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Abstract Booklet

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Message from the Head of School
Professor Pauline Ford

It is a pleasure to welcome you to the 2019 School of Dentistry Undergraduate Research Conference.

The school has a strong tradition in student research. As soon to be graduates of this program, you will all continue to engage with research. The UQ BDSc(Hons) program ensures that students are supported in developing not only the academic and technical skills required to deliver the highest quality dental care to their patients and their community, but that they also develop the skills and attributes that will distinguish them as UQ graduates, enhancing employability across their career span. These skills and attributes are more difficult to define but they are critically important to our graduates' success in a world where change is constant – leadership, resilience, adaptability, integrity, reflexivity and curiosity. An authentic research experience provides an opportunity for the development of many of these characteristics. Through this course, you have had the opportunity to gain hands on experience in research practice under the guidance of an expert mentor, with the possibility of publication in the academic literature thereby contributing to the professional knowledge base.

To tackle the health issues of the future it is recognised that we must embed research into the way we practice. Health services are under increasing strain as demographics change, technology advances and demand for health care surges. There is no option of continuing to do things the way they are currently done. We simply won't have the resources. The health system and our profession must pursue new knowledge and ways of doing things and identify ways to improve health outcomes, minimise adverse events and build cost effectiveness. To achieve these goals it will be important that we work in partnership with all stakeholders including industry, to ensure research targets clinically important issues and translates to better health outcomes.

A great example of this is the generous support provided by Colgate in making today's event possible. I would like to express my warmest congratulations to the students and staff involved for their achievements in the projects presented today, and hope that you all enjoy learning about the undergraduate research that has been undertaken in 2019.

Professor Pauline Ford
Head of School

Message from the Course Coordinator
Associate Professor Ratilal Lalloo

As Course Coordinator I am extremely proud of the research carried out by all of the fifth year Dentistry students.

For many this was probably a first go, and hopefully not the last, at the full process of conducting research, from the initial idea to publishing their abstract in this booklet and presenting their work at this research conference.

This year we have 21 projects completed, across a diverse range of disciplines, ranging from quality audits and research to improve patient care and service delivery, and most effectively use our scarce resources, oral health of vulnerable populations, diagnostic services, dental materials and endodontics, to the well-being of our students.

Students, we hope you have learnt and appreciated the importance of research, of the ethical principles of research, of the steps from taking your research idea to publicising your findings and seeing the application of research to evidence-based clinical practice and its broader public health good.

We hope you enjoy the experience and opportunity to present your research at the 4th School of Dentistry Student Research Conference.

Our sincerest thank you to all the supervisors who have mentored and supported our students to this important milestone of the research process.

Our thanks to the student administration team, school colleagues and assessors who have all ensured that this course and all its components progressed smoothly and successfully.

Our gratitude to Colgate for their generous support for this research conference.

Wishing our graduating students all the very best for a successful and productive professional career.

Associate Professor Ratilal Lalloo
Course Coordinator

STUDENT ABSTRACTS

Exploring Student Knowledge and Attitudes towards Saliva Screening for HIV in a Dental Setting: a Mixed Methods Study

Researchers: Chui Yi Sarah Low, Cyril Liu, Sung-Beom Justin Kim
Supervisor: Nicole Stormon

Background

Early detection of Human Immunodeficiency Virus (HIV) allows antiretroviral therapy to commence leading to better patient outcomes. Screening for HIV with saliva testing can be undertaken by dental practitioners, and previous research has found the procedure to be fast, less invasive and better accepted by patients than traditional blood tests. However, lack of knowledge of saliva screening for HIV, time constraints and providing follow-up for positive results were identified as barriers to implementation for dental practitioners.

Objective

This study aimed to investigate dental students' knowledge of HIV and their attitude towards implementing saliva screening for HIV.

Method

Convenience sampling was used to recruit four focus groups of six to nine dentistry students each from the University of Queensland. Participants completed a pre-focus group survey and were asked about their knowledge, attitudes and experiences with HIV and saliva testing.

Results

Thirty-three students participated in the focus groups. Students recognised their knowledge of HIV was limited and 46% (n= 15) reported having treated a HIV-positive patient in the last year. During focus group discussions, many students were unaware saliva testing could be used to screen for HIV, but believed the test could be useful for both the dental practitioner and patient. Students identified factors such as stigma, cost, and time restraints as barriers to implementing the test. Opinions varied on if the screening test was within a dental practitioner's scope of practice.

Conclusion

While students were open to implementing saliva screening for HIV in practice, factors such as lack of training, time and cost were prominent barriers limiting implementation. Education on saliva screening for HIV, patient counselling and referral pathways could be integrated further into dentistry curriculums. Further investigation is needed into the cost-effectiveness of implementing screening in a dental setting.

Association between infant feeding practices and early childhood caries in Aboriginal and Torres Strait Islander children

Researchers: Fiona Ma, Li Y. Lim, Haotian Zhang
Supervisor: Nicole Stormon, A/Professor Ratilal Lalloo

Background

Aboriginal and Torres Strait Islander children report higher levels of early childhood caries (ECC) than non-Indigenous counterparts. Early risk factors need to be identified to reduce the burden of disease. Current literature provides limited or inconsistent evidence on the relationship between infant feeding practices and ECC.

Objective

This study aims to investigate associations between early feeding habits and ECC in Indigenous children.

Method

Data from the Longitudinal Study of Indigenous Children was extracted for retrospective analyses. Descriptive analyses, χ^2 tests and bivariate logistic regression analyses were performed to identify significant differences in the prevalence of carer-reported caries at ages 4½-6 years across feeding variables at ages ½-2 years.

Results

Of 1,010 Indigenous children involved in the study: Breastfeeding (OR 1.55 CI 1.04-2.31), cordial consumption (OR 1.78 CI 1.27-2.52) and nocturnal fruit juice consumption (OR 1.97 CI 1.07-3.63) were significantly associated with increased ECC odds. Formula feeding was significantly associated with decreased ECC odds (OR 0.63 CI 0.42-0.93).

Conclusion

The findings support the importance of early feeding interventions to reduce ECC risk in Indigenous children. Future studies should account for the multifactorial nature of caries by controlling confounders and should rely on assessments performed by health professionals to increase data validity.

Dental anxiety in Australians experiencing homelessness

Researchers: Kumiko Yokota, Tara Tan Ping, Sheng Wey Yu
Supervisor: Nicole Stormon

Background

People experiencing homelessness in Australia suffer from poorer oral health compared to the general population. High dental anxiety is a major barrier to accessing oral health care and has been shown to be experienced to a higher extent in the homeless population. Currently, no such studies have been performed in Australia.

Objective

This study aimed to explore dental anxiety in Australian people experiencing homelessness. The prevalence, severity and nature of dental anxiety in this population were determined and compared to the general Australian population. This study also investigated the relationships between high dental anxiety against demographic and oral health factors.

Method

The Dental Anxiety Questionnaire (DAQ) and the Index of Dental Anxiety and Fear (IDAF-4C+) module questionnaire were completed by people experiencing homelessness in Brisbane, Australia. Demographic and oral health factors data were also obtained, followed by oral health screenings.

Results

A higher prevalence of high dental anxiety (28.2%) and dental-related phobia (6.6%-23.9%) were found in those experiencing homelessness compared to the Australian norm. A higher mean IDAF-4C summed score at 18.02 (CI 15.60-20.43) and a higher mean score in regards to feeling embarrassed or ashamed as anxiety-inducing at 2.27 (CI 1.89-2.64) were reported in people experiencing homelessness compared to the general population. No significant findings were established between high dental anxiety against demographic and oral health factors.

Conclusion

This study reported a higher severity and prevalence of dental anxiety in the homeless population which was different in nature compared to the general Australian population. Consequently, it is imperative to develop a more tailored approach to identifying and managing dental anxiety while providing oral health care to those experiencing homelessness.

Factors influencing a patient's search for a dental clinic

Researchers: Michelle Chen, Roland Yen Weng Foo, Dylan Feng Wei Fu
Supervisor: Christopher Sexton, Dr Sandra March

Background

Digital information is competing with the traditionally trusted word-of-mouth referrals as an information source. Evidence is lacking in how this has impacted a person's search strategy during the search for a dental clinic. Current literature focuses on dentist preferences based on retrospective experiences.

Objective

The study investigated the important information sources, facility, service and dentist factors during the Brisbane adults' search and selection process for a dental clinic prior to their initial visit.

Method

We surveyed 146 Brisbane adults in public areas situated around Brisbane.

Results

Recommendations from family members (93.2%), friends (88.4%) and healthcare professionals (84.2%) were the most important sources of information, accounting for the majority (61.6%) of the initial information source used. Important digital sources of information were in the form of online reviews (61.6%) and dental clinic websites (58.2%). The most important factors influencing the search of a dental clinic were the ability to book an appointment within a short time period (95.9%), cost of treatment (93.2%) and dentist's years of experience (80.8%).

Conclusion

Word of mouth remains the most important source of information during the

search for a dental clinic. While digital media is a significant source of information, it was more limited to younger people. Important facility and service factors were related to convenience and cost. Years of experience was the only important dentist characteristic. In the future, dental care providers can consider improving their word-of-mouth reputation, as well as increasing the convenience of attendance and appointment booking

The role of social media in 21st century dentistry

Researchers: Angela Chen, Haneul Kim, Li En Ang
Supervisor: Dr Emma Bartle

Background

The growth of social media has revolutionised the way dentists connect with the community. With increased ease of communication and convenience, it can also attract potential patients through marketing tactics. However, little is known regarding dentists' behaviours on social media and opinions regarding professional use.

Objective

This study explored the role of social media for dentists in Australia and New Zealand. It aimed to investigate the current usage patterns of social media for professional purposes, to explore their preferences of various social media platforms and rationale behind such choices and to identify the advantages and disadvantages of using social media for professional purposes from a dentist's perspective..

Method

Dentists registered with the Dental Board of Australia and New Zealand were invited to complete an online questionnaire from Facebook dental forum 'Dental Product Review (DPR). Respondents were questioned on their social media usage and attitudes toward professional applications of social media.

Results

Over 90% of respondents utilised social media accounts daily, with the most popular platforms being Facebook and Instagram. Respondents used social media mainly for personal purposes, while only 21% employed dental practice marketing. Despite a generally positive attitude towards social media, some dentists have raised concerns about consent privacy and quality control.

Conclusion

Social media and its use by dentists will continue to grow and have a greater future impact. Clearer guidance on how to utilise social media in an effective and professional manner should be highlighted by governing dental bodies. This will allow dentists to maximise their social media engagement and reap its benefits.

Knowledge, oral hygiene behaviours and clinical periodontal parameters among periodontal patients

Researchers: Cindy Pham, Zhi Hao Tan, Henrietta Wu
Supervisor: Dr Kelly McGowan

Background

Patient education is often provided in periodontal therapy on the assumption that oral health behaviours and decision making is dependent on the patient's understanding of their disease. However, no previous studies have explored knowledge of periodontal disease and oral health status in patients diagnosed with periodontitis.

Objective

This study developed an instrument to quantitatively measure patient knowledge of periodontal disease and assessed for possible associations between periodontal knowledge, oral hygiene behaviours and clinical periodontal status in patients diagnosed with periodontal disease.

Method

A cross-sectional pilot study involving 30 adult patients diagnosed with periodontitis was conducted at the University of Queensland Herston Oral Health Centre. A questionnaire was administered to quantitatively measure patient knowledge of periodontal disease, and assess for associations between knowledge scores, self-reported oral hygiene behaviours and clinical periodontal status. Univariate and multivariate linear regression analyses were used to analyse the data.

Results

An analysis of questionnaire responses demonstrated knowledge deficits across all themes among patients diagnosed with periodontal disease. Statistically significant associations were demonstrated between knowledge scores and self-reported ability to clean teeth, the number of remaining natural teeth, and self-reported periodontal knowledge in the univariate analyses.

Conclusion

The results of the study cannot demonstrate whether knowledge of periodontal disease is correlated with oral hygiene behaviours and clinical periodontal status. Further research on the effect of knowledge on treatment outcomes is recommended with a prospective study and larger sample size.

Survey of postgraduate periodontal clinic patients: Patient-reported quality of life prior to non-surgical periodontal treatment

Researchers: Alexandra Coombs, Jack O'Neill, Jessica Atalla
Supervisor: Dr Kelly McGowan, Dr Troy McGowan, Professor Saso Ivanovski

Background

This study aimed to pilot a quality of life (QoL) questionnaire tailored for periodontal patients to determine how periodontitis impacts on their daily lives and where the value in periodontal treatment lies from a patient perspective.

Objective

This study aimed to pilot a quality of life (QoL) questionnaire tailored for periodontal patients to determine how periodontitis impacts on their daily lives and where the value in periodontal treatment lies from a patient perspective.

Method

A cross-sectional QoL survey of patients presenting for their first appointment at a post-graduate periodontal clinic was conducted. Demographic data and clinical periodontal parameters were recorded from the dental record. Linear regression models were used to examine associations between demographic and clinical variables and QoL.

Results

Twenty-six participants met the inclusion criteria and consented to complete the questionnaire. The mean ± standard deviation (SD) QoL was 22.8 ± 8.0, with 36 being the highest possible score and indicating the maximum impact on QoL. The most commonly reported QoL concerns related to losing teeth (82%), perceived looseness of teeth (70%), and sensitive teeth and/or gums (63%). Self-reported knowledge of periodontitis (6.9; 95% CI 2.2, 11.5; p<0.01) and age (-0.3; 95% CI 0.5, -0.0; p=0.02) were associated with QoL in the adjusted linear regression model.

Conclusion

Periodontitis has a considerable impact on the QoL of patients. High-value periodontal care from a patient perspective should include education and reassurance about the likely loss of teeth, splinting where indicated to address subjective mobility, and desensitisation treatments where needed. Future prospective studies are needed to determine whether QoL improves after periodontal treatment.

Reasons for tooth extraction in emergency and general courses of care at a public dental service

Researchers: Ying Yuen Timothy Chin, Cloe C. Hui, Likai Poh
Supervisor: Dr Kelly McGowan, Dr Troy McGowan, Dr Jessica Zachar

Background

High demand for dental services and finite funding mean patients who seek emergency care through the public system are ineligible for multiple appointments or complex treatments. This influences treatment planning and periodontally compromised teeth may be extracted due to limited available treatment options and the inability to provide follow-up care.

Objective

This study aimed to determine the reported reasons for tooth extraction in patients seeking dental treatment in West Moreton Oral Health Service, to determine whether the nature of and reasons for tooth extraction varied between general and emergency courses of care and investigate the clinical justification for the decision to extract periodontally compromised teeth.

Method

A retrospective audit of extracted teeth from the West Moreton Oral Health Service was conducted using ADA item codes and clinical notes from January 2018 – December 2018. The primary reason for extraction, age, course of care, location and type of tooth was recorded. One month of data was randomly selected and clinical records for patients seen in September 2018 were reviewed to determine the clinical diagnosis of extracted teeth. The clinical measurements used for periodontal extractions were also recorded and chi-squared tests were used to determine statistical significance.

Results

In 2018, 9469 teeth were extracted. In September 2018 (N=506), caries was the most common reason for extraction (46%), followed by periodontal disease (14%). The primary reason for extraction was found to be significantly different (p<0.001) between emergency and general courses of care. Mobility was recorded as a justification in 90.1% of periodontal extractions.

Conclusion

Patients often present for emergency care with severe disease and are ineligible for complex treatment to save teeth. Caries was the most common reason for extraction. Periodontally compromised teeth were more likely to be extracted in emergency appointments. Many periodontal extractions were based on non-prognostic indicators such as mobility.

Emergency Department Presentations for Dental Conditions in West Moreton

Researchers: Anderson Wong, Ian Pang, Janice Wu
Supervisor: Dr Kelly McGowan, Dr Ellen Gielis, Dr Jessica Zachar

Background

Dental conditions are the fourth leading cause of potentially preventable hospitalisations (PPH) in Australia. The aim of this study is to investigate the nature and frequency of PPHs for dental conditions in West Moreton Hospital and Health Service (WMHHS).

Objective

To determine the number of potentially preventable dental hospitalisations and cost incurred at Ipswich Hospital Emergency Department (ED) in the 2017-2018 financial year along with potential strategies to reduce the number of these presentations in the West Moreton Hospital and Health Service (WMHHS).

Method

A retrospective cohort study was conducted at Ipswich Hospital (IH) Emergency Department (ED) from 1st October 2017- 30th September 2018. Patients were identified through IH Emergency Department Information System and their dental records were obtained from the Information System for Oral Health database. Data were then tabulated and chi square tests were used to investigate any significant differences between abscesses/cellulitis and less severe presentations.

Results

Overall, 417 of the 541 dental related presentations could have been prevented in a general dental setting. Patients who presented to the ED with abscess/cellulitis spent more time in ED and were less likely to have attended a dental appointment in the 12-month prior. Overall, 77% of all presentations to ED were discharged home on the same day with only 13 patients admitted into hospital. The total cost attributable to potentially preventable dental hospitalisations (PPDH) was AUD$258,177.

Conclusion

The majority of dental presentations to ED are due to dental abscess and toothache. These conditions are preventable and could have been diagnosed earlier and treated in a general dental setting rather than the ED. Understanding and removing the barriers to timely dental care in the community would reduce the financial burden of PPHs for dental conditions in WMHHS.

Nature and cost of dental treatment provided under general anaesthesia in West Moreton Hospital Health and Service

Researchers: Jiman Han, Khai S Chieng, Shan Y Ong
Supervisor: Dr Kelly McGowan, Dr Ellen Gielis, Professor Pauline Ford

Background

Dental general anaesthesia (DGA) increases the risk of complications for the patient and treatment cost for the health system. This study aimed to determine the demographic and clinical characteristics of patients who require DGA in West Moreton Hospital and Health Service (WMHHS) and associated costs.

Objective

This study assessed the nature and cost of dental treatment provided under general anesthesia in West Moreton Hospital Health and Service

Method

A retrospective cohort study of patients admitted to Ipswich Hospital for DGA from October 2017 to September 2018 was conducted. Patients were identified through the Information System for Oral Health (ISOH) database where demographic and treatment data were recorded. Chi-square tests were used to compare the nature and frequency of treatment across 4 age groups.

Results

194 patients received DGA over the 12-month study period, of which 73% were aged between 0-9 years. Patients averaged more than 4 restorations and 4 extractions per DGA and the average treatment cost provided was $1,605.10 ± 210.76. Provision of DGA in hospital cost nearly 4 times more compared to local anaesthesia in a dental clinic.

Conclusion

The majority of patients receiving DGA in WMHHS were children with high rates of dental disease. The biological and financial costs of DGA are significant and highlight the importance of alternative options and improving preventative strategies for early childhood decay.

Effect of clinician experience and image inversion on contrast thresholds for caries detection using digital bitewing radiographs

Researchers: Monica Farrelly, Tracy Tang, Joyce Wong

Supervisor: Professor Laurence J Walsh

Background

Bitewing radiographs aid diagnosis of dental caries. Detection of dental caries on radiographs requires distinction of a contrast between carious and adjacent sound tooth structure. The threshold for discernable contrast varies between individuals and correlates to a certain stage of caries progression. Digital radiographic enhancement has potential to assist the detection of caries at earlier stages.

Objective

This study investigated the effect of clinician experience and image inversion on the contrast threshold for detection of caries-like lesions on digital bitewing radiographs.

Method

Radiographs were edited digitally to show artificial carious lesions with predetermined differences in greyscale value, corresponding to known percentages of volume loss. Undergraduate second and fourth year dental students and postgraduate Doctor of Clinical Dentistry students at the University of Queensland assessed standard and inverted radiographs in a random sequence. The latter had 5-12 years of clinical experience.

Results

The diagnostic accuracy for second year (n=23), fourth year (n=36) and postgraduate students (n=5) was 0.721, 0.724 and 0.809, respectively, for standard images, then 0.626, 0.628 and 0.912 for inverted. The threshold for radiographic detection was the contrast produced by 30% volume loss for second and fourth year undergraduates, and 20% for postgraduates, corresponding to 38% and 24% change in greyscale, respectively.

Conclusion

Post-graduation clinical experience improves performance in detecting contrast changes on radiographs indicating caries. Image inversion only benefits experienced clinicians. A commitment to education and ongoing training that enforces clinical application is required to improve the diagnostic ability of both students and practitioners.

Factors Influencing Bacterial Levels in Dental Unit Waterlines at South-East Queensland Dental Clinics

Researchers: Yu Chieh Chou, Eun Jae Lee, Yao Sheng Ng

Supervisor: Professor Laurence J Walsh

Background

Bacteria in dental unit waterlines may affect health of patients, especially the immunocompromised individuals, as well as dental staff. While many factors have been shown to affect bacterial count in dental unit waterlines, there is limited literature in this field from Australia, and particularly from South-East Queensland.

Objective

This exploratory study aimed to identify the potential effects of dental chair brand and age, along with dental unit waterlines management schemes that could affect the bacterial count in dental unit waterlines. Additionally, the results of the study can contribute to current recommendations that could be directly applicable to practices in South-East Queensland.

Method

The age, brand of the chair and cleaning protocols were identified via questionnaires. Additionally, bacterial counts were measured with dental dipslide agar culture plates and expressed as colony-forming units.

Results

Forty practices participated in this study. Bacterial colony count was significantly higher in older dental chairs (P > 0.05) and silver-based protocol or no chemical-based treatment (P > 0.05), while chair brand observed insignificant contribution to the bacterial colony count (P < 0.05).

Conclusion

Overall, higher colony-forming units counts were found in older dental chairs, and in those which did not use chemical agents for water treatment. This information provides some directions for profiling dental chairs at risk of having high levels of dental unit waterlines bacteria.

Investigating the latest enzymatic pre-sterilisation adjuncts and nanotechnology in removing dentine bioburden from rotary endodontic files

Researchers: Benjamin Sheng Li Seow, Eleanor Churchill
Supervisor: Professor Laurence J Walsh

Background

The landmark Parashos protocol for rotary endodontic file disinfection that uses the enzymatic agent EmPowerTM (Metrex©) has been employed since 2003. This study aimed to improve existing methods for cleaning rotary files by investigating variations to the Parashos protocol.

Objective

This study assessed the cleaning performances of EmPowerTM alternatives, namely MetriZyme™ (Metrex), Genesis®, Proxy C+®, Sonex® (Whiteley Corporation) and NanoCleanTM B3 nanocellulose fibers (NovaFlux Technologies) for a modified Parashos protocol, to determine if these could yield similar or more effective outcomes.

Method

Rotary files that were heavily contaminated by instrumenting extracted teeth were subjected to six variations of the Parashos protocol, retaining the original steps of plunging into wet sponging, and then soaking and ultrasonication in the test agent – but with abbreviated times or alternative agents. Files were scored under 45x magnification at each stage for the presence of debris. Cumulative mean cleaning scores for each adjunct were calculated and compared.

Results

Alternative modern commercial agents (MetriZyme™ (Metrex) and Genesis®, Proxy C+®, and Sonex® (Whiteley)) all showed similar or greater effectiveness than EmPower™ (Metrex) but the extent of improvement was not statistically significant. On the other hand, NanoClean™ B3 nanocellulose fibers were superior to all commercial agents (two-tailed t-test; p=0.00011).

Conclusion

The use of NanoCleanTM and alternative agents would be suitable as alternatives to the established enzymatic cleaner EmPowerTM, when using the Parashos protocol. More research involving clinically contaminated files is needed to further refine protocols for cleaning rotary files.

Nanoparticle-assisted smear layer removal: An explorative study

Researchers: Barbara Lee, Tiffany Ji-Yun Chang, Nur Sakinah Kamarul Zaki
Supervisor: Professor Laurence J Walsh

Background

Endodontic instrumentation generates smear layer which needs to be removed for disinfection and sealing of the root canal. As the conventional syringe irrigation method does not completely remove smear layer, various enhancement methods have been proposed. Addition of nanoparticles to the irrigant may facilitate smear layer removal by creating sheer stress and thus mechanically disrupting the debris.

Objective

The main aim of this study was to assess if a combination of nano-structured cellulose (NanoClean) and EDTA removes smear layer better than EDTA alone. The supplementary objectives were to assess the extent of dentinal erosion and NanoClean residue on the root canal wall.

Method

42 extracted permanent teeth were instrumented with rotary NiTi files, and allocated into 4 groups based on the irrigant used (0%, 1%, 2 %, and 5% (v/v) NanoClean in EDTA). The irrigants were ultrasonically agitated. Scanning electron microscopy was used to visualise the root canal walls. To assess smear layer removal, the percentage area of open dentinal tubules (%AODT) was calculated. Dentinal erosion and NanoClean residue were assessed using qualitative scoring systems. The Kruskal-Wallis and Dunn's tests ($p < 0.05$) were used to compare the groups.

Results

There was no significant difference in %AODT nor dentinal erosion scores when using a combination of EDTA and NanoClean compared to EDTA alone. NanoClean residue was noted in middle and apical third regions of 2% and 5% samples.

Conclusion

In the given treatment conditions, addition of NanoClean to EDTA does not enhance smear layer removal nor cause dentinal erosion. Using higher concentrations of NanoClean may leave residues behind in the root canal space. Further investigations are required to optimise the specifications of nanoparticle-assisted irrigation.

The Effect of Endodontic Irrigants on the Microhardness and Hydration Characteristics of Biodentine

Researchers: Lauren Gilkison, Ying Jia Pua, Chunyang Jiang
Supervisor: Dr Unni Pillai

Background

Tricalcium based materials minutes are the material of choice for repairing root perforations but have varying setting times ranging from 12- 180 minutes. Materials with short setting time such as Biodentine make it possible to continue the chemomechanical preparation of the root canal system in the same sitting after the perforation repair. Endodontic irrigants are used for chemomechanical preparation of root canal space. However, the effect of endodontic irrigants, particularly newer ones such as Octenidine dihydrochloride on Biodentine is not known.

Objective

To determine if exposure of Biodentine to 4% sodium hypochlorite (NaOCl), 17% ethylenediaminetetraacetic acid (EDTA) and 0.1% octenidine dihydrochloride (OCT) has any effect on its microhardness and hydration characteristics.

Method

A total of 48 Biodentine samples (n=12) were allowed a 15 minute set before exposure to their respective irrigants for 30 minutes (Control, NaOCl, EDTA or OCT). Microhardness was measured with a Vicker's indenter. Data analysis for microhardness was performed using One-way ANOVA and post hoc Tukey tests. P=0.01 was defined as statistically significant. A single sample from each group was randomly selected to undergo x-ray diffraction using Rigaku

Smartlab. Phases were identified and Rietveld refinement was used to calculate relative weight percentages. Peak intensities were normalised using EVA (Bruker, V5).

Results

EDTA had a significant effect on both the microhardness (P<0.01) and hydration characteristics of Biodentine, while OCT appears to have the least effect on the properties of Biodentine compared to the control (P=0.439). NaOCl had significant reduction in microhardness (P<0.01).

Conclusion

The microhardness and hydration characteristics of Biodentine appears to be minimally affected by Octenidine dihydrochloride and significantly affected by exposure to EDTA.

CBCT analysis of residual dentin thickness (RDT) after virtual post placement in the palatal roots of maxillary permanent first molars

Researchers: An Yan Tan, Lawrence Poon, Michelle Ee Lin
Supervisor: Dr George Bogen, Dr Bilal M El Masoud, Professor Alexander Moule, Professor Paul Monsour

Background

Previous research has shown a bucco-palatal curvature tendency in the palatal roots of some maxillary permanent first molars, which cannot be assessed using conventional 2D imaging. The effect of placing parallel-sided posts at various depths on residual dentin thickness (RDT) in palatal roots of maxillary permanent first molars has not been well examined using CBCT.

Objective

To investigate the RDT of palatal roots of maxillary permanent first molars following the placement of digital post analogues of different diameters at different depths.

Method

This digital radiographic simulation study assessed 122 de-identified existing CBCT datasets containing both maxillary permanent first molars. Digital parallel-sided post analogues of different diameters were superimposed onto CBCT images of maxillary first molars at various depths. The minimum RDT for each analogue was determined and grouped into one of three groups: no RDT, inadequate RDT, and adequate RDT. The results were analysed with Friedman, Conover post hoc and Cohen's kappa statistical tests.

Results

At all tested depths and diameters of post analogues, there were significant differences in RDT (P<.001). The majority of teeth (>50.0%) had inadequate or no RDT. The depth of the post (P<.001) had a greater impact on RDT than the diameter of the post (P>.05) used. There was no relation between the RDT of contralateral maxillary permanent first molars in the same patient.

Conclusion

The risk of insufficient RDT (<1mm) after the placement of parallel-sided posts in the palatal roots of maxillary permanent first molars is minimised if the post is inserted to a depth equalling the height of the crown, compared to 5 mm, 4 mm, and 3 mm from the radiographic apex. The RDT of the palatal roots of maxillary permanent first molars on one side is not a reliable predictor of RDT of the contralateral first molar.

Prevalence and Radiographic Presentation of Incidental Soft Tissue Calcifications in the Maxillofacial region detected by Cone Beam Computed Tomography

Researchers: Hamdan Ghalib Abdat, Felix To, Nathan Nguyen

Supervisor: Dr Alyssa Zhang, Dr Jake Samuels, Dr Dayea Oh, Professor Paul Monsour

Background

Soft tissue calcifications (STC) are common incidental findings in cone beam computed tomography (CBCT) imaging but can present asymptomatically. There are several instances where these require monitoring or treatment, due to an underlying disease or gradual progression towards a more life-threatening condition. Currently there is a lack of undergraduate training in the use of three-dimensional (3D) imaging software.

Objective

To evaluate the prevalence of incidental STC findings and provide a summarised pictorial atlas of each calcification, as detected in the maxillofacial region with CBCT scans.

Method

A retrospective analysis of 255 CBCT scans was completed. CBCT scans were classified by field of view (FOV) captured and assessed for the presence of STCs. A summarised pictorial atlas was created to demonstrate varying presentations of each STC.

Results

Of the 255 scans reviewed, 188 STCs were detected in 133 patients. Pineal gland calcifications (23.40%), palatine tonsilloliths (21.96%), laryngeal cartilage calcifications (16.67%) and stylohyoid ligament calcifications (14.12%) were the most prevalent. A pictorial atlas summarising the spectrum of presentations for different STCs has been provided.

Conclusion

The high prevalence of STCs, lack of training in 3D imaging software and an increasing use for CBCT emphasizes the importance for dentists to understand the location and presentation of different STCs. Our pictorial atlas summarizes these in a systematic manner in hopes of providing a good guide for the modern dentist to accurately interpret CBCT images for common STCs.

Social cognitive function and mental health in student populations

Researchers: Calvin Kim, Tristen Yuen Kai Lim, Matthew Wei-Ren Tan

Supervisor: Dr Matthew Nangle, Professor Julie Henry, Dr Sarah Grainger

Background

Completing an undergraduate dental degree has been linked with an increased risk of poor mental health. A better understanding of the risk factors that predict poorer mental health would be beneficial for informing the development of interventions and strategies that might be applied as part of undergraduate training programs.

Objective

The objective of the study was to investigate the role of social cognitive function in understanding mental health and wellbeing in dental students.

Method

Undergraduate Dental students from the University of Queensland were invited to complete an online questionnaire testing various psychosocial traits of participants. The results were then used to quantify and assess the emotion regulation and social cognitive functioning of subjects, from which correlations between variables were drawn.

Results

Students who scored higher in the Interpersonal Reactivity Index for Personal Distress (IRI-PD) were found to score higher in the Hospital Anxiety and Depression Scale (HADS Anxiety). Students who scored higher in the Interpersonal Reactivity Index for Perspective-Taking (IRI-PT) were found to score lower in the Apathy Evaluation Scale (AES). A negative correlation was also found between The Awareness of Social Inference Test (TASIT) and AES. Other correlations that were found were not significant.

Conclusion

Undergraduate dental students that demonstrate higher levels of affective empathy, specifically the personal distress domain of the Interpersonal Reactivity Index, are predicted to have higher levels of anxiety. Theory of mind is suspected to be more significant in predicting apathy than current evidence suggests.

Patient knowledge of lip cancer and oral cancer

Researchers: Li-chen Yang, Lin Na Chen, Alan Yang
Supervisor: A/Professor Norman Firth, A/Professor Soorebettu R Prabhu

Background

Early diagnosis of lip and oral cancers allows for less aggressive treatment and improves quality of life and is the most effective means to increase survival rates. Patient knowledge of risk factors and signs and symptoms associated with lip cancer and oral cancer is crucial for increasing the likelihood of patient presentation for opportunistic screening and reducing delay in patient appraisal for early detection.

Objective

This study assessed patient knowledge regarding the risk factors and signs and symptoms for lip cancer and oral cancer and identified the socio-demographic factors that influenced knowledge.

Method

A convenience sample of 213 adult dental patients who attended the Herston Oral Health Centre or Stafford Dental Clinic in Brisbane between July and August 2019 were invited to participate in the self-administered survey. Data analysis was performed using the chi-square test and multinomial logistic regression to identify predictors for lip and oral cancer knowledge.

Results

Smoking was the most commonly identified risk factor for lip cancer and oral cancer (81.9% and 84.4% respectively). The association between sun exposure and lip cancer was also well-known (81.9%). However, knowledge surrounding other risk factors and the signs and symptoms for both lip and oral cancers were poor. Symptomatic signs and symptoms, associated with later stages of cancer, were recognised by a greater proportion of patients compared to asymptomatic signs and symptoms. Education level was the main significant knowledge predictor for both lip and oral cancers.

Conclusion

The findings suggest the need for more targeted approaches to increase public knowledge of lip and oral cancers. Further research is required to optimise patient education and public health promotion in reducing the gaps in knowledge.

Arch Form Changes in Invisalign® Treatment: Predicted versus Achieved

Researchers: Joshua ZH Chua, Farish A Auleear
Supervisor: Dr Tony Weir

Background

Invisalign® has been marketed as a viable alternative option to conventional braces. Increasing numbers of patients have chosen Invisalign® with the hope of employing a more aesthetic orthodontic appliance. In 2013, the company that founded Invisalign, Align Technology, introduced a new aligner material, SmartTrack®, to replace the previously employed Ex30®. Since the introduction of this new material, there have been few, if any, detailed studies carried out comparing this new material to Ex30.

Objective

To determine if there is a significant difference between the predicted virtual treatment plan known as ClinCheck® and the clinically achieved treatment for these two materials.

Method

A sample of 50 patients that underwent Invisalign® treatment were studied. Maxillary and mandibular intercanine width, intermolar width and arch depth were measured on the stereolithography (.stl) files of the pre- treatment and post- treatment casts as well as the corresponding final ClinCheck® models. The mean differences obtained between the final ClinCheck® projection and the actual post- treatment casts were calculated and compared.

Results

There was statistically significant difference (P<0.05) for maxillary intercanine width and mandibular arch depth between the two materials. There was no clinical difference between the two materials.

Conclusion

Further studies are needed to verify and extend the findings of the current study. Overcorrection of the prescribed result and aligner treatment augmentation with inter- arch elastics appear to be beneficial in achieving the desired outcome.

Assessing Inter- and Intra-rater Reliability of Romexis Compare® software

Researchers: Wen Shih, Kenny Tran, Vivian Yang
Supervisor: Dr Sobia Zafar, Dr Bilal El Masoud

Background

Since the introduction of digital dental assessment systems, there has been a shift toward this trend as it appears to provide a more accurate, reliable, time efficient and reproducible assessment. The Planmeca Emerald™ scanner coupled with Romexis Compare® software allows students and staff to objectively assess individual crown preparations, receive numerical values of key dimensions, and subsequently undergo comparison with ideal crown preparation dimensions.

Objective

To measure the inter- and intra-rater reliability using the intra-oral scanner and Romexis Compare® for prosthodontic crown preparation, and to evaluate the possible implementation of this software as a grading and self-assessment tool in a preclinical setting.

Method

The Planmeca Emerald scanner and Romexis Compare® were used to compare the difference between thirty experimental preparations (n=15 anterior teeth, n=15 posterior teeth) with their respective unprepared typodont teeth. Three examiners independently scanned the plastic teeth in pre-formed standardised and non-standardised putty jigs. Each preparation was measured from facial, lingual, incisal/occlusal and margin surfaces. A second trial was completed after two weeks to assess intra-rater reliability. The data was tabulated, graphed and analysed using SPSS® and GraphPad Prism.

Results

The results of the study show greater consistencies in inter-operator measurements for anterior teeth. Some variations, however, were found in posterior teeth measurements between the operators. The results of the intra-rater measurements appear to be relatively consistent.

Conclusion

With some limitations, Romexis Compare® can be used as a reliable and repeatable method for objective and consistent evaluation of student prosthodontic preparations in a preclinical setting.

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