THE UNIVERSITY OF QUEENSLAND
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School of Dentistry

Student Research Conference 2022

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Abstract Booklet

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Message from the Head of School

Professor Saso Ivanovski

It is my sincere pleasure to welcome you to the 2022 School of Dentistry Undergraduate Research Conference.

The UQ School of Dentistry has a strong research tradition and we are proud to include opportunities to engage with research in our undergraduate program. Our UQ BDSc (Hons) program not only provides the highest quality dental academic and technical skills to equip you for successful careers, but also enriches your experience with complementary skills in research.

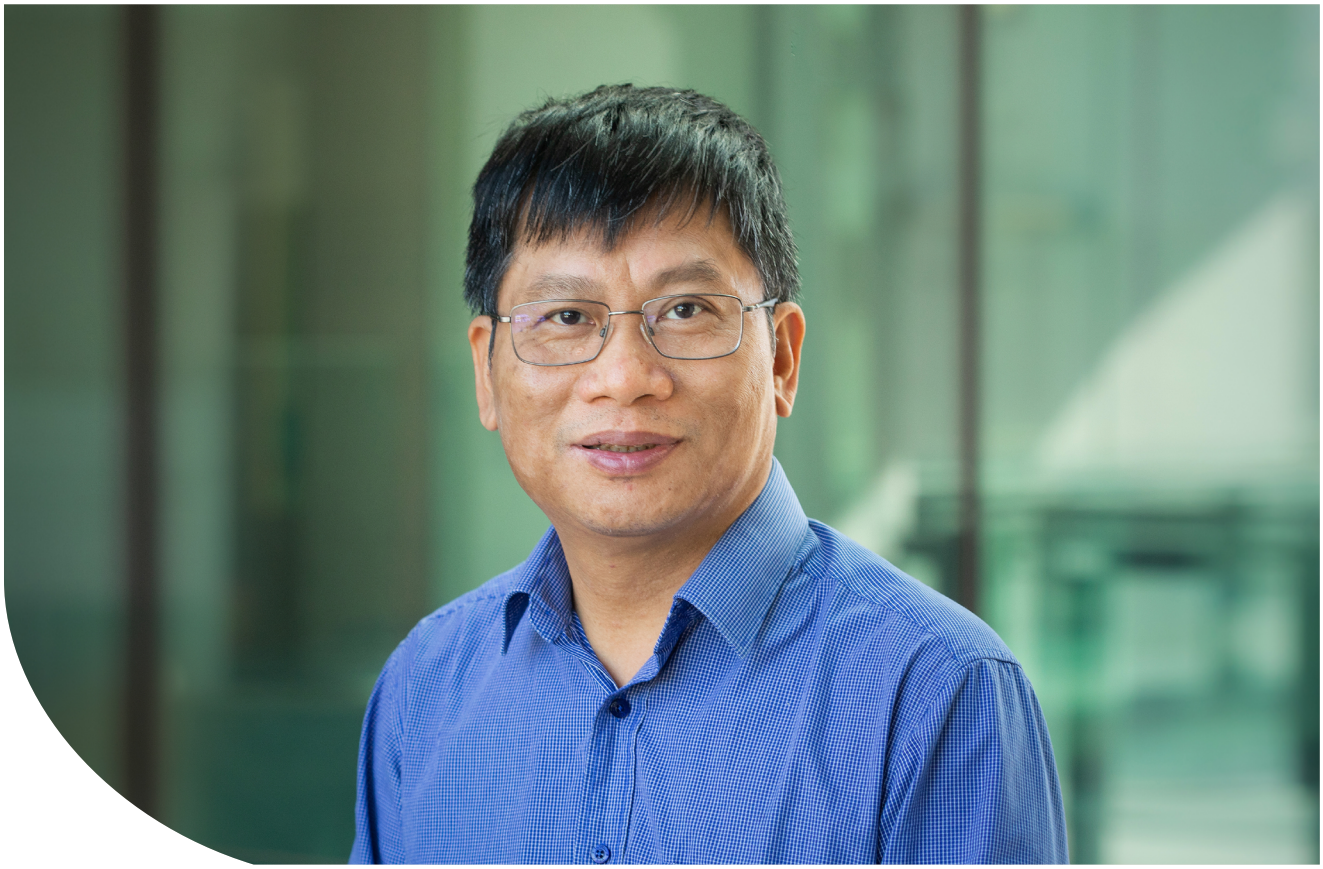
Participating in research is an excellent way for you to attain the UQ graduate attributes of effective communication skills, independence and creativity, critical judgement and ethical and social understanding.

This course has given you the opportunity to gain hands on experience in dental research across a wide range of dental disciplines. Your research has contributed not only to your own academic progress, but also to the success of the School's research agenda, and I thank you for your hard work and dedication this semester. Congratulations on your achievements and I wish you all the best for the future.

I would like to acknowledge the ongoing support of Colgate in making this event possible, and to thank all the staff and students involved in the program in 2022. I look forward to an even better 2023.

Professor Saso Ivanovski

Head of School



Message from the Course Coordinator

Professor Loc Do

As the course coordinator of DENT5023, I would like to thank and congratulate all of our graduating students for a wonderful year.

In addition to the demands of studying to become practising dentists, you have taken on the challenge of designing, carrying out and communicating findings of original research projects.

This year saw 70 students collaborate across 28 projects, ably supervised by our team of clinicians and researchers. The projects cover a wide range of research fields including dental materials, clinical research, dental public health, dental service provision for the general population and populations with special needs, and dental education.

I trust that this experience has been a positive one, equipping you with a better understanding of the research environment, new skills, and an appreciation for the importance of the nexus between research and clinical practice.

I hope you enjoy the experience and opportunity to present your research at the School of Dentistry Student Research Conference. This is your conference to showcase your research, and you can be proud of it.

I wish to express my sincere gratitude to all of the students, academic and administrative staff, and our sponsor Colgate for another successful student conference. I wish all of our students the best for their future careers in dentistry practice and research.

Professor Loc Do
Course Coordinator

STUDENT ABSTRACTS

Evaluating parental source of information for their child's oral health.

Researchers: Gurek S Nahal, Rafia Tasneem
Supervisors: Dr Christine Peters, Dr Sobia Zafar

Objectives

To assess parental source of oral health information for their child(ren), explore parental attitudes towards introducing a mandatory dental check-up by a child's first birthday and evaluate use of the Red Book, a Parent-Held Child Health Record (PHCHR) book, by parents in Brisbane, Queensland, Australia.

Methods

Parents and caregivers from a range of childcare locations were invited to complete a questionnaire. Child oral hygiene practices, dietary habits, parental oral hygiene knowledge, parental attitudes toward dental examinations and the use of the PHCHR in Queensland (Red Book) were assessed. Data analysis, tabulation and graph production were completed using Microsoft Excel, Jamovi and GraphPad Prism.

Results

A total of 130 participants were recruited to complete the questionnaire. Half of the participants stated that their children brush their teeth less than twice a day and 40% have access to sweets most days. Most participants (65%) took their child for a dental visit, however 88% attended their first dental appointment after two years of age. More than half of the participants (55%) do not feel that their child needs to have a dental check-up before their first birthday. When asked at what age they think their child's first dental check-up should be completed, 71% of participants were either not sure or selected after two years. 83% of the participants use the Red Book, however most participants stated that they do not use the book for any oral health related information.

Conclusion

The PHCHR (Red Book) in Queensland is received and utilised by many parents throughout Brisbane, however they appear to lack emphasis about the importance of early dental check-ups. Parental oral health knowledge is not satisfactory and their attitude toward a start date for child dental visits was uncertain, hence providing a standardised framework for early dental check-ups could help in preventing, identifying and treating caries.

Keywords

Parent, Child, Oral Health, Parent-Held Record, First Dental Visit

Continuous chelation gels for use in root canal preparation.

Researcher: Elise Diamond
Supervisors: Professor Ove Peters, Dr Patricia Wright

Objectives

To survey Australian clinicians' usage of file chelating gels and to formulate a novel gel containing clodronate, as an alternative chelator to EDTA, that has acceptable physical properties and maintains free available chlorine (FAC) levels with NaOCl irrigation.

Methodology

Survey: All 395 members of the Australian Society of Endondontology (ASE) were invited to participate in a survey to investigate file gel usage and product preference. Construction of novel gel: pulverized tetrasodium clodronate was added to liquid polyethylene glycol (PEG) to form a 46% clodronate gel. Gel physical properties: pH, density and viscosity were measured for the novel and commercial gels. Viscosity was measured using dynamic rheology. NaOCl compatibility: FAC was measured by iodometric titration in separate mixtures of 4% NaOCl with ultrapure water (control), liquid PEG and the novel clodronate gel at 1 and 15 minutes.

Results

Survey: The response rate was 182/395. Twenty-six percent of members use file gels in 80-100% of root canal treatments (RCTs), while 51% do not use a gel. The most popular gels were RC-Prep® and Glyde™, both of which had physical properties that satisfied their users.

Gels tested: File-Eze™, Glyde, novel clodronate gel, Odontoprep®, RC-Prep and SlickGel™ ES.

Gel Properties: The pH range was 5.8 for RC-Prep to 11.5 for the clodronate gel. Gel densities varied little. The gels ranged in viscosity, and the novel clodronate gel showed the most variations in measurements. NaOCl compatibility: at 15 minutes the decrease in FAC for the clodronate gel and PEG group was very minimal, while the control showed no decrease.

Conclusions

The novel clodronate gel had acceptable physical properties and maintained NaOCl stability during usage. Hence, the novel clodronate gel could be further developed as an alternative file gel. Survey results indicate a market for such a gel exists in Australia.

Keywords

Clodronate, Continuous Chelation, Endodontics, Chelating Gel Survey, Gel Viscosity

Effects of the COVID-19 pandemic on 5th year dentistry student clinics.

Researchers: Yunjoo Hur, Emily Mensforth, Abeer Warsi
Supervisors: Dr Christine Peters, Dr Sobia Zafar

Objectives

COVID-19 was declared an international public health emergency in 2020. Due to the high risk of transmission in a dental setting, heavy restrictions were introduced to dental practices and the clinical experience of dentistry students were impacted globally as a result. This study investigated the impact of the COVID-19 pandemic on the clinical experience of final year dentistry students in Australia. The objectives were twofold: (1) evaluate the influence of restrictions to dental practice and the associated suspension of student dental clinics on the number of treatments provided by final year dentistry students, and (2) assess if there was a change to the type of treatment rendered to patients by final year dentistry students during the COVID-19 pandemic.

Methods

Data was collected from available clinical logbooks from the final year dentistry student cohorts of 2018, 2019 and 2020 at The University of Queensland regarding the number of each treatment item code performed by each student per month.

Results

On average, the cohort of 2020 performed a reduced number of treatments across all disciplines; about 29% less than 2018, and about 37% less than 2019. The difference between cohorts was greatest in the early stages of the pandemic, from March to May. However, there were no significant changes in the proportion of treatment for each discipline for the cohort of 2020 compared to the cohorts of 2018 and 2019, with the most common disciplines being diagnostic (37.6% in 2020), preventive (25.7% in 2020), and restorative (22.7% in 2020).

Conclusion

Our findings suggest that the disruption to clinical experience in final year training of the 2020 cohort reduced the number of treatments provided by final year dentistry students, however, there were no significant changes to the proportion of treatment for each discipline compared to pre-COVID years.

Keywords

COVID-19, Pandemic, Dental Education, Clinical

Identifying factors that affect dental students' attitudes towards participation in rural and remote clinical outplacements in Australia.

Researchers: Tina Farhang, Maribelle Georgei, Hazel Swift
Supervisor: Associate Professor Ratilal Lalloo

Aim/Objectives

This research aimed to identify the factors that affect dental students' attitudes towards participation in rural clinical outplacements (RCOP) in Australia, in order to suggest strategies that will further improve students' desire to attend RCOP in the future.

Method

A cross-sectional survey was sent to dental students at most accredited dental schools in Australia. The survey design included a combination of close- and open-ended questions to collect demographic information and a Likert scale assessing influencing factors grouped into common themes of education, personal/health, social, financial and information-related. The factors were analysed to determine how they affected students' willingness to attend RCOP.

Results

Of the 287 completed surveys, 202 responses (70%) were sufficient for analysis. Growing up in a rural area was the only demographic factor significantly affecting students' desire to attend an RCOP. Most students wanted to participate in an RCOP (68%). Overall, attitudes towards the anticipated educational experience of RCOP were positive, while a variety of other factors, such as financial and information-based, were of concern to students. Educational, personal and health related, and social factors affected participants willingness to attend RCOP.

Conclusion

Overall attitudes towards RCOP were generally positive, with most students wanting to attend one during their dental training. Despite students holding negative opinions on certain social and financial factors, their expectations of positive clinical experiences and fulfilling work whilst on placement seemed to outweigh these. Universities should aim to promote these educational aspects of RCOP more to further improve students' attitudes prior to attending RCOP. More in-depth qualitative analysis is required into students' concerns regarding RCOP and longitudinal research is warranted to monitor students' attitudes towards RCOP and rural work overtime.

Treatment complexity and non-pharmacological behaviour management techniques of adult patients with special needs referred for dental treatment under general anaesthesia and sedation.

Researchers: Roupai Song, Hayden Tan, Lisa Zhu
Supervisors: Dr David Fu, Dr Claudia Lopez Silva

Background

It has been reported that in general, one in ten people with an intellectual disability have undergone dental treatment under general anaesthetic (GA). Although GA seems ideal for the facilitation of dental treatment to this vulnerable population, its risks preclude its consistent use in practice over alternative pharmacologic and non-pharmacologic adjuncts. Currently, there are no clear indications or accepted protocols that exist in the literature for the use of GA for dental treatment in individuals with special needs.

Objective

This study aimed to determine the nature of medical and dental treatment complexity of patients with special needs that require dental treatment under sedation and anaesthetics at Metro North Oral Health clinics.

Method

A retrospective, secondary data analysis was conducted at Metro North Oral Health Services for 1st January 2015 to 31st December 2018. Data of patients who were referred and treated for dental treatment under GA, IV and RA was explored. Demographic and treatment data was recorded from patient records accessed through ISOH, ORMIS, EDS and paper copies. Data was analysed with Chi-square tests to compare relevant parameters.

Results

Patients treated under GA were more likely to be classified into a greater number of SND categories than those treated under sedation ($X2 = 45.4$, P value <0.001). Patients seen under GA also were more likely to have a higher dental treatment complexity score than those seen under IV or RA sedation ($X2 = 110$, P value <0.001).

Conclusion

Increasing medical complexity and dental treatment complexity of patients with special needs is associated with increased sedation/anaesthesia modality. However, patient management is still inherently case based, and all options should be considered when referring patients for dental treatment with pharmacological adjuncts.

Keywords

General Anaesthesia, Conscious Sedation, Intravenous Anaesthesia, Dental Care for Disabled, Dentistry for Handicapped

Dental student satisfaction in The University of Queensland Dental Clinics.

Researchers: Conrad Henseleit, Jevarn Li Jun, Yean Wen (Hayley) Low
Supervisor: Professor Ove Peters, Dr Christine Peters

Background

Clinical learning is a key component of the University of Queensland School of Dentistry's (UQSOD) bachelor program and it is managed by the Metro North Hospital and Health Services (MNHHS), under the auspices of the Oral Health Alliance (OHA). However, the strengths and weaknesses of this alliance have yet to be documented.

Objectives

This cross-sectional study aimed to identify the strengths and weaknesses of UQSOD's clinical program from the perspective of students on clinical placement, with a secondary objective of using the gathered information to improve specific areas of UQSOD's clinical program.

Methods

Year 3 to 5 UQ dental students were offered to take an anonymous online survey regarding six critical aspects of their clinical learning. The survey used a mixture of sliding scale, Likert scale and open-ended questions to obtain the results. Jamovi was used to run statistical analysis on the data, while the open-ended questions were analysed using qualitative content analysis methodology.

Results

A total of 114 students (participation rate = 48.7%) participated in the study. Participants felt they were moderately confident (62.5/100, 95% CI: 57.7, 67.4) when asked if they felt like they would be a competent dentist upon graduation. There was strong agreement (93.6/100, 95% CI: 91.3, 95.9) that the clinical experience would be improved by having more clinical supervisors. Respondents felt that there were insufficient appropriate channels to provide feedback to OHA staff (30.0/100, 95% CI: 25.0, 34.9). Lastly, participating students did not feel that MNHHS assisted in ensuring fair case distributions (31.7/100, 95% CI: 25.9, 37.5).

Conclusions

UQ dental students feel stressed in clinics with the main sources of dissatisfaction being insufficient appropriate channels for student-staff communication, insufficient number of clinical supervisors and unfair case distribution. OHA stakeholders should consider the findings of this study and collaborate to improve the clinical experience of its students.

Keywords

Dentistry, Australia, Clinical Learning Environment, Dental Students

Geospatial access to dental care and quality of life in Queensland children.

Researchers: Taiga Higo, Jason Wan Wei Koh, Allen Miao
Supervisors: Dr Nicole Stormon, Mr Christopher Sexton

Introduction

The majority of the Australian population lives in urban areas with approximately 10% of the population living in regional, remote or very remote areas. The dental workforce is distributed with significant shortages in regional and remote areas, resulting in increased rate of dental diseases. Dental disease has been shown to significantly impact an individual's wellbeing and quality of life (QOL). No existing studies have explored the effect of the distribution of dentists in Australia on the QOL of the population.

Methods

Dental clinics locations in Queensland were collected from closed sources and mapped by Statistical Areas level 2 (SA2) on QGIS. Clinic density was calculated according to the number of dental clinics and land area of SA2. Participants from the Longitudinal Study of Australian Children (LSAC) were linked to associated clinic frequencies by SA2. Binomial logistic regression was used to analyse the relationship between dental clinic density, QOL and parental reported cavities.

Results

Most dental clinics were distributed among the urban areas of Queensland with lower density of dental clinics in regional, remote and very remote areas. A significant relationship between dental clinic density and QOL/ parental reported cavities could not be established with the data.

Conclusion

This study found that geospatial density of dental clinics did not significantly predict the QOL of 8–9-year-old children. The research highlighted the need for further investigation into the effect of different types of dental care access on QOL and the association between childhood dental disease and adulthood QOL.

Keywords

Dental, Distribution, Quality of Life

Maternal and birth factors predicting enamel defects in Australian children: A nested cohort study.

Researchers: Kum Yin Chung, Hui Ming Kwang
Supervisors: Dr Nicole Stormon, Mr Christopher Sexton

Introduction

Australian children aged 11-12 years were studied to identify specific hereditary indicators and environmental factors that predict enamel defect development. The aim of this research was to investigate the maternal, genetic and birth factors that contribute to enamel defects in Australian children.

Methods

The Child Health CheckPoint study is a nested cross-sectional module within the Longitudinal Study of Australian Children, carried out in 2015-16. Intra-oral digital photographs were utilised to visually assess the oral health of children-parent dyads. Permanent incisors of participants were scored for enamel defects based on the modified-Developmental Defects of Enamel index.

Results

Of 1,874 participating families, 1,207 children had enamel defect data available in the Checkpoint study. Parents that had enamel defects were 16% more likely (95% CI: 8%, 25%) to have children with enamel defects. Enamel opacities were highly prevalent in Australian children, though there were very few (<2%) severe cases of hypoplasia. Just under 90% of participating mothers reported taking over-the-counter medications during pregnancy. They had children with enamel defects at a prevalence of 1.09 (95% CI: 0.97, 1.24) times that of parents who did not take over-the-counter medications during pregnancy.

Conclusion

The results highlight the importance of parent education and regular screening to ensure enamel defects are identified early, allowing preventative intervention. Severe hypoplasia should be managed with sealants, remineralisation and desensitising treatments. Maternal medication use during pregnancy and traumatic birth have potential as predictors of enamel defects, and further research is warranted to identify their relationship.

Keywords

Enamel Defects, Hypoplasia, Maternal Medication, Prematurity

Students' perception of undergraduate education and training in special needs dentistry at an Australian Dental School.

Researchers: Grace Chen, Minju Pyun, Lillian Waterland
Supervisors: Dr David Fu, Dr Claudia Lopez Silva, Dr Sobia Zafar

Aim

To obtain an understanding of final year undergraduate dental students' level of confidence and perception of Special needs dentistry (SND) education and training at The University of Queensland (UQ), and their willingness to treat individuals with special needs.

Methods

A 56-item questionnaire was distributed online and physically to final year students enrolled in 2021 and 2022 BDSc (Hons) program. The questionnaire assessed four areas of the curriculum, which are theoretical knowledge, pre-clinical training, clinical observational experience and clinical training in SND. Self-reported confidence was recorded using a fivepoint Likert scale ranging from "not confident at all" to "completely confident", and were allocated the numbers 1-5 respectively. Jamovi and GraphPad Prism were used for data analysis and graphs.

Results

A total of 65 students from both cohorts completed the questionnaire. The response rate was 41.4%. Most participants (83.1%) reported that they have not received training in SND in a simulated environment. A majority of participants (69%) felt they do not have sufficient clinical experience in SND. Participants reported to be the least confident in performing dental extractions (56.9%) and dental trauma management (67.7%) in patients with special needs. Less than half (46.2%) indicated they were willing to provide dental treatment to individuals with special needs after graduation. Lack of confidence and case complexity concerns were commonly stated as reasons for students' unwillingness to treat individuals with special needs.

Conclusion

Overall, students reported a low level of confidence in their SND education and training. Many students wanted more observational experience with specialists or post-graduate students in SND, as well as more exposure to patients with special needs through case study and clinical training.

Keywords

Curriculum, Education, SND, Training, Undergraduate

Treatment preferences for cracked posterior teeth among Australian dentists.

Researchers: Joshua Fong, Anthony Ha, Annabelle Tan
Supervisor: Dr Unni Krishnan Pillai

Objective

Cracked teeth are the most common longitudinal fractures and often present a clinical dilemma in diagnosis and management. The purpose of this study was to investigate the preferred diagnostic process and treatment modalities for cracked teeth employed by Australian dentists.

Methods

Australian dentists were invited to complete an anonymous online survey investigating their perspectives on cracked tooth presentations, diagnosis, and treatment preferences in response to several clinical scenarios.

Result

Over half (56.8%) of the 171 Australian dentists responding to the survey chose to place an indirect cuspal-coverage restoration on an asymptomatic cracked, vital tooth. When the tooth was mildly cold sensitive, direct cuspal-coverage restoration was favoured (64.9%), while about one third (36.8%) of dentists recommended placement of an orthodontic band when the tooth exhibited cold sensitivity and biting pain. Dentists had significantly higher odds in recommending indirect restoration when CAD-CAM milling was available on-site or magnification was routinely used, regardless of presenting symptoms. Almost half (46.8%) of dentists preferred to extract when faced with a crack on a tooth undergoing root canal treatment with a 5mm periodontal defect. Most dentists (71.4%) demonstrated a poor understanding of cracked tooth biomechanics.

Conclusion

Australian dentists varied in their diagnostic and treatment preferences of cracked teeth reminiscent of the existing literature. There is a need for well-controlled clinical studies in the diagnostic process, clinical biomechanics and treatment modalities associated with cracked teeth.

Keywords

Cracked Tooth, Survey, Dentists, Treatment

Assessing the knowledge and awareness of dental students regarding tooth whitening.

Researchers: Junyoung Kim, Sean Tze-Meng Lee, Tze Syuen Tiong
Supervisors: Dr Yvonne Lai, Dr Sobia Zafar

Aim

Off-the-shelf tooth whitening treatment has gained popularity as tooth whitening becomes an in-demand treatment option in cosmetic dentistry. Tooth whitening treatment, if carried out inappropriately, could give rise to various side effects. The study aimed to explore the influence of having relative knowledge regarding tooth whitening on consumers' decision to receive the treatment.

Methods

A retrospective cross-sectional study was carried out on Year 1 and Year 5 dental students at The University of Queensland. A questionnaire was designed to investigate knowledge and motivations for tooth whitening and 42 responses were collected from each cohort.

Results

Findings revealed that knowledge regarding tooth whitening was not defined by year level. Consequently, the desire to undergo tooth whitening relative to possessing knowledge regarding tooth whitening was investigated regardless of year level. Study findings revealed that regardless of year level, participants who were aware of both the complications (aOR: 4.16, CI: 1.09, 15.88, p = .037) and mechanisms (aOR= 3.69, CI: 1.00, 13.6, p = .050) of tooth whitening reported to have a stronger desire for treatment.

Conclusion

In conclusion, the hypothesis that possessing dental knowledge discourages the consumption of tooth whitening was rejected. Satisfaction with current appearance as well as cost of treatment were identified as a significant factor influencing participants' desire to undergo tooth whitening.

Keywords

Tooth Whitening, Knowledge, Complications, Mechanism, Desire

Management of patients presenting with pain in a Dental School setting in 2018 to 2020.

Researchers: Jerry Kwak, Wenrui Ma
Supervisors: Professor Ove Peters, Dr Christine Peters

Background

Emergency management of pain is a hallmark of effective clinical dental care. A prevalent observation is the loss of follow-up after the initial pain relief, resulting in partial completion of definitive treatment and lack of outcome assessment.

Objectives

This study aimed to understand the factors that contribute to the loss of patients to follow-up after emergency treatment. Objectives were to assess the number and type of follow-up appointments, and to determine the outcome of the tooth that was the primary concern at the initial emergency visit.

Methods

Treatment records of patients who received emergency treatment in 2018-2020 at the UQ School of Dentistry and Metro North HHS Oral Health Centre for an acutely painful condition were obtained. The specific diagnosis and treatment provided, including prescription of medication, were recorded. Patient demographics, frequency and type of follow-up appointments, and patient attendance were assessed.

Results

A total of 586 patient records out of 27,141 were randomly sampled for analysis. The most common reason for attendance was endodontic emergencies (80.8%), and extractions (57.8%) was the most frequent treatment modality. Follow-up plans were arranged in 50.3% of cases, with significant variations in waiting time. Follow-up did not occur in 32.5% of patients despite a follow-up plan. An increase in age and travel distance was associated with better attendance and completion rate of definitive treatment. When antibiotics were prescribed, patients were 2.00 ($p < 0.001$) times as likely to fail to attend a follow-up appointment, and 1.74 ($p = 0.010$) times as likely to return for another emergency appointment.

Conclusion

The rate of follow-up after emergency treatment of dental pain was low. Prescription of antibiotics was associated with reduced follow-up and increased rate of return for further emergencies. These findings emphasise the need to discuss with patients the importance of return appointments after emergency treatment, even after symptoms resolve.

Keywords

Dental Pain, Emergency Treatment, Follow-Up, Attendance, Antibiotic Prescription

Dentist perspective on what should be provided through public health.

Researchers: Samuel Bullis, Christopher Stoltz
Supervisor: Matthew Nangle

Objectives

The study aimed to understand the opinions of Australian dentists on universal coverage for dental services.

Methods

Using a random sampling technique, (n=78) dentists completed an online survey and responded to services that they believe should be covered through a publicly funded system. Descriptive analysis of responses and bivariate analysis was performed to assess associations between participant demographic data and survey response outputs.

Results

Respondents believed that approximately half (50.1%) of dental services listed should be publicly funded. When the services were aggregated into their respective area of dentistry, orthodontics/ cosmetic and prosthodontics reported significantly lower approval than all other areas (15.0% and 33.1% respectively). Diagnostic (71.8%) and preventative (71.8%) services received the highest approval responses for coverage. More than two-thirds of dentists selected an annual limit of $2,000 or less as the maximum personal annual limit.

Conclusion

Australian dentists are not in favour of universal public coverage of all dental services, with dentists preferring coverage of diagnostic and preventative services over other services. Additional research with systematic sampling and a qualitative approach will improve external validity to understand the reasons behind dentist's opinions.

The prevalence of impacted canine ankylosis in patients referred to a private imaging clinic for cone-beam computed tomography (CBCT) imaging.

Researchers: Alaina Ng Cheng Hin, Kylie Kwok
Supervisor: Dr Raahib Dudhia

Background

Ankylosis of impacted canines is difficult to diagnose and can cause significant challenges to orthodontic management. Cone-beam computed tomography (CBCT) is a valuable imaging technique that can help overcome this diagnostic challenge and guide treatment decisions.

Objective

This study aimed to investigate the prevalence of spontaneous ankylosis of impacted canines using radiographic reports of CBCT images, and to explore associations between canine ankylosis and patient age, sex, canine position, resorption, and local anomalies.

Method

The data was collected from patients referred to a private imaging clinic for CBCT assessment. There were 241 impacted canines identified from the radiographic reports. The prevalence of impacted canine ankylosis was calculated by using the total number of cases suspected of ankylosis divided by the total number of cases in the study. Fisher's exact tests were used to investigate impacted canine ankylosis and its association with patient demographics, canine position, resorption, and local anomalies.

Results

Ankylosis was suspected in 3.7% (n = 9) of all impacted canines included in this study. Of these nine ankylosed canines, the majority were found in the maxilla (n = 8, 88.9%), in a palatal or lingual position (n = 5, 55.6%), and with a mesial angulation (n = 9, 100%). Most did not have root dilaceration (n = 6, 66.7%), proximity to the maxillary sinus or nasal cavity (n = 6, 66.7%), resorption of the canine (n = 6, 66.7%) or of the adjacent teeth (n = 6, 66.7%), or other local anomalies (n = 8, 88.9%). Impacted canine ankylosis was more prevalent in patients aged 20-29 than those aged 9-19 years old. Ankylosis was associated with resorption of the impacted canine.

Conclusions

According to the findings of this study, spontaneous ankylosis of impacted canines appeared to be uncommon, and was related to patient age and resorption of the canine. The prevalence rate is still debated due to a lack of research on impacted canine ankylosis in the literature. This study highlighted CBCT imaging as an essential tool in the diagnosis of ankylosis. The early identification of ankylosis prior to treatment can be a great asset in guiding treatment decisions. Future research should seek to investigate ankylosis through longitudinal studies following cases from pre to post treatment.

Prevalence of vital pulp therapy in Australia.

Researchers: Genghai Kwok, Jamie Wei Yi Leong, Nicole Ting Zhi Ong
Supervisor: Mr George Bogen BS, DDS

Objective

To evaluate the prevalence of vital pulp therapy (VPT) procedures provided by general and specialist dental practitioners in private practice within Australia using an online questionnaire.

Methods

The postal codes were collated via systematic random sampling and 2035 email addresses of clinics under the sampled postal codes were collected from the Australian Dental Association database. The anonymous online survey was distributed to the email addresses of the prospective participants.

Results

The valid response rate was 5.56% (113). The survey indicated that 69.0% (95% CI: 59.6, 77.4) of the respondents provide VPT in their clinical practice. However, haemostasis of the pulp appears not to be a common consideration when determining the inflammation status of the pulp. Calcium hydroxide (47.44%, n=37) and Mineral Trioxide Aggregate (39.74%, n=31) are the most prevalent pulp capping materials used among respondents. (Margin of Error of 9.2%)

Conclusion

Although the survey tends to show that the prevalence of VPT is moderately high in Australia, the margin of error and confidence interval suggest that the results may be inconclusive. Of the 69% that do practice VPT, a large percentage of clinicians do not employ all currently recommended techniques and materials. Dental practitioners' knowledge of new procedural protocols and bio ceramic material usage in VPT may require updated educational courses that better parallel this rapidly advancing science. Increasing the adoption of VPT employing careful case selection and modern techniques may be beneficial to the public health as it can prevent the irreversible nature and consequences of pulpectomy.

A retrospective study of emergency treatments provided in a Dental School Clinic in South-East Queensland in a one-year period.

Researchers: Melissa Baxendale, Claudia Pham, Sumaiya Tabassum
Supervisors: Professor Ove Peters, Dr Christine Peters

Objectives

The aim of this retrospective study was to investigate the distribution of emergency treatments provided in a Brisbane public service clinic with UQ student placement. Subsequent appointments for the same patient and tooth were also evaluated to determine the outcomes of initial treatment in the emergency clinic.

Methods

All dental records for the emergency clinic in 2021 were extracted. The demographic data, month of appointment, clinician status and treatment codes were statistically described. Exclusion criteria was applied to eliminate routine services such as smoking cessation, oral hygiene instruction and dietary advice. After refinement of data, 3410 appointments were considered. The data was analysed using Chi-Square tests and Poisson regression analysis. Results: The most common emergency dental services were restorative and oral surgery treatments (36.7%, 17.7%). The remaining disciplines in descending order were preventive, endodontics, miscellaneous, periodontics, removable prosthodontics and fixed prosthodontics (12.3%, 6.3%, 4.8%, 3.1%, 2.1%, 1.8%). A significant proportion of patients received examination and or diagnostic tests only (15.3%). There were 2.8% of patients which returned for subsequent appointments for the same tooth within the year. For patients where the same tooth was treated twice, 30.8% of these had a restoration placed at both appointments.

Conclusion

When considering the findings of this study, the allocation of resources in student dental clinics should be revised to reflect the high prevalence of restorative dentistry. Further, more emphasis should be put on common procedure types when educating dental students. The clinically significant findings of this study can be used to better prepare future dentists and efficiently service patients' needs.

Keywords

Emergency Treatment, Dentistry, Dental School Clinic, Dental Students, Australia

Comparing the efficacy of different permutations of restorative systems when performing a posterior interproximal restoration: An in-vitro study.

Researchers: Jun Onn Mervin Liang, Wei Sia Mah, Jun Xian Yap
Supervisor: Professor Ian Meyers

Objectives

To identify the optimal combination of restorative components when restoring posterior interproximal restorations.

Methods

This laboratory study consisted of two separate experiments which investigated the restorative (Experiment 1) and polishing (Experiment 2) outcomes when specific restorative armamentarium were used in combination. Experiment 1 compared four restorative outcomes (time taken, marginal adaptation, proximal contact tightness, proximal contour) when different combinations of matrix system (sectional or circumferential matrix), composite types (microfill or nano-hybrid), and fill techniques (incremental or bulk) were employed, with a sample of 96 pre-cut plastic upper right first premolar (FDI #14) disto-occlusal cavities. Experiment 2 compared time taken to reach a clinically acceptable surface roughness (<1.4um) when different combinations of composite types (micro-fill or nano-hybrid) and polishing systems (one-step or four-step) were employed.

Result

Incremental layering was significantly slower than bulk filling ($p < 0.01$). Circumferential matrices produced slightly better marginal adaptation compared to sectional matrices ($p = 0.04$), whereas sectional matrices led to markedly better contact tightness ($p < 0.01$) and contour ($p < 0.01$). Nano-hybrid composite produced better contours than the microfill composite ($p = 0.03$) when paired with a sectional matrix, but produced more samples with unacceptable proximal contact tightness when paired with a tofflemire matrix ($p = 0.02$). The nano-hybrid composite also appeared to display better and more consistent polishability, regardless of polishing system used, whereas the performance of the micro-fill composite was less satisfactory with the one-step polisher ($p < 0.05$).

Conclusion

For a posterior interproximal restoration, this study supports the recommendation of bulk filling, using sectional matrices and a nano-hybrid composite to achieve the best efficiency with the least drawbacks. However, clinicians may still want to consider incremental instead of bulk fill for potentially improved clinical outcomes.

Orifice barriers for the prevention of coronal microleakage: Systematic review and meta-analysis.

Researchers: Pengcheng Chen, Ziyin Chen
Supervisors: Professor Ove A Peters, Dr Christine I Peters, Dr Yu-Yao Teoh

Background

Apical periodontitis that emerges or persists after root canal treatment is caused by the presence of microorganisms that either remained during treatment or penetrated into the root canal system from the oral cavity. Therefore, placement of orifice barrier materials has been proposed to reduce coronal leakage and thereby decrease the rate treatment failure.

Aims

This systematic review aimed to compare the efficiency of different orifice barrier materials in preventing coronal microleakage in vitro.

Methods

A search of published articles without language restrictions was carried out until July 2022 in 8 databases focusing on in vitro studies on bacterial penetration of root canaltreated teeth. The final sample included 18 articles for review. A subsequent meta-analysis employed a random-effects model by using the I2 statistic. Risk ratios and 95% confidence intervals (CI) were determined for dichotomous variables. Microleakage assays included in the studies were bacterial leakage models and fluid filtration models. Ten publications using bacterial leakage models contributed to the meta-analysis.

Results

Orifice barriers were overall effective, as indicated by the risk ratios (RR) and 95% confidence intervals (CI) significantly reduced microleakage with placement of glass ionomercement (GIC) (RR 0.37, 95% CI 0.26-0.53, P=0.00001), resin-modified GIC (RR 0.32, 95%CI 0.15-0.67, P=0.002), composite resin (RR 0.54, 95% CI 0.38-0.75, P=0.0003), mineraltrioxide aggregate (MTA) (RR 0.25, 95% CI 0.12-0.52, P=0.0002) and Cavit (RR 0.23, 95% CI 0.14-0.39, P<0.00001). No statistically significant differences were shown between GIC, resin-modified GIC, composite resin and MTA orifice barriers.

Conclusions

The data confirms that placement of a GIC, RMGIC, Composite resin, Cavit or MTA orifice barrier is effective in prevention of coronal microleakage in vitro. There were too few reports for other materials to allow numerical comparisons. In vivo data or tests with more directly clinically applicable methodologies present an opportunity for future research.

Keywords

Orifice Barrier, Endodontics, Microleakage, Systematic Review, Meta-Analysis

Abbreviations and Acronyms

NSRCT = nonsurgical root canal therapy; GIC = glass ionomer cement; RMGIC = resin-modified glass ionomer cement; MTA = mineral trioxide aggregate; CI = confidence intervals; RR = risk ratio; MD = mean difference

Design of an interactive system for access cavities assessment: A novel feedback tool for preclinical endodontics.

Researchers: Jiwon Choi, Seongwon Choi
Supervisors: Professor Ove A Peters, Dr Christine I Peters

Introduction

A software program was developed provide to visual, guided feedback to students for access cavity preparations in preclinical learning. The specific aim of the study was to investigate students' overall experiences with the new learning method and compare their experiences with traditional teaching.

Materials and Methods

A workflow based on freely available software was designed to register three-dimensional models molar access cavities and to metrically compare to instructor prepared standard cavities. Third-year students practicing molar endodontics access cavity preparation in the preclinical course were surveyed. A total of 44/79 students completed self-administered questionnaires prior and after the use of the feedback software to gauge their learning experience.

Result

The results of the post-training questionnaire illustrated that all surveyed students agreed/ or strongly agreed that the software assisted their learning in access cavity preparation. In addition, 86% and 89%, respectively of students agreed that the use of the software improved their skills of access cavity preparation and felt more confident about their access cavity preparation skills after using the 3D Tooth comparison software.

Discussion

The presented software solution permitted setting and comparing access cavity preparations by students against a standard access prepared by an instructor. The process of data acquisition and registration was fast and straightforward. Student feedback was very positive and suggested the integration of this type of experiential learning into the preclinical curriculum.

Conclusion

This feasibility study demonstrates the utility of the new software to assist dental students' access cavity preparation learning.

Keywords

3D Guided Software, Dental Education, Dental Students, Guided Endodontics, Access Cavity Preparation

Investigating dental caries of children (aged 5) whose mothers were born in Australia versus overseas.

Researchers: Erin Giec-Yorston, Nicholas Jin, Sarah Whitehouse
Supervisors: Dr Diep Ha, Dr Claudia Lopez-Silva

Objectives

Investigate the prevalence of dental caries and presence of decayed, missing and filled surfaces (dmfs) of five-year-old children (aged 5) whose mothers were born in Australia versus overseas.

Methods

Data on 705 participants from The Study of Mothers' and Infants Life Events Affecting Oral Health (SMILE) was analysed. The main outcomes examined were prevalence of caries and dmfs, with mother's place of birth as the primary exposure. Covariate factors investigated included socioeconomic status, dietary patterns, mother's health behaviours and oral health of the mother and child. Results were adjusted for key characteristics identified in this study, generating the amount of impact of the characteristics on the prevalence and severity of caries in children. Multivariate regression analyses were performed to identify the effect of key characteristics in the population and adjust for them.

Results

Children whose mothers were born in India were 2.4 times more likely to have caries than children of Australian/New Zealand/ UK mothers (p-value 0.041). Similarly, children whose mothers were born in other Asian countries were 2.3 times more likely to have caries than children of Australian/New Zealand/ UK mothers (p-value 0.013).

Conclusion

This study suggests that maternal country of birth, maternal DMFS, and child's free sugar intake influence the prevalence of dental caries. Additionally, yearly income and maternal DMFS have an impact on the severity of dental caries. The prevalence and severity of caries in 5-year-old children cannot be rationalized alone by these factors, therefore it can be assumed there are remaining confounding factors that were not accounted for in this study.

Facial Anthropometrics: Epidemiology and concordance in Australian children and their parents.

Researcher: Radin Manafi-Khosroshahi
Supervisors: Susan Clifford, Katherine Lange, Timothy Olds, Nicole Stormon, Melissa Wake

Background

Facial anthropometry measurements of the body are used in many disciplines. Such measurements can be used by clinicians to enhance treatment planning in reconstructive surgeries, orthodontics, prosthetic fabrication, and forensics. The advancement of digital imagery has innovated the science of anthropometry, allowing for ease and reproducibility in measures and new analytic techniques. These data provide population-level descriptions of facial anthropometry for children and their parents. Associations with demographic factors such as ethnicity and gender are also explored.

Methods

The population-based cross-sectional Child Health CheckPoint study is nested within the Longitudinal Study of Australian Children (LSAC). Of all participating CheckPoint families (n=1874), facial anthropometric data were available for 1206 children (49% girls; mean age 11.9 years) and 1108 parents (88% mothers; mean age 44.3 years), including n=1071 parent-child pairs. The software 3dMDvultus were used to analyse thirty facial landmarks. Analysis syntax was used to calculate common facial anthropometric measurements.

Results

In this study, male children (n=955) when compared to female (n=919) were lager total facial width, gonial width, intercranial distance, total facial height, total lower facial height, upper lip to E-line, mandibular position vertically, maxillary position vertically, and facial angle. In contrast, female parents (n=1644) when compared to male parents (n=230) were significantly smaller across all facial measurements, excluding upper vermillion height, lower vermillion height, nasolabial angle, and nasofacial angle. Furthermore, father-daughter pairs (n=95) had the strongest overall concordance while mother-son pairs (n=816) had weakest overall concordance.

Conclusions

This study described the epidemiology of facial anthropometry in 11–12-yearolds and their parents, particularly gender differences. Such information can be of value for clinicians and surgeons in aiding with diagnoses and enhancing pre-operative and postoperative planning to optimise patient outcome.

Keywords

Facial Anthropometry, Children, Concordance, Checkpoint

A retrospective study of the impact of post-endodontic restoration on root canal treatment outcomes in an undergraduate clinic at the UQ School of Dentistry.

Researchers: Chermaine Mok, Michelle Yet
Supervisor: Professor Ove Peters, Dr Christine Peters

Background

In root-canal treated molar teeth, indirect cuspal coverage restorations can increase endodontic treatment success by preventing of fractures of teeth or re-infection of the root canal system.

Aim

The purpose of this study was to assess the impact of restoration type on root canal treatment outcomes, including periapical healing and tooth survival, of molar teeth root treated in the University of Queensland (UQ) undergraduate dental clinic, and thus inform clinical practice and undergraduate teaching at UQ.

Methods

A total of 102 deidentified radiographic data sets consisting of periapical (PA) and orthopantomographic (OPG) radiographs were obtained. The data was grouped into 3 categories: interim restoration, direct restoration, and indirect restoration. Odds ratios were calculated, with type of restoration as the independent variable, and outcome measures success of periapical healing and intervention required as dependent variables. Fisher's exact test was used to determine the significance of the data.

Results

Odds of periapical healing success were 1.75-fold (95% CI 0.22, 14.2) when comparing any definitive to interim restoration, and 6.33-fold (95% CI 0.26, 153) higher when comparing indirect to any other restoration type. Odds of no intervention required were 4.48-fold (95% CI 0.63, 31.7) higher with any definitive as compared to interim restoration, and 5.13-fold (95% CI0.27, 98.1) higher with an indirect compared to any other coronal restoration. These results, however, did not reach statistical significance (P>.05).

Conclusions

The outcome of apical condition had higher success with indirect restoration. The need for intervention was lower with any definitive restoration placed, and lower still with placement of an indirect restoration. This audit highlights a need for more standardised clinical protocols and case selection for root canal-treated molar teeth in the UQ and Metro North undergraduate clinic.

Keywords

Root-canal Treated Molar Teeth, Indirect Restoration, Intervention, Periapical Status

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Rotational speed of electric low speed motors used in endodontics.

Researchers: Benjamin Cheng Fu, Shane Jie Leong, Che-Ming Yeh
Supervisor: Professor Ove Peters

Background

Rotary file use in endodontics is an indispensable and effective way of preparing root canal systems for obturation. Nickel-titanium alloys mounted onto endodontic motors allow for their rotations per minute (RPM) and effective torque to be adjusted chairside by the operator. Higher speeds allow for more efficient cutting and preparation, but also increases the risk of file separation in the canal.

Aim

To analyse the adherence of the actual RPM of low-speed electric motors to the manufacturers' stated values of RPM within the Oral Health Centre.

Methodology

A specially designed testing platform was used to record a freely rotating polishing disc mounted onto the endodontic motor at the Oral Health Centre's recommended presets for the Protaper Next file system. The RPM's of the disc were recorded at 120 frames s-1. Mean difference between the actual RPM of each motor to the indicated RPM was analysed using Bland-Altman plots. Endodontic motors were fitted to a jig and filmed with a high-speed camera and analysed frame by frame to calculate the actual RPM.

Results

It was found that the KaVo KL703 motors had a higher RPM than stated, and the A-dec NLZ and XSmart motors had a lower than stated rpm, with XSmart's rpm being closest to its stated values, but with greater variance between trials. The differences observed were all significant as they exceeded the accepted limits of +/-5 rpm from the stated value.

Conclusions

Chair mounted solenoid foot switch operated endodontic motors adhere less to the manufacturers stated RPM values compared to stand-alone motors. Further research must be conducted to investigate if this remains true at all set RPM values.

Keywords

Endodontic Motor, Video Analysis, Rotational Speed, Solenoid Switch, Oral Health Centre

The impact of COVID-19 on the mental health of dental students in an Australian university.

Researchers: Saud Akhtar, Jonathan Lo, Jonathan Tissainayagam
Supervisor: Dr Sobia Zafar

Background

The dentistry program is extremely demanding mentally and physically. Consequently, it can induce high levels of stress, anxiety and depression in its students. Currently, there is already research in measuring these ramifications on dental students, but they lack the influence of the COVID-19 pandemic which has brought about many fundamental changes to the curriculum of dental students. This study assessed the University of Queensland School of Dentistry (UQ SoD) dental students' mental health through the Depression, Anxiety and Stress Scale (DASS-21) during the COVID-19 pandemic.

Methods

UQ Bachelor of Dental Science (Honours) students enrolled in years 2-5 were requested to complete an online questionnaire that included the DASS-21 and additional questions regarding the impact of COVID-19 on quality of life. Jamovi was utilised to conduct descriptive data analysis.

Results

179 students completed the survey with 81 males (45%) and 98 females (55%). 70.4% of the participants described elevated anxiety for the health of their loved ones and themselves during the COVID-19 pandemic. The overall mean DASS-21 scores were 7.1 (5.07) in depression, 4.9 (4.00) in anxiety and 6.5 (4.32) in stress.

Conclusion

The results indicate that the COVID-19 pandemic negatively impacted the mental health of dental students at UQ. While further research is still required, it is important for universities to recognise how this pandemic affected the mental wellbeing of students so that they can implement appropriate support programs and improve dental education.

Keywords

COVID-19, Dentistry, Depression, Anxiety, Stress

The effect of curing, storage in water, and thickness on the shade of restorative dental materials.

Researchers: Jamila Cox, Ebony Watson
Supervisor: Professor Ian A Meyers

Objectives

Shade matching is critical in aesthetic dentistry. While great improvements have been made in the materials that are used, shade stability remains a challenge. The purpose of this study was to evaluate the effect of curing, and storage in water on the newly marketed G-ænial A'CHORD (GA) universal paste composite, G-ænial Universal Injectable (GUI) composite, and EQUIA Forte Hybrid Technology (EFHT) glass-ionomer cement (GIC), as well as the effect of thickness on GA universal paste composite.

Methods

Forty-eight disc samples were fabricated (n=8, per group). Shade was measured according to the Commission Internationale d'Eclairage (CIE) L*a*b* scale, and ΔE was calculated using these values. For curing and storage, shade was measured at pre-cure (S1), post-cure (S2), and after seven days of storage in water (S3) for the A2 shades of GA, GUI, and EFHT. The shade at S2 of the materials and the shade of an A2 VITA shade guide was compared. For thickness, the shade of A3 GA at S3 was compared between the three thicknesses: one-template (1T), two-stacked templates (2Ts), and three-stacked templates (3Ts). Additionally, ΔE was calculated from S1-S3.

Results

Curing resulted in a significant change in the shade of A2 GA and GUI. Storage resulted in a significant change in shade for A2 GUI and EFHT. There was a clinically significant difference between the shade of the materials at S2 and the A2 VITA shade tab. Thickness had an effect on final shade, as thinner sections showed more of the background colour.

Conclusions

GA, GUI, and EFHT show a change in shade from when the restoration is placed to when the patient returns after a week. A change is also seen when GA is placed at various thicknesses. Direct shade matching is the preferred technique when selecting the shade for aesthetic restorations.

Keywords

Curing, Storage, Thickness, Change in Shade, Restorative Materials

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Dentinal tubule penetrability and bond strength of two novel calcium silicate-based root canal sealers.

Researchers: Karissa Shieh, Jack Yang, Elsa Zhu
Supervisors: Professor Ove A Peters, Dr Sepanta Hosseinpour

Aim

This study aimed to compare the penetrability and bond strength between two calcium silicate-based sealers and an epoxy resin-based sealer, as well as examine the relationship between penetrability and bond strength for the different sealers.

Methods

Thirty-nine recently extracted human premolar teeth were instrumented and divided evenly into three groups (n = 13) according to the sealer used for obturation: AH Plus, EndoSequence and AH Plus Bioceramic Sealer. Three teeth were randomly selected out of each for analysis using confocal laser scanning microscopy to assess penetrability. The remaining ten teeth in each group were subject to push-out tests using a universal testing machine. All teeth were sectioned into nine transverse slices of 0.9 mm thickness for their respective tests.

Results

AH Plus exhibited significantly lower penetrability and significantly higher bond strength when compared to EndoSequence and AH Plus Bioceramic Sealer. There was no significant difference between EndoSequence and AH Plus Bioceramic Sealer in terms of either penetrability or bond strength. No correlation was found between penetrability and bond strength.

Conclusions

The physical properties of endodontic sealers play an important role in their clinical application. Further studies, particularly those evaluating and comparing the novel AH Plus Bioceramic Sealer with other sealers are recommended.

Keywords

Penetration, Bond Strength, Confocal, Push-Out Test, Calcium Silicate-Based Sealer

Vital pulp therapy outcomes in Oral Health Centre patients.

Researchers: Joshua Chin, Geoffrey Yifan Zhang
Supervisors: Professor Ove Peters, Dr Christine Peters

Objectives

This retrospective study aimed to analyse the effectiveness of various materials for vital pulp therapy (VPT), based on clinical data gathered from the Metro North ISOH system. Other factors that may influence the outcomes of VPT were also identified and analysed..

Methods

A total of 560 patients who had undergone VPT at the Oral Health Centre between 2017-2021 were included in the present study. Chart records were screened for VPT materials used, outcome of treatment, and other variables such as tooth number, operator, and restorative material. The relationships between variables and outcomes were evaluated using Chi-squared analysis. Those found to have significant associations were further analysed using logistic regression.

Results

A total of 334 cases were found to be suitable for this study. Two variables were identified to be significantly associated with success: material choice and tooth position. Dycal (46.1%) and MTA (24.0%) were found to be the most common materials, however, non-setting calcium hydroxide (CH) (11.4%), Odontopaste (7.2%) and Odontocem (5.7%) were also used. Overall, MTA had the highest success rate (82.5%), followed by Dycal coming in second place (72.7%), non-setting CH (68.4%), Odontopaste (58.3%), and finally Odontocem (47.4%). Anterior teeth were correlated with a higher success at 83.0% and posterior teeth with a lower rate of 69.4%. A logistic regression model based on these two variables yielded a predictive value of 54.8%.

Conclusion

MTA had the highest success rate of all VPT materials included in this study, indicating that it can be regarded as the most reliable VPT material. Tooth position was found to be an important factor to consider prior to initiating VPT with anterior teeth demonstrating greater success than posterior teeth.

Keywords

Vital Pulp Therapy, Mineral Trioxide Aggregate, Calcium Hydroxide, Success

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