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PROGRAMME E-BOOK

Noble Resort Hotel Melaka, Malaysia

19 OCTOBER 2024

6th IIIDentEX 2024

International Invention & Innovation in Dentistry Exhibition

Content

Dean's Message

It is with great pleasure and pride that I extend my warmest welcome to you all to the 6th International Invention and Innovation in Dentistry Exhibition 2024 organized by the Faculty of Dentistry, Universiti Teknologi MARA, Sungai Buloh Campus.

As the Dean of the Faculty, it is with great pleasure that I welcome you to the symposium themed "Fostering Collaborative Health Clusters: Pioneering Innovation in Health and Wellness."

Our primary objective is to ignite and nurture a passion for innovation and invention among healthcare and oral health professionals. Innovation and research transcend mere knowledge acquisition; they involve cultivating a mindset characterized by curiosity, critical thinking, and creativity. By fostering these qualities, we aim to empower participants to emerge as future leaders who will drive positive change in healthcare.

In today's interconnected world, significant breakthroughs frequently occur at the intersection of diverse disciplines. This symposium provides a vital platform for interdisciplinary dialogue, where ideas can converge and new avenues of exploration can unfold.

I encourage all participants to seize this opportunity to showcase your innovations, engage in meaningful discussions, and connect with peers and mentors. Your contributions are essential for advancing the frontiers of scientific knowledge and enhancing patient care.

I extend my deepest gratitude to the organizing committee, speakers, and sponsors who have dedicated their time and resources to make this symposium a reality. Your commitment to academic excellence and professional development is truly commendable.

Let us embark on these two days of learning and collaboration with enthusiasm and a shared commitment to shaping the future of dental practices. Together, we can bridge disciplines, inspire innovation, and create a lasting impact that can benefit the society's quality of life.

Professor Dr. Aida Nur Ashikin Abd Rahman
IIIDentEx2024 Patron
Dean, Faculty of Dentistry, Universiti Teknologi MARA

Foreword

> An exhilarating innovation event designed to bring together brilliant minds and passionate individuals.

It is with great pleasure and enthusiasm that I extend a warm welcome to all esteemed participants as we convene for the IIIDentEx 2024 conference. This event promises to be a transformative experience in the fields of Dentistry, Medicine, and Allied Health Sciences. It is an honor to set the stage for what we anticipate will be an enriching and enlightening journey, marking the sixth consecutive year of IIIDentEx.

The theme, "Fostering Collaborative Health Clusters: Pioneering Innovation in Health Wellness," has been thoughtfully selected to address the current challenges, breakthroughs, and opportunities in our rapidly evolving health landscape.

We believe that IIIDentEx has the potential to drive significant positive change. It provides a platform for inventors, innovators, professionals, and enthusiasts from diverse backgrounds to unite, share knowledge, and cultivate new connections.

We would like to express our heartfelt gratitude to the organizing committee, speakers, and sponsors who have worked diligently to ensure the success of IIIDentEx 2024. Your dedication and commitment have been exemplary, and your collective efforts have been instrumental in bringing this event to fruition.

Once again, let us approach the IIIDentEx conference with open minds and a spirit of collaboration.

Nawwal Alwani Mohd Radzi
Chairperson
IIIDentEx 2024

Booth layout

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RESOURCES

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Schedule

19th October 2024
Saturday

Registration/ Booth Setup
7.30 AM - 9.00 AM

Judging Session
9.00 AM - 10.15 AM

Coffee Break
10.15 AM - 10.30 AM

Judging Session
10.30 AM - 1.00 PM

Lunch Break
1.00 PM - 2.00 PM

Plenary Talk I: The Interplay of Education, Training, & Challenges in Clinical Disciplines: A Pathway to Innovation
by YBhg Professor Dr. Rosnah Mohd Zain
Deputy Vice-Chancellor Research, Innovation, Enterprise (RIE) of MAHSA University
2.00 PM - 2.45 PM

Plenary Talk II: AI and the Metaverse: Revolutionising Healthcare with Opportunities and Risks
by YBhg. Datin Dr. Masdiana Sulaiman Metaverse Innovator of CelcomDigi
2.45 PM - 3.30 PM

Arrival of VIPs, Negaraku & Doa'
3.30 PM - 3.40 PM

Welcoming Remarks
by IIIDentEx2024 Chairman and Dean, Faculty of Dentistry UiTM
3.40 PM - 3.50 PM

Officiation of IIIDentEx2024
by YBhg. Professor Ts Dr. Norazah Abd Rahman
Deputy Vice-Chancellor (Research & Innovation, UiTM
3.50PM - 4.10 PM

Announcement of Winners and Price Giving
4.10 PM - 4.55 PM

Adjourned
4.55 PM - 5.00 PM

Judges

1. Ts. Dr. Ibrahim Ahmad
2. Dr Erma binti Mohd Kamal
3. Dr. Mohd Faiz bin Mohd Hanim
4. Dr Mas Idayu binti Md Sabri
5. Prof. Dr. Abdul Rashid bin Ismail
6. Assoc. Prof. Ts. Dr. Mohd Shukri bin Mohd Aris
7. Dr. Nurharnani Harun
8. Dr. Faezah Sabirin
9. Prof. Dr. Norliza Mastura binti Ismail
10. Ts. Dr. Aliana Hidayah

Abstract

Booth No.	Title	Category
1	DIARI PENGURUSAN PESAKIT KLEF CARE (CLEFT ANTICIPITATION & REHABILITATION EDUCATION)	Professional Inventor/ Innovator
2	Stain Tech Navigator	Young Inventor/ Innovator
3	Crack the Case: A Novel Tool for Cracked Tooth Education	Professional Inventor/ Innovator
4	Dental Science Kit (DES-Kit) Module as a Supplementary Teaching Tool in Oral Health Education	Young Inventor/ Innovator
5	The OralCare Box	Young Inventor/ Innovator
6	iBox Suction	Professional Inventor/ Innovator
7	Indonesian Propolis Extract Effective in Reducing the Diameter of Traumatic Ulcers of the Labial Mucosa of Wistar Rat	Professional Inventor/ Innovator
8	Effectiveness of Roselle Flower Extract on the Number of Streptococcus mutans Bacteria in Heat-Polymerized Acrylic Resin Plates	Professional Inventor/ Innovator
9	The Effect of Oral Administration of Flaxseed Oil Enhances the Bone Density in White Male Rats of Sprague Dawley Strain with Periodontitis	Professional Inventor/ Innovator
10	The Effectiveness of Nanochitosan Coating on Water Absorption and Transverse Strength in Heat-polymerized Acrylic Resin Bases	Professional Inventor/ Innovator
11	Inhibitory Power of Graptophyllum pictum L. Griff Extract on Streptococcus sobrinus: A Laboratorium Research	Professional Inventor/ Innovator
12	Retreatment of A Skeletal Class II Malocclusion with Bi Protrusion by Extraction and Molar Distalization	Professional Inventor/ Innovator
13	From Scan to Surgery: A Novel 3D-Printed Surgical Guide for Impacted Teeth	Young Inventor/ Innovator
14	SEM Analysis of Morphology Surface Roughness Denture Polished with Abrasive Powder from Anadara granosa Shell	Professional Inventor/ Innovator
15	Innovative Dust Reduction Strategies: A Comparative Investigation of Chairside Suction Devices	Professional Inventor/ Innovator
16	ChitoCal: Revolutionizing Regenerative Dentistry	Young Inventor/ Innovator

Abstract

Booth No.	Title	Category
17	Comparison of Adhesion Strength Test of Glass Ionomer Cement as a Fixed Orthodontic Cementing Material in Artificial Saliva on Bodily Tooth Movementitle II	Professional Inventor/ Innovator
18	Rinsing with Green Betel Leaf Extract (Piper betel L.) 25% Increases pH of Saliva in Students of Dentistry Faculty Mahasaraswati Denpasar University that using Fixed Orthodontic Appliances	Professional Inventor/ Innovator
19	VistaDent Mirror	Professional Inventor/ Innovator
20	Effectiveness of 10% Black Cumin (Nigella Sativa L.) Gel on Osteoblast Cell Proliferation in Wistar Rats (Rattus Norvegicus) with Periodontitis: An In Vivo Study	Professional Inventor/ Innovator
21	iHeadease 2.0	Young Inventor/ Innovator
22	PEDIS-KIT	Young Inventor/ Innovator
23	Central Diastema With Mesially Tipped Molars Treated Using Self Ligating Braces To Shorten Active Orthodontic Treatment Time	Professional Inventor/ Innovator
24	Near Field Communication (NFC)-Tagged Denture (N-TagDent)	Young Inventor/ Innovator
25	Interdental Cleaning Compliance Index: An Extension of the Gum Diary	Professional Inventor/ Innovator
26	Prevalence of Dentigerous Cysts in Patients at RSGM Saraswati Denpasar Analyzed from Panoramic Radiographs	Professional Inventor/ Innovator
27	EcoFlow (Eco-friendly Flowable Composite Derived from Rice Husk)	Young Inventor/ Innovator
28	Disclo-Light	Professional Inventor/ Innovator
29	OralBioSens: A Biosensing Detection Tool for Oral Cancer	Professional Inventor/ Innovator
30	Toothy Bundle	Young Inventor/ Innovator
31	ElderSmile Care	Young Inventor/ Innovator
32	Cleft Learning Family Tools (CLFT): Enhancing Feeding and Interceptive Care for Cleft Babies	Young Inventor/ Innovator

Abstract

Booth No.	Title	Category
33	Revolutionizing Post-Extraction Care: An Innovative Device for Dental Follicle Remnant Removal	Junior Inventor/ Innovator
34	Comparing 3D Printed Twin Block Appliance Designs for Class II Division 1 Malocclusion on Optimised Fit, Retention, and Compressive Strength	Young Inventor/ Innovator
35	Ergocush-D: Adaptive Support for Individuals with Posture and Mobility Needs	Young Inventor/ Innovator
36	A Novel Vibrating Fiber Optic (VFO) System for Implant Stability Measurement	Young Inventor/ Innovator
37	Prototype Engineering and Simulation Study of An Automated Gauze Handling Machine	Professional Inventor/ Innovator
38	Cal-ChlorideGrip: Surface Treated Orthodontic Mini Implant	Professional Inventor/ Innovator
39	OMIS: ISQ-Compatible Verifier for Orthodontic Mini Implant Stability	Professional Inventor/ Innovator
40	GigiTrauma Kit©: Rapid Dental Aid for School Children	Professional Inventor/ Innovator
41	Inovasi Dam Molar Perkasa	Professional Inventor/ Innovator
42	AIDentify	Young Inventor/ Innovator
43	Virgin Coconut Oil (VCO) Chewing Gum	Junior Inventor/ Innovator
44	B FRESH: Dentaceutical Solutions	Professional Inventor/ Innovator
45	META-OHE: Metaverse for Oral Health Education	Young Inventor/ Innovator
46	VeSurTrea Box: Solution for Storage and Surface Pretreatment of Veneer	Young Inventor/ Innovator

Diari Pengurusan Pesakit Klef: A Personalized Educational Intervention

Amirah Khairunnisa Mhd Nasser[1], Nur Farhah Ismail[2] & Badrul Munir Mohd Arif[3]

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Abstract

Cleft lip and/or palate (CLP) management is a long-term commitment for the parents, it commences immediately after birth and involves a multidisciplinary team. Lack of exposure and awareness to the knowledge of CLP management from the parents lead to the defaulted treatment of the child and increased stress levels of the parents, resulting in compromising their quality of life (QoL). Diari Pengurusan Pesakit Klef denotes the first joint effort of interdepartmental collaboration in Malaysia. It was introduced to the parents as an educational tool to increase the knowledge, awareness, and guidance that comprise a concise and comprehensive management care from the multidisciplinary team, including medical counterparts. This product aims to provide knowledge, information, and assistance to the parents about overall CLP management, allowing them to have a better understanding, reduce stress, and prevent the likelihood of defaulted treatment. It delivers all-inclusive information in a simpler term on CLP management, encompassing contributions from the expertise of different departments. Providing clear, simple, and easily navigable written guidance about CLP management can improve QoL and reduce anxiety of the parents. The diary serves as a support system for parents, as it also includes the contact information for each specialist in case further help is required. It also aids in early cleft exposure and awareness, as well as helping patients and parents understand the treatment strategy, hence preventing defaulting therapy. The pilot study was conducted among 10 parents with CLP children and 10 operators from different specialties. Parental knowledge and the effectiveness of health communications among parents and specialists were assessed by answering the survey before and after introducing the educational intervention. The results revealed that all respondents acknowledged the diary can enhance the insight of CLP information to the parents and facilitate them as assistance and early preparation in managing CLP children. It can be concluded that this educational intervention will be an impactful approach for the parents and specialists to use as reference and communication tool in handling children with CLP cases. Future projects will explore Augmented Reality (AR), which can enlighten the public with live 3D images of CLP conditions.

Key words: cleft lip, cleft palate, multidisciplinary, quality of life

Stain Tech Navigator

Nurain Abdul Samat[1], Nur Hidayatul Mardhiyyah Mohd Zubli[1], Nuranida Hani Ruslan[1], Budi Aslinie Md Sabri[1], Diyana Shereen Anwar[1]

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Abstract

Introduction: Nicotine and tar residues from cigarette smoke adhere to dental surfaces, posing health risks and causing persistent stains. Along with plaque and calculus, these residues are often invisible, making detection and cleaning challenging. Currently, dental practitioners rely on visual inspection or can be supplemented by bulky, heavy, and non- portable devices. These existing devices are impractical for patient education, as they require the patient to be positioned inside a confined space, limiting two-way communication between patient and doctor for effective education and treatment. This project aims to develop a UV light-based device to detect and highlight these contaminants, enhancing hygiene and patient education. Materials and Methods: The enhanced prototype consists of UV light source, detection sensors and fluorescent dye. The UV light source emits light that causes nicotine, tar residues, plaque, and calculus to fluoresce, while detection sensors capture the emitted fluorescence. This process is enhanced by the use of a fluorescent dye. Results and Discussion: Dental practitioners reported improved detection and cleaning of these contaminants, enhancing oral hygiene outcomes. Patients benefited from visual demonstrations of residues on their teeth, emphasizing the importance of oral hygiene. Also, this device provides a non-invasive, efficient solution for screening and education. Its portability and ease of use make it practical for everyday dental practice, potentially reducing long- term healthcare costs associated with poor oral hygiene. Conclusion: This project presents a novel UV light-based detection device that significantly improves the effectiveness of dental care and patient education. Its portability and user-friendly design make it a practical tool for everyday dental practice, promoting better oral hygiene and reducing associated health risks. Notably, no such device has been made before, marking a significant advancement in dental health technology. This innovation provides both practitioners and patients with a valuable tool for improving oral hygiene and overall health.

Key words: plaque, calculus, nicotine stain, detection, screening, education

Crack the Case: A Novel Tool for Cracked Tooth Education

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2Paediatric Dentistry & Orthodontics Centre of Studies,
Faculty of Dentistry, UiTM
3Preclinical Sciences Centre of Studies, Faculty of Dentistry, UiTM

Abstract

Background: Cracked teeth, affecting 4.54% of individuals aged 30-50, present a significant diagnostic challenge. Clinicians may not naturally look for cracks during routine oral examinations. Hence, cracks are often found incidentally when patients come in for other issues when they are visible to the naked eye. Otherwise, they may go unnoticed and continue to worsen because of chewing or certain para-functional habits. An early diagnosis and treatment can improve the prognosis significantly. Problem statement: The low prevalence of cracked tooth makes it difficult for all dental students to have exposure to cracks and how to conduct dental examination during their study years, evaluation of crack symptoms (pain upon release), visual crack line evaluation with naked eye or with transillumination and dye usage. Furthermore, there is no teaching aid or dummy available to teach the students. Objective: To develop a novel educational tool that simulates the clinical presentation and examination of cracked teeth, enabling students to practice diagnosis and improve their understanding of crack tooth-related complications. Novelty: This pioneer educational model prototype with model containing 3D-printed teeth from polylactic acid simulates pain upon release by using a pressure sensor and coded microcontroller board, offering a hands-on training experience in crack tooth education. Multiple 3D printed teeth with cracks are used to simulate examination using visual, toluidine blue or transillumination. The model contains teeth with molar band/crown which aid in education of treatment options. 3D-model kit includes teeth model with 3D printed teeth, Examination set, tooth sloth and transillumination device. Benefit: This tool will serve as an essential tool for dental students, familiarizing them with the appearance and examination of cracked teeth. By equipping students with the skills to perform accurate diagnoses, this tool can significantly impact the outcome and prognosis of cracked tooth cases.

Key words: crack tooth model, pain upon release, simulation, 3D-printed teeth

Dental Science Kit (DES-Kit) module as a supplementary teaching tool in oral health education

Wong Fui Jak1 3, Nor Azlida Mohd Nor1, Tengku Nurfarhana Nadirah Tengku Hamzah2, Safwanah Muhamad Nor1 3 & Nur Fatehah Mohamad Yusof1 3.

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2Department of Paediatric and Orthodontics, Faculty of Dentistry, Universiti Malaya
3Ministry of Health Malaysia

Abstract

Introduction: The traditional approach to oral health education (OHE), which primarily relies on oral health talks and lectures by oral health personnel, is often perceived as repetitive, uninteresting, and lacking interactive elements. While this conventional method reaches a broad audience, it faces challenges in maintaining continuity and involvement from parents and teachers. Additionally, teachers encounter difficulties accessing expert-endorsed, readily available reference materials, particularly in the Malay language, which hinders the integration of OHE into their teaching. To address this gap, the Dental Science Kit (DES-Kit) Module was developed as a supplementary teaching tool in OHE, offering relevant, engaging, safe, and educational resources for primary schoolchildren in Malaysia. It can be incorporated across subjects such as Science, Health Education, and extracurricular activities like the STEM club and Young Doctors Club. Materials and Methods: The DES-Kit module consists of an illustrated guidebook in the Malay language and an activity kit offering 10 hands-on science-related activities. The development process involved adapting, modifying and compiling existing dental science-related activities from the literature to suit primary school children aged 10-12. This was followed by expert group discussions and brainstorming to refine the module content, assess feasibility and educational value. The content was validated by experts and further refined based on stakeholders' feedback. Result and Discussion: This module integrates oral health concepts and science-based activities, making learning interactive and educational. The final version of the DES-Kit was implemented in two schools in Kuala Lumpur for OHE and community engagement programmes. Additionally, the kit was distributed to two more schools in Selangor and Pahang, suggesting that the DES-Kit has the potential for broader adoption and commercialisation as part of the school-based OHE materials. Conclusion: The module supports teachers in delivering OHE without needing specialised training and fosters active participation among schoolchildren, ensuring they are engaged and involved in their oral health education, leading to a better understanding of oral health.

Key words: oral health education, oral health promotion, schoolchildren

The OralCare Box

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Abstract

Introduction: The OralCare Box is a compact, user-friendly device inspired by makeup boxes designed for oral health self-examination. Its intuitive interface allows users to detect early signs of oral lesions, cavities, and gum diseases. By integrating convenience and well-being, the OralCare Box aims to promote proactive oral care and potentially transform oral hygiene practices. Organizing promotional activities is challenging due to the bulkiness of brochures, samples, and materials, necessitating streamlined items for easier transport. Limited space during travel and crowded venues complicates item management, while efficiently organizing banners, giveaways, and displays is essential for successful promotion. Materials and Methods: The OralCare Box contains critical elements to facilitate user-friendly self- examination. The top lid has an integrated 180-degree mirror with LED light that offers a clear view of the user's oral cavity. Below the mirror, an instructional panel provides step-by-step guidance for self-examination, highlighting indicators such as oral cancer. Crafted from robust, easily sanitized materials, the OralCare Box features a shatterproof, fog-resistant mirror and a laminated instructional panel to ensure durability and longevity. Results and Discussion: Promoters now employ the OralCare Box, a compact device consolidating multiple items. Its streamlined design easily enhances user engagement. The lightweight construction reduces physical strain during extended events, alleviating shoulder burdens. Its minimal size allows for effortless navigation in crowded venues. With LED lights, the intuitive interface supports clear and impactful oral health demonstrations, enabling promoters to educate attendees on early detection and preventive care confidently. Conclusion: The OralCare Box transcends traditional oral hygiene tools with its sleek design and built-in mirror, empowering users to self-examine their oral health. Eliminating bulky materials fosters confident engagement in preventive care. As data accumulates globally, the OralCare Box initiates a silent revolution, shaping a healthier future, one smile at a time.

Key words: oral promotion materials, mouth self-examination, oral health, preventive care

iBox Suction

Lee Poh Shyan, Nur Ain Iffah Mohamad Nadzri, Nurjamiah Fathihah Ab Rahim, Ashavathany A/P Sukumaran, Chen Wei Qi, Elaine Koh Xiao Chin, Gursimranjit Kaur A/P Sukdershan Singh, Nurul Nadia Husin, Intan Amalina Ahmad

Petaling District Dental Health Office, Selangor

Abstract

Background: The Mobile Dental Team (MDT) consists of dental personnel equipped with portable dental equipment to provide outreach dental health services. One crucial component of the MDT is the portable suction device. The portable suction device is used by the MDT during dental treatments and is frequently moved between locations. Problem Statement: Components of the portable suction, such as the glass bottle that easily detaches and tangled wires, necessitate more careful care and handling. Existing portable suction units lacked dedicated storage for protection. This made the glass bottles prone to breaking during transport and use due to the absence of specialized protection. Additionally, tangled wires contributed to a disorganized work environment, and the portable suction produced loud noise during operation. Objective: The development of the “iBox Suction” aims to improve asset care and handling. Novelty: The “iBox Suction,” developed from a prototype design by iTeam, is made from sturdy metal and polyethylene foam (PE foam) to store and protect the portable suction device. The PE foam adds protection and helps reduce noise. Benefits to user and/ or society: The portable suction now has a dedicated space for easier care and protection during transport and use. It can be more efficiently stored in departmental vehicles, as it is well-protected. Additionally, the suction’s wires now have a designated place for more organized storage. The noise produced by the suction during dental treatments is also reduced by the PE foam, which absorbs sound and reduces vibrations. The “iBox Suction” improves the quality of dental health services by providing better asset protection and easier handling of the portable suction device during use and transport. It also helps reduce noise during dental treatments.

Key words: portable suction, mobile dental team, outreach health service

Indonesian Ethanol Extract Of Propolis Effective In Reducing The Diameter Of Traumatic Ulcers Of The Labial Mucosa Of Wistar Rats

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2Undergraduated dental student, Faculty of Dentistry, Mahasaraswati Denpasar University, Indonesia

Abstract

Progress of orthodontic treatment could be hampered by the pain caused by the traumatic ulcers. Ethanol extract of propolis contains active compounds in the form of flavonoids, artephilin Cs, and polyphenols that act as an anti-inflammatory, antibacterial and antioxidant. People want to treat traumatic ulcers with natural medicines because it was known that modern medicines contain synthetic chemical ingredients that could be harmful to health. The aim of this is study to determine the effectiveness of 50% and 100% concentration of 96% ethanol extract of propolis in reducing the diameter of traumatic ulcers of the labial mucosa of male Wistar rats. The design of this study was randomized post-test only control group design. A total of 24 rats that met the eligibility criteria were then randomized into four groups, namely the control group (K1) rats were given hyaluronic acid as positive control, (K2) rats were not given anything as negative control, and the treatment group (P1) rats were given 50% concentration of 96% ethanol extract of propolis, (P2) rats were given 100% concentration of 96% ethanol extract of propolis. All experimental animals were conditioned to be traumatic ulcers by injured using a 5 mm punch biopsy at labial mucosa. Ethanol extract of propolis was topically administered once a day for 7 days. On the seventh day the ulcer diameter was measured using the UNC 15 periodontal probe. The results showed that the mean healing diameter of positive control was 3.25 mm, negative control was 2.52 mm, 50% concentration of 96% ethanol extract of propolis was 3.645 mm and 100% concentation of 96% ethanol extract of propolis was 4.562 mm respectively. The conclusion of this study was that 50% and 100% concentration of 96% ethanol extract of propolis effective in reducing the diameter of traumatic ulcers of the labial mucosa of rats.

Key words: Indonesian ethanol propolis extract, traumatic ulcers

Effectiveness of Roselle Flower Ethanol Extract on the Number of Streptococcus mutans Bacteria in Heat-Polymerized Acrylic Resin Plates

Ni Kadek Sugianitri, Ria Koesoemawati

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Abstract

Background: The use of dentures that have not been cleaned for an extended period can lead to various problems, including the buildup of plaque and the growth of Streptococcus mutans (S. mutans) bacteria. The roselle flower is anticipated to serve as a disinfectant for dentures due to its content of anthocyanins, tannins, saponins, and amino acids, which possess antibacterial, antiviral, and antifungal properties. Problem Statement: What is the effectiveness of ethanol extract of roselle flower at concentrations of 30%, 40%, and 50% against the number of S. mutans on heat-polymerized acrylic resin plates soaked for 6 hours? Objective: The objective is to determine the effectiveness of herbal ingredients as denture disinfectants compared to chemical alternatives, particularly focusing on roselle flowers. Research Question: What is the effectiveness of ethanol extract of roselle flower at concentrations of 30%, 40%, and 50% on the number of S. mutans on heat-polymerized acrylic resin plates soaked for 6 hours? Methodology:This study employs an experimental laboratory design with a post-test only control group. The results indicated the following counts of S. mutans bacteria for samples P1 (30%): 46.80 ± 4.60, P2 (40%) : 29.00 ± 1.58, P3 (50%) : 10.20 ± 1.30, K(Control) : 163.40 ± 6.43. This data exhibits a normal distribution and is homogeneous. One Way ANOVA analysis reveals $p < 0.05$, indicating a significant difference. LSD test at a concentration of 50%, the number of S. mutans is the lowest. Conclusion: The results demonstrate a significant difference across each treatment group. It can be concluded that soaking acrylic resin plates in 30%, 40%, and 50% ethanol extracts of roselle flower for 6 hours effectively reduces the number of S. mutans bacteria, with the 50% concentration being the most effective. Novelty: The novelty of this research lies in the finding that ethanol extract of roselle flower can serve as a disinfectant for heat-polymerized acrylic resin plates. Benefits to Society: The ethanol extract of roselle flower is notably effective in reducing the number of S. mutans bacteria, which can subsequently decrease the risk of cavities for users of removable acrylic resin dentures.

Key words: Roselle Flowers, Streptococcus mutans, Heat-Polymerized Acrylic Resin.

The Effect of Oral Administration of Flaxseed Oil Enhances the Bone Density in White Male Rats of Sprague Dawley Strain with Periodontitis

Ketut Virtika Ayu1, I Nyoman Mangku Karmaya2

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2Anatomy Department of Medical Faculty, Udayana University

Abstract

Orthodontic treatment ensures proper alignment of the teeth and improves the occlusal and jaw relationship. However, these treatments are difficult due to periodontal disorders involving alveolar bone resorption. Periodontitis is a chronic inflammatory disease leading to tooth loss. Flaxseed oil contains high omega- 3 that can reduce inflammatory activity thereby reducing bone resorption. This study was conducted to prove the flaxseed oil enhance the bone density in periodontitis rats. This study was purely experimental research with Randomized Post Test Only Control Group Design. Research subjects consisted of 8 – 12 weeks 32 white male rats of Sprague Dawley strain were divided into 2 groups; a control group were given placebo (glycerin) orally for 21 days, whereas the treatment group were given flaxseed oil 700 mg/200grBW orally for 21 days. On the 30th day, mice were euthanized for mandibula alveolar bone tissue sampling and histological preparations were made by HE (Harris Hematoxylin-Eosin) staining. The data were analyzed using SPSS program processed using Shapiro-Wilk for normality test and then continued using the independent t-test. The results showed that the mean of bone density determined by trabecular structure thickness at group treated with flaxseed oil (662.51 ± 5.495 μm per 5 field of view) was statistics significantly higher than the control group (360.01 ± 4.523 μm per 5 field of view). Test results based on comparison between the control group and the group treated with flaxseed oil with independent t-test showed that significant differences in bone density of white male Sprague Dawley rats ($p<0.05$). This study concluded that there's effect of oral administration of flaxseed oil enhance the bone density in white male rats of Sprague Dawley strain with periodontitis.

Key words: flaxseed oil, periodontitis, bone density

The effectiveness of nanochitosan coating on water absorption and transverse strength in heat-polymerized acrylic resin bases

Ria Koesoemawati, Dewi Farida

Department of Prosthodontics, Faculty of Dentistry, Mahasaraswati University
Denpasar, Bali, Indonesia

Abstract

Background: Removable dentures are typically made from heat-polymerized acrylic resin, which has a tendency to absorb water. This absorption can compromise the transverse strength of the material, leading to potential fractures in the dentures. One solution to mitigate water absorption is the application of coating made from the natural polymer chitosan. Problem Statement: The study seeks to evaluate the effectiveness of nanochitosan coating in reducing water absorption and enhancing the transverse strength of heat-polymerized acrylic resin plates. Objective: This study aims to demonstrate the effectiveness of nanochitosan coatings in minimizing water absorption and improving the transverse strength of acrylic resin plates. Methods: The experimental a Post-Test Only Control Group Design, using 30 plates divided into three treatment groups, coated with Aldrich® nanochitosan (derived from shrimp shells) at concentrations of 2%, 3%, and 4%. Two control groups were used: one with a 2% chitosan coating and another uncoated. The preparation of nanochitosan coating using Sodium tripolyphosphate (0.1%) was added to 20 ml of the solution and homogenized, followed by ultrasonic treatment for 20 minutes and centrifuged for 30 minutes to break the particles into smaller ones to produce nanochitosan suspensions. The plates were immersed in the coating solution for 5 minutes and dried for 1 hour. Water absorption was tested by immersing the samples in distilled water at 37±2°C for 7 days. Transverse strength was measured using a Universal Testing Machine. Results: Analysis results showed significant differences in water absorption and transverse strength between all treated samples and the untreated control group. Specifically, the 4% nano chitosan coating significantly reduced water absorption compared to the 2% chitosan control, while 3% and 4% nanochitosan coatings demonstrated significantly improved transverse strength over the 2% chitosan control. Novelty: This study explores the application of nanochitosan coatings on heat-polymerized acrylic resin plates. Conclusion:The findings suggest that nanochitosan coatings are effective in reducing water absorption and increasing the transverse strength of acrylic resin plates, with the 4% nano chitosan concentration proving most effective. Benefits: Nanochitosan coatings can be applied to dentures to enhance their durability and reduce the risk of fractures during mastication.

Key words: heat-polymerized acrylic resin, nanochitosan coating, transverse strength, water absorption

INHIBITORY POWER OF Graptophyllum Pictum L. Griff EXTRACT ON Streptococcus sobrinus: a LABORATORIUM RESEARCH

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Abstract

Caries is caused by acids from carbohydrate fermentation which causes demineralization of the hard tissue structure of the teeth by bacteria. The main cariogenic bacteria in the caries pathogenesis process is Streptococcus mutans, but there are other bacteria, namely Streptococcus sobrinus, which can be more cariogenic than Streptococcus mutans. Saliva containing Streptococcus mutans and Streptococcus sobrinus bacteria has higher levels of dental caries compared to children whose saliva contains only one type of Streptococcus mutans or Streptococcus sobrinus. A safer alternative antibacterial ingredient for preventing dental caries is using the herbal ingredient purple leaf (Graptophyllum pictum L. Griff). The contents of purple leaves which act as antibacterial compounds are alkaloid, flavonoid, tannin, saponin and steroid. This study aims to determine the effect of differences in the antibacterial concentration of purple leaf extract on the growth of Streptococcus sobrinus. The concentrations of purple leaf extract used in this research were of 5%, 10%, and 15%. The research method used was the Kirby-Baurer method or disk diffusion to determine the inhibitory power of purple leaf extract on the growth of Streptococcus sobrinus bacteria. The research results showed that the average positive control inhibition zone was 19.40, the 5% extract concentration was 5.51, the 10% concentration was 12.25, and the 15% concentration was 14.64. Based on the research results, purple leaf extract with concentrations of 5%, 10% and 15% had different inhibitory effects on the growth of Streptococcus sobrinus, with a purple leaf extract concentration of 15% having the greatest inhibitory effect on the growth of Streptococcus sobrinus.

Key words: caries, purple leaf, Streptococcus sobrinus

Retreatment of a Skeletal Class II Malocclusion with Bi-Protrusion by Extraction and Molar Distalization

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Abstract

Introduction: Hyper-divergent profile is common problem in bi-protrusion malocclusion. It could lead to extraction treatment and longer treatment time. Bi-protrusion case may require the extraction of all first premolar to gain space, but first molar is also one teeth than often found missing due to agenesis case so another biomechanic treatment must be consider. Objectives: To aiming better profile by extraction and molar distalization. Description: This case report describes the treatment of a 23-years-old patient presented with hyper divergent profile, incisor proclination. Patient was having orthodontic treatment on upper jaw years before without extraction. Clinical examination showed that first premolar of upper left was missing and on radiographic examination there wasn't tooth germ. Cephalometric showed that the patient has proclained incisors in maxilla and mandible. Based on arc length discrepancy and profile extraction was chosen as treatment plan. Due to missing upper left first molar distalization was chosen on maxilla and two step retraction technique was used to correct the condition. Conclusion: The success of the orthodontic treatment was influenced by the specific nature of the patient's dental and medical history, extraoral and intraoral examination, diagnosis and treatment planning, which was followed by a systematic approach to treatment. Combination of extraction and distalization could be used to achieve better profile and occlusion.

Key words: bi-protrusion, molar distalization, agenesis

From Scan to Surgery: A Novel 3D-Printed Surgical Guide for Impacted Teeth

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Abstract

Introduction: Impacted teeth pose significant challenges in dental surgery because of their variable positioning and complex relation with the surrounding vital structures. Accurate pre-operative assessment and surgical planning are critical for successful outcomes. Problem Statement: While 3D imaging modalities like Cone Beam Computed Tomography (CBCT) have enhanced visualisation, undergraduate and postgraduate students in training may still struggle to fully comprehend and visualise impacted tooth morphology and its spatial relationship within the surrounding anatomy using 2D viewer software. This limitation can increase surgical risk and hinder effective training. Objectives: This project aims to develop patient-specific 3D-printed upper/lower arch models with impacted teeth derived from CBCT slices. These models serve as a surgical guide and training tool for dental students. Methods: CBCT data are segmented using an open-source software and exported in STL file format. The STL files are then imported into a 3D-printing slicing software. The surrounding bone will be selectively removed in the model to reveal the impacted tooth's position, orientation, and depth. The models will be printed using PLA material, with the impacted tooth highlighted in a contrasting colour for enhanced visualisation. Novelty: The novelty lies in the utilisation of CBCT data to create a tangible, patient-specific 3D model of impacted teeth and their surrounding structures. The contrasting colour of the impacted tooth and selective bone removal in the 3D model facilitates superior visualisation and understanding of complex anatomical relationships compared to traditional 2D imaging or even 3D viewer software alone. Benefits: These 3D-printed models have the potential to improve surgical planning accuracy, reduce operative time, and minimise complications. Furthermore, they offer a valuable hands-on training tool for postgraduate students, enhancing their understanding of impacted tooth presentation and surgical approaches.

Key words: 3D printing, CBCT, surgical guide, impacted teeth, training tool

SEM Analysis of Morphology Surface Roughness Denture Polished with Abrasive Powder from Anadara granosa Shell

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Abstract

Background: Finishing and polishing are important process in making dentures, so that the dentures surface smoother and not become a retention area for food residue and oral microorganisms. Pumice is an abrasive material commonly used for this stage. The shells of blood cockles (Anadara granosa) have potential as polishing materials because they contain high levels of calcium carbonate. Problem statement: Pumice, a volcanic product, can cause negative environmental impacts and requires high energy in the production process. Considering the environmental impact and long-term sustainability, it is important to look for natural-based alternatives that can be used as denture polishing materials. Objective: The aim of this study was to analyze and compare surface roughness morphology of flexible denture plates made from thermoplastic nylon after polishing with the shells powder of blood cockles and pumice. Novelty: This study explores the use of abrasive powder derived from the shells of blood cockles, a natural resource that may not have been widely utilized in the denture polishing industry, as a new alternative abrasive material. Scanning Electron Microscopy (SEM) represents a detailed approach, to analyze the surface roughness morphology of denture plates surface. Benefits: Blood cockle shells are a natural material, offering advantages in terms of resource availability, greater sustainability and contributing to a more ecologically responsible use of materials. This can provide opportunities for innovation in the denture industry, as well as the potential for new product development. Method: This research used a Post Test Only Group Design, consisting of 18 samples, divided into 3 groups: control group without polishing, polished with pumice and polished with blood cockle shells powder with a particle size of 38 μm. Surface roughness morphology measurements were carried out using SEM method. Results: One Way ANOVA test showed that there were significant differences between groups and within groups ($p<0.05$). The LSD test showed that there was no significant difference between the blood cockles and pumice group ($p>0.05$). Conclusion: Polishing with blood cockles shell powder produces a smoother surface compared to pumice.

Key words: Anadara granosa, SEM, surface morphology, thermoplastic nylon

Innovative Dust Reduction Strategies: A Comparative Investigation of Chairside Suction Devices

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Abstract

Chairside trimming of a dental prosthesis is inevitable, especially during the prosthesis delivery stage. Acrylic dust particles that are generated throughout the procedure linger in the surrounding atmosphere for an extended period of time. These dust particles can be inhaled and deposited in the respiratory system, creating a significant occupational health concern within the dental fraternity. The adverse reactions of inhaling or contacting acrylic dust are well known, yet most clinicians do not utilise any suction devices due to their high cost and low practicality. The study aims to compare the efficacy of different chairside suction devices in reducing the acrylic dust during chairside trimming. Thirty acrylic samples mixed with phosphorescent powder were prepared and randomly distributed into three groups of experimental setup; control group with no suction device (C), a group using a high vacuum evacuator (HVE) and a group using a newly developed 3-dimensional printed polylactic acid (PLA) extraoral suction device (3D-HVE), which was designed using AutoCAD. Particle counts were measured using a particle count monitor during the trimming phase. Any visible dust on the floor and simulated patient was recorded via a mapping calculation. Statistically significant differences were found in the particle counts of all particle sizes (0.3µm, 0.5µm, 0.7µm, 1.0µm, 2.5µm, 5.0µm, 10.0µm), with the 3D-HVE group having the lowest particle counts ($p<0.05$). Visible dust on the floor and simulated patient was also significantly reduced in 3D-HVE group ($p<0.05$). The newly designed 3D-HVE showed significant reduction in particle counts and distribution in the dental practice, henceforth providing a healthier working environment for both staff and patients.

Key words: 3-D printing, acrylic resins, particle size, prosthodontics, suction devices

ChitoCal: Revolutionizing Periodontal Regenerative Therapy

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Abstract

Periodontitis is a chronic inflammatory condition that leads to the destruction of both soft and hard tissues surrounding the teeth and can result in significant alveolar bone resorption, eventually causing tooth loss. A variety of biomaterial products are available on the market that aim to improve periodontal health by enhancing bone height, reducing pocket depth, and promoting soft tissue attachment. However, these biomaterials face several limitations, such as limited availability, risk of infection, suboptimal regenerative properties, inadequate mechanical strength, high costs, and religious acceptability concerns in multi-faith societies. Alternative materials are needed to address the shortcomings of current biomaterials. In response to these challenges, ChitoCal was developed by combining calcium sulfate and chitosan—two well-known materials—into a single formulation to maximize regenerative potential in periodontal therapy. Calcium sulfate (gypsum) is a naturally occurring mineral found in rocks, particularly soil and marine salt deposits and has been used as a scaffold in bone regenerative therapy. Chitosan is a biomaterial derived from chitin which is derived for the deacetylation of the exoskeleton of crustaceans is a natural biocompatible, biodegradable, and non-toxic material. It also showed antimicrobial activity towards fungi, gram-positive and negative organisms. Previous studies demonstrate that ChitoCal is non-toxic, easy to handle, exhibits antibacterial properties, provides sufficient mechanical strength, and stimulates critical growth factors essential for tissue regeneration. With these properties, ChitoCal offers a cost-effective and innovative solution to support successful periodontal regeneration.

Key words: periodontitis, bone loss, regeneration, calcium sulfate, chitosan

Comparison of Adhesion Strength Test of Glass Ionomer Cement as a Fixed Orthodontic Cementing Material in Artificial Saliva on Bodily Tooth Movement

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Abstract

One of the treatments for malocclusion is a fixed appliance. A fixed appliance is a fixed orthodontic appliance which is attached to the patient's teeth so that it cannot be removed by the patient until the treatment is complete. The movements produced by this device including bodily movement. Glass ionomer cement is one of the bracket cementations that has fluoride releasing properties which can prevent enamel demineralization during orthodontic treatment. Orthodontic materials are often studied to measure attachment strength followed by tooth movement and can cause bracket dislodgement which can cause losses in the length and results of treatment. The aim of this research is to determine the attachment and strength tests of brackets using materials glass ionomer cement type V before and after immersion in artificial saliva during bodily movement of the teeth. This design of this research was post test only control group. Using sampling technique purposive sample. This sample is a maxillary first premolar or FDI 14 or 24 with a total of 32 samples divided into control and treatment groups. The sample was placed in a pipe with a diameter of less than 10 mm and then fixed using gypsum and the bracket was cemented using glass ionomer cement type V and connected using a wire that was fixed using epoxy and gypsum and then placed in a tensile testing machine, namely universal testing machine. The research results showed that the strength of attachment glass ionomer cement type V the bodily movement was 5.37 Mpa in the treatment group glass ionomer cement type V soaked in artificial saliva for 24 hours with an average of 1.48 Mpa so there was a difference in adhesion ability glass ionomer cement type V before and after immersion in artificial saliva for 24 hours in bodily movement.

Key words: attachment glass ionomer cement type V, bodily movements, fixed orthodontic appliances, artificial saliva immersion.

Rinsing with Green Betel Leaf Extract (Piper betel L.) 25% Increases pH of Saliva in Students of Dentistry Faculty Mahasaraswati Denpasar University that using Fixed Orthodontic Appliances

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Abstract

Orthodontic treatment changes environmental factors within the oral cavity, specifically helping to stimulate the saliva flow rate and increase the buffering capacity and pH of saliva, which increases the anti-caries activity of saliva. Efforts to maintain oral health include gargling. Green betel leaf is one of the plants that has potential as an antibacterial. This study aims to determine the effect of giving green betel leaf extract (Piper betle L.) 10% and 25% on changes in salivary pH in students wearing fixed orthodontic devices at the Faculty of Dentistry, Mahasaraswati Denpasar University. Using quasi-experimental design with pre-test and post-test group design. Samples were taken with purposive sampling technique. The study population was all students wearing fixed orthodontic devices at the Faculty of Dentistry, Mahasaraswati Denpasar University, with a sample of 27 people who were divided into three groups using the Federer formula. The first group was 9 control samples with distilled water, the second group was 9 samples with 10% green betel leaf extract, and the third group was 9 samples with 25% betel extract. The extract was made by maceration method with 96% ethanol solvent. All samples were instructed to consume fresh bread to standardize salivary pH by reducing the acidity of the oral cavity and then measuring the initial pH of saliva. After that, the samples rinsed their mouths according to their groups using distilled water, 10% and 25% green betel leaf extract and then measured the final pH of saliva again afterwards. Saliva sampling using the spitting method. Data from the measurement of salivary pH were statistically analyzed using the paired T test. The results of the paired T test for the 25% green betel leaf extract group were 0.002 significantly different ($p<0.05$). The results showed that gargling with 25% green betel leaf extract (Piper betle L.) was effective in increasing salivary pH, while gargling with 10% green betel leaf extract (Piper betle L.) was not effective in increasing salivary pH.

Key words: rinsing, green betel leaf extract, fixed orthodontic appliances, pH of saliva

VistaDent Mirror

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Abstract

The dental industry requires constant innovation and improvement to ensure the best patient care. Mouth mirrors and probes are essential tools for dentists to obtain accurate diagnoses and provide the most appropriate treatment plans. However, fogging of dental mirrors, especially during treatment, can create hazards and hinder the overall process. Therefore, anti-fogging dental mirrors are crucial for easing workflow. The VistaDent Mirror has been a turning point in dental clinics, as its hydrophobic layer coating is designed to keep the mirror surface clear of air and water droplets to speed up the work process and helps avoid accidents. The product incorporates a polyethylene terephthalate(PET) micro nano material waterproof film with a thickness of 0.08 mm, that adheres to the both one-sided and double-sided dental mirrors via a pre-manufactured adhesive glue. Nano coating technology involves applying extremely thin layers of material at the nanometer scale to create protective or functional surfaces. It consists of a unique optically clear, cross-linked polymer cured on clear polyester film. This film differs from alternative products in that anti-fog properties are not lost after water immersion or repeated cleaning. Polyethylene terephthalate (PET) belongs to the family of polyesters. It is produced by the polymerization of ethylene glycol and terephthalic acid. It has good mechanical properties of high durability, excellent mechanical resistance, and scratch resistance. The film comes with a user-friendly adhesive backing, allowing for easy installation with some help from a few other easily accessible tools. With its ease of use and practical design, the VistaDent Mirror promises to revolutionize dental practice by increasing safety and efficiency. We hope this dental mirror will become the gold standard in patient care, thus providing the best care for all patients.

Key words: dental mirror, fogging, sticker, water droplet

Effectiveness Of 10% Black Cumin (Nigella SativaL.) Gel On Osteoblast Cell Proliferation In Wistar Rats (Rattus Norvegicus) With Periodontitis: An In Vivo Study

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Abstract

Background: Porphyromonas gingivalis, a gram-negative anaerobic bacterium, plays a significant role in the development of periodontitis. Its lipopolysaccharide (LPS) component can interfere with the host's immune response, causing inflammation and tissue destruction, including bone resorption. The decrease in bone density due to increased resorption, influenced by bacterial products, enhances local cytokine production, which in turn modulates the host response and accelerates systemic bone loss. Osteoblasts, the cells responsible for bone formation, are crucial for bone remodeling. These cells differentiate from mesenchymal precursors, primarily influenced by bone morphogenetic proteins (BMPs). Objective: This study aims to evaluate the effect of Nigella sativa L. (black cumin) extract gel on the proliferation of osteoblast cells in Wistar rats (Rattus norvegicus) with apical periodontitis. Methods: A total of 27 Wistar rats were divided into three groups: a negative control group induced with P. gingivalis and treated with a placebo gel, a positive control group induced with P. gingivalis and treated with oral metronidazole, and a treatment group induced with P. gingivalis and treated with 10% black cumin gel. This study utilized a randomized posttest-only control group design. The number of osteoblast cells was measured after the treatment. Results: Significant differences were observed in the average number of osteoblasts between the negative control (K-) (4,50+1,52) and positive control (K+) groups (2,62 + 0,92) (p=0,029) , between the negative control (K-) (4,50+1,52) and treatment (P) groups (7,83 + 1,94) (p= 0,001) and between the positive control (K+) and treatment (P) groups (p = 0,000). Conclusion: The 10% Nigella sativa L. gel significantly increases osteoblast cell proliferation in the alveolar bone of Wistar rats periodontitis. Novelty: This study also provides novel insights into the use of black cumin for osteoblast enhancement, a topic previously unexplored. Benefits: The results of this study give insight into the community and suggesting the potential of Nigella sativa L. (black cumin) as an effective herbal therapy for bone regeneration in periodontitis.

Key words: black cumin gel (Nigella sativa L.),periodontitis, osteoblast cells, bone remodeling.

iHEADEASE 2.0

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Abstract

The "iHEADEASE 2.0" is an innovative head immobilizer designed to enhance dental treatments by providing secure and comfortable head support for patients. Dental procedures often require precise control of the patient's head, which can be particularly challenging with patients who have special needs, children, or those with anxiety. Existing solutions are often inadequate, leading to increased treatment times, practitioner fatigue, and potential risks to patient safety. The "iHEADEASE 2.0" addresses this problem with its ergonomic and adjustable design, allowing for individualized support that fits patients of various ages and needs. Unlike traditional headrests, "iHEADEASE 2.0" offers a non-invasive, user-friendly solution that ensures both comfort and hygiene. Its unique design not only enhances patient comfort by reducing anxiety and improving cooperation but also aids practitioners by reducing physical strain and enabling more precise control during procedures. This innovation aims to improve the overall quality of dental care, particularly for vulnerable patient populations, by making dental treatments safer and more efficient. Through its contribution to enhanced patient care and practitioner well-being, the "iHEADEASE 2.0" has the potential to make a significant impact on oral healthcare practices.

Key words: dentistry, head immobilizer, invention

Pediatric Dental Inhalation Sedation Education Kit (PEDIS-Kit) & Sedation Record Form

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Abstract

Background: Inhalation sedation, using nitrous oxide ("laughing gas"), is used in dental treatments to help patients to feel calm and relaxed, reducing anxiety and pain, improving cooperation, and allowing for quick recovery with minimal side effects. A sedation record form is a document used by dentists to track and record important details of the procedure performed under sedation. Problem Statement: In pediatric dental care, nitrous oxide sedation is commonly used. However, lack of clear information about what to expect during the sedation process can lead to confusion, anxiety, and inadequate preparation for the appointment. Additionally, the current Nitrous Oxide Sedation Consent and Record Form (NOSCRF) used is not detailed enough to ensure thorough documentation, which is crucial for both patient safety and legal protection for dentists. Objective: To develop effective tools for educating patients and their parents about the inhalation sedation procedure, ensuring that parents are fully informed and adequately prepared before the scheduled sedation appointment. To refine the existing NOSCRF, enhancing its structure to enable more comprehensive and detailed record-keeping. Methodology: Two products have been developed to facilitate the delivery of sedation treatment to pediatric patients. The first product is a specialized educational tool called the Pediatric Dental Inhalation Sedation Education Kit (PEDIS-Kit), which improves patient and parent preparedness prior to their scheduled inhalation sedation appointment at the dental clinic. The second product involves the modification of the current NOSCRF by including thorough pre-procedure, intra-procedure, and post-procedure inhalation or oral sedation assessments, ensuring that every aspect of patient safety is meticulously addressed. Novelty: The PEDIS-Kit is a comprehensive tool designed to support pediatric dentists in effectively communicating essential information regarding the sedation process to patient and parents, utilizing a range of engaging and informative resources. The updated sedation form not only enhances the quality of patient data collection but also safeguards dentists from potential medicolegal complications by ensuring compliance with best practices. Benefit to the patients: Clear information about the procedure can help alleviate parents' and patients' concerns about sedation risks, while the newly developed sedation form will assist dentists in ensuring proper and detailed documentation.

Key words: children, inhalation sedation, guide, parents

Central Diastema With Mesially Tipped Molars Treated Using Self Ligating Braces To Shorten Active Orthodontic Treatment Time

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Abstract

Introduction: Central diastema with mesially tipped molars are cases that are often encountered in daily orthodontic practice. Central diastema are generally simple to be treated, but with molar in a mesially tipped position, there will be a longer waiting time before the central diastema can be closed due to molar uprighting. This is especially true for cases treated using traditional non self ligating braces as space closing using molar as anchorage could cause anchorage loss and tipping of the molars due to high friction of the traditional braces system. Purpose: Shorten active orthodontic treatment time in cases with central diastema and mesially tipped molars using self ligating braces system. Case Presentation: A 22 year old female, Balinese, straight profile, symmetrical face, neutroclusion on left side molar and canine, mesioclusion on right side molar and canine, mesial tipping on 16, 26, 46, and 47. The patient also have temporomandibular joint and chewing problem. Treatment began with self ligating braces insertion; continued with leveling and aligning. Molars uprighted and space all closed at 10 months active treatment. All temporomandibular joint and chewing problem is gone. While there is still a need for distalization of the lower right arch to get a better occlusion on the right side, and also to fix manibular midline shift, the patient refuses to continue the treatment further as all of the major complaints is gone. Conclusion: Treatment of central diastema with mesially tipped molars cases start from an adequate diagnosis and treatment plan, taking arch length discrepancy, profile and the final goal of treatment into considerations. By using self ligating braces, the amount of time needed for active orthodontic treatment can be faster than treatment using traditional non self ligating braces. Not to say that this will apply to all cases, with research and studies saying there is no difference between the two, but alas there is also research saying there is a difference between the two. So it will be in the hands of the doctor based on their experience and preference, to use the treatment techniques and orthodontic tools better suited for them.

Key words: active orthodontic treatment time, central diastema, self ligating braces, tipped molar

Near Field Communication (NFC)-Tagged Denture (N-TagDent)

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Abstract

The identification and traceability of dental prostheses, particularly removable dentures, have presented a long-standing challenge in both clinical and forensic settings. Traditional methods such as engraving or labelling are susceptible to wear, damage, or loss over time, impeding effective identification. This project introduces an innovative concept by integrating Near Field Communication (NFC) technology into dentures. The primary objective of this concept is to provide a reliable, durable, and easily accessible method for denture identification by embedding NFC tags within the prosthesis. The NFC tag with identification data will be embedded in the posterior palatal region of the denture post-processing. The NFC tag stores critical patient data, such as personal identification and dental records, which can be retrieved instantly with an NFC reader. The novelty of the project lies in the fabrication method, which involves creating a prefabricated slot for the NFC tag during the final waxing phase prior to the denture processing, rather than creating the trough for the tag post-processing of the denture. This method ensures enhanced structural integrity, improved durability and reduced risk of damage to the denture. This seamless integration into the denture material ensures long-term protection and usability without compromising the denture's comfort or function. The key benefits to society include improved patient safety, faster identification of lost dentures, and substantial applications in forensic odontology for identifying individuals through dental records. Additionally, this solution has significant potential for commercialisation, as dental clinics can adopt the technology to enhance the functionality and traceability of the products. By addressing a critical gap in denture identification, this NFC-tagged denture innovation represents a forward-thinking solution that could transform the future of dental prosthetics, bringing advanced technology into everyday clinical practice and offering new possibilities for patient care and forensic investigation.

Key words: dental identification, dental innovation, denture marker, forensic odontology, NFC-tagged denture

Interdental Cleaning Compliance Index: An Extension of the Gum Diary

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Abstract

Compliance with oral hygiene instruction (OHI) is essential in periodontal treatment, as it significantly impacts the success of therapy and long-term gum health. Adhering to these guidelines effectively reduces plaque accumulation, prevents disease progression, and supports healing after periodontal interventions. The introduction of the Gum Diary has enhanced patients' understanding of their gum health, promoting adherence to self-plaque control, particularly in interdental cleaning. Currently, compliance assessment relies on overall effectiveness as measured by plaque presence or bleeding tendencies of the gingival tissues. Specific attention to interdental cleaning is largely subjective, based on clinical observations at time of examination. Reliance on patient-reported use of the interdental brush also leaves an arbitrary aspect to the OHI compliance assessment. To address this, we propose a new index to help dental practitioners evaluate interdental cleaning compliance by taking multiple components into consideration for a more objective assessment. This index combines scores from 3 components: 1. clinical examination using interdental plaque score, 2. self-reported frequency of interdental brush usage, and 3. physical interdental brush usage evaluation. The evaluation of the interdental brush condition is based on two criteria: distortion of the wire and the percentage of bristle flare. Each criterion is scored according to specific guidelines. A score between 0-3 will be given for each component; the interdental plaque score (1), self-reported frequency (2) and the 2 parts of the physical interdental brush evaluation (3 & 4). The total score will reflect the degree of compliance. A total score of 0-3 indicates low compliance, 4-6 reflects moderate compliance, 7-9 indicates high compliance, and a score of 10-12 signifies very high compliance. The combination of these 4 criterion will create a more reliable indication to patient's interdental cleaning compliance which may influence the periodontal review interval needed by the patient. Integrating this interdental cleaning compliance index into the Gum Diary will provide dental practitioners a better understanding of patient motivation in maintaining good oral hygiene, ultimately fostering better periodontal treatment outcomes.

Key words: compliance, gum diary, interdental toothbrush, oral hygiene instruction.

Prevalence of Dentigerous Cysts in Patients atvRSGM Saraswati Denpasar Analyzed from Panoramic Radiographs

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Abstract

Background: Dentigerous cyst is one of the most common types of odontogenic cysts, mainly associated with unerupted teeth. The prevalence of dentigerous cysts can vary based on population, gender, and anatomical location. Panoramic radiographic analysis provides an effective method for detecting this cyst. Objective: This study aims to evaluate the prevalence of dentigerous cysts in patients at Rumah Sakit Gigi dan Mulut (RSGM) Saraswati Denpasar, analysed using panoramic radiographs. Materials and Methods: This research is a descriptive observational study with a retrospective approach, involving panoramic radiographic data of patients obtained from RSGM Saraswati Denpasar for the year 2021-2022, comprising 1,233 patient visits. The subjects of the study were patients with radiographic indications of dentigerous cysts. Results:
From the total sample examined, the prevalence of dentigerous cysts was found in 41.1% of the 1,233 patients who underwent panoramic radiographic examinations. Dentigerous cysts were more common in the mandibula (100%) compared to the upper jaw. Male patients showed a higher prevalence (66.6%) compared to female patients (33.4%). Conclusion: The prevalence of dentigerous cysts at RSGM Saraswati Denpasar is quite significant, especially in male patients and in unerupted third molar teeth in the mandibula. Panoramic radiography is an effective diagnostic method for detecting this cyst and can be routinely used for examining patients with impacted teeth.

Key words: dentigerous cyst, odontogenic cyst, prevalence, panoramic radiograph, impacted teeth

EcoFlow
Eco-friendly Flowable Composite Derived from Rice Husk

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Abstract

Tooth decay remains a significant public health concern in Malaysia, with high prevalence among both children and adults, affecting their overall health, well-being, and quality of life. Despite advances in dental care, access to affordable, high-quality restorative materials is limited due to reliance on imported products, which contributes to the high cost of dental treatments. At the same time, Malaysia faces a major environmental challenge, as millions of tons of rice husk, an agricultural by-product rich in silica, are discarded annually. This disposal contributes significantly to pollution and waste management issues. However, these challenges have created an opportunity to address both dental health needs and environmental sustainability by introducing a newly developed flowable composite derived from rice husk, namely EcoFlow. This innovative solution transforms agricultural waste into valuable dental restorative materials, adhering to the waste-to-wealth concept. Designed to restore decayed teeth, EcoFlow incorporates nanohybrid silica from rice husk as a filler. It exhibits physical and mechanical properties, as well as polymerization shrinkage, that perform comparably to International Organization for Standardization (ISO) requirements and commercially available flowable composites. By using local, eco-friendly materials, EcoFlow not only offers more affordable dental treatments and supports environmental preservation but also enhances Malaysia's dental industry by reducing reliance on imports. With its potential for both local and international marketing, EcoFlow promises to create job opportunities, stimulate local industries, and develop a successful business network. This positions Malaysia as a leading hub for dental research and innovation, with a sustainable and economically beneficial approach to dental care.

Key words: eco-friendly composite, green technology, sustainable dentistry, tooth decay, waste-to-wealth

Disclo-Light

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PKPD Perak Tengah

Abstract

Oral health advice is typically provided to patients with high plaque scores during dental checkups, using dental models and plaque disclosing agents within a Plaque House, which allows patients to visualize plaque buildup on their teeth. However, the Plaque House is bulky, limiting direct interaction between patients and healthcare providers, which affects the delivery of personalized oral health advice. To address this challenge, Disclo-Light was developed as a more compact and lightweight teaching aid to enhance dental health education. The primary objective of Disclo-Light is to enable patients to self-assess the effectiveness of their brushing techniques and identify areas of plaque accumulation that are often missed during regular brushing. This innovation aims to improve patient engagement and motivation by offering real-time visual feedback on oral hygiene practices, while also allowing practitioners to deliver more personalized advice. Tested across three dental clinics in the Perak Tengah District, Disclo-Light received positive feedback from both patients and dental practitioners. Patients reported greater motivation to improve their oral hygiene after visually understanding how well they were brushing, while practitioners found that the device made it easier to provide effective oral health advice. The product's portability and ease of use make it suitable for clinical settings as well as mobile dental visits to schools, without requiring large spaces or specialized lighting. The safety of the device has been confirmed through evaluations by Kolej Vokasional Seri Iskandar, ensuring its reliability in both clinical and educational environments. Disclo-Light offers an innovative and cost-effective solution, with an estimated cost of RM 40.79, providing a replicable tool that improves patient outcomes, enhances dental education, and contributes to better public oral health.

Key words: dental health, innovation, oral hygiene, patient engagement, teaching aid

OralBioSens: A biosensing tool for oral cancer detection

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Abstract

Introduction: In recent years, high mortality rate of oral cancer still critically threatens people's lives due to its challenges arising in the cancer treatment and early diagnosis of cancer metastasis. Traditional treatment for this disease includes chemotherapy, radiotherapy, and surgery with their own limitations and disadvantages in clinical applications. Therefore, there is an urgent need to significantly reduce the cancer patients' mortality by exploring effective tools for early detection of cancer cells. Objectives: In our project, a sensitive and non-invasive tool of an electrochemical impedimetric biosensing (OralSens) is designed and developed as a digitated detection tool in detecting the oral cancer cells. Novelty: To scale this detection tool for real sample analysis, with novelty of a well-designed of electrochemical biosensing, OralSens that are reliable for cancer cells' detection using patients's samples. We believe that such a study will justify the bioimpedance application of OralSens in the detection in early oral cancer disease. Commercial potential: We plan to commercial the product of the cancer detection tool, OralSens to the existing and new end-user need, such as hospitals, diagnostic laboratory and technology industries. The key unmet needs include development of biosensors capable of multi-test detection and monitoring, development of integrated biosensing platforms, and development of a self-configuring biosensor. Benefits to community and / or society: The benefits of the developed detection cancer device, OralSens can contribute to enhance quality and health wellbeing of cancer patients' life quality by earlier cancer detection using the patients' samples.

Key words: biosensing, tool, oral cancer, detection

Toothy Bundle:
On-the-Go Care, Simplified for Every Day

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Abstract

Toothy Bundle is an innovative and versatile product specifically designed for individuals with sensory issues, such as individuals with Autism Spectrum Disorders and Attention Deficit Hyperactive Disorder (ADHD). In the current market, oral stimulator care products are very diverse, and this can be overwhelming for caregivers and dental practitioners due to challenges in navigating this wide range of tools. This innovation helps to solve this problem by integrating multiple oral sensory tools into a single, compact keychain design, providing an all-in-one solution that is easy to carry and can be used anywhere at any time. The bundle includes a fillable T-tube with a cooling effect, a wooden cylinder infused with aromatherapy, a detachable sponge holder, a silicone toothbrush, a chewy teether, and sensory cloths of different textures. These components help individuals manage sensory overload and improve oral hygiene compliance. The novelty of this innovation lies in its on-the-go convenience, which can be used in many settings due to its versatility and adaptability. Its portable nature will increase accessibility in these special needs' populations, providing immediate comfort when in need. Enhancing convenience will empower caregivers and dental practitioners to promote better oral health by improving daily oral care routines, reducing dental anxiety, and offering practical yet sensory-friendly solutions, benefiting both individuals and society holistically.

Key words: oral sensory issues, autism, ADHD

ELDERSMILE CARE

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Abstract

As the number of aging population in nursing homes grows, maintaining oral hygiene for elderly residents, many of whom experience dry mouth (xerostomia) and require specialized care, is an ongoing challenge. The ElderSmile Care, an innovative oral health kit is made to meet these needs by giving caregivers a useful, simple, and low-cost way to make sure that oral care is available and effective. The kit is designed to meet the needs of older people who have teeth, whether they have dentures or not. It includes basic oral hygiene supplies along with features customized for their particular circumstances. Along with an interdental brush to efficiently remove plaque between teeth, it also features a redesigned toothbrush with ergonomic grips and soft bristles for gentle cleaning. Oral swabs provide a safe and gentle way to wipe gums and other sensitive regions for extra dental cleanliness, together with fluoridated toothpaste. Having a bib with a spill-proof pocket, a collapsible cup, and a clean cloth for washing helps preserve hygiene and dignity while doing care tasks. The kit includes inexpensive, convenient-to use moisturizing gels and sprays that target dry mouth particularly and enhance comfort and salivary flow. For individuals who wear dentures, a small storage case and pills that dissolve quickly make cleaning dentures easier while encouraging proper hygiene. The kit's components are carefully chosen to be affordable and useful for everyday usage, which lessens the complexity of dental care for caretakers. By offering a practical and user-friendly solution that meets their particular needs—such as dry mouth and denture maintenance—this innovation aims to improve oral care for elderly. With ergonomic tools like adapted toothbrushes and interdental brushes, which streamlines the caregiving procedure, the package helps caregivers to execute regular oral hygiene. By reducing the risk of infections and dental problems typical in elderly, it also enhances general oral health.
Furthermore, the simplicity and cost of the package guarantee that patients of nursing homes can regularly receive oral care in nursing homes, benefiting both caregivers and residents.

Key words: oral care, elderly, caregivers

Cleft Learning Family Tools (CLFT): Enhancing Feeding and Interceptive Care for Cleft Babies

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Abstract

Introduction: Cleft lip and palate are prevalent congenital craniofacial malformations that present significant challenges for caregivers, particularly in feeding and caring for their cleft-affected infants. Problem statement: There is a limited availability of resources and a lack of standardized guidelines for caregivers in providing care for infants with cleft conditions. Objectives: This project aims to develop and introduce a comprehensive cleft care kit that includes a squeezable bottle with a soft spoon, lip tapping materials, vitamin E oils and arm splint with proper guide and timeline for cleft caregivers. The goal is to equip caregivers with practical tools and expert guidance for effectively managing cleft care. Method: All components of the kit will be assembled in a practical, portable bag, ensuring ease of use and transport for caregivers, with corresponding instructions included for each item. By following these steps, the kit can provide essential tools and guidance to caregivers, enhancing the feeding and interceptive care for infants with orofacial clefts. Result: Based on a recent questionnaire conducted, this kit is customized for convenience. Spoon feeding using a soft spoon type was identified as the most common method for feeding infants with orofacial clefts (41%). Lip taping was the prevalent practice for interceptive orthopedics (40%), while massaging was the most common method for post-operative scar care (60%). Vitamin E oil is crucial in the healing of cleft scars due to its antioxidant properties, which can protect skin cells from damage, promote tissue repair, moisturize scar tissue, reduce inflammation, and improve the overall appearance and texture of the scar, thereby enhancing the post-operative healing process for infants with orofacial clefts. Benefits: This project highlights the need for an innovative cleft care kit that offers structured guidelines and expert-backed support. Conclusions: By providing practical tools and guidelines, this kit can potentially enhance feeding practices and post-operative care for infants with orofacial clefts, promoting better outcomes.

Key words: cleft lip and cleft palate, spoon feeding, lip tapping, cleft, cleft kit

Revolutionizing Post-Extraction Care: An Innovative Device for Dental Follicle Remnant Removal

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Abstract

Background: The extraction of impacted teeth is a frequent procedure that involves the removal of tooth follicles. To prevent the destruction of surrounding delicate structures, including nerves, blood vessels, and bone, this procedure necessitates a high degree of precision. Prolonged interventions and potential complications may result from the absence of the refined control required for safe and efficient follicle removal in existing instruments. Problem Statement: The current surgical instruments used for tooth follicle removal frequently present challenges, including the potential to cause trauma to adjacent tissues and the difficulty of accessing hard-to-reach areas. This can lead to prolonged operative periods and heightened patient discomfort. Objective: The focus of this project is to create a specialized surgical instrument that improves the precision, safety, and efficacy of tooth follicle removal by reducing the risk of trauma to the surrounding tissues and enabling better control. Novelty: The proposed instrument is designed with an ergonomic slender, curved blade that allows for easier access to confined spaces within the oral cavity. Additionally, it provides improved tactile feedback to mitigate the risk of tissue injury by preventing the application of excessive force. The instrument is safe and practical for clinical use due to the use of biocompatible and readily sterilizable materials. Benefits to Users/Society: The innovative design of this instrument is anticipated to reduce recovery periods, enhance patient outcomes by minimizing trauma, and shorten surgery times. It is a valuable addition to the toolkit of oral surgeons, as it enhances the overall safety and efficacy of dental surgeries and improves the efficiency of tooth follicle removal procedures. This could result in improved patient care and decreased healthcare expenses that are linked to complications or extended treatments.

Key words: dental device, dental follicle remnant, impacted teeth, post extraction care

Comparing 3D Printed Twin Block Appliances Designs for Class II Division 1 Malocclusion on Optimised Fit, Retention and Compressive Strength

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Abstract

Background: The Twin Block appliance (TBA) is a removable functional appliance used for skeletal Class II malocclusion in growing individuals. Its design has evolved with various modifications to improve patient acceptance and compliance. The advent of 3D printing technology in dentistry brings a shift towards to digital workflow. Currently, 3D printing TBA is new in the market with limited literature on effective designs. Thus, there is a need to explore 3D-printed Twin Block designs to accommodate the materials used in 3D workflow to ensure adequate fit and retention of the appliance. Problem statement: The effectiveness of 3D-TBAs in terms of fit, retention, and strength remains uncertain, as this appliance requires different materials and design considerations compared to the conventional appliance. This creates a need for clear design guidelines that ensure functional and durable appliances. Objective: This study aims to propose key features for 3D-TBA designs based on best fit, retention, and compressive strength. Novelty: This research explores multiple design variations for both the upper and lower arches of the Twin Block appliance with different levels of incisal and occlusal coverage with a 3D printing resin (Graphy TR-07). Benefits to users and society: If proven effective, 3D-printed Twin Block appliances can improve manufacturing efficiency, patient comfort, and treatment outcomes in orthodontics. This could lead to better compliance among patients, faster turnaround times in treatment, and more durable appliances due to enhanced fit, retention and compressive strength.

Key words: twin Block, 3D-printed Twin Block, fit, retention, compressive strength

ErgoCush-D: Adaptive Support for Individual with Posture and Mobility Needs

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Abstract

Standard dental chairs are not well designed to accommodate individuals with posture or mobility disability (IWPMD), resulting in discomfort and complications during dental care. This issue affects IWPMD such as cerebral palsy, scoliosis, and those suffering from lumbar or neck pain. The inability to maintain a stable and comfortable position increases patient anxiety and creates physical discomfort. Additionally, the need for frequent repositioning of the patient during dental treatment prolongs treatment time, further exacerbating stress for both patients and practitioners. IPWMD require specific ergonomic positioning during daily activities like eating, feeding, and dental procedures. The objective of Ergocush-D is to create a specialized posture cushion that provides tailored support for IWPMD. The cuhion is segmented, and contoured offering an adjustable head, neck, back, and lumbar support. It is made from waterproof fabric and PVC synthetic leather to ensure easy disinfection for hygienic use. Each section includes a zip for refilling polystyrene foam beads, maintaining support over time. Ergocush-D is designed to be portable, detachable, and lightweight, enhancing convenience for use in various settings. Strap belts is built-in to secure both the patient and the cushion to the dental chair, and an anti-slip mat gripper attached at the bottom to prevent movement during use. Ergocush-D reduces pressure on the spine and neck, minimizing discomfort and frequent repositioning during treatment. The novelty of this innovation lies in its versatility to address diverse physical needs through a highly adaptive, patient-focused design. Unlike traditional dental chairs, this innovation offers customizable support that adjusts to individual body shapes and conditions. Its structure allows positioning, ensuring IWPMD remain comfortable and stable throughout treatment. The benefits are twofold: patients experience greater comfort, reducing anxiety and facilitating cooperation, while dental practitioners benefit from improved patient positioning and reduced strain. Ergocush-D ultimately enhances the inclusivity and efficiency of dental care, offering a practical solution for patients with special needs and improving treatment outcomes across various settings.

Key words: customizable support, dental ergonomics, patient-centered design, posture support, special care dentistry

A Novel Vibrating Fiber Optic (VFO) System for Implant Stability Measurement

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Abstract

Ensuring implant stability is critical for predicting the long-term success of dental implant treatments. Resonance Frequency Analysis (RFA), which uses the Implant Stability Quotient (ISQ) as a quantitative measurement, is a widely accepted non-invasive method for assessing implant stability. However, the need for implant-specific transducers in RFA limits its universal application across different implant systems. Moreover, RFA typically requires removal of the prosthesis to attach the transducer to the implant fixture, which can compromise the integrity of the implant system over time. Repeated removal and reattachment of the prosthesis can exert stress on the abutment collar and screw, increasing the risk of mechanical wear, cement failure, and crown loosening, all of which negatively affect the long-term stability of the prosthesis. Additionally, ISQ values may show inconsistent patterns due to various influencing factors. The proposed Vibrating Fiber Optic (VFO) system is designed to be compatible with all implant systems, eliminating the need for system-specific transducers and allowing for measurements without removing the prosthesis. This novel system utilises mode-locked pulses, similar to the principle of Doppler radar, for assessing implant stability. The device consists of two probes: a vibrating probe and a bifurcated fibre optic probe. The vibrating probe induces vibrations on the prosthesis, generating picosecond-scale reflected pulses that are captured by the fibre optic probe and recorded by a datalogger. By analysing the Doppler shift between the initial and reflected pulses, the stability of the implant can be accurately evaluated. The Vibrating Fiber Optic (VFO) system offers a universal, non-invasive approach to implant stability measurement without needing implant-specific transducers or prosthesis removal. Utilising Doppler shift principles, the system provides a reliable, less invasive method for evaluating long-term implant stability.

Key words: implant stability, resonance frequency analysis (RFA), vibrating fibre optic

Prototype Engineering and Simulation Study of An Automated Gauze Handling Machine

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Abstract

Introduction: The efficient production of medical gauze requires precise cutting and folding to meet the stringent standards of healthcare applications. Traditional manual methods are often labor-intensive, inconsistent, and inefficient, highlighting the need for an automated solution. This study focuses on the simulation-based engineering of a gauze cutting and folding machine prototype, aiming to enhance production efficiency and precision. Aims: The main objective of this study is to design and simulate the operation of an automated machine capable of both cutting and folding gauze. This involves creating a virtual model to evaluate its performance and identify potential improvements prior to physical prototyping. Methods: Using advanced computer-aided design (CAD) software, the machine's components, including cutting blades, folding mechanisms, and control systems, were modeled. Simulation tools were employed to analyze the functionality of the machine, focusing on the precision of cutting and folding, operational speed, and material handling efficiency. The simulations aimed to optimize the system by identifying and addressing potential issues in the design phase. Results: The simulations demonstrated that the automated gauze cutting and folding machine could achieve a cutting precision within 0.5 mm and consistent folding accuracy. The virtual prototype showed a 70% reduction in processing time compared to manual methods and significantly minimized material wastage. These results indicate that the design is feasible and effective for the intended medical applications. Conclusion: The simulative engineering approach has successfully guided the development of a prototype for an automated gauze cutting and folding machine. The study underscores the advantages of using simulation to optimize design and functionality before physical prototyping.

Key words: gauze folding machine, automated gauze cutting, CAD modeling

Cal-ChlorideGrip: Surface Treated Orthodontic Mini Implant

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Abstract

Background: Cal-ChlorideGrip is a surface-treated orthodontic mini-implant (OMI) designed to improve stability, a crucial factor in the success of OMIs. Recent advancements in surface treatment have shown potential in improving clinical outcomes. Problem statement: Prolonged treatment durations and suboptimal outcomes are often linked to inadequate orthodontic anchorage and limited treatment mechanics due to the frequent failure of OMI. Objective: To improve OMI success rates and optimize orthodontic treatment mechanics by enhancing osseointegration through calcium chloride ($CaCl_2$) surface treatment of OMIs. Novelty: $CaCl_2$ surface modification offers a novel and effective solution for improving OMI stability, with the potential to revolutionize orthodontic anchorage techniques without compromising patient experience. It is proven through in-vitro and clinical trial studies conducted which focuses on the key outcomes included optimal concentration of calcium chloride for surface treatment, insertion and removal torque, success rate, surface roughness, and patient-reported outcome such as oral health-related quality of life and pain perception. Benefits to user and / or society: This innovative product ensures predictable OMI stability for optimal treatment outcomes, while also optimizing time and cost for both patients and society through efficient treatment mechanics within the expected timeframe. Additionally, it offers a practical, scalable solution with strong commercial potential in orthodontic practices. The proprietary technology can be easily commercialized and integrated into existing workflows, providing a reliable, patient-friendly solution that enhances treatment results, making it well-suited for local market introduction at international standards.

Key words: orthodontic mini implant, anchorage, calcium chloride, surface treatment

OMIS: ISQ-Compatible Verifier for Orthodontic Mini-Implant Stability

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Abstract

Background: Orthodontic mini-implants (MI) are commonly utilized for anchorage in contemporary orthodontics. Achieving their stability, which is essential for successful treatment, necessitates a thorough understanding of biomechanics. Problem statement: Resonance Frequency Analysis (RFA) provides an accurate way to assess implant stability by measuring bone stiffness through magnetic pulses. The Osstell ISQ device is commonly used for this purpose, generating controlled vibrations through a magnet attached to a Smartpeg. However, this system is primarily designed for conventional implant, and there is currently no universal Smartpeg adapter available for measuring the stability of various types of orthodontic MI. Objective: To develop and validate a method for assessing orthodontic MI stability using the Osstell ISQ device with ISQ compatibility. Novelty: Introducing the first ISQ-compatible Smartpeg specifically designed for orthodontic applications, adaptable to various shapes and sizes of orthodontic MI. This Smartpeg, crafted from biocompatible materials, is safe, reusable, and autoclavable, making it suitable for oral use. Previously, measuring RFA with the Osstell device required an additional adapter, but the innovative Orthodontic MI Smartpeg (OMIS) now enables direct RFA measurement without the need for extra components. Benefit to users / society: OMIS marks a significant breakthrough in measuring orthodontic MI stability using the ISQ device. This non-invasive, precise, and highly effective technology is easy to implement and reduces treatment costs by providing clinicians with a versatile tool that accommodates various MI shapes and sizes, eliminating the need for specialized Smartpegs. OMIS enables a reliable MI stability assessment, leading to more predictable treatment plans, faster recovery times, and higher success rates. Patients benefit from this innovation, while it also opens up new research opportunities in MI stability, enhancing public trust in orthodontic care and paving the way for future advancements in the field.

Key words: Key words: orthodontic mini implant stability, Osstell ISQ System, resonance frequency analysis, Smartpeg

GigiTrauma Kit©: Rapid Dental Aid for School Children

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Abstract

Background: Emergency dental kits for children are becoming vital for delivering rapid care during dental crises, particularly in settings where professional dental assistance is not readily accessible. Children are at a higher risk of dental injuries as a result of their active lifestyles, play behaviours, and developing dentition. Problem statement: Dental avulsion is a form of trauma that leads to the total displacement of a tooth from its alveolar socket. The optimal intervention for teeth exhibiting damage and displacement is prompt re-implantation. In certain instances, it may be challenging to re-implant the avulsed tooth immediately; thus, it may need to be preserve in storage media before being transported for treatment while preserving the pulp vitality and mitogenic characteristics of the periodontal ligament (PDL) cells. Objectives: (1) To fabricate artificial saliva integrated with bioactive glass (SalivBGuard©) as a storage medium for preserving avulsed tooth vitality during transportation, (2) To assess the chemical and antibacterial properties of fabricated SalivBGuard© through pH analysis, rheological behaviour and agar diffusion assay. Novelty: This unique SalivBGuard© may enable preservation of the pulp vitality with antibacterial properties tailored to the characteristic of universal storage medium for avulsed tooth. The commercialisation of this research could be advantageous not only for avulsed tooth treatment but also for patients with burning mouth syndrome, xerostomia, and post-radiation cancer treatment. Benefits to society: This innovation will explore the development of a novel and universal storage medium for avulsed teeth that are compatible with physiological pH and osmolality, antibacterial characteristics, locally made, and low-cost material. Ultimately, this technology will enhance the quality of life of children by preventing costly dental treatment due to missing teeth, enhancing the survival rate of reimplantation of avulsed teeth, and improving function, self-esteem and aesthetics.

Key words: artificial saliva, bioactive glass, avulsed tooth, transport media

Inovasi Dam Molar Perkasa

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Abstract

In Malaysia, poor oral hygiene remains a significant public health concern. The prevalence of caries decreased over three decades from 60% (1997) to 40% (2007) and 30% (2017). Among pre-school children five years of age, the reported decayed and filled primary teeth (DFT) score showed a slow reduction in three decades, with DFT scores of 5.8 (1995), 5.5 (2005) and 4.8 (2015). Despite these improvements, the caries-free prevalence remains below the target set by the National Oral Health Plan to achieve a 50% caries-free score among six-year-old children by 2020. To address this challenge, an innovative approach to educate children on oral healthcare is proposed. This innovation integrates a redesigned version of the classic “Snake and Ladders” game with a card quiz system. Oral health education in children often faces challenges due to lack of engagement, interest and fear. Gamification has emerged as a promising strategy to enhance learning experience, particularly among younger demographics. Leveraging the familiarity and excitement of “Snake and Ladders, we introduce a novel aspect featuring molars as the game’s foundation, where toothbrushes replace ladders and lollipops replace the snakes. This innovation incorporates educational elements related to oral hygiene and gameplay. The game features are designed to stimulate daily oral healthcare scenarios, such as brushing techniques, flossing, healthy eating habits, dental check-ups and diseases related to oral healthcare. Players advance through the game by correctly answering oral health-related questions presented on interactive cards. Correct answers allow players to move forward and the opportunity to roll the dice once again, while incorrect answers may trigger setbacks or penalties. By intertwining entertainment with educational content, children are motivated to actively participate and absorb crucial oral health knowledge. Through engaging gameplay and interactive learning, children not only acquire essential oral healthcare information but also develop a sense of responsibility towards maintaining their dental well-being. The integration of gamification principles with educational content offers a promising avenue for promoting oral health awareness among children in a fun and effective manner.

Key words:gamification, oral healthcare education, snake and ladders, card quiz

AIDentify: Enhancing Dental Care with an AI-Driven Color Coded Systemn

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Abstract

This study introduces a practical and patient-friendly solution that combines a color-coded system with artificial intelligence (AI) to better address patients' dental needs. The approach involves using a simple color-coded framework that matches various dental devices and treatment options with patients’ preferences, mobility levels, and specific requirements. This makes it easier for both dentists and patients to understand and choose the right options, leading to clearer communication, fewer errors, and ultimately, greater patient satisfaction. Instead of relying on patient data or medical history, the AI component uses general dental guidelines to suggest the best treatment or prosthetic options, which are then categorized within the color-coded system. This study evaluates how this straightforward system works in real-world clinical settings, focusing on how it improves the efficiency of the treatment process and the overall patient experience. The AI-powered color-coding makes it simpler for dentists to navigate treatment choices and empowers patients to be more involved in selecting what works best for them. By integrating AI in this way, we aim to show that dental care can be more transparent, patient-centered, and effective without complicated data analysis or complex technology.

Key words: artificial intelligent, treatment options, dental treatment

Virgin Coconut Oil (VCO) Chewing Gum

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Abstract

Virgin Cononut Oil (VCO) is well known of its wide benefits to oral and general health. The ayurvedic technique of 'oil pulling' has been practice by mostly in India and recently has spread to the worldwide. Free fatty acids inside VCO are fully released thus provides more effective effects to address oral problems. The objective of this invention is to provide a halal and green chewing gum that derived from VCO. The Intellectual Property (IP) has been applied and the id number is PT6646/UIAM/24. This invention will benefit the public especially those who looking for the innovative way in using VCO and at the same time enjoying the pleasure of it taste.

Key words: chewing gum, virgin coconut oil, VCO, caries, oral health

B FRESH: Dentaceutical Solutions

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Abstract

Dental plaque or highly complex structured biofilm formation in the oral cavity is a major cause of periodontal disease. Severe periodontal diseases are estimated to affects about 20–50% of the population globally and 94% of adult in Malaysia. Biofilm-originated infections can lead to fundamental issues in society in terms of economical and health aspects. Mechanical and chemical strategies are the most widespread form to support the prevention of pathogenic biofilm formation. However, increasing bacterial resistance to common oral antiseptics is reported. This enhances the need for alternative oral care formulations for biofilm control. In this study, potent biological activities of purified bromelain have been successfully studied and incorporated into oral care formulations for biofilm control and prevention of periodontitis. This study was focused on early stages of bromelain purification from pineapple core and it's pre-clinical testing on oral pathogens and cell lines for the efficacy level evaluation. Bromelain enzyme isolated using two-stage Ammonium Sulphate precipitation and membrane ultrafiltration showed effectivity against selected oral pathogens without significant cytotoxicity. The purified Bromelain is used as an excellent and safe alternative as antibacterial, antibiofilm and anti-inflammatory agents and a main ingredient in new enrich B FRESH oral care formulation. This could fill the void among consumers that look for cost-effective, non-alcohol and plant-based alternatives oral care products for daily biofilm control and prevention of periodontal diseases. Besides, the collaboration researchers and industrialists will help in improving the economic potential of valuable agriculture wastes by promoting the usage of it for synthesizing value-added commodities that has high potential to be commercialized. This is in line with Sustainable Development Goals (SDG) to produce a high-quality Bromelain extract derived from side-product waste of pineapple to commercial product.

Key words: bromelain, periodontitis, biofilm, pineapple, antibacteria, antibiofilm

Meta-OHE: Metaverse for Oral Health Education

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Abstract

Background: The rapid expansion of the Internet has paved the way for a new frontier—the Metaverse—a dynamic, immersive, three-dimensional virtual space where users can interact, manipulate objects, and engage in real-time experiences on a 1:1 scale. Teenagers, being the most enthusiastic users of the Metaverse, are an ideal audience for delivering engaging and interactive health promotion, including oral healthcare education. Problem statement: Despite the implementation of various oral health promotion programs and health technologies in recent years, the burden of oral diseases remains high in Malaysia and globally, particularly among adolescents. This highlights the need for more innovative and effective approaches to improve oral health outcomes. Objective: To explore the potential and create an innovative Metaverse platform for oral health education, called Meta-OHE; targeting adolescents primarily as well as the wider population. Novelty: The Meta-OHE is a research-based platform developed through industrial collaboration to ensure its sustainability and long-term impact. It incorporates intellectual inputs from various stakeholders, including health and digital experts, educational institutions, healthcare professionals, potential end-users, and health promoters, following an established design and development framework. The platform features real-time interaction and gamification, which enhance user engagement, immersion and retention—key factors for sustainable oral health behavior change. Additionally, the Meta-OHE is highly accessible on smartphones and laptops without the need for VR headsets, allowing participation from users across diverse regions and socioeconomic backgrounds. Benefits to users and society: Users especially adolescents, the Meta-OHE creates a fun, engaging, and interactive environment that makes oral health education more accessible and enjoyable, fostering lifelong healthy habits and improving overall quality of life. For society, this digital health intervention can reduce the global oral disease burden in a long run by increasing oral health knowledge, literacy, and access to health information. Policymakers can leverage this platform to expand public health outreach and research, promoting early awareness of oral health's importance and supporting broader health goals.

Key words: metaverse, immersive technology, digital health intervention, oral health promotion, oral health education.

MetaVeSurTrea Box: Solution for Storage and Surface Pretreatment of Veneer

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Abstract

Surface treatment of the intaglio surface of a veneer prosthesis is a crucial step in ensuring reliable bonding with tooth surface. For restorations made from glass-ceramic or oxide ceramic materials, this process traditionally involves etching with hydrofluoric acid and applying adhesive prior to cementation. Current methods often rely on the use of disposable elastomeric mould or sticky veneer holders which can dislodge during rinsing, risk of contamination and may reduce dental wastage due to their single-use nature. VeSurTrea Box is a novel, eco-friendly surface treatment holding device designed to address these challenges by offering precise control during veneer surface treatment. It minimizes dislodgement and contamination risks while being cost-effective and environmentally friendly. The integrated workspace allows for efficient etching and bonding to be performed without the need to transfer the veneer during surface pre-treatment procedure. This streamlines the workflow, reducing handling errors thus enhances overall clinical efficiency. Additionally, it is designed to be easily sterilized and disinfected, providing a reusable alternative to traditional disposable materials. This significantly reduces dental waste and support to sustainability efforts while also offering cost saving for clinicians. VeSurTrea Box presents as a practical, sustainable solution for dental professionals, delivering improved clinical outcomes and contributing to reducing environmental

Key words: veneer, surface-pretreatment, etching, bonding

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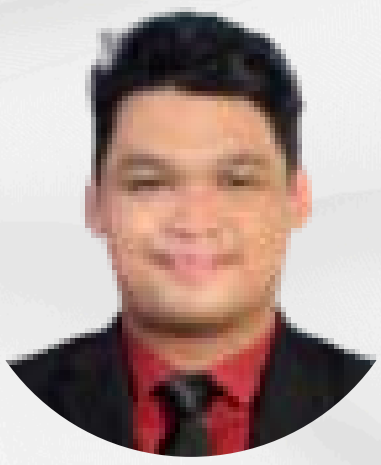

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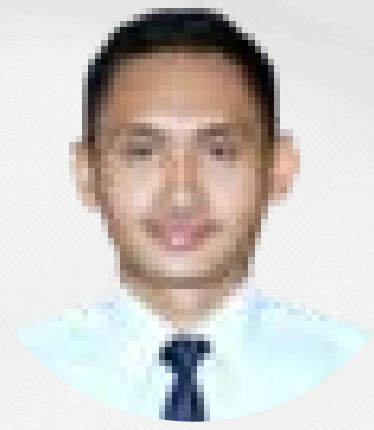

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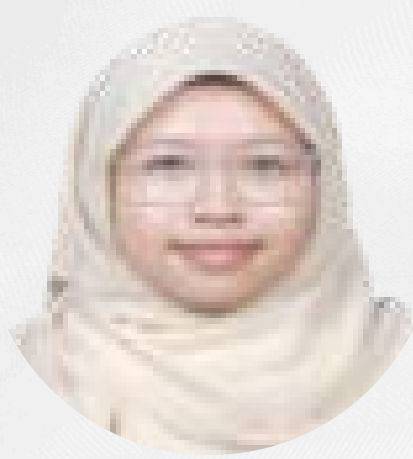

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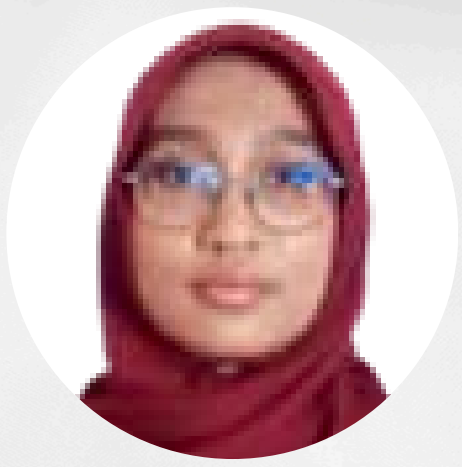

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