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Dentisphere
Dentistry Update & Scientific Atmosphere

PROCEEDING

INTERNATIONAL SEMINAR

2nd .DENTISPHERE.

"Current Concept in Dentistry"

Shangri-La Hotel, Surabaya, November 8-9, 2013

WELCOME NOTES

Dear Colleagues,

It's great honor to welcome you to Surabaya and ~~to~~ 2nd International Dentisphere 2013 seminar which held on 8-9th November, 2013 at Shangrilla Hotel. My great appreciation to all the speakers from Japan, Korea, Thailand, Singapura and Indonesia, thank you for the contribution and participation and your willingness to come and share the valuable knowledge and experience. It's been honor to us that this forum may be apart of strong role as quality control mechanism to ensure sustainability and continous improvement of dentist.

The theme of this 2nd International Dentisphere is "Current Concept In Dentistry" This is addressed to meet our aims to provide our nation a generation of professional and skillfull dentist with continuously update knowledge. We hope this event will be increase our profesionalism to all dentist and participants,.

My appreciation to the committee, for aranging this event very well. Hope the seminar will be well done accomplished tomorrow. Also, I would like to thank all sponsors who support this event. For the speaker, thank you for the contribution support of the seminar.

And for all the participants, thank you for joining the 2nd International Dentisphere, please enjoy the seminar and the events. I would like to ask for apologize if maybe in some ways we have some limitations in serving you on the event. Finally, I hope we all could get the benefit and advantage from this seminar to raise our professionalism in dentistry, in each of our ways

Sincere regards,

Dr. Dian Mulawarmanti., drg., M.S

Dean Faculty of Dentistry Hang Tuah University

WELCOME NOTES

Dear Colleagues,

It is a great pleasure for us to be the organizer of the 2nd Dentisphere from faculty of dentistry Hang Tuah University . We extend our warmest welcome to all Participants, Speakers, and Sponsors that make this 2nd Dentisphere to be a successful conference.

Under the theme of "Current Concept of Dentistry", this meeting will offer a platform to learn and exchange ideas with a host of internationally and national speakers. 2nd Dentisphere will provide participants with unique opportunities to develop their professional knowledge and skills as well as to network with another audience. I also strongly encourage you to take advantages of the presence of dental companies to keep up to date with envolving technologies of equipment and the latest dental materials. We do hope that this seminar will allow all participants to capitalize enough knowledge and experience keep in touch with issues world wide., Dental Health.

Lastly I wish to thank all Participants, Distinguish Speakers, Sponsors and all who contribute for the success of the 2nd Dentisphere in Surabaya. Hope you not only have an event for developin our professionalism, but also you could enjoy a nice stay and have a memorable excursion on Surabaya. Thank you for your kind attention, have a nice, enjoy and fruitful discussion and God Bless You.

Sincere regards,

Aprillia drg.,Sp.KG

Chairperson 2nd Dentisphere

CONTENT

PROCEEDING ABSTRACT

ABSTRACT MAIN LECTURE

CLINICAL IMPACT OF MISSED ANATOMY OF THE ROOT CANAL SYSTEM

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ABSTRACT

It is generally understandable that a major cause of the failure of root canal therapy is an inability to localize and treat all of the canals of the root canal system. The risk of missing anatomy during root canal treatment is high because of the complexity of the root canal system.

One must understood that all teeth may have extra roots and/or canals, but the incidence is higher in premolars and molars. In addition, lateral ramifications of the root canal system may be present in all teeth with a significant frequency, increasing the probability of leaving untreated spaces after root canal therapy.

Prevention of missed anatomy starts with good pre-operative radiographs, even though radiographs have limitations in assessing the number of canals and the presence of accessory canals and anastomoses. A correct access cavity preparation is of central importance in localizing the orifices of the root canals.

The impact of missed anatomy on the outcome of endodontic treatment is difficult to predict although theoretically it will be a failure. The clinical impact of missed anatomy can be clearly demonstrated with a large number of re-treatment case reports available in the literature; in the majority of these cases, failure of endodontic therapy is associated with untreated canal space. Localization and treatment of this missed anatomy typically leads to complete clinical and radiographic healing.

OROANTHRAL FISTULA : HOW TO PREVENT AND MANAGE PROPERLY

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ABSTRACT

Oroanthral communication (OAC) is unexpected communication between maxillary sinus and oral cavity which may occur after extraction of posterior maxillary teeth. Undetected post extraction OAC may eventually become oroanthral fistula (OAF) which is a permanent communication between maxillary sinus and oral cavity. OAF usually result in chronic infection of the affected anthrum (sinusitis) which further complicate the condition. It is therefore important that OACs be identified and managed accordingly in order to prevent the occurence of OAFs because they, if do occur, would usually require longer and more complicated treatment. This paper outlines various aspects of maxillary anthrum related to dental extractions and discusses the step-by-step procedures in the management of oroanthral communication as well as oroanthral fistula.

ORTHODONTIC COMPLIACTIONS CNSIDERATIONS TO REMEMBER TO PREVENT RUNNING INTO PROBLEMS

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ABSTRACT

The risks associated with orthodontic treatment are a reality, complications being a result of a multifactorial process, including aspects related to patient, orthodontist and the technical features of orthodontic appliances and procedures.These can be prevented by knowing the possible complications that may arise from orthodontic treatment and can be limited through identification and implementation of best treatment alternative for each individual case. Patient's compliance is an important factor that can contribute to a high standard outcome, with minimum side effects. In this lecture, we will be covering complications in relation to TMJ, periodontal, allergies and to the dental structures in general. Treatment planning will also be covered to show how best to plan an orthodontic treatment to minimise complications from arising.

THE FLOW, WHEN, AND WHERE

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ABSTRACT

Modifications of composite resin, as one of tooth restoration materials, are not only on the use of bonding, phisical and aesthetic properties, but also on how to use, which is getting easier on its application. Flowable composite resin is known to have many advantages, that it can prevents marginal leakage, high shrinkage on pulpal wall, with minimally invasive occlusal class I. This flowable composite can also be used to repair: porcelain fractures in non-stress-bearing area, leakage in amalgam fillings, any defect on enamel, and also for cementation or luting in porcelain and composite resin veneers. Flowable composite can also be used for surface texturing using brush. Latest generation of this flowable composite is bulky type that can be used in large cavities. This will easier our restoration work while also prevents porousity and high shrinkage.

Keywords*: flowable composite resin, bulky flowable, texturing, porousity, composite filling*

SLEEP APNEA: THE CASE FOR ORAL APPLIANCES

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ABSTRACT

There are different therapeutic option for treating obstructive sleep-disordered breathing, non and surgical. Non surgical therapeutic option is the using oral appliances.An oral appliance such as oral myofunctional appliance is commonly regarded as a simple, silent, bed-partner friendly, less invasive, reversible, tolerable, and efficacious choice.Orthodontists, based on their knowledge and training with functional appliances and their skills to evaluate jaw position and tooth movement, are ideally suited to provide oral appliances as an effective form of therapy.

DENTAL IMPLANT FAILURE; RELATED FACTORS AND CLINICAL CASES

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ABSTRACT

Oral implant therapy has been accepted as a predictable dental treatment and is recognized as effective treatment option for edentulous during patients.

As is widely known, the success rate of dental implant is more than 95%, but there are still some cases of failure. In this presentation, I will show clinical cases of 'dental implant failure' and how we tried to recover them in the University of Tokushima Japan.

Dentoalveolar Infection: Clinico Pathological Case

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ABSTRACT

The dental abscess is a difficulty of decay of the tooth. It can also be caused by tooth trauma when a tooth is chipped or broken. Any opening in the enamel of the tooth lets bacteria in to cause an infection of the tooth center known as the pulp. The infection can spread from the tooth root and into the bones which support the tooth. Bacteria from dental caries (a tooth cavity) can extend into the gums, the cheek, the throat, beneath the tongue, or even into the jaw or facial bones. A dental abscess can become very painful when tissues become inflamed or due to the pressure within the abscess. A gum or gingival abscess is the result of infection or trauma to the surface of the gum tissue. Periodontal abscesses are the result of an infection that has moved deeper into gum areas, and a periapical abscess refers to a tooth with an infection of the pulp. The success of both periodontal and periapical abscesses therapy depends on the elimination of both disease processes, whether they exist separately or as a combined lesion. Diagnosis is paramount to determining the course of treatment and overall prognosis. This paper aims at presenting a comprehensive review of several aspects of periodontal and periapical lesions.

Key words: *Periodontal lesion, periapical lesion, dentoalveolar infection*

MANAGEMENT OF COMPLETE DENTURE IN FLAT EDENTULOUS RIDGE

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ABSTRACT

Loss of teeth induces the patient's psychological, aesthetic and functional problems. If the edentulous condition persists for a long time, problems such as severe alveolar bone resorption, degenerative changes of TMJ, muscle atrophy can be caused and the treatment would be very difficult and complicated. Therefore, before the problems occur, the aesthetic and functional recovery through the complete denture fabrication is needed.

Some edentulous patients who visit dental clinic for the complete denture have severely resorbed ridges caused by anatomic, metabolic, and mechanical factors. The treatment for atrophied ridges is a clinical challenge faced by dentists because prosthodontic rehabilitation of a patient with compromised edentulous ridges in a conventional manner is a difficult task.

Severe ridge resorption results in increased inter-arch space, sunken appearance of cheeks, non retentive dentures without ability to withstand the masticatory forces, unstable dentures with associated pain and discomfort. The negative effects of ridge atrophy should be managed by modifying the conventional procedures of fabricating a complete denture.

In this presentation, modifications in occusal, impression and polished surfaces of denture will be described to manage the patient who has flat edentulous ridge.

DIRECT AESTHETIC RESTORATIONS FOR ONE AND ALL

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ABSTRACT

Composite resins have become the standard of care in many situations. Yet, this seemingly simple technique is fraught with problems if we as dentists do not pay attention to the number of issues arising from the use of material. Armed with this knowledge, we will be able to maximize the use of composites in numerous situations providing a quality of care that is not only aesthetic but certainly minimally invasive and of satisfactory longevity for our patients.

THE CURRENT CONCEPT OF ANCHORAGE SYSTEM IN ORTHODONTIC TREATMENT

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ABSTRACT

The anchorage system is part of orthodontic theraphy and the resistance to unwanted tooth movement due to reaction of buccal segment for space closure. Orthodontic tratment of malocclusion with the problems severe crowding, excessive overjet, bimaxillary protrusion and many posterior teeth mutilated, the operator should be able to determine minimum, medium, maximum and maximum plus of anchorage to achieve treatment goal. Extraoral anchorage, such as head gear, is traditionally used to reinforce anchorage and the current concept of anchorage system is TADs (Temporary Anchorage Devices) are many terms used in orthodontic skeletal anchorage such as, skeletal anchorage system, mini-screw, micro-screw, mini-implant, micro-implant and mini-screw implant. Placement of TAD is minimally invasive and often completed using only local anesthesia. Its can be usually inserted through the gingival tissue into bone with a srew driver. The location chosen should be the optimial one in terms of anatomic limitations and biomechanical considerations

Key words*: anchorage, orthodontic treatment*

BOTULINUM TOXIN AND FILLER AUGMENTATION AS MINIMAL INVASIVE AESTHETIC PROCEDURES IN DENTISTRY

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ABSTRACT

Introduction : *In modern dentistry, patients are demanding not only enhancement to their dental esthetics, but also their overall facial esthetics. To achieve the demanded results can be challenging especially in dental practice. No single modality can accomplish all the complex aesthetic impacts needed for satisfactory improvements. Neuromodulation using Botulinum toxin and soft tissue augmentation via hyaluronic acid fillers may be used to correct aesthetic defects such as wrinkles, thin lips, asymmetrical facial appearances, peribuccal volume loss, and others.*

Objective*: To review botulinum toxin and filler augmentation as minimal invasive aesthetic procedures in dentistry.*

Materials and Methods: *Technical details, aesthetic benefits and risks regarding botulinum toxin and filler augmentation with hyaluronic acid to refine dental and overall facial esthetics are described. Typical instructional cases of patients were detailed.*

Results: *Dental and overall facial esthetics are effectively achieved using botulinum toxin and filler augmentation. Using correct methods based on anatomical approach and clinical knowledge, these minimal invasive aesthetic procedures are performed safely with minimal risk of complication.*

Analysis and Conclusion: *Anatomical analysis and patient selection are essential to achieve effective results. It is also important that patients receiving these procedures understand the realistic expectations, advantages and limitations. Botulinum toxin and filler augmentation indicated for dental and overall facial aesthetics may be considered as minimal invasive aesthetic procedures in dentistry.*

BITTER TASTE AS DIPSRUPTIVE SIGN IN HOMEOSTASIS

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ABSTRACT

Background*. Taste is very important in human life, without taste the world seems so nothing. Taste is divided into five basic tastes. The five basic tastes are commonly recognized by a receptor. Humans can perceip these tastes through sensory organs called taste buds, concentrated on the upper surface of the tongue. Scientists have described five basic tastes as bitter, salty, sour, sweet, and umami. Inspite of the five basic tastes, human can also recognize two additional tastes, such as: water taste and metallic taste. Each of taste has a different function, but it totally depends on each other to work well. One of the most important tastes is bitter taste. Bitter is usually known as an unpleasant taste, but inspite of this condition, bitter taste indicates so many effects in human's body. If someone feels the bitter taste of excesive, it shows there are some disturbances in his body. Bitter taste is perceipted when there is a bitter subtance entering in the mouth. Bitter taste is perceipted by α1-G Protein, is usually called gustducin. This protein will activate phospholipase C (PLC). PLC in human is divided into two components,such as: Dialglyicerol (DAG) and Inositol Tri-phosphat (IP3). IP3 will release Ca^{2+} from Endoplasmic Reticulum to cytosol. This increasement of Ca^{2+} will be perceipted as a bitter taste. Bitter taste is commonly known when there are so many Ca^{2+} in cell, not only by IP3 but also by through pass on the membrane calcium. Bitter taste is commonly perceipted in some conditions, such as: someone doing too many exercises, fasting, someone suffering fever and cancer.* ***Purpose:*** *The main purpose of publishing this journal is to let someone know about the realtionship between bitter taste and homeostasis.* ***Conclusion:*** *The mechanism of bitter taste is to increasement intracellular Ca^{2+} that can caused depolarization, potensial action will be* occurred and there arose a bitter taste improvement in the oral cavity.

Key words*: Taste, bitter taste, IP3, DAG.*

THE CONCEPT OF BACTERIOTHERAPY IN DENTISTRY

Asteria Descintha

ABSTRACT

Day in and day out there is a battle going on in your mouth. Bad bacteria attack your teeth and gums causing gum disease, bleeding and potentially the loss of teeth. The body's own good bacteria fight the bad ones, but our modern life style makes their job difficult. They need reinforcements.

Three out of four adults will experience gum disease in their lifetime. The incidence of gum disease is high, underlining the importance of recognizing the signs of early gum disease (gingivitis) before it may progress to periodontitis and eventually lead to the destruction of bone and tooth loss. Almost all gum disease is caused by bacterial plaque. Some bacteria in plaque release substances which may be irritating and toxic to the gum tissue resulting in a local inflammation in the gum tissue. The disease is progressive and often the patient does not experience until the teeth are loose and ready to be lost. Frequently the signs of the gum disease cannot be seen just by looking in the mouth.

The most common cause of gingivitis is inadequate oral hygiene. The first measure in gingivitis treatment is to instruct the patient on good oral hygiene practices and to regularly visit dental professionals for tooth cleaning in order to remove plaque. However, booth gingivitis and plaque may develop again even with thorough brushing and flossing. The effect of professional cleaning lasts one to three weeks before plaque and gingivitis start to develop again.

Bacteria constitute a major component of the oral environment where more than 800 different microbial species co-exist, making the oral cavity the most diverse microbial population of the body. The biofilm is the preeminent form by which colonies of microbes grow., proliferate and mature. A balanced oral microbial environment is essential for the promotion of health and prevention of gum disease.

The ecological plaque hypothesis states that caries and periodontitis, the most common biofilm-associated diseases in the world, originate from a disturbance in the balance and diversity in

the biofilm. Contributing causes maybe inadequate oral hygiene, incorrect diet, stress and/or other factors which determine the micro-ecology.

*The oral micro flora is at least as complex as the gastro-intestinal and vaginal micro flora and consists of hundreds of different kinds of bacteria away. Some beneficial bacteria are referred to as probiotics. The term probiotics comes from the Greek pro bios (for life) and is defined by WHO as "live microorganisms which when administered in adequate amounts confer a health benefit on the host". Most friendly bacteria belong to a group known as lactic acid bacteria (*Lactobacillus*), which are naturally found in the mouth, stomach and intestines from the first days after birth and throughout life. However, modern hygiene standards and changes in eating habits have resulted in a reduction of these bacteria compared with just a few decades ago. By taking probiotics daily it is possible to restore the good and natural balance in the mouth and recreate the healthy ecology.*

Lactobacillus reuteri (L. reuteri) *is recognised as a true probiotic thanks to its documented positive effects on human health and that it meets all the requirements of a modern probiotic.* L. reuteri *is a natural colonizer in humans from time we are born and is even found in the milk of breastfeeding mothers. It is one of very few species of* Lactobacillus *that uniquely adapted to reside in the digestive and oral tract of man and to interact with us in symbiosis.* L. reuteri Prodentis *is the patented combination of two complementary strains of* Lactobacillus reuteri *that were originally isolated from human breast milk and saliva.* Lactobacillus reuteri DSM 17938 *and* ATCC PTA 5289 *are specifically selected for their exclusive properties of colonozation in the oral cavity, fixation to mucins and biofilms effects.*

Supplementation of Lactobacillus reuteri Prodentis *affects the oral micro flora locally by competing for binding sites and nutrients with pathogenic bacteria. In addition,* Lactobacillus reuteri Prodentis *produces reuterin that directly inhibits growth of pathogenoc bacteria.* Lactobacillus reuteri Prodentis *does not only suppress the emergence of endogenous pathogens and prevent superinfection with exogenous pathogens, but might also protect the host by stimulating the immune system.*

Lactibacillus reuteri Prodentis *is the first and only probiotic spesifically formulated to restore the oral micro flora in a natural, fast and simple way. It is the most studied probiotic in oral health. To date more than ten studies have been published proving its safety and health promoting affects. Clinical studies have shown the synergistic properties of* Lactobacillus reuteri Prodentis *in reducing plaque, halitosis, gingivitis and periodontitis.*

ORTHOGNATIC SURGERY ON POST LABIO AND PALATOPLASTY PATIENT

Setyo Harnowo

ABSTRACT

Case on 31 years old woman with a diagnosis of Class III Malocclusion Angle with 12 mm overjet post labio and palatoplasty. Etiology from family there is no one who suffer labio and palatochisis (including the 60% of the causes are unknown / congenital). Possibly related to his father's job in nuclear reactor, there are cases from the children of his father colleague in nuclear reactor who suffer cleft lip and palate, eye abnormalities, mental retardation and deaf mute.

Therapy history : Labioplasty surgery in 1982 (age 100 days). Palatoplasty surgery in 1983 and 1984 (age 1 and 2 years). Repeated Labioplasty in 1993 (age 10 years) and 1994 (age 11 years). Orthodontic treatment from 1997 through 2013 (age 15-31 years) and orthognatic surgery in 2013.

Sefalometri analysis result : skeletal analysis SNFH 9^o, SNA 79^o (Normal 80^o-82^o). Soft tissue analysis result of pre operation Kỗle, SNA perpendicular with upper lip (Normal). Based on the analysis of soft tissue post operation Gonzales Ulloa, FHP line perpendicular with NA exactly intersection with chin soft tissue (Normal).

Discussion of Oral Surgery and Orthognatics agreed that the patients underwent surgery to reserve only the lower jaw, the operation is performed with Sagital Split Osteotomy Method, followed by fixation intermaxilla upper and lower jaw during one month. After fixation intermaxilla to improving continue with orthodontic treatment again. After orthodontic treatment complete can be continued with prostodontic treatment to replace the missing tooth.

HOW TO USE OF AUTONOMIC DRUGS IN DENTISTRY HYPERTENSIVE PATIENT

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ABSTRACT

Autonomic drug is one of a large group of drugs that mimic or modify the function of the autonomic nervous system. It is a drug withsimilar effects to those of the effector agents in the two systems which are called Sympathomimetic or Parasympathomimetic drugs.

The use of Autonomic drugs in dentistry hypertensive patient can be a problem, especially for Sympathomimetic effect. The small amounts of epinephrine (combined with local anesthetics) that may be used in routine dental procedures are unlikely to be a problem. Hypertensive or High Blood Pressures, sometimes called Arterial hypertension, is a chronic medical condition in which the blood pressures in the artery is elevated.

The JNC VII reports said that any blood pressure above than 130/80 mmHg is called Hypertension. In order to detect hypertension accurately, good measurement of blood pressure is necessary. Dental treatment is contraindicated in patients with severe hypertension.

Betablokers are no longer recommended as first-line treatment by the US JNC, but remains asthe second choice among others.

Betabloker is an important protective effect in some certain cases. Perioperative death from cardiac causes and myocardial infarction were reduced by bisoprolol in high risk patients undergoing vascular surgery. Poldermans D et al. Betablokers are effective, acting not centrally but through a reduction of peripheral manifestations of anxiety such as tremor and tachycardia. If a patient on a nonselective beta-blocker receives a systemic dose of epinephrine, however, the beta-blocker prevents the vasodilation.

THE EFFECTS OF HYPERBARIC OXYGEN THERAPY TO REGULATE NITRICOXIDE PRODUCTION ON WOUND HEALING

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ABSTRACT

Hyperbaric oxygen therapy (HBOT) is a therapy in which patients breathe 100 % pure oxygen at a pressure of more than one atmosphere absolute (ATA) in a pressurized chamber . HBOT increases the amount of oxygen that is carried in the plasma . As adjunctive therapy in the healing process of wounds , HBOT has been shown to enhance wound angiogenesis and granulation tissue formation and accelerates wound closure . One of the properties of HBOT is an anti - inflammatory effect and is correlated with the healing process by increasing the production of Nitric Oxide which may play a role in wound healing. The purpose of this paper is to describe the effects of HBOT in increasing the production of nitric oxide in wound healing .

***Keywords** : hyperbaric oxygen, nitric oxide, anti-inflammatory, wound repair*

CARDIO-PULMONARY RESUSCITATION : IS IT A MUST FOR DENTIST ?

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ABSTRACT

Basic Cardio-Pulmonary Resuscitation (CPR) is a basic level competence which is a must for many who involved in mass activities, since sudden cardiac arrest event can be anywhere and at anytime. It is more important for health care providers as we introduce many substances to human body that may react differently. Accidental intravenous of local anesthetic agent that injected by a dentist may cause a severe bradycardia leading to cardiac arrest. Further concern for high risk patients, any stress during dental procedures may trigger cardiac events. Cardio-pulmonary resuscitation for the first seconds may change the survival rate, while waiting for the expert team for further cardiac arrest management.

Basic CPR consists of Airway Management, Breathing assistance and External Cardiac Compression. CPR 2010 is the latest version for cardiac arrest resuscitation. Since the cause of cardiac arrest mostly is ventricular fibrillation, cardiac compression is the most important procedure allowing the oxygen flows to important organs. In 2010 CPR guidelines, the sequence of resuscitation become C – A – B (Cardiac compression, Airway and Breathing Management.) and more frequent uninterrupted cardiac compression, 30 : 2 (breathing assistance) to buy time of defibrillation.

A chain of resuscitation, Call for help, immediate proper CPR, timely shock and good post cardiac arrest care, is needed to provide a high survival rate of cardiac event.

The Role of NSAIDs for Acute Dental Pain

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ABSTRACT

Everyone had experienced dental pain regardless of the cause and all dentists treat ever. But whether drugs or combinations of drugs are appropriate for dental pain? And whether the drugs are given also in accordance with the patient's condition is so diverse ? Dental pain may be nociceptive pain (inflammatory pain) , vascular pain , neuropathic pain or psychological pain . Acute inflammatory pain and are generally derived from the tooth , the pulp and periodontal tissues , often encountered in daily practice . Vascular pain characterized by severe pain, unilateral , intraoral , short and episodic migraine may manifest . Neuropathic pain such as trigeminal neuralgia that occurs in general due to dysfunction or damage to both somatic and autonomic innervation .

Various management approaches have often raised include pharmacotherapy, clinical psychology, acupuncture, etc., but whether it is satisfying for clinicians in pain management in daily practice? In this paper, discussion is limited to pharmacologic approach. Various medications are used to overcome pain medications can be classified as non- steroidal anti -inflammatory (NSAIDs) , opioids , drugs that act on the central nervous system such as tramadol , morphine sulphate tablets (MST) , tricyclic tranquilizers such as amitriptyline , an inhibitor of N - methyl - D - aspartate (NMDA) such as ketamine , amantadine , an anti - epileptic drugs such as gabapentin , pregabalin , and membrane -stabilizing drugs such as mexilitene, tocainamide and so on . These medications should certainly be used in accordance with the severity , type and location of pain where the pain comes from pain receptors in peripheral sensory nerve fibers , spinal cord and central nervous system .

NSAIDs can be used at different levels of severity of pain . Divided according to the nature and type of pain , NSAIDs can be combined either with opioid drugs , anti - epileptic drugs , tranquilizers or inhibiting NMDA . NSAID drug selection should consider the potential , safety , mechanism of action , pharmacokinetic profile and of course affordability and availability in the community . Things that should be avoided is the shared use of two or more drugs that work on the same pain receptors , such as the use of two types of NSAIDs at the same time , this action will only increase the side effects of the drug rather than increasing the potential for anti- pain.

ABSTRACT SHORT LECTURE

DESCRIPTION OF MANDIBLE CORTICAL BONE HEIGHT IN PATIENTS WITH TYPE-2 DIABETES MELLITUS AND SUSPECT OSTEOPOROSIS

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ABSTRACT

Background*: Osteoporosis and diabetes mellitus is a systemic disease in which both lead to decreased bone quality. Decrease in bone quality can be analyzed by measuring the mandible cortical bone height. Mentale index is an index that can be used for assessment the height cortical bone in the mandible. This Assessment use the panoramic radiograph.*
Purpose*: The purpose of this study was to analyze the ratio of mandibular cortical bone height in patients with type 2 diabetes mellitus and osteoporosis with panoramic radiography.*
Methods and Materials*: The study is descriptive study. Samples were secondary data were 14 panoramic radiographs of patients suspected osteoporosis, 13 pieces of patients with type 2 diabetes mellitus and 5 normal patients as a control. All data is the data of patients who come to the clinic RSGM Dentistry Padjadjaran.*
Results: *The results showed that mandible cortical bone height in patients with diabetes mellitus-value of 2.37 mm by 2.31 mm, whereas in patients with osteoporosis showed a lower value which is 1.7mm in the right and left 1.8 mm.*
Conclusion: *The conclusion that can be drawn from this study is the decline in the quality of bone in patients with osteoporosis is more common when compared with patients with type 2 diabetes mellitus*

Key Word*: Osteoporosis, Diabetes mellitus type 2, Cortical Bone height, Panoramic Radiograph*

FIBER COMPOSITION ANALYZED FOR ALGINATE IMPRESSION MATERIAL WITH CASSAVA STARCH (Manihot Utilisima)

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Prof Dr Moestopo (B) University

ABSTRACT

Back ground*: Alginate impression material is a common dental impression material used in producing a removable partial denture. A research done by Febriani (2009) was found that alginate impression material with cassava starch has physical properties still in ANSI/ADA no 18/1992.*
Objective*:To analyze fiber composition alginate impression material with cassava starch.* ***Material and methods****: All material in this research including Tulip alginate impression material of normal set type, cassava starch of Pak Tani brand, Aquadest and proximat test for composition analysing test.*
Result*: Alginate impression material with cassava starch has fiber 2.98, protein 0.84, water 6.03, ash 44.17, fat 0.24, and carbohydrate 45.74.*
Conclusion*: Alginate impression material with cassava starch contains water, fat, protein, ash and carbohydrate higher than alginate impression material standard.*

Key words*: alginate impression material, composition test.*

ASSESMENT OF DENTAL IMPLANT IN CBCT

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Departement of Dentomaxilofacial Radiology, Faculty of Dentistry, Padjadjaran University

ABSTRACT

Background: *Placement technique of dental implant needs accuracy and exactness that important to be examined and analyzed before so a satisfactory result can be obtained. Radiograph examination considered would be very useful to well-analyze in two-dimensional or three-dimensional. Three-dimensional radiograph or CBCT-3D able to give complete and accurate informations.*
Objective: *The objective of this study was to find standard criteria of dental placement by using CBCT-3D of alveolar bone before implant placement was done.*
Discussion: *CBCT-3D able to interpret various things needed to determine the treatment plan and evaluation after dental implant placement compared with two dimensional radiograph.*
Conclusion: *CBCT-3D has advantage to analyze compared to other radiographs and very useful in terms of dental implant placement.*

Keywords: *Dental implant, CBCT-3D*

ANTI BACTERIAL EFFECT OF THE MOUTHWASHES CONTAINING *CHLORHEXIDINE, POVIDONE IODINE, FLUORIDE* WITH *ZINC* SUPPLEMENTATION AGAINST PLAQUE MIX BACTERIA, *S.MUTANS* AND *P.GINGIVALIS*

Betadion Rizki Sinaredi , Seno Pradopo, Teguh Budi Wibowo
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ABSTRACT

Background: *Caries and periodontal disease prevalence in Indonesian children are still high. Approximately 90% of Indonesian children have been infected with caries disease. Effort to decrease the prevalence of caries and periodontal disease are using mechanical methods and chemical methods, mouthwashes. Mouthwashes in the market contain Chlorhexidine, Povidone Iodine and Fluoride with Zinc supplementation.*
Purpose: *The purpose of this study was to evaluate the efficacy of the Chlorhexidine, Povidone Iodine and Fluoride with Zinc supplementation against mix bacteria that found in the plaque, S.mutans and P.gingivalis.*
Method: *The disk diffusion test was selected to measure the efficacy each of the mouthwashes. Each of the bacteria, mix bacteria from plaque (obtained from 6 subject), S.mutans (obtained from clinical isolation) and P.gingivalis (ATCC No.33277) were being inoculated and spread in the petridish containing MHA. Paper disk containing the mouthwashes were placed in the middle of the petri dish and incubated for 24 hours in the 37^{o} temperature (anaerob for P.gingivalis, aerob for S.mutans and mix bacteria). Diameter of inhibition that surrounds the paper disc is measured and compared between each of the active ingredients used.*
Result: *There was significant difference in diameter measurement between each group with the mean diameter of Chlorhexidine was highest of all experimental groups.*
Conclusion: *Chlorhexidine was found to be more effective in all experimental group compared with Povidone Iodine and Fluoride with Zinc supplementation.*

Keywords: *Mouthwash, Chlorhexidine, Fluoride, Povidone Iodine, S.mutans, P.gingivalis*

FABRICATION OF NANOFIBERS WITH SOL-GEL METHOD FOLLOWED BY ELECTROSPINNING.

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ABSTRACT

Background : *In this new era, nano fibers with large surface area are really needed for various applications. In regeneratif medicine (biomedical applications),nano fibers is used as tissue engeneering (scaffold), drug release, wound dressing etc. In dentistry is used as a filler in restoration such as in composite filling materials which is known as nanocomposite, to strenghten dental posts, as a filler for denture base, porcelain veneer etc. But yet not every dentist and researcher fully understand this big chances.*
Purpose : *The purpose of this paper is to give dentists, researchers and all who are interested in, an understanding about nanofibers, sol-gel method, electrospinning and its procedures. In this paper is discussed the importance of nano, nanofibers, sol-gel and electrospinning method and its manufacturing. Here is described how to produced nanofiber by combination method; sol-gel and electcrospinning. In conclusion nano fibers can be made simply by using the sol-gel method and electrospinning..*

Keywords *: nanofibers, sol-gel method, electrospinning, zilica-zirconia*

NICOTINE EFFECTS ON THE NUMBER OF OSTEOCLAST AND OSTEOBLAST AFTER DENTAL IMPLANT PLACEMENT
(Animal laboratory experimental study in New Zealand rabbits)

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ABSTRACT

Introduction*: Smoking is a factor that can interfere the success rate of dental implants . In most smokers, dental implant failures before getting a load are higher than non smokers. Nicotine is the main ingredient in tobacco cigarettes and the purpose this study aimed to explore the nicotine effect on osteoclast and osteoblast cell to osseointegration in dental implant.*
Methods*: This study was performed on New Zealand rabbits through measurement the value of osseointegration by Implant Stability Quotient (Osstell), the number of osteoclast and osteoblast by histology test. This study is an animal experimental laboratory research with post test control group design. The number of rabbits in this study was 16, divided into 2 groups. Group 1 was a control group at week 1 and week 8, Group 2 was a treatment group at week 1 and week 8. The treatment group given nicotine injection, 1 week before implant placement until the end of the research. The dose of nicotine was 2,5 mg/kg BW/day.*
Result*: Statistical analysis found significant differences the controls and treatment group ($p<0,05$). At the first week and eigthth week on the treatment group, it showed that nicotine increase the number of osteoclast and decrease osteoblast.*
Conclusion*: Nicotine can increase the number of osteoclasts and decrease osteoblasts that causing the inbihition of osseointegration of dental implant.*

Key words*: Dental implant, nicotine, osteoclast, osteoblast, osseointegration*

VIABILITY OF FIBROBLAST CELLS ON SEVERAL COMMERCIAL BEVERAGES AS AN ALTERNATIVE MEDIA STORAGE FOR AVULSED TEETH

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ABSTRACT

Background: *The main treatment for the avulsed tooth is replantation. The cells in periodontal ligament of the avulsed tooth must be protected from damage and loss of normal cell metabolism so that required storage media which have optimal osmolarity, nutritional adequacy, proper pH and easy to obtained. Recommended storage media for avulsed teeth is Hank's Balanced Salt Solution (HBSS) because it has electrolytes and glucose. However HBSS is not always available when the trauma occurs.*
Purpose*: To determine the viability of fibroblasts in three commercially beverages which were coconut water, isotonic drinks and milk.*
Method: *BHK-21 cells that had been grown and placed in micro plate induced with coconut water, isotonic drinks and milk. The cells were measured with colometric assay and ELISA reader.*
Result: *All of the commercial beverages in this study showed a percentage above 50%; it appeared that all sample solution had no toxic effect on fibroblasts. The highest viability of fibroblast was found in coconut water 97% followed by isotonic drinks 87% and the lowest in milk 79%.*
Conclusion: *The study suggested that high viability of fibroblast found in coconut water, isotonic drinks and milk.*

Keyword: *Avulsed teeth, Storage media, coconut water, viability of fibroblast.*

MINERAL CONTENT DIFFERENCES BETWEEN LOW AND HIGH CARIES INDEX OF PRIMARY TEETH

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ABSTRACT

Background*: Dental caries prevalence in children increased because of the habit of bottle feeding, however with the same amount of milk consumption, there are children suffer with caries and free caries. One of the etiologies of dental caries is tooth quality (host). The tooth quality was influenced by levels of minerals that have resistance to dental caries. Mineral composition of the enamel primary teeth consist of Ca, P, Mg, Zn, Al, Sr, Mn, Fe, Na, K, and F.*
Purpose*: The purpose of this study was to compare the mineral content of primary teeth in low and high caries index children.*
Methods*: This study was using exfoliated deciduous anterior teeth from fourteen children aged 5-7 years, divided into 2 groups, low and high caries index children. Tooth mineral content was measured by X-ray fluorescence.*
Result*: by using parametric Independent t-test, there were significant differences in level of mineral Ca and P between low and high caries index children ($p < 0,05$).*
Conclusion*: The conclusion of this study was mineral content of Ca and P in low caries index children was higher than high caries index children.*

Key words: *mineral content, primary tooth caries index*

CORRELATION BETWEEN INTECANTHAL DISTANCE AND THE MESIODISTAL WIDTH OF THE MAXILLARY ANTERIOR TEETH IN JAVANESE BOYS

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ABSTRACT
Background: *Risk of trauma occurs in several boys by losing their anterior teeth that caused by extracting them. They could be restored by denture application, which the esthetic side is mainly concerned.*
Purpose: *the purpose of this study was to determine the proportional relationship between facial dimension and anatomic landmark with the width of the maxillary anterior teth that potentially provide a guide for teeth selection.*
Method: *A hundred adults (12-14 years old) with well aligned maxillary anterior teeth and minimal attrition were selected for this study. Using direct measurement with caliper we determined the intercanthal distance and intercanine width. For all the subjects in the study, mean, standard deviation, maximum and minimum values (range) were calculated. Pearson correlation test was done to estimate the correlation between the variabebles. Ration ('r' factor) between the mean of all the variables were calculated.*
Result : *the means (standard deviation) of ICD were 30,72 mm (2,62), respectively, the intercanine width were 30,09 mm (1,89). There was positive correlation between intercanthaldistance with intercanine width.*
Conclusion*: there are various methods of selection of teeth but their applicability varies due to the ethnic differences between populations. The results can help to use the correlation of these measurements for rehabilitating local edentulous adult patients as their pre-losing records were not available.*

Keywords: *intercanthal distance, intercaninus width, ratio*

ANTIMICROBIAL ACTIVITY OF *ZINC OXIDE EUGENOL* PASTE*, CALCIUM HIDROXIDE+ IODOFORM*, AND MINERAL *TRIOXIDE AGGREGATE* AS PULP TREATMENT OF PRIMARY TEETH

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ABSTRACT
Background: *Endodontic therapy is a commonly treatment in pediatric dentistry in order to prevent premature exfoliation in primary tooth .The successful of this therapy is directly affected by the success of eliminating pathogen microorganism that infects root canal, which can be accomplished by conducting disinfection, preparation root canal and filling the root canal.* ***Purpose:*** *The purpose of this study was to examine in vitro the antimicrobial effects of three experimental pastes containing zinc oxide eugenol paste, calcium hydroxide associated iodoform paste and Mineral Trioxide Aggregate (MTA) paste.*
Methods: *Three microbial strains (Porphyromonas ginggivalis, Enterococcus faecalis and Fusobacterium nucleatum) obtained from the American Type Culture Collection (ATCC) were inoculated in Brain Heart Infusion (BHI) and incubated at 37° C for 24 hour. For the agar diffusion test (ADT) 7 petri plates with 20 mL of BHI agar were inoculated with 0,1 mL of the microbial suspension, using sterile swab that were spread on the medium. Three cavities were made in each agar plate (total=21) and completely filled with one of the root canal paste. The plates were pre-incubated for 1 h at room temperature and then incubated at 37°C for 24 h. The inhibition zone around each well was recorded in mm.*
Result: *There is significant difference between the inhibition level of ZnOE, calcium hydroxide and iodoform and MTA on three bacteria groups of Porphyromonas ginggivalis, Enteroccus faecalis, and Fusobacterium nucleatum (p)0,000 (p<0,05). Porphyromonas ginggivalis was inhibited by MTA more effectively (p<0,05), while Enteroccus faecalis, and Fusobacterium nucleatum were more effective to be inhibited by ZnOE (p<0,05).*
Conclusion: *The in-vitro test on microbial activity from three pastes of pulp treatment showed that MTA had the highest inhibition level on the Porphyromonas ginggivalis, while ZnOE had the highest inhibition level on Enteroccus faecalis, and Fusobacterium nucleatum.*

Keywords: *antimicrobial activity, zinc oxide eugenol, calcium hydroxide, mineral trioxide aggregate*

THE USE OF MINI DENTAL IMPLANT IN THE POSTERIOR REGION (Case Report)

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Lakdogi TNI AL-Jakarta

ABSTRACT

The use of dental implants for single and/or multiple edentulous cases has increased significantly in recent years. They areused not only in normal cases, but also in special cases when the alveolar bone resorption occuredverticaly and/or horizontaly.

Mini dental implant is an implant with less than 3.1 mm diameter and the length more than 10 mm. There are many brands and companies produce mini dental implants. Mini dental implant generally indicated in cases when the alveolar bone width are very limited because of bone resorption process or in cases when the mesio-distal edentulous width is too narrow.

In this case report will be discussed the use of mini dental implant in the posterior region, the indications, treatment planning and techniques to achieve the optimal success and how to choose the mini dental implant for the cases and how to use the mini dental implant for posterior cases with a proper treatment planning.

ACCURACY OF DEMIRJIAN'S AGE ESTIMATION IN DEUTERO MALAY CHILDREN

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ABSTRACT

Background: *Tooth formation is widely used to assess dental maturity and predict age of growing children. Demirjian et al in 1973, formulated the method of dental age estimation in French - Canadian population with reference to the panoramic radiographs. It is based on eight calcification stages which span from the first sign of tooth calcification to apex closure for the seven left permanent mandibular teeth.*

Purpose: *The purpose of this study was to evaluate the accuracy of Demirjian's age estimation in 8 – 13 years Deutero Malay children.*

Method: *We selected 62 dental panoramic radiographs of 30 boys and 32 girls for estimating the age with Demirjian's technique. A paired samples t-test was performed to search for significant age differences between the obtained age estimation with Demirjian's method (dental age) and the chronological age based on medical record.*

Result: *The overestimation of the age was confirmed. Then, the index was calculated as an instrument for adapting Demirjian's method in Deutero Malay population. The index resulted in percent of the mean of chronological age divided by dental age of each samples group: boy is 92,7%, girl is 96,1%, boy and girl is 94,5%. The new data (after being multiplied by index) was analyzed for statistical differences with the chronological age using paired samples t-test. The result was no significant difference between the new data and the chronological age.*

Conclusion: *The conclusion was Demirjian's method could be applied in 8-13 years children of Deutero Malay with modification, so that helpful in dental forensic for estimating chronoloical age of cadaver.*

Keywords: *dental forensic, chronological age estimation, Demirjian*

THE DIFFERENCE OF *S. MUTANS* COLONY BETWEEN MICROHYBRID AND NANOHYBRID FLOWABLE COMPOSITE RESINS SURFACE

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ABSTRACT

Background: *Surface attributes of a restoration play an important role in adherence of plaque bacteria. The formation of biofilm and bacterial accumulation on dental materials may lead to the development of secondary caries. S. mutans can adhere to the entire surface of oral cavity and visible light composite resins.*
Purpose: *The aim of the present study is to examine the effect of different surface polishing methods on the amount of S. mutans colony adherence to the surface of two restorative materials.*
Method: a total 20 specimens were prepared from each material; micro hybrid and nano hybrid flowable composite resin. For each material, the specimens were randomly divided into two groups (n=10). Group 1: polished with alumunium oxide disc (enhance); Group 2: polished with diamond finishing bur (fine finishing). *The specimens of 5 mm diameter and 3 mm in thickness were immersed in saliva for one hour, than the samples were put into bacteria suspension, incubated for 24 hours at 37^{o}C. Final solution was dropped into TYC plate. The amount of S. mutans was determined by the plate counting method. The data were statistically analyzed by using independent t-test.*
Result: *a significant different of S. mutans colony on the surface between microhybrid and nanohybrid flowable composite resins finished with enhance and with fine finishing bur.*
Conclusions: *the amount of S. mutans adherence on the surface of microhybrid was higher than the nano hybrid flowable composite resin. Enhance polishing methodpossesses significantly lower adherence compared with fine finishing method in both composite material.*

Keywords: *S. mutans, bacterial adherence, flowable composite resin, polishing method*

THE SUCCESFULL OF PERIODONTAL TREATMENT WITH SCALING ROOT PLANNING COMBINED WITH HOST MODULATION ON PERIODONTITIS PATIENTS WITH DIABETES

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ABSTRACT

Background : *Periodontitis is a common problem in patients with diabetes, as much as 75% of diabetic patient had periodontitis. Diabetes can stimulate the chronic release of proinflammatory cytokines that have a deleterious effect on periodontal tissues. Conventional periodontal treatment in patient periodontitis with diabetes is ineffective.*
Objective *: For the patient periodontitis with diabetes type 2 we give unusual treatment. Scaling root planning and oral antibiotics to eliminate the pathogenic bacteria combined with host modulation terapy which is enable to support regeneration of periodontal tissue.*
Case : *An 62 years old male with Diabetes history fell unpleasant because of mobility tooth in maxillary anterior region. There's no allergic history. On clinical examination we found 4 mm pocket depth, gingival indeks score 2, periodontal indeks score 6.*
Case Management *: For the treatment we have done Scaling root planing, followed by consumtion Amoxillin and Metronidazole, and also NSAID per-oral as Host Modulation Terapy.*
Conclusion. *therapeutic mechanical scaling and root planning combined with host modulation therapy proves successful repair of periodontal tissue destruction in periodontitis patients with diabetes.*

Keywords : *Diabetes, Host Modulation, Periodontitis*

THE USE OF LOW DOSE DOXYCYCLINE FOR AGRESISIVE PERIODONTITIS THERAPY (CASE REPORT)

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ABSTRACT

Agresif periodontitis caused by lokal infection factors.others factor can be effecs the disease among other duo the stress factor,systemic disease,and idiopathic factors,the disease is usually accompanied by periodontal demage is quite extensive and accompanied by periodontal damage is quite extensive and accompanied by bone resobsi alveoli.periodontitis disease surference an object is therefore a factor stress.patient woment 30 year old,unmarried with agreat demage on the upper and lower jaw tooth,there is a loosening of three derajat ,the resobsi and alveoli bone care periodonsia for six months.

***Key word** : periodontitis agresif, emotional stress, low doxycyclin.*

CROSSBITE ANTERIOR TREATMENT WITH INCLINE BITE PLANE (CATLANS APPLIANCES) IN MIXED DENTITION

(Perawatan gigitan silang anterior dengan menggunakan incline bite plane (catlans appliances) pada fase geligi pergantian)

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ABSTRACT

Background: *Anterior crossbite is the term used to describe an abnormal labiolingual relationship between one or more maxillary and mandibular incisor teeth. Different techniques have been used to correct anterior crossbite. Single tooth anterior dental crossbite is the commonly encountered malocclusion during the development of occlusion in children. The presence of anterior crossbites may cause mandibular displacement, if left untreated may lead to restriction of maxillary growth, traumatic occlusion, and may lengthen the treatment time.The anterior crossbite should be treated immediately to prevent futher damage to the periodontium and attrition. Various treatment options such as removable and fixed appliances have been suggested by different authors in the past literature.*
Purpose*:This paper cases of anterior crossbite corrected using Incline Bite Plane in a short period of a weeks without any damage to the tooth or the periodontium.*
Case: *In this case report children aged eight years old with anterior crossbite was corrected with incline bite plane method.*
Case Management: *An acrylic incline bite plane cemented to the lower anterior teeth to correct in locked anterior teeth. An incline bite plane approximately ¼ inch in length is then added, extending at a 45 degree angle to the long axis of the lower incisors.*
Conclusion: *This would suggest that the prognosis of the tooth is good. This fixed appliance is a simple and traditional method which does not depend on patient cooperation to reverse the bite.*

Keyword: *Anterior crossbite, Incline bite plane, mixed dentition*

THE EFFECT OF STICHOPUS HERMANII TO PREVENT THE ORTHODONTIC RELAPS MOVEMENT

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ABSTRACT
Background:. *Relapse Orthodontic is the return, following correction, any change from the final tooth position at the end of treatment relapse, could be a return to the original teeth position, caused by factors unrelated to the orthodontic treatment.Stichopus hermanii is one of the best fishery commodities in Indonesia. It is natural and contain various active ingredient such as hyaluronic acid,chondroitin sulphate,cell growth factor, EPA DHA, flavonoid that might reduce relaps orthodontic.*
Objectives: *The aim of this study is to investigate the effect of Stichopus hermanii to prevent the orthodontic relaps movement .*
Material and Method: *The experiment was held by Post Test Only Group design. Thirty twomale Cavia Cobaya were divided into four groups. K(-) group as negative control group (without treatment), K(+) group as positive control group which is give with orthodontic mechanical forces, and the other groups P1, P2, were give with orthodontic mechanical forces and stichopus hermanii 2,5 % and 3 %. After treatment the rats were sacrificed. The orthodontic relaps movement of each group was measured by caliper in mm length.*
Results: *This study showed that orthodontic relaps movement was significantly differences in group P1 compare to K(-) and K(+), group P2. K(+) and P2, whereas the other data showed no significantly differences.*
Conclusion : *Stichopus hermanii 2,5 % could prevent orthodontic relaps movement in Cavia cobaya after releasing following orthodontic mechanical forces.*

Keywords*: Stichopus hermanii, orthodontic mechanical forces, orthodontic relaps movement.*

TEST OF BACTERICIDAL EFFECT BETWEEN METHANOL EXTRACT OF 80 % MAULI BANANA STEMS AND POVIDONE IODINE 1 % AGAINST STREPTOCOCCUS MUTANS

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ABSTRACT
Background: *There are a lot of traditional medicine that can be used as the alternative medicine. One of them is 80% methanol extract of mauli banana stems which is proven as a potential antibacterial agent if applied in the wound. Some people in North of Hulu Sungai Banjarmasin are using it as the agent for healing the wound. The gold standar for healing the wound is Povidone iodine that has an antibacteriocid effect. The therapies that have been given to reduce the colonies of Streptococcus mutans in oral cavity is modern medicine, such as povidone iodine 1% which had side effects such as toxicity, systemic absorption, and delayed healing.*
Purpose: *The aim of this research was to compare bactericidal effect between 80% methanol Extract of mauli banana stems and 1% povidone iodine against Streptococcus mutans.* ***Methods****: The method uses pure laboratory experimental with post test only design and complete randomized design. The given treatments were 80% methanol Extract of mauli banana stems and 1% povidone iodine which also used as the positive control. The treatment replication was done 16 times. 80% methanol Extract of mauli banana stems were tested and compared with 1% povidone iodine using paper disk diffusion method to measure the diameter of inhibition zone to Streptococcus mutans colonies.*
Result: *80% methanol Extract of mauli banana stems has antibacterial effect against Streptococcus mutans with average radical zone 15 mm and less effective than Povidone iodine 1% which showed average radical zone 17 mm.*
Conclusion: *80% methanol Extract of mauli banana stems has antibacterial effect against Streptococcus mutans but less effective than Povidone iodine 1%.*

Keywords*: antibactericidal effect, 80% methanol Extract of mauli banana stems, 1% povidone iodine, Streptococcus mutans.*

KNOWLEDGE LEVEL OF PRODUCTIVE-AGE-PATIENT IN DENTAL HOSPITAL UNIVERSITY OF HANG TUAH SURABAYA ABOUT HIV/AIDS DISEASE.

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ABSTRACT
Background*: This world has encounter a vicious virus called HIV/AIDS. This virus slowly but sure killed every people they infected and there's still no cure for this virus. In Indonesia this virus has infected 33.2 millions people and killed 2.1 millions people and most of it's victims are people at the age of 20-29. This virus are not well known, so the number of victims each year became increase.*
Purpose: *This research is want to know about how many people understand about HIV/AIDS virus.*
Methods: *We have deviced a test in which the people have to answer the questionnaire. We used this questionnaire to study 49 peoples, aged between 15-64 years, who visited Hang Tuah's dental hospital. By spread questionnaires to 49 peoples, without distinguish between men or women, and ask them to fill it. The results of the answer we calculated and classified it by the criterion. There are four criterions: very aware (9-12), aware (6-8), not aware (3-5), really do not aware (0-2). From the answer of the people, those will help us to gauge the knowledge.*
Result: *Most of the people we tested were very aware of this virus, and mostly of the people who known are the people with higher level education.*
Conclusion: *Our HIV/AIDS knowledge is a valuable standard of the knowledge of people who aware or not aware about HIV/AIDS virus. From this test we can gain valueable information about HIV/AIDS virus.*

Key Words *: HIV/AIDS, People, Knowledge, Hang Tuah*

INCIDENCE RATE OF TEMPORO MANDIBULAR DISORDERS (TMD) DUE THE MISSING OF THE FIRST PERMANENT MOLARS MANDIBULAR

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ABSTRACT
Background*: Losing teeth of mandibular first permanent molars in Banjarmasin have high prevalence while installing removable and fixed denture by only (3.0%). This suggests that many cases of tooth loss is not offset by rehabilitation treatment. This will lead to arch function decreased by 30%.*
Objective: *To determine the incidence rate for temporo mandibular disorder (TMD) due the loss of teeth mandibular first permanent molars.*
Methods: *Conduct anamnestic and dysfunction index to subjects that fit the inclusion criteria. Overall the data collected and grouped according to data obtained by descriptive methods.*
Results *: Calculated percentage of TMD due loss of the mandibular first molar by classification and gender.*
Conclusion: *TMJ dysfunction in women have most high frequency than men. Classification of severe TMJ dysfunction are shown in subjects with missing teeth 46 and who lost both its molar 36 and 46*

Keywords*: Incidence Rate, Temporo Mandibular Disorders (TMD), missing of the first permanent molars mandibular*

SYSTEMIC OBSERVATION-SURGICAL PERIODONTIC APPROACH IN THE MANAGEMENT OF AMLODIPINE INDUCED GINGIVAL ENLARGEMENT

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ABSTRACT

Background : *Drug induced gingival enlargement is frequently observed in patients taking three main group of drugs like calcium channel blockers (CCBs), immunosuppressant's and anticonvulsants***.** *Amlodipine belongs to the dihydropyridine-a third generation calcium channel blockers agents that may cause the side effect of drug-induced gingival enlargement and oral bacteria intervention due to calculus retention. This case report describes the management of gingival enlargement in a hypertensive patient taking amlodipine.*
Objective : *This case report was aimed to discuss the treatment and maintenance of systemic observation-surgical periodontic approach to restore gingival enlargement*
Case report : *A 47-years old man was referred to the Department of Periodontology, Faculty of Dentistry, Airlangga University complaining of swellings and bleeding on his gingiva in all region. He felt very uncomfortable as the swelling interfered while chewing and sometimes there was bleeding spontaneously and halitosis. He had hypertension since 5 years and was on medications Captopril 12,5 mg daily during 4 years and Amlodipine 5mg daily during last 1 year. A provisional diagnosis and systemic observation-periodontal phases treatment were taken to restore gingival enlargement condition.*
Case Management : *Systemic observation of medication use, periodontal phases treatment such as scaling root planning, periodontal surgery as flap and gingivectomy, home oral hygiene maintenance, control recall every month during first 3 months were taken.*
Conclusion : *The successful of combination carefully systemic observation-surgery periodontal approach are promising to maintain Amlodipine induced gingival enlargement.*

Keywords *: Amlodipine, Gingival enlargement, Systemic observation, Surgical periodontic*

SWEET TASTE STIMULATION POTENTIALLY INCREASE THE PAIN TOLERANCE THRESHOLD

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ABSTRACT

Background*: Sweet taste stimulation may possibly be applicable in the field of dentistry, and to relieve pain during injection of local anesthetic. In the present study, oral administration of sucrose and xylitol have been reported to increase the pain threshold.*
Objective: The aim of this study was to determine the mechanism of sweet taste stimulation on pain tolerance threshold.
Review*: A-delta fibers contribute to the sensation of pain, and C fibers contribute to pain pressure in the submucosa during injection of local anesthetic. The increase in pain threshold from sucrose and xylitol is caused by enhanced secretion of endogenous opioids and activation of the descending pain inhibitory system. The distribution in dorsal horn of spinal cord of A-delta and C fibers react to noxious stimulation. Serotonergic and noradrenergic neurons in descending pain modulatory system and endogenous opioids in the superficial layer of the trigeminal subnucleus caudalis both contribute to the pain-inhibiting effects of sweet taste stimulation. This may result an increasing of pain tolerance threshold.*
Conclusion*: Sweet taste stimulation may potentially inhibit pain and increase the pain tolerance threshold.*

Keywords: *mechanism, sweet taste, stimulation, pain threshold*

FACIAL TYPES DETERMINATION BASED ON FM ANGLE MEASUREMENT IN CEPHALOMETRIC ANALYSIS

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ABSTRACT

Background : *Cephalometric analysis is used in dentistry especially in orthodontics which is to study the growth of craniofacial, enforce the diagnosis or analyze abnormality of craniofacial, to study facial types, determine the treatment plan of orthodontic, evaluate any cased had been treated, to analyze functionally and to do research. FM angle mesurement is useful to determine facial types. Facial types are correlated to the shape of jaw arch.*
Objective : *The purpose of this paper is to discuse about facial type determining, based on FM angle measurement on cephalometric analysis in order to determine treatment plan.*
Methods : *FM angle is an angle formed by FHP and mandible plan. FHP (Frankfort Horizontal Plane) is plane that through orbita and porion points.*
Result : *When the resultant of FM angle is 260 ± 3 it is included in mesofacial type. When FM angle is < 260 ± 3 so that it is included in brachyfacial type and if FM angle is > 260 ± 3 it is included in dolichofacial type.*
Conclusion : Facial types will affect in determining treatment plan, there should be jaw expansion or tooth extraction.

Keywords : cephalometric analysis, face type, orthodontic treatment.

A SIMPLE TECHNIQUE FOR FIXING PREMAXILLA AFTER OSTEOTOMY IN PROTUDED PREMAXILLA PATIENT POST LABIOPLASTY AND PALATOPLASTY

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ABSTRACT

Background : *Patients post labioplasty and palatoplasty with protuded premaxilla require surgical setback of the premaxilla with osteotomy. There was no consensus for the setback osteotomy because it is usually difficult to fix the premaxilla after osteotomy. Due to financial constrains and the distances traveled, the patient prefer to come for fewer procedure.* ***Objective:*** *The aim of this paper to report repositioning of the protuded premaxilla as functional and aesthetic treatment*
Case: *An8 years old girl with protuded premaxilla have been performed labioplasty and palatoplasty. The procedures of these case were setback osteotomy and immobilization with intraosseous wire.*
Case management : *The premaxilla was immobilized using simple technique of Dentaurum wire fixation, after osteotomy and bone graft was placed in the alveolar cleft. Palatal closure was achieved with two flap technique.*
Conclusion :*Setback osteotomy of protuded premaxilla with intraosseous wire is simple procedure but the result was satisfactory.*

Key Words : *Set back osteotomy, labioplasty and palatoplasty, protuded premaxilla, intraosseous wire*

SUCCESSFUL MANAGEMENT OF "BLACK TRIANGLE" USING SUBEPITHELIAL CONNECTIVE TISSUE GRAFT

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ABSTRACT

Introduction: *Open gingival embrasures are a common occurrence in adult population with a history of periodontal disease. Open gingival embrasure show a loss of interdental papilla which usually refer as the "black triangles" occur in more than one- third of adults. Most of the treatment for black triangle usually treated with orthodontic treatment and restorative treatment. However this treatment is unsatisfied, as we want to regenerate the interdental papilla. One of the most difficult goals of periodontics in the field of reconstruction, regeneration and esthetic aspect of periodontal therapy is the surgical reconstruction of the lost interdental papilla. Loss of interdental papilla could result in patient complaints such as phonetic problems, food impaction, functional problems and esthetic concern. Subepithelial connective tissue graft was used to treat open gingival embrasure, better aesthetics can be achieved because of a better color match of the grafted tissue to adjacent area.*
Objective*: To provide information about a successful surgical reconstructive of interdental papilla using a subepithelial commective tissue graft and evaluated clinically for 3 months.*
Case: *Female, 25 years-old visit "Rumah Sakit Gigi dan Mulut" public service hospital Airlangga University, Surabaya in May 2012, she complained about her black spot at anterior lower region after scaling and root planning (SRP) treatment by dentist and she came to Rumah Sakit Gigi dan Mulut Airlangga University.*
Case management: *full thickness flap is dissected on the lingual aspect of the interental area. The flap is elevated labially, folded and sutured to create the new papilla at the facial part of the interdental area. The lingual which is open then covered by a subepithelial gingival graft then sutured to the facial part of interdental papilla, then coronally reposition flap was done for the lingual side. Then evaluated pre- and post treatment. After 3 month post flap surgery the interdental papilla has increased*
Conclusion: *Subepithelial connective tissue graft was able to increase the papilla height with interdental papilla lost <6 mm.*

Key words : *Loss of interdental papilla, black triangle, subepithelial connective tissue graft*

RESTORING FACIAL BALANCE AND FUNCTION WITH ANTERIOR TEETH PROSTHESES

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ABSTRACT

Background: *Contradiction in functional problems often occurs during the making of full dentures. Patients expect near-real prostheses in aesthetically and functionally, particularly in chewing and speech function.*
Review: *In these following cases, the problems are facial anatomical landmarks, mouth cavity and jaw shape of the patients that has changed due to resorbing of the alveolar ridge of upper jaw upwards to the palate, and resorbing of the alveolar ridge of lower jaw forward to the anterior.*
Conclusion*: Some efforts are done to overcome these problems: reduction to the vertical dimension during measurement of biting height, precise centric occlusion, and arrangement of anterior teeth not directly on the ridge for the upper jaw, as for the lower jaw, the anterior dentures are placed towards lingual direction.*

Keywords: *Full dentures, esthetic and function, vertical dimension, dentures arrangement*

MAKING FULL DENTURE WITH A FLAT RIDGE OF THE MAXILLA AND MANDIBLE IN PATIENT WITH POST STROKE (CASE REPORT)

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ABSTRACT

***Background**: In the case of post stroke patients who have lost teeth longer and do not use full denture may occur that flat ridge conditions. The condition of the flat ridge, have any impact on the stability and retention of dentures is difficult to achieve. Medical rehabilitation in this condition required special measures is using the shortest treatment time. Making full denture can be optimized with the use of fully adjustable articulator that can be adjusted condyle angle and bennet angle patients.*
***Purpose** : To get the denture retention and stability on flat ridge can be use of fully adjustable articulator.*
***Case** : Men age 80 years, come to the clinic specialist prosthodontics faculty of dentistry airlangga university to making full denture in the maxilla and mandible. Patients had a stroke during this, already wearing dentures, but often problematic bacause denture often loose when used for mastication.*
***Case management** : high initial bite determination using centric tray which is then connected to facebow transfer for move the position of the maxilla and mandible patient into the articulator. Functional printing is closed mouth method with the appliance gnathometer and use accessories articulator in making teeth.*
***Conclusion** : High determination bite, accurate and precise printing, the principles of making teeth is fulfilled with the help of fully adjustable articulator will result in intimate contact between the denture and mucosal tissue underneath so in get the denture retentive and stable.*

***Key Words** : full denture, flat ridge, fully adjustable articulator*

DISTRIBUTION OF VISITS THE PATIENT PARTICIPANTS ASKES TO POLY DENTAL PUBLIC HEALTH CENTER IN JEMBER BASED ON GOOGLE EARTH

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ABSTRACT

***Background**: Askes or health insurance is one of the health care insurance is managed by the Government. One of utilization service askes by society is service for outpatient poly dental public health center. The utilization of cards askes by the public can be seen through the distribution of visits his patient askes to poly dental public health center. There are 49 public health centers in Jember. The varying geographical conditions public health center in Jember can use geographic information system based Google Earth. Description of the distribution of visits the patient participants Askes to poly dental public health center Jember is presented in the form of geographic information systems based on Google Earth.*
***Purpose:** The purpose of this research is to know the description of the distribution visits the patient participants Askes to poly dental public health center in Jember based on Google Earth. **Method:** This type of research is observational descriptive. Data sources secondary derived from the District Health Office of Jember. Data obtained in 2010, 2011 and 2012 years. Data is processed and presented in the form of partial and non-partial.*
***Results:** The result of this study visit participants patients Askes to poly dental public health center in Jember showed average of + 5.59% (2010), 6.57% (2011) and 6.19% (2012).*
***Conclusion**: the distribution of visits the patient participants Askes to poly dental public health center in Jember based google earth uneven.*

***Key words**: distribution of visits the patient, askes, Google earth*

RELATIONSHIP BETWEEN THE ACTIVATION OF NFKB PRODUCING CELLS AND ALVEOLAR BONE DESTRUCTION IN LPS-INDUCED PERIAPICAL INFLAMMATION

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ABSTRACT

Backgrounds. *Infiltration of inflammatory cells is induced by penetration of bacteria and bacterial by products, including lipopolysaccharide (LPS), from infected root canals into the periapical tissues. These cells produce various chemical mediators, which characterize the periapical inflammation by activation NFκB.. NFκB will producing cytokines. Especially, interleukin-1 synthesized by macrophages is a typical mediator in the periapical lesions, and it is involved in the bone resorption*
Purpose: *The aim of this study is to evaluate the expression of NFκB and IL-1 producing cells into the periapical lesions induced by application of LPS to the pulp chamber in experimental animals.*
Method. *Non-treatment animals were served as a control (Group A, n=7). LPS was applied into the exposed pulp chamber of molars (Group B, n=7). Phosphate buffered saline (PBS) was used instead of LPS (Group C, n=7). LPS was applied into gingival sulcus (Group D, n=7). Three weeks later, animals were sacrificed, and extracted samples were prepared for immunohistochemical study.*
Results. *The data was analysis by Anova (SPSS 13) The results by statistic analysis were showed expressions NFkB and IL-1 in group B were significantly different between group A and B $p = 0,001*(p<0,05)$.*
Conclusion. *These results suggest that macrophages are involved in both progression and resolution of periapical inflamation induced by LPS. Macrophage expressing NFκB will release cytokines like IL-1, may play an important role in increasing the destructive mediators in periapical lesions.*

Keywords :*NFκB, Lipopolysaccharide, periapical inflamation, bone resorption*

LEVEL OF CREACTIVE PROTEIN (CRP) AMONG CARDIOVASCULAR DISEASE PATIENTS WITH CHRONIC PERIODONTITIS IN CARDIOVASCULAR DEPARTEMENT OF DR. SOETOMO NATIONAL HOSPITAL SURABAYA

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ABSTRACT

Background: *Periodontitis is a local inflammatory process mediating destruction of periodontal tissues triggered by bacterial insult. However, this disease is also characterized by systemic inflammatory host responses that may contribute, in part, to the recently reported higher risk for cardiovascular disease (CVD) among patients with periodontitis. Moderate elevation of C-reactive protein (CRP) has been found to be a predictor of increased risk for CVD. Elevated CRP levels in periodontal patients have been reported by several groups. In this study, we examined whether CRP plasma levels are increased in periodontitis and if there is a relation to severity of periodontal disease.*
Methods: *CRP serum levels were assessed using reagenImmulite C-Reactive Protein ® / Immulite ® 1000 high-sensitivity CRPas asolid-phase, chemiluminescent immunometric assay in 100 subjects which diagnosed cardiovascular disease with chronic periodontitis.Periodontal Disease Index (PDI) were measuredby clinical attachment loss, probing depths, and gingivarecessionat six selection teeth : 16, 21, 24, 36, 41,44 known as Ramfjord teeth.*
Results:*The measurement of Periodontal Disease Index (PDI) in 100 subjects with Cardiovascular Disease are Mild periodontitis (6,1%), Moderate periodontitis (70,4%), Severe periodontitis (23,5%) and only 2% with normal periodontal tissue. Increases in CRP levels were observed in these subjects. Subjects with high levels of clinical attachment loss (Severe periodontitis)had significantly higher mean of CRP levels (7,522 ± 0,3580 mg/L), moderate periodontitisare(5,284 ± 0,3138 mg/L) CRP levels and (2,017 ± 0,3656 mg/L) CRP levels for mild periodontitis*
Conclusions:*The positive correlation between CRP and periodontal disease might be a possible underlying pathway in the association between periodontal disease which a chronic inflammation as one of risk factor for Cardiovascular Disease in these patients.*

Keywords *: C- Reactive Protein, Periodontal diseases/ periodontitis , cardivaskular disease, pathogenesis, , risk* factors

CYTOTOXICITY OF STICHOPUS HERMANII WHOLE EXTRACT TO GINGIVA FIBROBLAST STEM CELL

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ABSTRACT

Background*: Stichopus hermanii contain rich glycosaminoglycans and triterpene glycoside which is much less, so it can be used for the treatment of wound healing. Gingival fibroblasts was the most substantial in the gingival connective tissue plays an important role in wound healing and has a unique tolerance in the oral mucosa. For used in oral mucosa extract whole Stichopus hermanii, it is necessary to test compatibility, one of them with acytotoxicity assay. Stem cells are widely studied today in the medical field due to a very larger olein the treatment, especially to replace damaged cells.*
Purpose *: The aim of this study was to determine the extract whole Stichopus hermanii cytotoxicity against stem cell gingival fibroblasts.*
Methods *: The sample of this research is that stem cells taken from human gingival fibroblasts were awakened and grown until confluent and the amount and distributed in 96-well plate. Further into the wells included 100mL test solution at various concentrations ranging series of concentrations of 1% -0.00390625%.Once through customs procedures MTT assay, the test results read by ELISA reader at a wave length of 595nm. ELISA reader results were analyzed through ANOVA and Tukey HSD test.*
Results*:The results of ANOVA and Tukey HSD test showed that there was no significant difference between each group.*
Conclusion*: Wholeextract of Stichopus hermanii not toxic to stem cells gingival fibroblasts*

Keyword : *cytotoxicity, Stichopus hermanii, stem cell gingiva fibroblas*

BIOCOMPATIBILITY OF ANADARA GRANOSA CLAMP SHELL HYDROXYAPATITE GRAFT ON FIBROBLAST CELL CULTURE

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ABSTRACT

Background: *Periodontitis that can lead to tooth loss needs a regenerative therapy and one of the materials is bone graft. Various kind of graft materials have been used to regenerate bone defects due to periodontal disease. In the past 30 years a variety of synthetic bone graft have been developed with the aim to minimize disease transmission. In this study we used Anadaragranosa clamp shells because they are a new source and haven't been used before as a graft material.*
Purpose: *The aim of this study was to examine the toxicity ofAnadaragranosa clamp shell hydroxyapatite graft by counting the amount of fibroblast living cells after being treated.* ***Material and Method:*** *This experiment used 44 wells of BHK-21 fibroblast culture cell which divided into 11 groups : cell control, media control group without cell and treatment groups were treated with 54mg/ml, 27mg/ml, 13,5 mg/ml, 6,75 mg/ml, 3,375 mg/ml, 1,6875 mg/ml, 0,8437 mg/ml, 0,4218 mg/ml, 0,2109 mg/ml blood cockle shell graft. These cells were read by ELISA reader and the cell viability were measured based on the optical density result.*
Result:*There was significant difference (p=0,000) and there were more than 77,63 percents of living fibroblast cells on all treatment groups.*
Conclusion:*Anadaragranosa clam shell hydroxyapatite graft was biocompatible with BHK-21 fibroblast cell culture.*

Keywords :*Anadaragranosa, graft,biocompatibility,hydroxyapatite*

THE INHIBITION EXTRACT LEAVES OF THE SOURSOP (ANNONA muricata linn) TO BACTERIA GROWTH OF MIXED PERIODONTOPATHOGEN

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ABSTRACT

Background: *Periodontitis is a periodontal disease caused by mixed periodontopathogen bacteria. The bacteria were dominated by gram-negative bacteria. Soursop fruit (Annona muricata) leaves have been known having antibacterial effect against gram-positive and gram-negative bacteria, thus assumed to have antibacterial effect on bacteria caused periodontal disease.*
Purpose: *To examine the inhibition effect of Annona muricata leaf extract to the growth of mixed periodontopathogen bacteria.*
Methods: *Subjects were mixed periodontopathogen bacteria with total of 30 samples, divided into 6 groups (n = 5). Four groups were given the extract with different concentrations of 15 mg/ml, 30 mg/ml, 45 mg/ml and 60 mg/ml, while two other groups served as positive and negative controls. Extracts were prepared by maseration method. Sample of bacteria were innoculated in Mueller Hinton agar, tested by disk diffusion method. The inhibitory effect was observed by measuring the diameter of inhibition zones on agar media. Data were analyzed by ANOVA and LSD test.*
Results: *The result of LSD test showed significant difference (p<0,05) between all concentrations and control except on the group concentration of 45 mg/ml and 60 mg/ml.* ***Conclusion:*** *Annona muricata leaves extract could inhibit the growth of mixed periodontopathogen bacteria.*

Keywords: *periodontitis, mixed periodontopathogen bacteria, soursop leaves, extract, Annona muricata linn.*

IN VITRO CYTOTOXICITY INVESTIGATION OF *Nannochloropsis occulata* EXTRACTTO HUMAN GINGIVAL FIBROBLAST STEM CELLS

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ABSTRACT

Background *: Nannochloropsis occulata has many biological activities such as analgesic, anti-inflammatory, antioxidant and antibacterial properties thus potentially explored as therapeutic agent in oral disease.*
Objective *: This study aims to evaluate cytotoxic effect of Nannochloropsis occulata extracts in human gingival fibroblast stem cells.*
Method *: The study is an experimental laboratories research with post test only control group design. Nannochloropsis occulata extractsin concentration of 0,3125%; 0,625%; 1,25%; 2,5%; 5%; 10%; 20%, 40%; and 80% were tested its cytotoxicity on human gingival fibroblast stem cell. For the in vitro toxicityassay, serial concentration of Nannochloropsis occulata extracts was applied to human gingival fibroblast stem cell cultures in conditioned media. The cells (1x105) were cultured in 96 well plates and allowed toattach for 5 days before treatment with serial concentration of Nannochloropsis occulata extracts for 24 hperiod.Cell viability was assessed by the mitochondrial dependent reduction of yellow MTT (3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide) to purple formazan. The data concerning cell viabilitywere statistically analyzed using two-way ANOVA test and LSD multiple comparison testat 5% significance level.*
Result *: Nannochloropsis occulata extracts showed toxicity in the concentration of 2,5% above and not cytotoxic in the concentrations below (p<0,05).*
Conclusion *:Nannochloropsis occulata extracts was not cytotoxic effect on human gingival fibroblast stem cellin the concentration below 2,5%,*

Keyword *: Nannochloropsis occulata extracts, cytotoxicity, fibroblast gingiva stem cell*

CLINICAL DIAGNOSIS OF VARICELLA ZOSTER (CHICKEN POX) (CASE REPORT)

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ABSTRACT

Background *:Varicella zoster virus (VZV) is a DNA virus morphologically similar to the HSV and apparently responsible for two completely dissimiliar disease in humans, namely, chickenpox (varicella) and herpes zoster(Shingles) It is usually, but not invariably, a mild, self-limited disease in otherwise healthy children, but the severity of disease and risk of complications are usually greater in adolescents and adults. Transmission occurs via airborne droplets, or contact with infected respiratory tract secretions or vesicular lesions. Oral lesion may appear on the hard palate, pillar of fauces, uvula and appear like small ulcers, with a red halo. The rash initially manifest as pink maculopapular lesions that develop into itchy vesicles on the back, chest, face and scalp. Other clinical manifestations include malaise, fever, and lymphadenopathy.*
Purpose : *This case report is aimed to discuss diagnosis and management of varicella with malaise, fever.*
Case : *Patient, female 14 years old came with chief complaint of malaise, fever, headache and multiple vesicle,ulcer and crustae on the facial and single ulcer on the oral cavity. The diagnosis was Varicella (Chicken pox).*
Case Management : *Patient was prescribed with acyclovir 200 mg 5 times per day, analgesic, antibiotic, antiseptic mouthwash, multivitamin and high calory high protein dietary. Oral pain disappeared in 3 days, and after 10 days ulcer in facial and mouth healed.*
Conclusion : *Diagnosis of Varicella zoster could be get from detail anamnesis and examination.*

Key Words*: Varicella, acyclovir, benzydamine HCl*

THE HEAD CONDYLE RESORPTION CONNECTED BY FHS LEVEL IN PATIENT OSTEOPOROSIS WITH PANORAMIC RADIOGRAPHY

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ABSTRACT

Backgrounds: *Osteoporosis is a systemic disease in which a decline in bone quality and increased levels osteocalsin as a detector of osteoporosis. Examination for these abnormalities does with BMD examination. Panoramic radiography is one tool to detect this disease. Head of condyle is a sign that examined the panoramic radiography.*
Objective: *The aim of this study was to assess the resorption of the head condyle associated with FHS with suspected osteoporosis.*
Methods: *This study uses the analytic description. Samples derived from 10 panoramic radiographs. Analysis uses multiple regressions analysis, calculated by ANOVA test.*
Result: *The results of this study found a positive correlation between the resorption of the head with the condyle with FHS levels. Beside that there is a correlation between BMD and resorption examination condyle head.*
Conclusion*: In Patients suspected of osteoporosis than proved by BMD and levels osteocalsin, panoramic radiographs especially when viewed from the head of the condyle resorption can be quite helpful.*

Keywords: *Head of the condyle, Osteoporosis, Osteocalsin*

COLLAGEN TYPE I ON THE WOUND HEALING PROCESS OF DENTAL EXTRACTION WITH DIFFERENT MOLECULAR WEIGH OF CHITOSAN (RESEARCH ARTICLE)

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ABSTRACT

Objectives: *The applications of chitosan in the medical field are determined by the specification of the deacetylation degree and molecular weight.*
Purpose: *The aim of this study was to account the rate of collagen type 1 on wound healing process of dental extraction in Rattus norvegicus for 7 and 14 days using chitosan gel with high molecular weight and low molecular weight.*
Methods: *Rattus nornegicus strain wistar male, aged 8-16 weeks, divided into 3 groups, namely group 1 which given chitosan gel with high deacetylation degree and high molecular weight, group II which given chitosan gel with high deacetylation degree and low molecular weight and group III as control which were not given chitosan gel. Chitosan gel were applied into the socket of dental extraction. Rat was decaputated 7 and 14 days after chitosan gel application and the jaw in the treated regions and control group were cut for immunohistochemical examination using type 1 collagen monoclonal antibody to observe collagen type I. Data were analyzed using t test.*
Results: *The result showed significant differences in collagen type 1 for 7 and 14 days observation ($p<0,05$).The number of collagen type 1 were found higher in the group which given chitosan gel with high deacetylation degree and high molecular weight.*
Conclusion: *Chitosan gel with high deacetylation degree and high molecular weight become more active and have high chemical reactivity. It can increase the number of collagen type 1 on wound healing process of dental extraction.*

Keys words: *Chitosan,molecular weight,collagen type 1*

HYPERBARIC OXYGEN THERAPHY FOR HERPERTIFORMIS RECURRENT APHTHOUS STOMATITIS

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ABSTRACT

Recurrent Aphthous Stomatitis (RAS) was an open wound in the oral cavity which is recurrent. Until now, the etiology was idiopathic, so the therapy has not specifically fixed. Considering the chief complaint of RAS was painfull, which cause disturbed food intake. Many factors which are known to have influence in the wound healing, among others in oxygenation hyperbaric oxygen theraphy was a theraphy wth continuous pure oxygen to the body with air pressure greater than normal atmospheric pressure. The reason is to increase the concentration of oxygen at all body tissues. So basically, in literature study theory, there is relationship between wound healing using hyperbaric oxygen theraphy

Key words: *Recurrent Aphthous Stomatitis, Hyperbaric Oxygen therapy, Atmosphere*

CORRELATION OF THE MANDIBULAR CORTICAL BONE HEIGHT WITH ALKALINE PHOSPHATASE VALUE IN PATIENT SUSPECT OSTEOPOROSIS WITH PANORAMIC RADIOGRAPHY

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ABSTRACT
Backgrounds: *Osteoporosis is a metabolic bone disease characterized by a reduction in mass and deterioration of bone microarchitecture. One of the symptoms the mandibular cortical bone height reduction by panoramic radiographs. Another way that can help detect osteoporosis is to look for levels of alkaline phosphatase in the blood.*
Objective *: The purpose of this article is to look at the correlation between the height of the mandibular cortical bone with alkaline phosphatase levels in patients with osteoporosis. The aim of this study was to assess cortical bone height correlated with the alkaline phosphatase levels in patients with suspected osteoporosis.*
Materials and methods*: This study used a descriptive analytic method. Population of 18 pieces complete with panoramic radiography blood test that consisted of 14 patients with osteoporosis and 4 pieces normal conditions. The collected data was then analyzed with regression and correlation analysis.*
Result: *The results obtained by the correlation between the height of the mandibular cortical bone alkaline phosphatase value.*
Conclusion*: Panoramic radiography can be used as a medium for detecting osteoporosis and alkaline phosphatase levels is one good marker in detecting osteoporosis*

Keywords*: Mandibular cortical bone height, alkaline phosphatase, osteoporosis, and panoramic radiography***.**

THE RITE OF DEATH THE STUDIES ON END OF LIFE CARE AS A BEREAVEMENT MANIFESTATION FOR TERMINAL ILLNESS PATIENTS AND HIS FAMILY IN THE SEVERAL CITY OF EAST JAVA

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ABSTRACT

Bacground : *Associated with chronic end-stage patients (terminal illness), due to illness or physical abilities elderly patient of illness. The objective conditions would impact on rationality and construction in the maintenance, construction also about end of life, and the good end of life after death, so with his family following a good treatment as a manifestation of a sense of bereavement, not regardless of culture, ethnicity, religion and socio-economic status.*
Methods *: This study uses Husserl's phenomenological approach in which an individual has a reflective consciousness and act to do on that awareness. In this case, the experience of illness resulting end of life (terminal illness) to be part of "ever," he was experiencing, and "near of the object that is being experienced." Surabaya chosen because there are ethnic and religious diversity. Meanwhile, the unit of analysis is the patient who is or ever experienced a fatal illness (terminal illness), including elderly parents and family members. The patient who is the subject divided into 2 (two), namely: hospitalized and at home. Data collection techniques used, observation and in-depth interviews.*
Results *: result of research carried out at several informants with different backgrounds chronic diseases suffered by various socio-economic backgrounds. Analysis of the results showed that the phenomenon of pain as fate and misfortune, as negotiations inpatient physician and patient, waiting for patients, and substitute of nurse "role".*
Conclusion *: that the patient's treatment decision doesn't just based on the severity of the disease, but also social and economic factors. There is a difference of understanding the construction of the hospital and family activities while waiting for patients in the hospital.*

Keywords: *terminal illness, elderly patient, end of life, a bereavement*

ORTHODONTIC TREATMENT IN UPPER ARCH DDM WITH MANDIBULAR CROWDING CAUSED BY UNFINISHED REMOVABLE ORTHODONTIC TREATMENT (Case Report)

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ABSTRACT

Introduction : *Disharmony dento maxillar a disproportion between teeth size and the arch. One of clinical appearance that can be seen is crowding with several signs. Which can be seen in this patient upper arch, with mutilation in mandibular first premolar causing increasing in overbite, overjet and moderate crowding in mandibular.*
Objectives : *The purpose of this treatment is to eliminate crowding, reduce overjet, overbite and establish good relationship between maxilla and mandibula.*
Case : *An Indonesia-Javanese female 25 years old. Patient presented dento-skeletal class I maloclussion with severe crowding at maxilla and moderate crowding in mandibula. Permanent first premolar mutilation at mandibula in both sides. With increasing overjet and overbite.*
Case Management : *Edgewise appliances was bonded, extraction maxillary first premolar, odontectomy mandibular third molar , canine retraction, maxillary anterior retraction. Overbite and overjet correction and mandibular leveling unraveling.*
Result : *In the end of treatment crowding was eliminate, good esthetic and function was established.*

Key words *: Orthodontic treatment, DDM, mandibular first premolar mutilation.*

THE INHIBITION EFFECT OF AVICENNIA MARINA MANGROVE LEAVES EXTRACT TO THE GROWTH OF MIXED PERIODONTOPATHOGEN BACTERIA

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ABSTRACT

Background *: Periodontitis is a periodontal tissue disease in which one of main factors is caused by bacteria periodontopathogen. Some antibacterial drugs had been used to eliminate the mixed periodontopathogen on periodontitis. A natural antibacterial compounds could have benefit as alternative drug on that matter. Avicennia marina is one of mangrove species which has potent as a source of antibacterial compound, such as flavonoid, alkaloid, terpenoid, tannin, and saponin.*
Purpose : *The aim of this research was to study the inhibitory effect of mangrove leaves (Avicennia marina) on the growth of mixed periodontopathogen bacteria with various concentrations.*
Methods : *Mangrove leaves was extracts with ethanol 96%. Mixed periodontopathogen bacterial was inoculated on Brain Heart Infusion (BHI) medium. The antibacterial effect of Avicennia marina extract to the growth of mixed periodontopathogen were tested by diffusion methods with 3 concentration 750 μg/ml, 1500 μg/ml and 3000 μg/ml, each consisted of 6 samples. The Inhibition effect were examined by measuring the clear zone surrounding diffusion disc with a digital calipers, stated in millimeters.*
Result : *Data were analized with ANOVA (one way) test and result showed the significant different ($p < 0,05$) between all groups and it was found that there is inhibition growth power of mixed periodontopathogen bacterial by leaf extract of Avicennia marina with concentration 750 μg/ml (0,8067 mm), 1500 μg/ml (0,9067 mm), 3000 μg/ml (1,2167 mm), DMSO 1% (0 mm) and minosiklin 0,1% (42,835 mm)*
Conclusion *: Leaf extract of Avicennia marina could inhibit the growth of mixed periodontopathogen bacteria.*

Keywords *: Avicennia marina, antibacterial, periodontal disease, mixed periodontopathogen bacterial.*

ANTERIOR CROSSBITE CORRECTION WITH INCLINE BITE PLANE (CASE REPORT)

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ABSTRACT

Anterior crossbite as a dental malocclusion resulting from the abnormal axial inclination of one or more anterior maxillary teeth. There are several method for solving this problem, one of them is inclined bite plane. Incline bite plane is a simple functional appliance used in the lower arch jaw wich work as bite jumper. In this case report we would like to describe removable incline bite plane in a 10 years girl with class III malocclusion, SNA 86, SNB 87, ANB -1, overjet -2mm, overbite 1.5 and concave facial profile. This apliance was applied for only 1 month for anterior crossbite correction. The result showed that the anterior crossbite can be corrected by incline bite plane.

***Key word**: anterior crossbite,axial inclination, inclined bite plane*

LASER THERAPY: NEW INSIGHT IN ANUG MANAGEMENT

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ABSTRACT

***Background** : Necrotizing ulcerative gingivitis (NUG) is a microbial disease of the gingiva, characterized by the death and sloughing of gingival tissue. Until today the treatment of NUG consists of alleviation of the acute inflammation and antibiotics. Very little literature, if any, had described theuse of laser in NUG management,*
***Purpose** : The purpose of this report is to give a new insight in treatment alternative for NUG*
***Case Report** : A woman 36-year-old came to our clinic with chief complain of severe pain on her gingiva. She has got the pain for 10 days, and had got ciprofloxacin twice a day from her previous doctor, but showed ineffective. Intraoral examination showed a pseudomembrane on her gingiva in some areas.*
***Case management** : Laser had been introduced to treat the ulcer. No antibiotics had been administered in this therapeutic session. The effect of laser may be seen directly after the laser had initiated. In 3 days the pain had been diminished and the patient had a full mouth scaling. After 7 days, the gingiva had completely recovered.*
***Discussion** : Laser has an ability to kill all bacterial contamination on the gingival surface without causing mucosal damage. This ability may decrease the bacterial load and at the same time causing protein denaturation and hemostatic effect beneath the pseudomembrane. The effect of biostimulation had been seen in this case. However it is usually take more than one week to fully recover, in this case 3 days after laser therapy, the gingiva showed recovery.*
***Conclusion** : Laser is a new treatment choice for NUG. It may offer faster healing, less tendency for antibiotics prescription, more comfortable for the patient.*

***Keywords :** NUG, laser, biostimulation, protein denaturation, hemostatic*

DIRECT IMPLANT PLACEMENT AND LOADING: CHALLENGING THE BRANEMARK CONCEPT

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ABSTRACT

Background *: Since Branemark's first implant invention, implant had been rapidly evolved. Branemark believed that implant shall be placed after the bone is healed completely and the prosthetic is placed after osseointegration occurs. However, this approach cause a long treatment time.*
Purpose : *The aims of this paper is to give a new paradigm of direct implant placement.*
Case Report : *A woman 43-year-old came to our clinic with a chief complaint of tooth no #15 fractured while eating. This tooth was previously endodontically treated and a composite onlay was placed over it.*
Case management : *Tooth no #15 was fractured. We decided to place an implant directly after the extraction. The tooth was extracted using a periotome, an implant 5.3x12 mm was inserted. Allograft was used to fill the bone defect and a healing abutment was placed to facilitate abutment and crown placement in the next day.*
Discussion : *New paradigm of implant placement and loading had been shifted dramatically. Based on theory of bone biology, a stress less than 150 micro Newton is needed to prevent bone resorption. Placing an implant directly and load it at few days can be successful as we can have the initial fit at the placement. The prosthetic had to be free of occlusal traumatism especially from the lateral forces.*
Conclusion : *Direct implant placement and loading are biologically-based protocol. The success and failure are the same as the usual implant protocol.*

Keywords : *Direct placement, direct loading, osseointegration, micromovement, atraumatic extraction*

APICAL GRANULOMA TREATMENT IN OPEN APEX BY USING CALSIUM HIDROXIDE (CAOH)

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ABSTRACT

Background : *The success of root canal treatment is based on total elimination of root canal content, thorough cleaning, shaping and obturation of root canal system. Calcium hydroxide is recommended as intra-canal medicament because of its antibacterial properties, tissue dissolving ability, inhibition of tooth resorption and indication of tissue repair by hard tissue formation. Apexification is a process/procedure well recognized and accepted by clinicians and researchers. Calcium hydroxide is most commonly used to induce an apical hard issue barrier. An immature tooth that develops pulpal or periapical disease presents special problems. Because the apex has not yet completely formed, conventional root canal treatment procedures would be unpredictable. The walls of the root canals are frequently divergent and open apexes make debridement and obturation difficult. Thus closure of root apex is very essential for success of the endodontic treatment. Although different materials are used for the apexification procedure, calcium hydroxide is the material of choice for apical barrier formation and healing. There are different opinions regarding frequency of CaOH dressing change to induce complete closure of the apex. Granuloma periapical is a growing mass of granulation tissue surrounding the apex of a nonvital tooth and rising in response to necrosis of the tooth pulp.*
Case : *A student, 19th, came and wanted to fix her left upper front teeth were fracture ± 7th ago because of accident.*
Case management :*The management for this case is Endodontic intracanal with apexification and Crown (for post endodontic).*
Conclusion : *Calsium hidroxide can reduce or eliminate periapikal lesion.*

Keywords *: Apeksifikasi, Calsium hidrokside, granuloma*

THE EFFECT OF TIME INTERVAL OF 1, 2, 3 MONTHS POST-TOOTH EXTRACTION TO RETENTION AND STABILITY OF FULL DENTURE IN RSGM FKG UHT SURABAYA

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ABSTRACT

Background: *The fabrication of full denture was often found that many patient have to extract their teeth due to full denture's treatment purposes. The time interval of post-tooth extraction and the commencement of the full denture fabrication will affect the outcome of the full denture treatment.*

Objective: *The aim of this study was to determine effect of the time interval post-tooth extraction in the fabrication of upper full denture retention and stability in RSGM FKG UHT.*

Methods: *This study was an observational analytic with cross sectional study design. analysis of the data using non-parametric Kruskal-Wallis test. Upper full denture which fit the criteria were divided into the interval of 1, 2 and 3 months post-tooth extraction and were checked for the retention and stability during insertion and given scores ranging from 0-3 for its retention and 0-2 for its stability*

Results: *Results showed that the average score for retention and stability at each time interval. At intervals of 1, 2, and 3 months post-tooth extraction, the mean retention score are 1.5, 1.75, 2.25 respectively while stability are 1.5, 1.5, 2 respectively. The average score based on the stability and retention intervals tested by Kruskal Wallis test and get a value for the variable respectively which are time interval, retention and stability scores p = 0.71, p = 0.93, p = 0.26 where all p> 0. 05.*

Conclusion: *The time interval of 1, 2, 3 months post-tooth extraction did not have effect on the retention and stability of full denture in RSGM FKG UHT.*

Keywords: *full denture, retention, stability, time interval*

CORRECTION OF UNILATERAL POSTERIOR CROSSBITE AND ANTERIOR OPENBITE IN PERMANENT DENTITION WITH ORTHODONTHICS REMOVABLE APPLIANCES

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ABSTRACT

Background : *The corredtion of class I malocclusion with unilateral posterior crossbite and anterior openbite in permanent dentition is very important, because this condition has a bad effect in many aspect, such as : aesthetic, mastication and fonetic for the patient.*

Objective : *The aim of this case report is to know the mechanism of orthodontics removable appliances for managing class I malocclusion together with unilateral posterior crossbite and anterior openbite in permanent dentiton.*

Case : *In this case report we would like to present a 11-years-old girl with class I malocclusion together with unilateral posterior crossbite and anterior openbite, SNA 79° ; SNB 74°; ANB 5° ; Overjet 4 mm ; Overbite -5 mm and Convex facial profile.*

Case Management *: Orthodontics removable appliances such as : expansion screw is used to correct unilateral posterior crossbite ; palatal spring, button and labial bow is used to correct anterior openbite.*

Conclusion : *The result of this treatment indicated that orthodontics removable appliances technique can be considered an effective therapy for correction class I malocclusion with unilateral posterior crossbite and anterior openbite in permanent dentition.*

Keywords : *Anterior Openbite, Permanent Dentition, Posterior Crossbite, Orthodonthics Removable Appliances.*

ORTHODONTICS REMOVABLE FIXED APPLIANCES IN MANAGING TREATMENT OF DENTAL CLASS I MALOCCLUSION WITH MAXILLARY MIDLINE DIASTEMA RELATED TO MESIODENS AND BIMAXILLARY DENTAL PROTRUSION

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ABSTRACT

Background *: The correction of class I malocclusion with maxillary midline diastema related to mesiodens in child patient is one of moderate biomechanical in orthodontics. Maxillary midline diastema is resulting from mesiodens caused poor facial aesthetic.*
Objective *:The aim of this case report is to know the mechanism of Watkin appliance in managing early treatment of dental class I malocclusion with maxillary midline diastema related to mesiodens.*
Case *: This case report presents an 11-year-old boy with dental class I malocclusion with maxillary midline diastema related to mesiodens and bimaxillary dental protrusion, SNA 83°, SNB 76°, ANB 7°, overjet 4 mm, overbite 6 mm, the diastema was 5 mm and convex facial profile.*
Case Management *: Firstly, we extract the mesiodens to correct the diastema. Watkin appliance consists of incisor bands with tubes and the watkin free sliding arch. This Appliance was ideal for retracting and rotating incisor teeth as desired. Any incisor rotation that was required could be done simultaneously by bending the arch wire laterally by the amount and in the direction that would cause precise correcting forces.*
Conclusion : *The result of this case showed that Watkin appliance is can be considered to be therapy choice for maxillary midline diastema.*

Key words: *Maxillary midline diastema, Mesiodens, Watkin appliance*

THE EFFECTS OF CHITOSAN BIOMATERIAL ON THE INHIBITION OF MATRIX METALLOPROTEINASE 8 (MMP-8) IN WOUND HEALING PROCESS

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ABSTRACT

Background : *Chitosan is a linear polysaccharide that consists of β-(1-4(-2-acetamido-d-glucose and β-(1-4(-2-amino-d-glucose units derived from partial deacetylation of chitin.*
Objective *: This study is to know about chitosan effect* on the inhibition of matrix metalloproteinase 8 (MMP-8) in wound healing process.
Review : *Chitosan in one of abundant, renewable, non toxic, biodegradable carbohydrate polymer and available largely in the exoskeleton of shellfish and insects. It has similar characteristics with glycosaminoglycans (GAGs), an extracellular macromolecule that is important in wound repair. The extracellular degradation of collagen and other matrix components is regulated by a complex system of enzyme is called matrix metalloproteinase (MMPs). Chitosan has inhibition MMP-8 effect in wound healing process. It has activity to release transforming growth factor β1 (TGF β1) that plays the role of increasing new collagen transcription and production of collagen. The expression of MMP-8 in human PDL fibroblast and macrofag is decreased by TGF β1. The balance between deposition and degradation of collagen would determine integrity and the strength of tissue.*
Conclusion*: Chitosan inhibits the expression of MMP-8 by releasing TGF β1, which will result in accelerated wound healing process.*

Keywords**:** *chitosan, MMP-8 , wound healing process*

IDENTIFICATION OF BONE DENSITY VALUES ON HOUNSFIELD UNITS (LITERATURE REVIEW)

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ABSTRACT

Objective *: The aim of this study was to describe and to discuss how accurate conversion from CT number into HU. A review of the current literature is presented and the study methods are discussed.*
Review *: Density of available bone influence the clinical success of dental implants. Computed Tomography (CT) is an established method for acquiring bone images before performing dental implant surgery. It allows precise three-dimensional evaluation of anatomic structures and direct measurement of bone density, expressed in Hounsfield units (HU), characteristics that provide important information about the bone. Conversion of CT numbers into HU becomes a problem.*
Conclusion *: Various authors have calculated machine-specific conversion factors from CT numbers to HU. However their results are impaired by the underlying (unexpressed) assumption that the CT numbers are consistent throughout the volume of interest.*

Keywords : *hounsfield unit, CT numbers, bone density*

PERIPHERAL GIANT CELL EPULIS IN A 5 YEARS OLD BOY

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ABSTRACT

Background*. Giant cell granuloma occurs either as a peripheral exophytic lesions on the gingival (giant cell epulis, peripheral giant cell reparative granuloma). Peripheral giant cell lesions are considered to be examples of benign inflammatory hyperplasia in which cells with fibroblastics, osteoblastic and osteoclastic potentials predominate. The lesions are highly vascular; hemorrhage is a prominent clinical and histologic feature.*
Objective: *of this paper is want to report about a large nodule between 84 and 85 in 5 years old boy. The nodule grew until about 3 cm in size in the last 3 months. It bleeds easily by a light trauma.*
Case : *The is a nodule between 84 and 85 in 5 years old boy that wanted to be treated pedodonticcally. By panoramic foto the sources of the epulis clearly detected.*
Case Management *: The management of the case was, examined the nodule intensly and refer to Dr.Soetomo Hospital, because he had to have his JAMKESKIN card. Meanwhile he was given Vitamins, herba mouth gargle and some liquid- high- nutrition- foods. of this case was, by the easily bleeding condition, we had to be very caution for a more serious illness. The examinations in the Dr.Soetomo Hospital were complete. The results were normal in the general conditions, except for the PLT concentration. According to the fund that was minimal, his parents postponed the continueity of the schedule. Meanwhile the herba's gargle (the most medicament that easily make by themselves) was dayly used. The lesion reduced and not bleed anymore.*
Conclusion. *The epulis that easily bleeds, for the patient from lower level, had to be treated with a natural herba medicament that was able for them..*

Keywords *: Epulis easily bleeding, general check up, herbal medicine.*

IMPROVING DENTAL PRACTICE WITH HOLISTIC THEME

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Abstract
Improving dental practice were not difference from effort of service. As a effort of service has two major should achieved : benefit and satisfaction of service. Improving dental practice with holistic care, whereas not only for dental and oral health but also involved generalized for overall health care, will giving satisfaction according to profesional procedure for operator and patient

***Key word** : improving practice, dentist, holistic care*

ROOT CANAL TREATMENT AT TEETH WITH FIXED ORTHODONTIC TREATMENT

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ABSTRACT
***Background** : The periapical abscess results from an infection of the pulpal tissue causing the pulp to become necrotic. It is formed when pus escapes from walls of the pulp chamber and the root canal(s) through the apical foramen. An area of pus and fluid accumulation forms in the bone surrounding the apex of the tooth and is accompanied by continuous pain and increases when there is pressure . Root canal treatment is the removal of the pulp tissue necrosis, after all necrotic pulp tissue is removed, the root canal sterilized, then root canal obturation well.*
***Case** : The author reports the case of root canal treatment with acute periapical abscess in the teeth 21 which are class 4 composite restoration and is undergoing fixed orthodontic treatment in female patients 20 years old.*
***Case Management** : Metapex root canal treatment is used as a dressing material, then performed the root canal obturation, with subsequent cavity in composite restorations because patients undergoing fixed orthodontic treatment so that restoration can not be made. Prognosis is good in this case.*
***Conclusion:** Root canal treatment can be performed on teeth that are in fixed orthodontic treatment.*

***Keyword:** Root canal treatment, periapical abcess*

THE MANAGEMENT OF CHRONIC ULCERS ON BOTH OF THE LATERAL BORDERS OF THE TONGUE

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ABSTRACT

Background*: Ulcer is the most common lesion that occur in the mouth. Stomatitis Aphthousa Reccurrent is one of the lesion and usually healed within maximal 14 days. Another ulcer that caused by trauma, will healed when yhe irritant was eliminated. Lateral posterior of the tongue is the place that mostly a persistent ulcer will become malignant.*
Objective *: The purpose of this paper was wanted to show the management of the chronic ulcer on both of the lateral posterior border of the tongue.*
Case *: The case was a 54 years old female, complain of a pain in all of her oral mucosa. The pain was recurrent ever since her husband passed away, about 5 years ago. She had already visited some doctors, taken many medicines, wheather modern or traditional. The ulcers still persist ever since.*
Case Management *; The management of the case was, recorded all of the histories and sending the person to be examined by FNAB from the Dr.Ramelan's Hospital. The result was a chronic supurative inflammatory infection. She received vitamin, mouth gargle, antacid and corticosteroid orally. From the histories of the illness, she had to be given some medicaments that hopefully regain her conditions*
Conclussion*. The therapy of some chronic ulcerations in the posterior lateral border of the tongue had to be supported by an HPA's examination. As a General Practitioner, had to be very familiar with the changes in the oral mucosa, to avoid a severe and dangerous progress of the lesions.*

Keywords *: Ulcers, chronic, lateral border of the tongue*.

PERIODONTIC- ENDODONTIC TREATMENT AT PERIAPICAL LESION (SUSPECT CYST)

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ABSTRACT

Background *In this case report, we present a periapical lesion case (suspect cyst) and was treated with Periodontic-Endodontic Treatment. Periapical lesions develop as sequelae to pulp disease. They often occur without any episode of acute pain and (are) discovered on routine radiographic examination. The incidence of cysts within periapical lesions varies between 6 and 55%*
Case : *a 40-years old man had been pain and swelling in right upper lateral incicivus, with radiographic picture oval radiluscent at apical right upper lateral incicivus with radiopague margin. The patient had heavy staining and calculus. The patient also has habit of smoking, drinking and bruxism.*
Case management*, endodontic treatment have been done on right upper lateral incicivus and scaling root planning on maxilla and mandibula. Post scaling and endodontic treatment, control patient recall after 3 month treatment to radiographic photo for evaluation of periodontic – endodontic treatment.*
Conclusion*, Periodontic – endodontic treatment able to treat periapical lesions (suspect cyst) with proper, routine treatment and regulary control.*

Keywords: *Periapical lesion , periodontic- endodontic treatment*

THE INHIBITITION EXTRACT FRUIT OF THE SOURSOP (ANNONAMURICATA LINN) TO BACTERIAL GROWTH OF MIXED PERIODONTOPATHOGEN

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ABSTRACT
Background: *Periodontitis is a periodontal disease caused by mixed periodontopathogen bacteria. The bacteria were dominated by gram-negative bacteria. Soursop fruit (Annona muricata linn) have been known having antibacterial effect against gram-positive and gram-negative bacteria, thus assumed to have antibacterial effect on bacteria caused periodontal disease. The effect of the soursoup fruit extract to inhibit the growth of mixed periodontopathogen bacteri has never been researched before.*
Purpose: *To examine the inhibition effect of Annona muricata fruit extract to the growth of mixed periodontopathogen bacteria.*
Methods: *Subjects were mixed periodontopathogen bacteria with total of 30 samples, divided into 6 groups (n = 5). Four groups were given the extract with different concentrations of 5%, 10%, 20% and 40%, while two other groups served as positive and negative controls. Extracts were prepared by maseration method. Sample of bacteria were innoculated in Mueller Hinton agar, tested by disk diffusion method. The inhibitory effect was observed by measuring the diameter of inhibition zones on agar media. Data were analyzed by ANOVA and LSD test.*
Results: *The mean of the inhibition effect for each concentration group were 5% = 6,38 mm; 10% = 7,02 mm; 20% = 7,96 mm; 40% = 8,55 mm; positive control = 17,35 and negative control = 6 mm, result showed the significant difference on ANOVA test ($p<0.05$). The result of LSD test showed significant difference between all concentrations and control.*
Conclusion: *Annona muricata fruit extract could inhibit the growth of mixed periodontopathogen bacteria.*
Keywords: *periodontitis, mixed periodontopathogen bacteria, soursop fruit extract, Annona muricata linn*.

THE INHIBITION EFFECTS OF NANNOCHLOROPSIS OCULATA EXTRACT TOWARDS THE MIXED PERIODONTOPATHOGEN BACTERIA

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ABSTRACT
Background : *Periodontal disease is multifactorial disease where the bacteria caused is mixed periodontopathogen. Antibiotics often used to support the treatment of periodontal disease but it has some disadvantages such as gastrointestinal disorder and teeth discolourization. Extracts of Nannochloropsis oculata has been known having antibacterial effect against negative gram microorganism, potential to be explored as the therapy to periodontal disease.*
Purpose : *The aim of this study was to determine the inhibitory effects of N. oculata extract to the growth of mixed periodontopathogen bacteria at concentration of 10%, 20%, 40% and 80%.*
Methods : *The antibacterial effects of N. oculata extract to the growth of mixed periodontopathogen were tested by diffusion methods with 4 concentration 10%, 20%, 40% and 80%, each consisted of 6 samples. The inhibition effects were examined by measure the diameter of the clear zone around the disc. Data were analyzed by Anova followed by LSD test.*
Result : *The result showed the clear zone around the disc of N. oculata extract in all concentration, the greater concentration of the extract the greater diameter of the clear zone. Mean of inhibition zone at concentrations of 10% (6.12 mm), 20% (6.34 mm), 40% (6.66 mm), 80% (7,24 mm), DMSO 1% (6.00 mm) and tetracycline (10.59 mm). Showed meaningful distinction between the group experiment with negative control. N. oculata extract could inhibit the growth of mixed periodontopathogen ($p<0,05$). The largest diameter of the clear zone was in the concentration of 80%.*
Conclusion : *N. oculata extract could inhibit the growth of mixed periodontopathogen.*
Key words : *Periodontal disease, antibacterial, mixed periodontopathogen* bacteria, Nannochloropsis oculata.

MANAGEMENT OF PROTRUSION CLASS I MALOCCLUSION WITH ORTHODONTIC REMOVABLE APPLIANCE AND ELASTIC (CASE REPORT)

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ABSTRACT

Background: *Protrusion is a condition where the maxillary anterior teeth protrude beyond normal overjet. The protrusion itself affects the appearance and aesthetic grade.*
Purpose: *The aim of this case report is to know the management of protrusion using the removable orthodontic appliance and elastic.*
Case: *This case report presents a 9 years old boy with protrusion class I malocclusion. SNA 80^0, SNB 75^0, ANB 5^0, overjet 5 mm, overbite 3 mm. and convex profile.*
Case management: *Removable orthodontic appliance and elastic was applied to this patient. Elastic was used to substitute the labial bow, the advantage of elastic is it could push the teeth constantly without any activation.*
Conclusion: *Therefore the using of elastic could decrease the overjet quicker than labial bow.*

Keywords*: protrusion, removable appliance, elastic*

RELATIONSHIP BETWEEN SELF SATISFACTION ABOUT FACIAL APPEARANCE AND ORTHODONTIC TREATMENT NEED

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ABSTRACT
Background :*Orthodontic patients at RSGM UHT treated by clinical students, have average age of 6-14 years old as a young adolescence. Failure in treatment often happened because lack of motivation from the patients. Patients motivation to seek orthodontic treatment depends on their self satisfaction on facial appearance. Study about correlation between self satisfaction about facial appearance with orthodontic treatment at 6 grade SD Sekolah Alam Insan Mulia Surabaya has not been studied yet.*
Objectives :*To determine relationship between self satisfaction about facial appearance and orthodontic treatment need at 6 grade SD Sekolah Alam Insan Mulia Surabaya.*
Material and Methods:*A survey of 41 children, was carried out at SD Sekolah Alam Insan Mulia Surabaya. The subjects were interviewed using a questionnaire consisting of questions concerning smile, dental appearance and desire for orthodontic treatment. Interocclusal records was made and assessed using the ICON. Analysis with Spearman test.*
Results:*There is no significant correlation between self satisfaction about facial appearance with orthodontic treatment need (R = -0.211 and P = 0.186). 53,7% respondent feel satisfied with facial appearance and 80,5% need orthodontic treatment.*
Conclusion: *There is no correlations between self satisfaction about facial appearance with orthodontic treatment need.*

Keywords :*Young adolescence, treatment need, self satisfaction, facial appearance.*

CITOTOXICITY OF DEMINERALIZED FREEZE DRIED APICAL TOOTH ALLOGRAFT ON FIBROBLAST CELLS VIABILITY FROM BHK-21

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ABSTRACT

Background : *Bone graft is one of the regenerative therapy which is needed to treat periodontal diseases. There are four kinds of bone grafts based on its donor, allograft, xenograft, alloplast and autograft. Demineralized Freeze-Dried Bone Allograft (DFDBA) is one of the most commonly used allograft material in dentistry to form new bones because the effect of bone induction protein which is BMP. BMP is produced by demineralisation. This experiment used post-extraction teeth material which is considered having similar composition with bone on dentin and cementum area, where collagen type 1 is found.*
Purpose : *The aim of this research is to examine the cytotoxicity of DFDATA on the viability fibroblast cell from BHK-21.*
Material and Methods: *This experiment used microplate with 44 wells of BHK-21 fibroblast culture which divided into 11 groups, cell control group without any treatment, media control group without cell and 9 treatment groups were treated with DFDATA: 54mg/ml, 27mg/ml, 13,5 mg/ml, 6,75 mg/ml, 3,375 mg/ml, 1,6875 mg/ml, 0,8437 mg/ml, 0,4218 mg/ml dan 0,2109 mg/ml. These cells were incubated for 24 hours before and after treatment. Then, these cells were read using Elisa reader and the cell viability percentage were measured based on the OD (optical dencity) result and viable cell count.*
Result : *There is significant difference (p=0,000) on all treatment group. All treatment group had more than 50% of cell viability.*
Conclusion: *Demineralized Freeze Dried Apical Tooth Allograft is not toxic to fibroblast cell viability from BHK-21.*

Keywords : *Demineralized, Tooth, Allograft, Graft, Cytotoxicity*

A CORRECTION OF CLASS II MALOCLUSSION DIVISION ONE IN MIXED DENTITION WITH TWIN BLOCK FUNCTIONAL APPLIANCE (CASE REPORT)

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ABSTRACT

Background: *Class II skeletal maloclussion division I is one of the most commonly encountered scenarios in clinical orthodontics. This is often caused by an underlying discrepancy in the growth of the jaws, ranging from mandible deficiency, maxilla prognatism, or both.*
Purpose: *The purpose of this case report is to describe the efficacy of twin block intervention as functional appliance for correction of class II skeletal maloclussion division I.*
Case management: *This case report demonstrate the use of twin block appliance in a 10 years old girl with skeletal and dental class 2 maloclussion, convex facial profile, overjet 10mm, overbite 6mm SNA 84°, SNB 76°, and ANB 8°. Twin block is a removable functional appliance that consist of two bite lock, upper and lower witch interlock at 70 degree, which work together to posture the lower jaw forward. This frees up the "locked-in" lower jaw and encourages it to grow to its fullest potential to correct underdeveloped lower jaw.*
Conclussion: *The twin block could be an effective intervention to correct skeletal class II maloclussion division I in mixed dentition case.*

Keyword : *class II skeletal maloclussion, twin block.*

INHIBITION OF RHIZOPHORA MUCRONATA BARK EXTRACT AGAINST GROWTH OF MIXED PERIODONTOPATHOGEN BACTERIA

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ABSTRACT

Background: *Periodontitis is a disease of the periodontal tissues which one of the primary etiology is mixed periodontopathogen, dominated by gram-negative bacteria. Rhizophora mucronata bark as one of the mangrove plant species have the antibacterial effect against gram positive and gram negative bacteria, thus potentially developed as antibacterial agent in periodontal disease.*
Purpose : *Examine the inhibition effect of Rhizophora mucronata bark extract to bacterial periodontopathogen pathogen.*
Methods: *Subjects were mixed bacterial periodontopathogen total of 42 samples were divided into 7 groups (n = 6). Five groups were given the extract with different concentrations of 5mg/ml, 10 mg/mlp kin\, 20 mg/ml, 40 mg/ml, and 80 mg/ml, control positive group was given minocicline 0,1 % and control negative was given aquadest steril. Extracts was prepared by percolation method, sample of bacteria were innoculated in Muler Hinton agar. The inhibitory effect was observed by measuring the diameter of inhibition zones on agar media.*
Results: *Data was analyzed by ANOVA and LSD test (P = 0.05). The results show each extract and control groups had significant differences. With an average diameter of eachdisc is obtained as follows:5 mg/ml= 6.23mm, 10 mg/ml= 6.51mm; 20 mg/ml=6.91mm, 40 mg/ml=7.70mm, 80 mg/ml=13.55mm; positive control=45.24, and negative control=6 mm.*
Conclusion: *Rhizophora mucronata bark extract could inhibit the growth of bacteria mixed periodontopathogen and the effevtive inhibitory concentration is 80 mg/ml but it smaller than positive control (minosiklin 0,1%)*

Keywords: *periodontitis, mixed periodontopathogen bacteria, Rhizophora mucronata barks*

CHARACTERIZATION OF WATER EXTRACT GOLD SEA CUCUMBER (STICHOPUS HERMANII)

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ABSTRACT
Background. *Indonesia is the country with the biggest sea cucumbers world's producer. So far, sea cucumbers are only used as a side dish alone. Indonesia can provided added value and high economic value of gold sea cucumber through right procedure. A lot of gold sea cucumbers active substance that are suspected to have an influence on wound healing. For the best result, extract gold sea cucumber must be prepare with correct procedure. Extraction choosen depends on miltifactorial. Water extract is one of a safe procedure with a small risk that may damage parts of the active substance*
Objectives. *The aim of this study is to know the characterization of water extract gold sea cucumber (Stichopus hermanii).*
Methods. *Gold sea cucumbers were collected, homogenized with distillated water and shaken with water-bath shaker. Then extract was freeze dried, the result then characterized using spectrophotometer.*
Results. *The largest component to fewest component of water extract gold sea cucumber is total protein 76,82%, essential amino acid 48,11%, non essential amino acid 28,70%, glycoprotein 4,62%, collagen 4,05%, GAG's 1,62%, proteoglycan 1,13%, heparin sulfat 1,02%, calcium 59%, saponin 56%,heparin 38%, hyaluronat acid 29%*
Conclusion: *There is many active substance of water extract gold sea cucumber that involed in wound healing process.*

Keywords*: gold sea cucumber, active substance, water extract, wound healing*

MANAGEMENT CLEFT LIP/PALATE OF A 10 DAYS OLD NEONATUS

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ABSTRACT

Background: *Cleft lip/palate are a congenital anomaly. Insidence cleft lip/palate are one in 800 live births worldwide with wide cultural variation, male>female. Cleft lip/palate makes some problem, like swallowing, speaking, and esthetic.*
Purpose**:** *The purpose of this case report is to describe the efficiency of feeding plate for patient with palatoschizis..*
Case management: *This case report a male 10 days old neonates, has class III unilateral of Veanus's Classification. He can not nursing well and using nasogastric tube. We apply a feeding plate so he can nursing well and the growth increase.*
Conclussion: *Feeding palate on cleft lip/palate can help patient to nursing well. The patient can reach the rule of ten to prepare the surgery to correct the cleft lip/palate.*

Keyword **:** *cleft palate,maxilla feeding plate, nursing*

ANTIBACTERIAL ACTIVITY OF SEA CUCUMBER EXTRACT TO *Porphyromonas Gingivalis* IN VITRO

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ABSTRACT

Background :*Periodontitis is the disease of periodontal tissue which is the second common oral disease worldwide and affected the systemic health in general. Porphyromonasgingivalisis one of main periodontopathogenic bacteria related to periodontitis. The recent local adjunctive therapy in periodontitis is antibiotic treatment. Sea cucumber is a marine vertebratae used as traditional medicine and has been known to have antibacterial properties so it's potentially be explored as antibacterial agent in dentistry.*
Aim *: to examine the antibacterial activity of sea cucumber extract Sticopushermanii and Holothuriaatrato Porphyromonasgingivalis.*
Methods :*The study is an experimental laboratory research with post test only control group design. The samples were divided into 5 groups each consisted of 6 samples i.e : positive control was given tetracycline, negative control was given DMSO 1%, treatment group were given each of Sticophushermaniiand Holothuriaatraextract with concentration of 20%, 40% and 80%. Antibacterial activity test was performed by disk diffusion method on Mueller Hinton agar. Diameter of inhibition zone was measured with digital caliper.*
Result *: All treatment groups in all concentration showed inhibition zones but less than tetracycline as positive control. Non parametric statistical analysis Kruskall Wallis showed the significant difference on Sticophushermaniiextract 40% and 80% and Holothuriaatraextract 80% compared to negative and positive control group (p<0,05).*
Conclusion :*Sticophushermaniiextract on the concentration of 40%, 80% and Holothuriaatraextract on the concentration of 80% have antibacterial activity against Porphyromonasgingivalis.*

Key words *:Sticopushermanii , Holothuriaatra, Porphyromonasgingivalis*

MINIMUM BACTERICIDAL CONCENTRATION (MBC) OF ARECHA CATECHU FOR MIXED PERIODONTOPATHOGEN BACTERIA

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ABSTRACT

Background : *Periodontitis is a periodontal tissue disease that one of the main etiologic is periodontopathogen bacteria that effects the supporting tissues of the teeth. Most of the bacteria associated with periodontitis are Gram negative. Antimicrobial was used to inhibit the growth of bacteria in dental plaque which caused periodontitis. This experiment was using extract of Arecha catechu as an antimicrobial.*
Objective : *This experiment was done to examine minimum bactericidal concentration (MBC)of betel nut (Arecha catechu) to the growth of mixed periodontopathogen bacteria.*
Material and Methode : *Periodontopathogen bacteria sample were taken from cultured mix periodontopatogen bacteria. Sample were divided into 5 groups which were K1 and K2 (control), where a sterile aquadest was given and P1, P2 and P3 groups (treated with infusum of Arecha catechu with the concentration of 80%, 90% and 100%). The sample were inoculated in BHI agar media. The inhibition effect was observed by counting the diameter of inhibiton zone on the agar media.*
Result : *Data were analyzed with ANOVA, the result showed extract of Arecha catechu can inhibit the growth of periodontopathogen bacteria between P1, P2 and P3 groups* ***Conclusion :*** *Extract of Arecha catechu inhibited 80% was a minimum bactericidal concentration (MBC)for mixed periodontopathogen bacteria.*

Keywords *:Periodontitis, mixed periodontopathogen bacteria, extract of Arecha catechu.*

EFFECT OF *AVICENNIA MARINA SP* LEAF EXTRACT TO RAT GINGIVAL CATALASE LEVEL INDUCED BY MIX PERIODONTOPATHOGEN BACTERIA

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ABSTRACT

Background :*Periodontal disease is the second largest oral disease in Indonesia population caused by infection of periodontopathogen bacteria. Most of the bacteria of periodontitis are Gram negative anaerobic bacteria. Avicennia marina sp is a natural product that has some medical potential regarding to its nutritional contents including antioxidant activity.*
Objectives :*The aim of this study is to investigate the effect of Avicennia marina spextract on catalase activities in gingival Wistar rats induced mix periodontopathogen bacteria.*
Material and Methods*: The study is an experimental laboratories research with post test only control group design.Fivety male Wistar rats divided into five group. Group-1 group was negative control group, group-2 group was a positive control group, and the other groups were induced by mixed periodontopathogen bacteria and treated with Avicennia marinaspleaf extract on various concentration. After treatment, the rats were sacrificed. Gingival catalase level (mg/ml) of each group was measured. All of datas were analyzed by one way ANOVA and LSD multiple comparison testat 5% significance level.*
Result*: This study showed that gingival catalase level was significantly lower in group-2 than group-1. Gingival catalase level in treatment group was significantly higher than control positive group.*
Conclusion*: Avicennia marina sp leaf extract can increase rat gingival catalase level.*

Key words*: Avicennia marina sp leaf extract, periodontitis, catalase*

PORCELAIN ONLAY RESTORATION ON THE FIRST LOWER MOLAR AFTER ROOT CANAL TREATMENT (CASE REPORT)

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ABSTRACT

Background *This paper is a case report of porcelain onlay restoration which was made on the first lower molar after root canal treatment. . Onlay is an alternative forEndodontically treated teeth it provides cuspal protection, this type of restorations sometimes called a partial crown.Thecaseis afemalepatient, age 19 yearsold, withpulpnecrosisinthe maxillarylowerteeth. This case report describes a minimally invasive, aesthetic solution to provide cuspal coverage after root canal treatment. The restoration were examinated for marginal integrity, anatomis form, surface and color for a period of 12 months. This restoration was in function at the end of evaluation periode. There was adverse event the all ceramic restoration exhibited the least plaque growth, have excellent biocompatibility, inertness, improved physical bonding and natural appearance.*

Key words *: dental porcelain,endodontics*

POTENCY OF RHIZOPORA MUCRONATA'S BARK EXTRACT IN INHIBITING THE GROWTH OF STREPTOCOCCUS MUTANS COLONY

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ABSTRACT

Background. *Streptococcus mutans cariogenicity is based on the ability to produce and tolerate large amounts of acid. Rhizophora mucronata have broad spectrum antibacterial properties that can inhibit the growth of gram-positive or gram negative bactery.*
Purpose. *The objective of this study was to examine minumum inhibition concentration(mic) against streptococcus mutans.*
Methods. *Subjects were 32 samples of s.mutans, divided into 8 groups (n = 4). Six groups were given the extract with different concentrations of 50% ,25%, 12,5%, 6,25%, 3,125%, 1,56% , control positive group was given eugenol 0,025mg/ml and control negative was given 1% dmso. Extracts was prepared by percolation method, sample of bacteria were innoculated from patients's saliva. The inhibitory effect was observed by measuring the diameter of inhibition zones (clear zone) on agar media with digital calipers. Data were analyzed with kolmogorov smirnov and one-way anova*
Result. *There were significant difference between each concentration (50%-p=0,015; 25%-1,56%-p=0,000) and control positive. There were significant difference between concentration (50%-p=0,000; 25%-p=0,001; 1,56%-p=0,001) and no significant difference between concentration (12,5%-p=0,083; 6,25%-p=0,091; 3,125%-p=0,054) and control negative.*
Conclusion *rhizopora mucronata's extract has inhibition potency against streptococcus mutans. The minimum inhibitory concentration (mic) is 50% in bark's stem extract.*

Keywords *rhizopora mucronata, streptococcus mutans, minimum inhibitory concentration*

PHOSPHATE LEVELS TOOTH AFTER SMEARED WITH SHELL ANADARA GRANOSA'S GEL

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ABSTRACT

Background: *Demineralization is the early process of dental caries as a results of bacterial fermentation of carbohydrate substrates. If there is calcium dan phosphate in sufficient quantities, the reminalization will occurs as a natural repair process for non cavitated lesions. Anadara granosa shell is among the source of calcium and phosphate.*
Purpose: *The aim of this study was to describe the phosphate levels of enamel after smear it with Anadara granosa shell.*
Methods: *In this study, Anadara granosa shell manufactured in gel. Then smear one drop of it on enamel surface 2 times a day and immersed the samples in artificial saliva. The samples (n=24) were labial of bovine incisive, 3 years old that it were divided into 4 groups. Group I was a control group and group II, III, IV were treated group for 3,14 and 28 days. Measurement of calcium levels was conducted by titration analysis . All data were analyzed by One - Way ANOVA test with a significance level of 5%.*
Results: *It showed significant differences in the phosphate levels of enamel between groups (p=0,000.*
Conclusion: *Smearing with Anadara granosa shell in gel 2 times a day for 3,14 and 28 days can increase the phosphate levels of enamel.*

Key words *: Phosphate, enamel, Anadara granosa shell*

TYPE 1 COLLAGEN ON THE WOUND HEALING PROCESS OF DENTAL EXTRACTION WITH DIFFERENT MOLECULAR WEIGH OF CHITOSAN

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ABSTRACT

Background : *The applications of chitosan in the medical field are determined by the specification of the deacetylation degree and molecular weight.*
Purpose : *The aim of this study was to account the rate of type 1 collagen on wound healing process of dental extraction in Rattus norvegicus for 7 and 14 days using chitosan gel with high molecular weight and low molecular weight.*
Methods : *Rattus nornegicus strain wistar male, aged 8-16 weeks, divided into 3 groups, namely group 1 which given chitosan gel with high deacetylation degree and high molecular weight, group II which given chitosan gel with high deacetylation degree and low molecular weight and group III as control which were not given chitosan gel. Chitosan gel were applied into the socket of dental extraction. Rat was decaputated 7 and 14 days after chitosan gel application and the jaw in the treated regions and control group were cut for immunohistochemical examination using type 1 collagen monoclonal antibody to observe collagen type I. Data were analyzed using ANOVA test.*
Results : *The result showed significant differences in type 1 collagen for 7 and 14 days observation ($p<0,05$).The number of type 1 collagen were found higher in the group which given chitosan gel with high deacetylation degree and high molecular weight.*
Conclusion : *Chitosan gel with high deacetylation degree and high molecular weight become more active and have high chemical reactivity. It can increase the number of type 1 collagen on wound healing process of dental extraction.*

Keys words: *Chtosan,molecular weight, type 1 collagen*

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INTRODUCTION

The application of chitosan on wound healing process has been growing shown by many studies.[1.2.3] The number of osteoblast cell and collagen synthesis type 1 in the formation of reparative dentin is increased in direct pulp capping on *Rattus norvegicus* teeth by using chitosan.[1] Chitosan with high deacetylation degree can increase the proliferation of fibroblasts and osteoblasts cell in wound healing process of dental extraction on *Rattus norvegicus.*[2] Chitosan have many useful and advantageous biological properties in the application as wound dressing. It biocompatibility, biodegradability, hemostatic activity, anti bacterial activity and property to accelerate wound healing.[4,5] Biological activity of material chitosan depend on their molecular weight and deacetylation degree. The degree of deacetylation and molecular weight are important parameter, which could influences the performance of chitosan in many its application.[6,7] When chitosan is applied, these material are biodegraded by some enzymes susch as chitosanase and subsequently become their oligomers and monomers.[5]

Kojima *et al*, reported that chitosan can stimulates the migration and proliferation of macrophages and fibroblast, which also activates of collagen in fibroblast.[8] Type 1 collagen is the most abundant extracellular matrix in periodontal tissues and is an essential factor in the formation of calcified nodules.[9] In the present study, we prepared chitosan that have different molecular weight and we examined the effect of them on the wound healing process of dental extraction in rats. The aim of this study was to account the rate of collagen type 1 on wound healing process of dental extraction in *Rattus norvegicus* for 7 and 14 days using chitosan gel with high molecular weight and low molecular weight.

MATERIALS AND METHODS

Chitosan material was 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). Chitosan gel 1 % (w/v) was made with diluted one gram of chitosan powder in acetic acid 2 %. 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 material in this experiment were asam asetat 2 % p.a (Merck, Germany), sodium asetat 0,25 M, buffer formalin, 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) and Type 1 collagen 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 glas, mikroskop trinokuler Olympus CX 31 Japan) dan camera Olympus E 330 AD 01 Japan.

Rattus nornegicus strain wistar male, aged 8-16 weeks, divided into 3 treatment groups namely group 1 which given chitosan gel with high molecular weight, group II which given chitosan gel with low molecular weight and group 3 as control which were not given chitosan gel. Chitosan gel were applied into the socket of dental extraction. Rat was decaputated 7 and 14 days after chitosan gel application and the jaw in the treated regions and control group were cut for immunohistochemical examination to observe collagen type 1. 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 µm thickness. Deparafin and rehydration were subsequently performed. Type 1 collagen 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 effect of molecular weight and deasetylation degree on collagen activity shown in figure 1 and figure 2. The region which would be evaluated was dark brown observed in third apical socket. The number of type 1 collagen was observed and evaluation was done 400 times magnification in all sub groups. Figure 1 and figure 2 showing the sample of type 1 collagen on 7 days and 14 days after dental extraction. In our study, the number of type 1 collagen on wound healing process of dental extraction using chitosan was more higher compared to control group. The number of type 1 collagen in 7 and 14 days using chitosan

with high molecular weight and high deasetylation degree was more higher than using chitosan with low molecular weight.

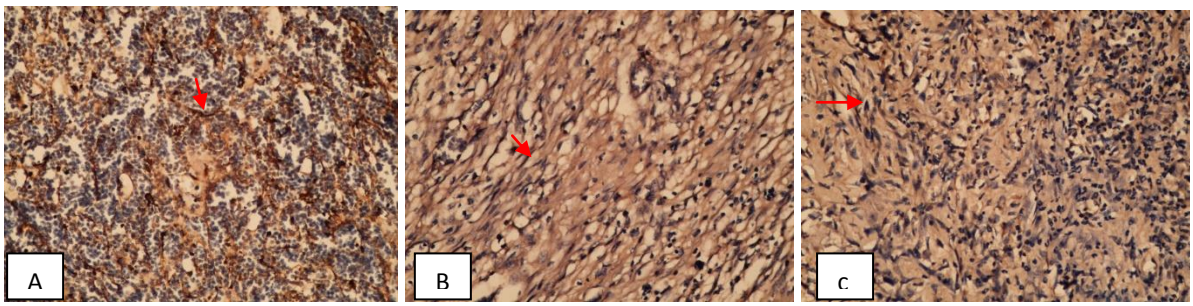

Fig 1. The number of type1 collagen at 7 days observation, (A) Chitosan with high molecular weight, (B) Chitosan with low molecular weight, (C) Control group, without using chitosan.

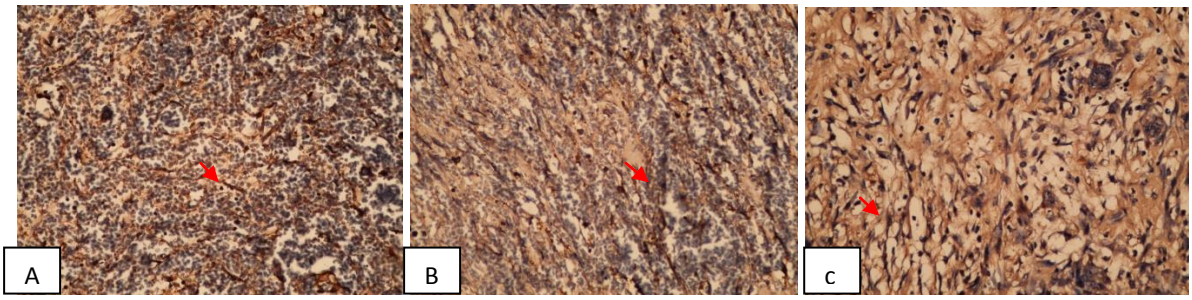

Fig 2. The number of type1 collagen at 14 days observation, (A) Chitosan with high molecular weight, (B) Chitosan with low molecular weight, (C) Control group, without using chitosan.

Table 1 and figure 3 shown the mean and standard deviation of each group from immunohystochemistry study done in 7 and 14 days after treatment. The number of type 1 collagen in 7 and 14 days after treatment using chitosan with high molecular weight more higher compared to group using chitosan with low molecular weight. The data was analysed 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 groups

Table 1. The mean and standard deviation of each group at 7 and 14 days after treatment

		7 days	14 days
Variable	**Treatment**	**Mean± SD**	**Mean± SD**
Type 1 Collagen	Control	25.5±2.56	36.5±2.45
	Chitosan, High BM	44.38±1.99	55.25±1.77
	Chitosan, low BM	33.38±3.36	45.75±4.12

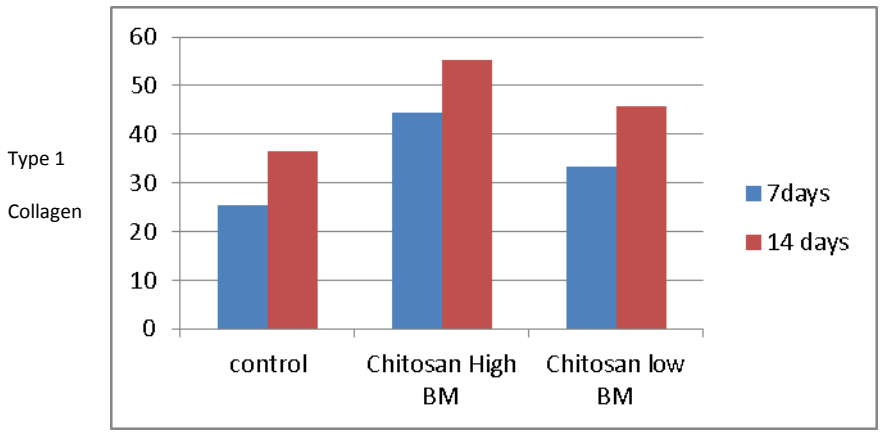

Fig 3. The graphic of type 1 collagen on 7 and 14 days using chitosan with high molecular weight, lower molecular weight and control group

DISCUSSION

Collagen is the most abundant protein of matrix extracellular of the periodontal ligament. Type 1 Collagen account for approximately 80% of the total collagen content.[10] Chitosan is derivative of chitin which is the second most abundant natural biopolymer and which is a primary structural component of the exoskeleton of antropods such as crustacean. Chitosan is obtained by N-acetylating chitin and it is a biodegradable natural biopolymer.[9,11] Chitosan (1-4,2-amino-2-deoxy-β-D-glucan) is a polycationic complex carbohydrate with a structure similar to that of hyaluronic acid. Hyaluronic acid is thought to facilitate the migration and proliferation of progenitor cells, thereby facilitating tissue regeneration, while collagen limits cellular migration and impairs regeneration.[9]

In our study,the effect of molecular weight on number of type 1 collagen is shown in figure 1, figure 2 and table 1. In the chitosan with high deacetylation degree and high molecular weight was the most effective. Chitosan were directly effective because they were biodegraded by some enyzmes and become monomers in the wound. Some study proved that biodegradable substances of chitosan were effective in wound healing.[5,6] This study using chitosan material with different molecular weight. When each sample with different molecular weight, it have different molecular size that was administered to the wound. The degree of biodegradability of each sample was different. It takes more time to be biodegraded and absorbed in the wound due to their high molecular weight, while monomers are absorbed quickly due to low molecular weight. In addition, chitosan with high molecular weight are also suitable in respect to absorbtion.[5,6,7] Chitosan with high molecular weight has a large

particle size that would be better mucoadhesive properties, especially in closing the wound. Strong blood clot is formed in order to prevent complications of dental extraction such as dry socket caused by the loss or destruction of blood clot formation in dental socket.[12,13] Due to this mucoadhesive, the film sticks to the wound protecting it againts the bacteria entrance. In addition to the physical protection, chitosan gel with strong tissue adhesiveness should release the antimicrobial effeciently in order to decrease the bacteria level. One of the most important stages in the wound healing process is the inflamatory stage, where the inflamatory cells clean foreign agents in the wound area.[14] Chitosan with high deacetylation degree proved influenced wound healing accleration because amino is strongly related to healing acceleration.[5] This suggests that wound healing with chitosan depends on the molecular weight and deacetylation degree .[6,7]

CONCLUSION

Chitosan material can increase the number of type 1 collagen on wound healing process. Type 1 collagen is related to the remodeling in the wound healing process. Chitosan were found to enhance collagenase activity, that produced mainly by fibroblast and inflammatory cells.[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. Futhermore, PDGF activates the synthesis of Tranforming growth factor beta (TGF β) in macrofag, which also activates the synthesis of collagen in fibroblast.[8,15]

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DESCRIPTION OF MANDIBLE CORTICAL BONE HEIGHT IN PATIENTS WITH TYPE-2 DIABETES MELLITUS AND SUSPECT OSTEOPOROSIS

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ABSTRACT

Background*: Osteoporosis and diabetes mellitus is a systemic disease in which both lead to decreased bone quality. Decrease in bone quality can be analyzed by measuring the mandible cortical bone height. Mentale index is an index that can be used for assessment the height cortical bone in the mandible. This Assessment use the panoramic radiograph.*
Purpose*: The purpose of this study was to analyze the ratio of mandibular cortical bone height in patients with type 2 diabetes mellitus and osteoporosis with panoramic radiography.*
Methods*: The study is descriptive study. Samples were secondary data were 14 panoramic radiographs of patients suspected osteoporosis, 13 pieces of patients with type 2 diabetes mellitus and 5 normal patients as a control. All data is the data of patients who come to the clinic RSGM Dentistry Padjadjaran.*
Results: *The results showed that mandible cortical bone height in patients with diabetes mellitus-value of 2.37 mm by 2.31 mm, whereas in patients with osteoporosis showed a lower value which is 1.7 mm in the right and left 1.8 mm..*
Conclusion: *The conclusion that can be drawn from this study is the decline in the quality of bone in patients with osteoporosis is more common when compared with patients with type 2 diabetes mellitus*

Key Word*: Osteoporosis, Diabetes mellitus type 2, Cortical Bone height, Panoramic Radiograph*

INTRODUCTION

Diabetes mellitus and osteoporosis is a disease due to metabolic disorders, which can cause metabolic disorders and cause damage to some tissues body [1, 2, 3]. Diabetes mellitus type 2 is a metabolic disorder characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency [3]. In the United States found 23.6 million people with diabetes mellitus and turned out 17.9 million or approximately 7.8% of all diabetics is type 2. It also occurs in Indonesia, since the beginning of this century has been the country with the number of people with type 2 diabetes mellitus fourth largest in the world 3. Based on WHO epidemiological studies conducted in 1999 in Indonesia, said that the prevalence of diabetes mellitus ranged between 1.5% - 2.3% and 90% are type-2 diabetes mellitus [4, 5, 6]. The condition often leads to diabetes mellitus complications including complications include a decrease in bone density or density. Although the decrease in density is not a major complication, loss of bone running concurrently with the occurrence of diabetes mellitus who allegedly caused a deficiency of insulin which causes wastage of calcium at the time of glycosuria 4. This density reduction can be seen from some of the research it was found on radiological bone thinning occurs 7-8 bone structure. Osteoporosis is a metabolic bone disease characterized by a reduction in mass and deterioration of bone micro architecture, thereby increasing the risk of fractures due to bone fragility increases. The incidence of osteoporosis is more common in women than men, especially in postmenopausal women 9. According to statistics of the National Osteoporosis Foundation, more than 44 million Americans have osteopenia and osteoporosis. In women aged $\geq$ 50 years, there were 30% of osteoporosis, osteopenia 37-54%, and 54% are at risk for osteoporotic fractures 9. From several studies that have been conducted in several parts of Indonesia, the results showed the prevalence of osteoporosis women ranged 26% and most osteoporosis patients in the age group 45-65 years, while the prevalence of osteoporosis in men ranged from 23.3% 9.10. Bone actually has an auto repair process known as remodeling process. In this process whereby the bone is bone changes, which have old or damaged will be replaced with new bone. The balance of this process began to fail after reaching the age of 40 years, namely an absorption process is higher than the formation, so that bone mass will begin to decline. This process will continue, so that impaired bone mineral metabolism and bone architecture that will ultimately arise osteopenia and then osteoporosis [11].

Radiography is used as a tool supporting the diagnosis of various abnormalities of the teeth and jaws in the dental practice. One type of radiography is widely used panoramic

radiographs [12]. Panoramic radiographs radiography has become a popular technique in dentistry because it has advantages capable of displaying an overall picture of the maxillofacial structures [12]. Assessment of bone quality through panoramic radiography is often done one of them is the height mengeukur cortical bone in the mandible using an index such as the measurement of mandibular Cortical Index (MCI), Mental Index (MI), Panoramic Mandibular Index (PMI), Gonion Index (GI), and Antegonion Index (AI) [13,14]. Mental measurement used is measured by an index where value is the thickness of cortical bone in the cortex below the mental foramen on the inferior border of the mandible. Thickness measurement is done separately for the right and left [14.]

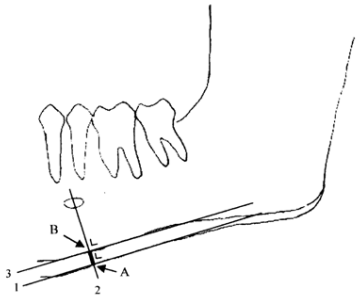

Fig 1. Mental index of Akira Taguchi et al 14

The purpose of writing this article is to provide an overview of the mandibular cortical bone height between patients with suspected osteoporosis and type-2 diabetes mellitus.

METHODS AND MATERIAL

This research is a descriptive study in which the results obtained in the form of quantitative data 15. The population in this study was all data of panoramic radiographs of patients coming to RSGM during January 2010 - January 2011 with complaints accompanying the patient are 1) Suspected osteoporosis as evidenced by a medical certificate and DXA examinations 2. Patients with type 2 diabetes mellitus as evidenced, by the testimony of a doctor, 2) While the study sample was selected for all of the data is pendeita patients with Radiographic criteria, where are 50-70 years old, panoramic radiographs should be of good quality (bright and clear), and mandible cortical bone occur clear that can be assessment

Scale used for measurement is mm; the index used is the mental index where assessment is done on both sides of [14]. Based upon the selection results, obtained 14 panoramic radiographs of patients with suspected osteoporosis and 13 for patients with type 2

diabetes mellitus. Besides data from the two patients mentioned above also selected 10 patients with radiographic data are no systemic disorders as controls. Panoramic radiographs were used taken with x-ray equipment digital types Picasso Trio; EPX-Impla brand, type B applied parts Impla, serial number 0165906; production Vatech & E-woo Korea. Processor is used to process the data is a single unit with the Axio computer specs Pentium 4, 4G memory. Soft-ware used is EasyDent 4 Viewer Program from Vatech & E-woo Korea [16].

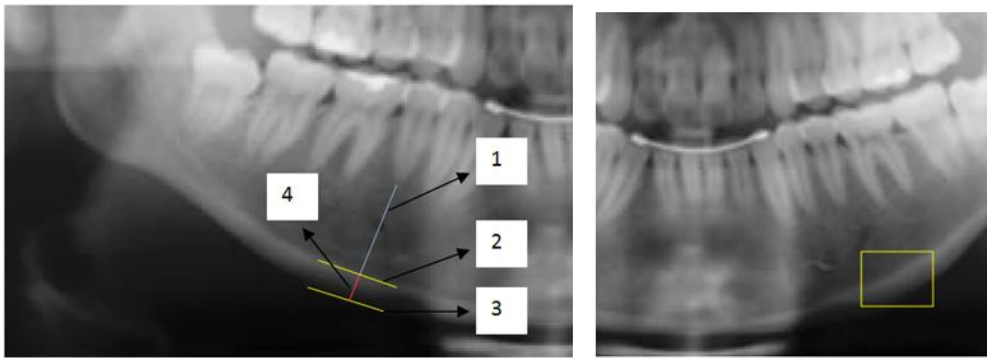

Fig 2. Picture A. Shows three lines on mental index, where 1 is the line perpendicular to the line 2 and 3 are passed forement mentale, line 2 and is parallel to the boundary line of the upper and lower bones Cortical mandible, line 4 is the height of the mandible bone cortical. B shows an overview of mandible cortical bone 16

RESULTS

Results of a study of 14 patients with suspected osteoporosis radiography and radiographic 13 patients with type 2 diabetes mellitus, acquired the level of a mandible cortical bone is:

1) Assessment of mandible bone height in patients with suspected osteoporosis to the right side of the left funds worth 1.7 mm have similar values almost 1.8 mm.

Table 1. Height of mandible bone in patients with suspected osteoporosis

Right		Left	
Osteoporosis	Normal	Osteoporosis	Normal
1,7	2,58	1,8	2,54

When displayed in graphical form:

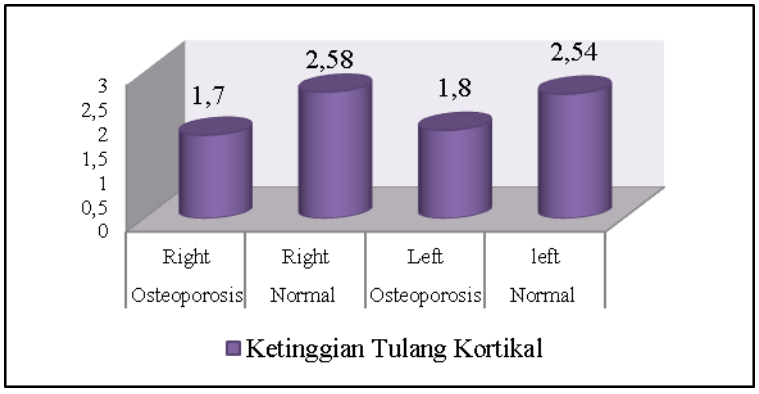

Fig 3. Mandibular cortical bone height chart on Patients with suspected osteoporosis

2) Assessment of mandible bone height in patients with suspected osteoporosis to the right side of the left-value of 2.37 mm funds has similar values almost 2.31 mm.

Table 2. Mandible bone height in patients with type 2 diabetes mellitus

Right		Left	
DM Tipe-2	Normal	DM Tipe-2	Normal
2,37	2,58	2,31	2,54

When displayed in graphical form:

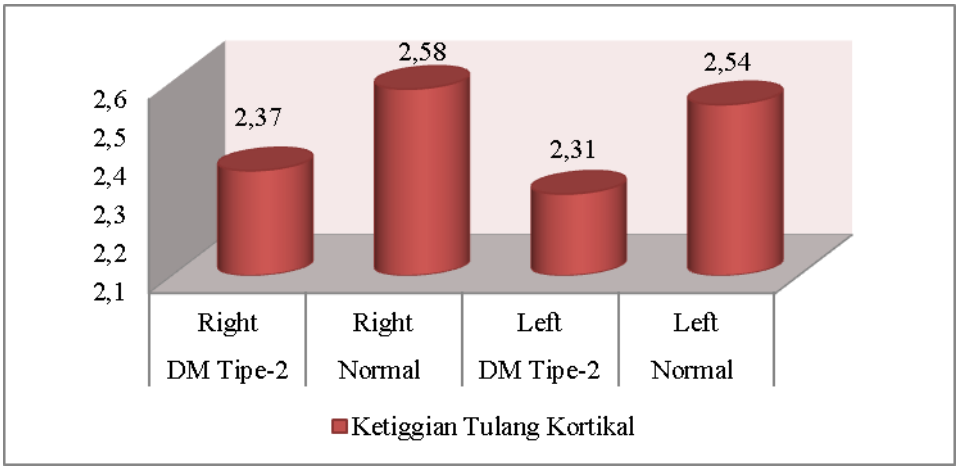

Figure 4. Mandibular cortical bone height chart on Patients with type 2 diabetes mellitus

3) Assessment of mandible bone height ratio on the right side of the patient with suspected osteoporosis is worth 65% of normal and in patients with diabetes mellitus type 2 is worth 91%, while on the left side of the patient with suspected osteoporosis is worth 70% of normal and in patients with diabetes mellitus type-2 is worth 90%.

Table 3. Comparison of mandibular bone height in patients with suspected osteoporosis, type-2 diabetes mellitus and normal (mm)

Osteoporosis Right	DM Tipe-2 Right	Normal Right	Osteoporosis Left	DM Tipe-2 Left	Normal Left
1,7	2,37	2,58	1,8	2,31	2,54

Table 4. Comparison of mandibular bone height in patients with suspected osteoporosis, type-2 diabetes mellitus and normal (%)

Osteoporosis Right	DM Tipe-2 Right	Normal Right	Osteoporosis Left	DM Tipe-2 Left	Normal Left
65	91	100	70	90	100

When displayed in graphical form:

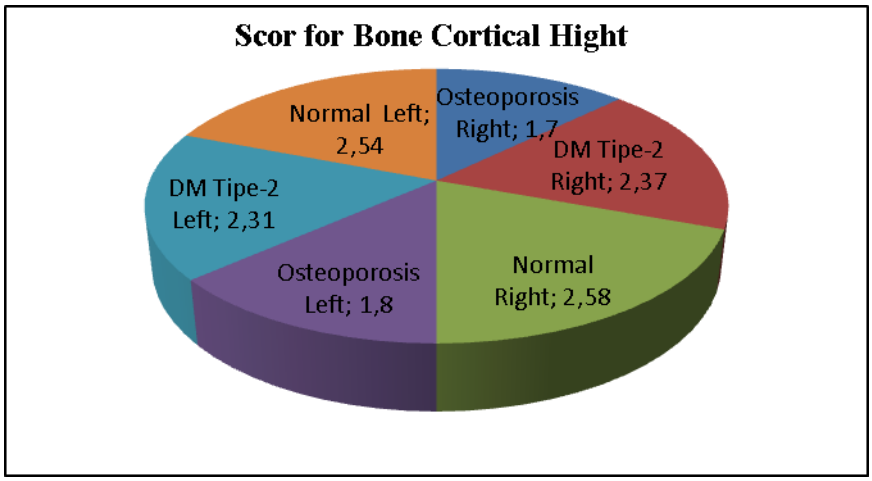

Fig 5. Chart comparison of mandible cortical bone height In patients with suspected osteoporosis, type-2 diabetes mellitus and normal (mm)

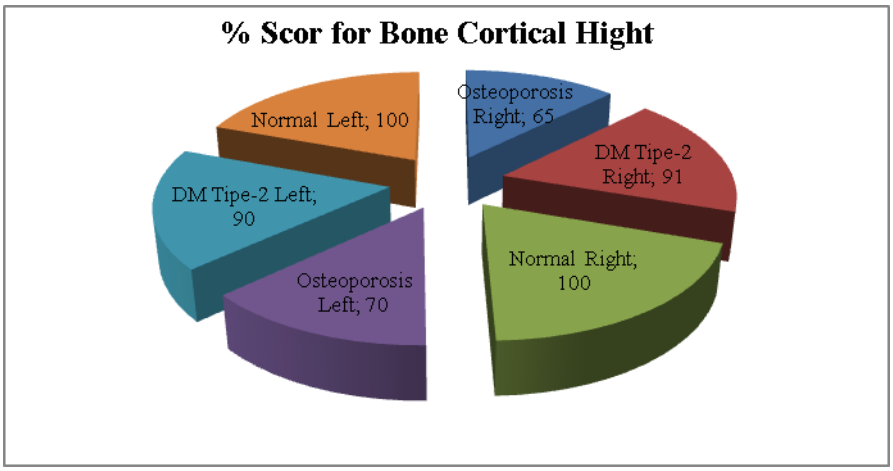

Fig 6. Chart comparison of mandibular cortical bone height in patients with suspected osteoporosis, type-2 diabetes mellitus and normal (%)

DISCUSSION

Cortical bone height related systemic conditions and processes of bone resorption, bone resopsi said to be really due to an imbalance in the bone remodeling process. Bone remodeling is an activity in the process of renewing mineral reserves. Factor formation and bone resorption changes implemented through two processes are always in a state of balance and is called coupling. This coupling allows the process of bone formation activity comparable with the activity of bone resorption. This process lasted 12 weeks and 16-20 weeks of young people in middle age or advanced. Remodeling rate ranges from 2-10 % of skeletal mass per year [17]. This remodeling process is influenced by several local factors that led to a series of events on the concept of Activation - resorption - Formation (ARF). This process is influenced by mitogenic protein that stimulates bone preosteoblasts into osteoblasts that splitting due to the activity of resorption by osteoclasts . Other factors that influence the remodeling process are a hormonal factor. Remodeling process will be enhanced by parathyroid hormone, growth hormone and vitamin D (1, 25 (OH) 2), while the remodeling process is inhibited calcitonin , estrogen and glucocorticoids [18] . This condition also occurs in cases of osteoporosis and type - 2 diabetes millitus , only factor contributing to the difference. In osteoporosis bone loss triggered conditions cause the lack of the hormone estrogen in the body. As we know that the hormone estrogen in the body has the function of which is as an activator for so menghemtikan osteoclast bone resorption process [18.] On the circumstances under which estrogen levels are then automatically decreases the remodeling process was disrupted and the result is uncontrolled and work osteoclast bone resorption process continues. Cases of diabetes mellitus on bone loss occur due to disruption of calcium absorption in the RANK - ligand process. RANK - ligand process is the formation of potassium phosphate (Ca3 (PO4) 2) for osteoblasts . It can be concluded that the levels lessning calsium in this process then formed into little osteblast.
This can be seen in the results of studies in which thinning condition osteoporosis occupy considerable with values 1.7 -1.8 mm , while the condition of diabetes mellitus there is a significant average difference between the bone where the value ranges from 2.31 to 2.37 mm compared with normal conditions approximately 2.54 to 2.58 mm .

It can be concluded that the condition of the bone in patients experiencing resopsi osteoporosis more than diabetes mellitus. But we need to realize that this study is far from perfect, still have to do more research on this by adding samples and add the index measurement.

CONCLUSION

Based on research conducted shows that the true condition of bone resorption in osteomilitis far greater than with diabetes mellitus.

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IN VITRO CYTOTOXICITY EVALUATION OF *Nannochloropsis occulata sp* EXTRACT TO HUMAN GINGIVAL FIBROBLAST STEM CELLS

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ABSTRACT

Background *: Nannochloropsis occulata sp has many biological activities such as analgesic, anti-inflammatory, antioxidant and antibacterial properties thus potentially explored as therapeutic agent in oral disease.*
Purpose *: This study aims to evaluate cytotoxic effect of Nannochloropsis occulata sp extracts in human gingival fibroblast stem cells.*
Methods *: The study is an experimental laboratories research with post test only control group design. Nannochloropsis occulata sp extracts in concentration of 0,3125%; 0,625%; 1,25%; 2,5%; 5%; 10%; 20%, 40%; and 80% were tested its cytotoxicity on human gingival fibroblast stem cells. For the in vitro toxicity assay, serial concentration of Nannochloropsis occulata sp extracts was applied to human gingival fibroblast stem cells cultures in conditioned media. The cells (1x105) were cultured in 96 well plates and allowed to attach for 5 days before treatment with serial concentration of Nannochloropsis occulata sp extracts for 24 h period. Cell viability was assessed by the mitochondrial dependent reduction of yellow MTT (3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide) to purple formazan. The data concerning cell viability were statistically analyzed using two-way ANOVA test and LSD multiple comparison test at 5% significance level.*
Result *: Nannochloropsis occulata extracts showed toxicity in the concentration of 2,5% above and not cytotoxic in the concentrations below ($p<0,05$).*
Conclusion *: Nannochloropsis occulata sp extracts was not cytotoxic effect on human gingival fibroblast stem cells in the concentration below 2,5%,*

Key word *: Nannochloropsis occulata sp extracts, cytotoxicity, fibroblast gingiva stem cells*

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INTRODUCTION

Microalgae, as an evolutionary form of organism, are showing an extraordinary adaptation in the ocean. Marine microalgae are a promising source of organisms that can be cultured and targeted to isolate the broad spectrum of functional metabolites. As a consequence, biochemically and ecologically significant differences have been gained a vast microalgae diversity and associated a broad spectrum of secondary metabolites. Thus, researchers are continuously mining the bioactive components from marine microalgae to determine pharmacological and medicinal values in many parts of the world.[2] Hence, marine microalgae have emphasized that research on their natural products are useful for the cure and for the alleviation of human diseases.[3]

Hence, researchers have been interested in cultured marine microalgae in order to reveal the biochemical constituents of their crude extracts and to determine which components have pharmacological effects.[4]

Microalgae such as *Nannchloropsis oculata sp* consist of many nutrients that include a rich source of protein, poly unsaturated fatty acids, carbohydrates, minerals, vitamins, pigments, and secondary metabolites.[5] *Nannochloropsis occulata sp* as many biological activities such as analgesic, anti-inflammatory, antioxidant and antibacterial properties thus potentially explored as therapeutic agent in oral disease.[1] Thus, its targeted for the research and revealed the health effects, for human well-being as well as for topical applications.[5]

Nannochloropsis occulata sp is a unicellular marine microalgae that is an important food source and additive used in the comercial industry.[6] In order to make these extract proper to be an agent of therapeutic, the harmful chemical or organic solvent in the extraction medium is required to be eliminated In this study, a marine microalgae species *Nannchloropsis oculata* was examined its potential medical used by screening its cytotoxicity using *in vitro* assays. As an attempt to explore its potential use as topical agent in oral disease *Nannchloropsis oculata* was evaluated its cytotoxicity in human gingival fibroblast stem cells.

MATERIALS AND METHODS

Preparation of *Nannochloropsis occulata sp* extract. *Nannochloropsis occulata sp* extract were obtained from Situbondo, East Java-Indonesia. The medium of RPMI 1640, Dulbecco's Modified Eagle's Minimum Essential Medium (DMEM), Penicillin, Streptomycin, Amphotericin, and trypsin were obtained from Gibco (Carlsbad, CA, USA). All other chemicals were analytical or pharmaceutical grade and obtained from Sigma-Aldrich

Chemicals (Bornem, Belgium). The *Nannochloropsis occulata sp* extract powder was collected via rotary evaporation and drying under freeze dryer. The *Nannochloropsis occulata sp* extract were collected by centrifugation (4500 rpm, 4°C, 30 min) and washed twice with deionized water. Microalgal pellet was stored in a freezer at -70°C for 24 h. The sample was then freeze-dried at -50°C at 5 m torr. The freeze-dried sample was ground to a fine powder. For the water extraction, the powdered sample (5 g) was extracted with 500 ml distilled water at 25°C for 24 h. The water ectract was collected by filtering and was then concentrated by mixed with an aqueous solution.[7]

Stem Cells Culture. Human gingival fibroblasts stem cells were obtained from biopsies of the attached gingival of sound permanent molar teeth of healthy persons. Informed consent based on an appropriate protocol was obtained from the donors. The biopsies were stored at 4°C for at most 24 hours in collection medium (RPMI 1640 supplemented with penicillin 100 U/mL, streptomycin 100 mg/mL, and amphotericin 2.5mg/mL) prior to amplification. The gingival tissues were cut into 1 to 2 mm^3 pieces then washed three times by RPMI 1640. After that, the cut biopsies were placed into 25 cm^2 tissue culture flasks. The explants were incubated with culture medium consisting of DMEM 90%, 10mM HEPES, glucose (4.5 g/L), NaHCO3 (3.7 g/L), penicillin (100 U/mL), streptomycin (100 mg/mL), and amphotericin (2.5mg/mL), supplemented with 10% heat-inactivated fetal calf serum (FCS). The tissue samples were grown at 37◦C in a humidified atmosphere of 10%
carbon dioxide in the air. When outgrowth of cells was observed, the medium was replaced twice weekly until cells reached confluence. Cells were detached from the monolayer by a brief treatment with trypsin-EDTA (0.25% trypsin, 0.02% EDTA) and recultured in 75 cm2 tissue flasks until confluent monolayer was reobtained.[8]

Research design. The study is an experimental laboratories research with post test only control group design. *Nannochloropsis occulata* extracts in concentration of 0,3125%; 0,625%; 1,25%; 2,5%; 5%; 10%; 20%, 40%; and 80% were tested its cytotoxicity on human gingival fibroblast stem cells.

MTT Cytotoxicity Test. The MTT cytotoxicity test is tests for in vitro cytotoxicity. Cells (1 × 105 cells/mL) in DMEM of 50μL were seeded into 96-well plates and maintained in culture for 24 hours to form a semiconfluent monolayer. They were then exposed to the

Nannochloropsis occulata extracts (50 µL) over a range of 0,3125%; 0,625%; 1,25%; 2,5%; 5%; 10%; 20%, 40%; and 80% concentration. For the in vitro toxicity assay, serial concentration of *Nannochloropsis occulata* extracts was applied to human gingival fibroblast stem cells cultures in conditioned media. The cells (1x105) were cultured in 96 well plates and allowed to attach for 5 days before treatment with serial concentration of *Nannochloropsis occulata* extracts for 24 h period. Cell viability was assessed by the mitochondrial dependent reduction of yellow MTT (3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide) to purple formazan. After 24-hour exposure, the formazan formations were determined for each treatment concentration by ELISA reader at a wavelength of 570 nm. The relative viability of the treated cells as compared to the control cells were expressed as the % cytoviability, using the following formula:

$$\% \text{ Cell viability} = [A\text{sample}/A\text{control}] \times 100\%$$

Note : A sample is mean value of the measured optical density of the treated cells; A control is mean value of the measured optical density of the control cells.[9,10,11]

RESULTS

The result of relative viability of the gingival fibroblast stem cells treated with *Nannochloropsis occulata sp* extracts serial concentration as compared to the control cells was expressed in Table 1.

Table 1. Cytoviability percentage of human gingival fibroblasts stem cells treated by serial concentration of *Nannochloropsis occulata sp* extracts as compared to the control cells

Group	Mean	Std. Deviation
Nanochloropsis 80%	,030267	,0039763
Control cell	1,000000	0e-7
Nanochloropsis 40%	,035100	,0006197
Nanochloropsis 20%	,089400	,0262592
Nanochloropsis 10%	,264067	,0114920
Nanochloropsis 5%	,376733	,0327344
Nanochloropsis 2,5%	,491967	,0430529
Nanochloropsis 1,25%	,761200	,3570908
Nanochloropsis 0,625%	,819967	,2597536
Nanochloropsis 0,3125%	,928167	,0890736

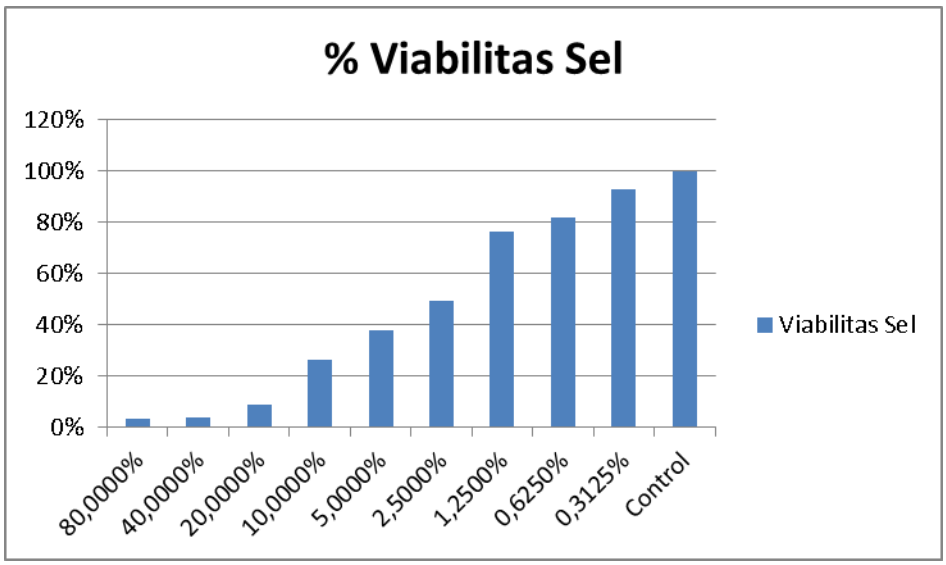

Fig 1. Graphic of Cytoviability percentage of human gingival fibroblasts stem cells treated by serial concentration of *Nannochloropsis occulata sp* extracts as compared to the control cells

Base on data at table 1 and graphic 1, showed that increased concentration of *Nannochloropsis occulata sp* extracts concentration exposure on the cells resulted in the decreasing of cytoviability percentage of human gingival fibroblast stem cells.

Further statistical analysis by two-way ANOVA test and LSD multiple comparison test at 5% significance level was shown in table 3, which described that there was any significant influence of the treated extracts concentration on the cytoviability of human gingival fibroblast ($p > 0.05$). *Nannochloropsis occulata sp* extracts showed cytotoxic effect where the cells were viable less than 50% after the treatment with certain concentrations ($p>0,05$). *Nannochloropsis occulata sp* extracts cytotoxic effect to the human gingival fibroblast stem cells in concentration of 2,5% above where the the viable cells apperaed less than 50% after the treatment, but it showed no cytotoxic effect on the treatment of the extract in lower concentration 0,3125-2,5% ($p<0,05$). *Nannochloropsis occulata* extracts showed toxicity in the concentration of 2,5% above and not cytotoxic in the concentrations below ($p<0,05$).

DISCUSSION

In the field of biomaterials for therapeutic agent, it is necessary to consider aspects of security, such as elimination of cytotoxicity and other harmful effects of the material to be used.[10] The cytotoxicity of an agent means the toxicological riskscaused by a material or its extract in a cell culture.[11] The interactions of the materials and their components with the

Table 2. ANOVA and LSD test summary of the effect of *Nannochloropsis occulata sp* extracts with serial concentration as compared to the control cells

(I) Group	(J) Group	Mean Difference (I-J)	Sig.
Nanochloropsis 80%	Control cell	-,969733*	,000
	Nanochloropsis 40%	-,004833	,954
	Nanochloropsis 20%	-,059133	,480
	Nanochloropsis 10%	-,233800*	,007
	Nanochloropsis 5%	-,346467*	,000
	Nanochloropsis 2,5%	-,461700*	,000
	Nanochloropsis 1,25%	-,730933*	,000
	Nanochloropsis 0,625%	-,789700*	,000
	Nanochloropsis 0,3125%	-,897900*	,000
Nanochloropsis 40%	Control cell	-,964900*	,000
	Nanochloropsis 20%	-,054300	,516
	Nanochloropsis 10%	-,228967*	,008
	Nanochloropsis 5%	-,341633*	,000
	Nanochloropsis 2,5%	-,456867*	,000
	Nanochloropsis 1,25%	-,726100*	,000
	Nanochloropsis 0,625%	-,784867*	,000
	Nanochloropsis 0,3125%	-,893067*	,000
Nanochloropsis 20%	Nanochloropsis 10%	-,174667*	,040
	Nanochloropsis 5%	-,287333*	,001
	Nanochloropsis 2,5%	-,402567*	,000
	Nanochloropsis 1,25%	-,671800*	,000
	Nanochloropsis 0,625%	-,730567*	,000
	Nanochloropsis 0,3125%	-,838767*	,000
Nanochloropsis 10%	Nanochloropsis 5%	-,112667	,181
	Nanochloropsis 2,5%	-,227900*	,008
	Nanochloropsis 1,25%	-,497133*	,000
	Nanochloropsis 0,625%	-,555900*	,000
	Nanochloropsis 0,3125%	-,664100*	,000
Nanochloropsis 5%	Nanochloropsis 2,5%	-,115233	,171
	Nanochloropsis 1,25%	-,384467*	,000
	Nanochloropsis 0,625%	-,443233*	,000
	Nanochloropsis 0,3125%	-,551433*	,000
	Nanochloropsis 10%	,112667	,181
Nanochloropsis 2,5%	Nanochloropsis 1,25%	-,269233*	,002
	Nanochloropsis 0,625%	-,328000*	,000
	Nanochloropsis 0,3125%	-,436200*	,000
Nanochloropsis 1,25%	Nanochloropsis 0,625%	-,058767	,482
	Nanochloropsis 0,3125%	-,166967*	,050
Nanochloropsis 0,625%	Nanochloropsis 0,3125%	-,108200	,198

cells at a molecular level are responsible for tissue reactions, such as inflammation, necrosis, immunological alterations, genotoxicity, and apoptosis. During the last years, the interest of in vitro systems as an alternative to animal experiments in toxicological research has been steadily increasing.[12]

In the present study, the cytotoxicity of *Nannochloropsis occulata sp* extracts which is aimed to be used as topical aplication agent is analyzed using a cell culture model of primary human gingival fibroblasts stem cells. Like other tissues, normal fibroblast function is critical to maintain oral mucosal function for optimal healing. Gingival fibroblasts are chosen due to their availability and culturing characteristics.[8]

Cytotoxicity test of *Nannochloropsis occulata sp* extracts was performed on human gingival fibroblast stem cells. Stem cells from human gingiva, a tissue source easily accessible from the oral cavity, namely, gingiva-derived mesenchymal stem cells (GMSCs) exhibited clonogenicity, self-renewal, and multipotent differentiation capacities. Most importantly, GMSCs were capable of immunomodulatory functions, specifically suppressed peripheral blood lymphocyte proliferation, induced expression of a wide panel of immunosuppressive factors including IL-10, IDO, inducible NO synthase (iNOS), and cyclooxygenase 2 (COX-2) in response to the inflammatory cytokine, IFN-gamma.[13]

In this study we used indirect test, in which the rate of cell number) and the metabolic activity (MTT) have indicated the degree of cytotoxicity of *Nannochloropsis occulata sp* extracts. The effect of *Nannochloropsis occulata sp* extracts on human gingival fibroblast stem cells viability measured by MTT test. MTT is a yellow water-soluble tetrazolium dye which is reduced by live cells to a purple formazan product insoluble in aqueous solutions. The amount of formazan generated is directly proportional to the number of viable cells.[8]

As can be seen from Table 1, *Nannochloropsis occulata sp* extracts exposure of 0,3125%; 0,625%; 1,25%; 2,5%; 5%; 10%; 20%, 40%; and 80%. during 24 hour of incubation induces the cytoviability of the gingival fibroblast stem cells to be 0,3125-80% in comparison to the control cells. It is proved that there is an increasing cytoviability on the decreasing of the extract concentration exposure. It means that more concentration exposure tends to lower the gingival fibroblast stem cells cytoviability.

Cytotoxicity testing includes numerous methods, both qualitative and quantitative. In this study we used indirect test, in which the rate of cell growth (cell number) and the metabolic activity (MTT) have indicated the degree of cytotoxicity of sea cucumber extract. Result showed cytotoxic activity on human gingival fibroblast stem cells after treated with *Nannochloropsis occulata sp* extracts start in concentration of 2,5%, shown by the cell viability less than 50% ($p > 0.05$).

Cell culture can be used to screen for toxicity both by estimation of the basal functions of the cell or by tests on specialized cell functions. General toxicity tests, aimed

mainly at detection of the biological activity of test substances, can be carried out on many cell types, one of the common one is fibroblast cell.[16]

Fibroblast forms the collagen and extracellular matrix. It provides the structural scaffold to many tissues and have important role in would healing and the formation of the main connective tissue. Fibroblast cells have the function to maintain the integrity of the connective tissue by secreting extracellular matrix precursors continuously.[17,18]

Recently, toxicity test have been developed and stem cells were explored regarding to some basic consideration in some advantage in the technique and result. Human stem cells are potentially attractive reagents for predictive toxicology, particularly if they can be shown to be a reliable, large-scale source of differentiated human cells. First, stem cells and their cellular derivatives could form the basis of *in vitro* assays that can be miniaturized and adapted to high throughput screening platforms. Use of cell-based toxicity assays during the early phases of drug development could decrease the cost of attrition at a later stage in development, and would also provide the opportunity to optimiz`e a chemical's safety profile through targeted medicinal chemistry. Second, the use of human cells could increase the correlation between safety studies and clinical trials, an important benefit since conventional animal models of toxicity are not always predictive of human responses. Finally, stem cells that are generated from adult tissues (iPS cells) could allow models to be created from individuals with a diverse range of drug susceptibilities, resistances or disease, which could reduce the rate of adverse effects within patient subpopulations.[19,20]

CONCLUSION

Nannochloropsis occulata extracts was not cytotoxic effect on human gingival fibroblast stem cells in the concentration below 2,5%, can be described as a good candidate for the future therapeutic uses.

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INCIDENCE RATE OF TEMPORO MANDIBULAR DISORDERS (TMD) DUE THE MISSING OF THE FIRST PERMANENT MOLARS MANDIBULAR

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ABSTRACT

Background*: Losing teeth of mandibular first permanent molars in Banjarmasin have high prevalence while installing removable and fixed denture by only (3.0%). This suggests that many cases of tooth loss is not offset by rehabilitation treatment. This will lead to arch function decreased by 30%.*
Purpose:*To determine the incidence rate for temporo mandibular disorder (TMD) due the loss of teeth mandibular first permanent molars.*
Methods: *Conduct anamnestic and dysfunction index to subjects that fit the inclusion criteria. Overall the data collected and grouped according to data obtained by descriptive methods. Calculated percentage of TMD due loss of the mandibular first molar by classification and gender.*
Conclusion: *TMJ dysfunction in women have most high frequency than men. Classification of severe TMJ dysfunction are shown in subjects with missing teeth 46 and who lost both its molar 36 and 46*

Keywords*: Incidence Rate, Temporo Mandibular Disorders (TMD), missing of the first permanent molars mandibular*

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INTRODUCTION

National Health Research (RISKESDAS) of the province of South Kalimantan in 2007 mentioned that the type of treatments that received by people who had dental-oral health problems in the province of South Kalimantan were dental care (81,2%), restoration/tooth extraction/dental surgical (42,3%), and counseling care/dental hygiene (12,5%). People who used removable or fixed dentures were around 0,6% - 10,8%, the highest age was over than 65 years old. In Banjarmasin, the percentage of people who did restoration/tooth extraction/dental surgical were 49,6%, while people who used removable or fixed denture were only 3,0%. This suggests that many cases of tooth loss are not equal with the rehabilitation treatment (Prostodontia).

The lack of public awareness can be seen from the old paradigm which assumedthat extracting the tooth without replacing it with denture would solve the problem.It can also be proved by the statement of Ketua Ikatan Profesi Kesehatan Gigi Masyarakat Indonesia, drg. Armasastra Bahar, stated that the current ratio between restoration and tooth extraction in Indonesia is one to seven (1:7).

The loss of mandibular first permanent molar has the highest prevalence. This is because the mandibular first permanent molar is the first permanent tooth to erupt around 6-7 years in the period of mixed dentition. The first permanent molar is the largest and strongest of all the teeth. It plays an important role in mastication and guiding eruption of other posterior teeth into proper occlusion.

Tooth loss due to extraction could be a serious problem because it may cause dysfunction of mastication, while when lots of tooth missing in a long time may cause temporomandibular disorder and also has impact in speaking and psychological aspect such as aesthetic even in certain jobs that required a great dental health.

The function of dental arch will decrease by 10% and this decline will increase by 30% in the loss of a teeth especially mandibular first permanent molar if the next step, which is to replace the missing teeth is not immediately be done. Misalignment of pressure or imbalance between the left jaw and right jaw caused by one side of chewingdue to the loss of mandibular first permanent molar may causing disruption on one side of the joint. Therefore, researcher feels that need to do some research on the incidence rate of temporomandibular disorder (TMD) due to the loss of mandibular first permanent molar.

MATERIALS AND METHODS

This research was using analitic survey method with cross-sectional approach. Population in this research were patients who came to the Poli Gigi RSUD Ulin Banjarmasin. Samples were taken with purposive sampling technique to those who came to the Poli Gigi RSUD Ulin Banjarmasin with inclusion criteria: there are symptoms of TMD, missing of mandibular first permanent molar, and willingly to be as a respondent. The initial preparation of this research is to determined the samples with Anamnestic index and Dysfunction index according to the inclusion criteria. Then explained the purposes and goals of the research and gave the informed consent to the patient as an approval.

RESULTS

Table 1. Cross tabulation of gender by Di classification.

Gender		Di (Disfunction Index)			
		Mild	Moderate	Severe	Total
	Men	19	11	2	32
		59,4%	34,3%	6,3%	100.0%
	Women	20	20	5	45
		44,4%	44,4%	11,2%	100.0%
Total		39	31	7	77
		50.6%	40,3%	9,1%	100,0%

Table 2. Cross tabulation of age by Di classification

Age		DI			
		Mild	Moderate	Severe	Total
	<31 years old	13	9	3	25
		52,0%	36,0%	12,0%	100.0%
	31-45 years old	21	10	2	33
		63,6%	30,3%	6,1%	100.0%
	>45 years old	5	12	2	19
		26,3%	63,2%	10,5%	100.0%
Total		39	31	7	77
		50.6%	40,3%	9,1%	100,0%

Table 3. Cross tabulation of missing molar by Di classification

Missing molar		Di classification			
		Mild	Moderate	Severe	Total
	36	23	8	1	32
		71,9%	25,0%	3,1%	100.0%
	46	10	5	3	18
		55,6%	27,7%	16,7%	100.0%
	36 and 46	6	18	3	27
		22,2%	66,7%	11,1%	100.0%
Total		39	31	7	77
		50.6%	40,3%	9,1%	100,0%

DISCUSSION

From table 1 above its known that women has bigger frequency of TMJ dysfunction than men. It can be described in the table above that as many as 19 men having mild Di, while there are 20 women, as well as there are 20 women having moderate Di, and only 11 people in men group. This thing can happen in severe Di, which are 2 men having severe TMJ dysfunction, while there are 5 women that having severe TMJ dysfunction. This can supported by the opinion from Achir YA which is said that women around 35 years old and men around 45 years old, have reach their peak bone mass. After that fase, more bone is lost than its formed. Generally women have narrow bone and less compact than men, that's why women tend from suffering *osteoporosis.*[24]

Table 2 above showing that the most group that suffering mild Di found at range age 31-45 years old which is 63,6% compared to other age groups. It caused that those age are classified as working age, so they are having more concern about their oral health.[25]

From classification of moderate TMJ dysfunction, this research show that the group above 45 years old are suffer from moderate TMJ disfunction at the most compared to other age groups, which is 63,2%. This can be confirmed according to Jubhari EH and Akhmadi which said that aging, make retrogression many function of body. For example, TMJ function for mastication, it causing the food intake reduce as a source of nutrition for body. So that good nutrition is very necessary and sufficient for elderly. It is also done with the consideration that the elderly need adequate nutrition to support and maintain their health. [23].

Meanwhile severe TMJ dysfunction in this research show that the age group under 31 years is greater than the other age groups, which is 12%. This is probably the subject in this research having bad habit that not been researched such as chewing on one side of which has been carried out. The subject in this research probably having malrelation that causing malocclusion thus aggravating TMJ function.

From table 7 above explain that in subjects in this research which are missing its 36 having greater frequency suffering mild TMJ dysfunction, which are 71,9%. This can be confirmed according to Janjua OS, dkk which said that percentage of left lower first molar extraction are 32,1% and percentage of right lower first molar extraction are 30,6%. Meanwhile the greatest frequency of TMJ dysfunction categories are shown in subjects who had lost both of its molar, both 36 and 46 which are 66,7%.

Classification of severe TMJ function disorder showed in subjects on this research that missing 46 and subjects that missing both its molar, 36 and 46. This is probably that the condition of missing posterior teeth more that one are causing its vertical dimention missing. This neuromascular disorder will be followed by occlusion changing. Deviation of the mandible as the result of tilting, migration and extrusion of teeth is the impact of posterior tooth loss cases. The teeth are tipping will increase pressure on the anterior teeth and will be followed by an open contact on anterior teeth and will reduce the vertical dimension. Effects of missing lower molar will also causing the reaction that is far from its located in some of arch segments, this will be result limitations on the movement of the mandible in mandibular functional movements.

CONCLUSION

1. 39 patients were having Di mild (50,6%), 31 patients were having Di moderate (40,3%), while 7 patients were having Di severe (9,1%).
2. Women had the frequence of having more TMJ dysfunction than men.
3. Age range of 31-45 years old were the most who getting Di mild in the amount of 63,6%. Moderate TMJ dysfunction of this research showed that the age of group over 45 years old had the biggest result than the other age group in the amount of 63,2%. Meanwhile, severe TMJ dysfunction of this research showed that the age of group under 31 years old had the biggest result than the other age group in the amount of 12%.
4. Missing its 36 element having greater frequency from suffering mild TMJ dysfunction, which are 71,9%.The greatest frequency of TMJ dysfunction categories are shown in

subjects who had lost both of its molar, both 36 and 46 which are 66,7%. Classification of severe TMJ function disorder showed in subjects on this research that missing 46 and subjects that missing both its molar, 36 and 46.

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ANTIBACTERIAL ACTIVITY OF SEA CUCUMBER EXTRACT TO *PORPHYROMONAS GINGIVALIS* IN VITRO

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ABSTRACT

Background : *Periodontitis is the disease of periodontal tissue which is the second common oral disease worldwide and affected the systemic health in general. Porphyromonas gingivalis is one of main periodontopathogenic bacteria related to periodontitis. The recent local adjunctive therapy in periodontitis is antibiotic treatment. Sea cucumber is a marine invertebratae used as traditional medicine and has been known to have antibacterial properties so it's potentially be explored as antibacterial agent in dentistry.*
Purpose *: to examine the antibacterial activity of sea cucumber extract Sticopus hermanii and Holothuria atra to Porphyromonas gingivalis.*
Methods : *The study is an experimental laboratory research with post test only control group design. The samples were divided into 5 groups each consisted of 6 samples i.e : positive control was given tetracycline, negative control was given DMSO 1%, treatment group were given each of Sticophus hermanii and Holothuria atra extract with concentration of 20%, 40% and 80%. Antibacterial activity test was performed by disk diffusion method on Mueller Hinton agar. Diameter of inhibition zone was measured with digital caliper.*
Result *: All treatment groups in all concentration showed inhibition zones but less than tetracycline as positive control. Anova and LSD statistical analysis showed the significant difference on Sticophus hermanii extract 40% and 80% and Holothuria atra extract 80% compared to negative and positive control group (p<0,05).*
Conclusion : *Sticophus hermanii extract on the concentration of 40%, 80% and Holothuria atra extract on the concentration of 80% have antibacterial activity againstPorphyromonas gingivalis.*

Key words : *Sticopus hermanii, Holothuria atra, Porphyromonas gingivalis*

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INTRODUCTION

Millions of people worldwide suffered from periodontitis, the second common oral disease which affected the systemic health in general[1] Periodontitis is an inflammation condition in periodontal tissue when continued untreated could cause futher progressive destruction to alveolar bone resulted in tooth mobility and tooth loss[2,3]. Periodontitis is one on he risk factor for cardiovascular disease[4], diabetes mellitus5, rheumatoid arthritis[6]. The proper treatment of periodontitis will not only restore oral health but also reduce the risk of systemic disease.

The primer cause bacterial etiology of periodontal disease are *Porphyromonas gingivalis* and *Actinobacillus actinomycetemcomitans,* which *P. gingivalis* is related to chronic periodontitis while *A. actinomycetemcomitans* have its role on aggressive periodontitis [3,7].

Therapy of periodontitis consisted of mechanical treatment i.e : scaling and rootplaning and also adjunctive therapy of local antimicrobial agent[3]. Tetracycline is the common antimicrobial agent used to be combined with scaling in chronic periodontitis therapy and proved to increase the efficacy of treatment by inhibiting extracellular collagenase activity of mammalian osteoblast and neutrophil. Tetracycline could be given as systemic or local treatment, but local treatment is preferable regarding to the possibility to obtain the higher concentration and less the risk of bacterial resistance[8].As for numerous other microorganisms, increasing antibioticresistance among oral bacteria may also be a potential majorpublic health problem. *P. gingivalis* has been know to be susceptible to tetracycline but some repost stated the resistance in sub gingival *P. gingivalis* isolates and the ones from odontogenic abcess. The level of resistance varies between countries, which canbe attributed to the different use of antibiotics[9]. The potential candidate for antibacterial agent from natural resources will be beneficial and could be the alternative antibacterial agent regarding to this matter.

Indonesia is a maritime country that rich with the sea natural source. Some marine biota has been explored mainly for food industry, but it has been known that some species has been consumed as traditional medicine regarding to its medically content[10-14].

Research in medical potential of marine biota has been developed recently in marine pharmacology, it has been known that some marine biota has it potential medical use regarding its content[16]. Some sea cucumber species has been stated to have antibacterial effect. Alcoholic extract of *H. scabra* dan *H. miliaris* showed high potential antimicrobial

against *Aeromonas hydrophila, Escherichia coli, Enterococcus sp, Klebsiella pneumonia, Pseudomonas aeruginosa, Salmonella typi, Staphylococcus aureus, Vibrio harveyi*[10]. Another sea cucumber *Sticophus variegatus* could inhibit *Escherichia coli, Pseudomonas* sp., *V. vionovica,* while *Sticophus cholronatus*and *Sticophus hermanii* could inhibit *Staphylococcus aureus, Escherichia coli, Vibrio anguila, V. vionovica*[15].

Our previous study showed that sea cucumber extract of *Sticopus hermanii* had antibacterial activity against mixed periodontopathogenic bacteria of periodontitis[17], and decreased the mandibular bone resorpstion on wistar rat that have been induced by mixed periopathogenic bacteria[17,18].

The content of saponin and triterpene glycoside in sea cucumber extract assumed to be have the important role in its antibacterial bioactivity.Sea cucumber is natural source agent so, in the certain safe concentration is expected to be compatible to fibroblast cell of oral cavity mucosa. Regarding to its antibacterial potency, it is promising candidate to be explored as local antimicrobial use in adjunctive treatment of periodontitis. In this study, the extract of two sea cucumber species: *Sticopus hermanii* and Holothuria *atra* will be tested its antibacterial activity against *P. gingivalis.* Considering that the two species of sea cucumber are plenty found in Jawa coastal, the exploration of the antibacterial activity will add more value as the potential therapy of oral disease. .

MATERIAL AND METHODS

The study is an experimental laboratory research with the design of post test only control group design. Methanolic extract of *Sticopus hermani* and *Holothuria atra* will be tested its antibacterial activity to *Porphyromonas gingivalis* ATCC 33277 by disc diffusion method.

Extract Preparation. Adult sea cucumber weight 100-250 gr were collected from Karimunjawa coastal, washed by running water to clean the dirt, immersed in fresh water for one night to remove the salt and adherent parasite. Sea cucumber then splitted, the inner abdomen were removed then cleaned and washed, so only the flesh of the body proceed to next process.

Thirty five (35) sea cucumber sample were cut into small pieces of 3-10 cm, the wet weight then measured then dried up in solar dryer for 3-4 days to reduce the water content. The dried sea cucumber then cut into smaller pieces of 1 cm, mashed by blender the the weight were

measured and ready for the maceration process.Two hundred and fifty (250) gram mashed dry sea cucumber sample immersed until soaked in 500 mL methanol solvent for 24 hour at room temperature, then filtered with filter paper to separate filtrate and residue.

Residue then reimmersed in 500 mL methanol solvent for 24 hour, again filtered with filter paper to separate filtrate and residue, resulted in maceration filtrate with the ratio of 250 gram sample / 1000 mL solvent (1:4 w/v).

Methanol (polar) filtrate got homogenized with 1000 mL hexane solvent (non polar) then performed partition with separatory funnel the each of the filtrate layer of methanol and hexane solvent were separated.

Methanol (polar) filtrate then got re-homogenized with 1000 mL chloroform solvent (semi polar), performed partition with separatory funnel the each of the filtrate layer of methanol and chloroform solvent were separated.Each filtrate were separated by its solvent with rotary evaporator until extract produced. The evaporated extract then placed in the vial and stored in -70^0C.

Bacterial suspension preparation. Stock of *Porphyromonas gingivalis* ATCC 33277 was obtained from Balai Laboratorium Kesehatan Daerah DIY. Pure culture were prepared by inoculating one single loop of bacterial colony to blood agar médium, incubated anarobically with CO2 in 37^0C for 2x24 hour. Bacteria then innoculated in BHI broth, adjusted its turbidity to stándard McFarland 0,5 by nephelometer Phoenix. .

Antibacterial activity testing by disk diffusion method. The samples were divided into 5 groups each consisted of 6 samples i.e : positive control was given tetracycline, negative control was given DMSO 1%, treatment group were given each of *Sticophus hermanii* and *Holothuria atra* extract with concentration of 20%, 40% and 80%. Antibacterial activity test was performed by disk diffusion method on Mueller Hinton agar.

Bacterial supension of *Porphyromonas gingivalis* equal to 0,5 McFarland was swabbed inoculated onto Muller Hinton agar plate. Sterile paper disks were immersed for 15 second into each contrentation of extracts for treatment groups, for control negative groups in DMSO 1%, each, and for the positive control group tetracycline disk were applied, then put on to Muller Hinton agar, gently pressed for a while and leave, incubated anarobically in 37^0C for 2x24 hour.

The clear zone around the disk showed inhibition effect to the growth of *Porphyromonas gingivalis.* Diameter of inhibition zone was measured with digital caliper.

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RESULT

All the treatment groups and positive control showed the inhibition zones around the disk , but not the negative control as shown in fig 1.

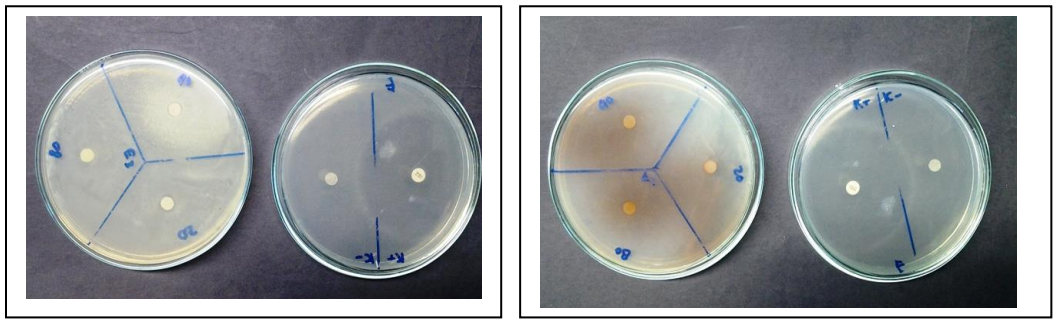

Fig 1. The inhibition zone on disk diffusion method of antibacterial activity of *Sticopus hermanii* extract (a) and *Holoturia atra* extract (b) in serial concentrations of 20%, 40%, 80, negative control (DMSO1%), positive control tetracycyline to *P. gingivalis*

The mean diameter of inhibition zone of the two extracts in all concentration vary from 6,38 – 8,82 mm on *Holothuria atra* , and 6,31 – 9,92 mm on Sticophus *hermanii*, both less thanthe diameter of tetracycline on the positive control group which was50,97-56.74 mm.

Table 1. The mean diameter of inhibition zone of *Sticophus hermanii* and *Holothuria atra* extracts on serial concentration extracts to *Porphyromonas gingivalis* compared to control groups (stated in mm)

GROUP		*Stichopus hermanii*	*Holoturiaatra*
Positive control group	Mean	56,0933	53,4850
	SD	1,04280	1,50078
Negative control group	Mean	5,5000	5,5000
	SD	,00000	,00000
Consentration 20%	Mean	6,5500	6,4550
	SD	,61511	,09182
Consentration 40%	Mean	6,9950	6,6433
	SD	,30231	,11742
Consentration 80%	Mean	8,9333	7,7067
	SD	,78429	,57812

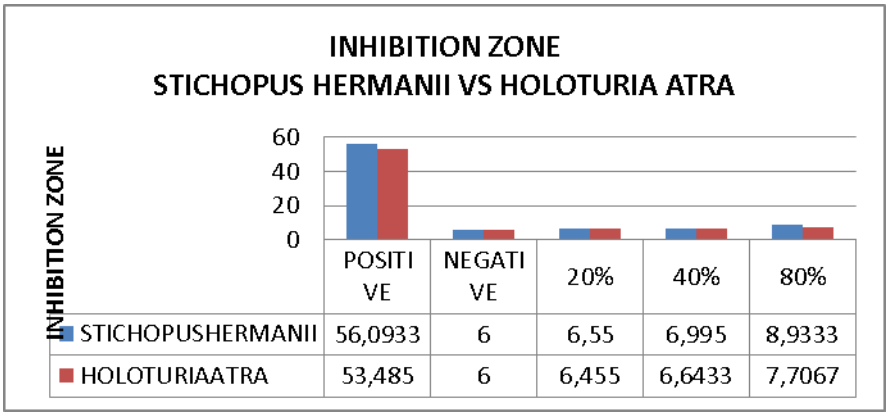

Fig 2. The graphic of inhibition zone of *Sticophus hermanii* and *Holothuria atra* extracts on serial concentration extracts to *Porphyromonas gingivalis* compared to control groups

Table 2. ANOVA and LSD test summary of inhibition zone of *Sticophus hermanii* and *Holothuria atra* extracts on serial concentration extracts to *Porphyromonas gingivalis* compared to control groups

Dependent variable	(i) group	(j) group	Mean difference (i-j)	Sig.
Stichopus Hermanii	Positive control group	Negative control group	50,0933*	,000
		Consentration 20%	49,5433*	,000
		Consentration 40%	49,0983*	,000
		Consentration 80%	47,1600*	,000
	Negative control group	Consentration 20%	-,5500	,161
		Consentration 40%	-,9950*	,015
		Consentration 80%	-2,9333*	,000
	Consentration 20%	Consentration 40%	-,4450	,253
		Consentration 80%	-2,3833*	,000
	Consentration 40%	Consentration 80%	-1,9383*	,000
Holoturia Atra	Positive control group	Negative control group	47,4850*	,000
		Consentration 20%	47,0300*	,000
		Consentration 40%	46,8417*	,000
		Consentration 80%	45,7783*	,000
	Negative control group	Consentration 20%	-,4550	,286
		Consentration 40%	-,6433	,135
		Consentration 80%	-1,7067*	,000
	Consentration 20%	Consentration 40%	-,1883	,655
		Consentration 80%	-1,2517*	,006
	Consentration 40%	Consentration 80%	-1,0633*	,017

All treatment groups in all concentrations showed inhibition zones but less than tetracycline as positive control. Further statistical analysisby two-way ANOVA test and LSD multiple comparison test at 5% significance level showed the significant difference on *Sticophus hermanii* extract 40% and 80% and *Holothuria atra* extract 80% compared to negative and positive control group ($p<0,05$).

DISCUSSION

The result of disk diffusion sensitivity test of the two sea cucumber extract *Sticophus hermanii* and *Holothuria atra* showed the inhibition zone on the growth of *P. gingivalis,* which mean that these extracts had the potential of antibacterial activity. The more concentration yield the more inhibition zone in both extract, lower concentration of *Sticophus hermanii* of 40% resulted in significant antibacterial activity more than *Holothuria atra* 80% ($p<0,05$). Even so, the potency of antibanterial activity is less than tetracycline as the positive control.

In this study, tetracycline has been used as the positive control considering that it commonly used as the drug of choice against periodontopathogenic bacteria. Tetracycline antibiotics are protein synthesis inhibitors, inhibit bacterial proteinsynthesis by preventing the association of aminoacyltRNA with the bacterial ribosome. Therefore, tointeract with their targets these molecules need to traverse oneor more membrane systems depending on whether the susceptibleorganism is gram positive or gram negative. Tetracyclines traverse the outer membrane of gram-negativeenteric bacteria through the OmpF and OmpC porin channels,as positively charged cation (probably magnesium)-tetracycline coordination complexes. The cationic metal ion-antibioticcomplex is attracted by the Donnan potential across theouter membrane, leading to accumulation in the periplasm,where the metal ion-tetracycline complex probably dissociatesto liberate uncharged tetracycline, a weakly lipophilic moleculeable to diffuse through the lipid bilayer regions of the inner(cytoplasmic) membrane.Within the cytoplasm, tetracyclinemolecules are likely to become chelated since the internal pHand divalent metal ion concentrations are higher than those outside the cell. Indeed, it is probable that the activedrug species which binds to the ribosome is a magnesiumtetracyclinecomplex. Association of tetracyclineswith the ribosome is reversible, providing an explanation of thebacteriostatic effects of these antibiotics[19]. Tetracyclines also have been found to inhibit matrix metalloproteinases. This mechanism does not add to their

antibiotic effects, but has increase the efficacy of treatment by inhibiting extracellular collagenase activity[8].

Some sea cucumber extract has been known to have antibacterial properties regarding its content of saponin and triterpene glycoside[17]. Another class of compounds is saponins, commonly identified as holothurins, from sea cucumber.The structural features of these compounds are quite comparable to those of the bioactives fromganoderma, ginseng, and other medicinally popular tonic herbs. They have displayed a widespectrum of biological effects such as hemolytic, cytostatic, antineoplastic, anticancer and antitumoractivities.Sea cucumbers are rich in glycosides, particularly triterpene glycosides which are proven tohave antibacterial and antitumor activities[21].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.

The result of inhibitory zone in tetracycline that was much higherthan those of the *Sticophus hermanii* dan *Holothuria* atra extracts, probably influenced by the distinctiveantibacterial mechanism of both, or the by the less potency of the sea cucumber extract whichinfluenced by another factors.

Both *Sticophus hermanii* dan *Holothuria* atra have been extracted by methanolic extract[22].The antibacterial compound of sea cucumber assumed to be polar for it is dissolved in methanol solvent and have been proven to have the antibacterial, antifungal and cytotoxic agent on some studies[10,12,21,22.] The sea cucumber extract studied in this research is the whole extract, which probably the optimum content of have not been explored and performed its optimal antibacterial activity. Saponin as triterpene glycoside has been known to have the immunomodulatory properties to induce macrophage as the response of infection[21] thus enhance the antibacterial activity, this property cannot be showed in in vitro by disk diffusion method, so further in vivo study is needed to be performed.

Sea cucumbers are one of the potential marineanimals with high food and medicinal value. The medicinal properties of these animals are ascribed tothe presence of functional components with promising multiple biological activities[21]. The antibacterial activity of *Sticophus hermanii* dan *Holothuriaatra* to the growth of *P. gingivalis* differs in relatively slight diameter on inhibition zone on disk diffusion methods. It has been stated the species of sea cucumbers have the same composition of content but vary in the prosentage of the amount.

The antibacterial activity of Holothuria *atra* to *P. gingivalis* as the gram negative bacteria matched to the study of Abraham[10, 21], while the antibacterial activity of *Sticophus hermanii* was mutual with the result on our previous research17 on mixed periodontopathogenic bacteria. The consortium of mixed periodontopathogenic bacteria on periodontitis predominantly are *Porphyromonas gingivalis, Actinobacillus actinomycetemcomitans, Tanerella forsythia, Fusobacterium nucleatum Prevotella intermedia, Campylobacter rectus, Peptostreptococcus micros, Eikenella corrodens*[1,3,7] but the main suspect pathogen on chronic periodontitis is *Porphyromonas gingivalis*so, the result of antibacterial activity testing to the latter could support the information to the basic on antibacterial therapy.

Sticophus hermanii extract on the concentration of 40%, 80% and *Holothuria atra* extract on the concentration of 80% have antibacterial activity against *Porphyromonas gingivalis,* the dose operate in a dose response manner was examined as the basic consideration to the therapy. Regarding to the efficacy of the periodontitis as local therapy, along with antibacterial potency of both extracts , its cytotoxocity to oral mucosa need is to be further examined to complete the candidate of antimicrobial treatment in periodontitis.

CONCLUSION

Sticophus hermanii extract on the concentration of 40%, 80% and *Holothuria atra* extract on the concentration of 80% have antibacterial activity against *Porphyromonas gingivalis*

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THE EFFECT OF TIME INTERVAL OF 1, 2, 3 MONTHS POST-TOOTH EXTRACTION TO RETENTION AND STABILITY OF FULL DENTURE IN RSGM FKG UHT SURABAYA

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ABSTRACT

Background: *The fabrication of full denture was often found that many patient have to extract their teeth due to full denture's treatment purposes. The time interval of post-tooth extraction and the commencement of the full denture fabrication will affect the outcome of the full denture treatment.*

Purpose: *The aim of this study was to determine effect of the time interval post-tooth extraction in the fabrication of upper full denture retention and stability in RSGM FKG UHT.*

Methods: *This study was an observational analytic with cross sectional study design. analysis of the data using non-parametric Kruskal-Wallis test. Upper full denture which fit the criteria were divided into the interval of 1, 2 and 3 months post-tooth extraction and were checked for the retention and stability during insertion and given scores ranging from 0-3 for its retention and 0-2 for its stability*

Result: *Results showed that the average score for retention and stability at each time interval. At intervals of 1, 2, and 3 months post-tooth extraction, the mean retention score are 1.5, 1.75, 2.25 respectively while stability are 1.5, 1.5, 2 respectively. The average score based on the stability and retention intervals tested by Kruskal Wallis test and get a value for the variable respectively which are time interval, retention and stability scores p = 0.71, p = 0.93, p = 0.26 where all p> 0. 05.*

Conclusion: *The time interval of 1, 2, 3 months post-tooth extraction did not have effect on the retention and stability of full denture in RSGM FKG UHT.*

Keywords: *full denture, retention, stability, time interval*

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INTRODUCTION

In the manufacture of complete dentures is often encountered patients who still require of tooth extraction for the purpose wearing of complete denture, The patients need denture fabrication and installation as soon as possible with a reason to meet aesthetic requirements, chewing and speech function after the loss of teeth without considering of the time interval after tooth extraction.

MATERIALS AND METHODS

This research is an observational analytic with cross sectional design. The materials for this research are ballpoint to write down the output of the research, status card of oral surgery and prosthodontics treatments of the patients, mouth mirror No. 4 and cheek retractor.

The first thing to do in this research are examining the population of full denture wearers and total of sample which will be used in this research, watching, observing and also making a note for the date and type of tooth of upper arch that has been extracted and then they are divided into 3 categories of time interval such as , 1 month post extraction, 2 month post extraction and 3 month post extraction, checking up the shape of palate and ridge from the respondents through master model and status card as well as making a note for the date of the insertion of the full denture inside the mouth of the patient and then doing clinical assessment for checking the retention and stabilization when the insertion of upper full denture and then inserting the score into retention and stabilization table based on the clinical assessment that have been performed. retensi setelah itu memasukkan skor penilaian kedalam tabel retensi dan stabilitas berdasarkan. The retention and stabilization score indicated the ability of full denture to exhibit its retention and stabilization achievement.

RESULTS

Table below shows the mean and deviation standard of retention score based on time interval post extraction

Table 1. Result of statistics test descriptive retention score

Mean and deviation standard	1 month	2 month	3 month
X $\pm$ SD	1,5 $\pm$ 0,5	1,75$\pm$0,7	2,25$\pm$0,7

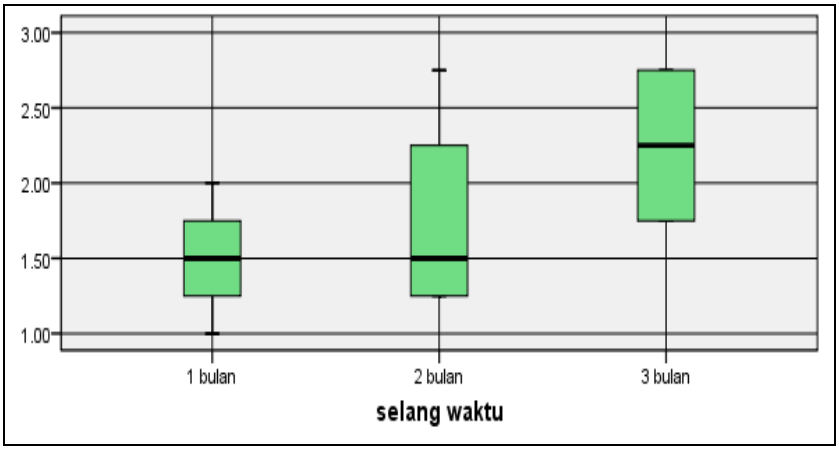

Fig 1. Stem diagramof the mean of retention score based on time interval post extraction tooth.

Table 2. Result of statistic descriptive stabilization score

Mean and deviation standard	1 month	2 month	3 month
X ± SD	1,5 ± 0,5	1,5±0,5	

Stabilization for time interval 3 month post extraction = constant, therefore they are omitted

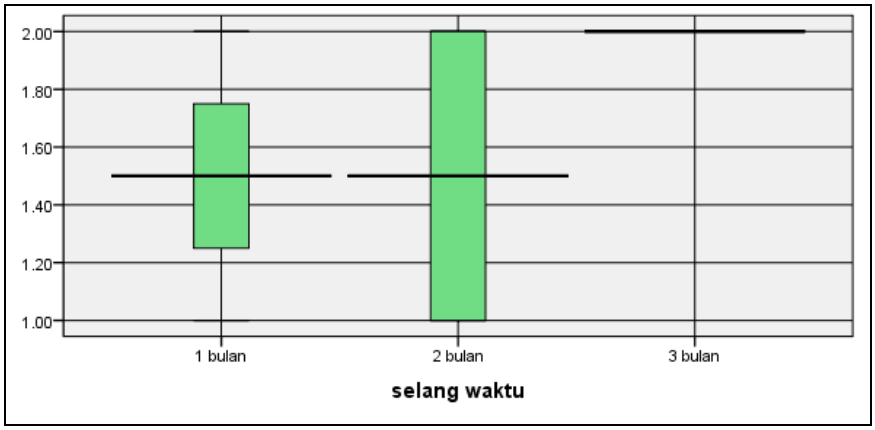

Fig 2. Stem diagram mean of stabilization score based on time interval post extraction tooth.

From the data, they exhibit the mean of retention and stabilization score on various categories of time interval post extraction tooth and then they are analyzed according to statistics then their significance are tested with significance error approximately 5% ($p < 0.05$).

Data of the research are not distributed normally and are not homogeny, and then they are analyzed with non parametric test which is kruskal wallis to know if there is any

difference on retention and stabilization of 3 different time interval post extraction which are 1, 2, 3 months post extraction tooth.

The result of this test for each variable are retention and stabilization score valued p = 0,71 , p = 0,93 , p = 0,26 where as all of them show p > 0.05 ,hence H0 is accepted which means there is no difference between all of them time interval post extraction categories with retention and stabilization of upper full denture. And so there is no effect of time interval on retention and stabilization of upper full denture ,so the statistics analyze are not continued with post hoc test.

DISCUSSION

In this study, the mean and standard deviation of the respondents who earn Prosthodontics 1 month post-treatment tooth extraction is 1.5 and 0.5. Within a period of 1 month after tooth extraction, the buccal wall and alveolar crest resorption experienced by the collapse of the wall gingival and interdental papil loss. Socket widens towards the buccal and alveolar bone on the buccal surface and alveolar crest on the site of the former extraction site. At 1 month after tooth extraction, healing is enough to support the load that falls on the jaw so that complete denture can be worn on the patient.

The respondents who received Prosthodontics treatment 2 months after tooth extraction to obtain the average (mean) and standard deviation of 1.75 and 0.7. Within 2 months, the existing network in the scar after tooth extraction complete denture already has the ability to support around 80%, this is due to the ability of the involvement of bone remodeling and the presence of collagen fibers .In 2 months, there are opinions that allow the installation of dentures as seen from reconstructive process (resorption and replacement by new bone that immature). On the stability score, mean (mean) and standard deviation for the group interval of 1 month and 2 months after tooth extraction looks located at the value of 1.5 and 0.5.

From the same table, for respondents with an interval of 3 months after tooth extraction, the average (mean) and standard deviation obtained was 2.25 and 0.7. the Delay of making complete denture up to 3 months based on previous studies of wound healing after tooth extraction, it was found that the impact of the extraction of the tooth would show a lot of the healing response. Therefore it is advisable to wait for the healing of wounds up to 3 months to obtain adequate bone formation, although not warrant or deposition process of bone mineralization that occurs within the such time. The highest rates for group stability is

an interval of 3 months, with a value of 2. The high mean for group 3 months after extraction of one of them may be because of the good support soft tissue, which is one physiological factor for retention complete denture.

CONCLUSION

Based on the survey results revealed that post-tooth extraction interval ranging from 1, 2, 3 months in RSGM FKG showed no effect on the retention and stability in patients of complete denture in UHT FKG RSGM SURABAYA

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NICOTINE EFFECTS ON THE NUMBER OF OSTEOCLAST AND OSTEOBLAST AFTER DENTAL IMPLANT PLACEMENT

(Animal laboratory experimental study in New Zealand rabbits)

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ABSTRACT

***Background**: Smoking is a factor that can interfere the success rate of dental implants . In most smokers, dental implant failures before getting a load are higher than non smokers. Nicotine is the main ingredient in tobacco cigarettes and the purpose this study aimed to explore the nicotine effect on osteoclast and osteoblast cell to osseointegration in dental implant.*

***Methods**: This study was performed on New Zealand rabbits through measurement the value of osseointegration by Implant Stability Quotient (Osstell), the number of osteoclast and osteoblast by histology test. This study is an animal experimental laboratory research with post test control group design. The number of rabbits in this study was 16, divided into 2 groups. Group 1 was a control group at week 1 and week 8, Group 2 was a treatment group at week 1 and week 8. The treatment group given nicotine injection, 1 week before implant placement until the end of the research. The dose of nicotine was 2,5 mg/kg BW/day.*

***Result**: Statistical analysis found significant differences the controls and treatment group ($p<0,05$). At the first week and eigthth week on the treatment group, it showed that nicotine increase the number of osteoclast and decrease osteoblast.*

***Conclusion**: Nicotine can increase the number of osteoclasts and decrease osteoblasts that causing the inbihition of osseointegration of dental implant.*

***Key words**: Dental implant, nicotine, osteoclast, osteoblast, osseointegration*

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INTRODUCTION

Dental implant is a material that implanted in the jawbone and support restorations that resemble a teeth. Currently, the material of dental implant is commonly made of Titanium (Ti). Dental implants as a replacement for lost teeth have been commonly used in the last two decades. Even with the increase in life expectancy, dental implant users also increased. Since 2005, more than 1 million dental implants have been installed each year [1].

The success of dental implants depends on comfort, aesthetics and function as much as possible natural tooth. Dental implants are said to be functionally successful in case of osseointegration, resulting in union between the implant. Osseointegration occurs when during the formation and healing process, the bone does not get interference and it is highly dependent on cellular mechanisms. Healing process depends on osteoclast and osteoblast cells. Osteoblasts are cells involved in bone formation, is located on the bone surface and derived from progenitor cells. In the active state, osteoblasts synthesize matrix, cuboidal-shaped, and the inactive state shaped flat and often referred to as bone lining cells. Osteoclasts play a role in bone resorption and during this process, hydrogen ions are formed from carbonic anhydrase into the plasma membrane to dissolve the bone matrix.

Various factors that influence the formation of bone and bone healing include systemic, genetic, molecular and pharmacologic factors. Other factors are smoking, alcoholism, and certain drugs (*bisphosphonates),* age and gender [2,3,4].

Research on the effect of smoking on dental implant has been previously done. Examination to know osseointegration is to calculate the percentage of new bone into the *thread.* Bone density is calculated by looking at the number of osteoblasts in the *thread.* Results count histometric this study stated that osseointegration in smokers was lower than in nonsmokers [5].

In this study, researchers will explore the nicotine effect on osteoclast and osteoblast cell to osseointegration in dental implant thrugh the New Zealand rabbits that had already been exposed to nicotine. Nicotine chosen because of the main ingredient of cigarettes is contains tobaccos, whereas 95% nicotine. It shows that nicotine significantly prevent or slow down the bone regeneration[6].

MATERIALS AND METHODS

This research is an experimental study with a *post-test control group design.* Observations were made at the firts week (inflammatory period) after the second implant

planted in the jaw bone and the second obervation were made at the eighth week (a period of consolidation and osseointegration) after the first implant planted. The samples were the left and right lower jawbone of the New Zealand rabbits, which met the inclusion criteria, which is healthy, male, aged 3.5 to 5 months and weight 2.5 to 3.5 kg.

The study was conducted in several different laboratories. The making and preparation of block tissue and HE staining performed in Anatomical Pathology laboratory RSU Haji Surabaya. Animal care and the placement of the implants were performed in the Institute of Tropical Disease, Airlangga University, Surabaya.

Insertion of dental implants. Prior to the implant placement, all the rabbits were weighed to determine the dose of anesthesia. All the rabbits anesthetized with total dose of 0,15 ml *xylazine* per kg body weight and 0,2ml *ketamil* per kg body weight by intramuscular injection. The jaw bone was marked before the implants implanted, then the bone was drilled with a speed of 1,200 rpm and with a depth of 7 mm. Implants with a diameter of 3.3 mm and a length of 7 mm were implanted the same as *bone level* with the speed of 30 rpm. Then do the *torque* was done with the power of 20 Newton and then the implant was closed with *screw cover*. The flap sewn and treated with antiseptic. Lastly, the rabbits were injected with *long acting* antibiotics (*Medoxy LA*) 0,1 ml per kg body weight.

Method of nicotine exposure. Nicotine powder (*(-) Nicotine hydrogen tartrate salt*) from Sigma-Aldrich, United Kingdom product, weighing 2.5 mg / kg then dissolved with 0.2 ml of sterile *distilled water*. After that, the liquid nicotine is taken with syringe and injected in the *subcutan* rabbits neck. Nicotine was injected every morning for 9 weeks, until the study ended.

Method and material processing work. The rabbits were killed by overdosed anesthetic agent (*Ketamine*). Then the mounted implant area made flap for measurements the value of osseointegration with *Osstell* tool. Lower jaw bone removed and cleaned from the soft tissue, and then implants with their jaws were fixed with formalin 10% for 1 day and formiat acid 5% for 14 days, followed by a series of bone processes of histological preparation. Number of osteoclasts and osteoblasts counted in preparation stained with Hematoxylen eosin (HE). Finally, the osteoclast and osteoblast cells calculated by looking at 10 different fields of electron microscopic view with magnification 400x.

RESULTS

Data on the number of osteoclasts and osteoblasts derived from observations of the number of cells in the bone tissue around the implant with histological methods. The results of observations made in the control group and the treatment group who had been given nicotine exposure can be seen in Figure 1.

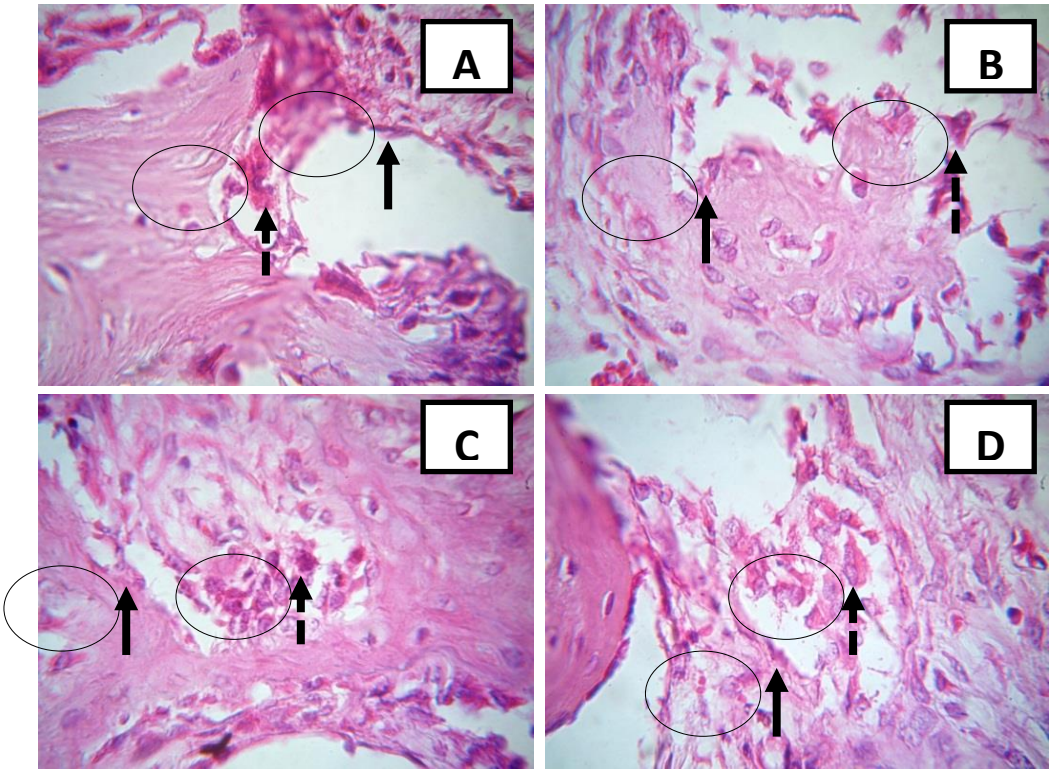

Fig 1. Osteoblast and osteoclast cells around the implant

Description of HPA : Cells are marked with arrows osteoclasts and osteoblasts drop marked with arrows. A) The control group at week 1 (k1). B) treatment group were exposed to nicotine at week 1 (KN1). C) The control group 8 weeks (k8). D) were exposed to nicotine treatment group at week 8 (kn8). Nikon E 100 400x magnification.

Data were analyzed using SPSS version 13.0 for Windows. Statistical methods examination with 95% confidence intervals, used Kolmogorov-Smirnov normality test, Lavene test, MANOVA different test and Pearson correlation test. To determine differences between groups, statistical analysis was done by Tukey HSD test.

Table 1. The value of osseointegration at week 1 and week 8.

Variable	Time	Group (n=8)	Mean	SD	P
Osseointegration	Week 1	Control	51.38	0.744	0,997
		Nicotine	51.13	0.991	
	Week 8	Control	65.63	2,134	0,000
		Nicotine	52.13	2,031	

Significance : p<0,05

Table 2. The number of osteoclasts and osteoblasts cells at week 1 and week 8

Variable	Time	Group (n=8)	Mean Number of	SD	P
Osteoclast	Week 1	Control	13.00	2,390	0,000
		Nicotine	18.63	4.104	
	Week 8	Control	10.50	1,773	0000
		Nicotine	29.63	2,875	
Osteoblast	Week 1	Control	21.13	2,360	0,000
		Nicotine	10.50	1,770	
	Week 8	Control	27.88	2,950	0000
		Nicotine	6.88	2,360	

Significance: p<0,05

The statistical test showed no significant difference for osseointegration variables between study groups at week 1 (p = 0.997), whereas at week 8 significant difference (p = 0.000). For osteoclast variable, results of data analysis at week 1 shows, there is an increase in the average 13.00 to 18.63. Similarly, at week 8, where the mean of the control group and the treatment group 10.50 to 29.63. The statistical tests for variables significantly different between the two study arms osteoclasts (p = 0.000). Results of data analysis for osteoblast variable at week 1 shows, there is a mean decrease 21.13 to 10.50. Similarly, at week 8, where the mean of the control group and 27.88 in the treatment group decreased to 6.88. The statistical tests for variables significantly different between the two study arms osteoblasts (p = 0.000).

DISCUSSION

Results of counting the number of osteoblasts in this study indicate that the number of osteoblasts in nicotine exposed group was lower than in the control group, both at the first

and eighth week. Thus proved that nicotine exposure inhibits osteoblast cell development and osteoblastogenesis.

In this study also proved, nicotine exposure accelerates osteoclastogenesis. Number of osteoclasts in the treatment group in this study, more than the control group, both in observations at the first week and at the eighth week ($p = 0.000$). The results support Henemyre[7] which states, exposure to nicotine will increase the number of osteoclasts. Nicotine may affect osteoclastogenesis through different ways and result in bone metabolism changing[8].

Nicotine suppress osteoblast proliferation and inhibit the expression of osteogenic and angiogenic mediators. Nicotine causes iskhemia and directly affect osteoblast cell growth[9]. Nicotine affects the expression of osteogenic and angiogenic genes in rabbit bone regeneration. Nicotine also affects the further development of osteoclasts through indirect mechanisms, namely through osteoblasts[6].

According to Pereira [10], exposure to nicotine negatively affects osteoblast activity. Nicotine has the effect of stimulators and inhibitors of bone metabolism. The low concentrations of nicotine can stimulate osteoblast cell proliferation, increased expression of osteocalcin, type 1 collagen and alkaline phosphatase, but it will be the opposite effect in higher concentrations[11].

Osteoblastic activity is influenced by the microenvironment of the cells, systemic factors and local factors. In this study, exposure to nicotine in the treatment group resulted in the microenvironment of the cells changed. With decreased osteocalcin, it can be said osteoblast cell activity also decreased due to the decreased number of osteoblasts. The results support previous research that states that high nicotine concentrations in smokers or low osteocalcin expression obtained.

In this study, the results of measurements of osseointegration at the first week in the control group and the treatment there was no significant difference (Table 1). This is due the first week of going soft callus formation and osseointegration has not happened yet. The average value of osseointegration in the control group was 51.38, while the treatment group was 51.13. This value has not shown the existence of osseointegration and not ready to be a burden.

At the eighth week measurements, lower value osseointegration was found in the treatment group was 52.13 while in the control group reached an average value of osseointegration 65.63 (Table 1). Cellular mechanisms are very sensitive to systemic and

local factors including nicotine. In this study proved that exposure to nicotine at a dose of 2.5 mg / day / kg body weight, inhibit osseointegration of dental implants in New Zealand rabbits.

Osseointegration can be found by laboratory examination and clinical examination. By laboratories, osseointegration can be seen with a microscope which saw new bone into the area of thread [5]. Therefore, to see whether osseointegration has occurred in people, can only be done by clinical and radiological examination. How to measure clinically osseointegrated can use the torque strength implants look when played. When the torque of implant is 20N, mean there has been a move osseointegration[1]. However, this method can only estimate it based on perception. In addition done the torque will damage the bone healing process.

The right tool for measuring osseointegration is the ISQ *Osstell* [12]. ISQ is a measurement scale that is used together with the method of RFA (resonance frequency analysis) to determine the stability of the implant. Osseointegration measurements needed to determine the readiness and the right time to receive an implant load. This tool uses the resonance frequency and is expressed on a scale of 1-100. Implant stabilization progress can also be monitored with ISQ. When from time to time ISQ values increased, meaning the process of osseointegration is underway. Conversely, if the value of ISQ fixed or declining, then the osseointegration process does not run as expected and will likely implant treatment failure. An implant is stable if the ISQ values above 55, and if the value reaches 70, then the implant well in osseointegration and ready to receive the load [12, 13, 14].

CLINICAL RECOMMENDATION

In this study it can be concluded that the implantation of dental implants in the study subjects were exposed to nicotine will cause delays the implant osseointegration because there are an increase the number of osteoclast, and decreased the number of osteoblast. Research needs to be done to look for levels of concentrations of nicotine in humans that inhibition affect on osseointegration dental implant. Further research also needs to be done to explore the biomoleculer mechanisms of nicotine effects to osteoclast and osteoblast cells.

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THE RITE OF DEATH
The Studies on End of Life Care as a Bereavement Manifestation for Terminal Illness Patients and His Family in The Several City of East Java

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ABSTRACT

Background : *Associated with chronic end-stage patients (terminal illness), due to illness or physical abilities elderly patient of illness. The objective conditions would impact on rationality and construction in the maintenance, construction also about end of life, and the good end of life after death, so with his family following a good treatment as a manifestation of a sense of bereavement, not regardless of culture, ethnicity, religion and socio-economic status.*

Methods : *This study uses Husserl's phenomenological approach in which an individual has a reflective consciousness and act to do on that awareness. In this case, the experience of illness resulting end of life (terminal illness) to be part of "ever," he was experiencing, and "near of the object that is being experienced." Surabaya chosen because there are ethnic and religious diversity. Meanwhile, the unit of analysis is the patient who is or ever experienced a fatal illness (terminal illness), including elderly parents and family members. The patient who is the subject divided into 2 (two), namely: hospitalized and at home. Data collection techniques used, observation and in-depth interviews.*

Result : *Results of research carried out at several informants with different backgrounds chronic diseases suffered by various socio-economic backgrounds. Analysis of the results showed that the phenomenon of pain as fate and misfortune, as negotiations inpatient physician and patient, waiting for patients, and substitute of nurse "role".*

Conclusion *: the patient's treatment decision doesn't just based on the severity of the disease, but also social and economic factors. There is a difference of understanding the construction of the hospital and family activities while waiting for patients in the hospital.*

Keywords: terminal illness, elderly patient, end of life, a bereavement

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INTRODUCTION

In the Indonesian city of ecological changes due to urbanization, lifestyle and consumption behavior of a person has improved preferences chronic diseases. In a number of studies, susceptibility to chronic diseases is greater suffered by elderly people. The physical condition of elderly people who have degenerative more at risk than those who are in the labor force age (17-50 years). However, due to changes in lifestyle and risk taking behavior also occurs in the age of the population in the labor force. That is, the risk of chronic disease is no longer only in the elderly, but also the age of the labor force.

Although it has been developing a community health service centers to village level since the Suharto government, however, attention to chronic diseases be handled at the district with referral health centers. This inability is filled by a private health care center, in the form of hospitals or private clinics which is not subsidized by the government. The impact on the cost of hospitalization and use of other health care facilities that are not cheap. Associated with chronic patients who otherwise terminal illness, either of illness or physical ability of elderly patients, the condition is of such objective rationality and construction impact on the treatment. Patients also have constructions on the good end of life and life after death, so his family following a good treatment as a manifestation of bereavement, of course, can not be separated from culture, ethnicity, religion and socio-economic status.

This study intends to understand and formulate several problems, as follows 1) How the social construction of the patient and the family, so that the decision to accept the consequences hospitalized following?, 2) How the social construction of the role of the family in the healing process?, 3) What is the role families inpatient care? And, how the process of acquiring skills that simple maintenance of the hospital?, 4) How lifestyle changes and adaptive strategies of the family in patient waiting?

The sick which then continues on the actual death is a natural process, but a different meaning in humans. [1,2] Death no longer seen as destiny, but there are always efforts avoid the process. It happened because humans as social beings and the human interaction to complete their existence and give his life meaning. Death separates from everything that has been formed and lost of a loved one. [3,4] Therefore, be a fear of death, there are at least eight (8) dimensions: (1) the fear of death (dying), (2) fear of premature death, (3) fear will cause a significant other, (4) pobia fears about death, (5) the resulting fear of destruction *(being destroyed),* (6) fear of the body after death , (7) fear of something that is not clear *(fear of the unknown)* and the last (8) fear of the dead.[5,6,7] Then simplified into three (3) components of

the fear of death: (1) the relationship between the components intrapersonel mind are experiencing the dying process, (2) interpersonal component associated with the effect of death, and finally (3) components involving fear transpersonal consciousness, which is composed of the following fears death and punishment after death.[8,9]

Death is a social and cultural construction, the individual feelings and attitudes about death and dying of a particular culture, religion in cultural, and the values that are placed in the cultural life, such as: child mortality is considered more tragic than the death of an adult. culture gives greater value to certain death than others, such as deaths from cancer is more valued than suicide or AIDS disease, and death of a public figure is more appreciated than the death of a homeless man.[10]

Individually and culturally actually have fear of death. On the cultural level, the construction of the system was developed to characterize a number of deaths. Man conspired with others to create cultural imperatives and institutions that resist the truth about death. A number of systems built culture of death that is (1) to prevent death, (2) disposition death, (3) helps to explain the death, and (4) seek social punishment for murder. Its products include healthcare institutions, belief systems, and legal institutions. [11,12]

Meanwhile, individual death anxiety will be determined by the awareness of death and dying him self, dying of the others, and covert death anxiety. It can be measured from (1) the conscious attention of death and dying, (2) fear of separation and isolation, (3) fear of dependence or loss of control, (4) fear of stagnation, (5) fear of loss of purpose, (6) fear of injury or disease in itself, (7) fear of pain, (8) fear of punishment or rejection of the other, and (9) concern about the loss of time.[13]

Bereavement is the process of transition and change in the relationship with the patient who has died. It depends on the role that changed due to the death, such as: age, gender, position in the family, as well as the personality and character structure. The sense of loss is also determined by the values, attitudes and customs that exist in society, and beliefs at the time of mourning that gives the meaning of death.[14]

METHODS

This study uses Husserl's phenomenological approach in which an individual has a reflective consciousness (Zietlin, 1999). In this case, the experience of illness resulting in death *(terminal illness).* The unit of analysis the patients who ***are*** (or ***have ever*** suffered from pain, which in turn resulted in death based on medical diagnosis). Methodologically, the

study sites are in Surabaya and surrounding areas as there are ethnic and religious diversity. Data collection techniques used, observation and in-depth interviews. Observations were made to obtain a picture of the role of family members in the healing process (hospitalization), changes in lifestyle and the strategy of waiting family members and caring for the sick. This interview is a process to obtain the experience of pain and the meaning of illness and death. General and personal ideal type built it covers about sickness, disease, death, fear of loss associated with the patient in the family.

RESULTS

Based on the results of in-depth interviews to some informants were obtained the following results:

A. Mrs. Muslikah and their family,

   Suffering from kidney stone disease and after a complete medical examination, surgery kidney stone retrieval. About families to be important to keep waiting Mrs. Muslikah recovery in the hospital is imperative for family members to care for and keep other family members who are sick.

B. Suffering Mr. Hariyanto with cancer,

   Cancer in the nose, pain in the form of an enlarged prostate ever. Perceived symptoms was difficulty breathing from the nose, so it can only breathe through the mouth. Other symptoms that appear are the body is becoming increasingly thin. Surgery is done in a way that cancer takes its nest at the top end of the nose. According to him, the meaning of pain is uncomfortable condition which suddenly struck him, so that makes him not able to perform activities as usual.

C. Dengue Hemorrargic Fever (DHF) suffering children, and mother,

   When Syamsul DHF illness, Mrs. Suprihatin who decided to immediately bring to the Dr. Soedono Hospital, to be hospitalized without prior deliberation with her husband and all family members. Syamsul was taken to a hospital solely because of a concern if the effective consideration later so dangerous illness and psychological factors. Her pain is an unpleasant condition that makes people can not learn, play, and not be able to enjoy food and drink.

D. Mrs.Sri Sukadarwati and faithfulness of the son,

   Lymph nodes sick since last year. Initially pain, Mrs. Sri Sukadarwati feel sore joints, both the foot and hand pain that gradually got worse. Cure diseases suffered by Mrs. Sri

Sukadarwati not just come from the doctor, but also of the effort and passion that never receded from within itself.

E. Mrs. Martanti and beloved daughter,

   According to Mrs. Martanti began experiencing pain in repeatedly begins to move in the house which is now occupied with his family. Although Mrs. Martanti further said that all of it comes from God, but removals are also one of the causes of disease.

F. Mrs. Nanik Wijiastuti and Faithfulness husband,

   Ie her illness and liver disease types. For him, pain is the time should be closer to God, and must rest with fairly.

DATA ANALYSIS

The development of information technology advances, along with the era of open communication between the patient's doctor has impacted gives approximately the same understanding and more obvious things about the disease. When a patient goes to health care (hospitals), alone or escorted by the person responsible for the patient will receive a detailed explanation from the doctors about his illness.

According to the basic law applicable health, doctors at the present time can not hide information on diseases and medical procedures to be performed by a physician. That is, physicians no longer be the sole authority of the medical knowledge of the patient. In some special cases, such as surgery and hospitalization, seems to have become a doctor convey obligations disease, medical treatment and the risks of medical procedures to be performed. If the patient or the patient's family and does not approve, then the doctor can not directly perform medical acts, though it may be at risk to the safety of patients' lives.

Nearly all of patients, an understanding of the pain is defined as a person can not run a social role. Do not functioning is characterized by traits, or physical condition that does not allow a patient to perform its functions, such as headache, body temperature rise (heat), body limp, not bad to move, up to fainting and even paralysis.

Patients and family members actually never discriminate on chronic illness and chronic. Chronic illness does not mean that the disease has lasted a long time due to organ dysfunction, but judging from the effects on the body. Throughout still healthy, with normal moves, although it suffers from a chronic illness and can lead to death, then that person is considered healthy. That is, chronic illness or not, the choice of the views of patients and

family members remain the same. A person is considered sick if you can not partially or as a whole to function.

Meanwhile, the families who are economically disadvantaged, seems to follow the theory of James C. Scott (1984), that the pain was a disaster. Therefore, when one member of the family, let alone the head of a family illness, will be regarded as a misfortune.

By using more or less the same chance, it turns out that medical treatment will be done at the hospital, the patient, is not always acceptable, because first, the condition of the patient a major consideration in the decision making patient or family members. Serious conditions, such as sudden onset of difficulty walking and talking, do not provide another alternative to inpatient family should. Secondly, negotiations could continue between the physician and the patient's family members. It happened when members of the family have been taking care experience at home with the same disease, and the main consideration is the issue of funding. Third, the action is usually to explain the gravity of the doctor patient if not treated intensively. Medical record evidence demonstrated in the laboratory that the patient's family members to decide. Lastly, this is the end of the episode negotiations between doctors, patients and patients' family members. These negotiations may last only five to ten minutes, or it could also take a few days because of the gravity of his illness.

D I S C U S S I O N

The decision of the patient and or family for inpatient care in a hospital was not the decision that was taken in for a moment, brief and without any calculations. The decision is not just based on the severity of the patient's illness, also social and economic factors.

Unlike the case in patients suffering from chronic diseases, the patients themselves will negotiate with family members and doctors. Such as negotiation process is not stopped at the time of decision making for the patient to do inpatient care. Negotiation process in terms of deciding for anyone from family members who will be waiting for the patient hospitalization. The reason patients should be continuation of the construction of the hospital or self-assessment of pain, the guilt, compassion, and an expression of concern for family members.

Some of the things that must be considered by the management of health services, among others:

First, there are differences understanding the construction of the hospital. For non-medical people (outside environmental health), if the sick person is considered unable to perform one or several social functions.

Secondly, there are a number of objective factors or conditions involved in decision-making. Including such factors as patient financing will, during, and after hospitalization.

Third, the objective conditions that also participated in family activities while waiting for patients in the hospital.

The number of attendants of patients commonly encountered more than the number of patients, especially in government hospitals, so that hospitals seem to be unsightly because many gatekeepers who finally let go of tired to sleep in a hospital corridor or hallway. Expected taking the objective conditions and the construction of the patient, the hospital management to manage and organize the wards, public hospitals do not seem shabby and can also bring a new disease (nosocomial infections) in family members of patients. Treated patients recovered, then after members of his family following an illness and require hospitalization and a new problem for the members of his family. If this condition continues over time, it is no doubt if ill be one of the main factors causing poverty.

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EFFECT OF *Avicennia marina sp* LEAF EXTRACT TO RAT GINGIVAL CATALASE LEVEL INDUCED BY MIX PERIODONTOPATHOGEN BACTERIA

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ABSTRACT

Background : *Periodontal disease is the second largest oral disease in Indonesia population caused by infection of periodontopathogen bacteria. Most of the bacteria of periodontitis are Gram negative anaerobic bacteria. Avicennia marina sp is a natural product that has some medical potential regarding to its nutritional contents including antioxidant activity.*
Objectives : *The aim of this study is to investigate the effect of Avicennia marina sp extract on catalase activities in gingival Wistar rats induced mix periodontopathogen bacteria.*
Methods*: The experiment was held by post test only control group design. Fivety male Wistar rats divided into five group. Group-1 group was negative control group, group-2 group was a positive control group, and the other groups were induced by mixed periodontopathogen bacteria and treated with Avicennia marinaspleaf extract on various concentration. After treatment, the rats were sacrificed. Gingival catalase level (mg/ml) of each group was measured. All of datas were analyzed by one way ANOVA and LSD multiple comparison test at 5% significance level.*
Result*: This study showed that gingival catalase level was significantly lower in group-2 than group-1. Gingival catalase level in treatment group was significantly higher than control positive group.*
Conclusion*: Avicennia marina sp leaf extract can increase rat gingival catalase level.*

Key words*: Avicennia marina sp leaf extract, periodontitis, catalase*

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INTRODUCTION

Periodontal infections occur when biofilm microorganisms initiate a host immune response and produce signs of periodontitis, including loss of connective tissue attachment and alveolar bone resorption.[1,2,3]As a chronic inflammatory disease, periodontitis is the most commonly encountered dental disease, appearing large scale of the population. This disease is the result of an interaction between microbial biofilms and host response in gingival connective tissue, which leads to gingival bleeding, periodontal pocket formation, connective tissue destruction, and alveolar bone resorption, ultimately causing tooth loss.[4,5,6]Although oral bacteria and their products, such as lipopolysaccharide and proteases, are considered to be the primary cause of periodontitis, host response to the subgingival plaque biofilm seems to be the main factor that contributes to the progression of this disease.[7]

Bacteriamediated periodontal diseases generally result in polymorphonuclear leukocyte (PMNL) infiltration. PMNLs are an important part of the immune system, and appear to be functionally activated and exhibit increased production of reactive oxygen species (ROS).[8,9,10] In the tissue, ROS mediated myeloperoxidase (MPO) activity can lead to an increase in inflammation severity.[11]

The oxygen-dependent production of reactive oxygen species (ROS) is a principal part of normal cellular metabolism as a host defence mechanism against bacterial pathogens.[12]Because ROS is a considerably toxic agent, production of ROS in large amounts, including hydrogen peroxide, superoxide, hydroxyl radicals, nitricoxide, and peroxynitrite not only serve as antimicrobial agents, but also lead to injury of extracellular structures.[13]ROS can also stimulate lipid peroxidation (LPO). Previous reports5,6 have shown that periodontitis is associated with increased lipid peroxidation in gingival crevicular fluid and saliva. Excessive production of LPO can cause oxidative stress and, ultimately, damage to cell integrity. The studies[14,15]have also demonstrated that polymorphonuclear leukocytes (PMN) are the primary mediators of host response against proliferating pathogenic microorganisms during periodontal disease, which causes oxidative DNA damage in gingival tissues. This evidence shows that oxidative stress is one of the factors that leads to the progression of periodontal disease.5 Oxidative stress develops when the levels of antioxidants are lowered. Thus, activity of antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase) is important in cell defence.9 In the literature there are a lot of studiesthat have reported on the effects of antioxidant agents against oxidative stress, and recently researchers have intensely investigated boron (B) as an antioxidant agent .[16,17,18]

Recent medical and dental research in this area has beengeared towards the prevention of free radical mediated diseasesby using specific nutrient antioxidants.[19] Other important candidate factors that may modulateperiodontitis, are pro-inflammatory cytokines such astumor necrosis factor-a (TNF-a), interleukin (IL)-1b known to be up-regulated early in the course of periodontitis.In addition, recruitment of inflammatory cellsfrom the circulation is an important process to augmentthe inflammatory response. Pro-inflammatory cytokinesproduction also induces the expression of adhesionmolecules in the vascular endothelium, andinvasion of inflammatory cells into inflamed tissues subsequentlyoccurs. P-selectin, a member of the selectinfamily of adhesion molecules, and intercellular adhesionmolecule-1 (ICAM-1), both of which are expressed atthe surface of the vascular endothelium, are involved inthis process. Various mediators contribute to the upregulation of endothelial cell and leukocyte-adhesionmolecules in inflammation.[20]

Principles of periodontal therapy is to reduce the supragingivalor subgingival plaque and calculus with appropriate action for oral health.[21] However, scaling and root planing fails to demonstrate maximum results to eliminate plaque and bacteria in the long term because can't eliminate the primary etiologic completed so that the bacteria will experience recolonisation. Antibiotics used to support mechanical periodontal therapy because antibiotics kill the subgingival bacteria remain.[22,23] Unfortunately, treatment antibiotics with inadequate doses and for a long time contributed greatly to the increase of antibiotic resistance. Bacterial resistance to antibiotics has become a problem in the world.[24]

Antibiotics consisting of natural and synthetic antibiotics . Antibiotic synthesis have adverse effects if used carelessly. While natural antibiotics are generally derived from secondary metabolites derived from the extract of a particular plant, which is expected to have efficacy for the drug. The high level of biodiversity of flora in Indonesia , many of which are used as herbal drug such as *Avicennia marina sp*.[25]There are many types of *Avicennia marina sp* which is a mangrove species that can tolerate a wide range of salinity than other types of mangrove lainnya.[26] Parts of *Avicennia marinasp* containing various active compounds such as flavonoids, tannins, and saponins which are compounds potentially useful as an antioxidant and anti-inflamation.[27] The aim of this study is to investigate the effect of Avicennia marina sp extract on catalase activities in Wistar rats induced gingival mix periodontopathogen bacteria .

MATERIAL AND METHODS

Animals preparation. Fivety male Wistar rats weighing about 220–250 g (8 weeks of age) were housed in an air-conditioned room (23–25°C) with a 12-h light–dark cycle and they received humane care. They were kept in the cage for 1 week for proper acclimatization before starting the experiment under controlled conditions of illumination (12 h light/12 h darkness) and temperature (23±2 °C). The animals were given standard rat pellets and tap water ad libitum. All experiments in this study were approved by the Local Ethics Board of Animal Experiments at Faculty of Dentistry HangTuah University.

Animal periodontitis model. The experiment was held by post test only control group design. Fivety male Wistar rats were randomly divided into five group. Group-1 group was negative control group, group-2 group was a positive control group, and the other groups were induced by mixed periodontopathogen bacteria and treated with *Avicennia marina sp* leaf extract on various concentration. Group-1 was negative control group without any treatment, group-2 was a positive control group induced by mixed periodontopathogen bacteria, and the other groups-3, 4, and 5 were induced by mixed periodontopathogen bacteria and treated with Avicennia marina leaf extract on serial dose: K3 (0,25 gr/kg/day), K4 (0,5 gr/kg/day), K5 (1 gr/kg/day). These animals were kept in position for 35 days to promote microbial dental plaque accumulation and inflammation.[28,29]After 35 days the ligature was removed. The animals were weighed before treatment administration at the beginning of the experiment, and tretment dose was improved according to our previous studies.[28]*Avicennia marinasp* leaf extract on various concentration were given for 15 consecutive days after mix periodontopathogen bacteria induction. At the end of the experimental period,the animals were sacrificed under anesthesia and then the surrounding gingiva were removed for catalase level analyses, according to the delivered standardizes procedure.[29]

Biochemical analysis for catalase activity measurement. For biochemical gingival catalase analysis, all collected samples wereobtained from gingivo-mucosal tissues. Then the sampleswere immediately stored in a deep freeze (at approximately–80 °C) for subsequent laboratory analysis. The homogenatewas then centrifuged at 10,000 rpm for 15 min, and the supernatant used for the determination of catalase activityaccording to the method developed by Bradley et al. Andwas estimated by colorimetric measurement at 460 nmon an ELISA

plate reader.[30] The amount of enzyme necessary to produce achange in absorbance per 1 s was defined as 1 unit of catalase activity.

Statistical analysis. Gingival catalase level (mg/ml) of each group was measured. All of datas were analyzed by one way ANOVA and LSD multiple comparison test at 5% significance level. For statistical analysis, differences between the groups were tested by analysis of variance using SPSS software, version 17.0 (SPSS Inc.).

RESULT

There were a significant differences in the gingival catalase activity which can be seen in distribution table 1.

Table 1. Average effect of Avicennia marina sp extract on catalase activities in Wistar rats induced gingival mix periodontopathogen bacteria(nmol/min/g)

Group	Mean	Std.Deviation
1	1,6570	0,01703
2	2,9810	0,01449
3	2,6590	0,01595
4	2,2560	0,01350
5	1,9590	0,01663

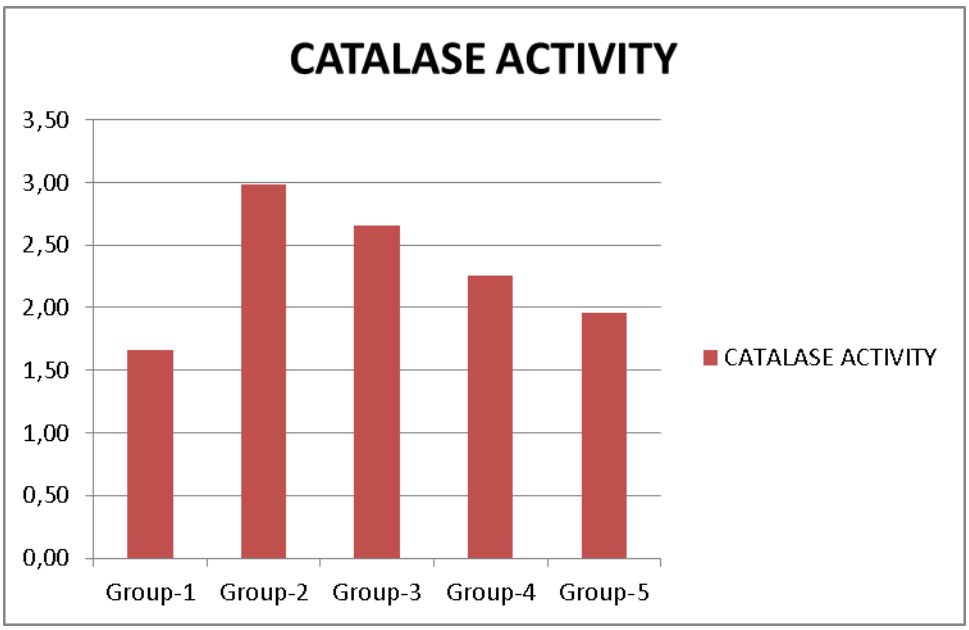

Fig 1. Graphic of Avarage gingival catalase activity(nmol/min/g)

Table 2. ANOVA and LSD test effect of Avicennia marina sp extract on catalase activities in Wistar rats induced gingival mix periodontopathogen bacteria

I) GROUP	(J) GROUP	Mean Difference (I-J)	Sig.
GROUP-1	GROUP-2	-1,3240*	,000
	GROUP-3	-1,0020*	,000
	GROUP-4	-,5990*	,000
	GROUP-5	-,3020*	,000
GROUP-2	GROUP-3	,3220*	,000
	GROUP-4	,7250*	,000
	GROUP-5	1,0220*	,000
GROUP-3	GROUP-4	,4030*	,000
	GROUP-5	,7000*	,000
GROUP-4	GROUP-5	,2970*	,000

This study showed that gingival catalase level was significantly higher in group-2 than group-1. Gingival catalase level in treatment group was significantly lower than control positive group.

DISCUSSION

The inability to examine initiation and progression of periodontal disease and to assess certain therapies in humans has led to a great interest in the use of animal models in periodontal research. Over the past two decades, various investigations have been implemented to understand the pathogenesis of periodontitis. Although only mechanical and surgical treatment modalities were used for many years, much advancement has been made thanks to detailed research on both causative microorganisms and the host-mediated response.[31,32]

Periodontitis can be seen in the control positive group with the induction of mix periodontopathogen bacteria. Periodontitis occurs due to increased reactive oxygen species due to the inflammatory process . At the time of the occurrence of inflammation, gingival cells will a first tissue defense against the presence of pathogenic bacteria, lipopolysaccharide (LPS), lipoteichoic acid (LTA), peptidoglycan, and on the network that has been damaged. On the pathogenesis of periodontitis, this is largely mediated by complement complex causes the formation of membrane-attact so that lysis bacterial cells with vasoactive and chemotactic component which is the mechanism of phagocytosis. Macrophages stimulated by bacteria or by the interaction of complement, so the release of interleukin-1 (IL-1), tumor necrosis factor , and the synthesis and the release of neutrophils chemotactic factor (IL-8). This resulted in

migration of neutrophils that occurs opsonization process, then lysis by ROS, such as the system H_2O-myeloperoksidase or lipid peroxidation-O_2. However, ROS are unstable oxygen compounds, that in this study which comes from the induction mix periodontopatogen bacteria that causes the increase of reactive oxygen compounds. Catalase is an endogenous antioxidant. Antioxidants are chemical compounds that have the capability to provide hydrogen radical electron. As a result, these compounds can alter radically the nature of any change nonradical and radical oxidation by antioxidants. Antioxidants consist of endogenous antioxidant produced by the body itself and exogenous antioxidants derived from food. If there is an increasing number of free radicals in the body (can be caused by inflammation, food, drugs, radiation, etc.) then the body will do the defense that is by increasing the activity of endogenous antioxidants such as superoksid dismutase, catalase, and glutathione, but in the event of exposure Excessive oxidant antioxidant body will not be able to handle it, so that the body requires external supply of antioxidants (flavonoids, vitamin A, vitamin C, vitamin E, selenium, zinc, and L-cysteine).[31,32]

Today, new periodontal treatment strategies are focused more on learning about the role of the host response and host-modulatory agent. It is emphasized that the adjunctive use of hostmodulatory agents can help to increase therapeutic responses, can be efficacious in slowing the progression of disease, and can make the responses more presumably in the susceptible host.For this reason, numerous host-modulatory agents such as anti-inflammatoryand anti-oxidantagents were investigated to cope with the breakdown of the soft and hard periodontal tissues.[33]

Recently, evidence has emerged that reduced total antioxidant capacity and enhanced oxidative damage within the oral cavity lead to the progression of periodontal tissue destruction. Moreover, periodontitis patients show increasing levels of LPO and ROS, which cause a state of oxidative stress. Reactive oxygen species are significant signalling molecules in several cellular processes. When there is excessive production, these molecules act as a toxic substance that leads to cellular damage (proteins, lipids, and DNA).[33,34]There is a defence mechanism against ROS provided by enzymatic and non-enzymatic antioxidants to prevent their deleterious actions. In healthy people equilibrium is present between the production of ROS and tissue concentration of antioxidants.[33]

Antioxidants have been extensively used as food additives and may playa crucial role in the treatment of many degenerative and chronic diseases such as periodontitis. Considering

increased oxidative stress and reduced total antioxidant capacity in periodontal disease, researchers are using antioxidant agents to treat or alleviate this disease.[33,34]

Avicennia marina sp leaf extract treatment on serial dose0,25 gr/kg/day; 0,5 gr/kg/day and 1 gr/kg/day caused increasing gingival catalase activity significantly from the positive control group. It showed that *Avicennia marina sp* leaf extract has protective effects against free radicals, although this increase has not been able to restore the initial state (negative control group).

Periodontal tissue damage induced by the mix of bacteria periodontopatogen compounded by the existence of a series of mechanisms involving ROS compounds. During phagocytosis, macrophages and neutrophils as effector cells also produce toxic oxygen combined fagosom and lysosomes become fagolisosom responsibility to help kill and swallow microorganisms. Most of those involved in the process of phagocytosis is hydrogen peroxide (H2O2), superoxide anions (O2-), and nitrogen oxide (NO), is directly toxic to the bacteria. Everything is generated through the oxidation of NADPH and other enzymes in a process called respiratory burst, due to increased consumption of oxygen in the inflammation. Macrophage activity is very efficient in destroying pathogens, this activity in vivo is usually in conjunction with local tissue damage caused by the release of antimicrobial mediators as free radicals. Have gingival epithelial cells of the immune system, cell membranes, the GCF (gingival creviculer fluid). One form of the antioxidant defense system were found (exogenous antioxidants) contained in the GCF to counteract the effects of oxidants and free radicals, but the number was limited. In the event of exposure or excessive production of oxidants, it will be seen an increase of antioxidant activity as a process of defense. In addition, because the numbers are limited, it is necessary to the existence of additional endogenous antioxidants.[33,34]

In summary, the results of this study reveal that *Avicennia marina sp* leaf extract contains compounds that are antioxidants. *Avicennia marina sp* leaf extract can decrease rat gingival catalase level. The components that contain antioxidants are very instrumental in securing the stability between the consumption of oxidants and free radicals and antioxidants in the body's production so as to provide protective and therapeutic effects on disease periodontitis because it proved to reduce the activity of catalase. Then it can be concluded that alternative therapies of periodontitis can be done by giving exogenous intake of antioxidants. [35,36,37]

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THE INHIBITION EFFECT OF AVICENNIA MARINA MANGROVE LEAVES EXTRACT TO THE GROWTH OF MIXED PERIODONTOPATHOGEN BACTERIA

(Daya hambat ekstrak daun mangrove (A*vicennia marina*) terhadap pertumbuhan Bakteri *mixed periodontopathogen)*

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ABSTRACT

Background *:Periodontitis is a periodontal tissue disease in which one of main factors is caused by bacteria periodontopathogen. Some antibiotics had been used to eliminate the mixed periodontopathogen on periodontitis and antibiotic resistance has increased rapidly during the last decade. Avicennia marina is one of mangrove species which has potent as a source of antibacterial compound, such as flavonoid, alkaloid, terpenoid, tannin, and saponin.*

Purposes :*The aim of this research was to study the inhibitory effect of mangrove leaves (Avicennia marina) on the growth of mixed periodontopathogen.*

Methods :*Mangrove leaves was extracts with ethanol 96%. The antibacterial effect of Avicennia marina extract to the growth of mixed periodontopathogen that were tested by diffusion methods on Brain Heart Infusion (BHI) medium with 3 concentration 750 µg/ml, 1500 µg/ml and 3000 µg/ml, each consisted of 6 samples. The Inhibition effect were examined by measuring the clear zone surrounding diffusion disc with a digital calipers, stated in millimeters.*

Results :*Data were analized with ANOVA (one way) test and result showed the significant different ($p < 0,05$) between all groups and it was found that there is inhibition growth power of mixed periodontopathogen bacterial by leaves extract of Avicennia marina with concentration 750 µg/ml (6,8067 ± 0,03386), 1500 µg/ml (6,9067 ± 0,03266), 3000µg/ml (6,2167 ± 0,02582), DMSO 1% (6 ± 0,0000) and minosiklin 0,1% (48,835 ± 0,4764).*

Conclusions :*Leaves extract of Avicennia marina could inhibit the growth of mixed periodontopathogen bacteria.*

Keywords *: Avicennia marina, antibacterial, periodontal disease, mixed periodontopathogen, inhibitory effect.*

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PENDAHULUAN

Indonesia memiliki mangrove yang terluas di dunia dan keragaman hayati yang terbesar serta strukturnya yang bervariasi.[1] Mangrove Indonesia Center tahun 2006 memperlihatkan luas hutan mangrove di Indonesia mencapai 25% dari total 18 juta hektare mangrove di dunia.[2] Tumbuhan mangrove di Indonesia jenisnya bermacam-macam, tetapi hanya didominasi oleh *Avicennia marina, Rhizophora mucronata, Sonneratia caseolari*.[3]

Tumbuhan mangrove jenis *Avicennia marina* paling banyak ditemukan karena memiliki batas toleran yang cukup tinggi terhadap perairan dengan kondisi yang ekstrim salinitas yang tinggi, kondisi berlumpur, mampu tumbuh dengan baik pada salinitas yang mendekati air tawar sampai dengan 90%.[4] Ekstrak daun mangrove*Avicennia marina*banyak ditemukan senyawa-senyawa aktif meliputi flavonoid, alkaloid, terpenoid, tannin, dan saponin daripada kulit, batang, getah, akar dan buah.[5] Ekstrak daun mangrove mampu menunjukkan aktivitas antimikrobanya terhadap bakteri gram negatif, gram positif dan jamur meliputi *Staphylococcus aureus, Staphylococcus epidermides, Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa, Klebsiella pneumonia, Aspergilus niger, Rhyzopus oryzae, Candida albicans* dan *Saccharomyces cerevisiae.* Hal itu menunjukkan bahwa senyawa aktif tersebut mempunyai antibakteri.[6]

Penggunan antibiotik yang berlebihan dan tidak tepat pada beberapa kasus, dapat ,menyebabkan masalah kekebalan antimikrobial.[7] Resistensi bakteri ini merupakan ancaman keberhasilan terapi terhadap penyakit infeksi baik dirumah sakit, pelayanan kesehatan lain, maupun di masyarakat.[8]

Penyakit periodontal merupakan penyakit pada jaringan pendukung gigi yang terutama disebabkan oleh bakteri. Inflamasi dan kehilangan tulang merupakan tanda-tanda adanya penyakit periodontal.[9]Di Indonesia, penyakit periodontal menduduki urutan kedua setelah karies dan masih merupakan masalah di masyarakat.[10]Penyakit periodontal pada umumnya dibagi menjadi dua macam yaitu gingivitis jika mengenai jaringan gingiva dan periodontitis jika mengenai jaringan periodontal lebih luas yaitu ligamen peridontal, sementum, dan tulang alveolar.[11]Bakteri-bakteri patogen yang diduga memiliki peranan penting sebagai penyebab kerusakan jaringan periodontal adalah *Actinobacillus actinomycetemcommitans (Aa), Porphyromonas gingivalis,Tannerella forshytensis, Prevotella intermedia, Fusobacterium neucleatum, Selenomonas* dan *Capnocytophaga* yang merupakan bakteri-bakteri jenis anaerob gram negatif.[12]Bakteri – bakteri tersebut yang disebut dengan bakteri *mixed periodontopathogen* yang berada dalam rongga mulut pasien dengan kelainan periodontitis.

Terapi periodontal selain dengan cara *scaling* dan *root planning*, juga dilakukan pemberian antibiotik, dimana dapat diberikan secara sistemik maupun secara lokal.[13] Pemberian antibiotika secara lokal mempunyai keuntungan yaitu secara langsung mencapai daerah target yang spesifik, sehingga dosis maupun konsentrasinya dapat dikurangi serta efek sampingnya juga berkurang.[14]

Ada beberapa golongan antimikroba yang efektif untuk pengobatan penyakit periodontal.Minosiklin sebagai salah satu dari golongan antimikroba yang dapat digunakan sebagai pilihan pada kasus periodontitis, di bidang kedokteran gigi, kecenderungan pemakaian minosiklin terus meningkat, karena minosiklin mempunyai kelebihan dibandingkan antibiotika lainnya untuk terapi penyakit periodontal. Keuntungan minosiklin adalah efektif melawan pertumbuhan bakteri periodontophatogen gram negatif anaerob, konsentrasi yang tinggi pada *gingival crevikular fluid* (GCF), dan efek antimikroba yang baik dengan pelepasan yang pelan pada poket periodontal.[15]

Berdasarkan penjelasan di atas, maka perlu dilakukan penelitian mengenai daya hambat ekstrak daun mangrove (*Avicennia marina*) terhadap pertumbuhan bakteri *mixed periodontopathogen* yang merupakan etiologi utama penyakit periodontal, sehingga nantinya dapat bermanfaat sebagai obat alternatif dalam bentuk obat kumur untuk mengobati penyakit periodontal.

BAHAN DAN METODE

Penelitian ini adalah penelitian *true eksperimental laboratoris* dengan rancangan *the post test only control group design.* Sampel penelitian ini menggunakan bakteri *mixed periodontopathogen* yang diambil dari biakan penderita dengan diagnosis periodontitis yang diinokulasi pada media *Brain Heart Infusion* (BHI) cairdengan teknik pengambilan sampel menggunakan *simple random sampling.*

Daun *Avicennia marina*diambil dari Balai Pengelolaan Mangrove wilayah I Wonorejo Surabaya. Daun Avicennia marina yang sudah kering dan halus seberat 1,1 kg diekstrak menggunakan pelarut etanol 96% 3 liter dengan cara maserasi menghasilkan ekstrak seberat 96 gram.

Subyek pada penelitian dibagi dalam 5 kelompok yaitu kelompok kontrol negatif dengan DMSO 1%, kelompok kontrol positif menggunakan minosiklin 0,1%, dan 3 kelompok diberi ekstrak daun mangrove *Avicennia marina* dengan konsentrasi 750 μg/ml,

1500 μg/ml dan 3000 μg/ml sehingga total sampel yang digunakan pada penelitian ini adalah 30 sampel.

Bakteri mixed periodontopathogen setelah diinkubasikan, diambil dengan mikropipet yang diletakkan pada obyek *glass* untuk dibuat preparat yang kemudian akan dilakukan pengecatan untuk melihat jenis bakteri yang mendominasi. Bakteri yang mendominasi yaitu bakteri gramnegatif. Setelah pengecatan, suspensi bakteri tersebutdisetarakan kekeruhannya dengan larutan standar Mc Farland 0,5 atau setara dengan konsentrasi $1{,}5x10^8$ CFU/ml.

Selanjutnya, menyiapkan petridisk yang telah berisi bakteri mixed periodontopathogen dengan media BHI agar. Setelah itu mencelupkan kertas saring yang sebelumnya telah dicelupkan ke dalam ekstrak daun *Avicennia marina* selama 10 detik pada kelompok perlakuan. Untuk kelompok kontrol, kertas saring dicelupkan pada aquadest steril selama 10 detik. Meletakkan kertas saring tersebut pada media agar *mixed periodontopathogen* dengan menggunakan pinset steril agak ditekan – tekan. Memasukkan *petri dish* ke dalam inkubator selama 2x24 jam dengan suhu 37^0C dalam suasana anaerob.

Tahap berikutnya yaitu mencelupkan kertas saring yang sebelumnya telah dicelupkan ke dalam ekstrak daun *Avicennia marina* selama 10 detik pada kelompok perlakuan. Untuk kelompok kontrol, kertas saring dicelupkan pada DMSO 1% untuk kontrol negatif dan minosiklin 0,1% untuk kontrol positif selama 10 detik. Meletakkan kertas saring tersebut pada media agar *mixed periodontopathogen* dengan menggunakan pinset steril agak ditekan – tekan. Memasukkan *petri dish* ke dalam inkubator selama 2x24 jam dengan suhu 37^0C dalam suasana anaerob.Pengukuran zona hambat yaitu selisih diameter zona jernih dikurangi diameter kertas saring menggunakan digital kalipers dalam satuan millimeter (mm).

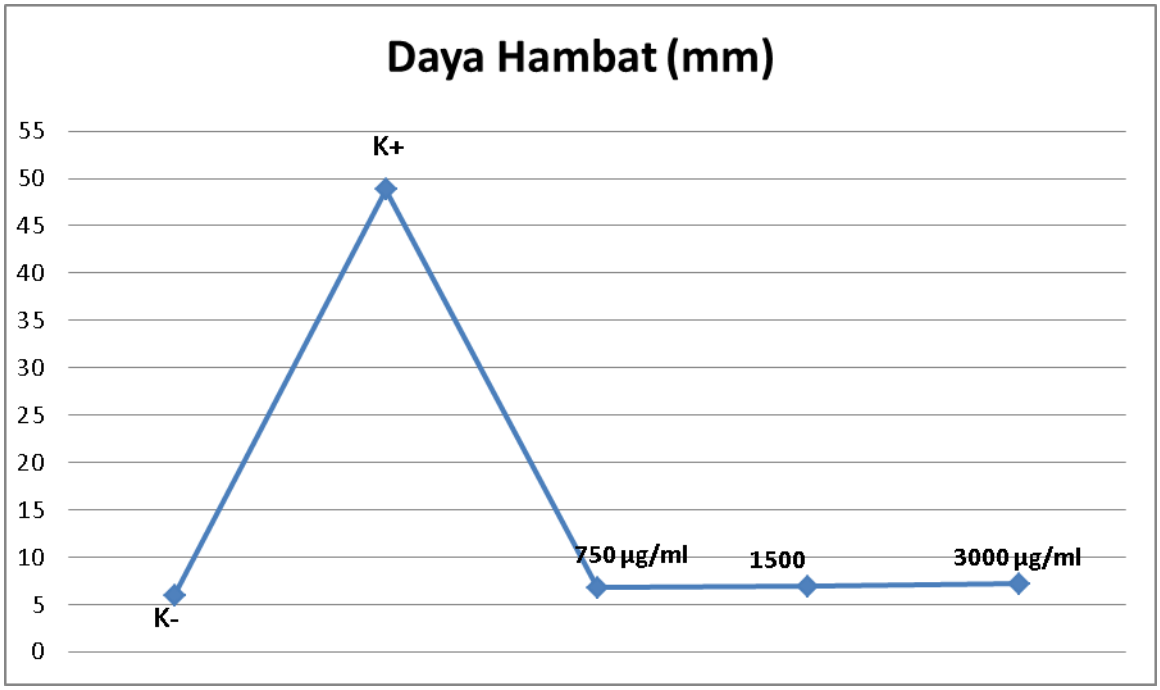
Dari hasil penelitian perlu dilakukan tes normalitas (Uji *Shapiro Wilk* karena besar sampel < 50). Setelah itu menggunakan uji *one way* Anova (satu arah) yang dilanjutkan dengan uji LSD (*Least Significant Difference*).

HASIL PENELITIAN

Dari hasil penelitian tentang daya hambat ekstrak daun mangrove Avicennia marina terhadap pertumbuhan bakteri mixed periodontopathogen adalah sebagai berikut :

Tabel 1. Zona hambat terhadap bakteri mixed periodontopatogen (dalam mm)

Sampel	Diameter Zona hambat dalam mm				
	Kontrol negatif DMSO 1%	Kontrol positif minosiklin 0,1%	750 µg/ml	1500 µg/ml	3000µg/ml
I	6,00	48,81	6,81	6,85	7,20
II	6,00	48,86	6,79	6,89	7,19
III	6,00	48,85	6,87	6,92	7,23
IV	6,00	48,90	6,78	6,91	7,20
V	6,00	48,76	6,78	6,94	7,26
VI	6,00	48,83	6,81	6,93	7,22
$\overline{x}$	6,00	48,835	6,8067	6,9067	7,2167
SD	0,00000	0,4764	0,03386	0,03266	0,02582



Gambar 1. Gambar Rata-rata Zona Hambat

Dari hasil penelitian perlu dilakukan tes normalitas (uji *Shapiro Wilk* karena besar sampel < 50). Setelah itu menggunakan uji *One Way ANOVA* (satu arah) yang dilanjutkan dengan uji *LSD* (*Least Significant Difference*).

PEMBAHASAN

Hasil analisa penelitian ini menggunakan uji statistik *ANOVA*dan *LSD* dengan signifikansi 5% ($p<0,05$) terlihat perbedaan bermakna antara kelompok kontrol positif (minosiklin 0,1 %) dengan rerata sebesar 48,835 mm dan kelompok kontrol negatif (DMSO 1%)

dengan rerata sebesar 6,00 mm. Hal itu membuktikan bahwa DMSO 1% tidak memiliki daya hambat dan tidak mempengaruhi hasil dari penelitian, sedangkan minosiklin merupakan antibiotik golongan tetrasiklin dimana sifatnya adalah lipofilik yang mampu menembus membran lemak di dinding sel dan menghambat sintesis atau merusak asam nukleat sel bakteri dan menghambat sintesis protein pada ribosomnya, Paling sedikit terjadi 2 proses dalam masuknya antibiotik ke dalam bakteri gram negatif, pertama secara difusi pasif melalui kanal hidrofilik, kedua melalui sistem transpor aktif. Setelah masuk antibiotik berikatan seraca reversibel dengan ribosom 30S dan mencegah ikatan tRNA–aminoasit pada kompleks mRNA-ribosom. Hal tersebut mencegah perpanjangan rantai peptida yang sedang tumbuh dan berakibat terhentinya sintesis protein.[15]Antibiotik yang memiliki mekanisme kerja menghambat sintesis protein mempunyai daya antibakteri sangat kuat.[16]

Hasil kontrol negatif DMSO 1 % (6,00 mm) dan kelompok perlakuan *Avicennia marina* padakonsentrasi 750 µg/ml (6,8067 mm),ekstrak *Avicennia marina* 1500 µg/ml (6,9067 mm), ekstrak *Avicennia marina* 3000 µg/ml (7,2167 mm), serta pada uji statistik *ANOVA*dan *LSD* dengan signifikansi 5% ($p<0,05$) pada semua konsentrasi memiliki perbedaan yang bermakna.Hal itu membuktikan bahawa adanya daya hambat ekstrak daun *Avicennia marina* terhadap pertumbuhan bakteri *mixed periodontopathogen* dikarenakan adanya senyawa aktif yang terkandung dalam ekstrak daun *Avicennia marina* antara lain flavonoid, alkaloid, terpenoid, tannin dan saponin.[5]

Flavonoid merupakan senyawa polar yang umumnya mudah larut dalam pelarut polar seperti etanol, methanol, butanol dan aseton.Flavonoid merupakan golongan terbesar dari senyawa fenol, senyawa fenol mempunyai sifat efektif menghambat pertumbuhan virus, bakteri dan jamur. Mekanisme kerja flavonoid dalam menghambat pertumbuhan bakteri adalah flavonoid menyebabkan terjadinya kerusakan permeabilitas dinding sel bakteri dan flavonoid mampu menghambat motilitas bakteri.[17]Flavonoid mempunyai sifatnya bakteriostatik, tetapi pada konsentrasi yang semakin tinggi flavonoid mampu membunuh bakteri gram negatif maupun gram positif.[18]

Alkaloid memiliki kemampuan sebagai antibakteri. Mekanisme alkaloid yaitu dengan cara mengganggu komponen penyusun peptidoglikan pada sel bakteri, sehingga lapisan dinding sel tidak terbentuk secara utuh dan menyebabkan kematian sel tersebut. Di dalam senyawa alkaloid juga terdapat gugus basa yang mengandung reaksi nitrogen yang akan bereaksi dengan senyawa asam amino yang menyusun dinding sel bakteri dan DNA bakteri. Reaksi ini mengakibatkan perubahan struktur dan susunan asam amino, dimana akan menimbulkan perubahan keseimbangan genetik pada pada rantai DNA sehingga akan

mengalami kerusakan yang akan mendorong terjadinya lisis sel bakteri yang akan menyebabkan kematian sel pada bakteri.[16] Penelitian sebelumnya menunjukkan pada konsentrasi 400 – 500 µg/ml alkaloid mampu membunuh bakteri gram negatif maupun gram positif.[18]

Terpenoid mempunyai manfaat penting sebagai obat tradisional, antibakteri, antijamur dan gangguan kesehatan. Senyawa terpenoid dapat menghambat pertumbuhan dengan mengganggu proses terbentuknya membran dan atau dinding sel, membran atau dinding sel tidak terbentuk atau terbentuk tidak sempurna.[17]Karena mekanisme itulah terpenoid lebih bersifat bakteriostatik.[20]Senyawa – senyawa ini yang mempunyai aktivitas bakteristatik itu dapat meningkat menjadi bakterisid, jika kadar senyawa antibakteri itu ditingkatkan melebihi kadar hambat minimal.[21]

Senyawa tannin menyebabkan denaturasi protein dengan membentuk kompleks dengan protein melalui kekuatan nonspesifik seperti ikatan hidrogen dan efek hidrofobik sebagaimana pembentukan ikatan kovalen, menginaktifkan adhesi mikroba terhadap molekul untuk menempel pada sel inang, menstimulasi sel-sel fagosit yang berperan dalam sespon imun selular.[22] Tannin pada konsentrasi rendah mempunyai sifat bakteriostatik, tetapi tannin dengan konsentrasi 12,5 - 50µg/ml mempunyai sifat bakterisid baik untuk bakteri gram negatif maupun gram positif.[23]

Saponin merupakan glukosida yang larut dalam air dan etanol, tetapi tidak larut dalam eter. Saponin bekerja sebagai antibakteri dengan mengganggu stabilitas membran sel bakteri sehingga menyebabkan sel bakterilisis, jadi mekanisme kerja saponin termasuk dalam kelompok antibakteri yang mengganggu permeabilitas membran sel bakteri, yang mengakibatkan kerusakan membran sel dan menyebabkan keluarnya berbagai komponen penting dalam sel bakteri yaitu protein, asam nukleat dan nukleotida.[17]Karena sifat itulah saponin pada konsentrasi 1 – 12 µg/ml tidak bisa menghambat pertumbuhan bakteri gram negatif *E.coli*sehingga saponin mempunyai sifat bakteriostatik.[24] Saponin juga tidak mampu menghambat bakteri gram negatif dan jamur tetapi saponin mampu menghambat pertumbuhan bakteri gram positif.[25]

Antar perlakuan ekstrak daun *Avicennia marina* dengan konsentrasi 750 µg/ml (6,8067 mm), 1500 µg/ml (6,9067 mm), dan 3000 µg/ml (7,2167 mm) yang menunjukkan bahwa semakin besar konsentrasi ekstrak daun *Avicennia marina*semakin besar pula zona hambat pertumbuhan bakteri *mixed periodontopathogen*yang dihasilkan. Hal itu disebabkan

pada konsentrasi yang semakin besar, semakin besar kandungan bahan aktif dan semakin besar juga efek antibakterinya.

Hasil penelitian tampak adanya perbedaan diameter selisih zona hambat pertumbuhan bakteri *mixed periodontopathogen* yang signifikan pada perlakuan kelompok kontrol positif (minosiklin) dengan konsentrasi ekstrak *Avicennia marina* konsentrasi 750 µg/ml, 1500 µg/ml, dan 3000 µg/ml. Hal itu dikarenakan bakteri *mixed periodontopathogen* didominasi oleh bakteri gram negatif. Kandungan protein porin pada membran terluar dinding sel bakteri gram negatif bersifat hidrofilik. Kemungkinan porin yang terkandung pada membran terluar tersebut menyebabkan molekul-molekul komponen ekstrak lebih sukar masuk ke dalam sel bakteri. struktur dinding sel bakteri ini berlapis tigayang tersusun atas peptidoglikan dan lipid dengan kadar yang tinggi (11-22 %).Selain itu, 20 % membran luar bakteri mengandung lipid sehingga senyawa metabolit sekunder ini sulit masuk ke dalam membran luar dinding sel, dimana lipid ini berfungsi mencegah masuknya bahan kimia dari luar.[16]Senyawa aktif *Avicennia marina*mempunyai cara kerja yang mengganggu lapisan peptidoglikan yang merupakan komponen luar bakteri sehingga lapisan dinding sel tidak terbentuk secara utuh. Hal itu dikarenakan lapisan lipid bakteri gram negatif yang sangat tebal sehingga senyawa *Avicennia marina* kesulitan untuk menembus lapisan tersebut. Sedangkan minosiklin seperti pada penjelasan diatas yang mampu masuk melewati membran menyerang DNA bakteri karena bersifat lipofilik, dengan lebih brusaknya struktur DNA bakteri sehingga sintesis DNA bakteri terganggu. Perbedaan cara kerja tersebut, sehingga Avicennia marina lebih bersifat bakteriostatik, sedangkan minosiklin bersifat bakterisid.

Sesuai dengan hasil penelitian ini, dapat diketahui bahwa ekstrak daun *Avicennia marina* mempunyai efek antibakteri terhadap bakteri *mixed periodontopatogen*. Hal ini disebabkan dalam ekstrak daun *Avicennia marina* terdapat berbagai senyawa aktif flavonoid, alkaloid, terpenoid, tannin dan saponin yang mampu berperan dan memberikan hasil yang efektif sebagai antibakteri. Besarnya diameter zona hambat pada minosiklin dibandingkan dengan ekstrak *Avicennia marina* membuat peneliti berinisiatif untuk menjadikan bahan alam ini sebagai preventif di bidang kedokteran gigi yaitu untuk menjaga *oral hygiene* dengan sediaan sebagai obat kumur.

Penelitian ini masih bersifat kualitatif yaitu menunjukkan adanya daya hambat ekstrak daun *Avicennia marina*terhadap pertumbuhan bakteri *mixed periodontopathogen* sehingga perlu dilakukan penelitian lebih lanjut.

SIMPULAN

Hasil penelitian ini dapat disimpulkan bahwa pada penelitian ini terdapat daya hambat ekstrak daun mangrove (*Avicennia marina*) terhadap pertumbuhan bakteri *mixed periodontopathogen* , dengan rincian sebagai berikut :Terdapat daya hambat ekstrak daun mangrove (*Avicennia marina*) terhadap pertumbuhan bakteri *mixed periodontopathogen* pada konsentrasi 750µg/ml, 1500 µg/ml, 3000µg/ml dengan semakin besar konsentrasi semakin besar pula daya hambatnya.Konsentrasi yang memiliki daya hambat paling optimal terhadap pertumbuhan bakteri *mixed periodontopathogen* secara *in vitro* adalah 3000µg/ml.Minosiklin 0,1% mempunyai daya hambat lebih besar daripada ekstrak daun *Avicennia marina*

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LEVEL OF C REACTIVE PROTEIN (CRP) AMONG CARDIOVASCULAR DISEASE PATIENTS WITH CHRONIC PERIODONTITIS IN CARDIOVASCULAR DEPARTEMENT OF DR. SOETOMO NATIONAL HOSPITAL SURABAYA

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ABSTRACT

Background: *Periodontitis is a local inflammatory process mediating destruction of periodontal tissues triggered by bacterial insult. However, this disease is also characterized by systemic inflammatory host responses that may contribute, in part, to the recently reported higher risk for cardiovascular disease (CVD) among patients with periodontitis. Moderate elevation of C-reactive protein (CRP) has been found to be a predictor of increased risk for CVD. Elevated CRP levels in periodontal patients have been reported by several groups. In this study, we examined whether CRP plasma levels are increased in periodontitis and if there is a relation to severity of periodontal disease.*

Methods: *CRP serum levels were assessed using reagen Immulite C-Reactive Protein ® / Immulite ® 1000 high-sensitivity CRP as a solid-phase, chemiluminescent immunometric assay in 100 subjects which diagnosed cardiovascular disease with chronic periodontitis. Periodontal Disease Index (PDI) were measured by clinical attachment loss, probing depths, and gingiva recession at six selection teeth : 16, 21, 24, 36, 41,44 known as Ramfjord teeth.*

Results: *The measurement of Periodontal Disease Index (PDI) in 100 subjects with Cardiovascular Disease are Mild periodontitis (6,1%), Moderate periodontitis (70,4%), Severe periodontitis (23,5%) and only 2% with normal periodontal tissue. Increases in CRP levels were observed in these subjects. Subjects with high levels of clinical attachment loss (Severe periodontitis) had significantly higher mean of CRP levels (7,522 ± 0,3580 mg/L), moderate periodontitis are (5,284 ± 0,3138 mg/L) CRP levels and (2,017 ± 0,3656 mg/L) CRP levels for mild periodontitis*

Conclusions: *The positive correlation between CRP and periodontal disease might be a possible underlying pathway in the association between periodontal disease which a chronic inflammation as one of risk factor for Cardiovascular Disease in these patients.*

Keywords *: C- Reactive Protein, Periodontal diseases/ periodontitis , cardivaskular disease, pathogenesis, , risk factors*

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PENDAHULUAN

Penyakit Jantung Koroner (PJK) masih merupakan masalah kesehatan utama di dunia saat ini. Pada tahun 2001, PJK merupakan penyebab dari sepertiga kematian di dunia, dan WHO memperkirakan bahwa PJK di seluruh dunia pada tahun 2020 menjadi penyebab kematian utama. Aterosklerosis merupakan proses utama yang mendasari terjadinya PJK, didefinisikan sebagai suatu penyakit intima arteri sistemik mulai dari aorta hingga arteri koroner epikardial dengan karakteristik berupa plak intima.[1,2] Proses aterosklerosis merupakan suatu proses yang rumit dan multifaktorial karena sangat banyaknya faktor-faktor yang berperan dan saling mempengaruhi.[3]

Konsep aterosklerosis tidak hanya mengenai akumulasi lemak di dalam dinding pembuluh darah, diduga proliferasi *smooth muscle cell* yang dianggap sebagai dasar terjadinya fenomena restenosis saat ini juga berperan penting. Hipotesa yang lain mengatakan bahwa aterosklerosis adalah proses *respon to injury* yang disebabkan oleh inflamasi kronik, konsep inilah yang merupakan inti dari proses aterosklerosis.[2,3,4,5,6,7]

Telah diketahui bahwa selain faktor resiko klasik tersebut, adanya hipertensi, obesitas, usia dan jenis kelamin merupakan predisposisi untuk terjadinya PJK. Tetapi dalam kenyataannya, banyak pasien dengan aterosklerosis yang tidak mempunyai faktor resiko tersebut, sehingga mendorong beberapa ahli untuk meneliti adanya peranan penting infeksi dan inflamasi terhadap terjadinya PJK. Diduga agen-agen infeksi yang berperan terhadap aterosklerosis adalah *Cytomegalovirus, Herpes simplex virus, Chlamydia pneumonia, Helicobacter pylori,* dan *Phorphyromonas gingivalis* pada penyakit jaringan periodontal.[8,9,10,11,12]

Hubungan yang cukup signifikan antara penyakit kardiovaskuler dan penyakit periodontal telah banyak ditentukan berdasarkan penelitian epidemiologi, dan diketahui bahwa peran keradangan pada kedua penyakit tersebut meningkat secara signifikan. Penyakit periodontal lebih lanjut dapat menjadi sumber potensial pada peningkatan keradangan sistemik yang mempengaruhi aterogenesis. Secara klinis terlihat adanya *attachment loss*, *pocketing* serta *radiographic bone loss*, periodontitis terjadi pada 7%-15% penderita dewasa tergantung derajat keparahannya. Beberapa peneliti beranggapan bahwa infeksi periodontal kronis merupakan predisposisi penyakit kardiovaskuler, dan dapat meningkatkan resiko morbiditas dan mortalitas PJK sebanyak 25%. [9,12,13,14] Dalam tiap tahunnya di United States, setengah dari penyebab kematian yang terjadi adalah penyakit kardiovaskular, yang mana 75% dari individunya telah mengalami penyakit periodontal.[10,13]

Saat ini petanda inflamasi yang sesuai dan tersedia dengan mudah untuk menentukan adanya inflamasi adalah *C-Reactive Protein* (CRP). Beberapa studi melaporkan adanya hubungan periodontitis dengan meningkatnya CRP, yang merupakan faktor resiko kuat dan independen pada aterosklerosis dan PJK. Juga diketahui bahwa peningkatan CRP merupakan prediksi resiko terjadinya penyakit kardiovaskuler. [10,15,16,17,18]

Kenyataan tersebut menarik untuk dikaji ulang, bahwa penyakit rongga mulut yang nampaknya sederhana, dapat berlanjut dan menimbulkan dampak yang membahayakan penderita bila tidak ditangani secara tepat. Dan belum adanya data resmi untuk penelitian tentang kadar hs-CRP pada penderita PJK dengan periodontitis di Departemen Kardiologi dan Kedokteran Vaskuler RSU Dr.Soetomo Surabaya mendorong kami untuk melakukan penelitian ini.

Spektrum penyakit arteri koroner bervariasi mulai dari terdapatnya kelainan kongenital arteri, infeksi, inflamasi hingga aterosklerosis. Namun dari semua kelainan koroner yang ada, penyakit aterosklerosis merupakan kelainan yang paling dominan. Oleh karenanya tidak jarang kelainan aterosklerosis diidentikkan sebagai kelainan arteri koroner.[19]

Lesi aterosklerotik (ateromata) adalah suatu kelainan difus vaskular yang ditandai oleh penebalan fokal dan asimetrik dari lapisan intima arteri. Proses terjadinya ateroma ini diawali dengan peningkatan akumulasi lipid dan lipoprotein dibawah endotelium, yang kemudian diikuti oleh melekat dan menyebarnya monosit dan limfosit T sehingga menyebabkan terjadinya perubahan permeabilitas endotel. Selanjutnya terjadi migrasi leukosit menuju permukaan endotel dan secara kemotaksis berakumulasi menuju ke lapisan intima. Dengan adanya LDL yang teroksidasi monosit berubah menjadi makrofag, dimana berperan sebagai reseptor *scavenger* dan melingkupi lipoprotein yang telah termodifikasi, berubah menjadi *foam cell* (*lipid laden macrophage*). *Foam cell* ini ber-akumulasi di dalam lapisan intima yang kemudian disebut *fatty streak*, dan merupakan lesi aterosklerosis yang pertama. Respon inflamasi ini semakin berkembang menjadi *fibrofatty lesion* dengan dilapisi *fibrous cap* dan mengandung *smooth muscle cell* serta matriks yang kaya kolagen. [2,7] Pada derajat tertentu, lesi ini menimbulkan hambatan mekanis berupa obstruksi dan oklusi, yang selanjutnya bermanifestasi sebagai PJK, stroke, *transient ischaemic attack* (TIA) dan penyakit arteri perifer. Lesi aterosklerotik secara histopatologis digolongkan atas plak yang stabil dan plak yang tidak stabil (*vulnerable plaque*), dimana tiap-tiap jenis plak ini memiliki morfologi dan manifestasi klinis yang berbeda. [2,5,19]

Pemahaman mengenai patofisiologi aterosklerosis berkembang dari waktu ke waktu. Pada akhir tahun 1970-an, aterosklerosis hanya dianggap sebagai kondisi dimana terdapat penimbunan lemak pada dinding arteri. Saat itu aterosklerosis didefinisikan sebagai suatu kelainan progresif yang ditandai oleh adanya penimbunan lemak dan elemen fibrosa pada dinding arteri. Antara tahun 1970 dan 1980 mulai berkembang konsep yang menyebutkan bahwa pada aterosklerosis bukan hanya terdapat akumulasi lemak tetapi juga terdapat proliferasi *smooth muscle cell*. Kemudian berkembang adanya hipotesa aterosklerosis akibat proses *response to injury* yang disebabkan oleh inflamasi kronik. Menurut hipotesa ini terjadi respon inflamasi yang diikuti oleh fibroproliferatif yang awalnya adalah mekanisme perlindungan tetapi akhirnya berubah menjadi proses penyakit, karena inflamasi dan fibroproliferasi yang berlebihan akibat serangan yang lama dan berulang. [2.3,5,7]

Pada penelitian yang dilakukan Li Xiaojing (2000), dilaporkan bahwa plak aterosklerotik pada umumnya terinfeksi oleh bakteri periodontal patogen gram negatif, yaitu *Actinobacillus actinomycetemcomitans* dan *Porphyromonas gingivalis. P.gingivalis* secara in vitro dapat menginvasi dan menyebabkan proliferasi sel-sel endothelium.[8,9,10,13] Dari penelitian lain yang dilakukan juga menunjukkan bahwa *P.gingivalis* dapat merangsang agregasi platelet yang menyebabkan pembentukan trombus. [10,12,14] Selain itu produksi protease oleh *P.gingivalis* dan bakteri patogen periodontal yang lain dapat membantu remodeling matriks ekstraselular pada plak ateroma. Dari data tersebut diduga bahwa organisme yang menginfeksi plak ateroma dapat berperan pada proses trombotik yang berhubungan dengan infark miokard.[12]

Patogen dapat secara langsung menginfeksi sel-sel dinding pembuluh darah. Di dalam sel patogen ini dapat hidup secara laten, berkembang biak dengan lambat atau merusak sel, serta dapat lebih dulu menginfeksi monosit di sirkulasi dan kemudian dibawa masuk ke dalam sel dinding pembuluh darah yang mengalami cedera atau inflamasi. Didalam sel dinding pembuluh darah, patogen dapat menyebabkan efek aterosklerotik seperti proliferasi SMC, peningkatan migrasi SMC, peningkatan ekspresi *cytokine, chemokine*, dan *cellular adhesion molecules*, faktor jaringan, *plasminogen activator inhibitor*. serta pembentukan *reactive oxygen species*. Beberapa dapat meningkatkan *uptake* LDL teroksidasi, transformasi fenotip sel-sel endotel dari bersifat antikoagulan menjadi prokoagulan, disertai pula oleh peningkatan sintesa faktor jaringan dan kecepatan pembentukan trombin, sebaliknya terjadi penurunan pembentukan prostasiklin dan trombomodulin. [1,7]

Patogen juga dapat menyebabkan eksaserbasi peradangan intima tanpa secara langsung menginfeksi sel tetapi melalui peningkatan sitokin sistemik seperti IL-2, IL-4, IL-6, dan *monocyte chemoattractant protein-1*. Selain itu beberapa bukti yang menyokong respon imunologis terhadap *self antigen* berperan penting pada aterogenesis. Dilaporkan bahwa *Heat Shock Protein* (HSP), yang merupakan protein intrasel, bisa menjadi sasaran dari reaksi otoimun. Respon otoimun terhadap HSP 60 berperan pada aterosklerosis ditunjukkan oleh hasil pengamatan bahwa peningkatan ekspresi HSP60 manusia pada sel endotel, makrofag, dan SMC di lesi aterosklerotik manusia dan kejadian serta keparahan CAD berkorelasi dengan titer antibodi anti-human HSP60. Mekanisme otoimun ini menjadi dasar mekanisme baru peranan infeksi pada aterogenesis: peranan "molecular mimicry" sebagai pencetus respon otoimun. Dipostulasikan bahwa infeksi patogen yang memiliki epitope homolog dengan protein host menyebabkan antibodi tubuh bereaksi silang dengan epitop host, seperti HSP yang dikeluarkan sel-sel endotel, mencetuskan respon otoimun yang turut menyebabkan aterogenesis.[1,4,6,7]

Selain itu dilaporkan adanya pengaruh faktor host pada respon terhadap infeksi. Didapatkan variasi antar individu yang bermakna dalam hal kerentanan terhadap infeksi, serta kemampuan host menghambat aktivitas inflamasi yang diinduksi patogen. Pada data yang ada saat ini juga menyokong bahwa perbedaan kerentanan terhadap PJK sebagian disebabkan oleh faktor genetik. Sehingga untuk dapat meramalkan dengan tepat bagaimana patogen dapat mempengaruhi aterogenesis dan komplikasinya pada seseorang, diperlukan informasi genetika meliputi kerentanan terhadap infeksi, inflamasi dan respon otoimun dari individu tersebut.[1,7]

Secara umum, penyakit periodontal dibagi dalam penyakit gingiva dan penyakit yang melibatkan struktur penyangga gigi. Keradangan merupakan bentuk dari penyakit periodontal yang sering terjadi dan secara umum dibedakan atas gingivitis dan periodontitis.[20]

Gingivitis adalah salah satu bentuk dari penyakit gingiva yang paling umum, yang ditandai dengan adanya proses keradangan. Jenis yang paling sering ditemui adalah *chronic marginalis gingivitis* atau *simple gingivitis*, ditandai oleh suatu keradangan pada margin gingiva yang terjadi karena adanya plak gigi yang menempel pada permukaan gigi. [20,21]

Periodontitis adalah penyakit keradangan yang terjadi pada jaringan penyangga gigi, yang terdiri dari ligamen periodontal, sementum, tulang alveolaris dan gingiva yang disebabkan oleh mikroorganisme spesifik, mengakibatkan kerusakan progresif pada ligamen periodontal dan tulang alveolar dengan terbentuknya poket, resesi gingiva, atau keduanya.

Gambaran klinis yang membedakan periodontitis dengan gingivitis adalah terjadinya *attachment loss*. Hal ini biasanya bersamaan dengan pembentukan periodontal poket serta perubahan densitas dan ketinggian tulang alveolar. Tanda klinis dari keradangan seperti perubahan warna, kontur, konsistensi, serta perdarahan saat probing bukan selalu merupakan indikator positif terjadinya *attachment loss.* [8,9,21]

Keradangan yang terjadi pada jaringan periodontal disebabkan karena bakteri plak dan faktor iritan yang terdapat disekitar lingkungan gingiva. Penyebab dari penyakit periodontal adalah akumulasi plak yang sebagian besar komposisinya terdiri dari bakteri. Bakteri spesifik yang terdapat pada plak disebut juga dengan ”periodontopatogen”. Bakteri-bakteri seperti *Actinobaccillus actinomycetemcomitans, Porphyromonas gingivalis* dan *Treponema denticola* adalah bakteri gram negatif yang dikaitkan dengan penyakit periodontal, dan menurut beberapa studi *P.gingivalis* merupakan mayor periodontopatogen. [10,21] Bakteri plak memproduksi beberapa faktor yang dapat menyerang jaringan periodontal. Untuk dapat menimbulkan kerusakan jaringan bakteri harus (1) berkolonisasi pada leher gingiva dengan menyerang sistem imun tubuh, (2) merusak barier krevikular epitelial, (3) memproduksi substansi yang menimbulkan kerusakan jaringan baik langsung maupun tidak langsung. [21,22]

Periodontitis dapat terjadi lokal atau general, tergantung dari tanda klinis yang spesifik, mikroba dan faktor host yang ada pada saat diagnosa. Bakteri periodontal dan produknya dapat mencapai sirkulasi darah perifer melalui kontak dengan jaringan beradang. Berbagai aktivitas di rongga mulut dapat menyebabkan penyebaran bakteri, seperti menggosok gigi, pemakaian benang gigi dan bahkan mengunyah. Pasien dengan penyakit periodontal tak terawat memiliki jumlah bakteri intra oral lebih banyak, sehingga lebih besar kemungkinan terjadi penyebaran bakteri. Penyebaran bakteri ini terjadi setiap saat, setiap harinya sepanjang tahun. Frekuensi kejadian ini diduga mengakibatkan perubahan pada endotelium vaskular serta perubahan homeostasis. [9,10,14,21,22]

Tingkat keparahan dan kekronisan penyakit periodontal merupakan sumber mikrobial subgingiva dan produk pertahanan tubuh, yang menimbulkan dampak untuk jangka waktu panjang. [21,22] Pada periodontitis, sekelompok mikroorganisme yang didominasi oleh bakteri anaerob gram negatif membentuk biofilm pada permukaan gigi. Hal ini akan menyebabkan lipopolisakarida (LPS) dan substansi lain mencapai jaringan gingiva untuk memulai dan menghasilkan imunoinflamasi yang akan memproduksi sitokin pro-inflamatori dalam jumlah besar. Hal ini merangsang produksi martriks metalloproteinase (MMP) yang merusak

jaringan ikat pada gingiva dan ligamen periodontal, serta prostaglandin E_2 (PGE2) sebagai mediator pada proses kerusakan tulang .[8,9,14,21]

Diketahui adanya hubungan antara infeksi rongga mulut dengan penyakit kardiovaskular terutama bakteremia yang berasal dari rongga mulut sebagai sumber terjadinya kerusakan pembuluh darah jantung. Mattila dkk (1989) adalah sarjana yang melaporkan pertama kali hubungan antara infeksi periodontal dengan aterosklerosis koroner, yang selanjutnya mendorong beberapa ahli untuk melakukan penelitian-penelitian besar yang bersifat eskperimental. Dilaporkan bakteri patogen pada infeksi periodontal berada di dinding vaskular yang mengalami aterosklerosis, dan pada studi sero-epidemiologikal dilaporkan adanya hubungan *pathogen-specific antibodies* dan aterosklerosis. [10,13,23,24]

Periodontitis dapat mengakselerasi aterosklerosis melalui beberapa mekanisme, yaitu secara langsung *fimbriae* periodontopatogen *P.gingivalis* menginvasi endotel vaskular mengakibatkan terbentuknya respon inflamasi lokal dengan cara merangsang respon host untuk mengaktifasi sel-sel endotel, melalui *receptor-mediated signaling event* dapat mengaktifasi transkripsi gen dan menstimulai sel-sel tersebut memproduksi *innate immune markers*, termasuk *cell adhesion molecules* (ICAM-1, VCAM-1), *Toll like receptors* (TLR-2, TLR-4), sitokin pro inflmatori (TNF α, IL-1β) dan *chemokines* (MCP-1, IL-8). Mediator-mediator ini berperan terhadap proses inflamasi dengan merubah sel-sel endotel dari normal anti trombotik menjadi pro trombotik. Kemudian sel endotel merespon monosit dan LDL teroksidasi dalam proses aterogenesis. [23,24]

Hipotesa kedua adalah melalui infeksi lokal yang kronis oleh *P.gingivalis* menyebabkan respon inflamasi dalam pembuluh darah sistemik dengan dikeluarkannya *acute phase mediator* (CRP), sitokin dan *chemokines*, dan dengan dikeluarkannya CAMs dan TLRs terjadi perubahan keseimbangan endotel vaskular yaitu merubah lingkungan anti-trombotik menjadi pro-trombotik. Selanjutnya dengan me-rekruitmen monosit, terjadi stimulasi, migrasi dan proliferasi *smooth muscle cells* (SMCs) bersama-sama dengan LDL teroksidasi mengakibatkan terbentuknya ateroma. [23,24]

Kemudian berkembang pula hipotesa *trafficking of pathogens* dari infeksi lokal di rongga mulut. Rusaknya jaringan periodontal oleh infeksi *P.gingivalis* mengakibatkan terjadinya lesi kompleks dari sel-sel inflamasi yang merupakan karakteristik periodontitis. Pada infeksi lokal ini *phagocytic mononuclear cells* (makrofag) bertanggung jawab untuk menghilangkan *non-self antigens* melalui proses fagositosis dan melingkupi *P.gingivalis*. Proses ini bertahan dan bergerak menuju ke sirkulasi sistemik dengan bantuan *P.gingivalis*

cysteine protease (gingipain). Sirkulasi sistemik yang terinfeksi oleh makrofag ini kemudian berinteraksi dengan sel endotel vaskuler dengan cara lokalisasi melalui gradien kemotaktik (IL-8 dan MCP-1), serta melekat kuat pada dinding endotel dengan bantuan CAMs. Pada fase ini antigen bakteri dapat melepaskan diri dari sel dan bersama-sama LDL teroksidasi membentuk ateroma. [23,24]

Hipotesa terakhir adalah stimulasi respon otoimun melalui *molecular mimicry*. Infeksi oleh periodontal patogen *P.gingivalis* mempunyai molekul homolog dengan molekul host menyebabkan respon otoimun dengan cara *cross-reactive epitope*. Adanya kerusakan jaringan mengakibatkan sekresi HSPs bakteri dan HSPs host sebagai respon infeksi. Selanjutnya antibodi terhadap HSPs bakteri bereaksi silang dengan HSPs host membentuk respon otoimun lokal. Respon inflamasi ini menyebabkan kerusakan sel endotel vaskular, dan dengan bersama monosit dan LDL teroksidasi membentuk ateroma. [23,24,25]

Pada *American Academy of Periodontology* 2003 merekomendasikan bahwa intervensi penyakit periodontal dapat mencegah onset maupun progresifitas aterosklerosis. Sedikitnya terdapat tiga studi meta-analisis besar setelah dikeluarkannya konsensus tersebut yang melaporkan adanya hubungan penyakit periodontal dengan penyakit kardiovaskular. Meurman (2004) melaporkan peningkatan resiko penyakit kardiovaskular sebanyak 20% pada penderita periodontitis. Demikian juga Vettore (2004) dan Kadder (2004) juga melaporkan peningkatan signifikan resiko penyakit kardiovaskular pada penderita periodontitis.[8]

Pada studi terbaru mengenai titer atibodi sistemik, Pussinen dkk.(2005) melaporkan tingginya kadar antibodi periodontopatogen berhubungan dengan meningkatnya prevalensi PJK, aterosklerosis di arteri karotid, serta resiko terjadinya penyakit koroner 10 tahun kedepan. Beck dkk.(2005) melaporkan tingginya kadar antibodi bakteri periodontal berhubungan dengan meningkatnya prevalensi PJK dan aterosklerosis subklinis.[9,12]

Studi tentang pengukuran secara langsung secara kuantitatif mikroba pada plak periodontal, INVEST (*Oral Infections and Vascular Disease Epidemiology Study*, 2005) melaporkan dari 5000 sampel plak subgingiva terdapat 11 bakteri periodontal, 4 diantaranya merupakan periodontopatogen, yaitu *Actinobaccillus actinomycetemcomitans, Porphyromonas gingivalis, Tannerella forsythensis* dan *Treponema denticola*. Selanjutnya Desvarieux dkk. (2005) melaporkan tingginya bakteri periodontal tersebut pada aterosklerosis arteri karotid. Spahr dkk pada studi CORODONT (*Coronary Event and Periodontal Disease*, 2006) melaporkan adanya peningkatan periodontal patogen burden

(*A.actinomycetemcomitans, T.forsythia, P.gingivalis, P.intermedia* dan *Treponema denticola*) berhubungan signifikan dengan PJK. [9,12]

Pada studi intervensi subklinis terbaru, Mercanoglu dkk 2004, Seinsot dkk 2005, dan Elter dkk 2006, melaporkan terapi periodontitis berhubungan dengan menurunnya kadar marker inflamasi penyakit kardiovaskular dan didapatkan perbaikan subklinis penyakit kardiovaskular. [9,12] Sedangkan pada studi lain yang mengamati hasil perawatan periodontal konservartif selama tiga bulan pada subyek dengan periodontits kronis, menunjukkan kondisi yang lebih baik dari sebelum dilakukan perawatan, hal ini ditunjukkan dengan nilai rata-rata *Clinical Attachment Loss* (CAL) yang menurun dari 4,6 menjadi 3,7 (P=0.01). Demikian juga dengan CRP, yang menunjukkan penurunan dari 2.97 ± 0.58 mg/L menjadi 2.3 ± 0.7 mg/L (P=0.009). [34]

Perawatan periodontal yang tepat juga memperbaiki fungsi endotel. Hal ini tercermin dalam sebuah penelitian yang berhasil mencatat perbaikan fungsi endotel setelah dilakukan perawatan peridontal selama tiga bulan, dengan *flow-mediated dilation* (FMD) pada arteri brakial sebagai indikasinya. Bila hal ini juga dilakukan pada pasien PJK, maka fungsi endotel akan lebih ditingkatkan sehingga pengobatan yang dilakukan seyogyanya akan lebih optimal. [33,34]

CRP adalah globulin berbentuk pentamer, salah satu *acute phase reactant*, biasanya ada pada serum dengan konsentrasi normal < 1 mg/L, dapat meningkat cepat lebih dari 100 kali selama inflamasi akut atau pada injuri jaringan, tetapi tidak spesifik, dengan waktu paruh 19 jam dan kadarnya tidak mempunyai variasi sirkadian. CRP terutama disintesis dan disekresi di liver 6 jam setelah adanya rangsangan berupa inflamasi akut. [15,16,17] Beberapa penelitian juga menduga bahwa CRP diproduksi oleh makrofag dan sel otot polos .[15,16]

Pada dasarnya fungsi CRP adalah untuk mengikat bermacam-macam *ligand* yang terjadi oleh karena paparan kerusakan jaringan atau bakteri, dengan fungsi untuk meningkatkan fagositosis dan mengaktifasi jalur komplemen, CRP memiliki kemampuan memicu disfungsi endotel, merangsang mediator *endothelin* (ET)-1 dan IL-6, *up regulation* molekul adesi dan merangsang *monocyte chemoatractant protein-1* (MCP-1) dan memfasilitasi *uptake* LDL oleh makrofag yang poten dalam mensintesis *tissue factor* (TF) sebagai pemicu utama koagulasi. CRP juga diketahui dapat berperan sebagai *ligand binding protein* yang melekat pada membran sel yang rusak.[5,8,30,31]

Kadar CRP pada keadaan inflamasi akut atau kronis, infeksi serta trauma mencapai 3,8 mg/L atau lebih. Pada orang yang mendapat terapi hormonal juga dapat terjadi

peningkatan CRP. Kondisi lain yang dapat meningkatkan CRP adalah pada penderita kanker, gagal jantung, hipertensi, diabetes mellitus, dislipidemia, perokok serta tinggal di lingkungan dengan kadar polutan yang tinggi.[8,15,16,31]

Pada beberapa *oral pathogens* gram negatif yang menyebabkan periodontitis, misalnya *Porphyromonas gingivalis* dan *Tannerella forysthensis* diduga dapat meningkatkan kadar CRP. Beberapa studi melaporkan didapatkan peningkatan kadar CRP 2 kali lipat pada penderita dengan periodontitis berat. Periodontitis dapat mengaktivasi monosit pada jaringan periodontal, sehingga memproduksi sitokin proinflamatori, termasuk interleukin yang merupakan regulator utama sintesis CRP di hati. [31,32,33,34] Sebuah penelitian melaporkan meningkatnya kadar CRP pada penderita periodontitis sejalan dengan beratnya penyakit setelah disesuaikan dengan faktor-faktor yang dapat meningkatkan kadar CRP, seperti merokok, BMI, kadar TG dan kolesterol.[29] Korelasi positif antara kadar CRP dan penyakit periodontal ini diduga merupakan mekanisme dasar dari hubungan penyakit periodontal dengan peningkatan resiko penyakit jantung koroner. [29,30]

Beberapa penelitian melaporkan bahwa CRP juga dapat memprediksi terjadinya penyakit kardiovaskuler dan berperan penting dalam menilai resiko kardiovaskuler secara menyeluruh. Dilaporkan pada penderita *unstable angina* peningkatan kadar CRP lebih dari 3mg/L dapat meningkatkan kejadian penyakit koroner sebanyak dua kali lipat, dan hubungan ini akan semakin kuat jika kadar CRP lebih dari 10mg/L. [5,17] Sebuah studi epidemiologi besar melaporkan dengan peningkatan kadar CRP dapat meningkatkan resiko aterosklerosis dan penyakit jantung iskemik pada populasi normal, demikian juga pada penderita *stable angina* peningkatan kadar CRP lebih dari 3,6mg/L dapat meningkatkan kejadian penyakit koroner sebanyak dua kali lipat. Meskipun CRP merupakan faktor resiko independen untuk penyakit jantung iskemik tetapi mekanisme dasarnya belum diketahui dengan pasti, diduga melalui respon inflamasi ataupun secara langsung mempengaruhi patogenesis aterosklerosis. Pada kadar lebih dari 5mg/L CRP mempunyai efek proinflamatori pada sel endotel arteri koroner, serta dapat menginduksi ekspresi dari ICAM-1, VCAM-2 dan E-selectin. Meningkatnya ekspresi ini merupakan faktor penting pada aterogenesis dan dapat memperbesar respon inflamasi didalam plak aterosklerosis dengan menariknya monosit serta limfosit. Sehingga CRP tidak hanya sebagai marker inflamasi tetapi merupakan fungsi modulatori yang kompleks dan berperan terhadap perkembangan serta evolusi proses inflamatori / aterosklerosis. [8,31,32,35]

BAHAN DAN METODE

Penelitian ini merupakan studi deskriptif observasional dengan menggunakan desain penelitian *cross sectional,* dilakukan di Poli Jantung RSU. Dr. Soetomo pada 100 orang pasien, dengan kriteria penerimaan sumber informasi (inklusi) meliputi: Pasien yang didiagnosis penyakit jantung koroner, pasien dengan penyakit jaringan periodontal, bersedia mengikuti penelitian dengan menanda tangani lembar *inform consent* atau persetujuan setelah penjelasan.

Kriteria penolakan sampel (eksklusi) meliputi: Pasien mempunyai gejala klinis sedang menderita penyakit infeksi akut yang ditandai dengan demam didukung dengan pemeriksaan fisik dan laboratorium atau sedang mendapat pengobatan antibiotik, pasien dengan penyakit keganasan, pasien sedang mendapatkan terapi hormonal, pasien sedang mendapatkan terapi kortikosteroid.

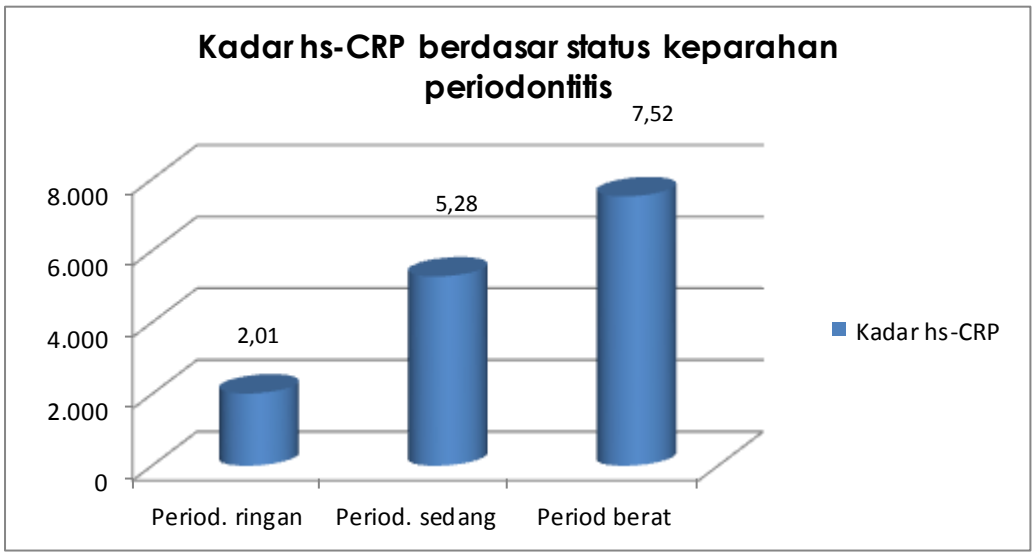
Adapun variabel penelitian ini adalah : Status periodontal dan Status hs-CRP.

Status periodontal adalah kondisi jaringan periodontal yang berhubungan dengan *attachment loss* yang diperoleh dari pengukuran jarak antara dasar poket dengan *cemento enamel junction* (CEJ) dengan menggunakan periodontal probe, merupakan modifikasi berdasarkan *Periodontal Disease Index* (PDI) yang dilakukan pada enam gigi terseleksi, yaitu 16, 21, 24, 36, 41,44 yang dikenal sebagai *Ramfjord teeth.* Kadar hs-CRP adalah kadar hs-CRP serum yang didapat melalui pemeriksaan dengan menggunakan reagen / alat Immulite C-Reactive Protein ®/ Immulite ®, dinyatakan dalam satuan mg/L.

HASIL PENELITIAN

Tabel 1. Persentase penderita periodontitis pada pasien PJK

Clinical Attachment Level	Laki-laki	Perempuan	Total
< 1 mm, tidak ada resesi	(2)	-	(2 %)
< 3 mm (Periodontitis ringan)	2 (2,0%)	4 (4,1%)	6 (6,1 %)
3 – 6 mm (Periodontitis sedang)	39 (39,8%)	30 (30,6%)	69 (70,4 %)
> 6 mm (Periodontitis berat)	16(16,3%)	7(7,1%)	23 (23,5 %)
Jumlah	57(58,2%)	41(41,8%)	100 (100 %)



Gambar 1. Grafik kadar hs-CRP berdasar status keparahan periodontitis

PEMBAHASAN

Derajat keparahan periodontitis dapat diketahui dengan mengukur besarnya *Clinical Attachment Levels* (CAL) atau kehilangan perlekatan akibat rusaknya struktur kolagen pada jaringan periodontal. CAL diukur dengan penghitungan yang dibuat dari sebuah titik tetap yang tidak berubah, yaitu pada *cemento enamel junction* (CEJ) hingga *junctional epithel*. Karena pada jaringan yang sehat, level tulang alvolar kira-kira 2 mm dibawah CEJ, sehingga CAL menentukan indikasi yang dapat dipercaya untuk batas tulang dalam menyangga sebuah gigi. Sedangkan *probing depth* bukan merupakan indikasi yang dapat dipercaya untuk batas *bone support* karena pengukurannya dibuat pada margin gingiva. Posisi margin gingiva bisa berubah oleh karena pertambahan jaringan/*overgrowth* dan resesi. [20,21]

Dari penelitian observasional ini berhasil dikumpulkan data status keparahan penyakit periodontal dari 100 orang penderita penyakit jantung koroner. Berdasarkan pemeriksaan *clinical attachment level* yang dilakukan, didapatkan hasil bahwa 98% pasien PJK juga mengalami periodontitis, dengan derajat keparahan yang berbeda. 6,1% penderitanya mengalami periodontitis ringan, 70,4% dengan periodontitis sedang, dan 23,5% sisanya dalam kondisi periodontitis berat. Didapatkan rerata kadar hs-CRP serum sebesar 2,017 ± 0,3656 pada periodontitis ringan, 5,284 ± 0,3138 pada periodontitis sedang, dan 7,522 ± 0,3580 pada periodontitis berat, terlihat bahwa faktor inflamasi berperan terhadap PJK disamping faktor resiko konvensional yang lain.

Periodontitis dapat merupakan keradangan yang bersifat kronis, karena dimulai dan dilanjutkan oleh bakteri plak subgingiva yang tidak terkontrol dengan baik sehingga

menyebabkan kerusakan jaringan. Pada umumnya muncul pada usia diatas 35 tahun, yang mana prevalensi dan keparahannya meningkat sejalan dengan bertambahnya usia. Perjalanan penyakit ini memberikan dampak rusaknya jaringan secara permanen yaitu migrasi *junctional epithel* ke apikal, hilangnya perlekatan jaringan penghubung serta *alveolar bone loss*. Hal ini dikarakteristikkan dengan terbentuknya poket dan/atau resesi gingiva. Perkembangannya lambat sampai sedang, akan tetapi dapat menyebabkan kerusakan yang parah, terutama jika terjadi pada penderita yang juga mempunyai penyakit sistemik misalnya diabetes mellitus. Dengan adanya proses inflamasi kronis di jaringan periodontal ini, monosit akan teraktivasi sehingga akan memproduksi sitokin proinflamatori, termasuk interleukin-6 yang merupakan regulator utama sintesis CRP di hati. [29]

Sebuah penelitian yang melaporkan bahwa dari total 5552 subyek memiliki kadar hs-CRP pada periodontitis berat sebesar 7,6 ± 0,6 mg/L, dan lebih rendah pada periodontitis sedang serta ringan.[32] Peneliti yang lain, Lavelle et al, 2002, melaporkan bahwa meningkatnya kadar CRP pada penderita periodontitis sejalan dengan beratnya penyakit setelah disesuaikan dengan faktor-faktor yang dapat meningkatkan kadar CRP, seperti merokok, obesitas, kadar TG dan kolesterol.[29] Pada penelitian kami ditemukan rerata kadar hs-CRP seluruh subyek yang meliputi pasien PJK dengan periodontitis adalah 5,623 ± 1,3654 mg/L. Dimana kadar terbesar adalah pada penderita dengan periodontitis berat dengan mean 7,522 ± 0,3580 mg/L.

Hal ini diduga dengan semakin beratnya derajat keparahan periodontitis, maka akan semakin lama proses inflamasi yang terjadi dalam jaringan periodontal tersebut, sehingga semakin merusak struktur di sekitar jaringan periodontal dengan akibat semakin besar jumlah monosit yang teraktivasi, demikian juga dengan sitokin proinflamatori yaitu TNF α dan IL-6, yang akan menyebabkan semakin tingginya kadar CRP yang diproduksi di hati. [29]

Penelitian kami memiliki keterbatasan antara lain jumlah subyek penelitian. Meskipun demikian penelitian ini merupakan penilitian yang pertama tentang kadar hs-CRP pada pasien PJK dengan periodontitis, dan dengan ditemukannya kadar hs-CRP yang meningkat seiring dengan derajat keparahan periodontitis maka dapat menjadi acuan penelitian lebih lanjut untuk membuktikan hipotesis apakah ada korelasi antara peningkatan kadar hs-CRP dengan penderita periodontitis, atau hipotesis bahwa faktor resiko PJK bukan hanya hanya faktor- faktor konvensional, tetapi juga faktor inflamasi.

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THE INHIBITION EFFECT OF NANNOCHLOROPSIS OCULATA EXTRACT TOWARDS THE MIXED PERIODONTOPATHOGEN BACTERIA

(Daya hambat ekstrak mikroalga hijau (*nannochloropsis oculata)* terhadap bakteri *mixed periodontopathogen)*

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ABSTRACT

Background : *Periodontal disease is multifactorial disease where the bacteria caused is mixed periodontopathogen. Antibiotics often used to support the treatment of periodontal disease but it has some disadvantages such as gastrointestinal disorder and teeth discolourization. Extracts of Nannochloropsis oculata has been known having antibacterial effect against negative gram microorganism, potential to be explored as the therapy to periodontal disease.*

Purpose : *The aim of this study was to determine the inhibitory effect of N. oculata extract to the growth of mixed periodontopatogen bacteria at concentration of 10%, 20%, 40% and 80%.*

Methods : *The antibacterial effects of N. oculata extract to the growth of mixed periodontopathogen were tested by diffusion methods with 4 concentration 10%, 20%, 40% and 80%, each consisted of 6 samples. The inhibition effects were examined by measure the diameter of the clear zone around the disc. Data were analyzed by Anova followed by LSD test.*

Result : *The result showed the clear zone around the disc of N. oculata extract in all concentration, the greater concentration of the extract the greater diameter of the clear zone. Mean of inhibition zone at concentrations of 10% (6.16mm), 20% (6.34mm), 40% (6.66mm), 80% (7,24mm), DMSO 1% (6.00mm) and tetracycline (10.58mm). Showed meaningful distinction between the group experiment with negative control. N. oculata extract could inhibit the growth of mixed periodontopathogen ($p<0,05$). The largest diameter of the clear zone was in the concentration of 80%.*

Conclusion : *N. oculata extract could inhibit the growth of mixed periodontopathogen.*

Key words : *Periodontal disease, antibacterial, mixed periodontopathogen bacteria, Nannochloropsis oculata.*

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PENDAHULUAN

Penyakit periodontal atau penyakit pada jaringan penyangga gigi merupakan salah satu jenis penyakit di dalam rongga mulut yang paling sering dijumpai disamping karies; terutama di negara-negara berkembang dan bersifat kronis.[1] Salah satu tahapan perawatan penyakit periodontal adalah pengurangan bakteri supragingiva dan subgingiva yang dapat dilakukan secara mekanik dengan *scaling* dan *root planning* dan secara kimiawi dengan pemberian antibiotik lokal dan oral atau sistemik. Antimikroba konvensional (antibiotik) yang sering digunakan menunjang terapi penyakit periodontal adalah tetrasiklin, metronidazole, amoksisilin, klindamisin dan sefalosporin.[2]

Namun pada saat ini, resistensi bakteri terhadap berbagai antibiotika sedang terjadi diberbagai belahan dunia dan merupakan ancaman bagi keberhasilan terapi terhadap penyakit infeksi baik di rumah sakit, pelayanan kesehatan lain, maupun di masyarakat. Para peneliti menemukan bahwa bakteri patogen menjadi resisten terhadap antimikroba melalui proses seleksi alami, Beberapa kuman gram (+) maupun gram (-) yang memproduksi beta-*lactamase* juga merupakan salah satu masalah resistensi terhadap penisilin dan cephalosporin.[3]

Alternatif pemecahan masalah ini adalah dengan memanfaatkan obat tradisional yang bahannya bersumber dari tumbuhan, hewan, atau mineral yang ada di sekitar tempat tinggal penduduk.[4] Menurut Juliantina, pemanfaatan *herbal medicine* ramai dibicarakan, termasuk dalam manfaatnya, namun kebanyakan informasi yang ada hanya sebatas bukti empiris belum ada bukti ilmiah.[5]

Dua pertiga luas wilayah Indonesia terdiri dari lautan yang didalamnya terdapat bermacam-macam makhluk hidup baik berupa tumbuhan maupun hewan. Salah satu makhluk hidup yang tumbuh dan berkembang di perairan laut adalah alga laut terutama alga hijau.[6] Penelitian sebelumnya oleh Meritasari dkk, mikroalga hijau *(Nannochloropsis oculata)* telah diteliti pada bakteri *Vibrio alginolyticus* yang merupakan bakteri anaerob gram negatif yang memiliki kesamaan dengan bakteri *mixed periodontopathogen* dan menunjukkan hasil dapat menghambat pertumbuhan bakteri yang sering menyerang ikan dan udang karena berdasarkan proses biosintesisnya, alga laut kaya akan senyawa turunan dari oksidasi lemak yang disebut *oxylipin*.[7] *Oxylipin* merupakan produk metabolit sekunder secara umum digunakan sebagai antibakteri.[8]

Ekstrak mikroalga hijau *Nannochloropsis oculata* mampu menghambat pertumbuhan bakteri *Vibrio alginolyticus*,[7] tetapi belum diketahui aktivitas terhadap bakteri *mixed periodontopthogen*. Pada penelitian ini ingin mengetahui apakah terdapat daya hambat

ekstrak mikroalga hijau terhadap bakteri *mixed periodontopathogen*. Tujuan umum penelitian ini adalah untuk mengetahui daya hambat ekstrak mikroalga hijau *Nannochloropsis oculata* terhadap bakteri *mixed periodontopathogen.*

Berdasarkan data tersebut, peneliti ingin mengembangkan penelitian daya hambat alga hijau *(Nannochloropsis oculata)* terhadap pertumbuhan bakteri *mixed periodontopathogen* yang merupakan bakteri penyebab kelainan periodontal dimana prevalensi penyakit ini masih sangat tinggi di masyarakat. Keinginan untuk menemukan alternatif antimikroba (antibiotik) baru dengan mengeksplor sumber daya laut menjadi alasan dilakukannya penelitian ini yang kedepannya bisa dimanfaatkan di bidang kedokteran gigi.

BAHAN DAN METODE

Penelitian ini termasuk penelitian *true experimental* dengan rancangan penelitian *the post test only control group design*.[9]

Bahan yang digunakan meliputi suspensi bakteri *mixed periodontopathogen*, *BHI* cair, agar *BHI oxoid*, ekstrak mikroalga hijau *Nannochloropsis oculata* dengan berbagai konsentrasi (10%, 20%, 40% dan 80%), larutan *Mc. Farland* 0.5, DMSO 1% dan tetrasiklin dosis *disc* 30 μg.

Sampel *Nannochloropsis oculata* diambil dari Balai Budidaya Air Payau Sitobondo. Proses ekstraksi dilakukan dengan metode maserasi, dengan cara 600 gram bubuk *Nannochloropsis oculata* direndam kedalam 500 ml larutan etanol 96% selama 24 jam kemudian disaring dengan corong *buchner* yang diletakkan diatas labu hisap yang telah dihubungkan dengan pompa *vacum*. Perendaman dan penyaringan ekstrak ini dilakukan sebanyak 3 kali. Filtrat hasil penyaringan dievaporasi dengan alat yaitu *vacum rotavapour* selama 7 – 8 jam. Kemudian didapatkan hasil akhir berupa ekstrak *Nannochloropsis oculata* sebanyak 29 gram. Persiapan ekstrak *Nannochloropsis oculata* dengan berbagai konsentrasi di dalam tabung – tabung steril dengan menggunakan pengenceran *DMSO* 1%.[10]

Bakteri *mixed periodontopathogen* biakan murni berupa biakkan dalam *BHI* cair yang sudah diinkubasi selama 24 jam dalam suasana *anaerob*, selanjutnya kekeruhannya disetarakan dengan standar *Mc Farland* 0,5.

Uji daya hambat menggunakan metode difusi (metode *Kirby-Bauer*) yaitu dengan mencelupkan kertas saring yang sebelumnya telah dicelupkan ke dalam ekstrak mikroalga hijau *Nannochloropsis oculata* selama 10 detik pada kelompok perlakuan. Untuk kelompok kontrol negatif, kertas saring dicelupkan kedalam 2ml DMSO 1% selama 10 detik.

Sedangkan untuk kelompok kontrol positif, diberi tetrasiklin *disc* dengan dosis 30 μg selama 10 detik.

Sebanyak 30 cakram kertas saring disiapkan. 6 cakram kertas saring masing – masing dicelupkan kedalam ekstrak *Nannochloropsis oculata* 10% 2 ml selama 10 detik. 6 cakram kertas saring masing – masing dicelupkan kedalam ekstrak *Nannochloropsis oculata* 20% 2 ml selama 10 detik. 6 cakram kertas saring masing – masing dicelupkan kedalam ekstrak *Nannochloropsis oculata* 40% 2 ml selama 10 detik. 6 cakram kertas saring masing – masing dicelupkan kedalam ekstrak *Nannochloropsis oculata* 80% 2 ml selama 10 detik. 6 cakram kertas saring masing – masing diberi tetrasiklin 30μg. Dan 6 cakram kertas saring lainnya masing – masing dicelupkan kedalam DMSO 1% 2 ml. Kertas saring tersebut diletakkan pada media *BHI* agar *mixed periodontopathogen* dengan menggunakan pinset steril agak ditekan – tekan. Kemudian *petri dish* dimasukkan ke dalam inkubator selama 2x24 jam dengan suhu 37° C dalam sungkup *anaerob.*

Setelah 48 jam, diukur diameter zona hambat yang terbentuk berupa area jernih *(clear zone)* disekitar kertas saring dengan menggunakan *digital calipers* (dalam satuan mm). Zona hambat yang lebih besar menunjukkan keefektifitasan dari agen uji antimikroba.[11] Zona hambat yang tampak disekitar kertas aring menunjukkan adanya daya antibakteri pada masing-masing konsentrasi ekstrak mikroalga hijau *Nannochloropsis oculata.*

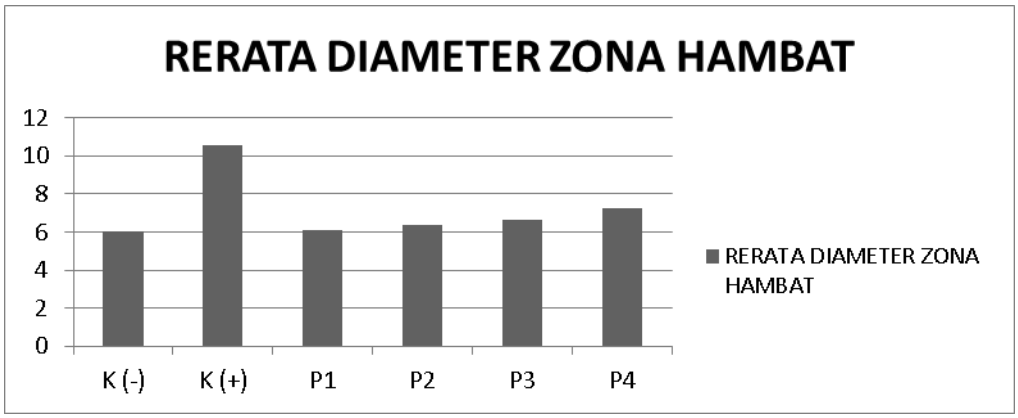
Teknik analisa data yang dipakai untuk membandingkan daya hambat pemberian ekstrak *Nannochloropsis oculata* dengan konsentrasi 10%, 20%, 40% dan 80% terhadap pertumbuhan bakteri *mixed periodontopathogen* dengan uji *one way analysis of varians (ANOVA)* dan dilanjutkan dengan uji *LSD.* [12]

HASIL

Data hasil penelitian dianalisis secara analisis deskriptif untuk memperoleh gambaran distribusi dan peringkasan data guna memperjelas penyajian hasil. Tabel dibawah ini menunjukkan rerata zona hambat ekstrak *Nannochloropsis oculata* sesudah perlakuan pada kelompok kontrol.

Tabel 1. Hasil uji statistik deskriptif

Kelompok	n	Rerata	Std. Deviation
K (-)	6	6,0000	0,0000
K (+)	6	10,5833	0,05888
P1	6	6,1150	0,01871
P2	6	6,3367	0,01211
P3	6	6,6517	0,03251
P4	6	7,2367	0,01633



Gambar 1. Grafik rerata diameter zona hambat

Data hasil penelitian yang menunjukkan zona hambat pertumbuhan bakteri *mixed periodontopathogen* dengan pemberian ekstrak mikroalga hijau *Nannochloropsis oculata* pada berbagai konsentrasi selanjutnya dianalisis statistik dan diuji signifikansinya dengan taraf signifikansi kesalahan sebesar 5% ($p<0.05$).

Setiap kelompok perlakuan dan kontrol positif diuji normalitasnya dengan menggunakan uji *Shapiro-Wilk*.[12] Hasil uji *Shapiro – Wilk* menunjukkan bahwa data berdistribusi normal dan hasil uji *Levene* didapatkan nilai signifikansi 0.07, sehingga dapat disimpulkan bahwa data hasil penelitian homogeny ($p> 0.05$).

Data penelitian yang terdistribusi normal dan variansnya homogen kemudian dianalisis dengan menggunakan uji parametrik yaitu *one way ANOVA* untuk mengetahui adanya perbedaan antara kelompok kontrol positif dengan kelompok perlakuan konsentrasi 10%, 20%, 40% dan 80% dari ekstrak mikroalga hijau *Nannochloropsis oculata* pada masing – masing sampel.

Hasil uji *one way ANOVA* menunjukkan nilai signifikansi sebesar 0.000 ($p < 0.05$). Ini berarti terdapat perbedaan makna antara kontrol positif dengan masing – masing kelompok perlakuan yang memiliki konsentrasi berbeda – beda. Berdasarkan hal tersebut maka dilanjutkan dengan uji *LSD*. Dari hasil uji *LSD* diketahui bahwa ekstrak mikroalga hijau *Nannochloropsis oculata* terhadap semua perlakuan menunjukkan perbedaan yang bermakna ($p< 0.05$). Semakin besar konsentrasi ekstrak *Nannochloropsis oculata* yang diberikan terhadap bakteri, maka semakin besar pula diameter zona hambat yang terbentuk disekitar *paper disc*.

PEMBAHASAN

Pada penelitian ini terlihat bahwa ekstrak mikroalga hijau *Nannochloropsis oculata* terbukti mampu mengambat pertumbuhan bakteri *mixed periodontopathogen* pada semua kelompok perlakuan dengan konsentrasi 10%, 20%, 40% dan 80% diperkirakan karena adanya kandungan senyawa bahan aktif terpenoid, alkaloid dan flavonoid. Efek senyawa aktif ditunjukkan dengan fungsinya sebagai antibakteri dimana diketahui eksrak *Nannochloropsis oculata* mempunyai daya hambat dan bunuh bakteri dimana kadar bunuh minimum terdapat pada konsentrasi 40%.[13]

Senyawa terpenoid merupakan salah satu bahan aktif yang terdapat pada ekstrak *Nannochloropsis oculata.* Golongan terpenoid dikenal sebagai senyawa utama pada tanaman yang bersifat sebagai penyusun minyak atsiri. Secara kimia, terpenoid umumnya larut dalam lemak dan terdapat di dalam sitoplasma sel tumbuhan. Mekanisme kerja dari terpenoid ialah mudah larut dalam lipid. Sifat inilah yang mengakibatkan senyawa ini lebih mudah menembus dinding sel bakteri baik bakteri batang gram positif maupun negatif yang mengakibatkan kelisisan sel sehingga menyebabkan kematian sel bakteri.[14]

Alkaloid merupakan suatu golongan senyawa organik yang terbanyak yang ditemukan di alam. Secara umum alkaloid merupakan metabolit basa yang mengandung nitrogen dan banyak sekali ragamnya termasuk struktur kimianya. Sebagian besar alkaloid dibentuk dari asam-asam amino seperti lisin, ornitin, fenilalanin, tirosin dan triptofan, serta kerangka asam-asam amino tersebut sebagian besar masih tetap dalam stuktur senyawa-senyawa alkaloid dan turunannya.Banyak jenis alkaloid yang bersifat terpenoid atau sebagai terpenoid termodifikasi. Senyawa alkaloid memiliki mekanisme penghambatan dengan cara mengganggu komponen penyusunan peptidoglikan pada sel bakteri, sehingga lapisan dinding sel tidak berbentuk secara utuh dan menyebabkan kematian sel tersebut.[5] Adanya gugus basa

dalam senyawa alkaloid apabila mengalami kontak dengan bakteri akan bereaksi dengan senyawa-senyawa asam amino yang menyusun dinding sel bakteri dan juga DNA bakteri yang merupakan pusat pengaturan segala kegiatan sel. Reaksi ini mengakibatkan terjadinya perubahan struktur dan susunan asam amino. Perubahan susunan asam amino ini jelas akan merubah susunan rantai DNA pada inti sel yang semula memiliki susunan asam dan basa yang saling berpasangan. Hal ini akan mengakibatkan perubahan keseimbangan genetik pada asam DNA sehingga DNA bakteri akan mengalami kerusakan. Kerusakan sel pada bakteri ini lama kelamaan akan membuat sel-sel bakteri tidak mampu melakukan metabolisme sehingga akan menjadi inaktif dan hancur (lisis).[5]

Senyawa flavonoid adalah suatu kelompok senyawa fenol yang terbanyak terdapat di alam.[15] Menurut Carlo, flavonoid bersifat *hydrophile* dan merupakan senyawa polar. Flavonoid mempunyai aktivitas antibakteri karena dapat membentuk kompleks dengan protein ekstra seluler, protein terlarut, dan kompleks dengan dinding sel.[16] Penelitian secara *in vivo* maupun *in vitro* menunjukkan bahwa flavonoid memiliki aktivitas biologis maupun farmakologis, selain bersifat antibakteri dapat juga sebagai antiinflamasi, antialergi, antikarsinogen, antioksidan dan melindungi pembuluh darah Prinsip kerja flavonoid sama dengan alkaloid yaitu dengan merusak dinding sel, hanya saja caranya yang berbeda, senyawa flavonoid merusak sel bakteri memanfaatkan perbedaan kepolaran antara lipid penyusun sel bakteri dengan gugus alkohol pada senyawa flavonoid. Sedangkan pada senyawa alkaloid memanfaatkan sifat reaktif gugus basa untuk bereaksi dengan gugus asam amino pada sel bakteri.[15]

Peneliti menggunakan tetrasiklin sebagai kontrol positif dengan pertimbangan antibiotik tetrasiklin mempunyai aktivitas bakteriostatis dan berspektrum luas, selain itu tetrasiklin juga menghambat pertumbuhan bakteri gram positif dan gram negatif yang peka dan merupakan obat pilihan untu infeksi yang disebabkan oleh riketsia, klamidia dan *Mycoplasma pneumoniae.*[17] Cara kerja daripada tetrasiklin adalah menghambat sintesis protein bakteri pada ribosomnya. Paling sedikit terjadi 2 proses dalam masuknya antibiotik ke dalam bakteri gram negatif, pertama secara difusi pasif melalui kanal hidrofilik, kedua melalui sistem transpor aktif. Setelah masuk antibiotik berikatan seraca reversibel dengan ribosom 30S dan mencegah ikatan tRNA–aminoasit pada kompleks mRNA-ribosom. Hal tersebut mencegah perpanjangan rantai peptida yang sedang tumbuh dan berakibat terhentinya sintesis protein.[15] Antibiotik yang memiliki mekanisme kerja menghambat sintesis protein mempunyai daya antibakteri sangat kuat.[18] Sedangkan untuk kontrol

negatifnya, peneliti memilih DMSO 1% dengan alasan cairan DMSO 1% merupakan *polar aprotic solvent* yang larut dalam senyawa polar dan non polar juga larut dalam berbagai pelarut organik serta air.[19] Selain itu, menurut Patel dkk, DMSO 1% tidak mempengaruhi pertumbuhan kinetik dari berbagai mikroorganisme yang diuji sehingga apabila digunakan dalam penelitian tidak mempengaruhi hasil dari penelitian.[10]

Hasil penelitian tampak adanya perbedaan diameter zona hambat pertumbuhan bakteri *mixed periodontopathogen* pada perlakuan kelompok kontrol positif (tetrasiklin) sebesar 10.5833 mm dengan konsentrasi terbesar ekstrak mikroalga hijau *Nannochloropsis oculata* 80% sebesar 7.2367 mm. Perbedaan ini disebabkan karena mekanisme kerja dari bahan aktif pada *Nannochloropsis oculata* hanya mengganggu komponen penyusunan peptidoglikan pada sel bakteri sehingga lapisan dinding sel tidak terbentuk secara utuh dan menyebabkan kematian sel tersebut. Hal ini dapat diasumsikan bahwa mekanisme kerja dari *Nannochloropsis oculata* ini bersifat bakteriostatik Sedangkan pada tetrasiklin cara kerjanya adalah dengan menghambat sintesis protein bakteri pada ribosomnya yang menyebabkan bakteri lisis. Dilihat dari kerjanya tersebut, tetrasiklin diasumsikan bekerja secara bakterisid. Berdasarkan mekanisme kerja tersebut terbukti pada hasil penelitian, tampak zona hambat yang lebih besar pada kelompok tetrasiklin dibandingkan kelompok perlakuan ekstrak mikroalga hijau *Nannochloropsis oculata*. Selain faktor mekanisme kerja tersebut itu, pada penelitian ini ekstrak yang digunakan adalah ekstrak yang partikelnya masih kasar. Hal ini menyebabkan sulitnya ekstrak untuk menembus dinding sel bakteri yang mempengaruhi proses penghambatan pertumbuhan bakteri *mixed periodontopathogen* tidak bekerja secara maksimal. Besarnya diameter zona hambat pada tetrasiklin dibandingkan pada ekstrak *Nannochloropsis oculata* menunjukkan bahwa bahan alam ini potensial dikembangkan sebagai terapi preventif di bidang kedokteran gigi yaitu untuk menjaga *oral hygiene* dengan sediaan sebagai obat kumur.

SIMPULAN

Ekstrak mikroalga hijau *Nannochloropsis oculata* mempunyai daya hambat terhadap pertumbuhan bakteri *mixed periodontopathogen* pada konsentrasi 10%, 20%, 40% dan 80%. Konsentrasi yang paling efektif dalam menghambat pertumbuhan bakteri *mixed periodontopathogen* adalah 80%, namun masih lebih kecil daya hambatnya dibandingkan antibiotik tetrasiklin.

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INHIBITION OF Rhizophora mucronata BARK EXTRACT AGAINST GROWTH OF MIXED PERIODONTOPATHOGEN BACTERIA

(Daya hambat ekstrak kulit batang bakau besar (R*hizophora mucronata*) terhadap pertumbuhan bakteri *mixed periodontopathogen)*

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ABSTRACT

Background: *Periodontitis is a disease of the periodontal tissues which one of the primary etiology is mixed periodontopathogen, dominated by gram-negative bacteria. Rhizophora mucronata bark as one of the mangrove plant species have the antibacterial effect against gram positive and gram negative bacteria, thus potentially developed as antibacterial agent in periodontal disease.*

Purpose : *Examine the inhibition effect of Rhizophora mucronata bark extract to bacterial periodontopathogen pathogen.*

Methods: *Subjects were mixed bacterial periodontopathogen total of 42 samples were divided into 7 groups (n = 6). Five groups were given the extract with different concentrations of 5mg/ml, 10 mg/mlp kin\, 20 mg/ml, 40 mg/ml, and 80 mg/ml, control positive group was given minocicline 0,1 % and control negative was given aquadest steril. Extracts was prepared by percolation method, sample of bacteria were innoculated in Muler Hinton agar. The inhibitory effect was observed by measuring the diameter of inhibition zones on agar media.*

Results: *Data was analyzed by ANOVA and LSD test (P = 0.05). The results show each extract and control groups had significant differences. With an average diameter of eachdisc is obtained as follows:5 mg/ml= 6.23mm, 10 mg/ml= 6.51mm; 20 mg/ml=6.91mm, 40 mg/ml=7.70mm, 80 mg/ml=13.55mm; positive control=45.24, and negative control=6 mm.*

Conclusion: *Rhizophora mucronata bark extract could inhibit the growth of bacteria mixed periodontopathogen and the effevtive inhibitory concentration is 80 mg/ml but it smaller than positive control (minosiklin 0,1%)*

Keywords: *periodontitis, mixed periodontopathogen bacteria, Rhizophora mucronata barks*

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PENDAHULUAN

Periodontitis merupakan salah satu penyakit dengan tingkat penyebaran yang luas dalam masyarakat. Angka kejadian periodontitis bervariasi pada berbagai negara di dunia dan memperlihatkan kecenderungan terjadinya peningkatan. Penelitian yang dilakukan di Brazil pada tahun 2005 menunjukkan prevalensi periodontitis agresif pada usia 12 – 25 tahun sebesar 6,5% dan meningkat menjadi 9,9% [1]. Oleh karena itu dibutuhkan perhatian khusus terutama dari tenaga-tenaga kesehatan gigi dan mulut untuk memahami etiologi, patologi serta cara penanganannya termasuk pengobatan alternatif yang dapat dilakukan dengan memanfaatkan kekayaan alam yang ada.

Penyakit Periodontal merupakan peradangan dan juga perubahan resesif pada gingiva dan periodontal. Gingivitis adalah suatu proses peradangan yang terbatas pada gingiva dan tidak ada kehilangan perlekatan. Kondisi gingivitis dapat ditimbulkan oleh plak, selain itu perubahan pada gingiva dapat dipengaruhi oleh faktor hormonal dan sistemik, atau sebagai efek samping obat. Sedangkan periodontitis terjadi apabila tingkat keparahan inflamasi telah mencapai jaringan penyangga yang letaknya lebih profundal, seperti tulang alveolar [2]. Periodontitis memiliki tingkat keparahan yang lebih tinggi dibanding gingivitis, karena periodontitis memiliki sifat kerusakan yang *irreversible* dan dapat menyebabkan kerusakan pada ligamen periodontal hingga resorpsi tulang alveolar [3].

Faktor etiologi penyakit periodontal biasanya diklasifikasikan menjadi faktor lokal dan sistemik, efek kedua faktor ini saling berhubungan. Faktor lokal menyebabkan terjadinya peradangan yang merupakan proses patologis utama dalam penyakit periodontal, sedangkan faktor sistemik mengontrol respon jaringan terhadap faktor lokal, jadi efek iritasi lokal secara dramatis dapat diperparah oleh kondisi sistemik yang tidak menguntungkan [4].

Salah satu contoh faktor lokal periodontitis adalah akumulasi plak. Plak terdiri dari bakteri-bakteri patogen rongga mulut. Bakteri-bakteri patogen yang diduga memiliki peranan penting sebagai penyebab kerusakan jaringan periodontal adalah *Actinobacillus actinomycetemcommitans (Aa), Porphyromonas gingivalis, Tannerella forshytensis, Prevotella intermedia, Fusobacterium nucleatum, Selenomonas* dan *Capnocytophaga* yang merupakan bakteri-bakteri jenis anaerob gram negatif [5]. Bakteri – bakteri tersebut disebut dengan bakteri *mixed periodontopathogen* yang berada dalam rongga mulut pasien dengan kelaian periodontitis. Salah satu cara untuk mencegah penyakit periodontal adalah dengan pengendalian plak. Pengendalian plak dapat melalui 2 cara yaitu, secara mekanik dan kimiawi. Secara mekanik dapat dilakukan dengan *scaling* dan *root planing*, sedangkan

kimiawi dengan cara pemberian antimikroba lokal. Keberhasilan perawatan tergantung pada terhentinya proses kerusakan jaringan, menghilangkan atau mengontrol faktor penyebab serta perubahan kondisi mikroba seperti pada kondisi jaringan yang sehat dan normal [4].

Salah satu tujuan perawatan penyakit periodontal adalah menghilangkan atau menurunkan jumlah bakteri patogen, namun tujuan ini sering tidak tercapai dengan perawatan konvensional seperti *scaling and root planning* dibutuhkan perawatan secara kimiawi berupa antibiotika [6]. Antimikroba konvensional (antibiotik) seperti minosiklin, doksisiklin, clyndamisin dan lain-lain sering digunakan untuk menunjang terapi penyakit periodontal, namun meskipun memiliki potensi inhibitor pertumbuhan mikroba yang kuat, antimikroba konvensional (antibiotik) dapat menimbulkan efek samping yaitu terjadi resisten, reaksi alergi, dan reaksi toksik [4]. Sehingga, diperlukan terapi alternatif untuk mengobati penyakit periodontal tanpa efek samping [7]. Mangrove sebagai flora pesisir memiliki beberapa kandungan yang dapat dimanfaatkan dalam pengobatan alternatif. Salah satu spesiesnya adalah *Rhizophora mucronata*. *Rhizophora mucronata* memiliki kelebihan dibandingkan jenis mangrove lainnya ditinjau dari daerah penyebaran, kemudahan untuk ditemukan, dan manfaatnya yang beragam [8]. Kemampuan antibakteri mangrove kemungkinan besar disebabkan oleh senyawa-senyawa kimia aktif yang terkandung di dalamnya, seperti alkaloid, flavanoid, tanin, saponin, dan lain-lain [9]. Kandungan kimia aktif yang terdapat pada tanaman mangrove khususnya spesies *Rhizophora mucronata* memiliki kemampuan sebagai antibakteri [10]. Diketahui pula bagian kulit dan kayu batang mangrove memiliki kandungan kimia aktif yang tinggi termasuk tanin, karena pada bagian tersebut terdapat floem yang bertugas menyalurkan hasil fotosintesis [11].

Berdasarkan penjelasan di atas, penelitian ini dilakukan untuk mengetahui daya hambat ekstrak kulit batang *mangrove* dengan spesies *Rhizophora mucronata* terhadap bakteri *mixed periodontopathogen,* sehingga dapat dijadikan bahan dasar pengobatan alternatif untuk penyakit periodontal. Selain itu penulis juga tertarik terhadap kekayaan alam bahari termasuk potensi-potensi yang dimiliki tumbuhan mangrove sebagai bahan pengobatan alternatif baru bagi rakyat Indonesia, khususnya pengobatan di bidang kedokteran gigi.

Rumusan masalah dari penelitian ini adalah apakah ekstrak kulit batang spesies mangrove *Rhizophora mucronata*dapat menghambat pertumbuhan bakteri *mixed periodonthopatogen.* Tujuan umum penelitian ini adalah megetahui daya hambat ekstrak kulit

batang bakau besar (*Rhizophora mucronata*) terhadap pertumbuhan bakteri *mixed periodontopathogen*.

BAHAN DAN METODE

Jenis penelitian yang digunakan adalah penelitian *true eksperimental*. Rancangan penelitian dalam penelitian ini adalah *the post test only control group design* yang berarti dalam rancangan penelitian ini didapatkan dua kelompok variabel yang dipilih secara random (R). Kelompok pertama atau beberapa kelompok diberi perlakuan sedangkan terdapat kelompok lainnya yang tidak diberikan perlakuan (kelompok kontrol) [12]. Teknik yang digunakan dalam pengambilan sampel ini menggunakan metode *simple random sampling.* Sampel yang digunakan pada penelitian ini adalah bakteri *mixed periodontopathogen* kultur biakan pasien dengan periodontitis kronis dari Laboratorium Mikrobiologi Fakultas Kedokteran Gigi Universitas Airlangga Surabaya. Ekstrak kulit batang bakau besar *(Rhizophora mucronata)* adalah simplisia yang diperoleh dari hasil pengulitan kayu pohon *Rhizophora mucronata* di balai pengelolaan hutan mangrove wilayah I, Wonorejo, Surabaya. Kulit kayu yang diambil berasal dari pohon *Rhizophora mucronata* yang sudah cukup tua.

Ekstrak kulit kayu bakau besar *(Rhizophora mucronata)* merupakan ekstrak etanol 95% dari kulit kayu *Rhizophora mucronata* dengan menggunakan metode *Perkolasi* dan terdiri dari konsentrasi 5 mg/ml; 10 mg/ml, 20 mg/ml, 40 mg/ml dab 80 mg/ml [9]. Metode perkolasi ini dilakukan dengan menggunakan etanol p.a (95%) sebagai pelarutnya. Sepuluh gram bahan kering *Rhizophora mucronata* digunakan untuk setiap variabel. [12].

Setelah proses pengekstrakan selesai, tahap berikutnya adalah proses pelarutan ekstrak dengan pelarut aquades. Ekstrak dilarutkan dalam bahan pelarut hingga diperoleh konsentrasi yang diinginkan. Selanjutnya ekstrak *Rhizophora mucronata* yang akan diuji, terlebih dahulu diaduk hingga bahan tercampur homogen dengan pelarutnya menggunakan vortex selama 10 detik. Setelah itu disterilisasi dengan *syringe mikroporus membrane* diameter 0,02µm untuk menjaga kemurnian dan mencegah kontaminasi mikroorganisme lain dalam ekstrak *Rhizophora mucronata* [7]. Berikutnya adalah proses inokulasi bakteri *mixed periodontopatogen* pada media *MH* Agar menyiapkan 1 *petri dish* berisi *MH* agar steril yang terdiri dari 2 kelompok kontrol dan 5 kelompok perlakuan. Mengambil biakan bakteri *mixed* periodontopatogen dari *BHI* cair yang telah disetarakan kekeruhannya dengan larutan *Mc Farland* 0,5. Mengusapkan biakan tersebut pada seluruh permukaan lempeng *MH agar* steril dengan menggunakan lidi kapas steril [13].

Setelah tahapan persiapan ekstrak dan inokulasi bakteri telah selesai maka tahap berikutnya adalah proses kerja uji daya hambat ekstrak *Rhizophora mucronata* terhadap pertumbuhan bakteri *mixed periodontopathogen* dengan cara mencelupkan kertas saring yang sebelumnya telah dicelupkan ke dalam ekstrak *R. mucronata* selama 10 detik pada kelompok perlakuan. Untuk kelompok kontrol negatif, kertas saring dicelupkan pada aquades selama 10 detik, sedangkan untuk kontrol positif, digunakan 1 ml minosiklin 0,1 %. Meletakkan kertas saring tersebut pada media agar *mixed periodontopathogen* dengan menggunakan pinset steril agak ditekan – tekan. Memasukkan *petri dish* ke dalam inkubator selama 2x24 jam dengan suhu 37^0C dalam suasana anaerob.

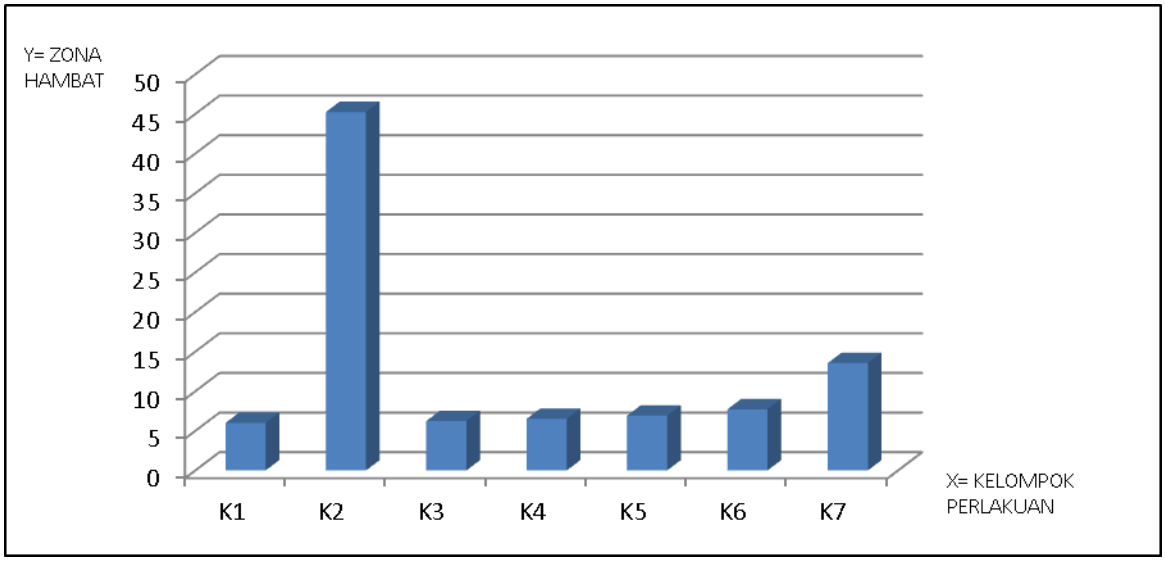
Mengukur zona hambat ekstrak *R. mucronata* yang berupa area jernih di sekitar kertas saring dengan menggunakan *digital calipers* (dalam satuan mm). Pengukuran tersebut dilakukan dari batas jernih terakhir yang berdekatan dengan koloni di sebelah kiri hingga batas jernih terakhir yang berdekatan dengan koloni di sebelah kanan yang diukur pada jarak daerah jernih terpanjang [14].

HASIL PENELITIAN

Setelah dilakukan rangkaian proses pengujian daya hambat ditemukan data yang kemudian dideskripsikan sebagai berikut.

Tabel 1. Daya hambat ekstrak *Rhizophora mucronata* terhadap pertumbuhan *mixed periodontopathogen*

Replikasi	Daya Hambat Kelompok dan Ekstrak *Rhizophora mucronata*						
	K1	**K2**	**K3**	**K4**	**K5**	**K6**	**K7**
1	6.00	45.00	6.28	6.54	6.54	7.30	11.37
2	6.00	45.55	6.25	6.49	6.49	7.37	11.75
3	6.00	45.21	7.12	7.35	7.35	7.72	11.32
4	6.00	45.20	6.90	7.46	7.46	7.41	10.49
5	6.00	45.25	6.12	6.35	6.35	7.17	10.83
6	6.00	45.23	6.14	6.30	6.30	7.73	13.58
Rerata ± std. deviasi	6,00 ± 0,000	45,24 ± 0,177	6,23 ± 0,029	6,51 ± 0,021	6,91 ± 0,026	7,71 ± 0,019	13,54 ± 0,032



Gambar 1. Grafik rerata diameter daya hambat *Rhizophora mucronata*

Dari grafik di atas dapat dilihat kontrol kelompok K7 sebagai (konsentrasi ekstrak 80 mg/ml) memiliki daya hambat paling besar dibandingkan kelompok ekstrak lainnya (K3, K4, K5, K6,), kontrol negatif (K1) tidak memiliki daya hambat, sedangkan kelompok K2 (Kontrol positif minosiklin 0,1 %) memiliki daya hambat terbesar pada penelitian ini. Uji normalitas data dengan menggunakan uji *Saphiro-Wilk* menunjukkan nilai yang lebih besar dari 0,05 untuk setiap perlakuan sehingga data dapat dikatakan normal. Kemudian dilakukan uji homogenitas menggunakan *Levene test*. Pada uji statistik *one way ANOVA* diketahui bahwa nilai signifikansi sebesar 0,000 yang lebih kecil dari 0,05 ($p<0,05$), maka dapat disimpulkan bahwa ekstrak kulit batang *Rhizophora mucronata* dapat menghambat pertumbuhan bakteri *mixed periodontopathogen.*

Berdasarkan analisis *post hoc* (*LSD*) ketahui pada kelompok ekstrak (K3, K4, K5, K6, K7), semakin besar konsentrasi, semakin besar secara signifikan pula daya hambatnya. Pada kelompok kontrol (K1, K2), kelompok kontrol positif (K2) memiliki daya hambat lebih daya hambat lebih besar bermakna dibandingkan kontrol negatif, sedangkan Kelompok kontrol positif juga menunjukkan daya hambat terbesar secara bermakna dibandingkan kelompok lainnya termasuk kelompok ekstrak

PEMBAHASAN

Berdasarkan analisis data, semakin besar konsentrasi ekstrak menunjukkan semakin besar pula daya hambat yang timbul. Hal ini dapat disebabkan oleh senyawa-senyawa kimia aktif termasuk senyawa aktif bersifat antibakteri yang terkandung dalam ekstrak tersebut.

Maka semakin besar konsentrasinya semakin banyak pula kandungan senyawa aktif di dalamnya dan semakin besar pula efek yang ditimbulkan oleh ekstrak tersebut, termasuk daya antibakteri. Alasan ini juga dapat menjelaskan ketika kelompok ekstrak dibandingkan dengan kelompok kontrol negatif aka nampak perbedaan nyata dimana kelompok ekstrak memiliki daya hambat yang lebih besar dibandingkan kelompok negatif, karena akuades steril sebagai kelompok negatif tidak memiliki kandungan senyawa-senyawa kimia yang terdapat pada kelompok ekstrak.

Seperti yang disebutkan sebelumnya, daya hambat pertumbuhan bakteri yang dimiliki oleh *Rhizophora mucronata* disebabkan oleh kandungan-kandungan kimia yang terdapat di dalamnya. Terdapat beberapa kandungan kimia yang dapat berpotensi menghambat pertumbuhan bakteri, seperti tanin, alkaloid, terpenoid dan saponin. Tanin yang terkandung dalam *Rhizophora mucronata* adalah tanin terkondensasi [15]. *Rhizophora mucronata* memilki kandungan tanin sebesar 26 %. Terdapat tiga mekanisme aktivitas tanin sebagai antimikroba yaitu pertama, tanin bersifat astringen (zat yang menciutkan); tanin dapat membentuk kompleks dengan enzim mikroba ataupun substrat. Kedua, tanin masuk melalui membran mikroba, untuk mencapai membran tanin harus melalui dinding sel mikroba. Dinding sel terbuat dari polisakarida dan protein yang berbeda yang memungkinkan tanin untuk masuk. Ketiga, tanin membentuk kompleks dengan ion metal. Kebanyakan tanin memiliki lebih dari dua grup o-difenol pada molekulnya, yang dapat mengikat ion-ion metal seperti Cu, dan Fe. Tanin mereduksi ketersediaan ion metal esensial untuk mikroorganisme [16].

Senyawa alkaloid memiliki mekanisme penghambatan dengan cara mengganggu komponen penyusun peptidoglikan pada sel bakteri, sehingga lapisan dinding sel tidak terbentuk secara utuh dan menyebabkan kematian sel tersebut [17.] Dalam senyawa alkaloid terdapat gugus basa yang mengandung nitrogen akan bereaksi dengan senyawa asam amino yang menyusun dinding sel bakteri dan *DNA* bakteri Reaksi ini mengakibatkan terjadinya perubahan struktur dan susunan asam amino [18]. Kemudian akan menimbulkan perubahan keseimbangan genetik pada rantai *DNA* sehingga akan mengalami kerusakan dan mendorong terjadinya lisis sel bakteri yang berakibat kematian sel pada bakteri.

Senyawa saponin dapat melakukan mekanisme penghambatan dengan cara membentuk senyawa kompleks dengan membran sel melalui ikatan hidrogen, sehingga dapat menghancurkan sifat permeabilitas dinding sel dan akhirnya dapat menimbulkan kematian sel. Hal ini disebabkan saponin memiliki molekul yang bersifat hidrofilik dan hidrofobik, bagian yang hidrofobik berikatan dengan ujung hidrofobik protein bakeri, sedangkan bagian

hidrofilik yang bebas akan melarutkan protein sehingga merusak membran sel bakteri [19].

Mekanisme senyawa terpenoid atau triterpene sebagai antibakteri adalah bereaksi dengan porin (protein transmembran) pada membran luar sel bakteri, membentuk ikatan polimer yang kuat sehingga mengakibatkan rusaknya porin. Rusaknya porin yang merupakan pintu keluar masuknya senyawa akan mengrangi permeabilitas dinding sel bakteri yang akan mengakibatkan sel bakteri akan kekurangan nutrisi, sehingga pertumbuhan bakteri terhambat atau mati [20]. Senyawa lainnya yang diperkirakan terkandung dalam ekstrak kulit batang *Rhizophora mucronata* adalah flavanoid. Flavanoid merupakan salah satu senyawa golongan fenol. Senyawa fenol memiliki mekanisme kerja dalam menghambat pertumbuhan bakteri dengan cara inaktivasi protein (enzim) pada membran sel [21]. Fenol berikatan dengan protein melalui ikatan hidrogen sehingga mengakibatkan struktur protein menjadi rusak, sedangkan sebagian besar struktur dinding sel dan membran sitoplasma bakteri mengandung protein dan lemak [22]. Ketidakstabilan pada dinding sel dan membran sitoplasma bakteri menyebabkan fungsi permeabilitas selektif, fungsi pengangkutan aktif, pengendalian susunan protein dari sel bakteri menjadi terganggu, yang akan berakibat pada lolosnya makromolekul, dan ion dari sel. Sehingga sel bakteri menjadi kehilangan bentuknya, dan terjadilah lisis [16].

Meskipun telah dapat disimpulkan bahwa dengan konsentrasi-konsentrasi 5 mg/ml, 10 mg/ml, 20mg/ml, dan 80 mg/ ml ekstrak kulit batang *Rhizophora mucronata* dapat menghambat pertumbuhan bakteri *mixed periodontopathogen*, namun hasil diameter daya hambat yang dihasilkan tidak terlalu besar dengan rata-rata terbesar pada konsentrasi 80 mg/ml sebesar 13,55 mg/ml, selain itu minosiklin sebagai kontrol positif pada penelitian ini memiliki daya hambat yang jauh lebih besar dengan rata-rata diameter sebesar 45,24 mg/ml.

Terdapat beberapa alasan yang menyebabkan hal tersebut dapat terjadi. Pertama, seperti yang telah dijelaskan pada bab sebelumnya, bakteri *mixed periodontopathogen* didominasi oleh bakteri gram negatif, selain itu kandungan protein porin pada membran terluar dinding sel bakteri gram negatif bersifat hidrofilik. Kemungkinan porin yang terkandung pada membran terluar tersebut menyebabkan molekul-molekul komponen ekstrak lebih sukar masuk ke dalam sel bakteri. Selain itu, 20 % membran luar bakteri mengandung lipid sehingga senyawa metabolit sekunder ini sulit masuk ke dalam membran luar dinding sel, dimana lipid ini berfungsi mencegah masuknya bahan kimia dari luar. Kedua, ekstrak yang digunakan adalah ekstrak kasar, dimana ekstrak tersebut memiliki kandungan senyawa polar dan non polar yang bersatu sehingga daya kerja senyawa bioaktifnya kurang optimal [16].

Antibiotik minosiklin sebagai kontrol positif memiliki mekanisme kerja yang berbeda

dengan senyawa yang dikandung dalam kulit batang *Rhizophora mucronata.* Dalam menghambat pertumbuhan bakteri *mixed periodontopathogen*, minosiklin memiliki mekanisme pemghambatan sintesis protein pada bakteri tersebut [23]. Minosiklin bekerja dengan cara mengikatkan dirinya pada subunit 30S dari ribosom bakteri, sehingga dapat menghambat sintesis protein dengan menghalangi pelekatan *tRNA-aminoasil* yang bermuatan. Dengan demikian minosiklin menghalangi penambahan asam amino baru pada rantai peptida yang terbentuk. Adanya gangguan sintesis protein pada bakteri beakibat sangat fatal yaitu terhambatnya atau terhentinya sintesis protein dan dapat mengakibatkan kematian sel bakteri.

Antibiotik yang memiliki mekanisme kerja menghambat sintesis protein, mempunyai daya antibakteri sangat kuat. Hal ini ditunjukkan dengan ukuran zona hambat minosiklin, jauh lebih besar dibanding zona hambat yang menggunakan ekstrak kulit batang *Rhizophora mucronata* [16]. Namun setelah diketahui bahwa minosiklin sebagai antibiotik non alamiah memiliki beberapa kekurangan seperti yang telah dijelaskan sebelumnya yaitu pada penggunaan jangka panjang dapat menyebabkan beberapa efek buruk seperti resistensi dan alergi serta dalam beberapa kasus dapat menyebakan perubahan warna gigi, maka pemilihan ekstrak kulit batang *Rhizophora mucronata* sebagai antibakteri alam alternatif dalam menangani penyakit periodontal merupakan pilihan yang dapat diaplikasikan. Berdasarkan pada penelitian ini dapat dipilih dan diaplikasikan dosis terbesar dan yang paling mendekati kontrol positif yaitu pada konsentrasi 80 mg/ml.

Hasil penelitian di atas sesuai dengan penelitian yang dilakukan oleh Ravikumar[9], yang menyatakan bahwa ekstrak *Rhizophora mucronata* memiliki aktivitas antimikrobial terhadap beberapa gram negatif contohnya *Pseudomonas aeruginosa* pada konsentrasi 5 mg/ml. *Pseudomonas aeruginosa* merupakan baktri gram negatif yang memiliki karakteristik hampir mirip dengan bakteri-bakteri *mixed periodontopathogen* [9]. Dengan demikian dapat diketahui bahwa *Rhizophora mucronata* mempunyai efek antibakteri terhadap bakteri *mixed periodontopathogen*. Hal ini kemungkinan disebabkan oleh beberapa senyawa yang terkandung di dalamnya seperti tannin, alkaloid, saponin, terpenoid dan flavanoid yang diperkirakan terdapat dalam ekstrak kulit batang *Rhizophora mucronata.* Sehingga *Rhizophora mucronata* dapat membunuh dan menghambat pertumbuhan bakteri *mixed periodontopathogen*

SIMPULAN

Konsentrasi ekstrak kulit batang bakau besar (*Rhizophora mucronata*) sebesar 5mg/ml,10 mg/ml, 20 mg/ml, 40 mg/ml,dan 80 mg/ml dapat menghambat pertumbuhan bakteri *mixed periodontopathogen*. Konsentrasi ekstrak kulit batang bakau besar (*Rhizophora mucronata*) 80 mg/ml memiliki daya hambat terbesar diantara konsentrasi lainnya, namun daya hambat yang dihasilkan masih lebih kecil dibandingkan dengan minosiklin 0,1 % sebagai kontrol positif.

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THE INHIBITION EXTRACT LEAVES OF THE SOURSOP (ANNONA MURICATA LINN) TO BACTERIA GROWTH OF MIXED PERIODONTOPATHOGEN

(Daya hambat ekstrak daun sirsak (*Annona muricata linn*) terhadap pertumbuhan Bakteri *mixed periodontopathogen)*

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ABSTRACT

Background: *Periodontitis is a periodontal disease caused by mixed periodontopathogen bacteria. The bacteria were dominated by gram-negative bacteria. Soursop fruit (Annona muricata) leaves have been known having antibacterial effect against gram-positive and gram-negative bacteria, thus assumed to have antibacterial effect on bacteria caused periodontal disease.*

Purpose: *To examine the inhibition effect of Annona muricata leaf extract to the growth of mixed periodontopathogen bacteria.*

Methods: *Subjects were mixed periodontopathogen bacteria with total of 30 samples, divided into 6 groups (n = 5). Four groups were given the extract with different concentrations of 15 mg/ml, 30 mg/ml, 45 mg/ml and 60 mg/ml, while two other groups served as positive and negative controls. Extracts were prepared by maseration method. Sample of bacteria were innoculated in Mueller Hinton agar, tested by disk diffusion method. The inhibitory effect was observed by measuring the diameter of inhibition zones on agar media. Data were analyzed by ANOVA and LSD test.*

Results: *The result of LSD test showed significant difference ($p<0,05$) between all concentrations and control except on the group concentration of 45 mg/ml and 60 mg/ml.*

Conclusion: *Annona muricata leaves extract could inhibit the growth of mixed periodontopathogen bacteria.*

Keywords: *periodontitis, mixed periodontopathogen bacteria, soursop leaves, extract, Annona muricata linn.*

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PENDAHULUAN

Penyakit periodontal merupakan masalah kesehatan gigi dan mulut yang memiliki prevalensi cukup tinggi di masyarakat. Di Indonesia, penyakit periodontal menduduki peringkat kedua setelah karies [1]. Periodontitis merupakan salah satu penyakit dengan tingkat penyebaran yang luas dalam masyarakat [2]. Angka kejadian periodontitis bervariasi pada berbagai negara di dunia dan memperlihatkan kecenderungan terjadinya peningkatan [2]. Di Indonesia, prevalensi penyakit periodontal menurut hasil survei Departemen Kesehatan sebesar 24,82% [3]. Prevalensi penyakit periodontal diperkirakan setinggi 75% pada orang dewasa di Amerika Serikat, di antaranya sekitar 20-30% memiliki penyakit periodontal yang parah [4]. Pada tahun 2006 di Brazil, ditemukan bahwa 25,9% menderita periodontitis kronis dan agresif [2]; sedangkan pada tahun 2005 menunjukkan prevalensi periodontitis agresif pada usia 12-25 tahun sebesar 6,5% dan meningkat menjadi 9,9% [2].

Penyakit periodontal adalah suatu proses patologis yang mengenai jaringan periodonsium seperti gingiva, ligamen periodontal, sementum dan tulang alveolar [5]. Penyakit yang paling sering mengenai jaringan periodontal adalah gingivitis dan periodontitis. Gingivitis adalah infeksi bakteri yang terbatas pada gingiva tanpa kehilangan tulang alveolar. Penyakit ini bersifat *reversible* yaitu jaringan gusi dapat kembali normal apabila dilakukan pembersihan plak secara teratur. Periodontitis adalah infeksi bakteri pada seluruh jaringan periodonsium. Penyakit ini bersifat progresif dan *irreversible*, yang biasanya dijumpai pada usia lanjut [6].

Bakteri adalah faktor etiologi utama pada penyakit periodontal. Ada 10-20 spesies yang berperan dalam patogenesis penyakit periodontal destruktif, yang selanjutnya disebut bakteri *mixed periodontopathogen.* Bakteri yang paling dominan ditemukan pada penyakit periodontal adalah bakteri batang anaerob gram negatif seperti *Actinobacillus actinomycetemcomitans* (Aa), *Bacteroides forsythus*, *Porphyromonas gingivalis* (Pg) [7]. Lipopolisakarida merupakan bagian dari dinding sel kuman gram negatif Pg dan Aa. Peningkatan LPS akan meningkatkan produksi IL-1(interleukin-1), IL-3 dan IL-6 yang dapat menyebabkan kerusakan pada jaringan [8].

Periodontitis merupakan penyakit infeksi rongga mulut yang didominasi oleh bakteri Pg dan Aa [8]. Periodontitis perlu diterapi yang bertujuan untuk mengeliminasi infeksi dan inflamasi sehingga tercapai jaringan periodontal yang sehat [9]. Prognosis penyakit periodontitis bila tidak diterapi dapat berakibat baik sampai dengan tidak ada harapan yang akan menyebabkan kerusakan jaringan periodonsium, resorbsi tulang alveolar yang pada

akhirnya akan berdampak pada hilangnya gigi secara prematur serta menimbulkan permasalahan estetik [5]. Selain menimbulkan masalah di rongga mulut, penyakit periodontal dapat menyebabkan akibat lebih jauh terhadap organ vital seperti hati, jantung, otak. Beberapa tahun terakhir ini ada penelitian / artikel yang mengkaitkan antara penyakit periodontal dengan penyakit sistemik antara lain penyakit kardiovaskuler, endokarditis, diabetes melitus, pneumonia bakterial dan stroke. Fokal infeksi terutama yang disebabkan oleh penyakit periodontal di permukaan marginal maupun apikal merupakan faktor risiko terjadinya penyakit sistemik [10]. Oleh karena itu, terapi periodontal non surgical (NSPT) digunakan untuk membantu mengontrol penyakit periodontal (gingivitis dan periodontitis) seperti patient *self care, scaling* dan *root planing* serta menggunakan bahan topikal kimia [6]. Keberhasilan dari terapi periodontal tergantung pada terhentinya proses kerusakan jaringan, menghilangkan atau mengontrol faktor penyebab serta perubahan kondisi mikroba seperti pada kondisi jaringan yang sehat dan normal [11]. Akibat pola kerusakan tulang yang luas serta kelainan anatomi gigi sering kali mempersulit *scaling* dan *root planing*, di samping itu penyakit periodontal merupakan penyakit infeksi, maka pemberian antimikroba sering digunakan untuk menunjang terapi penyakit periodontal; tetapi dapat menimbulkan efek samping yaitu terjadi resistensi bakteri, reaksi alergi dan reaksi toksik [5]. Oleh karena itu, perlu ditemukan metode alternatif untuk mengontrol penyakit periodontal yang ada di masyarakat dewasa ini.

Pemanfaatan sumber daya alam sebagai obat alternatif akhir-akhir ini semakin berkembang penggunaannya karena sifatnya yang alami dan relatif aman. Salah satu tanaman alami yang telah lama dikenal sebagai bahan obat tradisional adalah tanaman sirsak (*Annona muricata linn*) [12]. Hingga saat ini belum banyak masyarakat yang mengetahui bahwa tanaman sirsak memiliki khasiat yang luar biasa terhadap kesehatan [13]. Semua bagian tumbuhan *Annona muricata* dapat digunakan sebagai obat-obatan alami seperti kulit kayu, daun, akar, buah dan biji [14].

Dari seluruh bagian tumbuhan *Annona muricata*, organ daunlah yang paling banyak dimanfaatkan untuk mengobati penyakit karena mengandung kandungan kimia aktif yang sangat tinggi seperti tanin dan alkaloid [12]. Selain itu bagian daun lebih dipilih untuk digunakan karena keberadaannya yang tidak terpengaruh oleh musim. Senyawa tanin diduga mampu mengganggu dinding sel bakteri sehingga koloni bakteri terdisintegrasi dan pertumbuhannya terhambat. Senyawa alkaloid dilaporkan memiliki berbagai aktivitas biologis seperti aktivitas antibakteri karena dapat mengganggu protein kinase yang penting

untuk sinyal jalur transduksi. Dengan banyaknya kandungan kimia terutama tanin dan alkaloid, maka daun sirsak diduga memiliki potensi sebagai antibakteri [15]. Sesuai dengan penelitian sebelumnya, Novianti yang meneliti tentang aktivitas antibakteri ekstrak daun sirsak terhadap pertumbuhan *Escherichia coli* yang termasuk bakteri gram negatif pada dosis 15, 30, 45 dan 60 mg/ml [16].

Banyak sekali kandungan senyawa bioaktif yang ditemukan dalam daun sirsak seperti penelitian yang dilakukan oleh Prachi dkk, ekstrak metanol daun *Annona muricata* mengandung metabolit sekunder seperti tanin dan steroid [17]. Sedangkan menurut penelitian Takashi dkk, ekstrak etanol daun *Annona muricata* mengandung senyawa flavonoid [18]. Dari sekian banyak zat aktif yang ditemukan di dalam daun sirsak, senyawa tanin, saponin dan alkaloid diketahui memiliki sifat antibakteri [18]. Hal ini ditunjang dengan penelitian yang dilakukan oleh Prachi dkk, menemukan bahwa daun sirsak memiliki aktivitas antibakteri yang tinggi terhadap *Staphylococcus aureus, Escherichia coli, Proteus vulgaris, Streptococcus pyogenes, Bacillus subtilis, Salmonella typhimurium, Klebsiella pneumonia, dan Enterobacter aerogenes* [17].

Melihat kandungan di dalam daun sirsak yang begitu besar serta mudah didapatkan dan dimanfaatkan, menarik minat peneliti untuk mengetahui daya hambat ekstrak daun *Annona muricata* sebagai agen antibakteri alami yang dapat menghambat pertumbuhan bakteri *mixed periodontopathogen*. Dalam hal ini dipilih ekstrak karena kita benar-benar dapat mengeksplorasi bahan aktif yang terkandung dalam daun sirsak tersebut.

BAHAN DAN METODE

Penelitian ini adalah penelitian *true eksperimental laboratoris* dengan rancangan *the post test only control group design.* Subjek penelitian dibagi dalam 2 kelompok. Dua kelompok sebagai kelompok kontrol dan empat kelompok diberi ekstrak daun sirsak *(Annona muricata linn*) masing-masing dengan konsentrasi 15 mg/ml, 30 mg/ml, 45 mg/ml dan 60 mg/ml [16]. Sampel penelitian menggunakan bakteri *mixed periodontopathogen* yang diambil dari penderita periodontitis dengan jumlah keseluruhan sebanyak 30 sampel [19]. Teknik pengambilan sampel yang digunakan pada penelitian ini adalah simple random sampling.

Suspensi bakteri *mixed periodontopathogen* diinokulasikan pada media *Brain Heart Infusion* (*BHI*) cair dalam tabung reaksi. Kemudian biakan tersebut diinkubasikan secara anaerob selama 24 jam dengan suhu 37’C. Setelah diinkubasikan, biakan diambil dengan mikropipet yang diletakkan pada objek glass untuk dibuat preparat yang kemudian akan

dilakukan pengecatan Gram. Setelah pengecatan, suspensi biakan tersebut disetarakan kekeruhannya dengan larutan standar Mc Farland 0,5 [20].

Selanjutnya menyiapkan beberapa *petri dish* agar *Mueller Hinton* (*MH*) steril dan mengambil biakan bakteri *mixed periodontopathogen* dari *BHI* cair yang telah disetarakan kekeruhannya. Mengusapkan biakan tersebut pada seluruh permukaan lempeng agar *MH* steril menggunakan lidi kapas steril [20]. Menyiapkan kertas saring yang sebelumnya telah dicelupkan ke ekstraksi daun sirsak selama 10 detik pada kelompok perlakuan, sedangkan pada kelompok kontrol kertas saring dicelupkan pada DMSO 1% selama 10 detik. Meletakkan kertas saring tersebut pada media nutrient agar yang berisi bakteri *mixed periodontopathogen* dengan menggunakan pinset steril agak ditekan-tekan. Memasukkan *petri dish* ke dalam inkubator selama 2x24 jam dengan suhu 37'C. Mengukur zona hambat ekstrak berupa zona jernih di sekitar kertas saring menggunakan *digital calipers*. Besarnya diameter zona hambat yang timbul menunjukkan daya antibakteri ekstraksi [20].

HASIL PENELITIAN

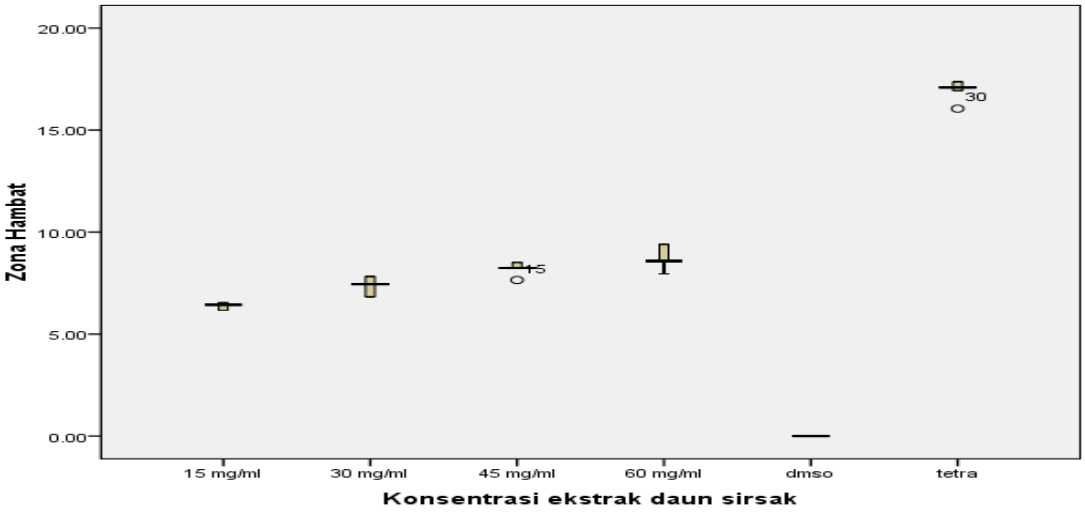
Data hasil penelitian tentang daya hambat ekstrak daun sirsak terhadap pertumbuhan bakteri *mixed periodontopathogen* pada media *MH* agar adalah sebagai berikut :

Tabel 1. Diameter Zona Hambat pada Ekstrak Daun Sirsak terhadap Pertumbuhan Bakteri *Mixed Periodontopathogen* pada *MH* Agar

Sampel	Diameter zona hambat dalam mm					
	K	X1	X2	X3	X4	X5
I	0	6.17	6.83	8.52	9.40	17.09
II	0	6.17	6.84	8.50	9.39	16.94
III	0	6.54	7.84	8.24	8.58	17.36
IV	0	6.54	7.81	8.24	8.56	17.38
V	0	6.44	7.45	7.65	7.95	16.05
x ± SD	0	6.37 ± 0.19	7.35 ± 0.50	8.23 ± 0.35	8.78 ± 0.62	16.96 ± 0.54

Pada tabel 4.1 dapat dilihat bahwa terdapat zona hambat ekstrak daun sirsak terhadap bakteri *mixed periodontopathogen* dengan beberapa konsentrasi yaitu 15 mg/ml, 30 mg/ml, 45 mg/ml dan 60 mg/ml pada media *MH* agar. Hal ini menunjukkan bahwa ekstrak daun sirsak mampu menghambat pertumbuhan bakteri *mixed periodontopathogen*, namun tidak sebesar pada pemberian *tetrasiklin*.

Dari hasil penelitian perlu dilakukan tes normalitas (uji *Shapiro Wilk* karena besar sampel < 50). Setelah itu menggunakan uji *One Way* ANOVA (satu arah) yang dilanjutkan dengan uji LSD (*Least Significant Difference*).



Gambar 1. Grafik rerata diameter daya hambat semua kelompok

PEMBAHASAN

Penelitian ini, ekstrak daun sirsak *Annona muricata linn* diteliti pada berbagai konsentrasi yaitu 15 mg/ml, 30 mg/ml, 45 mg/ml, 60 mg/ml serta *tetrasiklin* digunakan sebagai kontrol positif dan DMSO 1% sebagai kontrol negatif. Peneliti memilih konsentrasi ini didasarkan pada penelitian sebelumnya oleh Novianti, pemberian ekstrak daun sirsak *Annona muricata linn* pada konsentrasi 45 mg/ml mampu menghambat bakteri *Escherichia coli* yang merupakan bakteri gram negatif, yang memiliki kesamaan karakteristik dengan bakteri *mixed periodontopathogen* [16]. Pengenceran menggunakan DMSO 1% karena DMSO 1% merupakan *polar aprotic solvent* yang larut dalam senyawa polar dan non polar, larut dalam berbagai pelarut organik serta air [21]. Selain itu, menurut Patel, DMSO 1% tidak mempengaruhi pertumbuhan kinetik dari berbagai mikroorganisme yang diuji sehingga apabila digunakan dalam penelitian tidak mempengaruhi hasil dari penelitian [20]. *Tetrasiklin* digunakan sebagai kontrol positif karena *tetrasiklin* telah digunakan secara luas pada perawatan penyakit periodontal serta efektif dalam menghambat bakteri gram negatif fakultatif anaerob [5].

Penelitian ini menunjukkan bahwa ekstrak daun sirsak *Annona muricata linn* terbukti mampu menghambat pertumbuhan bakteri *mixed periodontopathogen* pada semua kelompok

perlakuan dengan konsentrasi 15 mg/ml, 30 mg/ml, 45 mg/ml dan 60 mg/ml dikarenakan adanya kandungan bahan aktif seperti alkaloid, tanin, flavonoid serta saponin [22]. Hasil uji LSD menunjukkan adanya perbedaan yang signifikan ($p<0,05$) antara kelompok perlakuan ekstrak daun sirsak dengan DMSO dan *tetrasiklin*. Pada uji LSD, kelompok konsentrasi ekstrak daun sirsak 45 mg/ml dengan 60 mg/ml tidak memiliki perbedaan yang signifikan ($p = 0,054$). Oleh karena itu, pada penelitian ini dapat dipilih konsentrasi ekstrak daun sirsak 45 mg/ml karena pada konsentrasi ini sudah mampu menghambat bakteri *mixed periodontopathogen* dengan daya hambat cukup besar. Namun, zona hambat yang dihasilkan lebih kecil dibandingkan *tetrasiklin* karena terdapat mekanisme kerja yang berbeda antara daun sirsak dan *tetrasiklin*.

Alkaloid adalah senyawa organik pada tumbuh-tumbuhan yang sering digunakan sebagai bahan obat-obatan. Kemampuan senyawa alkaloid sebagai antibakteri *mixed periodontopathogen* dipengaruhi oleh gugus basa yang mengandung 1 atau lebih atom nitrogen. Apabila gugus basa ini mengalami kontak dengan bakteri *mixed periodontopathogen*, maka akan bereaksi dengan senyawa asam amino yang menyusun dinding bakteri. Reaksi ini mengakibatkan terjadinya perubahan struktur asam amino dan DNA bakteri akan mengalami kerusakan. Kerusakan ini akan mendorong terjadinya lisis pada bakteri *mixed periodontopathogen* [23].

Flavonoid adalah suatu kelompok senyawa fenol yang terbanyak terdapat di alam. Aktivitas biologis senyawa flavonoid terhadap bakteri *mixed periodontopathogen* dilakukan dengan merusak dinding sel dari bakteri yang terdiri atas lipid dan asam amino.Dinding sel bakteri akan bereaksi dengan gugus alkohol pada senyawa flavonoid sehingga dinding sel akan rusak dan senyawa tersebut dapat masuk ke dalam inti sel bakteri. Selanjutnya, gugus alkohol ini akan kontak dengan DNA pada inti sel bakteri *mixed periodontopathogen* melalui perbedaan kepolaran antara lipid penyusun DNA dengan gugus alkohol pada senyawa flavonoid. Reaksi ini mengakibatkan struktur lipid dari DNA bakteri *mixed periodontopathogen* akan rusak sehingga inti sel bakteri juga akan lisis dan bakteri *mixed periodontopathogen* juga akan mengalami lisis dan mati [24].

Selain itu, daun sirsak juga mengandung bahan aktif saponin. Saponin adalah glikosida triterpena dan sterol yang merupakan senyawa aktif pada permukaan daun. Senyawa saponin dapat bekerja sebagai antimikroba sebagai surfaktan atau deterjen yang diduga akan menyerang lapisan batas sel bakteri melalui ikatan gugus polar dan non polar [25].

Tetrasiklin memiliki mekanisme berbeda dengan senyawa yang dikandung dalam daun sirsak yaitu dengan menghambat sintesis protein pada bakteri *mixed periodontopathogen* [26]. *Tetrasiklin* bekerja dengan cara mengikatkan dirinya pada subunit 30S dari ribosom bakteri, sehingga dapat menghambat sintesis protein dengan menghalangi pelekatan tRNA-aminoasil yang bermuatan. Dengan demikian, *tetrasiklin* menghalangi penambahan asam amino baru pada rantai peptida yang terbentuk sehingga dapat mengakibatkan kematian sel bakteri. Menurut Rinawati, antibiotik yang memiliki mekanisme kerja menghambat sintesis protein, mempunyai daya antibakteri sangat kuat [27]. Hal ini ditunjukkan dengan ukuran rata-rata zona hambat *tetrasiklin* yang lebih besar (17,8583) dibandingkan rata-rata zona hambat yang menggunakan ekstrak daun sirsak *Annona muricata* (8,6617).

Meskipun zona hambat yang dihasilkan *tetrasiklin* lebih besar, tetapi dalam penggunaan jangka panjang obat ini dapat menimbulkan efek samping antara lain reaksi alergi, reaksi pada kulit, reaksi toksik dan iritatif serta dalam beberapa kasus dapat menyebabkan perubahan warna gigi [23]. Oleh karena itu, berdasarkan penelitian ini, ekstrak daun sirsak pada konsentrasi 45% dapat dipertimbangkan untuk digunakan sebagai antibakteri alternatif berbahan dasar alami dalam menghambat bakteri *mixed periodontopathogen* penyebab penyakit periodontal, di mana terapi utama seperti *scaling* dan *root planing* harus tetap dilakukan. Penelitian lebih lanjut untuk dapat mendukung penggunaan ekstrak sebagai terapi alternatif dalam menangani penyakit periodontal. Dalam hal ini, dapat dipertimbangkan bentuk sediaan yang tepat sebagai terapi alternatif periodontitis dalam bentuk obat kumur karena melihat banyaknya kandungan senyawa aktif daun sirsak yang bersifat polar.

SIMPULAN

Ekstrak daun sirsak dapat menghambat pertumbuhan bakteri *mixed periodontopathogen*.
Konsentrasi terbaik dalam menghambat bakteri *mixed periodontopathogen* pada penelitian ini adalah 45 mg/ml.

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(Tingkat pengetahuan pasien usia produktif di Rumah Sakit Gigi Dan Mulut Fakultas Kedokteran Gigi Universitas Hang Tuah Surabaya Tentang Penyakit HIV/AIDS)

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ABSTRACT

Background*: This world has encounter a vicious virus called HIV/AIDS. This virus slowly but surely killed every people they infected and there's still no cure for this virus. In Indonesia this virus has infected 33.2 millions people and killed 2.1 millions people and most of it's victims are people at the age of 20-29. This virus are not well known, so the number of victims each year became increase.*
Purpose: *This research is want to know about how many people understand about HIV/AIDS virus.*
Methods: *We have deviced a test in which the people have to answer the questionnaire. We used this questionnaire to study 49 peoples, aged between 15-64 years, who visited Hang Tuah's Dental Hospital. By spreaded questionnaires to 49 peoples, without distinguish between men or women, and ask them to fill it. The results of the answer we calculated and classified it by the criterion. There are four criterions: very aware (9-12), aware (6-8), not aware (3-5), really do not aware (0-2). From the answer of the people, those will help us to gauge the knowledge.*
Result: *Most of the people we tested were very aware of this virus, and mostly of the people who known are the people with higher level education.*
Conclusion: *Our HIV/AIDS knowledge is a valuable standard of the knowledge of people who aware or not aware about HIV/AIDS virus. From this test we can gain valueable information about HIV/AIDS virus.*

Key words *: HIV/AIDS, People, Knowledge, Hang Tuah*

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PENDAHULUAN

Dunia telah menghadapi AIDS (Aquired Immuno Defficiency Syndrome), mengerikan dan penyebaran virus HIV (Human Immunodefficiency Virus) yang menyebabkan AIDS terus berlanjut, lebih cepat, lebih memiliki efek membinasakan, dibanding wabah/bencana lain yang terjadi dalam sejarah umat manusia. Karena itu memenangkan peperangan melawan AIDS adalah satu prasyarat untuk mewujudkan cita-cita hak asasi manusia yang amat berharga tersebut. Menurut UNAIDS (United Nations Programme on HIV/AIDS) sampai desember 2007 telah ditemukan sejumlah 33,2 juta orang penderita HIV/AIDS dan telah menewaskan 2,1 juta orang, sehingga setiap hari ada 6800 orang terinfeksi HIV dan 5700 orang meninggal karena AIDS. Prevalensi HIV /AIDS pada tahun 2007 tertinggi terdapat di kawasan Asia Tenggara dengan jumlah kasus HIV sebanyak kurang lebih 440 ribu orang dan sebanyak 300 ribu orang telah meninggal karena AIDS [1]

Sampai dengan desember 2012 ditemukan sejumlah 51,8 juta orang penderita HIV/AIDS dan telah menewaskan 6 juta orang. Sehingga setiap hari ada 12600 orang terinfeksi HIV dan 10235 orang meninggal karena AIDS. Prevaleni HIV/AIDS pada tahun 2012 tertinggi masih terdapat di kawasan Asia Tenggara dengan jumlah kasus HIV kurang lebih 685 ribu orang dan sebanyak 550 ribu orang meninggal karena AIDS [2]

Kasus HIV/AIDS pertama kali ditemukan di Indonesia pada tahun 1987 di Bali yaitu seorang penderita AIDS warga negara Belanda. Pada tahun berikutnya HIV/AIDS ditemukan di Jakarta dan Surabaya, dan semakin banyak provinsi yang melaporkan adanya kasus HIV/AIDS. Jumlah penderita HIV/AIDS terus meningkat dan daerah yang terinfeksi pun cenderung meluas. Penyebaran di Indonesia terutama sangat dipengaruhi oleh perilaku seksual berisiko dan penyalahgunaan narkotika, psikotropika, dan zat adiktif (napza) [3]

Menurut Dirjen Pemberantasan Penyakit Menular dan Penyehatan Lingkungan (Dirjen P2M & PL) Depkes RI (2005), potensi ancaman epidemi AIDS di Indonesia semakin berat. Pada tahun 2010 jumlah orang yang mengidap HIV/AIDS di Indonesia diperkirakan sebanyak 90.000-130.000 orang. Jumlah orang yang diperkirakan rawan tertular HIV sebanyak 13 juta sampai 20 juta orang [4]

Indonesia, secara kumulatif, pengidap HIV dan kasus AIDS pada Maret 2008 terdiri dari 11.868 orang. Dari jumlah tersebut laki-laki sebanyak 9.337 orang dan perempuan 2446 orang. Kebanyakan pengidap HIV adalah dari rentang usia 20-29 tahun sebanyak 6.364 orang. Diserangnya usia produktif ini suatu tantangan yang perlu segera diatasi mengingat usia produktif adalah aset pembangunan bangsa [4]

Data Subdit AIDS dan IMS Dit P2ML Depkes RI 2008, menunjukkan kasus AIDS di Jawa Timur mencapai 1046 kasus dan 779 orang meninggal, sehingga menduduki peringkat kedua bila dibandingkan dengan 33 provinsi lain di Indonesia, yakni setelah DKI Jakarta [4]

Penyakit menular seksual, termasuk HIV/AIDS telah cukup lama disadari sebagai masalah kesehatan reproduksi. Virus HIV/AIDS meningkat dengan pesat seperti bom waktu bagi dunia dan menjadi epidemic sejalan dengan semakin longgarnya nilai-nilai dalam masyarakat. Nilai ini erat kaitanya dengan tingkat pengetahuan individu dan lingkungan baik itu lingkungan sekolah, lingkungan keluarga maupun lingkungan masyarakat [5]

Dibidang kedokteran gigi HIV memiliki manifestasi yang dapat dilihat di rongga mulut. Manifestasi tersebut seringkali merupakan tanda awal infeksi HIV. Manifestasinya dapat berupa kandidiasis, gingivitis/periodontitis, necrotizing stomatitis, virus herpes simplex, sitomeglovirus, virus varicellazoster, leuokplakia dan lain-lain [6]

Berdasarkan paparan diatas, seiring dengan banyaknya jumlah penderita HIV/AIDS yang meningkat dari tahun ke tahun peneliti tertarik untuk meneliti tingkat pengetahuan pasien di Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Hang Tuah Surabaya tentang penyakit HIV/AIDS di kota Surabaya pada tahun 2011. Tingkat pengetahuan pasien usia produktif tentang penyakit HIV/AIDS ini belum pernah diteliti.

BAHAN DAN METODE

Jenis penelitian yang digunakan adalah penelitian deskriptif karena penelitian ini bersifat menggambarkan atau mendeskripsikan yang pengambilan datanya dilakukan secara cross sectional yaitu pengumpulan data dilakukan sekaligus, artinya tiap subyek penelitian hanya diobservasi sekali saja.

Teknik pengambilan sampel yang digunakan dalam penelitian adalah *Nonprobability Sampling*. Yaitu dengan menggunakan metode purposive,yang pengambilan sampelnya berdasarkan kriteria / tujuan penelitian. Untuk mengetahui tingkat pengetahuan seseorang tentang HIV / AIDS, ada beberapa indikator yang dapat digunakan dan dikelompokkan menjadi :

a. Definisi HIV : Human Immunodeficiency Virus
b. Definisi AIDS : Aquired Immuno Deficiency Syndrome
c. HIV/AIDS adalah jenis penyakit menular seksual
d. Cara penularan HIV/AIDS dapat melalui jarum suntik yang dipakai bergantian

e. Ciri-ciri orang yang terkena HIV/AIDS adalah berat badan turun drastis disertai diare yang berkepanjangan
f. Orang yang berada disekitar ODHA (Orang Dengan HIV/AIDS) belum tentu tertular HIV/AIDS
g. Manifestasi di rongga mulut pada orang yang tertular HIV/AIDS adalah bercak putih yang tidak bisa hilang pada samping lidah.
h. HIV/AIDS menyerang sistem imun / kekebalan tubuh.
i. Virus HIV/AIDS tidak dapat terdeteksi 3-6 bulan sejak tertular.
j. ELISA adalah salah satu tes yang dapat digunakan untuk mendeteksi bahwa seseorang terjangkit HIV/AIDS
k. Terapi yang dibutuhkan oleh penderita HIV/AIDS adalah Anti Retro Virus
l. Solusi yang dapat dilakukan untuk mengurangi penyebaran HIV/AIDS adalah tidak menggunakan NARKOBA dan seks bebas.

Indikator tersebut kemudian dibuat pertanyaan dalam bentuk "*multiple choice*".

Apabila responden berhasil menjawab dengan benar akan diberi skor 1, apabila salah maka diberi skor 0. Kemudian seluruh jawaban responden yang benar dijumlah untuk kemudian dikategorikan menjadi 4 kategori yaitu:

1. Sangat mengetahui : 9-12 pertanyaan benar
2. Mengetahui : 6-8 pertanyaan benar
3. Tidak Mengetahui : 3-5 pertanyaan benar
4. Sangat tidak mengetahui : 0-2 pertanyaan benar

HASIL

Penelitian ini dilaksanakan pada bulan Agustus Tahun 2012 dengan memberikan kuisioner tentang pengetahuan pasien terhadap penyakit HIV/AIDS pada 49 orang usia produktif (15-64 tahun). Sampel penelitian diambil secara *nonprobability sampling*. Hasil pengumpulan data yang diperoleh dari penelitian ini adalah sebagai berikut :

Tabel 1. Distribusi frekuensi responden berdasarkan jenis kelamin di Rumah Sakit Gigi dan Mulut (RSGM) FKG UHT Surabaya

Jenis Kelamin	Jumlah	%
Laki-laki	22	44.9%
Perempuan	27	55.1%
Total	49	100%

Sumber : Data Primer 2012

Tabel di atas menunjukkan bahwa responden sebagian besar (55,1%) berjenis kelamin perempuan.

Tabel 2. Distribusi frekuensi responden berdasarkan pendidikan di Rumah Sakit Gigi dan Mulut (RSGM) FKG UHT Surabaya

Pendidikan	Jumlah	%
SMU atau Sederajat	11	22.4%
Diploma	23	46.9%
Sarjana	15	30.6%
Total	49	100%

Sumber : Data Primer 2012

Tabel di atas menunjukkan bahwa responden sebagian besar (46,9%) berpendidikan diploma.

Tabel 3. Tabulasi Silang antara jenis kelamin dan pengetahuan pasien di Rumah Sakit Gigi dan Mulut (RSGM) FKG UHT Surabaya

		Jenis kelamin		
		Laki-laki	Perempuan	Total
Pengetahuan pasien	Sangat rendah	2	0	2
	%	9.1%	0%	4.1%
	Rendah	4	1	5
	%	18.2%	3.7%	10.2%
	Tinggi	2	2	4
	%	9.1%	7.4%	8.2%
	Sangat Tinggi	14	24	38
	%	63.6%	88.9%	77.6%
	Total	22	27	49
	%	100%	100%	100%

Tabel di atas menunjukkan bahwa responden sebagian kecil yang berjenis kelamin perempuan (0%) sedangkan yang berjenis kelamin laki-laki sebesar (9.1%) sangat tidak mengetahui tentang penyakit HIV/AIDS, sedangkan responden dalam jumlah besar dari jenis kelamin laki-laki sebesar 63.6% dan berjenis kelamin perempuan 88.9% sangat mengetahui apa itu penyakit HIV/AIDS.

Pada tabel 4. menunjukkan bahwa responden sebagian kecil yang berpendidikan diploma (0%) sangat tidak mengetahui tentang penyakit HIV/AIDS, sedangkan responden dalam jumlah besar dari pendidikan Sarjana sebesar 86.7% yang sangat mengetahui apa itu penyakit HIV/AIDS.

Tabel 4. Tabulasi Silang antara pendidikan dan pengetahuan pasien di Rumah Sakit Gigi dan Mulut (RSGM) FKG UHT Surabaya

		Pendidikan			
		SMU atau sederajat	Diploma	Sarjana	Total
Pengetahuan pasien	Sangat rendah	1	0	1	2
	%	9.1%	0%	6.7%	4.1%
	Rendah	3	1	1	5
	%	27.3%	4.3%	6.7%	10.2%
	Tinggi	0	4	0	4
	%	0%	17.4%	0%	8.2%
	Sangat tingggi	7	18	13	38
	%	63.6%	78.3%	86.7%	77.6%
	Total	11	23	7	49
	%	100%	100%	100%	100%

Tabel 5. Distribusi frekuensi pengetahuan pasien di Rumah Sakit Gigi dan Mulut (RSGM) FKG UHT Surabaya

Pengetahuan Pasien	Jumlah	%
Sangat rendah	2	4.1%
Rendah	5	10.2%
Tinggi	4	8.2%
Sangat Tinggi	38	77.6%
Total	49	100%

Tabel di atas menunjukkan bahwa responden sebagian besar (77,6%) sangat mengetahui pada kategori pengetahuan pasien.

PEMBAHASAN

Penelitian ini untuk mengetahui gambaran tingkat pengetahuan pasien usia produktif di Rumah Sakit Gigi dan Mulut Fakultas Kedokteran Gigi Universitas Hang Tuah Surabaya tentang penyakit HIV/AIDS, dilakukan dengan menggunakan instrument berupa kuesioner dan diisi oleh responden sebanyak 49 pasien. Dari 49 pasien yang datang dan mengisi kuesioner, memiliki tingkat pendidikan yang bervariasi dan jenis kelamin yang lebih banyak didominasi oleh perempuan (dapat dilihat pada table 4.1 dan 4.2). Hal ini disebabkan karena perempuan lebih berperan dalam masalah kesehatan dan perempuan lebih berperan di dalam keluarga dimana saat menjadi ibu rumah tangga, dia akan memberikan informasi kepada

anaknya sehingga anaknya akan memperoleh pengetahuan terutama pengetahuan tentang HIV/AIDS [8]

Dari tabel 4.3 dapat dilihat bahwa jenis kelamin perempuan memiliki tingkat pengetahuan sangat tinggi, lebih tinggi dari pada laki-laki, hal tersebut sangat bertentangan dengan pendapat dari Oktarina (2013) yang menyebutkan bahwa laki-laki memiliki tingkat pengetahuan yang lebih tinggi dibandingkan dengan perempuan. Hal ini didukung oleh data dari Depkes RI pada tahun 2006, yang menyatakan bahwa Indonesia secara kumulatif pengidap HIV kasus AIDS terdiri 11.868 orang pengidap HIV/AIDS. Dari jumlah tersebut laki-laki sebanyak 9337 orang dan perempuan 2446 orang dengan pengidap HIV/AIDS adalah dari rentang usia 20-29 tahun yaitu sebanyak 6364 orang. Hal ini disebabkan kecenderungan laki-laki yang terbiasa melakukan seks bebas dibandingkan dengan perempuan [7]

Dari tabel 4.4 yaitu tabulasi silang antara tingkat pendidikan dan tingkat pengetahuan pasien di Rumah Sakit Gigi dan Mulut Universitas Hang Tuah Surabaya didapatkan tingkat pengetahuan bahwa semakin tinggi tingkat pendidikan seseorang maka semakin mudah pula mereka menerima informasi yang akan menjadikan pengetahuan [8]

Pada table 4.5 yaitu distribusi frekuensi seluruh pengetahuan pasien di Rumah Sakit Gigi dan Mulut Universitas Hang Tuah didapatkan data pengetahuan sebanyak 2 responden memiliki tingkat pengetahuan sangat rendah, 5 responden memiliki tingkat pengetahuan rendah, 4 responden memiliki tingkat pengetahuan tinggi dan 38 responden memiliki tingkat pengetahuan sangat tinggi. Hal tersebut terjadi karena tingkat pendidikan yang cenderung tinggi. Menurut Mubarak (2007) menyebutkan bahwa tingkat pengetahuan dipengaruhi oleh tingkat pendidikan seseorang [8]

Pada kuisioner ini juga didapatkan bahwa responden dengan jenis kelamin perempuan memiliki tingkat pendidikan yang lebih tinggi daripada laki-laki, hal tersebut menyababkan tingkat pengetahuan yang dimiliki oleh responden perempuan lebih tinggi daripada laki-laki [8]. Pendidikan dapat mempengaruhi seseorang akan pola hidup, terutama dalam memotivasi untuk sikap berperan serta dalam pengembangan kesehatan, makin tinggi tingkat pendidikan seseorang makin mudah untuk menerima informasi sehingga makin banyak pula pengetahuan yang dimiliki. Pendidikan yang kurang seperti SD/MI, akan menghambat perkembangan sikap seseorang terhadap nilai-nilai baru yang diperkenalkan. Hal ini sesuai dengan pendapat dari Mubarak dkk, (2007) tidak dapat dipungkiri, bahwa makin tinggi pendidikan seseorang semakin mudah pula seseorang menerima informasi dan pada akhirnya makin banyak pula

pengetahuan yang dimilikinya. Sebaliknya, jika seseorang tingkat pendidikannya rendah, akan menghambat perkembangan sikap seseorang terhadap penerimaan informasi dan nilai baru yang diperkenalkan. Walaupun pendidikan tidak tinggi akan tetapi mempunyai pengalaman yang banyak akan mempengaruhi pengetahuan itu sendiri, jadi pengetahuan tidak hanya diperoleh dari pendidikan, akan tetapi pengalaman juga berperan penting untuk mendapatkan pengetahuan [8]

Pengetahuan adalah merupakan hasil dari keinginan tahu, dan ini terjadi setelah orang melakukan penginderaan terhadap suatu objek tertentu. Penginderaan ini terjadi melalui panca indera manusia, yaitu indera penglihatan, pendengaran, penciuman, rasa dan raba. Sebagaian besar pengetahuan manusia diperoleh melalui mata dan telinga. Pengetahuan atau kognitif merupakan domain yang sangat penting untuk terbentuknya perilaku seseorang [9]

Pengetahuan terjadi dalam manusia pada tingkat pengetahuan indrawi dan pengetahuan intelektual. Dalam pengetahuan indrawi, kesan yang diterima alat indra dari dunia sekitar diasimilasikan lebih lanjut. Kesan-kesan itu diterima (species impressa) oleh kekuatan indra dengan penyederhanaan yang didukung secara biologis dan kemudian dibawa kepada kesadaran yang aktif [9]

Pada penelitian ini didapatkan sebagian besar responden memiliki pengetahuan yang sangat tinggi tentang definisi HIV/AIDS. Sebagian besar responden memiliki pengetahuan yang sangat tinggi tentang cara penularan dan cara pencegahan HIV/AIDS, demikian juga mengenai ciri orang yang tertular HIV/AIDS dan tanda yang terlihat di dalam rongga mulut sebagian besar responden memiliki pengetahuan yang tinggi. Hal tersebut terjadi karena HIV/AIDS sudah merupakan hal yang umum di masyarakat. Banyak poster yang menjelaskan mengenai definisi dari HIV/AIDS yang bisa dilihat di berbagai tempat yang umum dan banyak dikunjungi oleh masyarakat seperti puskesmas, klinik, rumah sakit, surat kabar, internet, iklan televisi dan lain-lain [8]

Pada penelitian ini juga didapatkan bahwa sebagian besar responden memiliki pengetahuan yang sangat rendah tentang berapa lama virus HIV/AIDS dapat terdeteksi sejak tertular, tes yang harus digunakan untuk mendeteksi bahwa orang tersebut terjangkit HIV/AIDS, dan terapi yang diperlukan untuk penderita HIV/AIDS. Pengetahuan yang sangat rendah mengenai hal tersebut terjadi karena memang kurangnya informasi di Indonesia yang menjelaskan tentang pendetektesian HIV/AIDS, tes yang digunakan untuk mendeteksi HIV/AIDS dan terapi yang digunakan pada penderita HIV/AIDS di masyarakat. Kesadaran masyarakat Indonesia untuk memiliki pengetahuan lebih terutama pengetahuan tentang cara

mendeteksi HIV/AIDS masih sangat kurang. Tes tersebut yang digunakan antara lain ELISA yaitu memberikan hasil positif 2-3 bulan setelah infeksi dengan sensitifitas tinggi antara 98,1%-100%. Tes ELISA menggunakan recombinant antigen, yang sangat spesifik terhadap *envelope* dan *core. Western blot* memiliki sensitifitas tinggi antara 99,6%-100%, namun pemeriksaannya cukup sulit, mahal membutuhkan waktu skitar 24 jam. PCR (*Polymerase Chain Reaction*), tidak dianjurkan untuk diagnosis HIV di Indonesia karena tingkat keakuratannya rendah dan membutuhkan biaya yang besar [10]

Terapi yang digunakan untuk penderita HIV/AIDS adalah ARV (Anti Retro Virus) merupakan dasar penatalaksanaan pemberian antivirus terhadap ODHA; karena dapat mengurangi resistensi, menekan replikasi HIV secara efektif sehingga kejadian penularan/komplikasi lainnya dapat dihindari, dan meningkatkan kualitas serta harapan hidup ODHA. Dua golongan ARV yang diakui *Food and Drug Administration* (FDA) dan *World Health Organization* (WHO) adalah penghambat reverse *transcriptase* (PRT), yang terdiri dari analog nukleosida dan non-analog nukleosida, serta penghambat protease (PP) HIV [11.] Masa inkubasi ini penderita disebut penderita HIV. Pada fase ini terdapat masa dimana virus HIV tidak dapat terdeteksi dengan pemeriksaan laboratorium kurang lebih 3-6 bulan sejak tertular virus HIV yang dikenal dengan masa "*window period"* [12]

Oleh karena itu peran pemerintah sangatlah penting dalam memberikan informasi mengenai hal tersebut, seperti memberikan penyuluhan dan menambah jumlah informasi berupa poster maupun iklan yang menjelaskan tentang HIV/AIDS. Umumnya informasi yang diterima masyarakat lebih banyak tentang narkoba dan bukan HIV/AIDS. Informasi tentang HIV/AIDS masih dirasakan sangat menakutkan karena pada umumnya mereka tidak mengetahui tentang HIV/AIDS. Selain informasi dari sekolah, informasi berasal dari televisi (berita kriminal, *talk show*, film, dan sinetron) juga dirasakan belum maksimal, karena kesadaran masyarakat Indonesia yang kurang. Informasi tersebut juga tidak selamanya tepat, terutama yang bersumber dari berita kriminal lebih banyak mengedepankan peredaran narkoba. Semua masyarakat menyatakan bahwa teman merupakan orang yang tepat untuk berbagi informasi tentang narkoba. Selain itu, masyarakat mendapatkan informasi dari ibu, ayah, saudara kandung, atau anggota keluarga lain [8]

Hampir keseluruhan masyarakat tidak mendapat informasi mengenai HIV/AIDS yang seharusnya mereka dapatkan. Peran pemerintah dalam memberikan informasi tersebut di Indonesia masih belum maksimal. Hal tersebut mengakibatkan kesadaran masyarakan untuk terhindar dari penyakit HIV/AIDS menjadi sangat kurang. Kurangnya informasi yang

diterima masyarakat tentang HIV/AIDS di Indonesia menyebabkan penderita HIV/AIDS meningkat secara signifikan.

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THE MANAGEMENT OF CHRONIC ULCERS ON BOTH OF THE LATERAL BORDERS OF THE TONGUE
(CASE REPORT)

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ABSTRACT

Background *: Ulcer is the most common lesion that occurs in the mouth. Stomatitis Aphthousa Reccurrent is one of the lesions and usually healed within maximal 14 days. Another ulcer that caused by trauma, will healed when the irritant was eliminated. Lateral posterior border of the tongue is the place that mostly a persistent ulcer will become malignant.*
Purpose *of this paper was wanted to show the management of the chronic ulcer on both of the lateral posterior border of the tongue.*
Case : *was a 54 years old female, complain of a pain in all of her oral mucosa. The pain was recurrent ever since her husband passed away, about 5 years ago. She had already visited some doctors, taken many medicines, wheather modern or traditional. The ulcers still persist ever since.*
Case management : *of the case was, recorded all of the histories and sending the person to be examined by FNAB at the Dr.Ramelan's Hospital. The result was a chronic supurative inflammatory infection. She received vitamin, mouth gargle, antacid and corticosteroid orally.*
Discussion : *From the histories of the illness, she had to be given some medicaments that hopefully regain her conditions.*
Conclussion : *The therapy of some chronic ulcerations in the posterior lateral border of the tongue had to be supported by an HPA's examination.*
Suggestion : *As a General Practitioner, had to be very familiar with the changes in the oral mucosa, to avoid a severe and dangerous progress of the lesions.*

Key words : *Ulcers, chronic, lateral border of the tongue.*

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INTRODUCTION

Recurring oral ulcers are among the most common problems seen by clinicians who manage diseases of the oral mucosa. There are several diseases that should be included in the defferential diagnosis of a patient who present with a history of recurring ulcers of the mouth, including recurrent aphthous stomatitis (RAS) [1,2].

Recurrent Aphthous Stomatitis is a disorder characterized by recurring ulcers confined to the oral mocusa, in patients with no other sign of disease. Many specialists and investigators in oral medicine no longer consider RAS to be a single disease, but rather, several pathologic states with similar clinical manifestations. Immunologic disorders, hematologic, deficiencies, and allergic or psychological abnormalities have all been implicated in cases with RAS [1,3.]

Multiple ulcers are often present, but the number, size and frequency of them vary considerably. The buccal and labial mucosa are the most commonly involved. Lessions are less common on the heavily keratinized palate or gingival [1-4] .

Most patient with RAS, have between two to six lesions at each episode and experience several episodes a year. The disease is an annoyance for the majority of patients with mild RAS, but it can be disabling for patients with severe frequent lesions, especially those classified as major aphthous ulcers. Patients with major aphthous ulcers develop deep lesions, that are larger than 1 cm in diameter and may reach 5 cm. Large portion of the oral mucosa may be covered with large deep ulcers that can become confluent. The lesions are extremely painful and interfere with speech and eating. Many of these patients continually go from one clinician to another, looking for a “cure”. The lesions may last for months, and sometimes be misdiagnosed as squamous cell carcinoma, chronic granulomatous disease or pemphigoid. The lesions heal slowly and leave scars that may result in decreased mobility of the ovula, tongue, and destruction of portion of the oral mucosa [1-3]

The purpose of this paper was wanted to show the management of the chronic ulcer on both of the lateral posterior border of the tongue.

The patient recoqnized the lesion shortly after her husband passed away, that’s was about 5 years ago. Formally there was only a small ulcer at the lateral border of the posterior left tongue. The pain is still bareable. As the time passed by, the ulcer became larger and multiples, so the pain was much more severe. She look for a help, after this condition unbareable.

Many medicaments have been used by her, whether traditionally or fabricated. The result didn't seem good, so she looked for another solution. She came to Surabaya, met two Oral Medicinists at RSGM, FKG UHT, who were in charge.

CASE

The case was a 54 years old female, complain of a pain in all of her oral mucosa. The pain was recurrent ever since her husband passed away, about 5 years ago. She had already visited some doctors, taken many medicines, whether modern or traditional. The ulcers still persist ever since.

Fig 1. Clinically feature of this case

CASE MANAGEMENT

The management of the case was, according to the clinical appearance, the suspected diagnosis was major RAS. A detailed history and examination by knowledgeable clinicians should distinguish RAS from primary acute lesions such as viral stomatitis, or from chronic multiple lesions such as pemphigoid, such as connective tissue disease, drug reactions and dermatologic disorders. The history should emphasize symptoms of blood dyscrasias, systemic complain, and associated skin, eye, genital or rectal lesions. Laboratory

investigation should be used when ulcers worsen or begin past the age of 25 years. Biopsies are only indicated when it is necessary to exclude other diseases, particularly granulomatous diseases, such as Crohn's diases or sarcoidosis [4-8.]

Patients with severe major aphthous ulcers should have known associated factors investigated, including connective tissue diseases and abnormal levels of serum iron, folate, vitamin B 12, andferritin. Patients with abnormalities of these values should be referred to an internist, to rule out malabsorption syndromes and to initiate proper replacement therapy. The clinician may also choose to have food allergy or gluten sensitivity investigated in severe cases resistant to other forms of treatment [5-8.]

The patient was sent to be examined by Fine Needle Aspiration Biopsies (FNAB) at The Dr. Ramelan's Hospital, Surabaya. The result was a chronic supurative inflammatory reaction. The medication prescribtion should relate to the severety of the disease. She received mouth-gargle, antacid, vitamin and corticosteroid orally.

Fig 2. Clinically feature after treatment

DISCUSSION.

On the first visit of the patient, the clinician examined her thouroughly. The medical histories were taken systematically, so were the clinical examinations. The knowledgeable

clinicians were able to make a suspect diagnosis, after the procedures above were taken. According to the length of the lesions, the locations and the severe, the suspect diagnosis was squamous cell carcinoma [1-7].

For the perfect diagnosis, the patient was sent to Dr.Ramelan's Hospital, to be examined by FNAB. While waiting for the result, she got mouth gargle, antacid, vitamins and corticosteroid orally. The medicaments were prescribed supported by the histories of her illness. She complained of mouth each, all of her oral mucosa were ill, although she had taken many medicines. This condition make her discomfort for the oral fungtion, so her nutritional intake was low. She looked thin and sick. The pain on her stomach, she named it gastritis enable her get normal food or nutritions.

According to the major ulcers in all of her oral mucosa, the knowledgeable clinicians were given her potent moth gargle and corticosteroid orally. All of the medicaments prescribed above, were supposed to reduce her complain of illness, to regain her health, so the ulcers will be healed.

The result of the FNAB examination , that were taken from the ulcers on the lateral border of the tongue and the upper buccal fold; were chronic supurative inflammatory reaction. This condition was supported by the researchers [1-5], that the length of the duration time of lesion, may result in a differential diagnosis of the granulomatous conditions.

On the second visit, the lesion were less a bit, not totally healed yet. She was told to follow the rule of the treatment willingly, just to help her regain her illness.

On the third visit, the lesion much better, so she wanted to go home (outer island, Balikpapan/ KalTim). On her way home she was warned to take the medicine propperly, and as regular as it had to be.

She phoned after some times, about a month later, that her lesion were recurred, because she couldn't avoid some food she used to eat. She was adviced to take a sensitivity test for some medicines and foods, but no more contact.

CONCLUSSION

The therapy of some chronic ulcerations in the posterior lateral border of the tongue had to be supported by an HPA's examination.

SUGGESTION

As a General Practitioner, had to be very familiar with the changes in the oral mucosa, to avoid a severe and dangerous progress of the lesions.

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ORTHODONTIC TREATMENT IN UPPER ARCH DDM WITH MANDIBULAR CROWDING CAUSED BY UNFINISHED REMOVABLE ORTHODONTIC TREATMENT

(CASE REPORT)

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ABTRACT

Background : Disharmony dento maxillar a disproportion between teeth size and the arch. One of clinical appearance that can be seen is crowding with several signs. Which can be seen in this patient upper arch, with mutilation in mandibular first premolar causing increasing in overbite, overjet and moderate crowding in mandibular.

Purpose : The purpose of this treatment is to eliminate crowding, reduce overjet, overbite and establish good relationship between maxilla and mandibula.

Case : An Indonesia-Javanese female 25 years old. Patient presented dento-skeletal class I maloclussion with severe crowding at maxilla and moderate crowding in mandibula. Permanent first premolar mutilation at mandibula in both sides. With increasing overjet and overbite.

Case Management : Edgewise appliances was bonded, extraction maxillary first premolar, odontectomy mandibular third molar , canine retraction, maxillary anterior retraction. Overbite and overjet correction and mandibular leveling unraveling.

Result : In the end of treatment crowding was eliminate, good esthetic and function was established.

Key words : Orthodontic treatment, DDM, mandibular first premolar mutilation.

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INTRODUCTION

Disharmony dento maxillar known as DDM is a disproportion between teeth size and jaw, in this case is the arch. Etiology of DDM is hereditary factor.[1] Clinical appearance that can be seen in this patient are severe crowding in upper arch that match with DDM symptom. Eventhough there can be found crowding in DDM, but not every crowding caused by DDM. DDM clinical signs at anterior regio in mixed dentition phase are 1) By the time, permanent central insisive will erupt, it will resorp deciduous central and lateral insisive root at the same time. It will cause premature loss of deciduous lateral insisive, 2) Permanent central insisive erupt in normal position, because it has enough space, 3) By the time permanent lateral insisive will erupt, there will be 2 posibillity are permanent lateral insisive resorp deciduous canine root causing premature loss of deciduous canine and permanent lateral insisive erupt in normal position, then permanent canine will erupt outside the arch (ektostem) because it doesn't has enough space to erupt and permanent lateral insisive doesn't resorp deciduous canine root, instance it will erupt in palatal exactly where the bud will erupt. Then permanent canine erupt normally at the arch because it has enough space.[1]

In severe crowding space will be required to eliminate that. At permanent dentition extraction almost always required to provide enough space. The extraction choice is first premolar because it provide enough space in severely crowded patients (arch lenght discrepancy > 10mm).[2]

From the anamnesa, patient thought that mandibular first premolar mutilation were revealed for treatment using removable appliance, but the treatment it self never been finished. Treatment succesfull with removable appliance not only depend with patient cooperatif to use the appliances, but also operator ability to design and make an appliance that can be tolerated by patient. The design should be simple, not thick, not complex or complicated that may interfere with speech and eating. If this circumtances fulfilled, can be expected patients would used the appliances continously. Removable appliance used for treatment of mild malocclussion. For maximum result view things that must be noticed are : selection of cases, treatment planning, appliances design, and treatment management.[3] Cases that can be treat using removable appliance are cases that require tipping tooth movement.[4] It necessary to emphasized that removable appliance is not planned for comprehensive treatment. Although widely utilized in the past as the sole appliance to treat malocclussion, with the increasing availability and acceptance of fixed appliance have become more

apparent. As a result the role of removable appliance has changed and its becoming more widely used as an adjunct to fix appliances treatment.[3,4]

CASE

Case History

An Indonesia-Javanese female 25 years old patient, came to orthodontia specialistic programme clinic faculty of dentistry Airlangga University. The patient have been in orthodontic treatment using removable appliance but never been finished. Extra oral photographs revealed facial symmetry and straight facial profile. Intra oral examination revealed an end to end caninus relation and molar relation in class III, mutilation of mandibular first premolar. Severe crowding at maxilla and moderate crowding in mandibula, with increasing overjet (5mm) and overbite (3mm) and slight mandibular midline shifting (1mm to the left) (Fig. 1 and 2).

Fig 1. Extraoral photograph before orthodontic treatment

Fig 2. Intraoral photograph before orthodontic treatment

In panoramic examination obtained that there mutilation in mandibular first premolar (34 and 44)

Cephalometric Analysis

Cephalometric analysis revealed patient with orthognatic facial type and straight profile (∠FH-NP 81º, ∠NAP 7º). With maxilla and mandibula relationship toward cranium base showing class I skeletal pattern (∠SNA 75º, ∠SNB 72º, ∠ANB 3º).

DIAGNOSIS AND TREATMENT PLANNING

The patient was diagnosed to have class I Angle malocclussion with severe crowding at maxilla and moderate crowding in mandibula, with increasing overjet (5mm) and overbite (3mm) and slight mandibular midline shifting (1mm to the left). The objectives of the orthodontic treatment were eliminate crowding in maxilla and mandibula, and to establish stable occlussion. Level and align the arches, obtain normal overjet and overbite, and to improve patient facial esthethic.

Treatment Phase

The lower 3rd molars (38 and 48) were extracted to eliminate posterior discrepancy, in maxilla first premolars (14 dan 24) were extracted to eliminate severe crowding in anterior. An 0.018 Edgewise bracket prescription were inserted in upper arch (15 until 25) and lower arch (35 until 45) with molar band and welding tube in 2nd molars (17,27,37,47) and molar band and welding bracket in 1st molars (16,26,36,46). Levelling and aligning start with SS 0.012 in upper arch ,in lower arch using SS 0.012 with multiloop. Followed by SS 0.014 partial retraction of upper arch C using elastic chain were done in this stage and continued C retraction with SS 0.016 wire using elastic chain. When there is enough space for 12 and 22, then both of upper arch lateral insisive were pull to the arch using SS 0.016 with loop. Upper arch anterior retraction were done using SS rectangular 0.016x0.022 inch with loop mechanism. Ideal arch for upper and lower arch using SS rectangular 0.017x0.025. With pasif phase for 2 months long

Treatment Result

After 2 years 8 months orthodontic treatment. The orthodontic treatment result was able to eliminate crowded in upper and lower arch, reduces overjet and overbite. Caninus

relation from end to end become class I relation, and molar become class I relation. Patient facial estethic become better than before.

Fig 3. Extraoral photograph after treatment.

Fig 4. Intraoral photograph after treatment

DISCUSSION

In mixed dentition phase the treatment of choice to treat DDM is serial extraction[4], but in the permanent phase severe crowding case like this would require space to eliminite crowding by extract permanent teeth. The extraction choice would be first premolar because it provide enough space in severely crowded patient.[2] For extraction space closing in this case, canine were retract first into premolar extraction sites, then followed by four insisive retraction. In patient with severe crowding of anterior teeth, it is necessary to retract the canines into premolar extraction sites to gain enough space to align the incisors.[2] Sliding the canines produces more stress on the posterior anchorage, so critical anchorage is an indication.[2] Critical anchorage are category describes the critical maintance of the posterior tooth position. Seventy-five percent or more of the extraction space is needed for anterior

retraction.[5] To get this type of anchorage in this case it's used double molar band in upper and lower molars, to reduces stress on posterior anchorage.

Mutilation of mandibular first premolars caused shorthening of the arch, increasing overjet and overbite. Because mutilation can cause arch lenght shortens as the insicors teeth drift distally and lingually.[2] There is no extraction in mandibular because of first premolars mutilation, only extraction of impacted 3rd molars. Levelling and aligning using multiloop were done to correct dental malpositions, without space left in mandibular and put all the teeth well aligned. According Graber the most frequently used treatment sequence in the space utilization phase in lowe arch as follows : correction of rotations and dental malpositions, complete levelling of curve of spee, closure of residual space and detailing of the arch and occlusion.[6]

CONCLUSION

In removable orthodontic treatment it is important to consider patient cooperatif and operator ability to make design for maximal result of the treatment. With Severe crowding like this case, we should consider type anchorage should be use to avoid anchorage drift to extraction sites, that will cause lack of space to eliminate crowding.

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ROOT CANAL TREATMENT AT TEETH WITH FIXED ORTHODONTIC TREATMENT (CASE REPORT)

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ABSTRACT

The periapical abscess results from an infection of the pulpal tissue causing the pulp to become necrotic. It is formed when pus escapes from walls of the pulp chamber and the root canal(s) through the apical foramen. An area of pus and fluid accumulation forms in the bone surrounding the apex of the tooth and is accompanied by continuous pain and increases when there is pressure . Root canal treatment is the removal of the pulp tissue necrosis, after all necrotic pulp tissue is removed, the root canal sterilized, then root canal obturation well. The author reports the case of root canal treatment with acute periapical abscess in the teeth 21 which are class 4 composite restoration and is undergoing fixed orthodontic treatment in female patients 20 years old. Metapex root canal treatment is used as a dressing material, then performed the root canal obturation, with subsequent cavity in composite filling restorations because patients undergoing fixed orthodontic treatment so that restoration can not be made. Prognosis is good in this case.

Conclusion: *Root canal treatment can be performed on teeth that are in fixed orthodontic treatment.*

Keyword: *Root canal treatment, periapical abscess*

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INTRODUCTION

The periapical abscess results from an infection of the pulpal tissue causing the pulp to become necrotic. It is formed when pus escapes from walls of the pulp chamber and the root canal(s) through the apical foramen. An area of pus and fluid accumulation forms in the bone surrounding the apex of the tooth and is accompanied by continuous pain and increases when there is pressure.[1]

Root canal treatment is the removal of the pulp tissue necrosis, after all necrotic pulp tissue is removed, the root canal sterilized, then root canal obturation well.[2]

This case report was carried out root canal treatment in patients who are on fixed orthodontic treatment.

CASE

A woman 20 years old came to Conservation Laboratory of Dentistry faculty RSGM UHT on February 15, 2013. Patients complain of pain in the tip of the nose just above the upper front teeth were never patched with composite 3 months ago. The pain of a throbbing pain in head, continuous, localized, ongoing since 4 days ago and hurt when pressed, no complaints were made when eating, and patients in the fixed orthodontic treatment.

Objective examination of the teeth 21 on the mesioproksimal are composite fillings, cold test (-), the test cavity (-), no action miller needle test and go along the 19 mm, percussion test (+), the test pressure (+), there is no unsteadiness, and gingival about normal. Patients expect their teeth taken care of properly. Patient's general condition is good, no smoke, and no history of systemic disease.

On radiographic examination of the crown looks a picture of radiopaque in part that extends up to the mesial pulp horn. Single visible root canal and conical, medium size, and straight. At the apical end of the tooth 21 looks picture radiolusent, 7 mm diameter, oval shaped and is nearing the apex of the tooth 22, diffuse boundary. Periodontal membrane thickening in periapical lesion area and lamina dura disconnected at the apical end.

The clinical diagnosis of the teeth 21 is pulp necrosis totalis with periapical abscess. The treatment plan is root canal treatment and composite restoration the cavity entrance just because the patient is in fixed orthodontic treatment.

CASE MANAGEMENT

At the first visit (February 15, 2013) was charging informed consent. After the examination of subjective, objective, and support (X-ray images). Manufacture cavity entrance on the palatinal teeth using endo access bur, after the pulp chamber open out exudate / pus from the root canal, then performed extirpation of the pulp tissue is necrotic and diagnostic wire photo and obtained 20 mm working length. For drainage periapical exudates on abnormalities, overinstrumentasi done using a needle file #15 along the 22 mm. Then irrigated using H_2O_2 3% and sterile distilled water in turn further dried root canals using paper points. Root canal just closed a cotton pellet.

Fig 1. Radiographic of teeth 21 with periapical abscess

On the second visit (February 18, 2013) performed root canal preparation with step-back technique, beginning with the search for initial apical file (IAF) and the amount obtained is file #25. Large master apical file (MAF) is file #40 (file number above 3 IAF). Formation of root canal then used Niti - file #30 #35 #40 according to the length of employment and recapitulated Niti - file #30 #35 #40 respectively at the length of employment. Preparation followed by Niti - file #45 with a working length of 19 mm, with a recapitulation of Niti - file #40 with a working length of 20 mm. Then proceed with Niti - file #50 with a working length of 18 mm, with a recapitulation of Niti - file #40 with a working length of 20 mm. and followed by Niti - file #55 #60 #70 #80 with a working length of 17 mm, with a recapitulation of Niti - file #40 with a working length of 20 mm. At every turn of the file is always done irrigated with H_2O_2 3% and sterile distilled water alternately use 2 cc syringe with needle size #23, then dried with paper points #40 to clean and dry. Photo guttap trial use of the corresponding point guttap MAF is guttap point #40. Application metapex intracanal medicaments into the root canal using a needle lentulo then covered with a cotton pellet and temporary fillings.

Fig 2. Diagnostic Wire Photo

Fig 3. Trial Guttap Photo

On the third visit (March 4, 2013) was the turn of intra canal medicaments, temporary fillings root canal cleaned disassembled then use a needle file #40 round 20 mm, then irrigated with H_2O_2 3% and sterile distilled water alternately use 2 cc syringe with needle size #23. After the root canal was dried using paper points #40. Application metapex intracanal medicaments into the root canal using a needle lentulo and closed with a cotton pellet and temporary fillings.

On the fourth visit (March 18, 2013) was the seed. Patient controlled beforehand, the results obtained from patient history no complaints, inspection percussion (-), examination pressure (-), gingiva around normal, and while still in good condition fillings. Patients using a cotton roll isolation, the area in question and the surrounding teeth cleaned with 70 % alcohol disinfectant. Temporary fillings root canal cleaned disassembled then use a needle file #40 round 20 mm, then irrigated with sterile distilled water and dried with paper points. Do seed by way of paper points sterile inserted into the root canal for 1 minute then the paper points were taken and put into tube germination, before the tube was closed edge of the tube is heated over the fire spirits, and the tubes kept in an incubator in a temperature of 30º C and the results observed within 3 days. Application metapex intracanal medicaments into the root canal using a needle lentulo and closed with a cotton pellet and temporary fillings.

On the fifth visit (March 21, 2013) obtained negative results of seed, this suggests that the root canal is completely sterile and ready to do the charging, the patient had no complaints, inspection percussion (-), examination pressure (-), gingival about normal, and while still in good condition fillings. Filling the canals with lateral condensation technique using guttap point and pasta root canal AH^+, guttap point cut to limit orifice, after it closed with a cotton pellet and temporary fillings, and root canal filling done photo. From the images obtained filling the root canal filling good photo, then fillings while disassembled,

cotton pellets retrieved and replaced using the full basis of zinc phosphate cement (Zn $(PO)_4$).

Fig 4. Root Canal Filling Photo

On the sixth visit (March 28, 2013) performed a root canal filling control. Outcome of anamnesis patients had no complaints, inspection percussion (-), examination pressure (-) gingiva around normal, and temporary fillings still in good condition. Radiographic shows a picture of the lesion had shrunk.

Fig 5. Control Root Canal Filling Photo

On the seventh visit (22 April 2013) was dismantled and spared full base of approximately 2 mm from the orifice, then the cavity preparation by making long bevel on all enamel margins Cavo surface using a diamond fissure bur, after it was given etching (self etching) on the bevel, silenced for 20 seconds, then washed and dried (keep moist). Bonding material applied to the bevel and carried out the polymerization for 20 seconds. Application layer by layer composite made (2 mm) and in the polymerization for 40 seconds, layer by layer intended to minimize shrinkage and improvement of the polymerization process of the composite. Composite surface smoothed using a fine diamond finishing burs and polished with a rubber cup with slumbering composite materials. Radiographic shows the lesion has disappeared.

Fig 6. Control Root Canal Filling Photo After 1 Month

DISCUSSION

Effect of tooth pulp is infected by microorganisms into the root canal and not treated can cause the infection to spread to apikal.[3] It is an irritant causes the antigen - antibody reaction and eventually can cause periapical lesions . The possibility of the occurrence of periapical lesions in the etiology of these cases are due to secondary caries continues until the dental pulp due to residual necrotic tissue that is not picked up during cavity preparation, resulting in inflammation of the pulp, the death of the pulp, and periapical abnormalities.

Periapical lesion healing well after root canal treatment has been reported by Sudha et al [4] as many as 15 cases, 2 cases as much as Venugopal [5], Arslan [6] as many as 3 cases. Although the cystic fluid containing cholesterol crystals, the change in the root canal medicaments conducted every two to three weeks, and was followed by charging has led to complete healing of the lesion in 12 to 15 months.[5-7] Siqueira [8] states that the time needed calcium hydroxide to raise the pH to 9 in the root canal and periapical tissues is a minimum of 14 days and reached pH 12 in 1-3 months.[8-11] In the case of lesion size reduction and loss suffered swelling occurred in the eighth month, and the observation and control needed for complete healing at 3 months, 6 months, and 1 year after charging.

Root canal shaping techniques used in this case is the stepback technique using Niti - file aims to keep the apex preparation area remains small and handy but perfect and debrided with a widening taper from the apex to the corona and the wall on the third apical still thick.[4]

Clean the root canal system of the infection becomes very important. Adequate cleaning and shaping with H_2O_2 3% irrigation and sterile distilled water, and the provision of calcium hydroxide (metapex) as intracanal medicaments highly recommended.[2,12] Irrigation solution is used H_2O_2 3% as there are effects due to the formation of foam solution O - nasen which will facilitate cleaning debris and ends with sterile distilled water to function so that no O - nasen are trapped inside the root canal.[2]

Calcium hydroxide is a strong alkaline material with a pH of between 11 to 12,8. Calcium hydroxide in the root canal will break down into Ca^{2+} and OH^- (hydroxyl). OH^- group increases so will cause the pH to alkaline surrounding atmosphere, which will activate the alkaline phosphatase hydrolytic enzymes associated with tissue mineralization process and make the bacteria can not live. Calcium hydroxide to neutralize lactic acid from dissolving osteoclasts and prevent tooth mineral components to encourage the improvement of active calcification. This process starts from degenerative response that directly followed by the response of mineralization and ossification. Calcium hydroxide prevent bacterial proteins contained in the root canal and reduce toxicity. Calcium hydroxide diffuses through dentin tubules and may be associated with periodontal ligament space to withstand external root resorption and accelerate healing. Calcium ions work by providing a therapeutic effect on the surrounding tissue in the form of cellular stimulation, cell migration, cell proliferation, and mineralization. Calcium ions will meet with ions of carbon dioxide (CO_2) and the carbonate ion (CO_3) and transformed into calcium carbonate which play a role in tissue mineralization. Antimicrobial effectiveness in calcium hydroxide is through the ability to absorb carbon dioxide in the root canal is important for root canal bacteria, so the microbes that depend on carbon dioxide will not survive in the root canal.[5-11]

The terms in order to do a root canal is a dental filling asymptomatic, no exudation, swelling has gone.[13-17] In this case the charging is done on the fifth visit with no consideration of the subjective complaints of the patient, examination percussion, pressure, and negative palpation, a root canal is in a state of dry, clean, and sterile as evidenced by the results of a negative seed.

Control exercised 2x1 week to observe the results of charging. After that is done composite fillings only on cavity entrance because the patient is in fixed orthodontic treatment.

Based on the above discussion it can be concluded that the fixed orthodontic treatment does not block for endodontic treatment, only making fixed restorations after fixed orthodontic treatment is completed.

As a suggestion diagnosis must be done carefully, as well as the determination of the true etiology should be established to avoid excessive treatment. During the case management should be done with caution because patients undergoing fixed orthodontic treatment.

Radiological observations needed to periapical lesions shrink / disappear certainty to monitor healing. Informed consent is required for root canal treatment because the healing process often takes a long time, amount of traffic and the x-ray image capture for treatment and control.

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SUCCESSFUL MANAGEMENT OF "BLACK TRIANGLE" USING SUBEPITHELIAL CONNECTIVE TISSUE GRAFT (CASE REPORT)

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ABSTRACT

Background : *Open gingival embrasures are a common occurrence in adult population with a history of periodontal disease. Open gingival embrasure show a loss of interdental papilla which usually refer as the "black triangles" occur in more than one- third of adults. Most of the treatment for black triangle usually treated with orthodontic treatment and restorative treatment. However this treatment is unsatisfied, as we want to regenerate the interdental papilla. One of the most difficult goals of periodontics in the field of reconstruction, regeneration and esthetic aspect of periodontal therapy is the surgical reconstruction of the lost interdental papilla. Loss of interdental papilla could result in patient complaints such as phonetic problems, food impaction, functional problems and esthetic concern. Subepithelial connective tissue graft was used to treat open gingival embrasure, better aesthetics can be achieved because of a better color match of the grafted tissue to adjacent area.*
Objective*: To provide information about a successful surgical reconstructive of interdental papilla using a subepithelial commective tissue graft and evaluated clinically for 3 months.*
Case: *Female, 25 years-old visit "Rumah Sakit Gigi dan Mulut" public service hospital Airlangga University, Surabaya in May 2012, she complained about her black spot at anterior lower region after scaling and root planning (SRP) treatment by dentist and she came to Rumah Sakit Gigi dan Mulut Airlangga University.*
Case management: *full thickness flap is dissected on the lingual aspect of the interental area. The flap is elevated labially, folded and sutured to create the new papilla at the facial part of the interdental area. The lingual which is open then covered by a subepithelial gingival graft then sutured to the facial part of interdental papilla, then coronally reposition flap was done for the lingual side. Then evaluated pre- and post treatment. After 3 month post flap surgery the interdental papilla has increased*
Conclusion: *Subepithelial connective tissue graft was able to increase the papilla height with interdental papilla lost <6 mm.*

Key words : Loss of interdental papilla, black triangle, subepithelial connective tissue graft

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INTRODUCTION

There is large percentage of population suffers from periodontal disease. These can be a cause of concern for the patient both functionally and esthetically. Patients consciousness and awareness of esthetic make it imperative for todays discussion to understand and treat gingival recession and open gingival embrasures.[1]

The interdental papilla, also known as the interdental gingiva, is the part of the gingiva that exists coronal to the free gingival margin on the buccal and lingual surfaces of the teeth. The interdental papilla fill in the area between the teeth apical to their contact areas to prevent food impaction; they assume a conical shape for the anterior teeth and a blunted shape buccolingually for the posterior teeth.

Open gingival embrasures occur in 15% of the general adolescent population and 41,9% in adolescent patients who are treated for maxillary anterior crowding. Open gingival embrasures are associated with periodontal disease.[2]

The open gingival embrasure, also called “black triangle”, is a visible triangular space caused by the lack of interdental gingival papilla filling this area.[3] Open gingival embrasures can caused by periodontal disease, traumatic, mechanical or chemical preparation or crown lengthening procedure.[1] Potential causes include dimensional changes of papilla during orthodontic alignment, loss of periodontal attachment resulting in recession, loss of height of the alveolar bone relative to interproximal contact, length of embrasure area, root angulation, interproximal contact position, and triangular shaped crowns.[2]

The loss of interdental papilla may cause esthetic deformities as well as problems related to speech and food impaction. Patients with advanced periodontitis are always at high risk for a “black triangle”.[3]

Today clinicians are confronted with the challenge not only of addressing biological and functional problem present in the periodontium, but also of providing therapy that is esthetically acceptable. The gingival tissues form the soft tissue frame of the dentition and play important role in esthetics, especially in anterior region of the mouth.[4]

Current periodontal plastic surgery is based on the use of the palatal site for donor tissue(subepithelial connective tissue graft), which entails a second surgical wound.[5] The advantages of the subepithelial connective tissue graft is that better esthetic can be achieved because of better color match of the grafted tissue to adjacent areas. The reconstruction of the open interproximal space remains one of the gratest challenges in esthetic periodontal therapy.[6]

This case report shows the importance of the inter-proximal papilla and it's clinical significance and the progress of the papilla augmentation, based on the use of a sub-epithelial connective tissue graft for the treatment of the lost interdental papilla or "black triangle".

CASE REPORT

Case: Female, 25 years old visit "Rumah Sakit Gigi dan Mulut" public service hospital Airlangga University, Surabaya in May 2012, she complained about her black spot at anterior lower region after scaling and root planning (SRP) treatment by dentist and she came to Rumah Sakit Gigi dan Mulut Airlangga University. Extra oral examination revealed that everything were normal. Intra oral examination found that there was open gingival embrassure in lower anterior region. Probing revealed that there is no periodontal pocket in all regions.

Fig 1. Intra oral examination of the case. There was class I and class II Nordland and Tarnow classification loss of the interdental papilla founded in the mandibular anterior region.

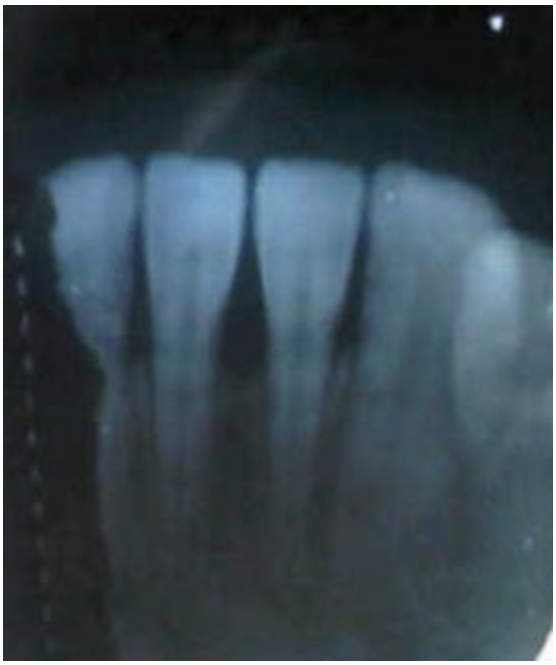

Fig 2. Periapicalradiograph showed horizontal resorption in region 31, 32, 41, 42.

CASE MANAGEMENT

At first visit, after the Scaling and root planing (SRP), we take a periapical radiograph and the patient was instructed to maintain her oral hygiene well. The patient was scheduled for evaluation in one week later.

Second visit, we evaluated about her oral hygiene and she doing it very well and the patient was schedule for periodontal flap surgery using subepitheliat connective tissue graft 1week after.

On May 21, 2012 periodontal flap was done using subepithelial connective tissue graft without bone graft.third visit using a "trap door" design (Figure 3), the graft was rinse in aquadest distilled water while writer prepared the resipient site. Citric acid was use as a root conditioning agent. To regenerate the new interdental papilla, the technique we use is modification of technique which is described by beagle (1992), a split thickness flap is dissected on the palatal aspect of the interdental area. The flap is elevated labially, folded and sutured to create the new papilla at the facial part of the interdental area, then writer put the subepithelial connective tissue graft to fill the embrasure from the lingual side and then elevated the lingual side flap coronally. The patient prescribed antibiotic(Clindamycin 300mg for 5 days) and analgesic (Mefenamat acid 500mg for 3 days)

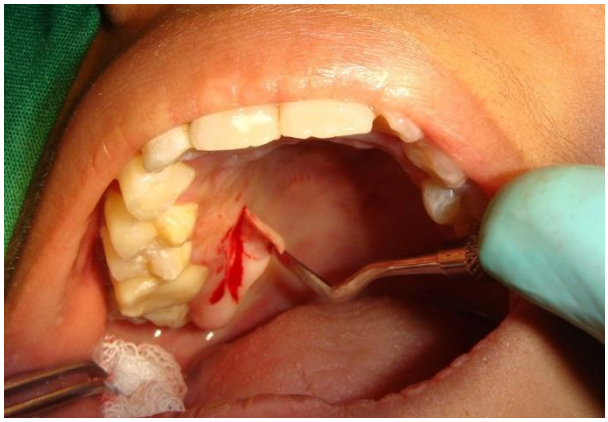

Figure 3. "trap door" flap design.

Figure 4. Recipient site

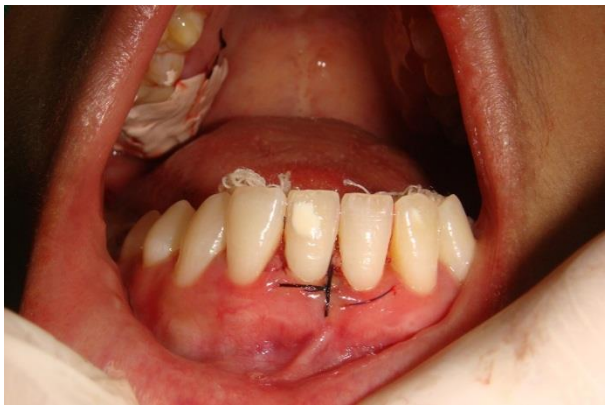

Figure 5. Labial view of the recipient site Site after sutured

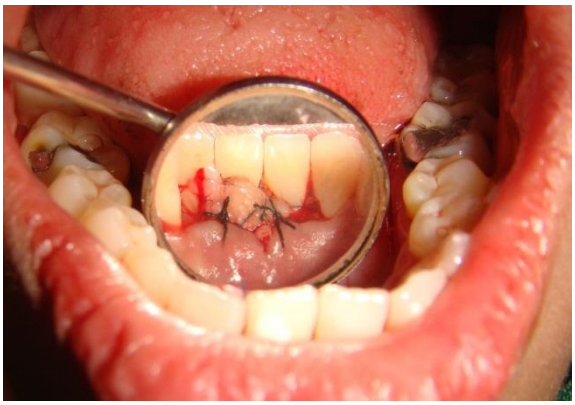

Figure 6. Lingual view of the recipient after sutured.

1 week after surgery observation, we found that the graft is still at it place, then writer irrigated the surgical site using a H_2O_2 and PZ. 2weeks after the surgery the suture were removed, the new papilla has filled the embrasure at region 31,32 and partially filled embrasure at region 31,41. There is a inflammation symptom on the surgical site. Instruction to keep her oral hygiene well was continued .

Fig 7. Lingual view of recipient site after

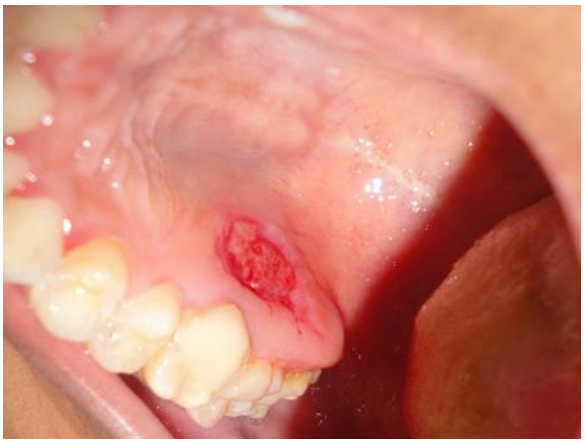

Fig 8. Palatal view of donor site after

1 week post-surgery **1 week post-surgery**

1month after the surgery observation there was no inflammation symptom found, the observation then continued for the next 3 months.

Fig 9. Labial view of recipient site after 2 weeks post –urgery

Fig 10. Lingual view of recipient site after 2 weeks post-surgery

Fig 11. Labial view of recipient site, 1 month post-surgery.

Fig 12. Labial view of recipient site, 3 months post-surgery.

Fig 13. Pre-surgery and post-surgery view

DISCUSSION

There may be several factors contributing to the loss of papilla height and the establishment of "black triangle" between teeth. The most common reason in the adult individual is loss of periodontal support due to plaque-associated lesions.[8]

A missing papilla is often visible as a small triangular gap between adjacent teeth. The relationship of interdental bone to the interproximal contact point between adjacent teeth is a determining factor in whether or not the interdental papilla will be present. When the vertical distance form the contact point to the crest of bone was 5mm or less, the papilla was present almost 100%, if the distance was 6.. or more, partial papilla commonly fill the embrasure between the teeth.[8]

Nordland and Tarnow classified the loss of papilla height into classes based on three anatomical landmarks: interdental contact point, facial apical extent of CEJ and the interproximal coronal extent of the CEJ. Normal: Interdental papilla fills the gingival embrasure apical extent of the interdental contact point; Class I: The tip of the interdental papilla is located between the contact point and the most coronal extent of the interproximal cement-enamel junction(CEJ); Class II: The crest of the papilla is at or apical to the

interproximal CEJ but coronal to the facial CEJ; Class III: Crest of the papilla is at or apical to the facial CEJ.[8]

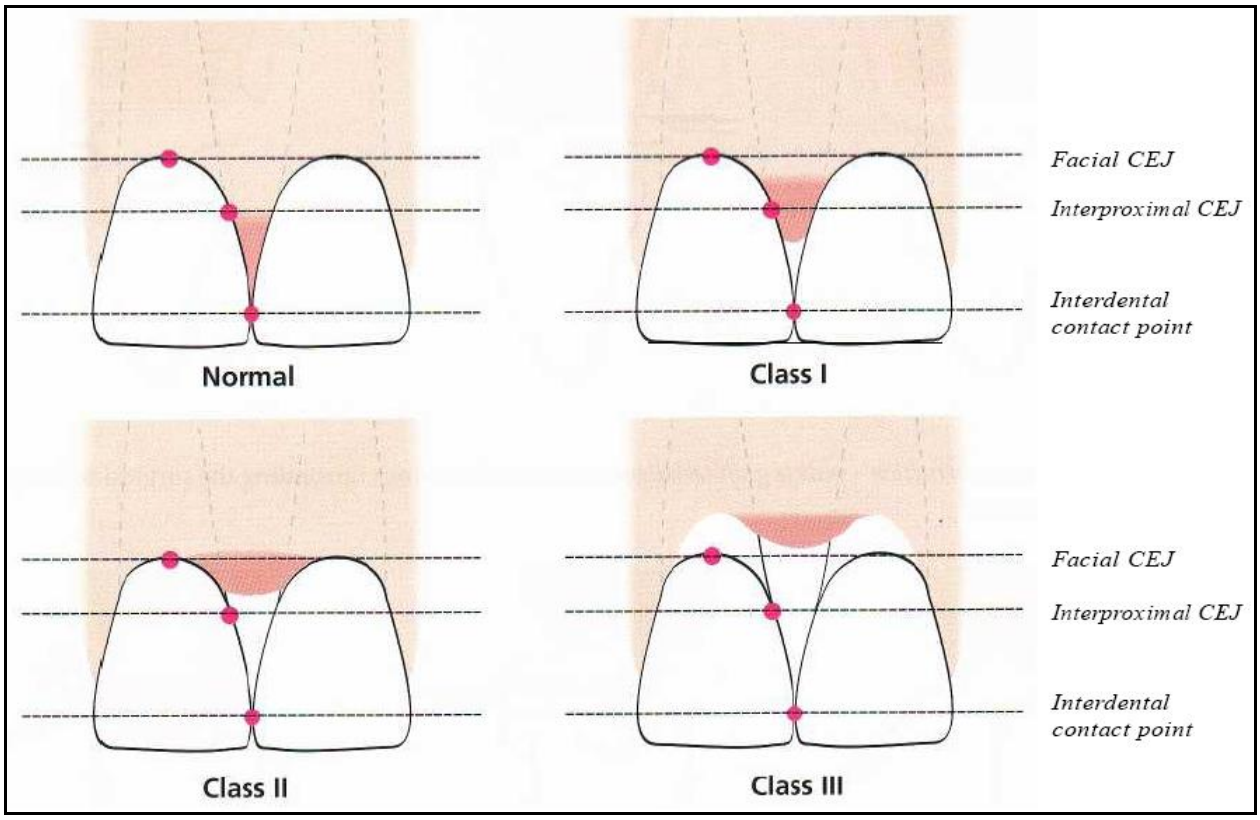

Fig 14. Nordland & Tarnow classification system for papilla height(1998)[8]

One of the major aesthetic challenges in periodontal plastic surgery is related to the ability of rebuilding the lost papilla in the anterior segment. It is caused by the anatomy of the anterior attached gingival which is usually thin.

Before we do surgically reconstruction of the papilla it is important to carefully asses the vertical distance between the bone crest and the apical point of the contact area between the crowns, and the soft tissue height in the interdental area.

If the distance bone crest-contact point is 5mm and the papilla height is less than 4mm, surgical intervention for increasing the volume of the papilla could be justified in order to solve the problem of an interdentally "black triangle". If the contact point is located >5 mm from the bone crest, because of loss of periodontal support and/or an inappropriate interdental contact relationship between the crowns, meand to apically lengthen the contact area between the teeth should be selected rather than a surgical attempt to improve the topography of the papilla.[8]

Beagle (1992) described a pedicle graft procedure utilizing the soft tissue of the interdental area. The technique is, a split thickness flap is dissected on the palatal aspect of the interdental area. The flap is elevated labially, folded and sutured to create the new papilla at the facial part of the interdental area. A periodontal dressing is apllied on the palatal aspect only, in order to support the papilla (Figure 14).[8]

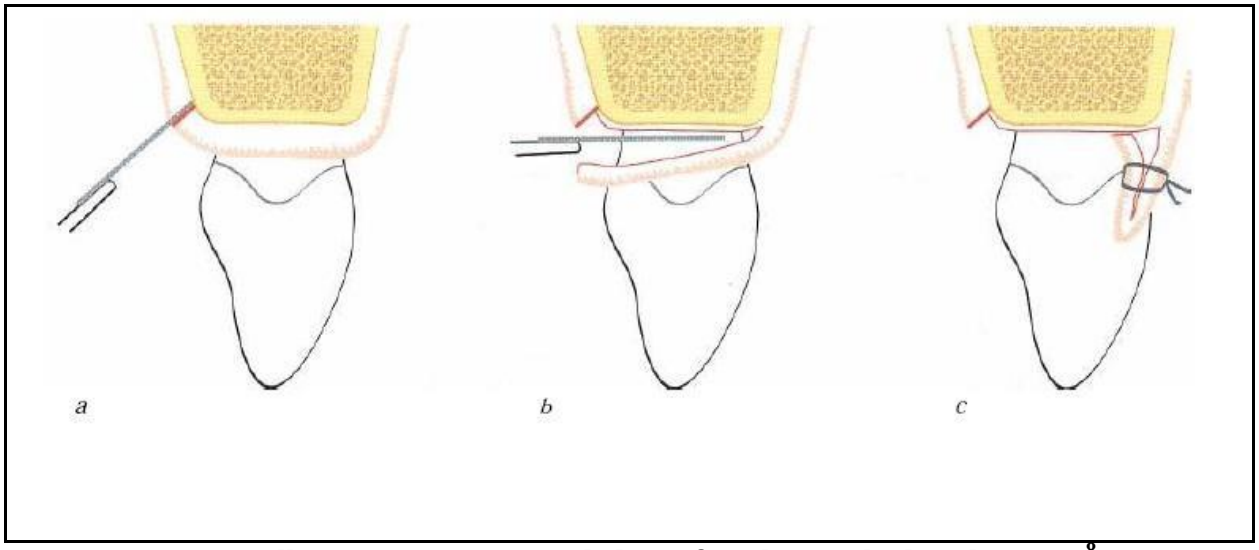

Fig 15. Papilla reconstruction –pedicle graft technique by beagle (1992)[8]

In this case report, writer make some modification of surgical reconstruction technique by beagle (1992). After the flap is elevated labially, folded and sutured to the facial part of the interdental area, the writer put the subepithelial connective tissue graft to cover up the death space around the embrasures and then elevate the flap at the lingual side to coronally and then sutured. The use of subepithelial connective tissue graft is to avoid any dead space in the inter proximal area, so that we can get a new formation of interdental papilla.

The subepithelial connective tissue graft is harvested from the palate or the retromolar pad by the use of a "trap door" approach.[7] Compared to the epithelialized graft, the connective tissue graft is preferable due to less invasive palatal wound and improved esthetic result.

The result of this technique that the writer apply in this case, new interdental papilla was regenerate perfectly for teeth 31,32 but there is a partially filled papilla for region 31,41. this can happen because the vertical distance between the contact point and the interproximal bone crest was > 6 mm, that is why just a partial papilla filled the embrasures.

CONCLUSION

Subepithelial connective tissue graft was able to increase the papilla height with interdental papilla lost <6 mm.

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ERIPHERAL GIANT CELL EPULIS IN A 5 YEARS OLD BOY
(CASE REPORT)

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ABSTRACT

Background : *Giant cell granuloma occurs either as a peripheral exophytic lesions on the gingival (giant cell epulis, peripheral giant cell reparative granuloma). Peripheral giant cell lesions are considered to be examples of benign inflammatory hyperplasia in which cells with fibroblastics, osteoblastic and osteoclastic potentials predominate. The lesions are highly vascular; hemorage in a prominent clinical and histologic feature.*
Purpose *: The aim of this paper is want to report about a large nodule between 84 and 85 in a 5 years old boy. The nodule grew until about 3 cm in size, in the last 3 month. It bleeds easily by a light trauma.*
Case *: a nodule between 84 and 85 in a 5 years old boy that wanted to be treated pedodontically. By panoramic photo the sources of the epulis clearly detected.*
Case management : *of the case was, examined the nodule intensly and referred to Dr.Soetomo Hospital, because hehad to have his JAMKESKIN card. Meanwhile he was given vitamins, herba mouth gargle, and some liquid-high-nutrition foods.*
Discussion : *of this case was, by the easily bleeding condition, we have to be very caution for a more serious illness. The examinations in the Dr.Soetomo Hospital were complete. The results were normal in the general condition, except for the PLT concentration. According to the fund that was minimal, his parents postponed the continueity of the schedule. Meanwhile the herba's gargle 9 the most medicament that easily make by themselves) was daily used. The lesion was reduced and not bleed anymore.*
Conclusion*.: The epulis that easily bleeds, for the patient from lower level, had to be treated with a natural herba medicament that was able to them.*

Key words : *Epulis easily bleeding, general check up, herbal medicine.*

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INTRODUCTION

Giant cell granuloma occurs either as a peripheral exophytic lesions on the gingival (giant cell epulis, peripheral giant cell reparative granuloma). Peripheral giant cell lesions are considered to be examples of benign inflammatory hyperplasia in which cells with fibroblastics, and osteoclastic potentials predominate. The lesions are highly vascular; hemorage in a prominent clinical and histologic feature [1-3].

Giant cell granuloma is generally believed to represent an altered response to injury or irritation and not true neoplasia. It may arise from the gingival (peripheral giant cell granuloma), with or without bone involvement, or it may arise centrally (central giant cell granuloma) within bone. Although both the peripheral and central forms more requently in the mandible, the central form occurs in an earlier age-group, before 20 years , and the peripheral type after 20 years of age. Although studies vary, some reports suggest a predilection for the female with both forms [1-4.]

These growths are made up of epithelial cells and leukocyts, resembling granulation tissue, and are the result of the presence in the socket of some foreign irritating materials – for example, bits of tooth structure, enamel, dentine, fillinf material, calculus or piece of dead bone. They may also possibly be an outgrowth of a periapical granuloma which was not removed at the time of extraction of the tooth [2-6] .

In apprearance they are masses of irregular “mulberry- like” reddish blue granulation tissue, or a well-circumscribed; smooth, rounded, tumor-like proliferation from the socket [2.]

Clinically the peripheral form appears as a firm fibrous growth arising from the gingival, often from between teeth or from gingival margin. Frequently the mass appears vascular or bluish, and depending on the degree of irritation, it may have an ulcerated surface. This may produce a clinical picture indistinguishable from the pyogenic granuloma. Those arising from extraction sites of teeth (usually primary teeth) are often misdiagnosed clinically as epulis granulomatosa. Peripheral lesions arising from extraction sites or between teeth will occasionally produce superficial destruction of bone [1-6]

Central giant cell granuloma appear as radiolucent lesions with fine trabeculae and borders that are diffuse. Large lesion may appear multilocular with expansion and thinning or perforation of the cortical plates. Tooth displacement and/or root resorption are not uncommon [1,2]

Histologically the tumor mass consists of fibrous connective tissue with varying numbers of capillaries, multinucleated giant cells, and chronic inflammatory cells.

Hemorrhage with hemosiderin pigment may account for some of the color of the tumor. Foci of osteoid or bone may be present.This histologic picture is nonspecific in that patient with hyperparathyroidism (primary or secondary) may exhibit peripheral or central lesions that are identical. Thus patient with giant cell granulomaa of the jaws may in fact prove to have undiagnosed hyperpara thyroidism [1,2,6].

Treatment of both localized forms requires surgical excision and/or curettement. Recurrences are uncommon. Giant cell granulomas resulting from resulting from hyperparathyroidism requires treatment of the primary disease as well [1,2,6,7],[8].

Pipper bettle Linn have been known have many essentials ingredients that useful for human being for long ago. Most of the part of this plant were useful , according to the culture of the population. Some place use the leave as a part of component for chewing, some place use the flower or fruit to do so. The percentage of the ingredients are depend on the soil they grew. Betel leaves are used as a stimulant, an antiseptic and a breath-freshener. This traditional habit were given generation to generation since the old days Some place used the leaves combine with some ingredient, such as lime and/or tobacco, as a stimulant to suppress hunger, reduce stress and heighten the senses[9].

According to Parwata et al (2009), that essential component that are dominatedly found in the Pipper-bettle Linn. oil are : 4-allyl phenyl acetate, 2 methoxy-4-phenol, 3-allyl-6-methoxy phenyl acetate and 4-(2-prophenyl)-phenol/cavikol [10].

CASE

The case is a nodule between 84 and 85 in a 5 years old boy that wanted to be treated pedodontically.

The first time he came to RSGM FKG UHT was at December 18th,2012 to treat his decays teeth. He couldn't continue the schedule of treatment, because his parents only stay for a while in Surabaya, in connection with looking for a job. They came from Ngawi, as free laborers.

The second time he came was at February 18th, 29013, because he was brought by a student, that need to fulfill his clinical requirement. The condition of the lesion was just as seen in the picture below.

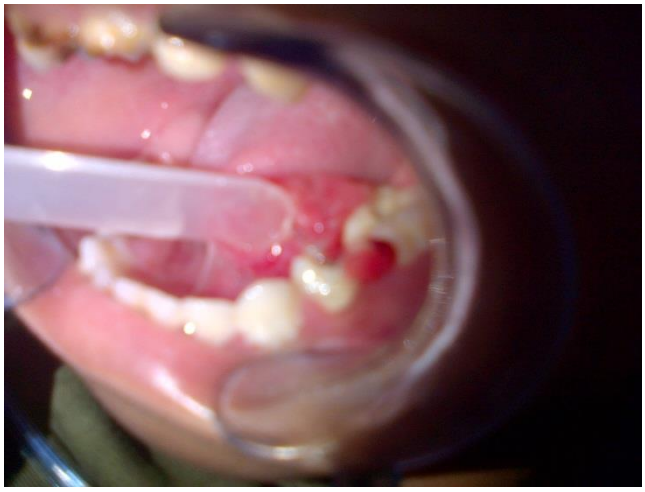


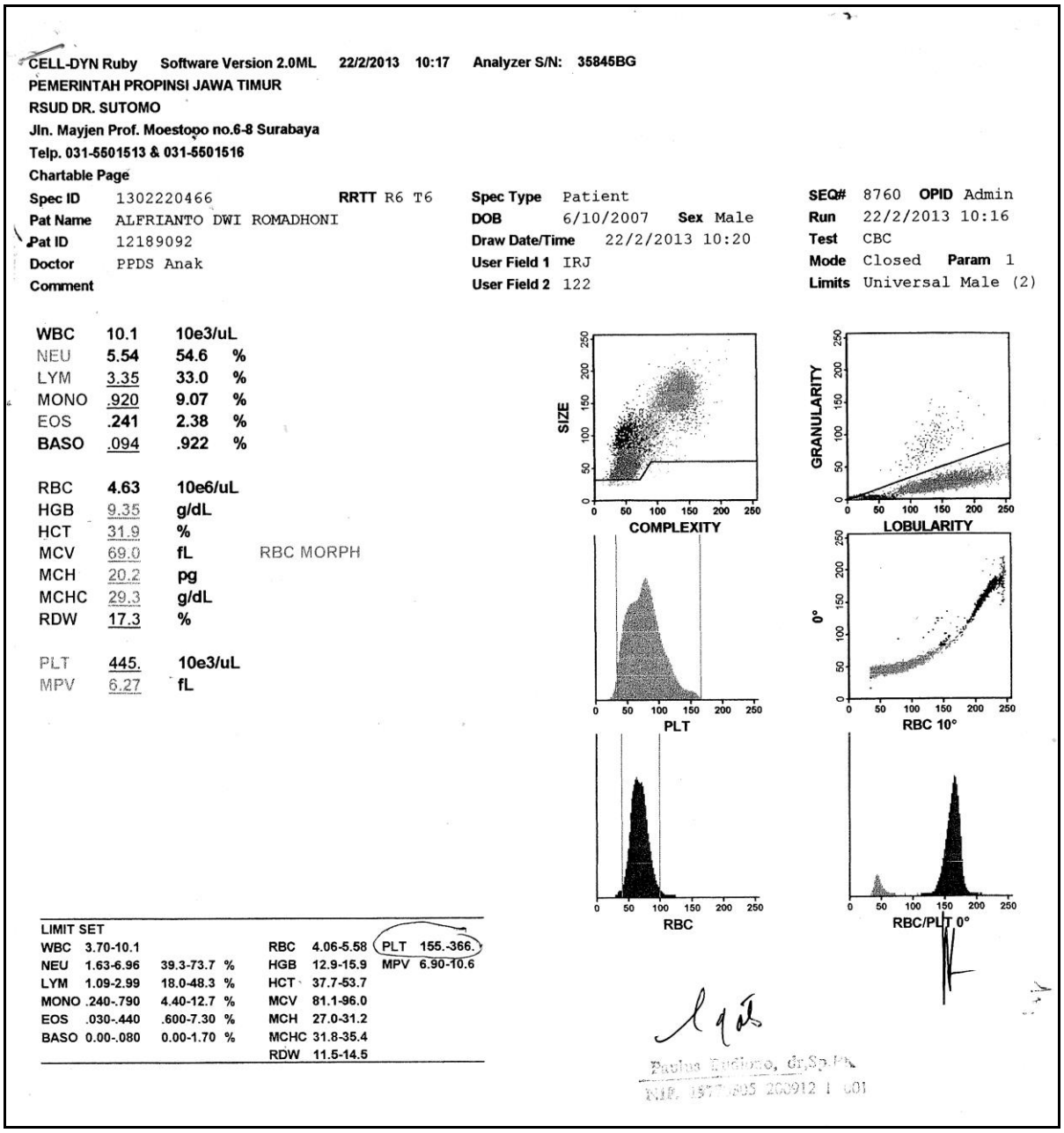
Fig 1. oral manifestation in this case

The lesion was a nodule, between 84 and 85, sesile in palpation, about 3 cm in broad, smooth surface, red and easily bleeds. According to the condition, there was no provocation action to the lesion. He was only receive a supportive medicament, gargle and dental education.

Fig 2. By panoramic photo the sources of the epulis clearly detected.

CASE MANAGEMENT

By examined the nodule intensly, carefully lifted the nodule to inspect the basis of the lesion. The severe of the lesion with their economic states, he was referred to Dr.Soetomo Hospital, because he had to have his JAMKESKIN card. The time for getting this card was a long one. Many steps and many offices had to be visited. At last his father finished the schedule for the card, and his child was able to be treated in Dr.Soetomo Hospital. Meanwhile, while waiting for the card, he was given vitamins, herba mouth gargle, and some liquid-high-nutrition foods.



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Pat Name ALFRIANTO DWI ROMADHONI DOB 6/10/2007 Sex Male Run 22/2/2013 10:16
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WBC	10.1	10e3/uL	
NEU	5.54	54.6	%
LYM	3.35	33.0	%
MONO	.920	9.07	%
EOS	.241	2.38	%
BASO	.094	.922	%
RBC	4.63	10e6/uL	
HGB	9.35	g/dL	
HCT	31.9	%	
MCV	69.0	fL	RBC MORPH
MCH	20.2	pg	
MCHC	29.3	g/dL	
RDW	17.3	%	
PLT	445.	10e3/uL	
MPV	6.27	fL	

SIZE / COMPLEXITY
GRANULARITY / LOBULARITY
PLT
0° / RBC 10°
RBC
RBC/PLT 0°

LIMIT SET

WBC	3.70-10.1			RBC	4.06-5.58	PLT	155.-366.
NEU	1.63-6.96	39.3-73.7	%	HGB	12.9-15.9	MPV	6.90-10.6
LYM	1.09-2.99	18.0-48.3	%	HCT	37.7-53.7		
MONO	.240-.790	4.40-12.7	%	MCV	81.1-96.0		
EOS	.030-.440	.600-7.30	%	MCH	27.0-31.2		
BASO	0.00-.080	0.00-1.70	%	MCHC	31.8-35.4		
				RDW	11.5-14.5		

Paulus Eryanto, Gr.Sp.PK

Fig 3. Report the results of the examinations at Dr.Soetomo's Hospital

At Dr.Soetomo's hospital, firstly came to the Dental Department, refered to take a panoramic photo and the result was an epulis fibromatosa.

Second department visited was cardiology dept. to take an ECG record, and the result was in a normal condition.

The third department visited was Chemical clinic and the result was there was an abnormality in the PLT's level.

After the parents were confirmed with the result, they didn't continue the further treatment's schedules .The patient's father met the FKG UHT's student, report the results of the examinations at Dr.Soetomo's Hospital. Meanwhile, by the advice of the student, and the parents obeyed strictly, the nodule was reduced dramatically. The rest of the nodule was only in the decay, must more lower in the cavity. The patient was able to eat normally, no bleed, no pain anymore.

Fig 4. clinical feature post treatment

DISCUSSION

By the easily bleeding condition, we have to be very caution for a more serious illness. The examinations in the Dr.Soetomo Hospital were complete. The results were normal in the general condition, except for the PLT concentration. According to the fund that was minimal, his parents postponed the continueity of the treatment's schedule. Meanwhile

the herba's gargle, (the most medicament that easily make by themselves) was daily used. The lesion was reduced and not bleed anymore.

The infusum of Piper-betel leaves, added with some salt, as a traditional mouth gargle, supported the reduced of the epulis granulomatosa dramatically.

Piper-betel leaves are also known to contain significant amout of anti-oxidants like hydroxychavicol, ascorbic acid and b-carotene [9]. Natural products are in great demand owing to their extensive biological properties and bioactive components which have proved to be useful against large number of diseases. It is proved that present extracts of Piper-betel leaves showed wide array of activities like antibacterials, antioxidative and antihaemolytic .Piper-betel leaves extracts containing high concentration of fatty acids like palmitic acid, stearic acid and hydroxyl fatty acids esters shows potent antimicrobial activity against diverse pathogenic microorganism [9].

CONCLUSION AND SUGGESTION.

The epulis that easily bleeds, for the patient from lower level, had to be treated with a natural herba medicament that was able to them.

General Practitioner had to be aware to their patients. The treatment had to be professionally done, but the medicaments used were the ones that had already contributed / supported by research.

ACKNOWLEDGEMENT.

The authors will thank you very much to the patient and his parents, for permitting this case to be presented in this event.

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RESTORING FACIAL BALANCE AND FUNCTION WITH ANTERIOR TEETH PROSTHESES (CASE REPORT)

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ABSTRACT

Contradiction in functional problems often occurs during the making of full dentures. Patients expect near-real prostheses in aesthetically and functionally, particularly in chewing and speech function. In these following cases, the problems are facial anatomical landmarks, mouth cavity and jaw shape of the patients that has changed due to resorbing of the alveolar ridge of upper jaw upwards to the palate, and resorbing of the alveolar ridge of lower jaw forward to the anterior.

Some efforts are done to overcome these problems: reduction to the vertical dimension during measurement of biting height, precise centric occlusion, and arrangement of anterior teeth not directly on the ridge for the upper jaw, as for the lower jaw, the anterior dentures are placed towards lingual direction.

Keywords: *Full dentures, esthetic and function, vertical dimension, dentures arrangement*

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INTRODUCTION

Construction of full dentures prostheses includes several important steps, because for patients who lost all their teeth, it is crucial to have a precise construction to restore the dentures function. Beside anatomical landmarks of the face and oral cavity to support prostheses stability, the jaw shape, the size of jaw arch, and contact between upper and lower jaw are also important. [2]

Several important steps beside impression, defining vertical dimension and central occlusion, is also step-by-step arrangement or anterior and posterior dentures.[1]

Patients who has lost their teeth for a long time, their anterior upper jaw alveolar ridge resorbtion directed toward the anterior and palatal, and the jaws are protruded, causing functional contradiction problem because the dentist is required to create prostheses that is close to the real dentures in order to maintain aestethic and speech function, and also chewing function.

To construct prostheses suitable for the patient, beside measuring vertical dimension and centric orientation precisely, it is also necessary to arrange the posterior dentures according to the peak alveolar ridge line, and for the anterior upper jaw, the dentures placement is not on the alveolar ridge line.

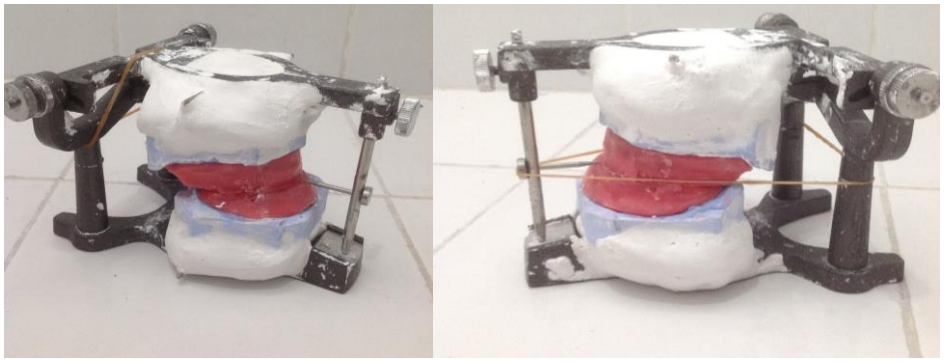
CASE

A 57 year old woman complained that her prostheses were not comfortable for chewing, speech, and aestethically unsatisfying. Patient wanted to make a new prostheses. At oral examination, no abnormalities found. Patient has no systemic disease, and during intraoral examination there was edentulous ridge of upper jaw with square anatomic palatum, and ovoid jaw arch, but with palatal anterior alveolar ridge resorbtion, while in lower jaw edentulous ridge appeared flat in the form of tapering and lower jaw arch seems bigger than upper jaw, therefore at resting position the relation of upper and lower jaw is class III. The old prostheses has flattened dental crowns, and during usage the lower jaw prostheses looked loose to the anterior.

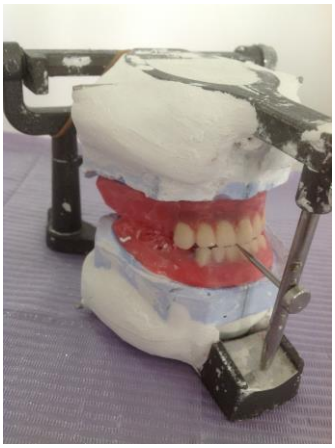
CASE MANAGEMENT

After Impression process & study model obtained, it is known that the size of lower jaw is bigger than upper jaw

Border moulding done before elastomer immpression, especially lingual part of postrior lower jaw/retromilohyoid, to obtain retention & stabilization from the vertical dimension and horisontal relation inside the articulator, its known that the horisontal alveolar distance at upper & lower jaw ridge at resting position are wide, over jet 6 mm & lower jaw arch is bigger & positioned more anterior



Working model & bite rim inside the articulator , showed that patient's anterior jaw relation is relation class III (Progeni)



For esthetical purpose, anterior part of upper jaw is not located/positioned on the alveolar ridge, but positioned more anteriorly in order to prevent the lips looking sagged & inward, also to reduce horisontal space with the anterior part of lower jaw

The anterior dentures are very imporant in 3 main functions of oral cavity, aesthetic, incicion & phonetic

The trial of upper jaw to evaluate horisontal space/ over jet with the alveolar ridge to predict anterior lower jaw dentures arrangement

Anterior lower jaw placement is not on top of alveolar ridge line, but more to the lingual side because the lower jaw alveolar ridge resorbtion towards the anterior side

After trial to the patientt and the patient is satisfied, followed by arrangement of posterior dentures on top of the alveolar ridge following the line, in order to obtain stabilization & restore the chewing function

Intermaxillary record is done after processing to correct the occlusion & articulation before insertion to the patient

Px seemed more satisfied with her aesthetic now, & 1 month after dentures insertion, px already feel comfortable chewing and talking

DISCUSSION

Management and care of full dentures patient usually emphasizes on chewing function than aesthetic function, considering most of them are elderly with chief complain of

unable to eat.[2] In the case above patient felt uncomfortable with her old prostheses because of the x-bite of lower jaw to the upper jaw and she also complained of speech difficulty in certain alphabetical sound, this caused by upper jaw prostheses that was located too palatal, therefore disturbing lingual function. The space between anterior upper and lower jaw was 3 mm width with x bite, buccal and lingual/retromylohyoid part of lower jaw prostheses appeared short, with all the dental surface has flattened.

Normally, anterior and posterior dentures placement is done according to the same real teeth position, inside the jaw arch and relation to antagonist teeth. [1,2,4] In this case, the lower jaw arch was bigger than the upper jaw, anterior jaw relation class III and for posterior ridge relation during resting position after vertical dymension and horizontal relation was $\geq 180^{0}$

From the observation and measurement the problem was anterior denture placement to restore esthetic function, therefore the arrangement was contrary to jaw resorbtion direction, modified in order to make the anterior teeth looked edge to edge, also avoiding difficulty in pronouncing the sound of "s,d, v and t", while to achieve stability and help retrieve chewing function in patient, the posterior teeth placement was according the outline on the ridge because the ridge relation was normal.[3,5]

CONCLUSION

To retrieve esthetic, chewing, and speech function, the construction of full dentures with abnormal anatomical landmark, and was complicated with incompatible jaw shape and arch , needs extra precision and accuracy, and a good teamwork with the technician, especially to achieve esthetic function. The main modification was done to the anterior teeth to obtain natural impression, while for the posterior teeth, the arrangement was to achieve stability.

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PORCELAIN ONLAY RESTORATION ON THE FIRST LOWER MOLAR AFTER ROOT CANAL TREATMENT

(CASE REPORT).

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ABSTRACT

Background : This paper is a case report of porcelain onlay restoration which was made on the first lower molar after root canal treatment. *Onlay is an alternative for* Endodontically treated teeth it provides cuspal protection, this type of restorations sometimes called a partial crown.

***C*ase** is a female patient, *age* 19 years old, with pulp necrosis in the maxillary lower teeth. *This case report describes a minimally invasive, aesthetic solution to provide cuspal coverage after root canal treatment.*

Case Management : The restoration were examinated for marginal integrity, anatomis form, surface and color for a period of 12 months. This restoration was in function at the end of evaluation periode. There was adverse event the all porcelain restoration exhibited the least plaque growth, have excellent biocompatibility, inertness, improved physical bonding and natural appearance.

Key words *: dental porcelain, endodontics*

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INTRODUCTION

The restoration of endodontically treated teeth is one of the topics more studied and controversial in dentistry. Questions and contradictory opinions remain about clinical procedures and materials to be used to restore these teeth, once fractures are often related. Although endodontically treated teeth have been extensively studied, the treatment planning and materials to restore them is yet controversial. The difficulty to determine the treatment planning is shown in a study related by Tu¨rp et al.[1] Therefore, the question about the better way to restore these teeth remains among the clinicians: direct or indirect restorations, using or not posts, the better material and the principles used in the design prepares. Some criteria should be considered to select the material and the technique used to restore endodontically treated teeth. Remaining coronal tooth structure and functional requirement are important factors to be observed to decide for a treatment planning.

The proper selection of restorative materials is important to preserve normal function and occlusal harmony. Ceramics/porcelain are used as an alternative to gold- based casting alloys because of the greater esthetic potensial. However, the main shortcoming of ceramics is their abrasiveness to enamel. In an attempt to minimize wear damage to the opposing tooth, the new low-fusing ceramics have been developed. These materials should be less abrasive to enamel because of their lower hardness, lower concentration of crystal base, and smaller crystals.

The use of the same porcelains for all-ceramic and metal-ceramic restorations leads to natural light effects and a homogenous surface structure. Many dental technicians have a standardized material for different types of restorations. Once the restoration has been placed, little difference can be observed between the all-ceramic onlays and the metal-ceramic crowns. Because the all-ceramic material is very transparent, the shade of the residual tooth structure is transmitted, resulting in outstanding esthetics. This case report describes the use of all ceramic/porcelain restorations in posterior onlays.

CASE REPORT

A 19-year-old young female reported for an evaluation of her permanent first molar teeth and this teeth was non vital. She had a dental history of caries in all first molars, which were consecutively treated with amalgam fillings.

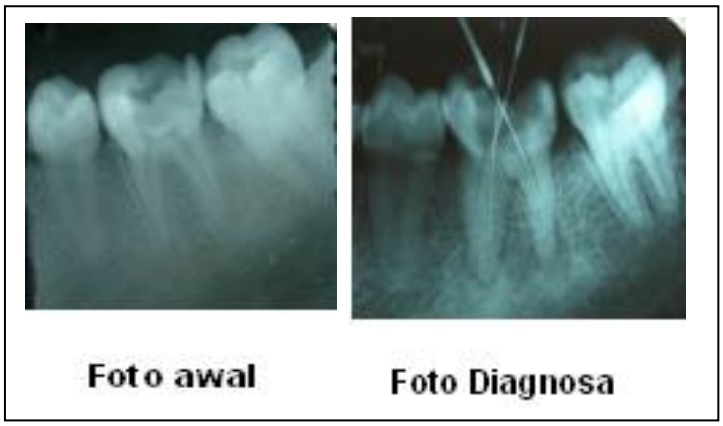

Figure 1. x-ray of first molar

This case was diagnosed as pulp necrosis, so that needs to be done Endodontics intracanal with single cone filling techniques. Furthermore, to the manufacture of all porcelain onlay restorations using. Prognosis is good in this case.

Visit 1 : Pre assessment of the case, Field isolation with rubberdam, Cavity entrance tooth 36, Irrigation of the pulp chamber, Localization of root canal orifice and penetration with flexible k file, Apical preparation with *crown down pressureless* technique (irrigation with NaOCl 2,5% and aquadest steril), Measuring working length by electronic apex locator distal= 19 mm, mesio bukal = 17mm and mesio lingual = 17mm, Apical Preparation are used in *protaper file* (F1), *Trial photo* (*gutta percha point* F1), Sterilitation with *calsium hidroksida*, cotton pellet and transient cement

Figure 2. trial photo

Visit 2 : The canal was sealed with gutta-percha. The canal is cleaned and irrigated with 0,5% sodium hypochlorite and sealed with gutta-percha.

Gutta-percha is the most commonly used material for the obturation of the prepared root canal system. Standardized gutta-percha points correspond to the ISO sizing system with a 2% taper. Various other shapes are now available to complement the recently introduced increased taper filing systems. This latter is normally used for root canal filling points.

Root canal sealers play an important role in the obturation of the prepared root canal system. Although many proprietary products are available, they may generally be divided into three groups, according to their main constituents: eugenol, non-eugenol and medicated.

Figure. 4. obturation photo

Figure. 5. after root canal treatment

Step preparation are 1) matching of shade, before starting for the restoration a matching of the shade has to be done. This will reduce the chances of the restoration colour being different from the natural teeth. All the shade selection procedure is to be carried out in natural light ; 2) core preparation, the tooth is prepared by removing old restoration materials and filling in any deep holes ; 3) onlay tooth preparation, outer surface the tooth is reduced in all dimensions (biting surface and sides) by 1mm to 3mm to make room for the material that will be placed on the tooth. The Wall of preparation are tapered to allow onlay to be slipped down over the tooth.

Figure 6. after onlay preparation

Figure 7. Post insertion

Then performed all stages of the manufacture of porcelain onlay beginning an impression of the tooth and that bite againts it is made, taking care to gently reflect the gum tissue away from the prepared tooth, placement of temporary Crown, laboratory work and the final delivery of the crown and finally cementation is used resin cement**.**

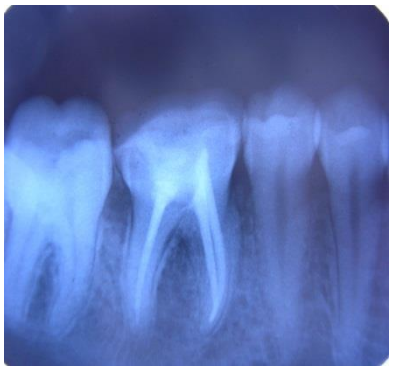

Figure 7. After onlay inserted

Figure 8. Follow up photo after 12 month

DISCUSION

It is evident therefore that endodontically treated posterior teeth with intra-coronal restorations show a high risk of unrestorable cusp fracture. The use of crowns can significantly improve the success for posterior teeth.[12]The predominant cause of failure of endodontically treated teeth is fracture and the fracture resistance of endodontically treated teeth to horizontal and vertical forces is related to the amount of healthy dentin remaining. Maximum conservation of internal dentine should therefore be a major objective during *both* endodontic therapy and subsequent restorative procedures. Minimal tooth cutting is the most effective measure for preventing vertical root fractures.[4]

The prognosis for posterior endodontically treated teeth is significantly improved with coronal coverage.The prognosis for anterior endodontically treated teeth is not necessarily improved with coronal coverage. Posterior teeth (crowns generally required) are molar teeth with an adequate pulp chamber do not require a post, molar teeth with inadequate pulp chamber may require a post, maxillary bicuspids generally require a post and mandibular bicuspids require independent consideration.

A dental onlay restoration is called an inlay when the material is bonded within the center of a tooth. Conversely, it is called an onlay when the extent of the dental damage requires inclusion of one or more cusps (points) of the tooth, or full coverage of the biting

surface. Onlays can often be used instead of traditional dental fillings to treat tooth decay or similar structural damage. While dental fillings are molded into place within the mouth during a visit with your dentist, onlays are fabricated in a dental lab, your dentist then fits and bonds it to the damaged tooth.

There are quite a few advantages to onlays including 1) Superior fit, onlays preserve as much healthy tooth as possible. They are a good choice if you have minimal to moderate tooth decay that extends into a flossing area; they offer an excellent alternative to full coverage crowns ; 2) Tooth color, onlays are not likely to discolor over time, as tooth-colored resin fillings sometimes do ; 3) Helping to ensure functional longevity, onlay restorations preserve the greatest amount of healthy tooth structure while restoring decayed or damaged areas ; 4) Easy tooth cleaning, your tooth can be easier to clean than it would be with full coverage restoratives like dental crowns, because the fit is tailored at all edges and the preparation is minimal. During the curing process, composite fillings can shrink; prefabricated porcelain or gold onlays will not, thus ensuring a perfect fit ; 5) Tight space fulfillments, onlays are better at sealing teeth to keep out bacteria, and they are easy to clean, will not stain, and offer exceptional longevity ; 6) Strength and stability, onlays are extremely stable solutions for the treatment of decay. Their superior fit and durable material make onlays a great choice that can actually strengthen a damaged tooth. ; 8) Weak tooth protector, an onlay can protect the weak areas of the tooth. The procedure does not require the complete reshaping of the tooth.

Occlusion also has an important effect on the wear process. The distribution of forces can be altered through selective occlusal adjustment. Multiple contact areas better protect occlusal stability by lowering stress concentrations. The increased demand for esthetically pleasing restorations has led to the introduction of new all- ceramic materials together with improvements in resin bonding agents. Bonded ceramic inlays or onlays can eliminate the need for conventional means of retention and allow the restoration of lost tooth structure. Numerous ceramics have excellent biocompatibility, inertness, improved physical honding, and natural appearance.

As with the cementation of any indirect restoration, the purpose of the cement is to secure the retention inherent in the design and to ensure a seal against micro-leakage. Cements are best introduced into the canal with a lentulo-spiral and the post also coated with cement. Current resin-modified glass ionomer luting cements provide adequate properties and are widely used for routine cementation.[3] Zinc phosphate cement cannot be discounted as it

provides high modulus, ease of use, and has withstood the test of time. For post situations with less than optimal retention, resin cements can provide a significant increase in retentive strength.[4]

CONCLUSION

In summary, endodontically treated teeth are more brittle due to loss of structural integrity associated with access preparation or caries. Because of the brittleness of these elements, planning will be associated to remaining tooth structure and functional demands, once load received depends on tooth position in the arch, occlusion and rehabilitation planning.

The described all-ceramic restorations seemed to perform without any problems for the 12-month evaluation time. Directly bonded all-ceramic restorations allow the restoration of lost tooth structure with minimal tooth preparation. Their outstanding esthetics, improved reliability, and minimal tooth preparation make all-ceramic restorations a practical alternative to other restorative options.

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THE USE OF MINI DENTAL IMPLANT IN THE POSTERIOR REGION
(CASE REPORT)

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Lakdogi TNI AL-Jakarta

ABSTRACT

The use of dental implants for single and/or multiple edentulous cases has increased significantly in recent years. They areused not only in normal cases, but also in special cases when the alveolar bone resorption occuredverticaly and/or horizontaly.

Mini dental implant is an implant with less than 3.1 mm diameter and the length more than 10 mm. There are many brands and companies produce mini dental implants. Mini dental implant generally indicated in cases when the alveolar bone width are very limited because of bone resorption process or in cases when the mesio-distal edentulous width is too narrow.

In this case report will be discussed the use of mini dental implant in the posterior region, the indications, treatment planning and techniques to achieve the optimal success and how to choose the mini dental implant for the cases and how to use the mini dental implant for posterior cases with a proper treatment planning.

Keyword : -

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INTRODUCTION

Implant dentistry is a branch of Dentistry that develops very fast in recent years, in the field of implant dentistry there are some developments in the materials, surface treatment and techniques in surgical aspect. One of the findings is the use of reduced diameter implant – the mini dental implant. Several years ago the smallest dental implant diameter is 3,0 mm but now we find in the market the 2,7 and 2,8 mm. Researches proved that reducing the diameter is correlated with increasing the length of the dental implant to gain stability and retention in the bone.

The development of mini dental implant also in the non-monotype or two component mini dental implant and abutment. In the last decades mini dental implant means the monotype, the implant united with the abutment. This monotype differs in the implantation techniques and the results especially in the esthetic zone.

In this case report will be discussed about two component mini dental implant. And also the author hopes that the audience will gain more realistic knowledge using the mini dental implants in daily practice, how to gain optimum esthetic outcome and function, and the use of mini dental implant in special cases.

Missing tooth is not always replaced by dental implant simultaneously. In some cases the patient asked for an implant years after the last extraction, leaving the edentulous space even without a denture or bridge. The reason for implant placement always varies, the bridge abutments have already infected or mobile and deep caries, failed endodontic treatment and the patient ask for a more comfortable denture.

Alveolar bone condition after a long period of edentulous sometimes have been resorbed horizontally and/or vertically. This condition leads a contra indication for a regular dental implant placement. In this case the use of mini dental implant is indicated.

Many types and brands of mini dental implant launched to the market. Some of them are monotypes, where the root part united with the abutment part. The other type is external abutment joint to the implant via a screw. Mini dental implants are usually the implant with less than 3,1 mm diameter.

Besides using mini dental implants as a permanent implant, the dentists also used as a temporary implant, as the anchorage for a temporary full acrylic denture with ball attachments in overdentures.

There are many types and brands of mini implant, and many brands claim their superiority each other, as practitioner the implantologist should know the specifications and features of each implant.

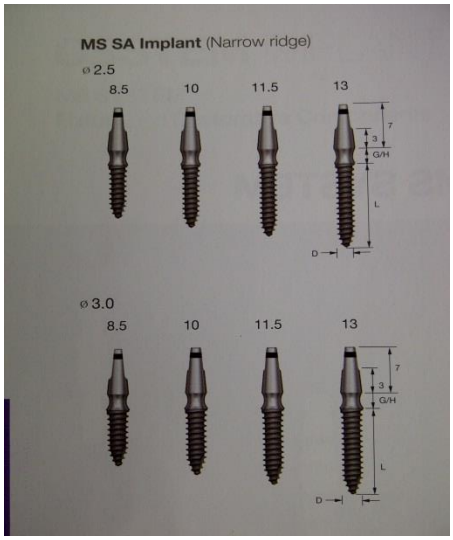

Fig 1. MS SA Implant (Osstem Implant, South Korea)

Fig 2. Smart 1 Piece (Cortex Dental Implant, Israel)

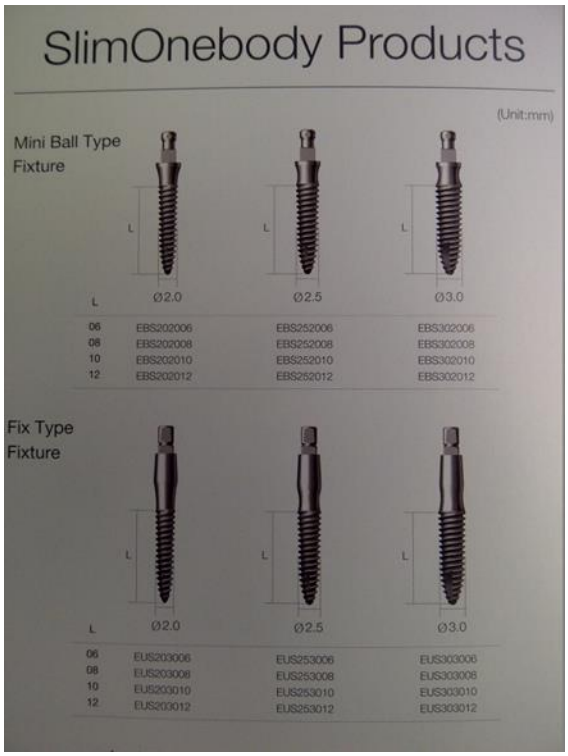

Fig 3. Slim Onebody (Dentium, South Korea)

Fig 4. Bego Semados Mini Implant (Bego Implant Systems GmbH & Co, Germany)

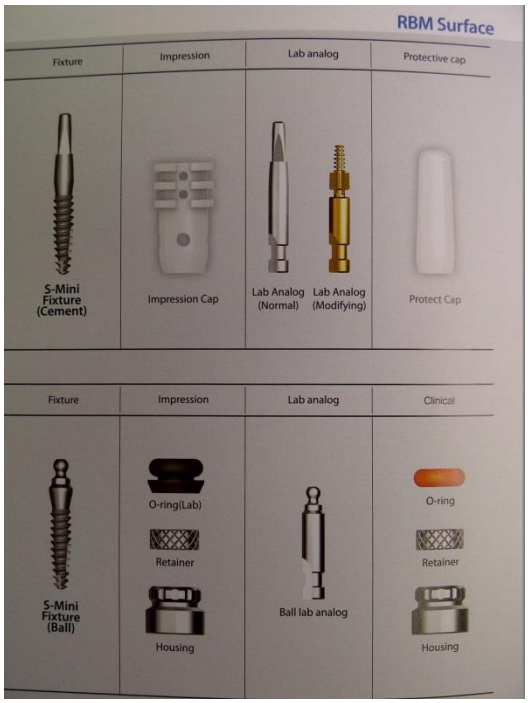

Fig 5. S-Mini (NeoBiotech, South Korea)

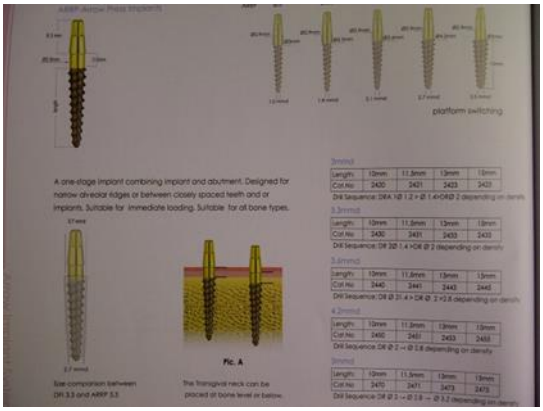

Fig 6. Arrow Press Implant System (Alpha Bio, Israel)

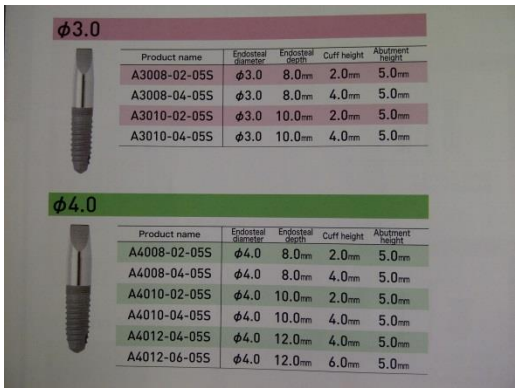

Fig 7. Mytis One-Piece Implant (Mytis Arrow Implant, Japan)

Fig 8. Axiom 2.8 (Anthogyr, France)

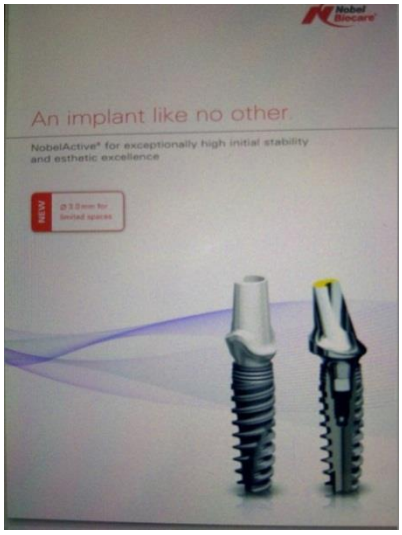

Fig 9. 3.0 Nobel Active (Nobel Biocare – Sweden)

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Mini dental implants used for the following indications : Edentulous jaws as the abutments for a ball retention overdentures, for an alloy bar framework in an overdenture and in a Locator Implants attachment in an overdenture, Edentulous narrow ridges with pronounced alveolar bone resorption, Small anterior upper and/or lower jaw gaps (12, 22, 32, 42).

As a general rule, always use the largest possible implant diameter. Because of their reduced mechanical stability, the small diameter/mini implants are used only in cases with a low mechanical load. Placement in the molar region is not recommendable. This statement looks like contraradictive with the title of this presentation. The explanation will be explained later.

Serious internal medical problems, bone metabolism disturbances, uncontrolled bleeding disorders, inadequate wound healing capacity, poor oral hygiene, maxillary and mandibular growth not completed, poor oral and general state of health, uncooperative patients, drug or alcohol abuse, psychoses, prolonged theray-resistant functional disorders, mouth xerostomia, inadequate and weakend body immune system, illness requiring periodic use of the steroids, titanium allergy, uncontrolled endocrine disorders such as diabetes mellitus.

Previously irradiated bone, diabetes mellitus, anticoagulant drugs/hemorrhagic diatheses, bruxism, parafunctional habits, unfavourable anatomic bone conditions, tobacco

abuse, uncontrolled periodontitis, temporomandibular joint disorders, treatable pathologic diseases of the jaw and changes in the oral mucosa, pregnancy, inadequate oral hygiene.

In-adequate bone volume and/or quality, local root remnants. Attention should be paid to the specific indications of the small diameter implants and the implants with a length of 6 mm.

Mini dental implants is specially designed for an implant based treatment of edentulous narrow ridges, and is the ideal choice to restore small anterior gaps, but in some cases we can use for the treatment in the posterior gaps. Like the regular implants, the mini dental implants conical basic shape guarantees outstanding primary stability, by its condensing thread flanks and parallel microthread in the collar. Extremly narrow alveolar ridges which would normally require prior bone augmentation are spread and condensed to receive implants.

Preparation of the implant bed using thread formers, and allows the narrow alveolar ridge to be spread in every direction, the subsequent insertion of mini dental implant transforms a less success into a more predictable outcome

Implant is the main and focal point of the whole restoration. Implant provides the basis for planning the surgical and prosthetic procedures. Communication between implantologist, patient, and the dental prosthetic technician is very important to achieve the best and desired prosthetic outcome.

To establish the topographical situation, the axial orientation and the choice of implants, a wax-up/set-up is produced on the previously prepared study cast and the type of superstructure is then defined. The wax-up/set-up can later be used as the basis for a custom-made X-Ray or drill template and for a temporary restoration.

The implant abutments should be in principle, always be loaded axially. Ideally, the long axis of the implant is aligned with the cusp of the opposing tooth.

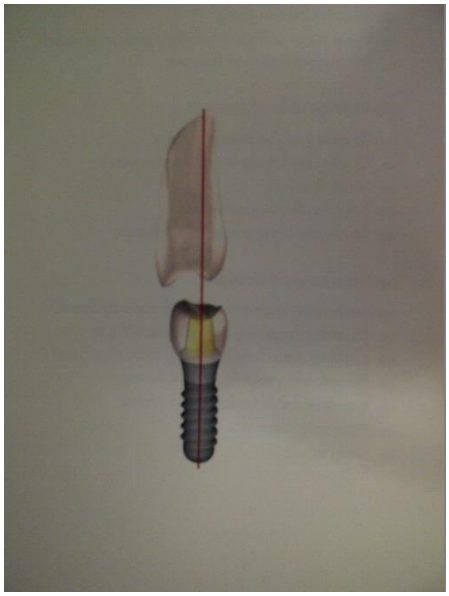


Fig 10. The Axis of implant should be pointed to the long axis of the opposing tooth, to the upper palatal cusp, and to the lower buccal cusp.

Extreme cusp formation should be avoided because it can lead to un-physiological loading and unpredictable alveolar bone resorption. The ideal position should be established using the using the wax-up and can be applied in vivo using a custom-made surgical template.

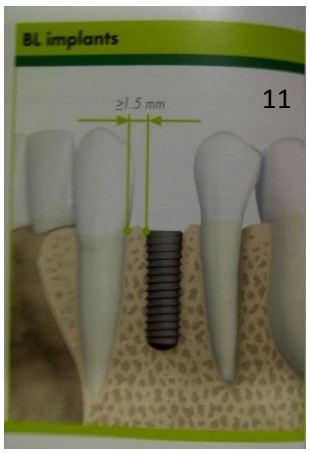
The implant is the apical extension of the planned restoration and therefore needs a prosthesis orientated implant position. The implant diameter, implant type, position and the number of implants should be selected individually, taking the anatomy and space conditions, eg. mal-positioned or inclined teeth into account. The measurements given here should be regarded as a minimum guidelines. The doctor should have a wide perspective according the patient individually. Only when the minimum distances are observed if is it possible to design the restoration so that the necessary oral hygiene measures can be carried out.

The final hard and soft tissue response is influence by the position between the implant and the proposed restoration. It should be based on the position of the implant-abutment connection. This implant position can be viewed in three dimensions : mesial-distal, oro-facial and coronal-apical directions.

The mesiodistal bone availability is an important factor in implant type and implant diameter choosing as well as the interimplant distance in the case of multiple implants. The

point of reference on the implant to measure mesiodistal distance is always the shoulder, being the most voluminous part of the implant. Distance to adjacent tooth at the bone level.

A minimal distance of 1,5 mm from the implant shoulder to the adjacent tooth at the bone level (mesial and distal) is required.



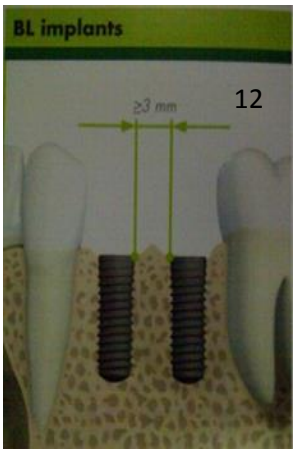


Fig 11. Distance from implant to adjacent tooth at bone level
Fig 12. Distance from teeth to adjacent implants at bone level and minimally distance between implants.
Fig 13. Distance between adjacent teeth at bone level
Fig 14. Orofacial Implant position, bone layer around implant at least 1mm thickness

A minimal distance of 3 mm between two adjacent implant shoulders (mesio-distal) is required.

For a single tooth restoration, the implant is placed centered within the tooth gap. The distance between adjacent teeth at the bone level is approximately 1 mm (2 x0,5 mm) more than the gap width,then the gap width should be 2 mm wider than the implant shoulder or the implant diameter should be 2 mm less than the gap width.

The facial and palatal bone layer must be at least 1 mm thick in order to ensure to stable the hard and soft tissue conditions. In this limitation, a restoration-driven orofacial implant position and axis should be chosen such that a screw retained restoration are possible.

An augmentation procedure is indicated , when the orofacial bone wall is less than 1 mm or a layer of bone is missing on one or more sides. The technique should be employed only by an implantologist or an adequate experienced and trained dentist in the use of augmentation material procedures.

The mini dental implant is specially designed for implant-based treatment of edentulous narrow ridges, and is the ideal choice to restore small anterior gaps. The conical shape guarantees outstanding primary stability. Narrow alveolar ridges which would be

normally require prior augmentation are spread and condensed by its conical shaped to receive implants. A good mini implant always completed with small and micro threads. Mini Implant with large threads has less primary stability due to mastication and chewing force.

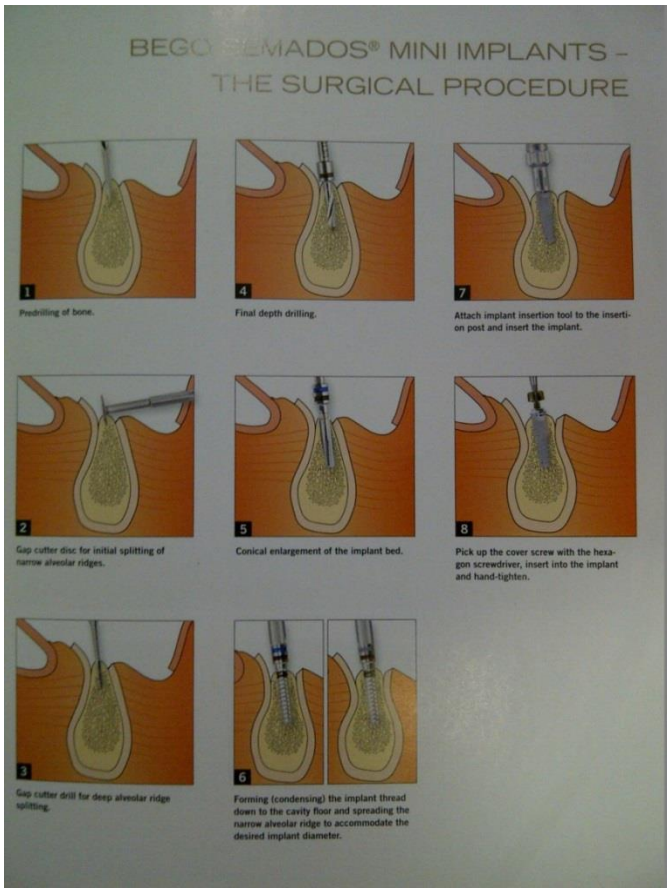


Fig 15. Mini Implants Surgical Procedures.

CASE REPORT

A 55 yr old gentleman come to my clinic with the chief complaint his lower right first molar felt pain. Intra oral inspection showed infection in 47 as the abutment for the bridge 47-45. The bridge was constructed in 1993. Radiographic panoramic examination showed infection in the periapical area of 47. The patient asked for extraction 47 . After separating the 45 with the bridge, 47 was extracted, curreted, and wait until healing process of the extraction site.

Fig16. Panoramic X Ray of the patient, 47 was infected due to pulpal gangrene and fistula.

Two weeks later the patient asked for an implant in the 46 edentulous region. Intra oral examination in the 46 edentulous area showed an anthropic bone in horizontal bucco-lingual. The bone is about 5 mm thickness, and the mesio-distal 46 width can not be inserted for more than 3,2 mm diameter implant . To solve the problem the operator decided to use 2 mini implants in the 46 area. That means we divide the edentulous molar width for two premolar width implants.

The first placement of 46 implant was done a week later. Based on the mesiodistal implant position described previously the operator calculated the crown width. That means implant width between 3 to 3,5 mm (3,1 mm Bego mini dental) + a space more than 3 mm implant – tooth distance (2x 1,5 mm), the optimal width of the crown about 6,5 – 6,8 mm.

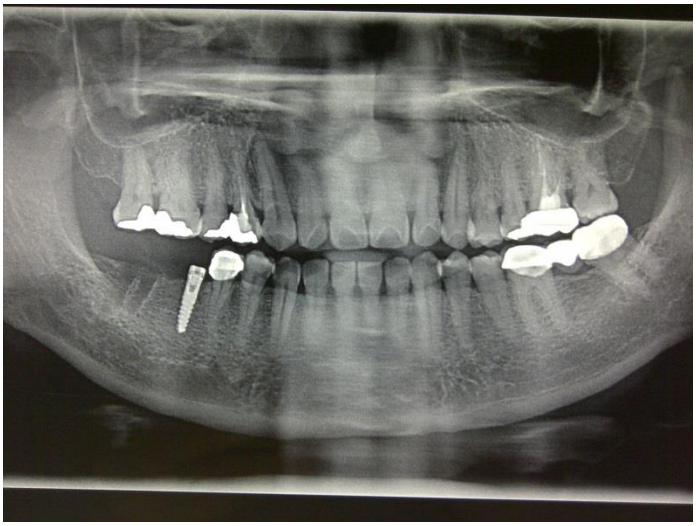


Fig 17. The first 3,1x11,5 mm mini implant in 46

The patient agreed for a first implant placement before to continue for the second implant. The first Bego dental implant 3,1x11,5 mm was inserted in 2 june 2012. In 22 September 2012 the process began with gum forming and a week later perform the impression, followed by laboratory process. Finally crown insertion in 6 October 2012.

The result was satisfied to the patient, as he asked for a second one even the third one in a single operation, but it is better to build the restoration one by one for esthetic and function consideration.

The second implant using the same diameter and length was performed in 8 December 2012. And the crown was finished in 13 April 2013. The result again satisfied the patient. Esthetically and functionally bot implants are in stable and control was taken in 21 September 2013. No sign of excessive bone resorpsion nor functional disorders.

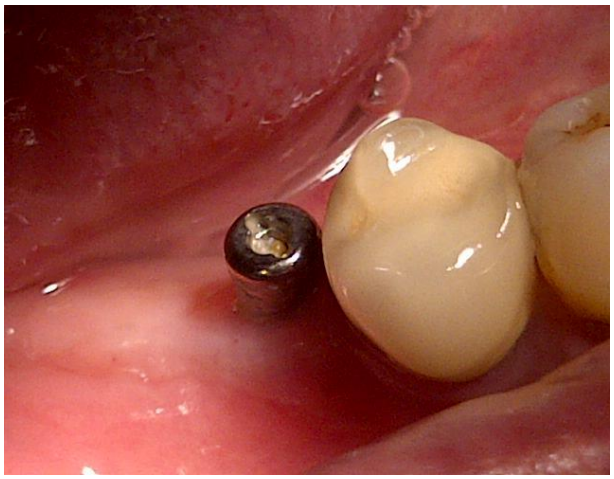


Fig 18. Healing screw for the first 46 implant.

Fig 19. Impression coping open tray for the first 46 implant.

Fig 20. Silicone impression material.

Fig 21. 46 Crown in smaller size.

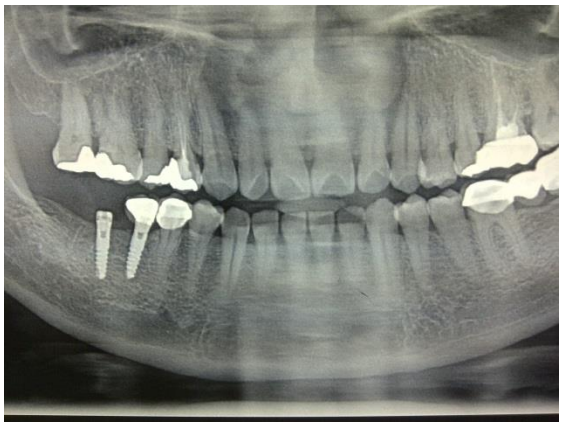


Fig 22. The second 46 implant inserted.

Fig 23. Abutment secured.

Fig. 24 Second 46 Crown inserted.

DISCUSSION

Implant restoration offers a long-life and predictable result as long as the indication and the process was performed step by step. Indication and contra indication have to be the first priority. Once the patient showed a contra indication do not perform the implantation. For this can lead to a failed implant restoration and rejection is very possible.

An implantologist should always aware and innovative while facing a complicated and/or complex case, always smart and precision in designing the treatment planning, using the standard operating protocol, and to be able to choose the right type, the right diameter and the right length implant used, and finish the case with confidence and perfect result functionally and esthetically.

CONCLUSION

Using the rule of implant restoration treatment guide, we can use a small diameter implant in the posterior area, conversing the restoration into a smaller one, and not following the tooth restored and replaced . A molar could be replaced by two ”*premolar restorations*”, not always replaced by a molar restoration only, depends on the bone width mesio-distally and bucco-lingually.

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PERIODONTIC- ENDODONTIC TREATMENT AT PERIAPICAL LESION (SUSPECT CYST)

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ABSTRACT

Background *In this case report, we present a periapical lesion case (suspect cyst) and was treated with Periodontic-Endodontic Treatment. Periapical lesions develop as sequelae to pulp disease. They often occur without any episode of acute pain and (are) discovered on routine radiographic examination. The incidence of cysts within periapical lesions varies between 6 and 55%*
Case report, *a 40-years old man had been pain and swelling in right upper lateral incicivus, with radiographic picture oval radiluscent at apical right upper lateral incicivus with radiopague margin. The patient had heavy staining and calculus. The patient also has habit of smoking, drinking and bruxism.*
Case management*, endodontic treatment have been done on right upper lateral incicivus and scaling root planning on maxilla and mandibula. Post scaling and endodontic treatment, control patient recall after 3 month treatment to radiographic photo for evaluation of periodontic – endodontic treatment.*
Conclusion*, Periodontic – endodontic treatment able to treat periapical lesions (suspect cyst) with proper, routine treatment and regulary control.*

Keyword: *Periapical lesion , periodontic- endodontic treatment*

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INTRODUCTION

Periapical lesions develop as sequelae to pulp disease. They often occur without any episode of acute pain and are discovered on routine radiographic examination.(1) there are many cases of patients with periapical lesions, either due to periodontal disease or to the pulp disease and not a few are caused by a combination of periodontal and pulp disease. Patients with cases of Periodontics endodontic treatment should be done regularly and properly to get the maximum results. Periapical lesions is an infection around the root of a tooth, usually a result of spreading of dental caries or periodontitis.(2)

The periapical cyst is the most common odontogenic cyst. It is caused by necrosis pulpa caused dental caries or trauma. The cyst lining is derived from the cell rests of Malassez. Usually, the periapical cyst is asymptomatic, but a secondary infection can cause pain. On radiographs, it appears a radiolucency (dark area) around the apex of a tooth's root.(3)

Most periapical lesions (>90%) can be classified as dental granulomas, radicular cysts or abscesses. The incidence of cysts within periapical lesions varies between 6 and 55%.The occurrence of periapical granulomas ranges between 9.3 and 87.1%, and of abscesses between 28.7 and 70.07%. The definitve diagnosis of a cyst can be made only by a histological examination. However, a preliminary clinical diagnosis of a periapical cyst can be made based on the following: (a) The periapical lesion is involved with one or more non-vital teeth, (b) the lesion is greater than 200 mm^2 in size, (c) the lesion is seen radiographically as a circumscribed, well-defined radiolucent area bound by a thin radiopaque line, and (d) it produces a straw-colored fluid upon aspiration or as drainage through an accessed root canal system(1).

CASE

40 year male patient came to the dental clinic with complaints of pain, gum was enlarged and was out of water. Patients has no systemic disease. Patients has bruxism habits, drinking and heavy smokers. Patients suffering from bruxism since child and never treated . Patients had never scalling and root planing treatment. Clinically there is a picture with a erlangment , dental attrition, without caries.

Patients had radiological picture and had visible image picture of oval radiluscent radiographic picture at upper right lateral apical incicivus with radiopague margin.

CASE MANAGEMENT

Patient care is done gradually, in first step, scaling and root planning and endodontic treatment is then performed for 6 weeks, after treatment the patient is given nightguard to be use. Post scaling and endodontic treatment, control patient recall after 3 month treatment to radiographic photo for evaluation of periodontic – endodontic treatment.

Before treatment | 1 day post treatment | 1 month post tratment | 3 month post treatment | 7 month post treatment

Fig 1. Radiografic picture

However, patient cooperation is also essential, while using the nonsurgical methods as several follow-up appointments may be required.

DISCUSSION

The etiopathogenesis of cysts is particularly controversial; the formation has been explained by diversetheories, such as epithelial colonization, epithelial cavitations or the formation of microabscesses. The formation of an epithelized fistulous tract up to the granuloma from a periapical abscess fistulized to the oral cavity; when the communication is closed, the epithelial cells have already fully colonized the abscess, epithelizing it and giving rise to a radicular cyst. In the theory of epithelial cavitation, accumulations of epithelial cells are created; those furthest from the connective tissue which feeds them are left without vascularization and undergo degeneration and necrosis, thus forming the central area of the cyst(4).

Periodontic endodontic lesion occur when pulpa necrosis and a periapical lesion occur on a tooth that also is periodontally involved. A radiographically evident intrabony defect is seen when infection of pulpal origin merges with infection of periodontal origin. In

all cases of periodontitis associated with endodontic lesions, the endodontic infection should be controlled before beginning definitive management of the periodontal lesion, especially when regenerative or bonegrafting techniques are planned.(5)

Once the drainage stops, fibroblasts begin to proliferate and deposit collagen; this compresses the capillary network, and the epithelial cells are thus starved, undergo degeneration, and are engulfed by the macrophages. Healing of large cysts like well-defined radiolucencies following conservative root canal treatment has been reported. Although the cystic fluid contains cholesterol crystals, weekly debridement and drying of the canals over a period of two to three weeks, followed by obturation has led to a complete resolution of lesions by 12 to 15 months.(1)

Radiographically, the cyst is a well circumscribed periapical, unilocular, radiolucency. The cyst may cause the neighboring structures to be displaced, especially in the maxillary sinus and the mandibular canal. Root resorption is occasionally seen. An acute exacerbation may result in the disappearance of the characteristic peripheral cortical rim.(6).

CONCLUSION

Periodontic – endodontic treatment able to treat periapical lesions (suspect cyst) with proper, routine treatment and regulary control. Even though the periapical conditions are viewed as a continuous process of healing or developing periodontitis, there is no middle ground between success and failure. Even though the periapical conditions are viewed as a continuous process of healing or developing periodontitis, the system is strictly dichotomous, that is, there is no middle ground between success and failure.

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APICAL GRANULOMA TREATMENT IN OPEN APEX BY USING CALSIUM HIDROXIDE $(CaOH)_2$

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ABSTRACT

Background : Apexification is a procedure well recognized and accepted by clinicians and researchers. Calcium hydroxide is most commonly used to induce an apical hard issue barrier. An immature tooth that develops pulpal or periapical disease presents special problems. Because the apex has not yet completely formed, conventional root canal treatment procedures would be unpredictable. The walls of the root canals are frequently divergent and open apex make debridement and obturation difficult. Although different materials are used for the apexification procedure, calcium hydroxide is the material of choice for apical barrier formation and healing. There are different opinions regarding frequency of CaOH dressing change to induce complete closure of the apex. The success of root canal treatment is based on total elimination of root canal content, thorough cleaning, shaping and obturation. Calcium hydroxide is recommended as intra-canal medicament because of its antibacterial properties, tissue dissolving ability, inhibition of tooth resorption and indication of tissue repair by hard tissue formation. Granuloma periapical is a growing mass of granulation tissue surrounding the apex of a nonvital tooth and rising in response to necrosis of the tooth pulp
Purpose : the study want to know the treatment in apical granuloma in open apical by using calcium hydroxide.
Case : A student, 19th, came and wanted to fix her left upper front teeth were fracture ± 7th ago because of accident.
Case management : Endodontic intracanal with apexification and postcrown
Conclusion : Calsium hydroxide can close apical also can reduce or eliminate periapical lesion.
Key Words : Apexification, Calsium hidrokside, Granuloma

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INTRODUCTION

Periapical lesions resulting from necrotic dental pulp are among the most frequently occurring pathologies found in alveolar bone. Exposure of the dental pulp to bacteria and their by-products, acting as antigens, may elicit nonspecific inflammatory responses as well as specific immunological reactions in the periradicular tissues, and cause the periapical lesion. Therefore, the primary objective of endodontic therapy is to reduce or eliminate microorganisms and their by-products from the root canal system. This can be achieved to a great extent by thorough chemo-mechanical debridement. Although a number of instrumentation and irrigation techniques exist, complete debridement is impeded due to the complex anatomy of the root canal system and the consequent limitations of access by instruments as well as irrigants. Calcium hydroxide is acknowledged as one of the most effective intra-canal medicaments used in endodontics due to its bactericidal properties. The specific mechanism of action of calcium hydroxide is still a matter for debate. Some researchers suggest that this antimicrobial activity is due to the release and diffusion of hydroxyl (OH-) ions leading to a highly alkaline environment (pH 12.5-12.8) which is non-conducive to the survival of micro-organisms.

It has been shown that calcium hydroxide kills microorganisms by direct contact, and hence it should ideally occupy the canal space with maximal density and depth to the working length in order to permit its biological effects to be exerted in closest proximity to the appropriate tissues.

A student, 19th, came and wanted to fix her left upper front teeth were fracture ± 7th ago because of accident. Subjective examination patient came to RSGM Hang tuah want to fix her teeth were fracture ± 7th ago because of accident and there is no pain and have not been treated previously. Objective examination Pulpitis reversibel = 11, 16, 17, 26, 27, 28, 36, 37, 38, 46, 47, 48 and 21 = pulp necrose with fracture 2/3 incisal , percussion no pain , drug pain. Vitality test : thermal test do not react, test cavity do not react and needle test miller does not react to incoming 16 mm , vitality : non-vital teeth. Radiografic picture : Normal pulp chamber and periapical radiolucent area bounded area diameter 2 mm.

CASE

Reported case with female 19 years old came to RSGM Hang Tuah Univercity want to fix her teeth were fracture ± 7th ago because of accident and there is no pain and have not

been treated previously. From Radiografic picture normal pulp chamber and periapical radiolucent area bounded area diameter 2 mm.

CASE MANAGEMENT

She came to conservasi clinic at 04 november 2011 the first was cleaning the cavity and then performed DWF (Diagnostic Wire Photo) for diagnostic and determine the working length then given drug sterilization with metapaste.

The tooth length measurement formula with techniques diagnostic wire photo :

$$PGS = \frac{PGF \times PAS}{PAF} \qquad \text{Working length} = PGS - 1$$

Information :

PGS = Actual tooth length

PGF = Photo tooth length

PAS = Actual tool length

PAF = Photo tool length

Unknown working length 17mm

Fig 1. DWF

Fig 2. Visit III : Trial guttap

Visit II 09 November 2011 : Debridement and shaping canal, preparation with step back technique, irrigation with H2O2 3% and Steril Aquadest , and then close with metapaste and paperpoint

Visit III 14 November 2011 : Trial Guttap,

Visit IV 23 November 2011 : germination ,

Visit V 30 November 2011 : after the germination result negative, next step is obturation with guttap point and AH+

Fig 3. Visit VI Control obturation

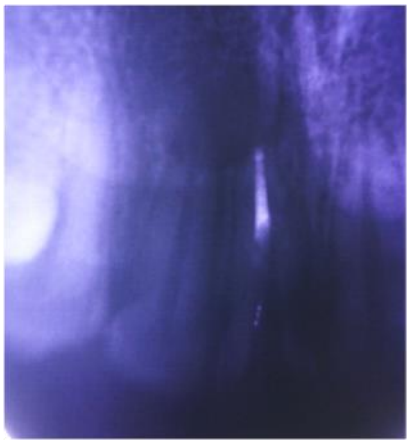

Fig 4. Visit VII

Visit VI 07 December 2011 : Control obturation → Subjective examination no pain Objective examination percussion and drug no reaction, mobility negative, So obturation complete. After that teeth were prepared in order to obtain power for the postcrown.

Visit VII 1week after endodontic control is carried out by using the formula cuts guttap and then periapical photo to know rest guttap and preparation teeth (root canal formed seat and labial lingual site formed like roof)

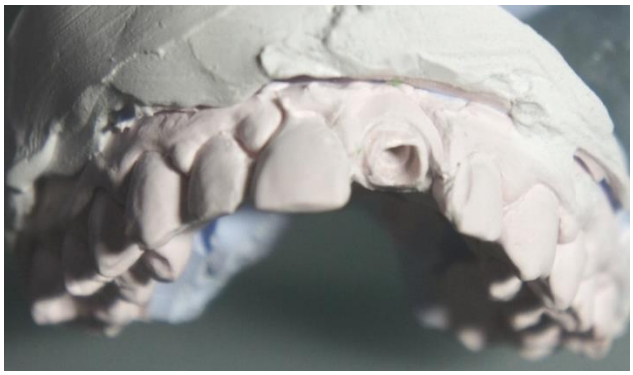

Fig 5. printouts of double impression

Visit VIII mould with double impression

Visit IX After peg finish from laboratory tray pairs of that peg and crown

Visit X Control

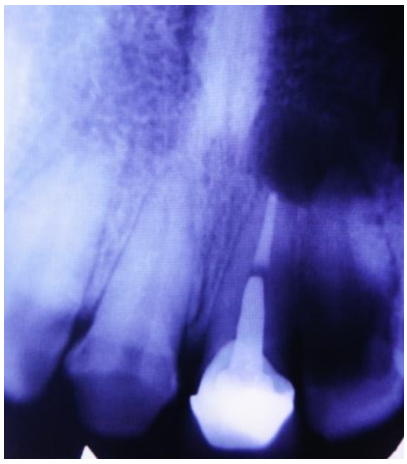

Fig 6. x-ray photo of post insertion

DISCUSSION

The aim of this article is to discuss the reasons for periapical lesion of endodontically treated teeth, the current concepts in their management and also the expected treatment outcome of each treatment strategy.

Periapical granuloma is relatively common lesion or growth that develops around the tip of tooth's root. It consist of a proliferating mass of granulation tissue (new tissue that forms on a wound) and bacteria that forms in response to dead tissue in the pulp chamber of the tooth. The death of the pulp may due to extensive decay, deep restorations, or trauma to the tooth. The formulation of a periapical granuloma represents the body's attempt to heal and wall off an infection. Normally, periapical granulomas resolve after source of the infection is removed (following root canal treatment), but residual periapical granulomas may persist even after the offending tooth is extracted unless the tissue is carefully removed at the same time. Periapical granulomas enlarge slowly and can grow to reach several centimeter in diameter. Smaller lesions (a few millimeters in diameter) do not have clearly defined borders and can be difficult to identify. Larger lesions, however, have well-defined borders and are often surrounded by bundles of collagen, a gelatin- like substance, making them identifiable on an X-ray. As the granulomas enlarge, the do not couse the affected area to expand, but infection develops, there are no other symptoms associated with periapical granulomas. If allowed to progress, periapical granulomas may develop into radicular cysts. In addition, they can develop a secondary infection which results in an acute or chronic abscess, causing extreme pain. Besides pain, an untreated abscess may result in spreading of the infection into surrounding soft tissue, the jaw bone, or elsewhere in the body, creating a much serious situation.

Apexification is the induction of calcific barrier (or creation of an artificial barrier) across an open apex. Apexification involves removal of necrotic pulp follow by debridement of the canal and placement of an antimicrobial medicament. Calsium hydroxide has been the most widely accepted material for induction of an apical barrier. The mechanism of action of calcium hydroxide remains controversial in spite of much research on its effect on pulp tissue. Calsium hydroxide produced a multilayered, sterile necrosis permiting subjacent mineralization. After placement calcium hydroxide , a radiograph is made to confirm that the canal space close to the apex is adequately filled.

Calcium hydroxide is a widely used material in endodontic treatment because of its bactericidal effects. It is thought to create favorable conditions for periapical repair and stimulate hard tissue formation. Souza *et al*,. suggested that the action of calcium hydroxide beyond the apex may be four-fold: (a) anti-inflammatory activity, (b) neutralization of acid products, (c) activation of the alkaline phosphatase, and (d) antibacterial action. A success rate of 80.8 and 73.8% has been reported with calcium hydroxide, when used for endodontic treatment of teeth with periapical lesions. It has been suggested that the presence of a cyst may impede or prevent root-end closure of an immature pulpless tooth even with the use of calcium hydroxide. Contrary to this, Çalişkan and Türkün have reported a case in which apical closure and periapical healing have occurred in a large cyst-like periapical lesion following non-surgical endodontic treatment with calcium hydroxide paste and a calcium hydroxide–containing, root-canal sealer. Extrusion of calcium hydroxide beyond the apex was suggested as a factor for the lack of early healing of periapical lesions. A high degree of success has been reported by using calcium hydroxide beyond the apex in cases with large periapical lesions. It is barium sulphate that is added to the calcium hydroxide paste for radiopacity, which is not readily resorbed when the paste extrudes beyond the apex. However, it has been reported that even though complete resorption of the paste does not occur in some cases, the periapical radiolucency around the paste resolves.

Metapaste is a water-soluble temporary root canal filling material composed of Calcium Hydroxide with Barium Sulfate. This antibacterial, premixed paste offers excellent radiopacity and is easy to clean and remove. Ideal for many other applications: Internal and external root resorption, Pulp capping and pulpotomy, Apexification, temporary root canal filling. The techniques for intracanal calcium hydroxide placement have been investigated within in-vitro studies, providing varying results in terms of effectiveness in filling root canals. This study aims to evaluate the extent and fill-density of calcium hydroxide placement

in the root canal with a Specially Designed Paste Carrier and to compare it with other commonly employed techniques such as the Syringe-Lentulo spiral and the Syringe-Spreader techniques in the intracanal placement of calcium hydroxide.

The purpose of the obturation phase of endodontic treatment is to prevent the reinfection of root canals that have been biomechanically cleaned, shaped and disinfected by instrumentation, irrigation and medication procedures. Successful obturation requires the use of materials and techniques capable of densely filling the entire root canal system and providing a fluid tight seal from the apical segment of the canal to the cavo-surface margin in order to prevent reinfection. This also implies that an adequate coronal filling or restoration be placed to prevent oral bacterial microleakage. It has been shown that endodontic treatment success is dependent both on the quality of the obturation and the final restoration.The quality of the endodontic obturation is usually evaluated using radiographic images upon completion. When endodontic treatment is performed to accepted clinical standards, a success rate of around 90% can be expected. The two most important factors that could relate the periapical lesion in association with root-filled teeth seem to be the qualities of the root fillings and the coronal restorations.

The purpose of endodontic irrigation is to remove debris created during instrumentation, and to dissolve and/or flush out inorganic and organic remnants of the pulp system, bacteria and bacterial byproducts that are not removed by mechanical instrumentation. With the introduction of obturation materials designed to bond with dentin, irrigation solutions must be used with consideration of the condition of the dentin surface that is most suitable for bonding. Attempts to eliminate pulp space infection with instrumentation only, without the use of antimicrobial agents, have proven to be unsuccessful. Modern root canal treatment requires the use of both mechanical and chemical preparation and disinfection of the canal system. The characteristics of an ideal irrigation system : Physical flushing of debris, Biocompatible, Bactericidal agent, Sustained effect, Disinfect and detoxify dentin and tubules of all microbial substances, Tissue solvent, Lubricant, Smear layer removal, Not affect physical properties of dentin. Many materials and techniques for obturation are available on the market. Dr. Louis I. Grossman, one of the founders of the specialty of endodontics, determined the ideal properties of obturation materials listed is : It should be easily introduced into the root canal system, It should seal the canal laterally as well as apically, It should not shrink after being inserted, It should be impervious to moisture, It should be bacteriostatic or at least not encourage bacterial growth, It should be radiopaque, It

should not stain tooth structure, It should not irritate periapical tissue, It should be sterile or easily and quickly sterilized immediately before insertion, It should be easily removed from the root canal if necessary.Taking these into consideration, the clinician should realize that material : (1) content; (2) toxicity; and (3) physical properties are controlled by the manufacturer.

Bhaskar has suggested that instrumentation should be carried 1 mm beyond the apical foramen when a periapical lesion is evident on a radiograph. This may cause transitory inflammation and ulceration of the epithelial lining resulting in resolution of the cyst. Although this proves to be an effective method Shah suggests the possibility that quiescent epithelial cells may be stimulated by instrumentation in the apical region, with resultant proliferation and cyst formation, and thus stressed on the need for follow-up for a period of at least two years. Healing of large cysts like well-defined radiolucencies following conservative root canal treatment has been reported. Although the cystic fluid contains cholesterol crystals, weekly debridement and drying of the canals over a period of two to three weeks, followed by obturation has led to a complete resolution of lesions by 12 to 15 months.

CONCLUSION

If healing of pulpal and periapical disease is to be predictable, a proper diagnosis and treatment plan is essential. The clinician should also utilize an evidence-based approach to treatment applying knowledge of anatomy and morphology, and endodontic techniques to the unique situations each case presents. It is crucial that all canals are located, cleaned, shaped, disinfected and sealed from the apical minor constriction of the root canal system to the orifice and the cavosurface margin. Our greater understanding of post-endodontic treatment disease and technological advances has enabled us to manage these cases more effectively. A high degree of success has been reported by using calcium hydroxide beyond the apex in cases with large periapical lesions and also success for apexification. It is barium sulphate that is added to the calcium hydroxide paste for radiopacity, which is not readily resorbed when the paste extrudes beyond the apex.

ORTHODONTICS REMOVABLE FIXED APPLIANCES IN MANAGING TREATMENT OF DENTAL CLASS I MALOCCLUSION WITH MAXILLARY MIDLINE DIASTEMA RELATED TO MESIODENS AND BIMAXILLARY DENTAL PROTRUSION

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ABSTRACT

Background: *The correction of dental class I malocclusion with maxillary midline diastema related to mesiodens and bimaxillary dental protrusion in child patient is one of moderate biomechanical in orthodontics. Maxillary midline diastema is resulting from mesiodens and convexity of the face is resulting from protruded and proclined upper and lower incisor caused poor facial aesthetic.*
Purpose: *The aim of this case report is to know the mechanism of orthodontics removable fixed appliances in managing treatment of dental class I malocclusion with maxillary midline diastema related to mesiodens and bimaxillary dental protrusion.*
Case management: *This case report presents an 11-year-old boy with dental class I malocclusion with maxillary midline diastema related to mesiodens and bimaxillary dental protrusion, SNA 83°, SNB 76°, ANB 7°, overjet 4 mm, overbite 6 mm, the diastema was 5 mm and convex facial profile. Firstly, we extract the mesiodens to correct the diastema.and then we used orthodontics removable fixed appliances such as: Watkin appliance, labial bow, button and wrap around to the patient.*
Conclusion: *The result of this case showed that orthodontics removable fixed appliances technique can be considered an effective therapy for correction class I malocclusion with maxillary midline diastema related to mesiodens and bimaxillary dental protrusion.*

Key words: *maxillary midline diastema, mesiodens, bimaxillary dental protrusion, Watkin appliance, orthodonthics removable fixed appliances*

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PENDAHULUAN

Maloklusi adalah penyimpangan letak gigi dan atau malrelasi lengkung geligi (rahang) di luar rentang kewajaran yang dapat diterima. Maloklusi juga bisa merupakan variasi biologi sebagaimana variasi biologi yang terjadi pada bagian tubuh yang lain, tetapi karena variasi letak gigi mudah diamati dan mengganggu estetik sehingga menarik perhatian dan memunculkan keinginan untuk melakukan perawatan [1].

Klasifikasi maloklusi menurut Edward Angle (1899) dibagi menjadi tiga kelas, yaitu: kelas I Angle (neutroklusi), kelas II Angle (distoklusi) dan kelas III Angle (mesioklusi). Maloklusi kelas I Angle adalah maloklusi dengan posisi puncak tonjol mesiobukal gigi molar pertama permanen rahang atas berada pada *buccal groove* dari molar pertama permanen rahang bawah. Gigi molar hubungannya normal, dengan satu atau lebih gigi anterior malposisi [2]. Pada kasus terdapat maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang.

Pada kasus diastema sentral maksila yang disebabkan oleh mesiodens, perawatan dimulai dengan ekstraksi mesiodens terlebih dahulu, kemudian baru dilanjutkan dengan perawatan ortodontik. Pada perawatan ortodontik dalam kasus digunakan peranti ortodontik remofik yakni kombinasi antara peranti ortodontik cekat dan lepasan yang digunakan untuk meningkatkan kemampuan dan hasil perawatan [3].

Peranti ortodontik cekat adalah peranti yang dipasang secara cekat dengan pengeleman pada gigi pasien sehingga peranti tidak bisa dilepas oleh pasien sampai perawatan yang dikehendaki selesai [3]. Peranti Watkin adalah piranti ortodontik cekat yang digunakan pada kasus. Peranti Watkin terdiri dari band insisivus yang dilengkapi dengan tabung dan busur Watkin yang dapat digeser bebas. Peranti ini ideal untuk meretraksi dan memutar gigi insisivus ke posisi yang sesuai [4].

Peranti ortodontik lepasan atau biasa disebut peranti lepasan adalah peranti ortodontik yang dapat dipasang dan dilepas oleh pasien. Ada juga yang menyebut peranti ini sebagai peranti lepasan aktif untuk membedakan dengan peranti fungsional. Peranti lepasan dapat memberikan hasil yang maksimal apabila dipakai terus-menerus. Keberhasilan perawatan dengan peranti lepasan tidak hanya tergantung pada kemauan pasien untuk memakai peranti, tetapi juga pada kemampuan operator untuk mendesain dan membuat peranti yang dapat ditoleransi pasien. Peranti yang digunakan pada kasus adalah busur labial, *flat button* dan *wrap around* [5].

Laporan kasus ini bertujuan untuk mengilustrasikan kepada kolega dokter gigi umum maupun spesialis ortodontik mengenai efisiensi dari penggunaan peranti remofik dalam mengoreksi maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang.

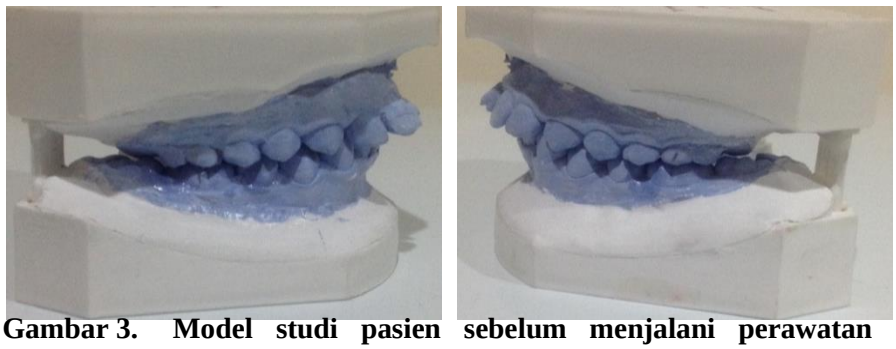
KASUS

Pasien laki-laki usia 11 tahun datang ke departemen ortodontik rumah sakit gigi dan mulut universitas Hang Tuah Surabaya oleh karena ingin merapikan gigi depan rahang atas dan bawah atas keinginan diri sendiri disertai dukungan orang tua dan motivasi operator.

Gambar 1. Foto wajah pasien laki-laki usia 11 tahun sebelum menjalani perawatan ortodontik.

Pasien memiliki masalah dengan estetika wajahnya. Pemeriksaan ekstra oral menunjukkan pasien memiliki bentuk muka/kepala simetris, tipe profil cembung, tipe muka ovoid, tipe kepala mesofalik, tonus otot bibir atas hipotonus, tonus otot bibir bawah normal, fonetik normal dan memiliki kebiasaan buruk yaitu menggigit jari telunjuk kanan. Pemeriksaan intraoral menunjukkan status geligi permanen dengan puncak tonjol mesiobukal gigi molar pertama permanen rahang atas berada pada *buccal groove* dari molar pertama permanen rahang bawah secara bilateral dimana dapat didiagnosis sebagai maloklusi kelas I Angle. Selain itu terdapat diastema sentral maksila oleh karena mesiodens sebesar 5 mm dan protrusi gigi pada kedua rahang pasien. Tumpang gigit pasien 4 mm dan jarak gigit pasien 6 mm. Etiologi kasus ini adalah herediter, dimana kondisi protrusi gigi pasien mengikuti kondisi gigi ayahnya serta terdapat kelainan jumlah gigi yaitu berupa mesiodens.

Gambar 2. Foto intraoral keadaan geligi pasien sebelum menjalani perawatan ortodontik.



Gambar 3. Model studi pasien sebelum menjalani perawatan ortodontik menunjukkan maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang pasien.

Gambar 4. Foto radiografi panoramik pasien sebelum menjalani perawatan ortodontik.

Gambar 5. Foto radiografi sefalometri pasien sebelum menjalani perawatan ortodontik.

Analisis sefalometri menunjukkan maloklusi dental kelas I Angle dengan relasis basis rahang sebagai berikut, SNA 83°, SNB 76° dan ANB 7°, profil wajah cembung, INA 33° (protrusif), INB 41° (protrusif), sudut antar insisal 97.5°, jarak bibir atas terhadap garis E: 6 mm, jarak bibir bawah terhadap garis E: 5 mm dan diskrepansi RA: 6 mm sedangkan RB: 0.

PENATALAKSANAAN KASUS

Pasien dengan diagnosis maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang. Tujuan utama dari perawatan pasien ini adalah (1) koreksi diastema sentral maksila oleh karena mesiodens (2) koreksi protrusi rahang atas dan rahang bawah (3) koreksi inklinasi dan kesejajaran gigi anterior rahang atas (4) evaluasi (5) fase retensi.

Sebelum perawatan ortodontik dimulai, pertama-tama pasien diberi terapi periodontal berupa scaling dan edukasi mengenai kebersihan mulut. Kemudian sebelum dilakukan koreksi diastema sentral maksila dilakukan ekstraksi pada gigi mesiodens terlebih dahulu.

Gambar 6. Foto setelah dilakukan ekstraksi pada gigi mesiodens.

Pada perawatan awal untuk koreksi diastema sentral maksila oleh karena mesiodens digunakan peranti cekat yaitu peranti Watkin. Peranti Watkin terdiri dari band insisivus yang dipasang cekat dengan GIC tipe I pada gigi 11 dan 21 serta dilengkapi dengan tabung untuk penempatan busur Watkin yang dapat digeser bebas. Pasien memakai peranti Watkin selama 1 bulan. Setelah aktivasi busur Watkin I tampak pengurangan diastema sentral maksila dari semula 5 mm menjadi 3 mm. Setelah aktivasi busur Watkin II tampak pengurangan diastema sentral maksila menjadi 2 mm.

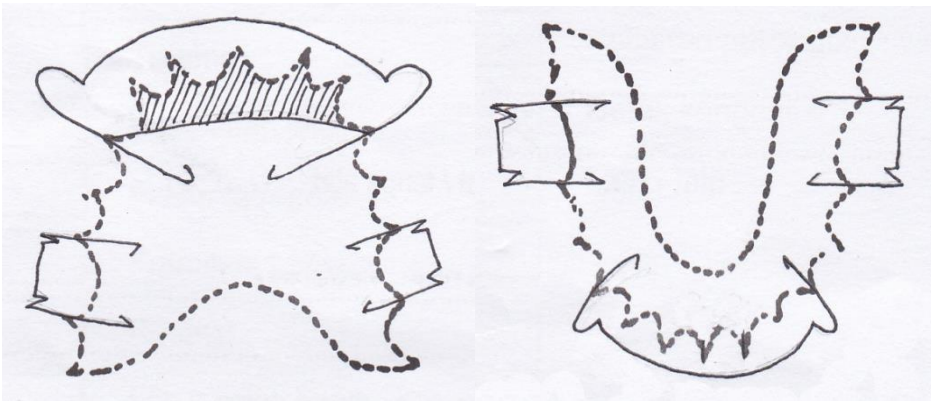
Gambar 7. Gambar atas: Band dengan tabung pada model gigi 11 dan 21; Gambar tengah: busur Watkin yang dipasang pada kedua tabung band insisivus; Gambar bawah: Insersi peranti Watkin pertama kali (23-04-2013).

Gambar 8. Gambar atas: aktivasi busur Watkin I (07-05-2013); Gambar tengah: aktivasi busur Watkin II (14-05-2013); Gambar bawah: Kontrol dan Watkin siap dilepas (21-05-2013).

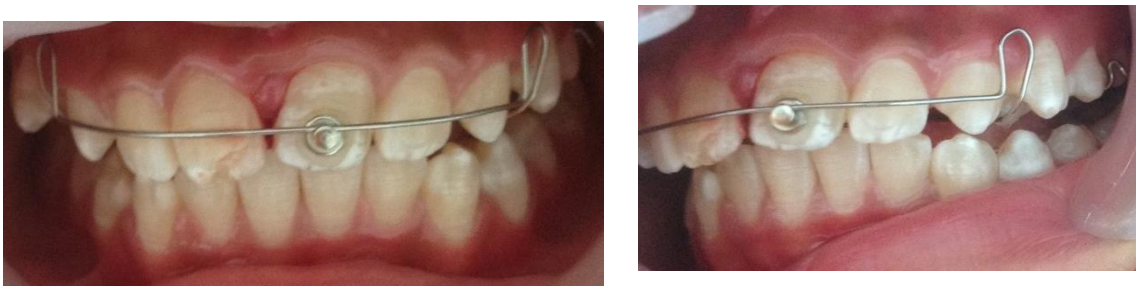
Setelah diastema sentral maksila sudah cukup terkoreksi maka dilakukan pergantian peranti yakni menggunakan peranti lepasan untuk menyempurnakan penutupan diastema sentral maksila serta mengoreksi protrusi pada kedua rahang. Busur labial sebagai komponen aktif dipasang pada gigi 13-23 dan gigi 33-43. Sedangkan klamer adam sebagai komponen

pasif dipasang pada gigi 16,26,36 dan 46, serta pada peranti rahang atas diberi tambahan peninggian gigit anterior untuk mengoreksi tumpang gigit pasien. Kemudian dilakukan aktivasi busur labial rahang atas dan bawah sebanyak empat kali secara berkala.

Pemasangan *flat button* pada gigi 21 dilakukan 1,5 bulan kemudian untuk mengoreksi gigi 21 yang intrusi agar sejajar dengan gigi 11 dan pada saat ini sudah tampak pengurangan diastema sentral maksila menjadi 1 mm dan protrusi kedua rahang sudah mulai terkoreksi. Dua minggu setelah itu dilakukan *slicing* pada mesial gigi 11 serta aktivasi busur labial rahang atas dan bawah lagi.



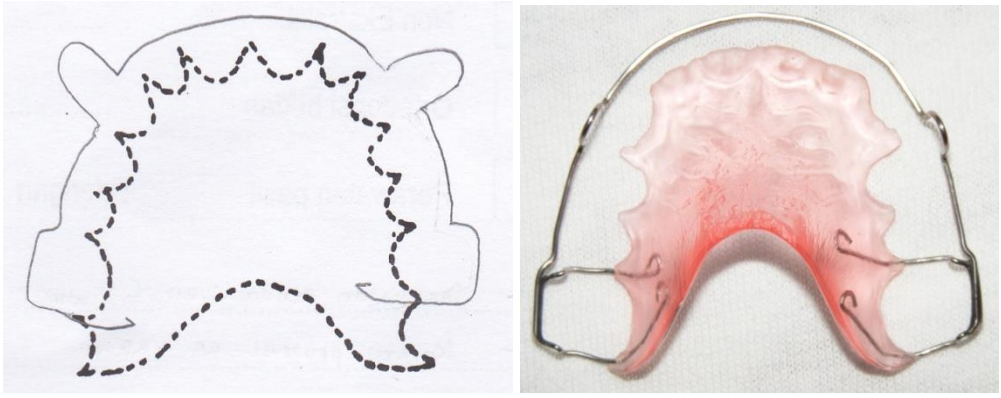
Gambar 9. Insersi peranti lepasan pada rahang atas dan bawah (23-05-2013).



Gambar 10. Pemasangan *button* pada gigi 21 agar diperoleh kesejajaran dengan gigi 11 (11-07-2013).

Hasil akhir perawatan tampak ± 2 bulan kemudian, dimana diastema sentral maksila dan protrusi kedua rahang sudah tampak mengalami perubahan yang signifikan. Jarak gigit pasien dari semula 6 mm menjadi 3 mm dan tumpang gigit pasien dari 4 mm menjadi 3 mm. Perawatan dilanjutkan dengan dilakukan *slicing* antara gigi 14-15 dan 24-25 serta pemasangan peranti pasif untuk fase retensi yaitu peranti *wrap around* untuk membentuk serta mempertahankan bentuk rahang yang ideal.

Gambar 11. Hasil akhir perawatan ortodontik setelah menggunakan peranti remofik (12-09-2013).



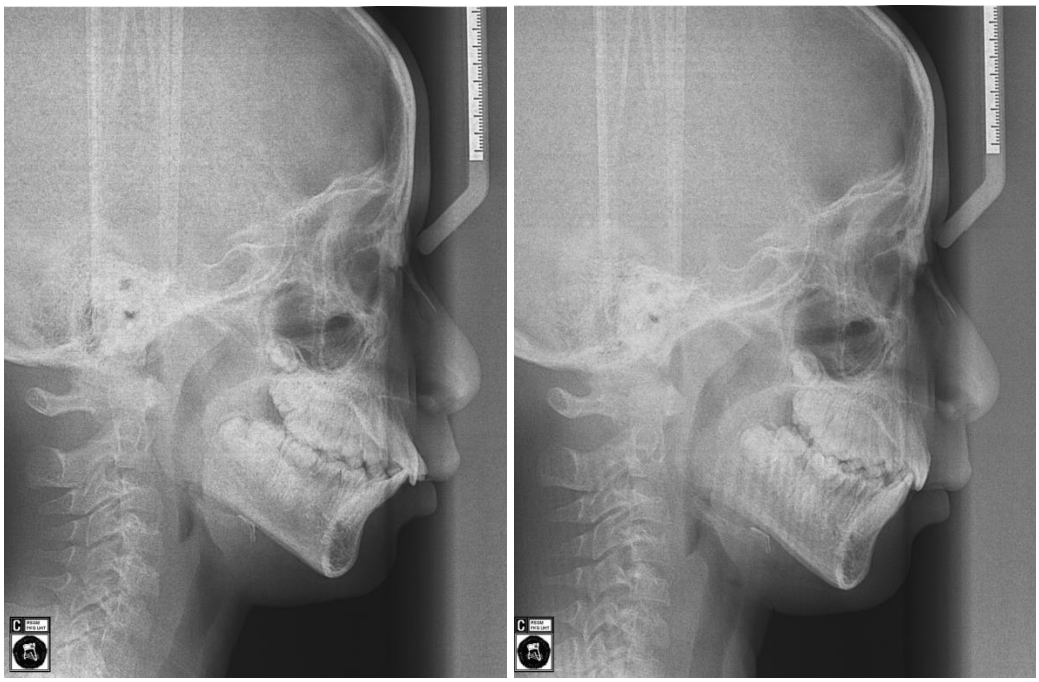
Gambar 12. Peranti *wrap around*.

Analisis sefalometri menunjukkan sudut SNA 83º, SNB 76º dan ANB 7º. Sudut I-NA sudah terkoreksi menjadi 5º dan I-NB menjadi 27 º. Sudut antarinsisal 138º. Jarak bibir atas – garis E (*esthetic line*): 4 mm; bibir bawah – garis E (*esthetic line*): 4 mm.

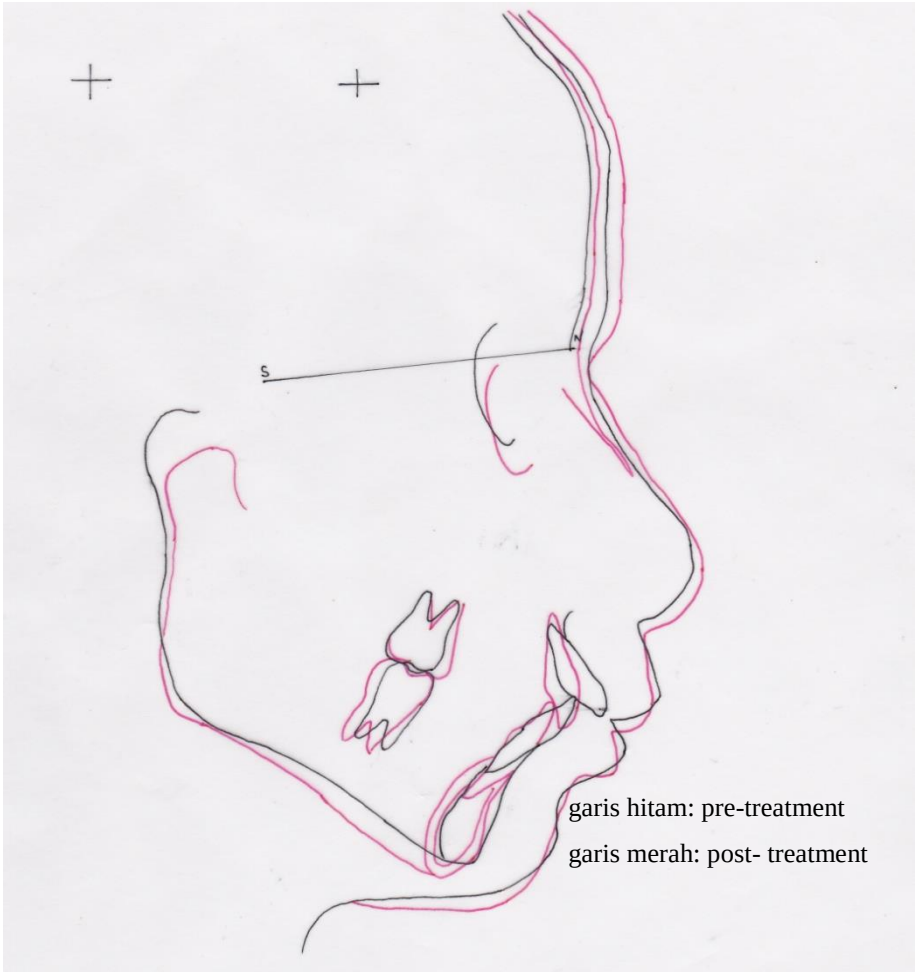
Gambar 13. Foto radiografi sefalometri pasien sebelum menjalani perawatan ortodontik.

Tabel 1. Analisis sefalometri *pre* dan *post-treatment.*

	PRE	***POST***
∠SNA	83º	83º
∠SNB	76º	73º
∠ANB	7º	10º
∠I-NA	33º	5º
∠I-NB	41º	27º
∠ANTAR INSISIVUS	97.5º	138º
BIBIR ATAS-GARIS E	6 mm	4 mm
BIBIR BAWAH-GARIS E	5 mm	4 mm



Gambar 14. Foto radiografi sefalometri pasien *pre* dan *post-treatment*.



Gambar 15. Superimposisi sefalometri

Gambar 16. Foto wajah (samping) *pre* dan *post-treatment*.

Gambar 17. Foto wajah (depan) *pre* dan *post-treatment*.

PEMBAHASAN

Maloklusi kelas I Angle adalah maloklusi dengan posisi puncak tonjol mesiobukal gigi molar pertama permanen rahang atas berada pada *buccal groove* dari molar pertama permanen rahang bawah. Gigi molar hubungannya normal, dengan satu atau lebih gigi anterior malposisi. Pada kasus terdapat maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang.

Diastema adalah celah atau ruang yang terdapat antara gigi geligi yang dapat terjadi pada gigi geligi atas dan bawah [6]. Diastema pada kasus terjadi pada rahang atas dan disebabkan oleh karena mesiodens. Mesiodens merupakan salah satu jenis gigi lebih yang terdapat di regio insisivus sentral rahang atas dengan angka kejadian sebesar 0,15%-1,9%, dan laki-laki dua kali lebih sering daripada perempuan. Mesiodens dapat erupsi normal, impaksi, atau erupsi ektopik, dan hanya 25% yang dapat erupsi spontan. Mesiodens dapat menyebabkan gangguan erupsi dan malposisi gigi yang berdekatan. Penatalaksanaan mesiodens dilakukan tergantung dari posisinya, dan akibat yang ditimbulkan [7].

Pada kasus diastema sentral yang disebabkan oleh mesiodens, perawatan dimulai dengan ekstraksi mesiodens terlebih dahulu, kemudian baru dilanjutkan dengan perawatan ortodontik. Pada perawatan ortodontik dalam kasus digunakan peranti ortodontik remofik yakni kombinasi antara peranti ortodontik cekat dan lepasan yang digunakan untuk meningkatkan kemampuan dan hasil perawatan [3].

Peranti Watkin adalah piranti ortodontik cekat yang digunakan pada kasus. Peranti Watkin terdiri dari band insisivus yang dilengkapi dengan tabung dan busur Watkin yang dapat digeser bebas. Peranti ini ideal untuk meretraksi dan memutar gigi insisivus ke posisi yang sesuai [4]. Pasien memakai peranti Watkin selama 1 bulan. Dari hasil pemakaian peranti Watkin ini tampak terjadi perubahan yang cukup signifikan pada diastema sentral maksila pasien dari yang semula 5 mm menjadi 2 mm.

Setelah diastema sentral maksila sudah cukup terkoreksi maka dilakukan pergantian peranti yakni menggunakan peranti lepasan busur labial untuk menyempurnakan penutupan diastema sentral maksila serta mengoreksi protrusi pada kedua rahang serta pada peranti rahang atas diberi tambahan peninggian gigit anterior untuk mengoreksi tumpang gigit pasien.. Busur labial aktif digunakan untuk menarik insisivus ke palatal dan lingual. Dimana digunakan kawat berdiameter 0,5 mm pada busur labial untuk mengurangi jarak gigit yang besar [5].

Pemasangan *flat button* pada gigi 21 dilakukan 1,5 bulan kemudian untuk mengoreksi gigi 21 yang intrusi agar sejajar dengan gigi 11 dan pada saat ini sudah tampak pengurangan diastema sentral maksila menjadi 1 mm dan protrusi kedua rahang sudah mulai terkoreksi.

Pada akhir perawatan, diastema sentral maksila dan protrusi kedua rahang sudah tampak mengalami perubahan yang signifikan. Jarak gigit pasien dari semula 6 mm menjadi 3 mm dan tumpang gigit pasien dari 4 mm menjadi 3 mm. Analisis sefalometri setelah perawatan juga menunjukkan adanya perubahan inklinasi gigi yang signifikan, dimana sudut I-NA yang sebelum perawatan sebesar 33º menjadi 5º, sudut I-NB yang sebelum perawatan sebesar 41º menjadi 27º dan sudut antar insisivus yang sebelum perawatan sebesar 97.5º menjadi 138º . Hal ini menunjukkan jika gigi insisivus rahang atas maupun bawah sudah mengalami perubahan dari yang sebelumnya sangat protrusif menjadi lebih tegak.

Perawatan dilanjutkan dengan dilakukan *slicing* antara gigi 14-15 dan 24-25 serta pemasangan peranti pasif untuk fase retensi yaitu peranti *wrap around* untuk membentuk serta mempertahankan bentuk rahang yang ideal.

SIMPULAN

Peranti ortodontik remofik cukup efektif dalam menangani kasus maloklusi dental kelas I Angle dengan diastema sentral maksila oleh karena mesiodens dan protrusi gigi pada kedua rahang. Walaupun hasil perawatan ortodontik ini tidak sebaik hasil perawatan menggunakan peranti cekat, namun peranti remofik dapat menjadi pilihan alternatif utama dalam menangani kasus ini.

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THE SUCCESFULL OF PERIODONTAL TREATMENT WITH SCALING ROOT PLANNING COMBINED WITH HOST MODULATION ON PERIODONTITIS PATIENTS WITH DIABETES

(Keberhasilan perawatan periodontal dengan scaling root planning dikombinasikan dengan host modulation pada penderita periodontitis dengan diabetes)

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ABSTRACT

Background : *Periodontitis is a common problem in patients with diabetes, as much as 75% of diabetic patient had periodontitis. Diabetes can stimulate the chronic release of proinflammatory cytokines that have a deleterious effect on periodontal tissues. Conventional periodontal treatment in patient periodontitis with diabetes is ineffective.*
Objective *: For the patient periodontitis with diabetes type 2 we give unusual treatment. Scaling root planning and oral antibiotics to eliminate the pathogenic bacteria combined with host modulation terapy which is enable to support regeneration of periodontal tissue.*
Case : *An 62 years old male with Diabetes history fell unpleasant because of mobility tooth in maxillary anterior region. There's no allergic history. On clinical examination we found 4 mm pocket depth, gingival indeks score 2, periodontal indeks score 6.*
Case Management *: For the treatment we have done Scaling root planing, followed by consumtion Amoxillin and Metronidazole, and also NSAID per-oral as Host Modulation Terapy.*
Conclusion. *therapeutic mechanical scaling and root planning combined with host modulation therapy proves successful repair of periodontal tissue destruction in periodontitis patients with diabetes.*

Keywords : *Diabetes, Host Modulation, Periodontitis*

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PENDAHULUAN

Periodontitis merupakan suatu penyakit jaringan periodontal karena suatu proses inflamasi sebagai respon jaringan periodontal terhadap Lipo Poli Sakarida bakteri gram negatif yang mengakibatkan kerusakan progresif pada jaringan periodontal . Periodontitis ditandai dengan adanya poket, resesi gingiva atau kegoyangan gigi.[1]

Bakteri yang merupakan penyebab utama terjadinya periodontitis. Porphyromonas gingivalis, Treponema denticola dan Bacteroides forsythus merupakan bakteri periodontopathogen yang sangat agresif. Infeksi bakteri periodontopathogen dapat memicu sekresi proinflammatory cytokines yang akan memicu timbulnya inflamasi pada daerah tersebut. Reaksi inflamasi merupakan respon protektif yang fokus untuk mengeliminir jejas yang bertanggung jawab terhadap kerusakan jaringan periodontal. Persistensi dari stimulus bakteri dalam proses inflamasi menyebabkan keradangan berjalan kronik. Kerusakan jaringan disebabkan disregulasi inflamasi kronis sebagai akibat aktifasi fagosit yang berlebihan.[1]

Hasil akhir metabolisme bakteri periodontopathogen berupa berbagai macam asam amino dan berbagai macam endotoksin, hemolisin, kolagenase dan berbagai macam protease yang dapat menyebabkan kerusakan immunoglobulin, faktor komplemen, dan heme-sequestering proteins: suatu protein dari host yang dapat menahan kerusakan kolagen. Endotoksin yang merupakan hasil metabolisme bakteri periodontopathogen akan merangsang timbulnya matrix metalloproteinase yang akan merangsang proses apoptosis pada sel tulang. Terjadinya apoptosis secara berlebihan akan menyebabkan resesi tulang tetap melanjut meskipun bakteri periodontopathogen dari kalkulus sudah dibersihkan dengan sempurna.[2]

Diabetes melitus merupakan penyakit metabolik dengan karakteristik hiperglikemia (kadar gula darah yang tinggi) yang terjadi karena kelainan sekresi insulin, kerja insulin atau keduanya. Hal ini mengakibatkan ketidakmampuan glukosa untuk masuk ke jaringan dari pembuluh darah sehingga terjadi peningkatan kadar gula darah yang tinggi.

Diabetes tipe 2, disebut juga non-insulin dependent diabetes mellitus terjadi karena resistensi fungsi insulin dan ketidakseimbangan sekresi insulin. Pada awalnya penderita diabetes tipe 2 memiliki kadar insulin normal. Kegagalan utamanya adalah berkurangnya sensitivitas insulin sehingga transpor glukosa dari pembuluh darah ke seluruh tubuh terganggu. Hal ini menyebabkan kadar gula dalam darah tinggi

Diabetes adalah penyakit sistemik dengan beberapa komplikasi utama yang mempengaruhi kualitas dan panjang hidup. Salah satu komplikasi ini adalah periodontitis. Periodontitis adalah lebih dari sebuah infeksi oral local. Keterkaitan antara periodontitis dan diabetes memberikan contoh penyakit sistemik sebagai predisposisi terhadap infeksi oral

KASUS

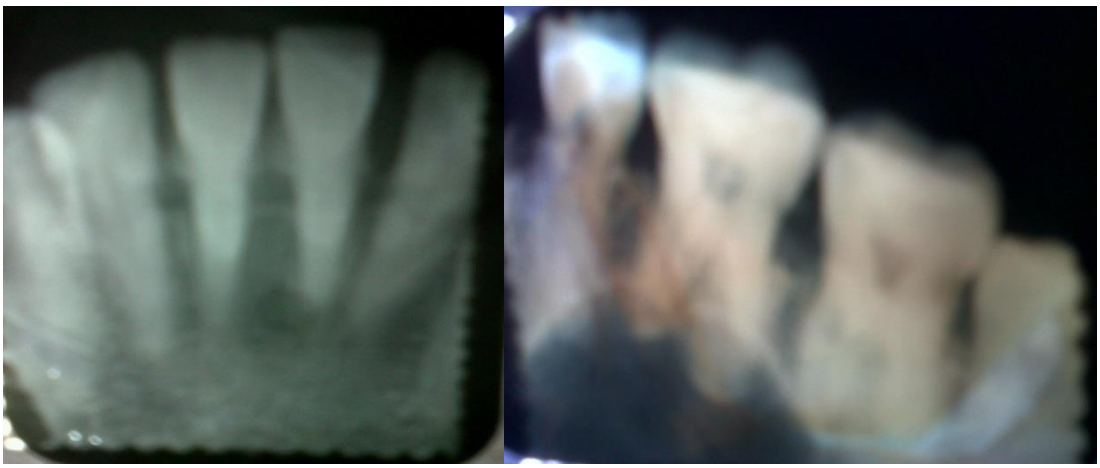
Seorang pasien laki-laki usia 62 tahun datang ke klinik Spesialis Periodonsia Fakultas Kedokteran Gigi Universitas Airlangga dengan keluhan adanya bau mulut yang kurang sedap dan ingin membersihkan karang gigi. pasien merasa gigi regio depan rahang bawahnya agak goyang sejak 1 bulan yang lalu dan tidak diketahui penyebabnya. Pada anamnesa didapatkan informasi bahwa pasien tidak memiliki riwayat alergi terhadap apapun akan tetapi memiliki riwayat penyakit Diabetes Mellitus yang terkontrol sejak 2 tahun yang lalu, terakhir kontrol penyakit Diabetes Mellitusnya tanggal 17 Desember 2012 di RSUD Dr. Sutomo.

Kondisi umum pasien normal tapi pada pemeriksaan klinis rongga mulut didapatkan poket sedalam 4 mm pada interdental antara gigi 16 dan 17 dengan pengukuran menggunakan Marquis Probe. Selain itu didapatkan hiperplasi ginggiva pada lingual gigi 43,42,41,31,32,33. Pada labial gigi 13,15 terdapat resesi ginggiva. Kegoyangan terjadi pada gigi 42,41,31,32 sebesar 2 derajat. Terdapat kalkulus pada semua gigi terutama pada gigi 16,17,31,32,41,42 kalkulusnya hingga subginggiva. Skor Gingival Indeksnya 2 dan skor Periodontal Indeksnya 6.

Gambar 1. Gambaran Klinis Rongga Mulut Pasien

Untuk membantu menegakkan diagnosa dilakukan foto radiografik periapikal pada gigi 16,17,31,32,41,42 untuk. Dari hasil foto radiografik periapikal didapatkan gambaran adanya resorbsi pada tulang alveolar hingga 1/3 servikal disertai pelebaran periodontal space pada gigi 31,32,41,42. Sedangkan pada gigi 16,17 selain didapatkan gambaran adanya

resorbsi tulang alveolar disertai pelebaran periodontal space juga tampak gambaran terputusnya lamina dura.



Gambar 2. Gambaran Radiografik Periapikal Gigi Pasien

PENATALAKSANAAN KASUS

Berdasarkan anamnesa ,pemeriksaan klinis, dan pemeriksaan radiografik dapat ditegakkan diagnosa terjadi Periodontitis Kronis pada gigi 16,17,31,32,41,42 dengan faktor etiologi plak dan kalkulus serta kelainan sistemik Diabetes Mellitus yang diderita pasien sebagai factor predisposisi yang memperparah kerusakan jaringan periodontal pasien.

Dari diagnosa yang sudah ditegakkan disusun rencana perawatan yaitu didahului perawatan fase 1 non surgery berupa scaling root planning dengan pemberian antibiotic profilaksis sebelumnya. Selain itu dilakukan host modulation terhadap kondisi sistemik pasien yaitu dengan menjaga kadar glukosa darah pasien agar tetap dalam kondisi normal melalui diet yang tepat serta konsumsi obat yang teratur. Selanjutnya dilakukan splinting menggunakan bahan fiber pada gigi 31,32,41,42 yang mengalami kegoyangan tujuannya agar gigi tersebut dalam posisi yang stabil sehingga hasil perawatan bisa optimal. Pasien juga diberi terapi antibiotic per-oral yaitu Amoxillin 500 mg dan Metronidazole 250 mg ditambah NSAID Natrium Diclofenak sebagai host modulationnya selama 3 hari. Satu minggu setelah terapi fase 1 pasien dilakukan pemeriksaan kembali untuk melihat kondisi giginya. Hasil dari pemeriksaan control tersebut didapatkan perbaikan dimana kegoyangan pada gigi 31,32,41,42 sudah tidak ada dan kedalaman poket pada gigi 16,17 sudah berkurang dari 4mm menjadi 3mm .

PEMBAHASAN

Periodontitis adalah penyakit inflamasi yang mempengaruhi jaringan pendukung gigi dan dapat menyebabkan terjadinya pembentukan poket serta resorbsi tulang alveolar memicu terjadinya kerusakan progresif pada perlekatan jaringan ikat dan terkadang terjadi pula kehilangan tulang alveolar. Banyak faktor yang dapat menyebabkan terjadinya periodontitis. Etiologi infeksinya bersifat multifaktorial. Bakteri merupakan penyebab utama yang menginduksi terjadinya periodontitis, tetapi perkembangan penyakit dan keparahannya juga ditentukan oleh imunitas host itu sendiri. Penelitian menyatakan bahwa respon imun lebih berperan terhadap destruksi periodontal pada periodontitis.[3]

Bakteri dan produknya merangsang inflamasi sehingga menghasilkan mediator inflamasi seperti prostaglandin E2 (PGE2) atau cytokines. Mediator ini akan merangsang produksi dan aktivasi enzim yang merusak jaringan ikat gingiva serta produksi osteoklas yang akan meresorpsi tulang.

Pada pasien dengan riwayat penyakit sistemik seperti Diabetes, kelainan hematologi, gagal ginjal kronik, dan penyakit dengan defisiensi imun lainnya perawatan periodontal konvensional seperti scaling dan root planning hasilnya kurang optimal, karena biasanya pasien dengan penyakit sistemik mengalami gangguan sistem imun. Diabetes dapat memicu sekresi proinflammatory cytokines yang memiliki efek kerusakan pada jaringan periodontal. Pada penderita diabetes, produksi TNF- α yang berlebih akan menyebabkan keterbatasan perbaikan jaringan sehingga hal ini akan memperburuk kondisi jaringan periodonsium yang terkena periodontitis karena TNF- α akan membunuh sel yang berperan dalam memperbaiki jaringan ikat yang rusak.[3]

Diabetes menyebabkan kerusakan perlekatan netrofil sehingga terjadi kemotaksis dan fagositosis. Akibatnya bakteri tertahan dalam pocket. Bakteri mengeluarkan endotoksin yang merusak dinding pocket sehingga kerusakan periodontal tambah parah. Penderita diabetes dengan infeksi periodontal menyebabkan kendali glikemik memburuk.[4]

Dengan perawatan periodontal konvensional semata plak dan kalkulus mungkin dapat dieliminir secara sempurna tapi kerusakan jaringan periodontal tidak dapat dihentikan. Apabila perawatannya hanya pada jaringan periodontal saja tidak disertai pengobatan terhadap diabetesnya maka kerusakan jaringan periodontalnya akan terus berlanjut akibat dari sekresi cytokine dan TNF- α. Meskipun terjadi regenerasi jaringan periodontal tetapi sintesis MMP tetap berlanjut dan akan terus merangsang proses apoptosis.[5]

Terapi periodontal terbaru berupaya untuk menekan sintesis MMP dan merusak endotoksin yang terbentuk untuk mencegah melanjutnya kerusakan tulang. Terapi modulasi host yang menggunakan obat-obatan antibiotik dan

antiseptik terbukti efektif untuk membunuh bakteri periodontopathogen yang tersisa dan menghambat produksi MMP.[5]

Modulasi host merupakan suatu istilah baru yang merujuk pada adanya perubahan status/fungsi host sebagai respon terhadap stimulus. Periodontitis stimulus adalah bakteri periodontopatogen yaitu Aa, Pg dan PI. Konsep modulasi host merupakan istilah baru dibidang kedokteran gigi, namun di bidang kedokteran sudah banyak digunakan untuk menangani arthritis dan osteoporosis. Sejumlah bahan yang digunakan untuk modulasi host yaitu NSAID,antikolagenase, antioksidan. Pemberian modulasi host secara lokal tidak hanya meningkatkan proses penyembuhan, tetapi juga merangsang regenerasi tulang alveol, ligamen periodontal, sementum dan memperbaiki perlekatan jaringan periodontal. Yang termasuk didalamnya yaitu ; enamel matrix protein, BMP 2 ,BMP 7, Growth factor, tetrasiklin dan antikolagenase.[6]

Keberhasilan perawatan di bidang periodontik memerlukan strategi integrasi antar berbagai bidang ilmu yaitu internist,orthodontist, prosthodontist maupun endodontist. Di era Periodontal Medicine, penggunaan bahan antimikroba dan modulasi host sangat mendukung teori " the mouth as a mirror of health or disease ".[7]

Pada laporan kasus berdasarkan anamnesa dan pemeriksaan klinis didapatkan diagnose Periodontitis Kronis dengan Diabetes Mellitus sebagai factor predisposisi. Setelah dilakukan perawatan periodontal dengan scaling dan root planning dikombinasikan dengan host modulation perkembangan penyakit periodontal terhenti. Selain itu terjadi perbaikan jaingan periodontal dimana kedalaman poket berkurang serta skor gingival indeks dan skor periodontal indeksnya menjadi 0.

Berdasarkan pembahasan diatas dapat ditarik kesimpulan terapi mekanik scaling dan root planning dikombinasi dengan terapi host modulation terbukti sukses memperbaiki kerusakan jaringan periodontal pada penderita periodontitis dengan diabetes

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HYPERBARIC OXYGEN THERAPHY FOR HERPERTIFORMIS RECURRENT APHTHOUS STOMATITIS CASE

(Terapi oksigen hiperbarik pada kasus stomatitis aphtosa recurrent)

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ABSTRACT

Recurrent Aphthous Stomatitis (RAS) was an open wound in the oral cavity which is recurrent. Until now, the etiology was idiopathic, so the therapy has not specifically fixed. Considering the chief complaint of RAS was painfull, which cause disturbed mouth function and food intake. Many factors were known to have influence in the wound healing, among others in oxygenation hyperbaric oxygen theraphy was a theraphy wth continuous pure oxygen to the body with air pressure greater than normal atmospheric pressure. The reason is to increase the concentration of oxygen in the all body tissues. Basically, in literature study theory, there is relationship between wound healing using hyperbaric oxygen theraphy.

Key words*: Recurrent Aphthous Stomatitis, Hyperbaric Oxygen therapy, Atmosphere*

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PENDAHULUAN

Ulkus merupakan suatu kondisi diskontinuitas pada jaringan mukosa yang meluas hingga sampai dermis hingga ke subkutis dan menyebabkan hilangnya sebagian struktur epitel melebihi membran basalis atau dapat mencapai lamina propria.[1] Ulkus yang paling sering terjadi adalah *Traumatic Ulcer* (TU) dan *Recurrent Aphthous Stomatitis* (RAS). Masyarakat awam sering menganggap kedua ulkus ini sama dan menyebut keduanya sebagai sariawan atau luka, karena TU dan RAS memiliki gambaran klinis yang serupa. Secara klinis keadaan tersebut ditandai dengan lesi berupa ulkus dengan dasar berwarna putih kekuningan, berbatas jelas dikelilingi daerah eritema, disertai rasa sakit.[2] Dasar ulkus berwarna putih menunjukan adanya jaringan nekrotik dengan epitelnya hilang, sehingga terjadi cekungan yang dangkal. [3] Perbedaannya pada TU harus ada riwayat trauma, sedang pada RAS biasanya timbul dengan sendirinya karena keadaan yang multifaktorial, walaupun terkadang juga dapat dipicu oleh trauma.[4]

Prevalensi ulkus pada mukosa Rongga Mulut (RM) cukup tinggi, yaitu sekitar 83,6 %.[2] Walaupun ulkus sembuh sendiri pada hari ke 6-10 secara spontan, tapi pengobatan sangat diperlukan untuk mengurangi rasa sakit, mempercepat proses penyembuhan, dan menghindari terjadinya komplikasi lebih lanjut. [5] Banyak faktor yang diketahui berpengaruh dalam penyembuhan luka, antara lain : 1) ukuran,lokasi dan tipe luka, 2) Infeksi, 3) Vaskularisasi, 4) proteksi pada luka, 5) nutrisi, 6) Usia, 7) Status endokrin, 8) Adanya benda asing, 9) Desikasi (kelembaban), dan 10) Oksigenasi. [6]

Terapi Oksigen Hiperbarik (OHB) merupakan bentuk pengobatan dengan pemberian oksigen yang dilakukan dalam suatu Ruangan Udara Bertekanan Tinggi atau biasa disebut dengan *Hyperbaric Chamber/ Caisson*. [7] Terapi OHB merupakan terapi penunjang yang ternyata sangat membantu dalam penyembuhan pasien dengan mengurangi infeksi, dan mempercepat epitelisasi. [8]

Penggunaan terapi OHB untuk pengobatan suatu penyakit sudah lama digunakan, dan perkembangannya sangat pesat terutama di Negara maju. Cara pengobatan ini telah digunakan untuk menanggulangi bermacam penyakit, baik penyakit akibat penyelaman (*Caisson's disease*) maupun penyakit bukan akibat penyelaman. [9] Pada bidang Kedokteran telah digunakan untuk beberapa penyakit seperti ulkus diabetic, sclerosis multiple, cerebral palsy, *post* pembedahan dan penyembuhan luka. [10] Selain itu untuk kesehatan dan kebugaran, organ tubuh terutama kulit, supaya tampak cantik alami dan awet muda. [11] Bahkan laporan

terbaru di bidang *ophtalmogy* dapat meningkatkan ketajaman penglihatan, menurunkan insiden kebutaan akibat kekurangan oksigen dan meningkatkan aliran sirkulasi darah retina.[12]

Penggunaan terapi OHB di bidang Kedokteran Gigi (KG) relatif cukup banyak. Di bidang Periodontia, kasus *severe periodontitis* bisa sembuh. [9] Di bidang Bedah Mulut (BM), Laihad (2003) [8] melaporan keberhasilannya dalam menangani kasus osteomyelitis, *odema post odontectomy*, *parestesi post odontectomy*, nekrosis ginggiva maxilla post extraksi. Taufiqurrahman (2005) [13] juga melaporkan adanya kasus osteoradionekrosis yang sukses.

Dari berbagai kasus diatas, penulis mencoba menghubungkan secara kajian pustaka mengenai hubungan terapi OHB pada SAR. Dengan demikian terapi OHB dapat bermanfaat pula di bidang KG cabang Ilmu Penyakit Mulut (IPM).

Ulkus dalam bahasa awam juga disebut sebagai luka pada mukosa RM karena kerusakan lapisan epitel melebihi membran basalis, sehingga menyebabkan rasa sakit. [14] Etiologi RAS ialah idiopathic, tapi banyak faktor yang mendukung antara lain : imunologi, herediter, defisiensi nutrisi, kelainan darah, kelainan Gastro Intestinal, pengaruh hormonal, *agent* infeksi, trauma, alergi dan stress. [4] Adapun RAS terbagi menjadi 3 type, yaitu : 1. RAS *type minor*, artinya lesi dengan ukuran diameter dibawah 10 mm ; 2. RAS *type mayor*, artinya lesi dengan ukuran diameter diatas 10 mm, dan ; 3. RAS *type herpertiformis*, artinya lesi yang multipel dengan ukuran diameter lesi antara 0,5 mm sampai diatas 10 mm. [1]

Lesi RAS ini, selain sering kambuhan, juga sangat menganggu, karena sangat nyeri, menganggu fungsi bicara, sulit untuk makan, dan mengurangi fungsi estetik. [15] Apalagi pada lesi RAS *type herpertiformis*, mengingat lesi nya cukup banyak. [1] Bahkan Setianingtyas (2013) [16] telah membuat laporan kasus, dimana karena lesi RAS *type herpertiformis*, seorang pasien harus beberapa kali Masuk Rumah Sakit (MRS) /opname di RSAL "Dr Ramelan" Surabaya. Hal ini dikarenakan pasien sama sekali tidak bisa makan, sehingga tubuh pasien sangat kekurangan *intake* makanan dan menyebabkan pasien mengalami infeksi sekunder.

Gambar 1. Lesi RAS *type herpetiformis* (multiple ulkus).

Pada keadaan normal , kita menghirup udara yang kemudian diproses dalam paru-paru untuk diambil oksigennya saja. Oksigen secara terus menerus diserap ke dalam sirkulasi darah, dimana oksigen tersebut akan diikat oleh hemoglobin dan diedarkan keseluruh tubuh.[13]

Jalur transportasi Oksigen dimulai udara dari luar. [9] Perjalanan oksigen setelah dihirup pertama kali dimulai dari alveolar di bronkus menuju paru-paru berlanjut ke kapiler dan pembuluh darah vena, kemudian ke sistem arteri dan pembuluh darah kapiler. Setelah itu bergerak melalui cairan interstitial dan intraseluler ke bagian mikroskopik sel yang mengkomsumsi oksigen di sel (perioksome, retikulum endoplasma dan mitokondria). [9.13] Oksigen secara terus menerus diserap ke dalam darah, kemudian berpindah melalui paru-paru masuk ke sirkulasi sistemik. [9]

Pada manusia normal, jumlah pertukaran udara sebanyak 5 liter/menit, dan komsumsi oksigen sebesar 250 ml/menit. Dengan adanya perbedaan antara tekanan parsial oksigen dalam alveoli (pAO_2) dengan tekanan parsial oksigen di pembuluh darah vena (pvO_2) sebesar 64 mmHg, sehingga menyebabkan oksigen berdifusi ke dalam pembuluh darah paru. Fase ini merupakan fase tranportasi, yaitu oksigen yang sebagian besar berikatan dengan hemoglobin menuju ke jaringan dan dilepaskan untuk digunakan oleh sel. [9] Aspek fisiologi terbagi menjadi : 1. Fase respirasi (ventilasi, perfusi parut dan difusi). 2. Transportasi dan utilisasi oksigen, 3. Efek kardiovaskular. 4. Retensi CO_2. [17]

Oksigen bereaksi dengan nutrisi untuk membentuk energi dengan hasil H_2O dan C_2O, selanjutnya masuk kedalam kapiler untuk diangkut ke paru-paru dan dilepaskan ke dalam tubuh. [9] Dalam keadaan normal 97 % dari oksigen yang dipindahkan dari paru-paru ke jaringan dibawa dalam kombinasi kimiawi dengan hemoglobin dari eritrosit dan sisanya 3 % terlarut dalam plasma. [9.13.]

Terapi OHB adalah suatu metode pengobatan dimana pasien menghirup oksigen murni (100%) secara terus menerus pada tubuh pada tekanan udara lebih besar dari tekanan atmosfer normal. Terapi OHB ini berpengaruh pada pengiriman oksigen yang mengalami peningkatan 2 sampai 3 kali lebih besar daripada atmosfer biasa. [9] Tekanan yang diberikan lebih besar dari 1 Atmosphere Absolute (ATA) di dalam *hyperbaric Chamber*. [10] (1 ATA = 760 mm Hg atau pada tekanan yang lebih besar daripada yang terdapat di permukaan bumi pada permukaan laut. [18]

Pengobatan terapi OHB berfungsi untuk meningkatkan konsentrasi oksigen pada seluruh jaringan tubuh, bahkan pada aliran darah yang berkurang ; merangsang pertumbuhan pembuluh darah baru untuk meningkatkan aliran darah pada sirkulasi yang berkurang ;

menyebabkan pelebaran arteri *rebound*, sehingga meningkatkan diameter pembuluh darah, dibanding pada permulaan terapi, serta merangsang fungsi adaptif pada peningkatan *superoxide dismutase* (SOD) yang merupakan salah satu anti oksidan dalam tubuh untuk pertahanan terhadap radikal bebas dan bertujuan mengatasi infeksi dengan meningkatkan kerja lekosit sebagai pembunuh kuman. [9]

Terapi OHB adalah suatu cara pengobatan medis, dimana seorang pasien harus berada dalam suatu ruangan bertekanan dan bernafas dengan oksigen 100 % atau kurang dari itu, pada suasana tekanan ruangan yang lebih besar dari 1 ATA (760 mm Hg). [8] Terapi OHB yang pada awalnya digunakan untuk menangani kasus kecelakaan penyelaman itu, sifatnya sangat fisiologis, aman, dan tidak menyakitkan. Hal ini dikarenakan oksigen yang diberikan hanya dihisap, tidak disemprotkan, diminum, atau disuntikkan. Adapun pelaksanaan terapi OHB ini layaknya seperti menyelam, yang menggunakan kapal selam, dimana pasien masuk *hyperbaric chamber*. [18]

Adapun *hyperbaric chamber* dibedakan menjadi : *multiplace chamber*, *monoplace chamber*, dan *mobile chamber*. *Multiplace chamber* dapat digunakan untuk beberapa pasien pada waktu yang bersamaan, sedangkan pada *monoplace* (ruangan tunggal) digunakan untuk pengobatan satu orang saja. Pada *mobile* terdiri dari *multiplace* dan *monoplace*. Tidak perlu penggunaan masker atau sarung tangan dalam *chamber*, kecuali pada keracunan karbon monoksida atau inhalasi asap. [9.10]

Pada ruangan tersebut diberikan tekanan sebesar 2,4 ATA (setara dengan kedalaman 14 m dibawah permukaan laut). Setelah itu pasien menghirup oksigen selama 3x 30 menit, sekali dalam sehari. Namun hal ini disesuaikan dengan kondisi jaringan serta perawatan yang diperlukan..[9] Pada tekanan ini, kadar oksigen dalam darah 10 – 12 kali lebih besar dari tekanan normal. Namun, pasien tidak menghisap oksigen berturut-turut. Setiap 30 menit, tabung oksigen dilepas dan beristirahat selama 5 menit. Setelah itu dihisap lagi. Total pelaksanaan terapi OHB memakan waktu 2 jam. [18]

Dalam terapi OHB digunakan tekanan parsial oksigen antara 1,9 ATA sampai 2,8 ATA. Pada tekanan 2 ATA, tekanan oksigen didalam darah meningkat 10 kali, sehingga terapi OHB dapat memperbesar *tissue survival.* [8] Dosis yang digunakan pada perawatan terapi OHB tidak boleh lebih dari 3 ATA karena tidak aman. [9] Untuk profilaksis, menggunakan dosis 2,4 ATA selama 60-90 menit, sedang terapetik, menggunakan dosis 2,4 ATA selama 90 menit dengan 20 sesi, dimana keberhasilan nya 92 %. [7] Kebanyakan memang dipilih dosis 2,4 – 2,5 ATA selama pemberian oksigen karena tekanan tersebut merupakan

dosis aman serta dosis optimum dan mempunyai efek imunosupresan. Selain itu pemberian tekanan yang lebih besar dapat menyebabkan terbentuknya radikal bebas di dalam tubuh. [10]

Oksigen dalam darah diangkut dalam bentuk larut dalam cairan plasma dan bentuk ikatan dengan Hemoglobin (Hb) dan hanya sebagian kecil kurang lebih 3 % dijumpai dalam bentuk larut. Untuk terapi OHB, oksigen bentuk larut yang menjadi amat penting karena sifatnya yang lebih mudah dikomsumsi oleh jaringan lewat difusi langsung daripada oksigen yang terikat sistem Hb. Terapi OHB dapat meningkatkan jumlah oksigen bentuk larut sedemikian rupa, sehingga tercapai suatu keadaan dimana praktis kebutuhan oksigen dapat dipenuhi dari oksigen bentuk larut saja tanpa menggunakan oksigen yang berasal dari *oxyhemoglobin*. [8]

Kerusakan pada jaringan menyebabkan kerusakan pada pembuluh darah. Lekosit bermigrasi diantara sel endotel ketempat jaringan yang rusak dalam waktu beberapa jam, tepi yang rusak sudah diinfiltrasi dengan granulosit dan makrofag. Lekosit yang rusak akan digantikan oleh fibroblas. Pada jaringan yang rusak, yang dibutuhkan metabolisme paling besar, sedangkan kemampuan lokal untuk mendukungnya sangat kecil. Sehingga terjadi krisis energi lokal dan terjadi hipoksia di daerah tersebut. Dalam beberapa hari, fibroblas mengalir dari jaringan ikat perivaskuler dan mempercepat sintesa jaringan kolagen. Oksigen memainkan peran aktif dalam proses perbaikan jaringan melalui mekanisme peningkatan replikasi fibroblas dan produksi kolagen. Oksigen dapat meningkatkan kemampuan lekosit dalam membunuh bakteri dan memicu epitelisasi di daerah luka. [8]

Gambar 2 A. Seperti di kapal selam : pasien harus memasuki hyperbaric chamber, kemudian ruangan tersebut diberi tekanan.

Gambar 2 B. Pasien bisa berbaring selama memasuki hyperbaric chamber selama 3 x 30 menit.

Secara umum terapi OHB direkomendasikan oleh *The Hyperbaric Oxygen comitte of undersea Medical Society* dan diterima sebagai perawatan untuk kasus ; gas emboli/ udara ; keracunan karbon / sianida, *ischemic traumatic akut*, penyakit dekompresi, penyembuhan

luka jaringan, kehilangan darah, gangren, infeksi jaringan lunak *necrotizing*, infeksi anaerob khususnya *actinomycosis*, *graft* dan flap kulit, *osteomyelitis*, *osteoradionecrosis*, dan nekrosis jaringan lunak. [9.13]

Saat ini pengobatan dengan terapi OHB telah berkembang dengan pesat. Cara pengobatan ini telah digunakan untuk mengelola berbagai macam penyakit, baik penyakit akibat penyelaman (*decompression sickness*) ataupun penyakit bukan akibat penyelaman termasuk penyakit *ophtalmogy*. [12] Selama kurang lebih 20 tahun terakhir ini terapi OHB banyak memberikan andil dan berperan dalam bidang Kedokteran secara umum. Dibidang KG, terapi ini juga dapat dimanfaatkan untuk menunjang perawatan yang dilakukan, khususnya di bidang BM misalnya *osteomyelitis* kronis, nekrosis jaringan lunak serta pembengkaan *post odontectomy* dan parestesi adalah kasus yang pernah ditangani di Rumkital Dr Ramelan Surabaya bekerjasama dengan Lakesla Surabaya. [8]

Gambar 3 . Hyperbaric chamber. Dioperasikan dan dikendalikan dari luar tabung dengan tetap dapat melakukan komunikasi dari luar dan didalam tabung.

Efek terapi OHB dapat meningkatkan deferensiasi sel fibroblas, produksi kolagen. Bisa di aplikasikan pada pasien menggunakan *dental implant* (post radioterapi, poet tindakan

bedah karena *carcinoma*), komplikasi terapi *oral cancer*, *oral mucositis* dan *actinomycosis* RM dan *Trigeminal Neuralgia*. [7] Wardana (2010)[19] melakukan penelitian pada periodontitis disertai perdarahan, hasilnya didapatkan perbaikan parameter klinis secara umum.Penelitian Chen Et All (cit Sucahyo, 2005) [9] didapatkan hasil yang signifikan pada pasien dengan *severe periodontitis* serta dapat bertahan 1 tahun. Studi penelitian pasien *osteomyelitis* kronis post fraktur mandibula juga menunjukkan penyembuhan lebih singkat di RSAL dr Ramelan. [9]

Menurut Eiguchi(1990, cit Susan 2003) [20] bahwa terapi OHB memberikan efek imunosupresan, baik pada respons imunohumoral maupun imunoseluler. Terapi OHB meningkatkan aktifitas makrofag dan *Vaskular Endothelial Growth Factor* (VEGF), epitelisasi dan produksi kolagen.

PEMBAHASAN

Difinisi RAS adalah ulkus atau luka terbuka (hilangnya sebagian struktur epitel melebihi membrana basalis) pada RM yang sifatnya rekuren. [2] Sehubungan dengan etiologi RAS *idiopathic* (dengan beberapa faktor predisposisi), maka terapi yang spesifik juga belum dipastikan. Sampai saat ini terapi SAR banyak dilakukan hanya bersifat simptomtis (mengurangi rasa sakit), mengurangi inflamasi, dan mempercepat penyembuhan luka. [21]

Penyembuhan luka merupakan suatu proses komplek dan terkait satu sama lain, yakni perbaikan jaringan dan maturasi (*remodeling*) jaringan sebagai respons atas terjadinya jejas. Proses penyembuhan luka ini bertujuan merelokasi suatu jaringan agar mirip dengan jaringan aslinya. [22] Penyembuhan luka sangat dipengaruhi oleh reepitelisasi, karena semakin cepat proses epitelisasi, semakin cepat pula luka tertutup, sehingga semakin cepat penyembuhan luka. Pada proses penyembuhan luka yang normal matriks ekstra seluler memicu suatu respons organik yang ditujukan melalui 4 fase, yaitu : hemostasis, inflamasi, proliferasi dan maturasi.[23]

Seperti diungkapkan pada pendahuluan tadi bahwa salah satu faktor penyembuhan luka diantara 10 faktor adalah oksigenasi. [6] Pengertian oksigenasi adalah upaya pemenuhan kebutuhan oksigen dalam tubuh dengan cara melancarkan saluran masuknya oksigen dengan cara : (1) melancarkan saluran masuknya oksigen, atau (2) memberikan oksigen, sehingga konsentrasi oksigen meningkat dalam tubuh. Adapun salah satu tujuan oksigenasi adalah untuk mempertahankan oksigen yang adekuat pada jaringan. [24]

Hal ini dikarenakan Oksigen terutama penting untuk pembentukan ATP dalam sel, sehingga sangat penting dalam hampir seluruh proses penyembuhan luka. Oksigen mencegah

infeksi pada luka, menginduksi angiogenesis, meningkatkan diferensiasi keratinosit, migrasi dan epitelisasi, meningkatkan proliferasi fibroblas dan sintesis kolagen dan menginisiasi luka. Tingkat produksi SOD (faktor untuk membunuh kuman patogen yang oksidatif) oleh PMN tergantung tingkat oksigen.[6] Sebetulnya pengertian oksigen adalah komponen gas yang merpakan kebutuhan dasar manusia yang digunakan untuk kelangsungan metabolisme sel. [25]

Seperti telah diungkapkan di awal pembahasan mengenai etiologi RAS adalah idiopathic, dengan beberapa faktor predisposisi, antara lain diantaranya berupa imunologi dan alergi. [4] Disisi lain bahwa salah satu manfaat terapi OHB adalah imunosupresan. [9.10.19] Jadi terdapat korelasi antara etiologi RAS dan terapi OHB yang saling berhubungan

Dengan terapi OHB diharapkan akan terjadi sebagai berikut : terjadi hiperoksigenasi lebih jauh (peningkatan asupan oksigen), memberi asupan seketika terhadap jaringan. Peningkatan tekanan didalam *chamber* menyebabkan peningkatan oksigen terlarut dalam darah lebih banyak. Hal ini membuat oksigen mampu merasuk 10-15 kali lebih jauh dan lebih banyak dalam jaringan, sehingga terapi OHB sangat bermanfaat menangani tubuh dalam penyembuhan luka. [10]

Seperti telah disinggung pada Tinjauan Pustaka, bahwa salahfungsi terapi OHB adalah untuk meningkatkan konsentrasi oksigen pada seluruh jaringan tubuh. [10] Sedangkan pada penyembuhan luka diperlukan oksigenasi. [8] Termasuk penyembuhan luka pada RAS herpertiformis, yang menjadi tujuan dari terapi RAS. [21] Apalagi RAS type herpertiformis, dimana ulkus nya banyak, sehingga sangat nyeri, sulit makan dan bicara.[15] Jadi berdasar uraian diatas, berarti ada hubungan antara penyembuhan luka pada RAS herpertiformis dengan menggunakan terapi OHB.

Adapun mekanisme kerja OHB meliputi : hiperoksigenasi, yaitu memberikan pertolongan segera terhadap jaringan di daerah yang aliran darahnya buruk. Mekanisme kedua , yaitu hiperoksia yang dapat meningkatkan aktifitas antimikroba, sehingga menyebabkan terhambatnya toksin dan inaktifasi toksin pada infeksi bakteri. Mekanisme ketiga, yakni neovaskularisasi dengan menunjukkan adanya suatu respons yang tidak langsung dan lambat terhadap pemberian OHB. Efek terapetiknya meliputi peningkatan pemecahan fibroblas, pembentukan kolagen baru dan angiogenesis kapiler di daerah yang sulit terbentuk neovaskularisasi. [9]

Neovaskularisasi (tumbuhnya pembuluh darah baru), namun untuk terjadinya hal ini harus melalui pengobatan jangka panjang terapi OHB. Efek terapi lainnya adalah peningkatan

fibroblast dan terbentuknya kolagen baru , sehingga tumbuhnya sel epitel pembuluh kapiler (*epithellization*) disekitar jaringan yang tersumbat aliran darah nya *(sligish tissue)*. [10]

Pada Tinjauan Pustaka tadi dikatakan bahwa fungsi terapi OHB adalah untuk meningkatkan konsentrasi Oksigen pada seluruh jaringan tubuh.[10] Sedang pada penyembuhan luka diperlukan oksigenasi.[6] Berdasar uraian diatas, ini berarti ada hubungan antara penyembuhan luka pada SAR herpetiformis dengan menggunakan terapi OHB.

Perawatan terapi OHB memberi efek pada organ, struktur jaringan, dan reaksi biokmia termasuk didalamnya, yaitu menekan produksi alfa toksin pada gas gangren, meningkatkan aktifitas lekosit, pertumbuhan fibroblas dan produksi kolagen, merangsang produksi SOD, mempertahankan ATP dalam membrane sel dari reduksi sekunder jaringan edema, menekan respons imun tertentu (imunosupresan), meningkatkan proliferasi kapiler, menurunkan sitokin pro inflamasi serta meningkatkan regulasi berbagai *growth factors*. [9] Jadi artinya, disini terapi OHB dapat menurunkan sitokin pro inflamasi. Sedang lesi RAS, pada umumnya didapatkan peningkatan sitokin pro inflamasi, seperti IL-1, IL-6, IL-8, TNF, dan IFN.[15] Hal ini menunjukan bahwa terapi OHB dapat menurunkan sitokin proinflamasi, yang mana pada keadaan lesi RAS terjadi peningkatan sitokin pro inflamasi. Dengan demikian terapi OHB dapat mempercepat penyembuhan RAS type herpetiform, karena merupakan lesi paling parah diantara beberapa macam lesi (Selain RAS type minor dan mayor).

Dari pernyataan Ibeghaulth (2006) [22] yang mengatakan bahwa pada penyembuhan luka sangat dipengaruhi oleh epitelisasi. Padahal dalam terapi OHB dinyatakan bahwa terapi ini sangat bermanfaat menangani tubuh dalam penyembuhan luka.[10] Hal ini menandakan memang terapi OHB bisa diterapkan pada SAR herpetiformis

KESIMPULAN DAN SARAN

Terapi OHB telah terbukti dapat dimanfaatkan di bidang KG, seperi BM dan periodontia dalam mempercepat kesembuhan dengan cara mempercepat epitelisasi. Di bidang IPM pun, secara tinjauan pustaka didapatkan hubungan antara faktor penyembuhan luka pada RAS type herpertformis dengan adanya oksigenasi pada terapi OHB. Sebaiknya disarankan untuk dilakukan penelitian lebih lanjut mengenai studi klinis tentang mekanisme biomolekuler pada pasien RAS dengan menggunakan terapi OHB, sepertyang telah dilakukan di bidang KG sebelumnya.

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DEVELOPMENT PRACTICE DENTIST HOLISTIC THEME

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ABSTRACT

Improving dental practice were not difference from effort of service. As a effort of service has two major should achieved : benefit and satisfaction of service. Improving dental practice with holistic care, whereas not only for dental and oral health but also involved generalized for overall health care, will giving satisfaction according to profesional procedure for operator and patient

Key words : *improving practice, dentist, holistic care*

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INTRODUCTION

Develop the practice of dentists is not really different from opening in the field of business services. As a service there are two things that must be achieved, namely benefit and satisfaction service. To create a place of greater private practice will cost a good management skills and thus achieved the expected profit and satisfaction. The concept "*service profit chain"* advanced by Heskett in 1941 can be used as the basic theory of managing the organizations dental clinic. The elements that need to be taken care of according to this concept are: profitability, customer loyalty, customer satisfaction, value, productibility, employee loyality, employee satisfaction, internal quality and internal leadership. This concept shows that there is a very strong relationship between the profit with the patient loyalty, employee loyalty with loyalty and patient satisfaction patient satisfaction with employees[1].

To develop the practice of dentists, it needs improvement in terms of management as well as in terms of facilities and infrastructure. The purpose of writing this is how to build the practice of a dentist who is entitled holistic (dental treatment thoroughly).

ENTREPRENEURSHIP

Entrepreneurship in developing the practice of dentists is an approach that is needed in the health profession in the face of globalization and openness today. With various approach the field of science is expected to understanding entrepreneurship in dentist can be properly applied, and still referring to medical ethics business [2] . Entrepreneurs are peoples the one who has the ability to see and judge chances a business opportunity; collects resources needed to take advantage of it and take appropriate action to reach for the success of [3]. The dentist was an undergraduate dental hygiene and dental professions have an education and according to research someone educated or equivalent Bachelor's degree will be more successful as an entrepreneur [4]. Personal entrepreneurial characteristics among others: have a vision and mission, commitment, confidence, discipline, leadership, risk takers, creative and informative [5]. In an effort to increase in practice dentist, entrepreneurship the role of psychology business communication is important.

In the form of two way communication, equality of patients with his teeth, a doctor openess; an outpouring of trouble, emotions, and the impact of disease a belief in and secrecy patients and ripeness of personality the dentist and staff. The relation of a dentist and patients

in the concept of psychology and management dynamically can increase trust and satisfaction and faithful patient [2].

THE DEVELOPMENT OF THE PRACTICE OF A DENTIST

Vision and mission need to set to equalize perception for all team members. The mission is a handle all the task team. Something that needs to be in determining mission : care service patient and work environment [1]. Into a place of especial the grantor health service the teeth and the mouth in a holistic, that gives excellent service as an answer must be against the teeth and the mouth and health problems as a whole.

Take advantage of all aspects of dentistry and health sciences who work together and support each other in providing oral health services in full. Provide facilities and infrastructure supporting holistic dentistry are complete. Provide a service that is comfortable, calm , safe and exclusive. Excellent service professionally and based science and technology. In general needs the room on the practice is a dentist waiting room, space preparation tools and materials, the consulting rooms and the infirmary. Design the waiting room must consider, make the room comfortable, the condition of not created an impression scary as well as the clerk or staff be friendly and responsive. Cleanliness and sterility instrument need to have serious attention as the use of plastic wrap to close equipment that come into contact with a patient as well as with operators would provide security in patients [1,3].

The promotion of effective for the practice of dentist actually lies in satisfaction patients. Satisfaction patient vary depending on factors that could be influential on the degree of satisfaction patient is age, gender, economic status, experience treatment ago and the level of anxiety. Patient basically hoping to get ease when receive treatment, among other ease of access to (phone, fax, the internet, etc.) Information that is easily obtained, personal care, transparent,scientific who takes care of security and cooperation. Granting description in written or spoken will be a special attraction for satisfaction patients. Dentist make a brochure about the kind of diseases of the teeth which have an impact on public health, and kinds of sorts of dental treatment is effective a method of promotion.

CARE HOLISTIC IN DENTISTRY

Care Holistic in dentistry is health care as a whole, the mouth not only health the teeth and the mouth only but also involving public health as a whole. Physical and mental

health someone will affect health his teeth and vice versa. Diseases of the teeth and the mouth is either a cause or resulting from a disease that other for that repairs nutrition, and control the diet is important to achieve a holistic healing in.

Seven ways the treatment with holistic dentistry (carey o ' rielly & ampères. ; victoria klubok) is the use of material, dental biocompatible The treatment of disease gingiva naturally and no pain, the demolition of tumpatan metal safely, effective prevention and care, on the issue of mastication support additional habit of a diet that is good the maintenance of toothlike structures, education to elimination toxisitas of care for the teeth, and the products of the teeth in the house and the environment around us. Oral health services in Holistic dentistry field, among other things: 1). use of dental materials are biocompatible bonding agent. 2).Avoid using tumpatan with materials that allow to occur, such as toxic amalgam. 3.) beware of the use of metals such as aluminum, cadmium, which can cause allergic reactions. 4). treatment of diseases of the gingiva is naturally and no pain.

Fetor can caused because there ' s a disorder in periodontal and gingiva. A disease-causing bacterium periodontal not only found in the mouth but also in the blood stream. Gingiva is the basis of dental treatment in general. Needed isolation of the teeth are good to protect the oral cavity of a particle metal when the demolition of the patches of metal even its worst terlelan if to the point. More than 14 % of air pollution because of a metal on fillings teeth. Effective prevention and treatment on the issue of mastication. In dentistry holistic the cavity of the mouth is the gate of the human body not just affect padd the internal factor but also outward structure. Not only of the head but the jaw is also the structure of the body as a whole. Traditionally dentist regularly, advocated brushing your teeth dental flossing after eating food sweet. In dentistry holistic advocated a diet of foods that are good, for example, a diet of sugar free and alkaline diet. Bonding cosmetics for the maintenance of toothlike structures, with the technique of bonding the reduction of toothlike structures become fewer. The rise of the science of material in the field of kedoktern teeth maketh teeth into the natural look and beautiful. Education to elimination toxisitas of dental treatment, the product of teeth in the house and the environment around us. The use of materials with minimal toxicity good in daily life in households and the surrounding environment and in dental treatment will get the result holistic dentistry being effective.

DISCUSSION

With the progress of the times and entrepreneurship in practice dentist needs to develop, the practice of dentist is a business services. Besides knowledge in general there are several skills entrepreneurial conceptual, namely: skills creative, lead, manages, communication, interact and engineering effort. A patient may believe and loyal if doctor his teeth can give satisfaction in accordance with the procedure of professional and safe that is spatially holistic, as well as treatment not only health the teeth and the mouth only but also involving public health as a whole.

Physical and mental health someone will affect health his teeth and vice versa. A disease of the teeth and the mouth is either a cause or resulting from a disease that others. For that repairs nutrition, and control the diet is important to achieve a holistic healing in.

CONCLUSIONS

Develop the practice of dentist not actually different from opening in the fields of service business. As service businesses there are two things that must be achieved, namely benefit and satisfaction service. Give innovation development practice of a dentist who is entitled care holistic, where not only health the teeth and the mouth only but also involving public health comprehensively would be able to give satisfaction in accordance with the procedures professional.

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FACIAL TYPES DETERMINATION BASED ON FM ANGLE MEASUREMENT IN CEPHALOMETRIC ANALYSIS

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ABSTRACT

Cephalometric analysis is used in dentistry especially in orthodontics which is to study the growth of craniofacial, enforce the diagnosis or analyze abnormality of craniofacial, to study facial types, determine the treatment plan of orthodontic, evaluate any cased had been treated, to analyze functionally and to do research. FM angle mesurement is useful to determine facial types. Facial types are correlated to the shape of jaw arch. The purpose of this paper is to discuse about facial type determining, based on FM angle measurement on cephalometric analysis in order to determine treatment plan. FM angle is an angle formed by FHP and mandible plan. FHP (Frankfort Horizontal Plane) is plane that through orbita and porion points. When the resultant of FM angle is $26^0 \pm 3$ it is included in mesofacial type. When FM angle is $< 26^0 \pm 3$ so that it is included in brachyfacial type and if FM angle is $> 26^0 \pm 3$ it is included in dolichofacial type. Facial types will affect in determining treatment plan, there should be jaw expansion or tooth extraction.

Keywords : cephalometric analysis, face type, orthodontic treatment.

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INTRODUCTION

Cephalometri is a human cranial measurement with methods of traditional imaging from x-ray film. Cephalometric analysis is used in dentistry especially in orthodontics which is to study the growth of craniofacial, enforce the diagnosis or analyze abnormality of craniofacial, to study facial types, determine the treatment plan of orthodontic, evaluate any cased had been treated, to analyze functionally and to do research. [1] Cephalometric analysis is divided into three group: there are skeletal analysis, dentoskeletal analysis, and soft tissues analysis. Skeletal analysis are including measurement the angles of SNA, SNBm facial, FM and A-NPg. FM angle mesurement is useful to determine facial types. Facial types are consist of three types, there are dolichofacial, esofacial, and brachyfacial. [2]

Facial types are correlated to the shape of jaw arch. These may affect in determining treatment plan. The purpose of this paper is to discuse about facial type determining, based on FM angle measurement on cephalometric analysis in order to determine treatment plan.

CEPHALOMETRIC ANALYSIS

Cephalometri is a human cranial measurement with methods of traditional imaging from x-ray film. Cephalometric analysis is used in dentistry especially in orthodontics which is to study the growth of craniofacial, enforce the diagnosis or analyze abnormality of craniofacial, to study facial types, determine the treatment plan of orthodontic, evaluate any cased had been treated, to analyze functionally and to do research. Cephalometric is divided into two according to their analysis.Frontal cephalogram is description of the frontal or antero-posterior of craniofacial. Lateral cephalogram is lateral description of the cranial. Profile of soft tissues can be analyzed using the lateral aspect of the lateral cephalogram. [1]

One of skeletal analyisis measurement on cephalometric analysis is FM angle measurement. FM angle is an angle formed by FHP and mandible plan. FHP (Frankfort Horizontal Plane) is plane that through orbita and porion points. There are some methods to determine mandible plan, (1) mandible plane is a plane that through gonion and menton points, (2) mandible plane is a plane that through gonion and gnaton points, mandibular plane is a plane that offends inferior border of mandible and menton. [2]

MESUREMENT POINT OF CEPHALOMETRIC

To determine facial types on cephalometric skeletal analysis, there are several points which should be determined firstly. The points needed in the measurement are:

Orbitale : the lowest points of the base of eye cavities. Gonion: The point of intersection between a tangent ramus posterior with mandible plane with growth for surgical intervention. Gnation (Gn): a point between the point of menton and Pg

Porion, (po): the most superior point of meatus acusticus eksternus, that offends frankfort plane. Menton: the most inferior point of chin soft tissue. Pogonion: the most anterior point of chin soft tissue. [3]

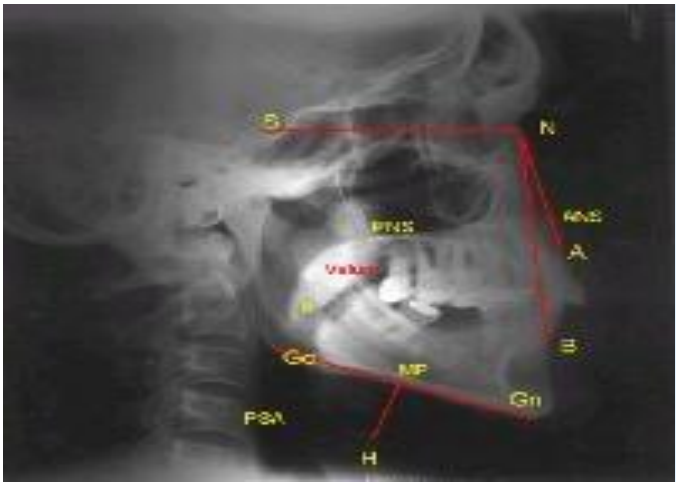

Fig 1. Cephalometric analysis is used in dentistry especially in orthodontics

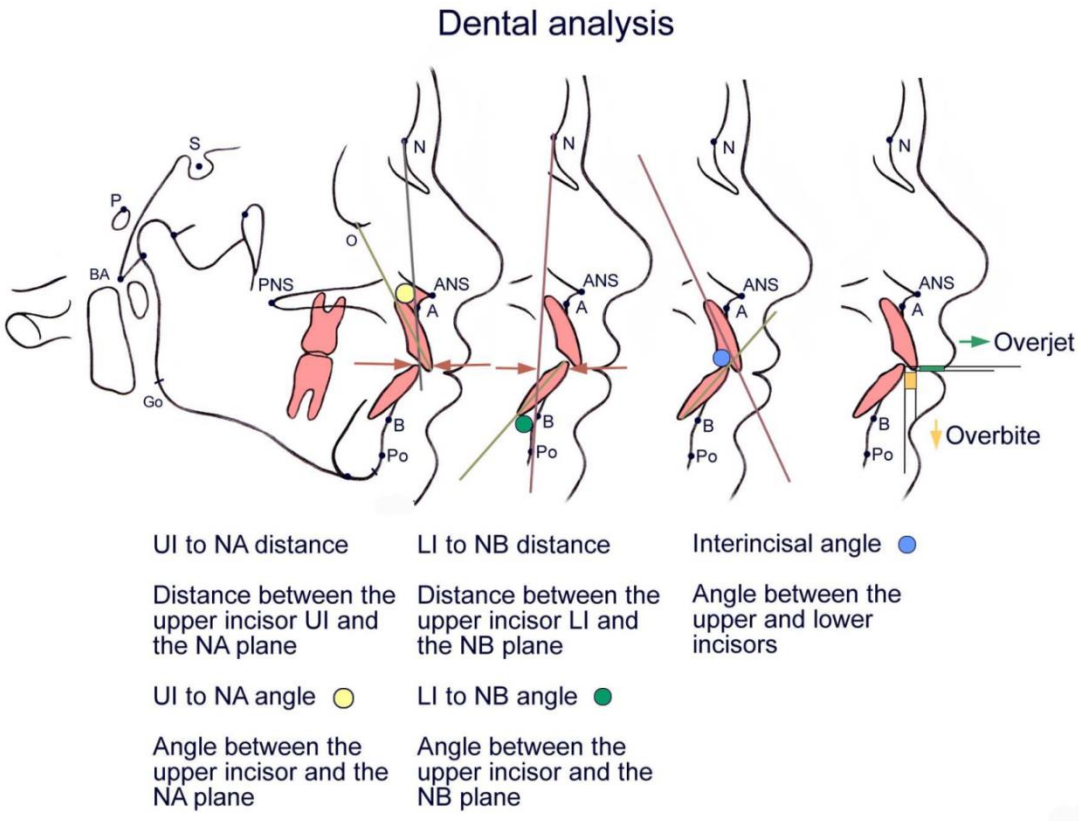

Fig 2. Dental analysis determine the treatment plan of orthodontic

FM angle measurement is useful for determining facial types. Facial types are consist of dolichofacial, esofacial, and brachyfacial. The long and oval shape of dolicoephalic head make the growth of face becoming narrow, long, and protrusive. The round and wide shape of brachichepalic head make the growth of face wider and rather protrusive. The shape of mesochepalic head is an oval shaped. The resulting facial type is medium-sized so that the shape of nose, forehead, cheekbones, eyes, and jaw arch as well as medium-sized. Facial types are related to the shape of the jaw arch. This may affect for determining treatment plan. [4]

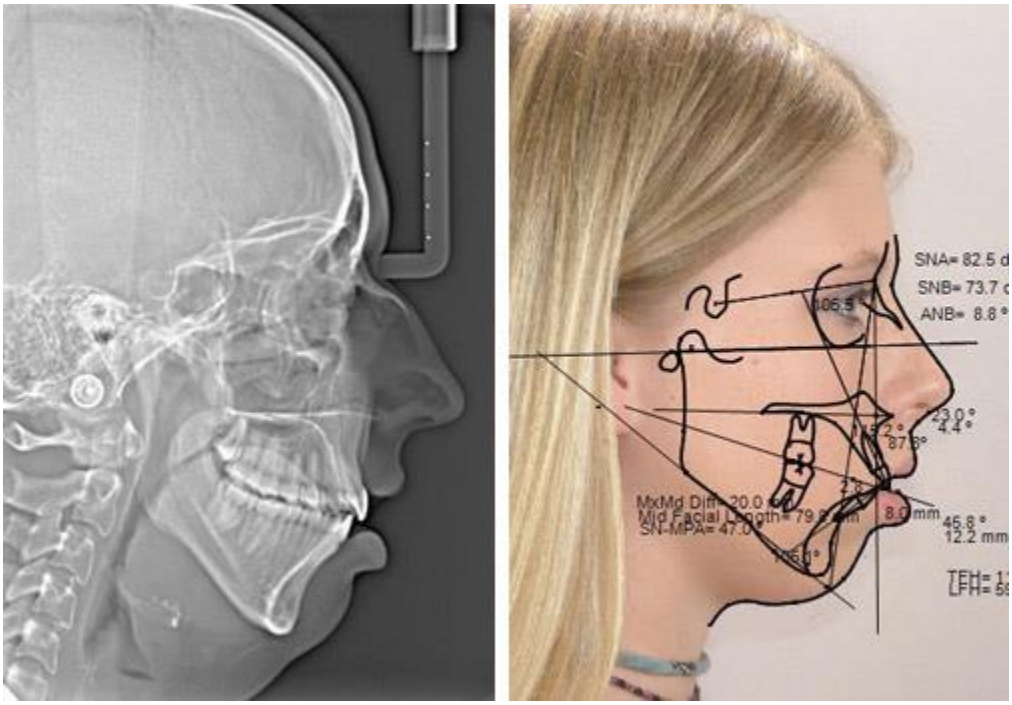

Fig 3. Facial types are correlated to the shape of jaw arch. These may affect in determining treatment plan.orthocj.com

DISCUSSION

FM angle is an angle formed by FHP and madibula plane. FHP (Frankort Horizontal Plane) is plane that through orbita and porion points. Mandible plane is a plane that through gonion and menton points. FHP and mandible plane are projected to meet at one point that will form FM angle. When the resultant of FM angle is $26^0 \pm 3$ it is included in mesofacial type. When FM angle is $< 26^0 \pm 3$ so that it is included in brachyfacial type and if FM angle is $> 26^0 \pm 3$ it is included in dolichofacial type. [5]

Facial types are related to the jaw arch shaped. The wide shaped of facial types of brachyfacial has squared shaped of jaw arch. These will effect in determining treatment plan. Treatment option of crowding teeth in brachyfacial type is usually expansion. While in dolichofacial type is usually extraction. In the other words, facial types determination is useful to determine treatment plan. [6]

CONCLUSION

FM angle measurement on cephalometric analysis, it can be concluded that: FM angle measurement can be obtained from an angle which is formed by FHP and mandible plane that is used to determine facial types. Facial types are consist of three types, there are mesofacial (FM angle of $26^0 \pm 3$), brachyfacial (FM angle of $< 26^0 \pm 3$) and dolichofacial (FM angle of $> 26^0 \pm 3$). Facial types will affect in determining treatment plan, there should be jaw expansion or tooth extraction.

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SWEET TASTE STIMULATION POTENTIALLY INCREASE THE PAIN TOLERANCE THRESHOLD

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ABSTRACT

Background*: Sweet taste stimulation may possibly be applicable in the field of dentistry, and to relieve pain during injection of local anesthetic. In the present study, oral administration of sucrose and xylitol have been reported to increase the pain threshold.*
Purpose*: The aim of this study was to determine the mechanism of sweet taste stimulation on pain tolerance threshold.*
Discussion*: A-delta fibers contribute to the sensation of pain, and C fibers contribute to pain pressure in the submucosa during injection of local anesthetic. The increase in pain threshold from sucrose and xylitol is caused by enhanced secretion of endogenous opioids and activation of the descending pain inhibitory system. The distribution in dorsal horn of spinal cord of A-delta and C fibers react to noxious stimulation. Serotonergic and noradrenergic neurons in descending pain modulatory system and endogenous opioids in the superficial layer of the trigeminal subnucleus caudalis both contribute to the pain-inhibiting effects of sweet taste stimulation. This may result an increasing of pain tolerance threshold.*
Conclusion*: Sweet taste stimulation may potentially inhibit pain and increase the pain tolerance threshold.*

Keywords: *mechanism, sweet taste, stimulation, pain threshold*

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INTRODUCTION

Interventions in dental and oral treatment often involve pain. For example, on the treatment of tooth extraction, local anesthetic is required to avoid pain. However, it becomes difficult because of local anesthetic application had caused pain by itself (using the needle of cytojet). Thus, there are needed gently and slowly application methods, especially in children. [1,2]

When babies were born, they received vaccination and blood sampling. Additionally, on clinical research has reported that sucrose administration may suppress pain in infants. A study of animals has reported that sucrose administration may reduce pain post formalin administration on the back leg in mice. Other studies have also mentioned that sucrose is an inhibitor of pain. [3]

Sweet taste stimulation may be applied in the field of dentistry to relieve the pain while the injection of local anesthetic, but there has been no study that examined the effects of sweet taste stimulation on pain tolerance threshold of oral mucosa. This review to examine the mechanism of sweet taste solution on pain tolerance threshold.

MECHANISM OF PAIN RECEPTORS

Pain is a mixture of physical reactions, emotions, and behaviors. The best way to understand pain experiences can aid to explain the following of three physiological components are: the reception, perception, and reaction. Pain-producing stimulus sends impulses through the peripheral nerve fibers. Nerve fibers enter medulla spinal and through one of several routes of nerves and eventually came in gray masses in the spinal medulla. There are the pain messages which can interact with neuronal cells inhibitor, preventing the pain stimulus so that it does not reach the brain or transmit without blockage of cerebral cortex. Once the stimulus reaching the cerebral cortex, the brain interpret pain quality and process information about your past experience and knowledge as well as cultural associations in order to perceive pain. [4]

Pain receptors are the organs that function to receive stimulation of pain. Organs that act as pain receptors are free nerve endings in the skin that only respond against strong stimulus that is potentially damaging. Pain receptors also called nocireceptor , anatomically there are myelinated and unmyelinated peripheral nerves.

There are two types of peripheral nerve fibers that conduct stimulus of pain: A-delta receptor (transmission speed of 6-30 m/s). This allows the onset of sharp pain that will quickly

disappear when the cause of pain is removed. C fiber (transmission speed of 0.5 m/s) found in the deeper areas, pain is usually blunt and difficult to allocate. Structures of deep somatic

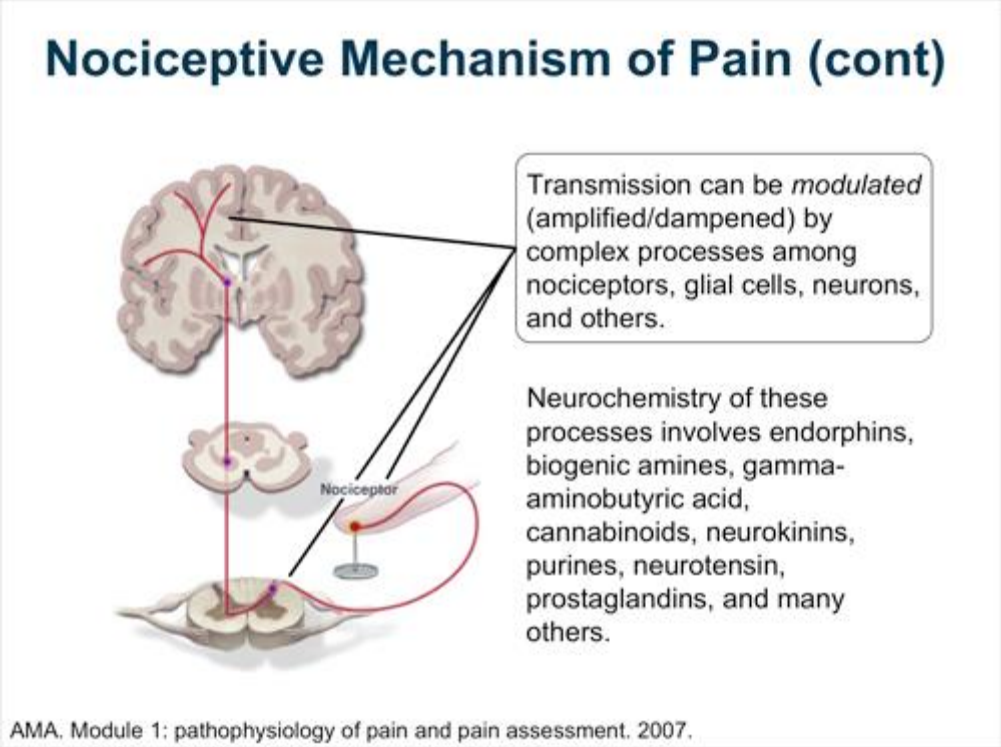

Figure 1. Pain receptors also called nocireceptor are the organs that function to receive stimulation of pain.

pain receptors include the pain receptors in the bone, blood vessels, nerves, muscles and other supporting tissues. Because of the complexity of receptor structures, pain that arises is the blunt pain and difficult to allocate. [5]

C fibers are exposed to chemical materials that are released when cells damaged. When C fiber and A-delta fiber transmit impulses from peripheral nerve fiber, they release biochemical mediators are potassium and prostaglandins that activate or make them sensitive to response pain. They have ending in the cornu dorsalis of medulla spinal cord. In cornu dorsalis, neurotransmitter, such as p substance has released, thus it may cause a transmission synapses of peripheral nerve to the spinothalamus tracts nerve. [6]

ROLE OF NEUROREGULATORS IN PAIN EXPERIENCES

Neuroregulator or substance affects transmission of nerve stimulus have important role in pain experiences. These substances are found in nocireceptor location, in nerve terminal on cornu dorsalis of medulla spinal. Neuroregulator is divided into two groups, there are neurotransmitter and neuromodulator. Neurotransmitter, such as P substance transmits

physical impulses through synapse gap between two fibers. This nerve fiber is exitator or inhibitor fiber. Neuromodulator modifies activity of neuron and adjusts or makes variation transmission of pain stimulus without transfers directly of nerve sign through synapse. Neurotransmitter do not work directly, it increases and decreases certain of neurotransmitter effect. Endorphin is one example of neuromodulator. Pharmacologic therapy for pain widely is based on the effect of chosen drug in neuroregulator. [7]

Neuromodulators, consist of endorphin and bradikinin. Endorphin (morphin endogen) is substance of morphin that is supplied by body. Endorphin is activated by stress and pain forces, the location is on brain, spinal, and gastrointestinal tract and endomorphin also has analgesic effect. Bradikinin is released by plasma and breakdown around of blood vessel on injury area. Bradikinin acts in peripheral nerve receptor that cause pain stimulus increasing and acts on cell that cause chain reaction thus occurs prostaglandin releasing. [8]

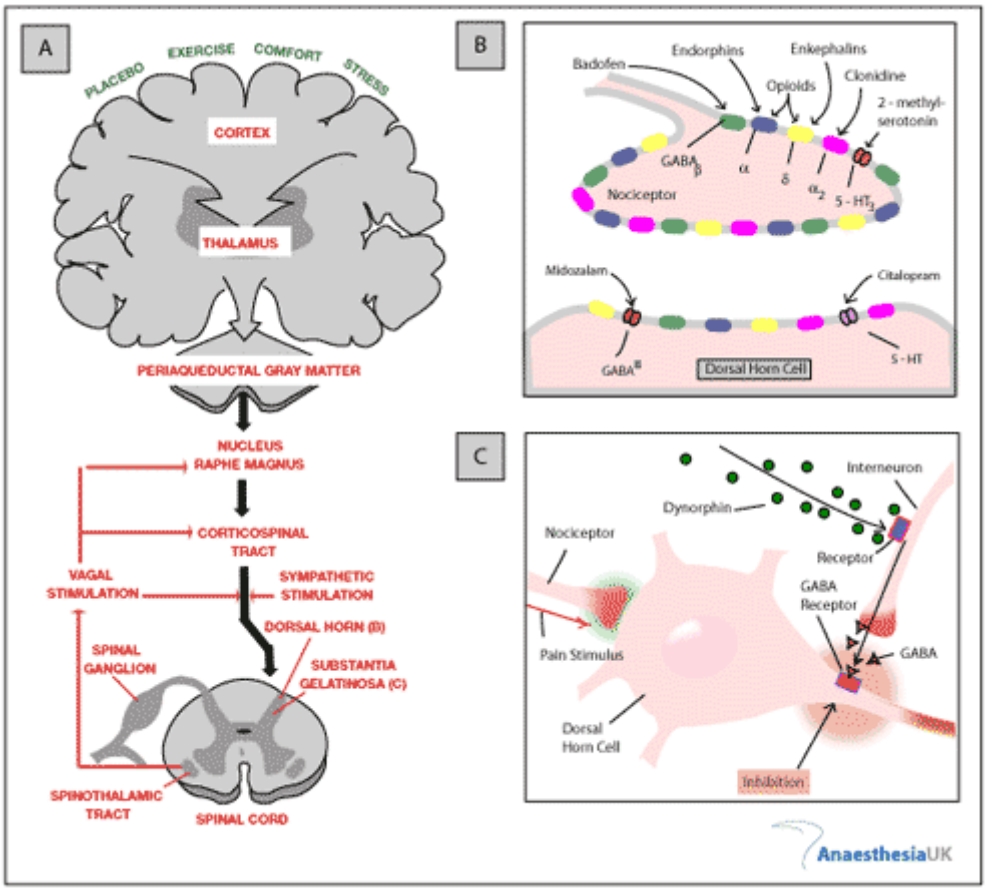

Figure 2. Neuromodulators, consist of endorphin and bradikinin. Endorphin is activated by stress and pain forces, the location is on brain, spinal, and also has analgesic effect. Bradikinin acts in peripheral nerve receptor that cause pain stimulus increasing

SWEET SOLUTION AND PAIN TOLERANCE THRESHOLD

Sweet solutions can relieve pain in children. After procedure that cause pain such as process of tooth extraction, patients are administered of sugar solution on their tongue, had shorter time to cry and faster to reach heart beats normally. Sweet solutions can also decrease negative responses of electroenchepalographic to become non invasive and non danger. These indicate that sugar solutions may relieve pain, relieve stress and minimize heart beat alteration in pediatric.

Sucrose is digested by gastric in long time, so analgesic properties comes from the sweet taste itself that move attention of children from pain. In addition, sucrose solution administration may increase beta-endorphin levels in plasma and cerebrospinal fluid. Endorphin is natural pain killer which is derived from body. This hypothesize is supported that sweet stimulations contribute in beta-endorphin releasing. Therefore analgesic properties of sucrose are due to their ability to decrease control of hipotalamo-pituitary thus increased amount of beta-endorphin in plasma.

Pain threshold in pediatric oral mucosa is significantly lower than adults in normal condition. Pain threshold in children increased with sweet taste stimulation (sucrose and xylitol solutions). Sweet solutions do not affect on pain threshold of adults. [9,10]

PAIN THRESHOLD ALTERATION TEST

Neurometer CPT/C was used to test pain threshold alteration in children oral mucosa when sweet stimulation was applied orally. Neurometer CPT/C can stimulate sensory nerve fiber selectively with frequency alteration of SWCs. Therefore, widely used to measure perception and pain threshold. Frequency that available in SWCs were 2 kHz, 250 Hz, and 5 Hz, which were related to AA, Adelta, and C fiber. A delta and C fiber free nerve ending react to damage stimulation, cause pain perception. A delta free nerve ending was react to damage stimulation, especially in high mechanic threshold. Mostly neuron polimodal C fiber with free nerve ending that react to any stimulation, and contribute to deep sensation in several region, including bones, muscles, and connective tissues. In other words, A delta fiber may contribute on pain sensation in oral mucosa when injected with needle, and C fiber may contribute to pain of pressure or stress in submucosa during local anesthetic injections. [11]

DISCUSSION

Sweetness is detected by the neural system, whereas palatability may be detected within the neural and chemical systems in the brain. Sweetness is discriminated from other tastes by different receptor sites on taste bud cells, a different subset of fibers in the taste nerves, and different projection zones in the brain.

Pain threshold in children mucosa has proven significantly lower than in adults at any frequency. These means children have high sensitivity to pain, and experience pain stronger even during small invasions. Therefore, pain stimulation in local anesthetic injections should be avoided. Sucrose solutions may potentially relieve pain associated with local anesthetic injections in oral mucosa. Sucrose using to relieve pain before local anesthetic injections administration is ease and safe, but the application in clinical practice is difficult because sucrose is cariogenic substance.[12]

Recently, it has found xylitol, this is alcohol sugar that synthesized by xylose as new artificial sweetener, it has more attention in dentistry practice. Xylitol do not cause tooth caries, because of bacteria that cause caries may not produce acid from xylitol. Xylitol is also effective in tooth caries prevention. Therefore, xylitol may as effective as sucrose in order to resist pain response in oral mucosa. Xylitol application may effectively used before local anesthetic injections in oral mucosa in practical of dentistry. But, this should be carefully to use it in clinical practice, because high doses of sucrose may cause diarrhea or hyperalgesia.[13]

Sweet taste from sucrose solutions increased pain threshold, but it can only shift the children attention from pain, because they like its taste. The application of sucrose solutions in rat oral mucosa cause beta-endorphin releasing, that is opioid endogen, released from hipotalamus to cerebrospinal fluid in great volume, thus resist pain responses. Pain effect can be blocked by sweet taste stimulation which is feedback response of naloxon, antagonist of opioid. Both of neuron terminal, there are the first order that transmit pain in corn of dorsal spinal cord and the second order of neuron that receive information of pain sensory have same opioid receptor.

When opioid receptor in the first order of presypnatic terminal is stimulated, the limit of tension Ca channel is blocked and volume flow of Ca2+ to presypnatic terminal is decreased, in turns it may block glutamate releasing and the other neurotransmitter stimulation. When opioid receptor in cell body and dendrite order of both neuron are stimulated, K channel is opened, and the second order become hyperpolarization because K+ flow out of cell. Stimulus inhabitation of debit neurotransmitter from presypnatic terminal

and hyperpolarization from postsypnatic cell are stressed by potential intervention in corn dorsal of medulla spinal, thus pain information does not transmit from spinal cord to neuron or brain. In addition, secretion of opioid endogen in middle brain and medulla oblongata has increased activity, therefore pain modulation system become decrease (DPMS). [14]

Pain inhibitation system decreasing is pain mechanism through neuron serotonergic form raphe nuclei and neuron noradrenergic form nucleus ceruleus in brain cord that located in superior position from medulla spinal, it descend to corn dorsal of medulla spinal, thus block transmission of synaptic from the first order neuron to the second order neuron in several region. In other words, pain threshold increasing from sucrose solution application is caused by secretion increasing of opioid endogen and activation of pain inhibitation system.[15]

CONCLUSION

Research has shown that sugar consumption can act like an analgesic drug on the brain. Sugar addiction is known to create a measurable physiological state by activating certain opioid receptors in the brain. The **sweet taste of sugar** is seen to stimulate the beta endorphin receiver sites within the brain and impacts dopamine and opioid in the brain. Children have pain threshold lower than adults in oral mucosa. Oral application of sucrose and xylitol solutions may increased pain threshold in children oral mucosa. Sweet taste stimulation may potentially relieve pain associated with local aneshetic injections in oral mucosa.

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