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نورة بنت عبدالرحمن
كلية طب الأسنان



International Association
for Dental Research
Saudi Arabian Division

كتيب يوم البحث العلمي السادس

6th Research Day Booklet





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Dean's Message

يعد البحث العلمي ركيزة من الركائز الأساسية التي يقوم عليها المجتمع لتقدم في مختلف العلوم إذ تسعى المؤسسات التعليمية للتطور والرقى من خلال دعم هذه البحوث ماديا ومعنويا وتذليل الصعوبات التي تواجه الباحثين في عملهم الدؤوب ، حيث سعت جامعة الاميرة نورة بنت عبدالرحمن لتكون احدى تلك المؤسسات التعليمية الرامية الى تحقيق مراكز علمية متقدمة عالميا حيث اطلقت العديد من البرامج البحثية المتنوعة إذ كانت كلية طب الاسنان سباقة الى الاستفادة من هذه البرامج وتفعيلها ، حيث أسس مركز بحوث كلية طب الأسنان في عام (١٤٣٦) لتقديم العون للباحثات من الطالبات و طبيبات الامتياز و اعضاء هيئة التدريس كما يساهم في تنظيم ندوات وحلقات نقاش مكثفة عن منهجية البحث العلمي مما شجع الباحثات في الكلية وذلك لهم الصعاب لتقديم عدد كبير من الابحاث اذ بلغ عدد الابحاث المنشورة في المجالات العلمية ثمانية وأربعون بحثا هذا بالرغم من حداثة الكلية وقلة أعضاء هيئة التدريس وهذا كله بفضل من الله عز وجل ثم بفضل الدعم الذي تلقاه الجامعات من قبل حكومتنا الرشيدة ونتطلع للمزيد دائما من الابحاث التي تهدف لتطوير العلوم في كافة مجالاتها.

عميدة كلية طب الاسنان

د. منيرة بنت صالح بن شبيب





Vice Dean's Message

الحمد لله وحده والصلاة والسلام على من نبي بعده إن معيار التقدم في اي مجتمع يعتمد على مدى ما حققه من نجاح وتقدم على المستوى الاقتصادي والثقافي والاجتماعي ، وإذا امعنا النظر في أسباب تقدم بعض الدول لوجدناها تولى عناية فائقة بالبحث العلمي الذي مكنها من مسيرة العصر وامتلاك أدوات المعرفة

إن جامعة الأميرة نورة بنت عبدالرحمن تؤمن بأن صناعة المعرفة أولوية من الأولويات التي تسهم في خدمة المجتمع على جميع الأصعدة .ولذلك فهي تسعى للدخول في المنافسة والمساهمة في تحقيق التميز المحلي والإقليمي في مجال البحث العلمي من خلال تنمية العمل الجماعي والاهتمام بالجودة الشاملة في كافة مراكزها البحثية وتوطيد أواصر التواصل الأكاديمي بين الجامعة ومثيلاتها بما يعود بالنفع على المسار التنموي في المجالات الاقتصادية والاجتماعية والفكرية.

وكيلة الدراسات العليا والبحث العلمي بكلية طب الأسنان

مديرة مركز أبحاث كلية طب الأسنان

د.شذا بنت صبحي الحارثي





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BDS

DEPARTMENT ABSTRACTS





Molecular alterations of mitochondrial D-loop in oral leukoplakia

Azza Elamir, Sahar M. ElRefai, Shaimaa E. Ghazy

BACKGROUND:

Over the years, numerous studies proposed a crucial role of mutations of nuclear DNA in the carcinogenesis process. Of late, many researchers suppose that alterations of mitochondrial DNA should not be excepted from this analysis. Mutational analysis of mitochondrial DNA displayed that mitochondrial D-loop is assessed as a hotspot for molecular alterations in various types of malignant tumors encompassing oral squamous cell carcinoma. Squamous cell carcinoma is believed to emerge through precancerous stages, which might be merely morphologic aspects of cumulative genetic variations.

METHODS:

In keeping with this model of molecular tumor progression, this study aimed to investigate the qualitative and quantitative alterations that might occur in mitochondrial D-loop in oral leukoplakia whether dysplastic or not by semiquantitation of a product of the polymerase chain reaction and sequence analyses of mitochondrial D-loop gene.

RESULTS:

Statistically significant increases in the mean values of D-loop concentrations were observed across the dysplasia gradient of oral leukoplakia. Sequence analyses revealed the presence of point mutations in both dysplastic and nondysplastic oral leukoplakia but not in normal mucosa.

CONCLUSION:

The results of this study suggested that quantitative and qualitative alterations in mitochondrial D-loop could be a promising molecular marker for early detection and progression of the malignancy.

Elamir A, ElRefai SM, Ghazy SE. Molecular alterations of mitochondrial D-loop in oral leukoplakia. *J Cell Biochem.* 2019; 120(8):13944-13951.





Prophylactic platelet transfusion at higher thresholds was associated with increased risk of death or major bleeding in neonates

Abdul Razak, Ishrat Rahman.

Study Question:

Should preterm infants (less than 34 weeks gestational age) with significant thrombocytopenia but no major bleeding receive prophylactic platelet transfusion at a threshold below $25 \times 10^9/L$ or below $50 \times 10^9/L$?¹

Design: Randomized clinical trial.

Razak A, Rahman I. Prophylactic platelet transfusion at higher thresholds was associated with increased risk of death or major bleeding in neonates. Arch Dis Child Educ Pract Ed. 2019 Feb 23. pii: edpract-2019-316838. [Epub ahead of print]





Knowledge, awareness, and perception of oral and maxillofacial surgery among the public and professionals in Saudi Arabia: a cross-sectional study

Hourya Alnofaie, Basem Alchawaf, Mohammed Alkindi

Although oral and maxillofacial surgery (OMS) is expanding rapidly in Saudi Arabia, accurate knowledge of the specialty appears to be lacking. The aim of this study was to assess the knowledge, awareness, and perception of OMS among the public and professionals in Saudi Arabia. A cross-sectional design was adopted, incorporating five groups: dental interns, dental practitioners, medical interns, medical practitioners, and the public. A sample size of 130 was determined for each group, assuming a significance level of 5% and test power of 90%. Surveys were distributed randomly to participants from March to June 2018. For each of 15 specific clinical problems, respondents were asked to choose the most appropriate of three overlapping specialties for treatment, including OMS. A total of 1051 responses were collected. Participants correctly recognized OMS as appropriate for some problems, such as mandibular reconstruction, but for others recognition was poor. Surprisingly, medical professionals were the only group to strongly consider plastic surgery appropriate for treating orthognathic correction. Dental professionals were the most informed. This study highlights the need for greater awareness and education regarding OMS, promoting its development, contribution, and impact among the public and healthcare professionals in Saudi Arabia.

Alnofaie H, Alchawaf B, AlKindi M. Knowledge, awareness, and perception of oral and maxillofacial surgery among the public and professionals in Saudi Arabia: a cross-sectional study. *Int J Oral Maxillofac Surg.* 2019; 48(12): 1597-1603.





Relationship of Mandibular Ramus Dimensions to Lower Third Molar Impaction

Talat Hasan Al-Gunaid, Abdul Kadir Bukhari, Sara M. El Khateeb, Masaki Yamaki.

OBJECTIVES:

The aim of this study was to investigate the mandibular ramus features that could contribute to the etiology of mandibular third molar impaction.

MATERIALS AND METHODS:

Two hundred and forty subjects were divided into two groups: impacted group: 115 subjects presented with an impacted mandibular third molar, and control group: 125 subjects with the normal mandibular third molar eruption. Digital panoramic radiographs were used, and four angular and twelve linear measurements were done. Comparisons between groups were done using Student's t-test. Pearson correlation and linear regression tests were used to assess the degree of relationship between retromolar space and mandibular measurements.

RESULTS:

Control group showed significant greater measurements in most of the variables, whereas the impacted group showed significant larger gonial angle and larger inclination of lower posterior teeth than the control group. Significant correlations were found between retromolar space and coronoid height, ramal heights, ramus notch depths, the inclination of lower posterior teeth, and retromolar space/3M width ratio in both groups.

CONCLUSION:

The present study found that the configuration of the mandibular ramus appears to be discrete in many aspects in the erupted other than impacted lower third molars subjects, which might be a possible cause for the impaction.

Al-Gunaid TH, Bukhari AK, El Khateeb SM, Yamaki M. Relationship of Mandibular Ramus Dimensions to Lower Third Molar Impaction. Eur J Dent. 2019; 13 (2): 213-221.





Comparison of perceived pain and patients' satisfaction with traditional local anesthesia and single tooth anesthesia: A randomized clinical trial

Mohammad I Al-Obaida, Mehdiya Haider, Rawan Hashim, Wafa AlGheriri, Sree Lalita Celur, Samar A Al-Saleh, Ebtissam M Al-Madi

BACKGROUND

Contemporary innovations in the area of local anesthesia have attempted to provide an absolutely pain free experience for patients. Since the introduction of Computer-Controlled Local Anesthetic Delivery Systems to dentistry, many studies have compared its efficacy and safety to conventional anesthesia. However, very few studies have compared single tooth anesthesia (STA) and traditional local anesthesia.

AIM

To compare pain rating, changes in blood pressure, and heart rate during the local anesthetic injection. The secondary objectives were to measure the patients' level of satisfaction and the differences in anesthetic efficiency between the STA system and traditional local infiltration.

METHODS

A randomized controlled trial was conducted and a total of 80 patients with dental restorative needs were enrolled for the study. The patients were evaluated for their general physical status and oral clinical findings before enrollment. Information regarding perceived pain, changes in heart rate and blood pressure, and patients' satisfaction was collected using an electronic data form and was analyzed using paired and unpaired *t*-tests.

RESULTS

No significant difference was noted in perceived pain ($P = 0.59$) and systolic blood pressure ($P = 0.09$) during anesthetic injection using both traditional and STA techniques. STA patients had a significantly higher heart rate during anesthesia, although a statistically significant difference was noted among the traditional anesthesia and the STA groups even before anesthesia. During the restorative procedure, less pain was perceived by STA patients on the Wong-Baker FACES pain scale, which was statistically significant ($P < 0.001$). Analyses of post-procedure patient responses showed that STA patients had a significantly better treatment experience and preferred to have the same method of injection in the future ($P = 0.04$).

CONCLUSION

STA system can provide less painful and more comfortable restorative treatment procedures in comparison to the traditional infiltration technique.

Al-Obaida MI, Haider M, Hashim R, et al. Comparison of perceived pain and patients' satisfaction with traditional local anesthesia and single tooth anesthesia: A randomized clinical trial. *World J Clin Cases*. 2019;7(19):2986–2994.





The prevalence of non-syndromic orofacial clefts and associated congenital heart diseases of a tertiary hospital in Riyadh, Saudi Arabia

Ziyad AlHammad, Ihab Suliman, Hourya Alnofaie, Waad Alsaadi, Sarah Alhusseini, Ghadah Aldakheel, Noura Alsubaie

Background: Orofacial clefts are considered one of the most common birth defects and are frequently associated with other malformations. Congenital heart disease is one of the most prevalent congenital malformation.

Objective: To investigate the prevalence of congenital heart diseases associated with non-syndromic orofacial clefts in the Saudi population.

Methods: Electronic files of non-syndromic orofacial cleft patients who visited the Oral and Maxillofacial Surgery Department of Riyadh, Saudi Arabia from January 2015 to December 2018 were retrospectively reviewed. Data were recorded in an excel sheet and analyzed using SPSS via frequency tests.

Results: In the cleft children identified, the prevalence of non-syndromic orofacial clefts was (77%). Orofacial clefts showed a male predominance (62%). The most common orofacial phenotype was unilateral cleft lip and palate (34%). The prevalence of associated congenital malformations with orofacial clefts was (41%). The most prevalent congenital malformation was congenital heart disease (35%), mainly found in unilateral cleft lip and palate patients (33%). The prevalence of associated congenital heart disease with orofacial clefts was (19%). The most frequent type of congenital heart disease was atrial septal defect (37%).

Conclusion: This study highlights the recognition of the associated congenital heart disease with non-syndromic orofacial cleft patients. Global screening protocols designed for newborns with non-syndromic orofacial cleft are needed to eliminate late diagnosis of critical congenital heart diseases which might present operative risks of anesthesia and/or surgical procedures.

AlHammad Z, Suliman I, Alnofaie H, Alsaadi W, Alhusseini S, Aldakheel G, Alsubaie N. The prevalence of non-syndromic orofacial clefts and associated congenital heart diseases of a tertiary hospital in Riyadh, Saudi Arabia. Saudi Dental Journal (2019)





The assessment of drug utilization study of anticancer drugs using who prescribing indicators in a government tertiary care hospital of the Hyderabad-Karnataka Region of India

Asmatanzeem Bepari, Nayana Sakre, Ishrat Rahman, Shaik Kalimulla Niazi, and Asmabi M. Dervesh

Background: Cancer is a major burden and threat to global society. A wide range of chemotherapeutic agents is extensively used to treat cancer at different stages. Inappropriate drug use may also lead to the raised cost of medical care, adverse drug effects, and patient mortality. Hence, in recent years, drug utilisation studies have become a potential tool to be used in the evaluation of different health care systems including cancer. **AIMS:** The objectives of the study were to identify the various types of cancer, the commonly prescribed drugs, rational use of anticancer drugs, and analyze the prescribing indicators in a tertiary care government hospital of India.

Material and Methods: Newly diagnosed cancer and/or known case of carcinoma of either sex which required treatment/on treatment with chemotherapy aged > 18 yrs admitted in Radiotherapy Department from April 2016 to September 2016 were included in the study and analysed for prescribing indicators. **RESULTS:** The head & neck cancers were the prevalent cancers observed with more preponderance among males. Most of the patients were prescribed with a single anticancer drug. Cisplatin was the most commonly used cytotoxic drug followed by carboplatin, and antimetabolites. The most commonly used adjuvant drugs in our study were anti-emetics and anti-peptic ulcer drugs. Over 82% of anticancer agents were taken from the essential drug list and were prescribed in generic names, indicating rational use. **CONCLUSION:** Over 82% of anticancer agents were taken from the essential drug list and were prescribed in generic names, indicating rational use.

Bepari, A., Sakre, N., Rahman, I., Niazi, S.K., Dervesh, A.M. The assessment of drug utilization study of anticancer drugs using who prescribing indicators in a government tertiary care hospital of the Hyderabad-Karnataka Region of India. *Open Access Macedonian Journal of Medical Sciences.* 2019; 7(7), pp. 1203-1208





The Comparative Evaluation of Knowledge, Attitude, and Practice of Different Health-Care Professionals About the Pharmacovigilance System of India

Asmatanzeem Bepari 1, Shaik Kalimulla Niazi 2, Ishrat Rahman 3, Asmabi Makandar Dervesh

Abstract

In India, the under-reporting of adverse drug reactions (ADRs) by health professionals is recognized as one of the leading reasons of poor ADR signal detection. The knowledge of ADRs and positive attitude of health-care professionals toward ADRs reporting is vital for decreasing the irrational use of an inappropriate pharmacy. The present study was directed to assess the knowledge, attitude, and practice (KAP) of pharmacovigilance (PV) among the physicians, nurses, and pharmacists of a teaching tertiary care hospital of India. A structured questionnaire was designed using previous studies and standardized. Questions were categorized into three groups: Group 1 tested the knowledge (K1-K8), Group 2 tested attitude (A1-A6), and Group 3 tested the level of practice of PV (P1-P5) of the participant. Such 250 questionnaires were distributed to different health-care professionals of VIMS, Ballari. The participants were graded in three categories as poor, unsatisfactory, and satisfactory depending on the mean score. The data were interpreted by calculating the frequencies, one-way ANOVA and Scheffe's test. Furthermore, factors that discourage them from taking part in the PV program were recorded. A total of 182 questionnaires were statistically analyzed. It was found that KAP of PV among doctors, nurses, and pharmacists was unsatisfactory. Our study showed that knowledge, attitude, and level of practice of PV among doctors, nurses, and pharmacists stand inadequate. Educational interventions periodically can improve these parameters of PV.

Bepari, A., Niazi, S.K., Rahman, I., Dervesh, A.M. The comparative evaluation of knowledge, attitude, and practice of different health-care professionals about the pharmacovigilance system of India. *Journal of Advanced Pharmaceutical Technology and Research.* 2019; 10(2), pp. 68-74





CDS

DEPARTMENT ABSTRACTS





Comparison of clinical peri-implant indices and crestal bone levels around narrow and regular diameter implants placed in diabetic and non-diabetic patients: A 3-year follow-up study

Nouf Al-Shibani, BDS, MSD, Khulud Abdulrahman Al-Aali, Rana Sulaiman Al-Hamdan, Mohammed Alrabiah, Ghadeer Basunbul, Tariq Abduljabbar.

BACKGROUND:

Studies evaluating and comparing clinical and radiographic peri-implant indices around narrow diameter implants (NDIs; <3.3 mm) and regular diameter implants (RDIs) in type-2 diabetes mellitus (T2DM) and non-diabetic individuals are deficient.

OBJECTIVE:

To estimate and compare the clinical and radiographic indices around NDIs and RDIs placed in T2DM and non-diabetic patients.

MATERIALS AND METHODS:

Eighty-six patients requiring implant surgery in the posterior mandible were divided into two groups (42 T2DM and 44 non-diabetic individuals). Patients were further categorized into two subgroups on the basis of diameter of implants: (1) patients with NDIs (3.3 mm ϕ) and (2) patients with RDIs (4.1 mm ϕ). Clinical indices evaluating plaque index (PI), bleeding on probing (BOP), probing depth (PD), and crestal bone levels (CBL) were recorded around all dental implants at 18 and 36 months follow up. Serum hemoglobin A1c (HbA1c) test was carried out for both groups to assess the profile of glycosylated hemoglobin at baseline, 18 and 36 months of follow up.

RESULTS:

The mean age of patients in T2DM group and non-diabetic group was 45.2 and 41.6 years, respectively. At 18 and 36 months follow up, mean HbA1c levels were 6.5% and 4.5% and 6.7% and 4.5% in T2DM and non-diabetic individuals, respectively. A statistically significant reduction in mean HbA1c levels from the baseline to respective follow-up periods were seen in T2DM patients. There was no statistically significant difference in the overall mean scores of PI, BOP, PD, and CBL around NDIs and RDIs among T2DM and non-diabetic patients at 18 and 36 months of follow up.

CONCLUSION:

NDIs show reliable clinical stability and radiographic bone levels as RDIs placed in T2DM and non-diabetic individuals, provided oral hygiene and glycemic status are strictly maintained.

Al-Shibani N, Al-Aali KA, Al-Hamdan RS, Alrabiah M, Basunbul G, Abduljabbar T. Comparison of clinical peri-implant indices and crestal bone levels around narrow and regular diameter implants placed in diabetic and non-diabetic patients: A 3-year follow-up study. Clin Implant Dent Relat Res. 2019; 21(2):247-252.





Clinical and radiographic peri-implant health status around narrow diameter implant-supported single and splinted crowns

Khulud Abdulrahman Al-Aali, Aws S. ArRejaie, Ali Alrahlah, Yasser F. AlFawaz, Tariq Abduljabbar, Fahim Vohra.

Background

Studies assessing and comparing clinical and radiographic peri-implant status around narrow diameter implant-supported single crowns (NDISCs) and splinted crowns (NDISPs) are scarce.

Objective

The aim of this retrospective study was to estimate and compare complication rates, patient satisfaction, peri-implant status and peri-implant bone loss (PBL) of NDISCs and NDISPs.

Materials and Methods

Patients receiving narrow diameter implants (NDIs) in the posterior mandible were assessed. Technical complication and patient satisfaction were recorded. Clinical peri-implant plaque index (PI), bleeding on probing (BoP), probing depth (PD) and PBL were assessed. Technical complications and patient satisfaction were recorded. Log-rank test was computed to evaluate the influence of prostheses type and NDIs location on technical complications. *P*-value less than 0.05 was regarded as significant.

Results

Seventy-eight patients (43 male and 35 females) agreed to follow up. The mean follow-up duration of the patients was 3.6 years. A total of 102 (43 NDISCs and 59 NDISPs) NDIs with moderately rough surfaces were included. No significant differences in PI, BoP, or PD were observed between NDISCs and NDISPs. The average PBL score was 1.17 (range: 0.03-4.15) at implant level and 1.14 (range: 0.03-4.14) at patient level. Seven implants and three patients showed peri-implantitis. The rates of technical complication of single crowns were significantly higher than those of splinted crowns ($P = 0.036$). PBL was significantly higher in molar sites than those in premolar sites ($P = 0.041$). A total of 67 patients (85.9%) were satisfied with the esthetics of the crowns, while a total of 59 patients (75.6%) were satisfied with the function of the crowns.

Conclusion

NDISCs and NDISPs offer high patient satisfaction and tolerable complication rates. Peri-implant conditions and peri-implant bone levels were comparable around NDISCs and NDISPs. However, bone loss of implants was higher in molar sites than those implants in premolar sites.

Al-Aali KA, ArRejaie AS, Alrahlah A, AlFawaz YF, Abduljabbar T, Vohra F. Clinical and radiographic peri-implant health status around narrow diameter implant-supported single and splinted crowns. *Clin Implant Dent Relat Res.* 2019; 21(2):386-390.





Survival of adjacent-dental-implants in prediabetic and systemically healthy subjects at 5-years follow-up

Mohammed Alrabiah, Ali Alrahlah, Rana Sulaiman Al-Hamdan, Khulud Abdulrahman Al-Aali, Nawaf Labban, Tariq Abduljabbar.

BACKGROUND:

Long-term survival of adjacent dental implants (ADI) in prediabetic patients remained uninvestigated.

PURPOSE:

This 5 years' follow-up clinical study compared the survival of adjacent implants in prediabetic and nondiabetic subjects.

MATERIALS AND METHODS:

Prediabetic (group-A) and nondiabetic (group-B) subjects having undergone dental rehabilitation using ADI were assessed. Data about sex, age treatment and period (in years) since diagnosis of prediabetes, and family history of diabetes was gathered and haemoglobin A1c (HbA1c) levels were recorded. Dental implant related data (dimensions, loading protocol, surface characteristics, restoration type, and duration in function) was recorded. Depth of probing (PD), bleeding-on-probing (BOP), and plaque index (PI) were measured and mesial and distal crestal bone loss (CBL) were recorded. P values less than .05 were contemplated as statistically-significant.

RESULTS:

Seventy-nine male individuals (39 in group-A and 40 in group-B) were included. Subjects in groups -A and -B were 54.3 ± 3.6 and 51.2 ± 2.4 years old, respectively. In group-A, subjects were diagnosed with prediabetes 5.4 ± 0.2 years ago. Patients in group-A more often had a family history of diabetes than group-B. Thirty-nine and 40 ADI were placed in patients in groups -A and -B, respectively. Tooth-brushing once daily was reported by 79.5% and 82.5% individuals in groups -A and -B, respectively. Peri-implant PI ($P < .001$), BOP ($P < .001$), PD ($P < .001$), mesial ($P < .001$), and distal ($P < .001$) CBL and HbA1c levels ($P < .001$) were higher in group-A than group-B. The implant survival rate in group-A and group-B was 100% and 100%, respectively.

CONCLUSION:

Although ADI can survive in prediabetic patients in the long-term; soft-tissue inflammation and CBL are worse around adjacent implants in these patients compared with nondiabetic controls.

Alrabiah M, Alrahlah A, Al-Hamdan RS, Al-Aali KA, Labban N, Abduljabbar T. Survival of adjacent-dental-implants in prediabetic and systemically healthy subjects at 5-years follow-up. *Clin Implant Dent Relat Res*. 2019; 21(2):232-237.





Clinical indices and local levels of inflammatory biomarkers in peri-implant health of obese and nonobese individuals

Mohammed N. Alasqah, Nouf Al-Shibani, Khulud Abdulrahman Al-Aali, Osama A. Qutub, Tariq Abduljabbar, Zohaib Akram,

BACKGROUND:

Obesity seem to regulate peri-implant health. It is proposed that peri-implant crevicular fluid (PICF) levels of interleukin (IL)-1 β and IL-6 are higher in obese as compared to nonobese individuals.

OBJECTIVE:

The purpose of the present clinico-laboratory study is to estimate and compare the clinical and radiographic indices and PICF levels of IL-1 β and IL-6 among obese and nonobese patients.

MATERIALS AND METHODS:

Fifty patients were divided into two groups (25 obese with ≥ 27.5 kg/m² and 25 nonobese with < 27.5 kg/m² individuals). Clinical indices for both periodontal and peri-implant evaluating plaque index (PI), bleeding on probing (BOP), probing depth (PD), clinical attachment level (CAL), and crestal bone loss (CBL) were recorded around teeth and implants. PICF was collected and assessed for the levels of IL-1 β and IL-6 using enzyme-linked immunosorbent assay.

RESULTS:

A significant difference was observed in PI and BOP around natural teeth and implants in obese patients, respectively ($P < .05$). CBL was found to be significantly higher among obese as compared to nonobese patients ($P = .022$). Peri-implant and periodontal PD was higher in obese as compared to nonobese but did not reach statistical significance. Levels of IL-1 β and IL-6 were statistically significantly higher among obese patients as compared to nonobese ($P = .001$). Pearson correlation analysis showed IL-1 β was positively correlated with CBL ($P = .0079$), whereas IL-6 showed positive correlation with both BOP ($P = .0019$) and CBL ($P = .015$) among obese patients.

CONCLUSIONS:

Clinical peri-implant parameters were worse and proinflammatory biomarkers were significantly higher in obese patients compared with nonobese subjects. The findings of the present study suggests that increased proinflammatory biomarkers in PICF of obese patients may modulate peri-implant inflammation around dental implants.

Alasqah MN, Al-Shibani N, Al-Aali KA, Qutub OA, Abduljabbar T, Akram Z. Clinical indices and local levels of inflammatory biomarkers in peri-implant health of obese and nonobese individuals. Clin Implant Dent Relat Res. 2019; 21(1):80-84.





Golden proportion evaluation in maxillary anterior teeth amongst Saudi population in Riyadh

Alhanoof Aldegheishem, Ambreen Azam, Ebtissam Al-Madi, Lujain Abu-khalaf, Bashayer Bani Ali, Lamyia Anweig.

Introduction

In achieving pleasing dental aesthetics, the maxillary anterior teeth are essential. Numerous methods are used to measure their dimensions, including the golden proportion between their perceived widths and the width-to-height ratios, referred to as the golden proportion and is considered as a gold standard for esthetic evaluation.

The objective of this study was to evaluate the existence of the golden proportion between the width of the maxillary anterior teeth of Saudi males and females.

Methods

This clinical observational study included a total of 61 participants that met the inclusion criteria having 36 females and 25 males, all Saudi nationals, presented to Princess Nourah bint Abdulrahman University (PNU), College of dentistry, clinics. Dental casts of the maxillary arches for each participant were made after taking digital impressions in addition to taking photographs. The dimensions and the perceived width of the anterior teeth viewed from the front were measured using a digital caliper. SPSS was used to analyze the data.

Results

There were significant differences between the subject's width-to-height ratios and the golden proportion of 0.80 where (p -value < 0.05). Thus, indicating that no golden ratio was observed except in case of tooth number 12 in male subjects where mean value was (0.83) with a standard deviation of (0.09) and the p -value of ($p = 0.144$) > 0.05 .

Conclusions

From the perceived widths of maxillary anterior teeth, the golden proportion was not found to exist. No gold standard was detected for the width-to-height proportions of maxillary incisors. Therefore, in addition to anterior teeth measurements, specific population characteristics and perception of an agreeable smile should be considered for evaluating esthetics.

Aldegheishem Al, Ambreen Azam., Almadi Ebtissam, Lujain Abu-khalaf, Ali B, Anweigi L. Golden Proportion Evaluation in Maxillary Anterior Teeth Amongst Saudi Population in Riyadh. The Saudi Dental Journal; 2019: 31(3): 322-329.





Peri-implant soft tissue status and crestal bone levels around adjacent implants placed in cigarette smokers and never smokers: Five-year follow-up results

Aws S. ArRejaie, Khulud Abdulrahman Al-Aali, Mohammed Alrabiah, Sameer A. Mokeem, Fahim Vohra, Tariq Abduljabbar

BACKGROUND:

It is hypothesized that peri-implant soft tissue inflammation and crestal bone loss (CBL) are higher around adjacent implants placed in cigarette smokers compared with never smokers. The aim of the present 5-years follow-up retrospective clinical study was to compare the peri-implant soft tissue status and CBL around adjacent implants placed in cigarette smokers and never smokers.

METHODS:

Cigarette smokers (group 1) and never smokers (group 2) with adjacent dental implants were included. Demographic information regarding age, sex, duration of smoking (pack-years), daily frequency of toothbrushing and most recent visit to a dentist or dental hygienist were recorded using a questionnaire. Information regarding implant dimensions (length \times diameter), duration of implants in function, loading protocol (and type of restoration was recorded. Peri-implant plaque index (PI), bleeding on probing (BOP), probing depth (PD), and mesial and distal CBL were measured. $P < 0.05$ were considered statistically significant.

RESULTS:

Seventy-two male participants (37 in group 1 and 35 in group 2) were included. The mean age of individuals in groups 1 and 2 were 50.3 ± 5.4 and 48.5 ± 3.8 years, respectively. In group 1, the mean duration of cigarette smoking was 22.3 ± 1.6 pack years. A family history of smoking was more often reported by individuals in group 1 compared with group 2. In groups 1 and 2, 54 and 70 adjacent implants, respectively were placed in the regions of missing premolars and molars. All implants were delayed loaded and were fixed with non-splinted screw-retained restorations. In groups 1 and 2, toothbrushing twice daily was reported by 78.3% and 74.2% individuals, respectively. There was no statistically significant difference in peri-implant PI, BOP, PD, and mesial and distal CBL among individuals in groups 1 and 2.

CONCLUSION:

Peri-implant soft tissue status and crestal bone levels were comparable around adjacent dental implants placed in cigarette smokers and never smokers.

ArRejaie AS, Al-Aali KA, Alrabiah M, Mokeem SA, Vohra F, Abduljabbar T. Peri-implant soft tissue status and crestal bone levels around adjacent implants placed in cigarette smokers and never smokers: Five-year follow-up results. *J Periodontol.* 2019; 90(3): 234-240.





Current weight of evidence of viruses associated with peri-implantitis and peri-implant health: A systematic review and meta-analysis

Zohaib Akram, Khulud Abdulrahman Al-Aali, Mohammed Arabiah, Faisal Abdullah Alonaizan, Tariq Abduljabbar, Fatemah AlAhmari, Fawad Javed, Fahim Vohra

The pathological role of human herpesviruses (HHVs) (Epstein-Barr virus [EBV], Human cytomegalovirus [CMV], and Herpes simplex virus [HSV]) in peri-implant health needs clarification quantitatively. To determine the weight of evidence for HHVs in patients with peri-implantitis (PI) and substantiate the significance of HHVs in peri-implant inflammation, electronic databases including EMBASE, MEDLINE, Cochrane Oral Health Group Trials Register, and Cochrane Central Register of Controlled Trials were searched from 1964 up to and including November 2018. Meta-analyses were conducted for prevalence of HHVs in PI and healthy controls. Forest plots were generated that recorded risk difference (RD) of outcomes and 95% confidence intervals (CI). Five clinical studies were considered and included. Four clinical studies reported data on EBV while three clinical studies reported data on CMV. Considering the risk of these viruses in PI, significant heterogeneity for CMV ($\chi^2 = 53.37$, $p < 0.0001$, $I^2 = 96.25\%$) and EBV ($\chi^2 = 14.14$, $p = 0.002$, $I^2 = 78.79\%$) prevalence was noticed between PI and healthy control sites. The overall RD for only EBV (RD = 0.20, 95% CI, 0.01-0.40, $p = 0.03$) was statistically significant between both groups. Frequencies of the viruses were increased in patients with PI compared with healthy nondiseased sites. However, the findings of the present study should be interpreted with caution because of significant heterogeneity and small number of included studies.

Akram Z, Al-Aali KA, Arabiah M, Alonaizan FA, Abduljabbar T, AlAhmari F, Javed F, Vohra F. Current weight of evidence of viruses associated with peri-implantitis and peri-implant health: A systematic review and meta-analysis. *Rev Med Virol.* 2019; 29(3): e2042.





An RCT of atraumatic restorative treatment for older adults: 5 year results

Cristiane Da Mata, Gerald Gerald McKenna, Lamyia M. Anweigi, Martina Hayes, Michael S. Cronin, N. Woods, Denis O'Mahony, Patrick Finbarr Allen

OBJECTIVES:

To compare the survival of ART and a conventional restorative technique (CT) for restoring carious lesions in older adults after 5 years.

METHODS:

In this parallel randomised controlled clinical trial, 219 independently-living adults were recruited from a dental hospital/community and a geriatric day hospital. Ninety-nine patients who met the inclusion criteria and presented with carious lesions were randomly allocated to receive either ART or conventional restorations (anaesthesia, rotary instruments and resin-modified glass ionomer). The status of restorations was assessed 6 months, 1, 2 and 5 years after restoration placement. Estimates of cumulative survival were calculated for each interval between assessments and a Cox Proportional Hazards (PH) model was fitted to the interval-censored survival time.

RESULTS:

Three hundred restorations (ART n=142; CT n=158) were placed on 99 patients, 46 males and 53 females, with a mean age of 73.2, SD: 6.8 (65-90 yrs). After 5 years, ART and CT presented cumulative probability of survival of 85% and 79% ($p=0.8095$), respectively.

CONCLUSIONS:

ART presents survival rates comparable to a conventional technique, when treating older adults after 5 years. The ART approach could be a useful tool to provide dental care for older adults particularly in the nonclinical setting. (Trial Registration number: ISRCTN 76299321).

CLINICAL RELEVANCE:

This study shows that ART presents survival rates comparable to conventional techniques to treat carious lesions in older patients after 5 years. It is well accepted by this age cohort, and therefore could be an alternative to treat the elderly, especially those who are homebound or cannot attend the dentist.

da Mata C, McKenna G, Anweigi L, Hayes M, Cronin M, Woods N, O'Mahony D, Allen PF. An RCT of atraumatic restorative treatment for older adults: 5 year results. *J Dent.* 2019; 83:95-99.





Proinflammatory cytokine levels and peri-implant parameters among cigarette smokers, individuals vaping electronic cigarettes, and non-smokers

Aws S. ArRejaie, Khulud Abdulrahman Al-Aali, Mohammed Alrabiah, Fahim Vohra, Sameer A. Mokeem, Ghadeer Basunbul, Ali Alrahlah, Tariq Abduljabbar

BACKGROUND:

Tobacco smoking compromises the prognosis of dental implant treatment and is associated with increased risk of peri-implant bone loss and increased implant failure rate. There is a dearth of studies that have compared clinical, radiographic, and immunological peri-implant parameters among cigarette smokers (CS), individuals vaping e-cigarettes (e-cigs), and non-smokers (NS). This study aimed to compare clinical and radiographic peri-implant parameters and levels of matrix metalloproteinase (MMP)-9 and interleukin (IL)-1 β levels among CS, individuals' vaping e-cigs, and NS.

METHODS:

Thirty-two CS (group 1), 31 individuals vaping e-cigs (group 2), and 32 NS (group 3) were included. Demographic- and implant-related data were collected using a structured baseline questionnaire. Peri-implant plaque index (PI), bleeding on probing (BOP), and probing depth (PD) were recorded and marginal bone loss (MBL) were assessed using standardized digital radiographs. Enzyme-linked immunosorbent assay was used to assess levels of MMP-9 and IL-1 β in peri-implant sulcular fluid. Pearson correlation coefficient was used to analyze for correlations of MMP-9 and IL-1 β levels with peri-implant parameters.

RESULTS:

BOP showed significantly higher values in group 3 as compared with groups 1 and 2 ($P < 0.01$). PI ($P < 0.01$), PD ≥ 4 mm ($P < 0.01$), and mean concentrations of MMP-9 ($P < 0.001$) and IL-1 β ($P < 0.01$) were significantly higher in groups 1 and 2 than group 3. MBL was significantly higher in group 1 as compared with group 2 and group 3 ($P < 0.01$). Significant positive correlations were found between MMP-9 ($P = 0.0198$) and IL-1 β ($P = 0.0047$) levels and MBL in group 1; and a significant positive correlation between IL-1 β and MBL in group 2 ($P = 0.0031$).

CONCLUSIONS:

Peri-implant health was compromised among CS than vaping individuals and NS. Increased levels of proinflammatory cytokines in CS and vaping individuals may suggest greater peri-implant inflammatory response.

ArRejaie AS, Al-Aali KA, Alrabiah M, Vohra F, Mokeem SA, Basunbul G, Alrahlah A, Abduljabbar T. Proinflammatory cytokine levels and peri-implant parameters among cigarette smokers, individuals vaping electronic cigarettes, and non-smokers. *J Periodontol.* 2019; 90(4): 367-374.





Clinical and radiographic indices around narrow diameter implants placed in different glycemic-level patients

Abdulaziz Alsahhaf, Ibraheem F. Alshiddi, |Rana Saud Alshagroud, Khulud Abdulrahman Al-Aali, Fahim Vohra MPros, Tariq Abduljabbar.

BACKGROUND:

Studies assessing peri-implant clinical and marginal bone resorption (MBR) around narrow diameter implants (NDIs) placed in different glycemic levels are uninvestigated.

OBJECTIVE:

The present 3-year retrospective follow-up investigation was designed to explore clinical and radiographic status of NDIs placed in individuals with different glycemic control levels.

MATERIALS AND METHODS:

Patients with serum hemoglobin A1c (HbA1c) levels $\geq 6.5\%$ (Group-1), 5.7%–6.4% (Group-2), and 4.0%–5.0% (Group-3) were included. Clinical indices evaluating bleeding on probing (BOP), plaque scores (PI), peri-implant probing depth (PD), and MBR were recorded around NDIs at 1-, 2-, and 3-year follow-up. Serum HbA1c test was carried out for all patients to assess the profile of glycosylated hemoglobin at 1 and 3 years of follow-up.

RESULTS:

A significant reduction in mean HbA1c levels from year 1 to year 3 follow-up period was seen in Group-1 only. PI varied from 0.40 in Group 1 at 2 year and 0.42 at 3-year follow-up to 0.18 at 2-year ($P = 0.032$) and 0.17 at 3-year ($P = 0.018$) follow-up, respectively. Greater BOP was noted in Group 1 (0.53) as compared with Group 2 (0.42) and Group 3 (0.21) ($P = 0.048$) at 3-year follow-up. PD after 3 year ranged from 2.04 mm in Group 3 to 2.32 mm in Group 1 that showed statistically significant difference ($P = 0.037$). No statistical significant differences were observed in MBR at any time point between the groups.

CONCLUSION:

The results of this short-term follow-up study indicate that NDIs show clinical and radiographic stability, provided oral cleanliness and glycemic levels are relatively maintained. Further long-term clinical studies are needed to evaluate implant stability over the period along with controlled glycemic status.

Alsahhaf A, Alshiddi IF, Alshagroud RS, Al-Aali KA, Vohra F, Abduljabbar T. Clinical and radiographic indices around narrow diameter implants placed in different glycemic-level patients. Clin Implant Dent Relat Res. 2019; 21(4): 621-626.





Clinical Performance of One-Piece Zirconia Dental Implants: A Systematic Review

Aws S ArRejaie¹, Rana S Al-Hamdan², Ghadeer I Basunbul³, Tariq Abduljabbar¹, Khulud A Al-Aali⁴, Nawaf Labban¹

The aim of the present review was to evaluate the clinical and radiographic performance of one-piece zirconia implants (O-PZI). This review followed the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines that addressed the following focused question: What is the overall clinical and radiographic performance of O-PZI? The MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, and Cochrane Oral Health Group Trials Register databases were searched. Six clinical studies were included. For studies evaluating O-PZI compared with one-piece titanium implants, zirconia implants showed higher crestal bone loss (CBL) in both the studies. However, one study demonstrated a high failure rate compared to titanium dental implants, while one study demonstrated comparable survival rates between zirconia and titanium dental implants. For studies evaluating O-PZI for the restoration of single crown and fixed dental prostheses, O-PZI showed comparable bone loss and survival rates for single crowns and fixed dental prostheses. Two studies were included that compared O-PZI with two-piece zirconia (T-PZI). One study showed a higher CBL and low survival rate for O-PZI compared to T-PZI, whereas the other study demonstrated comparable CBL and survival rates between O-PZI and T-PZI. It is still debatable whether O-PZI demonstrate better clinical performance when compared with titanium implants or two-piece design.

ArRejaie AS, Al-Hamdan RS, Basunbul GI, Abduljabbar T, Al-Aali KA, Labban N. Clinical performance of one-piece zirconia dental implants: A systematic review. *J Investig Clin Dent*. 2019;10(2):e12384.





A novel non-invasive retentive approach of an interim auricular prosthesis: A case report

Abdullah Kamel Abdullah, Amro Mohammed Moness Ali, Amal Mohammed Elsayy

Auricular reconstruction is a challenging issue. It can either be performed surgically or by the use of prosthesis. Definitive auricular prosthesis can be retained by craniofacial implants. Temporary (interim) prosthesis can be retained using adhesives, engaging anatomical undercuts and using mechanical means of retention-like spectacles. This case report proposes a new mechanical means of retention for a temporary auricular prosthesis, which can be suitable for non-eyeglass wearing females or for female patients who refuse to wear eyeglass for retaining their prosthesis.

Abdullah AK, Ali AMM, Elsayy AM. A novel non-invasive retentive approach of an interim auricular prosthesis: A case report. Singapore Dent J. 2019:1-4.





Clinical, radiographic, and restorative peri-implant measurements of narrow and standard diameter implants in obese and nonobese patients: A 3-year retrospective follow-up study

Ibraheem F. Alshiddi, Abdulaziz Alsahhaf, Rana S. Alshagroud, Khulud A. Al-Aali, Fahim Vohra, Tariq Abduljabbar

BACKGROUND:

There is dearth of studies assessing clinical, restorative, and radiographic peri-implant outcomes around narrow diameter implants (NDIs) and standard diameter implants (SDIs) in obese and nonobese subjects.

OBJECTIVE:

To assess clinical, restorative, and radiographic parameters of NDIs and SDIs placed in obese and nonobese individuals.

MATERIALS AND METHODS:

Obese and nonobese patients requiring NDIs and SDIs in the anterior maxilla/mandible were included. Based on the implant diameter, participants were further divided into two subgroups: (a) NDIs (3.3 mm) and (b) SDIs (4.1 mm). Peri-implant clinical measurements including plaque index (PI), bleeding on probing (BOP), probing depth (PD), and radiographic crestal bone loss (CBL) were evaluated around NDIs and SDIs at 1 and 3-year follow-up.

RESULTS:

A total of 70 patients (35 obese and 35 nonobese) were included. Only BOP showed statistically significant differences between both the groups at patient level at 1 and 3-year follow-up ($P < .05$). There was no statistically significant difference in PI and PD around NDIs and SDIs between obese and nonobese patients. Statistical significant differences were observed in the total CBL around NDIs and SDIs among obese and nonobese subjects at 3 year follow-up ($P < .05$).

CONCLUSION:

Both NDIs and SDIs show consistent clinical stability among obese and nonobese patients. Higher amount of bone loss was observed in obese patients compared to nonobese patients despite regular hygiene maintenance.

Alshiddi IF, Alsahhaf A, Alshagroud RS, Al-Aali KA, Vohra F, Abduljabbar T. Clinical, radiographic, and restorative peri-implant measurements of narrow and standard diameter implants in obese and nonobese patients: A 3-year retrospective follow-up study. *Clin Implant Dent Relat Res.* 2019; 21(4): 656-661.





Antibacterial efficacy of silver diamine fluoride as a root canal irrigant

Ebtissam M. Al-Madi, Manar A. Al-Jamie, Noura M. Al-Owaid, Amal A. Almohaimede, Albandary M. Al-Owid

Objectives

Conventional disinfectants and medicaments have not been able to achieve and maintain sterilization of root canals. The purpose of the study was to evaluate the antibacterial efficacy of 3.8% silver diamine fluoride (SDF) in comparison with 2% chlorhexidine (CHX) against *Enterococcus faecalis* biofilm.

Materials and methods

Extracted human teeth were used to make 70 dentin discs that were then inoculated with *E. faecalis* to generate a 3-week-old biofilm model. The discs were subjected to treatment with 3.8% SDF, 2% CHX, sodium hypochlorite (NaOCl), or saline for 10 min. After exposure, the dentin discs were examined with a confocal laser scanning microscope to verify the percentage of live versus dead cells within the biofilm. Univariate one-way analysis of variance and Tukey-honestly significant difference post hoc analysis ($p < .05$) were performed to detect significant differences.

Results and conclusion

The NaOCl group showed the greatest percentage of dead cells (62.26%) among all groups ($p < .05$). The SDF group showed a significantly higher percentage of dead cells (57.39%) than the 2% CHX and saline groups ($p < .05$). SDF possessed higher antimicrobial activity than 2% CHX against *E. faecalis* biofilms.

Ebtissam M. Al-Madi EM, Al-Jamie MA, Al-Owaid NM, Almohaimede AA, Al-Owid AM.

Antibacterial efficacy of silver diamine fluoride as a root canal irrigant. Clin Exp Dent Res. 2019;5: 551–556.





Comparison of yeasts species in the subgingival oral biofilm of individuals with type 2 diabetes and peri-implantitis and individuals with peri-implantitis without diabetes

Abdulaziz Alsahhaf, Khulud Abdulrahman Al-Aali, Rana Saud Alshagroud, Ibraheem F. Alshiddi, Ali Alrahlah, Tariq Abduljabbar, Fawad Javed, Fahim Vohra.

BACKGROUND:

There are no studies that have investigated the presence of yeasts in the subgingival oral biofilm (OB) of type-2 diabetic and non-diabetic patients with peri-implantitis. The aim was to assess the presence of yeasts in the subgingival OB of patients with type 2 diabetes and peri-implantitis and patients with peri-implantitis without diabetes.

METHODS:

Patients with type 2 diabetes with peri-implantitis (group A), non-diabetic individuals with peri-implantitis and without diabetes (group B), and individuals with and without peri-implantitis (group C) were included. Lifestyle-related and demographic data were collected using a questionnaire and hemoglobin A1c levels were measured. Peri-implant plaque index (PI), bleeding on probing (BOP), and probing depth (PD) were evaluated and crestal bone loss (CBL) were measured. Subgingival OB samples were collected and oral yeasts species were identified using ChromAgar medium. Level of significance was set at $P < 0.05$.

RESULTS:

The mean age of individuals in groups A ($n = 43$), B ($n = 41$), and C ($n = 42$) were 55.6 ± 6.4 , 54.6 ± 4.5 , and 57.1 ± 3.3 years, respectively. The mean HbA1c levels were higher in group A ($P < 0.01$) than groups B and C. Peri-implant PI ($P < 0.01$), BOP ($P < 0.01$), PD ($P < 0.01$), and CBL ($P < 0.01$) were significantly higher in group A compared with patients in groups B and C. Peri-implant PI ($P < 0.05$), BOP ($P < 0.05$), PD ($P < 0.05$), and CBL ($P < 0.05$) were significantly higher among patients in group B compared with group C. Subgingival yeasts were more often isolated from the OB of patients in groups A (74.4%) and B (46.3%) than group C (7.1%). The most common yeast species identified in all groups was *Candida albicans*. The CFU/mL for subgingival yeasts were higher in group A than groups B ($P < 0.01$) and C ($P < 0.01$). The CFU/mL for subgingival yeasts were higher in group B than group C ($P < 0.01$).

CONCLUSION:

Candida species (predominantly *C. albicans*) were more often present in the subgingival OB of patients with and without type 2 diabetes with peri-implantitis than systemically healthy individuals without peri-implant diseases.

Alsahhaf A, Al-Aali KA, Alshagroud RS, Alshiddi IF, Alrahlah A, Abduljabbar T, Javed F, Vohra F. Comparison of yeasts species in the subgingival oral biofilm of individuals with type 2 diabetes and peri-implantitis and individuals with peri-implantitis without diabetes. *J Periodontol.* 2019 [Epub ahead of print]





Efficacy of photodynamic therapy versus local nystatin in the treatment of denture stomatitis: A randomized clinical study

Mohammed Alrabiah, Abdulaziz Alsahhaf, Raneem S. Alofi, Khulud Abdulrahman Al-Aali, Tariq

Abduljabbar, Fahim Vohra

AIM:

The aim of the present randomized clinical study was to compare the efficacies of photodynamic inactivation (PDI) to nystatin (NST) in terms of prevalence of *Candida* species in cases with denture stomatitis (DS).

METHODS:

Thirty-six patients were randomly divided into two groups; 18 in PDI and 18 in NST. Irradiation was carried out by using the GaAlAs diode laser with wavelength, mode of transmission, laser output and energy density were standardized at 660 nm, continuous mode, 100 mW power and 28 J/cm² respectively. The PDI was applied twice a week, with an interval of at least 48 h among the sessions during four weeks. Topical nystatin oral suspension 100,000 IU was used four times daily for 15 days. The existence of *Candida* spp. was confirmed by employing the microbiological culture technique. *Candida* colony counts from the palates and dentures surfaces, quantified as colony forming unit (CFU)/mL, measured at baseline, at the end of treatments (day 15), and at follow-up (days 30 and 60) and the prevalence of *Candida* spp. were identified in the two groups of treatments.

RESULTS:

The overall CFU/mL values were higher in the dentures of the patients of both the groups than those from the palates. During all time periods of the study, the CFU/mL values obtained from both NST and PDI groups showed no significant differences. For dentures and palates, a significant reduction in mean CFU/mL values was observed on day 15 compared with baseline (day 0) in both NST and PDI groups. It can be seen that the effect size of treatments was large for the palates of patients in the NST group (1.79) and moderate for the palates of patients in the PDI group (0.63). On the other hand, the effect size was very large for the dentures for both groups (NST group = 3.01; PDI group = 1.58). *C. albicans* was the most common species on both dentures and palates of patients throughout the study period followed by *C. tropicalis* and *C. glabrata*.

CONCLUSION:

Out of all the *Candida* spp., *C. albicans* showed the highest prevalence among all species. In addition, PDI was equally effective as nystatin for the treatment of DS.

Alrabiah M, Alsahhaf A, Alofi RS, Al-Aali KA, Abduljabbar T, Vohra F. Efficacy of photodynamic therapy versus local nystatin in the treatment of denture stomatitis: A randomized clinical study. *Photodiagnosis Photodyn Ther.* 2019; 28: 98-101.





Effect of Photodynamic Therapy, Er,Cr:YSGG, and Nd:YAG Laser on the Push-Out Bond Strength of Fiber Post to Root Dentin

Faisal Abdullah Alonaizan, Raneem S.Alofi, Yasser F.AlFawaz, Abdulaziz Alsahha, Khulud Abdulrahman Al-Aali, Fahim Vohra, Tariq Abduljabbar

Objective: To evaluate the push-out bond strength and modes of failure of fiber post to root dentin by using photodynamic therapy (PDT), Er,Cr:YSGG, Nd:YAG laser, and conventional cleaning and shaping (CCS). **Materials and methods:** Eighty anterior teeth were sectioned in a horizontal manner being 2 mm incisal to the cementsoenamel junction, and root canal was prepared for post space. After post space was made, fiber posts were placed inside the root canal system. The fiber posts were subjected to PDT, Er,Cr:YSGG laser, Nd:YAG laser, and conventional cleaning and shaping (CSS) with 20 specimens in each group. Cervical and apical sections were obtained from the specimens. For performing the push-out test, the universal testing machine was used. The formula used for calculating the push-out bond strength was $\sigma = N/mm^2$. **Results:** PDT group (8.16 ± 2.19 MPa) achieved the highest mean push-out bond strength, whereas Er,Cr:YSGG (7.24 ± 1.27 MPa) reported the lowest value in the specimens. Among the experimental groups, the ANOVA test expressed statistical difference ($p = 0.481$). In the cervical segments, the mean push-out bond strength was found to be higher in all of the experimental groups. For the cervical segments, the independent t-test results showed higher mean push-out bond strength values than the apical segments in PDT, Er,Cr:YSGG, Nd:YAG, and CSS groups, respectively ($p < 0.05$). Twenty failures were observed at the interface level between the adhesive and surface of dentin. Seven failures were found at the interface between mixed and the adhesive and post, respectively. **Conclusions:** Push-out bond strength to root canal dentin was not affected by PDT, Er,Cr:YSGG, and Nd:YAG laser compared with CCS. However, PDT produced the smallest number of failure modes and slightly higher push-out bond strength to root dentin. Laser treatment using PDT and Er,Cr:YSGG appeared to be clinically efficient showing acceptable push-out bond strength of fiber post with less number of failures at different regions of the root dentin.

Alonaizan FA, Alofi RS, AlFawaz YF, Alsahhaf A, Al-Aali KA, Vohra F, Abduljabbar T. Effect of Photodynamic Therapy, Er,Cr:YSGG, and Nd:YAG Laser on the Push-Out Bond Strength of Fiber Post to Root Dentin. Photobiomodul Photomed Laser Surg. 2019. [Epub ahead of print]





Effect of photodynamic therapy and ErCrYSGG laser irradiation on the push-out bond strength between fiber post and root dentin

Faisal Abdullah Alonaizan, Yasser F. AlFawaz, Abdulaziz Alsahhaf, Raneem S. Alofi, Khulud Abdulrahman Al-Aali, Ali Alrahlah, Fahim Vohra, Tariq Abduljabbar

Background

To evaluate the push out bond strength and modes of failure of fiber post by using photodynamic therapy (PDT), Er,Cr:YSGG laser and conventional cleaning and shaping (CCS).

Methods

Sixty maxillary anterior teeth were sectioned horizontally 2 mm incisal to the cemento-enamel junction, and root canal were prepared for post space. Tapered fiber posts were placed inside the root canal after post space was made. The fiber posts were subjected to PDT, Er,Cr:YSGG laser and CSS with 20 specimens in each group. The specimens obtained were sectioned in cervical and apical sections. A universal testing machine was used to perform the push out test and the push out bond strength was formulated by $\sigma = C/A$, expressed in mega-pascals (MPa).

Results

The highest mean push out bond strength was achieved by PDT group (8.08 ± 2.73 MPa) and the lowest was shown by specimens in CCS group (7.45 ± 1.04 MPa). ANOVA showed no statistical difference among the experimental groups ($p = 0.481$). In the cervical segments, the mean push-out bond strength was found to be slightly higher for all three groups compared to apical segments ($P < 0.05$). The independent t-tests results showed that the mean push-out bond strength values of the cervical segments were slightly higher than the apical segments in PDT, Er,Cr:YSGG and CSS groups ($P < 0.05$). Significant differences were observed when mean push-out bond strengths were compared for both cervical ($p = 0.037$) and apical ($p = 0.019$) segments between all the groups. Twenty-one failures were found at the interface between the adhesive and the dentin surface, 6 failures were observed at the interface between the adhesive and post, whereas 5 failures were mixed.

Conclusion

Push-out bond strength to root canal dentin were not affected by Er,Cr:YSGG compared with conventional cleaning and shaping. However, PDT produced the smallest number of failure modes and slightly higher push-out bond strength to root dentin.

Alonaizan FA, AlFawaz YF, Alsahhaf A, Alofi RS, Al-Aali KA, Alrahlah A, Vohra F, Abduljabbar T. Effect of photodynamic therapy and ErCrYSGG laser irradiation on the push-out bond strength between fiber post and root dentin. *Photodiagnosis Photodyn Ther.* 2019; 27: 415-418.





A novel sample design for determining color compatibility between layered resin composite and vita shade guides

Eman H. Ismail, Deborah V. Dawson, Rodrigo R. Maia

Objective

To compare the color of double-layered (DL) resin-composite (RC) samples with variant enamel-thicknesses (ET) to their corresponding shade-tabs from VITA classical (VC) and 3D-Master (V3DM).

Methods

A2-DL samples (N = 30) fabricated using three pairs of custom-made molds with an ET of 0.5, 0.7, and 1.0 mm. Shades were selected according to the manufacturer's instructions of two RC brands: Clearfil-Majesty (CM), and Vita-l-essence (VL). A spectrophotometer measured CIE L*a*b* color parameters. We used ΔE_{00} to calculate color differences among DL samples, VC, and V3DM shade-tabs. The data were analyzed using Spearman correlation coefficient, one-way ANOVA, and Tukey test ($\alpha=0.05$).

Results

ΔE_{00} between DL samples A2 and 2M2 shade tabs were all greater than the predetermined 50:50% acceptability threshold ($\Delta E_{00} = 6.6-10.4$). Depending on the shade tabs compared, the ΔE_{00} among CM and VL ET subgroups were statistically different ($P < .001$). ET and L* were negatively correlated for CM and VL. For CM, ΔE_{00} and L* correlated on the A2 shade tab, whereas for VL, ΔE_{00} , and ET correlated on the 2M2 shade tab ($P < .05$).

Conclusions

The DL samples produced unacceptable color matches to their corresponding shade. An enamel layer thickness of 0.7 mm corresponded to the lowest ΔE_{00} . The use of V3DM for RC shade selection should be investigated.

Clinical Significance

Understanding color interaction between RC layers is important to achieve consistent results in esthetic clinical procedures. The thickness of the enamel layer can critically alter the overall shade for a given RC shade and brand. This variation is difficult for the clinician to predict and negatively impacts patient satisfaction, increasing overall procedure costs, and decreasing efficiency. This color interaction study aims to facilitate consistency in shade reproduction.

Ismail EH, Dawson DV, Maia RR. A novel sample design for determining color compatibility between layered resin composite and vita shade guides. *J Esthet Restor Dent.* 2019. [Epub ahead of print]





Characterization of osteogenic cells grown over modified graphene-oxide-biostable polymers

Eraj Humayun Mirza, Aftab Ahmed Khan, Abdulaziz Abdullah Al-Khureif, Selma Adnan
Saadaldin, Badreldin Abdelrhaman Mohamed, Fatima Fareedi, Muhammad Muzammil Khan, Musaad
Alfayez, Randa Al-Fotawi, Pekka K Vallittu, Amer Mahmood.

Abstract:

Graphene is an excellent filler for the development of reinforced composites. This study evaluated bone cement composites of graphene oxide (GO) and poly(methyl methacrylate) (PMMA) based on the proliferation of human bone marrow mesenchymal stem cells (hBMSCs), and the anabolic and catabolic effects of the incorporation of GO on osteoblast cells at a genetic level. Surface wettability and roughness were also evaluated at different GO concentrations (GO1: 0.024 wt% and GO2: 0.048 wt%) in the polymer matrix. Fabricated specimens were tested to (a) observe cell proliferation and (b) identify the effectiveness of GO on the expression of bone morphogenic proteins. Early osteogenesis was observed based on the activity of alkaline phosphatase and the genetic expression of the run-related transcription factor 2. Moreover, bone strengthening was determined by examining the collagen type 1 alpha-1 gene. The surface roughness of the substrate material increased following the addition of GO fillers to the resin matrix. It was found that over a period of ten days, the proliferation of hBMSCs on GO2 was significantly higher compared to the control and GO1. Additionally, quantitative colorimetric mineralization of the extracellular matrix revealed greater calcium phosphate deposition by osteoblasts in GO2. Furthermore, alizarin red staining analysis at day 14 identified the presence of mineralization in the form of dark pigmentation in the central region of GO2. The modified GO-PMMA composite seems to be promising as a bone cement type for the enhancement of the biological activity of bone tissue.

Mirza EH, Khan AA, Al-Khureif AA, Saadaldin SA, Mohamed BA, Fareedi F, Khan MM, Alfayez M, Al-Fotawi R, Vallittu PK, Mahmood A. Characterization of osteogenic cells grown over modified graphene-oxide-biostable polymers. *Biomed Mater.* 2019; 14(6): 065004.





Fatigue resistance of ProTaper gold exposed to high-concentration sodium hypochlorite in double curvature artificial canal

Fahda Algahtani, Xiangya Huang, Markus Haapasalo, Zhejun Wang, Ahmed Hieawy, Duo Zhang, Jolanta Aleksejuniene, Ya Shen.

Abstract: This study aimed to evaluate and compare the fatigue resistance of ProTaper Gold (PTG) and ProTaper Universal (PTU) in artificial single and double curvature canals in 5% sodium hypochlorite (NaOCl) at body temperature (37 °C). PTG and PTU files (size F1) were subjected to fatigue tests in two different artificial ceramic canals. The single curvature model had a 60° curvature angle with a 5 mm radius. The double curvature model had a 60° curvature angle with a 5 mm radius and a second 30° curvature with a 2 mm radius. A file segment was introduced into the artificial canal and immersed in water or 5% NaOCl at 37 °C. The total number of cycles to fracture (NCF) was recorded. Data were analyzed using t-test and linear regression analysis. The NCF of all files was significantly influenced by the type of NiTi metal alloy ($P < .01$), canal curvatures ($P < .01$), and the environmental conditions ($P < .05$). PTG had higher fatigue resistance than PTU files in both single and double curvature canals ($P < .05$). The NCF of PTU files in 5% NaOCl was shorter than that in water ($P < .05$). The mean length of broken PTG was significantly shorter than those of PTU files in both single and double curvature canals ($P < .01$). The fatigue performance of PTG is better than that of PTU in both single and double curvature. Environmental conditions may affect the fatigue behavior of PTU files with single curvature.

Algahtani F, Huang X, Haapasalo M, Wang Z, Hieawy A, Zhang D, Aleksejuniene J, Shen Y. Fatigue resistance of ProTaper gold exposed to high-concentration sodium hypochlorite in double curvature artificial canal. *Bioact Mater.* 2019; 4:245-248.





Effects of different monomer systems on shear bond strength of bonding cement to zirconia

ElZahraa Eldwakhly, Selma Adnan Saadaldin, Abdulaziz Abdullah Al-Khureif, Mai S. Soliman,

Abstract: Plenty of surface treatments to zirconia (ZrO_2) are available. However, the long-term hydrolytic stability is still a major concern for the investigators. This paper explores the effects of different monomer systems on mold enclosed shear bond strength (ME-SBS) of bonding cement to zirconia (ZrO_2) using commercially available silane primers with different monomer systems. Eighteen ZrO_2 blanks (KaVo™ Everest) were subjected to tribo-chemical silica coating and divided into the following primer groups: (1) Sil (control); (2) Composite; (3) G-Multi; and (4) Monobond Plus. Each group was then subdivided into three subgroups ($n = 6$) depending on storage conditions: (1) 24-h dry storage, (2) 2-month water aging, and (3) 4-month water aging. Elemental analyses and contact angle measurements were conducted. The ME-SBSs and failure modes were analyzed. The data were subjected to the two-way analysis of variance (ANOVA) followed by Tukey's *post hoc* test for pairwise comparisons ($p < 0.05$). Similar chemical compositions with marginal differences in content weight (%) were observed. The water contact angle measurements on treated ZrO_2 were $<32^\circ$ in all groups. After 4-month water aging, the highest ME-SBS was exhibited by Group 4 (18.3 ± 6.5 MPa). The Monobond Plus primer systems have the ability to resist hydrolysis at the bonding cement/ ZrO_2 interface.

Eldwakhly El-Z; Saadaldin S; Al-Khureif, AA; Soliman MS. Effects of different monomer systems on shear bond strength of bonding cement to zirconia. *Materials Express*. 2019; 9 (8): 978-983(6)





Remineralization, Regeneration, and Repair of Natural Tooth Structure: Influences on the Future of Restorative Dentistry Practice

Moataz El Gezawi, Uta Christine Wölfle, Rasha Haridy, Riham Fliefel, Dalia Kaisarly

Abstract: Currently, the principal strategy for the treatment of carious defects involves cavity preparations followed by the restoration of natural tooth structure with a synthetic material of inferior biomechanical and esthetic qualities and with questionable long-term clinical reliability of the interfacial bonds. Consequently, prevention and minimally invasive dentistry are considered basic approaches for the preservation of sound tooth structure. Moreover, conventional periodontal therapies do not always assure predictable outcomes or completely restore the integrity of the periodontal ligament complex that has been lost due to periodontitis. Much effort and comprehensive research have been undertaken to mimic the natural development and biomineralization of teeth to regenerate and repair natural hard dental tissues and restore the integrity of the periodontium. Regeneration of the dentin-pulp tissue has faced several challenges, starting with the basic concerns of clinical applicability. Recent technologies and multidisciplinary approaches in tissue engineering and nanotechnology, as well as the use of modern strategies for stem cell recruitment, synthesis of effective biodegradable scaffolds, molecular signaling, gene therapy and 3D bioprinting, have resulted in impressive outcomes that may revolutionize the practice of restorative dentistry. This work reviews the current approaches and technologies for remineralization, regeneration and repair of natural tooth structure.

El Gezawi, M., U. C. Wölfle, R. Haridy, R. Fliefel, and D. Kaisarly, "Remineralization, Regeneration and Repair of Natural Tooth Structure: Influences on the Future of Restorative Dentistry Practice". *ACS Biomater. Sci. Eng.* 2019, 5, 10, 4899-4919.





Influence of Er,Cr:YSGG Laser Irradiation on the Push-Out Bond Strength of Zirconia and Glass Fiber Posts with Radicular Dentin

Raneem S. Alofi, Ibraheem F. Alshiddi, Yasser F. AlFawaz, Abdulaziz Alsahhaf, Khulud Abdulrahman Al-Aali, Tariq Abduljabbar, Fahim Vohra.

Objective: This in vitro study was designed to evaluate the influence of an Er,Cr:YSGG laser on the bond strength of zirconia and glass fiber posts with root dentin. **Materials and methods:** Ninety extracted single-rooted human teeth were randomized into 6 groups (n=15/group) on the basis of different posts (zirconia/glass fiber) and Er,Cr:YSGG laser tips (axial and radial). Specimens were prepared for push-out testing with the help of a cutting machine; six slices (2 on each cervical, middle, and apical) of approximately 1 mm thickness were sectioned for all roots on a plane perpendicular to the long axis of the post. All specimens were placed into a universal testing machine with a defined 0.5 mm/min crosshead speed until the maximum failure load was obtained. **Results:** The highest mean push-out bond strength of the glass fiber and zirconia groups was achieved with laser treatment. The highest push-out bond strength was achieved with the axial fiber tip (7.63 ± 1.22 MPa), and the lowest was achieved with a radial fiber tip of the glass fiber group (6.98 ± 0.96 MPa). ANOVA showed a statistically significant difference between the groups (). The mean push-out bond strength was found to be higher with an axial fiber tip for both cervical and apical segments in the glass fiber and zirconia groups (). The independent t-test resulted in the overall highest mean push-out bond strength in the apical segments (). **Conclusion:** Within the limits of the present in vitro research study, an enhancement in the push-out bond strength of resin cement, mainly in the cervical region of the root canal, was achieved after irradiation with an Er,Cr:YSGG laser using an axial fiber tip.

Raneem S. Alofi, Ibraheem F. Alshiddi, Yasser F. AlFawaz, et al., “Influence of Er,Cr:YSGG Laser Irradiation on the Push-Out Bond Strength of Zirconia and Glass Fiber Posts with Radicular Dentin,” *International Journal of Biomaterials*, vol. 2019, Article ID 4869853, 5 pages, 2019.





Graphene oxide-based experimental silane primers enhance shear bond strength between resin composite and zirconia

Aftab A. Khan, Abdulaziz A. Al-Khureif, Selma A. Saadaldin, Badreldin A. Mohamed, Abobaker S. O. Musaibah , Darshan D. Divakar, Elzahraa Eldwakhly

Abstract: Despite various mechanical and chemical surface-pretreatment methods, long-term bonding of resin composite to dental zirconia (ZrO₂) remains a major concern. In this study, graphene oxide (GO) sheets were infused into two commercially available primers and the enclosed mould shear bond strength (EM-SBS) of resin composite to ZrO₂ was evaluated. Twelve fully sintered ZrO₂ blanks were pretreated and randomly allocated to four groups according to the primers used: RelyX (RX); GO blended RelyX (RXGO); Monobond-S (MB); and GO blended Monobond-S (MBGO). The resin composite stubs were bonded onto the pretreated ZrO₂ surfaces and analysed at baseline and after storage in distilled water for 2 and 4 months. The experimental primers blended with GO sheets influenced the surface morphology, visualized as increased surface roughness, and slightly increased the water contact angle measurements. Moreover, the infusion of primers with GO increased the mass fraction (wt%) of carbon and oxygen. The highest EM-SBS values were found for RXGO, with mean (SD) EM-SBS values of 26.4 (3.7) MPa and 21.5 (5.1) MPa after 2 and 4 months of storage, respectively. Infusion of silane primers with nanometre-to micrometre-size GO sheets enhanced the SBS between resin composite and ZrO₂.

Khan AA, Al-Khureif AA, Saadaldin SA, Mohamed BA, Musaibah ASO, Divakar DD, Eldwakhly E. Graphene oxide-based experimental silane primers enhance shear bond strength between resin composite and zirconia. *Eur J Oral Sci* 2019; 127: 570–576.





Clinical and Microbiological Outcomes of Photodynamic and Systemic Antimicrobial Therapy in Smokers With Peri-Implant Inflammation

Modhi Al Deeb¹, Abdulaziz Alsahhaf¹, Sarah Almubarak², Nawaf Alhamoudi³, Khulud Abdulrahman Al-Aali⁴, Tariq Abduljabbar⁵

Aim: To compare the effectiveness of two protocols in the treatment of peri-implant mucositis (p-iM) among cigarette smokers.

Materials and methods: Three groups were randomized into (i) single session of antimicrobial photodynamic therapy (aPDT) with mechanical debridement (MD) (Group-A), (ii) systemic AB with MD (Group-B), and (iii) MD alone (Group-C). Clinical peri-implant parameters including plaque scores (PS), bleeding on probing (BOP) and probing depth (PD) were measured at baseline, 6 weeks and 12 weeks. Microbiological parameters included the assessment of percentage level of *Pseudomonas aeruginosa* and *Staphylococcus aureus* at baseline and 12 weeks. All parameters were analyzed using Friedman test and multiple comparisons performed using Bonferroni tests. P-value less than 0.05 were considered statistically significant.

Results: At 6 weeks of follow-up, there was a statistically significant reduction in PS ($p < 0.001$), BOP ($p < 0.01$), and PD ($p < 0.05$) among patients in groups A and B on intragroup comparison. At 12 weeks of follow-up, there was a further significant reduction in PS ($p < 0.001$) and BOP ($p < 0.01$) among patients in groups A and B on intragroup comparison but this reduction was comparable with 6-week follow-up. On inter-group comparison, only Group-A showed statistically significant reduction in BOP compared to Group-B and C at 6 weeks ($p < 0.05$). The levels of both *P. aeruginosa* and *S. aureus* in Group-A and Group-B showed statistically significant reductions at 12 weeks compared with baseline ($p < 0.01$). On inter-group comparison, Group-A and B showed no significant differences at follow-up ($p > 0.05$).

Conclusion: This short term clinical study suggests that aPDT as an adjunct to MD is as efficacious as adjunctive antibiotic therapy. However, additional benefits in the reduction of bleeding scores were observed for aPDT in peri-implant inflammation among cigarette smokers.

Deeb MA, Alsahhaf A, Almubarak S, Alhamoudi N, Al-Aali KA, Abduljabbar T. Clinical and microbiological outcomes of photodynamic and systemic antimicrobial therapy in smokers with peri-implant inflammation [published online ahead of print, 2019 Nov 2]. *Photodiagnosis Photodyn Ther.* 2019;101587.





PDS

DEPARTMENT ABSTRACTS





Role of problem-based learning in undergraduate dental education: a questionnaire-based study

Munerah Binshabaib, Manal Shalabi, Soad Mansour, Lamia Alageel, Nourah Alsuwidan, Shatha Subhi ALHarthi

Background: There is a debate regarding the significance of problem-based learning (PBL) model in educational systems. The aim of this study was to assess the awareness of dental students at the Princess Nourah Bint Abdulrahman University (PNU), Saudi Arabia, toward PBL.

Methods: The present cross-sectional study was performed at the College of Dentistry, PNU, Riyadh, Saudi Arabia. An anonymous, standardized and self-administered questionnaire (based on nine items) coded as 1, 2, 3 and 4 was distributed to the first-, second-, third- and fourth-year undergraduate students, respectively, after a seminar that focused on the perceptions of PBL among the students at the end of the academic year 2017. The questionnaire was developed following an exhaustive search of indexed databases. Based on the students' responses (yes/no) to the questions, group mean differences (95% CI) were computed and Pearson's chi-squared test was used for data analysis. Cronbach's alpha coefficient was also determined. The level of significance was set at $P < 0.05$.

Results: In total, 238 female undergraduate dental students (61 first-year, 59 second-year, 60 third-year and 58 fourth-year students) were included. The Cronbach's alpha coefficient ranged between 0.82 and 0.93. Group comparisons (95% CI) showed no statistically significant difference in the responses (yes) of students in the first, second, third and fourth year of academic years related to the perceptions listed earlier ($P > 0.05$).

Conclusion: Perception of female undergraduate dental students at the PNU was inconclusive. Further studies are warranted in this regard.

Binshabaib M, Shalabi M, Mansour S, Alageel L, Alsuwidan N, ALHarthi SS. Role of problem-based learning in undergraduate dental education: a questionnaire-based study. *Adv Med Educ Pract.* 2019;10:79–84.





Adherence to American Academy of Pediatrics' Oral Health Guidelines by Pediatricians and Pediatrics Residents in Riyadh, Saudi Arabia.

Alaa Al Jameel, Mona A Elkateb, Quratulain Shaikh, Maha El Tantawi.

Purpose: The purpose of this study was to assess: (1) oral health knowledge and practices of pediatricians and pediatrics residents in Riyadh, Saudi Arabia; (2) their adherence to American Academy of Pediatrics (AAP) guidelines for caries-risk assessment and anticipatory guidance; and (3) the barriers that prevent their adherence to these guidelines. **Methods:** Participants completed a questionnaire comprised of three sections: (1) demographic and professional characteristics; (2) oral health knowledge and practices; and (3) adherence to AAP oral health guidelines and barriers against adherence. The association between knowledge and practices scores and demographic and professional characteristics was assessed using Mann Whitney and Kruskal Wallis tests. **Results:** One-third of 1,261 pediatricians and pediatrics residents returned complete questionnaires. The mean±(standard deviation [SD]) knowledge score was 5.0±2.4 (out of 12), and the mean±(SD) practice score was 13.4±5.4 (out of 26). Only 8.3 percent reported following the AAP oral health guidelines, and the barriers against this included lack of awareness (60.9 percent), inadequate training on oral health (28.1 percent), and lack of time (21.6 percent). **Conclusion:** Most pediatricians and pediatrics residents in Riyadh had inadequate oral health knowledge and practices as well as poor adherence to the AAP guidelines. Unfamiliarity with the guidelines was reported to be the main barrier against following them.

Al Jameel A, Elkateb MA, Shaikh Q, El Tantawi M. Adherence to American Academy of Pediatrics' Oral Health Guidelines by Pediatricians and Pediatrics Residents in Riyadh, Saudi Arabia. *J Dent Child (Chic)*. 2019; 86(1):10-16.





How well are dental qualitative studies involving interviews and focus groups reported?

Dalya Al-Moghrabi, Aliko Tsihklaki, Saleh Alkadi, Padhraig S.Fleming

OBJECTIVE:

Qualitative research is being increasingly ingrained within dentistry. The aim of the study was to assess whether recent qualitative studies involving interviews and focus groups in the dental literature comply with the consolidated criteria for reporting qualitative research (COREQ) checklist.

METHODS:

Qualitative studies in dentistry, involving interviews and focus groups with patients, parents or caregivers published between January 2017 and June 2018 were identified through electronic and hand searching with no language restrictions. The characteristics of the included studies and adherence to the COREQ checklist were assessed.

RESULTS:

A total of 7137 studies were identified. Following initial screening, 244 full-text articles were obtained; of these, 100 met the inclusion criteria. The majority of the identified studies were in the field of dental public health (30%) with just half published in dental journals. The median sample size was 20 participants (IQR 38.5). Data analysis was most commonly undertaken using thematic analysis or the framework approach 59% (53/90), with purposive sampling used in 54% (36/67) of those describing sampling methods. On average, 17 (± 5.3) of 32 of the COREQ checklist items were presented within the individual studies. Overall, the quality of reporting of individual studies was typically categorised as either moderate (51%) or poor (34%).

CONCLUSION:

As qualitative research in dentistry becomes more established, improved adherence to the COREQ checklist should be encouraged to ensure transparent reporting, in order to maximally influence the delivery of care, policy and clinical practice.

Al-Moghrabi D, Tsihklaki A, Alkadi S, Fleming PS. How well are dental qualitative studies involving interviews and focus groups reported? *J Dent.* 2019; 84: 44-48.





Etching Patterns of Sodium Hypochlorite Pretreated Hypocalcified Amelogenesis Imperfecta Primary Molars: SEM Study

Amel Mahmoud Ahmed, Dina Nagy, Mona Abdallah Elkateb

Aim: To investigate the etching patterns of hypocalcified amelogenesis imperfecta (AI) in primary molars pretreated with 5.25% NaOCl prior to phosphoric acid application using scanning electron microscopy (SEM). **Study design:** Ten hypocalcified AI primary molars were collected, sectioned longitudinally into 2 parts and allocated into two groups of ten specimens each. The enamel surface in the first group (control group) was etched using 37% phosphoric acid gel for 15 seconds; while in the second group (study group), it was pretreated using 5.25 sodium hypochlorite (NaOCl) for 60 seconds prior to acid etching. Each specimen was examined at 16 different sites, and evaluated for the etching pattern (types I, II, and III) distribution using SEM. A total of 320 microphotographs at 1,500 magnification were obtained using Auto-Cad 2007 software. **Results:** The etching pattern with phosphoric acid was not uniform with predominance of type III etching (65.63%), while the pretreated enamel surfaces showed a significant increase in type I and II (82.5%) etching patterns ($P < 0.001$). **Conclusion:** Treatment of primary teeth affected by hypocalcified AI using 5.25% NaOCl prior to phosphoric acid etching significantly improves the etching pattern which is required for good resin bonding.

Ahmed AM, Nagy D, Elkateb MA. Etching Patterns of Sodium Hypochlorite Pretreated Hypocalcified Amelogenesis Imperfecta Primary Molars: SEM Study. *J Clin Pediatr Dent.* 2019; 43(4): 257-262.





Clinical periodontal status and gingival crevicular fluid cytokine profile among cigarette-smokers, electronic-cigarette users and never-smokers

Munerah BinShabaib, Shatha Subhi ALHarthi, Zohaib Akram, Junad Khan, Irfan Rahman, Georgios E.Romanos, FawadJaved

OBJECTIVE:

There are no studies that have compared the clinical (plaque index [PI], bleeding on probing [BOP], probing depth [PD], clinical attachment loss [AL] and number of missing teeth [MT]) and radiographic (marginal bone loss [MBL]) periodontal parameters and gingival crevicular fluid (GCF) levels of proinflammatory cytokines among cigarette-smokers and individuals using electronic-cigarettes. The aim was to compare the clinical periodontal status and gingival crevicular fluid (GCF) cytokine profile among cigarette-smokers (Group-1), electronic-cigarette users (Group-2) and never-smokers (Group-3).

METHODS:

Demographic data including age, gender, duration and reason for smoking and vaping and daily frequency and duration of smoking and vaping was collected using a questionnaire. Clinical (PI, BOP, PD and clinical AL) and radiographic (MBL) periodontal parameters were recorded. The volume of collected GCF was determined and levels of interleukin (IL) 1 β , IL-6, tumour-necrosis-factor-alpha (TNF- α), matrix metalloproteinase (MMP)-8 and interferon-gamma (IFN- γ) were investigated.

RESULTS:

Forty-six cigarette-smokers, 44 electronic-cigarette users and 45 never-smokers were included in groups 1-3, respectively. Mean scores of PI ($P < 0.05$), PD ($P < 0.05$) and clinical AL ($P < 0.05$) were significantly higher among individuals in Group-1 than Group-3. Compared with groups 1 ($P < 0.05$) and 2 ($P < 0.05$), BOP was more often manifested among patients in Group-3. Compared with Group-3, MBL was significantly higher in groups 1 ($P < 0.01$) and 2 ($P < 0.01$). GCF volume was significantly higher in Group-1 compared with groups 2 and 3. The concentrations of IL-1 β , IL-6, IFN- γ , TNF- α and MMP-8 were significantly higher in the GCF samples of individuals in Group-1 ($P < 0.05$) than groups 2 and 3.

CONCLUSION:

Periodontal status is poorer and GCF levels of proinflammatory cytokines are higher in cigarette-smokers compared with electronic-cigarette smokers and never-smokers. However, the probability of increased periodontal inflammation and GCF proinflammatory cytokine levels in electronic-cigarette users than never-smokers cannot be annulled.

BinShabaib M, ALHarthi SS, Akram Z, Khan J, Rahman I, Romanos GE, Javed F. Clinical periodontal status and gingival crevicular fluid cytokine profile among cigarette-smokers, electronic-cigarette users and never-smokers. Arch Oral Biol. 2019; 102: 212-217.





Comparison of Proliferation and Differentiation of Human Osteoblast-like Cells Harvested During Implant Osteotomy Preparation Using Two Different Drilling Protocols

Afsheen Tabassum, Daniel Wismeijer, J.M.A. Hogervorst, Ali Tahmaseb.

PURPOSE:

Autogenous bone grafts are considered a "gold standard." The success of autografts mainly depends on their ability to promote an osteogenic response. The aim of this study was to collect autogenous bone during implant osteotomy preparation using two different drilling protocols and to evaluate and compare the proliferation and differentiation ability of the collected bone particles.

MATERIALS AND METHODS:

Autogenous bone particles were harvested from 20 patients during implant osteotomy preparation using two different drilling protocols: (1) standard drilling protocol with saline irrigation (according to the manufacturer's recommendation) and (2) low-speed drilling protocol without saline irrigation (speed < 200 rpm). Bone samples collected were cultured in growth medium, and after 2 to 3 weeks, cells that grew out from bone grafts were cultured in the normal medium as well as in osteogenic medium for days 0, 4, 7, and 20. Scanning electron microscopy, alizarin red/toluidine blue staining, DNA, ALP, and calcium content measurements were performed. Repeated measures analysis of variance (ANOVA) with Bonferroni's test was employed to analyze the data of this study.

RESULTS:

The total DNA content was significantly higher for the low-speed drilling samples compared with the standard drilling on day 4 ($P < .05$), day 7 ($P < .01$), and day 20 ($P < .001$) in the normal medium and on day 7 ($P < .01$) and day 20 ($P < .01$) in the osteogenic medium. Besides, calcium measurements and mineralized matrix formation observed with alizarin red/toluidine blue staining were significantly higher for the low-speed drilling group compared with the standard drilling group.

CONCLUSION:

Osteogenic efficacy (differentiation and proliferation) of autogenous bone particles collected using low-speed drilling was superior compared with standard drilling samples.

Tabassum A, Wismeijer D, Hogervorst J, Tahmaseb A. Comparison of Proliferation and Differentiation of Human Osteoblast-like Cells Harvested During Implant Osteotomy Preparation Using Two Different Drilling Protocols. *Int J Oral Maxillofac Implants.* 2019. [Epub ahead of print]





Middle East Respiratory Syndrome Coronavirus Infection Dynamics and Antibody Responses among Clinically Diverse Patients, Saudi Arabia.

Hail M. Al-Abdely, Claire M. Midgley, Abdulrahim M. Alkhamis, Glen R. Abedi, Xiaoyan Lu, Alison M. Binder, Khalid H. Alanazi, Azaibi Tamin, Weam M. Banjar, Sandra Lester, Osman Abdalla, Rebecca M. Dahl, Mutaz Mohammed, Suvang Trivedi, Homoud S. Algarni, Senthilkumar K. Sakthivel, Abdullah Algwizani, Fahad Bafaqeeh, Abdullah Alzahrani, Ali Abraheem Alsharef, Raafat F. Alhakeem, Hani A. Aziz Jokhdar, Sameeh S. Ghazal, Natalie J. Thornburg, Dean D. Erdman, Abdullah M. Assiri, John T. Watson, and Susan I. Gerber

Middle East respiratory syndrome coronavirus (MERS-CoV) shedding and antibody responses are not fully understood, particularly in relation to underlying medical conditions, clinical manifestations, and mortality. We enrolled MERS-CoV-positive patients at a hospital in Saudi Arabia and periodically collected specimens from multiple sites for real-time reverse transcription PCR and serologic testing. We conducted interviews and chart abstractions to collect clinical, epidemiologic, and laboratory information. We found that diabetes mellitus among survivors was associated with prolonged MERS-CoV RNA detection in the respiratory tract. Among case-patients who died, development of robust neutralizing serum antibody responses during the second and third week of illness was not sufficient for patient recovery or virus clearance. Fever and cough among mildly ill patients typically aligned with RNA detection in the upper respiratory tract; RNA levels peaked during the first week of illness. These findings should be considered in the development of infection control policies, vaccines, and antibody therapeutics.

Al-Abdely HM, Midgley CM, Alkhamis AM, Abedi GR, Lu X, Binder AM, Alanazi KH, Tamin A, Banjar WM, Lester S, Abdalla O, Dahl RM, Mohammed M, Trivedi S, Algarni HS, Sakthivel SK, Algwizani A, Bafaqeeh F, Alzahrani A, Alsharef AA, Alhakeem RF, Jokhdar HAA, Ghazal SS, Thornburg NJ, Erdman DD, Assiri AM, Watson JT, Gerber SI. Middle East Respiratory Syndrome Coronavirus Infection Dynamics and Antibody Responses among Clinically Diverse Patients, Saudi Arabia. *Emerg Infect Dis.* 2019; 25(4): 753-766.





Factors Influencing Adherence to Vacuum-Formed Retainer Wear: A Qualitative Study

Dalya Al-Moghrabi, Fiorella Beatriz Colonio Salazar, Ama Johal, Padhraig S Fleming

Objective: To explore factors influencing adherence to vacuum-formed retainer wear over a minimum period of four years.

Design: A qualitative study based on a randomized controlled trial assessing the effectiveness of orthodontic retainers.

Setting: Institute of Dentistry, Queen Mary University of London.

Participants: Fifteen participants wearing vacuum-formed retainers for at least four years.

Methods: One-to-one semi-structured interviews were undertaken on a criterion-based purposive sample of participants wearing vacuum-formed retainers. The interviews were audio-recorded, transcribed verbatim and analysed using Framework Methodology.

Results: High self-reported levels of adherence in the early stages of retention were linked to a desire to maintain orthodontic outcomes and the negative perception of potential post-treatment changes. However, adherence typically reduced over time due to a combination of factors including the negative impact of retainers on quality of life and pragmatic issues related to retainer wear. Network support was found to be important in the short and long term, with instances of self-directed wear and negative beliefs concerning the importance of retainer wear and predisposition to post-treatment changes. Lack of follow-up appointments and immaturity of participants prompted independent decisions to cease retainer wear.

Conclusions: Six key influencers of prolonged adherence with vacuum-formed retainer wear were identified. Future strategies to improve adherence should account for these while also being responsive to time elapsed since debond and patient age.

Al-Moghrabi D, Colonio Salazar FB, Johal A, Fleming PS. Factors influencing adherence to vacuum-formed retainer wear: A qualitative study. *J Orthod.* 2019;46(3):212–219.





Evaluation of the effectiveness of a tailored mobile application in increasing the duration of wear of thermoplastic retainers: a randomized controlled trial

Dalya Al-Moghrabi, Nikolaos Pandis, Kieran McLaughlin, Ama Johal, Nikolaos Donos, Padhraig S Fleming

Background

The ‘My Retainers’ mobile application is a patient-informed intervention designed to enhance removable retainer wear and associated patient experiences during the retention phase.

Objectives

To evaluate the effect of receiving the ‘My Retainers’ application on objectively assessed thermoplastic retainer (TPR) wear time, stability, periodontal outcomes, patient experiences, and knowledge related to retainers.

Materials and methods

Eighty-four participants planned for removable retention with TPRs were assigned either to receive the ‘My Retainers’ application or to control not receiving electronic reminders during the 3-month period. Randomization was based on computer-generated random numbers and allocation was concealed using opaque, sealed envelopes. The primary outcome was objectively assessed retainer wear recorded using an embedded TheraMon[®] micro-electronic sensor. Secondary outcomes, including irregularity of the maxillary and mandibular incisors, plaque levels, bleeding on probing and probing depth, were assessed at baseline and 3-month follow-up; and analysed using a series of mixed models. Experiences and knowledge related to orthodontic retainers were recorded using questionnaires. The outcome assessor was blinded when possible.

Results

Receipt of the mobile application resulted in slightly higher median wear time (0.91 hours/day); however, this difference was not statistically significant ($P = 0.56$; 95% confidence interval [CI]: $-2.19, 4.01$). No significant differences were found between the treatment groups in terms of stability ($P = 0.92$; 95% CI: $-0.03, 0.04$), plaque levels ($P = 0.44$; 95% CI: $-0.07, 0.03$), bleeding on probing ($P = 0.61$; 95% CI: $-0.05, 0.03$) and probing depth ($P = 0.79$; 95% CI: $-0.09, 0.07$). Furthermore, similar levels of patient experiences ($P = 0.94$) and knowledge related to retainers ($P = 0.26$) were found. However, marginally better levels of knowledge were identified in the intervention group. No harms were observed.

Limitations

A relatively short follow-up period with the study confined to a single-center in a university-based hospital.

Conclusions

Provision of the bespoke ‘My Retainers’ application did not lead to an improvement in adherence with TPR wear over a 3-month follow-up period. Further refinement and research are required to develop and investigate means of enhancing adherence levels.





Chapter

Tooth Morphology Overview

Abeer ALShami, Shatha ALHarthi, Munerah Binshabaib and Monika Wahi

Abstract:

This chapter provides an overview of tooth morphology, including a review of tooth anatomy, tooth development, and associated nomenclature and numbering systems. First, basic tooth morphology nomenclature is presented. Next, various tooth numbering systems are described and discussed, and the Federation Dentaire Internationale (FDI) system is detailed. Third, tooth surfaces and ridges are explained along with terminology, followed by an explanation of tooth crown and root anatomy. Fourth, the stages of tooth formation are described, starting with the bud stage, and followed by the cap stage, bell stage, and maturation. Annotated diagrams are presented for clarity. Finally, two currently accepted hypotheses explaining tooth formation are presented

ALShami A, ALHarthi S, Binshabaib M, Munerah, Wahi, M. (2019). Tooth Morphology Overview. In book: Basics of Dental Morphology and Anatomy 10.5772/intechopen.87153.





Do adjunctive statins improve periodontal treatment outcomes in patients with chronic periodontitis?

Suha Aljudaibi & Brett Duane

Study selection Controlled clinical trials studies with at least one month follow-up that utilised locally or systemically delivered statins as a sole adjunctive treatment to mechanical periodontal therapy in patients diagnosed with chronic or aggressive periodontitis were included. Selection was carried out independently by two reviewers.

Data extraction and synthesis Data were extracted to a spreadsheet with authors being contacted for missing data. Risk of bias for randomised controlled trials was assessed using the Cochrane tool with the ROBINS-I tool being used for non-randomised studies. Weighted mean differences between baseline and six months after periodontal treatment for clinical attachment level (CAL), probing pocket depth (PPD) and intrabony defect (IBD) were calculated.

Results Fifteen studies were incorporated in the systematic review, with ten investigations included in the meta-analysis. In the meta-regression, the additional use of simvastatin, rosuvastatin and atorvastatin decreased pocket depth in contrast with mechanical periodontal treatment and a placebo gel ($p < 0.05$). Simvastatin and rosuvastatin significantly reduced the development of intrabony defect in contrast with control group ($p < 0.05$). Statins failed to provide a statistically significant difference between the adjunct therapy for both periodontal pocket depth and intrabony defect ($p < 0.05$). Simvastatin provided a statistically significant improvement in clinical attachment level gain, as compared to the control group (2.02 ± 0.79 mm; $p = 0.043$).

Conclusions Improvements in periodontal parameters were observed with the use of statins as adjunct to mechanical periodontal therapy. Simvastatin was the main medication that demonstrated additional advantages in all assessed parameters. The use of statins in relationship with non-surgical scaling and root planing provided better clinical periodontal outcomes.

Aljudaibi, S., Duane, B. Do adjunctive statins improve periodontal treatment outcomes in patients with chronic periodontitis?. *Evid Based Dent* **20**, 18–19 (2019).





INTERNS ABSTRACTS





Antimicrobial properties of myrrh-synthesized silver nanoparticles against *Porphyromonas gingivalis*

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Objectives: Gingivitis is an oral condition characterized by inflammation and bleeding of the gingiva (gums) and is predominated by *Porphyromonas gingivalis*. Oral hygiene options for controlling *P. gingivalis* include mouthwash containing *Commiphora myrrha* (myrrh), which has been shown to be effective against the microbe. Silver nanoparticles (SN) have been studied for their antibacterial effect in different oral health applications, including mouthwash. This was an *in vitro* laboratory study of the actions of myrrh and SN against *P. gingivalis*.

Materials and Methods: Four conditions were tested: a) placebo solution, b) myrrh solution (MS), c) MS mixed with silver nanoparticles (MSN) and d) SN solution alone. Four agar plates in each condition (total n=16) were subjected to the agar disc diffusion method, and inhibition zones (IZ) were measured after 24 hours, 48 hours (time 2), and 72 hours (time 3). Fourier-transform infrared spectroscopy (FT-IR) was used to characterize SN and MSN, and UV-Vis and energy dispersive x-ray (EDX), were used to further characterize MSN.

Results: For IZs, after 24 hours, median MS IZ was 16 mm and for MSN, it was 15 mm. At time 2, MS median IZ was 15 mm, but MSN median IZ increased to 18 mm, and interquartile ranges (IQRs) did not overlap. At time 3, median IZs were similar again, with MSN and MS having IZs of 16 mm and 15 mm, respectively. SN showed no antimicrobial activity alone.

Conclusions: Our findings showed that MSN displayed superior antimicrobial activity against *P. gingivalis* compared to MS and SN after 48 hours of incubation, but not after only 24 hours. Further, the increased antimicrobial activity had ceased by 72 hours. Studies of the potential use of nanoparticles in oral health offer the possibility of new approaches to prevention and treatment of gingivitis and other oral health issues.





Awareness, attitudes and knowledge on dental implants among partially dentate patients in Riyadh city

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Objectives:

1. Assess the knowledge, awareness, and attitudes of partially dentate patients in Riyadh city toward dental implants as an option of replacement of missing teeth.
2. Determine the patient factors that would affect the treatment decision to replace missing teeth.

Materials and Methods: Descriptive cross-sectional study was assessed the awareness, attitudes, and knowledge on dental implants among partially dentate patients in Riyadh city, as an option for replacement of missing teeth. The Study included 419 participants; the age were above 18 years. The Surveying was distributed in Arabic and English language. SPSS version 20 was used to analyze the data.

Results: The result revealed that, 59.2% of the participants were females. 76.4% of participants were aware that they had missing tooth/teeth and missing teeth need to be replace by prosthetic means. 84.7% were aware of dental Implant and 54.9% prefer it as a replacement option. 39% of participant got their knowledge regarding dental implant from the dentist.

Conclusions: Sixty-one% of participants get their information about dental implant as an alternative treatment option for replacing missing teeth from friends & media. The study recommended increasing the role of dentist to give right knowledge related to the implant and other different dental prosthetic treatment.





Comparison between Patients', laypersons' and Dentists' Perception of Dental Appearance and Esthetic Analysis

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Objective: The purpose of this study was to evaluate how patients, dental practitioners and laypersons differ in their perception of dental appearance and smile esthetics.

Materials and methods: A cross sectional study, to compare the patients' dental students' and dentists' perception of dental appearance through dental standard digital photographs and Dental Appearance Questionnaire. Fifty patients with no previous history of esthetic dental work were asked to answer the Dental Appearance Questionnaire (QDA). Length-width of central incisor, laterals and canines, skin and tooth shade, age of patient and level of education were recorded. The laypersons, dental students and dentists were asked to evaluate the photographs with smiling and with retracted lips according to the aesthetic appearance on Linear Scale from (0-10) where 0 represent (absolutely unaesthetic) and 10 represent (absolutely aesthetic). One-way ANOVA and t test analysis were measured for each group.

Result: Patients' satisfaction level towards six measures describes the appearance of teeth including its shape, size, color and position; where in general patients of the sample were **satisfied** about most of items related to the smile and dental appearance. Patients agreement level towards five negative self-behavioral attitudes describes their reaction to the smile and teeth appearance; in general patients of the sample were **disagreed** with most of items. The laypersons' sample included 488 participants, generally laypersons' perception towards the aesthetic smile and dental appearance for photos with lips and without lips had significant different for (46) of the patients. Whereas for dentist sample a 90 dentists' perception towards the esthetic smile and dental appearance for photos with lips and without lips were the same for (23) of the patients.

Conclusion: Perception of smile esthetics differed between dentists and laypersons. Multiple factors can influence the perception of smile esthetic.





Restoration Discoloration After Silver Diamine Fluoride Application

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Objectives:

1. To examine the restoration color change overtime after Silver Diamine Fluoride (SDF) application and tooth restoration.
2. To examine different restorative material to minimize discoloration after SDF application.

Materials and Methods: A Sample of 30 sectioned carious permanent posterior teeth were mounted and assigned randomly into 3 different groups (n=10). SDF application on all samples; first group was restored immediately with composite, second group was restored immediately with GIC, for the third group, no restoration was applied after SDF application to serve as a control group. Colour measurement using a spectrophotometer was taken immediately after treatment for all samples, then measured again after two weeks and after 4 weeks. Colour change (ΔE) was calculated for each sample in each time point. All the samples were restored in a distilled water throughout the study. Data were analysed using repeated ANOVA.

Results: Mean discoloration for GIC was higher compared to the composite group, (68.16) (53.08) respectively. For the three study groups, there was a significant color change ($p < 0.0001$) between the three-time measurements, discoloration decreased overtime. Teeth restored with SDF only showed less dark stain than teeth restored with GIC, which means GIC effect in minimizing SDF discoloration did not show a positive effect. On the other hand, teeth restored with composite after SDF application showed a better effect in minimizing the stain than teeth restored with GIC. Moreover, the data between third group (SDF only) and the first group (SDF + Composite) showed no significant difference in the mean ΔE values of SDF (50.58) and Composite (53.08) groups.

Conclusions: Discoloration after SDF application decreased over time when compared to immediate application regardless of the treatment choice. Teeth restored with GIC after SDF application showed higher discoloration when compared to teeth restored with composite restoration.





Dimensional Accuracy of Working Dies Fabricated by Different Impressions; *In-vitro* Study

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Objectives: To compare the dimensional accuracy of working dies utilized by two different impression materials (Aquasil and Virtual) that fabricated by two different impression techniques (One-step and Two-step).

Materials and Methods: Forty working dies (n=40) were fabricated from 40 impressions that was taken on prepared molar tooth replica using two different PVS impression materials; Aquasil and Virtual, 20 impression each. Two different impression techniques used with each type of impression material; One-step impression technique using light body and heavy body consistencies, and Two –step impression technique using light body and putty consistencies, 10 impressions for each technique. The Dimensional accuracy of the tooth replica was compared with the working dies using digital caliper and 3D shape scanner.

Results:

A) Regarding the effect of different impression **materials**:

Based on 3D scanner, there is a significant difference of dies fabricated by the two tested impression materials (Aquasil and Virtual) using two-step impression technique in Mesiodistal-Gingival dimensions (IIA and IIB) groups in relation to the prepared tooth replica with an average $0.370 \mu m$ ($P < 0.005$).

B) Regarding the effect of different impression **techniques**:

Based on 3Shap Scanner, there is a significant difference of the dies fabricated by the two tested impression techniques (One-step and Two-step) using virtual impression material in Mesiodistal Occlusal dimensions (IB and IIB) groups in relation to the prepared tooth replica with an average $0.135 \mu m$ ($P < 0.03$). Moreover, a significant difference of the dies fabricated by the two tested impression techniques (One-step and Two-step) using Aquasil impression material in Mesiodistal-Gingival dimensions (IA and IIA) groups in relation to the prepared tooth replica with an average $0.490 \mu m$ ($P < 0.001$), and in Buccolingual-Gingival dimensions (IA and IIA) groups in relation to the prepared tooth replica with an average $0.143 \mu m$ ($P < 0.005$).

Conclusions: Among the fabricated dies there is no significant difference tested by two impression materials. Aquasil impression material using the two-step impression technique showed less accuracy in Mesiodistal Gingival dimensions compared to the fabricated dies by Virtual impression material. Moreover, there is a significant difference between the dies fabricated by the two tested impression





techniques in all dimensions. However, the dies fabricated by one-step impression technique showed better accuracy compared to dies fabricated by two-step impression technique. Nevertheless, in Buccolingual-Occlusal dimension there is no significant difference.





Infection Control Awareness Level among Dental Laboratory Technicians, Riyadh-Saudi Arabia

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Objectives: The aim of this study is to evaluate the knowledge, attitude, and practice among dental lab technicians toward infection control protocols at the dental laboratories of Riyadh.

Materials and Methods: A self-administered questionnaire was distributed to dental lab technicians working at both private and governmental laboratories in Riyadh. Data were collected from one hundred and twenty-one dental laboratory technicians.

Results: According to the findings, only 42.9% had an infection control manual display in the dental lab, 43.8% had received infection control training courses as part of their orientation, 40.4% of the technicians had a valid hepatitis B vaccination. Dental technicians are exposed to high risk of injuries, 72.7% of respondents answered Yes, when they were asked about reporting sharp injuries to laboratory administration.

Conclusions: There was poor compliance to infection control procedures, dental techniques are at increased risk of cross-contamination and infection, they have limited orientation and knowledge on the infection control guideline and policy.





Knowledge and Self-perceived Confidence Level in Oral and Maxillofacial Surgery among Dental Interns in Riyadh

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Objectives: To assess the knowledge and confidence level between male and female dental interns in private and governmental Riyadh dental schools in performing simple dento-alveolar procedures.

Materials and Methods: The study will be conducted among dental interns from all Riyadh dental schools. Around 300 participants belonging to 6 Riyadh dental schools will comprise the study population. All interns will be included in the study after obtaining informed consent.

Results: Out of 300 interns invited to participate, 210 submitted the electronic survey (70%). The final study population included 117 (56%) females and 93(44%) males. 111 (53%) belonged to governmental college, and 99 (47%) belonged to a private college. A positive significant correlation was found between the total score knowledge and the total score confidence in performing surgical procedures.

Conclusions: The study provides baseline data on the knowledge and perceived confidence of dental interns in Riyadh city Saudi Arabia about certain clinical procedures in oral surgery. With most respondents being knowledgeable in most practiced clinical procedures and lacking knowledge in the least practiced ones.





Anatomical Assessment of Mandibular Foramen location: A Cone-Beam Computed Tomographic Study

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Objectives: The present retrospective study was performed to analyze the location of mandibular foramen (MF) in a vertical and horizontal directions by using CBCT volumetric data set in a group of adult population.

Materials and Methods: This study was conducted using 51 CBCT data for 24 males and 27 females who were randomly collected from the Oral & Maxillofacial Radiology Division, Faculty of Dentistry, PNU between 2017 to 2019 following inclusion criteria. The CBCT exams were acquired using i-CAT 3D imaging system (Imaging Science international, USA 2008). Standardization of the 3D rendered volume within the three co-ordinates were made. Then, junior examiners were trained and calibrated to identify all the mandibular landmarks utilized in the study using different CBCT volumetric data sets. Confidence interval and inter examiner reliability were measured statistically. All measurements (MF/A, MF/I, MFS, MFP, MFO) * were done on both right and left rami hence; 102 CBCT were analyzed.

Results: A total of 51 CBCT records were retrieved and analyzed. Among them 24 (47.04 %) were males and 27 (52.92%) were females. Age group ranged from 18-55, with mean age of 25.08 ± 10.98 . There was statistically significant difference between different age group for MF/A ($P= 0.0411^*$) and for the MF/superior vertical height ($P= 0.0082$) and there was statistically significant difference between gender and MF/I ($P=0.0045^*$) and for MF/superior vertical height ($P= 0.0297$).

Conclusions: Since our results showed the mandibular foramen, is located more anteriorly and inferiorly and in direct correlation with different patients' age groups and gender. Patient age and gender appeared to be particularly useful in predicating the location of the mandibular foramen and will be helpful for block anesthesia of inferior alveolar nerve and Orthognathic surgery. Further clinical studies have to be conducted to validate the other parameters used in this study.





Comparison of flexibility and fatigue behavior of Co-Cr and acetal resin RPD clasps: An *in-vitro* study

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Objective: To compare the flexibility and fatigue behavior between cobalt chromium (Co-Cr) and acetal resin (thermoplastic) clasps

Materials and Methods: Flexibility and fatigue behavior for testing materials were evaluated in-vitro. 40 samples were included in the study out of which 20 were Co-Cr and 20-acetal resin. Samples dimensions were 1.2 mm thickness, 1.5 mm width and 20 mm length with half round cross section. Each group had been divided into two groups for testing the fatigue and flexibility through compression stress. The static fatigue was applied to the samples until the fracture of the samples. While the flexibility was evaluated by applying gradual load till the beginning of the permanent deformation, and the maximum compression stress was measured. The data were collected and statistically analyzed.

Results: The mean fatigue load for Co-Cr samples was 56.58368 N with compression stress 3.2 ± 0.12 and for acetal resin was 53.46652 N with compression stress 3.02 ± 0.15 to produce permanent deformation.

While the mean load for flexibility in Co-Cr was 5.93942 N with compression stress 0.33 ± 0.06 , while for acetal resin was 7.34548 N with compression stress 0.41 ± 0.06 .

Conclusions: The mean compressive stress for Co-Cr and acetal resin were relatively the same in fatigue test. The compression stress for testing the flexibility of acetal resin samples was higher than Co-Cr samples. Thereby the acetal resin clasps might give less stress on the abutment and preserves the health of periodontium.





Cost effectiveness of using matching vs non matching greater taper gutta percha cones in continuous warm vertical condensation

An *ex-vivo* study

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Objectives: The aim of this study was to use micro-computed tomographic imaging (micro CT) to compare apical third obturation quality in canals filled using non-standardized, ISO standardized greater taper gutta percha (GP) cones and Niti system matching GP cones with warm continuous wave condensation (CWC) technique, and analyze it in relation to the cost of using each type of cone defined by cone price and the time required to fit the cone in the canal.

Materials and Method: This *ex.Vivo* study was conducted on 36 extracted teeth, with single straight root canals. Root canal instrumentation was carried out using Protaper NEXT (PTN) rotary NiTi instruments according to manufacturer recommendations. Specimens were then randomly divided into three groups according to GP cone type used for canal obturation; Group (A): Non-standardized Medium GP cones calibrated to size 30 using an endodontic gutta percha calibrator and cutter; Group (B): PTN GP cones size X3, and Group (C): ISO standardized greater taper GP cones size 30 taper 0.04 (30 .04). Time required to fit the cone in the canal was quantified by the number of modifications (cone cutting) required for proper cone adaptation. Obturation of the apical third of the canals was done using CWC and AH 26 sealer. Obturation quality was assessed using micro CT to measure voids and sealer volume and percentage.

Results: While the results showed no statistically significant difference between the groups regarding voids volume ($p=0.3017$), void percentage ($p=0.3514$), and number of modifications for proper cone fit ($p= 0.3526$). There was statistically significant difference in sealer volume and sealer percentage. Group (C) (30 .04 GP cones) sealer volume and percentage was significantly lower compared to group (B) (PTN GP cones) ($p=0.0029$), ($p=0.0017$).

Conclusions: In straight canals, using expensive GP cones that match the Niti instrumentation system with CWC technique was not associated with significantly better obturation quality in the apical third or more saving of money-costing time to fit the cone within the canal compared to ISO standardized greater taper GP cones and non-standardized GP cones. Furthermore, studies should be done to better understand the significance of this clinically.





Antibacterial Efficacy of CPP-ACP Compared to Calcium Hydroxide as Intracanal Medicaments Against *E. Faecalis*: In-Vitro Study

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Objectives: The aim of this study was to assess the antibacterial efficacy of CPP-ACP as an intracanal medicament against *E. Faecalis* and compare it to Calcium Hydroxide “the gold standard” intracanal medicament.

Materials and Methods: The study is an in-vitro randomized controlled study, conducted on 60 single canal permanent teeth. The study samples were divided into three equal groups: Negative control, Calcium hydroxide and CPP-ACP as intracanal medicaments. The intracanal medicaments were placed for 7 days. The outcome was measured using colony forming units. Statistical analysis is done using variance test (One-Way ANOVA), and Tukey’s Post Hoc Test to test any significant difference between the groups.

Results: The mean bacterial count for group 2 (Calcium Hydroxide) was significantly different compared to group 1 (Negative Control) and group 3 (CPP-ACP).

Conclusion: CPP-ACP showed less antibacterial efficacy against *E. Faecalis* as intracanal medicament as compared to calcium hydroxide.





Dental Age Assessment of 5-17 Years Old Children in Saudi Arabia Using the Demirjian's Age Estimation Method

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Objectives: Assess the accuracy of the Demerjian age estimation method (DJ) when applied to the Saudi Population in Riyadh city and create a regression model adapting the DJ for better application.

Materials & Methods: In this retrospective, cross-sectional study, 465 digital OPG radiographs were selected from healthy children aged between 5 and 17 years old, taken previously from multiple centers in Riyadh. The DJ method was used to estimate the age (EA) of the patient; then, it was compared to the chronological age (CA) of the patient. A mean difference between EA and CA of less than 0.5 years was considered as the threshold for acceptable difference.

Results: The sample consisted of 232 male and 233 female OPGs divided into 13 age groups each. There were statistically significant differences between EA and CA among 8 male and 9 female groups. Age was overestimated for 6 male groups (5,6,12,13,14,15) with a mean age difference of 0.61 to 1.68 years and 3 female groups (6,12,13) with a mean age difference of 0.64 to 1.19 years. Significant underestimation was found in one male group (17) with mean difference of -1.24 and two female groups (16,17) with a difference of -0.65 and -1.19 retrospectively. A proposed Logistic regression model was formulated to better adapt the DJ for the Saudi Population.

Conclusion: The original DJ method had better age prediction for Saudi females compared to the male sample. The DJ tends to overestimate age for age groups from 5-15 and underestimate for ages 16 and above. Due to the high number of inaccuracies in the prediction using DJ, it is not recommended to be used in the clinical situation on the Saudi Population. A modified model is proposed for better age estimation using the DJ method.





Parental Awareness and knowledge towards space maintainer effectiveness as an essential intervention after premature extraction of primary teeth

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Objectives: The current study was conducted to assess knowledge and awareness of parents towards space maintainer and its importance as an interceptive strategy after premature loss of primary teeth.

Materials and Methods: The present study is a cross sectional descriptive study (a questionnaire based) that was conducted on a sample size of 600 parents recruited from outpatient dental clinic at Princess Nourah Bint Abdulrahman University. The questionnaire was distributed among parents and was composed of two sections. The first section collected the socio-demographic data of the participants the second section collected parental knowledge about space maintainers. The informed consent was obtained prior to participation and Ethical approval was obtained from the research ethics committee of Dental College.

Results: A total of 600 parents participated in this study. The total mean awareness score regarding space maintainer was 7.97 ± 3.38 . Mean awareness score for males was 7.06 ± 2.99 and females was 8.26 ± 3.45 . The difference in the mean awareness score was statistically significant ($p < 0.001$). There was statistically significant difference in the awareness score and age group, with 31-45 age groups have highest knowledge. ($p = 0.0197$). There was a positive correlation between the awareness score and number of Children in the family. Parents who had one child showed less awareness compared to those who have 2-4 children ($p = 0.0121$).

Conclusions: From the results of this study we conclude that it is important to increase the awareness about the space maintainer as an interceptive strategy after premature loss of primary teeth among parents, using a variety of educational methods.





Percentage of oral lesions and periodontal disease among diabetic females attending Princess Nourah Bint Abdulrahman University (PNU)

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Objectives:

- 1-To evaluate the percentage of different oral lesions among diabetic female patients.
- 2- Association between periodontal status and diabetes

Materials and Method: A retrospective study was performed by reviewing the files of all patients who visited Faculty of Dentistry, PNU University during the last 5 years. We selected Diabetic, 20-40-year-old female patients. Ethical approval was obtained from Institutional Review Board. Data collection sheets were used to gather information on demographics, education, medical and dental history, extra and intra-oral findings. Data on the duration of diabetes, any major complications, and type of diabetes therapy were retrieved from medical records. The data was entered into excel sheet and descriptive statistics was performed. Analytical phase will proceed to correlate oral lesions with patient age, type of diabetes and periodontal status.

Results: 226 patients were included in the study. The highest percentage for oral lesion were traumatic ulcers 10.2%, while the least was fibroma 2.7% of the total patients. Periodontitis had significant effect on oral lesion ($p < 0.05$) for each increase in the level of periodontitis the oral lesion will increase, while age had no significant effect on oral lesion ($p > 0.05$).

Conclusion: In the present study, the diabetic sample showed high percentage of both oral lesions and periodontal disease especially in high age group. Strong correlation existed between patients with severe periodontitis and oral lesions.





Assessment of Saudi dental graduate and senior students' knowledge regarding radiation protection and practice

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Objective: To assess the knowledge, practice and hazards of radiation protection among seniors' dental students and freshly graduates.

Materials and Methods: A cross sectional study was conducted through distributing a structured and validated questionnaire composed of seventeen questions as an online survey.

Results: Two hundred and four participants were enrolled in the study in which one hundred sixteen were graduate and eighty-eight were seniors. The result revealed that majority of participant have a good knowledge about ALARA, radiosensitivity of thyroid gland, importance of lead apron, radiation symbol and what CBCT stands for. The majority of participant choose the incorrect answers regarding, rectangular collimator, basic principles of MRI well as stochastic effect of radiation. Moreover, 50% graduates and 34% seniors have the correct knowledge about performing x-ray to pregnant female. Furthermore, 50.0% of graduate and 46% of seniors answer correctly when asked about the ideal distance between the operator and the x-ray tube. Concerning film speed graduate and senior correct answer percentage were 44.7% and 45.5% respectively.

Conclusions: Majority of Saudi Freshly graduate and senior students had appropriate knowledge about radiation protection and practice. However, workshops and continuous education programs should emphasize on some important knowledge regarding this information. In addition, curriculum design should be regularly updated according to the student's needs.





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