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BASIC SCIENCES

THERAPEUTIC POTENTIAL OF NATURAL PRODUCTS ON TUMOR MICROENVIRONMENT IN ORAL CANCER

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Introduction: Oral cancer is cancer that develops in the lip or oral cavity tissues. It is ranked among the top ten cancer incidences, and survival rates have not drastically improved despite significant advances in research and therapy. Treatment options for oral cancer include surgery, radiotherapy, surgery with postoperative radiotherapy, and chemotherapy. However, the chances of oral cancer metastasize are very high even after treatment due to the involvement of the tumor microenvironment which is a dynamic network that consists of the cancer cells, stromal tissue, and surrounding extracellular matrix. Natural products from plants and marine organisms are considered good anti-cancer agents because they constituted about forty-seven percent of all anti-cancer drugs available on market.

Objectives: To conduct a review on the therapeutic potential of natural products on tumor microenvironment in oral cancer.

Methods: A narrative review search was performed using multiple combinations of keywords in Google Scholar, PubMed, Medline, Web of Science, Scopus, and scientific computerized databases to select relevant articles that were in the interest of this research.

Conclusion: Natural products have therapeutic potential on tumor microenvironment in oral cancer.

Keywords: Natural products, tumor microenvironment, oral cancer

THE ROLE OF MECHANOTRANSDUCTION IN DENTAL STEM CELL DIFFERENTIATION

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Introduction: Mechanotransduction is a process through which cells will convert any external mechanical stimuli to electrical or biomechanical signals before generating a functional response. Stem cells, including dental stem cells, have been indicated to be induced by mechanotransduction during differentiation. The external mechanical signals shown to stimulate differentiation cascade include fluid flow, hydrostatic pressure, tension, and compression.

Objectives: To review the role of mechanotransduction in dental stem cell differentiation.

Methods: This review was based on the analysis of the literature gleaned from reliable authoritative texts and digital databases such as Cochrane, PubMed, ScienceDirect, Google Scholar, Wiley, and Scopus throughout the year of 2000 to 2021. The keywords used in the literature search were mechanotransduction, biophysical stimuli, biomechanical stimuli, mechanobiology, mechanosensing, dental stem cell, and stem cell differentiation.

Results: A total of 37 articles out of 39 articles complied with the inclusion and exclusion criteria of this study.

Conclusion: Differentiation of DSCs is induced by mechanotransduction through regulations of mechanical cues, microenvironment, surface membrane, multiple growth factors and variety of intracellular components.

Keywords: mechanotransduction, biophysical stimuli, biomechanical stimuli, dental stem cell, stem cell differentiation.

ADVANCEMENT OF FILLERS IN DENTAL COMPOSITES

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Introduction: Dental composite has been widely used in esthetic dentistry world nowadays. They made of organic matrix, fillers and coupling agent. Although they have excellent aesthetics, strength and durability, they have several drawbacks such as polymerisation shrinkage, bulk fracture and poor wear resistant. Thus, several types of fillers were added to enhance their physical and mechanical properties.

Objectives: The proposed study was conducted to write a review writing about the fillers used in dental composite which covers the types of fillers used in dental composites and the changes in the types of fillers used in dental composites for the past 30 years.

Methods : A literature search was performed using electronic databases and included articles that fulfilled the inclusion criteria such from Journal Citation Report (JCR), SCIEDIRECT, Google Scholar and other e-journals and e-books to identify the related articles that are within the research interest where the information was assessed, gathered and a report was written. The exclusion criteria for this review are articles from data sources like Wikipedia or unknown sources. Articles that fulfilled the criteria for this study were selected, the information was assessed, gathered and a report was written.

Results: There were changes in Fillers types, shapes, sizes, volume fractions, and distributions which affect the physical properties of dental composite.

Conclusion: There were some advancement of fillers in dental composites occurred for the past 30 years.

Keywords: Fillers, Silica, dental composite, macrofillers, microfillers.

THE EFFECT OF FORMULATED TOOTHPASTES ON ORAL MICROBIOME: A REVIEW

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Introduction: Oral diseases are one of the major public health problems. In order to maintain or improve oral health, the prevention of plaque accumulation on the teeth surfaces is essential. Tooth brushing with fluoridated toothpaste is the most widespread means for plaque control. However, the prevalence of oral diseases is still high among the majority of population because they do not clean their teeth thoroughly enough to prevent accumulation of plaque. As a result, toothpaste formulated with enzymes and proteins has been developed for more effective action of plaque removal. In addition, herbal toothpaste also has been shown to have good antimicrobial activity.

Objectives: To examine the impact of formulated toothpastes on the oral microbiome and its association with healthy oral health.

Methods: A comprehensive literature search was performed on the ScienceDirect, PubMed and ProQuest databases for articles published from 2011 to 2021. The findings of the pertinent articles are discussed.

Results: Toothpaste formulated with enzymes and proteins improves gingival health and prevents dental caries. When compared to conventional fluoridated toothpaste, brushing with toothpaste formulated with enzymes and proteins results in significant reduction in plaque and gingival scores. Herbal toothpaste outperforms regular toothpaste in maintaining oral hygiene and gingival inflammation.

Conclusion: Herbal toothpaste and enzyme and protein toothpaste can both help improve oral health. These formulated toothpastes can be a useful alternative to fluoridated toothpaste.

Keywords: toothpaste, enzymes and proteins, herb, plaque, oral hygiene.

THE EFFECT OF NANOCOMPOSITES ON AESTHETIC PROPERTIES: A SYSTEMATIC REVIEW

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Introduction. Material which most commonly used to restore the anterior teeth is composite resin since aesthetic is become the superior concern. Extensive studies has been done in order to improve the properties of the composite resin with the advances in filler compositions and resin chemistry. One of the improvement in composite resin is nanocomposite in which provides mechanical strength and wear resistance that is as same as hybrid composite while its superior polish and gloss retention same as micro fill composite. Hence, this study aim to review the aesthetic outcome of the nanocomposite.

Objective. In this study the literature was systematically review the available evidence of the effect of nanocomposite resin restoration on aesthetic outcome.

Methodology. The aims of this systematic review was to investigate the discolouration of nanocomposite after the certain period of time and also the polishing outcome when compare to the other types of composite materials. The source from PubMed, Google Scholar and Science Direct database was included. Screened titles and/or abstracts of 45789 unique studies. In total, 32 studies were selected for full-text reading, from which 20 were included in the qualitative synthesis.

Result. The longest period of time is 6 months and show nanofilled composite resin has shown less discolouration ($p < 0.001$) compared to other types of composite resins. The polishing of nano composite resin was superior compared to the other types of composite resins. Different polishing systems have shown smoother surface compared to nanohybrid and other types of composite resin ($p < 0.05$)

Conclusions. Few factors has impact to the discolouration outcome of composite resin. Aesthetic of composite resin is depends not just on the composition but also the polishing part. Overall, nanocomposite is the best in terms of aesthetic and polishing outcome.

Keywords: Aesthetic, polishing outcome, surface finish, nanocomposite resin, colour stability.

FACTORS AFFECTING WOUND HEALING AMONG ELDERLY: A REVIEW

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Introduction: Globally, the elderly population is increasing at a very high rate. However, they are very susceptible to wound healing disorders and chronic wounds. Complications and morbidity are expected to rise proportionally, posing a threat clinically. As such, more studies need to be done to provide better understanding to improve the therapeutic effects of wound healing in the elderly.

Objectives: This review aimed to determine the predisposing factors of delayed wound healing among elderly age group.

Methods: Literature search was performed using Google Scholar, ScienceDirect and Scopus databases to identify the related articles using systematic search strategy. Searches were limited to articles that were published from January 2011 to December 2021.

Results: Out of 151, 61 articles that fulfilled the eligible criteria were selected. Overall findings showed results in both microscopic and cellular level. Elderlies were shown to have an elevated level of inflammatory markers, impaired cytokines and macrophages function, and elevation in pro-inflammatory cytokines. Elderlies also showed impaired function and migration of fibroblast and decreased angiogenesis and formation of granulation tissue while showing elevated matrix metalloproteinases level. Diabetes patients were shown to have similar characteristics as elderlies with regard to delayed wound healing such as prolonged inflammatory phase, and hyperglycemia-induced elevation of reactive oxygen species.

Conclusion: The alterations of growth factors, impairment in function of cytokines, neutrophils, macrophages and fibroblasts contribute to delay in wound healing amongst elderlies. Diabetes shows a positive co-relation with ageing in relation to delayed wound healing.

Keywords: Delay wound healing, elderly, diabetes, research articles.

THE CURRENT INNOVATION OF SMART RESTORATIVE MATERIAL IN PAEDIATRIC DENTISTRY: A MINI REVIEW

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Introduction: Bio-smart is a new generation of materials with the enhancement of their excellent properties that can be altered, increasing efficiency and making the treatment more quickly and reliably. Specifically, paediatric dentistry is an age-specific speciality that provides primary and comprehensive dental health care to infants, children, adolescents, and those with special health care needs. However, the effectiveness of these intelligent material designs, which focus on the paediatric group, is still in its infancy.

Objectives: To review the current innovation of smart-restorative materials in paediatric dentistry that may, over time, aid in the transition to a new era of bio-smart dentistry.

Methods: The searches were conducted from 2000 to 2021 in the databases Web of Science, PubMed, Medline, Scopus, Mendeley and Science Direct and computerized scientific databases. The search terms used are bio-smart restorative material and the result was limited to articles written in English and articles published during the last 4 years.

Results: The current smart materials such as flowable composite, self-healing composite, silver diamine fluoride, smart glass ionomer cement, and zirconia have a profound impact on the restoration of primary teeth. These materials have been improvised by having excellent aesthetics and effective treatment by saving time and ease in handling these materials.

Conclusion: Significant advances in the innovation of smart materials has attracted researchers' attention. These materials are beneficial, time-saving, and simple to use with outstanding handling characteristics such as perceiving environmental stimuli, which will benefit paediatric dentistry, respectively.

Keywords: Bio-smart restorative materials, composite, glass ionomer cement, paediatric dentistry, innovation.

HERBAL PLANT EXTRACTS AS A DISINFECTION IRRIGATION SOLUTION FOR ENDODONTIC TREATMENT

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Introduction: Endodontic treatment aims to eliminate the microorganisms and their by-products which course the infection to the pulp tissue in root canal space. Synthetic irrigation solutions such as sodium hypochlorite and chlorhexidine have shown to be effectively kill the endodontic pathogen from an infected root canal. However, they were found to cause undesirable properties like allergic potential, toxicity, unacceptable taste and soft tissue injury. Therefore, studies are looking for an alternative irrigation solution from natural plant extracts with less toxicity, and thus, cost effectiveness.

Objectives: The present study was conducted to review the use of herbal plants as potential disinfection irrigation solutions in endodontic treatment.

Methods: Literature search was performed using electronic databases PubMed, Google Scholar, and ScienceDirect. Searches were limited to original research articles that were published in English between 1990 and 2020.

Results: Results from the search showed that herbal extracts such as *Azadirachta Indica* and *Aloe Vera* alter the bacterial adhesion and their ability to colonize in the root canal system. *Triphala*, *Green Tea* and *Allium Sativum* have bacteriostatic and bactericidal properties to some Gram positive and Gram negative pathogens. *Curcuma Longa* is as effective as propolis in disinfecting dentinal tubules against antibiotic resistant *E. faecalis*. Whereas *Zingiber officinale* has an ability to rupture phospholipid membranes of respective bacteria.

Conclusion: The herbal irrigation solution has an inhibition action on endodontic pathogens in the infected root canal system, suggesting the potentiality to be used as disinfection irrigation solution for endodontic treatment.

Keywords: endodontic pathogen, endodontic treatment, irrigation, herbs.

EFFECT OF MODIFYING CURING LIGHT INTENSITY ON POLYMERIZATION SHRINKAGE OF RESIN COMPOSITE: A REVIEW

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Introduction: Resin composite (RC) has been widely used as restorative materials due to aesthetically and functional excellence. However, its major limitation is polymerization shrinkage (PS) as it manifests as marginal leakage, secondary caries, post-operative sensitivity and restoration failure. PS is influenced by various factors including curing light intensity and modes.

Objectives: The present study was conducted 1) to review the effect of using different light intensity on PS of RC, and 2) to review the effect of different curing modes on PS of RC.

Methods: Literature search was performed using PubMed, Scopus, and Journal Citation Report databases using related keywords. Data were limited to the original research articles that were published in English from 1995 to 2021.

Results: Objective 1, 8 out of 175 articles that fulfilled the eligible criteria were selected. From our findings, PS ranges from 0.45 - 7.3% for high light intensity (HI), low light intensity (LI), soft-start (SS) and pulse-delayed (PD) curing modes. The findings reveal that the relationship between light intensity and PS are consistent whereby HI, 1200 mW/cm² results in a high percentage of PS (3.75%) compared to LI, 650 mW/cm² with PS of 3.65%. Objective 2, 9 out of 175 articles were selected. The findings show that SS and PD curing modes were effective in reducing PS.

Conclusion: Curing light intensity and mode influence the PS, whereby a higher light intensity may exhibit disadvantages due to increased PS. Thus, the presented result suggests that SS and PD curing modes could decrease PS.

Keywords: polymerization, shrinkage, resin composite, light intensity, light curing mode.

AMNIOTIC MEMBRANE: AN APPROACH TO PERIODONTAL REGENERATION

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Introduction: Periodontal disease is a chronic inflammatory condition characterised by destruction of periodontal structures. If left untreated, tooth loss may occur. Periodontal therapies aim to stop the disease and regenerate lost periodontal structures. Tissue engineering has been proposed as a possible approach for periodontal regeneration. Over the years, various materials have been used for scaffold-based periodontal tissue engineering. However, the ideal scaffold is still being sought. Recently, the use of amniotic membrane (AM) as a scaffold for periodontal regeneration has gained great interest among researchers.

Objective: This review aims to critically appraise the properties of AM and its potential clinical applications in periodontal regeneration.

Method: PubMed, ScienceDirect, Scopus and Wiley Online Library databases were searched for relevant articles that highlighted the properties and potential applications of AM in periodontal regeneration.

Results: AM has unique structure and components contributing to its exceptional properties such as anti-inflammatory (presence of anti-inflammatory factors); low immunogenicity (presence of human leukocyte antigen-G); anti-scarring (downregulation of transforming growth factor- β); anti-microbial (expression of antimicrobial factors); promotion of epithelialisation (production of growth factors); reduction of pain (protection of exposed nerve endings), showing the potential of AM as an ideal scaffold for periodontal regeneration.

Conclusion: AM has shown its ability as a potential scaffold for periodontal tissue engineering in many different studies. However, future studies and long-term clinical trials on the efficacy and survival rate of AM are required to completely understand the potential of AM in periodontal regeneration.

Keywords: Amniotic membrane, periodontal regeneration, periodontal surgery, tissue engineering, regenerative medicine.

EXPRESSION OF PD-L1 IN ORAL SQUAMOUS CELL CARCINOMA: A REVIEW

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Introduction: Programmed death protein 1 (PD-1), a surface receptor on activated T and B cells, acts as inhibitory immunological checkpoint to prevent excessive immune-mediated damage to healthy tissue. Expression of its ligand, programmed death-ligand 1 (PD-L1) by tumour cells enables these cells to elude immune attack and has been linked to malignancy of higher grade and of poorer prognosis. Anti-PD-1 and anti-PD-L1 agents have been used in the immunotherapy of non-oral squamous cell carcinomas (non-OSCCs). Due to the current constraints in surgical management, the potential use of immunotherapeutic agents as non-surgical alternatives in OSCC treatment should be considered.

Objectives: This review aimed to determine the range of PD-L1 expression in OSCC and clinicopathological factors associated with PD-L1 expression.

Methods: A literature search of PubMed, ScienceDirect, Scopus, EBSCOHost, CINAHL, MEDLINE, Google Scholar, and Cochrane Library databases was performed using a systematic search strategy. Searches were limited to articles published within the last two decades, until December 2020.

Results: Out of 778 articles, 11 fulfilling the eligible criteria were selected. PD-L1 was expressed in 18.3% to 100% of OSCC tissue samples. The clinicopathological factors associated with PD-L1 expression include gender, smoking habit, nodal involvement, distant metastasis, and poor tumour prognosis. Higher PD-L1 expression was also positively correlated with presence of tumour-infiltrating-lymphocytes and p53 expression.

Conclusion: PD-L1 is variably expressed in OSCC tissue, and its expression is influenced by several clinicopathological factors. There is a potential role for the therapeutic use of anti PD-1/PD-L1 in selected OSCCs exhibiting the clinicopathological features.

Keywords: PD-1, PD-L1, oral squamous cell carcinoma, oral cancer, immunohistochemistry.

THE PATTERNS AND EFFECTIVENESS OF MOVEMENT CONTROL ORDER (MCO) IMPLEMENTATION IN MALAYSIA FROM MARCH 19, 2020 UNTIL MARCH 17, 2021

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Introduction: Coronavirus disease (COVID-19) is a newly discovered infectious disease caused by coronavirus and was declared as a world pandemic by the WHO on the 11th March 2021. The COVID-19 outbreak started in Malaysia in January and continues to grow in number. This causes the Prime Minister to announce a Movement Control Order (MCO) to reduce the rapid spread of COVID-19. The restriction hinders people from travelling in and out of the country, gathering, having social activities and closure of all economic sectors except essential services.

Objectives: This study aims to determine the pattern of Covid-19 infection measuring the effectiveness of the MCO implementation by the Malaysian government from March 19, 2020 until March 17, 2021.

Method: Statistical analysis was performed using SPSS ver. 26 and Excel Software using One-Way ANOVA. This analysis helps researchers to investigate the trends of COVID-19 from the start of MCO until March 17, 2021.

Results: From the result shown that there was a statistically significant difference in the mean positive cases of COVID-19 [$F(3,360) = 399.46, p < 0.05$], statistically significant difference in the mean death cases of COVID-19 [$F(3,360) = 132.82, p < 0.0$], statistically significant difference in the mean recovered cases of COVID-19 [$F(3,30) = 284.360$] among four phases of MCO.

Conclusion: From the study, all variable shows a significant difference in controlling COVID-19 infection, death and recovery. MCO has greatly curb the spread of infection in Malaysia however, all party should play their roles to reduce transmission of COVID-19.

Keywords: COVID-19, Malaysia, Movement Control Order, one-way ANOVA.

DEGREE OF CONVERSION AND DEPTH OF CURE OF NANOHYBRID DENTAL COMPOSITE FROM RICE HUSK REINFORCED WITH KENAF FIBRE

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Introduction: Degree of conversion (DC) and depth of cure (DOC) affect the mechanical and physical properties of the restorative materials, thus determine the success of the restoration.

Objectives: This study aimed to compare DC and DOC of nanohybrid dental composite from rice husk reinforced with kenaf fibre.

Methods: For DC, preparation of samples was done using dental composite from rice husk according to groups (0%, 1%, 2% addition of kenaf fibre), Neofil composite (KERR CORPORATION, USA) and everX posterior composite (GC CORPORATION, ASIA)]. The absorbance peak was recorded using the diffuse-reflection mode of Fourier-transform infrared spectroscopy. For DOC, preparation of samples was done using the same experimental composite materials and everX posterior composite groups. Samples were tested in 40, 80 and 160 seconds of light curing. Data were entered and analysed in IBM SPSS version 26.0. One-way ANOVA was used for DC and two-way ANOVA for DOC. $P < 0.05$ was considered as statistically significant.

Results: There was a statistically significant results in all groups tested ($P = 0.000$) for both tests. DC for the experimental groups was equivalent to the Neofil and everX posterior composites whereas DOC was less in the experimental groups compared to everX composite.

Conclusion: DC of nanohybrid dental composite from rice husk reinforced with kenaf fibre was comparable to the commercial composites tested and DOC of composite resin from rice husk reinforced with kenaf fibre was lower than the commercial composite resin tested despite the curing time was increased.

Keywords: Kenaf fibre, degree of conversion, depth of cure.

CLINICAL SCIENCES I

PRIMARY INTRAOSSEOUS CARCINOMA (PIOC) OF THE JAWS: A REVIEW OF CLINICOPATHOLOGIC CORRELATION

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Introduction: Primary intraosseous carcinoma (PIOC) describes the squamous cell carcinoma that arises exclusively within the jawbone. It is rare and infrequently reported.

Objectives: This study reviews available evidences from the last 30 years regarding prevalence, sociodemographic, clinicopathologic characteristics, predisposing factors, treatment modality and prognosis of PIOC.

Methods: Literature searches were conducted on PubMed, Scopus and Web of Science databases. Journal articles, review writings and well-documented case reports of PIOC from 1991 till 2021 were included. The initial search yielded 63 articles but only 46 articles met the inclusion and exclusion criteria.

Results: Our findings demonstrate that PIOC has a slight male predisposition (58.1%) compared to females (41.9%) and ranges from ages 25 to 71 years old, with mean age of 49.4 years. The mandible is commonly affected (87.1%) with swelling (83.9%) and pain (64.5%) being the most reported symptoms. Surgery alone (60.7%), or with neck dissection (57.1%) were the treatment of choice for majority of the cases. Prognosis was fair, with patient survival ranging from 0.3 years to 10.6 years after treatment, with mean of 2.8 years.

Conclusion: So far, around 257 cases of PIOC have been reported based on recent literature. Due to its rarity, this study highlighted the common presentation and treatment for this lesion, along with other relevant information to aid clinician in diagnosis and management.

Keywords: Primary intraosseous carcinoma, Jaw, Clinicopathologic characteristics, Diagnosis, Treatment.

EVOLUTION IN INTRACANAL RESTORATION OF ENDODONTICALLY TREATED TEETH: REVIEW

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Introduction: In the last few decades, various posts have been developed in order to restore endodontically treated teeth. Nevertheless, a comprehensive review on restoration of endodontically treated teeth is still lack in literature review. Our study aimed to identify the evolution in restoring endodontically treated teeth base on literature search together with the implication/impact of each approach according to scientific studies.

Methods: Out of 442 articles, 75 articles that fulfilled the eligible criteria were selected. We summarize recent research reports on a comprehensive overview literature of evolution in restoring endodontically treated teeth and implication between various types of posts from previous articles that were published.

Results: The earliest method of restoring endodontically treated teeth was by modifying the use pin that later changed to the post and core system. The earliest post was found to be metal which was introduced in 1930s. Further development of post was continued to take placed due to several problems with the metallic post which lead to development of carbon post followed by fibre post. This later influence the development of fibre reinforce post system and zirconia post to enhance the aesthetic properties.

Conclusion: The evolution in material and technique of restoring endodontically treated teeth was found to be due to the clinical performance of each type of post together with properties and aesthetic outcome which has shown improvement and better clinical success.

Keywords: dental post, carbon post, metal post, fibre post, fibre reinforced composite post.

A SYSTEMATIC REVIEW OF TOOTH ABNORMALITIES IN CLEFT LIP AND PALATE PATIENTS

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Introduction: Cleft lip and palate (CLP) are amongst the most common orofacial congenital disorders with a complex aetiology of both genetic and environmental factors. In comparison with general population, dental anomalies are more prevalent in CLP patients. These malformations affect the tooth morphology resulting in functional deficiency and aesthetic concerns.

Objectives: This review was conducted to assess the prevalence of dental anomalies in CLP patients.

Methods: Data was collected by retrieving full text articles from PubMed, Scopus and Google Scholar databases published from 1990 to 2021. The search was conducted by two independent reviewers and methodological quality (risk of bias) assessment was performed on all the selected articles.

Results: A total of 61 studies were selected for this systematic review from 524 articles retrieved. Cohen's kappa coefficient for the quality assessment was 0.886 which showed the absolute level of inter-rater agreement. It was found that there is an increased incidence of anomalies which affect the position, orientation, and morphology of the teeth in individuals affected by CLP with the most common dental anomalies reported were microdontia, enamel hypoplasia and taurodontism.

Conclusion: The available evidence showed that tooth abnormalities in CLP affect tooth morphology and severely compromised their shape and function.

Keywords: Cleft lip and Palate, Dental Anomalies, Microdontia, Enamel Hypoplasia, Taurodontism.

PREVALENCE, AETIOLOGY, AND PATTERNS OF MANDIBULAR FRACTURES

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Introduction: Mandibular fracture is one of the most common facial bone fractures and was studied in many populations. Different results of prevalence, aetiology, and patterns of mandibular fractures were reported.

Objectives: The aim of this study is to conduct a review on the prevalence, aetiology, and patterns of mandibular fractures in different environmental, geographical, cultural, and socio-economic backgrounds.

Methods: Comprehensive review of the literature was performed integrating explorations of computerised databases and authoritative texts on sources such as PubMed, Medline, Web of Science, Scopus, and other scientific databases.

Results: The prevalence of mandibular fractures ranged from 37% to 70%. The most causative factor of mandibular fractures in developing countries such as Turkey, Malaysia, and Nigeria are road traffic accidents (38% to 91%) while interpersonal violence was found to be more prevalent in developed countries such as United States, Australia, and Canada (41% to 55%). Angle of the mandible was observed to be more prone to fractures in developed countries (29% to 33%) and mandibular body fractures are more prevalent in developing countries (30% to 36%).

Conclusion: Prevalence, aetiology, and patterns of mandibular fractures are influenced by different environmental, geographical, cultural, and socio-economic factors.

Keywords: mandibular fractures, prevalence of mandibular fractures, aetiology of mandibular fractures, pattern of mandibular fractures, facial trauma.

PARAOXONASE-1 ACTIVITY AND ITS POLYMORPHISM IN THYROID DYSFUNCTION: A SYSTEMATIC REVIEW

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Introduction: Paraoxonase-1 (PON1) is an enzyme which is synthesized in the liver and attached to high density lipoprotein (HDL) structure at the hydrophobic N-terminal of PON1. PON1 inhibits low density lipoprotein (LDL) oxidation and it protects HDL from oxidation by inactivating LDL-derived oxidized phospholipids. Patient with thyroid dysfunction has higher susceptibility to LDL cholesterol oxidation and oxidative stress compare to healthy population. Genetic variation in the PON1 polymorphism may affect the activities of PON1 as an antioxidant.

Objectives: The study was conducted to review the PON1 level and its polymorphism in patients with thyroid dysfunction.

Methods: The activity of PON1 and its polymorphisms in thyroid disorder was investigated in this study. Articles published in the computerized databases of PubMed, SpringerLink, Web of Science, Scopus, Science Direct, and Google Scholar were searched using keywords paraoxonase-1, PON1, polymorphism, thyroid, hyperthyroid, hypothyroid, hyperthyroidism, hypothyroidism and were systematically reviewed based on PRISMA guidelines.

Results: PON1 activity is lower in thyroid disorder patients, in both hypothyroid and hyperthyroid patients. There are two types of PON1 polymorphisms at the region L55M and Q192R. The 192 position and 55 position polymorphism is the most important determinant of PON1 activity.

Conclusion: There is a consistent association between thyroid dysfunction and decreased PON1 activity. However, the genetic polymorphism of PON1 and its association with thyroid dysfunction need to be further evaluated in various populations.

Keywords: paraoxonase-1, polymorphism, thyroid dysfunction, hyperthyroid, hypothyroid.

COPPER NANOPARTICLE SURFACE COATING ON TITANIUM DENTAL IMPLANT FOR TREATMENT OF PERI-IMPLANTITIS: A REVIEW

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Introduction: Titanium dental implant often fail due to the occurrence of peri-implantitis post-operatively. Hence, copper nanoparticles (CuNPs) that are incorporated onto dental implant are hoped to help in addressing this problem as they possess antibacterial properties.

Objective: This narrative review is aimed to summarise the findings on copper nanoparticle addition as antibacterial coating against different type of microorganisms.

Methods: Based on the keywords, relevant articles in the databases were identified. Next, screening process was done by reading the related titles and abstracts where any non-related and irrelevant articles were excluded. The remaining selected articles were then reviewed for their eligibility based on the research question, inclusion criteria and exclusion criteria. Then, these articles undergone appraisal of quality process before data extraction and analysis were carried out for report writing.

Results: Out of 50 articles, only 12 articles which fulfilled the eligible criteria were selected. Findings from this review acknowledge the different methods in synthesising CuNPs with chemical reduction being the most frequently used method, the antibacterial actions of CuNPs as well as the various microorganisms tested against its antimicrobial properties. All these studies portrayed the high bactericidal ability of CuNPs that may aid in reducing the occurrence of peri-implantitis clinically.

Conclusion: The merger of metal element such as CuNPs onto titanium dental implant can be considered as one of the initiatives in treating peri-implantitis as they possess antimicrobial actions against various microorganisms.

Keywords: Copper nanoparticle synthesis, antibacterial activity, microorganisms, titanium dental implants, peri-implantitis.

EMERGING DIAGNOSTIC METHODS AND MANAGEMENT OF XEROSTOMIA: A LITERATURE REVIEW

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Introduction: Xerostomia (dry mouth) is a common oral health issue caused by various systemic diseases and local factors. Ten to 46 per cent of the population are suffering from xerostomia, a subjective symptom that can range from a little discomfort to serious oral disease, which later can have a severe influence on a person's health, nutritional intake, and quality of life. Therefore, accurate diagnosis and appropriate management are essential to manage the condition.

Objectives: This study aims to review the recent update on diagnostic methods to diagnose xerostomia and its management.

Methods: A literature search was conducted using keywords that described a method to diagnose and manage a patient with xerostomia. The electronic databases of PubMed, Web of Science, and Google Scholar were used as data sources. Relevant articles were selected, and duplicate articles were removed. Finally, the most relevant articles were chosen based on the inclusion criteria.

Results: Diagnosis of xerostomia is dependent upon detailed history taking and thorough oral examination. Other methods of diagnosis include salivary flow rate measurement and imaging modalities. Management of xerostomia can be either nonpharmacological or pharmacological approaches. Both of these approaches include simple lifestyle modifications, salivary stimulants, saliva substitutes, topical agents, and systemic sialogogues.

Conclusion: There are many modalities currently available in the diagnosis and management xerostomia.

Keywords: xerostomia, dry mouth, diagnosis, management.

KAPOSI SARCOMA OF SALIVARY GLAND IN HIV/AIDS PATIENT

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Introduction: Kaposi sarcoma (KS) of a salivary gland is a rare manifestation of AIDS patients. However, it is considered an AIDS-defining illness. The dental practitioner should be knowledgeable about the KS of the salivary gland to aid in the early detection of HIV patients.

Objectives: To conduct a review of KS of the salivary gland in HIV/AIDS patients. To conduct a review on the prevalence, common presentation, and management of the KS of the salivary gland in HIV/AIDS patients.

Methods: A narrative review of the literature was conducted to ascertain the prevalence, common presentation, and management of KS of the salivary gland in AIDS patients from previously published articles.

Results: Based on the results analysed from the 21 cases included in this study (1983-2021), the mean age of patients during diagnosis was found to be 44.2 years old (range 20-78 years old). The parotid gland was the most common site (77.8%), followed by 3 cases involving submandibular gland (16.7%) and 1 cases of sublingual gland (5.6%). Salivary gland mass formation were the most reported symptoms which is seen in 4 cases (40.0%). In this study, 8 patients (66.7%) underwent excision of the affected salivary gland, 3 patients (25.0 %) underwent superficial parotidectomy and 1 patient (8.33%) underwent radiotherapy.

Conclusion: KS is one of the most frequently encountered manifestations in AIDS patients. It can manifest as a mass lesion. Thus, KS should be considered in patients with AIDS who present with salivary gland mass.

Keywords: Salivary gland lesion, Kaposi sarcoma, AIDS patient, HIV disease.

RHEUMATOID ARTHRITIS AND PERIODONTAL DISEASE ASSOCIATION: A REVIEW

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Introduction: Association between periodontitis (PD) and other diseases including rheumatoid arthritis (RA), respiratory disease, and chronic kidney disease, have been reported. Patients with moderate to severe periodontitis are at higher risk of suffering from RA and vice versa. This bidirectional relationship could be due to common genetic (HLA-DR), dysregulation of the inflammatory response as well as the role of *Porphyromonas gingivalis*, which stimulates anti-cyclic citrullinated peptide antibodies via citrullination.

Objectives: This review aims to identify associated factors that contribute to RA and PD relationship and to explore the effects of disease modifying anti-rheumatic drugs (DMARDs) on PD.

Methods: Literature search was performed using PubMed and Google Scholar to identify the related articles that are within the research interest using multiple keywords combinations. Searches were limited to articles that were published from year 1990 to 2020. Thirty-one articles that fit the research interests and addressed the research questions for both objectives were selected.

Result: The associated factors for RA and PD relationship include genetic predisposition, immunoregulatory imbalance, and the role of *P. gingivalis* as a key pathogen involved in citrullination process as a risk factor for RA. Significant improvement was found in periodontal parameters in RA patients treated with biologic and synthetic DMARDs.

Conclusion: The present review shows the common factors which contribute to RA and PD relationship and benefits of DMARDs on periodontitis.

Keywords: rheumatoid arthritis, periodontal disease, anti-cyclic citrullinated peptide, citrullination, *Porphyromonas gingivalis*

MODELLING THE ASSOCIATED FACTORS OF CHRONIC KIDNEY DISEASE AMONG PERIODONTITIS PATIENTS

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Introduction: Periodontitis is a chronic infection of teeth's supporting tissues caused by specific microorganisms. Chronic kidney disease (CKD) is characterised by structural or functional abnormalities of the kidney. Periodontitis is a potential risk factor for CKD as increased inflammatory burden contributes to systemic diseases. A bidirectional relationship between CKD and periodontitis is plausible, however the associated factors have not been widely reported.

Objective: To determine the factors influencing CKD among periodontitis patients attending Hospital Universiti Sains Malaysia (HUSM).

Methodology: This is a cross-sectional study of periodontitis patient who attending dental clinic HUSM. Twenty periodontitis patients with CKD and twenty patients without CKD were recruited. The factors including age, ethnicity, gender, CKD status, diabetes, hypertension, smoking, Interleukin (IL)-1, IL-6, IL-10, cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), triglyceride (TG) levels, were obtained from medical record. Descriptive statistics and Spearsman's matrix correlation was applied.

Results: The majority of periodontitis patients were Malays (95%) and males (85%).Urea levels ($r_s=0.832$, $p<0.05$), creatinine($r_s=0.867$, $p<0.05$), IL-10 ($r_s=0.71$, $p<0.05$) were found to be significantly associated with CKD while others factor was not significant, age ($r_s=0.02$, $p>0.05$), gender ($r_s=0.00$, $p>0.05$), ethnicity ($r_s=0.00$, $p>0.05$), IL-1($r_s= -0.173$, $p>0.05$), IL-6 ($r_s= 0.344$, $p>0.05$), cholesterol ($r_s=-0.108$, $p>0.05$), LDL ($r_s=-0.172$, $p>0.05$), HDL ($r_s= 0.005$, $p>0.05$), TG ($r_s=-0.170$, $p>0.05$), DM ($r_s=0.250$, $p>0.05$), HPT($r_s=-0.115$, $p>0.05$), smoking($r_s=0.160$, $p>0.05$).

Conclusion: This study demonstrate IL-10, urea and creatinine levels are the factors influencing CKD among periodontitis patients which may aid in the early identification of individuals at high risk for CKD.

Keywords: Chronic kidney disease, periodontitis, bidirectional relationship, risk factor.

MOLECULAR SALIVARY BIOMARKERS FOR XEROSTOMIA IN PATIENTS WITH TYPE II DIABETES MELLITUS: A REVIEW

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Introduction: Type II diabetes mellitus (T2DM) is the most common form of diabetes, which may range from predominantly insulin resistance with relative insulin deficiency to prevailing defective secretion with or without insulin resistance. Xerostomia, a subjective perception of dry mouth with or without hyposalivation, is one of the oral complaints associated with T2DM. Saliva has abundance of protein molecules which can be used as biomarkers. Biomarkers are naturally occurring measurable molecules, by which a particular pathological or physiological state of a living organism can be identified.

Objective: To conduct a review on molecular salivary biomarkers for xerostomia in patients with T2DM.

Methods: The review was based on literature search, which was conducted using MEDLINE and Web of Science databases to identify related articles that are within the research criteria using different combinations of the keywords of interest including "saliva", "biomarker", "dry mouth", "xerostomia", and "diabetes". A quantitative synthesis was conducted to summarise the results from articles.

Results: There were a total of eight articles included in our study for the present review. Among them, four articles were related to salivary biomarker for xerostomia in patients with T2DM. The other four articles were related to salivary biomarkers for xerostomia not specific to any diseases.

Conclusion: The present review has shown that there are salivary biomarkers for xerostomia in patients with T2DM as well as for xerostomia not specific to any diseases.

Keywords: Saliva, biomarker, dry mouth, xerostomia, diabetes.

A REVIEW OF EFFECTS ON TITANIUM IMPLANT SURFACE BY DIFFERENT HYGIENE INSTRUMENTS

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Introduction: Regular debridement must be done to ensure the sustainment of the dental implant preferably, the hygiene instruments used should efficient and effectively remove the plaque accumulations yet cause no or minimal damage to the surface of the dental implant.

Objectives: To conduct a review of effects on titanium implant surface by different hygiene instruments.

Methods: The study searched was PubMed, ScienceDirect and Scopus and Wiley Online Library databases for article published from 1992 to 2021 that have keywords of interest and met the criteria.

Results: A total of 19 full text papers were included in this study. Metal curette produced a significantly roughened surface on the titanium implant. Plastic curette do not alter the titanium surface. Rubber cups left the implant surface unchanged and appeared to smoothen the titanium surface. Titanium surface was significantly altered and there were presence of micro pits and pores in the air-powder abrasive treated group. Conventional metal ultrasonic scaler showed significant surface topographical changes and scratches on both titanium implant surfaces. Diode laser, light emitting diode (LED) and laser treatment do not show any alteration on the rough and smooth titanium implant surface.

Conclusion: Metallic instrument should be avoided on titanium implant surfaces. Non-metallic instrument such as plastic curette, rubber cups and novel technology including diode laser, LED and laser treatment are appropriate and can be used on smooth, machined, SLA (sandblasted and acid etched surface), TPS (titanium particles surface) and RBM (resorbable blast media) titanium implant surface debridement.

Keywords: dental titanium implant, surface effect, hygiene instrument.

A REVIEW ON SECOND MESIOBUCCAL (MB2) CANAL IN MAXILLARY MOLAR AMONG DIFFERENT DEMOGRAPHIC FACTORS (GENDER, AGE AND GEOGRAPHICAL REGION)

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Introduction: The root canal system has always been one of the most complicated aspects of dentistry, especially in endodontic. Lack of knowledge about the root canal system could lead to missing the additional root canal, which can later cause the endodontic treatment failure. The second mesiobuccal (MB2) canal which is the popular additional canal in maxillary molar is one of the most discussed topic. There will be different variations regarding the MB2 canal in various demographic factors. Thus, gender, age and geographical region factors should be considered to determine the anatomical variability and the frequency of the MB2 canal.

Objectives: To review the available evidences on the prevalence of MB2 canal among different demographic factors such as gender, age and geographical region.

Methods: Literature search was performed using PubMed, Scopus, Medline and Google Scholar databases to identify the related articles using systematic search strategy.

Results: Among the selected articles, the prevalence of MB2 canal is 43.6%-73.0% in male and 23.2%-71% in female. The prevalence of MB2 canal is 27.3%-74.4% in younger age group and 10%-69.4% for the older age group. The prevalence of MB2 canal is 52.0%-57.8% in China and 45.6%-59.9% in Malaysia.

Conclusion: According to the gender, the prevalence of MB2 canal is more frequent in male compare to female. In the age group aspect, the prevalence of MB2 canal is more frequent in the younger compare to older age group. The pattern also showed that the prevalence of MB2 canal varies randomly regardless of any geographical region.

Keywords: Literature review, second mesiobuccal (MB2) canal, gender, age, geographical region.

CLINICAL SCIENCES II

PARACETAMOL USE IN PREGNANT WOMEN AND ITS EFFECTS ON THEIR OFFSPRING

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Introduction: To date, paracetamol is still considered a safe drug therapeutically used as antipyretic and analgesic to relieve mild to moderate pain. Unlike many other drugs which are associated with teratogenicity, paracetamol has a long history of safe pharmacologic and toxicity profile since its introduction in the mid-18th century. However, emerging evidence have linked paracetamol use during pregnancy with the increased risk of childhood asthma and other disorders related to abnormal neuro-development in the offspring.

Objectives: This review provides an update on paracetamol safety focusing on paracetamol use in pregnant women and its association with childhood asthma, and other neuro-developmental disorders—attention deficit hyperactivity disorder (ADHD), hyperkinetic disorder (HKD), autism spectrum disorder (ASD) and cerebral palsy (CP) in their offspring.

Methods: Data for this review were retrieved from literature searched via computerised databases from 1943 to 2021 using a specified keywords. A total of 29 and 40 articles were found on asthma and neuro-developmental disorders, respectively.

Results: Analysis of all publications retrieved shows that most studies are in agreement with the hypothesis that childhood asthma and neurodevelopmental disorders are associated with prenatal exposure of paracetamol caused by maternal intake of paracetamol during pregnancy.

Conclusion: Growing evidence indicates that maternal intake of paracetamol during pregnancy is linked to childhood asthma and neurodevelopmental disorders (ADHD, HKD, ASD and CP).

Keywords: paracetamol, pregnancy, childhood asthma, neurodevelopmental disorder, neurological disorder.

A REVIEW OF COVID-19 PANDEMIC AND ITS RAMIFICATIONS IN DENTISTRY

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Introduction: Dentistry is one of the professions that is susceptible to COVID-19 infection due to its working nature that involves with close patient contact and aerosol generating procedures.

Objectives: To determine the ramifications of COVID-19 on treatment and infection control protocol in dentistry and evaluate the impact of COVID-19 on dental treatment procedures and patient management.

Methods: Search for relevant articles in English that were conducted and published in PubMed, Embase, Scopus, Web of Science and Cochrane databases were used to identify publications on COVID-19 and its ramifications on dentistry from year 2019-2020. The inclusion criteria was articles published in English that have the keywords of interest and showed impacts of COVID-19 on dentistry.

Results: Out of 487, only 28 articles relating to the objectives and inclusion criteria were included. Studies recommended infection control measures by using personal protective measures, use of mouth rinses, rubber dam isolation, use of anti-retraction hand pieces, disinfection and proper waste management. Patient management required thorough evaluation, triage, and screening. Procedures that generate aerosol were avoided and focused on treating emergency rather than elective cases to reduce the COVID-19 transmission.

Conclusions: COVID-19 pandemic influences the treatment, infection control protocol, treatment procedures and management of patients in dentistry.

Keywords: COVID-19 transmission, COVID-19 guidelines, airborne contamination, COVID-19 dental-related aspects.

A REVIEW ON SECONDARY BONE HEALING IN LONG BONE AND EFFECTIVENESS OF HYALURONIC ACID IN BONE REGENERATION

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Introduction: Secondary bone fracture healing is tightly controlled by different inflammatory cells, cytokines, growth factors and signaling molecules. Bone tissue engineering promotes bone regeneration on the basis of this physiological bone regeneration mechanism. Hyaluronic acid which is a natural biochemical component involved in the healing process is frequently applied in regenerative medicine field.

Objectives: This study was conducted to study the mechanism of secondary fracture healing in long bone as well as the effectiveness of hyaluronic acid in promoting bone regeneration

Methods: Studies were selected from the PubMed/Medline, Science Direct, Online Wiley Library, and Scopus databases.

Results: Most experimental studies show increased percentage of bone structure in the defect cavity compared to its control group after the same duration of observational period. Failure of hyaluronic acid to enhance bone formation in some experiments is associated with its molecular weight.

Conclusion: High molecular weight hyaluronic acid promotes bone regeneration.

Keywords: Secondary bone healing, long bone, high molecular weight, hyaluronic acid, bone regeneration.

POTENTIAL APPLICATION OF DYNAMIC NAVIGATION IN DENTAL PRACTICE: A FOCUSED REVIEW

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Introduction: Dynamic guidance is based on computer-aided surgical navigation technology and analogous to global positioning systems or satellite navigation. Recently, the concept of using guided navigation has become an area of interest in dental practice particularly in dental implant surgery, oral and maxillofacial surgery, and endodontics.

Objective: The aim of this review was to evaluate dynamic navigation in terms of its application in dental practice and its impact on making treatments less invasive.

Methods: This review was conducted according to the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines. The search was conducted with keywords of interest from electronic databases (Cochrane, PubMed, Scopus and ScienceDirect). The articles were then screened based on a predetermined inclusion and exclusion criteria.

Results: A total of 67,325 articles were found during the initial search process. After removal of duplicates, initial screening, and full text evaluation, 26 articles were selected for qualitative analysis. The results revealed that application of dynamic navigation in dental practice largely outperforms the manual planning practice and reduces the risk of unintentional iatrogenic damage to nearby anatomic structures resulting in minimally invasive surgery.

Conclusion: Dynamic navigation has substantial applications in dental practice particularly in dental implant surgery, oral and maxillofacial surgery, and endodontics. Dynamic navigation is a promising technique where treatment can be performed in a less invasive manner.

Keywords: Computer-aided, computer-assisted, endodontics, image-guided, minimally invasive.

PARTIAL PULPOTOMY ON COMPROMISED FIRST PERMANENT MOLAR IN CHILDREN: A REVIEW

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Introduction: First permanent molar (FPM) is most common teeth affected by caries in young patient due to its anatomical structure and early eruption in the mouth especially in 1-2 years after eruption. Partial pulpotomy is an optional management in treating cariously exposed immature permanent teeth for preserving the vitality and physiological root development. However, despite of the success rate reported in previous studies, there is still limited evidence regarding successful of partial pulpotomy in immature permanent teeth in immature permanent teeth specifically in first permanent molar in terms of standardised clinical criteria, technique and material used in procedure.

Objectives: Therefore, the aim for this narrative review is to determine the updated and standardized protocol of partial pulpotomy in immature first permanent molar in terms of clinical criteria, technique and material used in procedure.

Methods: Literature search through computerized databases from PubMed, Google Scholar, Science Direct, Wiley Online Library, Scopus and National Centre for Biotechnological Information (NCBI) with relevant keywords.

Results: Partial pulpotomy is an optional management for cariously exposed first permanent molar (FPM) with high success. The success rate has been shown to be substantially influenced by the dressing material used.

Conclusion: Recently, partial pulpotomy with clinical diagnosis of irreversible pulpitis has shown good success rate. However, more relevant clinical trials with a bigger sample size are required for better accuracy.

Keyword: Partial pulpotomy, Young immature first permanent molar, Caries in young immature first permanent molar, Vital pulp therapy.

A NARRATIVE REVIEW ON THE ASSOCIATION OF TEMPOROMANDIBULAR JOINT DISORDER WITH INTERCEPTIVE TREATMENT ON PATIENT WITH CLASS III MALOCCLUSION

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Introduction: Temporomandibular disorders (TMD) encompass a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints, the masticatory muscles, and all associated tissues. Malocclusion has been one of the factors that constitutes to the TMD aetiology. There is also a significant degree of controversy regarding the relationship of TMD and orthodontic treatment. The use of orthodontic appliances to correct the alignment and vertical relationships of teeth has small yet significant risks.

Objective: The aim of this literature review is to evaluate the possible association between interceptive treatment on class III malocclusion and temporomandibular disorders.

Methods: Electronic database searches was carried out on PubMed database using the keywords "orthodontics and temporomandibular disorders", "class III malocclusion and temporomandibular disorders" and "interceptive treatment of class III malocclusion".

Results: Four articles were included. The studies were grouped according to the type of interceptive treatment used. Two studies with intervention of chin-cup therapy show a low percentage of sign and symptoms of TMD developed after treated. One study that used modified JJ appliance and Delaire-face mask as intervention observed a reduction of TMD sign and symptoms at post-treatment. Another study that used mandibular cervical headgear (MCH) as their intervention concluded that subjects with Class III malocclusions treated with MCH and fixed appliances do not have greater prevalence of TMD symptoms.

Conclusion: From all the papers searched, there is no significant association between interceptive treatment on class III malocclusion and temporomandibular disorders.

Keywords: Temporomandibular joint disorders, orthodontics, interceptive treatment, class III malocclusion.

EFFECT OF SMOKING AND COMORBIDITIES ON COVID-19 PROGRESSION: A REVIEW

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Introduction: Coronavirus disease 2019 (COVID-19) is caused by Betacoronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Smoking acts as a detrimental to the immune system and its responsiveness to infection, making smokers more vulnerable to infectious diseases. Elderly and those with underlying medical problems are at higher risk of getting severe form of COVID-19 infection.

Objectives: The present study was conducted to review the effect of smoking and comorbidities [diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD) and hypertension] on progression of COVID-19.

Methods: A literature search of PubMed, Scopus, Google Scholar and ScienceDirect databases were retrieved from January 2020 till December 2021 with the keywords used alone or in combination.

Results: Based on the review articles, smokers are highly likely to increase COVID-19 severity. DM, COPD, and hypertension also showed significant association with COVID-19 severity. Upregulation of ACE2 receptors, cytokine storm, suppressed immune system and use of certain medications in smokers and patients with comorbidity often lead to more severe COVID-19.

Conclusion: Smoking and comorbidities lead to more severe cases of COVID-19. Our understanding of COVID-19 is evolving as more reports are published.

Keywords: COVID-19, smoking, comorbidities, diabetes mellitus, chronic obstructive pulmonary disease, hypertension.

TECHNIQUES OF MEASURING REMAINING DENTINE THICKNESS BENEATH CARIOUS LESIONS: A NARRATIVE REVIEW

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Introduction: Remaining dentine thickness (RDT) is the thickness of the healthy dentine that is left between the base of carious cavity and the roof of the pulp chamber. RDT is very important and needs to be retained as much as possible as it protects the pulp against mechanical injury or inflammatory products. Knowledge of remaining dentine thickness left prior to cavity preparation can prevent unintentional pulp exposure. Therefore, some techniques have been used previously for measuring RDT.

Objective: The aim of this paper was to review the different techniques of measuring RDT and determine the technique that is most appropriate and easily available for the general dental practitioners, so that better treatment outcomes can be achieved.

Method: A detailed literature search was carried out using international databases (PubMed, Science Direct, Google Scholar), using keywords like: remaining dentine thickness, measuring techniques, carious lesion, and radiograph.

Result: Out of 101 articles, only 15 met the set inclusion/exclusion criteria and were selected for further review. Optical coherence tomography (OCT) is the best technique to measure RDT as it provides non-invasive, high spatial resolution of biological microstructure compared to other techniques. However, radiograph remained the most used in the clinical settings.

Conclusion: OCT was found to be the best technique to measure RDT. Nevertheless, further research is required to identify the best technique that can be used cost effectively in everyday practice.

Keywords: Caries, dentine, radiograph, remaining dentine thickness, techniques.

A REVIEW OF HEMATOLOGICAL PARAMETERS AND PERIODONTITIS

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Introduction: Periodontitis is a multifactorial, chronic inflammatory disease that causes destruction of connective tissue and alveolar bone primarily due to bacterial infections in subgingival biofilm. This will activate the host inflammatory response by increasing hematologic markers such as neutrophil counts and erythrocyte sedimentation rate (ESR), which are an accepted surrogate of systemic inflammation, in addition to lower levels of hemoglobin (Hb). Prolonged exposure to proinflammatory cytokines and iron deficiency predisposes individuals with periodontitis to anemia of chronic disease.

Objectives: This review was conducted to appraise the changes of hematological parameters in patients with and without periodontitis, and the effect of non-surgical periodontal therapy on various hematological parameters in patients with periodontitis.

Methods: Data was collected by retrieving full text articles from Pubmed, Scopus, Science Direct and other computerized scientific search engines for studies published between 1990-2021.

Results: It was found that chronic periodontal inflammation reduces red blood cell number and affects its morphology causing anemia of chronic inflammation. Elevated levels of pro-inflammatory cytokines, namely tumor necrosis factor- α and interleukin-1, also reduced erythroid progenitors, in addition to an increase in white blood cell parameters. Nonsurgical periodontal treatment was associated with a decrease in white blood cell count and ESR, increased Hb levels and red blood cell count from baseline after 6 months after therapy.

Conclusion: Periodontitis causes a reversible state of systemic inflammation and shows changes in hematological parameters. Non-surgical periodontal treatment alleviates this effect.

Keywords: Periodontitis, hematological parameters, periodontal therapy, inflammatory markers.

THE ANALYSIS OF ORBITAL FRACTURE IN MAXILLOFACIAL TRAUMA IN THE PERIOD OF 5 YEARS IN HUSM

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Introduction: Oral maxillofacial trauma is injury to the face, either isolated or combined with other fractures or injuries including the head. Orbital bone is one of the most common exposed parts of facial bone and most susceptible area to injury.

Objective: To analyse the orbital fracture in maxillofacial trauma that were reported to Hospital USM in the past 5 years.

Methods: This a retrospective study that carried out in Hospital USM. The record of patients who sustained maxillofacial fractures were retrieved from Hospital USM from July 2013 to September 2019.

52 maxillofacial trauma cases included. Details were collected from patients' record including demographic data, site of injury, type of treatment received and type of surgical approach.

Results: Male are more frequent present with orbital fracture due to maxillofacial trauma compared to female, 42(80.8%) and 10(19.2%) respectively where all of them are Malay. Most common aetiology of orbital fracture in maxillofacial trauma is motor vehicle accident (90.4%). Most common site of orbital wall fracture is lateral wall (38.5%). The most common type of facial bone fracture that associated with orbital fracture is zygomatic complex fracture (13.2%) and most of the patients were treat conservatively (71.2%). The most common type of surgical approach done is coronal approach (30.4%) and followed by blepharoplasty (26.1%). 44.2% of the injuries happen between 1800-2359hrs.

Conclusion: In conclusion, orbital fracture mostly involved male due to motor vehicle accident which mostly happen in between 1800-2359hrs and most of the fractures were treated conservatively.

Keywords: maxillofacial trauma, orbital fracture.

PERIODONTAL STATUS OF ADULT PATIENTS AT PERIODONTICS SPECIALIST UNIT IN HOSPITAL UNIVERSITI SAINS MALAYSIA: A RETROSPECTIVE STUDY

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Introduction: Periodontitis is a common and often lifelong inflammatory disease that is characterized by destruction of tooth-supporting apparatus including periodontal ligament and alveolar bone. Severe periodontitis is declared as the sixth most common disease globally affecting 743 million people (10.8% of total world population) aged between 15 and 99 (Frencken et al., 2017).

Objectives: The study was conducted to describe the periodontal status, severity and extent of periodontitis in the adult patients visiting Periodontal Specialist Clinic in HUSM from January to December 2019.

Methods: Periodontal records of periodontitis patients from 2019 was studied and all the required parameters are recorded and analyzed with SPSS version 26.

Results: The mean age for periodontitis patients is 48.17% (SD12.99), 53.3% are males and 46.7% are females. Demographically, most are Malays 90%, 6.7% of Chinese, and 3.3% are other ethnicity. Mean for PPD is 6.65 (SD1.77), CAL with mean 3.90 (SD1.30), GBI with mean 41.90 (SD22.86) and PS with mean 60.10 (SD21.34). 50% lost 0-5 teeth, 23.3% lost 6-10 teeth, and 26.7% lost more than 10 teeth. 70% of the patients are non-smokers, 23.3% are current smokers and 6.7% are former smokers. 30% of the periodontitis patients have hypertension, 10% have diabetes mellitus and the rest have other medical issues.

Conclusion: Overall, periodontitis is highly prevalent in adult patients visiting Periodontal Specialist Clinic in HUSM. These findings provide an opportunity to determine how the overall health-care management to improvement of their oral health conditions.

Keywords: Periodontitis, severity, extent, adults, tooth loss.

A TWENTY-YEAR RETROSPECTIVE STUDY OF ORTHOGNATHIC SURGERY AT HOSPITAL UNIVERSITI SAINS MALAYSIA (HOSPITAL USM) KELANTAN, MALAYSIA

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Introduction: Orthognathic surgery is becoming more common in Malaysia compared to 20 years ago. However, no research exists on the East Coast of Malaysia to assess sociodemographic, dentofacial deformities, surgical procedures, in-admission post-operative complications, and associated factors among treated patients. So, this study looked at patients who had orthognathic surgery at Hospital USM.

Objectives: To study the sociodemographic, prevalence and types of dentofacial deformities, surgical procedures, and associated factors amongst the patients in Hospital USM from year 2000 till 2020.

Methods: This retrospective study was based on medical and radiographic records of patients in Hospital USM from 1st January 2000 to 31st December 2020. Data were analysed using IBM SPSS Statistics version 22.0. Descriptive statistics and Chi-square test were applied, and the statistical significance was set at $p < 0.05$.

Results: Among 71 patients' records assessed, 69% were female, the age group of 21-30 was the highest (57.7%), and Malay occupied 46.5% of total patients. Class III skeletal pattern was the most common (73.2%), and bimaxillary osteotomies were the most commonly done procedure (62%). The most common in-admission post-operative complication was numbness or paraesthesia (88.7%). No significant association between dentofacial deformities with ethnicity and between in-admission post-operative complications with surgical procedures performed.

Conclusion: Orthognathic surgery was commonly performed in Malay and Chinese female patients aged 21-30 with class III skeletal patterns. The most prevalent surgical procedures were bimaxillary osteotomies. Numbness or paraesthesia was the most common complication. No significant association was found between factors.

Keywords: Orthognathic surgery, dentofacial deformities, osteotomies, complications.

A 2-YEAR RETROSPECTIVE STUDY ON THE PREVALENCE OF CHOLELITHIASIS AND CHOLECYSTECTOMY AMONG PATIENTS ADMITTED TO HOSPITAL UNIVERSITI SAINS MALAYSIA

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Introduction: Cholelithiasis is the presence of one or more calculi in the gallbladder. Most individuals with cholelithiasis are asymptomatic throughout their life and management of patients with cholelithiasis depends on the patient's symptoms, imaging test findings, and whether complications are present. Cholecystectomy is the treatment of choice for symptomatic cholelithiasis patients.

Objectives: This study aimed to determine the prevalence of cholelithiasis and cholecystectomy among patients admitted to Hospital Universiti Sains Malaysia (USM) surgical ward from 2016 to 2017. In addition, factors associated with cholecystectomy were explored.

Methods: This retrospective study used hospital records of cholelithiasis patients admitted to Hospital USM surgical ward from 1st January 2016 to 31st December 2017. Descriptive statistics and chi-square tests were used for data analysis.

Results: Overall, 197 from 4735 patients (4.2%) were admitted to Hospital USM surgical ward for cholelithiasis. Out of these patients, 52.8% (104 out of 197 patients) underwent cholecystectomy procedures. One patient (1.2%) out of 85 patients who underwent cholecystectomy without preoperative evidence of common bile duct or intrahepatic duct stones developed choledocholithiasis 2.5 years post-operation. Cholecystectomy operation was significantly associated with the presence of biliary colic ($p=0.001$), cholecystitis ($p=0.001$), and derangement of liver function test i.e., alanine transaminase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP), with $p<0.001$.

Conclusion: The presence of biliary colic, cholecystitis, and derangement of liver function test results were the factors associated with cholecystectomy among patients with cholelithiasis.

Keywords: Cholelithiasis, cholecystectomy, choledocholithiasis, biliary colic, cholecystitis.

PUBLIC HEALTH

BENEFITS AND LIMITATIONS OF ONLINE HEALTH EDUCATION: A REVIEW

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Introduction: The internet is a growing international communication platform that allows users to access real-time information regardless of where they are. It has become increasingly important in recent years, particularly as a source of health information, due to its ability to reach a global audience. It is critical to understand the internet's strengths and drawbacks when it comes to using it as a medium for health education for the health information seeker to use it more effectively.

Objectives: The aim of the study proposed is to review evidence on the benefits and limitations of online health education.

Methods: Literature search was conducted using PubMed, Science Direct and Google Scholar. Studies were included if they were published within the last ten years and in English language.

Results: People have profited from online health education by saving time and money, reaching a larger audience, and having easy access to health information. However, people with limited knowledge of information technology or who do not have access to the internet may find it difficult.

Conclusion: Health information seekers can now access a variety of online platforms for health education. Majority of them were judged to be effective in delivering evidence-based health information, although more effort is needed to ensure that the information reaches those who need it.

Keywords: Benefits, social media, web-based approach, online health education, mass media and health information.

ELDERLY PATIENTS ATTENDANCE TO DENTAL CLINIC: A FOCUSED REVIEW

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Introduction: The worldwide trend of elderly population is increasing including Malaysia which leads to an ageing nation. Elderly population are known to have poor general and oral health but still recorded unsatisfactory utilization of dental services.

Objective: To assess dental care utilization among elderly patients aged 60 and above.

Methodology: The method of this study is by searching of literature review using scientific computerized databases search engine such as ScienceDirect and PubMed. The articles containing keywords of interest and meet the inclusion criteria will be selected and reviewed.

Results: Total of 21 articles were selected according to the inclusion criteria consisting of both primary and secondary papers. 19 reports mentioned low utilization of dental care among the elderly. Most commonly reported reason for not utilizing dental care is due to financial-related difficulties. Other than that, low education level and lack of perceived need are also reported to hinder elderly from utilizing dental care.

Conclusion: Overall this study concluded that the utilization of dental care among the elderly is still low and at an unsatisfactory level. The low utilization is caused by financial related difficulties which is common among the elderly community.

Keywords: Barriers, reasons hindering from care, dental care utilization, elderly patients.

ATTITUDES AND PERCEPTIONS OF MEDICAL AND DENTAL STUDENTS TOWARDS BASIC SCIENCES KNOWLEDGE: A REVIEW

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Introduction: The learning process of medical and dental undergraduates is influenced by their attitudes and perceptions towards different subjects. Basic sciences are the foundation for students to build the mansion of clinical knowledge and skills.

Objectives: To perform a review on studies investigating the attitudes and perceptions of medical and dental undergraduate students towards basic science knowledge from existing literatures.

Methods: A rapid review of the literature was performed to identify the attitudes and perceptions of both medical and dental students around the world towards learning basic sciences knowledge during their undergraduate studies. Manual search was performed using Boolean search operators and keywords. PICO framework was used to define the inclusion or exclusion of the studies.

Results: It has been observed that medical and dental undergraduates in clinical years have positive attitudes and perceptions toward basic science knowledge; however, students' attitudes towards basic science courses became increasingly negative as they progressed throughout their studies. Students identified anatomy and pathology as the courses most overloaded with content. However, both were top preferred basic medical sciences including physiology, even though it is overloaded. Physiology was perceived as the subject with the highest applicability to clinical practice, while pathology was identified as the subject with the least practical application. It has also been discovered that postgraduates are more interested in a career in basic sciences than medical and dental undergraduates.

Conclusions: Overall, students showed positive attitude towards and perceived effectiveness of their education in basic sciences.

Keywords: Attitudes, Perception, Basic Science, Medical and Dental Undergraduate, Interest.

MALOCCLUSION, NUTRITIONAL STATUS (BMI) AND NUTRIENT INTAKE AMONG 6 TO 12 YEARS OLD CHILDREN: A SYSTEMATIC REVIEW STUDY

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Introduction: Malocclusion, ranked as the third greatest oral health problem worldwide, can affect individual's oral functionality and psychosocial health. Malocclusion is said to be affected by nutrient intake and nutritional status.

Objectives: To review the association between nutritional status (BMI), nutrient intake and malocclusion.

Methods: Web search was done on the research databases such as PubMed, Science Direct, Google Scholar to identify the articles regarding nutritional status (BMI), nutrient intake and malocclusion in school aged children. 310 studies were selected in this review and 32 studies matched the research question of this study. The search terms included "nutritional status", "BMI", "nutrient intake", "malocclusion" and "6-12 years old children". Articles were retrieved from dentistry journals and reference lists of selected studies on similar topics. The list of titles and abstracts of studies were reviewed by the researcher for inclusion. All literature with full text available that meet the criteria will be examined and data were extracted, followed by literature analysis.

Results: 8 studies showed significant relationship between nutritional status (BMI) and malocclusion whereas only 2 studies reported otherwise. Association of BMI with crowding is controversial. Association of BMI with facial height and dental age which can lead to malocclusion is significant. Nutrient intake and malocclusion had no significant association. Vitamin A was the only nutrient found to have an approaching significant relationship with crowding.

Conclusion: There is a significant association between BMI, nutrient intake and malocclusion.

Keywords: Nutritional status, Body Mass Index, Nutritional Intake, Malocclusion, 6 to 12 years old children.

DENTAL AMALGAM PHASE DOWN – A SYSTEMATIC REVIEW OF THE KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) AMONG DENTISTS AND DENTAL STUDENTS

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Introduction: Dental amalgam is a type of restorative material that have been used for more than 165 years. Dental amalgam consists approximately 50% mercury with alloy. However, the Minamata Convention treaty has identified dental amalgam as one of mercury products which needs to be phased down due to its perceived health and environmental concerns.

Objectives: This review aims to identify the knowledge, attitude and practice of dentists and dental students around the world regarding the dental amalgam phase down.

Methods: Computerized search were performed in electronic databases such as Scopus, ScienceDirect, Google Scholar and EBSCOhost from 2013 to 2020. Searches were limited to articles that fulfil our inclusion criteria including studies on KAP towards amalgam phase down, studies involving registered dentists or dental students and articles that were published in English.

Results: Out of 65, 17 articles that fulfilled the eligible criteria were selected. Among the selected articles, 13 studies were cross-sectional and and 4 studies were observational and prospective design study, respectively. The findings of the studies were consistent where most of dentists were not routinely use dental amalgam in their practice.

Conclusion: The KAP regarding dental amalgam phase down among dentists and dental students are still low. More studies with larger sample size and further research to determine the KAP of dental amalgam phase down among dentists and dental students are recommended to evaluate the readiness nationwide to adapt with the amalgam phase down.

Keywords: Amalgam Phase-Out, Knowledge, attitude, practice of dentists towards amalgam restorations, practice of dentists towards dental amalgam restorations.

PSYCHOSOCIAL IMPACT OF SMARTPHONE ADDICTION AMONG UNIVERSITY STUDENT: A REVIEW

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Introduction: Excessive, uncontrolled and problematic use of smartphones can lead to smartphone addiction. Nevertheless, a comprehensive review on smartphone addiction among university students impacts the student's psychosocial either positively or negatively, is still lacking in the literature.

Objectives: Thus, this review is intended to discuss the psychosocial impacts of smartphone addiction, specifically among university students.

Methods: Narrative overview of the literature synthesizing the findings of the literature retrieved from searches of computerized databases, hand searches and authoritative texts.

Results: Smartphone addiction can negatively influence students' mental health. Smartphone addiction can lead to psychosocial impacts like stress, anxiety, depression, poor sleep quality and sleep disturbance, poor academic performance, loneliness and disruptions of daily work.

Conclusion: Smartphone addiction among university students leads to negative psychosocial impacts.

Keywords: Smartphone, addiction, university students, mental health, psychosocial impact.

ATTITUDE, PERCEPTION, AND EXPERIENCE OF DENTAL STUDENTS TOWARDS ONLINE LEARNING BEFORE AND DURING PANDEMIC COVID-19

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Introduction: COVID-19, which stands for novel human coronavirus disease 2019, was first reported in Wuhan, China, in 2019 and was declared a pandemic by World Health Organization (WHO) in March 2020. To prevent this virus from spreading, many sectors are affected to break the chain of infection COVID-19 including the educational sector. Online or distance learning is the most suitable method to ensure education process can be continued. The dentistry academic field has also been affected and students moving toward adapting to the new era of teaching and learning.

Objectives: To explore the attitude, perception, and experience of dental students towards online learning before and during pandemic COVID-19.

Methods: We conduct a review. through database such as PubMed, Ovid, ProQuest, Web of Science, Science Direct, Scopus, Google Scholar, MEDLINE, and Wiley Online Library. The resources chosen were based on the inclusion and exclusion criteria standardize for this study.

Results: Based on the review, it showed that overall, dental students had positive acceptability on online learning before and during COVID-19. However, due to some challenges, some students perceived that online learning cannot totally replace the traditional learning method.

Conclusion: Positive perception and attitude toward online learning will definitely give rise to a better learning environment and good psychological impact on students.

Keywords: Dental students, COVID-19, online learning, attitude, perception.

SELF-REPORT AND OBSERVATION-BASED ASSESSMENTS FOR DENTAL FEAR AND ANXIETY IN CHILDREN: A MINI REVIEW

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Introduction: Dental fear and anxiety (DFA) is a major dilemma in paediatric dental practice. It is critical to assess and acknowledge the children's dental fear and anxiety in order to provide a positive dental experience. Self-report and observation-based DFA assessments are commonly practiced among dental practitioners.

Objectives: To review and discuss the self-report and observation-based assessment tools available for DFA in children.

Methods: A search of six computerized databases between 1960 to date, which was associated with DFA self-report and observation-based assessments, using Boolean search operators and keywords. The data extracted are type of DFA assessment, year of first publication, age range, advantages, disadvantages, reliability and validity. The results were reported narratively.

Results: A total of 21 out of 187 papers were identified and reviewed in this study. There are 15 self-report and six observation-based assessments available to date to assess children's DFA. Five newly developed assessments were noted from 2012 onwards. The assessments' reported reliability and validity showed good or acceptable internal consistency, test-retest reliability and concurrent validity. Self-report assessment can easily be administered in clinical and non-clinical settings, but adequate comprehension is needed. In observation-based assessment, there is observer bias possibility and that obstinate behaviors are not due to DFA; nevertheless, repeated scoring can be done.

Conclusion: There are no superior self-report and observation-based DFA assessments in children. Each has its own advantages and disadvantages, thus the application depends on multiple factors and the operator's best discernment.

Keywords: Dental fear anxiety, self-report, observation, assessment, children.

PERCEPTION OF DENTAL STUDENTS AND LECTURERS ON ONLINE LEARNING EXECUTION DURING THE COVID-19 PANDEMIC

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Introduction: Distance learning through the online platforms was implemented to ensure the continuity of education during the COVID-19 pandemic. However, not all teaching and learning activities can be fully substituted with online learning particularly in dentistry due to its substantial preclinical and clinical components. In order to determine the effectiveness of this new and flexible non-face-to-face learning in dental education, it is important to evaluate the perceptions of online learning among dental students and lecturers.

Objectives: The objective of the study was to assess the perception of dental students and lecturers on the execution of online learning at Universiti Sains Malaysia (USM) during the COVID-19 pandemic.

Methods: This cross-sectional study was carried out via online questionnaire, involving dental students and lecturers from the School of Dental Sciences, USM. The respondents were assessed on the perspectives (handling, didactic benefit and motivation) of online learning execution during the COVID-19 pandemic.

Results: While most of the dental students rated online learning positively, 66.0% of them still preferred face-to-face learning compared to online learning. Similarly, 44.3% of the lecturers felt uncomfortable using online teaching although majority of them (98.3%) agreed that online learning was a good option for teaching the theoretical content during the pandemic. Nevertheless, both students and lecturers agreed with the implementation of online learning in the future.

Conclusion: Generally, dental students and lecturers showed positive perception towards the handling, didactic benefit and motivation on the online learning execution. Hence, online learning can provide an alternative avenue in future dental education.

Keywords: Perception, online learning, dental students, lecturers, COVID-19 pandemic.

KNOWLEDGE AND ATTITUDE ON THE USAGE OF SILVER DIAMINE FLUORIDE AMONG DENTISTS IN HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM), KELANTAN

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Introduction: Silver Diamine Fluoride (SDF) is minimally invasive, inexpensive, known to promote remineralization of the tooth and act as caries arresting treatment. It contains silver and fluoride particles that have a bactericidal effect, thus halting the carious lesions' progression and strengthening the demineralized dentine of children with early childhood caries.

Objectives: The present study evaluated the knowledge and attitude level toward Silver Diamine Fluoride among dentists in HUSM.

Methods: A cross-sectional study was done, data were collected in December 2021 using a validated questionnaire and was analyzed. A sample size of 42 dentists in HUSM was agreed to the study and completed the questionnaire, including four parts of 43 questions with a Likert scale that require demographic details, knowledge, attitude, barriers and future usage of SDF.

Results: A total of 42 dentists in HUSM completed the survey. The mean knowledge of SDF among participants was averagely of 3.5. The most frequently reported barrier to SDF use was black discolouration (61.9%) and high number of respondents have not experienced of using it in their practice (>70%). However, 26.2% expect an increase in the future use of SDF. The correlation between knowledge among different education level and dental specialities were statistically significant ($P < 0.05$), highest mean of paediatric dentistry was observed to have (4.20) while master education level with (3.60).

Conclusion: The knowledge and attitude on the usage of SDF among dentists in HUSM were average, with means of 3.5 and 3.7, respectively, among participants.

Keywords: SDF, dental caries, HUSM, knowledge, attitude.