

BS Brazilian Dental Science



TUIDC1

Thamar University International
Dental Conference





TUIDC 1

Thamar University International Dental Conference

PROCEEDINGS



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TUIDC 1

First of all, I would like to extend our thanks and gratitude to the Brazilian Dental Science journal (BDS) that gave us the opportunity through its official scientific newspaper to add a special supplement for our first scientific conference at Tamar University in Yemen.

Tamar University International Dental Conference (TUIDC) is our first international scientific conference represents a new breakthrough in the world of scientific research in a country currently suffering conflicts, turmoil and wars a matter that negatively affects the academic research in all Yemeni universities.

Despite of that, with a spirit of determination, the academic staff at the Faculty of Dentistry at Tamar university in Yemen insisted to encounter all these challenges, overcome all obstacles and announce holding this conference which is the first of its kind in Yemen. Holding the conference at this time represents and emphasizes the spirit of hope, fortitude and desire for a better future of scientific research in a country that enjoys peace and stability.

Our conference was honored by the participation of elite international academic lecturers and researchers in different fields of dentistry although they could not make it in person to deliver their valuable lectures due to war circumstances that prevented them from traveling to Yemen. Therefore, it was adequate to contact them through Skype application. Moreover, a big number of local professors took part in the conference and enriched the three-day scientific sessions with their lectures and researches in all dentistry and oral health specialties.

In addition to the scientific programs in the conference, a number of researchers participated with poster presentations and clinical presentations which have been judged by an evaluation committee and granted three prizes for the first positions. During the conference, a number of scientific workshops and courses have been conducted by specialists in different aspects for training doctors on modern techniques in the big world of dentistry.

Word of the President

Along with the conference, there was an exhibition for dentistry supplies and materials with the participation of top dentistry companies. With all efforts and all possible ways forward, we held this conference and brought it to light with a good image a matter that has established solid foundations for subsequent conferences with more success in the coming years.

Finally, I would like to thank my colleagues at the Faculty of Dentistry, Thamar University, Yemen who allowed me to write these lines and represent them as the chairman of the conference. I thank all international and local participants for their response and distinguished participation. I also thank all organizing committees who exerted all efforts to make this event a success.



Prof. Mokhtar Al-anesi
Conference Chairman of Thamar University
International Dental Conference TUIDC1

ESTABLISHMENT OF CEPHALOMETRIC NORMS FOR YEMENI ADULTS AND COMPARING IT WITH CAUCASIAN NORMS

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Objective: It was necessary to identify what is considered natural and pleasing for Yemenis because of the increasing numbers of Yemeni patients looking for specialized treatment by orthodontists. Therefore the purposes of our study were to establish norms of cephalometric features for Yemeni adults and to compare it with that of Caucasians. **Material and Methods:** A total of 100 Yemeni students (fifty males, mean age of 23.6 ± 2.1 years, and fifty females, mean age of 21.5 ± 3.1 years) with normal occlusions, well balanced faces and no history of orthodontic treatment were involved in the study. Five angular and eighteen linear measurements were used for the skeletal, dental and soft tissue analysis. All participant's Lateral cephalometric radiographs were evaluated. The average values and standard deviations for all angles and measurements were determined. The differences for each measurement between Yemenis and Caucasians were calculated using unpaired t-tests. **Results:** Yemenis subjects had more retrugnathic mandibular positions ($P < 0.05$), protrusive mandibular incisors ($P < 0.01$), more protruded lip positions ($P < 0.01$), deeper mentolabial sulci ($P < 0.01$) and steeper mandibular planes ($P < 0.001$) compared to the Caucasians. Yemenis females had larger lower face height than Caucasian females ($P < 0.001$). **Conclusions:** This study shows that Yemeni cephalometric norms are different in comparison to Caucasians and provides specific standards for Yemeni patients to be treated according to their special ones.

Keywords: Cephalometric X-ray; Caucasian; Yemeni Norms.

TOXICITY ASSESSMENT OF SILVER NANOPARTICLES SOLUTION AFTER TOPICAL ADMINISTRATION IN MICE

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Objective: The aim of this study was to assess the toxicity of silver nanoparticle after topical administration on tongue's mice. **Material and Methods:** Sixty male and female mice (15.5 – 18.5 g b.w) were randomly divided into the following experimental groups; Group 1 (vehicle control group): consisted of 20 healthy mice (given 0.5 ml distilled water once daily for 28 days topically on mouse's tongue). Group 2: (low dose group): consisted of 20 healthy mice, (given 0.5 ml nanosilver solution in concentration of 50 g/ml once daily for 28 days topically on mouse's tongue in a dose of 5mg/kg). Group 3 (high dose group): consisted of 20 healthy mice, (given 0.5 ml nanosilver solution in concentration of 50 g/ml twice daily for 28 days topically on mouse's tongue in a dose of 10mg/kg). During 28 days of exposure, the rats were observed weekly for toxicity symptoms. By the end of study, the rats were sacrificed for hematological, biochemical and histopathology studies. The blood samples were drawn then analyzed for ALP (alkaline phosphatase, GOT (glutamic oxaloacetic transaminase), GPT (glutamic pyruvic transaminase), CRE (creatinine), and BUN (blood urea nitrogen). Tongue, kidneys, spleen and liver were removed, weighed, fixed, stained, and examined under light microscopy for histopathological study. This study tested the toxicity of silver nanoparticles (20 nm) over a period of 28 days in mice following Organization for Economic Cooperation and Development (OECD) test guideline No. 408 and Good Laboratory Practices (GLP). **Results:** There was no significant difference in the organs weight of mice after exposure, as well as no significant changes in all four enzymes tested. Histopathology examination revealed no pathological abnormalities in all treated animals compared to untreated healthy animals. (no inflammatory cell infiltration, no hyperplasia, no fatty degeneration ,no edema ,as well as no necrosis). **Conclusion:** Silver nanoparticles solution in concentration of 50 g/ml once daily is safe when applied topically on tongue's mice for a period of 28 days.

Keywords: Silver; Nanoparticles; Toxicity; Mice.

TOXICITY EVALUATION OF SILVER NANOPARTICLES SOLUTION AFTER TOPICAL APPLICATION IN ALBINO RATS

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Objective: The objective of this study was to evaluate the toxicity of silver nanoparticles after topical administration on tongue of rats. **Material and Methods:** Sixty males albino rats (180–200 g b.w.) were randomly divided into the following experimental groups; Group 1 (vehicle control group): consisted of 20 healthy rats (given 0.5 ml distilled water once daily for 28 days topically on rat's tongue). Group 2: (nano-silver 50 group): consisted of 20 healthy rats (given 0.5 ml nanosilver solution 50 g/ml once daily for 28 days topically on rat's tongue in a dose of 10mg/kg). Group 3 (nano-silver 100 group): consisted of 20 healthy rats (given 0.5 ml nanosilver solution 100 g/ml once daily for 28 days topically on rat's tongue in a dose of 10mg/kg). During these 28 days of exposure, the rats were observed weekly for toxicity symptoms. By the end of study, the rats were sacrificed for hematological, biochemical and histopathology studies. Blood samples were drawn then analyzed for GOT (glutamic oxaloacetic transaminase), GPT (glutamic pyruvic transaminase), CRE (creatinine), and BUN (blood urea nitrogen). Tongue, kidneys, and liver were removed, weighed, fixed, stained, and examined under light microscopy for histopathological test. This study tested the toxicity of silver nanoparticles (20 nm) over a period of 28 days in rats following Organization for Economic Cooperation and Development (OECD) test guideline No. 408 and Good Laboratory Practices (GLP). **Results:** There was no significant difference in the organs weight of rats after exposure, as well as no significant changes in all four enzymes tested. Histopathology examination revealed no pathological abnormalities in all treated animals compared to untreated healthy animals (no inflammatory cell infiltration, no hyperplasia, no fatty degeneration, no edema, as well as no necrosis). **Conclusion:** Silver nanoparticle solution in concentrations of 50,100 g/ml once daily is safe when applied topically for a period of 28 days in rats.

Keywords: Silver; Nanoparticles; Toxicity; Rat.

PREVALENCE AND PATTERN OF IMPACTED TEETH IN YEMENI POPULATION: A RETROSPECTIVE RADIOGRAPHIC STUDY

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Objective: The aim of this study was to explore the prevalence as well as the pattern of impacted canines, first premolars, and third molars in both maxillary and mandibular jaws in adult Yemeni population. **Material and Methods:** This was a retrospective radiographic study conducted in Dhamar city, Yemen. For impacted 3rd molars, angular position and depth of impaction were assessed while, for impacted canines the type of impaction was recorded. The angulation was assessed according to winter's classification and Archer's classifications. The depth of impaction was recorded according to Pell and Gregory classification. For impacted canines, the type of impaction was assessed according to Al Zoubi's classification. Data were analyzed and presented in terms of descriptive statistics (frequencies and percentages). Differences between both genders were calculated using Chi-squared test with P-value < 0.05.

Results: Records of 913 patients were collected and evaluated for teeth impaction. The most impacted canines were maxillary canines. The most prevalent type of impaction was Type II. Most prevalent impacted 3rd molars were found in the left side of the mandible followed by impacted 3rd molars in the left side of the maxilla. Mesioangular position was the most frequent position of the mandibular impacted 3rd molars followed by vertical position.

Conclusion: Impacted mandibular third molars were the most impacted teeth followed by maxillary canines. Prevalence of impacted 3rd molars teeth was more in females than in males while, prevalence of impacted canines was higher in males.

Keywords: Impaction; Canines; Third molar; Radiographic; Retrospective; Yemen.

ETIOLOGY AND PREVALENCE OF PERMANENT TOOTH LOSS AMONG SAMPLE OF YEMENI POPULATION

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Objective: To investigate the reasons of the permanent tooth extraction and its relationship with age and gender. **Material and Methods:** 662 participants, divided into five age groups 14–23, 24–33, 34–43, 44–53, and ≤54-years-old. Oral and radiographic examinations were done for each participant. Causes of tooth loss, age group, gender, khat chewing, Shammah use, smoking, teeth brushing and Miswake using were recorded. The data were statically analyzed with SPSS program using Chi-square tests. The p value ≤ 0.050 were considered statistically significant. **Results:** From the total number of the participants 335(50.6%) were males. The highest age group was in the 14–23 age-group (43.1%). Dental caries was represented by (49.53), while the periodontal disease was (23.3%). The, failure of root canal treatment, orthodontic and other causes were (3.6%, 11.3%, 11.3%), respectively. There were significant differences between genders and different age groups in relation to causes of tooth extraction. **Conclusion:** Dental caries was the major reason of tooth loss in the young age groups, while the periodontal disease was increased gradually from the middle to the elder age groups among the participants from Taiz, republic of Yemen.

Keywords: Tooth loss; Yemen; Khat; Shammah; Smoking.

EVALUATION OF SOME MECHANICAL AND PHYSICAL PROPERTIES OF GLASS-IONOMER RESTORATIVE MATERIAL MODIFIED WITH ZIRCONIUM DIOXIDE NANOPARTICLES

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Objective: The objective of this study was to evaluate of some mechanical and physical properties of glass-ionomer restorative material of adding the zirconium dioxide (ZrO₂) nanoparticles. **Material and Methods:** ZrO₂nanoparticles were incorporated into the powder component of promedica (Germany) at 3%, 5% and 7% (w/w). Unblended powder was used as control. Mini- flexural strength, compressive strength, were evaluated using a universal testing machine. Surface microhardness was measured using Vickers microhardness tester. Water sorption and solubility was determined as specified in the ISO standard. Data were analyzed using ANOVA and Tukey's test. **Results:** GI-containing 3% and 5% (w/w) ZrO₂nanoparticles improved the mini-flexural flexural strength and compressive strength compared to the unmodified GI. However, a decrease in the mechanical properties was found for GI-containing 7% (w/w) ZrO₂nanoparticles. GI-containing 3% and 5% (w/w) ZrO₂nanoparticles improved the surface microhardness. GI-containing 3% and 5% (w/w) ZrO₂ nanoparticles improved water sorption and solubility. However, a decrease in the water sorption and solubility was found for GI- containing 7% (w/w) ZrO₂ nanoparticles. **Conclusions:** GI-containing 3% and 5% (w/w) ZrO₂ nanoparticles are a promising restorative material with improved mechanical and physical properties. This novel experimental GI may be potentially used for higher stress-bearing site restorations such as Class I and II.

Keywords: Glass-ionomer; ZrO₂ nanoparticles; Microhardness; Water sorption.

EFFICACY OF SUB-MUCOSAL INJECTION OF CHYMOTRYPSIN, ORAL SERRATIOPEPTIDASE AND ORAL CORTICOSTEROIDS FOR REDUCTION POSTOPERATIVE COMPLICATIONS FOLLOWING IMPACTED LOWER THIRD MOLARS SURGERY: A PROSPECTIVE, RANDOMIZED, DOUBLE-BLINDED, CONTROLLED CLINICAL TRIAL

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Objective: The study aimed to compare between chymotrypsin, oral serratiopeptidase and oral dexamethasone following lower third molars surgery (L3Ms) in respect of postoperative complications. **Material and methods:** A randomized, double-blinded, clinical trial was conducted on 60 patients who were the candidate to L3Ms and randomly allocated into the following 3 groups: submucosal chymotrypsin, oral serratiopeptidase and oral dexamethasone (each group = 20). The primary outcomes were postoperative pain (visual analogue scale), facial swelling (tape method) and trismus (maximal mouth opening) at 2nd, 5th and 7th postoperative days. **Results:** All three groups perform a similar achievement following L3MS. There was no statistically significant difference between the three groups in respect of change in facial pain swelling and trismus ($P < 0.05$). **Conclusion:** Sub-mucosal injection of chymotrypsin yield comparable effectiveness in decreasing postoperative sequelae following L3MS when compared to oral serratiopeptidase and corticosteroids. This is a first RCT that assessed benefits of sub-mucosal injection of chymotrypsin after L3Ms.

Keywords: Chymotrpsin; Oral serratiopeptidase; Corticosteroid; Lower third surgery; Postoperative sequelae.

EFFECT OF PICOSECOND LASER VERSUS CONVENTIONAL ACID ETCHING ON SHEAR BOND STRENGTH OF ORTHODONTIC BRACKETS BONDED TO FLUORESCED TEETH

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Objective: Active orthodontic treatment with fixed appliances generally last for 2-3 years and successful bonding ensures good treatment progress. Effort are made therefore constantly to improve bond strength , especially in challenging situations such as bonding to gold , porcelain, and amalgam, but the conditions that challenges the orthodontist most is enamel fluorosis. This study aimed to determine if the irradiation of flourized enamel surfaces with picosecond laser might be viable alternative to acid etching to improve the bonding of orthodontic adhesive to flurosed enamel surface. **Material and Methods:** Sixty four standard edgewise stainless steel brackets (American Orthodontics, Sheboygan, WI, USA) were bonded using Transbond XT (3M Unitek, Germany) on upper flourized premolars prepared by acid etching with 37% phosphoric acid (a), and TimeBandWidth Duetto laser .shear bond strength was measured with a Zwick Universal testing machine at across head speed of 1mm/min. The obtained shear bond strength values of the groups were statically evaluated using SPSS 20 for windows (SPSS Inc. Chicago, IL, USA) using ANOVA, Kolmogorov-Smirnov, and Levine's test at the statistical significance of $P < 0.05$. **Results:** Mean shear bond strength for acid etching group (13.27MPa), for ultrashort laser group L (18.5 MPa). **Conclusion:** Picosecond laser etching imparts clinically acceptable shear bond strength of 16.2 MPa. Moreover, laser irradiation play a key role in the caries preventive effects.

Keywords: Acid etching; Laser etching; Shear bond strength; Orthodontic brackets; Dental fluorosis.

INFERIOR ALVEOLAR NERVE LATERALIZATION FOR DENTAL IMPLANT PLACEMENT IN ATROPHIED POSTERIOR EDENTULOUS MANDIBULAR AREAS

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Objective: The aim of this study was to confirm the effectiveness of inferior alveolar nerve lateralization performed with the piezotome as an alternative treatment for edentulous patients with severe atrophies posterior mandibular areas with evaluation of postoperative neurosensory function and survival rates of implants. **Material and Methods:** A prospective cohort study was carried out in edentulous patients with posterior mandibular atrophies who were treated between 2016 and 2017. Ten patients were included that have bone height above the IAN was <5 mm, 15 procedures, with 25 implants were placed with an average of 2.5 implants per patient. Panoramic and cone beam computerized tomography radiographic views were taken at 3 months and 1 year after implant loading to check marginal bone loss. The degree of osseointegration of the implants was determined by examining whether or not the implants were both painless and immobile when under torque and while loading. Follow-up visits were done on the third and eighth weeks, and at 6, 12 and 24 months, during each visit through 2 years of study neurosensory function was checked by a two point-discrimination test, in which a measurement of <15 mm was considered normal. **Results:** The results of this study showed that the normal rate neurosensory function was 95.7% after 8 weeks with implant success rate of 100% were achieved with all 25 implants placed and the implant survival rate was 98.4%. **Conclusion:** Inferior alveolar nerve lateralization technique performed with piezotome with immediate implant placement can be a useful and safe surgical procedure due to its satisfactory success rate.

Keywords: Dental implants; Inferior alveolar nerve; Nerve lateralization.

EFFECT OF ULTRASHORT PULSED LASER VERSUS CONVENTIONAL ACID ETCHING ON SHEAR BOND STRENGTH OF ORTHODONTIC BRACKETS BONDED TO ENAMEL SURFACE

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Objective: Acid etching is the best method of bonding resins to enamel. A potential disadvantage of enamel acid etching is the demineralization of the most superficial layer, a matter of concern for orthodontist. As a result of demineralization, the surface become more susceptible to long term acid attack and caries. Laser irradiation has been claimed to improve the adhesion of orthodontic adhesive to enamel surface; therefore, it has been proposed as an alternative to acid etching. The study aimed to determine if the irradiation of enamel surfaces with picosecond laser of different output powers might be viable alternative to acid etching for the bonding of orthodontic adhesive to enamel surface. **Material and Methods:** Sixty upper central incisors standard edgewise stainless steel brackets (American Orthodontics, Sheboygan, WI, USA) were bonded using Transbond XT (3M Unitek, Germany) on bovine incisors prepared by acid etching with 37% phosphoric acid (a), and TimeBandWidth Duetto laser with different settings (L1, L2, L3, L4, L5) .shear bond strength was measured with a Zwick Universal testing machine at across head speed of 1mm/min. The obtained shear bond strength values of the groups were statically evaluated using SPSS 20 for windows(SPSS Inc. Chicago, IL, USA) using ANOVA, Kolmogorov- Smirnov, and Levine's test at the statistical significance of $p < 0.05$. **Results:** Mean shear bond strength for groups: a (20.1 MPa), L1 (6.7 MPa), L2 (5.9 MPa), L3 (11.1MPa), L4 (15.4MPa), L5 (16.2MPa). **Conclusion:** Ultrashort pulsed laser etching imparts clinically acceptable shear bond strength (5.9 MPa-16.2 MPa).

Keywords: Acid etching; Laser etching; Bonding; Shear bond strength; Orthodontic brackets.

PERCEPTION OF ALTERED DENTOFACIAL AESTHETICS BY DIFFERENT DENTAL PROFESSIONALS AND LAYPERSONS

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Objective: Attractive facial and smile features results from the coordination between intra and extraoral soft tissues. This study was aimed to comprehensively assess the perception of altered dentofacial esthetics between different dental professionals and lay people, and to identify the threshold were different variables being to impair dentofacial attractiveness.

Material and Methods: Ten photographs were digitally manipulated involving three facial, two smile, four dental, and one gingival component. Fifty images were randomized and rated according to attractiveness by three groups: general dentist, dental students, and lay people. The participants evaluated the original and manipulated images using a visual analogue scale. The responses were then analyzed using Mann-Whitney test. **Results:** The results demonstrated threshold levels of noticeable differences between varying levels of discrepancy. The overall perception of esthetic was high among dental students with the highest perception toward facial profile and the lowest toward gingival margin height. No differences were found in perception between males and females. Dental students perceived esthetic components more accurately than dentist. **Conclusions:** Dental students unexpectedly had a better perception of dentofacial esthetics. Unlike gender, clinical training has a substantial positive effect on the assessment of beauty.

Keywords: Esthetics; Dental students; Laypersons; Perception; Dentofacial; Dentist.

PREVALENCE AND DISTRIBUTION OF DENTAL ANOMALIES AMONG SAMPLE OF ORTHODONTIC AND NON- ORTHODONTIC PATIENTS: A RETROSPECTIVE STUDY

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Objective: The study aimed to address the prevalence and distribution of dental anomalies in a group of Yemeni dental patients, and compare the presence of dental anomalies in patients seeking dental and orthodontic treatment. **Material and Methods:** This retrospective study was conducted on 1675 digital panoramic radiographs for dental patients aged between 9 and 52 years, who visited orthodontic specialty centers in Sana'a city, Yemen, from January 2018 to February 2019. The digital panoramic radiographs were evaluated for prevalence and distribution of dental anomalies based on the description presented by White and Pharaoh (Pharaoh and White, 2008). **Results:** The distribution of anomalies was 30.61% among the orthodontic patients and 22.96% through non – orthodontic patients. The most frequent anomaly among the subjects was impaction (14-47%), macrodontia (11.8%), microdontia (9.23%), hypodontia (7.48%), dilaceration (5,07%), dens evaginatus (1,91%), dens invaginatus (1.58%), hyperdontia (0.99%) and taurodontism (0.91%) respectively. Among the individuals who had dental anomalies 57.9% of subjects showed one type of anomaly, 30.5% had two types of anomalies, while 11,49% had more than two types of anomalies. The selected dental anomalies in present study showed high prevalence rate among the orthodontic patients. **Conclusion:** Variations in data and results among different studies suggest the impact of racial, genetic and environmental factors. The high frequency of dental anomalies emphasizes the need of early detection, diagnosis which can be achieved through radiographic imaging, this would avoid potential orthodontic, functional and esthetic problems and further emphasizes awareness to minimize any means of complexity of orthodontic and other dental problems.

Keywords: Tooth Abnormalities, Orthodontic patients; Radiography, Panoramic.

OCCUSAL FEATURES AND ORTHODONTIC TREATMENT NEED AMONG HIGH SCHOOL STUDENTS IN SANA'A CITY: A CROSS-SECTIONAL STUDY

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Objective Dental malocclusion was defined by the World Health Organization (WHO) as the third largest oral health problem that is related to an individual's general well-being. This cross study was carried out to assess the occlusal features and orthodontic treatment need in Yemeni high school students who had not any orthodontic treatment. **Material and methods:** A sample of 1036 subjects (527) males and (509) females attending different high schools in scattered areas in Sana'a city. One examiner visited those high schools assisted students using conventional FDI/WHO method of occlusal traits to evaluate occlusal discrepancies and Index of the Orthodontic Treatment Need (IOTN) in order to estimate the need of orthodontic treatment. Collected data was analyzed using the Chi-square test to compare proportions among groups and the significance threshold was set at $P < 0.05$. **Results:** Occlusal discrepancies were including: crowding (42%), of whom 16.6% had crowding of ≥ 2 mm. spacing was observed in 20.5% of students, mostly in the maxilla. Midline diastema was also found to occur in 9% of students examined. Asymmetrical molar relationship was only observed in 16.1% of students mostly class I/ class II relationship (8%). Overjet was observed in 90.9% of the subjects, 12.8% had deep bite while anterior open bite observed in 3.5%, 12.2% had anterior cross bite whereas 6.6% had posterior cross bite, 1.3% posterior open bite whilst 0.6 had scissor bite. Asymmetrical canine relationship was only observed in 23.8% of students, mostly of class I/ class II relationship (18.3%). Normative orthodontic needs as assessed by criteria of (IOTN) indicated slightly less than half (38.9%) of the students needed some form of orthodontic treatment (Grade 3, 4 and 5). Of this a quarter (24.3%) definitely needed treatment assessment. **Conclusion:** The findings suggest a need for a more conservative treatment approach in dealing with malocclusion problems among school students in all direction of Yemen.

Keywords: Occlusal discrepancies; Interceptive orthodontic; Orthodontic treatment need; Yemen.

NASAL LEISHMANIASIS: CLINICO-EPIDEMIOLOGICAL STUDY

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Objective: Cutaneous (CL) and mucocutaneous leishmaniasis (MCL) are the common forms of leishmaniasis affecting the orofacial region. The nasal leishmaniasis is the commonest facial units to be involved in the face. It displays high variety of clinical forms making the disease more difficult to be diagnosed. In Yemen, CL is prevalent. However, detailed describing of the nasal lesions is scarce in the literature. **Study Area and Population:** Seventy six diagnosed cases with nasal leishmaniasis were screened during a CL surveillance in western highlands, Yemen (2015). Demographical data, history, examination with regard to site, size, number, morphology and any associated satellite papules and/or subcutaneous nodule were recorded. **Clinical Observation:** Patients aged of ≤ 15 years and > 45 years were more frequent accounting for 51%, 33% of the cases respectively. The plaque form was the most prevalent form of the nasal lesion developed commonly (43%) on the nasal lobule of the middle aged and elderly patient. The plaque form was presented in lupoid form, psoriasiform, erysipeloid form and rhinophyma accounting for 45%, 24%, 18%, and 6% of lesions, respectively. The impetiginous form (Figure 10) was only found in four children. 7 cases showed nasal cartilage perforation. Satellite papule and subcutaneous nodules were found in 25 and 4 of the cases, respectively. **Conclusion:** The plaque form is the most frequent form of nasal leishmaniasis mainly the lupoid form which was found in the nasal lobule in middle-aged and elderly patient.

Keywords: Nasal; Leishmaniasis; Plaque form; Lupoid; Yemen.

PREVALENCE OF MALOCCLUSION AND TOOTH ANOMALIES AMONG 3-5-YEAR-OLD PRE-SCHOOL CHILDREN IN SANA'A CITY, YEMEN

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Objective: Malocclusion and dental anomalies are developmental disorders that occur due to the disruption of the process of craniofacial complex growth and odontogenesis respectively. The aim of this study was to investigate the prevalence of malocclusion, dental morphological and numerical anomalies in the primary dentition of randomly chosen three to five-year-old pre-school children in Sana'a City, Yemen. **Material and Methods:** This was a cross-sectional study. A sample size of 1106 children (boys: 53.3% and girls: 46.7%) were selected. Criteria used by Foster & Hamilton, Björk et al. and Kreiborg et al. with modification done by Carvalho et al. was used to define occlusal traits, malocclusion and dental anomalies respectively. **Results:** Bilateral flush terminal molar relationship was found in 60%, followed by: bilateral mesial step (27.9%), asymmetrical relationship (8.5%) and distal step (3.5%). Bilateral class I incisor relationship was present in 42.1% followed by: class II (29.3%), class III (23.8%) and open-bite (4.8%). Bilateral canine class I was observed in (62.8%) followed by: asymmetrical relationship (13.6%), class II (12.5%) and class III (11.1%). Normal overjet of 1-3 mm (39.2%), decreased overjet < 1 mm (32.7%), increased over-jet of > 3 mm (16.9%), edge-to edge (8.8%) and reverse bite (2.4%). Ideal over-bite of 1-50% (64.5%) and increased over-bite of > 50% (19.7%). Physiological spacing present in 77.7%. Anthropoid spacing was found in 81.1%. Posterior cross-bite was detected in 29.9%. Dental anomalies: Localized microdontia (15.7%), double teeth (3.3%), hypodontia (0.9%) and hyperdontia (0.7%). **Conclusion:** Malocclusion was detected in 52.0% of the children. Dental anomalies were detected in 20.7%.

Keywords: Dental anomalies; Malocclusion; Prevalence; Primary dentition.

PROTEINS FROM WHOLE MOUTH SALIVA MEDIATE GREATER PROTECTION AGAINST SEVERE EROSIIVE TOOTH WEAR THAN PROTEINS FROM PAROTID SALIVA USING AN IN VITRO MODEL

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Objective: to investigate how the composition of the acquired enamel pellicle (AEP) affected a laboratory model of Erosive tooth wear (ETW) on human enamel by comparing whole mouth saliva (WMS) to parotid saliva (PS). **Material and Methods:** A total of 60 enamel specimens were prepared from extracted human teeth and were randomly assigned to 4 experimental groups: WMS (n=20), PS (n=20), artificial saliva (AS, n=10) and deionized water (DW, n=10). AEP samples were eluted from WMS (n=5) and PS (n=5) groups after five cycles (acid, wash and saliva) using filter papers soaked in sodium dodecyl sulfate by mechanically rubbing before mean step height was evaluated using a non-contacting profilometer for all groups (n=10 each). Total protein in AEP was quantified using BCA assay, individual protein components of AEP were separated and analyzed using SDS-PAGE and western blot for [mucin5b, albumin, carbonic anhydrase VI (CA VI), statherin]. Specific antibody binding was quantified using purified protein standards of known concentration. Samples of AEP were also analyzed by LC/MS/MS sequencing. **Results:** WMS group had significantly less acid-induced erosion (step height [4.16 (0.9) μm]) than PS group [6.41 (0.3) μm]. The amount of total protein, mucin5b and albumin were more dominant in WMS pellicles than PS whereas CA VI and statherin were dominant in PS pellicles. **Conclusion:** The composition of the acquired enamel pellicle influences the degree of protection from acid attack. AEP from WMS was more protective than that of PS, and its likely mechanisms of protection seem to be as a physical barrier rather than stabilizing the crystal structure.

Keywords: Saliva; Human enamel; Pellicle; Erosion; Step height; Proteins; Ions; SDS-PAGE.

AN EPIDEMIOLOGICAL STUDY ON THE PATTERN AND PREVALENCE OF MANDIBULAR FRACTURE IN HADRAMOUT GOVERNMENT

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Objective: The aim of this study was to determine the etiology, frequency of mandibular fractures among different age and sex, to determine the frequency of types of trauma, and to report the different modalities of treatment provided to among patients of AL-WADI Hospital (2004-2017). **Material and Methods:** A retrospective analysis of the registration files of various mandibular fracture patients was conducted on cases diagnosed during (2004-2017) in patients of AL-WADI Hospital in Hadramout. **Results:** Out of 43 patients, forty were males (93%) and three were females (7.0%). We found a peak occurrence in young adults, aged 21-40 years (35%). In case of etiology of fracture, road traffic accidents (RTAs) was the most common (58%). In most (60.5%) of the patients, an open reduction and rigid internal fixation using bone plate and screws with intra-maxillary fixation was done. **Conclusion:** In the present study, the prevalence of mandible fractures was more prevalent in male patients, especially during the 2ed and 3rd decade of life. The most common cause was road traffic accident. Open reduction and rigid internal fixation using miniplates and screws with intra-maxillary fixation was the most commonly used treatment.

Keywords: Mandibular fracture; Close reduction; Open reduction; Screw; Intra-maxillary fixation.

AN AUDIT OF ROOT CANAL FILLING QUALITY PERFORMED BY UNDERGRADUATE PRE-CLINICAL DENTAL STUDENTS, YEMEN (ACCEPTED IN BMC MEDICAL EDUCATION, ARTICLE NUMBER: 350 (2019))

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Objective: Dental students are future dentists. Continuous assessment and improving of the educational curricula will ensure excellent academic performance of dental students and thus providing the community with the best treatment modalities. The aim of this study was to evaluate the root canal filling quality performed in extracted teeth by preclinical undergraduate Yemeni dental students. **Material and Methods:** Root canal treatment was performed by undergraduate preclinical dental students on 331 extracted human teeth including 741 roots. The teeth were then collected and evaluated radiographically based on three criteria of quality (length, density, and taper). Cohen's Kappa test was used to assess the agreement between the examiners and Chi-squared test was used for the association between the study variables. The level of significant was set at $\alpha < 0.05$. **Results:** The results of the study revealed that the overall quality of roots canals fillings was poor. However, more than half of the study sample (53.4%) had adequate length, 13.1% had adequate density, and 14.2% had adequate taper. Anterior as well as single-rooted teeth had significantly better quality than posterior and multi-rooted teeth, respectively. The root canal fillings quality of mandibular teeth was better than that of maxillary teeth with no significant difference ($P > 0.05$). **Conclusion:** The findings of the study emphasize the need of improving the endodontic course in the preclinical level and more advanced techniques and instruments should be incorporated.

Keywords: Root filling quality; Dental students; Dental education; Endodontic treatment.

PREVALENCE AND ETIOLOGY OF TRAUMATIC DENTAL INJURIES TO ANTERIOR TEETH AMONG PRIMARY SCHOOL CHILDREN IN SANA'A CITY, YEMEN

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Objective: Dental traumatic injuries are common health problems in child and adolescent populations. Information on prevalence and severity of dental trauma in various age groups of the population has significant implications for preventive public oral health care and other strategies for the population. The aims of this study were: a) To determine the prevalence of traumatic dental injuries to anterior teeth among mixed dentition of schoolchildren in Sana'a city, Yemen, and b) To determine the causes of traumatic dental injuries to anterior teeth among mixed dentition of school children in Sana'a City, Yemen. **Material and Methods:** A cross sectional study was carried out among 1252 school children among (7-12) years old of three districts in Sana'a City using multistage random sampling method. Examination of permanent incisor teeth was done in accordance with the modified Elli's Classification (By Mc Donald, Avery and Lynch 1983) using a standard mouth mirror and probe. Subjects who had clinical evidence of trauma were interviewed for details of the injury event by using structured questionnaire. Chi square test was used to analyze the distribution of the measurement in this study at the statistical significance of < 0.05 . **Results:** Among the 1252 school children of 30 public and private schools examined, the prevalence of the TDI from total sample size was 129 case (10.30%) with mean age was (10.76 ± 1.22) . A statistically significant difference between two groups was found: 10-12 were 4.2 times (95% CI=2.7–6.5) more prone to traumatic dental injuries compared to 7-9 ($p < 0.001$). Experienced TDI, 107 (82.95%) of these were boys and 22 (17.05%) girls. A statistically significant difference between genders was found: boys were 3.83 times (95% CI=2.45–5.98) more prone to traumatic dental injuries compared to girls ($p < 0.001$). The most commonly affected teeth were maxillary central incisors. Public schools were 1.88 times (95% CI=1.3– 2.7) more prone to traumatic dental injuries compared to Private schools ($p < 0.01$). TDI in public schools were (71.32%) which was approximately twice as higher in private schools being (28.68%). Fall was the most common cause for TDI with (62.01%) and most place of occurrence was street (41.08%). Most common type of fracture was class I (51.61%) and most of them were untreated. **Conclusion:** The level of dental trauma was high but low percentage of children with trauma seeking treatment stresses. We need for increased awareness in Sana'a population to prevent future complications and high cost treatments. It is importance that all traumatic injuries are diagnosed, treated, and controlled in time.

Keywords: Traumatic dental injuries; Incisors; Fractures.

INFLUENCE OF CHLORHEXIDINE MOUTHWASHES ON CORROSION RESISTANCE OF NI-CR DENTAL CASTING ALLOYS

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Objective: Metals and alloys have many uses in dentistry. The most commonly used base metal alloys in dentistry are nickel–chromium alloy, which are commonly used for crown and bridge casting. The most important factors that affect the choice of dental metallic alloys are the body acceptability for these alloys, or the so-called biocompatibility. The aim of the present study was to compare the corrosion behavior of the Ni-Cr alloys used for crown and bridge casting in three mouthwashes, in relation to a reference solution, namely Fusayama Meyer saliva, in order to assess the influence of these products on the corrosion resistance of the Ni–Cr dental alloys. **Material and methods:** The three materials analyzed were Ni-Cr dental alloys: Kera NC[®], Realloy N[®] and 4 all[®], which were tested in three mouthwashes: Hexa[®], Hexadyle[®] and Coxydil[®] as well as in Fusayama-Meyer artificial saliva. The electrochemical measurements were carried out at room temperature, a potentiostat (PGZ 100 France radiometer analytical S.A) was used to perform the electrochemical measurements. **Results:** The corrosion behavior study showed that in Hexa[®] mouthwash the 4 all[®] alloy was the least resistance to corrosion, in Fusayama-Meyer artificial saliva tended to be more corrosive for Kera NC[®] alloy, in Coxydil[®] mouthwash exhibited the highest corrosion resistance for Kera NC[®], and 4 all[®] alloys, in Coxydil[®] and Hexadyle[®] mouthwashes exhibited the highest corrosion resistance for Realloy N[®] alloy. **Conclusion:** The results obtained in the present study will enable us to provide attending practitioners with advice concerning mouthwash to recommended, depending on the treatment phase and the alloy used. So we can advise Coxydil[®] mouthwash to patients treated with 4 all[®] and Kera NC[®] alloys, Coxydil[®] or Hexadyle[®] mouthwashes for the patients treated with Realloy N[®] alloy.

Keywords: Corrosion resistance; Ni-Cr alloys; Mouthwash; Artificial saliva.

ASSOCIATION OF KHAT CHEWING AND OTHER RISK FACTORS WITH PERIODONTAL DISEASES AMONG ADULT DENTAL PATIENTS

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Objective: Periodontal diseases are very common dental disease. Many risk factors may play significant role in the periodontal disease initiation and progression. This study was performed to evaluate the effects of khat chewing, smoking, age and sex as risk factors on clinical parameters of periodontal diseases among Yemeni dental patients. **Material and Methods:** This cross-sectional study was performed on 1231 patients attending the outpatient dental polyclinics of University of Science and Technology during the academic years 2017/2018. Preformed case sheet was used as a tool of data collection in the clinical sessions. All data concerning this study were revised carefully by the supervisors during data collection. All completed sheets were collected throughout the year by the supervisors, then the data were managed using SPSS statistical package. Data cleaning, descriptive statistics, and inferential statistics were then performed. **Results:** Khat chewers were higher among the study sample than non-chewers counterparts (60.7% vs. 39.3%). Regarding smoking, prevalence of smoking among the study sample was 25.5% (297 patients). Study results indicated that periodontitis are more associated with khat chewing, smoking, female gender and age older than 35 years old. Results also showed that female and age > 35 years were significantly associated with gingival recession. Mean number of the teeth with gingival recession in male patients were more teeth than in females. Regarding furcation involvement, khat chewing, smoking, male gender, and patients > 35 years old were significantly associated with furcation involvement. **Conclusion:** It was concluded from the present study that khat chewing, smoking, age older than 35 seem to be risk factors of periodontal diseases.

Keywords: Periodontal disease; Khat chewing; Smoking; Yemeni; Risk factors.

PREVALENCE OF MELANIN PIGMENTATION IN A YEMENI POPULATION AND ITS RELATION TO SOME RISK FACTORS

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Objective: The present study aimed to explore the prevalence of melanin pigmentation in a sample of Yemeni population and its relation to some possible risk factors. **Material and Methods:** In this cross-sectional study printed questionnaires were introduced to the patients and a clinical examination was performed for each patient. The questionnaire included questions regarding demographic data, and questions regarding some common habits such as smoking, khat chewing and consuming of hot drinks. Melanin pigmentation was assessed regarding its presence, most affected areas and the numbers of affected quadrants. The data were managed and analyzed using SPSS software program at P value < 0.05. **Results:** Four hundred and forty patients with mean age 29 ± 8.21 years were included in the study. Of them, 67.5% were fair-skinned, 26.8% were smokers, 47.5% were khat chewers and 33.6% were hot drinks consumers. The prevalence of melanin pigmentation was 62.7%, with class I represented 56.9% of cases. Males showed more prevalence (67.9%) of melanin pigmentation than females (57.7%) with no significant difference. Results also showed more prevalence of melanin pigmentation in patients > 25 years, and dark-skinned patients. Regarding habits, smoking, khat chewing and hot drink consumption habits showed significant associations with melanin pigmentation. Whereas the association of khat chewing and hot drinks alone with melanin pigmentation showed no significant relationship. **Conclusion:** It can be concluded that Yemeni people had high prevalence of melanin pigmentation with more prevalence of CL I type. Males, patients > 25 years and dark-skinned patients showed more prevalence of melanin pigmentation. Smoking, khat chewing and hot drinks consuming habits had significant associations with melanin pigmentation.

Keywords: Khat; Melanin; Risk; Smoking; Yemen.

ATTITUDE AND KNOWLEDGE OF A YEMENI DENTAL PRACTITIONERS TOWARDS MANAGEMENT OF ACUTE APICAL PERIODONTITIS

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Objective: Management of acute apical periodontitis is almost every day dental practice, planning for proper outcome for endodontic therapy depends on various factors to maintain the quality of root canal treatment standards including both restoration of root canal system and coronal part, and individual factors including dentist knowledge, attitude and skills. Therefore, the purpose of this study was to address the current knowledge and attitude of Yemeni dental practitioner employed during root canal therapy of tooth associated with acute apical periodontitis. **Material and Methods:** This cross-sectional study was conducted randomly on 146 general practitioners, who practiced in dental clinics in Sana'a city, Yemen. The collected data was analyzed using the Chi square test and the significance threshold was set at $P < 0.05$. **Results:** Of the respondents 93.58% were prescribed antibiotic and 78.2% were anesthetized associated tooth. The low usage of rubber dam was strictly prevalence only 0.64% of the participants were used rubber dam compared to other isolation methods. Among the participants, 57.05% used both hand and rotary means in cleaning and shaping the root canal system. Multiple irrigation protocol was the most followed protocol (69.23%), of whom 39.1% were used Sodium hypochlorite, hydrogen peroxide and chlorhexidine successively. Of the respondents, the mixture of both calcium hydroxide and chlorhexidine (57.05%) as intracanal medicament was more frequent than Calcium Hydroxide (48.07%). **Conclusion:** the result of this study indicates that the recently graduated dental practitioners were following the recommended standard of endodontic treatment better than those of longer time from the graduation.

Keywords: Apical abscess; Apical periodontitis; Knowledge; Dental practitioners.

THE EFFECT OF THE LOWER WISDOM TOOTH AND OCCLUSAL SUPPORT ON MANDIBULAR ANGLE AND CONDYLE FRACTURES

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Objective: This retrospective study was intended to assess whether the mandibular angular and condylar fractures are influenced by the existence or absence of the lower third molar (angulation & impaction) as well as the occlusal support. **Material and Methods:** The study was performed among patients who experienced mandibular fractures in the department of maxillofacial surgery at the three affiliated hospitals of Jinzhou Medical University, Jinzhou, China. The study covered 73 fractured jaws (44 angular & 29 condylar fractures). Data were selected randomly from 2015 till 2019. Patient's medical charts and radiographs were the exact source for data acquisition. The independent variables were the existence or absence of lower wisdom tooth and occlusal support. The system of Pell and Gregory has been applied to assess the various positions of lower impacted M3 while Winter's classification was used to evaluate its angulations. The dependent variables were the resultant fractures whether angle or condyle. Data analysis was carried out by applying Fisher's exact test and χ^2 distribution test with ($p < 0.05$) level of significance. **Results:** The presence of lower M3 or occlusal support is significantly associated with the raised prevalence of angular fractures and conversely diminished the risk of fractures in the condyle. **Conclusion:** The lack of lower M3 or occlusal support decreases the frequency of angular fractures occurrence and conversely increase the incidence of fractures in the condyle.

Keywords: Mandibular angle fractures; Mandibular condyle fractures; Mandibular third molars; Occlusal support.

DO OCCLUSAL SPLINTS THERAPY CURE TEMPOROMANDIBULAR DISORDERS?

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Objective: A network meta-analysis (NMA) of randomized clinical trials (RCTs) was performed to assess the effectiveness of various types of occlusal splints and rank them according to their effectiveness in managing TMDs. **Material and Methods:** An electronic search was undertaken to identify RCTs published until August 2019. Predictor variables were control, non-occluding splints, hard stabilisation splint (SS), soft SS, prefabricated splint, minianterior splints, anterior repositioning splint (ARS), and counseling therapy (CT) with and without hard SS. Outcome variables were pain improvement, posttreatment pain intensity, improvement in mouth opening and TMJ sounds. **Results:** Forty-nine RCTs involving 2000 patients were included. There was a significant decrease in posttreatment pain intensity in arthrogenous TMDs after ARS (low-quality evidence), CT plus hard SS (moderate-quality evidence), minianterior splints (very low-quality evidence) and hard SS alone (low-quality evidence) when compared to control. There was a significant decrease in posttreatment pain intensity of myogenous TMDs with minianterior splints (very low-quality evidence), soft SS (very low-quality evidence), CT alone (moderate-quality evidence), CT plus hard SS (moderate-quality evidence), and hard SS alone (moderate-quality evidence), when compared to control. ARS and CT were superior in decreasing TMJ clicking than control and hard SS alone. **Conclusion:** Based on the current NMA of 49 RCTs, there is a moderate to very low-quality evidence confirming the effectiveness of occlusal splints therapy in the treatment of TMDs. Multimodal therapy consisting of CT & self-care plus hard SS could produce the maximum improvement for TMDs patients.

Keywords: Full hard stabilization splint; Anterior repositioning splint; Full soft stabilization splint; Arthrogenous TMDs; Myogenous TMDs.

**NEEDLING THERAPIES IN THE MANAGEMENT OF TEMPOROMANDIBULAR MYOFASCIAL PAIN:
A NETWORK META-ANALYSIS OF RANDOMIZED CLINICAL TRIALS**

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Objective: A network meta-analysis (NMA) of randomized clinical trials (RCTs) was performed aiming to compare the treatment outcome of dry needling, acupuncture, or wet needling using different substances in managing myofascial pain in the orofacial region (TMD- M). **Material and Methods:** An electronic search was undertaken to identify randomized clinical trials (RCTs) published until September 2019, comparing dry needling, acupuncture, or wet needling using local anaesthesia (LA), botulinum toxin-A (BTX-A), granisetron, platelet-rich plasma (PRP) or passive placebo versus real active placebo in patients with TMD-M. RCTs meeting the inclusion criteria were stratified according to the follow-up time; immediate post- treatment to 3 weeks, and one to 6 months post-treatment. Outcome variables were post- treatment pain intensity, increased mouth opening (MMO) and pressure threshold pain (PPT). Mean difference (MD) was used to analyzed via frequentist NMA using STATA software. **Results:** Twenty-two RCTs involving 959 patients were included. There was significant pain decrease after PRP when compared to an active/passive placebo and acupuncture. There was a significant improvement of MMO after LA (MD=3.65; CI: 1.18-6.1) and dry needling therapy (MD= 2.37; CI: 0.66-4) versus placebo. **Conclusion:** Based on this NMA, one can conclude that the effectiveness of needling therapy did not depend on needling type (dry or wet) or needling substance. Also, the present NMA supported the hypothesis that needling therapies have an antinociceptive effect. An effect of needling therapy was not beyond the placebo effect.

Keywords: Wet needling therapy; Dry needling; Acupuncture; Temporomandibular disorders; Myofascial pain.

WHAT IS THE MOST EFFECTIVE TREATMENT FOR ARTHROGENOUS TEMPOROMANDIBULAR DISORDERS?

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Objective: We conducted a NMA of randomized clinical trials (RCTs) to identify the most effective treatment of arthrogenous TMDs with respect to pain reduction and improved mouth opening. **Material and Methods:** An electronic search on three major databases was undertaken to identify RCTs published before August 2019, comparing up to fourteen different treatments against control/placebo patients for arthrogenous TMDs with respect to pain reduction and improved mouth opening. The treatment variables were controls/placebo, conservative treatment (muscle exercises and occlusal splint therapy), occlusal splint therapy alone, intraarticular injection (IAI) of hyaluronic acid (HA) or corticosteroid (CS), arthrocentesis with or without HA, CS and platelet-rich plasma, (PRP), arthroscopy with or without HA and PRP, open joint surgery, and physiotherapy. **Results:** Thirty-six RCTs were identified that performed comparative outcome assessments for pain and 33 RCTs for MMO. At the short term (≤ 5 months), IAI-HA and IAI-CS achieved a substantially greater pain reduction than control/placebo. At intermediate term (≥ 6 months), a statistically significant decrease in posttreatment pain intensity was observed following Arthroscopy-PRP, Arthrocentesis-PRP, Arthroscopy-, TMJ- surgery, IAI-HA, Arthroscopy- alone and Arthrocentesis-HA when compared to the control /placebo groups. **Conclusion:** There is a very low to moderate quality level evidence supporting that minimally invasive procedures, particularly in combination with IAI of adjuvant pharmacological agents (PRP, HA or CS), are significantly more effective than conservative treatments for both pain reduction and improvement of MMO in both short (≤ 5 months) and intermediate term (6 months to 4 years) periods.

Keywords: Conservative treatments; Arthrocentesis; Platelet-rich plasma; Hyaluronic acid; Arthroscopy; Physical therapy; TMJ pain.

EVALUATION OF THE SAME COMPOSITION MATERIALS: IROOT BP PLUS AND ENDOSEQUENCE ROOT REPAIR MATERIAL (ERRM) AS PULP CAPPING AGENTS: A SYSTEMIC REVIEW

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Objective: iRoot BP Plus or Endosequence Root Repair Material (EERM) is a premixed bioceramic thick/putty. According to its instruction manual, iRoot BP Plus is composed of Tricalcium silicate, Zirconium oxide, Tantalum pentoxide, Dicalcium silicate, Calcium sulfate, Calcium phosphate monobasic and filler agents. This systematic review was aimed to evaluate and present the iRoot BP Plus material as a pulp capping agent. **Material and Method:** A systematic search for articles with the scope of the selection criteria undergoing for data extraction was conducted through electronic databases. Studies on evaluation of the cytotoxicity, bioactivity and dentinal bridge formation of iRoot BP, iRoot BP Plus, Endosequence Root Repair Material putty or paste (ERRM) on variant human cells were selected for In-vitro models, and dentinal bridge formation on human and animals' teeth for In-Vivo models were selected. **Results:** A total of 22 articles were discussed in the review; 14 in-vitro studies, five in-vivo studies, and three articles with both studies. MTT was the most used method for evaluating cytotoxicity. As for dentinal bridge formation, histological assessment and Micro-CT were used. Human Dental Pulp Cells were the most investigated for In-vitro models and Rats for In- vivo models. Except for one study, all studies involved in this review were primarily examining the material and comparing it to different types of MTA. **Conclusion:** iRoot BP, iRoot BP Plus, and ERRM are biocompatible materials that enhance Human Dental Pulp Cells' (hDPCs) and other variant human cells proliferation, migration, attachment adhesion, mineralization, and dentinal bridge formation.

Keywords: Endosequence root repair material; iRoot BP; iRoot BP Plus; Pulp capping.

MINIMAL INVASIVE DENTISTRY: A CLINICAL CASE SERIES REPORT

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Dental composite restorative materials are newly products in the dental market when compared to the old history of using amalgam restorative materials. However, dental composites are used commonly in the modern dentistry as posterior restorations replacing amalgam because of their esthetic appearance and adhesive properties. Despite of that, dental composite has some drawbacks that limit its using in some cases such as large stress bearing involvement or dentinal margins. On the other hand, dental practitioners should response to the esthetic demands of their patients, at the same time the longevity of restoration and minimal intervention dentistry concept should be considered. Since there is no ideal restorative material existing until now, the aim of this clinical case report series is to present a combination of the advantages of both composite and amalgam materials reflecting minimal invasive dentistry with enhancement of the longevity of the restoration. The clinical techniques using composite to veneer the amalgam restoration or repair rather than replace are easy to apply with low failure risk factors, low cost and low time consuming.

Keywords: Amalgam; Composite; Repair; Veneer; Minimal invasive.

DENTAL IMPLANTS FOR REPLACEMENT BILATERAL CONGENITALLY MISSING MAXILLARY CANINES: THREE YEARS FOLLOW-UP

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Maxillary canines play strategic roles in maintaining the normal function and visibility of teeth. However, rare cases of bilateral permanent congenitally missing maxillary canines were occurring. Replacing these missing canines with dental implant prostheses is an optimal treatment plan for aesthetics and functions. In this case report, we described the replacement of bilateral maxillary canines with osseointegrated implants to support all-ceramic prostheses for a young female patient. This treatment avoids the conventional preparation of adjacent teeth as a part of prosthetic reconstructions. In addition to that all-ceramic crowns are biocompatible with oral cavity structures. Stable short-term result has been achieved with the replacement of the bilateral congenitally missed canines with an implant and cemented all-ceramic crowns, with 3-years cumulative success rate.

Keywords: Cuspid; Dental Prosthesis, Implant-Supported; Dental Implantation, Endosseous.

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