation of *C. albicans* cell-wall components toward production of cytokines, such as tumour necrosis factor (TNF), interleukin (IL)-1β and IL-10.[5] TNF-alpha and interleukin (IL) plays important role in mucosal defence as pro-inflammatory cytokines, whereas IL-10 is a potent inhibitor in the immune defense against C. albicans.[6,7]

Candida species recognition by TLRs activates intracellular signaling pathways that might contribute to the polarization lead to proinflammatory TH17 response.[8] Th17 responses constitute essential components of immunity to the commensal fungus Candida albicans.[9] Th17 cells produce cytokines that is IL-17A and IL-22, which mediate protection from candida infection at mucocutaneous surfaces. The role of IL-17 is recruit neutrophil accumulation by stimulating production of cytokines and chemokines from nonhematopoietic cells, while IL-22 stimulates proliferation and antimicrobial peptide production by epithelial cells.[3,9]

Sea cucumbers (Holothuria sp.) has immunostimulatory effect. Its plays a role in improving leukocyte count and differential leukocyte carp namely monocytes and Neutrofil.[10] Several studies indicate that sea cucumber extract has several therapeutic properties such as a promoters of soft tissue healing and as an antibacterial, antifungal, antitumour, antianaphylactic, anti-inflammatory, antinociceptive and antioxidant. Sea cucumbers species extract also affects viability or proliferation of human fibroblasts and osteoclast cells.[11] The presence of sulfate GAG in particular of sea cucumbers can accelerate healing through a positive effect on the acceleration of the percentage of wound contraction, epithelialization increasing migration, fibroblast proliferation, angiogenesis processes, and organization of collagen.[12]

One of sea cucumber's family, Stichopus hermanii, has potential therapeutic properties in oral cavity diseases. Several studies have shown that the metabolites of saponin in the sea cucumber Stichopus hermanii can be used as an antibacterial and

antifungal. As antibacterial, this extract inhibit the growth of caries bacteria such as Enterococcus faecalis and Streptococcus mutans. While as antifungal, it can inhibit the growth of Candida Albicans.[13-15] Revianti dkk[16] found that Stichopus hermanii is not toxic at concentration of 2.5% wherease in concentrations of 5% it is toxic. Increased fibroblasts are found in the teeth with orthodontic treatment were treated with golden sea cucumber 3% in order to prevent relapse.[17]

Based on the description above and anticandida potency of sea cucumber (Stichopus hermanii) is necessary to do research on the effects of *Stichopus hermanii* ethanolic extract on TLR-2 and IL-17 expression in rats with oral candidiasis immunosupressed model. The purpose of this study was To find out the effect of stichopus hermanii ethanolic extract on the expression of TLR-2 and IL-17 in rats with oral candidiasis immunosupressed models.

MATERIAL AND METHODS

This research was a true experimental research with post test only control group design. Sixteen Male Ratus Novergicus Wistar strain, aged 8-16 weeks, 200-300 gram weight and healthy were immunosupressed with dexamethasone and tetracycline orally and induced by C.albicans $6x10^8$ (2 Mc.Farland) on the tongue of rats for 14 days. Divided into four groups, healthy group (K1), candidiasis group (K2), treatment group 1 (P1): candidiasis treated with ethanol extract Stichopus hermanii 3% and treatment group 2 (P2): candidiasis treated with Nystatin.

The instruments used in this study were a box cage rat, disposable syringes, analytical balance, glass boxes, portable device Glucoce test (Glucosure), scalpel, cotton bud, scissors, test tubes, tube centrifuge, pipette, erlenmeyer, tweezers, glass beaker, microscopes, cameras. The tools necessary for the preparation of the erythrocyte preparation is scalpels, scissors, tweezers, syringes, cotton, bottles, test tubes, centrifuges, refrigerators. Materials of this study were immunohistochemistry kit, Candida albicans ATCC10231, Saburoud Agar, Saburoud broth, PBS, TLR-2 and IL-17 marker.

Sea cucumber were used in this study is the golden sea cucumber (Stichopus hermanii) adults, weighs 100-250 grams from karimunjawa. The extraction method is using maceration method by soaking dried Stichopus hermanii in ethanol for 24 hours and then separated filtrate and residue. To get dried sea cucumber, gold Sea cucumbers (Stichopus hermanii) cleared later in the freeze dryer at a temperature of -85 ° C and then crushed into a powder and solvent extracted with ethanol 96%. After that added with 0.2% Na-CMC up to concentration of 3%.

Healthy Rats which were not immunosupressed and given tetracycline orally. In this group, Rats were given 1mL 0.2% CMC-Na and PBS per day. Whereas candidiasis and treatment group, rats were previously immunosupressed by providing oral dexamethasone for 1 week at a dose of 0.5mg / day / mice and supplemented with tetracycline 1mg / day / rat orally and then induced with Candida albicans ATCC10231 containing $6x10^8$ on the entire surface of the tounge three times/week for 2 weeks.

During the induction to treatment, the rats were given tetracycline orally at a dose of 0.1 mg / day / rat.

Therapy for this study was given stichopus hermanii 3% and nistatin topically for 14 days after Rats undergoing oral candidiasis, after that were sacrificed. Samples that is rat's tounge are processed and stored in paraffin blocks and ready to do the cutting. Results pieces and placed in glass objects made by immunohistochemical staining and by TLR-2 and IL-17 marker. Measurement of the amount of antibody made by observing in the microscope with 400x magnification. Data were analyzed with One-way ANOVA and LSD-test.

RESULT

Expression of TLR-2 and IL-17 showed a dark brown color (Figure 1). The results of this study indicate the amount of both TLR-2 and IL-17 expression in the group was given therapy candidiasis with stichopus hermanii (P2) has the highest number compared to other groups. While in the healthy group (K1), the number of TLR-2 and IL-17 expression at least compared to the others. TLR-2 and IL-17 expression in Candidiasis groups has compared to both therapy groups has the lowest number (Table.1).

There were significant different between groups in expression of TLR-2 ($p<0.05$). The expression of TLR-2 and IL-17 were decreased in candidiasis group ($p<0.05$). Treatment with Sticophus hermanii and Nystatin both increased TLR-2 and IL-17 expression compare to candidasis group ($p<0.05$). TLR-2 expression showed significance different between K1 and K2 ($p<0.05$). Whereas There were no significant different between healthy (K1) and candidiasis (K2) groups in expression of IL-17 ($p>0.05$) (Figure 2).

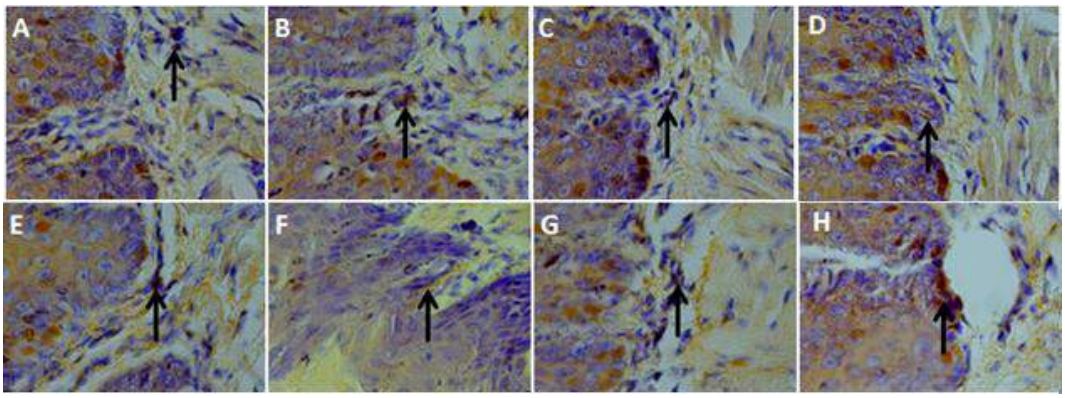

Figure 1. Expression of TLR-2 and IL-17 in the tongue epithelium of Wistar rats with oral candidiasis immunosupressed model

TLR-2 and IL-17 expression appointed by arrow: TLR-2 expression in Healthy group (A), TLR-2 expression in candidiasis group (B), TLR-2 expression in the group treated with Stichopus hermanii 3% (C) and group treated with Nystatin (D). IL-17 expression in Healthy group (E), TLR-2 expression in candidiasis group (F), TLR-2 expression in the group treated

with Stichopus hermanii 3% (G) and group treated with Nystatin (H) (magnification 400x).

Table 1. Number of TLR-2 and IL-17 in a group of healthy mice, candidiasis, treatment with stichopus hermanii extract 3% and Nystatin.

GROUPS	n	MEANS±SD	
		TLR-2	IL-17
HEALTHY	4	1,75 ± 0,5	1,75 ± 0,95
CANDIDIASIS	4	6,25± 2,5	3,5± 1,29
STICHOPUS HERMANII	4	15,5 ± 3,5	15 ± 1,41
NYSTATIN	4	11,25 ± 0,95	11,5 ± 1,29

n = Replication, SD= standard deviation

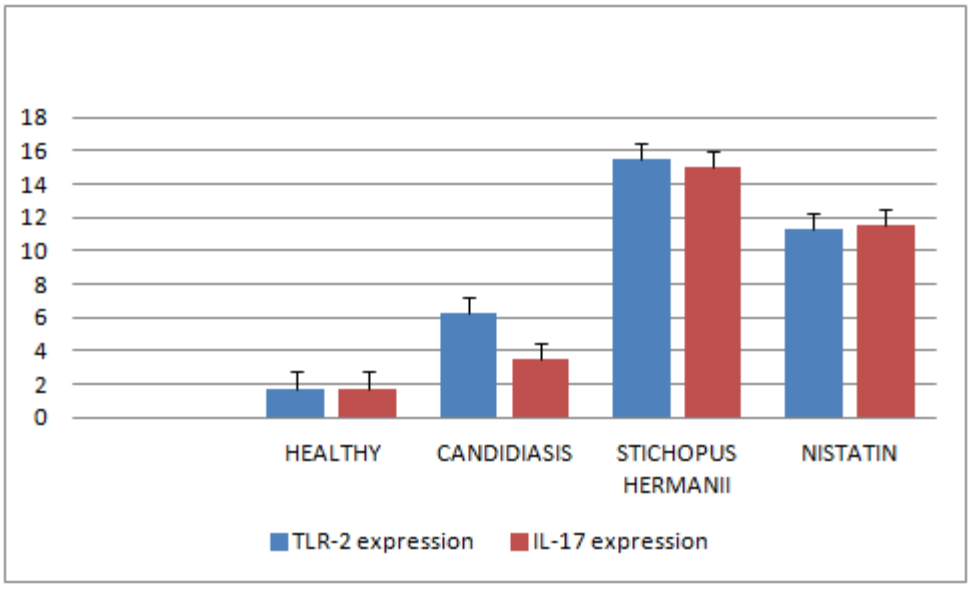

Figure 2. Variation of means TLR-2 and IL-17 expression in the tongue epithelium of Wistar rats with oral candidiasis immunosupressed model

DISCUSSION

The used of systemic immunosuppressive medication and broad-spectrum antibiotics hopefully will increase susceptibility candidal infection. Neutrophils and macrophages, as control both yeast and short filamentous forms of Candida albicans, were no longer respond effectively to Candida albicans infection in immunocompromised patients apparently due to an impaired immune status.[18] The used of broad-spectrum antibiotics alters the oral microflora. Imbalance of the normal bacterial population favours yeast growth, since it decreases the competition for nutrition and cell adhesion.[19] Therefore immunosuppressed condition and the use of broad-spectrum antibiotics is a well known predisposing factor for oral candidiasis.

C. albicans can invade the superficial layers of the oral epithelium, and cause proteolytic breakdown of E-cadherin which is important structural protein in the oral cavity, responsible for epithelium continuity, and a barrier against harmful substances.[19] Recognition of spesific antigens by T-cells in the adaptive immune response, are recognised by PRRs as part of the innate immune response.

One of PRR family that play a role in fungal recognition is TLR2. TLR2 activation induces cytokine production.[1]

Analysis of candida albicans colonization in the rat's tongue by TLR-2 expression showed significant different between healthy group and candidiasis group ($p<0.05$). This means the amount of candida in rats with candidiasis immunosupressed model were increased. Expression of TLRs might be associated with the progression of infection in these sites. Recognition of Candida albicans through TLRs activates intracellular signaling pathways that might contribute to the polarization toward a proinflammatory TH17/IL17 response where as essential components of immunity to Candida albicans.[8,9]

TLR-2 was involved in the induction of pro-inflammatory cytokine production.[20,21] However, some data suggest that TLR-2 is able to suppress immunity against Candida albicans through induction of IL-10 and regulatory T cells.[22,23] Which means that TLR-2 has two mechanism in immunity agains candida albicans. C. albicans may be able to induce both pro- and anti-inflammatory responses when recognized by macrophages depend on TLR-2 signaling.[23] In this study, IL-17 expression were increased in candidiasis groups but no significant compared with healthy groups ($p>0.05$). It is possibly due to a balance response of TLR-2 signaling.

Both treatment group with Sticophus hermanii and Nystatin were increased TLR-2 and IL-17 expression compare to candidasis group ($p<0.05$). Nystatin is an antifungal agent widely used for treatment of superficial mycoses with potent proinflammatory properties.[24,25] Razonable *et al*[25] found that nystatin induces cytokine secretion in TLR2-expressing but not TLR2-deficient cells. Nystatin reported could induce pro-inflamatory cytokine.[24] In this sudy, Nystatin could increased IL-17 that may be important in immune responses to candida infections.

Unbalanced Th17 and Treg responses during candidiasis due to cytokine, positively correlate with increasing severity in candidiasis.[9] IL-17 play a role in Epithelial cells and neutrophils as a bridge between the adaptive and innate immune responses, include induction of antimicrobial peptides, MMPs, and other inflammatory mediators. T*h*17 cells also been shown to drive antibody responses at mucosal surfaces, in particular secretory IgA (sIgA).[1] IgA known play an important role by causing fungal aggregation and prevnting adherence to mucosal surface.[26]

Stichopus hermanii ethanolic extract can increase TLR-2 and IL-17 expression compare to candidasis group since its has bioactive component. Flavonoids component in this extract modulated signaling pathways. The other component such Glikosaminoglican play role in wound healing demonstrated through increased fibroblast proliferation,

angiogenesis process and collagen formation.[27] Amino acids identified in powdered golden sea cucumber (Stichopus hermanii) such as Aspatat acid and glutamic acid have indirect role in the activation and proliferation of NK cells (Natural Killer). While arginine can increase the body's immune system by stimulate the activation and proliferation of T cells, which in turn triggers the activation of antibodies. Glycine can stimulate production and expenditure of IL-12 and cell B. B cells stimulated by candida will proliferate, differentiate and develop into plasma cells that produce antibodies.[28,29]

CONCLUSSION

Stichopus hermanii ethanolic extract has potency in inhibiting Candida albicans and promote immune system againts Candida albicans . Stichopus hermanii ethanolic extract could increase the expression of TLR-2 and IL-17 in rats with oral Candidiasis immunosupressed model.

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RESEARCH ARTICLE

TGF-β1 Expression on Traumatic Ulcer Healing Process Treated with Water Extract Gold Sea Cucumber

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ABSTRACT

Background: *Ulcers are the most common oral soft tissue lesions that can cause discomfort or pain which interferes with daily social activities. Glycosaminoglycan in gold sea cucumber proven have a positive effect on the wound healing, by regulate the activity of TGF-β1 process. TGF-β1 functionates to stimulate fibroblast proliferation which plays a role on wound healing* ***Purpose :*** *The aim of this study was to determine level of TGF-β1 expressionon oral traumatic healing process Wistar rats treated with gel of extract water gold sea cucumber.* ***Materials & Methods:*** *This study using Rattus Novergicus strain Wistar male, aged 3 months, were divided into 4 group. The group are gold sea cucumber extract concentration 20%, 40%, 80% and a negative control group. Ulcer was made with heated burnisher on lower lips of Wistar rats, The level of TGF-β1 was measured with immunohistochemistry and analyze with ANOVA* ***Result:*** *There is significant difference between negative group and treatment group (p<0,05). The most significant difference in group concentration 40% compared to all group (p<0,05) Animals treated with water extract gold sea cucumber showed the highest results regarding the level of TGF-β1 after 4 days, especially in concentration 40%.* ***Discussion:*** *Glycosaminoglycans (GAGs) in gold sea cucumber bind to TGF-β1 in ECM so this growth factor more stable. Poliferation and Migration of fibroblasts mainly triggered by transforming growth factor-β (TGF-β). Omega 3 in gold sea cucumber also can leading to neutrophil clearance and release of anti-inflammatory and reparative cytokines such as TGF-β1.* ***Conclusion:*** *It can be conclude that water extract gold sea cucumber could be used to enhance the oral traumatic healing procces by increasing level of TGF-β1*

Keys words: *Traumatic Ulcer, Healing TGF-β1.Gold sea cucumber*

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BACKGROUND

Ulcers are the most common oral soft tissue lesions, most are caused by simple mechanical trauma. Many are a result of accidental trauma and generally appear in regions that are readily trapped or abraded between the teeth, such as the lower lip, tongue, and buccal mucosa.[1] Ulcer is a lesion eroding epithelial tissue with clear border. Ulcer can happen spontaneously and reccurently. Traumatic ulcer on the mucous membranes of the oral cavity is a clinical appearance of inflammation indicated by an area with exudat and surrounded by connective tissue. Inflammation.[2] Oral health is important to the quality of life of all individuals. Oral lesions can cause discomfort or pain that interferes with mastication, swallowing, and speech, which interfere with daily social activities, so it need a medication to improve the healing process.[3]

Damage to any tissue triggers a cascade of events that leads to rapid repair of the wound. Wound healing is a specific biological process related to the general phenomenon of growth and tissue regeneration. It is characterized by the formation of a granulation tissue consisting of inflammatory cells, newly formed blood vessels and fibroblasts embedded in a loose collageneous extracellular matrix. Re-epithelization, angiogenesis and matrix deposition are critical events controlling this process.[4] Platelets are the first cells recruited at sites of injury, as a result of the coagulation process. Platelets have generally been believed to be important in the wound- healing cascade, both as initiators of coagulation and through the release of growth factors such as platelet- derived growth factor (PDGF) and transforming growth factor b (TGFb) at the site of injury, thus initiating activation of fibroblasts and other mesenchymal cells Numerous studies have shown that macrophages make a variety of cytokines, growth factors and mediators of inflammation that regulate both fibroblasts and microvascular blood vessels, key players in fibrosis and scar formation. TGF-β, a growth factor produced by numerous cells types within wounds, is one of the more potent of the chemoattractants for monocytes and other cell types. Topical application of TGF-β to wounds results in increased inflammation, angiogenesis and fibrosis, with increased matrix deposition.[5]

Traumatic ulcer, furthermore, can be treated with certain medical therapies, namely topical corticosteroid, sodium bicarbonate with water, or mouthwash with antiseptics, such as 0.2% chlorhexidine gluconate or benzydamin hydrochloride. Unfortunetely, the side effect of using chlorhexidine in a long term is discolouration of tooth.[2]

Indonesia is a country with the biggest sea cucumber potential in the world. Empirically gold sea cucumber has been widely used for the treatment wound healing in community.[6] Sea cucumber has been known as poly-anion rich food, due to the presence of glycosaminoglycans (GAGs).[7] Glycosaminoglycan in gold sea cucumber proven have a positive effect on the wound healing process.[2]

Research using sulfated GAGs (glycosaminoglycans) of extract gold sea cucumber showed an increase in contraction through enhanced collagen synthesis.[7]

Many previous researches show that glycosaminoglycans (GAG) sulphate, such as chondroitin sulphate and heparan sulphate, have a positive effect on the wound healing process.[2] Proteoglycans are composed of several glikosamonoglikan can modulate the ability of heparin-binding growth factors, such as vascular endothelial growth factor (VEGF), and FGF. Proteoglycan regulate the activity of TGF-β1 and the preparation of collagen fibrils in type I and III. The release of TGF-β1 led to an increase in collagen synthesis.[8] TGF-β functionates to stimulate fibroblast proliferation which plays a role on wound healing. Many previous researches show that the water extract of gold sea cucumber could increase the number of fibroblast cells with optimal concentration of water extract from gold sea cucumber as much as 40% on the traumatic ulcer of Wistar rats.[2] The process of wound healing will occurs faster.

Another content of gold sea cucumbers that are suspected to have an influence on wound healing is omega 3. EPA and DHA is known can accelerating wound healing procces. In gold sea cucumbers the content of EPA and DHA are relatively high.[6]

Indonesia as the biggest producer should harness the potential of gold sea cucumber. Based on all of the research above this study is aim to determine the level of TGF-β1 expression on oral traumatic healing process Wistar rats treated with gel of extract water gold sea cucumber.

MATERIAL AND METHODS

All experiments were approved by the Faculty of dentistry Animal Care Committee and performed in accordance with the guidelines of the Airlangga Council on Animal Care**.** Extract water of gold sea cucumber was made using freeze dried method. Water extract gold sea cucumber gel 80%, 40% and 20% (m/v) was made with diluted of water extract gold sea cucumber powder in PEG 400:4000 base. PEG base was added little by little until it reaches the desired concentration. For concentration 20%, 20 gram of powder mix with 100 ml PEG base.[9]

Twenty Wistar rats male, weighing 200-300 g and aged 3 months, were divided into 4 group.namely group 1 which given water extract gold sea cucumber gel concentration 80%, group II which given water extract gold sea cucumber gel concentration 40%, group 3 given water extract gold sea cucumber gel concentration 20%, and group 4 as negative control which were not given any treatment.

Ulcer was made but first Rats was anastized by inhalation anesthesia. Wistar rat's lower lip mucous was wounded by no 4 burnisher with 2 mm diameter that had been heated for 1 minute, and it was then touched to Wistar rat's lip mucous for 1 second.

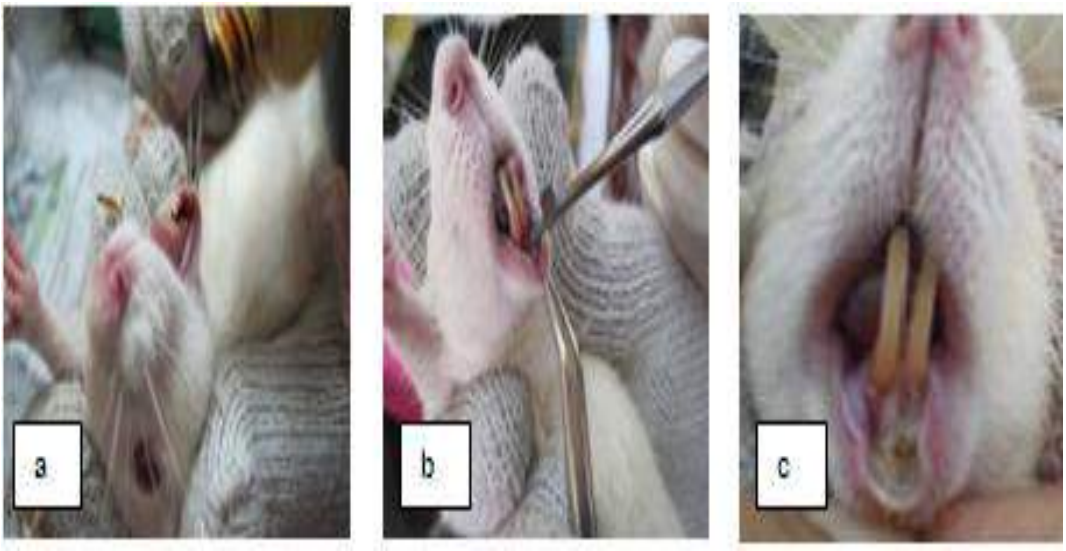

Figure 1. a). Lower lip mucosa before injured with a burnisher was smeared using clorhexidine digluconate 0.12%. (B). Lower lip mucosa injured with a burnisher No. 4. That has been heated. (C). traumatic ulcers Wistar rats appeared, on day 3 after injured.

The ulcer first seen on day 3 after injury. Water extract gold sea cucumber gel were applied into the ulcer on day 3 when the ulcer first time can be observed apply once a day. The preparation of immunohistochemical preparations begins by cutting the lower lip mucosa of rats were sacrificed on day 4, by including the normal tissue of rats. Then proceed with paraffin method, after that lips tissue was stained with antibody secunder TGF-β1.[10]

TGF-β1 expression was count with modification of Brandacher methods. Histometric using Olympus CX-22 and optilab program, magnificent at 400x. Slide were divided into 3 field of view and score using proportion score multiplied with intensity score technic. Proportion score (1(≤25%), 2 (26%-50%), 3 (51%-74%), and 4 (≥75%), of the cells were detectable) and intensity score (1 = no staining/background of negative controls; 2 = weak staining detectable above background; 3 = moderate staining; 4 = intense staining). [11] The measuring result were analyzed using ANOVA test. It analyzed the comparison between water extract gold sea cucumber gel tretead group and negative control group ($p<0,05$).

RESULT

The effect of water extract gold sea cucumber histopathology shown on figure 2, which in group two or 40% concentration showing the most intensive staining with immunohistochemestry.

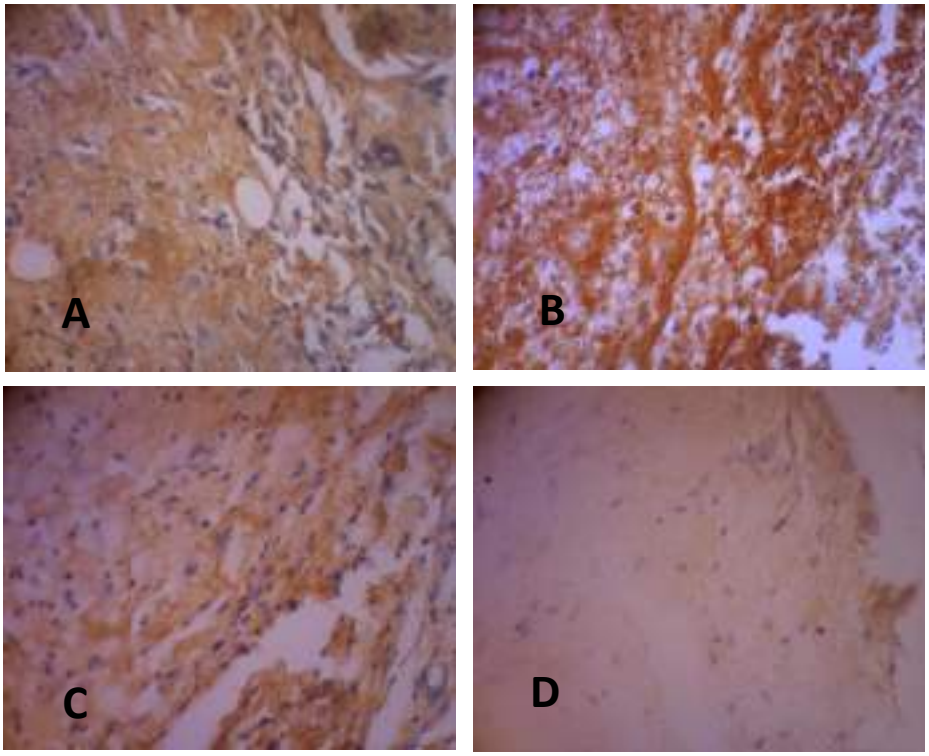

Figure 2. A. Immunohistochemestry image of group 1 with treatment water extract gold sea cucumber concentration 80%. B. Immunohistochemestry image of group 2 with treatment water extract gold sea cucumber concentration 40%. Showing the most intensive colour. C. Immunohistochemestry image of group 3 with treatment water extract gold sea cucumber concentration 20%. D. Immunohistochemestry image of group 4 with no treatment or negative control.

Table 1. Median and mode score TGF-β1 between groups

	Concentration 80%	Concentration 40%	Concentration 20%	Negative control
Median	4	6	6	2
Mode	4	6	4	2

Result of experimental study using twenty wistar rats with water extract gold sea cucumber shown in table 1. It shown that the best result on group concentration 40% which median score and mode score 6.

Table 1 shows us median and mode score, because it shows the median value of the center then it shows the distribution of scores is highest in the group of 40%, the next in the group, 80%, 20% and the negative control group. Meanwhile mode shows the value score that often appear in groups, the highest score that appears most frequently is on the group concentration of 40%. it can be conclude the best scoring on group concentration of 40%. Distribution of scoring can also be seen in diagram figure 3.

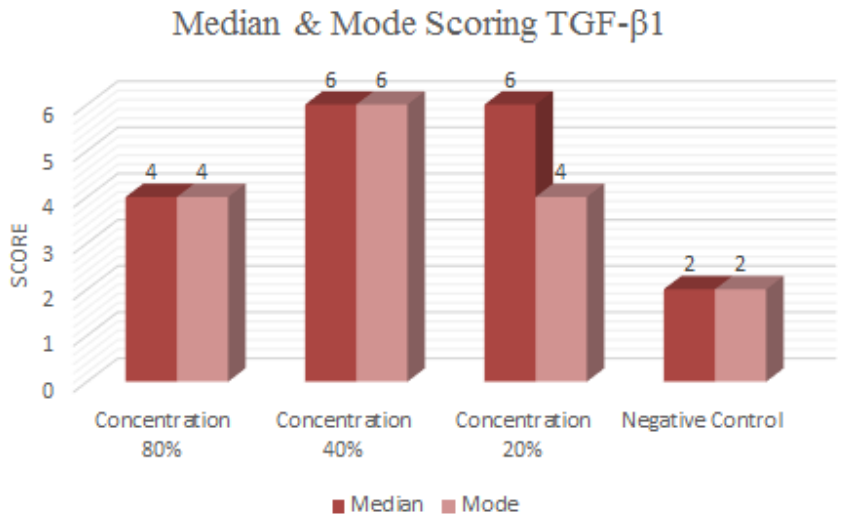

Figure 3. Diagram of median and mode scoring TGF-β1

The data was collected and analyzed using Shapiro-wilk statatistical test because sample test less then 50. The analyze showed distribution not normal ($p<0.05$) which not fulfill the requirement of parametric test, so analyze continue with non parametric test kruskal wallis. Test showed there were significant difference ($p<0.05$) between groups. Analyzed continue with mann whitney shown that in group gold sea cucumber and negative control there are significant difference ($p<0,05$), and the comparation between treatment group concentration 80% and 40% there is significant difference, also in group; concentration 40% and 20% showing significant difference ($p<0,05$), mean while the comparation between group concentration 80% and 20% not to significant ($p>0,05$) (table 2).

Table 2. Mann whitney result between group

	Concentration 40%	**Concentration 20%**	**Negative Control**
Concentration 80%	0.005*	0.828	0.00*
Concentration 40%		0.018*	0.00*
Concentration 20%			0.001*

Table 2 shown that group concentration 40% has the most significant difference. Among all group, group concentration 40% shown the best result in increasing level of TGF-β1 (figure 3). From this analysis provable that group concentration 40% is the most effective treatment in increasing level of TGF-β1 in all group.

DISCUSSION

In the past several decades, we have learned a great deal about the biochemistry, molecular biology, and

cell physiology of the events that lead to wound healing. The physiologic mechanisms of wound healing are similar with slight variations in all tissue.[12] Oral mucosa is covered with stratified squamous epithelium, and the connective underneath the epithelium consists of fibroblasts, collagens and capillaries. The process of wound healing devide into four phase which are hemostasis, inflammation, cell proliferation and remodeling. The first phase of hemostasis begins immediately after wounding, fibrin clot formation was perform in this phase. The inflammatory phase is characterized by the sequential infiltration of neutrophil, macrophages, and lymphocytes. The proliferation phase overlaps with the inflammatory phase, and is characterized by epithelial proliferation and migration over the provisional matrix within the wound, vascularization, collagen synthesis and extracellular matrix formation. The remodeling phase involve collagen remodeling, vascular maturation and regression.[13]

Collagen is synthesized primarily by fibroblasts, beginning 3 to 5 days after the injury. Finally, there is a balance between the rates of collagen production and collagen destruction by collagenase. Age, tension, pressure, stress, and TGF-β affect the rate of collagen production. [12]. That's why this research held on day 4 after injury.

TGF-β1 is secreted in a latent form, bound to a latent TGF- β1-binding protein-1 (LTBP-1), and can be activated by plasmin and modulated by fibromodulin. The regulation of TGF- β1 activation may also play a role in modulating repair.[14] Poliferation and Migration and proliferation of fibroblasts mainly triggered by transforming growth factor-β (TGF-β) and FGF produced by macrophages.[15]

Glysomaninoglycans (GAGs) in gold sea cucumber which are sometime known as mucopolysaccharides are large complex carbohydrate molecules that interact with wide range of protein involved in physiological and pathological processes.[7] Glycosaminoglycans, linear carbohydrates such as heparan sulfate and hyaluronan, participate in a variety of biological processes including cell-matrix interactions and activation of chemokines, enzymes and growth factors.[16] There two types of GAGs, sulfated and non-sulfated GAGs, sulfated Gags include Chondroitin sulfate, dermatan sulfate, keratan sulfate, heparan sulfate, and heparin.[7] There are a variety of growth factors in the ECM, including members beta (TGF-β) superfamily, and vascular endothelial growth factor (VEGF). These growth factors stimulate cells and have been shown to improve wound healing. However, they are unstable in solution. Many growth factors, including members of the TGF- β superfamily, can bind to GAGs in the ECM (extracellular matrix) where they are protected and localized.[17]

This research proved that gold sea cucumber can accelerated TGF-β1 especially on concentration 40% which show the highest median and mode scoring in expression TGF-β1, which also shows the significant difference between group. TGF-β1 expression increase possible because GAGs contents in gold sea cucumber. Another research prooven using gold sea cucumber can accelerated wound healing in traumatic ulcers with rapid

wound closure by decrease of ulcer diameter.[18]

Pharmacological modulation of TGFβ signaling pathways that results in decreased influx of monocytes into wounds might thus be a valuable approach to reducing fibrosis and promoting basic repair mechanisms [5]. Modulation of TGF-β1 will improve traumatic ulcers wound healing. Gold sea cucumber with GAGs contents, bind to TGF-β1 in ECM so this growth factor more stable.

The contents omega 3 on gold sea cucumber also has inffluance in TGF-β1. Omega-3 polyunsaturated fatty acids, of resolvins and protectins, which critically shorten the period of neutrophil infiltration by initiating apoptosis. Consequently, apoptotic neutrophils undergo phagocytosis by macrophages, leading to neutrophil clearance and release of anti-inflammatory and reparative cytokines such as TGF-β1.[19] Shorten period of neutrophil mean shorten the inflammation. The tissue damage because inflammation can be avoided and the next phase proliferation can run and wound healing can occur more faster.

CONCLUSION

Based on the research results revealed that the treatment using water extract gold sea cucumber gel shown an increase TGF-β1 expression in traumatic ulcer healing process , where most effective improvement is achieved at concentration 40% . It can be conclude that water extract gold sea cucumber could be used to enhance the oral traumatic healing procces by increasing level of TGF-B1

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POSTER PRESENTATION

P 1.3

Case Report

Combination Technique For Gingival Depigmentation: Case Report

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ABSTRACT

Background: *Gingival hyperpigmentation most often caused by genetic factors, and the condition is different at every race that occurs due to excessive deposition of melanin pigment in the basal layer of the gingival epithelium. Gingival depigmentation is treatment that aimed at eliminating gingival discoloration that causes gingival color becomes darker. Several techniques can be used for gingival depigmentation treatment such as using laser and scalpel. The purpose of this case report is to describe the effectiveness of laser, scalpel, and the combination technique in the treatment of gingival depigmentation.* ***Case and case management:*** *A 21 years old female patient with chief complain of darkish gingival color and less confidence of wide smiling. Patient is not a smoker. Depigmentation performed on the maxillary gingiva area 21 to 23 using a laser, area of 11 and 12 using a scalpel #15, and area of 13 using a combination of laser and scalpel, then the exposed surface was irrigated with sterile saline solution. Application periodontal pack on the area 11 and 12, and giving oxyfresh™ on the area which not given periodontal pack. Patient adviced not to eat and drink hot, and controls several times after surgical treatment.* ***Conclusion:*** *Combination technique of the laser and scalpel gives the best results because gingival color looks normal even in the first day after surgical treatment. The patient feels very comfortable.*

Keywords*: gingival depigmentation, laser, scalpel*

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BACKGROUND

A smile is a method of communication and is a mean of socialization and attraction. The harmony of the smile is determined by the shape, the position and the color of the teeth or lips as well as by the gingival tissues, unfortunately this condition can't be achieve because of gingival hyperpigmentation.[1]

Oral pigmentation is a discoloration of the gingival/oral mucosa, associated with several exogenous and endogenous factors. Etiological factors are varied which include drugs, heavy metals, genetics, endocrine disturbances, syndromes as Albright's syndrome, Peutz Jegher's syndrome, and also in inflammation. Adverse habits such as smoking can also stimulate melanin pigmentation and the intensity of pigmentation is related to the duration of smoking and the number of cigarettes consumed. The pigmentation is mostly localized at the anterior labial gingiva, affecting females more than males.[2]

Melanin pigmentation of gingiva occurs in all the races. Melanin, a brown pigment, is the most common natural pigment contributing to endogenous pigmentation of gingiva and the gingiva is also the most predominant site of pigmentation on the mucosa.[3] Melanin pigmentation is caused by melanin granules in gingival tissue, which are produced in melanosomes of melanocytes. Melanocytes are primarily located in the basal and suprabasal cell layers of the epithelium. In addition, the oral pigmentation is due to the activity of melanocytes rather than the number of melanocytes in the tissue.[1]

The degree of gingival pigmentation of the gingiva and skin is reciprocally related. Fair-skinned individuals are very likely to have non pigmented gingiva, but in darker skinned persons, the chance of having pigmented gingiva is extremely high. The highest rate of gingival pigmentation is observed in the area of the incisors.[4]

Gingival depigmentation can be considered a periodontal plastic procedure whereby the gingival hyperpigmentation is removed by various techniques and the technique selection should primarily be based on clinical experiences and individual preferences with primary indication of demand for improved esthetics.[2] There is a various techniques for gingival depigmentation like scalpel, free gingival autografting, electrosurgery, cryosurgery, abrasion with diamond bur, and various types of lasers. The foremost indication for depigmentation therapy is the demand by a person for improved esthetics.[3] Removal of gingival melanin pigmentation should be performed cautiously and the adjacent teeth should be protected, since inappropriate application may cause gingival recession, damage to underlying periosteum and bone, delayed wound healing, as well as loss of enamel.[5] There is no specific indication for using any methods that was described before, the purpose of this case report is to compare the effectiveness of new method like laser, conventional method like scalpel, and the combination both of them in the treatment of gingival hyperpigmentation**.**

CASE AND CASE MANAGEMENT

A 21 year old woman visited to the Dental Hospital, Department of Periodontics, Faculty of Dentistry, University of Airlangga with complaints of blackish color of her upper and lower front gum, and this condition make her feel less confident while smiling widely. Since esthetic is main concern, patient want to eliminate the black color in her gums. in intraoral examination found gingivsl hyperpigmentation in upper and lower. There was no marginal gingival inflamation. Patient medical history was non contributory and she had no complain or discomfort. Patient is not smoker.

In this case, the first action is aceptic, and then an infiltration anesthesia on mucobucal fold on area 13 to 23 (2% scandonest with adrenaline in the ratio 1:100,000). Depigmentation performed on maxillary gingiva area 21 to 23 using a laser, and area of 11 and 12 using a scalpel #15 and the area of 13 using a combination of laser and scalpel, then the exposed surface was irrigated with sterile saline solution. Application periodontal pack on the area 11 and 12, and giving oxyfresh^{TM} on the area which not given periodontal pack. After surgery the patients were prescribed antibiotics (Amoxsan 500mg 3 times daily) and analgesics (Mefinal 500mg 3 times daily) for 5 days. Patient was advised not to eat / drink hot and not to brushed her front teeth. Controls 1 day post surgery showed better healing in the area of 13 that are taken care by a combination of techniques laser and scalpel. Patient did not report any pain. On the area 21-23 still shows a blackish color because the effects of the laser use. On the area 11 and 21, pack was loosed and was not re-pack because it looks a good healing process. Evaluation 3 days postoperative showed a reddish color had started to disappear, the former blackish color laser use have also started to disappear, a new gingiva began to form. Evaluation 7 days postoperative showed gingival color is starting to back normal, the black color is disappearing. Evaluation for 14 days, that all three give good results, there is no pain or infection, and gingiva showed normal color.

Fig 1. Before depigmentation procedure

Fig 2. Depigmentation with laser on region 21-

Fig 3. Depigmentation with scalpel Region 11 and 12

Fig 4. Post surgery

Fig 5. Application periodontal dressing

Fig 6. Control 1 day post surgery

Fig 7. Control 3 days post

Fig 8. Control 7 days post surgery

Fig 9. Control 14 days post surgery

DISSCUSION

Pigmentation occurs in all human races. No significant differences that occur between men and women. The intensity and distribution of oral mucosal pigmentation varies, not only between races but also between individuals with the same race.[6] Physiological pigmentation might be due to genetic, but the degree of pigmentation is affected by mechanical stimulation, physical or chemical, for example as a result of exposure to mercury, lead, arsenic, bismuth, and nicotine.[6]

Excessive pigmentation causes discoloration of the gingiva. The pigmentation is due to excessive deposition of melanin pigment in the basal layer of the gingival epithelium.[7] Clinically characterized by brown-black color on the attached gingival-vestibule area. There is no elevation of the gingival mucosa in normal hyperpigmentation. If hyperpigmentation accompanied by elevation of the mucosa there is a tendency to be benign or neoplasia.[7,8]

Basically, melanin pigments also function as a barrier to ultraviolet light. Exposure to ultraviolet light causes the stimulation of melanocytes to produce melanin. Melanin produced will absorb ultraviolet radiation at the cellular level.[9] Melanin also serves to neutralize free radicals. Nevertheless, excessive deposition of melanin resulting in discoloration of the gingiva and may caused esthetic problems.[9,10]

Gingival depigmentation aim to eliminate excessive deposition of melanin pigment to obtain a good esthetic. Gingival depigmentation can be either surgical or non-surgical.[9] Non-surgical treatment, for example by chemical applications locally on gingival intended that the gingival epithelium chipped. In addition to non-surgical, depigmentation can be done by surgical technique for example by gingivectomy, either by using laser or scalpel.[12]

Gingival depigmentation is a surgical procedure that is most often used in cases of gingival discoloration because this treatment can restore gingival esthetics. In this case, depigmentation gingiva is done by technique using a scalpel, laser, and combination both of them, to compare the result of that three technique.

After depigmentation procedure, the scalpel technique area was covered with periodontal dressing to protect the open wound from mechanical trauma and stability of the surgical site during healing process, and the other advantages include: patient comfort, good adaptation to underlying gingival, prevention of post hemorrhage or infection.[13] The others area was given oxyfresh™ to soothe tissue inflamation and oral wounds, and enhanced healing process and deodorise oral wounds.

The depigmentation procedure was successful and the patient was satisfied with the result. Among the mention technique, it is found that the combination technique is the best technique because of the healing process post surgical was great even the first day post surgical treatment. Gingival color of combination technique looks more normal that the other site because laser have biostimulant effect that can make epithel growth faster. We have that effect with laser technique, but we can not go too deep because laser

can make bone necrotic. In combination technique, we use laser only for control bleeding and to obtain biostimulan effect. Combination technique does not require any periodontal dressing and that make patient very comfortable.

With laser, easy handling, short treatment line, homeostasis, sterilization effects and excellent coagulation (small vessels and lymphatics) are known advantages. Also, elimination of using periodontal dressing is possible by using laser. However, laser surgery has some disadvantages. Delayed type of inflammatory reaction may take place with mild post-operative discomfort lasting up to 1–2 weeks. Epithelial regeneration (re-epithelialization) is delayed (lack of wound contraction) as compared to conventional surgery. Also, expensive and sophisticated equipment makes the treatment very expensive. Another disadvantage is loss of tactile feedback while using lasers.[14]

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P 1.4

Case Report

Effect of Hyperbaric Oxygen Therapy Combined with Golden Sea Cucumber (Stichopus hermanii Powder to the Level Of Blood Glucose Diabetic Wistar Rat Induced Porphyromonas gingivalis

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ABSTRACT

Background: Diabetes mellitus (DM) is a metabolic disorders characterized by hyperglycemia caused by oxidative stress. Porphyromonas gingivalis (P.g) is a periodontopathogen caused periodontitis exacerbate blood glucose levels (BGL). Hyperbaric oxygen therapy (HBOT) combined with stichopus hermanii (SH) has a role as an antioxidant and antibacterial agent. **Objective:** To analysis effect of HBOT, SH powder and combination of both to the level of blood glucose diabetic Wistar rat induced P.g. **Materials and Methods:** This study was pre-test-post-test control group design, using 20 male Wistar rat were divided into 5 groups, Group1 (STZ), Group2 (STZ+P.g), Group3 (STZ+P.g+HBOT), Group4 (STZ+P.g+SH powder), Group5 (STZ+P.g+HBO+SH). STZ induction intravenous for 4 days in a row. P.g. induction was exposure 3 times for 4 days. After therapy (7 days), sample blood tail vein of rat were taken for measure BGL by glucometer. **Result:** Level of blood glucoseK1(280.25±88.786)mg/dl, K2(372.25±135.662)mg/dl, K3(249.50±96.652)mg/dl, K4(172.00±82.077)mg/dl, K5(104.75±38.257)mg/dl. **Conclusion:** Induction of STZ increased the BGL but induction of P.g. cannot exacerbate BGL . HBOT combined with SH powder can reduce BGL in STZ and P.g. induction group.

Keywords: Diabetes mellitus, Periodontitis, Blood Glucose Levels, Stichopus hermanii, hyperbaric oxygen.

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BACKGROUND

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia which causes disruption of the metabolismof glucose, lipids and protein[1]. High levels of blood glucose (hyperglycemia) is the main characteristic of diabetes caused by a lack of insulin secretion by pancreatic β cells, decreased insulin sensitivity, or both combination[2]. A estimated 346 milion people worldwide suffer from diabetes and the World Health Organization (WHO) estimates that it will increase to 439 milion people in 2030 and almost 10 percent occur in adult people[3].The prevalence of DM in Indonesia in 2013 based on the diagnosis and symtoms is 2.1 percent, higher than in 2007 at 1.1 percent. This prevalence increases with age, but from age ≥65 years tends to decrease[4].

. Increased AGEs in serum have been shown to be associated with periodontitis in patients with NIDDM[8].

Inflammatory periodontal disease is a chronic inflammatory condition that most commonly occurs in humans throughout the world and even affects about 50% of adults and more than 60% from age 65, with severe periodontitis affects 10-15% of populations[3]. Chronic periodontitis is the most common because it lasts longer and generally occurs clinically in more than 35 years of age but can occur in childrens[5].

Porphyromonas gingivalis is one of bacteria most commonly found in chronic periodontitis[5]. *P. gingivalis* produce the variety in vitro factors such as protease, collagenase, gyaluronidase and cytotoxins. These

Several research have shown a two way relasionship between glycemic control and periodontal disease[6]. Reported that patients with non insulin dependent diabetes mellitus (NIDDM) 2.8 times more likely to have periodontitis and 4.2 times more likely to experience a significant loss of alveolar bone compared to healthy individual systematically[7].

Hyperglycemia has chronic effects that involve the formation of advance glycation end-products (AGEs)[8]. AGEs cause cellular stress by directly exerting effects of pro – inflammatory / oxidant, or through interactions with receptors on the cell surface. AGEs together with oxidative stress demonstrated for the first time in the gingival tissue of diabetic patients with periodontitis

factors can interfere host's defense and damage the part of periodontium such as soft tissue damage and bone resorption[9].

Diabetic patients with periodontitis should receive oral hygiene instructions, mechanical debridement to remove local factors and routine maintenance of the oral cavity. Systemic antibiotics are not needed on a regular basis, although there is new evidence that a combination of tetracycline antibiotics with Scaling and Root Planing (SRP) can effect glycemic control[5]. Antibiotics have contraindications and undesirable effects in the treatment of periodontitis such as metabolism and excretion disorders that lead to disease and impaired function of the liver or kidney[10]. In addition, the use

of antibiotics also has some shortcomings such as the onset of allergies, toxicity, and resistance on long term use[5].

Treatment of patients with diabetes is most important is to control blood glucose levels before periodontal therapy[5]. In patients with diabetes mellitus obtained blood glucose remains high even received the maximum dose of a sulfonylurea glizipid antidiabetic drugs and proper diabetes diet such as fiber foods. Thus require insulin therapy to control blood glucose levels, but there are incidents of local allergic reactions and systemic[11]. Therefore, it takes a supportive therapy to cope with blood glucose control one of which is the hyperbaric oxygen therapy.

HBO 100% oxygen therapy at 2.4 ATA were given 60 minutes per day for 7 days can lower blood glucose levels in diabetes's rat[12]. In addition, HBO treatment with 100% oxygen at 2.4 ATA 3x30 minutes dor 5 consecutive days can lower blood glucose levels in patients with NIDDM[13]. HBO 100% oxygen therapy at 2.8 ATA can inhibit the growth of obligate anaerobes subgingival bacteria[14].

Most of the food and medicine that is available nowdays directly or indirectly derived from natural sources, that is land and marine life. Sea cucumber have a high commercial value with the high value of production and trade globaly[15]. Sea cucumber can be used as a food supplement to help the healing process of various disease[16].

Sea cucumber contain active subtances that are benefical to wound healing, antibacterial, antifungal, antioxidant and antidiabetes[17]. In Muttaqien research (2011), known that extract the golden sea cucumber (*Stichopus hermanii*) with a concentration of 20 mg/ml can inhibit the growth of bacteria mixed periodontopathogens. Golden sea cucumber (*Stichopus variegatus*) also has a fairly high antioxidant activity at a dose of 40.5 mg/kgBW, 81 mg/kgBW and 162 mg/kgBW because it contains phenol and flavonoid which is quite high as an effective anti-oxidants to protect from oxidative stress[17,15]. Based on research conducted, giving golden sea cucumber (*Stichopus variegatus*) powder with dose 40.5 mg/kgBW was the most effective in lowering blood glucose levels at hyperglycemic's rat models[17].

Based on the background, the researchers want to conduct a study of the effect of the golden sea cucumber at a dose 40.5 mg/kgBW and hyperbaric oxygen therapy with the pressure 2.4 ATA, as well as the combination of hyperbaric oxygen therapy with the pressure 2.4 ATA with golden sea cucumber powder with a dose of 40.5 mg/kgBW on blood glucose levels in diabetic rat induced bacterium *Porphyromonas gingivalis.*

MATERIAL AND METHODS

This research is type of true experimental laboratories research with design completely randomized post test-only control group design[18].The samples are *Ratus novergicus strain wistar* male.

Twenty two male Wistar rats were divided into 5 groups, Group 1 (STZ), Group 2 (STZ+*P.g*), Group 3 (STZ+*P.g*+HBO), Group 4 (STZ+*P.g*+terapi teripang), Group 5 (STZ+*P.g*+HBO+sea cucumber's

therapy). Wistar rat given *nicotinamide* (NAD) 110 mg/kgBWfor 30 minutes after induction of STZ for 1 day at a dose of 65 mg/kgBW single dose for diabetes condition intraperitoneally[19]. After that, rats were given dextrose 10% ad libitum throughout the first night after induction of STZ. Rats were incubated for 7 days and declared DM if the blood glucose levels over 200 mg/dl[17].

In an incubation period of 7 days, the rats were given*kanamycin* 20mg, *ampicillin* 20mg and*chlorhexidine glukonat* 0,12% for 4 days. The state of periodontitis conducted using *P.g* number ATCC (*American Type Culture Cell*) 33277 as much as 0.2 ml of 1 x 10^9 cell/ml of bacteria topically along the edge of the gingival labial, bucopalatal/lingual from maxillay molar to mandibular molaras well as on the surface of the anal Wistar rat using cotton bud. Frequency induction*P.g* 3 times in 4 days. After three weeks starting from administration, Anatomical Pathology examination showed signs periodontitis[20].

Do therapy on treatment therapy K3 with 100% oxygen HBO 2.4 ATA 3x30 minutes for 7 days, 1 day each day[12], K4 with golden sea cucumber powder treatment giving a dose of 40.5 mg/kgBW 2 times a day for 7 days[17] and K5 with HBO therapy treatment combined with golden sea cucumber powder for 7 days.

To obtain the data, the data were analyzed by ANOVA followed by post hoc Tamhane test($p<0.05$)[21].

RESULT

From the results, the statistical test, as follows:

Table 1. Mean and standard deviation of blood glucose levels (mg/dl) of each group.

Mean of blood glucose levels (mg/dl) ± standard deviation			
Groups	**Day-0**	**Day-8**	**Day-38**
K1	107,50 ± 3,416	280,25 ± 88,786	274,75 ± 182,172
K2	100,50 ± 9,950	426,00 ± 100,216	357,50 ± 81,460
K3	91,75 ± 11,026	313,50 ± 118,902	249,50 ± 96,652
K4	92,75 ± 11,587	189,00 ± 30,605	172,00 ± 82,077
K5	99,75 ± 22,006	379,00 ± 129,432	104,75 ± 38,257

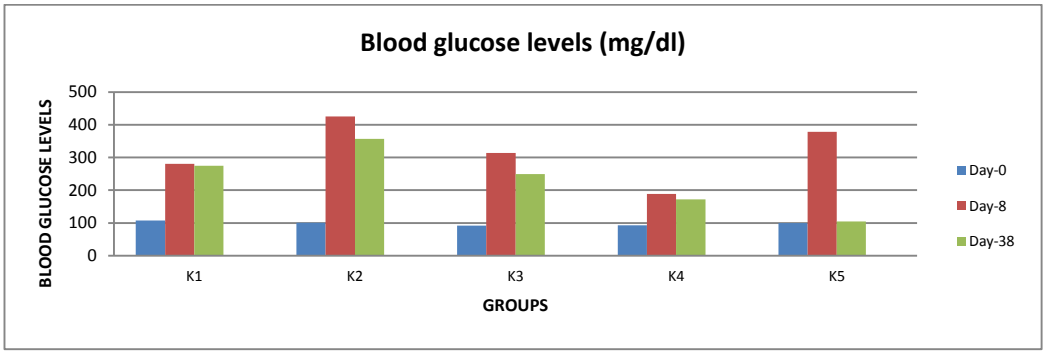

Figure 1. Mean and standard deviation of blood glucose levels (mg/dl) of each group.

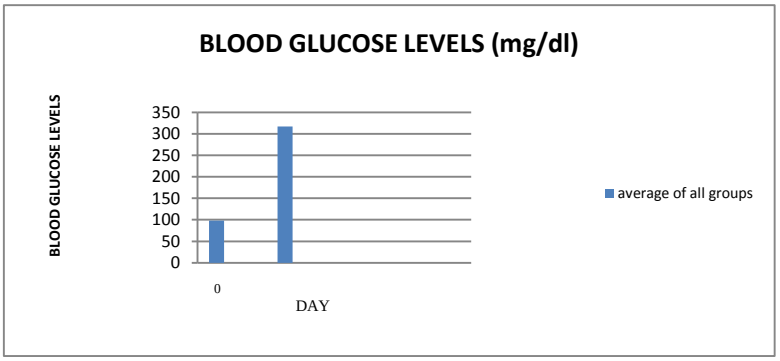

Figure 2. Mean and standard deviation of blood glucose levels (mg/dl) day 0 and day 8

Showed significance (normal distribution) at all levels of the data group BGL (Shapiro-Wilk test was obtained p>0.05). Then do homogenitas test[21].

Table 2. Test results Levene Statistic

Homogenitas Test		
DAY-	**GBL*Sig.***	
Levene Statistic		
0	**2.361**	**0.100***
8	**0.846**	**0.518***
38	**6.608**	**0.003**

From Table 2, it is known that shows all the groups have homogeneous variance ($p>0.05$) except day-38 group show results $p<0.05$ which indicates that the data has a different variance. If the results of the different variants i.e. $p<0.05$ so using hypothesis One Way ANOVA test with pos hoc Tamhane[21]

To know the difference between groups BGL used Oneway ANOVA test showed $p>0,05$ at day-8 and day-38. Therefore $p>0.05$, it can be concluded that "there are at least two groups which have different average BGL means". Post-Hoc conducted to determine which group has a significant differences in one way ANOVA test. The result of *post hoc Tamhane*test showed no significant differences in levels BGL ($p<0.05$) between groups K2 to K5 on day-38.

DISCUSION

Based on these results the average normal blood glucose levels in Wistar rat were measured on day-0 (before induction of STZ) amounted to 98.45 mg/dl. This is in accordance with nomal blood glucose levels in rats at ≤ 100 mg/dl. After 7 days of induction of STZ is day-8 increased BGL on Wistar rats with an average of 317.55 mg/dl. This shows that the rat experiencing hyperglycemia (DM) with blood glucose levels of ≥ 200 mg/dl[17].

Rat that induced experiencing hyperglycemia with signs of diabetes such as polydipsia, polyphagia, polyuria and weight loss, similar to the clinical symptoms in patients with diabetes. This provides evidence that STZ causes diabetes in experimental animals by destroying insulin-producing cells in pankreas[35]. From research Deeds et al (2011), 6-10 days after a single dose STZ induced in Wistar rats experienced severe hyperglycemia, polyuria, torpor, hunched appearance and sustained weight loss, but there were no death[36]. Wistar rats experienced normoglikemik during ± 60 days after induction STZ[37]. Measurement of blood glucose diabetic rat performed 7 days after STZ induction is the 8th day. This is because blood glucose levels on the day-7 after the induction of STZ increased and experiencing hyperglycemia. STZ entering Langerhans pancreatic β cells through the glucose transporter 2 (GLUT 2) and cause alkylation (damage to DNA). This resulted in the formation of free radicals and an increase in the enzyme xanthine oxidase[25]. Increased xanthine oxidase can inhibit the Krebs cycle and lowering the oxygen consumption mitochondria[23]. Mitochondrial dysfunction will increase intracellular fatty acid metabolites (acyl CoA diasil fat and glycerol (DAG)) that interfere with insulin signaling in muscle and liver, causing an increase of ROS[26]. Increased ROS can cause a decrease in mitochondrial function resulting in accumulation of fat in the muscles and liver, causing the sresistensi insulin[22]. In insulin resistance, increased glucose production and decreased glucose utilization, thereby increasing blood glucose levels (hyperglycemia)[23]

Under conditions of hyperglycemia (DM), rat induced *P. gingivalis*bacterial. Lipopolysaccharide from *P. gingivalis*(LPS-PG) secrete proinflammatory cytokines such as TNF-α, IL-1β, IL-8, IL-6 encourage inflammation, increase the concentration of superoxide,and the expression levels of ROS and tissue damage and bone[27,28]. The high TNF-α leads to reduced synthesis of glucose

transport into cells, causing insulin resistance in diabetes mellitus type 2. Excess IL-1β and TNF-α is produced as a systemic response to periodontal infection causes insulin resistance and poor glycemic control[24].

In this research, diabetic's Wistar rat induced *P. gingivalis*bacterium 3 times in 4 days. Signs of periodontitis seen after 3 weeks of induction *P. gingivalis*bacterium[20].The signs of periodontitis were visible after 3 weeks occurred during the established lesion where the blood vessels to dilate and dense, impaired blood flow and slow. This results in localized gingival anoxemia, superimpose a slightly bluish patterned reddish. Histologically, plasma cells increased so inflammatory cells become stronger. Plasma cells invade the connective tissue below the junctional epithelium, blood vessels and collagen fibers. Junctional epithelium seen in the lysosomes are derived from neutrophils, lymphocytes and monocytes that have acid hydrolases that can damage tissue. In the connective tissue, collagen fibers were destroyed around the plasma cells, neutrophils, lymphocytes, monocytes and mast cells[5].

Increased blood glucose levels in diabetic Wistar rats were induced bacterium P. gingivalis looked at K1 to K2 the day-38, but found no significant difference in the increase in the blood glucose levels. Moderate and severe periodontitis associated with an increased risk of diabetes, but it depends on the sex, smoking, body mass index, triacylglycerols, hypertension and high cholesterol lipoprotein[29].Genetic predisposition diabetes is considered an important contributor in influencing the development of periodontal infection. Increased TNF-α from the bacterium P. gingivalis is an independent factor for the development of periodontal disease that has no impact on the severity of diabetes[30].It is caused by the development of diabetes correlated with other factors in addition to TNF-α. In NIDDM, TNF-α plays lead to insulin resistance. However, in addition to insulin resistance, insulin secretion defect is an important requirement for the development NIDDM[38]. The role of TNF-α in the onset and progression of NIDDM is limited[30].

After getting therapy HBO 2.4 ATA with 100% oxygen is given approximately 30 minutes x 3, with intervals 5minute for 7 days, measurement of blood glucose levels in diabetic rat induced by *P. gingivalis*bacteria. In the group K2 to K3 day-38 after treatment HBO decrease blood glucose levels are not meaningful. A decrease in blood glucose levels with therapy HBO 2.4 ATA with 100% oxygen have a temporary effect but potential for permanently recover diabetes if β cell regeneration can be fully induced and β cell function fully recovered.The percentage reduction in pancreatic β cell damage associated with the recovery of the functions of insulin causes blood glucose levels stable[12]. HBO therapy 100% oxygen at 2.4 ATA provides the results of your blood glucose level that is optimal on day 5 compared to day 10 because there tends to be an increase in blood glucose levels, SOD levels tend to decrease,and levels of Hsp 70 and TNF-α did not make a meaningful contribution[13]. This is likely to cause blood glucose levels on the day-7 started to increase.

Golden sea cucumber powder therapy at a dose of 40.5 mg / kg body

weight can lower blood glucose levels[17]. Flavonoid content of the active ingredient contained in the golden sea cucumber is estimated to have a common action of acarbosemechanism that is the inhibition of the enzyme alpha-glucosidase and alpha amilase[31,17].Inhibition of the enzyme alpha-amylase and alpha-glucosidase by this flavonoid resulted in the failure of the catabolic of carbohydrates into monosaccharides form, so it can not be absorbed by the intestine. This is what causes the effects of flavonoids may lower blood glucose levels[31].But in this study, there is a decrease in blood glucose levels are not significantly between K2 to K4 on day 38. This is probably caused by the influence of the distribution golden sea cucumber therapy that too long. Known to decrease KGD with the use of powdered golden sea cucumber dose of 40.5 mg / kg on day 14 had a decrease KGD more than the delivery of the golden sea cucumber day-7[17].Flavonoid content is marked with SOD activities which are antioxidants to prevent oxidative stress in conditions of hyperglycemia. Increased long distribution golden sea cucumber powder therapy could be expected to increase the amount of flavonoid compounds so many free radicals released by diabetogen compounds that can be captured[17].

The distribution HBO therapycombined with the use of powdered golden sea cucumber in diabetic rats induced by *P. gingivalis*bacteria for 7 days showed a decrease in blood glucose levels significantly between K2 to K5 day 38. HBO therapy ATA 2.4 100% oxygen has the potential to improve endothelial function in IDDM and NIDDM in lowering blood glucose levels. Endothelial dysfunction associated with insulin resistance so that the insulin sensitivity of the tissue to be enhanced to improve the function of insulin[32]. Therapy HBO 2.4 ATA with 100% oxygen can reduce blood glucose levels by forming Hsp 70 which will improve insulin receptor damaged by free radicals, as the carrier will increase the anti-tumor immnunity and secretion of pro-inflammatory cytokine (TNF-α) from monocytes. Secretion of TNF-α stimulates an anti-inflammatory factor resulting in improved insulin receptor. This resulted in blood glucose into the tissue resulting in decreased blood glucose levels. A decrease in blood glucose levels lead to increased antioxidant activity[13]. Flavonoids from the golden sea cucumber contains antioxidant compounds that can capture free radicals from diabetogen preventing the further deterioration of the pancreatic β cells. The next normal cells proliferate so that the amount of β cells that normally become more and improve β cell function[17]. In addition, the use of powdered golden sea cucumber has a role as an antibacterial. Antibacterial contained in Stichopus hermanii are saponins and flavonoids[33,34]. Some studies report that a reduction in the plasma levels of inflammatory (ROS, TNF-α, IL-1β and IL-16) after periodontal therapy with antibiotics that cause the deacrease of blood glucose levels[39].

Conclussion

The results of this study, each treatment HBO pressure of 2.4 ATA with 100% oxygen and giving golden sea cucumber powder dose of 40.5 mg / kgBW can lower blood glucose levels in diabetic Wistar rats were induced by *P. gingivalis*bacteria but the results were not significant , Treatment is most

effective in lowering blood glucose levels significantly in rats induced diabetic Wistar bacterium *P. gingivalis*is a therapeutic HBO pressure of 2.4 ATA with 100% oxygen combined with the application of powdered golden sea cucumber with a dose of 40.5 mg / kg. Therefore, this therapy is expected to be developed as an adjunctive therapy in patients with diabetes mellitus with complications of periodontitis.

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P 1.8

RESEARCH ARTICLE

The Comparison of Osteoblast and Osteoclast in the Pressure area and Tension area on Tooth Movement with Adjuvant of Hyperbaric Oxygen Therapy

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ABSTRACT

Background*: Orthodontic force application causes changes in dental and paradental tissues as well as cellular changes in pressure and tension area. The pressure area in accordance with the direction of the force given undergo bone resorption by osteoclast, whilst in the tension area stimulation produces by stretching of PDL fiber bundles result in an increase in bone deposition formed by osteoblast. Mechanical force in orthodontic caused hypoxia and increase osteoclast for resorption. Osteoblast needs oxygen that is transported by blood vessel as its energy source for bone remodeling. Oxygen in hyperbaric condition can increase osteoblast activity. Oxygen is important in bone remodelling, because the addition hyperbaric oxygen therapy, can increased oxygen level on blood plasma.*. ***Purpose:*** *To determine the effects of Hyperbaric Oxygen 2,4 ATA (3x30 minutes), with interval 5 minutes, 7 days (start from day 8 until day 14) between pressure and tension area of osteoblast and osteoclast number during orthodontic tooth movement in cavia cobaya.* ***Materials and Methods:*** *This research used Completely Randomized Control Group Post Test Only Design. 36 cavia cobaya (3-4 months) weight 450-500 gram, were divided into 3 groups : negative control group* (K-), *positive control group* (K+), *hyperbaric oxygen therapy group* (P). *After using Hematoxilin Eosin (HE) to colouring histological preparation, data were analized with One-way ANOVA, LSD, and Paired T test.* ***Results:*** *Data showed there is a significant difference between osteoblast and osteoclast in pressure and tension area. Osteoblast pressure area: (P=5.000±1.858); (K+=7.000±2.954); (K-=11.166±1.992). Osteoblast Tension area: (P=17.000±1.858); (K+=11.916±2.954); (K-=9.833±1.992). Osteoclast pressure area: (*P*=17,2500±2.05050); (*K+*=12,1667±1.80067);* (K-=*9,6667±1.82574). Osteoclast tension area: (*P*=2,3300±0,88800);* (K+=*7,3300±1,59500);* (K-=*9,000±1,59500). With signification (P < 0,05).* ***Conclusion:*** *Hyperbaric Oxygen Therapy increase osteoblast and osteoclast number for bone apotition and resorption in the orthodontic tooth movement process. Therefore this research finding suggest that adjuvant of Hyperbaric Oxygen Therapy could accelerate the bone remodelling process.*

Keywords *: Hyperbaric oxygen, cavia cobaya, tooth movement, bone resorption, osteoclast*

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BACKGROUND

Beautiful smile is a dream of every human being. Neat appearance of the teeth will certainly support each smile, however the reality is that some people have teeth with crowding conditions, this will decline one's confidence. Dental crowding has become a problem for some people since many years ago.[1] Crowding of the teeth is the most frequent malocclusions ever seen. [2]

Malocclusion is an important issue in dental health in Indonesia, which ranks third after caries and periodontal disease. Malocclusion is a deviation from normal occlusion that may occur because of abnormalities of teeth, jaw bones, teeth and jaw combination, as well as mastication muscles disorders.[3]

Orthodontic treatment is a treatment that aims to correct the abnormal of teeth and jaws to obtain good functionality and esthetic, a pleasant face and with this result will improve one's psychosocial health.[1] Orthodontic is different from the other branches of dentistry, orthodontic treatment takes long time, continuously following the growth and development of dento-facial.[4] The average length of orthodontic treatment time is 15-24 months. [5] There are many factors that affecting the orthodontic treatment, there are the patient's age, the type of malocclusion, presence or absence of extraction, the use of fixed or removable devices, the severity of the initial malocclusion, cooperative from the patient. [6]

Tooth movement in orthodontic treatment is basically a combination between resorption and bone apposition on the pressure and tension area.[7] When the force is placed on the tooth, then there will be compressed area and the area that is stretched.[8] Compressed area will occur in accordance with the movement direction of the force received will push the teeth into the wall of alveolar bone and periodontal membrane will be squeezed between the tooth and alveolar wall, then bone resorption occurs in this area. On the opposite area, the teeth will avoid alveolar wall. Widening of the periodontal membrane space will cause a tension in this area and bone apposition occurs.[9] Osteoclast and osteoblasts play a important role in the process. Osteoclast function to destroy the bone in an area adjacent to the compressed periodontal ligament, while osteoblasts is needed to form new bone in the opposite area. [10]

During orthodontic treatment, the pressure is to produce distortion in the extracellular matrix of the periodontal ligament (PDL) resulting in a change in cell shape and cytoskeletal configurations that produce piezoelectric short and leads to cellular activation by changing the polarity of the membrane and ion channel activity. This incident led to the synthesis, secretion of extra cellular matrix components, enzyme degradation, acids and local factors, which cause cellular proliferation and differentiation, as well as the process of wound healing and remodeling of periodontal tissue.[11]

Remodeling that occurs during orthodontic tooth movement is a biological process that involves an acute inflammatory response to the periodontal tissues. Histological study showed that the first phase of resorption occurred within 3-5 days, followed recovery within 5-7 days,

and the final stage of bone remodeling between 7 and 14 days. [12] In the process of remodeling, osteoblasts will disaggregate intercellular substance containing bone collagen for the synthesis of new collagen fibers and forming osteoid. [13] Osteoblast that located on the surface of the bone and is responsible for the formation of the organic matrix of bone, then mineralized into the bone.[14] While osteoclasts can be found in the hollow bone or commonly known as Lacuna Howship or at the end of bone spicules. Osteoclasts are derived from stem cells in the bone marrow mononuclear precursor. Through the blood vessels, osteoclast activity will take place, where osteoclasts will be fused with other same type of cells.[3]

Osteoblasts need energy as osteoclasts, by means of proliferation or differentiation of precursor cells in the periodontal membrane and perivascular proliferation or differentiation of stem cells. Proliferation and differentiation of these cells are seen in one or two days after the administration of the force. Blood vessels play an important role in the delivery of nutrients and oxygen and other materials essential for the bone synthesis.[15] Oxygen is one important element in the process of bone remodeling. [16]

Hyperbaric Oxygen Therapy (HBOT) is a method of medical treatment by inhaling pure 100% oxygen continuously by the body with the air pressure that is greater than normal atmospheric pressure over specific time.[17] Oxygen in a hyperbaric conditions have the effect to reducing the free radicals (hematoma phase) stimulate regrowth of damaged blood vessels (neovascularization), increase the activity of osteoclasts in bone resorption (osteoclastogenesis), increase the activity of osteoblasts in bone formation (osteogenesis) and maintain angiogenesis in the process of remodeling.[18]

It takes various measures to accelerate the process of orthodontic tooth movement, one of them is hyperbaric oxygen therapy. Everyday people breathe free air with 20% oxygen levels in air pressure 1 ATA, it issaid that the concentration of oxygen in the bloodstream at the time was normal. When humans are in pressure chambers (hyperbaric chamber) and pressurized to 2.4 ATA or depth of 18 meters below sea level, the arterial partial pressure (PO2) will increase 10 times so that the concentration of oxygen in the blood flow will increase by 10 times the normal level. The pressure of 2.4 ATA is chosen during hyperbaric oxygen therapy is a safe dose and the optimum dose. [16] Because pressure greater of 3 ATA can increase formation of free radicals in the body that can cause oxidative stress. [19]

Based on the literature study and previous research on the benefits of hyperbaric oxygen therapy, as well as seeing the limited studies that investigate hyperbaric oxygen therapy as an adjunctive therapy that accelerates orthodontic tooth movement, the authors are interested to examine and determine the effect of 2.4 ATA hyperbaric oxygen therapy, 90 minutes a day (3x30 minutes) interval of 5 minutes breathing normal air, for seven days to the number of osteoblasts and osteoclasts between the pressure and the tension area of the orthodontic tooth movement.

MATERIALS AND METHODS

This research is true experimental laboratory research type with study design completely randomized control group post-test only design.

The parameters were seen in this research are the number of osteoblast and osteoclast in the pressure and tension areas. 36 male guinea pigs (Caviacobaya) were divided into three groups, age 3-4 months, weigh 400-550 grams.

The equipment in this research is the animal chamber, cage woven size 60x40x34 cm, plastic enclosure measures 60 x 40 x 20 cm, syringe 2 cc, force module separator, scalpel and handle sterile, surgical scissors, glass reaction, scales, rotary microtome, caliper, autographs, a microscope, 100% pure oxygen in a hyperbaric chamber, rubber separator, anesthetic ketamine 10% betadine solution, cotton, rice husks, guinea pig food, and distilled water.

The procedure of this study begins with the division of guinea pigs into three groups (K- control negative group (-), K + as the control positive group (+) and P treatment group), housed for each one cage containing 8 tailed guinea pigs, given husk and covered with woven wire. Guinea pigs were given food that contains a lot of crude fiber, root crops of corn and other greenery via adlibitum. Cage placed at room temperature, out of directsunlight, in a place that was not noisy, adequate lighting. Adapted for 24 hours before being given treatment.

The group (K +) and group P being installed of rubber separator on the maxillary incisor teeth. In the group (K +) for 14 days. Rubber separator with strength 0,29gr / cm2 was used until the 2nd day then the next day using a rubber separator replaced with strenght 0,48gr / cm2.

In the group P after mounting the rubber separator with strength 0,29gr / cm2 until the 2nd day then the next day using a rubber separator replaced with the power 0,48gr / cm2 until 14 days and was given hyperbaric oxygen (in the animal chamber) for 7 days for group P without releasing the rubber separator in experimental animals.

Once the group P is placed into animal chamber, then increased pressure within the chamber to 2.4 ATA, and fed pure oxygen (100%) for 90 minutes (3x30 minutes) with interval 5 minutes of breathing normal air (normobaric). The treatment was performed on day 8 to day 14 for group P.

On the 14th day of HBO all group were anaesthetized up until overdose (Overdose of Chemical anesthetics) and then decapitation to be taken of their maxilla. Maxilla were fixed in 10% buffered formalin solution and decalcification are conducted for 21 days with a 10% EDTA solution (room temperature) are changed every day. Furthermore, the tissue processing and staining with Hemaktosilin eosin (HE) and observed by microscope Olympus P21CX and photographed using a Panasonic camera GMCD3 and calculated the number of osteoclasts and osteoblasts are seen on a microscope with a magnification of 1000x. One preparations count as much as 20x the field of view.

The data obtained were analyzed to obtain a picture of the distribution and summarizing data to clarify the results. Then testing the

hypothesis by using parametric statistical tests One-way ANOVA, followed LSD and statistical analysis paired T test. Then the calculation results are being compared (comparing the number of osteoclasts and osteoblasts in two areas, namely the areas of pressure and tension.

RESEARCH RESULT

Table 1 Mean and standard deviation in the number of osteoblasts and osteoclasts pressure and tension areas

Osteoblast

	Pressure		Tension	
Group	Mean	Deviation Standard	Mean	Deviation Standard
K-	11.166	±1.992	9.833	±1.992
K+	7.000	±2.954	11.916	±2.954
P	5.000	±1.858	17.000	±1.858

Osteoclast

Group	Mean	Deviation standard	Mean	Deviation standard
K-	9.666	±1.825	9.000	±1.595
K+	12.166	±1.800	7.330	±1.595
P	17.250	±2.050	2.330	±0.888

Table 2 Results of one way ANOVA test on the number of osteoblasts and osteoclasts pressure and tension areas during movement teeth

Variance source	P	P
Between treatments in treatment total	0.000	0.000

Table 3 Results of LSD number of osteoblasts and osteoclasts in the area of pressure

Group means Osteoblast	K- (11.166)	K+ (7.000)	P (5.000)
K- (11.166)		0.000*	0.000*
K+ (7.000)			0.042*
P (5.000)			
Group means Osteoclast	K- (9.666)	K+ (12.166)	P (17.250)
K- (9.666)		0.003*	0.000*
K+ (12.166)			0.000*
P (7.250)			

information: *there are significant differences

Table 4 Results of LSD number of osteoblasts and osteoclasts in the tension area

Group means	K-	K+	P
Osteoblast	(9.833)	(11.916)	(17.000)
K- (9.833)		0.049*	0.000*
K+ (11.916)			0.000*
P (17.000)			
Group means	K-	K+	P
Osteoclasts	(9.000)	(7,330)	(2.330)
K- (9.000)		0.001*	0.000*
K+ (7.330)			0.000*
P (2.330)			

Information : * there are significant differences

Table 5 Results of Paired T test osteoblasts and osteoclasts, the negative control group

Osteoblast

	Mean	Deviation	Value P
Pressure (K-)	11.166	1.333	0.092
Tension (K-)	9.833		

Osteoclast

	Mean	Deviation	Value P
Pressure (K-)	9.666	0.666	0.000*
Tension (K-)	9.000		

Table 6 Results of Paired T test osteoblasts and osteoclasts positive control group

Osteoblasts

	Mean	Deviation	Value P
Pressure (K+)	7.000	-4.916	0.002*
Tension (K+)	11.916		

Osteoclast

	Mean	Deviation	Value P
Pressure (K+)	12.166	4.836	0.000*
Tension (K+)	7.330		

Table 7 Results of Paired T test osteoblasts and osteoclasts treatment group

Osteoblasts

	Mean	Deviation	Value P
Pressure (P)	5.083	-11.916	0.000*
Tension (P)	17.000		

Osteoclasts

	Mean	Deviation	Value P
Pressure (P)	7.250	4.920	0.000*
Tension (P)	2.330		

DISCUSSION

Osteoblasts and osteoclasts are cells that play an important role in bone remodeling in the process of tooth movement. The movement of the teeth resulting in periodontal tissue changes: alveolar bone, cementum, gingiva and pulp. [20] Orthodontic tooth movement associated with inflammatory processes which occur chemical and mechanical response of the periodontal tissues. [21] When the force is applied on teeth, then there will bone resorption in depressed area and in the area of stretched in the bone will occured apposition. [22] It causes the treatment group and the group positive-pressure area (7000 ± 2954) have a number of osteoblasts less than the positive control group tension area (11 916 ± 2954), because in pressure area, there is more osteoclast functioning for bone resorption and compressed the formation of osteoblast functioning in bone formation.[23] While the treatment groups, tension area (17,000 ± 1,858) has a number of osteoblasts more than-pressure area (5000 ± 1858) it is in accordance with the theory expressed by Alghamdi (2011) that the increase of oxygen pressure with compression can result in an increase in bone formation by increasing osteoblastic activity in the area of tension due to increased pressure of oxygen resulting in the formation of reactive oxygen species (ROS) that can cause DNA damage and apoptosis of osteoclasts so that bone resorption decreased. [24]

Research conducted by Sutomo *et al* (2012) and Zakki (2014) also showed that hyperbaric oxygen therapy could increase the number of osteoblasts in the tension area. Research conducted by Sutomo *et al* (2012) showed that the average group of guinea pigs which received hyperbaric oxygen therapy from day 1 to 7 show an increase in the number of osteoblasts were highly significant compared to a group of guinea pigs which did not receive hyperbaric oxygen therapy (control). Meanwhile, according to Zakki (2014) research, administration of 2.4 ATA hyperbaric oxygen therapy for 10 days, showed an increase in the number of osteoblasts in the tension area compared with hyperbaric oxygen therapy for 7 days. But did not experience a significant difference. Hyperbaric oxygen therapy for 7 days was relatively good in increasing the vascularization in tissues. [20, 25]

Average osteoclast-pressure area treatment group (17.2500 ± 2.05050) have the highest number of osteoclasts compared to the positive control group (12.1667 ± 1.80067) and negative control group (9.6667 ± 1.82574). When the mechanical strength of orthodontic given, causing hypoxia so that there will be an increase in HIF-1α. Hypoxia is a condition where the concentration of oxygen in the cells is very low. In hypoxia, protein Hypoxia Inducible Factor-1α (HIF-1α) plays an important role, as it will initiate the process osteoclastogenesis by stimulating and activating pro-inflammatory cytokines such as IL-1, IL-6, IL-11 and IL-17, TNF -α to inhibit the action of osteoblasts. With the activity of HIF-1α-pressure area on orthodontic movement, an increase in osteoclasts, and when given extra high pressure oxygen therapy will increase the amount of osteoclast.[26,27] In tension area negative control group (9.0000 ± 1.59500) has most number of osteoclasts compared to the positive control group (7.3300 ± 1.59500) and the treatment group (2.3300 ± 0.88800). In tension area OPG would inhibit binding of RANKL to RANK, so that in tension area will occur osteogenesis by osteoblasts and inhibit the occurrence osteoclastogenesis. [26]

From the data Osteoblas LSD, showed significant difference in the number of osteoblasts between pressure and tension area on the tooth movement process between the only given with the orthodontic mechanical stress by mechanical pressure orthodontic and adjunctive therapy of 2.4 ATA hyperbaric oxygen 3x30 minutes a day at intervals of 5 minutes of breathing normal air at day 8 - day 14. the number of osteoblasts in the pressure in the positive control group (K + = 7,000 ± 2,954) have more number than in the treatment group (P = 5,000 ± 1,858), whereas in the group of tension area positive control (K + = ± 11 916 2954) has a number of osteoblasts fewer than in the treatment group (P = 17,000 ± 1,858). This was due to the pressure area experiencing an inflammatory process caused by the force of the rubber separator on teeth. The force released by the rubber separator, pressing crowns ofthe tooth and forwarded through the root of the tooth to the periodontal ligament and alveolar bone. [28] Inflammation has been linked with higher levels of ROS. This will cause the destruction

of periodontal tissues by stimulating cells such as macrophages and fibroblasts to produce mediators cytokines such as IL-1, PGE-2 and TNF-α. These mediators inhibit osteoblast differentiation process, inhibits the production of mediators osteoblasts and inhibit the production of extracellular matrix in the process of calcification. T lymphocytes produce RANKL plays a role in osteoclast activation. Inhibiting the release of inflammatory mediatorsosteoprotegerin (OPG) and metalloprotein tissue.[29] As a result, the number and function of osteoblasts are being decreased.periodontal ligament suffered hyalinization. Hyalinization zone elimination process carried out by the macrophage cells that arise because of the necrotic tissue as a result of orthodontic pressure. Histologically, the experts agree that bone resorption is part of a process of elimination hyalinization zones carried out by macrophage cells. The cells involved in these activities, besides mononucleated macrophage like cells, there are also TRAP positive multinucleated giant cells without the ruffled border. These cells may be a osteoclasts that involved in the activity of elimination necrotic tissue. [23]

Whereas in the tension area, hyperbaric oxygen therapy can accelerate osteoblast differentiation and adding early stage of mineralization and have a more pronounced effect than in hyperoxia or pressure alone. According to Al-Hadi's research, group of hyperbaric oxygen therapy can significantly improve the mineralization on the 7th day as much as 1.55 times compared with normoxia group. On day 14 of 1.4 times compared with normoxia group. While on day 21 hyperbaric oxygen therapy group had a significant influence but not when compared with normoxia group. Al-Hadi's other research, on the 4th day of hyperbaric oxygen therapy group significantly increased ALP activity with an increase of 1.7 times compared with normoxia group. On the 7th day of hyperbaric oxygen therapy group experienced no significant difference when compared with normoxia group, but when compared with the hypoxia group of hyperbaric oxygen therapy increased 1.5 times. On the 14th day of hyperbaric oxygen therapy increased the activity of ALP 1.2 times compared with normoxia group and when compared with the hypoxia group, hyperbaric oxygen therapy group increased 1.3- times. Hyperbaric oxygen therapy also significantly increased the expression of collagen type I, hyperbaric oxygen therapy increased the induction of collagen type 1 as much as 1.6 times compared with normoxia conditions and 2.4 times when compared with hypoxia conditions.[14] Type I collagen and alkaline phospatase (AP) are markers of good bone formation. [30]

It was proved that hyperbaric oxygen therapy can increase bone nodule formation and activity of alkaline phosphatase in osteoblasts so that the number of osteoblasts increased. [14] Alkaline phosphatase plays an important role in depositing calcium and phosphate into bone matrix. There is a close relationship between the activity of osteoblasts with a concentration of alkaline phosphatase in the plasma, in which the activity of this enzyme is responsible for the classification

process of collagen fibrils as the base material of bone. [31]

Osteoblast differentiation is regulated by transcription factors that control gene expression. Therefore, to determine where a potential molecular mechanism of hyperbaric oxygen therapy can improve the early stages of osteoblast differentiation through RUNX-2 expression were examined using quantitative real time PCR. Exposure to hyperbaric oxygen therapy every day for ninety minutes significantly increased the expression of RUNX-2 by 8. 3 times compared with normoxia and 22.6 times compared with hipoxia. [14]

From the data LSD Osteoclasts, showed significant difference between groups in the area of pressure and tension on the tooth movement that are only given orthodontic mechanical stress only with pressurized mechanical additional orthodontic and hyperbaric oxygen therapy. In the treatment group pressure area (17.2500 ± 2.05050) has a number of osteoclasts more than the positive control group (12.1667 ± 1.80067). Key to the process is the bonding osteoclast bone resorption with mineral matrix on the surface of the bone. Factors mediating the bonding osteopontin (OPN), OPN plays an important role in the attachment of bone cells to bone matrix, the bone resorption process. Without the presence of OPN will inhibit bone resorption.Synthesis OPN is stimulated by calcitriol (1,25-dihydroxyvitamin (D3), which are substances that stimulate bone resorption.[6,32,33,34] OPN induced by several inflammatory cytokines, namely interleukin-1 (IL-1), interleukin-6 (IL-6), tumor necrosis factor (TNF) produced by macrophages in response to inflamation. [11] Osteopontin is found in the region of the surface of the bone where the osteoclasts worked. other substances known to OPN is specific vitronectin receptor, commonly found in the area about osteoclast plasma membrane. When the osteoclast bone resorb the bone, vitronectin receptors on the plasma membrane of osteoclast captured by OPN.[6] Hyperbaric oxygen therapy can also improve regulatory OPN. [35] With the increase of OPN there will be an increase in the number of osteoclasts in the area of pressure during tooth movement.[36] OPN gives osteogenesis process inhibitor effect by inhibiting the proliferation and differentiation preosteoblastic cells.[15] difference sessions of hyperbaric oxygen therapy also affects the number of osteoclasts, with hyperbaric oxygen therapy 10 sessions increase the number of osteoclasts, while in 25 sessions decrease osteoclast-pressure area. So that it can be seen that giving short-term hyperbaric oxygen therapy can accelerate the development of osteoclasts in accordance with the present study (7 sessions). [14]

Whereas in the tension area of the treatment group (2.3300 ± 0.88800) has a number of osteoclasts less than the positive control group (7.3300 ± 1.59500). The increased activity of osteoclasts resorptionin pressure area is helpful to provide a new place for the teeth will be moved, while in the tension area, process of callus formation occurs by increasing the activity of osteoblasts in bone formation after the departure of previous tooth that has moved. The new osteoblasts work only in places where osteoclasts have finished making resorption. On serial lines to

several factors released from bone which has been resorbed or increased local mechanical stimuli generated as a result of bone resorption can stimulate cell proliferation and differentiation of osteoblast precursors. The process of bone resorption and new bone formation is a pairing process required to maintain the structural integrity of the alveolar bone depends on the kind of continuous or intermittent, strength, direction and duration of force being applied. [10] Depressed area will occur in accordance with the movement direction of the force received, the force will push the teeth into the walls of alveolar bone and periodontal membrane will be squeezed between the tooth and alveolar wall, then bone resorption occurs in the area. In the opposite area, the teeth will avoid alveolar wall. Widening of the periodontal membrane space will cause a tension in the area and bone apposition occurs. Given hyperbaric oxygen therapy can accelerate the differentiation of osteoblasts, adding the early stages of mineralization, and increase bone nodule formation and activity of alkaline phosphatase in human osteoblasts. [22] Alkaline Phosphatase is a surface protein that can participate in the regulation of proliferation, migration and differentiation of osteoblastic cells. [12,37]

In Paired T test results showed significant differences. highest number of osteoblasts are the tension area, while the number of osteoclasts at the highest are on pressure area. Positive control pressure area, the amount of osteoblast has less than the positive control tension area, while the treatment group pressure area also has a number of osteoblasts fewer than in the group treated tension area. In contrast, the positive control group and the treatment group osteoclast pressure areas have more number of the positive group and the treatment tension area group. It was caused because the pressure area, appearing pro-inflammatory cytokines such as IL-1, IL-6, IL-11 and IL-17, TNF-α, prostaglandins, bradykinin, kallidin and thrombin inhibit the action of osteoblasts and decrease the number of the cells. [38] Mediators and pro-inflammatory cytokines that trigger the formation of osteoclasts are from stromal cells / osteoblasts through RANKL on osteoblasts bond with RANK on osteoclast progenitor cause osteoclast precursors differentiate and fuse then active into osteoclasts. [18]

Where as in the tension area, the number of osteoblasts increased due to the reduction of proinflammatory mediators resulted in the formation and activity of osteoclasts is inhibited, osteoblasts done proliferation and differentiation to become mature osteoblasts which thus increases the number of osteoblasts and bone density will be also increased. [38] In this tension area, osteoprogenitor cells hold differentiation into osteoblasts forming osteoid tissue. Osteoid tissue is rapidly becoming a blood vascular woven bone (soft). After several months of woven bone it will turn back into hard bone. [20]

Based on experimental evidence, it has been proved that the administration of hyperbaric oxygen therapy for 7 days as adjuvant on tooth movement there is an increased trabecular bone volume and trabecular bone number that indicates activity of osteoblast. [39] Significant difference has obtained between the number of osteoblasts in guinea pigs

that were given hyperbaric oxygen therapy for 7 day compared to guinea pigs that were not given hyperbaric oxygen therapy. In the pressure area the number of osteoblasts decreased because of the region undergoing a process of osteoclastogenesis thus inhibiting the formation of osteoblasts in the area, while in the tension area, the number of osteoblasts in guinea pigs that were given hyperbaric oxygen therapy for 7 days has more significantly compared to guinea pigs that were not given oxygen therapy hyperbaric.

This research was conducted in experimental animals, but is expected to be considered as an alternative therapy on orthodontic treatment to accelerate the process of bone remodeling, after first performed on humans. [20]

A B C

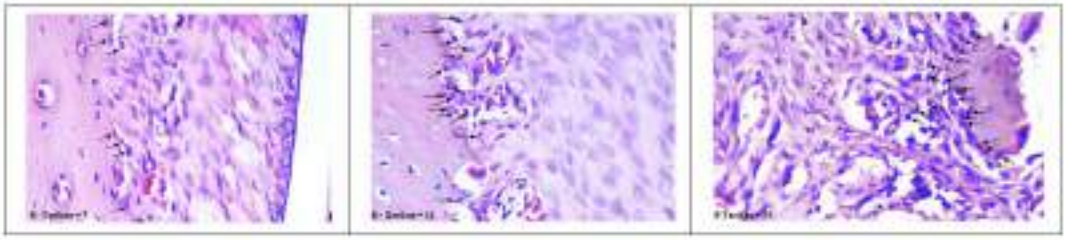

Figure 1. Osteoblast in tension area, (divided into 3 groups : negative control group (A), positive control group (B), hyperbaric oxygen therapy group (C)

D E F

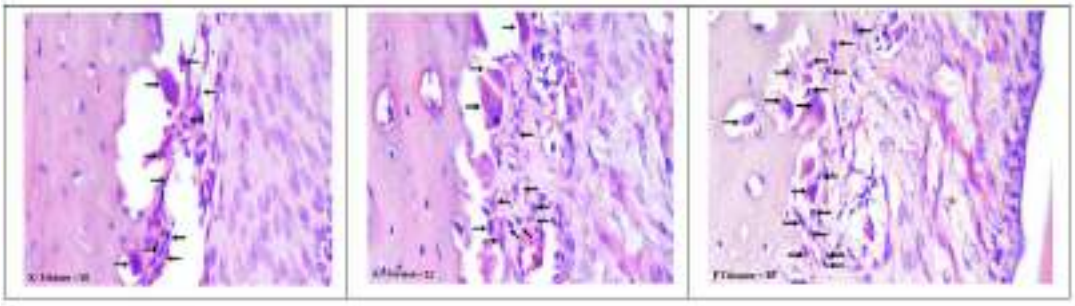

Figure 2. Osteoclast in pressure area, (divided into 3 groups : negative control group (D), positive control group (E), hyperbaric oxygen therapy group (F).)

CONCLUSION

In this research, generally it can be concluded that there is an effect of hyperbaric oxygen therapy to increase the number of osteoblasts in tension area and osteoclasts in the pressure area, as well as a decrease in the number of osteoblast in pressure area and the osteoclast in tension area during tooth movement in guinea pigs.

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P 1.9

RESEARCH ARTICLE

Comparison Of Color Changes In Thermoplastic Nylon Resin Denture Base Material Soaked In Black Tea

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ABSTRACT

Backgoround: Thermoplastic nylon resin is one of the denture base materials that is manipulated with the injecton moulding technique. Thermoplastic nylon resin products such as Valplast® and Lucitone FRS®. People habit on consuming black tea nearly every day makes denture base made of thermoplastic nylon resin changes color. One of thermoplastic nylon resin properties is that it has a high water absorption which can cause to change color. **Purpose:** This study aimed to determine teh comparison of color changes in thermoplastic nylon resin denture base material soaked in black tea. **Material and Method:** This study was a true experimental with pretest and post test with control group design. This study using 32 sample devided in 2 treatment groups and 1 control group, each group consists of 8 samples. The treatment groups Valplast® and Lucitone FRS® were immersed in black tea. The control group was immersed in aquadest for 2 days in temperature 37ºC. The color changes observation of each group was measured by Fotodetector Optic type 101 and digital microvolt. **Result:**Analysis with one way anova and post hoc bonferroni showed that there was significant difference in the color changes of two type of thermoplastic nylon resin which was immersed in black tea with $p<0,05$. The color changes of Valplast® resin (0,863 mv) which was immersed in black tea was lower than Lucitone FRS® resin (1,291 mv). **Conclusion:** There was significant difference in the color changes of thermoplastic nylon resin Valplast® and Lucitone FRS® which was soaked in black tea.

Keywords: black tea, color changes, thermoplastic nylon resin Valplast® and Lucitone FRS®

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BACKGROUND

A denture is a dental prostheses instrument which substitutes the original tooth, partially or completely, applied in maxilla and mandible. These prostheses are consisted of denture which is attached to the denture base. The denture base obtains the support through the close contact with the mouth tissue underneath. Generally, the denture base is made of polymers.[1]

Polymers are long-chain molecules which composed by the repeating units (mer). Polymers are divided into two categories, natural polymer and synthetic polymer. One of the synthetic polymers developed in dentistry is nylon thermoplastic resin. Thermoplastic nylon resinis a material employed in the making of denture base originally made of *diamina*acid and monomer *dibasic* acid.[2]In prosthodontics, this resin becomes one of the denture basis alternatives due to its esthetical stability consideration.[3]

Thermoplastic nylon resincannot be made in a form of dough and manipulated with a regular technique. This resin must be melted and injected into the under pressure cuvette or famously known as injection moulding technique. In general, thermoplastic nylon resin injected in temperature of 274°C or higher. [4]

One of the products produced by thermoplastic nylon resin is *Valplast*®. This resin usually replaces the metal and pink acrylic resin operated to make the skeleton of the denture. *Valplast*®possesses a fine stability and flexibility when it comes to the process and the finishing, with the recommended material thickness of 1 – 2 mm. The color and the form of this material is similar to gingival tissue and biocompatible.[4]Aside from *Valplast*®, *Lucitone FRS*®is also one the products under the same resin which meets the requirements of fine quality of flexibility, lightweight, and has a high resistance to cracking. One of the characteristics of thermoplastic nylon resin, both *Valplast*® and *Lucitone FRS*®, is that it owns high enough water absorption that eases the resin to change its color.[5,6]

The color changing of the denture basis is caused by two factors, intrinsic and extrinsic factors. Intrinsic factor is a chemical changes in the material itself, in this case, means the imperfect polymerization process, while, the other way around, the extrinsic factor is a factor of a stain affected by the absorption or the dye absorption from the exogenous sources. The samples of exogenous sources are coffee, tea, nicotine, soft drinks, and mouth rinses.[6,7,8]These two factors are responsible for the chemical and physical reactions of the resin. Takabayashi (2010) reported that there are color changes in the thermoplastic nylon resinpost-contact with black tea, green tea, red wine, curry sauce, and coffee. The color changes happen due to the physical penetration comes from the pigment into the resin. [9]

The habit of the people to daily tea consuming causes the basis of the denture thermoplastic nylon resin materialized to discoloration. According to a research conducted by Hatim al (2013), tea is the highest discoloration effect to thermoplastic nylon resin, later followed by coffee and soft drinks.[10]Generally, tea is classified in line with the processing into three kinds: black tea, green tea, and oolong tea. However, the most consumed one is the black tea.[11]The concentration and the long exposure of

the stain material in the drink affects the resin pigmentation.[12]

MATERIAL AND METHODS

This research is a true experimental research with the framework of pre-test and post-test with control design, the kind of research to acknowledge the color changes in denture basis material in thermoplastic nylon resin, which are *Valplast*®and *Lucitone FRS*®, before and after the soaking in the black tea water. This research applies the simple random sampling consisted of 2 treatments: black tea solution and sterile distilled water. Using 8 samples for each group makes the total number of the samples becomes 32. The measurement of the discoloration was conducted in the *Laboratorium Optik dan Aplikasi Laser Fakultas Sains* and *Teknologi Universitas Airlangga.*

The samples of this research uses thermoplastic nylon resin, which are *Valplast*® and *Lucitone FRS*® in cylinder form of 20 mm in diameter and 3 mm in thickness, corresponding with the standards of American Dental Association (ADA) No.12,[13,14]and as well as smooth, flat and nonporoussurface. The samples were made in Asia Afrika Dental Clinic, Bandung.

Samples making of the *Valplast*® thermoplastic nylon resinwas injected in the temperature of 287,7ºC (550°F) for 11 minutes until *Valplast*® resinmaterial soften in the stove. The mould which contacted with the halogen light was heated evenly for 15-20 minutes until the temperature around 80°C. The metal injection and cartridge consisted of soften *Valplast*®later removed into the injection unit. The soften resin afterwards put in the cuvette using the plunger. The injection pressure was maintained in the 5 barsfor 3 minutes,later on the chain was removed and released. The dental flaskwas chilled around 20minutesbefore the deflasking. The samples eventually removed from the mold and the *sprue*were cut, followed by surface polishing in accordance with the manufacturer's instructions.

In the thermoplastic nylon resin*Lucitone FRS*®sample making, the resin material was put in the cartridge then placed on the 302°C (575,6°F)furnace until the *Lucitone FRS*® material is soften. The mold was rested under the halogen lamp in order to be exposed evenly for 17 minutesuntil the temperature got between 65°C - 70°C. The metal injection was located under the place and the flaskwas assembled with the brackets, later on the cartridgeconsisted of soften *Lucitone FRS*®resin placed in the injection unit. Later, the soften*Lucitone FRS*®resin put in the cuvette using the plunger. The injection pressure was maintained in the 5 barsfor 3 minutes,later on the chain was removed and released. The dental flaskwas chilled around 20minutesbefore the deflasking. The samples eventually removed from the mold and the *sprue*were cut, followed by surface polishing in accordance with the manufacturer's instructions.

Before the samples were given treatments, the was a measurement of the original color of the *Valplast*® and *Lucitone FRS*®thermoplastic nylon resin using the series of tools of spectrometer optic (Fotodetektor Optic type 101)andmicrovolt digital.Later on, the samples were soaked in saline solution for 24 hours to condition the samples as if it was already in the human mouth cavity. The samples were later given the treatment by dividing

into 4 groups, each given 8 samples of *Valplast*®soaked in black tea, 8 samples of *Valplast*®soaked in sterile distilled water. Afterwards, 8 samples of *Lucitone FRS*®soaked in black tea, and another 8 set samples of *Lucitone FRS*®soaked in sterile distilled waterwere passed on. The soaking was done for 24 hours each day for 2 days straight, later the samples were removed and put on dry wipes, in a room temperature, and then their color stability was ready to be measured. The soaked samples later on be re-measured using the series of tools ofspectrometer optic (Fotodetektor Optic type 101) and microvolt digital.

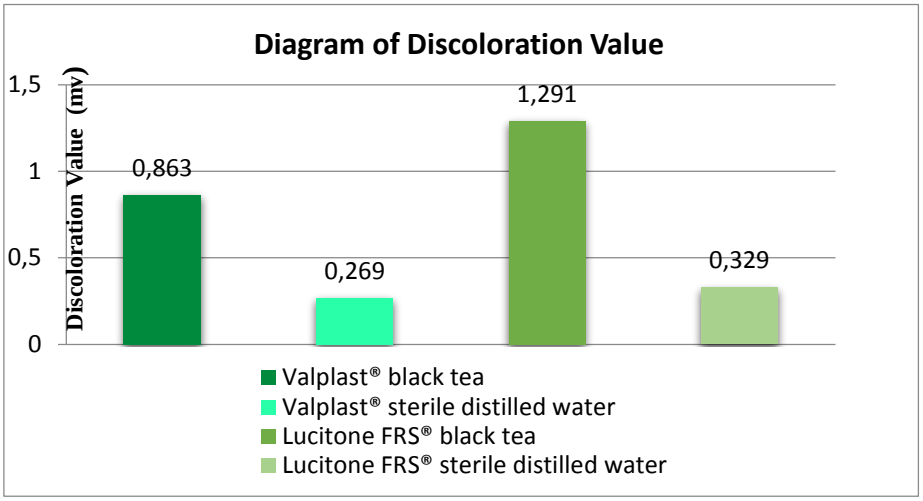
The data were evaluated statistically by testing the normality using Shapiro-Wilk test and the homogeneity testing with Levene's test.Later, if the data were distributed as normal homogenous, it means there had to be done the parametrical analysis by using one wayANOVA hypothetical testing with the accuracy level of 95% (α=0,05) and followed by Post HocBonferroni testing.

RESULT

Based on the research result, it is discovered that the color changes of the *Valplast*® and *Lucitone FRS*thermoplastic nylon resinexperienced an increasingcolor changes after being soaked in black tea and sterile distilled water. The data normality testing was done by Saphiro-Wilk test. The data analysis was continued with the Levene's test to find out the group's variety or the homogeneity. The homogeneity testing resulted in showing the value of p=0,94 (p>0,05) which means that the data are indeed homogenous. The parametric testing requir® ements are the normal and homogenous distributed data so that these data are continued with One Way Anova parametric testing.In accordance with the One Way Anova testing result, there obtained p=0,000 (p<0,05). From all these, can be concluded that there are differences in value of the discoloration on the thermoplastic nylon resinsurface post-treatment with black tea and sterile distilled water. The diagram grade of the discoloration of the *Valplast*® and*Lucitone FRS*®thermoplastic nylon resincan be seen in the picture below.

From the measurement it is earned the average value of the discoloration or the color changes of the *Valplast*®thermoplastic nylon resinsoaked in black tea in 0,863 ± 0,050 mv, the average value of the discoloration or the color changes of the *Valplast*®thermoplastic nylon resinsoakedin sterile distilled water in 0,269 ± 0,034 mv. The value of 1,291 ± 0,033 mv of black tea *Luciton FRS*®thermoplastic nylon resinsoaked, and the value of 0,329 ± 0,029 mvof sterile distilled water *Luciton FRS*®thermoplastic nylon resin soaked.

After normality and homogeneity testing being conducted, later on the post hoc Bonferronitesting was held to acknowledge which group had the significant differences. The comparison among groups of *Valplast*® and*Lucitone FRS*®



Picture 1 Bar chart of the average color changes value of Valplast® and Lucitone FRS® thermoplastic nylon resinin black tea and sterile distilled water soaking

thermoplastic nylon resinin black tea soaking resulted in *p* value=0,00. This shows that among all the treatment groups, the *Valplast*®and *Lucitone FRS*®thermoplastic nylon resinhas the significant value in (p<0,05).

From the diagram above can be seen that *Lucitone FRS*® resinsoaked in black tea experienced higher discoloration (1,291 mv) compared to *Valplast*®resinsoaked in sterile distilled water (0,269 mv). This affects *Lucitone FRS*® thermoplastic nylon resinblack tea soaked to own lighter color due to its higher discoloration measurement compared to other treatment groups.

DISCUSSION

Based on the one way Anova testing and the average value of the thermoplastic nylon resindiscoloration andpost-treatment to both kinds of samples it can be understood can the result of the research is compatible with the researcher's hypothesis, which shows that there are significant differences among all the sample treatment groups. The principal of the measurement of this research is the differences in light intensity, in this case, is equated to the value of voltmeter. If the light is reflected more than it is being forwarded, then it reduces the value of the voltmeter. If the color of the sample initially is pink and it changes into lighter color (to white) after being soaked in a particular solution, it means that more spectrum is reflected than forwarded, so that the voltmeter value decreases.[15]However, it is cannot be equally applied in this research. The lighter the color of the sample, the higher the value earned. This also works the other way around, the darker the color, the lower the value it is. It is inversely proportional to the principle of the measuring of the change of the color.

The *Valplast*®thermoplastic nylon resintreatment group of black tea and sterile distilled water bring significant differences. This is due to the active chemical element in the black tea has influenced the original characteristic of the thermoplastic nylon resin. Although black tea is beneficial in obtaining the refreshing sensation and containing antioxidant that can be useful for

human body, this drink has the participation in the color changing of the basis prosthesis of the denture. There is chemical element in the black tea that is polluting and corrupting the surface of the prosthesis. The active material in black tea can be accidentally absorbed into the thermoplastic nylon resinby diffusing so that the color stability of the thermoplastic nylon resin becomes easily unstable and changes the original characteristics of the prosthesis. In addition, thermoplastic nylon resinoriginal characteristics possess high level of water absorption.

The *Lucitone FRS*® thermoplastic nylon resintreatment group of black tea and sterile distilled water also bring significant differences. Besides containing thermoplastic nylon, *Lucitone FRS*®thermoplastic nylon resin, the basis prosthesis material of this is also combined with resin. The black tea has tannin (theaflavin and thearubigin) and chlorophyll which has already broken down into pheophytinin the process of oxidation as a giver of pigment in the black tea and also containing polyphenol as antioxidant for human beings. If the phenol solution is contacted with the resin, it will result in the characteristics and also harm the surface of the resin. It causes the pigment of the black teagraded in the surface of thermoplastic nylon resin.[16]

The *Valplast*® thermoplastic nylon resin treatment group of black tea and sterile distilled water bring significant differences. The *Valplast*® thermoplastic nylon resin treatment group with the *Lucitone FRS*® thermoplastic nylon resinin black tea soaked gained the value of p=0,00 which means it has significant differences. In line with the research conducted by Takabayashi (2010) the coloring in prosthesis material can happen through two things: physical changes in the prosthesis in penetration from the pigment into the prosthesis, or, caused by the absorption of the pigment into the surface of the prosthesis.[9]this research offers that *Lucitone FRS*®resin shows a higher color changing compared to *Valplast*® resin.The measurement of the *Lucitone FRS*® resin color changing after being soaked in black tea is higher compared to the value before the treatment is being done. The highest difference in numbers of the color changing among other *Lucitone FRS*® thermoplastic nylon resin is 1,346 mv.

Different from the *Valplast*® thermoplastic nylon resin, the difference in value of this resin is lower compared to *Lucitone FRS*® which has the highest value among other samples 0,926 mv. The measurement of the color changing in the *Valplast*® thermoplastic nylon resinafter being soaked in has a lower value compared to *Lucitone FRS*®. This points that the color changing that happens to *Valplast*®thermoplastic nylon resinis lower.

Basically the cause of the color changing in the *Lucitone FRS*® and *Valplast*® thermoplastic nylon resin is the same. *Lucitone FRS*® and *Valplast*® thermoplastic nylon resin are the polyamide kind of resin. However, *Lucitone FRS*® (*flexible dental resin*) thermoplastic nylon resin is the kind of thermoplastic nylon combined with resin, different from *Valplast*® which the composition is purely containing thermoplastic nylon. This makes the color changing chemical reaction in the *Valplast*® and *Lucitone FRS*®thermoplastic nylon resin is different. Visually *Lucitone FRS*® thermoplastic nylon resin is slightly

having a change of color, different from *Valplast*®which turns to yellowish after being soaked in black tea. Known from one composition of the *Lucitone FRS*®thermoplastic nylon resin, it has a higher glass transition temperaturecompared to *Valplast*®, which causes *Lucitone FRS*®to have more stabile visually color changes.[17]

According to Takabayashi (2010) research, the color changing happens after being soaked in coffee. *Valplast*® and *Lucitone FRS*® thermoplastic nylonresin show the highest changes among other specimen material (*Flexite*®). However, seen in the Takabayashi's research, *Lucitone FRS*® thermoplastic nylon resin experiences the color changing in the value of L^*(*lightness*) which is higher compared to *Valplast*® thermoplastic nylonresin.[9]

In this research the color changes in the samples is affected by water absorption level of the samples. Known from the result of the research, the*Lucitone FRS*® thermoplastic nylonresin has a higher absorption compared to *Valplast*® thermoplastic nylon resin. Although this thermoplastic nylon resin is already modified by adding glass reinforce material to reduce the water absorption level, yet the fiber in the thermoplastic nylon resin is still capable in absorbing water. This makes the thermoplastic nylon resin still possesses high water absorption if compared with other prosthesis material such as polymetyilmethacrylate.

Based on Joseph (2009) research, it is proven that tea is originally acid in the number of pH 3,5.[18] Ion H^+. The acid can cause a degradation of the polymer bonding so that the thermoplastic resin which possesses the long linear bonding will be easily weakened and releasing itself. This will lead to the release of the empty spaces between the polymer matrix to multiply so that the process of diffusion of the fluid from the outside heading into the resin will easily occur.[17]

According to Takabayashi (2010), all the tested prosthesis basis material contained *chromophores* (>C=O), which is already known that the material itself is easily causing polarization. The polyamide type of prosthesis also contains *auxochromes* (>N-), in which if the *chromophores*combined with the free radical in the soaking, it will potentially cause coloring or staining. The color changing is influenced by the surface of the resin, diffusion, and absorption of the samples. [9]

The changing of the color also caused by the process of the sample making if the air is captivated inside in the injection moulding technique process or if it does not meet the requirement of the procedure that caused in porosity of the samples caused by the chemical reaction that happens in the material of the samples themselves. This leads to fatal reaction of the bad condition of the mouth the denture prosthesis in. This also happens to the tea that long term consumed, accumulated and piled up and clung in the surface of denture basis material that causes color changing.

CONCLUSION

Thermoplastic nylon resin of *Valplast*® and *Lucitone FRS*® experienced color changes after being soaked in black tea and sterile distilled water. There was significant difference (*p<0,05)*in the color changes of *Valplast*® and*Lucitone FRS*® thermoplastics nylon resin which was

soaked in black tea. Based on the research result, the color changes of *Lucitone FRS®* thermoplastic nylonresin experienced higher color changes compared *Valplast®* thermoplasticnylon resin soaked in black tea.

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P 1.13

RESEARCH ARTICLE

The Effect of Alkaline Peroxide and Celery Extract (*Apium Greveolens .L*) 75% Solution to Flexural Strength of Heat Cured Typed Acrylic Resin

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ABSTRACT

Background: *Heat cured typed acrylic resin are often used as denture base material. One of the properties is easy to absorb liquids such as denture cleanser. These properties can affect the flexural strength of acrylic resin. Alkaline peroxide are often used as denture cleanser, naturally based solution that can be used was celery extract due to antibacterial and antifungal effect.* ***Purpose:*** *The aim of the study to determine the effect of alkaline peroxide desinfectant solution and celery extract (Apium graveolens.L) 75% to flexural strength of acrylic resin.* ***Methods:*** *It was a purely experimental laboratory with posttest control group design only, 36 samples of heat cured typed acrylic resin sized 65 x 10 x 2.5 mm are divided into six group. Six samples are used for each treatment by soaked in a solution of alkaline peroxide, extracts of celery 75% and aquades for 5 and 15 days. Acrylic resin was tested with Universal Testing Machine, cross head speed of 5 mm/min and load cell 50 kgf.* ***Results :*** *The results of One-way ANOVA and post hoc Bonferroni test showed there is significant difference mean value of flexural strength in the immersion in alkaline peroxide solution(51,78 N/mm2) and celery extract(54,70 N/mm2) compared with aquadest for 15 day(73,42 N/mm2), where as immersion for 5 day in alkaline peroxide (63,37 N/mm2), celery extract (64,08 N/mm2) and aquades (52,74 N/mm2) was not significantly different.* ***Conclusion:*** *alkaline peroxide and celery extract 75% can result in higher flexural strength decrease than aquadest.*

Keywords*: Acrylic resins, flexural Strength, Alkaline Peroxide, Celery (Apium graveolens.L).*

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BACKGROUND

Complete denture is the most common treatment for older denture patients to rehabilitate total edentoulous patients. Since the mid-1940, the denture base are mostly fabricated from polymethyl methacrylate (PMMA) or acrylic resin. Polymethyl methacrylate have optimal physical properties that remain stable and good estehetic.[1] The material was often used as denture base due to economical price, relatively low toxicity, does not irritate the tissue, easy application and polishing and does not dissolve in oral fluid. [2,3] Polymethyl methacrylate exhibit a tendency to absorb water when placed in an aqueous environment due to polarity of the resin molecules.[4]

A denture base seated on oral cavity may inducing formation and deposit of biofilms and microrganisme on both prosthetic and adjacent mucous. As a result, the recurrence of fungal growth can be high and lead to denture stomatitis.[5] Denture stomatitis was often occur among user of denture with a prevalence of approximately 10-75%. The disease can be prevented by removal of the dentures regularly at night and denture cleansing, it should be quick, efficient and easy to be performed by patient. Denture cleansing can be divided into two main classes : mechanical cleanser using tooth brush and liquid soap and also chemical cleanser by soaking denture in denture cleanser.[5,6]

There were various types of denture cleansers on the market, one of them is an effervescent tablet particularly alkaline peroxide group. The alkaline peroxide is one of the denture cleanser that often used as anti-bacterial, anti-fungal and dissolving the organic biofilm matrices, therefore reducing the number of Candida sp. Paranhos (2013) reported that alkaline peroxide may damage acrylic resin and metal components of the prosthetic by forming surface oxidation and releasing ions in solution.[7,8] The last few years the government back in advocating the use and development of traditional materials as medicine. This is in accordance with the declaration by WHO Traditional Medicine Strategy. One of the traditional materials that can be used are celery or celery (*Apium graveolens L.*).[9,10]

Research conducted by Anindita in 2013 investigated effect of the concentration of celery extract (*Apium graveolens L.)* on the candida albicans growth to acrylic resin. The study reported that celery extract used as a denture cleanser with concentrations 75% are the most effective to inhibiting the candida albicans growth on acrylic resin.[10]

Celery (*Apium graveolens L*.) contains of flavonoids, tannins, essential oils, saponins, flavoglukosida, apigenin, choline, lipase, asparagines, bitter substances, vitamins A, B, C and minerals. Some compounds from celery herbs that role in inhibiting the growth of candida albicans is flavonoids, tannins and essential oil. The three content has antibacterial and anti-fungal effect that can be used as an alternative to denture cleanser.[11,12]

The use of a denture in the long term should be considered. Denture cleanser should not cause adverse effects to acrylic resin denture base and does not alter the physical and mechanical properties of acrylic resins. Some researchers reported that the use of denture cleanser everyday may affect the properties of acrylic resin, one of them is the flexural strength.[8,13]

Dentures are commonly subjected to flexures during mastication. Wulandari (2012) conducted a study to investigate the flexural strength of acrylic resin that is immersed in denture cleanser contain of 0.4% of natural eugenol cinnamon oil. The research showed there is no significant change in flexural strength. Another research conducted by Peracini in 2010 by using a solution of alkaline peroxide showed significant differences in flexural strength.[13,14]

The aim of the study is to know the flexural strength of heat cured typed acrylic resin that is immersed in alkaline peroxide solution, extract celery (*Apium graveolens L.*) 75% and aquades as a control for 5 day and 15 day (as 1 -year and 3 year immersion simulation) according to denture cleansing instructions 20 minute perday.

MATERIAL AND METHODS

The study used a true experimental laboratory with post test only and control group design. Heat polymerized denture base resins (QC-20-Dentsply) were used in the study. The sample sized 65 x 10 x 2.5 mm in rectanguler shape according to ADA specification no 12:2002. Two layer of wax (Cavex) were placed on cuvette and flasked. To embed the flask, type 2 gypsum was used and mixed at ratio 100 gr of powder with 30 ml of water, stirred with a spatula and put into a cuvette which has been prepared on the vibrator so that air bubbles come out of the cuvette. Wax elimination was done after the gypsum is hardened or set, then surface of gypsum is coated with cold mold seal. The liquid (monomer) to polymer (powder) ratio of acrylic resin according to ratio of 3:1, both are stirred on stelon pot porcelain until dough phase and packed in the flask. Acrylic resin sample were fabricated using conventional flaksing and pressure pack technic with pres hydraulic pressure of 1000 psi (70kg / cm2) and then 2200 psi (154kg / cm2). Polymerization of the resin was carried out in boiling water for 30 minute, the cuvette were removed and cooled at room temperature. The surface were finished with rotary grinder and 2000 grit silica carbid paper. All the samples were stored in saline solution at 37^0C temperature in incubator for 24 hour before immersion in extract selery and alkaline peroxide.

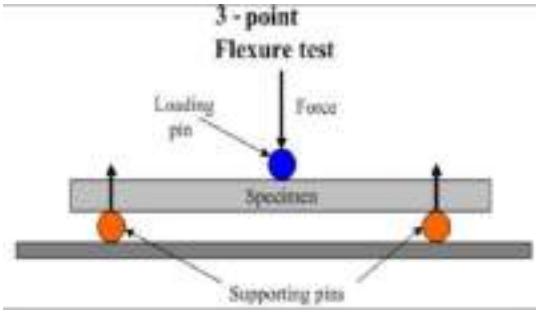
Extract celery (*Apium graveolens L.*) were fabricated by maceration method. Harvested celery were washed with water and dried in the drying cabinet with a temperature of 45°C to dry, then pulverized using a blender to form a celery powder. The powder is then immersed with 70 % ethanol solution while stirring for 30 minutes and then allowed to stand for 24 hours. The results obtained from immersion was the pulp and filtrate celery, then the filtrate is evaporated using a vacuum rotary evaporator at 70°C.

Thirty six samples of acrylic resin are divided into 6 groups, 6 samples of each for groups, which is alkaline peroxide, celery extract (*Apium graveolens L.*) solution and aquades for 5 days and 15 days immersion and load cell 50 kgf. Flexural strength measurement were carried out using a Universal Testing Machine (Shimadzu autograph AG - X 5 kN, Japan). The distance between the sample support was 50 mm and load cell 50 kgf, the loading force was applied to the sample at crosshead speed of 5 mm/min until the sample fractured. The maximum load exerted on the specimens was recorded, and the flexural strength was

calculated according to the following formula:

$$F=3WL/2bd2$$

(F: flexural strength; W: load at fracture; L: distance between supporting points (50 mm); b: width of specimens (mm); d: specimen thickness (mm)) Flexural strength was calculated in N/mm^2.[15]



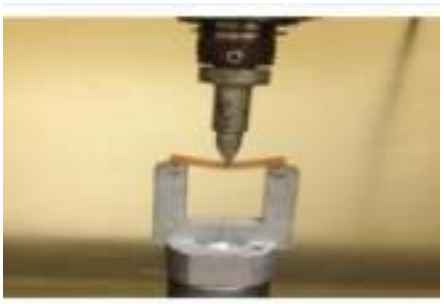


Figure 1. Universal testing machine for flexural strength test (three point bending).[15]

Flexural strength data are evaluated statistically using a one-way ANOVA and Bonferroni test for post-hoc comparisons. All analyses were performed at a 95% level of confidence. Data were analyzed with *SPSS for Windows software.*

RESULT

Flexural strength means and standard deviation for flexural strength test are listed in table 1. Table 1 shows the decrease in flexural strength value from day 5 to day 15 in the group that was immersed in alkaline peroxide and 75% celery extract , but there is increase in flexural strength value from day 5 to day 15 in the group that was immersed in aquadest. Flexural strength value of celery extract group are higher than alkaline peroxide group. The highest flexural strength value is aquadest in 15 day group and the lowest flexural strength value is alkaline peroxide in 15 day group.

Statistical analysis used in this study is One Way ANOVA parametric test Based on Shapiro Wilk normality test ($p > 0.05$) and homogeneity of variance Levene 's Test ($p > 0.05$) exhibit normal data distribution and homogeneous variance of data , thereby Post Hoc Bonferroni test was performed.

Table 2 show the results of post hoc Bonferroni test, there was a significant difference between groups of immersion in alkaline peroxide and aquadest in 15 day, there was a significant difference between celery extract 75% group and aquadest group in 15 days. While the immersion for 5 days, there was no significant difference between celery extract 75% group and aquadest group, between alkaline peroxide group and aquadest group, between celery extract 75% group and alkaline peroxide group.

Table 1. Mean and standard deviation flexural strength (N / mm^2) heat cured acrylic resin

Group	Mean ±SD (N/mm^2)	Significance
Alkaline peroxide 5 day	63,37±5,90	p=0,369
Celery extract 5 day	64,08 ±6,44	p=0,239
Aquades 5 day	52,74 ±6,00	p=0,805
Alkaline peroxide 15 day	51,78 ±6,13	p=0,051
Celery extract 15 day	54,70 ±9,12	p=0,259
Aquades 15 day	73,42 ±5,48	p=0,619

Table 2 : Value significance flexural strength of heat cured typed acrylic resin on Alkaline Peroxide , Celery extract and Aquades immersion for 5 days and 15 days post Hoc Bonferroni test

	Alkaline peroxide 5d	Alkaline peroxide 15d	Celery extract 75% 5d	Celery extract 75% 15d	aquadest 5d	aquadest 15d
Alkaline peroxide 5d	-	0.075	1,000	0.461	0.14	0.000*
Alkaline peroxide 15d	-	-	0.302	0.100	0.000*	0.000*
Celery extract 75% 5d	-	-	-	0.302	0.088	0.311
Celery extract 75% 15d	-	-	-	-	0.000*	0.000*
aquadest 5d	-	-	-	-	-	0.000*
aquadest 15d	-	-	-	-	-	-

"*" mean there was a significant difference

DISCUSSION

Flexural failure of denture base resins is considered to be the most clinical failure. The flexural strength test with three point bending system is useful in investigate denture base materials as it simulates the type of stress that is applied to the denture during mastication.[16] Therefore, in this study, flexural were evaluated for the effect of immersion in denture cleanser solution and aquadest as control.

In the study there is a decrease in flexural strength value on resin that is soaked in alkaline peroxide solution and extract selery 75% from day 5 to day 15 days. the decrease is due to acrylic resin may absorbs water slowly, the water absorption occurs in the gap that lies between the polymer chains of acrylic resin. The amount of water absorbed is determined by the slit between the polymer bond. Absorption by molecular diffusion mechanism lawful fluid by diffusion of small molecules, as a solution or water can act as a debilitating bonding polymer chains to diffuse into the polymer, thus bonding the polymer chain is disrupted and can decrease the strength of acrylic resin. The absorbed water in the

polymer networks can cause physical changes such as plasticization and softening, leading to a decrease in flexural strength.[4] There is a decrease in flexural strength value to acrylic resin that is immersed in alkaline peroxide solution for 5 days to 15 days. This is due to the content of the alkaline peroxide which affecting flexural strength of acrylic resin. The alkaline peroxide can react with water and form H_2O_2 (hydrogen peroxide) + alkali, $2H_2O_2 \rightarrow 2H_2O + 2O$ (nascent Oxygen). Hydrogen peroxide release oxygen (nascent Oxygen) that damage the chain in a single bond of polymer chains. Hydrogen peroxide as an oxidizing agent having free radicals (nascent Oxygen) that does not have an electron pair, subsequently separated and accepted by the matrix resin therefore the oxidation reaction occurs. These free radicals react with unsaturated bonds, result in interference electron conjugation and changes in resin molecule that causes changes in the chemical structure of the resin molecules.[13,14]

There is a decrease in flexural strength value on resin by immersion for 5 days to 15 days in a solution of celery extract 75%. The decrease is due to the content of phenolic compounds in celery extract 75% . Phenol compounds can be absorbed by acrylic resin and result in swelling on acrylic resin. Phenol is an aromatic hydrocarbon compounds that having a molecular weight less than the molecular weight of the acrylic resin, therefore the phenolic compounds can enter the bond between resin that causes a decrease in the strength of acrylic resin. Wulandari (2012) reported that the acrylic resin was a long polyester formed polymer comprising units of methylmethacrylate with a low polarity, while the acidic phenol with high polarity. Esters in under acidic conditions would be hydrolyzed to form carboxylic acids and alcohols. Polyester splits will cause degradation of the chemical bonding of acrylic resin. This is may result in a flexural strength decreasing. [1,8,17] If denture cleansers affect negatively the resins decreasing the strength, greater incidence of denture fractures might occur, both outside and inside the mouth.[17]

There is an increase in flexural strength value on resin by immersion for 5 days to 15 days in aquades. This is due to the weak secondary bonding acrylic resin result in penetration of the water molecules between the polymer chains in the process of water absorption. Water absorbing properties of acrylic resin has positive and negative effects.in the study, immersion for 5 days to 15 days in aquades exhibit positive effect which is absorption of water by the polymer can help compensate the effects of imperfectly polymerization or shrinkage due to the process of making acrylic resin. Salim (1995) reported that the acrylic resin that is immersed in water for 2-3 months does not degrade flexural strength and it is a significant difference when stored in humidity of 40 %.[15,18] Another study report that polymerization of acrylic resins which perfectly can increase the bond strength between the polymer chain and decrease the amount of water absorption.[19]

In the study, rectangular specimens were examined and variables such as shape, size and thickness of the samples were controlled. By this approach, flexural strength as mechanical properties were directly related to acrylic resin itself.

garechahi reported that it is better to use specimens with simple shapes for comparison of properties instead of dentures and denture-shaped specimens.[19]

According to the research, it was showed that there were significant differences mean value of flexural strength in the immersion in alkaline peroxide solution(51,78 N/mm2) and celery extract(54,70 N/mm2) compared with aquadest for 15 day(73,42 N/mm2), where as immersion for 5 day in alkaline peroxide (63,37 N/mm2), celery extract (64,08 N/mm2) and aquades (52,74 N/mm2) was not significantly different. alkaline peroxide and celery extract 75% can result in higher flexural strength decrease than aquadest.

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P 1.15

RESEARCH ARTICLE

The Relation Of Body Mass Index Status With Dental Caries And Permanent Teeth Eruption Overview On Elementary School Students In District Hss Grade 1, 2, And 3

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ABSTRACT

Background: *Caries is a focal infection in oral cavity, responsible for painful episodes and affects optimal nutritional intake. This eventually results in growth disorder and poor nutritional status. Nutritional status can be measured using Body Mass Index (BMI), a screening tool developed for individual's assessment of underweight or overweight. Malnourished childrenhave higher risk in caries compared to normal children. In fact, malnourished children also experience delayed eruption of permanent teeth and early exfoliation of deciduous teeth. According to South Kalimantan's Riskesdas (Basic Health Research), South Hulu Sungai takesplace in the first rank of most malnourished children (14.2).* ***Purpose:*** *This study aimed to assess the relation between Body Mass Index and caries and permanent teeth eruption.* ***Method:*** *This analytic observational study used cross-sectional approach, with total samples of 90 children, divided into 30 children per class (class 1, 2, and 3).* ***Results:****This study found 83 severely underweight children, 6 underweight children, and 1 normal child, but no overweight or obese children were found. The mean of def-t index was 8,1 which was very high. There were 80 children with incomplete permanent teeth eruption, 9 children with normal permanent teeth eruption, and 1 child with excessive permanent teeth eruption. Spearman test result showed that Body Mass Index affected permanent teeth eruption with p value of 0.000.* ***Conclusion:****There was a relation between Body Mass Index and caries and permanent teeth eruption.*

Keywords: *BMI, caries, permanent teeth eruption.*

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BACKGROUND

Nutritional status is every individual's health status which ismeasured by height and weight according to the age. Body mass index (BMI) is a mathematical formula in which a person's weight (kg) divided with height in meters squared. BMI is a simple instrument for monitoring the nutritional status related to deficiency and excess of body weight.[1] Data of Riskesdas (Basic Health Research) 2013 reported the nutritional status of population aged 5-18 years can be assessed based on BMI which is differentiated by age and gender. Based on data presentation of Riskesdas in 2013, the prevalence of weight-less (underweight) by Regency / City of South Kalimantan data obtained from malnutrition in which Banjarmasin ranks 11th with numbers (5.4) while the first place is taken by Hulu Sungai Selatan (HSS).[2] Alow BMI can easily explain that there is difficulty in masticatory function that can prevent normal eating in some cases. It is proven in the scientific literature that public health has a huge impact on oral health and vice versa.[3]

As many as 28% children aged 2-6 year in the United States has caries and its prevalence has increased by 15% during the last decade terakhir.[4] According to the data from the National Riskesdas in 2013, it reported that the DMF-T Index in Indonesia is of 4,6.[2]South Kalimantan occupies the second position of the highest (7.2) after Bangka Belitung (8.5).[5] Dental caries may affect anyone regardless of age and if allowed to continue it would become a source of focal infection in the mouth, causing complaints of pain. This condition will certainly affect the nutrients intake which can lead to impaired growth, which in turn will affect the nutritional status of children.[4]

Some studies on children with good nutritional status will show the value of caries in primary teeth is less and higher value of caries in permanent teeth. In contrast to children with malnutrition, it will show a higher prevalence of caries in primary teeth but will have a lower caries prevalence in permanent teeth. As a result, the food needs for growth and development of children is not fulfilled.[3] Moreover, malnourished children also undergo delayed tooth eruption and exfoliation of primary tooth.[6]

In children who experience chronic malnutrition or nutritional deficiency can lead to slow growth and lack of cognitive ability in the future. Slow growth can cause short stature due to endocrine disorders and malnutrition, so that the bone age is lower and cause delayed tooth eruption.[7] Tooth eruption can be influenced by nutritional and environmental factors, including gender and heredity which are also important factors that can affect tooth eruption.[1]At this stage of tooth eruption, interference in tooth eruption can occur. Children with good nutritional status, their growth and development of permanent teeth run normally, whereas in children who are obese, their growth and development of permanent teeth tend to be quicker compared to children of normal or good nutritional status.[8]Based on the background above, this research aimed to rese determine the relation of Body Mass Index (BMI) status to dental caries and permanent tooth eruption in elementary schools in Hulu Sungai Selatan (HSS).

INSTRUMENTS AND MENTHOD

This study was an observational analytic study using cross-sectional approach. The tools used are sheets of licensing or consent to the school, replenishment sheets for BMI measurement,def-t index sheets, permanent teeth eruption table sheets, stature meters, scales, stationery, calculators, nierbekken, diagnostic tools, flashlights, gloves and masks, the work surface, 70% alcohol, and tissue. The population in this study were all students at elementary schools in HSS grade 1, 2, and 3. The sampling in this study conducted in Stratified Random Sampling which was used to select SDN sample by strata area. Then a random sample will be scrambled again to get a total number of 90 samples, namely 30 children in each grade 1, 2, and 3.

Variables studied are divided into independent variables and dependent variable. The independent variable in this study was the Body Mass Index Status in children and the dependent variable in this study was caries and permanent tooth eruption. This study was conducted in August 2015 in children of grade 1, 2, and 3 at the elementary schools in the HSS District namely SDN Panggungan District of Loksado, SDN Pakapuran Kacil 1 Daha North District of Nagara, and SDN Gambah South Outer District of Kandangan. Analysis of the data used in this research was the analysis of Spearman.

RESULTS

The results of the relation status ofbody mass index against caries and permanent tooth eruption research on HSS school students of grade 1, 2 and 3 obtained 90 samples. The results of the relation status ofbody mass index against caries and permanent tooth eruption research on HSS school students of grade 1, 2 and 3in August 2015 can be seen in Figure 1 and Figure 2.

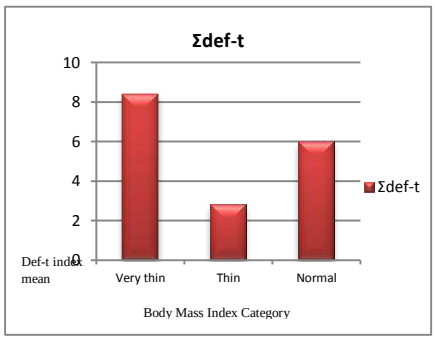

Figure 1. Bar chart based on caries in HSS school student of grade 1, 2 and 3 relation status of body mass index against caries and permanent tooth eruption permanent in HSS school students of grade 1, 2 and 3 in August 2015.

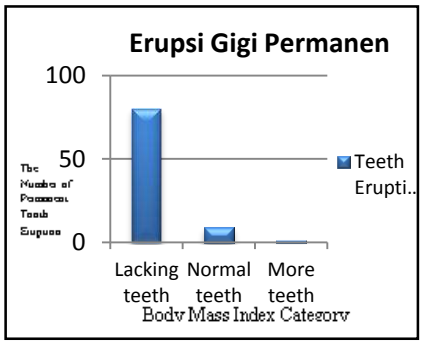

Figure 2. The bar chart based on the permanent tooth eruption in HSS school students of grade 1, 2 and 3 relation status of body mass index against caries and tooth eruption permanent HSS school student in grades 1, 2 and 3 in August 2015.

The data of Figure 1 shows that there are differences in the severity of dental caries in the number and the mean of def-t index is 702 for def on very thin children group as many as (92.22%) 83 children with an average index of def-t 8.4, while the number of

underweight children def group as many as (6.67%) 6 children with 17 of an average def-t indexof 2.83 and the number of def in normal children as many as (1.11%) 1 child is 6 to the average def-t index of 6. The data of Figure 2 shows there is eruption time difference in each child obtaining (88.89%) 80 children had less number of permanent tooth eruption, (10%) 9 children with normal eruption of permanent teeth and (1.11%) 1 child with excessive eruption of permanent teeth.

DISCUSSION

Based on the results that the Body Mass Index (BMI) of the children in Hulu Sungai Selatan (HSS) is the mostly dominated by the category of very thin or underweight severelywith numbers <17.0. It is in accordance with the data of Riskedas 2013. According to Aparna Sheetal et al (2013) said that malnutrition is directly caused by poor nutrition and the presence of infectious diseases as comorbidities one of which comes from the teeth. Malnutrition can affect the mouth and play a role in the development of dental and oral disease.[9]Rebecca et al (2015) stated that oral health is a part of the body's health which can not be separated from one another because it will affect the health of the body holistically.[10]

According to Andriany et al (2008) and Aparna Sheetal et al (2013) many factors that lead to increased dental caries in protein and energy malnutrition that can lead to reduced salivary flow, affect salivary composition, alter the immune system and increased solubility in acidic email. Tooth is protected by an immune system in the oral cavity, where the components produced by saliva is of paramount role in the immune system in the oral cavity. In saliva, not only it contains antibodies in the form of secretory immunoglobulin A (sIgA) that plays a role in protecting teeth, there are also components of the non-specific nature which have a role in protecting the teeth from caries. If someone's nutrition intake was reduced, it would disrupt the defense system of teeth and caries would occur.[6, 9, 11]According to Romadhona (2009) in children, especially at primary school age, they have mixed dentition in which there areprimary teeth and permanent teeth so that they're susceptible to dental caries.[12]

Based on the results, Body Mass Index can also affect the eruption of permanent teeth which is found in a lot of children with BMI category of very thin which the number of permanent tooth eruption is less than it should be. According to Almonaitiene et al (2010), one of the factors that may affect the permanent tooth eruption is nutrient intake and nutritional status in children.[8] According to Faizal (2011) and Moyers (2011), the difference between the permanent tooth eruption is influenced by many factors, such as genetic factors , the factors of race, gender, socio-economic, nutritional and local factors.[13,14] So BMI can affect the rate of eruption of the permanent teeth in children.

According to Virginia et al (2015) the effects of impropernutrients intake reflected in the growth patterns of children, both in general and specifical to the eruption of the permanent teeth in the oral cavity. Inadequate intake of nutrients can affect, among others, on the delay tooth eruption. At this stage of growth and development of the tooth, not a small amount of cases of children with impaired tooth eruption due to

non-fulfillment of nutrient intake is discovered. This can cause abnormalities in dentition. According to Aparna Sheetal et al (2013), malnutrition can cause delayed eruption of permanent teeth then improve distribution and increase the risk of dental caries.[9]

CONCLUSION

Based on this research, it can be concluded that there is a relation between body mass index with caries and the eruption of permanent teeth.

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P 1.16

RESEARCH ARTICLE

Fluoride Concentration On Mice Teeth After Application Naf Patch On Back Mice That Shaved Manually And Ellectrically

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ABSTRACT

Background: *Fluoride applications can be used as a preventive caries action. The use of fluoride can be done systemically and topically. One example of fluoride topical application in patch or known as transdermal drug delivery (TTD). TTD could reduce drug adverse effects and increased the success of drug therapy.* ***Purpose:*** *This research aimed to know the differences of fluoride levels in mice teeth after application fluoride patch on dorsal mice that were shaved manually and electrically.* ***Methods:*** *This type of research was an in vivo experimental with post test control group design. Twenty wistar strain mice were divided into 4 groups. Group that shaved electrically and applied patch fluoride (EF), group shaved manually and applied fluoride patch (MF), group shaved manually and applied patch without fluoride (MK), and group shaved electrically and applied patch without fluoride (EK). Fluoride levels in the incisors teeth examined with a spectrophotometer then analyzed with Kruskal Wallis test.* ***Results:*** *The results showed the average levels of fluoride in EF: 0.96 ± 0.03; MF: 1.05 ± 0.02; MK: 0.3 ± 0.02; and FK: 0.4 ± 0.02. Kruskal Wallis test resulted in p = 0.04 means that there was a significant differences of fluoride levels in all groups.* ***Conclusion:*** *Fluoride concentration on mice teeth which plastered by patch without NaF was lower than plastered by NaF patch, and which shaved electrically than manually*

Keywords*: NaF Patch, fluoride concentration, teeth, shaved manually, shaved electrically*

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BACKGROUND

Caries incidence in Indonesia still high, as the data shown 46.5% of caries prevalence and 72.1% of caries experience.[1] Caries is a demineralization process of enamel and dentine caused by inbalance in oral cavity. One of demineralization prevention action is by fluoride application.[2]

Fluoride is proven has action to prevent caries by making enamel more resistant to acid and forming new mineral to control tooth decay. [3] Some develop countries has water fluoridation with fluoride concentration 0.6-1.2 ppm to prevent caries incidence to whole population.[4] Indonesia has difficulties to implement the such programme as technical problem and difficult to control fluoride concentration, therefore Indonesia community need other form of fluoride modalities. [5]

Fluoride work to prevent caries in two ways, systemically and topically. Water, salt and tablet fluoridarion are fluoride modalities which work in systemic way, while fluoride toothpaste, fluoride topical application are fluoride which work in topical way. A new fluoride topically modality has been developed with method transdermal drug delivery (TDD) in form of patch. Fluoride in patch will be diffused, absorbed and distributed to tooth and bone, which enriched calcium tissue.[6]

Transdermal drug delivery is the non-invasive delivery of medications from the surface of the skin - the largest and most accessible organ of the human body - through its layers, to the circulatory system. This route has several advantages including reduced side effects and improved therapy due to maintenance of plasma levels up to the end of the dosing; avoid hepatic first past effect; improved bioavaibility; increased convenience to administer drugs which would otherwise require frequent dosing and more uniform plasma level of drugs. [6] A research of fluoride patch has been started, and a result that fluoride in blood increased after patch application on back mice which shaved electrically. [7]

Fluoride will be applied on the back mice and will be absorbed via skin. Skin has layers and the most hard layer and difficult to be absorbed is stratum corneum.[8] How is stratum corneum when skin shaved manually with razor blade compared with electric shaver and also fluoride concentration on teeth after fluoride patch application on the back mice.

MATERIAL AND METHODS

Reseach design was experimental in vivo with post test control group approach. Samples was 20 male Wistar mice which divided into four group. Group I (EF): mice which shaved ellectricaly and fluoride patch applied on back

Group II (MF): mice which shaved manually and fluoride patch applied on back

Group III (EC): mice which shaved ellectricaly and patch no fluoride applied on back

Group IV (MC): mice which shaved manually and patch no fluoride applied on back

a. Patch formulated same as research by Fatmasari et all [10]
b. Patch applied on back mice for 14 days and replaced every 3 (three) days
c. Mice eat and drink ad libitum
d. After 14 days patch application, mice then euthanasia with ether 5% the tooth then extracted

e. Tooth was cut into small pieces, and dissolved in 2.5 ml HNO_3 65% and 5 ml TISAB solution
f. All then dissolved into 100 ml aquadest
g. Fluoride concentration on teeth mice then measured with Potensiometer specific ion F^{7}
h. Differences of fluoride concentration on four groups the compared and analysed statistically with Kruskall Wallis

Patch without fluoride

Patch with fluoride

Back mice was shaved by electric

Back mice was shaved manually

Patch was applied on back mice

RESULT

Result of fluoride concentration on teeth on four groups are as follows:

Table 1. Mean ± SD fluoride concentration on teeth after patch application

Group	Mean fluoride concentration (ppm) ± Std.Deviasi
EF (electric fluoride)	0.96 ±0.03
MF (manual fluoride)	1.05 ±0.02
MC (manual control)	0.30 ±0.02
EC (electric control)	0.40 ±0.02

The highest mean of fluoride concentration was on group manual fluoride and the lowest was on group manual control.

Table 2 Kruskall wallis result differences on mean fluoride concentration after patch application

group	Sig.	
EF MF MC EC	0,04	Different significanly

As p value of Kruskall Wallis test was p<0,05 we can conclude that there was a differences of fluoride concentration on teeth after patch application for 14 days both on treatment group and control group.

DISCUSSION

NaF patch used in this research was patch with fluoride concentration 1.000 ppm same with result of Fatmasari et all [10] which found fluoride patch with concentration 1.000 ppm can be applied. The highest concentration of NaF was 1.000 ppm when used higher than 1.000 ppm the physical properties was crystallized (not homogenous).

This research result was in line with Fatmasari et all [11] which found that blood plasma mice after application of NaF patch with back mice was shaved electrically was higher than those who shaved manually. This design research was different as compared four group with control group which applied of patch without NaF.

Application of patch on human skin has already used several years ago and successfully can deliver many drugs effectively.[12] Transdermal patch is a medicated adhesive pad that is designed to release the active ingredient at a constant rate over a period of several hours to days after application to the skin. The innovation of NaF patch was already proven to enhance fluoride concentration on blood and teeth (experiment study on mice).

Mouse skin compared with human skin was different as more hairy in mice skin. When moved fur mouse used razor it can be seen that the back mice surface full of redness spot, it might be loss of stratum corneum (the most hardness skin layer). It contrary with the surface skin when shaved with electric, it look smooth no redness spot.

Back mice after shaved electrically

Back mice after shaved manually

The highest fluoride concentration was on treatment group which applied NaF patch and shaved manually. It is proven that when stratum corneum was loss as the used of razor, fluoride can penetrate to blood plasma easily and then fluoride absorbed to teeth as the most rich calcium tissue. Fluoride can only bond with calcium in body tissue. Fluoride concentration on teeth determine by several aspects 1) aged (the older age the fluoride concentration on enamel [13]; 2) Fluoride intake on period of dentition, for example water fluoridation and fluoride topical application 3) dimanic mechanism on fluoride absorbtion; 4) number of hydroxyl ion on enamel which subsituted by fluoride. [14]

Skin surface when shaved electrically still have stratum corneum layers and fat layes did not upraise. Fluoride ion need more struggle to penetrate the barier. Fluoride concentration on teeth is lower compared to those who shaved manually. Patch was replaced every 3 (three) days, in group shaved electrically showed fur mice already growed.

There was fluoride on teeth when fluoride patch without NaF applied on back mice, although the concentration was low. This condition was caused by the food and drink which probably contain fluoride naturally.

CONCLUSION

There was a differences of fluoride concentration on teeth on group of mice which their back skin shaved manually and electrically. The highest fluoride concentration on mice teeth was on group of mice which shaved manually and applied NaF patch. Recommendation : Research about NaF patch need to be developed as this route is promising to deliver fluoride in low therapeutic dose and more appropriate for children as can be applied once for several days.

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CASE REPORT

Management Of Maxillary Flat Edentulous Ridge With Magnetic Retained Immediate Complete Denture

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ABSTRACT

Background: *Immediate denture is the best option for maintain patient confident during prosthodontic treatment. Meanwhile, flat ridge also need to be concerned as it can give great effect to denture retention. Magnet retained can significantly improve denture retention.* ***Purpose:*** *To get better retention in flat ridge maxillary and get better aesthetic by doing immediate extraction.* ***Case and Case Management:*** *Man, 72 years old came to clinic RSGMP Airlangga University wanted to make new denture to replace the old denture. He had been using the denture for 8 years. Upon examination, there were 3 anterior teeth remained, 2nd degree mobility on teeth 12,22 and gangrene radix on tooth 23. From the radiographic results, there were widening of periodontal ligament on teeth 12,22 and there was apical radiolucency on tooth 23. He wanted to wear the old denture untill the new denture is ready. Cast keeper was inserted after endodontic treatment on tooth 23, and then patient had been impressed on maxilla and mandible for making working cast models. After bite registration and transfering models to articulator have been done, tooth 12 and 22 were removed from the cast (working model). When the new denture is ready, do extraction teeth (12,22) and denture directly inserted. 1 week after denture was inserted and stabil, magnet was placed on to the denture.* ***Conclusion.*** *Magnet retained immediate complete denture with maxillary flat ridge can give the better retention.*

Keywords : *magnet retained, immediate denture, flat ridge*

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BACKGROUND

Immediate denture is the best option to maintain patient confident during prosthodontic treatment . Meanwhile, flat ridge also need to be concerned as it can give great effect to denture retention. Magnet retained can significantly improve denture retention. By doing immediate extractionion, it can get better retention in flat ridge maxillary and get better aesthetic.

CASE

A person 73 years old male patient came to Prosthodontic clinic, Faculty of Dentistry Airlangga University with a loss of some teeth on maxilla. He wanted to make new denture to replace the old denture.The patient could not eat comfortably and bothered by aesthetic upper anterior teeth made by dental technician. He had been using the denture for 8 years. Upon examination, there were 3 anterior teeth remained, 2nd degree mobility on teeth 12,22 and gangrene radix on tooth 23. From the radiographic results, there were widening of periodontal ligament on teeth 12,22 and there was apical radiolucency on tooth 23. He wanted to wear the old denture untill the new denture is ready.

PRETREATMENT

Fig 1. With old denture

Fig 2. Maxillary posterior flat ridge with gangrene radix 23 and 2nd degree mobility tooth 12,22

CASE MANAGEMANT

1. **Endodontic treatment at 23**

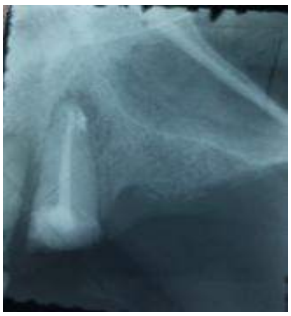

Fig 3. Endodontic treatment 23

2. **Cast keeper was inserted after endodontic treatment on tooth 23**

Fig 4. Insertion of cast keeper in tooth 23.

3. **After insertion of cast keeper in 23, make final impression maxilla for making working model**

Fig 5. Maxillary Final impression

4. **Calculating the Vertical Dimention Occlusion and Bite Registration**

fig 6. Vertical Dimention Occlusion and bite registration

5. **Try in denture in patient**

Fig 7. Try in denture

6. **After tooth 12 and 22 were removed from the cast (working model), arrange the teeth (12,22) and then acrylic processing. After new denture was ready, do extraction teeth (12,22) and denture directly inserted.**

Fig 8. Extraction tooth 12 and 22

Fig 9. Denture directly inserted

7. **One week after denture was inserted and stabil, magnet was placed on to the denture.**

Fig 10. Magnet was placed on to the denture

8. **The new denture was inserted to the patient**

Fig 11. New denture was placed to the patient

DISCUSSION

In this case immediate denture with magnet retained is the best choice of treatment because patient didn't want look toothless and using old denture during treatment, meanwhile the patient has posterior maxillary flat ridge. From the radiographic result, the root condition of 23 was good for making magnet, and cast keeper was inserted to 23. Magnet retained could increase retention when the condition of ridge was flat. Immediate denture is the best option because patient will still confident during prosthodontic treatment.

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CASE REPORT

How to Manage Single Denture Syndrome?

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ABSTRACT

Background: Single Denture Syndrome is the characteristic features that occur when an edentulous maxilla is opposed by natural mandibular anterior teeth, including loss of bone on anterior maxillary ridge that in advance condition resulting in the occurence of flabby tissue, overgrowth of the tuberosities, papillary hyperplasia of the hard palatal mucosa, extrusion of mandibular anterior teeth. Problem that occurs on Single Denture Syndrome are ill fitting denture because of flabby tissue, loss of vertical dimension of occlusion, occlusal plane discrepancies, fracture in the midline of maxillary denture. **Purpose:** The aim of this case report is to manage maxillary edentulous ridge with single complete denture. **Case:** A 63 years old female patient came to RSGMP Clinic, Faculty of Dental Medicine, Airlangga University, with maxillary edentulous ridge and mandibular partial edentulous ridge. Patient complain that she feels uncomfortable while eating and wants to improve her appearance. The last extraction at left anterior maxillary two months ago. Patient never use denture before. **Case management:** Occlusal equilibrium with compensating curve on remaining mandibular teeth done in the study model then selective grinding on patients remaining mandibular teeth using grinded study model as a guidance. Patient were trained for right occlusion movement for bite registration. Impression taken using custom tray and mucostatic impression technique. **Conclusion:** Occlusal equilibrium must be done in the making of single complete denture.

Keywords: edentulous ridge, single denture, single denture syndrome

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BACKGROUND

Single Denture Syndrome is the characteristic features that occur when an edentulous maxilla is opposed by natural mandibular anterior teeth, including loss of bone on anterior maxillary ridge that in advance condition resulting in the occurence of flabby tissue, overgrowth of the tuberosities, papillary hyperplasia of the hard palatal mucosa, extrusion of mandibular anterior teeth. Problem that occurs on Single Denture Syndrome are ill fitting denture because of flabby tissue, loss of vertical dimension of occlusion, occlusal plane discrepancies, fracture in the midline of maxillary denture[1,2,3].

To preserve remaining structures, we should understand the occlusal biomechanics that allows us to obtain physiological occlusion: acceptable interocclusal distance, stable jaw relationship with bilateral tooth contacts in centric relation, stable tooth quadrant relationships with axially directed forces, multidirectional freedom of tooth contact troughout small range (within 2 mm) of mandibular movements. .

When only one arch is edentulous, tooth position may preclude such objectives being reached and unfavorable force distribution may cause tissue changes that are going to compromise optimum function[2].

One of difficulties arises from a complete denture opposing natural teeth is that natural teeth in mandibula are malposed, tipped, or supraerupted. Unfavorable occlusal relationship tends to displace maxillary complete denture causing soreness, mucosal chages, and ridge resorption[1]. The aim of this case report is to manage maxillary edentulous ridge with single complete denture.

CASE

A 63 years old female patient came to RSGMP Clinic, Faculty of Dental Medicine, Airlangga University, with maxillary edentulous ridge and mandibular partial edentulous ridge. Patient complain that she feels uncomfortable while eating and wants to improve her appearance. The last extraction at left anterior maxillary two months ago. Patient never use denture before

Fig 1. Before treatment

CASE MANAGEMENT

1. Impression for study model.
2. Occlusal equilibrium with compensating curve on remaining mandibular teeth done in the study model

Fig 2. Occlusal Equilibrium with compensating curve

3. Selective grinding on patients remaining mandibular teeth using grinded study model as a guidance
4. Custom tray fabrication.
5. Impression taken using custom tray and mucostatic impression technique.

Fig 3. Mucostatic Impression

6. Patient were trained for right occlusion movement for bite registration.
7. Try in
8. Insertion of maxillary single complete denture and mandibulary metal frame partial denture.

Fig 4. After treatment

DISCUSSION

Dentures remain stable when forces directed to the base support. Horizontal forces tends to dislodge the dentures, and could destroy the residual ridge. The midline fracture in a denture is a result from flexural fatigue[4]. Reduction of mandibular posterior support results in a gradual reduction of occlusal load in this region and an increase the anterior region, which can result in great pressure on the maxillary anterior, accelerating the process of maxillary anterior bone resorption and promoting the occurence of flabby tissue[5]. Those characteristics of Single Denture Syndrome could be avoided with occlusal equilibrium and free of contotact on anterior maxillary and mandibular teeth , thus the forces on anterior portion of maxillary denture could reduced. From maxillary single denture and mandibular metal frame

partial denture of the case above, prosthodontist should not forgot to do the important step in the making of single complete denture, that is the occlusal equilibrium.

RESULT

Occlusal equilibrium must be done in the making of single complete denture to avoid the occurence of Single Denture Syndrome.

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CASE REPORT

Maxillary Bare Root Complete Overdenture with Mandibulary Removable Partial Denture

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ABSTRACT

Background: *Stability is important thing to concern at denture construction in case many loss of teeth. Overdenture had selected for denture design because could maintain the height of alveolar, increase the stability of denture and decrease the lateral force.* ***Purpose:*** *This construction has aim to prevent the resorption that remain natural teeth.* ***Case and Case Management:*** *A 39 years old female patient came to Specialist Prosthodontics Clinic, RSGMP, Faculty of Dentistry, Airlangga University with loss of several teeth at maxilla and mandibula. Patient complain that not comfort when she ate and want to improve her appearance. The last extraction at left anterior right maxillary on five months ago. Teeth of 18,26 had extraction because have three degrees of mobility and had two third alveolar resorption. Teeth of 15,23,24 had endodontic treatment, then cutted down and filled by GIC. Mandibulary had removable partial denture for therapy.* ***Conclusion:*** *Bare root complete overdenture design was selected onto the teeth have cutted down and filled by GIC to prevent the alveolar resorption. The success of treatment depend on patient's behaviour that including maintaining oral hygiene and routine periodic control.*

Keyword: *maxillary complete overdenture, endodontic, mandibulary removable partial denture*

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BACKGROUND

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems. In the past when patients presented themselves as candidates for a denture with teeth that were badly broken down with periodontal involvement or without the ability to financially support an extensive restorative treatment, those teeth were extracted that could have been retained under more favourable conditions. Retention of the roots of one or more teeth for overdenture offers the patient a lot of advantages like better stability, proprioception, support among a few.[1]

The overdenture is defined as a removable partial denture or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth or dental implants, aprosthesis that covers and is partially supported by natural teeth, natural tooth roots or dental implants. Sensory innervation is as important to the periodontal ligament as to the other components of mastication. The periodontal receptors are related to the activity of masticatory muscles. Better bone preservation in overdentures resulted in better masticatory function and less loss of overall facial height.[2] The periodontal basis for the overdenture is based on the sound physiologic contention that the presence of healthy teeth is essential for maintaining the alveolar ridge.[1]

CASE

A 39 years old female patient came to Specialist Prosthodontics Clinic, RSGMP, Faculty of Dentistry, Airlangga University with loss of several teeth at maxilla and mandibula. Patient complain that not comfort when she ate and want to improve her appearance. The last extraction at left anterior right maxillary on five months ago

Fig 1. Condition of maxilla before treatment

Fig 2. Condition of maxilla before treatment

CASE MANAGEMENT

1. Cutting off the teeth 15,23,24 that had endodontic treatment before and filling by GIC.

Fig 3. Cutting off the teeth 15,23,24 and filling by GIC

2. Maxillary bare root complete overdenture and mandibulary removable partial denture were made and inserted together.

Fig 4. Insertion of maxillary bare root complete overdenture and mandibulary removable partial denture (front side)

Fig 5. Insertion of maxillary bare root complete overdenture and mandibulary

Fig 6. Insertion of maxillary bare root complete overdenture and mandibulary removable partial denture (left side)

DISCUSSION

Retaining teeth permit the stresses of occlusion to be borne partially by the teeth, thus reducing the abuse, which the alveolar process and the mucoperiosteum undergo when dentures are worn. By reducing the trauma to the mucosal tissues, it is reasonable to expect that resorption of the alveolar process will be lessened.[3]

Overdenture abutments, have shown to preserve alveolar bone height and stabilize dentures, particularly the mandibular ones. Retained roots have effective cost, with no requisite of an invasive therapy, and therefore should be considered by general practitioners as a useful platform for over dentures, particularly for older individuals.

From physiological viewpoint, the roots provide not only a periodontal ligament to support the teeth, but also directional sensitivity, tactile sensitivity to load, dimensional discrimination and gives an individual a sense of not being edentulous.[2]

Failure to instruct the patient is the proper care, used and maintenance of the removable appliance will increase the chances of breakage of the

prosthesis or attachment, or even failure of the entire treatment. The patient should be instructed to nerve bite the prosthesis into position, but to carefully feel it into the position around the undercuts. Similar care should be exercised in removal of the prosthesis also. Make the patient aware that the prosthesis will seen bulky at first and there is no room for the tongue. This is only a temporary discomfort and that the tongue will adjust. There will be a speech problem at first but it will improve with time and practice.[1]

As with any new prosthesis, the patient can expect a few sore spots. There can be adjusted on the denture. Each patient should be placed on a regular recall program.

The patient should also be instructed to keep the prosthesis clean, to brush it daily as well as his retained teeth. A proper technique should also be taught to the patient for proper crushing and cleaning of the prosthesis.[1]

The tooth brush is one of the main tools for plaque control. Although the tooth brush may clean most areas, some interproximal or other areas may need the use of floss or interproximal brushes. Fluorides such as stannous fluoride, or acidulated phosphate fluoride can be used by themselves or in combination to protect the abutment teeth from undergoing carries breakdown. The overdenture should be left out of the mouth in a cleaning solution overnight.[1]

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CASE REPORT

Precision Attachment Removable Partial Denture Is The Best Choice For Unilateral Free End Edentulous Ridge

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ABSTRACT

Background: *Precision attachment removable partial denture was selected for denture design because could increase patient's comfortable that constructed with precision part so that the patient got back the better aesthetic function.* ***Purpose:*** *provide the information about denture with precision attachment to increase patient's comfort.* ***Case and Case Management:*** *A 47 years old female with loss of several mandibular teeth. She use the removable acrylic partial denture only for three months. But now she wasn't using the denture because of bad odor, unstable denture and easy for being patched by plaque. She wanted to make a new denture. Teeth 34, 35 were preparated for making splint crown with ball attachment on distal side. Tooth 43 was preparated for making solitary crown with ball attachment on distal side. Tooth 47 had an endodontic treatment then restored by solitary crown with occlusal rest.* ***Conclusion :****Removable partial denture with precision attachment give better and more stable mastication system.*

Keyword *: Precision attachment denture, extracoronal ball attachment, splint crown*

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BACKGROUND

Posterior edentulous commonly was found in prostodontics cases, complaint's patient about unstable denture during masticating. One of The treatment for this case was made removable partial denture with precision attachment retention. Precision attachment is a connecting device includes a componenet that is attached to the abutment, the roots of the teeth, or dental implants, and the parts are fused with removable denture [3]. Precision attachment is an alternative treatments for a case of class I and II kennedy. Attachment types used in this case is the kind of ball attachment. The advantage of this type of attachment that is relatively cheap compared with other types, its use more widely, good aesthetic minimal altough the available space, the manufacturing procedure is relatively simple, the female part are easily replaced in case of breakage. And the most important thing to note is the succes rate of ball attachment is already more than 30 years. [4]

CASE

A 47 years old female came to the clinic prostodontic faculty of dentistry airlangga university with complaint of mandibular posterior tooth loss in the region 36, 37, 44, 45, 46

Fig 1. Intra oral condition of the right side before treatment. Extraction will be done on tooth 45 because of its °2 mobility, root canal treatment will be done on tooth 47. Tooth 47 will be recontoured to change its inclination.

Fig 2. Intra oral condition of the left side before treatment. Teeth loss on region 36, 37, 38

Fig 3. Preparated teeth 34, 35, 43, 47

Fig 4. The first final model for splint crown making on teeth 34, 35, and solitary crown making on teeth 43, 47

Fig 5. Splint crown and solitary crown with ball attachment on distal side of teeth 34 and 43

Fig 6. Impression taking for second final model with crown attached in it. That model will be used for making metal frame

Fig 7. Metal frame on the second final model

Fig 8. Try in of the metal frame

Fig 9. Insertion of the denture

Fig 10. After treatment: patient with precision attachment retained removable partial denture

DISCUSSION

The patient's demand of aesthetic and stable removable partial denture became spesific case in prosthodontic section, especially removable partial denture with wire or metal klasp retention. Using of precision attachment for removable partial denture have the same basic with the component of clasp as occlusal rest, bracing and retentive arm. Precision attachment had better aesthetic and

distribute abutment load, so could maintaining periodontal tissue.

The purpose of made fixed splint and extracoronal ball attachment at teeth 34, 45, 43 for got the abutment restoration stronger. The function of made occlusal rest at tooth 47 was support that distribute vertical mastication load and prevent the teeth movement to soft tissue.

Made of mandibulary removable partial denture with precision attachment class 1 design could be the choice for increase the patient's comfort during wearing denture.

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CASE REPORT

Changes Spectrum Of Sound Frequency Consonant 'S' After Crossbite 21 Corrected

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ABSTRACT

Background: *Crossbite of anterior teeth is one tooth position disorders. The disorder may affect articulation gear position on a child. Consonants are pronounced in patients with abnormalities of the anterior crossbite is consonant 'S'. The purpose of this case report was to determine changes in consonant 'S' in pediatric patients with crossbite teeth 21 that have been corrected.* ***Case and Case Management:*** *A 9 years old girl with a 21 tooth crossbite treatment with inclined bite plane. Periodogram analysis and spectrogram can be seen changes consonant 'S' which is voiced by patients. There are differences in the sound power before and after the treatment is done. From the analysis of the periodogram on the letter 'S' before treatment at a frequency of 500 Hz -60 dB noise power, and after treatment at a frequency of 500Hz power sound reaches -64dB. While the 'S' sound (when the 'sizzle') the highest sound power reaches -35 Hz at 700 Hz after treatment.* ***Conclusion:*** *Crossbite abnormalities that have been corrected by inclined bite plane can help improve pronunciation of the consonants 'S' of a child from an early age.*

Keywords: *spectrum of sound frequency, crossbite*

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BACKGROUND

Anterior cross bite is a condition in which one or more of the maxillary anterior teeth are located further lingual / palatinal than the lower anterior teeth. This situation occurs because the tipping of one or more teeth, usually do not involve the basal bone called the dental cross bite.[1] Anterior crossbite occurs as a result of abnormal eruption of permanent incisors. Many variations of the etiological factors which include; insisiv dental trauma caused the change position the oldest seed replacement tooth, the tooth excess, and tooth persistence.[2]

Words or utterance is formed by the articulation of the lips, teeth with alveolar bone, tongue, and palate. Articulation factor is heavily influenced by malocclusion jaw or teeth. Some of malocclusions of the anterior teeth and jaws that can hinder the formation of the valve and cause a speech disorder, among others; Angle Class I malocclusion with protrusion of the maxillary anterior teeth, Class II division I Angle with a large overbite and overjet, it can be a protrusion of the upper jaw, lower jaw retrusion, maxillary anterior teeth protrusion, retrusion mandibular anterior teeth; Angle Class III malocclusions with lower anterior teeth located more anterior to the maxillary anterior teeth; open bite (open bite); cross bites (crossbite).[3]

Malocclusion can occur when a child was often doing bad habits such as pressing the teeth with the tongue that will cause jaws and teeth evolving towards front, so that the teeth become protrusive and articulation errors occur. The ability to speak normal require growth and normal development of the maxillofacial structure, so that any abnormalities or pathological state in such structures will generally lead to dysfunction or speak disability in accordance with the degree of anomalies or pathological conditions that occur.[4]

Speech disorder can be defined as not having, interruption or loss of language, voice, articulation, rhythm or a combination of these four. Disorders or phonetic sound if a person's voice that is not normal, the sound quality is not normal, for example nasal. Articulation disorder occurs when a person can not pronounce the voice to speak clearly and correctly. Rhythm disorders occur when someone talked too fast, too slow, not smooth or stutter. Malfunctioning of articulation is the main cause of speech disorders, malocclusion and abnormal swallowing habits have the biggest role.[5]

Errors in the language sounds production process can cause faulty pronunciation of phonemes, both in terms of the placement of articulation and pronunciation. This causes an abnormality pronunciation obscurity or replacement in the form of spoken letters into another letter, as one example the letter 'S', this letter is a vowel that most mistakes in pronunciation. Pronunciation errors caused by the failure of consonant articulation mechanism that can result in a failure of one or more components of the oral cavity.[6]

CASE AND CASE MANAGEMENT

A 9 year old girl with the initials M has 21 tooth palatoversi and

crossbite. There is 1.3 mm overbite and 1.5 mm overjet. Intra oral and extra oral examination is healthy and have no abnormalities. 55 is pulp necrosis tooth and 72 is tooth persistence. Posterior occlusion is normal. Patient has oral bad habit ie chin resting on the right side with the right hand. Furthermore, 21 tooth was palatoversi and crossbite and taken care by using inclined bite plane.

Stage managing case are as follows:

I. Examination of the teeth, panoramic rontgen, moulding
II. Recording sound the letter 'S'
III. Insertion of inclined bite plane appliance
IV. The remove of inclined bite plane
V. Brushing and polishing
VI. Recording sound the letter 'S'

Picture1. Teeth before treatment

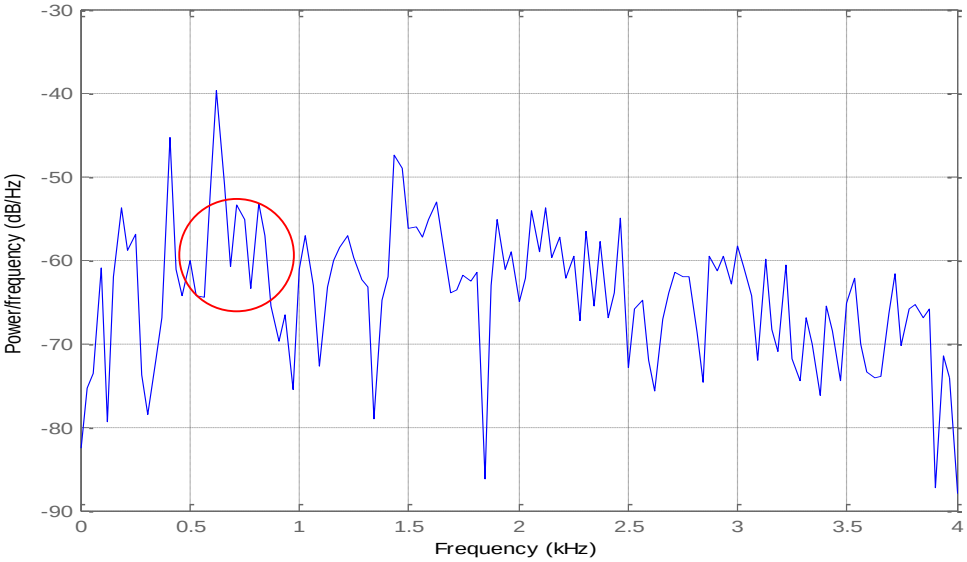
Picture 2. The use of inclined bite plane appliance

Picture 3. Teeth after treatment

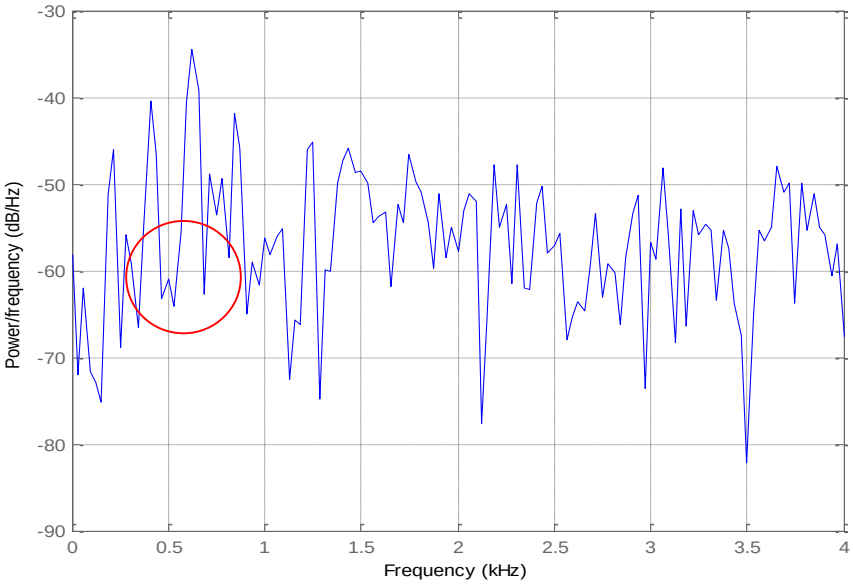
RESULT

Evaluation of the Sound Recording ('S')

1. Periodogram of the patient's voice (Spectrum of voice power)



Picture 4. Before treatment ('S'), at a frequency of 500 Hz, the sound power reaches - 60 dB



Picture 5. After treatment ('S'), at a frequency of 500 Hz, the sound power reaches - 64 dB

Based on Figure 4 and 5 shows the differences in power between the sound of the letter S before and after treatment.

2. Frequency power spectrum of the patient's voice recording

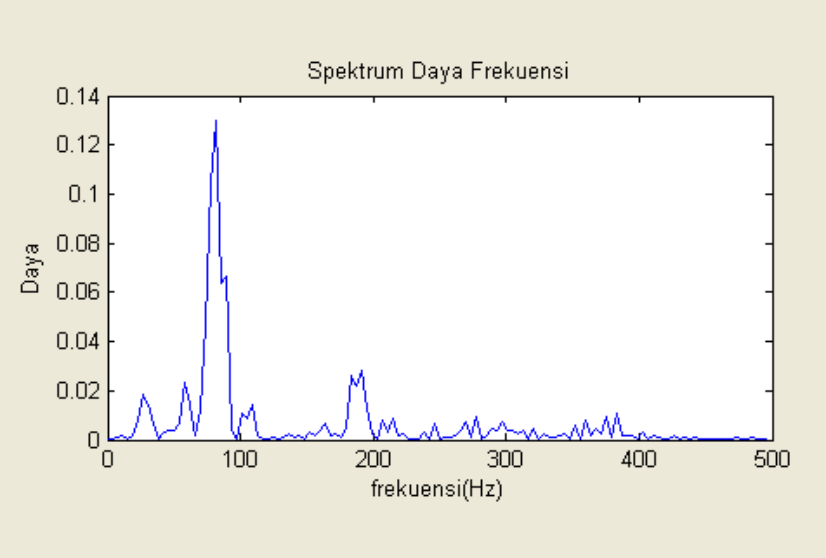


Figure 6. Frequency power spectrum before treatment

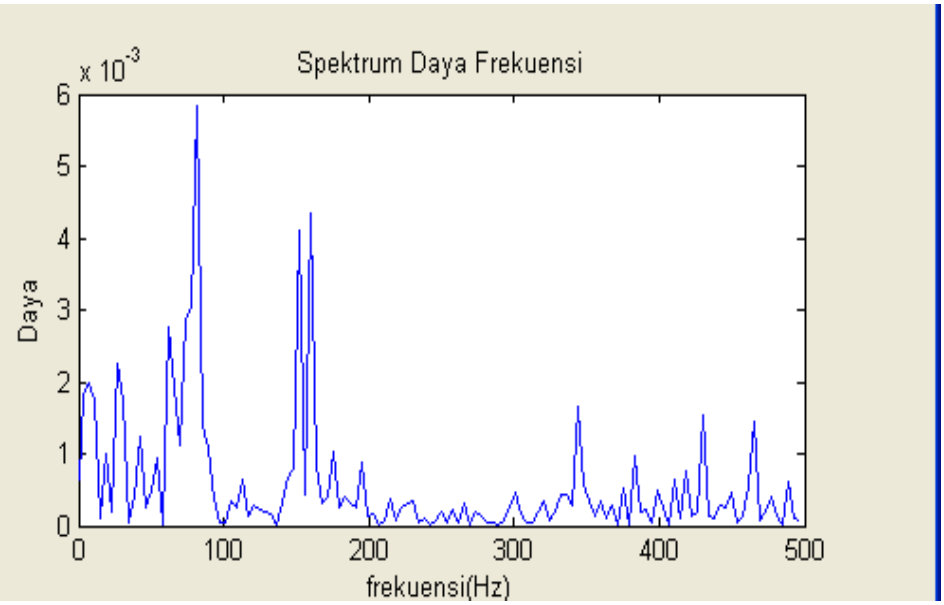


Figure 7. Frequency power spectrum after treatment

DISCUSSION

From the periodogram sound analysis, shows the differences in sound power before and after the treatment. From the analysis of the periodogram on the letter 'S' before treatment at a frequency of 500 Hz - 60 dB noise power, and after treatment at a frequency of 500Hz power sound reaches -64dB. Medium sound S (during the 'sizzle') the highest sound power reaches -35 Hz at 700 Hz after treatment.

After orthodontics treatment was expected to improve the aesthetic arrangement of teeth, mastication and phonetics. Because the teeth of the upper jaw is fully functional as a basic articulations, cooperate with the lower lip or tongue tip. Treatment of teeth malposition can eliminate interference phonetic formation. Pronunciation of the consonants 'S' is formed by placing the tip of the tongue on the basis of an incisor. Agency tongue then used to form a path through the flow of the breath, the friction of the tongue, teeth and breath flow forming consonant 'S'.[5]

CONCLUSION

Anterior crossbite treatment in these patients using inclined bite plane was successfully corrected, because the abnormalities that occur was dental abnormalities alone and patient was very cooperative. In addition, anterior crossbite corrected can improve the aesthetic, mastication, and pronunciation sound 'S' on the patient.

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P 1.26

Case Report

Magnetic Attachment Retained Complete Overdenture As Treatment For Flat Alveolar Ridge

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ABSTRACT

Background *: Flat residual ridge usually came with stability and retention problem for denture fabrication. Magnetic attachment is a retentive appliance of the prostheses. Magnetic attachment allows the residual roots to be retention part. Until now, the maintenance of residual roots was mostly for prevention of further absorbtion of the alveolar bone which support the denture base. By application of magnetic attachment, residual roots came to play a part of retentive effects as well as support of dentures.* ***Purpose:*** *The purpose of this case report is to achieve retention, stability, and comfort by using the magnetic attachment as the retention part for comple overdenture.* ***Case:*** *A 67 years old male patient with partial edentulous ridge visit the prosthodontic clinic of Airlangga University asked for new denture. Clinical examination shows edentulous area in the lower jaw have moderate flat ridge in the posterior area, and the remaining teeth which are in the anterior are mostly have mobility issue. This patient wanted no clasps visible when he open his mouth.* ***Case management:*** *the severe mobile teeth in the anterior mandible were extracted and the only teeth remaining are 33 and 43. Partial acrylic denture with clear clasp in 13 and 23 was the therapy of choice for the upper jaw because the clear clasps remain invisible as the patient asked. Magnetic attachment complete overdenture was choosen for the mandibe. The remaining teeth keeps the alveolar ridge from resorption and the magnet provide extra retention for the complete overdenture.* ***Conclusion:*** *Magnetic attachment can be used to increase retention in denture and the residual root also prevent further alveolar ridge resorption.*

Keywords: *Magnetic attachment, overdenture, flat ridge*

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BACKGROUND

Flat residual ridge usually came with stability and retention problem for denture fabrication. Dental magnetic attachment systems have been increasingly utilized in prosthodontics to improve the retention of overdenture.[1] Magnetic attachment is a retentive appliance of removable prostheses.[2] Conventional overdenture placement involves embedding the magnetic assembly in the denture base and inserting its corresponding keeper into the abutment root. The magnetic assembly holds the keeper with a retentive force.[3] The magnetic attachment is surely easy to use as a root surface attachment. The residual roots are positively indicated for retention of dentures by using magnetic attachments. Until now, the aim of maintenance of residual roots was mostly for prevention of resorption of the alveolar bone which support the denture bases. By application of magnetic attachments, residual roots came to play part for retentive effects as well as support of denture. [2] This clinical report describes the fabrication of mandibular overdenture retained by closed field magnetic assembly and maxillary conventional removable partial denture to rehabilitate the patient.

PURPOSE

The purpose of this case report is to achieve retention, stability, and comfort by using the magnetic attachment as the retention part for comple overdenture.

CASE

A 67 years old male patient with partial edentulous ridge came visit the prosthodontic clinic Airlangga University asked for new denture. Many of his tooth lost due to caries that lead to extraction, last extraction were performed one month before. Clinical examination shows edentulous area in the lower jaw have quite flat ridge in the posterior area, and the remaining teeth which are in the anterior are mostly have mobility issue. Patient was made aware of the clinical condition and he was willing to preserve the remaining teeth as long as possible. In the mandibular arch, the remaining teeth (33 and 43) were vital and moderate resorption was recorded in relation to bilateral mandibular posterior ridge.

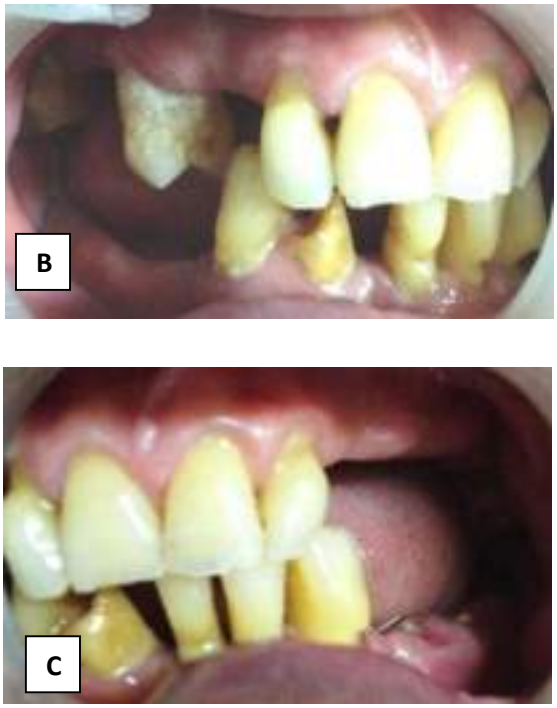

Fig.1 Preoperative upper and lower partially edentulous arch, A. frontal view, B. right side, and C. left side

Fig.2 Preoperative upper and lower partially edentulous arch

CASE MANAGEMENT

The severe mobile teeth in the anterior mandible were extracted and the only teeth remaining are 33 and 43. Partial acrylic denture with clear clasp in 13 and 23 was the therapy of choice for the upper jaw because the clear clasps remain invisible as the patient asked. Magnetic attachment complete overdenture was choosen for the mandible, using Magfit® EX 400W. The residual root of 33 was treated endodontic before the root keeper preparation. After root canal keeper preparation, impression is taken using putty and light body silicone with double impression technique. After that, begun the fabrication of the root canal keeper. The root canal keeper were cemented to the residual root using GIC cement and the we take final impression of the mandible using medium body silicone. After that, the

bite registration is taken with wax bite rims, then arrangement of the tooth (upper & lower jaw). After the wax try in, the step continue to processing heat cured acrylic. After that, insertion of the denture was taken place, the one week after that insertion of the magnet in the denture was taken place. The magnet part was inserted into the denture one week later because it is important to check the stability of the f the denture first before we add the magnet. Then patient came to control after insertion after one, three, and seven days after that.

Fig. 3. Mandibular abutment teeth preparation and post space preparation

Fig.4 Keeper along with post are cemented with GIC cement.

Fig.5. Postoperative upper partial denture and magnetic retained complete overdenture in lower jaw

CONCLUSION

Magnetic attachment can be used to increase retention in denture and the residual root also prevent further alveolar ridge resorption. Magnetic assembly used in this case is a new-generation magnetic attachment system which provides predictable retention, stability, support, and offers long-term durability. Magnet-retained overdenture preserving natural abutment teeth has better proprioception and satisfaction, and also is psychologically beneficial as the patient had not undergone extraction.

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P 1.27

CASE REPORT

The Use of Facebow Transfer with Free-plane Articulator

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ABSTRACT

Background: *Facebow transfer is rarely used by dentists when making a complete denture. Facebow transfer is a tool to transfer working casts to articulator according to the patient's jaw position. It is usually used with adjustable articulator, but due to the high cost makes dentists seldom buy it. On the other hand, free-plane articulator is more affordable and simpler to use. Dentists are more familiar with it. In this case, Facebow transfer was used with free-plane articulator to make a pair of complete dentures.* ***Purpose:*** *The use of facebow transfer with free-plane articulator is to transfer the casts to the articulator according to patient's jaw position with average condylar angle value.* ***Case and Case Management:*** *A Woman, 55 y.o, came to the prosthodontic clinic at Airlangga Faculty of dentistry, with edentulous ridge maxilla and mandible to make dentures. The patient complained that she could not chew and eat comfortably. She never wore dentures before. She had her last tooth on her lower right extracted 4 months ago. After border moulding and impression taking (close-mouth) were done, maxilla custom tray with wax rim was inserted and facebow transfer was installed. Then, facebow was removed and the mandible custom tray with wax rim was inserted. Bite registration was done using elastomer. Facebow transfer with the maxilla custom tray was then mounted into free-plane articulator (Handy II), and then mandible custom tray was mounted according to the bite record.* ***Conclusion:*** *The use of facebow transfer is to help the dentists to transfer the working casts to the articulator so that the position is correct according to patient's jaw. Free-plane articulator is not only cheap, but also easy to use.*

Keyword: *Facebow Transfer, free-plane articulator, complete denture*

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BACKGROUND

Maxilla is a fixed entity in the cranium. Occlusion is defined when teeth of both jaw come in contact in a hinge movement. The condyle slides in a definite radius from the temporomandibular joint.[2] The radius is not constant, it has to be determined for each individuals. The anatomy of the temporomandibular joint and the maxilla varies from person to person. Thus, recording of the orientation jaw relationship is very important when making a denture.

Articulators are instruments to attempt to reproduce the range of movement of the jaws. Maxillary and mandibular casts are attached to the articulators so that functional and parafunctional contact relation between the teeth can be examined. It represents the temporomandibular joints and jaw to simulate jaw movement. Facebow are calliper-like instruments that record the spatial relationship between the maxillary dental arch and anatomic reference points, and transfer this relationship to articulator.[2,4]

For many dentists, articulators with facebow are complicated to use and take much clinical time. The articulators that are used with facebow are usually adjustable or semi-adjustable types. They are more complicated than the free plane articulator due to their additional accessories. On the other hand, free-plane articulators are easy to use as no additional accessories is needed. it uses the average value of condyle's angle which is 30°.[4]

CASE

A Woman, 55 years old, came to the prosthodontic clinic at Airlangga Faculty of dentistry, with edentulous ridge maxilla and mandible to make dentures. The patient complained that she could not chew and eat comfortably. She never wore dentures before. She had her last tooth on her lower right extracted 4 months ago.

CASE MANAGEMENT

1. After border moulding and impression taking (close-mouth) were done

2. Maxilla custom tray with wax rim was inserted and facebow transfer was installed

3. Bite registration was done using elastomer.

4. Facebow transfer with the maxilla custom tray was then mounted into free-plane articulator (Handy II)

5. Mandible custom tray was mounted according to the bite record.

DISCUSSION

Making a complete denture is not simple. Dentists need to use the available tools to support this fabrication. Facebow is one of them although many dentists are not familiar with it.

The main purpose of the face-bow is to record the relationship between the maxilla and the Temporomandibular joint so that it can be established in the articulator. If the casts are not correctly positioned, the arcs of movement of the jaw are different from the articulator which will cause some problems with the occlusion.[1]

Some people argues that face-bow is useless as there will be so many errors during setting up the face-bow to the patients. There are some possibilities that makes the use of face-bow inaccurate, this includes: a) failure to locate the arbitrary hinge-axis point or failure to locate the same place at each recording session, b) failure of the subjects to properly place the ear pieces of the face-bow in th external auditory meatus, c) failure to seat the maxillary teeth properly in the occlusal index, and d) error occurring during measurement procedures[1].

However, face-bow allows more accurate use of the lateral rotational points for arrangement of teeth. It helps in securing antero- posterior positioning of the cast in relation to the condyles. A correct horizontal plane is established[2]. Therefore, the incisor plane is also properly established and finally it helps in vertical positioning of the cast in the articulator.

In summary, as the Academy of Denture Prosthodontics stated that the use of face-bow is essential, it should be used for mounting the upper cast on any articulator that has a fixed axis of opening. A correct orientation of the occlusal plane and the inclination of the plane had an effect on the masticatory performance[2].

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CASE REPORT

Management of Patient with Dentoalveolar Compensation and Ridge Resorption in Prosthodontics

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ABSTRACT

Background:*Dentoalveolar compensation can cause problems during denture insertion, especially the occlusion and teeth arrangement. Incorrect occlusion and teeth position can cause Temporomandibular Disorder.* ***Purpose:****The correct management to treat patients with dentoalveolar compensation is to get dentures with the correct occlusion to gain stability in mouth.* ***Case and Case Management:*** *A man, 57 y.o, with rocking denture when he ate and talked. Upon examination, mandible resorption was present on 33,34,35,36,37,46,47,48, and dentoalveolar compensation on maxilla 15,23,24,25 and mandible 43,44,45. This made the distance between inter-ridge shorter and the height of the ridge not balance. After diagnosing and evaluating patient's condition, the treatment plan was to extract the remaining teeth with alveolectomy. The surgery was done by the resident of oral surgery. The surgery was done using custom plate as a guidance to reduce the alveolar bone. The definite treatment was done 3 months after the surgery which was complete denture with close-mouth impression method.* ***Conclusion:*** *Alveolectomy is an alternative to treat dentoalveolar compensation for patient with edentulous ridges.*

Keywords: *Alveolectomy, complete denture, dentoalveolar compensation, flat ridge, template*

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BACKGROUND

Dental extractions most performed because of dental caries. Teeth extraction can be performed of healthy teeth Also to correct malocclusion, Improving the aesthetic , and also for orthodontic and prosthodontics treatment. [1] Tooth extraction will be followed with alveolar bone resorption process because this process can not be avoided and is a physiological process. [2,3] Making denture require structure and volume of alveolar bone to support the denture. Loss of alveolar bone's support will affect the denture retentivity and stability. [4]

Excessive alveolar bone resorption can lead to flat ridge. Patient with flat ridge really needs a full or complete denture for the purpose of chewing, speaking and improving the appearance. A dentist is considered successful to make a complete denture if the result is stable, retentive and comfortable to be used. Hamada et al suggested that the number of complete denture users would increase is due to the increasing number of elderly people. In these patients ridge resorption caused by tooth extraction. This condition is exacerbated by the use of denture that is not retentive, and the wear on the occlusal surface of the denture. This leads to dentoalveolar compensation in the region are still toothed and flat ridge in the region of edentulous ridge. [5]

Dentoalveolar compensation can lead to prominant bone on alveolar. This can reduce inter ridge distance which will affect the arrangement of the tooth. Reduction of inter ridge distance is not accompanied by a decrease VDO (Vertical Dimention of Occlusion) this is because during the process of occlusal wear on the teeth , dentoalveolar processes will be elongated with progressive remodeling of the alveolar bone. This will offset the loss of high occlusal. That is why in dentoalveolar compensation, although occlusal tooth wear, yet high VDO is not reduced. In dentoalveolar compensation needed care in increasing inter ridge distance so it can be ideal tooth arrangement. [6]

Region with edentulous ridge it could be flat ridge that will cause difficulties in getting retention and stability. The second issue has a different treatment. Whereas in the case of a flat ridge can be conducted in stages in several ways including surgical and non surgical techniques. In the surgical technique to do the addition of bone, whereas in non- surgical techniques to do manipulation in impression techniques. So we get a good peripheral seal to make the denture more retentive. [7]

There are two methods of impression with compression those are: open and closed mouth. Mostly open mouth method is more preferred because the operator can easyly trim the muscle and see the movement. While in close mouth method first the bite occlusion should be determine in wax. The tongue movement is stronger during occlusion when the mouth is closed simultaneously, and also there is no other power to disturb ridge when the jaw is closed in occlusal centric condition. [7] Impression with closed mouth could develop physiological strength of muscle trimming during border molding the impression could record the compressed soft tissue to achieve good outcome, in this technique, patient's cooperation is really needed. [8]

The aim of this paper is to understand how to manage patient with dentoalveolar compensation and flat ridge as an efford to got retentive and comfortable complete dentureof upper and lower jaw

CASE

Patient, male, 57 years old, self employed work. Patient came into RSGM, prosthodontics specialist Airlangga University with chieft complaint his lower denture broken and move when he eats or speak hence he feels discomfort (figure 1). Patient wear denture since 2009. Based on extra oral examination was not found disfunction of TMJ and from intra oral examination we found some missing teeth, gangren radix and dental caries (figure. 2, 3, and 4). Upon examination mandible resorption was present on 33, 34, 35. 36. 37. 46. 47. 48 and dentoalveolar compensation on maxilla 15,23,24,25 and mandible 43, 44, 45. This made the distance between inter-ridge shorter and the height of the ridge not balance.

On radiographic examination , it is known that missing teeth on 11,12,13,14,16,17,18,21,22,26,27,28,31 , 32,33,34,35,36,38,41,42,46 , 47.48 , gangren radix tooth 43 and irreversible pulpitis in teeth 44.45 (figure 5) .

Pict 1. Patient with his old denture

Pict 2. Intra oral examination

Pict 3. Right side intra oral examination

Pict 4. Left side intra oral examination

Pict 5. Radiographic exxamination

CASE MANAGEMENT

After diagnosing and evaluating patient's condition, the treatment plan was to extraction the remaining teeth with alveolectomy (Figure 6). The surgery was done by the resident of oral surgery. The surgery was done using template as a guidance to reduce the alveolar bone (figure 7 and 8). The purpose of alveolectomy is to get balancing alveolar ridge, so operator can do next treatment easily

Figure 6. Upper jaw Alveolektomi

Figure 7. Using of template on upper jaw

Figure 8. Using template on lower jaw

The definitife treatment was done 3 months after the surgery, it is making complete dentures upper and lower jaw. Manufacturing of complete dentures begins with making individual tray of self cured material. In this case, we put bite wax into the individual tray and measure the height and searching bite position. After we got the height and bite position, compound material was given to margin individual tray for border moulding. Next step, individual tray with bite wax, inserted into the mouth and then instructed the patient to perform active movement in masticatory muscle by spelling "i" and "o" (figure 9, 10, 11 and 12). The process was continued by filling with hard gypsum and working model was formed and put on articulator. The following step, teeth arrangement was done and adjust on the patient (figure 13).

The adjustment was tried on the patient in the condition that wax was still used. If the patient was satisfied with denture wax, then, countour would be done. Followed by acrylic processing and polishing. The next step, acrylic denture was adjusted on the patient. Occlusal record was done for occlusal correction, then continued by selective grinding, polishing and the last, it would be applied on the patient (figure 14). The instructed given to the patient after the denture was insertion that was: denture was allowed only for drinking and speaking, but not eating. The denture was recommended used at night and followed up on the one day.

Figure 9. active movement spell "i"

Figure 10. Active movement spell "o"

Figure 11. *Close mouth impression method*

Figure 12. Impression result for working model

Figure 13. teeth arrangement upper and lower jaw

Figure 14. new complete denture applied to patient

After the denture applied on the patient, the instructed given to the patient after the denture was insertion that was: denture was allowed only for drinking and speaking, but not eating. The denture was recommended used at night and followed up on the one day. The first day of follow up control, the patient complained of pain in mylohyoid region and lingual region of anterior lower jaw. In fact, the pain was caused by excessive pressure of denture, therefore, grinding was done in retromylohyoid region and lingual part of anterior denture. The upper jaw seemed retentive and no complaint presented by the patient. In the first control, the patient was advised to use the denture to eat something soft, to drink and to speak. The denture should be removed at night and soaked in water, with the purpose that the tissue would rest. The patient was instructed to have follow up control three days later.

On the second day followed up, the condition of upper and lower jaw denture was stable and retentive, but, the patient still complained of pain in lingual region of anterior lower jaw, because of excessive pressure from denture. To reduce the pain, anterior lingual region was grinded, but not excessively in order not to reduce denture retention. The patient was advised to have follow up control the following week. The instruction was similar to first control.

On the third follow up control, the patient still complained of pain in anterior lingual lower jaw, but the complete denture was retentive and stable so grinding was done, slightly reducing part of lingual anterior and polishing, the instruction was still similar to the second control if there was any complaint, the patient was advised to have regular control.

DISCUSSION

In this case, to solve dentoalveolar compensation, we did extraction remaining teeth with alveolecctomy to increase distance of inter ridge. We didn't increase vertical dimention of occlusion because this patient had a normal VDO. In alveolectomy procedure we use template as a guidance to reduce alveolar bone. Alveolectomy had to did first because the purpose of this procedure is to prepare the alveolar ridge to search occlusion and arrange teeth easily. After we got height alveolar ridge that balance, the procedure is continued with making complete denture.

In this case, as the procedure of complete denture can not be done by increasing other retention such as: tooth implantation, therefore, accurate method of impression must be done so the space between denture and basal seat would be vacuum, air pressure would be less than 1 atm, denture would become retentive and stable. De Franco and Sallustio [8] also confirmed that if another treatment such as: implant denture could be not be applied in the case of atrophied mandible, therefore, supporting denture is only on the residual tissue such as: mucosa and ridge, so procedure of impression is made for atrophied mandible.

Hamada et al [5] suggested that it is not easy to produce good jaw impression in elderly patient who is toothless, close mouth impression method would produce better outcome. The result of closed mouth technique with muco compressive material will get Netral zone. Because by using this

method, good pheriperal seal could be achieved and could balance mucosa reciliancy.

The patient had really flat ridge region. To Increase retention, impression with muco compressive material is required to be able to compress the mucosa so it could produce accurate impression. In this way, vacuum space between mucosa and denture would be achieved. Itjingsih [9] and Zarb et al [10] indicated the same opinion that impression with muco compression is needed to make the compression more equal, impression material could flow and fill complicated part, so it could impress accurately.

In this case, after using complete denture, the patient felt his denture was retentive, stable and comfortable to be used comparing with his old denture. Even though he felt pessimistic at the beginning to have complete denture in mouth considering the ridge was flat. After using the new complete denture, the patient felt satisfied and he could chew the food, speak normally and he has better performance. It is concluded that to make a complete denture in the management of that dentoalveolar compensation with flat ridge case on upper and lower jaw, alveolectomy can be an alternative treatment and need to apply impression using closed mouth method to get retentive and stable denture.

RESULT

The patient came to control two months after insertion, without complaint, the denture was retentive and stable. The patient felt more comfortable to use complete denture either for speaking or chewing the food, the patient felt satisfied. The patient was instructed to come for control periodically six months after the usage of denture.

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CASE REPORT

Management of Edentulous Patient Using Biofunctional Prosthetic System (BPS)

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ABSTRACT

Background. *Biofunctional Prosthetic System (BPS) is one of the technique or methods designed to create a harmony between the prosthesis with the human body, so as to provide comfort, giving natural appearance on the patient and als o maximizing function of the prosthesis. BPS using the functional impression technique from the active jaw movement of patient and followed with simulation of patient's jaw using semi-adjustable articulator. Expected with this BPS technique, the result of the denture prosthesis will give a better fit and function for the patient and more comfort when compared to a prosthesis using conventional techniques.* ***Purpose.*** *This case report aims to show one example of creating a complete denture in upper and lower jaw using BPS techniques.* ***Case and Case Management:*** *A 89 years-old male patient came to the RSGM Faculty of Dentistry Airlangga University with loss of the entire upper and lower jaw teeth. Patient had been using complete denture for more than three years but cannot chew well and feel uncomfortable with the prosthesis. To get better results, it was decided to implement a BPS techniques on making a new complete denture prosthesis. Patient is molded using centric tray to determine the initial vertical dimension. Results from the centric tray used for guidance to mounting the plaster cast model from initial impression in a semi-adjustable articulator. Furthermore, to determine the occlusal position of the patient and get the bite registration record was done by using tracing device gnathometer M. This device used for obtain Jaw Relation Record (or Jaw Registration) from active movements of the patients with jaw protrusive movement. After that, the result of the jaw registration is the last step for making final impression then casts were poured to get a working model and a wax-up denture was made for try in (trial). After checking the fit, occlusal relations and also the stability of the prosthesis, the denture was sent to the laboratory for the manufacture of prosthesis made of acrylic with injection molding technique. Selective grinding is done when adjustment is necessary then the denture was deliver to the patient. A week after insertion, the patient expressed satisfaction with his new dentures and has no complaints.* ***Conclusion.*** *In creating complete denture prosthesis with BPS technique need to be considered regarding the active movements of the patient when using centric tray and gnathometer M to get the right result.*

Keywords: *BPS technique, centric tray, complete denture, jaw relation record*

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BACKGROUND

Biofunctional Prosthetic System or BPS technique has been a major improvement in the complete denture technology. Besides the conventional methods, this BPS system uses a comprehensive technique for impressions, record taking, and also processing. The functional impression technique and simulation of the jaw movements by the semi-adjustable articulator in BPS ensure that the denture comply most exacting requirements[1]. The advantage of this technique is to provide patients with optimal form, function, and esthetics in complete dentures. Since this method puts a high priority on the patient's own functional morphology and movements during using the centric tray, border molding, final impression taking, and also Gnathometer M tracing in the closed-mouth position are used instead of the clinician's manual handling as is usually the case in the conventional techniques. These stages should be observed if the patient did the right movements. The jaw relationship could be tested at least two times during the jaw relation record[2,3].

CASE

A 89 years old male patient came to RSGM Faculty of Dentistry, Airlangga University, with edentulous ridge maxilla and mandible. Patient complains he feels discomfort with the old denture especially when eating. Patient had been using complete denture for more than three years and want to replace the old denture with a new, better and more comfortable prosthesis.

Fig 1. Patient's condition before treatment

Fig 2. Patient with his old denture

CASE MANAGEMENT

1. Using of the centric tray for recording initial vertical dimension.

Fig 3. Centric tray loaded with impression

2. Cast mounted into semi-adjustable articulator and manufacture of the bite rim using light tray.

Fig 4. Bite rim attached into cast in the semi-adjustable articulator

3. Border molding
4. Patient were trained the right jaw movement for jaw relation record using Gnathometer M.
5. Functional impression taking through Gnathometer M and bite registration.

Fig 5. Final impression taking after Gnathometer M tracing in close-mouth position

6. Tooth set-up and wax-up trial

Fig 6. Wax up trial in the patient

7. Final contour for wax-up denture.
8. Denture processed at BPS-supporting lab.
9. Insertion of the complete denture.
10. Control

Fig 7. Final insertion in the patient

DISCUSSION

Complete dentures can be fabricated by some various procedures. General dental practitioners, usually

use the simplest clinical and laboratory protocols which is called conventional complete dentures[4]. However, there's one major advancement for the making of complete dentures called Biofunctional Prosthetic System (BPS). The BPS techniques recommends impression making similar in principle to the mucostatic method that minimally compresses tissues. Impression material was syringed into the vestibular area and the occlusal centric tray was loaded with hydrocolloid impression and inserted into the patient's mouth to get the initial vertical dimension. This vertical dimension was used for mounting the casts obtained from initial impressions. Bite rims were made on the primary casts using light tray. The Gnathometer M tracing device was attached to the casts, which facilitates the clinical procedures of the final impression making and jaw registration[2,3].

A major shortcoming of the coventional methods is the fact that they can only be implemented after some basic clinical training, which will allow the operator to decide whether the outcome of each step is satisfactorily done or not. In order to overcome this problem, some standardized methods for fabricating complete dentures have been introduced, for example, the BPS technique. This technique includes a comprehensive procedures of simple, standardized techniques for impression-making, the recording of the jaw relationship, tooth set-up, and denture fabrication[3,4]. The BPS techniques really depends on patient's movements during use of the centric tray and jaw relation record for final impression taking instead of the clinician's manual handling as is usually the case in the conventional method. The significant difference between the numbers of adjustment appointments required for the two dentures indicates that the BPS techniques requires less adjustments than the coventional methods, and that BPS dentures fit very well immediately after completion. Further differences existed between BPS and coventional methods in terms of making impressions and recording the jaw relationship. Several possibilities could explain the apparent superiority of the BPS dentures. The BPS final impressions provide a record in the closed position to reproduce the functional figure more accurately than conventional impressions.

In this case, patient complaints that he feel uncomfortable and can't chew well with his old conventional complete denture. The initial examination with the old denture shows that patient had a lower number of VDO from the right measurement and this is the major problem so that patient always feel that his old denture regardless from his mouth. This led to decision using BPS technique to ensure the right measurement of patient's initial VDO with centric tray and records multiple jaw relationships with Gothic arch tracing using the Gnathometer M, to sustaining greater accuracy in recording and replicating the correct jaw relationship. Denture adjustments can be required for various reasons such as residual ridge resorption, the health of the soft tissues covering edentulous areas, the adaptability of patients to complete dentures, the jaw relationship, denture occlusion, and other factors. Therefore, the number of adjustments required is a useful indicator for evaluating the overall denture quality[1,3].

RESULT

BPS denture offer excellent long term when compared to dentures achieved with conventional procedures, results indicates that with the BPS technique produce a better fit complete dentures and more patient's satisfactory results regarding the right active movements of the patient when using centric tray and gnathometer M.

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CASE REPORT

Oropharyngeal Candidiasis in Diabetes Mellitus Patient Using Oral Glucosamine

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ABSTRACT

Background : *Candidiasis is a common opportunistic fungal infection of the oral cavity, may cause oral discomfort in dental patient and oropharingeal candidiasis common occure in the course of patient with immunocompromise such as human immunodeficieny virus (HIV) and diabetes melitus (DM).Prevalence of diabetes mellitus increase globally. In 2010, there are 285 million people suffering DM at the age of 20-70 years old and 70% in develope country. Estimate this case will increase about 438 million people in the year 2030. As consequent, fungal diseases are more frequent in patients with diabetes mellitus, wich potentially increases their morbidity. The infections in diabetic patients is mostly caused by the hyperglicemic condition that will make immune disorder such as decreasing of the neutrophyl function.Glucosamine (GlcN) is a widely utilized dietary supplement that is used to promote joint health. Using oral GlcN supplementation at usual doses adversely affects glucose metabolism. Effective treatment options are of high importance for reduce the incidence of the oropharyngeal candidiasis. Nystatin as topical treatment options for patients with oropharyngeal candidiasis have existed for many years.* **Purpose** : *The purpose of this case report is to present incidenceof oropharyngeal candidiasis and the management of the disease.* ***Case and Case Management****: This case report was about the patient with oropharyngeal candidiasis. Intra oral examination showed pseudomembranous at buccal mucosa dextra and sinistra, palatum molle, pharyngeal and tongue dorsum, multiple, was able to scrapped, leaving erythematous area, unclear border, irregular shape and no pain. The management of this case was nysatatin oral suspension 100.000µl apllication four times daily and refferedthe patient to internist for her DM.* **Conclusion** : *The case of oropharyngeal candidiasis can occur in people with DM as consequent using oral glucosamine.*

Keyword : *Oropharyngeal candidiasis, diabetes mellitus, glucosamine, nystatin.*

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BACKGROUND

Candidiasis is a fungal opportunistic infections that often occur in the oral cavity and cause discomfort to the patient. Most cases of candidiasis caused by Candida albicans and predisposing factors are changes in C. albicans from commensal flora (saprophytic stage) into a pathogenic organism (parasitic stage) (Jontell & Holmstrup 2015). Candida term derived from the Latin *Candid* meaning white. Candida genus consists of 150 species are distributed in many places as a saprophyte in soil or water. Candida species is a third of the normal flora in healthy individuals. In general, Candida species that can be isolated is C.albicans, C.glabrata, C.tropicalis, C.krusei, C.lusitania, C.dubliniensis, C.kefyr, C.guillermondii, C.tropicalis and C.lypolitica (Chopra et al 2015).

Oropharyngeal candidiasis (OPC) is a common infection found on the mucous membranes of the oropharynx caused by Candida species. In most cases come from candida species of normal flora of patients themselves. There are four types of OPC, the first is pseudomembranous OPC or thrush type and the second type is erythematous OPC. Thrush is characterized by white plaques with erythematous base on the buccal mucosa, throat, tongue and gingiva. This plaque can be scraped off and left the redness area and bleed easily. OPC type erythematous is characterized by erythematous smooth red areas on the hard palate, or soft palate, dorsum of the tongue, or buccal mucosa. The third type, hyperplastic OPC is white plaques, firmly and adhere to the bilateral buccal mucosa, tongue or palate. Angular cheilitis is also part of the OPC that form of this lesions is red fissures at the mouth corner. OPC is an opportunistic fungal infection most common in HIV-infected patients or in patients suffering from cancer (Collins et al, 2011).

The prevalence of diabetes globally increased. In 2010, around the world there are 285 million people in the 20-79 age group who had diabetes and 70 % are in developing countries. In 2030 estimated an increase to 438 million people (Tjokroprawiro & Murtiwi 2015). *Candida albicans* is the species most frequently associated with normal oral carriage in humans, occurring in the mouths of up to 80% of healthy individuals (Williams & Lewis 2011). The species most often causes infection and systemic superficial in humans is Candida albicans is about 70-80 % (Wahyuningsih, Syarifah & Mulyadi 2012).

Candida is a normal microbiota in the human oral mucosa and responsible at various clinical manifestations of the fungal infection. Spores of Candida is commensal in immunocompetent individuals but can cause infection in immunocompromised individuals due to Candida has the ability to adapt to the conditions of different host. More than 17 species of Candida species known to be a cause of yeast infections in humans and 90 % of these infections are caused by *Candida albicans, Candida glabrata, Candida parapsilosis, Candida tropicalis and Candida krusei* (Sardi et al 2013).

Candida albicans is a species of candida are responsible for the majority of the cases of OPC. The ability of C.albicans to adhere to buccal epithelial cells important in the opening colonization in the oral cavity. After colonization. These organisms will remain in the area until a few months or a few years in small quantities without

causing inflammation (Vasquez 2010). Glucosamine is an amino sugar that is essential for the biosynthesis of glycosylated proteins and lipids. Glucosamine has long been used as a supplement for the treatment of osteoarthritis (OA). In the beginning glucosamine allegedly forming a substrate in the biosynthesis of cartilage extracellular matrix, but in subsequent studies found that glucosamine has the ability as an anti -inflammatory mechanism of anti- catabolic (Henrotin 2012).

Diagnosis of OPC is based on symptoms, clinical features and investigations. OPC symptoms can range from oral lesions asymptomatik until the pain in the mouth, burning sensation on the tongue and the disphagia. Clinical features include the OPC area diffuse erythema and white patches that appear as discrete lesions on the surface of the buccal mucosa, pharynx, tongue and gingiva. In OPC also found angular cheilitis (Vasquez 2010).

Investigations to establish the diagnosis of OPC include KOH examination and fungal culture. On examination of KOH samples were taken from the oral cavity with a swab and given 2-3 drops of KOH and covered with a glass cover for 2-3 hours then examined under a microscope with a magnification of 40x. The fungal culture using media Saboroud Dextrose Agar and chloramfenikol. Samples were inoculated and then incubated at 37 ° C for 3-4 days. In an examination under a microscope, to distinguish spores and pseudohyphae used Lactose Phenol Cotton Blue (LPCB) (Singh et al 2013).

CASE

Visits 1 March 2016-03-10

Patients is a woman 72 years old (Mrs. NGI) comes to dental practice RSU Airlangga depart ment Oral Medicine at March 10, 2016 on the referral of dental practice RSU Airlangga department of Oral Surgery with case of oral candidiasis . Eight days before the patient came to the dental practice Airlangga Hospital with her complaints was a lump on the right and left lower linguogingiva that are not painful. From the examination known that the lump was a mandibular torus and the dentist discovered fungus in the oral cavity of the patient. Previous thely the patient did not feel complaints in the oral cavity, but when the fungus was discovered the patients felt that her oral cavity thick and coarse. However, patients could not remember the time she had this complaints. Then the patient was referred for KOH and complete blood examination at laboratory Airlangga RSU. Patients get mouthwash 0.1% chlorhexidine gluconate before being referred to the Oral Medicine. In reference included intra-oral photos of patients during the visit eight days earlier.

Anamnesis on March 10, 2016, the patient said taking glucosamine since ± 10 years ago to treat her knee pain since 10 years ago. The drug obtained from the physician. In addition, the patient did not taking other medications. From the medical record, we get that the patient did not have diabetes mellitus history and she had a blood sugar tests on November 24, 2015.The result was 94 mg / dl. Blood pressure showed normal numbers.

From the examination on March 10, 2016 we found angular cheilitis at the right and left mouth corner. Intra oral examination, we found pseudomembranous on the right buccal mucosa, soft palate, pharynx and dorsum of the tongue, multiple, white in colour, can be scraped and leave the red areas, diffuse border, irregular shape, no pain.

Results of laboratory examinations that included mention that the KOH

examination found yeast formation and pseudohyphae. Complete blood test results as follows

Pemeriksaan	Hasil	Nilai Rujukan	Satuan
Hematologi Lengkap			
Hemoglobin	13.8	11,7-15,5	g/dl
Lekosit	10,49	6,0-12,0	10^3/µl
Eritrosit	4,66	4,0-5,2	Ml
Hematrokit	41,1	35-47	`%
Trombosit	214	150-440	10^3/µl
MCV	88,2	80-100	fL
MCH	29,6	26-34	Pg
MCHC	33,6	32-36	g/dl
RDW	15	11,5-14,5	%
MPV	9,7	6,8-10	mikro m3
Limfosit %	10,4	25-40	%
Monosit %	4,2	2-8	%
Eosinofil %	0,3	2-4	%
Basofil %	0,1	0-1	%
Neutrofil %	85	50-70	%
LED	8	0-20	mm/jam

Temporary diagnosis is OPC ed causa HIV infection and differential diagnosis is OPC ed causa diabetes melitus.
The patient get antifungal medication.

R/ Chlorhexidine gluconate 0,1% 60ml fl No I
S 4dd 5ml coll or pc.an

R/ Nistatin oral susp 100.000IU/ml 60ml fl No I S 4dd 2ml kulum 5 menit telan pc.an

Then the patient is referred to Labkesda Surabaya laboratory for fungal culture examination and CD4 . Patients were then instructed to use prescribed medications as directed and oral hygiene . Patients are advised to control up to the date of March 17, 2016 with the results of laboratory tests .

Fifth visite day-27

Patients declare the oral cavity are much better and thick taste on her cheek reduced. Drugs have been used on the right rule and the now remaining two bottles.

In the extra-oral examination we found no abnormality and the intra oral examination we found pseudomembrane coating on the dorsum of the tongue white , irregular shape , the border is not clear , the surrounding tissue looks normal and easy to clean (coated tongue).
Test results HbA1C by 6.71% . Chinese herb identification results show that negative results for all types of examinations that include antalgin , paracetamol , mefenamic acid , dexamethasone , prednisone and methylprednisolone . Results of culture examination found no mold growth . Final diagnosis of this case is the OPC ed causa diabetes mellitus.

On this visit OPC declared cured and the use of Nystatin was continued until 48 hours after the visit. Then made reference to the disease and the patient is instructed control when there are any complaints.

DISCUSSION

In this case the patient is diagnosed as oropharyngeal candidiasis caused by diabetes mellitus. OPC diagnosis based on the history of drug use and the characteristic clinical features of patients during clinical examination. Results anamnesis of patients known that patients taking glucosamine supplements and Chinese herbs. Patients admitted to taking glucosamine for approximately 10 years and Chinese herbs taken for the last 5 months. Based on the patient's clinical examination of the oral cavity, extra oral found on the right and left angular cheilitis. In intra oral pseudomembranous found on the right buccal mucosa, soft palate, pharynx and dorsum of the tongue, multiple , white , can be scraped and leave the red areas, clear border, irregular shape, no pain. Differential diagnosis from is OPC caused by HIV infection. In both cases the clinical picture is similar but have different etiology.

In the case of OPC caused by diabetes mellitus is the condition of patients taking glucosamine. Glucosamine is an amino sugar that is essential for the biosynthesis of glycosylated proteins and lipids. Glucosamine has long been used as a supplement for the treatment of osteoarthritis (OA). Glucosamine is the largest content of extracellular matrix macromolecules such as glycosaminoglycans (GAGs), glycolipids and glyco protein in the form of acetylation. High number of glucosamine on articular cartilage, intervertebral disc and synovial fluid. Glucosamine can also be extracted from crustacean chitin and chitosan and stabilized as a salt, glucosamine hydrochloride or glucosamine sulfate for oral administration. Osteoarthritis Research Society International (OARSI) and the European League Against Rheumatism (EULAR)

recommends the use of glucosamine sulfate for the treatment of osteoarthritis. Glucosamine sulfate demonstrated the ability to inhibit gene expression in osteoarthritis is greater than glucosamine hidrochloride. Glucosamine is absorbed quickly and get into the blood circulation. Glucosamine achieve stable conditions 3h after ingestion and reach maximum concentration in plasma after oral consumption 10μM with a standard dose of 1500mg. 15jam half-life is estimated based on a single daily dose. Allegedly glucosamine can affect glucose metabolism and induce insulin resistance (Henrotin et al 2012).

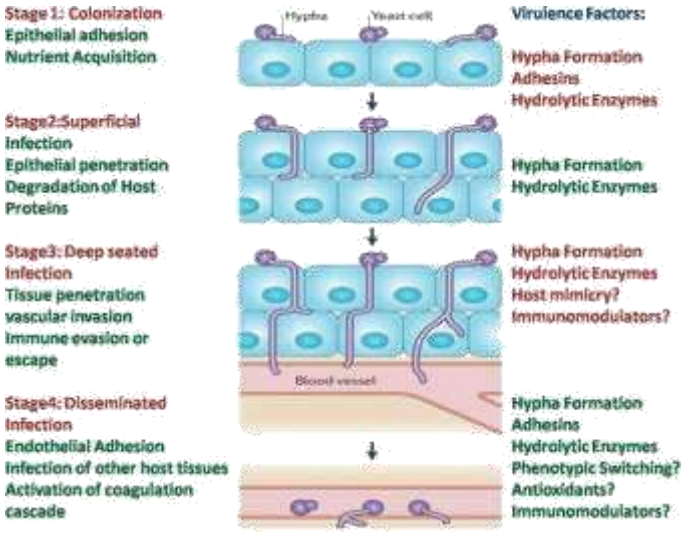
There are two mechanisms glucosamine affects blood glucose. The first is to act as a source of glucose, or interfere with the regulation of blood glucose by converting glucosamine to glucose. The second possibility is the role of glucosamine and hexosamine biosynthesis pathway in the regulation of glucose transport. Endogenous glucosamine is synthesized from fructose - 6 - phosphate and glutamine by the enzyme glutamine is fructose - 6 - phosphate gludotransferase (GFAT) in excess of GFAT hexosamine.Ekspresi lines produce high levels of glucosamine and insulin resistance (Scroggie 2003).

People with diabetes tend to have a fungal infection caused by high blood glucose levels that support the growth of fungi. In diabetic condition weakened immune system eventually disrupted cellular immune response of the immune system can not fight fungal infections as well (Santhosh et al , 2011).

Candida is a fungus blastopore group consisting of many species, but only about 17 species that can infect humans. Such species include *C.albicans* , *C.glabrata* , *C.tropicalis* , *C.krusei* , *C.lusitania* , *C.dubliniensis* , *C.kefyr* , *C.guillermondii* , *C.tropicalis* . Candida can live as normal flora (commensal) in the human body and can turn the pathogen when favorable circumstances, for example in immunocompromised patients. The species most often causes infection and systemic superfisisal in humans is Candida albicans is about 70-80 % (Wahytuningsih, Syarifah & Mulyadi 2012).

Several virulence factors expressed by C. albicans and the most widely discussed in recent years is a factor tearkhir hyphae formation, adhesions and the formation of extracellular hydrolytic enzymes. Several stages in the candida infection is

- Colonization.
  Colonization of the oral cavity is defined as the ability of candida to stabilize and maintain that condition, but does not cause clinical symptoms.
- Superficial infections by forming a biofilm.
- Penetration into tissue
- Spread through blood vessels.



Picture of candida infection. Source Shah et al 2011

In this case fungal cultures taken but the of fungal growth . Perhaps this is because the sampling for the purposes of culture take when the lesion had received drug treatment containing chlorhexidine gluconate antiseptic and antifungal . In the theory OPC is opportunistic infections caused by C. albicans as the first etiology and C. glabrata as the second etiology however there are rare case that C glabrata as single infections . Fungal cell wall proteins involved in adhesion to endothelium and epithelium are EPA (Epithelial cell adhesin) , AED (adherence to endothelial cells) , and the and then swallowed . Patients were instructed not to eat and drink and rinse for 30 minutes after use nistatin.Terapi carried out for 7-14 days and continued for 2-3 days after symptoms and the clinical picture disappears . The use of Nystatin along with chlorhexidine reduces the efficacy of the use of current Nystatin be spaced at least 30 minutes between them. Nistatin become the primary choice for Nystatin has no interaction with other drugs .(Tarcin 2011)

results do not indicate the presence PWP (PA14 Wall domain containing proteins Mixed Species Oral Candidiasis . In C. glabrata Epa 1,6,7 bind endothelial and epithelial cells were Pwp7p and Aed1p host interacts with endothelial cells. C. glabrata is binding hyphae of C. albicans and C.glabrata cell wall protein necessary for the attachment of C albicans (Tati et al 2016).

For mild cases of candidiasis and localized the main drug of choice is topical antifungal therapy . Nystatin 100.000IU / ml was used four times a day for 2 minutes

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Case Report

Management of Herpangina In A Young Adult Patient

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ABSTRACT

Background*: Herpangina is a contagious pharyngeal infection typically caused by various enteroviruses such ascoxsackievirus A16, enterovirus 71 andcoxsackievirus B. The highest prevalence of Herpangina is found in children, but can also be found in newborns, adolescents and young adults. The disease is spread through contaminated saliva.Herpangina symptoms begin with fever, headache and myalgia for about 1-3 days with sore throat and painful swallowing, followed by characteristic clinical features of erythematous oropharynx, soft palate and tonsillar pillars with multiple tiny vesicles which rapidly break down into erosions or ulcers of 2-5 mm. This disease is self-limiting within 5-10 days.* ***Purpose****:Reporting the management of Herpangina occurring in a young adult patient.* ***Case and Case management****: Female, aged 23 years, a college student, complaining ofpainful ulcers in her throatcausing painful swallowing since the day before. Three days preceeding the ulcers, patient had a fever with headache, malaise and sore throat causing eating difficulty. Increased neutrophils and erythrocyte sedimentation rate were discovered in complete blood count, as well as decrease in eosinophils. Patient was treated with antiseptic mouthwash (Povidone Iodine 1% and Chlorine Dioxide), multivitamins of B complex, C and Zinc, antipyretic-analgesic (Paracetamol), antibiotic (Cefadroxil), and instruction to increase hydration and bed rest. Sympthoms subsided after 10 days and patient was declared well after 16 days.* ***Conclusion****: Diagnosis of Herpangina is determined by careful anamnesis and characteristic intra oral clinical features so that patients can be treated appropriately.*

Keywords *:Herpangina, oropharyngeal stomatitis, coxsackie virus*

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BACKGROUND

Herpangina is an infection of the oropharynx highly contagious and is caused by enteroviruses include coxsackie virus A16, enterovirus 71, and coxsackie virus Coxsackie B virus is an RNA virus of the family Picornaviridae, genus Enterovirus, which include echovirus and poliovirus. Coxsackie divided into groups A and B. The virus that causes herpangina usually spreads through the fecal - oral, although it can also via route pernapasan.[1]

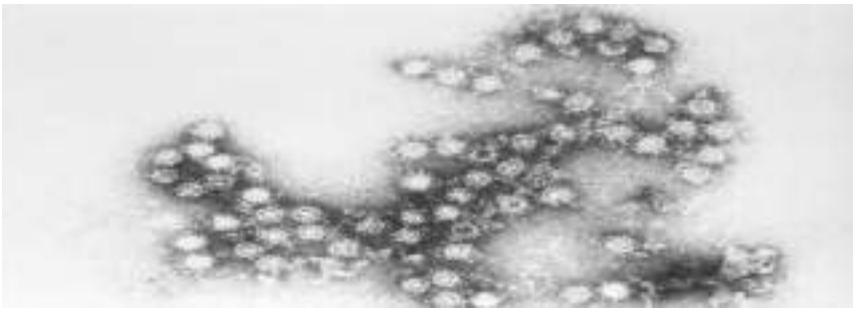

Figure 1. Virion Coxsackievirus B4 under an electron microscope (Sandra et al, 2015) [1]

Herpangina highest prevalence in children, but can also be found in newborns, adolescents and young adults. The disease is spread through contaminated saliva. Herpangina has an incubation period of 4-14 days. Viremia occurred after inoculation and replication of the virus causing clinical picture in oropharingeal.[2] Typical symptoms include fever that appears suddenly, headache, myalgia, malaise usually lasts for 1-3 days with sore throat, dysphagia, with their characteristic clinical features further diffuse erythema with vesicles are small, multiple that will quickly break into erosion or ulceration measuring 2-5 mm. Characteristic of these lesions are in the soft palate, uvula, tonsillar pillars and the posterior pharyngeal wall. Herpangina is a disease that is self-limiting, it can be recovered in 5-10 hari.3 In this case report will discuss the diagnosis and management of cases in young adults who suffer from the symptoms of infection Herpangina preceded by fever and headache.

CASE

A 23-year-old woman came to the Hospital section Mouth Disease Science Airlangga University on May 4, 2016, with complaints stomatitis since the previous day. Historically three days before appearing stomatitis, patients experience fever, pain swallowing, headache and body feels sore. Two days later appeared stomatitis on local oropharynx, tonsils and soft palate. Patients then drink Panadol medicine to relieve fever and pain in the mouth mucosa. But still no change.

Public health history no abnormalities, patients with no history of stomatitis, no history of allergies to drugs NSAIDs.

In the extra-oral examination found no abnormality. Examination of bilateral submandibular gland palpable, chewy, pain, increased temperature, normal color, can be driven.

In the intra-oral examination looked at the soft palate macular

lesions, erythematous, irregular boundaries. In the oropharynx, tonsils, soft palate there are multiple ulcers, irregular boundary, the edge is reddish with yellowish-white ulcer base, diameter of 5 mm, 4 mm, 3 mm, 2 mm, feels pain when swallowing.

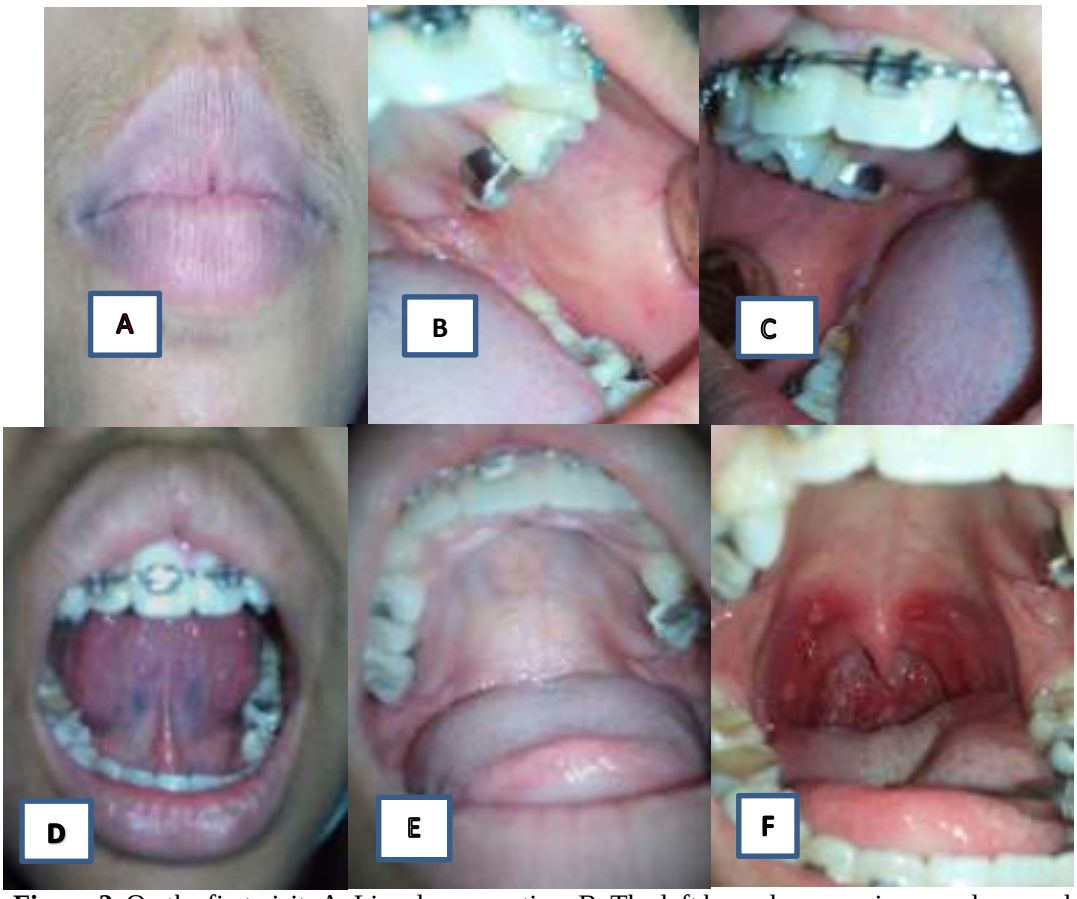

Figure 2. On the first visit; A. Lips desquamation, B. The left buccal mucosa is normal, normal dextra buccal mucosa C., D. Ventral tongue and floor of the mouth normal, normal durum palate E., F. palate palate, tonsils, oropharingeal there is inflammation and ulceration

CASE MANAGEMENT

By paying attention to history and the clinical picture, the patient was diagnosed as Herpangina with FAPA syndrome diagnosis.

Patients get a prescription paracetamol 500 mg 10 tablets (3x1 a day), becom C (1x1 a day) and mouthwash Povidone Iodine 1% who gargled 4 times a day. Instructions improve oral hygiene, High-Calorie Diet High Protein, bed rest, rehydration (± 2 liters). Pro controls five days.

The first control Day 5 (dated May 9, 2016)

Patients get a prescription paracetamol 500 mg 10 tablets (3x1 a day), becom C (1x1 a day) and mouthwash Povidone Iodine 1% who gargled 4 times a day. Instructions improve oral hygiene, High-Calorie Diet High Protein, bed rest, rehydration (± 2 liters). Pro controls five days.

In the extra-oral examination no complaints. Examination of bilateral submandibular gland palpable, chewy, not pain, increased temperature, normal color, can be driven.

Intra oral examination on the soft palate macular lesions, erythematous, irregular boundaries. In the oropharynx, tonsils, soft palate there are ulcers, multiple, irregular shape, diameter between 2 mm, 3 mm, 4 mm, irregular boundary, the edge of the ulcer base reddish yellowish white base color on oropharynx dextra with pain.

Figure 3. Inflammation and ulceration of oropharyngeal, soft palate

Patients were referred to Labkesda (Regional Health Laboratory) for examination CBC.

Patients get a prescription cefadroxil 500 mg 10 tablets (2x1 a day), paracetamol 500 mg 10 tablets (3x1 a day), becom Z (1x1 a day) and mouthwash Povidone Iodine 1% who gargled 4 times a day. Instructions improve oral hygiene, High-Calorie Diet High Protein, rehydration (± 2 liters). Pro controls three days.

Control Second Day 9 (dated May 13, 2016)

Patients come with the results of the laboratory and the patient's condition is better than before. Medication taken regularly and mouthwash used as directed.

In the intra-oral examination are the macula, reddish, clear boundary, no pain in the oropharynx.

Figure 4. The macula, redness, bounded clear in oropharyngeal

Based on laboratory results on May 9, 2016 showed a value above normal is 66% neutrophils, erythrocyte sedimentation rate 59 mm, the result is below normal eosinophils 1%. The impression in the reading lab results is the existence of conditions of acute infection due to a virus. And there is no history of allergies.

EXAMINATION	RESULTS	REFERENCE VALUE
Hemoglobin	12,5	11,7 – 15,3
Number of Leukosit	7,8	3,6 – 11
Trombosit	404	150 – 440
Eosinofil	1	2 – 4
Basofil	0	0 – 1
Neutrofil	66	55 – 65
Limfosit	27	25 – 35

Handling the case with instructions to continue taking medication regularly, prescription mouthwash Chlorine Dioxide who gargled 4 times a day, improving oral hygiene, High-Calorie Diet High Protein, rehydration. Pro controls three days

Controls Third Day 12 (dated May 16, 2016)

Patients come back with a better state than before, medications taken

regularly and mouthwash used as directed.

On examination there is little intra oral macula, somewhat reddish colored, clear boundary, no pain in the oropharynx.

Figure 5. The macula, redness, on oropharyngeal

Patients were instructed to continue the drug is still present (Z Becom Multivitamin tablets), and the prescription mouthwash Chlorine Dioxide who gargled 4 times a day. Pro controls three days.

Control Fourth Day 16 (dated May 20, 2016)

Patients present with a better condition and had no complaints. Drug is taken regularly and mouthwash used as directed.

In the intra-oral examination there are no macula, the color of normal mucosa in the oropharynx.

Figure 6. in oropharyngeal lesions heal

Patients were instructed to improve oral hygiene and maintain stamina and the therapy is completed.

DISCUSSION

Herpangina oropharingeal also called acute fever, can be triggered by fever, emotional stress and viral contamination. Lesions preceded by prodromal period and pain swallow the oropharynx. These symptoms are accompanied by edema in the area of the lesion followed by the formation of small vesicles group[3]. Vesicle diameter between 1-3 mm with a large group of 1-2 cm. The vesicles rapidly rupture to form ulcers. These lesions or ulcers forming a collection of small vesicles with a diameter of 1-2 mm, in small groups on the mucosa.[4]

Herpangina often found in children and adolescents end. This is as reported by Puenpa *et al* regarding Herpangina cases occur in children under the age of 10 years in Thailand in 2012[5] and Park et al report on the case Herpangina in children aged 1-2 years in Korea in 2009[6]. Herpangina in people adults can manifest as pharyngotonsillitis with lesions confined to palatinalis tonsils and posterior oropharynx accompanied by symptoms of pain in the throat, fever, malaise, and headache[7].

In young adult patients, Herpangina clinical diagnosis is usually made on clinical signs and symptoms are typical, especially if found signs of a classic form vesikuloulseratif lesions on the soft palate, tonsillar, uvulla, oropharingeal. Basically, if the young adult patients showed typical clinical signs and symptoms, primarily found their mark in the form of lesions vesikuloulseratif classic, symmetric, shallow, rounded on the soft palate,

tonsillar, uvulla, oropharingeal herpangina the diagnosis can be established.

In this case, the patient was diagnosed as a prodromal herpangina by history, fever, sore throat, headache, myalgia before the appearance of inflammation in tonsillar and oropharingeal. The presence of ulceration appear after 2 days of prodromal period. The picture is a classic sign Herpangina at the first direct examination led to the diagnosis Herpangina.[8]

Investigations conducted due to detect secondary infections, because patients still feverish day up to eight accompanied by headache. Investigations can do is very limited in terms of both time and costs for the typical signs and symptoms can be found. Culture can not be carried out because the necessary specimens ruptured vesicles were still fresh, while the vesicles are very rare because of rapidly rupture. While PCR though accurate and does not require fresh specimens but keep costs relatively expensive[9]. While in this case the patient had experienced pain swallow more than three days so that the necessary action is fast and precise.

In healthy individuals, Herpangina is a self-limiting disease. Causative therapies such as antibiotics for secondary infections and not prescribed acyclovir. Antibiotics are given to prevent secondary infection for the patient during his seven days of fever and headache. Acyclovir is not useful in dealing with these cases and corticosteroids are contraindicated[10].

Symptomatic and supportive therapy including 500mg paracetamol for fever and pain therapy and fluids to maintain hydration and electrolyte balance. Giving a multivitamin that contains vitamin B complexes, vitamin C and Zinc or immunomudulator can improve patient endurance through adequate intake of vitamins that are needed in order to prevent the occurrence of metabolic disorders functional leads to reduced intake of vitamins and hoped that the process of healing is faster, and the spread of infection other cells can be prevented[11].

Preventive therapy is given such education, in which patients were informed about the condition is infectious so expect patients isolate themselves from family members or others and wear masks to prevent the spread of infection by inhalation of the patient to others, especially the immediate family. Furthermore, the patient informed also to consume high-calorie foods high in protein to aid recovery efforts[12].

On the tenth day of the first visit, the patient did not have any complaints anymore. This shows the rapid response of the therapy is expected. In addition to its Herpangina infection is self-limiting disease, therapy and the patient's own body resistance greatly assist in accelerating the easing of symptoms and signs of disease.

RESULT

Based on the discussion regarding the diagnosis and management of oral pain caused by coxsackie virus infection can be concluded that Herpangina can occur in young adults are caused by viral infection. Although the diagnosis can appeal due to bacterial infection and other types of viral infections that manifest in oropharingeal. Therefore, careful history and their knowledge of the characteristic clinical features of the manifestations of infection herpangina

is key to establishing the correct diagnosis so that patients can be treated appropriately and avoid spreading the virus either otoinokulasi or to others.

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CASE REPORT

Manifestation of Recurrent Oral Ulceration Associated to Reactivation Rheumatic Heart Disease

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ABSTRACT

Background *: Recurrent oral ulceration (ROU) is a condition presenting typically with recurrent, round ulcers, single or multiple, with circumscribed margins, erythematous haloes, and yellow or grey surface. ROU is associated with other systemic disorders, such as rheumatic heart disease (RHD), a cardiovascular disease due to non-suppurative complications of group A β streptococcal pharyngitis caused by a delayed immune response. Oral streptococci has been suggested as an important cause of oral ulcers.* ***Purpose*** *: Reporting a case of recurrent oral ulceration in association with reactivation of rheumatic heart disease.* ***Case and Case Management:*** *A 21st year old woman, complaining of recurrent oral ulceration & almost never healed since she was 6th years old. She had been diagnosed with rheumatic heart disease by her cardiologist since she was 9th years old and underwent treatment until she was 15th. Oral ulcers were treated with topical antiinflammatory and antiseptic. On the first follow up, the former ulcers have healed but new ulcers appeared on different side. The same condition happened during the 2nd follow up. We referred the patient to periodonthia department to treat her gingivitis, and to clinical pathology for complete blood count & ASTO (Antistreptolysin Titer O) examination. As a result her ASTO was 3200 IU/ml (N = < 200 IU/ml). The patient was then referred to her cardiologist and her RHD diagnose was determined. Patient was then treated with Penicillin G benzathine injection monthly for a year and was advised to avoid tooth extraction.* ***Conclusion*** *: Streptococci bacteria causing RHD in this patient also induces recurrence of oral ulcerations.*

Keywords: *Recurrent Oral Ulceration, Rheumatic Heart Disease, Streptococcus A β Hemoliticus*

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BACKGROUND

Recurrent oral ulceration (ROU) is a recurrent oral lesion, round or ovoid, can be single or multiple, define boundary, forming erythematous halo, and the base surface is yellow or gray. ROU may be associated with disorder systemic disease or rheumatic diseases, such as lupus erythematosus, sweet syndrome, Reiter's syndrome (reactive arthritis).[1] Rheumatic heart disease (RHD), is one of the rheumatic diseases that can occur after an infection acute rheumatic fever (RF), is a manifestation of infection with non-suppurative, appear 1-4 weeks after infection Group A Streptococcus (GAS) pharyngitis and can occur in the multisystem inflammatory.[2,3] Rheumatic fever (RF), an acute condition due to hypersensitivity reactions type II, which produced Ig G, Ig M, due to the bonding of the antigens on target cells/tissues, causing leukocyte chemotactic, resulting in lysis of target cells that are activated complement or fc. Receptor. M protein in the cell membrane GAS cross-reaction with human heart tissue and acts as a major virulence of GAS. GAS also has lipoteichoic acid and hyaluronic acid capsule. Lipoteichoic acid helps the bacteria attached to the epithelial cells and hyaluronic acid binds to the CD 44 on the epithelium, and damage interceluler junction so that the bacteria can penetrate the mucosal epithelium and the skin. Hyaluronidase issued by hyaluronic acid is an important component of connective tissue to help the spread of bacteria. GAS produce streptolisin O which will lyse the blood and antibodies streptolysin O develops after infection with GAS. These antibodies blocking hemolysis done by streptolisin O, but does not show immunity. High titers of > 250 units indicates that patients are infected with GAS or recurrence of infection. Therapy ROU triggered by the reactivation of RHD is with topical anti-inflammatory and antiseptic local, as well as referral to a cardiologist for the treatment of RHD patients.[1,3]

CASE

On November 2, 2015, the female patients Ms. SM age of 21 years, the referral of the student profession (S1) which stationed on the UNAIR Oral Medicine, with complaints sores that do not heal after 2x control. Treatment was given with topical anti-inflammatory and antiseptic and patients using prescribed medications regularly. Patients say frequently recurring ulcers since the age of 6 years and have a history of rheumatic heart

A HISTORY OF PREVIOUS VISITS:

Visits 1, October 19, 2015

diseases at the age of 9 years, by a cardiologist by injection penadur (penicillin) monthly until the age of 15 years and the age of the patient was cured.

Figure 1. ulcer lesions, basic white, reddish irregular edges, clear boundaries, pain, with a size of 2x3 mm on the left superior labial mucosa, and 4x6 mm in dextra inferior labial mucosa

Control 1, October 26, 2015

Figure 2. The first visit ulcers began to shrink and heal

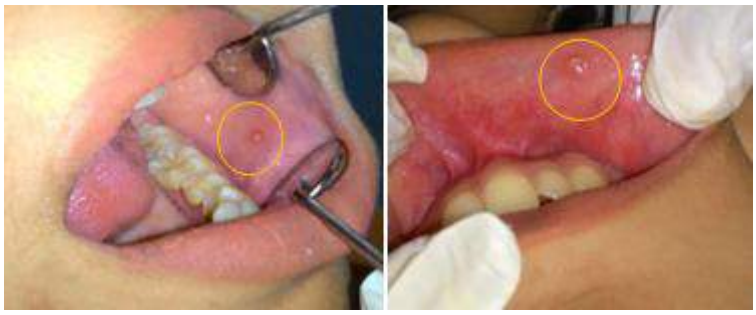


Figure 3. The new ulcers, basic white, irregular edges and a reddish, clear boundaries, asymtomatic, appear on the buccal mucosa of the left and the left superior labial mucosa with sizes of 2x2 mm and 1x2 mm

Referral of the profession S1/Co-ass (As the first visit for our treat) on November 2, 2015

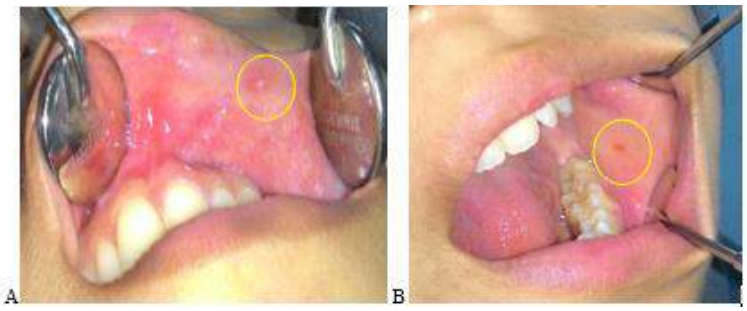


Figure 4. A new ulcers, a position more to the left than the previous ulcers, with basic white, irregular edges slightly reddish diameter of 3 mm, no pain in the left superior labial mucosa. B. Old ulcers reddish-shaped in the healing process.

Current diagnose are recurrent oral ulceration suspect systemic disease. The differential diagnosis is traumatic ulcer.

Capaise management

Patients continue the medication prescribed last week. We referred the patient to periodonthia department to treat her gingivitis, and to clinical pathology for complete blood count & value ASTO (Antistreptolysin Titer O) examination.

Control 1, November 16, 15.

Patient says that the mouth ulcer has healed after scalling. Prescribed medications are used regularly, The laboratory results show the value ASTO 3200 IU/ml (N=<200 IU/ml).

On examination of intra-oral, oral hygiene patient looks better, (is not there gingivitis because calculus

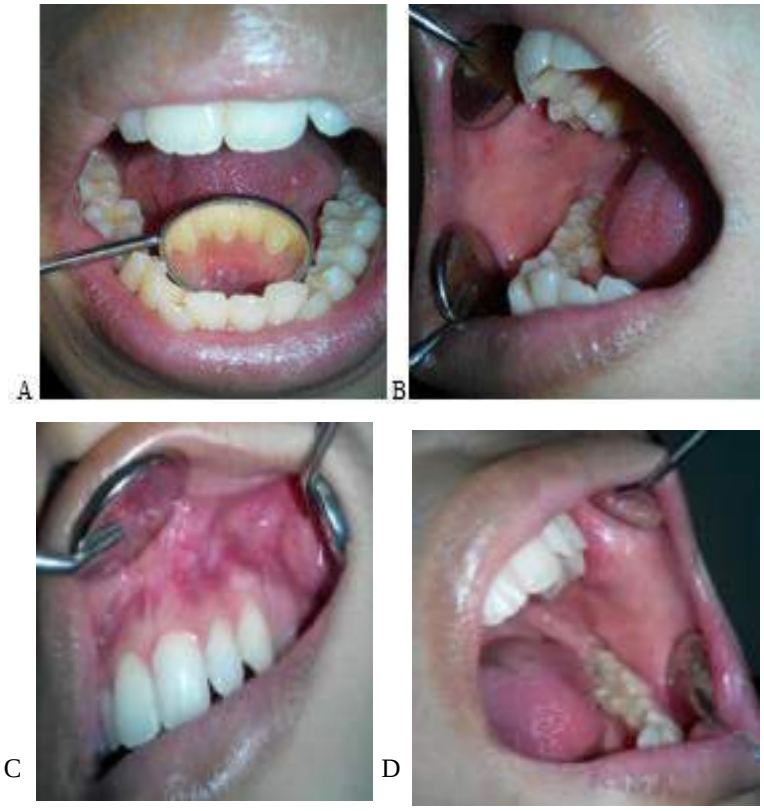


Figure 5. A. oral mucosa after scaling, B.Lesi dextra inferior labial ulcer healing form of macular reddish look, C. Lesions of the left superior labial mucosa ulcer has healed (approximately the same as the surrounded tissue), D. lesions of the left buccal mucosa ulceration seem to heal form macular redness

The first control diagnose is ROU heal, but suspected of re-infection GAS, by the examination results ASTO. Patients remained prescribed local antiseptic mouthwash to maintain oral hygiene and referred her to a specialist cardiologist.

Control 2, december 1, 2015

Patients come control, said the new oral ulcer appears again on the lower lip and the gums lower canine teeth left. The prescribed medication is used regularly.

Patients also bring answers consul of specialist cardiologist doctor (attached). In the intra-oral examination, seemed lesions had previously been cured yet, another new ulcer lesions appear at different positions. The Answer consul of spcialist cardiologist doctor said that this time the patient is experiencing reactivation of rheumatic heart disease and should not do teeth extractions.

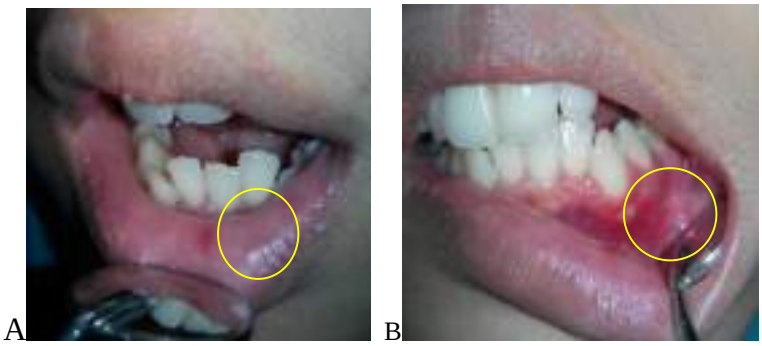


Figure 6. A. Macular redness, irregular edges, diffuse boundaries, no pain in the lower lip mucosa, B. ulcer lesions, basic white, reddish irregular edges, clear boundaries, ache, a diameter of 3 mm on the labial gingiva of teeth 33.

The final diagnose, we stated that the patient had recurrent oral ulceration (ROU) associated with reactivation of rheumatic heart disease (RHD).

DISCUSSION

Recurrent oral ulcers (ROU) can be a manifestation of systemic disease, one of rheumatic heart disease, a chronic inflammation of the heart valves continuation of inflammatory rheumatic fever (RF) after acute infection Group A Streptococcus (GAS) or Streptococcus pyogenes approximately 1-4 weeks. GAS infection initially causes pharyngitis, scarlet fever, erysipelas, impetigo, rheumatic fever, toxic shock syndrome, glomerulonepritis.1,2 Approximately 50% of patients with rheumatic fever (RF) will continue acute chronic inflammation of the multisistem.[1,2,4] ROU diagnosis based on history and clinical features of the lesion. ROU accompanied by fever may indicate periodic fever syndrome, like aphthae ulceration, pharyngitis, and cervical adenitis (PFAPA syndrome) or a group of autoimmune diseases, occasionally, common in the age of the children, heal itself and may also be without rekuren.[1]

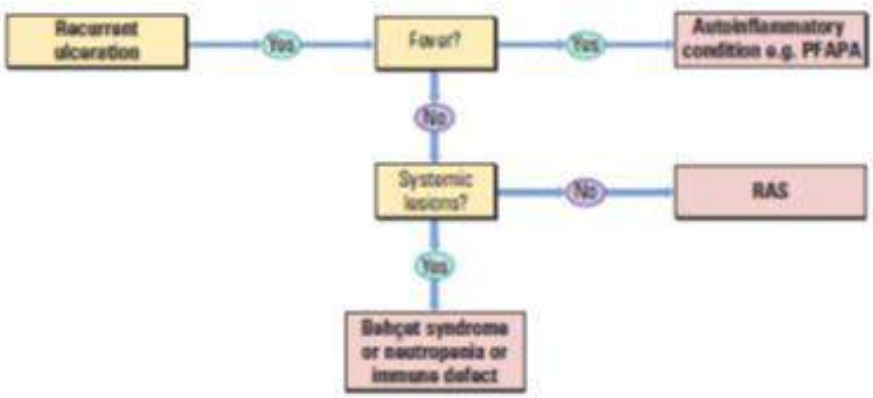


Diagram Recurrent ulceration diagnosis; (PFAPA, periodic fever, adenitis, pharyngitis, aphthae)[1]

GAS is also known as A β hemolytic streptococcus, a major cause of acute RF and RHD. The pathogenesis of RF and RHD, involving several elements principles, including by specific strains of GAS, host susceptibility, the ability of the immune response against the antigen GAS conducting cross-reaction with the host tissue. GAS capsule is covered by hyaluronic acid, carbohydrate and protein antigen-specific M between the cell wall and membrane. Protein M and the capsule to be considered as a virulence factor, antifagositik of streptococcal cell. M protein binds to fibrinogen initiate activation ability of plasminogen, streptokinase then activates plasmin. M protein also binds to human kininogen which would then be put out of bradykinin, a vasoactive peptide in plasma.[3]

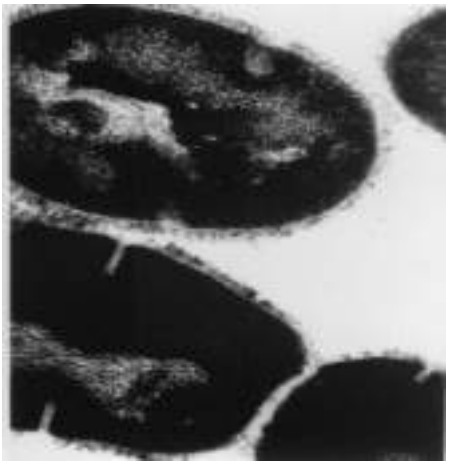
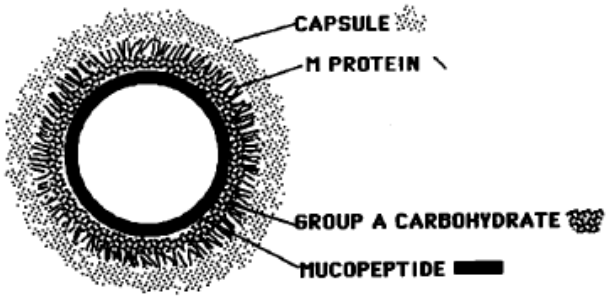
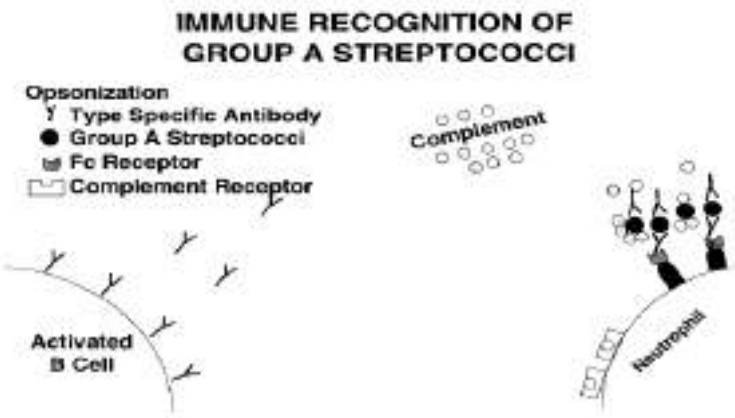


Figure 7. Overview Electron Microscopes A streptococcal M types are fimbria 24. The surface resembles ramput, indicates the M protein on the surface of streptokokus[3]

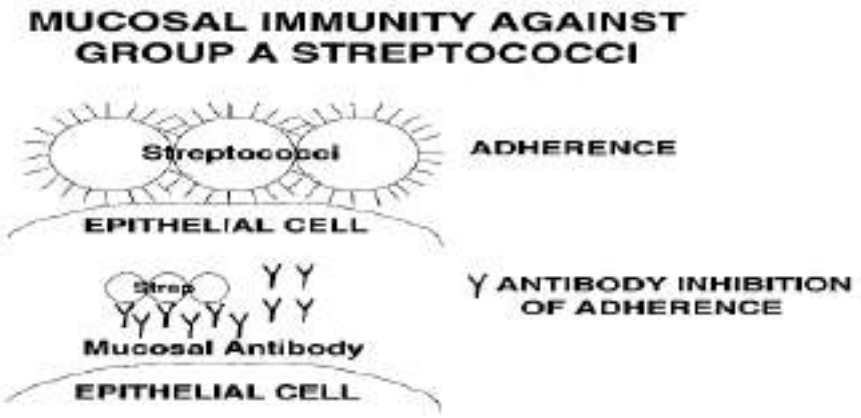


Picture 8. Diagram of the group A streptococcal cell covered with an outer hyaluronic acid capsule and the group A carbohydrate, consisting of a polymer of rhamnose with *N*-acetylglucosamine side chains. Streptococcal M protein extends from the cell wall and is anchored in the membrane.[3]

GAS (Group A streptococcal) do abrasion and penetrate the epidermis produce erysipelas or cellulitis. Erysipelas is a form of cellulitis, with elevation and surface characteristics are superficial skin, while cellulitis affects erythematous subcutaneous tissue. Ellen and Gibbons, suspect attachment GAS, the epithelium by fimbria protein M, whereas by Beachey and Ofek, publish that lipoteichoic acid (LTA) as adesin, amphipathic molecules, adesin the buccal epithelial surface. Antibodies against the LTA on GAS by inhibiting the adhesion of the cells, later identified as fibronectin cell receptor binds to LTA, indicating that the intracellular invasive GAS conduct. GAS has upheld since its recurrence antiphagocytic (M protein and hyaluronic acid capsule). Antiphagocytic behavior in GAS are also mediated by fibrinogen binding to the protein surface M. Fibrinogen binding to the surface of GAS blocking the activation of complement via the alternative pathway and massively reduce the amount of C3b that bind to streptococci, which reduces phagocytosis by polymorphonuclear leukocytes. [3]

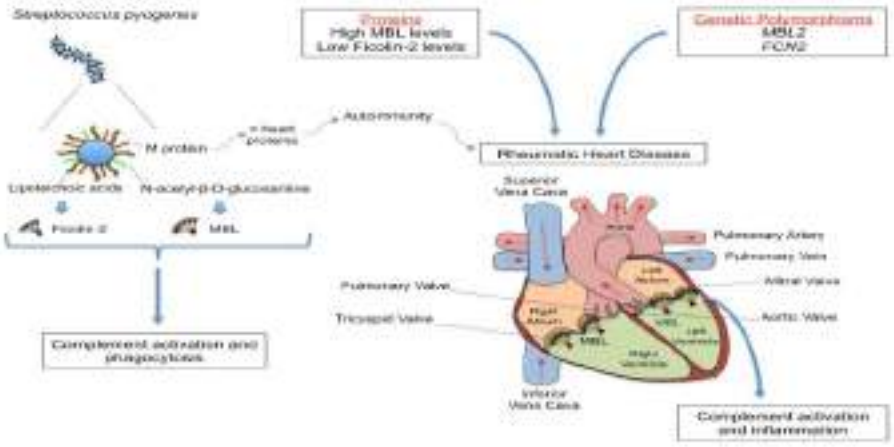


Picture 9. How the immune system recognizes group A streptococci and uses opsonization by complement and type-specific antibody against M protein or any other surface molecule capable of generating opsonic antibody. Fc receptors shown on macrophages bind to the antibody Fc region, inducing phagocytosis and killing of the streptococci. [3]



Picture 10. Streptococcal adherence and inhibition of adherence to the mucosa by specific antibody. Mucosal antibody against surface adhesins or epitopes in the C repeat region of M proteins protects against colonization with group A streptococci.[3]

Rheumatic fever (RF) continues with chronic rheumatic heart disease (RHD), is a chronic inflammation after infection oropharynx by streptotoccus pyogenes (GAS), which the cell wall there is the M protein, acid lipoteichoic, and N-acetyl-β-D-glucosamine. The structure of the M protein homolog of the heart protein such as myosin and tropomyosin, into the early formation of auto-cross-reactive antibodies. Mannose binding lectin (MBL) and ficolin-2 (FCN2) binds N-acetyl-β-D-glucosamine and lipoteichoic acid, immediately trigger complement activation and phagocytosis. MBL deposited on the valve eliminates the inflammatory and destructive network complement the chronic stage of the disease, the protein is important for infection with MBL2 and FCN2 be polimorphisme started high and low levels of MBL ficolin 2, it is associated with risks to RHD.[4,5]



Picture 11. Pathogenesis rheumatic heart disease.[5]

Similarities molecular pathogenesis of GAS as RF, where streptococcal group A carbohydrate epitope, N-acetyl glucosamine, and helical coiled-coil structure of the streptococcal M proteins have similarities to cardiac myosin. T lymphocytes and antibodies play an important role in the pathogenesis of rheumatic carditis (heart valve disease / valve endothelium). Genetically shows that the human leukocyte antigen (HLA) class II was involved in the development of rheumatic fever / rheumatic heart disease. HLA class II gene located on chromosome 6 and is responsible for controlling the immune response. HLA class II molecule plays an important role in antigen presentation to T-cell receptor (TCR) consequently trigger a cellular and humoral immune responses. HLA-DR4, DR7 and DR9 are strongly linked to RF and RHD.[6,7] Streptococcal superantigens interact with the molecules of the major histocompatibility complex (MHC) class II and limiting non-specific activation of T cells, produces a number of inflammatory cytokines such as interleukin as tumor necrosis factor and interferon gamma. Bacteria have been contributing to the pathogenesis of ROU, because of bacterial pathogens / antigens trigger the formation of antibodies that cross-reaction with the oral mucosa keratinosit.[7]

There are three mechanisms of streptococci to survive:[8]
1. Avoid of a mucosal antibody
2. Inhibits phagocytosis
3. Inactivation of the complement cascade

GAS infections can be spread through direct contact with mucus or sores on the skin. Group A streptococcal virulence factors, such as the M protein, hemolysin and extracellular enzymes. GAS can secrete two types of hemolysin is streptolisin O (oxygen-labile) and streptolisin S (serum-soluble). Both can destroy erythrocytes, polymorphonuclear leukocytes, platelets, and organelles by making a hole in the cell membrane. Streptolisin O immunogenic and oxygen-labile, while the S streptolisin not immunogenic and oxygen-stabile. Streptolisin S can induce the release of the content of lysosomes followed by cell death caused by phagocytosis. Streptolisin S contribute to beta-hemolysis around colonies on an agar medium darah.[9,10,11] Inspection routine echocardiography is important in diagnosing and controlling valve disease. Primary prophylaxis with penicillin G bezathine injection or 10 days with oral penicillin V therapy after positive GAS pharyngitis. Patients with further RF or RHD, should secondary prophylactic therapy for a minimum of 10 years or until the age of patients 21 years (or longer). Patients with RHD may be symptomatic of $\geq$ 20 years after RF. Patients moderete or severe RHD should continue secondary prophylaxis until the age of 35-40 tahun.[4,12]

CONCLUSION

Streptococcus bacteria cause rheumatic heart disease (RHD) in the case of this patient triggers recurrent oral ulceration.

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Research Article

The Effectiveness of Snake and Ladder Game Method on Small Dentist Cadres' Level of Knowledge and Students' Oral Hygiene

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ABSTRACT

Background*: The biggest problem faced by the people of Indonesia in oral health is a disease of dental hard tissues. Activities of dental and oral disease prevention can be done with the promotion of dental health education. The dental health education commonly used today are still using conventional methods that are less attractive to children that need to be innovative extension methods, one of them with a method to make it more fun games and children can participate play an active role.* ***Purpose:*** *to determine the effectiveness of the method of snakes and ladders game on the level of knowledge of a small cadre of dentists.* ***Methods****: This type of research is a quasi experimental research design non-randomized control group pre-test post-test. The population consist of 24 students. The sample selection using the total sampling. The data obtained were analyzed using statistical tests paired T test and Independent T test.* ***Results:*** *There was an increase in knowledge after dental health education.* ***Conclusion****: Extension method of snakes and ladders game effectively used to improve the oral health knowledge.*

Keywords: *knowledge, snakes and ladders game, a small cadre of dentists*

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BACKGROUND

A major challenge encountered by Indonesia and also other developing countries in the dental and oral health field is dental hard tissue diseases. Basic Health Research Report which was conducted by Health Department in 2013 stated that the prevalence of oral and mouth diseases is 25,9%. The prevalence of both diseases is commonly caused by the lack of knowledge, attitude and behavior in maintaining dental and oral health[1]. Providing dental health education is an attempt to overcome to this problem.

Education is an important aspect. This is stated in act number 9 year 1960 about health main points which mentioned that the government maintains and enhances social health status through organizing and intensifying efforts in the field by means of educationto the society. Education is an effort to enhance health status by way of preventive healthcare which is conducted by health promotion. Health promotional activities aim to elevate competences of individuals, families, groups or communities to live healthy and develop community based health care. They can be done through health education/counseling[2] which requireappropriate methods and media to achieve the goals.

The using of media can facilitate and improve students' comprehension onhealth education materials to be presented. The selected media should consider the targets, the goals to be achieved and existing resources. Current dental and oral health education is still based on conventional approach making it less attractive to children. Although modeling principles have been applied, the selection of media that is used down to date felt less evocative, monotonous, unattractive to children and easy to be forgotten.[3]Another form of preventive activities is the formation of small dentist cadres who becomes part of School Dental Health Effort (UKGS in Bahasa Indonesia) which its existence should receive fullest attention.

A small dentist cadre is an organized individual within a certain time and during that time, the quality is continuously improved in order to achieve the goal in building up dental and oral health quality.[4] School-age social groups (6-18 years) which represent a large part of Indonesian population (± 29%) which about 50% of them are schoolchildren are the basis of building up small dentist cadre training. Since they are still developing and growing, they are easier to be guided.[5]

Ambulu I and YosSudarso Elementary School are elementary schools located in Ambulu district which exactly located about 27 km from Jember center city and 30 km from Faculty of Dentistry, University of Jember. Both elementary schools are included in Ambulu Public Health Center working area located in Jember regency. Preliminary survey has been conducted in January 2013 by team servant through interviewing Ambulu public health center dentists and the persons in charge from both elementary schools. In the interview, the dentists stated that UKGS activities were still running although they were not routinely carried out. This was due to longtimeneed to be taken to bring it off. Frominterview results with Ambulu I elementary school, it's known that it has UKS room, but it's never functioned as it was intended. Similar

situation was also found in YosSudarso elementary school.

Team servant also looked at the fact that students' level of knowledge on dental and oral health was categorized as sufficient. It's proven by dental and oral health pretest administration to several students in Ambulu I elementary school andYosSudarso elementary school distributed by dental students University of Jember who were conducting Field Work Practice in 2012/2013 academic year. Pretest were conducted randomly to students from both elementary schools and the results showed that students' level knowledge on dental and oral health was still lacking. The pretest mean value from Ambulu I elementary school was 60.67 and 64.6 from YosSudarso elementary school. Other supporting data came from survey conducted by students of Faculty Dentistry who performed Field Work Practice activities in 2012, 2012/2013 academic year which resultedin high categorized DMF-T rate; 6.2 for Ambulu I elementary school and 5.1 for YosSudarso elementary school.

From that situation, it can be concluded that UKGS is still running but it hasn't been reached maximum results. This situation can be seen from students' level of dental and oral knowledge, which is categorized as quite high and caries knowledge which is classified as high.

Based on that situation, we want to augment the UKS/UKGS function in both schools by building up small dentist cadres and introducing game tools. A game is a fun activity which can improve students' characters and abilities.[6] Methods developed in the learning sciences shows the percentage of success about 75%, prompting us to develop game method for dental and oral health education.[7] Snake and ladder game is chosen because this game is commonly played by children.

Small dentist cadres are taken from grade III, IV and V as they already had capability to read well, ability to communicate actively and chance for having longer opportunity to disseminate the information to their friends and environment before graduating from elementary schools.

Children development stages are divided into 4 stages; motoric stadium (0-18 months or 24 months), pre operational stadium (1-7 years), concrete operational stadium (7-11 years), and formal operational stadium (11-15 years).[8]School-aged children are involved in concrete operational stadium meaning that they are no longer relying information acceptance merely on five senses-based information as they begin to have abilities to distinguish between objectsthat visible to the eyes and conceptscoming from real situation. All matters that don't relate clearly will be hard to be put into their thoughts.[9]

METHODS

This research is quasi experimental research type using non randomized control group pre test post test research design with cross sectional approach. The research was conducted in YosSudarso elementary school and Ambulu I elementary school. Twenty four small dentist cadres from both elementary schools were involved in the research population. The sample selection method used total sampling in which all populations are incorporated.

The research was conducted in three phases. For the initial step, the sample was given a pre test in the form

of questionnaire, then it's followed by giving them oral health education/counseling through snake and ladder game method, and subsequently same questions were given for the post test questionnaire as the final step. Counseling materials delivered are about dental and oral anatomy, teeth caring tips, bad oral health habits, and mouth-healthy foods.

After that, statistical paired T test was performed to see the knowledge advance before and after health education materials delivered. This test was followed by statistical Independent T test to analyze differences on knowledge level of improvement between Ambulu I elementary school and YosSudarso elementary school students.

Besides giving pre test and post test questionnaire, oral examination was also conducted to the students using OHI-S index in order to assess oral hygiene status ofAmbulu I elementary school andYosSudarso elementary school students.

RESULT

Dental and oral health education and training were given to small dentist cadres. These programs were attended by 24 small dentist cadres consisting of 18 cadres from Ambulu I elementary school and 6 cadres from YosSudarso elementary school.

Dental and oral health education was provided using discourse method combining with snake and ladder game as the game supporting tool method. This combining method turned out to attract participants' attention as they seemed to pay attention and listen to lectures and demonstration presented enthusiastically and orderly. Participant cadres then played snake and ladder games which embodying dental and oral health materials and seemed enjoying them much. It's proven by their enthusiasm when conveying questions and feedbacks to the materials delivered. In other words, the participants gave positive responses to the activity.

Not only did team servant give dental and oral health education and training to small dentist cadres in both schools, but they also held brushing teeth demonstrationwhich was followed by all students. Subsequently, evaluation was conducted by team servant by administering post test to the participants. The results showed that small dentist cadres' level of knowledge on dental and oral healthcare underwent elevation. Pre test and post test mean results can be seen in table 1

Table 1. Pretest and Posttest Mean Values of Ambulu I Elementary school and YosSudarso Elementary school

School Name	Pretest	Postest	Δ
Ambulu 1	53,62	87,78	34,16
SD YosSudarso	55,8	85,7	29,9

Explanation :
Δ= post test and pre test deviation value

Table 1 shows that pretest mean value of YosSudarso elementary school (55,8) is higher than that's of Ambulu I elementary school (53,62) whilst post test mean value is found higher in Ambulu I elementary school (87,78) than that's of YosSudarso elementary school (85,7). The pre test and post test mean value deviation is higher in Ambulu I elementary school.

Pre test and post test data were tested using KolmogornovSmirnof test and Levene test. The result indicates data are normal and homogeneous. Hereinafter, statistical Paired T test was conducted to observe knowledge improvement after education materialsusing snake and ladder games in Ambulu I and YosSudarso elementary school has been delivered. The result of statistical Paired T test can be seen in the following table.

Table 2. Pre test and post test statistical Paired T test result in Ambulu I elementary school

	Sig. (2 tailed)
Pre test-Post test	0,000

Table 2 shows significant difference ($p<\alpha=0,05$) between pre test and post test in counseling using snake and ladder game in Ambulu I elementary school. The result shows value increase before and after education using snake and ladder games delivered.

Table 3. Statistical pre test and post test paired T test result in YosSudarso elementary school

	Sig. (2 tailed)
Pre test-Post test	0,000

Table 3 illustrates significant difference result ($p<\alpha=0,05$) between pre test and post test value using snake and ladder game in YosSudarso elementary school. This result shows value improvement before and after counseling using snake and ladder game delivered.

Afterwards, Independent T test was used to observe knowledge differences before and after counseling using snake and ladder game between Ambulu I and YosSudarso elementary school. Statistical test result can be seen in the table 4.

Table 4. Statistical Independent T test result

	Sig. (2 tailed)
Equal Variances Assumed	0,483
Equal Variances Not Assumed	0,459

Table 4 displays significant result about 0,483 and 0,459 ($p>\alpha=0.05$).This result shows no knowledge differences after dental and oral health education was delivered using snake and ladder game between Ambulu I elementary school and YosSudarso elementary school.

Oral hygiene examination was also conducted using OHI-S index to assess oral hygiene status of Ambulu I elementary school students and YosSudarso elementary school students. OHI-S index examination result can be seen in table 5.

Table 5. OHI-S index mean value in both schools

School Name	OHI-S index
SD Ambulu 1	0,17
SD YosSudarso	0,14

Table 5 shows that OHI-S index is lower in YosSudarso elementary school, but generally OHI-S index in both schools are catagorizedas good.

DISCUSSION

This research used questionnaire as measuring tool to determine students' level of knowledge on dental and oral health. Several materials that were given to the students in this research were the causes of dental and oral diseases, various kinds of dental and oral purifiers, the right time to brush teeth and ways to brush

teeth correctly. In the causes of dental and oral diseases section, it's amplified that the major factors which drive an individual to the diseases are bacteria, dirty oral environment, and sweet and sticky foods. In the right time to brush teeth materials, it's explained that the correct times to brush teeth are after breakfast in the morning and before going to bed in the night. Students are also suggested to go to dentists at least once in 6 months.

This study aims to determine the effectiveness of dental and oral health education through snake and ladder game method to the students' level of knowledge on dental and oral health. This game will be taught to small dentist cadres in Ambulu I and YosSudarso elementary school students with an eye to improve students' level of knowledge on dental and oral health, especially for small cadre dentists and grade III to V students in both schools.

This research was divided into 3 sessions; pre test, counseling using snake and ladder game, and post test. Pre test was conducted to analyze small dentist cadres' level of knowledge before counseling. After that, small dentist cadres were given snake and ladder game method which consists of dental and oral health education materials. Students could see and read dental and oral health materials and images directly when playing the game which then elevate their level of knowledge. It would be recognized in their high scores on post tests.

Pre test and post test mean deviation value result in table 1 shows knowledge improvement after counseling with snake and ladder game delivered.

Knowledge advance which comes after counseling implies that an action can result in a change; something initially unknown becomes known and something formerly they don't understand becomes something understandable[10]. Dental and oral health education on this matter is an act of intervention in the form of knowledge provision that makes studentsfeel motivated to practice maintaining their dental and oral health properly that it can heighten their dental and oral health status.[11]

Knowledge advance is affected by counselors and the used media. Correct media and method help to achieve counseling goals. Every medium has different intensity to be understood by the counseling targets. The selected media depend on targets' level of education, types of targets, aspects to be achieved, the used methods and existing resources.[12]

There are differences in the knowledge advance level on each individual after counseling delivered. It originates from internal and external factors a individual has. External factors include individual environment such as family, school, etc. Internal factors consist of those which are derived from the will coming from an individual soul such as motivation, interest, willingness, desire, etc.[13]

From analysis results (table 3 and 4), it's known that game counseling using snake and ladder games works effectively intensifying students' knowledge on dental and oral health. Game based learning works more effectively enhancingstudents' knowledge because itdoes not merely offer materials but also fun and liberating atmospheres.[6]

Counseling as a process of learning will take more benefits when it's combined with games especially for children because learning and playing are active and fun combination for

them.[14]Snake and ladder game is familiar game for children. Dental health education materials with snake and ladder game are presented in image form equipped with information which can attract students' attention, train students' intelligence and dexterity to learn the ideas manifested inside. According to Edgar Dale cone, the acceptance process through original objects has the highest intensity to perceive the information whilst material delivery process using words works less effectively or at the lowest intensity.[15]

In this research, snake and ladder games are presented in the form of educational games. They are an example of education supporting equipments in teaching process. Educational games stimulate students' knowledge advance higher than those of conventional means for a number of reasonse.g pictures appeal students more than text, faster information acceptance. This game is also more interactive since pictures ease students to play in their mind to be oriented in problem solving.[16]

Snake and ladder game is counseling media at tenth layer of Edgar Dale cone. The snake and ladder game is presented in the form of educational games which will provide illustrations of the actual conditions that occur in everyday life making it works more effectively in enhancing students' knowledge about dental and oral health.

Analysis result shows no significant difference in students' knowledge advance after receiving snake and ladder game counseling. This result is due to student conditions in both schools which already had equally intelligent and easy to comprehend the materials delivered.

Dental and oral examinations were also conducted using OHI-S index toobserve students' oral hygiene. It implied that students already had good attitude and behavior to maintain dental and oral health; they accustomed to brush their teeth although it's not in the correct time.

The challenge encountered when implementing this activity is the difficulty in conditioning the students to be focused orderly. This problem can be overcome by the prepared game.

CONCLUSION

Dental and oral health education using snake and ladder method works effectively to increase students' level of knowledge about dental and oral health care.

In order to follow up these activities, it's suggested to build up other ongoing health promotional activities which aim to change people's behavior so that they have capability to keep and maintain teeth and mouth health independently and accustomed to healthy lifestyle.

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Case Report

Veneer Application As Instant Correction For Microdontia - Palatoversion Tooth

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ABSTRACT

Background. Nowadays tooth aesthetic gains a lot of attention, especially for ladies who live in metropolis city like Surabaya. Because of high rates of business in metropolis city, people tend to have a perfect tooth aesthetic instantly. They don't like a long and multiple visit treatments. Veneer is a thin laminate restoration, which is put on labial surface of anterior tooth. Veneer has a transparent look and its color similar with tooth. There are two types of veneer, direct and indirect veneer. In this case, we used indirect porcelain veneer because it has a perfect similarity with tooth and never going to change color. **Purpose.** To report that veneer can correct a simple tooth malocclusion with tooth anomaly instantly. **Case.** A 17 years old, female patient came to fix her left maxillary anterior tooth. Patient disturbed because she felt that the tooth has an abnormal size and asymmetrical also didn't locate in the right curve of spee. **Case management.** Labial tooth #22 surface was prepared with round end diamond bur. Preparation should be incisal capping veneer type. Impression is taken with rubber base impression material and sent to laboratory for veneer formation. A completely finished veneer should be seated on clean, dry and isolated prepared tooth. **Conclusion.** Veneer is a best choice to fix simple malocclusion at anterior teeth instantly. It has a perfect aesthetic and less visit treatment.

Keywords : Indirect porcelain veneer, palatoversion, microdontia, instant

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BACKGROUND

Nowadays tooth aesthetic gains a lot of attention, especially for ladies who live in metropolis city like Surabaya. Because of high rates of business in metropolis city, people tend to have a perfect tooth aesthetic instantly. They don't like a long and multiple visit treatment.

Advancements in the field of cosmetic and aesthetic dentistry have provided the dental professionals with new opportunities in conservative and aesthetic restorative procedures. There are various ways to treat cosmetic dental problems depending upon the problem per se. Diastema, tooth size discrepancy, discolorations, staining, fractures in teeth, endodontic treatment, and smile designing are some of the reasons for which patient seek aesthetic dental treatment[1].

As being less invasive, for both hard and soft tissues and granting satisfactory aesthetic outcome, the rehabilitation procedure with porcelain veneers has been widely welcomed by the patients. In addition, the modern improvement of composite cements, adhesive systems and simplified cementation procedures also enable the promotion of this effective treatment approach among the dentists. Porcelain veneers is a thin bonded ceramic restoration that restores the facial surface and part of the proximal surfaces of teeth requiring esthetic restoration.[2]

Porcelain laminates has the following advantages: tooth structure preservation because of minimum or none prepare; thermal expansion similar to that of enamel, appearance similar to that of tooth, color stability, biocompatibility with periodontal tissues, resistance to wear, reinforcement of tooth structure, gloss retention, longer clinical longevity than that of resin composite veneers.[3,4]

CASE AND CASE MANAGEMENT

A 17 years old female patient came to fix her left maxillary anterior tooth which was microdontia and palatoversion. Patient disturbed because she felt that the tooth has an abnormal size and asymmetrical, also didn't locate in the right curve of spee. The patient was unhappy with the appearance of her teeth and restrained herself from smiling due to self-consciousness. A detailed family history, medical history and dental history was obtained. In family history, none of his family members had similar problem. (Figure 1)

Anamnesis showed tooth #22 asymptomatic. Clinical examination showed that tooth # 22 vital, no hypersensitivity, microntia, palatoversion, surrounded by normal gingiva.

Figure 1. # 22 microdontia and palatoversion

Owing to its minimally invasive nature and excellent aesthetic qualities it was decided to enhance her appearance using porcelain laminate veneers. Porcelain Laminates veneer for maxillary left lateral incisor was planned.

Depth orientation grooves were placed on the facial surface of the tooth with 0.3mm and 0.5mm three wheel diamond depth cutter on the gingival half and incisal half respectively. The tooth structure remaining between the depth orientation grooves were removed with a round end tapered diamond so the prismatic top surface of mature unprepared enamel, which is known to offer only a minor retention capacity, was removed. A chamfer finish line was placed lightly subgingivally in the maxillary anterior teeth. Distally the tooth preparation was extended into the contact area but terminated facial to the contact area. An overlapped incisal edge preparation was chosen because incisal overlap provides a vertical stop that aids in the proper seating of the veneer. The lingual finish line was placed with a round end tapered diamond, approximately one fourth the way down the lingual surface connecting the two proximal finish lines. The finish line should be minimum 1mm away from centric contacts. The veneer extended onto the lingual surface will enhance mechanical retention and increase the surface area for bonding. (Figure 2)

Figure 2. #22 Tooth preparation

After gingival retraction, impression of maxillary arch was obtained with irreversible hydrocolloid rubber base impression material with customized impression tray. The shade was selected with VITA Master shade guide. (Figure 3)

Figure 3. Register initial tooth color

Provisional restorations were not required as the tooth reduction was minimal and restricted to enamel. The porcelain laminates were fabricated and were tried in for shade, fit, marginal adaptation, shape, size, symmetry and contacts. Patient's approval was obtained at the time of try-in.The cementation appointment: Was carried out as laminate preparation and tooth preparation for cementation. Dual cure composite crown and bridge luting agent (Rely X, 3M, USA) was to be used for cementation. (Figure 4)

Figure 4. #22 Porcelain veneer insertion

DISCUSSION

The term of microdontia is used when teeth are smaller than normal. According to Shafer et al there are three types of microdontia : true generalized microdontia, relative generalized microdontia, and microdontia involving single tooth. Microdontia involving single tooth is rather common condition. It affects most often the maxillary lateral incisor and the third molar. One of the common forms of localized microdontia is that which affects the maxillary lateral incisor, and this condition has been called the "peg lateral".[5]

Palatoversion is one of teeth malocclution conditions. The term "irregularities of teeth" as applied to

teeth that were twisted or unevenly arranged, did not express the full meaning of these deformities. The term "malocclusion" would be more expressive. The World Health Organization (1987), had included malocclusion under the heading of Handicapping Dento Facial Anomaly, defined as an anomaly which causes disfigurement or which impedes function, and requiring treatment "if the disfigurement or functional defect was likely to be an obstacle to the patient's physical or emotional well-being". Proffit (1986) elaborated that malocclusion might be associated with one or more of the following:

a) Malalignment of individual teeth in each arch: a tooth in an arch may occupy a position deviating from the smooth curve of line by being; tipped, displaced, rotated, in infra-occlusion, in supraocclusion and transposed.

b) Malrelationship of the dental arches relative to the normal occlusion: may occur in any of the three planes of spaces: anteroposterior, vertical or transverse.[6]

A veneer is labial partial crown which looked like a thin layer of tooth colored material that is applied to a tooth for esthetically restoring localized or generalized defects of or intrinsic discolorations. Veneer indications are for fracture anterior teeth, large noncarious cervical lesion on anterior teeth, discoloration resistant to bleaching, developmental enamel defects, closing spaces in anterior teeth, correcting mild malalignment of anterior teeth.[3,7]

There are two types of veneers according to design : partial veneer, full veneer. There are two types veneer based on method of fabrication : Direct veneers with composite material and indirect veneers with porcelain material. Indirect porcelain veneer has more advantages than direct composite veneer. It less technique sensitive than direct veneer, multiple teeth can be done in less time, chair time required for indirect veneer is less, produce better contour, contact and shades, has longer life than direct veneer, better retention, less prone to stains, good aesthetics, less prone to fractures than other types of veneers.[3]

Procedure of tooth veneer preparation is cleaning the teeth, selection the shade, tooth isolation and retraction of gingiva using retraction cord. To achieve esthetic and physiologically sound results consistently, an intraenamel preparation is usually indicated. The only exception is in cases in which the facial aspect of the tooth is significantly undercontoured because of severe abrasion or erosion. In these cases, mere roughening of the involved enamel and defining of the peripheral margins are indicated. Intraenamel preparation (or the roughening of the surface in undercontoured areas) before placing a veneer is strongly recommended for the following reasons: to provide space for opaque, bonding, or veneering materials for maximal esthetics without overcontouring, to remove the outer, fluoride-rich layer of enamel that may be more resistant to acid etching, to create a rough surface for improved bonding, to establish a definite finish line.[3,8]

Different preparation designs have been advocated from feather and window preparations that involve no reduction of the incisal edge or preparation of the lingual surfaces, to other preparations that involve reduction of the incisal edges. Incisal preparation is carried over the incisal

edge from buccal to palatal, with up to 1.5-2 mm of incisal reduction. Tooth preparation that incorporates incisal edgeis preferable, because the veneer is stronger and provides a positive seat during cementation. Moreover, this preparation design is simple and the incisal translucency is easier to be created by the ceramist.[9]

An elastomeric impression is made of the preparations. If the gingival margins are well isolated and spaced from the retraction cord, the cord may be left in place during impression making. If the margins are subgingival or close to the gingival tissue, however, better access for recording the gingival margin is afforded by cord removal just before injection of the impression material. It also is recommended that the lingual aspect of the gingival embrasures be blocked out with soft wax if the gingival embrasures are open faciolingually. This step prevents penetration and interlocking of the impression material through the gingival embrasure, which often results in torn impressions, especially along critical marginal areas.[8]

A light-cured resin cement is recommended for bonding the veneer to the tooth. Attempting to achieve the color compatibility among the porcelain, tooth, and cement, the cement shade was chosen. This was achieved through shade guides and hydrosoluble pastes whose shades are equal to those of the cements and enable the evaluation of the color onto the tooth.[4]

On the other hand long-term study of porcelain veneers is required in order to study their marginal integrity, marginal staining and their effect on gingival tissues ideally 0.3 mm of thickness for each shade change. Based on literature it appears that if the veneer precision. This ensures minimal damage to tooth and gingiva and ensure optimal long-term prognosis. Despite following all precautions, because of the delicate nature of porcelain veneers, a possible post-operative complication is cracking. If the veneer has been well bonded to the underlying enamel and is not an aesthetic concern, the patient should be informed and the veneer should be left in place.[2]

RESULT

Veneer is a best choice to fix simple malocclusion at anterior teeth instantly. It has a perfect aesthetic and less visit treatment. Porcelain veneers can provide successful esthetic and functional long-term service for patients. Porcelain laminate veneer offers more extensive applications when they are used cautiously and the results achieved have been gratifying for the cosmetic dentist and the patient alike. It has become increasingly apparent that conservation of tooth structure is a major factor in determining the long-term prognosis of any restorative procedure.

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CASE REPORT

Prosthetic Rehabilitation of a Partially Edentulous Patient with Chronic Periodontitis

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ABSTRACT

Background: *One of the most common inflammation disease in the oral cavity for the past few years is the chronic form of periodontitis. Patients with chronic periodontitis, who her jobs requires to interact with people are a real challenge for the dentist and the prosthetis. The problem with the traditional method is the fact that for rehabilitation of patients who have lost their tooth/teeth , has to be waited for approximately 8 to 12 weeks before having their dentures. There are many advantages of immediate as opposed to conventional complete denture. Hence, dentists have no opportunity to observe the anterior teeth at the try in appointment; therefore, the esthetic result cannot be evaluated until the dentures are inserted.* ***Purpose:*** *The prosthetic rehabilitation of a partially edentulous patient with chronic periodontitis using immediate maxillary full denture and immediate mandibular partial overdenture.* ***Case and Case management:*** *We presented a patient suffered from chronic periodontitis with major complain of her teeth mobility, mostly anterior teeth. She had undergone periodontal treatment, but the result were bad. In maxilla, at the end of peridontal treatment, all of her teeth need to be extracted and replaced by dentures. In mandible, there were some teeth that can be used as abutment for an overdenture, so we decided to place immediate partial overdenture in mandible with consideration both of her functional and esthetic aspects.* ***Conclusion:*** *One of the advantages of immediate dentures is patients don't have to be in edentulous state for any length of time. After treatment, patient was evaluated, fortunately she had no complaints and was happy with her new smile.*

Keywords*: immediate denture, overdenture, chronic periodontitis, esthetic*

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BACKGROUND

An immediate denture is a dental prosthesis constructed to replace the lost dentition and associated structures of maxilla and mandible and inserted immediately following removal of the remaining teeth. An immediate denture can replace 1-6 teeth in either the maxillary or the mandibular arch or in both arches.[1] There are some contraindications to immediate dentures, such as cardiac, endocrine and blood disturbances, slow healing potential, or emotional disturbances, mental incapacity, indifferent and unappreciative patients.[1] Some advantages of immediate dentures such as: the denture acts as a bandage or splint to help control bleeding; to protect against trauma from the tongue, food or teeth if present in the opposing arch, and to promote rapid healing; patients regain adequate function in speech, deglutition and mastication much sooner compare to conventional complete denture, many patients are not afraid to have teeth removed if they can have them replaced immediately. They would have a social and familial life without embarassement. Some disadvantages of immediate denture are : the procedures are precise and time consuming and need require more appointments, particularly during the adjusment phase; the resorbtion is faster than the changes of healed tissue. These changes require new impressions to keep the denture base adapted to the basal seat. The remounting of the dentures to refine the occlusion is necessary whenever the denture base is altered; there is no opportunity to observe the anterior teeth at the try in appointment; therefore, the esthetic result cannot be evaluated until the dentures are inserted.[2]

Chronic periodontitis usually prevalent in adult but can occur in children and the amount of destruction consistent with local factors. Their teeth are likely to be mobile in various degree depend on how bad is the bone destruction.[3] In severe chronic periodontitis followed by teeth mobility, the vast majority of general dental practitioners will extract all of the teeth and made complete dentures for the patient. In modern dentistry, we can combine between complete denture and overdenture to solve patient with periodontitis case. Although some conditions must be carefully understanding by the dentist. Several periodontal factors are critical to the prognosis of overdenture's abutment teeth. The efficacy of a professional periodontal maintenance program, which is coordinated with a home oral hygiene program, is related to the success of overdenture therapy.[4] In periodontitis case, teeth or roots that possess a sufficiently good prognosis can be used as abutments in overdenture treatment plan. Some advantages of preserving teeth or roots are : psychological benefits to the patient, effects upon the edentulous ridge, tactile discrimination, improved stability and retention of the denture.[5]

Patients suffering from chronic periodontitis which involved their anterior teeth, nowadays can be relieved. By placing immediate denture, whether it is complete denture or partial denture, we may achieve a good result of denture. Patients don't need to be edentulous for any length of time, so they can do

social activity without any embarassement.[1] It also depends on case selection and proper prosthodontics treatment, considering important factors as mentioned above.

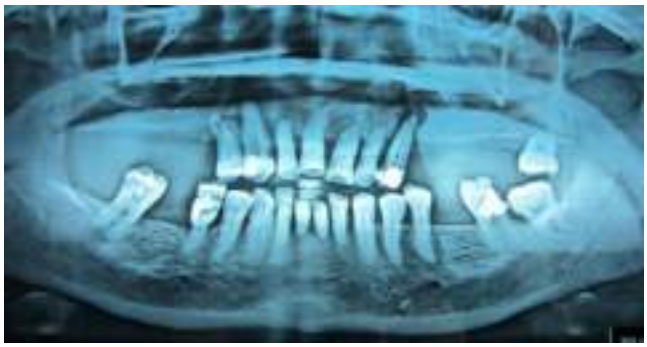
CASE

A 51 years old woman, came into dental practice with major compalin of her esthetic and chewing problems due to her mobile teeth. The woman was adamant that she could not be edentulous for any length of time. She was very cooperant and from the psychological points of view, a philosophical type. Patient already had her teeth extraction on 13,14 before she came to us. After her medical, dental and social history was obtained, she was examined clinically and radiographically. Within the last 3 months the patient had undergone periodontal treatment (composite splinting in her upper and lower anterior teeth). Intraoral examination revealed generalized bleeding on probing with varying pocket depth up to 8mm in the labial segments. All the incisors had grade 3 mobility. Radiographs showed generalized horizontal bone loss, which was advanced in the upper and lower labial segments. Additionally, the patient's occlusal vertical dimension was decreased. The "before treatment" pictures were shown at the picture below.

picture 1. Intra oral examination of patient

CASE MANAGEMENT

Examination clinically and radiographically was performed on patient. We did initial impression using alginate to determine the best treatment for her. Endodontic treatment was done in teeth number 32,33, and 43 because we would use those teeth as an abutment teeth for overdenture treatment. The calculus and plaque were removed thoroughly in maxillae and mandible. The hopeless teeth were extracted.



picture 2. Radiographic image of the intraorally condition

From picture 2, we can see there was a mass destruction of the periodontal ligament of her anterior teeth, both in maxillae and in mandible. Some teeth were not supported by adequate periodontal ligament, that's why, we should have extracted some hopeless teeth.

As a next phase, we examined the vertical dimension of patient. Because some of her teeth were mobile, we had to examine whether the vertical dimension of her was decreased of still in a good dimension. We did the *Willis methode* to determine her occlusal vertical dimension. And the result was her vertical dimension was decreasing 2mm. So, we had to designed her final prostheses with 2mm increasing of her vertical dimension.

To increase her vertical dimension, we did the preliminary bite registration. First, we determined her vertical dimension while in rest position and her vertical dimension while in centric occlusion. After we got the "before" occlusal vertical dimension, then, we determined the "after" vertical dimension which we've been raised in 2mm by the help of bite registration materials. Patient were instructed to bite in centric relation, and stopped 2mm before her maxillae and mandible were contacted. At the 2mm space,we put the bite registration materials to fill the space. The result were shown as the picture below.

picture 3. Preliminary bite registration done by using bite registration

Then, we take the functional impressions using medium bodied elastomer to get the precise result. The functional model were put on "average articulator" by using the bite registration materials before.

The final working model on articulator as shown below on picture .

picture 4. Final working model on articulator

Then we did the tooth arrangement. At the edentulous ridge, we try-in the position of artificial teeth in patient (picture 5). After that, we decaputed the teeth which will be used as an abutment teeth of overdenture (teeth number 33,34, and 43) and covered it with glass ionomer cement type 2 (picture 6).

picture 5. Try-in the tooth arrangement for edentulous area

Picture 5 showed us, we could only try-in the tooth arrangement for the edentulous area, not in the area which we would have done the immediate denture.

picture 6. Decaputation of the abutment for overdenture

In the working model, we decaputed the mobile teeth (teeth number 12, 11, 21, 22, 23) and abutment teeth for overdenture (33, 34, 43) and we did the tooth arrangement at the space.

We're ready to place the immediate full denture on maxillae and immediate partial overdenture on mandible. The day before the extraction of 12, 11, 21, 22, 23 patient was instructed to take premedical treatment. She had to take *amoxsan* (3 times a day, for 5 days) and *ponstan* (3 times a day for 2 days). Those medications must be taken until post extraction and denture inserted.

At the appointment day, we did extraction on teeth number 12, 11, 21, 22, 23, 31,32,41,42 and did the suturing on those regio (picture 7).

picture 7. The extraction done for maxillae and mandible

After extraction, we immediately inserted the dentures on maxillae and mandible (picture 8).

picture 8. The insertion of immediate denture on maxillae and mandible

The intra oral image after insertion of immediate dentures was shown at picture 9.

picture 9. Intra oral image after insertion

Patient was instructed to use the dentures on first 24 hours and not to replace the dentures even she slept. The dentures must not be used to chew, only to drink and speak. She must not ate and drunk hot food or beverages, must not rinse and gargle.

Picture 10 and 11 showed the difference of patient's profile, before and after treatment.

picture 10. Patient 's front profile before treatment (left) and after treatment (right)

picture 11. Patient's side profile before treatment (left) and after treatment (right)

First post insertion appointment, did 24 hours after insertion. The result was good, no sign of traumatic ulser both in maxillae nor in mandible. The post extraction site was still intact and no over bleeding in the site. Patient was instructed to maintenance her oral hygiene. Now, she had to replace the dentures every night and clean the dentures by using dentures cleanser or liquid soap. Patient was told to have her second control appointment 3 days after.

At the second appointment, the soft tissue were totally healed. And we removed the suturing of the ridge. Next appointment would be a week after.

At third appointment, there were no complain from patient. She had adapted with her dentures and could speak and ate comfortably. The retention and stability of her dentures were good. So she instructed to still maintenance her oral hygiene and have routine appointment with us every 3 months to check the retetion and stability of her dentures. We would do the relining procedures if, then, in the future, the dentures were not stable or not retentive anymore.

DISCUSSION

Patient's self perceived needs, expressed desires and expectations are the essential parts of an evidence based model for prosthodontics treatment planning.[6] Since the patient perceive wide ranges of dental needs, it was assumed that not only did the clinical aspects of the tooth loss influence the treatment needs. The human ability to adapt physically and psychologically to changes in the oral condition, and to cope with these impacts when the pain symptomps are absent, may act in addition to external factors like the environment and the social context.[6]

The use of immediate denture, although there are limitations, the final outcome is usually positive. One of the most important esthetic advantage of immediate dentures is that the patients ar spared the inconvenience and distress of being seen in public without teeth. One disadvantage of immediate dentures is the inability to review tooth arrangement and esthetics before processing and inserting the dentures. In most situations, the anterior teeth are arranged to duplicate the patient's natural tooth arrangement. The positions of natural anterior teeth are not always compatible with esthetic, and it may not be desirable to duplicate these positions for every patient. Careful evaluation of the vertical dimension of occlusion, centric relation and the placement of the teeth are essential factors for the success of the treatment.[7]

Another limitations of immediate dentures is there may not have sufficient space to position the teeth correctly and esthetically. In this case report, the patient with a chronic periodontitis disease made another challenge for the dentist. The soft tissue and overall ridge are very good at the time of extraction, but after several weeks the resorbtion is accentuated.[3] Therefore it is very important for the dentist to get an adequate information of the existing periodontal disease in patient and how far it will impact our prosthodontics treatment in order to make a suitable prosthesis for the patient. A good case selection will make an excellent result both to the patient and to the dentist.[8]

The used of overdenture to a selected teeth in periodontics case, will also provide good result of treatment which the roots not only provide periodontal ligament to support the teeth but also maintaining the alveolar ridge. Studies have indicated that bone loss in complete denture wearers were at least 8 times as much as bone loss in overdenture wearers.[9]

Moreover, frequent hygiene recalls and proesthetic maintenance are essential tools to achieve a good long-term prognosis in this case.[8]

RESULTS

Patient was very happy with her new teeth, new smile and adapted very well with her dentures. No chewing problems at all. She was satisfied with both the retention and the esthetics of the dentures.

CONCLUSION

Treatment of patient with chronic periodontitis followed by teeth mobility presents a real problems from both functional and esthetic points of view. An esthetic result also will result in an

improvement in the patient's quality of life. Treatment using immediate dentures allow patients to continue their social and bussiness activities without being in edentulous state. This advantage can be demanding and challenging, as the arrangement of artificial teeth cannot be observed at a try in appointment. It is important for both the patient and the dentist to understand the limitations of the procedure. Overdenture has many advantages, especially to preserve the alveolar bone and in advanced, provide better retention of prostheses. With proper selection of the patient and the abutment teeth, a well-designed home care regimen and frequency of recalls, and proper execution of maintenance care, chances for long term success of overdenture therapy will be much improved.

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CASE REPORT

Apex Resection On Post Endodontic Treatment Tooth With Periapical Cyst

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ABSTRACT

Background: *Apex resection is the most surgical effort in endodontic surgery due to its high survival rate. Apex resection especially indicated for periapical lesion cases with open apex involvement that cannot be managed with conventional endodontic (retreatment). The main goal of apex resection is to prevent bacterial leakage from the root-canal system into the periradicular tissues by placing a tight root-end filling following root-end resection.* ***Purpose:*** *This case report want to show that the apex resection is the choice of treatment on post endodontic treatment with radicular cystic.* ***Case and Case Management:*** *A 40 years age women in maxillary anterior teeth (central incisors left first) post endodontic treatment 2 years ago. Clinically, tooth discoloration becomes greyishbrown and the patient often complain of pus came out from the labial tooth. Apex resection treatment.* ***Conclusion:*** *Maxillary central incisors left first on post endodontic treatment with radicular cystic can be successfully managed by apex resection.*

Keywords : *apex resection, post endodontic treatment, radicular cyst*

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BACKGROUND

Apex resection is a form of periapical surgery that most performed and most common. [1]Where one goal apex resection is to ensure the placement of a cover material exactly between periodontium and root canal foramen.[1] If obturation ortogradly is not unsatisfied , then a surgical procedure can control and manipulate the material placement area with fillings. The better obturation in the apical region, so the prognosis and success rate is better.[2]

The apex resection is hopefully dispose of pathological tissue at root tip and also get rid of the root tip with root canal and ramifications that infected while at the same time close that tip root to prevent infection in the future days. The ideal healing expected from the apex resection is regeneration bone, apposition cement, and formation of structure that resemble the new periodontium tissue around the teeth.[3,4]

CASE

A 40 years-old-female come to RSGM FKG UHT Surabaya with complaint of the maxillary anterior teeth (central incisors left first) often excrets the pus at the gums. The teeth has received root canal treatment 2 years ago. On clinical examination, the appearance of teeth 21 had changed colour to greyishbrown shows with existent of fistula at mucosa gingiva on labial part and pus came out from the fistula.

Radiography examination shows that obturation is not hermetic, is not reaching the apex, periapical region shows radiolucent well-defined with diameter 4 mm and spread into apical teeth 22. Based on the examination, the diagnose of teeth 21 is post endodontic treatment with periapical lesion. The treatment plan is done by retreatment of root canal with apex resection and obturation retrogradly with MTA.

Figure 1: Radiograph (pre-operative)

Figure 2: Clinical (pre-operative)

CASE MANGEMENT

First visit. First we do the diagnose, taking extra oral photo (digital), root canal filling removed and preparation root canal biomecanic using K-file until enlargement number 80. After the root canal is irrigated and dried, do obturation sealer is done using gutappercha that smears with canal cement. Periapical photo is recreate to evaluate the result of obturation. Then cavity filled using temporary filling. Second visit. Operation preparation, the patient is informed about the procedure on what will be done and what must be done on post operation. Patient fill the agreement operation procedure and sign the informed consent. Then we end list the step of the operation, like : disinfection the operation area, infiltration anasthesi supraperiosteal at apex region of teeth 21 with phcaine 2 cc, flap incision semilunar region 21 and 22, also reflection of the tissue with rasparatorium, bone opening or apex exist until apex 21 and 22, because there is pus existence so we do punction to take the pus with spuit and then do periapical curettage done with irrigation with saline sterile, the apex tip is cut with inclination of 45 degrees to axial teeth using fissure surgical bur until the tip of gutappercha appeared, preparation of apex tip with small round bur, the closing of teeth apex cavity in retrograde with using MTA, bone graft application, returning the composition of the former composition flap and do the suturing with 4 sutures, radiology photo post apex resection, post operation instruction and reminder to control a week later and prescribe NSAID, antibiotic and analgesic drug.

Figure 3: Bone opening

Figure 4 : Curettage

Figure 5 : Root Resection

Figure 6 : MTA placement

Figure 7 : Bone graft aplication

Figure 8 : Suturing

Third visit. A week control post operation. The surface of wound is clean with antiseptic solution, the string is cut and taken, evaluation with radiography 5 weeks later post operation, shows the sign of healing and reparation at alveolar bone cavity with radiopaque appearance.

Figure 9: After 1 week

Figure 10: After 5 weeks

DISCUSION

Results of evaluation of dental radiographs showed 21 post treatment dental root canal filling is not perfect and is accompanied periapical abnormalities to overcome the failure of treatment, root canal treatment should be repeated, so as to prevent the development of more extensive periapical lesions.[2,3] Then do apex resection surgery to ensure the placement of a substance or fillings with right between the periodontal and root canal foramen. endodontic surgical care measures reported by Friedman can deliver success 73% to 99% when combined with endodontic treatment.[5]

Strategy to remove low density guttaperca charging preceded by making grooves using a K-file # 15, which is inserted between the guttapercha and the canal walls with a working length estimation of photos diagnosis. after forming a groove, extirpation file inserted into the groove and rotated half a turn pulled out. The next stage doing biomechanical preparation of the root canal, using techniques stepback.[6] Election this technique because generally lumen anterior root canals large and shaped oal. cleaning and shaping the root canal reaches a maximum in the K-file # 80.[1,7] Irrigation is done every turn of the file to use as much as 2.5% NaOCl solution 2,5ml acid, ethylene-diaminetetraacetate (EDTA) 15% as much as 1ml, and chlorhexidine (CHX) 2,5ml as much as 0.2ML.[8]

Root canal filling using sterilize main guttap percha that's smear with canal cement with main component is resin with calcium hydroxide included.[9] The filling is using vertical condensation technique so that we can get result of thick root canal filling. Root canal filling is done first with intention to prevent blood contamination to the root canal system if done in the same at operation procedure, after that to shorten the operation time.[2,10] The final restoration at teeth 21 is post crown because to repair the teeth esthetic that have changed colour.

At this stage of operations, mucogingival flap incision design with two incision lines to facilitate mucosal flap elevation and retracted to obtain sufficient field of view so that the apex of the tooth 21 seen, in addition to aesthetic considerations post-healing wounds. Closure apex of the tooth cavity in retrograde, aim to prevent the intrusion of system fluid into the root canal system, that can lead to the development of microorganisms in the root canal system and result in treatment failure.[3,11]

Apex covering materials used are MTA, contents of MTA are calcium silicate CaSiO3, bismuth oxide Bi2O3, calcium carbonate CaCO3, calcium sulfate CaSO4 and calcium aluminate CaAl2O3.[12] When mixed with water MTA will form amorphous calcium oxide crystal. This material will glue well on the surface of the root end and the apex cavity when the surface was cleaned from dentin debris and dried , after the excess material removed and cleaned although this material in bone cavities do not give inflammatory reaction. MTA has excellent biocompatibility with pH of 12,5 and a very low toxicity that included materials that are non-cytotoxic and non-mutagenic.[13,14] In addition, it has the ability to act as an anti bleeding due to the effects vasoconstriction that contained in calcium ions that influx into calcium canal so that the contractile effect block by calcium

canal blocker nifedipine.[14] Evaluation results of retrograde filling materials MTA can be seen radiographically in density gives an overview radiopaque for their content of bismuth oxide as a contrast material.[15,16]

Sewing the flap into it's original position aims to get completely wound closure and prevent secondary infection during the wound healing process.[16] In five weeks postoperative, radiographic evaluation showed the healing and repair of the alveolar bone cavity. It appears as a radiopaque picture is more apparent when compared with periapical photo before maintenance actions. This situation is possible because of the bone graft that helped spur the growth of new bone.[2,13,16]

CONCLUSION

Maxillary central incisors left first on post endodontic treatment with periapical lesion can be successfully managed by retreatment of root canal with apex resection and obturation retrogradly with MTA. Re-obturation root canal with main guttappercha and root canal cement also procedure close root tip with MTA is the best choice for this case. Examination post operation included pain is gone and insision has healed without scars.

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CASE REPORT

Oral Mucocele in Pediatric Patient : a Case Report

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ABSTRACT

Background : The mucocele or mucous retention phenomenon is a salivary gland lesion of traumatic origin, formed when the main duct of a minor salivary gland is traumatized with subsequent extravasation of the mucus into the fibrous connective tissue so that a cyst like cavity is produced. The wall of this cavity is formed by compressed bundle of collagen fibrils and it is filled with mucin. Mucoceles are known to occur most commonly on the lower lip, followed by the fiber of mouth and buccal mucosa being the next most frequent sites. **Purpose :** This case reporting management of mucocele on lower labial mucosa due to traumain pediatric patient. **Case** : 9 years old male child visited the dental clinics with the chief complain of painless swelling in the lower lip. History of present illness includes swelling in the central lower lip since 2 months, and no history of fever or malaise was present. Patient had lip biting habit. **Management :** The patient treated with complete excision of the lesion. **Conclusion** : Mucocele is a common disorder in children and the small lesion can be treated with complete excision.

Keywords : mucocele, salivary gland, extravasation, excision

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BACKGROUND

Mucocele (from the Latin terms mucus, or mucus, and coele, or cavity) is a clinical term that describes swelling caused by the accumulation of saliva at the site of a traumatized or obstructed minor salivary gland duct.[1,2] Mucocele occur when injury to the minor salivary glands occurs usually secondary to trauma, biting one's lip, chronic inflammation with periductal scarring, excretory duct fibrosis, prior surgery, trauma from oral intubation, or rarely, minor salivary gland sialolithiasis.[3]

The incidence of mucocele in the general population is 0.4-0.8%.[1] Most mucocele occur in young individuals, with 70% of individuals being younger than 20 years. The peak prevalence occurs in persons aged 10-20 years.[3] Nico et al reported 104 patients with mucoceles, 52 were less than 20 years old (50%) and 36 patient (34,6%) were less than 15. Of these, 22 were under 10 years old.[4] Mucocele more frequent in the minor salivary glands, however such lesions can also be found with less frequency in the major salivary glands.[1] This lesion mainly occurs at the mucosa of the lower lip, due to frequent biting (40-80% of all cases) followed by the cheek mucosa and floor of the mouth.[1,5,6] The tongue, palate and upper lip are infrequent locations.[1] In pediatric patient, Nico et al found 30 mucocele (83,3%) on the lower labial mucosa.[4]

Clinically, the lesion is painless and presents as a smooth round or oval swelling that fluctuates. Its color is normal or slightly bluish, and its size ranges from a few millimeters up to 2 cm.[5] Mucocele can cause discomfort by interfering with speech, chewing or swallowing. In most cases these lesions rupture spontaneously or traumatically a few hours after being formed, with the release of a characteristic viscous, mucoid fluid. In the case of repeated trauma, the lesion may become nodular and firmer in response to palpation–rupture in this situation being more difficult. According to Harrison, the lesions develop over a period of one week to five years, though the most common duration is three weeks to three months.[1]

The treatment of choice for mucocele is surgical excision.[2] Removal of the mucocele must include excision of the underlying damaged minor salivary glands to avoid recurrence.[7] Some patients may experience spontaneous resolution or rupture of their mucocele or ranula. Many different treatment options exist such as sclerotherapy, marsupialization, and excision with or without combined excision of the involved salivary tissue.[8]

In this case a patient suffers swelling on his lower labial mucosa. This case report discusses management of a 9-year-old boy with mucocele on his lower labial mucosa due to trauma.

CASE AND CASE MANAGEMENT

On 10th January 2016, a 9-year-old boy came to private practice (Dental Kids Smile) at Surabaya with complained of swelling on his lower lip. The swelling first noticed by his mother about 2 months earlier. Anamnesis known that he had a lip biting habit. He did not feel any pain but the swelling interfered with speech and chewing.

Clinical examination revealed that general condition of the patient was good. There's no known disorder in patient's and family medical history. He had no para functional habits.

Intra oral examination of lower labial mucosa showed round swelling, about 7 mm, smooth in surface, normal mucosa color, and painless (Figure 1).

Figure 1. Swelling of lower labial mucosa

Clinical diagnosis of this case was mucocele. The differential diagnosis of this case was lymphangioma and lipoma. Patient then scheduled for operation at the next day.

In the next day (11th January 2016), patient came for operation. The procedure began with local anesthesia around the mucocele (Figure 2, A). After that, an elliptical incision is made on the mucosa around the lesion to facilitate dissection of the lesion (Figure 2, B). Then the superior wall of the lesion is grasped with a hemostat together with the overlying mucosa and is separated from the surrounding tissues using scalpel. After removal of the lesion (Figure 2, C), the mucosa of the wound margins are undermined and superficially sutured (only at the mucosa) (Figure 2, D). The lesion was sent to pathology laboratory for diagnosis confirmation. Patient was given amoxicillin 250 mg 3 times daily and paracetamol 250 mg twice daily for 3 days.

Figure 2A, 2B. The operation procedure: A. After local anesthesia, B. Elliptical incision around cyst with scalpel

Figure 2C. Surgical field after removal of lesion, and **2D**. Operation site after placement of sutures.

One week later (18th January 2010) the patient was scheduled for control. The post operative results was good. The wound already healed and there is no complained (Figure 3). The result of histopathological examination revealed mucous pools surrounded by granulation tissue

.

Figure 3. The wound already healed.

DISCUSION

Mucocele, also known as mucous cyst is a benign, common, mucus-containing cystic lesion of the minor salivary glands in the oral cavity. Some authors prefer the term mucocele since most of these lesions are not true cysts in the absence of an epithelial lining.[9] Two main types of mucocele are recognized.[6] These lesions classically have been divided into retention mucocele and extravasation mucocele.[1] Extravasation mucocele which results from duct rupture due to trauma and spillage of mucin into the surrounding soft tissues account for over 80% of all mucocele, and are more common in individuals under 30 years of age.[1,6]They are in fact pseudocysts lacking a well defined wall, and are composed of compressed elements of the surrounding connective tissue, and inflammatory components. Extravasation mucocele are fundamentally located in the lower lip (80%).[1] Retention mucocele which usually results from ductal dilation due to ductal obstruction are seen particularly in elderly patients.[1,2,6] It consist of a well defined cystic cavity

presenting an epithelial wall lined with cuboid or squamous cells. Retention mucocele are uniformly distributed throughout all the territories that contain minor salivary glands.[1]

Harrison reported that in younger patient most mucocele are of extravasation type. Jimbu et al hypothesized that mechanical trauma may be more pronounced in younger patients, favoring extravasation mucocele (thought to be posttraumatic).[4]

In most cases, diagnosis can be established from clinical details, although all excised tissue should be submitted for histopathological examination to confirm diagnosis.[7,9] After history examination that the lesion appeared in young patient due to mechanical trauma and clinical examination that the lesion located on lower labial mucosa, diagnosis of this case was extravasation mucocele.

Histopathological findings of extravasation mucocele revealed a separation of the epithelium from its underlying submucosa and the formation of a subepithelial mucus-filled vesicle. A mild-to-moderate chronic inflammatory cell infiltration is observed in the underlying connective tissue, along with excretory ducts that may demonstrate ductal dilatation.[3] The result of histopathological examination which revealed mucous pools surrounded by granulation tissue confirmed the diagnosis of extravasation mucocele.

Differential diagnosis of this case was lymphangioma and lipoma due to resemblances of clinical appearance but lymphangioma and lipoma do not contain of mucus.

Surgical excision is the most commonly used method although if extirpation is not complete recurrence is frequent. Baurmash HD showed that there are 3 possible approaches to the management of mucocele of the lower lip which also apply. The small lesion can be completely excised, making sure to include the associated salivary gland tissue as well as any marginal glands before primary closure. Large mucocele are best treated with an unroofing procedure (marsupialization). The third procedure involves the dissection of the mucocele along with the servicing mucous glands. This technique is performed on moderate sized lesions. As in the excision technique, all marginal glands should be removed before primary closure.[9]

This case was treated complete excision because the lesion was quite small. The excision included the associated salivary gland tissue to avoid recurrence. Oral antibiotic (amoxicillin) was given to prevent secondary infection. Meanwhile oral analgesic (paracetamol) was given to reduce pain after the operation procedure.

Mucocele in children are not rare. In this case mucocele was induced by trauma. Diagnosis of mucocele was defined based on history examination and clinical examination, and confirmed with histopathological examination. The treatment of this case was complete excision of the lesion.

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RESEARCH ARTICLE

Expression of Osteopontin And Osteoblasts After Given Alloplast With PRF Compare To Xenograf With PRF On Bone Defect

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ABSTRACT

Background: *Bone grafts have been widely used to repair bone defects, which are caused by trauma, tumor resection, degeneration due to pathological processes, and congenital bone defects. Type of bone graft is classified into several types, autograft, allograft, xenograft, and alloplast. PRP and PRF derived from auto logous blood which sendsa high concentration of growth factors on bone defect area. Osteopontin (OPN) is a phosphorylated acidic glycoprotein in the extracellular matrix of mineralized tissues and is one of the plenty fulnon-collagenous proteins in bone matrix produced by osteoblasts, osteoclasts, and osteocytes. These proteins containing arginine-glycine-aspartate sequence which is the major integrin-binding site and the supporting bone cell adhesi on non mineral matrix .**Purpose:** The aim of this study is to investigate the effect of xenograft with PRF and alloplast with PRF on osteoblast and osteopontin in bone New Zealand rabbits. **Methods:** The experiment was held by Post Test Group design. Twenty seven male New Zealand Rabbits were divided into three group. The first group performed the treatment on the right hind limb be treated with Alloplast and PRF treated , The second group performed the treatment on the right hind limb be treated with xenograft and PRF, and The third group was the control group performed the treatment on the right hind limb was given PRF. After treatment the rabbits were sacrificed. Osteoblast and osteopontin of each group was measured by EDTA method and immunohistochemistry method. All data experiment were analyzed by ANOVA and LSD test (p<0,01). **Result:** The result showed that no significant difference in the expression of osteopontin (OPN) in the xenograft with PRF group compared to alloplast with PRF group (p =0.985>0.05), while the xenograft with PRF group compared with the control group there were significant differences (p =0.001<0.005) and alloplast with PRF group compared with the control group there were significant differences (p =0.000<0.005). While the results of osteoblasts between alloplast with prf compared with xenografts with prf, significant differences as a result of the process of bone formation to see the results of better bone formation. **Conclusion:** Alloplast with PRF has the same amount of osteopontin in xenograft with PRF so that it can indicate that the initial phase of the process of bone remodeling have the same initial phase, while osteoblasts on alloplast with PRF had higher numbers than xenografts with PRF, so it can be seen that the process of formation bone on alloplast have better results.*

Keywords : *osteopontin, osteoblast, bone, xenograft, alloplast, PRF, immunohistochemistry method*
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BACKGROUND

Periodontitis is defined as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession, or both." The clinical feature that distinguishes periodontitis from gingivitis is the presence of clinically detectable attachment loss. This often is accompanied by periodontal pocket formation and changes in the density and height of subjacent alveolar bone..[1] factors involved in bone destruction in periodontal disease is bacterial plaque. Products of plaque bacteria induce differentiation of progenitor cells into osteoclasts and bone stimulates gingival cells to release mediators which have the same effects .[2] first treatment odf periodontitis is performed to control bacteria plaque and boost the immune system against periodontal bacteria. The treatment fo periodontitis is oral health education , scaling, and root planning.[3]

Periodontal flap provides access for operators to clean granulation tissue and regenerate the periodontal tissues.[3] Bone grafts have been widely used for the repair of bone defects, which are caused by trauma, tumor resection, degeneration due to pathological processes, and congenital bone defects. The use of bone graft to reconstruct bone defects due to periodontitis has been used since 1923 by Hegedus, and reused by Nabers and O'Leary in 1965.[4]

Osteopontin (OPN) is a phosphorylated acid glycoprotein in the extracellular matrix of mineralized tissue and is one of the abundant non-collagenous proteins in bone matrix produced by osteoblasts, osteoclasts, and osteosit.[5]

METHODS

Twenty-seven New Zealand male rabbits aged 4-5 months, weigh 1550 to 2500 grams. All rabbits adjusted during the week. Twenty-seven rabbits were randomly divided into three groups, Group A, B, and C. All groups were sacrificed after 1 month and surgery for bone-making osteoblasts legs for later visits and osteopontin (OPN) under a microscope.

The first group performed the treatment on the right hind limb, treated by Alloplast and PRF. The second group performed the treatment on the right hind limb, treated by Xenograft and PRF. The third group was the control group performed the treatment on the right hind limb treated by PRF. Rabbits is given intramuscularly anaesthetized with ketamine injection. Then the rabbit right tibia fur removed to make it easier to do incision. Before the incision, the rabbits given an injection of one cc lidocaine, local anesthetic in order to strengthen ketamine anesthetic. After that, using rasparotorium for separation of muscle tissue to get tibia bone of rabbits. Bone defects created by using low speed bur with size 3x5 mm and a depth of about 3 mm.

In the first group, the defect is made in the right leg of the rabbits and will be given Alloplast with PRF, while the second group was given Xenograft and PRF in right foot. Then sewing back on the incision and 27

rabbits will be wait for 21 days. After 21 days, we expected at rabbits are already found osteoblast cells and osteopontin cell (OPN).

To sacrifice first anaesthetized animal. Right tibia tissue removed and a cut with a small saw, then put in 70% buffered formalin solution so that the tissue does not rot, tissue hardening, increases the refractive index of the various components tissue and increases the affinity tissue against paint materials. After fixation, the tissue rinsed with water for 6-9 hours and then put in a solution decal. After that, the tissue rinsed with water than put the tissue in a solution of 5% HNO3 decalcified for 60 minutes. Furthermore, process of making preparet follows:

1. Dehydration (water and tissue uptake)
2. Clearing (purification)
3. The impregnation at a temperature of 56 degrees Celsius in paraffin bedding in paraffin
4. Cut using microtome with 4 microns thickness. Then with a DAB staining (deamino benzidine) do observations of the number of osteoblasts and osteopontin expression quantitatively using EDTA staining and immunohistochemical techniques. Data taken from the treatment group and the control group were analyzed using descriptive statistics and one way Annova test.

RESULT

In the research data and analysis of data from research objectives conducted in a number of experimental animals, 27 male new Zealand rabbits aged 4-5 months, weighing 1500 to 2500 grams obtained normal distributed data (Asim sig> 0.05). In data obtained osteopontin note that the data were normally distributed (P = 0981> 0.05) and data on osteoblasts also in normal distribution (P = 0.167> 0.05) .On the results of homogeneity also got results homogeneous distribution data on osteoblasts (P = 0132> 0.05) and in osteopontin (P = 0253> 0.05).

After the statistical analysis of one-way Annova and showed no significant difference expression of osteopontin (OPN) in the Xenograft with PRF than the group Alloplast with PRF (p = 0985> 0.05), whereas in the group Xenograft with PRF compared with the control group there a significant difference (p = 0.001 <0.005) and in the group PRF with alloplast than the control group there were significant differences (p = 0.000 <0.005).

On the results of the analysis on osteoblasts showed the group Xenograft with PRF than the group Alloplast with PRF (p = 0.041 <0.05), there are significant differences, whereas in the group Xenograft with PRF compared with the control group there was no significant difference (p = 0. 996 > 0.005) and in the group with PRF alloplast than the control group there were significant differences (p = 0.034 <0.005).

The rabbits osteoblast and osteopontin normalitas test

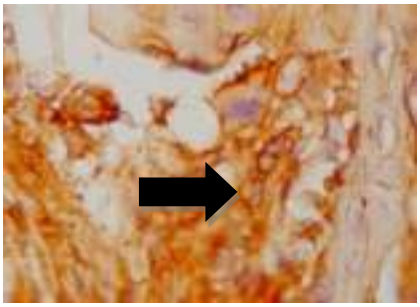
	Normalitas	Homogenitas
Osteopontin	0.981	0.253
Osteoblast	0.167	0.132

The rabbits osteopontin cell Annova test

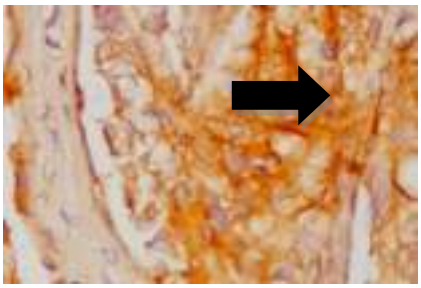
	Alloplast	Xenograft	Kontrol
Alloplast		0.985	0.000
Xenograft	0.985		0.001
Control	0.000	0.001	

The rabbits osteoblast cell Annova test

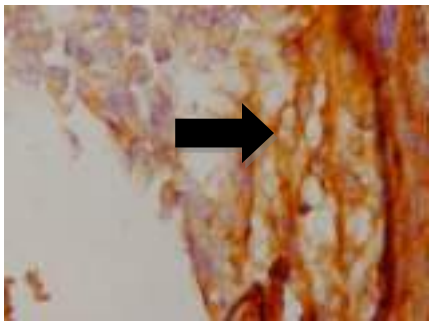
	Alloplast	Xenograft	Kontrol
Alloplast		0.041	0.034
Xenograft	0.041		0.996
Control	0.034	0.996	



Histological examine with immunohistokimia kit staining of osteopontin cell on Xenograft with PRF group



Histological examine with immunohistokimia kit staining of osteopontin cell on Alloplast with PRF group



Histological examine with immunohistokimia kit staining of osteopontin cell on control group

DISCUSSION

In this study aims to determine differences in the number of osteoblasts, and osteopontin (OPN) in bone defects of New Zealand Rabbit with the use of Alloplast with PRF compared xenograft with PRF.

Based on immunohistochemical examination, found the number of osteopontin in the control group (PRF) is lower than the levels of osteopontin from Alloplast with prf group compare to Xenograft with prf group . Whereas in the group Alloplast with prf than Xenograft with prf group did not have significant differences so that it can be seen that the levels of ostepontin at Alloplast with prf and Xenografts with prf is the same level. In this study, it is known that OPN with a combination of hydroxyapatite and calcium oxalate, OPN may help cell attachment to the crystal structure mineral.[6] Expression of OPN by activated macrophages and lymphocytes occurs as part of the host defense mechanism, in which OPN acts as a cytokine which stimulates cellular and humoral of the immune system OPN resulting macrophages and can protect the mineralized tissue on fracture of teeth and bones. In these circumstances, it can be seen OPN aid cell attachment in tissue repair and implant integration .[6] OPN increase in Alloplast with prf and Xenograft with prf showed that the initial phase is well established for bone remodeling, while levels of osteoblasts showed levels of osteoblasts in Alloplast with prf compared with results showing Xenograft with prf. Alloplast with prf to have more osteoblasts that form bone formation better.

This is supported by the statement that in the early stages of osteoblastic cells migrate to the bone surface and begin the secretion of matrix reserbsion and manufacture of the cement layer on the surface of the bone is exposed. The cement layer of collagen fibrils are very few but rich OPN, and sometimes contain bone sialoprotein. Initially, OPN on cement layer can be used for adhesion of osteoblasts, or to start the initial process of calcification. At this stage OPN move to mineral or organic group of bones as starters start a new cycle of mineralization. Studies are often conducted to look at the interaction of macromolecules in an area that allows for calcification, cell attachment and new bone matrix adhesion to the base layer. After the cement layer, which accumulate in the bone matrix lacuna of a secret network becomes fully osteoblast activity. In particular, the cement layer matrix structure in the main areas of bone remodeling observed in alveolar bone of the periodontium. In addition, the main mineral Association of OPN function in connecting matrix and mineral, and regulate the growth of hydroxyapatite crystals in space interfibrillar of bone matrix. The main thing, the physical properties of bone matrix is in large measure determined by the relation of minerals either within or between collagen fibrils. Where OPN, plays a role in determining the biomechanical properties of bone. [6]

Osteopontin (OPN) is a protein multifunctional, and can be seen clearly on the bone, and can also be seen clearly in various cell types including macrophages, endothelial cells, smooth muscle cells and epithelial cells, OPN is involved in two physiological processes and pathological in some organs or networks such as biomineralization, inflammation, leukocyte recrutment and cell survival. OPN is intimately involved in the regulation of both physiological and pathological mineralization. In normal bone tissue, OPN is involved either by osteocast and osteoblasts are the cells responsible for bone remodeling.[6]

Based on the results of the study, osteopontin was no significant difference between Alloplast with prf groups than xenografts with prf groups due osteopontin as an early phase in the process of bone formation as the new bone adhesion. While the results of osteoblasts between Alloplast with prf and Xenografts with prf significantly different as a result of the process of bone formation to see better bone formation. This is consistent with the results of research by sodek, OPN move to mineral or organic group of surface bones as the beginning of a new cycle started mineralisasi.[6]

CONCLUSION

Alloplast with PRF has better results compared with Xenografts with PRF seen from the increase in osteoblasts.

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CASE REPORT

An Obturator Bottle Feeding Appliance For A Newborn Baby With Cleft Palate

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ABSTRACT

Background: *A child born with cleft palate may experience difficulties while feeding. Obtaining a good seal of the oral cavity can be difficult due to the incomplete palatal structures. Nasal regurgitation and choking are common in infants with cleft palate because of inability of the palate to separate the nasal and oral cavities.* ***Purpose:*** *The aim of this case report is to maintain suction reflex of a newborn patient with cleft palate defect so the patient could feed properly.* ***Case and Case management::*** *The case presented here is a 1-month-old-female-newborn baby with cleft palate defect. The patient with her parents came to Prostodhontics Clinic RSGM-P Faculty of Dentistry, Airlangga University Surabaya, with referal from Ibnu Sina Hospital Gresik, wants an appliances to help the baby feed properly. The impression of cleft palate defect was made by wax based and putty. After the impression has made, it casted to make a working model as result. This working model used as a first step to make bottle feeding obturator using a pacifier and elastomer silicone material.* ***Conclusion:*** *Bottle feeding obturator has to be made in a newborn baby with cleft palate defect so the patient could feed properly.*

Keywords: *cleft palate, bottle feeding, obturator*

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BACKGROUND

Cleft lip and palate are one of the most common structural birth defects. Its consequences affect several systems and functions that include feeding, facial growth, dentition, speech as well as the social and psychological problems which have an impact on the child and parent.[2]

A child born with cleft palate may experience difficulties while feeding. Obtaining a good seal of the oral cavity can be difficult due to the incomplete palatal structures. Nasal regurgitation and choking are common in infants with cleft palate because of inability of the palate to separate the nasal and oral cavities.[1] Compressing the nipple between tongue and hard palate to squeeze out the liquid becomes difficult.[3,4]

Feeding appliances are often required by such patients. A feeding appliance is a device that creates a seal between the oral and nasal cavities and helps the infant to express milk properly. The aim of this case report is to maintain suction reflex of a newborn patient with cleft palate defect so the patient could feed properly.

CASE

A-1-month-old-female-newborn baby with cleft palate defect. The patient with her parents came to Prostodhontics Clinic RSGM-P Faculty of Dentistry, Airlangga University Surabaya, with referal from Ibnu Sina Hospital Gresik, wants an appliances to help the baby feed properly.

Fig 1. Cleft palate defect

CASE MANAGEMENT

1. Make a palatal impression using combination of wax based and putty.

Fig 2. Make a palatal impression using combination of wax based and putty

2. Make a working model.

Fig 3. Putty became hard and the cleft palate deffect being an impression (left); Impression being casted so it became a working model (right)

3. Making bottle feeding obturator using elastomer silicone.

Fig 4. Mix the elastomer silicone and then pour it into the working model. Placed the pacifier at the top of elastomer silicone around the neck of the pacifier.

4. Elastomer placed around the neck of the pacifier.
5. After the elastomer is set, the excess of elastomer should be removed and smoothered so the baby's mouth isn't become full. The elastomer is used to seal the palatal defect so the milk could flow into the baby's tongue.

Fig 5. The elastomer after the excess being removed and smoothered (left-right)

6. After being cleaned and sterilized, bottle feeding obturator tested to the baby, then felt if the baby sucking the pacifier.

Fig 6. The pacifier tested to the baby

7. After the baby could sucking the pacifier, placed the pacifier to the bottle then tested again to the baby, check whether the milk entering the cleft palate defect.

Fig 7. The pacifier placed on the bottle and tested to the baby

DISCUSSION

Cleft lip and palate is one of the most common congenital anomalies. Treatment of this deformity presents a serious problem for health delivery systems all over the world. Sucking efficiency is one of the most common difficulties related to feeding in children with cleft lip and palate.[5] In order to be successful in sucking, coordination of the intraoral muscles is important, which may be difficult in children with cleft lip and palate.[6]

Breast feeding a child with a cleft palate can be challenging. The opening in the palate makes it impassible for the child to create suction. The baby may have difficulty in locating a place on the palate to press the breast against and to express milk. However, the amount of difficulty will vary based on the severity of the cleft. In order to be successful in breast feeding a child with a cleft palate, the mother needs to implement some modifications. An example of a position that can be used is the modified football hold (child in usually held at an angle of 45°), which minimizes nasal regurgitation.[6]

There are a variety of feeding devices that can be very useful in successfully feeding an infant with a cleft lip and palate, like a plastic squeeze bottle, soft nipple, specially designed nipple with enlarged opening and wide based nipple (useful in sealing off the cleft lip). A feeding obturator is a device that creates a seal between the oral and nasal cavities and controls the flow of milk.[4] Feeding device is inserted over the infant's hard palate, which allows him or her to compress the nipple easier because it provides a contact point and helps the infant to express milk. It facilitates feeding, reduces nasal regurgitation and shortens the length of time required for feeding. Appliance acceptability is better than acrylic used in the past.[7,8]

RESULT

Bottle feeding obturator has to be made in a newborn baby with cleft palate defect so the patient could feed properly and the milk couldn't entering cleft palate defect.

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CASE REPORT

Maxillary Attachment Retained Removable Partial Denture And Mandibular Magnetic Retained Overdenture

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ABSTRACT

Background: *patient with few teeth (2-4 teeth) represents a clinical challange to restored both in aesthetic, functional, stability and retention of the denture. One of the most demanding aspects of such cases involves the development of sufficient aesthetic improvement, while simultaneously fulfilling occlusal and functional parameters essential to long-term success.* ***Purpose:*** *to achieved a long term clinical success with the improvement of aesthetic, functional, stability and retention.* ***Case and case management:*** *A 66 years old female, who had few teeth with a chief complaint in aesthetic aspect and difficulty of chewing. Management patient with few teeth using precision attachment retained to removable partial denture (RPD) and overdenture magnet is sensitive technique and among the most difficult cases to restore. Assesment of the initial condition is important for the management, and careful comprehensive treatment plan is required for this case. Articulated study casts and diagnostic wax-up can provide important information which is helpful for the evaluation during this treatment.. Functional impression taken using a different impression technique from conventional technique.* ***Conclusion:*** *in this clinical report, precision attachment retained to RPD and magnetic retained overdenture showed a successful rehabilitation for a few teeth patient.*

Keywords: *precision attachment, magnetic overdenture, removable partial denture.*

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BACKGROUND

The gradual loss of teeth is a normal process during the lifetime of a patient. However, patient with a few teeth (2-4 teeth) remaining can result in a periodontal issue, occlusal disharmony, impaired function and aesthetic disfigurement. In many cases, this undergoing situation continues without any posibility of treatment, which aim to the loss of teeth. Therefore, it is important to identify the factors that contribute to attain diagnosis and to evaluate the treatment plan that sustain a long term clinical success with the improvement of aesthetic, functional, stability and retention of the denture.

CASE

A 66 years old female, who had few teeth with a chief complaint in aesthetic aspect and difficulty of chewing. This patient have been using denture for three years. Patient complain of the old denture is not comfortable to wear, and want to make new denture. This old denture patient denture made from flexible material, which is very uncomfortable to use after a long time period. However, when the patient do not use denture and tried to chew food, the patient complained of pain in several places in the upper jaw.

This occurs because the remaining teeth on some parts of gum on the opponent's area. This situation happened for a several years that cause perodontal problems.

Fig 1 : Initial condition without her old denture.

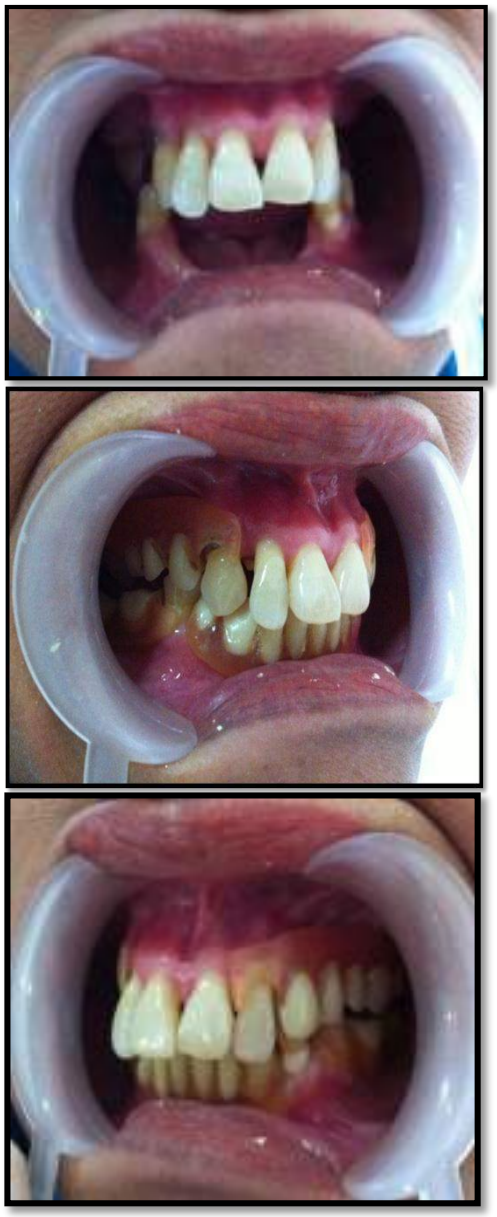

Fig 2 : Initial condition with her old denture.

Case management

Precision attachment retained to removable partial denture (RPD) and magnetic retained overdenture is used to treat this patient. Preliminary treatment with endodontic treatment was done first for all of the remaining teeth except tooth number 12, because it has suffered severe bone loss. Teeth on the lower jaw then decaputated, guttap percha was take based on the working length of the endodontic treatment and make an impression for a cast keeper magnet. After cast keeper was inserted into teeht on the lower jaw, functional impression were made with polyvinylsiloxane impression material and alginate material for the upper jaw in order to make a bite rim for maxilla mandibula relationship to achieve centric relation and centric occlusion of the patient.

Fig 3 : Maxilla and mandibular relationship.

Bite registration was taken for fixation upper and lower bite rim then to transfered into articulator. Articulated patient casts and diagnostic wax-up were made for anterior region of the upper jaw. Final preparation was performed then immidiate extraction for tooth number 12 was also performed, then provisional bridge was inserted for 8 weeks. After evaluation 8 weeks post extraction tooth number 12, adjusment preparation were made for finishing line preparation tooth number 11 and 13 due to the resorbtion of the soft tissue and bone post extraction. Definitive impression were made with polyvinylsiloxane impression material for the upper jaw then send to the dental laboratory for a splinted crown attachment and complete denture.

Fig 4 : Try in.

Fig 5 : Attachment retained removable partial denture and magnetic retained to overdenture

Fig 6 : Insertion and evaluation

During this period, patient's condition and functions, such as muscle tenderness, discomfort of TMJ, mastication, range of the mandibular movements, swallowing, and speech, were evaluated. Improvement in mastication, speech, and facial esthetics confirmed the patient's tolerance to the new mandibular position with the restored VDO. The anterior guidance and posterior disclusion on excursive movement were established.

DISCUSSION

The rehabilitation using restoration precision attachment retained removable partial denture providing posterior support is commone for many patients who require the treatment of loss teeth. However, the restored anterior teeth can be easily exposed to excessive occlusal loads if the patient does not wear the removable partial denture or resorption of residual ridge proceeds. Because the compliance of patient in wearing free-end saddle denture has been shown to be poor, the education on wearing RPD is necessary. Regular check-up for the occlusal evaluation and RPD fitting is essential. Reduced dentition used to retain an overdenture is a main factor not only preventing to a great extent, alveolar bone resorption but increasing the stabilisation of the dentureas well. In this respect the load distribution is an important factor. Magnetically retained overdenture transfer no detrimental lateral forces to those supporting element helping in maintaining a favourable clinical situation.

RESULT

In this clinical report, precision attachment retained to RPD and magnetic retained overdenture showed a successful rehabilitation for a few teeth patient.

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P 2.55

CASE REPORT

Direct Class II Resin Composite Restoration on Maxillary Right Posterior Tooth

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ABSTRACT

Background: *Based on the aesthetic properties and good compressive strength, composite resin can be used to restore cavities class II. Restoration of class II composite requires good knowledge and techniques to restore the anatomical shape of the original tooth.* ***Case and case management:*** *16 teeth with caries reaches the dentin in mesial prepared to remove the infected tissue and dentin email unsupported. After disinfection, the liner was applied to the cavity in the area. Sectional matrix and a holder fitted. Etching was applied for 20 seconds on email and 10 seconds on dentin. Once cleaned with water, dried cavity using a cotton pellet and bonding agent is applied, wait 20 seconds then polymerized using light cure. A2 shade composite was applied using an teflon instrument with incremental technique from the proximal portion, and occlusal areas using anatomic layering technique with shade A3. Occlusion checked using articulation paper and remove the excess using superfine bur. Restoration polished with rubber composite polishing and polishing using the proximal part of the strip. Patients scheduled for control of one week. At the time of control, there are no complaints and restoration in good condition with aesthetic.* ***Conclusion:*** *The success of Class II composite restoration is determined by various factors. Avoid leakage and restore the anatomical contours of the teeth can be achieved with good isolation techniques, proper matrix, and the use of incremental and anatomic layering technique.*

Keywords: *Class II composite restorations, incremental, aesthetic*

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BACKGROUND

Composite class II restoration has its own difficulty, because the operator has to deal with several factors, such tas limited proximal access, sensitivity due to preparation, difficulty in gaining marginal seal, reccurent caries and fracture[1].

CASE REPORT and MANAGEMENT

A 22 year old male reported to integrated clinic of RSGM Unpad with pain in cracked maxillary right posterior tooth since a month ago, and food impaction occured regularly. Pain increased when the patient drank something cold. There is no throbbing spontanous pain history. Intraoral examination revealed caries extended to dentin on maxillary right first molar (Figure 1). Provisional diagnosis for this case was pulpitis reversible on ooth 16. Treatment plan for this case was composite class II restoration.

Figure 1. Caries on proximal tooth 16

The first step for composite restoration is choosing composite color using shade guide. The color used for this case was A3 for pit and fissure part, and A2 for restoration around the cusps (Figure 2).

Figure 2. Choosing colour with *shade guide*

Initial preparation was started with round bur. Unsupported enamel and damaged tissue were removed.

The initial depth was maintained 0.5 mm under DEJ or one fourth diameter of 0.8 mm fissure dimond bur. Cavity walls prepared resulting 90 degrees or slightly more using bur held parallel to the long axis of the tooth crown. Cavosurface margins on facial and palatal side of proximal area that were not supported by dentin removed using smaller bur. Caries on the dentin removed using carbide round bur attached to low speed handpiece (Figure 3).

Figure 3. Carbide bur

After removing all of the caries, cavity was cleaned using water syringe and brush to remove the residual debris (Figure 4A). Cavity was disinfected using chlorhexidine 0.2% and dried with cotton pellet (4D). RMGI liner was applied to the deep portion of preparation floor (Figure 4C).

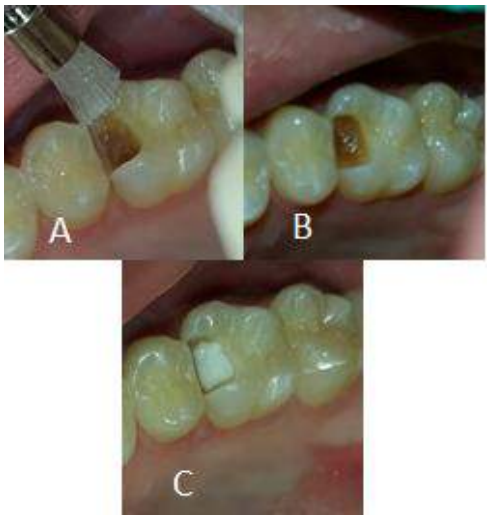

Figure 4. A. Cleaning the cavity using *brush*. B. Disinfected the cavity C. Liner application

Matrix which used in this case was sectional matrix. Cotton roll was placed in the buccal vestibule, then sectional matrices was placed on the proximal part and fixated using bitine ring at the one third cervical to maintained proximal seal on this area. The wedge was inserted into the bitine ring to minimize overhang restoration. Etch was applied into the cavity using syringe, 20 seconds for the enamel and 10 swconds for the dentin (Figure 5). After 20 seconds, etch was removed using water syringe and the excess water was dried using cotton pellete until the preparation surface looked moist and shiny.

Figure 5. Application of sectional matrix and etch

Wet cotton roll must be replaced, then bonding agent was applied using microbrush to all of the cavity surface, let it for 20 seconds then polimerized using light cure for 10 seconds. On the next 10 seconds, polimerized the bonding agent using swivel technique. With this technique, polimerization on every part of the proximal surfaces should be attained.

Composite was placed from the proximal part incrementally (Figure 6). To increase marginal adaptation, the flowable composite was applied to the first layer of the increment then followed by packable composite. Each of the increment was cured for 20 seconds using light cure with composite thickness less than 2 mm.

Figure 6. Proximal wall filling

After filling the proximal wall, the occlusal part was restored similarly to class I composite restoration using anatomic layering technique. Matrix was removed, then proximal part of the restoration was cured again from facial and palatal.

Patient's occlusion was checked using articulating paper. The excess composite on the occlusal surface was reduced using superfine round bur, while the proximal surface was reduced using flame shaped bur.

Figure 7. Overfilled restoration was checked using articulating paper

Composite brush and polishing rubber were used to polish the restoration, and polishing stripe was used to polish the proximal surface until all part of the restoration were smooth and shiny, and there was no step between the restoration and tooth (Figure 8A and B).

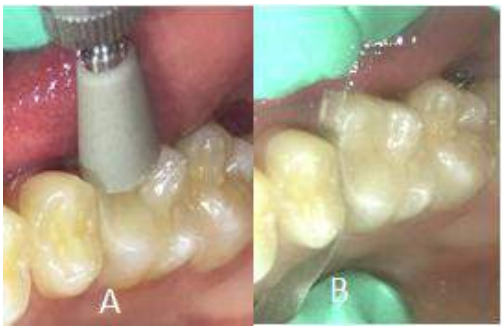

Figure 8. A. Polishing the composites using rubber. B. Polishing the proximal using polishing strip

Figure 9. The final class II composite restoration on tooth 16

The next step was taking periapical radiograph to evaluate whether there was overhang restoration or not (Figure 10). Patient was requested to come on the seventh day to control the restoration and there was no complain, restoration and surrounding tissue were in good condition.

Figure 10. Periapical photograph on tooth 16

DISSCUSSION

Restoring class II cavity is more difficult than class I cavity on posterior teeth. Every step starting from preparation to composite filling should be done correctly to prevent failure that frequently occured on class II composite restoration such as proximal leakage, reccurent caries, or fracture.

Class II cavity that is small in size can be prepared using round bur, round edge diamond bur, or round edge carbide bur to remove caries or damaged tissue from occlusal and proximal surface. The axial and pulpal depth are only determined by the lesion depth where the floor is not always have to be uniform. Proximal extention is also only determined by the extension of the lesion, but may need another instruments with a straight side to shape the preparation wall resulting 90 degree angle or more.

Another design in preparing class II composite is box-like

preparation. The proximal portion is prepared using round bur or round edge fissure diamond bur that held parallel to the long axis of the tooth crown. Instrument movement in the marginal ridge extends to gingival aspect. The depth of axial axis is determined by the caries or damadged tissue extention. The box shape depends on which instrument sshape is used. The more box-like with elongated pear and the more scooped with the round. The lingual, facial, and gingival floor extensions are dictated by the defect or caries. Secondary retention is not indicated for this case.

The third conservation design for restoring proximal lesions on posterior teeth is lingual or facial slot preparation. A lesion is is obtained from either a facial or lingual direction. A small round diamond or bur is used to gain access to the lesion. The instrument is oriented at the correct occluso-gingival position, the entry is made as close to the adjacent as possible, preserving as much of the facial or lingual surface of possible. The preparation is extended occlusally, facially, and gingically enough to remove the lesion. Cavosurface margins are 90 degrees or slightly greater.

Bevels are not placed on the occlusal cavosurface margins because these walls already have exposed enamel rods ends because of the enamel rod direction in this area. A bevel placed on an occlusal margin may result in thin composite on the occlusal surface in areas of potentially heavy contact. This could result in fracture or wear of composite on this area. Beveled composite margins also may be more difficult to finishing.

Strength factor in restoring class II composite depends on the strength of composite to bond to the tooth. So that isolation of the cavity is a unnecessary. Isolation method that is used frequently is rubber dam. Isolation also can be achieved using dry cotton palette. Cotton roll is placed on facial vestibules near the preparations.

Many materials can be used as a liner or base under the composite restoration. One of them are RMGIC and *flowable composite.* This material doesn't act as a pulp protection but to make a better seal on the restoration that extends to the root. RMGIC protects the pulp by releasing fluoride. This property may render the restoration more resistant to recurrent caries.

The matrix is applied before adhesive placement. Sectional matrix is preferred because it is thinner than a metal band and can be contoured better than a clear polyester matrix. The sectional matrix is inserted to the proximal sulcus. Bitine ring and wedge are inserted to stabilize the matrix and keep the contour tight.

Etch is applied 10 seconds to dentin and 20 seconds to enamel. Cavity that has been cleaned from the etch is dried using cotton pellete. If the dentin surface is dried with air, the collagen undergoes immediate collapse and prevents resin monomers from penetrating. Bonding agent is applied to all cavity then let it for 20 seconds to evaporate the solvent and let the bonding agent penetrating, then polymerize it for 20 seconds.

CONCLUSION

Resin composite is considered as a good material to restore class II cavity. The advantages of resin composite are its strength that is always improving, aesthetics, and its

preparation technique that is more conservative. Long lasting and satisfying Class II composite restoration can be achieved with good knowledge and technique of the operator.

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