

**ABSTRACT FOR THE 1ST INTERNATIONAL CONFERENCE
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University Putra Malaysia**

New Challenges Toward Regenerative Medicine

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ORAL PRESENTATION

Development of a Human Salivary Gland Organoid Model

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ABSTRACT

Introduction: Currently, organoid technology provides a useful tool for modelling human organ development and pathologies *in vitro*. Salivary gland (SG) organoids developed from mice SG cells display self-organizing properties closely mimic the native organ. Thus, this study would like to investigate the potential of this organoid system to develop a human salivary gland *in vitro*. **Methods:** Organoids were developed from biopsy samples of normal human sublingual gland tissue. Cells were isolated and cultured in Matrigel at an Air Liquid Interface (ALI) for up to 14 days in an enriched media supplementing with Wnt-3A, R-spondin1, EGF, and FGF2. Specific differentiation factors like TGF β , BMP, and LIMK inhibitors were added to enriched media for further differentiation studies. Haematoxylin and eosin-stained sections of the cultures were used to visualise growth. RT-PCR, immunohistochemistry and immunofluorescence were used to determine the differential expression of cell-specific markers. **Results:** Human SG organoids developed when the cells were grown in Matrigel at ALI in a defined culture system. The addition of TGF β inhibitor and all the inhibitors (TGF β , BMP and LIMK) to the culture media affected SG organoids development by displaying distinct characteristics that closely resemble native glands and expressed specific cell-type markers; BPIFA2, AQP5, CK5 and E-cadherin. The inhibition of BMP signalling demonstrated SG organoids growth more into ductal-like structures and expressed ductal cell marker, CK7. While LIM kinase inhibition signalling showed significantly higher of amylase activity assay. **Conclusion:** This study certainly offers valuable insight into determining the optimal culture conditions for developing human SG organoids.

Keywords: Organoid, Salivary gland, In vitro model, Matrigel, Air liquid interface

Oral Bioavailability Enhancement of Acyclovir from Solid Lipid Nanoparticles Drug Delivery System

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ABSTRACT

Introduction: Acyclovir, a widely marketed antiviral drug is used for the treatment of Herpes Simplex infection. High doses of acyclovir are prescribed to patients to attain its maximum therapeutic effect due to its poor absorption and low oral bioavailability. The current therapeutics regiment of acyclovir are known to cause unwarranted adverse effects, thus prompted the need for a suitable drug carrier to improve the pharmacokinetic limitations. Development of solid lipid nanoparticles for oral delivery of acyclovir proposed in this study aimed to enhance acyclovir oral bioavailability. **Methods:** Comprehensive experiments and a series of optimization process were carried out to ensure reproducibility and assurance of product quality. The physicochemical characteristics of the solid lipid nanoparticles developed from plant-based solid lipid, Biogapress Vegetal 297 ATO with polysorbate 80 as an emulsifying agent were also evaluated. **Results:** The spherical-shaped nanoparticles had an average size of 123 nm with good drug entrapment efficiency, up to 80%. The in vitro drug release study showed that solid lipid nanoparticles had prolonged acyclovir release in simulated intestinal fluid for 24 hours. The nanoparticles formulation was considered stable during storage at refrigerated temperature for at least three months. In vivo oral bioavailability study showed that acyclovir-loaded solid lipid nanoparticles possessed superior oral bioavailability when compared with the commercial acyclovir suspension. **Conclusion:** In conclusion, this study exhibited the feasibility of solid lipid nanoparticles as an oral delivery vehicle for acyclovir and therefore represent a new promising therapeutic concept of nanoparticulate delivery system.

Keywords: Acyclovir, solid lipid nanoparticles, drug delivery, oral bioavailability

Hes1 Plays an Important Role in Mediating BMP9-induced Osteoblast Differentiation

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ABSTRACT

Introduction: Bone morphogenetic proteins (BMPs) are expected to be applied to bone regeneration therapy. BMP9 is one of the most potent among the 14 BMP members in inducing osteogenic differentiation, but its mechanism of action has not been fully elucidated. Our laboratory has recently revealed that BMP9 increases the protein expression of Hes1 in osteoblasts. Hes1 is a transcriptional regulator with basic helix-loop-helix (bHLH) domain and is a well-known effector of Notch signaling. In this study, I investigate the molecular mechanisms of Hes1 induction by BMP9 in osteoblasts. **Methods:** A mouse osteoblast cell line, MC3T3-E1, was stimulated with recombinant mouse BMP9. Hes1 mRNA and protein expression levels were analyzed by real time PCR and Western blotting. Next, MC3T3-E1 cells were stimulated with BMP9 in the presence of various signal inhibitors and their effects on BMP9-induced Hes1 expression were examined. Furthermore, Hes1 expression was knocked-down by transfecting siRNA against Hes1 into osteoblasts before BMP9 stimulation. **Results:** Stimulation of osteoblasts with BMP9 induced periodic increases of mRNA and protein expression of Hes1. Among the signal inhibitors, pretreatment with SMAD inhibitor significantly inhibited the Hes1 expression in BMP9-stimulated osteoblasts. Notably, the expression of osteogenic differentiation markers was highly increased by Hes1 siRNA in BMP9-stimulated osteoblasts. **Conclusion:** BMP9 induces the expression of Hes1 in osteoblasts via the SMAD pathway which is known as the canonical signal of BMPs. It was also found that the BMP9-induced expression of Hes1 plays an important functional role in the intracellular signaling events in osteoblasts stimulated by BMP9.

Keywords: Bone morphogenetic protein 9, Hes1, Notch, Osteogenic differentiation, Bone regeneration

Mitochondrial Redox Modulation of NLRP3 Inflammasome in Differentiated THP-1 cells

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ABSTRACT

Introduction: Innate host defence against pathogen required NLRP3 inflammasome activation. Two steps of inflammasome complex activation are identified: Signal 1 or priming (expression of NLRP3 protein, pro-IL-1 β , pro-IL-18 and pro-caspase-1), followed by Signal 2 or activation (expression of active IL-1 β and IL-18). The purpose of this study was to investigate the possible mitochondrial role of superoxide generators and slow-release hydrogen sulfide generation in activating the NLRP3 inflammasome in THP-1 and endothelial cells (HUVEC and EA.hy926 cells). **Methods:** THP-1 cells were differentiated with PMA (5 ng/ml) up to 3 days. Later, LPS treatment (5 μ g/ml) was administered for 24 h for Signal 1 priming followed by bzATP (300 μ M) for 1 hour for Signal 2. Subsequently, the effects of intracellular generation of superoxide (mitoparaquat and paraquat at 1 and 5 μ M) and hydrogen sulfide (GYY4137 and AP39) were investigated in differentiated THP-1 cells before and after LPS. **Results:** NLRP3 inflammasome activation were up-regulated in differentiated THP-1 cells. However, only EA.hy926 showed Signal 2 activation. The higher concentration of mitoparaquat (5 μ M) was able to increase Signal 2. Interestingly, both slow-release hydrogen sulfide donors were able to reduce Signal 2 NLRP3 inflammasome. However, no active caspase-1 expression was observed. **Conclusion:** The effects of pro- and anti-inflammatory properties were observed by modulating IL-1 β and IL-18 synthesis in differentiated THP-1 cells *via* redox active oxygen and sulfur species. Hence, promoting anti-atherosclerotic properties.

Keywords: NLRP3 inflammasome, Mitochondria, Superoxide, Hydrogen sulphide, THP-1 cells

Determinations of Secondary Metabolites and its Antioxidant Activities of Various Fractions of *Albizia myriophylla* Bark and Evaluations of Anti-Obesity Effect of Methanolic Extract of *Albizia myriophylla* in High-Fat Diet Mice

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ABSTRACT

Introduction: This study examined the antioxidant activity and phenolic, flavonoid and saponin contents from multiple solvent extracts of *Albizia myriophylla* (ABZ) bark. Antioxidant activity of the methanol extract and its derived fractions namely hexane, chloroform, ethyl acetate, butanol and a residual aqueous fraction of the bark of ABZ was assessed. **Methods:** All the extracts showed a significant presence of phenolic, flavonoids and saponins. In DPPH (1, 1-diphenyl-2-picrylhydrazyl) radical scavenging test, ABTS (2,2'-azino-bis (3-ethyl-6-sulfonic acid) radical scavenging test and reducing activity on ferrous iron (FRAP) test, the total antioxidant capacity was found to be varied in different fractions. **Results:** The IC50 calculated value of the three assays showed that the methanolic extract of ABZ bark had the lowest IC50 value for each assay, compared to the other extracts signifying highest anti-oxidant activity. Methanolic extract of ABZ was tested in high-fat diet induced mice, which showed reduce adipocyte cellularity and reduces the cholesterol, triglyceride, LDL level while increasing the HDL level. **Conclusion:** The antioxidant capacity with probable free radical scavenging activity of the methanolic extract of ABZ may be useful for the treatment of chronic inflammatory-related metabolic diseases such as obesity.

Keywords: Antioxidant activity, *Albizia myriophylla*, Obesity

Color Changes Study On Heat- Cured Acrylic Resin Base Plate After Immersion In Red Dragon Fruit Juice (*Hylocereus polyrhizus*)

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ABSTRACT

Introduction: Discoloration of denture acrylic resin base is one of the problems in appearance for patients who use them. The most common habits can cause discoloration in the denture usually associated with the patient's diet and drink. One example is consuming red dragon fruit juice. Red dragon fruit juice contains many anthocyanin substances which can give color from colorless to purple. Besides that the color changes in the denture can also be caused by the nature of the acrylic resin plate which can absorb water due to porosity that occurs in the denture. This study aims to look at the negative effects of consuming red dragon fruit juice solution on plate acrylic resin based heat-cured.

Methods: This type of research is laboratory experimental and the design of this research is pre test post test with control group design. The number of samples were 32 pieces selected using Simple Random Sampling method. The samples were divided into two groups, control (n = 16, distilled water solution) and tentative (n = 16, red dragon fruit juice solution). Color measurement using VITAEasyshade. Before being dipped the plate was measured first, then the plate was left for 7 days to 14 days, after that the plate was measured again on the 7th and 14th day. The data analysis test used was Friedman statistical test and Mann Whitney statistical test. **Results:** There was a significant difference in the color of the heat-cured acrylic resin plate after 7 days and 14 days between the distilled water solution and the red dragon fruit juice solution. **Conclusion:** Red dragon fruit juice can cause color discoloration on plate acrylic resin based heat-cured.

Keywords: Red dragon fruit juice solution, Discoloration plate acrylic resin, Heat-cured acrylic resin base

Age Profile of The First Operation of Cleft Lip Patients in Department of Oral and Maxillofacial Surgery Airlangga University Charity Programs, 2008-2018

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ABSTRACT

Introduction: Labioschizis or cleft lip is the most common congenital disorder in the maxillofacial region. 1 out of 1000 child born with congenital cleft lip. The main therapy for this congenital defect is operation performed which optimally should be performed at the age 3-6 months old. The social charity programs of cleft lip correction surgeries that was held by the Department of Oral and Maxillofacial Surgery of Airlangga University on cleft lip patients of various ages was conducted in several areas in Indonesia. The purpose of this study was to determine the average of the age of cleft lip patients at first operation at the social charity programs. **Method:** This research is descriptive study based on the patient's medical record that was operated in social charity by the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Airlangga University, during the period of 2008-2018. Data related to area, number of operations, and age of patients were studied and analyzed. **Results:** The number of patients who have been operated is 277 patients. There are 9 social charity areas with different numbers of visits ranging from 1 to 5 times. The area with the highest number of visits was Bima with 5 times, and the average age of the first operation was 5 years 2 months old. The average age at the time of first operation in 2008 was 8 years 2 months old, and in 2018 was 4 years 2 months old. **Conclusion:** Average age at first surgery in patients who had been operated on social charity still high compared to the optimal age according to world consensus. However, there is a tendency to decrease in the average age of the first surgery for the cleft lip patient.

Keywords: Cleft lip surgery, First operation age, Health education, Social charity

Hif-1 α Expression is essential for BMP9-Mediated Osteoblast Differentiation

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ABSTRACT

Introduction: Bone morphogenetic proteins (BMPs) are known to be involved in the processes of bone healing and regeneration. Latest reports showed that BMP9 possess the strongest osteoinductive potential among BMPs. Hif-1 α is a well-established hypoxia-responsive protein inducing angiogenic, and plays important roles in skeletal development. Our study aimed to investigate the functional roles of Hif-1 α in the signaling pathway of BMP9-induced osteoblast differentiation. **Methods:** MC3T3-E1 cells (a mouse osteoblast cell line) were stimulated with recombinant BMP9. We then stimulated MC3T3-E1 cells with BMP9 under normoxic or hypoxic (2% O₂) condition with or without Chrysin (PHD activator) or NSC697923 (Ubc13 inhibitor). Hif-1 α gene knockdown was performed by transfecting MC3T3-E1 cells with Hif-1 α -specific siRNA. Protein and mRNA expression levels were analyzed by Western blotting and real-time PCR, respectively. We also analyze the mineralization process of BMP9-induced osteoblasts in the absence or presence of Hif-1 α inhibitor with Alizarin red staining. **Results:** Hif-1 α protein expression was significantly induced by both BMP9 in MC3T3-E1 cells within 2h. Combination of BMP9 and hypoxia resulted in a synergistic increase of Hif-1 α protein level. Although Chrysin inhibited both BMP9- and hypoxia-induced Hif-1 α protein expressions, NSC697923 failed to inhibit BMP9-induced Hif-1 α protein expression. When Hif-1 α expression was knocked down by siRNA, the mRNA expression level of ALP was affected in BMP9-stimulated MC3T3-E1 cells but not Runx2 and Osterix. Mineralization process of osteoblasts was inhibited in the present of Hif-1 α inhibitor. **Conclusions:** We have revealed that the protein expression of Hif-1 α in osteoblasts is rapidly induced by osteogenic BMPs under normoxic condition. Hif-1 α expression is essential for the induction of ALP, but not that of osteogenic transcription factor, Runx2 and Osterix in BMP9-stimulated osteoblasts. Our findings indicate for the first time that Hif-1 α expression is important in BMP9-mediated osteoblast differentiation not by means of osteogenic transcription factor, Runx2 or Osterix.

Keywords: Bone Morphogenetic Protein 9 (BMP9), Osteoblast, Differentiation, Hypoxia inducible factor 1 alpha (Hif-1 α)

Ameloblastoma Profile and Management in Department of Oral and Maxillofacial Surgery, Airlangga University Affiliation Hospital: 3 Years Retrospective Study

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ABSTRACT

Introduction: Ameloblastoma is a locally invasive tumour from odontogenic origin and usually treated by radical approach. The purpose of this study is to describe ameloblastoma profile and management in Dr. Soewandhie Hospital and Airlangga University Hospital in 3 years of a retrospective study. **Methods:** Data from all Ameloblastoma cases between January 2017 until June 2019 were collected from Dr. Soewandhie and Airlangga University Hospital. Information regarding gender, age, tumour location, histopathological examination, and treatment were recorded, reviewed, and analyzed. **Results:** There are 20 cases of ameloblastoma from January 2017 to June 2019. Males and females ratio are 1:1. There are 5 patients were treated in 2017, 10 patients were treated in 2018, and 5 patients were treated in 2019. Four patients with tumour on the anterior part of the mandible (20%), 7 patients with tumour on the right posterior of the mandible (35%), 6 patients with tumour on the left posterior of the mandible (30%), and 3 patients with tumour in mixed area of the mandible (15%). Nineteen patients were treated radically (95%), and 1 patient (5%) were treated with marsupialization for further follow-up. **Conclusion:** All tumour presented in this study is located in the mandible. Most ameloblastoma was treated with a radical approach.

Keywords: Ameloblastoma, Epidemiology, Mandible, Radical treatment

The Difference of Salivary Volume Before and After Consuming Probiotic Beverage

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ABSTRACT

Introduction: Probiotic beverage with *Lactobacillus casei shirota* strain is one of the probiotic beverages that is commonly consumed by people due to the fact that it provides benefits for digestive health including oral health. One of the factors affecting oral health is salivary volume. The purpose of this study was to determine the difference of salivary volume before and after consuming a probiotic beverage with *Lactobacillus casei shirota* strain. **Methods:** The design of this study was quasi-experimental. This study has been conducted to 30 students of the Dentistry Faculty of Padjadjaran University, young adults, ages 18-23 y.o with healthy condition. Each sample was asked to spit saliva on a beaker glass before and after consuming the probiotic beverage with *Lactobacillus casei shirota* strain. The results were analyzed with paired t-test. **Results:** The results of this study showed that the mean of salivary volume before consuming a probiotic beverage with *Lactobacillus casei shirota* strain was 4,58 ml and the mean salivary volume after consuming a probiotic beverage with *Lactobacillus casei shirota* strain was 8,02 ml. The result of paired t-test showed that there was a significant difference between salivary volume before and after consumption of a probiotic beverage with *Lactobacillus casei shirota* strain ($p < 0,05$). **Conclusion:** The conclusion of this study was the salivary volume after consuming probiotic beverage with *Lactobacillus casei shirota* strain was higher than before consuming probiotic beverage with *Lactobacillus casei shirota* strain.

Keywords: Salivary volume, Probiotik beverage, *Lactobacillus casei shirota*

Relationship of Three Types of Occlusion with Tooth Wear Among Preclinical Dental Students, University of Indonesia (Class 2005-2008)

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ABSTRACT

Introduction: Tooth wear is the non-carious loss of tooth structure. One of the types of tooth wear is attrition. The attrition results from tooth to tooth contact (occlusion) such as during mastication. There are three types of occlusion during lateral movement of the mandible are balanced occlusion, group function, and cuspid protected. The purpose of this study was to identify the relationship between balanced occlusion, group function, and cuspid protected with the tooth wear and to identify the type of occlusion which is the most causing the tooth wear. **Methods:** This research is observational analysis using cross-sectional study. The subjects are 78 preclinical dental students from the University of Indonesia Class 2005-2008, aged 17-23 years old which were taken by purposive sampling. Univariate statistical analysis is the distribution of each variable and bivariate statistical analysis is using Fisher test. **Results:** Fisher test showed that there was no relationship between balanced occlusion, group function, and cuspid protected with the tooth wear ($p > 0,05$). Descriptive statistic was not been able to prove the type of occlusion which is the most causing the tooth wear. **Conclusion:** There was no relationship between balanced occlusion, group function, and cuspid protected with tooth wear on preclinical dental student from University of Indonesia Class 2005-2008. And, there is no evidence that balanced occlusion is the most causing the tooth wear.

Keywords: Balanced occlusion, Group function, Cuspid protected, Tooth wear

Gingival Fibromatosis; Idiopathic or Drug Induced? A Rare Case Report

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ABSTRACT

Introduction: Gingival fibromatosis is rare condition. Clinical features is an enlargement of gingiva, pale pink gingiva with firm consistency without bleeding, can occur both in maxilla or mandible. Gingival enlargement caused by many factors, including inflammatory conditions, side effects of systemic drugs, hereditary or idiopathic. Here, we reported a rare case of gingival fibromatosis. **Case Report:** A 7-year-old girl was referred from department of Pediatric Dentistry to department of Oral Medicine in dental hospital of Universitas Indonesia with chief complaint of gingival enlargement throughout maxillary and mandible. The condition was noted 3 years back when she was 3.5 years old. This condition did not found in any member of family, and there was no history of taking any medication. Patient said she don't feel comfortable because of the condition. Intra oral examination, it was seen that a complete enlargement of maxillary gingiva and mandible was the same around, bleeding did not exist. Patient we referred to department of Periodontology for preparation of biopsy, histopathology result is consistent with gingival fibromatosis. **Conclusion:** Gingival enlargement can cause by many factors, in this case report gingival fibromatosis is due to idiopathic condition. Dentists must be able to distinguish the causes of gingival enlargement so that they are expected to be able to manage properly and correctly.

Keywords: Gingival Enlargement, Gingival Fibromatosis, Idiopathic, Pediatric

Oral Lichen Planus Mimicking Oral Lichenoid Lesion: A Case Report

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ABSTRACT

Introduction: Oral lichen planus (OLP) is a chronic autoimmune disease of unknown etiology mediated by T cells. The clinical lesion of OLP is almost similar to oral lichenoid lesions (OLL). OLL and OLP can be distinguished from the presence of precipitating factors. OLP and OLL may occur in association with xerostomia. The triad of oral lichen planus, diabetes mellitus, and hypertension can be referred as Grinspan's syndrome. The objective of this study was to determine the difference between oral lichen planus or oral lichenoid reaction from the clinical features. **Management:** The right diagnosis can determine the best treatment for patients, in which laboratory tests and salivary flow rate checks are performed. **Conclusion:** A geriatric patient is diagnosed with OLP, in which it is proven by her clinical features and factors associated with OLP lesions referred to be diabetes mellitus and hypertension (Grinspan's syndrome). Dentist has important roles in the diagnosis and treatment of oral conditions associated with both of these diseases.

Keywords: Oral lichen planus, Oral lichenoid reaction, Xerostomia, Grinspan's syndrome

The Effect of Propolis on Proliferation and Viability of Stem Cell of Human Exfoliated Deciduous Teeth (SHED)

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ABSTRACT

Introduction: Propolis is a complex substance of bee's products was reported to prevent infections and oxidative stress. However, no study has revealed its defensive effects against oxidative toxicity in stem cell of human exfoliated deciduous teeth (SHED). In this study, we investigated the effects of propolis on proliferation and viability SHED induced hydrogen peroxide (H₂O₂). **Methods:** SHED was cultured in alpha MEM medium with 10% fetal bovine serum. Cell proliferation and viability assays were carried out using propolis concentrations of 125, 250, 500 and 1000 µg/mL. Cell proliferation analysis using microplate reader after stained by CCK-8. Cell viability analysis using trypan blue staining. **Results:** Showed that decreased number of cells proliferation and cell viability by H₂O₂ treatment were recovered after the treatment of propolis. The optimal dose protected H₂O₂ exposure was at a concentration of propolis 500 µg/mL. **Conclusion:** Propolis shows potential to protect against oxidative stress in stem cell of human exfoliated deciduous teeth (SHED) depending on their concentration.

Keywords: Stem cell of human exfoliated deciduous teeth, Propolis, Proliferation, Viability, Hydrogen peroxide (H₂O₂)

Trial of timer toothbrush prototype on dental plaque, Ph, Fluoride Levels and Streptococcus mutans

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ABSTRACT

Introduction: Many adolescents are not able to achieve effective duration of tooth brushing so might cause a high risk of caries. The purpose of this research was to determine the differences of the average plaque score, salivary pH, fluoride levels and the number of Streptococcus mutans between the uses of manual toothbrush compared to the timer toothbrush prototype. **Methods:** Experimental study with a randomized controlled trial, single blind method and a cross over design. The subject of this research involved 20 students of second grade Junior High School. Plaque scores were assessed using the Turesky modified Quigley-Hein plaque index (TMQHPI) while pH, fluoride levels and the number of S. mutans is measured by taking unstimulated saliva. **Results:** The mean of plaque index was 0.78 ± 0.37 (manual group) and 0.44 ± 0.27 (prototype group). Independent T-test showed significant differences in the plaque index ($p= 0,005$) and fluoride levels ($p=0,0001$) while there were no significant differences in salivary pH ($p=0,58$) and the number of mutans streptococci ($p=0,761$) between the timer toothbrush prototype and the conventional toothbrush group. **Conclusion:** Timer toothbrush prototype can improve tooth brushing behavior in terms of duration, plaque reduction, and increase fluoride levels to prevent dental caries.

Keywords: Dental caries, Fluoride, Duration, Tooth Brushing, Saliva

Toxicity Test of Apple Cider Vinegar Against the Fibroblast Cells as an Alternative Root Canal Material

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ABSTRACT

Introduction: Irrigation material commonly used for root canal treatment is sodium hypochlorite. The material is reported to have dissolving and antimicrobial properties. However, the material is also reported to have some risk of emphysema, and unpleasant odors. Therefore, a lot of research has been carried out to find efficient irrigant alternatives. This study aims to determine the toxicity of apple cider vinegar to fibroblast cells as an alternative root canal irrigation material. **Methods:** This study uses a descriptive analytic study design. The sample used in this study is human fibroblast cells. The fibroblast cells will be multiplied and then treated with apple vinegar with an exposure time of 10 minutes, 20 minutes, and 30 minutes and with a concentration of 2.5%; 5%; and 10%. **Results:** In fibroblast cells treated with apple cider vinegar at 10 minutes exposure, the highest number of surviving cells was obtained from the 2.5% group with the T-test which was 0.46. At a time of 20 minutes, the highest number of surviving cells was obtained from the 2.5% group with the T-test which was 0.01. On exposure to 30 minutes, the highest number of surviving cells was obtained from a group of 5% with a T-test which was 0.03. **Conclusion:** Safe use of apple cider vinegar is at a concentration of 2.5% and 5% at a 10-minute exposure time.

Keywords: Canal material; Sodium hypochlorite; Apple cider vinegar; Fibroblasts

Temporomandibular Joint Disorder Examination Based on DC/TMD in Preclinic Students of The Faculty of Dentistry Universitas YARSI

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ABSTRACT

Introduction: Temporomandibular joint disorders (TMD) often characterized by craniofacial pain, include joints, masticatory muscles. The main cause is because of tooth loss and bad habits. The age of patients with TMD is from the age of 20 to 40 years. The DC / TMD protocol is a TMD examination protocol that is highly recommended for use as a clinical and research protocol. The objective of this study was to determine the relationship of tooth loss with TMD using the DC / TMD protocol. **Method:** This research is a descriptive analytic study with cross-sectional design. The sample consisted of 209 FKG YARSI academic students taken by total sampling. TMD assessment uses the DC / TMD protocol. **Results:** The results of the ken-tau test showed that there was a significant relationship between tooth loss and TMD, namely p-value = 0.024 (<0.05). **Conclusion:** There is a significant relationship between tooth loss and temporomandibular disorder according to DC / TMD. The most common description of temporomandibular disorder diagnosis in YARSI University Faculty of Dentistry academic students is disc displacement with reduction.

Keywords: DC/TMD; Tooth loss; Temporomandibular Disorder; TMD.

Propolis Extract Gel Decrease Expression of Nfkb and Cox-2 in Oral Ulcer Model in Streptozotocin-Induced Type I Diabetic Mice

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ABSTRACT

Introduction: A diabetic oral ulcer is a lesion caused by increased Advanced Glycosylation End Products (AGEs). AGEs increase intracellular expression of ROS, NFκB and COX-2 which prolong ulcer healing time. The propolis extract gel has an antiinflammatory effect thus decreased the expression of NFκB and COX-2. **Methods:** This was an original experimental research design featuring post test-only control groups. Mice were induced by Streptozotocin at dose 50mg/kg body weight. Twenty seven male mice were distributed equally into 3 experimental groups which are : non-diabetic control mice; diabetic mice and diabetic mice treated daily with a topical application of propolis. Propolis extract gel application is done every day, 3 times a day with a time span of 6-8 hours up to the day specified for tissue removal, days 1, 3, and 5. The treated diabetic mice were then sacrificed, then the expression of NFκB and COX-2 in the labial mucosal epithelium was assessed by doing immunohistochemistry. The expression of NFκB and COX-2 was observed on day 1, 3, and 5 with monoclonal antibodies NFκB (Santa Cruz Biotechnology, Inc, sc-8008) and monoclonal antibodies COX-2 (Santa Cruz Biotechnology, Inc, sc-1747). **Results:** Propolis extract gel decrease the expression of NFκB and COX-2 in the treatment group on day 1, 3 and 5. **Conclusion:** Propolis extract gel proven to have an effect as an antiinflammatory in diabetic oral ulcer healing in Streptozotocin-Induced Type I Diabetic Mouse Model.

Keywords: Propolis, Streptozotocin, Diabetes Mellitus, NFκB, COX-2.

Mineral Deposition during Tooth Development is Influenced by Nano Calcium Supplementation during Pregnancy on Sprague Dawley

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ABSTRACT

Introduction: Calcium deficiency during pregnancy will affect tooth development and results in defect of tooth structure. The development of enamel and dentin as dental hard tissues require adequate calcium intake. Nano calcium product is meant to increase calcium bioavailability and is more reactive chemically. The aim of this study is to evaluate the effect of nano calcium consumption during pregnancy to the mineral deposition during tooth development on Sprague Dawley rats. **Methods:** Pregnant Sprague Dawley was randomly divided into four groups, each treated with: nano calcium and vitamin D, micro calcium and vitamin D, vitamin D only, and distilled water. Treatment was conducted from the first day of pregnancy to day one after birth of the pups. Evaluation of mineral deposition during tooth development was performed on Sprague Dawley pups' mandibular first molar through Alizarin Red staining, examination of dentin sialophosphoprotein (Dspp) mRNA, and examination of calcium level on Sprague Dawley incisor. **Results:** The result of Alizarin Red staining on molar tooth germ during bell stage shows that calcium is deposited in larger area in group treated with nano calcium and vitamin D ($p < 0.05$). The expression of Dspp mRNA in between group showed a significant difference ($p < 0.05$) but the final calcium level in erupted tooth doesn't differ between group ($p > 0.05$). **Conclusion:** Nano calcium supplementation during pregnancy on Sprague Dawley affects mineral deposition during tooth development.

Keywords: Calcium, Vitamin D, Dentinogenesis, Dentin sialophosphoprotein, Alizarin red

The Difference between Surface Microhardness of Resin-based Sealant and Resin-modified Glass Ionomer Sealant After Immersion in Soft Drink

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ABSTRACT

Introduction: Pit-and-fissure caries accounts for 80-90% of total caries occurrence. Fissure sealant has an important role to prevent caries in deep pit and fissure. Resin is one of the materials that being used for fissure sealant, among them are resin-based sealant and resin modified glass ionomer sealant (RMGIC). Acid activity in soft drinks may deteriorate surface hardness of the restorative material. The aim of this research is to find the changes of surface microhardness of resin-based sealant and RMGIC after immersion in soft drinks. **Methods:** The objects that being used in this research are 12 samples of resin-based sealant and 12 samples of RMGIC. The samples are divided into 6 groups, which are two control groups that immersed in the distilled water, and four treatment groups that immersed in different brand of soft drink for 2 minutes every day for 21 days. **Results:** Both material show decreasing value of microhardness after 21 days immersion. The data were analyzed using One-way ANOVA and show 0,0 value, which means there is significant difference between surface microhardness value of resin-based sealant and RMGIC ($p < 0.005$). The resin-based sealant was the most affected by acidic environment after immersion. **Conclusion:** The effect of soft drinks on the surface microhardness of restorative materials depends on the composition of the material. In this study, resin-based sealant has lower surface microhardness value compared to RMGIC after immersion in soft drinks.

Keywords: Resin-based sealant, Resin modified glass ionomer sealant, Acid, Immersion, Microhardness

Effect of Hydroxyapatite from *Oreochromis niloticus* as a Desensitizing Agent on Dentinal Tubules Occlusion

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ABSTRACT

Introduction: Dentine hypersensitivity is a dental problem characterized by short, sharp pain arising from exposed dentine in response to stimuli, typically thermal, tactile, or chemical. One of the treatments for hypersensitive dentine is by applying desensitizing agent such as hydroxyapatite which can occlude dentinal tubules. The fish bone is a natural material that can be used to synthesize hydroxyapatite. This study aimed to determine the effect of hydroxyapatite from bone waste of *Oreochromis niloticus*, with a local name, tilapia, as a desensitizing agent on dentinal tubule occlusion. **Methods:** Hydroxyapatite powder was prepared using the precipitation method and sintered at 9000C for 5 hours. A 25% hydroxyapatite solution was obtained by mixing 25 grams of hydroxyapatite powder with 100 ml of distilled water. Dentine samples were prepared from twelve premolars cut longitudinally to separate the buccal and palatal sections, then the enamel layers on occlusal and buccal area were removed until the dentino enamel junction. Dentine samples were etched with 6% citric acid to open dentine tubule. Occluded dentinal tubules were observed by measuring microstructure microscope for pretest and posttest after application of 25% hydroxyapatite solution (Group A) and distilled water (Group B). Data were analyzed statistically using paired t t-test and independent t-test. **Results:** The dentinal tubules occlusion in the pretest hydroxyapatite group was 41.17% and post test 95.94%, while in the pretest distilled water group was 35.90% and posttest 42.19%. The mean differences of dentinal tubule occlusion between pretest and posttest in groups A and B were significant, and also between the two groups. **Conclusion:** The present study showed that application of 25% hydroxyapatite solution from *Oreochromis niloticus* is effective to occlude dentinal tubules, so it could be considered for a dentine hypersensitivity treatment.

Keywords: Dentinal tubules occlusion, dentine hypersensitivity, desensitizing agent, hydroxyapatite, *Oreochromis niloticus*

Topical Application of *Bixa orellana* Seed Extract Hydrogel Patch on the Collagen Fibers Density of the Diabetic Wound Healing of the Rat Model

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ABSTRACT

Introduction: The diabetic condition may delay collagen formation of the wound due to prolonged inflammation. The seeds of *Bixa orellana* contains some active substances that may accelerate collagen formation during wound healing. The objective of this study was to determine the effect of topical application of *B. orellana* seed ethanolic-extract-hydrogel-patch on the density of collagen fiber of rat diabetic wound healing model. **Method:** Thirty male Wistar rats (8-12 weeks-old, 150-200grams) were induced into diabetic state (fasting blood sugar level >150mg/dL) via injection with streptozotocin (40mg/kg BW, ip). Following confirmation of the blood sugar level, the animals were then divided into treatment and control group (n=5 rats/group). The back skin was wounded using punch-biopsy-instrument. The hydrogel patch with or without the extract was applied on the oral and skin wounds once a day during the treatment. The subjects were sacrificed on day 5, 7, and 14, histologically processed, and Mallory-stained. The density of collagen fiber was scored from five view fields under microscope. The data were analyzed using Kruskal-Wallis statistical test. **Results:** The study showed that the extract significantly accelerated the formation of the collagen fiber on the skin of the treated group compared to the control group ($p < 0.05$). **Conclusion:** The application of *B. orellana* seed extract-hydrogel-patch affected collagen fiber density of the skin, and, therefore, may accelerate wound healing on a diabetic model.

Keywords: *Bixa orellana* seed ethanolic extract hydrogel patch, Wound healing, Diabetes mellitus, Collagen

Antioxidant activity and Growth Inhibition Test of on *Streptococcus mutans* and *Actinomyces naeslundii* with Extract Black Garlic (*Allium sativum* L extract)

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ABSTRACT

Introduction: *Allium sativum* L which is well known as garlic has been reported to be a potential source of antioxidants. Potential sources of natural antioxidants one of them are garlic. The use of garlic as a drug has often been used offers numerous advantages in treating various diseases including those caused by bacterial infections such as dental caries and oral diseases. Black garlic is a processed product of garlic which is heated at a temperature of 60-80°C with high humidity for 1-3 months. The objective of this study was to clarify antioxidant test of black garlic extract with 96% ethanol and sterile distilled water solvent, growth inhibition test of *Streptococcus mutans* and *Actinomyces naeslundii*. **Methods:** The study used three different black garlic samples to extract with 96% ethanol and sterile distilled water solvent to measure antioxidant test and growth inhibition test of *Streptococcus mutans* and *Actinomyces naeslundii* with a concentration of 25%, 50%, 75% and 100%. **Results:** Three black garlic samples had different antioxidant (IC₅₀) values and the best antioxidants were extract black garlic super® with ethanol 96% solvent. Black garlic extract for inhibiting growth of *Streptococcus mutans* has a no significant differences (p > 0.05) at concentrations of 100%, 75%, 50%, and 25%, but there were significant differences (p < 0.05) in positive control with chlorhexidine 0.2% and negative control with sterile aquadest solvent and for inhibiting growth of *Actinomyces naeslundii* has no impact. **Conclusion:** The results of antioxidant test showed that black garlic has a high antioxidant substance but has a weak impact in growth inhibiting of the *Streptococcus mutans* and *Actinomyces naeslundii* bacteria.

Keywords: Black garlic, *Streptococcus mutans*, *Actinomyces naeslundii*, Antioxidant, Growth inhibition test

Nano Propolis trigona sp Increases Molar Enamel Hardness

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ABSTRACT

Introduction: *Propolis trigona* contains minerals and flavonoids. Minerals and flavonoids affect the tooth enamel hardness. The presence of flavonoids in propolis which has been proven to be able to suppress the formation of bacterial biofilms that cause caries is expected to have an effect on hardness of tooth enamel so that caries can be prevented. This work was aimed to determine the effect of nano *Propolis trigona* sp ($\pm 77,3$ nm) on enamel hardness of permanent molar human tooth *in vitro*. **Methods:** The sample used in this study were molars after extraction which were caries-free, without anomalies and had no fillings. The molars were sterilized using chlorhexidine gluconate (CHG) 0.1% and phosphate buffer saline (PBS). The twenty-four molar specimen were selected and divided into three treatment and a control group. The specimens were smeared with nano propolis 30%, 40%, 50% and the control group was smeared with fluor protector, for 45 min in the solution. The hardness of tooth enamel was measured using the vickers micro-hardness Testing machine with force 300 grams for 10 seconds, prior and after treatment with the testing material. **Results:** The harden of enamel was clearly observed in a dose. The harden of enamel was most evidence in the treatment group suggesting a dose-dependent manner. Significant hardness of enamel was observed in the molar teeth treated with 30% and 50% nanopropolis compared to the control group. **Conclusion:** Thus, it can be concluded that nano propolis affect the improvement of molar enamel hardness, and there should be further studies on the optimal time usage of nano propolis on the tooth.

Keywords: Nano propolis, Tooth enamel hardness, Micro-hardness Vickers, *Propolis trigona*

The Difference of Lighting Distance on Surface Hardness of Hybrid Composite Resin Activated by Light Emitting Diode (LED)

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ABSTRACT

Introduction: Nowadays, the use of composite resin material as restorative material increases in line with patient's demand. Composite resin is a tooth colored patching material inclusive of resin matrix, fillings, and coupling agent to combine resin matrix, fillings, and activator-initiator for resin polymerization. The aim of this research is to evaluate the effect of lighting distance on surface hardness of hybrid composite resin when activated by light emitting diode (LED). **Methods:** The samples used were 30 disc-like hybrid P60 composite resins (61% silica/zirconia filler and matrix Bis-GMA, Bis-EMA, UDMA, and TEGDMA) with a diameter of 6 mm and the thickness was 2 mm, lighted by an LED for 20 seconds. They were divided into 3 groups with 10 samples in every group. Each group was exposed to three (3) different lighting distance which were 0 mm, 2 mm, and 5 mm. Every sample in each group was evaluated with Vicker Hardness Test and the results were then analyzed with one-way ANOVA to evaluate the difference of lighting distance on surface hardness of hybrid composite resin. **Results:** There were differences in surface hardness value between hybrid composite resin sample with different lighting distance. Statistic test result shown hardness mean change of composite resin between 0 mm and 2 mm lighting distance with 0.00 significance ($p < 0.05$), between 0 mm and 5 mm lighting distance with 0.00 significance ($p < 0.05$), and 2 mm and 5 mm lighting distance with 0.05 significance ($p < 0.05$). **Conclusion:** According to the result of this research, we concluded that the further lighting distance, the more surface hardness decline of hybrid composite resin.

Keywords: Hybrid composite resin, Lighting distance, Surface hardness of composite resin, Light curing LED

Anatomical Variations of Dentine Dimension in Human Deciduous Male Teeth on Panoramic Radiograph

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ABSTRACT

Introduction: Teeth are hard tissues in the human body whose development is affected by sexual dimorphism caused by chromosomal differences. The X chromosome plays a role in the formation of enamel thickness, while the Y chromosome contributes to the difference in thickness of the dentine. This study aimed to analyze sexual dimorphism in the height and width of the deciduous dentin based on panoramic radiographs. **Method:** The research material used 60 medical records of a panoramic radiograph of boys and girls aged 5-11 years. Measurements were made on canine teeth, molar 1, and molar 2 on all tooth parts using the CliniView 3.02 application. Furthermore, the data obtained were carried out statistical tests Independent T-test for compare each group. **Results:** The Independent T-test showed there were significant differences in the height and width of dentine in male and female deciduous teeth because the significance value was $p < 0.05$. **Conclusion:** There are differences in the height and width of dentine in deciduous teeth where male have a larger size than female. This difference can be caused by several factors such as the influence of chromosomes and hormones.

Keywords: Deciduous Teeth, X Chromosome, Y Chromosome, Dentine Height, Dentine Width

The Characteristics Ca^{2+} Ions From The Source of The Chalk Mountains in The Hidroksiapatit Demineralisation Process of Dental Enamel

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ABSTRACT

Introduction: The problem of dental caries still needs to be considered by looking at around 60-70% of elementary school children in Pagak, Malang Regency. The caries incidence is associated with the problem of consuming drinking water with a very high calcium content of 165 mg/L. The purpose of this study is to analyze calcium deciduous teeth due to PDAM Pagak water consumption and correlate it with the incidence of childhood dental caries in Pagak.

Methods: This research uses screening results in the form of a SiC index and 20 deciduous teeth samples were then divided into 4 groups, namely the sample group with a concentration 8,125%, 16,25%, 32,5% and 65% HNO_3 .

Results: The results of the statistical test with the Kruskal Wallis test obtained a significance value of 0,002 which means there are significant differences in calcium content between the four groups. Based on the Spearman correlation test obtained a significance value of 0,00 and a correlation coefficient of 0,853 which means that there is a very strong and unidirectional relationship between the calcium content of deciduous teeth and children's dental caries. To see the effect, the r^2 value of 0,853 means that the deciduous tooth calcium effect on the incidence of child dental caries in Pagak District is 85,3%. To see the enamel microporosity with a high Ca in the Desidui tooth obtained from SEM-EDX analysis of 41.96% of other elements contained in the tooth (oxygen, natrium, silicate, Magnesium, Posfor, kalium) and there are special characters of calcium, its spread on each side of a single-sided dental preparation, and can decay due to the acid resulting from bacteria in the mouth resulting in saliva becoming more acidic. So that the teeth become fragile (demineralization of Apatit hydroxylation) and affect the occurrence of remineralization of apatit hydroxy. **Conclusion:** The conclusion of this research is there is a relationship between calcium content of deciduous teeth due to the water consumption of PDAM Pagak and Wonokerto with the incidence of children's dental caries in Pagak and Wonokerto.

Keywords: Calcium Analysis, Deciduous teeth, Atomic Absorption Spectrophotometry Method, SEM-EDX, Dental Caries

The Influence of Application Duration of Cocoa Paste on Surface Hardness Tooth Enamel

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ABSTRACT

Introduction: A decrease in pH of the oral cavity will cause demineralization which may lead to loss of minerals from hydroxyapatite in teeth. The mineral loss can be replenished by applying a remineralization agent such as cocoa paste. Cocoa beans (*Theobroma cacao* L.) contain theobromine that allows calcium and phosphorus to bind together to form crystals of hydroxyapatite. However, the application duration of theobromine as remineralization agent is not clearly established. The purpose of this study is to determine the effect of application duration of cocoa paste on surface hardness of tooth enamel. **Methods:** Enamel samples from premolar teeth (n= 32) were demineralized and divided into 4 groups. Enamel hardness was measured by Vickers Hardness Tester. Remineralization was performed using 5% cocoa paste in various duration application: group A (5 minutes), B (15 minutes), C (30 minutes), and D (60 minutes). The surface hardness of enamel was again measured following treatment. **Results:** Application of cocoa paste for 30 min has indicated the highest surface hardness of the enamel while application for 5 min was the lowest level surface hardness of the enamel. The result of one-way ANOVA test showed that there were significant differences of enamel hardness before and after treatment with cocoa paste. Tukey post hoc test also showed that there were significant differences of enamel hardness between group A and other groups, also between group B and C. **Conclusion:** The present study showed 5% cocoa paste have a significant effect in increasing enamel surface hardness and the optimal application time is 30 minutes.

Keywords: Cocoa paste, Application time, Enamel surface hardness, Remineralization, Theobromine

The Correlation Between the Act of Dental Caries Filling and Improving the Quality of Life SD Katolik St. Maria 2 Student Malang

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ABSTRACT

Introduction: Caries or cavities is an oral health problem that may cause pain which affect the quality of life. To prevent pain subsequently improving the quality of life as a result of dental cavities, is by filling. This study aims to investigate the act towards dental caries filling and improving the quality of life of Catholic elementary school students St. Maria 2 Malang. **Methods:** This study has an observational analytic study design with a cross sectional research approach. Sampling uses non-probability techniques with purposive sampling technique. The motivation of overthrow was measured using the PTI index, while quality of life was measured using the OHIP-14 questionnaire. **Result:** Many factors may have affect the result of the study, they are the possibility of failures in questionnaires answers, small number of samples, the low index of DMF-T and PUFA, and quality of life is not only determined by the oral health, but also other aspects such socio-economic, educational, and environmental and cultural aspects of students. Data analysis with Pearson correlation test and the Spearman correlation show there were no correlation between filling motivation and quality of life. **Conclusion:** The conclusion of this study is that there is no correlation between motivation of cavities with the quality of life of Catholic St. elementary school students. Maria 2 Malang significantly.

Keywords: Motivation of filling, Quality of life, Cavities

Effect of Ethanol Extract of *Sonchus arvensis* L. Leaves in the Generation of Osteoblast on Post-Tooth Extraction Socket's Healing in Sprague - Dawley Rats

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ABSTRACT

Introduction: Process of post-tooth extraction socket's healing needs to be improved to restore alveolar bone volume and function to be adequate for restorative and rehabilitative treatments. Osteoblasts are one of the cells that play an important role in this process. *Sonchus arvensis* L. leaves' contain flavonoids and triterpenoids. These compounds increases production and activity of ALP enzymes that play important role in osteoblast formation and bone mineralization, therefore the healing process of post-extraction socket's would accelerate. The purpose of this study was to determine the effect of *Sonchus arvensis* L. leaves' extract (SLE) on the number of osteoblasts in post-extraction sockets healing in Sprague - Dawley rats. **Methods:** SLE were made by maceration method using 96% ethanol. The central left lower incisor of Sprague-Dawley rats was extracted, then the rats were divided into 4 groups. The first 2 groups received SLE for 7 and 14 days (P7, P14), and the other 2 groups did not receive SLE for 7 and 14 days (K7, K14). After 7 and 14 days, the rats were killed using lethal dose of ketamine injection. Histological preparation was made by dissecting the socket from the mandible in sagittal direction and colored using Hematoxylin-Eosin. The number of osteoblasts were counted under microscope and were scanned using image processing software. **Results:** Statistical analysis using unpaired T-test showed significant differences from each of the 2 groups compared. Pearson correlation test showed a strong positive relationship, which means the longer SLE is given, the greater the number of osteoblasts. **Conclusion:** Based on this study, it can be concluded that SLE affects generation osteoblasts on post-tooth extraction socket healing in Sprague-Dawley rats (*Rattus norvegicus*).

Keywords: Osteoblasts, SLE, Tooth extraction socket

Analysis of Factors Affecting the Success of Periapical Radiograph with Parallel Technique in Clinical Students of Radiology Department in August – September 2018 Faculty of Dentistry Brawijaya University

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ABSTRACT

Introduction: Radiological examination plays an important role in the diagnosis, treatment, and management plan for the treatment. Radiographs with good diagnostic quality are needed to support interpretation and accurate diagnosis, Film processing is a process converting the invisible latent image, contained in the sensitized film, into the visible radiographic film. Poor chemical processing will produce radiographs that have inadequate diagnostic quality. Technical errors, decrease the rate of accurate diagnosis and treatment planning, increases patient's contact with the radiation, and the loss of time and money for the radiographic retakes. The aim of this study is to analyze factors affecting the success of taking periapical radiograph with parallel technique in clinical students in Department of Radiology between August-September 2018 in the Faculty of Dentistry Brawijaya University. **Methods:** The study was conducted by observational method, which is by observing and assessing the process of taking periapical radiograph with parallel technique at the processing stage in the assessment form and radiograph taken by the clinical students at the radiology department. **Results:** Factors affecting the success of taking radiograph at the processing stage obtained from this study were the duration of film immersion in the developer and fixer, how to rinse the film, and careful handling of the film. The data were then analyzed using Mann-Whitney, showing that the successful radiographs have a higher average score than those faulty radiographs with p-value 0,027 which is less than 0,05. **Conclusion:** There is a significant difference between the average score of successful radiograph with the average score of faulty radiograph in taking periapical radiograph with parallel technique at the processing stage.

Keywords: Success of taking radiograph, Film processing

Activity of Chitosan as Antibacterial in Chitosan-Collagen Composite Dressing

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ABSTRACT

Introduction: Chitosan is known as biopolymers that offer advantages such as biocompatibility, biodegradability, lower antigenicity, antibacterial and renewability. It can be modified with collagen as a composite dressing for wound healing. The aim of this study was to determine the activity of chitosan as an antibacterial in chitosan-collagen composite dressing. **Methods:** This experimental study was divided into group K0, K1, K2, and K3. K0 as control group used pure chitosan, K1 group made by collagen 25% and chitosan 75%, K2 group made by collagen 50% and chitosan 50%, K3 group made by collagen 75% and chitosan 25%. Chitosan powder was dissolved in acetic acid 2%, then mixed with acid soluble collagen and dried at room temperature. Each of the composite then were growth in nutrient agar plate to count total bacteria. **Results:** This study showed that no bacteria were recovered on K0, K1, K2 plates, but K3 had total plate count of 42 CFU and statistically showed there was discrepancy for each group with p-value was 0,002 ($p < 0,05$). **Conclusion:** Chitosan had the effect as antibacterial properties based on its concentrations in composite dressing.

Keywords: Chitosan, Collagen, Bacteria, Composite, Wound Healing

Pangasius djambal Gelatin Effects on Angiogenesis and Remodelling by MMP13 in Traumatic Ulcer Healing

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ABSTRACT

Introduction: The traumatic ulcer is a pathological condition that causes damage to the entire epithelial layer and the underlying tissue, coated with fibrin tissue, so it is yellowish-white. In 2009, the prevalence in Indonesia reached 60.5%. Oral ulceration may be the most oral mucosal disease frequently seen and serious. Although many oral ulcers have a similar clinical appearance, the underlying etiological factors can vary from reactive lesions, neoplastic and oral manifestations of skin diseases. Oral ulceration can also be manifestations of epithelial damage for defects. The aim for this reaserach is to prove the effect of patin fish gelatin (*Pangasius djambal*) on angiogenesis and remodeling by MMP13 in the healing process of traumatic ulcers (*in vivo*). **Methods:** This study used an experimental research design purely with Post Test Only Randomized Control Group Design *in vivo*. We will divide the subject research into 2 groups with time series. This study used 30 mice with 5 samples for each group: untreated mice and treated mice. **Results:** There is a significant relationship between the group angiogenesis given patin fish gelatin in the wound healing process with a positive correlation which means it influences increasing the number of blood vessels. **Conclusions:** Administration of patin fish gelatin is the most effective treatment and can speed up increasing the number of blood vessels or angiogenesis which shows an increase in the speed of wound healing in the post-traumatic ulcer. MMP13 also can enhance remodeling cells in wound healing.

Keywords: Patin, Traumatic Ulcer, Matrix Metalloprotein

The Differences in 6-8 Years Old Children's Behaviour Towards Oral and Dental Health in the Urban and Rural Areas in Malang

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ABSTRACT

Introduction: Dental and oral health is still a problem in Indonesia, especially in early childhood. Oral and dental health in early childhood needs special attention because they are in the process of growth and development that will affect the development of dental and oral health later. The purpose of this study is to find out the differences in 6-8 years old children's behaviour towards oral and dental health in the urban and rural areas in Malang. **Methods:** This research used observational analytic with the cross-sectional approach. The determination of the sample is done by purposive sampling technique. There are 80 samples were divided into two groups; the students aged 6-8 years in urban and rural area. The differences in behaviour between the two groups were analyzed using the Mann-Whitney test. **Results:** The results of the study of both groups have good oral dan dental health behaviours with an average score of knowledge 49.71 and the attitudes by 44.40 for urban area. While, in rural area the result pointed out 32.29 of knowlegde and 36.60 of attitude. Statistical test results of the differences in 6-8 years old children's behaviour towards oral and dental health in both groups showed a value of $p = 0.001$. **Conclusion:** It can be concluded that there are differences in oral and dental health of children aged 6-8 years in urban and rural areas in Malang.

Keywords: Oral and dental health, 6-8 years old children, Urban and rural areas

The Effect of Theobromine Gel Exposure on Surface Hardness of Artificial Enamel Lesion in Primary Teeth – An in vitro study

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ABSTRACT

Introduction: Prevention strategy is important in caries management to reduce the risk of caries in children. Fluoride intake for a long time can cause an increased incidence of fluorosis. Theobromine is an alkaloid compound of the methylxanthine group found naturally in cocoa beans (*Theobroma cacao*). It can play a role in increasing enamel surface hardness by exchanging minerals on the enamel surface. **Methods:** This study used 20 specimens of primary teeth that were embedded in epoxy resin. Caries-like lesion was created on each specimen using 37% phosphoric acid for 60 second. Specimens were divided into 5 groups of topical application of theobromine gel with the concentration of 1%, 2%, 3%, 4% and 5% for 4 minutes. Then specimens were immersed in artificial saliva in 60 minutes. The hardness of the enamel surface was tested using *Vickers Microhardness Tester*. A statistical tes was performed using Kruskal-Wallis test and Mann-Whitney test. **Results:** The result of the analysis showed a significant increase in enamel microhardness between different concentration of theobromine gel ($p < 0,005$). The higher the theobromine gel concentration, the greater of increases the enamel surface hardness in primary teeth. Theobromine gel group of 5% concentration gave the highest increase in microhardness compared to the other groups. **Conclusion:** Theobromine gel concentration of 5% is effective in increasing enamel surface hardness. Theobromine can be used as potential material to prevent caries in children.

Keywords: Caries prevention, Microhardness, Primary teeth, Theobromine

Effect Of Cigarette Smoke Exposure To Expression Of TRAIL R1 On Tongue Epithelium *Rattus Novergicus*

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ABSTRACT

Introduction: One of the risk factors for cancer is the habit of smoking. Some carcinogenic substances in cigarettes are nicotine and nitrosamine. In cigarette smoke there are free radical molecules or Reactive Oxygen Species (ROS) that can cause DNA mutations that can disrupt the balance of cell metabolism. One of them is the apoptosis, apoptosis is a programmed cell death mechanism. In cancer conditions there are apoptotic disorders and excessive proliferation of cells. The process of apoptosis is influenced by the death receptor, Tumor Necrosis Factor apoptosis inducing ligand R1 (*TRAIL R1*). This study aims to determine the effect of smoke exposure to expression of *TRAIL R1* on the mucosal epithelium of the tongue of the Wistar rat (*Rattus Novergicus*). **Methods:** The subjects of this study were 24 male *Rattus Novergicus* with the age range of 12-14 weeks and weighing \pm 170 grams. Divided into 4 groups with 2 control groups 4 weeks (K4), 8 weeks (K8) and 2 treatment groups each given 2 cigarettes / day exposure to cigarette smoke for each rat for 4 weeks (P4) and 8 weeks (P8). **Results:** The results showed that exposure to cigarette smoke can cause interference with TRAIL R1 expression. There was a significant difference in *TRAIL R1* expression between the control and treatment groups and there was a significant difference in *TRAIL R1* expression between the duration of cigarette smoke exposure (P4 and P8). **Conclusion:** Exposure to cigarette smoke can interfere with the process of apoptosis.

Keywords: *TRAIL R1*, Apoptosis, Carcinogenesis, Tobacco smoke, Reactive Oxygen Species

Hyposalivation and Xerostomia in Diabetes Mellitus Controlled and Uncontrolled Patients

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ABSTRACT

Introduction: Diabetes mellitus is a metabolic disease with multiple symptoms characterized by high levels of glucose in the blood (hyperglycemia). Abnormalities in oral mucosa of patients diabetes mellitus were found is reduction of salivary flow in patients with diabetes mellitus that can cause dry mouth (xerostomia). Thus, the current study has explored the relationship between prevalence of xerostomia and the prevalence of hyposalivation in diabetes mellitus controlled and uncontrolled patients. **Methods:** This research was an observational analytic with cross sectional approach. The subject consist of 61 patients division of internal medicine Johar Baru districts hospital, central Jakarta by using total sampling method. Measurement of salivary flow used spitting method every once a minute in a time interval of 5 minutes. Condition of xerostomia in this study was measured by the Xerostomia Inventory questionnaire. **Results:** The results showed that there was a significant relationship between xerostomia and hyposalivation ($p < 0.05$). **Conclusion:** Based on this research, it can be concluded that reduction of salivary flow effect on occurrence of xerostomia. Avoiding diabetes mellitus disease in Islam view can be done by adjusting diet and lifestyle simple or not excessive, if experience on xerostomia then one way to overcome them is to drink some water, because water is one of the most important things for human life.

Keywords: Diabetes mellitus, Hyposalivation, Xerostomia

Allogeneic Adipose-Derived Mesenchymal Stem Cells Accelerate Regeneration of Alveolar Bone Defect in Rat

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ABSTRACT

Introduction: Mesenchymal stem cells taken from adipose tissue have a more accessible access advantage, their retrieval techniques are painless and have multipotent properties which can differentiate osteogenically. Therefore, they have bone regeneration ability in vitro and in vivo studies. The use of allogeneic adipose-derived mesenchymal stem cells (ADMSCs) can regenerate damaged tissue with high-quality without fibrous tissue formation, minimal donor morbidity compared to autografts, and hypo-immunogenic responsiveness. The purpose of this study was to analyze the acceleration of the administration of allogeneic ADMSCs from rat and demineralized dentin matrix (DDM) scaffolds to regenerate alveolar bone resorption in the periodontitis model. **Methods:** Twenty-five Wistar rats were divided into three groups: control, DDM scaffold group and ADMSCs-DDM composite group. Alveolar bone resorption was induced by injection of LPS *P.gingivalis* for six weeks in the right mandibular molars. Transplantation was done in periodontal pockets for 7 & 14 days. The parameters were assessed by using scanning electron microscope (SEM), micro-computed tomography (μ -CT), expression collagen type I by immunohistochemistry (IHC) staining and trabecular area and osteoblast with hematoxylin staining (HE). Statistical Analysis was done by using Mann Whitney ($p < 0.05$). **Results:** There was a significant difference in the expression of collagen type I on the 7th and 14th days. Where the expression on day 14 showed significant results ($p < 0.05$) in the ADMSC- DDM composite group compared to DDM scaffold and controls groups. The trabecular area and osteoblast cell count of ADMSC-DDM composite on day 14 was significantly higher than the DDM and control groups ($p < 0.05$). **Conclusion:** This study concludes that the composite of ADMSCs-DDM on periodontal pockets of Wistar rats has the ability in alveolar bone regeneration.

Keywords: Adipose-derived mesenchymal stem cells, Demineralized dentin matrix, Alveolar bone defect, Allogeneic, Periodontitis model

Antibacterial Activities of Yellow Kepok Banana Peel Extract (*Musa paradisiaca* L.) against *Enterococcus faecalis* (an in vitro study)

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ABSTRACT

Introduction: One of the principles of endodontic treatment is to eliminate the microorganism populations in infected root canals. Disinfection is dominant factor in determining the success of treatment because the persistent infection in the root canal leads to endodontic treatment failure. *Enterococcus faecalis* is one of the bacteria commonly found in root canals after performing endodontic treatment. The peel of yellow Kepok banana (*Musa paradisiaca* L.) seems to hold many antibacterial properties such as flavonoids, alkaloids, saponins, tannins, and terpenoids. This study aims to determine the antibacterial power of Kepok banana (*Musa paradisiaca* L.) peel extract against *Enterococcus faecalis* bacteria. **Methods:** This study utilized a tube dilution method to determine the Minimum Inhibitory Concentration (MIC) and employed the striking method on the media to determine the Minimum Bactericidal Concentration (MBC). The extract concentrations used in the study were 50%, 60%, 70%, 80%, and 90%. The results of the MBC were for observations using a Scanning Electron Microscope (SEM). **Results:** Yellow Kepok banana peel extract had MIC against *Enterococcus faecalis* at a concentration of 50%, and had an MBC at a concentration of 60%. In the SEM observation, it was revealed that there were significant differences in the size and morphology of *Enterococcus faecalis* bacteria in the form of additional cell lengths; additionally, there were blebs on the cell walls of *Enterococcus faecalis* bacteria. **Conclusion:** Yellow Kepok banana (*Musa paradisiaca* L.) peel extract has an antibacterial activity against *Enterococcus faecalis*.

Keywords: Yellow Kepok Banana Peel Extract, *Enterococcus faecalis*, Minimum Inhibitory Concentration, Minimum Bactericidal Concentration, Scanning Electron Microscop

Dental Medicine Intervention of Further Bone Destruction in Jaw Caused by Infected Tooth

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ABSTRACT

Introduction: Infected tooth is a common findings in dental patients. A neglected infected tooth goes untreated the infection will spread into the root canal and further into the apex, chronically destruct the surrounding hard tissues. Inflammatory radicular cyst is one of the result of an untreated tooth infection. In this article we present a cross-sectional study of inflammatory radicular cyst in the jaw accompanied with their histological examination, clinical findings and their treatments. **Method:** Exactly 8 cases, accompanied with the available post-operation histological examination, were collected in 8 months between January – August 2019 in the Maxillofacial Surgery department in Brawijaya University Hospital (RSUB). **Results:** Across all 8 cases, 75% of cysts formed in the mandible, in addition the frequency of the cyst observed in the apex of the posterior tooth is 87.5%. surprisingly a moderate number of radicular cyst studied in this article is caused by an inadequate tooth restoration which leads to secondary caries (37.5%). All of the cases were in accordance with the diagnosis established by their own histological examination. **Conclusion:** The treatment in periapical lesion that cause bone destruction needs correlation between clinical examination, radiography, and histological examination in order to properly establish the diagnosis and to improve the patient's quality of life.

Keywords: Infected tooth, Bone destruction, Odontogenic cyst, Radicular cyst

The Effect of Lime Peel Decoction (*Citrus aurantifolia*) to Number of Fibroblasts Cells on Wound Healing after Tooth Extractions

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ABSTRACT

Introduction: Tooth extractions can cause tissues damage around the extraction area and wound healing will occur later. Fibroblasts cell play an important role in repairing of tissues injuries with synthesis component matrix ekstrasel. The lime peel decoction (*Citrus aurantiifolia*) have highest flavonoid content. Flavonoid has effects inflammatory phase of wound healing process. The purpose of this research is to know the effect of lime peel decoction to number of fibroblasts cells on wound healing after tooth extractions. **Methods:** This research was conducted with an experimental approach laboratoris in *in vivo*. The research design used Randomized Post Test Only Control Group Design. The total rats were 30, divided into 6 groups, there were the control group was not given the lime peel decoction (K7, K14, K21) and the treatment group was given the lime peel decoction (P7, P14, P21) each sacrificed on the day 7th, 14th, 21st and made the preparations of histology tissue with hematoxylin-eosin staining to count the number of fibroblasts cells. **Result:** Data were analysed using One-way Anova which is showed a significantly differences between control group and treatment group on the 7th day and there were no differences meaningful between control group and treatment group in day 14th, 21st. Pearson correlation test showed that increasing the day indicates the number of fibroblasts cells progressively decreased. **Conclusion:** The lime peel decoction has an impact to number of fibroblasts cells on wound healing after tooth extractions.

Keywords: Fibroblast, the peel of lime (*Citrus aurantiifolia*), wound healing

Collaboration Approach in Aesthetic Rehabilitation for Huge Middle Diastema Caused by Frenulum Penetration

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ABSTRACT

Introduction: Closing of middle diastema can be challenging aesthetic rehabilitation. The procedures can be more complicated when the cause is not only dental deformity but also caused by frenulum anatomy. Full veneer crown (FVC) is usually the standard solution for closing the diastema, but coronally frenulum can put the result at risk of failure. **Methods:** This case presents a 21 years old female with middle diastema and coronally penetrating frenulum. After a series of discussion, it was decided to perform frenectomy with V-Y plasty technique before prosthodontic treatment, so it will not give a problem on FVC insertion and black triangle post-FVC insertion. The prosthodontic approach can be challenging because the diastema is too wide to close by two units FVC. The prosthodontist decided to make four units FVC on four anterior teeth subsequently so the dental anatomy could be achieved aesthetically. **Results:** Healing of frenulum showed the standard height in three weeks post-frenectomy. Making four units FVC and change the dental y-axis, an anatomical standard could be achieved. The patient showed no complaint for a week later. **Conclusions:** The frenulum anatomy and gap size of middle diastema can be a challenging case. Frenectomy and changing the dental y-axis should be performed in this case to give the patient maximum treatment output.

Keywords: Middle diastema, Frenectomy, Full veneer crown, Aesthetic challenge

The Serum Corticosteron Levels Alteration in Occlusal Disharmony

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ABSTRACT

Introduction: A disturbance in any component of stomatognathic system such as reduced occlusal contacts of teeth will cause occlusal disharmony. Occlusal disharmony identified as stressors that affect homeostasis in the body, particularly in regulatory of corticosterone hormone. The aim of this study was to analyze the levels of corticosterone in the serum of rats with occlusal disharmony. **Methods:** There were 5 adult male Sprague dawley rats for each group. The occlusal disharmony group and the no treatment (control) group. In the occlusal disharmony group, all of molar cusps were cut off (occlusal grinding) \pm 1 mm with fissure bur. The blood samples in heparinized tubes were received from infraorbital vein of rats in each group at 1st day, 7th day, 14th day and 21st. Serum samples were separated by centrifugation. Levels of serum corticosterone were determined using a highly sensitive ELISA kit. **Results:** There were significant differences of corticosterone serum levels between groups ($p < 0.05$). Tukey HSD test showed that were significant differences between the treatment and control of 1st day and the treatment group on 7th day ($p < 0.05$). **Conclusion:** This study showed there was alteration of serum corticosterone levels in the serum of rat with occlusal disharmony.

Keywords: Occlusal disharmony, Corticosterone, Stress, Trauma occlusion

Dental Emergency Management of Odontogenic Facial Infection for General Practitioners

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ABSTRACT

Introduction: Dental emergency was uncommon medical events. In several cases, a correct diagnosis was required for effective and safe patient management. General dental practitioners should be well trained to manage dental emergency efficiently. Patients may present severe condition of oral and maxillofacial infection, hence dentist may get overwhelmed by patients' situation. Odontogenic infections involving canine fossa rarely occur, but if left untreated may lead into more severe complication. The aim of present study is to determine the expand of general practitioners' competency in treating odontogenic infections; including determining differential diagnosis, performing emergency treatment, medications, and referral consideration. **Case Presentation:** A 17 years old male was referred for assessment of right facial swelling. Patient has had a history of injury 4 years ago on his upper incisives and the teeth were left untreated. Clinical examination showed extra oral swelling on the right side of the nose and intraorally from the buccal mucosa of tooth 11 and 12 extending to the lips. Radiographic examination showed radiolucency on the apices of tooth 11 and 12. A current diagnosa of fossa canina abscess were made following the assessment. Initial therapy was done through incisional drainage on mucobuccal fold of tooth 11 and 12, followed with drainage placement and antibiotic prescription. Pain and swelling has reduced significantly on the first and second follow up, thus drain was removed. The symptoms have completely resolved on third follow up and patient was referred to pursue endodontic treatment. **Conclusion:** Odontogenic infections still pose a grave danger to the healthcare community. Thorough examination and adequate treatment planning could prevent further complications.

Keywords: Odontogenic infection, Fossa canina abscess, Emergency treatment

Ovarian Dysfunction Induced *Porphyromonas gingivalis* Infection Enhances the Risk of Metabolic Syndrome (in vivo study)

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ABSTRACT

Introduction: Disruption of ovarian function is frequently correlated by periodontitis, although the correlation is presently unclear. *Porphyromonas gingivalis* (Pg), as dominant periopathogen, may induce ovarian function disruption, which it later will stimulate a metabolic syndrome in menopause condition related to estrogen hormone status. No study has investigated it yet. This study was aimed to know the metabolic syndrome risk in ovarian dysfunction triggered by Pg. **Methods:** This study presented in an experimental laboratory study using rats Sprague Dawley Strain. The present study divided the animal models into four groups: control, ovariectomy group (OVX), ovariectomy-periodontitis group (OPG), and periodontitis group (PG). All of the treatment groups were performed to get ovarian dysfunction. The blood samplings were observed on 0, 3rd, 7th, 14th, 21st, and 28th days. The blood sampling was analysed the glucose, cholesterol, uric acid, and estrogen. The obtained data were analysed statistically. **Results:** Most of the treatments groups presented body weight and blood biochemical observation significantly higher than the control group, except in total cholesterol level ($p < 0.05$). The alteration of biochemical parameters related to treatment and estrogen level ($R > 0.5$). **Conclusions:** The present study revealed that ovarian dysfunction triggered by Pg infection stimulated the metabolic syndrome risk. Beside it, Pg infection could worsen the severity of the metabolic syndrome. Hence, this study would be the novel paradigm about the role of Pg in ovarian function, while it was required for further studies.

Keywords: Metabolic syndrome, Oestrogen deficiency, Ovarian dysfunction, Periodontitis, Pg infection

The Roselle Calyces (*Hibiscus sabdariffa*) Extract Gel Decrease the Pyridinoline Cross-linked Carboxyterminal Telopeptide of Type I Collagen (ICTP) Level of Periodontitis Rats Gingival Crevicular Fluid

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ABSTRACT

Introduction: Matrix metalloproteinase (MMP) affects the alveolar bone destruction in periodontitis. Increasing of type I collagen destruction by MMP in alveolar bone can increase bone resorption marker, pyridinoline cross-linked carboxyterminal telopeptide of type I collagen (ICTP). Roselle is a rich source of polyphenol, PCA (protocatechuic acid), and ascorbic acid which act as anti inflammation. The aim of the present study was to investigate the effect of roselle calyces extract gel on ICTP level of gingival crevicular fluid (GCF) in periodontitis rats. **Methods:** Thirty five male Sprague dawley rats aged 2-3 months and weight 200-250 gram were divided into 5 groups: K1, a healthy control group (non periodontitis and received carbopol 940 gel); K2 a negative control group (periodontitis and received carbopol 940 gel); P1 (Periodontitis and received 5% roselle calyces extract gel); P2 (Periodontitis and received 10% roselle calyces extract gel); P3 (Periodontitis and received 20% roselle calyces extract gel) groups. One McFarland *Aggregatibacter actinomycetemcomitans* was injected into the gingival sulcus of mandible incisivus for 7 days to gain periodontitis condition. Rats in control groups and treatment groups were administered Carbopol 940 gel or roselle calyces extract gel respectively for 14 consecutive days. The GCF were collected from all of groups at day 15 and were analyzed for ICTP level using ELISA method and the data was analyzed using One-Way ANOVA and Post-Hoc LSD. **Results:** The ICTP level of treatment groups lower and significant different than negative control group. Otherwise, the ICTP level was not significant different from healthy group. **Conclusion:** The data of the present study suggest that the roselle calyces extract gel decreases ICTP level in GCF until gain the normal level, which might inhibit alveolar bone resorption.

Keywords: ICTP, Periodontitis, Gel, Roselle

The Difference in Acidity Value of Conventional Zinc Phosphate Cement and Nano Zinc Phosphate Cement

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ABSTRACT

Introduction: Zinc phosphate cement is one of the materials in dentistry that is used as a luting cement. Unfortunately, high acidity value of zinc phosphate cement in the early application potentially irritate the pulp. The challenge to accelerate the increasing of zinc phosphate cement pH is by changing the particles of zinc phosphate cement from micro scale into nanoscale. The purpose of this study is to determine the difference in acidity value between conventional zinc phosphate cement and nano zinc phosphate cement. **Methods:** This research was an experimental research using posttest only control group design to see the acidity value differences of the two kinds of zinc phosphate cement. It consisted of six samples; three samples were conventional zinc phosphate cement and three samples were nano zinc phosphate cement. Each sample was measured based on eight intervals i.e 2, 5, 10, 15, 20, 30, 60, 1440 minutes after manipulating. Thus totally consists of 16 groups. Acidity value was measured by pH meter. **Results:** The test results showed statistically significant difference of acidity value between conventional zinc phosphate cement and nano zinc phosphate cement ($p = 0.000$). **Conclusion:** The conclusion of this research was that the acidity value of conventional zinc phosphate cement was higher than nano zinc phosphate cement.

Keywords: Acidity value, Conventional zinc phosphate cement, Nano zinc phosphate cement

The Potential of Zeolite as An Adsorbent of Calcium, Phosphate and Oral Microbes: A New Concept of Prevention of Calculus Formation on The Mouth

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ABSTRACT

Introduction: Dental plaque and calculus are known as cause of periodontal disease, the most common problems of global human population. Dental plaque microbes is releasing toxin and other metabolites, provokes inflammation. The Calculus is dental plaque that is hardened by the deposition of calcium and phosphate ions. The Calculus is acting as a niche for harbors the plaques microbes and as a physical irritant to periodontal tissue. The experts have recommended to resolve by control dental plaque and calculus formation. They can be controlled in 2 ways, by brushing with toothpaste and rinsing with an antiseptic. The mechanical way may eliminate dental plaque, but it can not prevent the precipitation of calcium and phosphate became calculus. An antiseptic used may be prevent plaque formation by killing plaque microbes, but it is increase risk of resistance and other side effect. **Methods:** This research was conducted with a literature study by collecting several research reports with keywords "Zeolite, Adsorbtion, Ca and PO₄, microbes, Calculus Formation". **Results:** The zeolite is a volcanic rock, porous, alluminosilica crystal, 3-D tetrahedral framework, cage-like structures, capable to adsorbing material in the form of liquid, gas or solid. The zeolite was reported adsorb such as Fe, Mg, Pb, Ca, ammonium, and methane. The zeolite also adsorb Vibrio cholera and Salmonella typhimurium, a microbe digestive tract's microbes, without killing them. **Conclusion:** The zeolite is expected to be used as an adsorbent calcium, phosphate and oral microbes. It is a new concept about prevention of calculus formation.

Keywords: Zeolite, Adsorbtion, Calcium and phosphate, Calculus formation

POSTER PRESENTATION

Construction of a Full-Thickness of Tissue-Engineered Oral Mucosa (TEOM) Based on Immortalised Keratinocytes

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ABSTRACT

Introduction: Tissue-engineered oral mucosa (TEOM) is increasingly being used to model oral mucosal diseases and to assess drug toxicity. Current TEOM models are constructed using normal oral fibroblasts (NOF) contained within a hydrogel matrix with normal oral keratinocytes (NOK) cultured on top. NOK are not commercially available and suffer from donor-to-donor variability. Therefore, oral mucosal models based on immortalised keratinocytes may offer advantages over NOK-based models. The objective of this study was to construct and characterise the TEOM developed using TERT2-immortalised oral keratinocyte (FNB6) cells and validate its similarity to normal oral mucosal tissue. **Methods:** TEOM were constructed by culturing FNB6 cells on top of a NOF-populated collagen type-1 hydrogel in tissue culture transwell inserts cultured at an air-to-liquid interface and collected at 14 day. TEOM were subjected to morphological (H&E and PAS), ultrastructural (TEM) and immunohistological (Ki-67, cytokeratin 14 and E-cadherin) analysis. **Results:** Histologically TEOM mimicked native oral mucosa displaying a stratified epithelium, fibroblast-containing connective tissue and basement membrane. Furthermore, TEM confirmed the presence of desmosomes and hemi-desmosomes in the epithelium. IHC revealed expression of differentiation markers (cytokeratin 14), proliferation (Ki-67), cell adhesion (E-cadherin). **Conclusion:** FNB6 mucosal models able to mimic native oral mucosa structure. It has potential for drug delivery and toxicity evaluation, and replacing models based on NOK where access to primary cells is limited.

Keywords: Tissue-engineered oral mucosa, Normal oral fibroblast cells, Normal oral keratinocytes, Immortalised oral keratinocyte cells, Primary cells

Disinfecting with Aloe Vera Extract 25% against The Dimensional Stability of Alginate Mould

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ABSTRACT

Introduction: In the work scope of the dentist, the cross infections risk between patients, dentists, and laboratory officer could appear through saliva, plaque, and blood during the printing process. The prevention of the risk in the moulding process could be prevented through immersion and spray disinfection techniques. The extract of aloe vera in 25% concentration could be utilized as a disinfection solution in the alginate mould. The objective of this research was to obtain the technical impact of immersion and spray alginate mould dimensions. **Methods:** This research used the method of laboratory experiments with pretest-posttest control group only by involved 27 samples which each divided into 3 groups. The first group with immersion by aloe vera in 25% concentration, the second group with the spray by Aloe vera 25% concentration, and control group. The data were analyzed using a nonparametric test: Kruskal Wallis dan Man Whitney. **Results:** Based on the result of Wilcoxon toward all treatments are generated that the technical immersion of Aloe vera 25% concentration could afford to influence the alginate mould dimension as vertically and horizontally with result $P=0.008$ ($P < 0.05$). Based on the result of the Kruskal Wallis test, identified there was a significant difference between the three groups. Where the ranking order starts from the smallest onto the biggest in sequence for the control group, spray Aloe vera 25% and immersion of Aloe vera 25%. Based on the test of Mann-Whitney is obtained result $P < 0.05$ that there was a significant difference. **Conclusion:** From this research could be stated there is the technical impact of immersion techniques using Aloe vera in 25% concentration towards the stability of alginate mould dimension.

Keywords: Alginate printed, Aloe vera, Dimension stability, Immersion technical, Spray technical.

The Effects of Differences in Post Canal Widths on Microleakage in Prefabricated Fiber Reinforced Composites

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ABSTRACT

Introduction: Fiber Reinforced Composite (FRC) post is one of choice in post root canal treatment. Resin cement polymerization results in shrinkage, creating micro gaps between the FRC posts and the root canal wall. This study aimed to find microleakage differences of prefabricated FRC posts with different root canal diameters. **Methods:** Twenty four maxillary central incisors were used, the root length was 13 mm from the apex. The root canal was prepared with conventional technique and then filled with a single cone technique. Samples were divided into 4 treatment groups with diameter preparation of 1.2 mm, 1.4 mm, 1.6 mm and 1.8 mm, cemented, then coated with sticky wax and nail polish and immersed in 2% methylene blue liquid and put into an incubator at 37o for 72 hours. The objects were divided into two mesiodistal directions and microleakage was observed under a stereomicroscope with 20x magnification. **Results:** Kruskal Wallis test showed there were significant differences in all treatment groups ($p < 0.05$). Mann Whitney test showed differences between groups ($p < 0.05$) of Ø 1.2 mm and Ø 1.6 mm group, Ø 1.2 mm and Ø 1.8 mm group, either of Ø 1.4 mm and Ø 1.8 mm group. **Conclusion:** This study concluded that there were microleakage in the four groups of post diameter, the wider root canal might lead to greater microleakage.

Keywords: Microleakage, FRC, Root canal diameters

Epigallocatechin-3 Gallate: A New Generation in Oral Mucosa Wound Healing Treatment

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ABSTRACT

Introduction: Hydrogen peroxide (H₂O₂) used in dental procedures is an oxidant that caustic and may lead to chemical injury on oral mucosa exposed. The antioxidant and anti-inflammatory agent was required to prevent prolonged inflammation and inhibit the activity of free radicals to prevent tissue damage. Epigallocatechin-3 Gallate (EGCG) is an antioxidant class of polyphenol, isolated from green tea. Its anti-inflammatory effects could enhance wound healing. This study was to prove the potential role of EGCG in promoting oral mucosa wound healing. Reepithelialization is an essential process of wound healing used as a defining parameter of its success. **Methods:** The study was a randomized Post Test Only Control Group Design. 32 male Wistar rats (*Rattus norvegicus*) were divided into 2 treatment groups. 35% hydrogen peroxide applied topically using micro brush 2 mm of diameter on lower lip mucosa to induce the caustic ulcer. After 24 hours, the control group was given plain mucoadhesive placebo gel (CMC-Na), while the treatment group was given EGCG Gel 0.5%. Gels were applied topically on ulcer surface for 3 days. On the 5th day, rats euthanized for tissue sampling and histological specimens were made by HE staining. The present study measured epithelial cleft as the marker of epithelial formation by the morfometry method. The data were analyzed by independent T-test. **Results:** The mean of epithelial cleft at treatment group ($549.25 \pm 217.094 \mu\text{m}$) was lower than the control group ($1417.25 \pm 180.572 \mu\text{m}$), it was statistically different ($p < 0.05$). EGCG enhanced reepithelialization through increasing expression of Transforming Growth Factor-beta 1 (TGF- β 1) that stimulated migration and increased the adhesion strength of epithelial cells. **Conclusion:** It was concluded that EGCG gel 0.5% enhanced reepithelialization on oral mucosa wound healing.

Keywords: EGCG, Wound healing, TGF- β 1, Reepithelialization

Inhibition Effect of Garlic (*Allium Sativum*) Extract on *Streptococcus Sanguinis* Biofilm Formation Involving Bacterial Motility Mechanism

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ABSTRACT

Introduction: *Streptococcus sanguinis* is a primary colonizer in oral biofilm formation. This species is often implicated in infective endocarditis. Besides its important role in systemic disease and antimicrobial resistance, methods to control oral biofilm formation need to be developed. Garlic (*Allium sativum*) has shown antimicrobial activities against many pathogen species. The purpose of this study was to analyze the ability and optimal concentration of garlic extract required to inhibit bacterial adherence to hydroxyapatite (HA) discs as a model of the tooth surface.

Methods: Saliva coated HA discs were incubated with various concentrations of extract then stimulated with *S. sanguinis* ATCC 10556 suspension to analyze the ability of garlic extract and the optimal concentration required to inhibit bacterial adherence. A motility assay was performed using inoculated bacteria treated in a Motility Indole Ornithin (MIO) medium. **Results:** It was shown that garlic extract could inhibit bacterial adherence to HA discs. Moreover, there was motility inhibition of *S. sanguinis*-treated as the extract concentration increased in MIO medium. Statistical analysis using One-way Anova demonstrated a significant difference in optical density (OD) value between groups ($p < 0.05$). **Conclusion:** Garlic extract has the ability to inhibit adherence of *S. sanguinis* to HA discs, through its inhibitory effect on bacterial motility, with the optimal concentration being 250 µg/ml.

Keywords: *Streptococcus sanguinis*, Garlic, Biofilm, Motility

The Effect of Herbal Mouthwash against Halitosis in Elderly

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ABSTRACT

Introduction: Elderly generally experience a decreased in the level of oral hygiene, number of teeth, mucosal sensitivity of the oral cavity and xerostomia. Xerostomia can cause halitosis. One of halitosis therapy is by using herbal mouthwash (betel leaf). Betel leaf has an antibacterial, antioxidant and antifungal ability. The purpose of this study was to provide information on the benefits of herbal mouthwash on decreasing halitosis score in elderly. **Methods:** This was a clinical experimental research with cross sectional approach. Spearman correlation test was used to determine the effect of herbal mouthwash on decreasing halitosis scores. The numbers of subject were 30 and obtained by quota sampling. Data collection was done by measuring initial and final halitosis score after rinsing with herbal mouthwash, using Tanita breath checker. Tanita breath checker is an innovative palm-sized monitor that can detect and measure the presence of volatile sulfur compound (VSC) by displaying 6 levels of halitosis. **Results:** The result showed a decrease in halitosis score before and after rinsing with herbal mouthwash (betel leaf). A significant decrease in the halitosis score is indicated by the $p=0,000$ obtained from the results of the Spearman correlation test. There was a significant decrease in the halitosis score after rinsing with herbal mouthwash. **Conclusions:** The present study showed that the decrease in halitosis score is due to the betel leaf containing essential oils. The main component of essential oils consists of phenols and their derivative compounds, namely kavikol. Thus, betel leaf was able to fight gram-positive and gram-negative bacteria, so that it can be used to treat halitosis in elderly.

Keywords: Halitosis, Elderly, Herbal mouthwash, Betel leaf

The Effect of Dayak Onion Extract (*Eleutherine Americana* Merr) on Testicular MDA Level in Male Mice (*Mus musculus*)

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ABSTRACT

Introduction: Free radicals in lead was known to promote infertility. Free radical activity can be inhibited by antioxidants in *dayak* onion extract. This study aims to prove the effect of *dayak* onion in inhibiting the increase in malondialdehyde levels in mice testicles induced by lead acetate. The bioactive content in *dayak* onions consists of alkaloid compounds, glycosides, flavonoids, phenolics, saponins, triterpenoids, tannins, steroids and quinones as effective dampening compounds for free radicals. **Methods:** This study was a laboratory experimental study using Posttest Only Control Group Design. This experimental study using 30 male mice (*Mus musculus*) which randomly divided into five groups, as follows : the control negative group, the control positive group, the first, the second and the third treatment groups (induced by lead acetate and treated *dayak* onion extract dose of 30; 60; 120 mg / kgBW / day in sequence for 38 days). **Results:** Showed a significant difference in testicular MDA levels between K0 and K1, K2, K3 and K4, K1 with K0 and K3 also showed significant differences. **Conclusion:** *Dayak* onion extract can reduce levels of MDA testicles in mice exposed to lead acetate.

Keywords: Lead acetate, *Dayak* onion extract, Malondialdehyde

Stevia Leaf Extract against Antioxidant Activity and Total Sugar Levels as Alternative Drinks for People with Type 2 Diabetes Mellitus

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ABSTRACT

Introduction: Stevia leaf (*Stevia rebaudiana*) extract is a natural antioxidants and low in sugar which can be used as functional food as an alternative drink for people with type 2 diabetes. This research is to prove the potential of stevia leaf extract on antioxidant activity, total sugar and organoleptic properties including color, aroma, and taste. **Methods:** The method in this study was an experimental study with a completely randomized design of stevia leaf extract (0% and 0.25%) Pick stevia leaves with their stems, mash in warm water with a mixture of spices using 20 respondents divided into two groups, as follows: the first group received treatment (0% and 0.25%), group second without treatment. Statistical analysis for antioxidant activity and total sugar using the One Way ANOVA test followed by the Tukey test, while organoleptic analysis using the Friedman test followed by the Wilcoxon test. **Results:** The alternative drink 0.25% stevia leaf extract is most preferred by panelists for color, aroma and taste parameters. This drink has an antioxidant activity of 32.45%; and total sugar content of 4.63%. **Conclusion:** Potential stevia leaves can significantly increase antioxidant activity and product organoleptic so that this can be used as an alternative choice for type 2 diabetes mellitus. Safe if consumed in the long run for people with type 2 diabetes. Therefore that stevia leaf extract can be used alternative drinks for people with DM 2.

Keywords: Stevia leaves, Antioxidants, Total Sugar levels, Alternative Drinks, Diabetes Mellitus

Stem Aqueous Extract of *Physalis minima* Maintains the Width of Periodontal Ligament Space and Inhibits Alveolar Bone Oxidative Stress in Ovariectomized Rats

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ABSTRACT

Introduction: Estrogen deficiency is a determinant for periodontal disease. Oxidative stress implements a critical role in the pathology of periodontitis. *Physalis minima* serve as an essential genus of the Solanaceae family that carries natural steroids. The study was intended to evaluate the effects of *Physalis minima* stem aqueous on extract the width of periodontal ligament space and oxidative stress level in ovariectomized rats. **Methods:** The study used twenty female rats treated with ovariectomy, which were divided into five groups including the 5-weeks ovariectomy, 9-weeks ovariectomy and the 5-weeks ovariectomy supplemented with extracts at the dose of 500, 1500 and 2500 mg/kg body weight for 4 weeks, respectively. The normal group consisted of four female rats without any treatment. The width of periodontal ligament space was determined by H&E staining. Malonaldehyd (MDA), as an indicator of the oxidative stress level, was assayed using the thiobarbituric acid test. All data were analyzed by one-way ANOVA, followed by LSD post-hoc tests. **Results:** Ovariectomy caused the widening of periodontal ligament space and increased oxidative stress levels in rats ($p < 0.05$). There were no statistical differences on the width of periodontal ligament space and MDA concentration in the 5-weeks ovariectomy group treated with the extract at the dose of 2500 mg/kg compared to the normal. **Conclusion:** The present study showed that *Physalis minima* stem aqueous extract lessen the width periodontal ligament space and decrease oxidative stress level in ovariectomized rats.

Keywords: *Physalis minima*, Ligament periodontal, Oxidative stress, Ovariectomy

Health Monitoring Education with “Healthy Book” as Guidance can Improve Blood Glucose Levels in Pre-elderly and Elderly Communities

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ABSTRACT

Introduction: The prevalence of type 2 diabetes mellitus (T2DM) is increased in many parts of the world, especially in Indonesia. Most T2DM sufferers are people approaching old age. Type 2 DM is one of the degenerative diseases that can cause death as a result of various complications. Evidence shows that complications of DM can be prevented by optimal blood glucose control, but unfortunately the target of achieving blood glucose control is often not optimal. Increasing the active role of people with diabetes and communities in managing DM independently is needed. **Methods:** We provided education to the elderly and pre-elderly people in Malang, Indonesia, to be able to monitor their health. We composed “Healthy Book” as a guidance for the community to evaluate their health status independently. We measured fasting blood glucose and HbA1c as the initial diagnosis of DM or not. This program was implemented for six months. Fasting blood glucose levels were measured before and after the program was completed. **Results:** A total of 77 people participated in this study. We found that 28 people were diagnosed as DM, and 49 people were non-DM. There was a significant improvement in the control of blood glucose levels in the T2DM community, indicated by decreasing of fasting blood glucose level at the end of the program. Furthermore, in the non-DM community showed that they could maintain the normal blood glucose level. **Conclusions:** The health monitoring education program with “Healthy Book” as guidance to the community can improve blood glucose levels. This program is intended to reduce the type 2 DM, one of the degenerative diseases.

Keywords: Health monitoring education, Healthy Book, Blood Glucose Level, Diabetes Mellitus

Herpes Labialis and Dental Treatment Procedure: Related or Not Related – A Case Report

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ABSTRACT

Introduction: Herpes simplex virus type 1 (HSV-1) belongs to the family of human herpes virus, is latent in the body and will be activated if induced by triggering factors. Herpes labialis is one of recurrent lesions of HSV-1. Herpes labialis triggering factors include mucosal tissue trauma of the oral cavity or nerve tissue, stress, ultraviolet light, immunosuppressed conditions, hormonal disorders and fatigue. This case report discusses about recurrent herpes labialis which is thought to be triggered by dental procedures. **Case Report:** A 37-year-old male presented to the Dental Hospital of Universitas Indonesia with chief complaint of soreness on the lips. A few days before, he underwent dental treatments, which are scaling and root canal treatment. After those dental treatments, blisters appeared on the lower lip and he experienced fever and joint pain. This condition had been experienced before and also arises after dental treatment. Clinical examination showed painless brownish yellow crust accompanied by ulcers at the left lower lip. Based on the history and clinical examination the patient was diagnosed with herpes labialis. The patient was instructed to apply sterile gauze moistened with 0.2% chlorhexidine gluconate for 2 minutes 3 times a day. **Conclusion:** Dental treatments may be served as triggering factor for herpes labialis. This condition can be avoided by minimizing trauma and increase time effectiveness during dental treatment.

Keywords: Herpes labialis, Dental treatment, Trigger

Evaluation of the Bioactive Content of Papaya Seeds Ethanolic Extract

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ABSTRACT

Introduction: The potentials of papaya ethnobotanics have been known for a long time, including the steam of boiled papaya leaves used as a cure to toothache, has an anti-inflammatory effect, plays a role in periodontitis therapy and inhibits anti-inflammatory cytokines. Papaya seed that is considered waste has components of polyphenols (phenolic acids and flavonoids) even more than the edible part of papaya. In a previous study was found that papaya seed ethanolic extract qualitatively contains flavonoids and phenolic acids but it is not known how much quantitatively. When the bioactive compounds contained in papaya seed extract can be known, this will facilitate further research in determining which compounds actually have a therapeutic effect. The objective of this study was to investigate the phytochemical screening and identification of bioactive compounds by Liquid chromatography–mass spectrometry in Papaya seed ethanolic extracts. **Methods:** The qualitative phytochemical analysis was obtained from standard phytochemical screening, then LC-MS examination was used to determine the quantifier of bioactive compounds contained in ethanol extract of papaya seeds. **Results:** Preliminary phytochemical analysis showed the presence of papaya seed ethanol extract qualitatively shows that there are phytochemical compounds in the form of flavonoids, phenols, alkaloids, and saponins. Whereas the quantitative examination using Liquid Chromatography-Mass Spectrometry showed the content of Chlorogenic acid was greater than the Quercetin level. **Conclusion:** Our results suggest that papaya seed ethanolic extract quantitatively contains Chlorogenic acid and Quercetin Further studies have to be carried out regarding the papaya seed ethanolic extract in vitro inhibition compare to the antibacterial potency of the commercial antibiotics on the tested bacteria species.

Keywords: Medicinal plant, Papaya seed extract, Flavonoid, Chlorogenic acid, Quercetin

Difference Number of Fibroblast in Healing Traumatic Ulcer of Wistar Mice (*Rattus norvegicus*) After Giving the Latex of Nanogel Jarak Cina (*Jatropha multifida* L)

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ABSTRACT

Introduction: Thrush or ulceration is inflammation that occurs in the oral mucosa including the gingiva, cheek, palate, lip tongue and mouth floor. Wound healing process is strongly influenced by fibroblast cells. Nanogel Jarak Cina latex extract contains alkanoid, latexonin, tannin and flavonoid as antioxidants, antibacterial, anti-inflammatory, and increases collagen type 1 that it can accelerate wound healing of ulceration. The aim of this study was to determine the differences in the number of fibroblasts in healing traumatic ulcer Wistar rats (*Rattus norvegicus*) after administration of Jarak Cina latex extract (*Jatropha multifida* L). **Method:** experimental study, used the Randomized Post test only control group design. Every group were divided in four groups, where 3 groups treated with Jarak Cina latex extract and 1 group without treatment. On the fifth day mice were decapitated and tissue histology preparations were made to count the number of fibroblasts. **Result:** Homogeneity and normality tests show that the data is homogeneous and normally distributed. The results showed the group P1 with a 1% concentration has the highest number of fibroblasts, followed by a group P2, P3 and the control group. **Conclusion:** Based on this study it can be concluded that there are differences in the number of fibroblast cells in Wistar rats (*Rattus norvegicus*) for the administration of Jarak Cina nanogel extract (*Jatropha multifida* L).

Keywords: *Jatropha multifida* L, Nanogel, Ulceration, Fibroblasts, Wound healing

Surface Morphology Analysis of Nanohydroxyapatite Using Electrochemical Method for Biomedical Engineering

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ABSTRACT

Introduction: Biomedical engineering is a rapidly growing discipline covering the application of engineering principles and materials technology to healthcare. Nowadays, nanotechnology based drug carrier or regenerative medicine are developed. Nanotechnologies have the potential to improve diagnosis or therapeutical applications. Nanoparticle materials can be found from natural source or synthetic source. Hydroxyapatite has been commonly used in dentistry because of the characteristic. But, hydroxyapatite has some disadvantages such as low tensile strength and brittleness. It is desirable to make smaller particle of hydroxyapatite. Nano-hydroxyapatite (n-HAp) is considered one of the most biocompatible materials. In this study, we discuss the synthesis of nanohydroxyapatite using electrochemical method and describe the surface morphology with scanning electron microscopy. **Method:** KH_2PO_4 , Na_2EDTA , CaCl_2 was dissolve with demineralized water. The electrolysis was carried out in two platinum foil electrodes were connected to the positive and negative terminals of a DC power supply. **Result:** There was highly agglomerated of nanohydroxyapatite. The spherical shaped particles with clumped distributions. **Conclusion:** Surface morphology of nanohydroxyapatite that synthesize using electrochemical method was highly agglomerated.

Keywords: Nanohydroxyapatite, Surface Morphology, Biomedical Engineering

Poly(lactic-co-glycolic acid) Enhance of Biodegradability Properties and Pore Size of Hydroxyapatite Nanoparticle/PVA Composites for Alveolar Ridge Preservation

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ABSTRACT

Introduction: Post-tooth extraction makes alveolar bone loss progressive, especially in the first 6 months. Inadequate alveolar bone hampers dental prosthetic, implant reconstruction and esthetic problems. Therefore, alveolar ridge preservation should be performed to avoid aggressive bone loss post-extraction. Poly(lactic-co-glycolic acid) (PLGA) is one polymer which widely used in biomedical. This present study was conducted to evaluate the percentage of biodegradability and the size of pores Hydroxyapatite nanoparticles/PVA composites which was coated PLGA for potential alveolar ridge preservation materials. **Methods:** There was divided into 2 groups: Hydroxyapatite nanoparticles/PVA composites and Hydroxyapatite nanoparticles/PVA/PLGA composites which contained 20% PLGA (w/w). All of composites were prepared by freeze drying methods at -50 °C. Biodegradability rate was evaluated by soaking composites into PBS for 12 weeks at 37 °C, then measured water uptake (%) and water loss (%). The pore size was evaluated by FE-SEM analysis. Statistical analysis based on Independent T-test ($p < 0.05$). **Results:** The experimental results showed that Hydroxyapatite nanoparticles/PVA/PLGA composites have greatest biodegradable properties and proper pore size and structure for bone regeneration. The water uptake and water loss of Hydroxyapatite nanoparticle/PVA/PLGA composite was 819.60% ($p < 0.05$) and 70.74% ($p < 0.05$) which greater than Hydroxyapatite nanoparticle/PVA composite (271.25% and 58.38%). Moreover, the pore size of Hydroxyapatite nanoparticle/PVA/PLGA composite was $176 \pm 61.93 \mu\text{m}$ which also greater than Hydroxyapatite nanoparticle/PVA composite ($54.53 \pm 35.74 \mu\text{m}$). **Conclusion:** Hydroxyapatite nanoparticle/PVA/PLGA composite has excellent biodegradability properties and morphology which would be a promising material for alveolar ridge preservation to achieve bone regeneration.

Keywords: Poly(lactic-co-glycolic acid), Biodegradable, Hydroxyapatite nanoparticle, PVA, Alveolar ridge preservation

Development of In-House Hepatitis C Virus (HCV) Genotype 3 Betel Leaf Extract (Piper betle L.) as a Removable Denture Cleaning Agent for the Number of *Candida albicans* Colonies on a Heat-Cured Acrylic Resin Plate

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ABSTRACT

Introduction: Heat cured acrylic resins are often used as material from artificial teeth, especially removable denture bases. The existence of microcavities in acrylic becomes a place of attachment of food scraps that can increase the number of microorganisms in the oral cavity, one of which is *Candida albicans*. The use of dentures that are constantly and not clean can cause an increase in the number of *Candida albicans* colony growth is rapid, making it the main cause of infection in the oral mucosa called denture stomatitis. Maintenance of denture hygiene can be done in several ways, namely mechanically and beggars. Chemical cleaning is usually the most widely used because it is easier to clean dentures from microorganisms such as the number of *Candida albicans* colonies on the acrylic heat-cured denture base material. Betel leaf extract containing essential oils and the main component is phenol which has an antifungal effect. **Method:** The purpose of this study was to determine the effect of 10%, 15% betel leaf extract and polydent solution as a positive control with 1 hour and 6 hours immersion on the growth of *Candida albicans* colonies on a heat-cured acrylic resin plate which was purely experimental laboratory using the post-test method control group design only. **Result:** The results of statistical calculations with the Kruskal-Wallis Test revealed differences between the betel leaf extract group and the control group with soaking time, followed by the Mann-Whitney test to determine differences in effectiveness between the 2 concentrations in the betel leaf extract group and the immersion time ($p < 0.05$). **Conclusion:** From the results of the study it can be concluded that the betel leaf extract can kill the growth of *Candida albicans* colonies on a heat-cured acrylic resin plate with high concentration and length of soaking time.

Keywords: Heat cured acrylic resin, *Candida albicans*, Betel leaf extract

Initial Cell Density to Optimize Proliferation of Stem Cell from Human Exfoliated Deciduous Teeth (SHED)

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ABSTRACT

Introduction: Over the last decades, caries management is moving from restorative method into regenerative by using autologous stem cell transplantation. It is important to gain high quality human postnatal stem cells from accessible resources. Stem Cell from Human Exfoliated Deciduous Teeth/SHED is stem cell source with extensive proliferation capacity and extracted primary teeth are easy to obtain. After being isolated, SHED is then growth in culture in initial cell density. In order to gain stem cell in abundant supply, initial density might effect cell growth. This study was aimed to analyze effect of initial cell density in SHED proliferation capacity. **Methods:** The research was experimental laboratory with cross sectional design. The sample was obtained from dental pulp of primary extracted teeth which matched the criteria. SHED was seeded in different initial cell density that is 500 cell/well, 1000 cell/well, 2000 cell/well and 4000 cell/well. Cell proliferation then being analyzed using MTT assay. **Results:** The average number of SHED seeded in initial cell density 2000 cell/well and 4000 cell/well showed the highest proliferation with no statistical difference. **Conclusion:** In this study, initial cell density 2000 cell/well showed optimal proliferation capacity of SHED. SHED is very accessible tissue resource and also potential in providing abundant cells for clinical application.

Keywords: SHED, Initial cell density, Proliferation capacity

The Relationship between Dental and Oral Hygiene to the Quality of Life of Elderly People in Nursing Home

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ABSTRACT

Introduction: Elderly is something that happens naturally to all people in this world without exception. Physical changes in the elderly cause the elderly to lack confidence in social relations with the community and various diseases that can attack the elderly both acute and chronic. The increase in disease disorders causes changes in the quality of life of the elderly. Hygiene of the teeth and mouth needs to be considered and improved because it is something that is integral to overall health. Hygiene of the teeth and mouth can affect the quality of life of the elderly. This study aims to determine the relationship of dental and oral hygiene to the quality of life of elderly in the Wredha Pangesti nursing home. **Methods:** The design in this study was observational analytic with cross sectional approach. The sampling technique was purposive sampling. **Results:** Elderly who have dental and oral hygiene, at most in the criteria of being 21 people (70%) and the elderly who have quality of life, at most in the moderate criteria of 22 people (73.3%). **Conclusion:** Data analysis using the Pearson Correlation Test and Spearman Correlation Test shows that there is no relationship between dental and oral hygiene to quality of life.

Keywords: Elderly, Quality of life, Oral and dental

The Effect of Snail Mucus Topical Application with Concentrations 2,5%, 5% And 7,5% For Post Tooth Extraction Wound Healing In Guinea Pigs (*Cavia cobaya*)

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ABSTRACT

Introduction: The wound healing process can be accelerated by topical medication. Snail mucus is one of the traditional medicine which commonly used by the community, because it has Acharin Sulfate and Glycosaminoglycan. This study aims to determine the effect of snail mucus topical application with concentrations 2,5%, 5% and 7,5% for post tooth extraction wound healing in guinea pigs. **Method:** Quasi-experimental research was conducted on 24 guinea pigs, which were divided into 4 groups. The first group was given topical application of Povidone Iodine 10% on H0, the other groups were given snail slime gel 2.5%, 5% and 7.5% on D+1 and D+2 after extraction of left incisors, respectively. Standard photo taking is done on D0, D+3, D+5, D+7, D+10 with a DSLR camera. Wound area measurements using the 2016 Skech-up program. Inflammation scores were assessed by drawing marginal lines in the wound tissue and then dividing it into 8 sections. The section with inflammatory was given 1 score. Data were analyzed by Kruskall Wallis and Mann Whitney at a significance level of 5%. **Result:** The results showed that on each day of observation each group experienced a reduction in wound area and inflammation score. The difference in wound area was 7.5% for the control group and 2.5% was significant for each day of observation. The difference in wound area in the 5% group and the 7.5% group was significant in D+3, D+5 and D+7 observations, but in D+10 it was not significant. The difference in inflammation score of the 7.5% group and the control group was significant at D+7 and D+10. **Conclusion:** It was concluded that the application of 5% and 7.5% snail slime gel could accelerate wound healing after guinea pig's tooth extraction with the same effect on the 10th day observation.

Keywords: Snail mucus gel, Tissue discoloration, Wound healing, Wound area

Penaeus Monodon Shell Powder as a Candidate for Dental Materials

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ABSTRACT

Introduction: Glass ionomer cements (GIC) are one of the dental materials that are often used and have biocompatibility properties. GIC has a silica composition of 29%. Penaeus monodon shell is a waste of production that is found in the export industry. One of the contents of the Penaeus monodon shell is silica which can be used as a candidate for dental materials. This aim of this research is to study Penaeus monodon shell powder as a candidate for dental materials. **Methods:** This research is descriptive observational research. The research sample used was Penaeus monodon shell powder were tested by with XRD test (x-ray diffraction). **Results:** After XRD test, the composition of Penaeus monodon shell powder is 69% silicon oxide (SiO_2) and 31% calcium carbonate (CaCO_3). **Conclusion:** Penaeus monodon shell powder can be used as a candidate for dental materials.

Keywords: Penaeus monodon, silica, XRD

Evaluation of Synthesized Nanohydroxyapatite from Third Molar in Bone Tissue Engineering

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ABSTRACT

Introduction: Hydroxyapatite (HAp) has been widely used in repair of hard tissues, and common uses include bone repair. The characteristic of HAp is low mechanical strength so its generally restricts use to low load-bearing applications. Recent advancements in nanoscience and nanotechnology have reignited investigation of nanoscale HAp formation in order to clearly define the small-scale properties of HAp. It has been suggested that nanohydroxyapatite (nano-HAp) may be an ideal biomaterial due to its good biocompatibility and bone integration ability. Hydroxyapatite can be obtained from third molars as bone remodeling materials. Bone remodeling is a process of homeostasis that involves coordination of osteoblast cells, osteoclasts and osteocytes. Utilization of nanotechnology in fabrication and characterization of third molars as bone graft candidates on the dentistry is able help bone regeneration. **Methods:** Hydroxyapatite is made from calcium on third molars with addition of phosphoric acid through a calcination process with temperature 900 °C. Hydroxyapatite is milled to obtain nanoparticles. The synthesized samples were characterized by X-ray diffraction (XRD) test to determine the contain phase and degree of crystallinity and particle size analysis (PSA) to find the substance size. **Results:** Particles was synthesis by ball milling methods. XRD test showed the third molar contains of $\text{Ca}_5(\text{PO}_4)_3(\text{OH})$. The XRD test revealed a degree of crystallinity of 60.27% indicating the solid particle phase and the PSA test determined the particle size of 234.2 nm. **Conclusion:** Synthesis of nanohydroxyapatite (nano-HAp) from third molars led to obtaining a product with a high degree of crystallinity and nanoscale particle.

Keywords: Nanohydroxyapatite, Third molars, Bone tissue engineering

The Role of Effective Communication In Improving Patient Compliance

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ABSTRACT

Introduction: The patient's level of compliance with the dentist's instructions is generally quite low. The willingness of patients to return to visit the dentist is influenced by several things, one of which is the patient's satisfaction with the dentist. Patient satisfaction with the dentist is affected by effective communication between the dentist and the patient. Effective communication between the dentist and patient is communication built on the hope that it can create good interpersonal relationships, the same meaning of information, and medical decision making. Therefore, in this study, the authors intend to determine the role of effective communication in increasing patient compliance with dentist instructions. **Methods:** Using descriptive analytic research with quantitative data collection using the interview method with guidance questionnaire. The sample of the study was 33 dental patients of RSI Asyiyah Malang and Brawijaya University Hospital who had fulfilled the sample inclusion criteria. The statistical method used to be the Spearman rank correlation test with $\alpha = 0.05$. **Results:** The percentage of patient compliance improve, according to the level of effectiveness of communication. Result of Spearman correlation test p-value is 0.002 ($< \alpha 0.05$) and the correlation coefficient is 0.553. **Conclusion:** There is a huge role of effective communication in improving patient compliance. The effectiveness of communication between dentist and patient can be caused by several factors. Effective communication that built by both, can create a good interpersonal relationship and will improve patient compliance with dentist's instruction.

Keywords: Effective communication, Patient compliance, Dentist's instructions, Interpersonal relationship, Patient satisfaction

Fibronectin Expression in Diabetic *Rattus Novergicus* Suffering Traumatic Oral Ulcer After *Apis Mellifera* Propolis Extract Gel Applications

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ABSTRACT

Introduction: Diabetes mellitus can cause delayed wound healing include in oral cavity because of fibronectin formation decreases. Propolis is one of the herbal medicines commonly used as an alternative medicine for oral ulcer. The study explored the role of propolis extract gel application from beekeeping Malang Lawang Regency on the expression of fibronectin in the healing process on diabetic *Rattus novergicus* with traumatic oral ulcer. **Methods:** The study was conducted on 27 male *Rattus novergicus* divided into nine groups. Sixth groups were induced by 50 mg/kg of Streptozotocin to provoke hyperglycemia for positive control and treatment groups. Three groups without Streptozotocin for negative control. All of the groups suffering traumatic ulcer on their lower lip mucosa. The control groups treated with HPMC 5% gel and propolis extract gel was applied to treatment groups. The fibronectin expression was observed on days 3, 5, and 7. *Rattus novergicus* sacrificed and the lower lip labial mucosa tissue has been taken for the histopathological anatomy preparation using immunohistochemical examination with monoclonal antibodies anti-fibronectin. **Results:** This study revealed the expression of fibronectin increased in the treatment group rather than positive controls resembling expressions in normal conditions. Analysis of variance showed significant differences ($p < 0.05$) of fibronectin expression between the treatment and positive control groups on days 5 and 7. **Conclusion:** Propolis extract gel increase the expression of fibronectin during the healing process of traumatic ulcers on the oral mucosa of diabetic *Rattus novergicus*.

Keywords: Diabetes mellitus, Ulcer healing process, Fibronectin expression

Effect of Side Stream Cigarette Smoke Exposure on Immunohistochemical Expression of Bcl-2 Protein in Tongue Epithelial Mucosa of *Rattus norvegicus*

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ABSTRACT

Introduction: Active and passive smoking are widely known to be toxic to the human body and induces several types of cancers including oral cancer. Substances of carcinogen benzopyrene in tobacco smoke lead to carcinogenesis which can affect the regulation of cell apoptosis, not only in active smokers but also in passive smokers. The risk of malignant transformation can be observed through the apoptotic pathway with the expression of anti-apoptotic protein like B-cell lymphoma 2 (Bcl-2). **Methods:** Thirty-six rat (*Rattus norvegicus*) were divided into 4 groups, namely the exposed group to side stream cigarette smoke for 4 weeks (P4) and 8 weeks (P8), the control group which was not exposed to side stream cigarette smoke for 4 weeks (K4) and 8 weeks (K8). Exposure was done by using a smoking pump, each rat received dose exposure of 2 cigarettes everyday for 4 weeks and 8 weeks. The tongue mucosa of rat was dissected and prepared for immunohistochemical for analyzed the expression of Bcl-2. T-test was done to determine the difference between treatment and control group. **Results:** The expression of Bcl-2 in treatment group exposed to side stream cigarette smoke for 8 weeks (P8) is significantly higher compared with the control group not exposed to side stream cigarette smoke for 8 weeks (K8) ($p=0.006$) and the treatment group exposed to side stream cigarette smoke for 4 weeks (P4) ($p=0.008$). No differences between treatment group exposed to side stream cigarette smoke for 4 weeks (P4) and the control group not exposed to side stream cigarette smoke for 4 weeks (K4) ($p=0.801$). **Conclusion:** Higher exposure of cigarettes leading to higher expression of Bcl-2 can affect the regulation of cell apoptosis, therefore change cell structure and develop to malignancy.

Keywords: Bcl-2, Apoptosis, Side stream cigarette smoke, Carcinogenesis, Tongue mucosa

Wound Healing Effect of Lime Peel Decoction (*Citrus aurantifolia*) on the Osteoclast Number in Alveol of Wistar Rats after Tooth Extraction

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ABSTRACT

Introduction: Tooth extraction causes damage to oral tissue and needs treatment to restore chewing, aesthetics, speech function, and prevent tooth extrusion. Osteoclasts in alveolar play an important role in bone healing, especially in the remodeling phase of bone resorption at the start of new bone formation. Lime peel contains many active compounds such as flavonoids, vitamin C and tannins that possesses antibacterial, anti-inflammatory and antioxidants. Therefore, this study was aimed to determine the effect of lime peel decoction (*Citrus aurantifolia*) on the number of osteoclast alveoli in Wistar rats after tooth extraction. **Methods:** Two-month-old male Wistar rats were divided into 6 groups of 5 animals in each group namely: control groups without lime peel decoction (K1, K2, K3) and treatment groups with lime peel decoction (P1, P2, P3). The first mandibule incisivus were extracted and the treatment groups were given 1 cc lime peel decoction once a day for seven days (P1) fourteen days (P2) and twenty first days (P3), then decaputed on the 7th, 14th, 21st day and proceeded to histology tissue preparations to calculate the number of osteoclasts. **Results:** The lime peel decoction was found to decrease the number of osteoclasts on 14th days along with that osteoblast proliferate so that induce the formation of new bone. Treatment group reached remodelling process on 14th days while the control group estimated on 29th days. One-Way ANOVA showed a significant difference between group K2 and group P2. **Conclusion:** Based on this study, it can be concluded that the lime peel decoction (*Citrus aurantifolia*) affects the amount of osteoclast alveolar in Wistar rats after tooth extraction and accelerate healing process.

Keywords: Healing process, Lime peel decoction (*Citrus aurantifolia*), Osteoclast, Tooth extraction

Anti-Fungal Properties of the Extract of *Carica papaya* var. California's Peel against *Candida Albicans*: In Vitro Study

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ABSTRACT

Introduction: *Carica papaya* variety California is widely distributed in Indonesia. The pulp is used for daily consumption, but the seed and peel are usually discarded. Even though the seed and peel of *Carica papaya* are often discarded, they may have a potential as a herbal medicine. Previous studies have shown that *Carica papaya*'s seeds and leaves can inhibit the growth of *Candida Albicans*. *Carica papaya* variety California contains anti-fungal properties such as saponin, alkaloids, flavonoids, steroids and tripenoids, but the anti-fungal effects of *Carica papaya* variety California's peel against *Candida Albicans* has not been established yet. Therefore, this study aims to determine the anti-fungal potential of the extract of *Carica papaya* variety California's peel against *Candida Albicans* colony.

Methods: The 2.5%, 5%, 10% and 20% concentration of *Carica papaya* variety California's peel was prepared. Each concentration was tested with *Candida Albicans* culture in Sabouraud dextrose agar, using aquadest as negative control and Nystatin 1:100,000 IU as positive control. The minimum inhibitory concentration was evaluated by Kirby-Bauer Disk Susceptibility Test. **Results:** No minimum inhibitory concentration was found in 2.5% concentration, whereas low minimum inhibitory concentration was found in 5%, 10% and 20% concentration of *Carica papaya* variety California's peel extract. **Conclusion:** Extract of *Carica papaya* variety California's peel with a minimum concentration of 5% might be used as an anti-fungal agent against *Candida Albicans in vitro*. Further investigation need to be performed to evaluate the potential of *Carica papaya* variety California's peel as a herbal medicine *in vivo*.

Keywords: *Carica*, *Candida albicans*, herbal medicine, minimum inhibitory concentration, *in vitro* technique

The Effect of Allogenic Freeze-Dried Platelet Rich Plasma Topical Application on TGF- β 1 Expression in Traumatic Oral Ulcers of Diabetic Wistar Rats

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ABSTRACT

Introduction: Diabetes mellitus is a metabolic disorder characterized by persistent hyperglycemia due to defect in insulin secretion, insulin action, or both. In the condition of diabetes disruption of the wound healing process such as traumatic ulcers, one of which is caused by a decrease in several growth factors such as TGF- β 1. This study was aimed to determine the effect of allogenic Freeze Dried – Platelet Rich Plasma (FD-PRP) topical application on TGF- β 1 expression in traumatic oral ulcers of Wistar rats suffered with diabetes mellitus (DM). **Methods:** Allogenic FD-PRP was obtained from 35 healthy Wistar rats (*Rattus norvegicus*) and gel was made by adding 2% carboxymethyl cellulose (CMC). Another 30 Wistar rats were divided into 6 groups and induced with 50 mg/kg streptozotocin as diabetogenic agent that selectively damage pancreatic B cells. Traumatic ulcers were made by touching a heat burnisher on lower labial mucosa. Traumatic ulcers in 3 control groups were given 2% CMC and the other 3 groups were given topical application of allogenic FD-PRP gel. The expression of TGF- β 1 was observed on day 3, 5 and 7 by immunohistochemical examination. Data were analysed using SPSS program with ANOVA test with the results of the study were considered significant if less than 0.05. **Results:** The results showed a higher increase in TGF- β 1 expression in the group given allogenic FD-PRP than in the control group. Analysis of variance showed significant differences ($p < 0.05$) of TGF- β 1 expression between the treatment and control groups. **Conclusion:** Allogenic FD-PRP increases TGF- β 1 expression during the healing process of traumatic oral ulcers in diabetic Wistar rats. Thus, TGF- β 1 has a crucial role in healing process of diabetic oral ulcer.

Keywords: Diabetes mellitus, Traumatic oral ulcer, Allogenic freeze-dried platelet rich plasma, TGF- β 1 expression, Streptozotocin

Effects of Topical Application of Propolis Extract Gel on Epidermal Growth Factor (EGF) Expression in the Traumatic Oral Ulcers of Diabetic Wistar Rats

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ABSTRACT

Introduction: Patients with diabetes mellitus (DM) tend to experience decreased levels of Epidermal Growth Factor (EGF) that can slow wound healing process, including in the oral cavity. This study was to determine the effects of propolis extract gel on EGF expression in the traumatic oral ulcers of Wistar rats suffered with diabetes mellitus (DM).

Methods: The study was conducted on 36 male Wistar rats (*Rattus norvegicus*) induced intraperitoneally by 50 mg/kg of Streptozotocin to provoke hyperglycemia, and a traumatic ulcer on their lower lip mucosa. The Wistar rats were divided into twelve groups; three for each positive control, negative control and treatment groups. Each control and treatment group consisted of three rats. The control groups were treated with HPMC 5% gel and propolis extract gel was applied topically on treatment groups. The expression of EGF was observed on day 3, 5, 7, and 9. Furthermore, the rats were sacrificed and the lower lip labial mucosa tissue of rats has been dissected for the immunohistochemical examination with monoclonal antibodies anti-EGF. **Results:** This study revealed that there was a the expression of EGF was increased in the treatment groups rather than positive controls. Analysis of Variance showed significant differences ($p \leq 0.05$) of EGF expression between the treatment groups and positive control groups. **Conclusions:** The use of propolis extract gel can increase the expression of EGF that can activate cell proliferation which plays an important role in the process of wound healing.

Keywords: Diabetes mellitus, Ulcer healing, Propolis extract gel, Hydroxypropyl methylcellulose, EGF expression

Physical Stress as Predisposing Factor of Recurrent Oral Ulceration

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ABSTRACT

Introduction: Oral ulcers can be predisposed by various factors such UV light, genetic, the presence of imbalance hormone, trauma, systemic disease, vitamin deficiency, food allergies, infections bacteria or virus, and physical or psychological stress. Physical stress is commonly experienced by people and it is frequently associated to the development of recurrent oral ulcers. This case report discussed the two most common recurrent oral ulcers, recurrent aphthous stomatitis (RAS) and recurrent herpes labial (RHL) that are predisposed by physical stress. **Case Report:** A 49-year-old female patient came to Oral & Dental Hospital Faculty of Dentistry University of Indonesia with complaints of a reddish wounds on her lips, that initially appeared in the form of vesicles. She admitted to had physical stress and fatigue prior the eruption. The lesion was diagnosed as RHL and healed in a week but then she experienced canker sore which was diagnosed as RAS. Both oral ulcers were known to recur whenever she experienced physical stress or fatigue. **Results:** The patient was informed about her recurrent oral lesions and the predisposing factors. Her lesions were healed after treated with use chlorhexidine gluconate, bufacetine chloramphenicol treatment for RHL and hyaluronic acid treatment for RAS. **Conclusion:** Physical stress is one of the predisposing factors for the presence of recurrent oral ulcers. Taking history and a thorough examination is needed to get a successful treatment.

Keywords: Recurrent Oral Ulcers (ROU), Recurrent Aphthous Stomatitis (RAS), Recurrent Herpes Labial (RHL), Physical stress, Stress management

The Use of Teledentistry to Enhance Diagnosis in Oral Medicine: A Systematic Review

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ABSTRACT

Introduction: Teledentistry is an application that provide dental care, consultation, treatment plan and follow up in real time or offline through electronic transmission from distant location. This article objective is to review systematically about the use of teledentistry in Oral Medicine field in order to enhance diagnosis difficulties. **Method:** Electronic databases were searched to find relevant articles, limited in English language and publication for the period of March 2009 up to March 2019. Literature searches were conducted from relevant databases. The search strategy included subject and keyword searching. **Result:** Of 100 possible articles that were seen, only 7 articles that meet the inclusion criteria. The studies showed that teledentistry in oral medicine field can reach remote areas, such as in countries with vast areas with lack of dentists, such as Australia and Brazil. Most of the studies uses smartphone application in performing teledentistry. **Conclusions:** Teledentistry has been used in Oral Medicine field, in the form of consultation, clinical examination, diagnosis ability for oral lesions and oral medicine referral. The lack of corresponding studies in this systematic reviews, showed the further need to elaborate more of teledentistry usefulness in Oral Medicine.

Keywords: Teledentistry, Oral Medicine, Diagnosis, Oral Disease, Oral Lesion

Chronic Oral Ulcer Management in Post Irradiated Tongue Cancer Patient: A Case Report

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ABSTRACT

Introduction: Chronic ulcer of the tongue should raise dentist awareness, since the location is prone for the development of Oral Squamous Cell Carcinoma (OSCC), especially to those who had history of OSCC. **Case Report:** A 31 years old female patient visited Oral Medicine clinic for painful tongue ulcer for more than 2 weeks. Three months before, she had undergone combination of hemiglossectomy and chemo radiotherapy for lateral tongue cancer, that located adjacent to the present ulcer. Clinical examination showed a 1-cm irregular whitish shallow ulcer, the lateral area of the right tongue in contact to the linguoversion positioned 47. **Result:** Clinical examination showed that there was no considerable lesion improvement after common oral ulcer therapy. The patient was then referred to an endodontist to devitalize and re-contour the 47 crown so it would not cause trauma to the tongue. Subsequently, the ulcer healed on follow up visits. **Conclusion:** Dentist should take precaution to prevent the development of chronic ulcer on areas prone to the development of OSCC. It should include any possible risk that can cause chronic ulcers, including chronic irritation by tooth malposition. The risk assessment and action should be performed prior irradiation.

Keywords: Chronic oral ulcer, Oral Squamous Cell Carcinoma, Post irradiated patient, chronic irritation, Tongue ulcer

Thermal Burn of Palate: A Case Report

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ABSTRACT

Introduction: There are four primary aetiologies of oral mucosal burn, one of them is thermal. Thermal burns in oral cavity are most often caused by accidental ingestion of hot foods or beverages. Clinical presentation of thermal burn appears various, from erythematous to ulceration, localized or diffused area of tissue damage depending on the severity and extent of the insult. **Case Report:** A 22-year-old female sought care at Dental Hospital Universitas Indonesia with chief complain of anterior palatal pain for one day. She complained that the pain began after she ate hot fried tofu. Clinical examination revealed multifocal erythematous patches on the hard palate mucosa that extended to the posterior site of the upper premolars area. **Results:** The lesion had resolved after the application of soothing oral gel by follow-up visiting one week later after the application of soothing oral gel. **Conclusion:** Thermal burns can cause patient's discomfort in the oral cavity and can manifest in various clinical features. For its comprehensive management, dentist should gain complete anamnesis, thorough examination and have the ability to distinguish it from other lesions.

Keywords: Oral mucosal burn, Thermal burn

Multiple Clinical Findings on The Tongue: Normal, Variants of Normal or Pathologic? (A Case Report)

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ABSTRACT

Introduction: The normal variations of healthy tissues are common. Although the locations of normal variations are predictable for dentists and asymptomatic, most people are not familiar with those. The increasing awareness of oral cancer also increases in patients who concern towards normal variations. Human tongue has many normal variations, such as geographic tongue and fissured tongue. Also, there are candida-associated lesions on the tongue whose appearance is similar to the geographic tongue, which is the central papillary atrophy, this lesion can be symptomatic and asymptomatic. The objective was to present a case report about a patient with multiple oral findings on the tongue; geographic tongue, fissured tongue and central papillary atrophy. **Case Report:** A 53-year-old male patient came to Dental Hospital of Universitas Indonesia for dental check-up. In objective examination we found no papillae areas surrounded by keratinized lining in the lateral left and right area of the tongue and fissures spreading all over the dorsum of tongue and an ovoid area of redness in the middle of 2/3 posterior dorsum part of the tongue. All those findings were asymptomatic. We diagnosed those findings as geographic tongue, fissured tongue, and central papillary atrophy. The unique of this case the geographic tongue was bilateral on the lateral tongue. **Conclusion:** As a dentist, especially specialize of oral medicine, it is important to have knowledge and ability to detect normal, variations of normal or pathologic lesions of the tongue. We should inform and educate the patients about the normal variations so that they would not develop anxiety about the normal variations in the future.

Keywords: Geographic tongue, Fissured tongue, Central papillary atrophy, Normal variations, Oral lesion

Measurement of Motivation in Oral Medicine Learning in Dental Students Universitas Indonesia using Indonesian Version of Science Motivation Questionnaire II

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ABSTRACT

Introduction: Oral health problems, including oral soft tissue lesions, in Indonesia is increasing annually. Motivation in Oral Medicine learning is needed for dentists to treat these issues. This study aims to determine the level of learning motivation in Oral Medicine among dental students of Universitas Indonesia. **Methods:** This study used an analytic-descriptive study with cross-sectional design by gathering data directly from total population of Universitas Indonesia dental students. Respondent were divided into three groups based on curriculum. Data gathering was using *Science Motivation Questionnaire II (SMQ-II)*, which include five motivation components, consist of intrinsic motivation, self-efficacy, self-determination, grade motivation and career motivation. **Results:** The response rate of this study was 96.6% (743 respondent). The result of Interclass Correlation Coefficient of 0,941, indicated was a good internal consistency. In discriminant validity test, grade motivation and career motivation of pre-clinical groups showed no significant difference. Among three respondent groups, clinical years acquired the highest mean score for highly motivated groups (mean: 67.27), followed by pre-clinical taken OM (mean: 65.89), ended by pre-clinical hadn't had OM (mean: 62.54). The highest mean score for overall motivation, acquired by clinical years. **Conclusion:** Clinical years have the highest motivation level to learn in Oral Medicine.

Keywords: Learning motivation; Oral Medicine; Dental Students; Motivation Components; Science Motivation Questionnaire II (SMQ-II)

Compressive Strength Difference of Restoration Material Nanohybrid Resin Composite With Fiber Reinforced Composite (FRC)

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ABSTRACT

Introduction: Compressive strength is a mechanical property as a posterior tooth restorative to avoid cracking the restoration due to chewing pressure. Compressive strength composite resin has different strengths depending on the resin material. One of the applications of dental nanotechnology is nanohybrid resin composite which has compressive strength over microfiller composites. The composition of nanohybrid is nano-sized filler combined with micro-sized filler. Composite resins with a new fillers, which is known as fiber reinforced composites (FRC), is offer highfracture resistance because they contain E-glass fiber which can increase the hardness of composite resins. The aim of this research is to know the difference of compressive strength between nanohybrid resin composite and fiber reinforced composite. **Methods:** This study used 20 resin composite samples divided into 2 groups, group A was a nanohybrid resin composite restoration and group B was a fiber reinforced composite restoration, formed to resemble a cylindrical tube with a diameter of 4 mm and a height of 6 mm. Samples were given the same treatment by incremental technique and light cure for 20 seconds in every 2mm layers. Afterward the sample was fed into the incubator at 37 °C for 48 hours. Each sample were tested for compressive strength test by using Universal Testing Machine (UTM) within 1mm/sec speed. **Results:** The data ware analised by t-test and showed a significantly difference ($p>0,05$). **Conclusion:** This study revealed that the strenght of fiber reinforced composite was greater than greater than nanohybrid resin composite.

Keywords: Nanohybrid resin composite, Fiber reinforced composite, Compressive Strength, Tooth restorative, Resin material

Angiogenic activity on bone healing of dental extraction stimulated by *Aloe vera* scaffold from Batu, Malang, Indonesia

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ABSTRACT

Introduction: *Aloe vera* was a healing plant contains proangiogenic phytochemical. Vascular Endothelial Growth Factor (VEGF) plays a vital role to enhance blood vessel formation, osteoblast proliferation and new bone formation. This study was done to investigate the effect of *Aloe vera* scaffold on bone healing of dental extraction in animal model *Cavia cobaya*. **Method:** *Aloe vera* plants was obtained from Batu, Malang, East Java, Indonesia. Thirty six males *Cavia cobaya* were divided into six groups: negative control, positive control applied with chitosan scaffold and treatment groups which applied combination of chitosan and *Aloe vera* scaffold into mandibular left incisor socket. The first three groups were sacrificed after 7 days and the last three groups after 14 days. The jaw was cut for immunohistochemistry examination to observe the expression of VEGF and histopathology examination to observe osteoblast proliferation. Data were analyzed by ANOVA test and LSD test. **Result:** There were significantly different between control group and treatment groups ($P < 0.05$). The application of combination chitosan dan *Aloe vera* scaffold increase expression of VEGF and osteoblast proliferation in dental socket. **Conclusion:** *Aloe vera* has biologic activity to enhance the expression of VEGF and osteoblast proliferation on bone healing of dental extraction.

Keywords: VEGF, Osteoblast proliferation, *Aloe vera*, Bone healing, Dental extraction

C-Terminal Telopeptide Crosslinks (CTx) and Osteocyte in rats (*Rattus norvegicus*) Induced by LIPOPOLISAKARIDA (LPS) *Aggregatibacter actinomycetemcomitans* by administering Green Tea Extract (*Camellia sinensis*)

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ABSTRACT

Introduction: Periodontitis is an inflammatory reaction caused by specific microorganisms that cause damage to the alveolar bone. The bacteria can cause a severe damage, and one of them is known as *Aggregatibacter actinomycetemcomitans*. Bone damage can be caused of osteoclast activity. Osteoclast biomarker in blood serum was named a Crosslink C-Terminal Telopeptide (CTx). Green tea (*Camellia sinensis*) contains active ingredient epigallocatechin gallate (EGCG) which was proven to regenerate bone by increasing bone cell proliferation and differentiation using periodontitis wistar rats. **Methods:** This study was divided into 4 groups: The first group was a negative control, the second was a positive control, the third and the fourth were treatment groups. The negative control group did not receive any treatment. The positive control group was given LPS Aa 5 µg/3µl PBS and *Camellia sinensis* induction with each dose 150 mg / 100 grBB and 200 mg / 100 grBB on days 21-36 days. The level of CTx was examined by using ELISA method to observe osteoclast activity. The number of osteoclast were stained by HE method. **Results:** data analysis showed there was a very strong correlation between administration of *Camellia sinensis* extract and an increase in osteocyte count ($p < 0.05$, with correlation coefficient = 0.883), whereas CTx levels showed that there were no significantly different ($p > 0,05$) between positive groups with treatment caches one and two. **Conclusion:** This study revealed that was a *Camellia sinensis* could increase the number of osteocytes in periodontitis inducing LPS Aa on rat wistar.

Keywords: CTx, Osteocytes, LPS Aa, *Camellia sinensis* extract

Anatomical Variations of Thenar Muscle of Hand, Among Cadavers In Universiti Putra Malaysia (UPM)

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ABSTRACT

Introduction: Detailed information of structural and functional anatomy of thenar muscle is very significant in order to improve diagnostic and various conditions of hand surgeries so that the function of hand movement can be restored and to prevent further iatrogenic injuries. **Methods:** In this study, fifty hands were dissected to determine the variation in each of the thenar muscle. **Results:** Only the abductor pollicis brevis showed significant findings. Normal formation of one belly in abductor pollicis brevis represented 72.0% (18) and 84.0% (21) for the left and right hands, respectively. Variations according to the number of belly of the abductor pollicis brevis were also observed. One of the variations is the absence of the abductor pollicis brevis, 4.0% (1) in the right hand. Two belly formations of abductor pollicis brevis were observed, 28.0% (7) and 12.0% (3) for left and right sides of hand respectively. Thus, more variations were observed to occur on the left hand (7) compared to the right hand (4). Many studies describe about the variations of each thenar muscle, but few literatures were found discussing on the association of thenar muscle variation with the sides of hand. Using the Fisher Exact Test, it showed that there was no significant association of variations in the thenar muscle in relation to the sides of hand. **Conclusion:** This study conclude that there is no consistency between variations of the thenar muscle in relation to the sides of hand. However, clinical awareness of these variations is important in the context of compartment syndrome, use of the aberrant structures as grafting material in reconstructive surgery and proper interpretation of imaging modalities.

Keywords: Thenar muscle, Abductor pollicis brevis, Flexor pollicis brevis, Opponen pollicis, Adductor pollicis brevis

The Effect of Casein phosphopeptide-amorphous calcium phosphate Paste on Salivary Acidity Levels and *Streptococcus mutans* Counts in Children

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ABSTRACT

Introduction: Dental caries is one of the most prevalent disease worldwide. This disease caused by *Streptococcus mutans*. There are two methods to control *Streptococcus mutans* counts, which are mechanically and chemical-ly plaque control. One of chemically plaque control method used is Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP). Topical application of CPP-ACP can inhibit the attachment of bacteria plaque on the teeth. It will inhibit the growth of *Streptococcus mutans* counts and prevent dental caries. Therefore, this study was to determine the effectiveness of CPP-ACP to increase the salivary acidity level and decrease the colony of *Streptococcus mutans* in children. **Methods:** This study was an experimental clinical study that aims to determine the impact of a treatment on research subjects. The design used in this study was pretest-posttest design. The participants were 30 children, aged 10-12 years old that obtained with purposive sampling. The saliva of the children were collected before and after topical application CPP-ACP. The colony of *Streptococcus mutans* was determined by colony counting (Colony Forming Unit). The salivary acidity level was measured using dental saliva pH indicator. **Results:** This study showed that the mean of salivary acidity level before CPP-ACP topical application was 7.6333 and after CPP-ACP topical application becomes 7.7467. There was a significant difference in saliva pH level between before and after CPP-ACP topical application. The colony of *Streptococcus mutans* before CPP-ACP topical application was 4762,23±8104,682 CFU/ml and after CPP-ACP topical application was 555,73±409,602 CFU/ml. Wilcoxon test showed that there was a significant difference between the levels of salivary acidity and the colony of *Streptococcus mutans* before and after CPP-ACP topical application. **Conclusion:** There was an increase in the salivary acidity levels and decrease in the *Streptococcus mutans* counts before and after CPP-ACP topical application in the children.

Keywords: Casein phosphopeptide – amorphous calcium phosphate, *Streptococcus mutans*, Caries, Salivary, pH

Effectiveness Test of 0.5% Green Betel Leaf Extract (*Piper betle* L.) and 6,5% Red Betel Leaf Extract (*Piper crocatum*) of Mixed Bacteria of Root Canal's Deciduous Tooth In Vitro Study

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ABSTRACT

Introduction: Primary teeth have a higher pulp horn morphology and thinner enamel causes caries teeth have easier bacterial invasion, rapid extending into pulp necrosis which need root canal treatment. Some natural materials which can developed as alternative of root canal irrigation materials were green betel leaf 0.5% and red betel leaf 6.5%. This study was done to determine the effectiveness of 0.5% green betel leaf (*Piper betle* L.) extract and red betel leaf extract (*Piper crocatum*) 6.5% in inhibiting the growth of mixed bacteria of non vital root canal's deciduous teeth *in vitro* study. **Methods:** this research was post test only control group design using *in vitro* solid dilution method. Samples of mixed bacterial taken from 12 root canal of necrosis anterior deciduous teeth. These samples then tested with 0.5% green betel leaf extract, 6.5% red betel leaf extract and negative control only MHA media. The growth of the mixed bacteria counted using scoring method. Data were analyzed. **Results:** Mann Whitney test results showed that there were significant differences between the average effect of 6.5% red betel leaf extract and 0.5% green betel leaf extract. **Conclusion:** 6.5% red betel leaf extract was more effective than 0.5% green betel leaf extract in inhibiting the growth of mix bacterial root canals of non vital deciduous teeth *in vitro*. Further research needed to prove the effectiveness of these betel leaves as root canal irrigation materials *in vivo* study.

Keywords: Deciduous teeth, Root canal's mixed bacteria, Green betel leaf, Red betel leaf, Root canal irrigation

The Differences of Compliance Level between BPJS and Non BPJS Patient on Caries Treatment at Klinik Nusantara Kepanjen Kabupaten Malang

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ABSTRACT

Introduction: Caries is one of the most complained dental and oral disease. On caries treatment, compliance is the most important thing so the result of the caries treatment reach optimal. However, sometimes patients are not obedient when in caries treatment. Through the National Health Insurance (JKN) program organized by BPJS, patients are expected to be more obedient when in caries treatment. The purpose of this research is to determine the differences of the compliance level to caries treatment between BPJS and Non BPJS patients at Klinik Nusantara Kepanjen Kabupaten malang. **Methods:** The design in this study was observational analytic research with a cross-sectional approach. The sampling technique was purposive total sampling. The characteristics of respondents in this study were mostly female, namely 48 respondents (80%) with the highest age of respondents between 15-44 years, 44 respondents (73.3%). **Results:** The highest level of compliance of BPJS patients in caries treatment is the level of moderate compliance and the most non-BPJS patients have a low level of compliance that is 15 respondents (50%). **Conclusion:** Data analysis using the Mann-Whitney U Test showed that there was no significant difference in compliance level between BPJS and Non BPJS patients at Klinik Nusantara Kepanjen Kabupaten Malang.

Keywords: BPJS, Caries, Compliance

Expression of Epidermal Growth Factor in Wound Healing Following Administration of Pangas Catfish Gelatin

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ABSTRACT

Introduction: When a wound occurs, several growth factors are released together with inflammatory mediators, such as epidermal growth factor (EGF). Pangas catfish gelatin contains abundant amino acids that play an important role in wound healing process. This study aimed to investigate the effect of pangas catfish gelatin on the level of EGF expression in dental socket following tooth extraction of albino rats. **Methods:** Study samples were divided into three control groups (K) and three treatment groups (P) evaluated on the third, fifth and seventh days after tooth extraction. Expression of EGF in dental socket was assessed using immunohistochemical method. **Results:** The mean levels of EGF expression in post-tooth extraction wounds of the control groups (K) on the third (K1), fifth (K2) and seventh (K3) days were 214.5, 283.25 and 370.45, respectively, meanwhile those of the treatment groups (P) on the third (P1), fifth (P2) and seventh (P3) days were 310.35, 457.7 and 512.4, respectively. **Conclusion:** Administration of pangas catfish gelatin increases the mean level of EGF expression from the third day to the seventh day. Accordingly, application of pangas catfish gelatin may be considered for the wound healing treatment.

Keywords: Epidermal growth factor, Pangas catfish gelatin, Wound healing