

WEB OF SCIENCE™
Clarivate
Analytics



ELSEVIER
Scopus

VOLUME 11, NUMBER 3, SEPTEMBER-DECEMBER 2022

Print-ISSN: 2089-1180

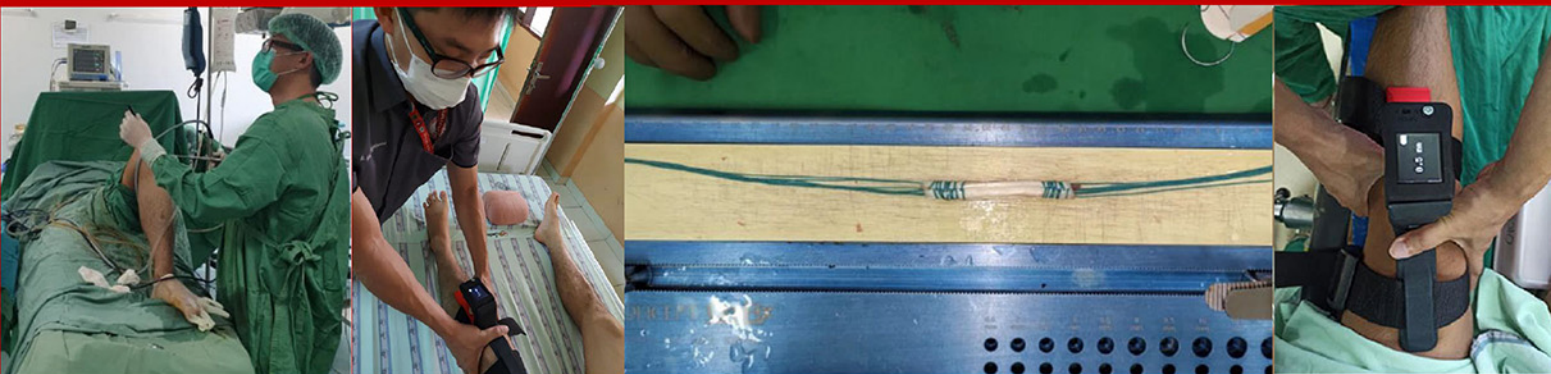
E-ISSN: 2302-2914

DOAJ
DIRECTORY OF
OPEN ACCESS
JOURNALS



BALI MEDICAL JOURNAL (BaliMedJ)

ABSTRACT THE 1st AIRLANGGA INTERNATIONAL ENDODONTIC SYMPOSIUM 2022



**Bali
Medical Journal**

www.balimedicaljournal.org



**PUBLISH BY : SANGLAH GENERAH HOSPITAL
IN COLLABORATION TO
INDONESIAN PHYSICIAN FORUM
AND INDONESIAN COLLEGE OF
SURGEON, BALI-INDONESIA**

Editorial Board Bali Medical Journal

Editor-in-Chief

Prof. Dr. dr. Sri Maliawan, SpBS (K)

([Scopus ID](#)), ([Google scholar](#))

srimaliawan@unud.ac.id / maliawans@yahoo.com

Department of Neuro Surgery, Universitas Udayana

Sanglah General Hospital

Bali - Indonesia

Associate Editor

Prof. Dr. Ir. Ida Bagus Putra Manuaba, M.Phil

([Scopus ID](#)), ([Google Scholar](#))

putramanuaba@unud.ac.id / putramanuaba28@yahoo.com

Biomedicine Postgraduate Program, Universitas Udayana

Bali - Indonesia

Prof. DR. dr. Ketut Suwiyoga, SpOG (K)

([Scopus ID](#))

suwiyoga@unud.ac.id

Faculty of Medicine, Universitas Udayana, Sanglah Hospital Denpasar, Bali-Indonesia

Editorial Board for Regional America

Ankit Sakhuja, M.B.B.S., F.A.C.P., F.A.S.N.

([Scopus ID](#))

asakhuja@med.umich.edu

Nephrology and Hypertension Cleveland Clinic (United States)

Editorial Board for Regional Australia

Prof. John Svigos, MB. BS. DRCOG., FRCOG., RANZCOG

([Scopus ID](#))

jsvigos@iprimus.com.au

Ashford Hospital & Faculty of Health Sciences, University of Adelaide, Australia

dr Deasy Ayuningtyas Tandio MPH-MBA.

([orcidID](#))

deasytandio@yahoo.com

James Cook University Australia Master of Public Health Master Of Business Administration, Indonesia

Editorial Board for Regional Europa

Prof. Harald J. Hoekstra, MD, PhD.

([Scopus ID](#))

h.j.hoekstra@wxs.nl

Universitair Medisch Centrum Groningen, Division of Surgical Oncology, Groningen the Netherland

Editorial Board for Regional Asia

Prof Huang Qin

([Scopus ID](#))

qhuang@cqu.edu.cn

Chairman Dept. of Neurosurgery, Guangdong 999 Hospital Guangzhou China

Prof. Soo Khee Chee, MD. PhD.

([Scopus ID](#))

kheechee.soo@duke-nus.edu.sg

SGH (Singapore General Hospital), National University Hospital, Duke Medical Center Singapore

Dr. G Sai sailesh Kumar, Ph.D

([Scopus ID](#))

saisailesh.kumar@gmail.com

Department of Physiology, Little Flower Institute of Medical Sciences and Research, Angamaly, Kerala, India

Assoc. Prof. Mohammad Amin Bahrami

([Scopus ID](#))

aminbahrami1359@gmail.com

Head of healthcare management department, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Dr. Tanveer Beg, PhD

([Scopus ID](#))

tbmirza@jazanu.edu.sa

Assistant Professor, Department of Biology, Faculty of Science, Jazan University, Jazan, Saudi Arabia.

Editorial Board Members**Prof Dr. dr. Andi Asadul Islam, SpBS(K).***(Scopus ID), (Google Scholar)**undee@med.unhas.ac.id**Faculty of Medicine Universitas Hasanudin, Makasar-Indonesia***Prof. Dr. dr. Abdul Hafid Bajamal, Sp.BS(K)***(Scopus ID)**hfbajamal@gmail.com**Faculty of Medicine Universitas Airlangga, Surabaya-Indonesia***Dr. Dr. I Wayan Sudarsa, Sp.B(K) Onk, FINACS, FICS.***(Scopus ID), (Google Scholar), (Researchgate)**sudarsa@unud.ac.id**Department of Surgery, Universitas Udayana,**Sanglah General Hospital**Bali - Indonesia***dr. I.B. Amertha P. Manuaba, SKed, MBiomed.***(Scopus ID), (Google Scholar), (Orcid), (Researcher ID) (Researchgate)**AmerthaManuaba@gmail.com / Amertha_Manuaba@unud.ac.id**Biomedicine Magister Program, Universitas Udayana, Indonesia***dr. I Putu Yuda Prabawa, S.Ked., M.Biomed.***(Scopus ID), (Google Scholar), (Orcid ID), (Researcher ID), (Researchgate)**Clinical Pathology Department, Faculty of Medicine Universitas Udayana, Indonesia.***dr. Agha Bhargah, SKed.***(Scopus ID), (Google Scholar), (Orcid ID), (Researchgate), (Researcher ID)**Faculty of Medicine Universitas Udayana, Indonesia.***Editorial inquiries to be addressed to: editor@balimedicaljournal.org**

TABLE OF CONTENTS

Editorial Board Bali Medical Journal	i
Table of Contents	iv
1. The study hydroxyapatite bovine tooth graft (HAp-BTG) in regenerative dentistry: the role of polyethylene glycol as carrier	1
Nanik Zubaidah, Maria Margaretha S. Nogo Masa, Ernie Maduratna Setiawatie, Sri Kunarti	
2. The Role of Lipoteichoic acid (LTA) Lactobacillus plantarum (Lp) on the Number of Lymphocyte Cells in Dental Pulp (In Vivo Laboratory Experimental Research)	2
Nirawati Pribadi, Galih Sampoerno, Hasna Shabrina, Cindy Ramadhan Putri, Maya Safitri, Nadien Sekar Pramesti	
3. The effect of CaCO₃ application from blood cockles (Anadara granosa) to the expression of BMP-2 in Rattus novergicus pulp cell on tertiary dentin formation	3
Widya Saraswati, Galih Sampoerno, Nabiela Rahardia, Chaerun Mutmainnah, I Gede Marantika Yogananda Sutela, Saindra Arsa Gumilang	
4. Incidence of radix entomolaris in Asia population: systematic review and meta-analysis	4
Amanda Andika Sari, Deddy Dwi Septian, Valonia Irene Nugraheni, Dian Agustin Wahjuningrum, Tamara Yuanita	
5. Antibacterial effect of calcium hydroxide – propolis combination against oral microbiome of dental caries	5
Ira Widjiastuti, Mandojo Rukmo, Ayu Rafania Atikah, Frida Fardanila Asmoro	
6. Upregulation of activator Protein-1 as signaling of dentin regeneration after administration of CaCO₃ from blood shells (Anadara granosa)	6
Widya Saraswati, Adioro Soetojo, Ganiezha Cindananti, Alfina Putri Nurrahmania, Rey Pasenda, Rossabella Vennowusky Rafli	
7. Endodontic management of complicated crown fracture in single visit: a case report	7
Melia Heptania, Widi Prasetya	
8. Management of iatrogenic furcation perforation in mandibular first molar – a case report	8
Raeesa Shafiqqa, Wandania Farahanny	
9. Periapical healing in previously initiated therapy with asymptomatic apical periodontitis using bioceramic sealer: case report	9
Nelmi Wahyuni, Widi Prasetya	
10. Comparison of Enterococcus faecalis biofilm degradation after diode laser exposure with Chlorophyll and Psoralens photosensitizer	10
Veronica Regina Rosselle, Cendranata Wibawa Ongkowijoyo, Setyabudi, Sri Kunarti, Nirawati Pribadi	

11. The role of bioburden in the determination dose of γ irradiation	11
Dian Agustin Wahjuningrum, Setyabudi, Devi Eka Juniarti, Maulida Putri Syarifina, Brigitta Adela Rahmadita, Fery Setiawan	
12. The role of strontium (Sr^{2+}), silver (Ag^+), and dental pulp stem cells-conditioned medium (DPSCs-CM) in increasing the osteogenesis of bone graft materials	12
Fery Setiawan, Dian Agustin Wahjuningrum, Dwikora Novembri Utomo, Heni Puspitasari, Fani Deapsari, Arif Rahman Nurdianto	
13. The effect of different immersion time in green tea solution towards discoloration of nanofilled composite	13
Arvia Diva Firstiana, Galih Sampoerno, Laksmiari Setyowati, Achmad Sudirman	
14. The effect of mangosteen pericarp extract (<i>Garcinia mangostana</i> L.) on smear layer removal	14
Tamara Yuanita, Sylvia Paulina Panggono, Rosa Amalia Iqony, Eric Priyo Prasetyo, Sukaton, Anuj Bhardwaj	
15. Effect of combination of calcium hydroxide ($Ca(OH)_2$), green tea and cacao pod husk on the expression of hypoxia-inducible factor-1α (HIF-1α) and vascular endothelial growth factor A (VEGF-A) in dental pulp	15
Tamara Yuanita, Teuku Cahiril hafiz, Rosa Amalia Iqony, Sylvia Paulina Panggono, Sukaton, Anuj Bhardwaj	
16. Biodentine applicatins in endodontics: a review	16
Karissa Navita Saragih, Ayu Larissa Putri, Dian Agustin Wahjuningrum, Setyabudi	
17. Potential of epigallocatechin gallate (EGCG) and EGCG collagen as antioxidant, anti-inflammatory, proliferation and differentiation of odontoblast cells: a literature review	17
Kun Ismiyatin, Sukaton, Dalhar Hakiki, Mardikaning Riasta Saptaningrum	
18. The expression of osteopontin in dentin pulp complex after stimulated by calcium carbonate from blood clam shells (<i>Anadara granosa</i>) as marker of reparative dentinogenesis	18
Widya Saraswati, Galih Sampoerno, Saindra Arsa Gumilang, Nadiah Salsabila, Venny Lusanda Ambarwati, Rania Rizka Ramadani	
19. Modified technique of broken instrument retrieval in lower left mandibular molar: an endodontic challenge (case report)	19
Sarah Devina, Widi Prasetia	
20. Degradation of extracellular polymeric substance biofilm <i>Staphylococcus aureus</i> due to 405 nm diode laser exposure with chlorophyll photosensitizer	20
Koerniasari Eraiko Sudjarwo, Kun Ismiyatin, Sri Kunarti, Venny Lusanda Ambarwati	
21. Fiber reinforcement type in the posterior restoration	21
Sweetly Purnomo, Dian Agustin Wahjuningrum, Eric Priyo Prasetyo	
22. The differences in analgesic effects between eugenol and propolis extracts in mice (<i>Mus musculus</i>) using the writhing test method	22
Sagita Putri Andyningtyas, Ira Widjiastuti, Kun Ismiyatin, Annisa Salsabila Witjaksana, Mohammad Gerald Athallah Putra	

23. Difference of surface hardness of nanofilled composite immersed in soda contains sugar and contains aspartame	23
Laksmiari Setyowati, Ruslan Effendy, Kun Ismiyatin, Dinsa Celia Putri	
24. Higher potent antimicrobial activity in endodontic: sodium hypochlorite versus chlorhexidine gluconate.....	24
Delicia Winarko, Yosephine Sirait, Dian Agustin Wahjuningrum	
25. Zirconia as innovation in dental implant biomaterial science: A literature review	25
Multazan, Nabila Izas Herninda, Dian Agustin Wahjuningrum	
26. Ceramic versus porcelain fused to metal for restoration as dental cosmetics: A literature review	26
Samuel Manuela Nurhadi, Yadjnes Iswaran Kodi Ispanan, Dian Agustin Wahjuningrum	
27. The factors for success rate of dental implant: A literature review	27
Shafy Shariz, Ramadhani Darmawan, Dian Agustin Wahjuningrum	
28. Influence of caffeinated beverages on various types of direct composite: A literature review	28
Alfredo Pascoal Luvyano Da Silva, Faridatul Fariza Binti Ismail, Dian Agustin Wahjuningrum	
29. Various failures of dental implants: A literature review	29
Patricia Shankar Jethani, Nur Yasmin Nadiah Binti Muhammad, Dian Agustin Wahjuningrum	
30. Management of traumatized tooth with open apex and discoloration	30
Iceu Estu Kurmaena, Fitri Yunita Batubara, Trimurni Abidin	
31. Minimum Inhibitory Concentration(MIC) and Minimum Bactericidal Concentration (MBC) of henna leaf extracts (<i>Lawsonia inermis L.</i>) against <i>Enterococcus faecalis</i>.....	31
Mirza Bahar Firnanda, Cyntia Nur Malikfa Nugraha, Setyabudi, Febriastuti Cahyani, Mochammad Mudjiono	

The study hydroxyapatite bovine tooth graft (*HAp-BTG*) in regenerative dentistry: the role of polyethylene glycol as carrier

Nanik Zubaidah^{1,2}, Maria Margaretha S. Nogo Masa³, Ernie Maduratna Setiawatie^{4*}, Sri Kunarti²

¹Doctoral Program of Medical Science, Faculty of Medicine, Universitas Airlangga

²Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia

³Post-Graduate Program of Conservative Dentistry Specialist, Faculty of Dental Medicine Universitas Airlangga, Surabaya, Indonesia.

⁴Department of Periodontology, Faculty of Dental Medicine Universitas Airlangga, Indonesia

*Corresponding to:

Ernie Maduratna Setiawatie;

Department of Periodontology, Faculty of Dental Medicine Universitas Airlangga, Indonesia;

erniemaduratna@gmail.com

Introduction: Socket alveolar tooth bone defect is common after endodontic surgical procedures. A bone graft is a new update for improving alveolar bone healing in the clinical setting. This study will explore *HAp-BTG* and Polyethylene glycol (PEG) as a carrier for enhancing bone healing. This study aimed to explore the expression of Osteoblast (OB), Osteoclast (OC), and Osterix (Osx) after induction of *HAp-BTG*, compared to control with or without PEG as a carrier.

Methods: Thirty Wistar rats were randomly selected into two groups, day seventh and 14th. Every group was randomly divided into three subgroups, treatment, control with PEG, and control without PEG. Extraction of the lower-left incisor of Wistar rats was done, then filled the dental socket with *HAp-BTG*+PEG (treatment group), PEG (control with PEG), and control without PEG. Wistar rats were sacrificed, and the mandible was taken and processed histopathologically to make a tissue section in glass preparation. OB and OC were stained with Hematoxylin-Eosin, whereas Osx with Immunohistochemistry, observed by light microscope 1000x magnification among 20 microscopic fields and analyzed per microscopic field.

Results: The number of cells per microscopic field for OB, OC, and Osx on days 7th & 14th for treatment groups were significantly different ($p < 0.01$) than control with PEG or control without PEG. The control result with PEG was not significantly different ($p > 0.05$) compared to the control without PEG.

Conclusion: *HAp-BTG* is a prospective candidate for bone graft regenerative in dentistry, and PEG can be used as a carrier of *HAp-BTG* for application in the clinical setting.

Keywords: Bovine tooth graft, dental health, bone regenerative, osteogenesis, osteoblast, osteoclast, osterix.

The Role of *Lipoteichoic acid (LTA) Lactobacillus plantarum (Lp)* on the Number of Lymphocyte Cells in Dental Pulp (In Vivo Laboratory Experimental Research)

Nirawati Pribadi^{1*}, Galih Sampoerno¹, Hasna Shabrina², Cindy Ramadhan Putri³, Maya Safitri⁴, Nadien Sekar Pramesti⁴

¹Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Airlangga University, Surabaya, Indonesia,

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine, Airlangga University, Surabaya, Indonesia,

³Graduate Student of Dental Health Science, Faculty of Dental Medicine, Airlangga University, Surabaya, Indonesia,

⁴Undergraduate Student, Faculty of Dental Medicine, Airlangga University, Surabaya, Indonesia.

*Corresponding to:

Nirawati Pribadi;

Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Airlangga University, Surabaya, Indonesia. Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya;

nirawati-p@fkg.unair.ac.id

Background: The prevalence of pulp inflammation due to caries is more common than pulp inflammation caused by trauma. Cariogenic bacteria in the oral cavity consist of gram-positive bacteria and gram-negative bacteria. *Lactobacillus* is a gram-positive bacterium which is the largest lactic acid-producing bacteria. The species of *Lactobacillus* found in caries are *Lactobacillus plantarum* (Lp). Lp has the virulence factor Lipoteichoic acid (LTA) which plays an important role in bacterial adhesion and induction of inflammatory mediators that cause tissue damage. Lymphocytes play a role in the immune system and will increase during inflammation because they play an important role in the immune response when pulp inflammation occurs.

Purpose: To know the role of LTA Lp on the number of lymphocyte cells in dental pulp.

Methods: 48 wistar rats were divided into 2 groups, namely the control and treatment groups. Wistar rats in the control group were treated in the form of tooth preparation until the perforation was then filled with cention-N material, while in the treatment group the treatment was in the form of tooth preparation until the perforation was added with LTA Lp 10 µg/ml and then filled with cention-N material. On day 1, 2, 3 rats were sacrificed and maxilla was removed and then stained with Hematoxylin Eosin (HE) on histopathological examination, the number of lymphocytes was observed using a microscope with 400x magnification. Statistical data analysis was carried out by using the Independent t-test.

Results: There is a significant difference in the number of lymphocyte cells between the control and treatment groups.

Discussion: Lymphocytes act as an immune response that always circulates in lymphoid tissue and other tissues through blood circulation and the lymphatic system so that lymphocytes have been in the wound area since day 1. The significant difference in the number of lymphocytes between the control and treatment groups, with the number of lymphocytes in the treatment group being larger, is thought to be due to the acidic pH produced by Lp bacteria. Lp can live well in very acidic environments. Lp can grow at pH below 3.5 and can survive at pH 2. This can trigger damage to odontoblast cells on the surface of the dental pulp, causing an inflammatory reaction. In the inflammatory reaction, there will be an infiltration of inflammatory cells in the dental pulp to eliminate the injury.

Conclusion: Giving LTA Lp at a dose of 10 µg/ml can increase the number of lymphocyte cells in the dental pulp.

Keywords: *Lipoteichoic acid (LTA)*, *Lactobacillus plantarum (Lp)*, lymphocyte, dental pulp, SDGS

The effect of CaCO₃ application from blood cockles (*Anadara granosa*) to the expression of BMP-2 in *Rattus novergicus* pulp cell on tertiary dentin formation

Widya Saraswati^{1*}, Galih Sampoerno¹, Nabiela Rahardia², Chaerun Mutmainnah³,
I Gede Marantika Yogananda Sutela², Saindra Arsa Gumilang²

¹Staff of Conservative Dentistry Departement, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Widya Saraswati;

Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia;
widya-s@fkg.unair.ac.id

Introduction: Tertiary dentin is a dentin layer formed in response to stimuli in the dentin-pulp complex. Calcium hydroxide is the gold-standard material for vital pulp therapy. However, calcium hydroxide has several drawbacks. Recently, newer materials have replaced calcium hydroxide with better treatment results. *Anadara granosa* shells contain 98.7% calcium carbonate. The high calcium carbonate content can be a source of calcium and has good biocompatibility to be used as a bone formation biomaterial, making it a good candidate for pulp protection material. Several molecules may play a role in the signaling process that results in the differentiation of odontoblast-like cells. One of the growth factor molecules that may play a role is Bone Morphogenetic Protein (BMP). This study was conducted to determine the effect of calcium carbonate suspension from *Anadara granosa* shell on the expression of BMP-2 as a molecule that regulates reparative dentin formation.

Methods: This experimental laboratory research was conducted using Wistar rats (*Rattus novergicus*) whose maxillary molars had been prepared until perforated. The teeth were then applied a thin layer of CaCO₃ suspension from the shell of *Anadara granosa*, the cavities were filled with RMGIC and light-cured for 20 seconds. The treatment group was determined on days 1, 3, and 7. The teeth were then extracted, and slide preparations were made.

Results: There was a significant increase in BMP-2 expression between the treatment groups from day 1 to day 3 with p-value=0.001 (p <0.05). There was a significant difference between the application of calcium hydroxide and calcium carbonate on days 1, 3, and 7 with a p-value=0.001 (p<0.05), with the expression of BMP-2 higher in the treatment group (calcium carbonate application) compared to control group (calcium hydroxide application).

Conclusion: There was an increase in BMP-2 expression in the reparative dentin formation process after applying CaCO₃ suspension from *Anadara granosa* shell on days 1, 3, and 7.

Keywords: CaCO₃, *Anadara granosa*, dentinogenesis, reparative dentin, bone morphogenic protein-2

Incidence of radix entomolaris in Asia population: systematic review and meta-analysis

Amanda Andika Sari^{1*}, Deddy Dwi Septian², Valonia Irene Nugraheni³,
Dian Agustin Wahjuningrum⁴, Tamara Yuanita⁴

¹Postgraduate Student of Conservative Dentistry, Universitas Airlangga, Surabaya, Indonesia

²Private Practice, OT Dental, Malang, Indonesia

³Private Practice, Dentallight Clinic, Jakarta, Indonesia

⁴Department of Conservative Dentistry, Universitas Airlangga, Surabaya, Indonesia.

*Correspondence: Amanda Andika Sari; Postgraduate Student of Conservative Dentistry, Universitas Airlangga, Surabaya, Indonesia; Email: amanda.andika.sari-2021@fkg.unair.ac.id

Introduction: A successful endodontic outcome must prevent bacterial penetration from the pulp to periodontium by the endodontic triad of debridement, thorough disinfection, and obturation. It has also been reported that awareness, understanding, and identification of the presence of unusual root and canal morphology can contribute to the successful outcome of endodontic treatment. Radix entomolaris is one of the major anatomical variants of the two-rooted mandibular molars, which can lead to difficulties during endodontic treatment or even worse, endodontic failure. This study aimed to evaluate the incidence of radix entomolaris in the Asia population in mandibular molars.

Methods: We performed a literature search using Google Scholar, PubMed, and Cochrane without time limitation. We defined Participants, Interventions, Comparators, and Outcome (PICO) based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guideline. Studies reporting mandibular molars with radix entomolaris based on the population's country of origin in Asia, gender, and type of molars were included. Review Manager (Revman) [Computer program] Version 5.4. The Cochrane Collaboration 2020 was used to do the data calculation. Our search yielded 7067 studies, and a total of 33 articles were included based on PICO criteria.

Results: Our finding found that Korea has the highest incidence rate of radix entomolaris (27.15%) compared to the other countries in Asia. We found a significant difference between males and females, in which the radix entomolaris is more common in females (95% CI; $P=0.0001$; $I^2=54\%$). The incidence radix entomolaris was also higher in the mandibular first molar if we compared the odds ratio with the mandibular second molar (95% CI; $P=0.00001$; $I^2=89\%$).

Conclusion: Clinicians need proper knowledge to do a successful endodontic treatment and educate their patients about the risk of treatment failure caused by radix entomolaris. That is related to the patient's country of origin, gender, and types of molars. Thus, thorough informed consent could be achieved.

Keywords: Disto-lingual root, three-rooted, mandibular molar, asia

Antibacterial effect of calcium hydroxide – propolis combination against oral microbiome of dental caries

Ira Widjiastuti^{1*}, Mandojo Rukmo¹, Ayu Rafania Atikah², Frida Fardanila Asmoro³

¹Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine Universitas Airlangga, Surabaya, Indonesia

³Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Ira Widjiastuti;

Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia;

ira-w@fkg.unair.ac.id

Introduction: Dental caries is a major public health issue worldwide with a high prevalence that affected oral hygiene and social impact related to biofilm dependent and fermentable dietary carbohydrates. *Streptococcus mutans* is the commonest bacteria associated with dental caries and lactobacilli fermented dietary carbohydrates causing an imbalance in the oral microbiome ecology and leading to demineralization. *Calcium hydroxide* is generally used as pulp capping material, intracanal medical material, root canal filling material, and pulpotomy treatment. Calcium hydroxide is not completely effective in killing all microorganisms in root canals, one of which is the Enterococci group. Propolis has been recognized as useful material for human health, which has an antimicrobial and anti-inflammation effect. The continuing presence of propolis in the oral cavity enabled more effective antimicrobial activity, leading to a significant decrease in the severity of carious lesions.

Methods: A web based research on Scopus, Pubmed, and Google Scholar was done. To limit our literature review to relevant articles, the search was filtered using keywords, published in the past 10 years and dental journals. Keywords used for research were antibacterial effect, calcium hydroxide, propolis, and dental caries. Relevant articles were chosen to get the desired knowledge update. This review article screened about 23 articles comparing the antimicrobial efficacy of calcium hydroxide, propolis, and dental caries.

Results: Propolis was very effective against *E. faecalis*, but resistant on *C. albicans* after 14 days of placement. The addition of propolis to Ca(OH)₂ was able to kill and inhibit colonization of *F. nucleatum* better than Ca(OH)₂ without propolis. The antibacterial effect produced by calcium hydroxide added with propolis is higher than calcium hydroxide without propolis against *E. faecalis*.

Conclusion: Calcium hydroxide-propolis has a significant antibacterial effect against *L. Acidophilus*, *E. Faecalis*, *S. Mutans*, *C. Albicans*, *Fusobacterium nucleatum*.

Keywords: Calcium hydroxide, propolis, antibacterial, dental caries

Upregulation of activator Protein-1 as signaling of dentin regeneration after administration of CaCO₃ from blood shells (*Anadara granosa*)

Widya Saraswati^{1*}, Adioro Soetojo¹, Ganiezha Cindananti², Alfina Putri Nurrahmania³, Reyz Pasenda², Rossabella Vennowusky Rafli²

¹Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

*Corresponding to:

Widya Saraswati;

Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia;

widya-s@fkg.unair.ac.id

Introduction: Dental caries is still a problem that often occurs in Indonesia. Dental caries will cause inflammation of the pulp, which can continue until the pulp loses its vitality if not treated immediately. One of the treatment goals in dental conservation is to protect the vitality of the pulp by creating tertiary dentin formation by pulp capping treatment. Ca(OH)₂ is considered the gold standard for pulp capping. Ca(OH)₂ has the disadvantage that it is easily soluble in fluids from the oral cavity. Fluid from the oral cavity, when reacted with calcium hydroxide, can dissolve calcium hydroxide and create a gap (tunnel defect), increasing the risk of marginal leakage and pulp sensitivity. These weaknesses make many researchers look for materials that can be an alternative to Ca(OH)₂ as a pulp capping material. One material that can be an alternative is blood clam shells (*Anadara granosa*) which have high calcium carbonate (CaCO₃) content of 98.7%. This study aimed to determine the upregulation of Activator Protein-1 as signaling of dentin regeneration after administration of CaCO₃ from blood shells (*Anadara granosa*).

Methods: The experimental laboratory research with post-test only control group design. Cavity preparation around 1 mm is performed in rats' occlusal side of the right upper molar. Group 1-3, the control group, was treated with Ca(OH)₂ and sealed with cement. Group 4-6, the experimental group, were treated with blood clam shells derived calcium carbonate suspension and sealed with cement. The teeth in each group were extracted after 1, 3, and 7 days; accordingly, the slide was made.

Results: The number of AP-1 expressions was significantly different in each group in which the control group was lower than the treatment group. The mean value of cells expressing AP-1 in odontoblasts after applying calcium carbonate showed an increase with increasing exposure. The smallest mean AP-1 expression was in the control group on day 1, while the largest mean AP-1 expression was in the treatment group with calcium carbonate application on day 7.

Conclusion: Applying calcium carbonate from blood cockle (*Anadara granosa*) shells induced the healing process and generated dentinogenesis formation by increasing the expression of the AP-1.

Keywords: CaCO₃, AP-1, *Anadara granosa*, Dentine reparative, Dentinogenesis.

Endodontic management of complicated crown fracture in single visit: a case report

Melia Heptania¹, Widi Prasetia^{2*}

¹Postgraduate Program in Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara, Medan, Indonesia

²Lecturer, Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara, Medan, Indonesia

*Corresponding to:

Widi Prasetia;

Department of Conservative Dentistry, Faculty of Dentistry Universitas Sumatera Utara, Medan, Indonesia;

widi.prasetia@usu.ac.id

Introduction: Single-visit endodontic treatment is the conservative non-surgical treatment of an endodontically involved tooth consisting of complete biomechanical cleansing, shaping, and obturation of the root canal system during one visit.

Case Description: A 26-year-old female patient came to the Dental Clinic, Department of Conservative Dentistry, Universitas Sumatera, with the chief complaint of a broken tooth in the upper front tooth. The patient has a history of falling two months ago and causing a broken front tooth, tooth #22 had pain one month ago. Single-visit endodontic treatment was performed on necrotic pulp with asymptomatic apical periodontitis in complicated crown fracture. Treatment was done by cleaning and shaping with Reciproc Blue VDW file, irrigation using 5.25% NaOCl and EDTA 17%, activation using ultrasonic, obturation with single cone technique, and optimum magnification. With advanced dental equipment, appropriate instrumentation, and irrigation, single-visit treatment is possible. A single visit was performed on the patient according to the indications: fractured teeth where esthetics is the most important concern, teeth with accidental/mechanical pulp exposure, and the patient who cannot frequently visit the dental clinic. Working with the aid of magnification of dental loupe and ultrasonic devices helps increase the effectiveness. Using copious irrigation with sodium hypochlorite gave better effectiveness than interappointment calcium hydroxide dressing in disinfecting the root canal system and treatment outcome. Biomechanical preparation is done using various advanced NITI systems, which prepare root canal in crown down manner with minimal extrusion of debris and irrigant. NITI systems are safe with a minimal incidence of instrument failure. Based on some literature, there is no significant difference in healing at one or several visits, in cases of apical periodontitis, or even in large periapical lesions. Even in the case of a complicated crown fracture of the incisors, this gives good results.

Conclusion: In complicated anterior crown fractures, single-visit endodontic treatment gives good results, so it can be a treatment option

Keywords: Single visit endodontics, complicated crown fracture, case report

Management of iatrogenic furcation perforation in mandibular first molar – a case report

Raeesa Shafiq¹, Wandania Farahanny^{2*}

¹Postgraduate Program in Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara, Indonesia

²Lecturer, Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara, Indonesia

*Corresponding to:

Wandania Farahanny;

Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara, Indonesia;

wandania@usu.ac.id

Introduction: Perforations can occur pathologically due to iatrogenically during root canal treatment. Accidental root perforations occur in approximately 2–12% of endodontically treated teeth. Factors determining the prognosis are size, location of the defect, time, duration of exposure to contamination, the possibility of sealing the perforation, and the material used to repair it. Biodentine is a calcium silicate-based bioactive material. It is easy to handle, the short setting time (12 minutes), high alkaline pH and a biocompatible material make it a favorable material for perforation repair. Biodentine showed considerable performance as a perforation repair material even after exposure to various endodontic irrigants compared to MTA. This case report describes the repair of a furcal perforation in the mandibular tooth using Biodentine.

Case Description: A 30-year-old woman was referred with pain in the right lower back tooth region three days ago. It was recorded that the patient had undergone a procedure for root canal treatment on 47, 1 week ago. Presently the pain was continuous, aggravated on chewing food, and was relieved on taking medication. Clinical examination no response to EPT, palpation (-), and percussion (+). Periapical radiographic examination revealed a radiolucent area in the furcal and apical region. In the first visit the access cavity was prepared, and the perforation area was clinically seen. Hemorrhage was controlled, and PTFE was placed at the site of perforation. The root canals were cleaned and shaped then the perforation site was repaired by condensing Biodentine in the perforation area. The root canals were dried and obturated using the continuous wave technique. The final direct restoration was performed using fiber-reinforced composite and composite resin. The patient was completely asymptomatic after one week and routinely evaluated after one month and six months.

Conclusion: In the present case, furcal perforation of the mandibular right second molar was treated using the non-surgical placement of Biodentine. The repaired tooth was clinically and radiographically healthy and continued to satisfy the functional demands.

Keywords: Perforation, biodentine, endodontic, iatrogenic, furcation

Periapical healing in previously initiated therapy with asymptomatic apical periodontitis using bioceramic sealer: case report

Nelmi Wahyuni¹, Widi Prasetia^{2*}

¹Dental Conservation Specialist Education Program, Faculty of Dentistry, Universitas Sumatera Utara, Medan, Indonesia

²Department of Conservative Dentistry, Faculty of Dentistry, Dentistry, Universitas Sumatera Utara, Medan, Indonesia

*Corresponding to:

Widi Prasetia;

Department of Conservative Dentistry, Faculty of Dental Faculty of Dentistry, University of North Sumatra Medan,

widi.prasetia@usu.ac.id

Introduction: Asymptomatic apical periodontitis is a condition that occurs in non-vital teeth accompanied by periapical lesions and does not cause complaints in patients. Establishing the diagnosis requires a proper history, clinical examination, and appropriate objective examination to obtain adequate treatment. Adequate endodontic treatment and the use of materials containing strong antibacterials are required. Good obturation is a supporting factor, bioceramic sealer is very good to be used as an obturation material with high antibacterial power. This case report evaluates conventional endodontics as non-surgical management of teeth with asymptomatic apical periodontitis.

Case Description: A male patient aged 30 years came with a complaint of a cavity in his left back tooth, the tooth had been treated and filled by a previous dentist about four years ago but because the filling was broken, the tooth had pain about two weeks ago but currently no complaints. The patient had no history of systemic disease. Non-vital root canal treatment is carried out with the final restoration of cuspal coverage direct resin composite. The evaluation was done to see the healing of the periapical lesion. Periapical lesions may be caused by microbes in the root canal system, usually after pulp necrosis has occurred. These irritants move apically from the root canal system to the periradicular tissue, initiating inflammation and tissue changes. Asymptomatic apical periodontitis develops after relief of the acute phase and infection as a result of caries, trauma, and iatrogenic procedures. Adequate conventional endodontic treatment is determined by several things that are incorporated in the endodontic triad, namely cleaning of necrotic tissue and bacteria from the root canal that irritates the periapical area, application of medicament materials to the root canal, hermetic obturation and good final restoration. In this case, the periapical lesion was reduced after three months of endodontic treatment. This can be seen from the negative clinical evaluation of percussion, palpation, and mobility. The patient has no complaints, and radiographic evaluation shows a reduced periapical lesion size, indicating healing.

Conclusion: Adequate root canal treatment affects the success of endodontic treatment. In this case, there was very good progress in healing the periapical lesion.

Keywords: Asymptomatic apical periodontitis, dental management, previously initiated therapy, periapical lesion

Comparison of *Enterococcus faecalis* biofilm degradation after diode laser exposure with *Chlorophyll* and *Psoralens* photosensitizer

Veronica Regina Rosselle¹, Cendranata Wibawa Ongkowijoyo¹, Setyabudi², Sri Kunarti^{2*}, Nirawati Pribadi²

¹Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Lecturer of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Sri Kunarti;

Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Surabaya, Indonesia;

attybp@yahoo.com

Introduction: *Enterococcus faecalis* are dominant in root canal infection and can survive harsh conditions such as high pH, scarce nutrients, and heat. They form mature biofilm readily and can resist disinfection approaches. *Photo-activated disinfection* with *photosensitizer* and laser irradiation is a viable alternative to eliminate *E. faecalis* biofilm. This study aimed to investigate and compare *E. Faecalis* biofilm degradation using *photo-activated disinfection* with *chlorophyll* or *psoralens* photosensitizer and 405 nm diode laser irradiation.

Methods: This study used *E. Faecalis* biofilm grown in the laboratory. *Chlorophyll* or *psoralens* were applied as a photosensitizer, and then 405 nm diode laser was irradiated for 30 or 60 seconds. The effectiveness of biofilm degradation was measured with *optical density* using *microplate reader*.

Results: *Chlorophyll* with 30 seconds of laser irradiation results in 30.8% biofilm degradation, whereas *psoralens* with 60 seconds of laser irradiation result in 81.8% biofilm degradation. *One-way ANOVA* test results in significant difference in biofilm degradation effectiveness amongst all groups.

Conclusion: *Psoralens* with 60 seconds of 405nm diode laser irradiation yielded the most *Enterococcus faecalis* biofilm degradation compared to other groups.

Keywords: Photo-activated disinfection, photochemical reaction, photosensitizer, root canal biofilm

The role of bioburden in the determination dose of γ irradiation

Dian Agustin Wahjuningrum^{1,2*}, Setyabudi^{1,2}, Devi Eka Juniarti^{1,2}, Maulida Putri Syarifina³, Brigitta Adela Rahmadita³, Fery Setiawan⁴

¹Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

²Academic Dental Hospital, Universitas Airlangga, Surabaya, Indonesia

³Undergraduate student of Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

⁴Doctoral Program of Medical Science, Faculty of Medicine, Universitas Airlangga, Indonesia

*Corresponding to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia;

dian-agustin-w@fkg.unair.ac.id

Bone graft treatment is one of the treatments in dentistry that aims to prepare the condition of the alveolar bone before implant placement. Statistical data showed that more than two million procedures were carried out the bone grafts procedure. The bioburden method is used to determine the correct dose of γ -ray irradiation because the weakness of γ -ray irradiation can cause changes in mechanical properties, thereby reducing bone graft efficacy. The purpose of writing a review article was to discuss the determination of the irradiation dose using γ -rays based on the ISO 11137 standard and the *sterility assurance level* (SAL). All articles showed that determining the amount of initial contamination (bioburden) is important in determining the dose of γ -ray irradiation based on the SAL value. The first SAL value used was SAL 10^{-2} (verification dose) because from the verification dose obtained, it can be stated whether the irradiation dose using γ -rays is acceptable or not. SAL 10^{-2} is out of a hundred irradiated samples using γ -rays, only a maximum of 2 samples that are not sterile. If the SAL 10^{-2} value is accepted, the dose of γ -ray irradiation based on the SAL 10^{-6} value is accepted, but if it is not accepted, bone grafting must be done again. SAL 10^{-6} is the sterilization dose used when the product comes in contact with tissue or blood. The initial determination of the irradiation dose using γ -rays is finished by determining the amount of initial contamination (bioburden) so that the appropriate dose of γ -ray irradiation is obtained. The lower the bioburden level, the lower the dose of γ -ray irradiation used. The lower the dose of γ -ray irradiation, the lower the detrimental effects caused by γ -ray irradiation.

Keywords: Bone graft, sterility assurance level, γ -ray irradiation, patient satisfaction, bone graft efficacy.

The role of strontium (Sr²⁺), silver (Ag⁺), and dental pulp stem cells-conditioned medium (DPSCs-CM) in increasing the osteogenesis of bone graft materials

Fery Setiawan¹, Dian Agustin Wahjuningrum^{2,3*}, Dwikora Novembri Utomo⁴,
Heni Puspitasari⁵, Fani Deapsari⁶, Arif Rahman Nurdianto⁷

¹Doctoral Program of Medical Science, Faculty of Medicine, Universitas Airlangga, Indonesia

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

³Academic Dental Hospital, Universitas Airlangga, Surabaya, Indonesia

⁴Department of Orthopaedics & Traumatology, Dr. Soetomo General Hospital/Universitas Airlangga, Surabaya, Indonesia

⁵Toxoplasma study group, Institute of Tropical Disease, Universitas Airlangga, Surabaya, Indonesia

⁶Cell & Tissue Bank-Regenerative Medicine Centre, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

⁷Lecturer at Universitas Anwar Medika

*Corresponding to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga,

Surabaya-Indonesia;

dian-agustin-w@fkg.unair.ac.id

Bone grafting is one of the orthopedic treatment procedures using an augmentation process to support bone regeneration. Statistical data states that the bone grafting process is carried out more than two million, causing the bone to be the second-largest tissue transplanted after the blood transfusion process. Physiologically, bone, as the strongest tissue, can perfectly heal without leaving scar tissue but in some conditions, they need doping to increase their osteogenesis. There are four bone graft materials, namely: autograft, allograft, xenograft, and alloplastic materials. Our main focus is on alloplastic materials which are the most commonly used: hydroxyapatite, beta-tricalcium phosphate, and biphasic calcium phosphate. They are good enough in osteoconductive and osteogenesis ability but lacking of osteoinductive, so they need doping from the other materials, namely: ion strontium, silver, and conditioned medium from dental pulp stem cells. The results showed that the osteogenesis of alloplastic materials bone graft can be increased by doping using ion strontium, silver, and dental pulp stem cells-conditioned medium. It was related to the increase in osteoconductive and osteoinductive ability. These osteoconductive and osteoinductive properties are needed to support healing from both intramembranous and endochondral ossification. The conducted literature study using PRISMA chart analysis found that the doped bone graft materials were needed in bone healing. There are three basic stages of bone healing namely: haematoma, reparative, and remodeling phase. Each stage has its characteristics and happens in the sequential event, so improving each stage can accelerate bone healing. To increase the capability of bone grafts can be doped by ion strontium, silver, and dental pulp stem cells-conditioned medium. The more the increase of bone graft capability, the more the increase of patient satisfaction.

Keywords: Bone graft, ion strontium-silver, dental pulp stem cells-conditioned medium, patient satisfaction, immunology.

The effect of different immersion time in green tea solution towards discoloration of nanofilled composite

Arvia Diva Firstiana¹, Galih Sampoerno^{2*}, Laksmiari Setyowati², Achmad Sudirman²

¹Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

*Corresponding Author: Galih Sampoerno; Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia. Email: galih-s@fkg.unair.ac.id

Introduction: Composite has gained a prominent role in restorative dentistry due to the increasing demand for esthetic restoration. With the rise of nanotechnology, nanofilled composites were introduced with their inorganic phases of characteristic dimensions in the range of 10–100 nm. Because of the increased filler loading and reduced amount of resin matrix, its polymerization shrinkage is expected to be reduced, providing excellent esthetics and strength. Presently, the common problem of esthetic dentistry is discoloration and color mismatch of tooth-colored restorations after consuming chromogens. Asian people, including Indonesia widely consume green tea. Green tea contains catechins and tannin, which are thought to be antioxidants and determine tea products' properties. Nevertheless, the presence of catechins and tannins shows the disadvantage as well as causing discoloration in composite restoration. The study aimed to explore the effect of different immersion time in green tea solution on the discoloration of nanofilled composite.

Methods: Cylindrical nanofilled composite samples, 5 mm in diameter with 2 mm thickness, were divided into two groups, the control group (n=5) and the treatment group (n=5). Each group was divided into three sub-groups based on immersion time day-1, day-7, and day-14. Color measurements were obtained using He-Ne light supply, optical spectrometer, and optical power meter. Data were taken and analyzed statistically.

Results: There was significant difference in nanofilled composite discoloration between each day of treatment and between each group (control and treatment). Discoloration within day-1 to day-7 immersion period gave greater results than discoloration from day-7 to day-14.

Conclusion: Immersion of nanofilled composite in green tea solution could cause brownish darker discoloration. The first week of the immersion period gave greater discoloration compared to the second week of the immersion period.

Keywords: Nanofilled composite, discoloration, green tea, immersion time.

The effect of mangosteen pericarp extract (*Garcinia mangostana L.*) on smear layer removal

Tamara Yuanita^{1*}, Sylvia Paulina Panggono², Rosa Amalia Iqony², Eric Priyo Prasetyo¹, Sukaton¹, Anuj Bhardwaj^{3,4}

¹Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³Department of Conservative Dentistry and Endodontics, College of Dental Sciences, Rau, Indore, MP, India

⁴Adjunct Professor at Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Tamara Yuanita;

Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia;

tamara-y@fkg.unair.ac.id

Introduction: The adhesive bond between teeth and restoration materials is important in determining restoration success. An adhesive bond can not be obtained because of the smear layer formed during the instrumentation process. The smear layer must be removed by using a cavity cleanser. Recently, there have been many products of cavity cleansers, but they have limitations. Therefore, it is necessary to develop ingredients derived from nature, like mangosteen pericarp extract. Mangosteen pericarp extract consists of saponin, xanthone, tannin, and flavonoid that can remove the smear layer from the cavity surface. However, until now, we have not known the effective concentration of mangosteen pericarp extract as smear layer removal. Our main focus was determining the most effective concentration of mangosteen pericarp extract on smear layer removal.

Methods: Twenty-four premolar maxillary human teeth were randomized into four groups, each group consisting of 6 teeth. Teeth were cut horizontally on CEJ with disk bur, and the teeth' occlusal was prepared with wheel diamond bur as deep as 1.5 mm. After preparation, mangosteen pericarp extract concentration 400 µg/ml, 500 µg/ml, 600 µg/ml were applied on cavity surface in 10 seconds while the control group were not applied. The cavity cleanliness was observed with the scanning electron microscope (SEM) equipped with 1000X magnification.

Results: There was a significant difference between each group ($p < 0.05$). The median value of the mangosteen pericarp extract 600 µg/ml was 1.00 (the smallest value among the other groups), indicating that less than 25% of the cavity surface was covered with smear layer.

Conclusion: Mangosteen pericarp extract with a concentration of 600 µg/ml was effective on smear layer removal.

Keywords: Mangosteen pericarp extract (*Garcinia mangostana L.*), smear layer, cavity cleanser, good health and well being.

Effect of combination of calcium hydroxide (Ca(OH)₂), green tea and cacao pod husk on the expression of hypoxia-inducible factor-1 α (HIF-1 α) and vascular endothelial growth factor A (VEGF-A) in dental pulp

Tamara Yuanita^{1*}, Teuku Cahiril hafiz², Rosa Amalia Iqony², Sylvia Paulina Panggono², Sukaton¹, Anuj Bhardwaj^{3,4}

¹Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³Department of Conservative Dentistry and Endodontics, College of Dental Sciences, Rau, Indore, MP, India

⁴Adjunct Professor at Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Tamara Yuanita;

Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia;

tamara-y@fkg.unair.ac.id

Introduction: The preparation procedure of caries can lead to pulp perforation by taking too deep into the caries tissue. Ca(OH)₂ is the gold standard in using pulp capping materials as pulp protection but has several disadvantages. There are limitations on Ca(OH)₂, so research was carried out with other alternative materials such as pulp capping materials. The purpose of this study was to analyze the effect of the application of a combination of cocoa pod skin with Ca(OH)₂ and a combination of green tea with Ca(OH)₂ on the expression of hypoxia-inducible factor-1 α (HIF-1 α) and vascular endothelial growth factor-A (VEGF-A) in pulp angiogenesis.

Methods: Thirty-six upper molar teeth in Wistar rats were mechanically perforated, and a combination of pulp capping materials were applied, then divided into three groups. The first group of Ca(OH)₂ with aquadest. The second group was Ca(OH)₂ with cocoa pod husk. The third group was Ca(OH)₂ with green tea.

Results: The expression of HIF-1 α and VEGF-A increased more in the group combination of Ca(OH)₂ with green tea than the group of Ca(OH)₂ with cocoa pod husk, but insignificant difference.

Conclusion: The insignificant difference between green tea and cocoa pod husk indicated that both have the same anti-inflammatory ability because the content of the active substance increases the comparable expressions.

Keywords: Perforation, Ca(OH)₂, green tea, cocoa pod husk, HIF-1 α expression, VEGFA expression.

Biodentine applicatins in endodontics: a review

Karissa Navita Saragih^{1*}, Ayu Larissa Putri², Dian Agustin Wahjuningrum³, Setyabudi³

¹Resident of Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²General Dentist Practitioner, Makmuri Dental Clinic, Surabaya, Indonesia

³Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Karissa Navita Saragih;

Resident of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia.

karissa.navita-12@fkg.unair.ac.id

Biodentine has frequently been acknowledged in the literature as a promising material and serves as an essential representative of tricalcium silicate-based cement used in dentistry. It was introduced as 'dentine replacement' or 'dentine repair' material. Biodentine has many applications, such as dentine replacement material in restorative dentistry, endodontic repair, and pulp capping. The material is formulated using the MTA-based cement technology and improving some properties of these types of cement, such as physical qualities and handling. Biodentine has high biocompatibility and bioactivity, with enhanced properties, such as a quick setting time, homogeneity, perfect sealing ability, high compressive strength, and regenerative property. Literature sources used to prepare these articles are gathered through several databases using the keyword that matches with the topic of the study. The limits were imposed on the year of publication, and only articles in English were considered. The conducted literature study found that Biodentine is a popular tricalcium silicate material and has an extensive range of applications in endodontic procedures such as pulp capping, pulpotomy, apexification, root perforation repair, surgical endodontic and regenerative endodontic treatment. Numerous studies are generally in favour of this material in terms of its advantages. Biodentine promises clinical dental procedures as biocompatible, quick setting time, excellent sealing ability, and regenerative property.

Keywords: Tricalcium disilicate, pulp capping, apexification, regenerative endodontic, dentine replacement.

Potential of epigallocatechin gallate (EGCG) and EGCG collagen as antioxidant, anti-inflammatory, proliferation and differentiation of odontoblast cells: a literature review

Kun Ismiyatin^{1*}, Sukaton¹, Dalhar Hakiki², Mardikaning Riasta Saptaningrum²

¹Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine, Universitas Airlangga, Surabaya –Indonesia

*Corresponding to:

Kun Ismiyatin;

Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga;

kun-is@fkg.unair.ac.id

The pulp is the innermost part of the tooth, which contains blood vessels and nerves. Inflammation of the dental pulp, also known as pulpitis, is a pulp response to irritants. Inflammation of the pulp is a common case in dental practice, many research has been done to find the best therapeutic ingredients for this disease. Green tea has polyphenolic chemical compounds, which are composed of many catechins. Many studies on epigallocatechin gallate (EGCG) have been carried out to take advantage of this material's therapeutic effects, which have anti-inflammatory, antioxidant, anti-tumor, and antibacterial effects. The literature searches through the SCOPUS, PUBMED, CROSSREF, GOOGLE SCHOLAR, GARUDA PORTAL databases using the keywords: (EGCG, Epigallocatechin gallate, Collagen scaffold, Antioxidant, Anti-inflammatory, Pulp Pain, Human Dental Pulp Cells, Odontoblast cell). Where the data obtained are not directly supervised but taken from previous research that has been carried out. EGCG has an important role as an antioxidant and anti-inflammatory by reducing the expression of proinflammatory cytokines such as TNF- α . EGCG on collagen scaffolds can increase the strength and surface roughness and exhibit antibacterial activity. These enhance the collagen scaffold environment suitable for the pulp cells supporting proliferation and differentiation of odontoblast cells. The potential of EGCG is due to its ability as an antioxidant, antibacterial, anti-inflammatory, and inhibiting pain conduction. EGCG has potential as a crosslinking agent on collagen scaffolds in hDPCs proliferation and differentiation.

Keywords: EGCG, collagen scaffold, antioxidant, anti-inflammatory, pulp pain.

The expression of osteopontin in dentin pulp complex after stimulated by calcium carbonate from blood clam shells (*Anadara granosa*) as marker of reparative dentinogenesis

Widya Saraswati^{1*}, Galih Sampoerno¹, Saindra Arsa Gumilang², Nadiyah Salsabila², Venny Lusanda Ambarwati², Rania Rizka Ramadani²

¹Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Widya Saraswati;

Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia;

widya-s@fkg.unair.ac.id

Introduction: Dental caries is a progressive loss of tooth minerals caused by substances where demineralization occurs more than remineralization. Dental caries can damage the enamel and dentin tissues causing pulp exposure. The use of calcium hydroxide as vital pulp therapy has become a common standard because of its antibacterial properties and can stimulate the repair of the pulp tissue. One of the most important elements in reparative dentine formation is osteopontin. Osteopontin (OPN) is highly expressed in bone and teeth and can be used as a marker that regulates the expression of type 1 collagen, one of the most important elements in reparative dentin formation. The study aimed to know the effect of calcium carbonate stimulation from blood clam shells on osteopontin expression as marker of reparative dentinogenesis.

Methods: This research was conducted using Wistar rats (*Rattus norvegicus*), and preparation was made on the occlusal of the right upper molar until perforated. The teeth were then treated with CaCO₃ suspension from the blood clam shells (*Anadara granosa*) and filled with RMGIC. The treatment group was determined on days 1, 3 and 7. The teeth were extracted, and then slide preparations were made with IHC staining.

Results: Each treatment group showed a significant difference on days 1, 3 and 7 with p-value = 0.001 (p < 0.05). Osteopontin expression between the treatment groups showed significant increase on day 1 and day 7 with p value = 0.001 (p < 0.05).

Conclusion: Osteopontin expression in reparative dentin formation increased after applying CaCO₃ suspension from *Anadara granosa* shell on days 1, 3, and 7. This study indicated that CaCO₃ could induce the formation of reparative dentinogenesis in perforated teeth.

Keywords: CaCO₃, *Anadara granosa*, dentinogenesis, reparative dentin, osteopontin.

Modified technique of broken instrument retrieval in lower left mandibular molar: an endodontic challenge (case report)

Sarah Devina^{1*}, Widi Prasetia²

¹Postgraduate Program in Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara

²Lecturer, Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara

*Corresponding Author: Widi Prasetia;
Department of Conservative Dentistry, Faculty of Dentistry,
Universitas Sumatera Utara;
widi.prasetia@usu.ac.id

Background: Successful root canal treatment depends on the cleaning and shaping the root canal. A broken instrument in endodontics is an accident or mishap which can affect treatment outcomes when blocking the canals for cleaning and shaping procedures. Incidence of instrument fracture is reported in 0,7-7% of cases. This article reported and discussed endodontic management of broken instrument retrieval in the lower left mandibular molar with a modified technique.

Case description: Another dentist referred a 32 years old female patient because of the broken file inside the root canal. In the clinical examination of teeth #36, temporary restoration was seen in the mesial of the teeth. Teeth were responsive to percussion but nonresponsive to palpation. The pre-operative intraoral radiograph showed radio-opacity in the mesial canal, furcation lesion, and periapical radiolucency. Root canal treatment was planned with the attempt of broken instrument retrieval with the burrow technique (which uses an angulated approach to the staging platform rather than straight access, allowing minimized canal damage in slender roots). This technique differs in how radicular access is gained, avoiding the usage of GG drills; to preserve more dentin structure.

Conclusion: Retrieving instruments is a stressful situation, using the modified burrow technique hopefully will preserve more dentin and minimize complications. However, many factors still affect instruments' successful retrieval, such as tooth type, canal configurations and accessibility, fragment location and visualization.

Keywords: Retrieval, broken instrument, burrow technique, ultrasonic.

Degradation of extracellular polymeric substance biofilm *Staphylococcus aureus* due to 405 nm diode laser exposure with chlorophyll photosensitizer

Koerniasari Eraiko Sudjarwo¹, Kun Ismiyatin², Sri Kunarti^{2*}, Venny Lusanda Ambarwati¹

¹Resident of Conservative Dentistry Specialist Program, Faculty of Dental medicine, Universitas Airlangga, Surabaya-Indonesia

²Department of Conservative Dentistry, Faculty of Dental medicine, Universitas Airlangga, Surabaya-Indonesia

*Corresponding to:

Sri Kunarti;

Department of Conservative Dentistry, Faculty of Dental medicine, Universitas Airlangga, Surabaya-Indonesia;

sri-k@fkg.unair.ac.id

Introduction: *Staphylococcus aureus* is one of the causative bacteria from root canal infections and is one of the persistent bacteria that can cause apical periodontitis. Biofilm formation is a defense mechanism of bacteria. The main composition of biofilm is an extracellular polymeric substance (EPS). Photodynamic therapy is an alternative to eliminate bacterial biofilm by inactivating microbes by utilizing light-absorbing molecules (photosensitizers) to form free radical particles that can damage microorganisms. This study aimed to know the degradation of extracellular polymeric substance biofilm *Staphylococcus aureus* due to 405 nm diode laser exposure with chlorophyll photosensitizer.

Methods: This study used *Staphylococcus aureus* biofilms, diode laser 405nm as photodynamic therapy, and chlorophyll as a photosensitizer. *Staphylococcus aureus* biofilm samples are divided into 5 groups (n=25), they were group K1 (control group, *Staphylococcus aureus* biofilms in TSA media), group K2 (*Staphylococcus aureus* biofilms in TSA media added with 20 µl chlorophyll), group K3, K4, K5 are *Staphylococcus aureus* biofilms in TSA media added with 20 µl chlorophyll with 405 nm laser with exposure time 90s, 105s, 120s respectively. All samples were then given alexa fluor 647 dextran staining and measured the EPS intensity by confocal laser scanning microscope (CLSM) under 400x magnification. Statistical analysis was performed by ANOVA followed by Tukey HSD (p<0.05).

Results: The irradiation duration of 405 nm diode laser photodynamic affects the degradation of EPS, and the 120 s exposure time showed significant EPS degradation. Statistical analysis showed that all K5 samples have significant results for all groups, p=0,000. The result of the CLSM examination for Group K5 has the lowest intensity of fluorescence expression in EPS of *Staphylococcus aureus* biofilm than other groups.

Conclusion: Photodynamic therapy using laser diode 405 nm with 120 s exposure time and photosensitizer chlorophyll could degrade *Staphylococcus aureus* biofilm EPS.

Keywords: Photodynamic therapy, *Staphylococcus aureus*, EPS, chlorophyll.

Fiber reinforcement type in the posterior restoration

Sweetly Purnomo^{1*}, Dian Agustin Wahjuningrum², Eric Priyo Prasetyo²

¹Dental Conservation Resident of Airlangga University

²Lecturer of Conservative Dentistry, Faculty of Dental Medicine, Airlangga University

*Corresponding to:

Sweetly Purnomo;

Conservative Dentistry Department, Faculty of Dental Medicine,

Universitas Airlangga, Mayjend. Prof. Dr. Moestopo Street 47, Surabaya Indonesia;

sweetlypurnomo@gmail.com

Restorative dentistry is constantly evolving due to innovative treatment solutions based on new materials, treatment techniques, and technologies, with composite materials being a prime example. Different types of fiber reinforcement have further increased composites' potential uses within restorative dentistry. The advent of fiber reinforcement has expanded the potential applications of composite restorations in restorative dentistry, as they internally strengthen the restorations and reduce the occurrence of fractures. This paper discusses fiber types, structure, and the physical properties of fiber-reinforced composites, in addition to outlining some of the potential clinical applications of this exciting group of materials, thus updating the reader on the new treatment possibilities for posterior restoration.

Keywords: Restorative dentistry, biomimetics restorations, posterior restoration, fiber-reinforced composite

The differences in analgesic effects between eugenol and propolis extracts in mice (*Mus musculus*) using the writhing test method

Sagita Putri Andyningtyas¹, Ira Widjiastuti^{2*}, Kun Ismiyatin²,
Annisa Salsabila Witjaksana¹, Mohammad Gerald Athallah Putra¹

¹Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Ira Widjiastuti;

Department of Conservative Dentistry, Faculty of Dental Medicine,

Universitas Airlangga, Surabaya, Indonesia;

ira-w@fkg.unair.ac.id

Introduction: Odontogenic is a pain with a high prevalence. Moreover, the one compound that is widely used as an analgesic in dentistry practice is eugenol. However, eugenol has a few drawbacks that are unpleasant for the patient. Therefore, an alternative option is needed. Propolis is one of the ingredients that can be used as an alternative analgesic option since propolis reduce the release of arachidonic acid and the activity of COX and NF- κ B even though its widespread use is less studied compared to other options. This study aimed to examine and investigate the use of propolis extract as an analgesic compound in mice with the writhing test method. It was also to further explain the effects of eugenol compared to propolis extract on pain response.

Methods: This is an experimental study with a posttest-only control group design. The research sample consisted of 27 mice divided into three treatment groups, the propolis extract group, the eugenol, and the piroxicam control group. Analgesic effect was obtained by performing a writhing test.

Result: The results showed that Propolis extract at a dose of 70 mg/kg had a significant difference compared to eugenol at 42 mg/kg and had no significant difference compared to piroxicam at 10 mg/kg.

Conclusion: Propolis extract is proven effective as an analgesic compound compared to eugenol.

Keywords: Propolis extract, analgesic, writhing test, medicine.

Difference of surface hardness of nanofilled composite immersed in soda contains sugar and contains aspartame

Laksmiari Setyowati¹, Ruslan Effendy¹, Kun Ismiyatin¹, Dinsa Celia Putri²

¹Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, East Java, Indonesia;

²Resident of Conservative Dentistry Specialist Program, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, East Java, Indonesia

*Corresponding to:

Kun Ismiyatin;

Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, East Java, Indonesia. 60132.

kun-is@fkg.unair.ac.id

Introduction: Soft drinks containing aspartame have a more neutral pH than soda drinks that use sucrose as a sweetener, this is influenced by the presence of the amino acid phenylalanine that can neutralize the acid produced by soft drinks. Soft drinks with low pH can affect the integrity of the composite by increasing biodegradation. A high consumption rate of soda drinks and these drinks can increase the biodegradation of composite resins. This study aimed to prove the difference in surface hardness of nanofilled composites immersed in soda drinks containing sugar and soda drink containing aspartame.

Methods: A total of 27 samples of nanofilled cylindrical composite are divided into 3 kinds of immersion (aqua dest, Coca-Cola, Coca-Cola Zero). These materials were immersed into soda drinks for 5 minutes, then moved into aqua dest until 24 hours. This experiment was carried up for 7 days. After 7 days, the materials were tested for the surface hardness with Vickers Microhardness Tester. Data were taken and tested statistically.

Results: There was a significant difference in surface hardness in the entire group. There was a significant difference in each group found in the Turkey HSD test. Decrease in surface hardness caused by the presence of phosphoric acid and CO₂ gas in soda which can form weak acids when dispersed by water, as well as the absorption of water by the composite. However, the aspartame in aspartame soda drinks can neutralize acids when hydrolyzed by water and prevent direct contact between the acid and the surface of the composite.

Conclusion: There is a difference in the surface hardness of nanofilled composite resin after being immersed in soda containing sugar and soda containing aspartame.

Keywords: Composite, Nanofilled Composite, Surface Hardness, Soda, Sugar, Aspartame

Higher potent antimicrobial activity in endodontic: sodium hypochlorite versus chlorhexidine gluconate

Delicia Winarko¹, Yosephine Sirait¹, Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Dental Medicine, Universitas Airlangga, Indonesia,

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia,

*Correspondin:

Dian Agustin Wahjuningrum; Department of Conservative Dentistry,
Faculty of Dental Medicine Universitas Airlangga, Indonesia
Jl. Mayjen. Prof. Dr. Moestopo No.47, Surabaya.
dian-agustin-w@fkg.unair.ac.id

Introduction: This study aimed to evaluate the antibacterial effect of sodium hypochlorite gel and four types of intracanal medicaments.

Methods: The agar diffusion method was used to evaluate the antibacterial effect of five medicaments (sodium hypochlorite gel (NaOCl), chlorhexidine gel (CHX), calcium hydroxide paste (CH), Ledermix, and Diapex plus) against *Enterococcus faecalis* (*E. faecalis*), *Staphylococcus aureus* (*S. aureus*), and *Escherichia coli* (*E. coli*). The zone of inhibition around each medicament was measured in millimeters after 48 hours of incubation at 37°C. The antibacterial effects of medicaments against each microbial strain and the sensitivity of microorganisms towards each medicament were compared using the one-way ANOVA and Games–Howell post hoc tests.

Results: All medicaments showed variable inhibition zones for all bacterial strains except Diapex Plus, which showed no antibacterial activity. NaOCl gel exhibited the most significant inhibition zones for all bacterial strains, followed by CHX gel, Ledermix, and CH. However, the effect of CHX and CH paste against *S. aureus* was statistically similar, while the effect of CH against *E. faecalis* was significantly higher than the Ledermix.

Conclusion: Sodium hypochlorite gel showed the highest antibacterial activity among tested medicaments. It can be recommended as a potent intracanal medicament. Chlorhexidine gel showed a significantly higher antibacterial effect when compared with Ledermix and calcium hydroxide. Calcium hydroxide showed stronger antibacterial activity against *E. faecalis* than Ledermix. Diapex Plus exhibited no antibacterial effect.

Keywords: Calcium hydroxide, antibacterial effect, NaOCl, Chlorhexidine.

Zirconia as innovation in dental implant biomaterial science: A literature review

Multazan¹, Nabila Izas Herninda¹, Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Medicine, Universitas Airlangga, Indonesia,

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia

*Corresponding to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia.

Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya;

dian-agustin-w@fkg.unair.ac.id

The recent drive towards metal-free tooth-colored aesthetic dental implants has led researchers to search for potential substitutes for the gold standard dental implant material titanium. Consequently, zirconia has been introduced in this regard. The present article provides insight into this material's structural and compositional properties, limitations and clinical use, biomechanical perspectives, and the scope of future research works and developments. Four patients were treated for multiple cases of edentulism with zirconia dental implants, and after surgery, all multiple implants were splinted together by provisional restoration. Considering the marginal bone loss adjacent to free-standing implants and multiple implants, it was observed that there is a statistically significant difference between the two groups. According to previous studies, there are 18 total articles found, of which ten articles have a definite correlation with zirconia as material in dental implants. The current audit examined the zirconia-embed materials at present utilized, and the methods revealed for zirconia surface adjustments. In outline, zirconia is a decent possibility for dental embed due to its great mechanical, tasteful, and biocompatible exhibition. Zirconia dental inserts have profoundly been contemplated, and promising outcomes in clinical preliminaries have been shown. Considering results of preclinical investigations and clinical preliminaries are dubious when contrasted with titanium, whether zirconia material will be utilized as an option in contrast to titanium is unclear because of the absence of subsequent long-haul meet-ups. Surface changes of zirconia inserts were examined generally, and the vast majority of the adjustment techniques are demonstrated helpful to zirconia inserts in a few angles, including upgrading cell reaction and working on their osseointegration. Be that as it may, the examinations are not as adequate as those of titanium inserts.

Keywords: Zirconia, Dental implant, Biomaterials, Titanium

Ceramic versus porcelain fused to metal for restoration as dental cosmetics: A literature review

Samuel Manuela Nurhadi¹, Yadjnes Iswaran Kodi Isparan¹, Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Medicine, Universitas Airlangga, Indonesia,

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia,

*Corresponding to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine

Universitas Airlangga, Indonesia. Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya,

dian-agustin-w@fkg.unair.ac.id

This review showed the understanding the differences of ceramic restoration between all ceramics crowns and porcelain fused to metal as dental cosmetics. Teeth are one of the indicators of the health of a person. When determining which restoration can be set with our smiles, choosing the material can be confused because there are pros and cons to each other related to ceramic material to improve not only the appearance of our tooth but also improving the quality of life of a person. The study is a review comparison between all-ceramic crowns and porcelain fused to the metal used in dental restoration. Data are collected from various scholarly search engines, including Pubmed, Elsevier, and google scholar. The research is conducted by the interest in the restoration of dental cosmetics, including meta-analysis, systematic review, review, and clinical reports in between last ten years. From time to time, there are improvements in the performance of dental ceramics restoration. The development of ceramics material, including strength and aesthetics. The other improvements involve the high elastic moduli cores, buildup materials, and cement to protect single crowns against bulk factors. There are approaches to strengthening porcelain to add uniformly dispersed filler particles to the glass matrix, namely dispersion strengthening. The successful filler used in dental ceramics is leucite, a crystalline mineral with an index of refraction similar to spathic glasses. While porcelain fuse to metal (PFM) crowns are color-matched to all-ceramic crowns and have a longer lifespan, all-ceramic crowns have a better cosmetic look and are better for patients with metal allergies, TMJ, and/or excessive grinding. All-ceramic crowns provide patients with more choices for a more attractive smile. All-ceramic crowns have a better cosmetic look and are better for patients with metal allergies, TMJ, and/or excessive grinding.

Keywords: All ceramic crown, porcelain fused to metal, Dental restoration, Dental Aesthetic

The factors for success rate of dental implant: A literature review

Shafy Shariz¹, Ramadhani Darmawan¹, Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Medicine, Universitas Airlangga, Indonesia

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia.

Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya,

dian-agustin-w@fkg.unair.ac.id

A dental implant is a new treatment that most patients expect to have an important role in oral rehabilitation. This review aimed to know the factors that influence the success rate of dental implants and how to maximize the factors. Data including implant sizes, insertion time, and implant location have been collected, and the association of these factors with success, survival, and failure of implants was analyzed. Some of the journal articles definitely discuss the factors of success, failure, and survival for dental implants. Immediate implantation, prosthetic treatment type and modality, and implant location may affect the failure rate of dental implants. In contrast, patient age, implant length, and location are important factors influencing the success of dental implants.

Keywords: Treatment, Failure, Implant, Success, and Location of The Implant

Influence of caffeinated beverages on various types of direct composite: A literature review

Alfredo Pascoal Luvyano Da Silva¹, Faridatul Fariza Binti Ismail¹,
Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Medicine, Universitas Airlangga, Indonesia,

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia,

*Corresponding email: Dian Agustin Wahjuningrum, Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia. Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya, dian-agustin-w@fkg.unair.ac.id

This study aimed to evaluate the color change of three different types of composite resins when exposed to coffee and cola drinks, as well as the effect of repolishing on the color stability of these composites after staining. Fifteen specimens (15 mm in diameter and 2 mm in thickness) were made from micro-hybrid and high-density hybrid composites and polished with aluminum oxide discs. In a reflection spectrophotometer, the color of the specimens was measured using the CIE L*, a*, and b* system. Following baseline color measurements, five specimens of each resin were immersed for 15 days in different staining solutions: G1 - distilled water (control), G2 - coffee, and G3 - cola soft drink. Following that, new color measurements were taken, and the specimens were repolished and subjected to new color readings. The difference (E) between the coordinates L*, a*, and b* was obtained from the specimens before and after solutions immersion. The repolishing was used to determine color stability. There was no statistically significant difference between the E values for the different types of composites after staining or repolishing (ANOVA, Tukey's test; $p > 0.05$). Coffee promoted more color change ($E > 3.3$) than distilled water and cola soft drinks for all composite resins. The E values of the specimens immersed in coffee decreased to clinically acceptable levels ($E \leq 3.3$) after repolishing but remained significantly higher than those of the other groups. There was no significant difference between composite resins or color values before and after repolishing specimens immersed in distilled water and cola. Immersion in coffee caused more color change in all types of composite resins tested in this study, and repolishing helped to reduce staining to clinically acceptable E values.

Keywords: Composite resins, Color, Spectrophotometry, Dental polishing.

Various failures of dental implants: A literature review

Patricia Shankar Jethani¹, Nur Yasmin Nadiah Binti Muhammad¹, Dian Agustin Wahjuningrum^{2*}

¹International Undergraduate Program of Dental Medicine, Faculty of Medicine, Universitas Airlangga, Indonesia,

²Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia,

*Correspondin to:

Dian Agustin Wahjuningrum;

Department of Conservative Dentistry, Faculty of Dental Medicine Universitas Airlangga, Indonesia.

Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya,

dian-agustin-w@fkg.unair.ac.id

This study aimed to understand the dental implant failures during or after the procedure and deal with the challenges. Through a literature search that included studies measuring implant failure and removal up to 2018, questions were generated, answered, and discussed. Studies describing reasons for implant failure, implant removal techniques, and the reinsertion of implants in a previous failed site (n = 12). To date, peri-implantitis is the main reason for late implant failure (81.9%). Trephine burs seem to be the best-known method for implant removal. Nevertheless, the counter-torque-ratchet technique should be the first choice for the clinician because of the low invasiveness. Regarding zirconia implant removal, only scarce data are available. Implantation in previously failed sites, irrespective of an early or late failure, results in 71% to 100% survival over five years. There are three types of implant failures which are biological, mechanical, and surgical malpositioning. There are four suggested ways to overcome the issue: implant replacement, removable and fixed partial dentures, or implant tooth-supported removable partial dentures.

Keywords: dental implants, failed implants, implant removal, denture, implantation

Management of traumatized tooth with open apex and discoloration

Iceu Estu Kurmaena¹, Fitri Yunita Batubara², Trimurni Abidin³

¹Resident of Conservative Dentistry Specialist Program, Faculty of Dentistry, Universitas Sumatera Utara

²Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara

³Department of Conservative Dentistry, Faculty of Dentistry, Universitas Sumatera Utara

*Corresponding to:

Trimurni Abidin, Department of Conservative Dentistry, Faculty of Dentistry,
Universitas Sumatera Utara,

triabidin@yahoo.com

Introduction: Traumatic dental injuries (TDIs) are often associated with complex injury patterns. The correct diagnosis is of great importance as it forms the basis for developing the appropriate management strategy. This study aimed to describe the diagnosis and management of traumatized teeth with open apex and discoloration.

Case description: The patient, 17 years old, came to Universitas Sumatera Utara Dental Hospital complaining of discoloration and fractured incisal on the right upper front tooth. The patient wished to repair his teeth. The periapical radiograph showed an open apex of tooth #11 then diagnosed with pulp necrosis and periodontitis apical asymptomatic. The treatment began with informed consent, local anesthetic, and access opening. Furthermore, the root canal was prepared using K-file #70 and applied Calcium hydroxide in root canal medicament.

Conclusions: Conventional treatment for immature teeth with a necrotic pulp is apexification, in which mineral trioxide aggregate (MTA) is used to create an artificial apical plug.

Keywords: traumatized tooth, open apex, discoloration, pulp necrosis

Minimum Inhibitory Concentration(MIC) and Minimum Bactericidal Concentration (MBC) of henna leaf extracts (*Lawsonia inermis* L.) against *Enterococcus faecalis*

Mirza Bahar Firnanda¹, Cyntia Nur Malikfa Nugraha², Setyabudi^{3*},
Febriastuti Cahyani³, Mochammad Mudjiono³

¹Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

²Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

*Corresponding to:

Setyabudi;

Department of Conservative Dentistry, Faculty of Dental Medicine

Universitas Airlangga, Indonesia. Jl. Mayjen. Prof. Dr. Moestopo No.47 Surabaya,

setyabudigoenharto@yahoo.com

Introduction: *Enterococcus faecalis* is a bacteria that is resistant to treatment and can cause secondary endodontic infections. The increase in antibiotic resistance and side effects of synthetic drugs increase research efforts to find alternative herbal ingredients that have antibacterial properties effective that can be used as a root canal irrigation. *Lawsonia inermis* Linn or Henna leaf is an ancient herbal medicine with antibacterial effects. This study aimed to investigate the antibacterial activity of henna leaf extracts (*Lawsonia inermis* L.) against *E. faecalis*.

Methods: This study was experimental with a post-test-only control group design. *E. faecalis* ATCC 29212 was exposed to henna leaf extracts at 45%, 40%, 35%, and 30% concentrations using Brain Heart Infusion Broth (BHIB). Value of MIC and MBC henna leaf extracts manually calculated the growth of bacteria colonies in Nutrient agar with CFU/ml results.

Results: At a concentration of 30%, the growth of bacteria was 9.1%, indicating that the bacteria grew less than 10%, which is considered as MIC value. At a concentration of 35%, the growth of *E. faecalis* colonies was not found, so this is considered an MBC value. The decrease in the *E. faecalis* colony was caused by the synergism of the function of the phytochemical content of henna leaf extracts. Lawsone (2-hydroxy-1,4 naphthoquinone) is an antibacterial, possibly due to the large number of free hydroxyl that attaches to the enzyme site and makes it inactive. Naphthoquinones may cause oxidative stress in cells resulting in lipid peroxidation of cell membranes and damage to the organization of cell membranes. Tannins are antibacterial by forming complex compounds with extracellular proteins through hydrogen bonds which interfere with the resistance of bacterial cell membranes. Saponins are phytochemicals that can damage cell membranes. Alkaloids interfere with the peptidoglycan constituent components in bacterial cells and cause changes in the structure and composition of amino acids that make up bacterial cell walls and DNA.

Conclusion: The henna leaf extracts have an antibacterial effect against *E. faecalis*. The MIC at 30% and MBC at 35% concentration.

Keywords: endodontic, root canal irrigant, herbal medicine, henna leaf, *Enterococcus faecalis*