

School of Dentistry

# Student Research Conference 2020

19 November

**Abstract Booklet**



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## Message from the Head of School Professor Pauline Ford

### It is a pleasure to welcome you to the 2020 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 BDS (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. The impact of the COVID-19 global pandemic has highlighted the critical importance of 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 our 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 2020.

**Professor Pauline Ford**  
Head of School



## Message from the Course Coordinator

# Associate Professor Ratilal Laloo

**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 online research conference.

Even in a global pandemic, this year we have 23 research 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 5th School of Dentistry Student Research Conference.

Our sincerest thank you to the research stream coordinators and 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 Laloo**  
Course Coordinator

# STUDENT ABSTRACTS

## SMS reminders to improve public outpatient attendance: a retrospective study

**Researchers:** Cecilia Chen, Pei-Chen Chen & Elizabeth C. Hsu  
**Supervisor:** Dr Ellen Gielis, Dr Kelly McGowan, Nicole Stormon

### Background

Patients who miss scheduled appointments reduce clinical productivity and delay access to care for other patients. Reminders have improved attendance for healthcare appointments in the past, but it is not known if short message service (SMS) implementation reduces incidence of patients unable to attend (UTA) or who fail to attend (FTA) appointments in the public dental service. Patients who miss scheduled appointments reduce clinical productivity and delay access to care for other patients. Reminders have improved attendance for healthcare appointments in the past, but it is not known if short message service (SMS) implementation reduces incidence of patients unable to attend (UTA) or who fail to attend (FTA) appointments in the public dental service.

### Objective

This paper studied the effectiveness of SMS reminders in increasing appointment attendance at a public dental outpatient sector in Queensland.

### Method

A total of 69,352 appointments were analysed before and after implementation of SMS reminders over a period of two years. Data was sourced from the adult service as well as the children and adolescent oral health service (CAOHS) at West Moreton Hospital and Health Service (WMHS), a public dental service in Queensland. Frequency tables and confidence intervals were used to establish significance.

### Results

Following SMS implementation in the adult service, missed appointments decreased from 24.2% to 20.1% of all booked appointments. Among the missed appointments, there was a statistically significant reduction in UTAs from 19.8% to 15.4%, though FTAs increased by 0.3%. Within CAOHS, there was an increase in missed appointments from 22.2% to 24.3% of total appointments after the introduction of SMS reminders. While UTA rate increased from 12.3% to 14.3%, FTA remained the same, comprising 9.9% of missed appointments.

### Conclusion

SMS reminders may have been effective in reducing patient non-attendance for the adult service but not the CAOHS.

## An Exploration into the Accessibility of Dental Services by pregnant Aboriginal and Torres Strait Islander women in South East Queensland

**Researchers:** Grace Kan, Valerie CW Kwok, Daniel Saw  
**Supervisor:** A/Professor Ratilal Laloo, Dr Boby Thomas, Joanne Sutton

### Background

Underutilisation of dental services among pregnant Aboriginal and Torres Strait Islander women is evident. Improvements to oral health service delivery for pregnant women in particular would be beneficial due to their higher risk of dental diseases and their influence on future generations. Furthermore, it would contribute to promoting health equity between Aboriginal and Torres Strait Islander people and the wider Australian population.

### Objective

This project aimed to identify factors that affect access to dental services provided by the Institute of Urban and Indigenous Health and Member Services (IUIH) through surveying the organisation's relevant staff.

### Method

IUIH staff (n=318) were invited to participate in a survey that included quantitative and qualitative questions. The survey explored their involvement with pregnant women, current policies and recommendations to improve oral health service delivery at IUIH.

### Results

The total number of visits made by pregnant Aboriginal and Torres Strait Islander women to IUIH medical services was 2.5 times that of IUIH dental services. There were 31 participants (10%) who completed the survey. The majority of the participants were unaware of current efforts made by IUIH to improve dental access for pregnant women. Themes on the underutilisation of dental services differed by occupation groups and included 'lack of education', 'dental fear and anxiety' and 'dental appointments being a lower priority'. Suggestions to improve access included patient education and improving in-house systems.

### Conclusion

The unique ideas amongst occupation groups, on contributing factors and suggested solutions, to the underutilisation of dental services revealed that personal experience and roles in service delivery affect perceptions of these staff. Hence, it is important that future research is conducted to explore the first-hand perspective of pregnant Aboriginal and Torres Strait Islander women towards accessing dental care in South-East Queensland.

## What are the enablers and barriers to dental attendance in Indigenous Australians?

**Researchers:** Anthony Taing, Viet Toan Anton Tran, James Yang  
**Supervisor:** Professor Pauline Ford, Clare Mangoyana

### Background

Aboriginal and Torres Strait Islanders are an at-risk group for poor oral health. Unfavourable patterns of dental attendance have been identified as a possible contributor to this discrepancy.

### Objective

This systematic review was conducted to evaluate the literature regarding the barriers and enablers to dental attendance in Indigenous Australians.

### Method

Electronic databases were searched for relevant studies. The Critical Appraisal Skills Programme checklist was used to evaluate the quality of the studies. Thematic analysis was conducted to analyse and summarise the literature.

### Results

Five studies were included. The following factors were identified as affecting attendance: oral health literacy, dental fear, cultural appropriateness of care, discrimination, accessibility, cost.

### Conclusion

This review provides recommendations on structural changes needed to facilitate Indigenous dental attendance. Further research is needed regarding the effect of treatment quality on attendance.

## Assessing the communication preferences of the Metro North eligible population for accessing information and dental care through Metro North Oral Health Services

**Researchers:** Emma Leong, John Pham, Deborah Seah  
**Supervisor:** Alison Dickinson, Dr Michael Foley

### Background

With the recent shift towards modern communication modalities, the Internet has become a popular source for accessing information about health services. Few studies have investigated patients' preferences in receiving information about public dental services, booking appointments and receiving appointment reminders.

### Objective

This study investigated the communication preferences of Metro North Oral Health Services (MNOHS) patients in Queensland for accessing information about public dental care, booking dental appointments and receiving appointment reminders.

### Method

Data was collected from a previous quality assurance project which used convenience sampling in MNOHS clinics and received 416 responses to a survey. The outcome variables were the preferred communication modalities, and the explanatory variables were age, language spoken at home and Aboriginal and/or Torres Strait Islander origin.

### Results

The Internet was the most frequently selected method of receiving information about public dental services (57.2%), regardless of age group and language spoken at home. Amongst Aboriginal and/or Torres Strait Islander participants, face-to-face communication from a doctor was the most frequently selected option (52.6%). Phone was the most frequently selected method of making a dental appointment (91.3%) and receiving appointment reminders (96.0%), regardless of age group, language spoken at home and Aboriginal and/or Torres Strait Islander origin.

### Conclusion

The Internet is likely to be the preferred method of MNOHS patients for receiving information about public dental care regardless of age, language spoken at home and non-Aboriginal and Torres Strait Islander participants. Amongst Aboriginal and/or Torres Strait Islander participants, face-to-face communication from a doctor is likely to be most preferred. Phone is likely to be the preferred way of making dental appointments and receiving appointment reminders regardless of age group, language spoken at home and Aboriginal and/or Torres Strait Islander origin. Further research is recommended to investigate the efficacy of these communication methods to improve MNOHS patient attendance, attendance and appointment booking.

## Analysis of oral health content promoted by health organisations and social media influencers in Australia

**Researchers:** Pei Qing Teo, Shiuan Ling Felicia Chin, Long Chee Jessie Ng  
**Supervisor:** Nicole Stormon

### Background

The goal of oral health promotion (OHP) is to prevent oral diseases and maintain population oral health through community initiatives and awareness campaigns. Despite continuing efforts from health organisations (HOs) and stakeholders, oral diseases remain prevalent in Australia. Previous studies have explored the use of social media platforms such as Twitter as a health promotion tool, but little research has been undertaken to analyse the image-sharing web application Instagram within the context of OHP.

### Objective

The purpose of this study was to investigate the presence of oral health-related content on social media.

### Method

Content analysis was used to investigate oral health-related posts published by Australian HOs and the top 50 Australian individual users (IUs) known as social media influencers from 2015 to 2019 on Instagram.

### Results

A total of 79,432 posts were screened, of which oral health content was present in 0.1% (n= 68) of posts by IUs and 2.2% (n= 402) of posts by HOs. The most common type of oral health content were oral health messages (n= 201, 37.1%), followed by oral health products (n= 154, 28.4%). The majority of posts published by HOs were oral health messages (n= 197, 42.0%) and the most common type of content posted by IUs were oral health products (n= 52, 71.2%).

### Conclusion

This study described the frequency and nature of oral health content promoted on social media and illustrated the different content promoted by HOs and IUs. With the rise in popularity of social media, this research highlighted the need for HOs to maximise their reach and impact on the public in order to establish more effective measures for OHP.

## The impact of the COVID-19 Pandemic on public dental waiting lists in Queensland

**Researchers:** Pragya Singhal, Layanga Ranasinghe, Chung Y. Chuo  
**Supervisor:** A/Professor Ratilal Laloo

### Background

Queensland Health has waiting lists for public dental services. Long waiting times are associated with poorer patient satisfaction and outcomes. The COVID-19 pandemic may have adversely impacted the waiting lists due to imposition of procedural restrictions, but the extent of the impact in context of previous fluctuations is unknown.

### Objective

This study aimed to quantify the impact of COVID-19 on public waiting lists in context of the fluctuations that occurred in previous years.

### Method

Monthly data on Queensland Health public dental waiting lists was collated to track the changes in waiting list numbers and the percentage of people waiting beyond the recommended time. Monthly changes for total and Priority 1 waiting lists during the pandemic months were compared to the changes seen in pre-pandemic months (Jan 2016 to Feb 2020).

### Results

Total waiting list increased from 146,229 in March 2020 to 157,473 in July, whereas the Priority 1 list increased from 718 to 951. However, pre-COVID years have witnessed comparable monthly increases and higher total numbers. The percentage of people waiting beyond the recommended time for all waiting lists underwent its sharpest recorded increase in April to reach a 5 year high of 7.96 in May 2020. Priority 1 list similarly suffered a steep increase, with a record high of 92.40% of people waiting beyond the desirable period during April 2020.

### Conclusion

The increase in the total number of people on the waiting list during the pandemic was within the range of fluctuations that occurred in previous years. The pandemic had a more pronounced impact on the percentage of people waiting beyond the recommended time, especially those on Priority 1 list for urgent conditions.

## The relationship between early childhood development, dental caries and oral health behaviours in Indigenous Australian children

**Researchers:** Jia Min Goh, Subin Moon, Luke Zhang  
**Supervisor:** Nicole Stormon, Christopher Sexton

### Background

Aboriginal and Torres Strait Islander children are at higher risk for poor oral health compared to non-Indigenous Australian children. Early childhood development has been shown to impact oral health behaviours. No studies have investigated the relationship between early childhood development and caries or oral health behaviours in Indigenous Australian children.

### Objective

This study aimed to explore this relationship. Data from waves one to five of the B cohort in the Longitudinal Study of Indigenous Children was accessed and used.

### Method

Descriptive statistics were calculated and where significant, unadjusted and adjusted odds ratios were calculated. For wave one, 960 children were recruited and approximately half were male (50.5%). The majority were Aboriginal and had average socioeconomic status within their Indigenous community but low socioeconomic status overall. 10.1% children were born with low birth weight and 11.7% were born pre-term. 80.3% of carers possessed a baby book, 50.1% reported that their child brushes once or more daily, 10.0% visited a dental practitioner within the last year and 45.4% were given a bottle in bed.

### Results

There seemed to be no relationship between a child's birth weight or gestation period and caries experience or oral health behaviours. However, children with carers in possession of a baby health book were more likely to have better tooth brushing habits.

### Conclusion

The possession of a baby health book indicated increased health literacy of the carer which may have resulted in more positive oral health habits in the child. This phenomenon is also supported by other literature and highlights the impact of oral health education on oral health behaviours. Further studies should be undertaken to investigate whether possession of a baby health book has an impact on a carer's values and views of oral health, and whether it affects oral health practices and the dietary choices made for the child.

## The Child Dental Benefits Schedule and its Impact on Indigenous Children's Rate of Dental Attendance

**Researchers:** Phuc Pham, Martin Nguyen, Theresa Truong  
**Supervisor:** Dr Claudia Silva Lopez, Christopher Sexton

### Background

The Child Benefit Dental Schedule (CDBS) is an Australian program introduced in 2014 that provided access to up to \$1000 in benefits to eligible children aged 2 to 17 years. It was intended to improve access to dental care for children of priority populations including Indigenous children.

### Objective

To determine if the CDBS increased the rate of dental attendance amongst Australian Indigenous children.

### Method

Data from 2008 to 2016 of the Longitudinal Study of Indigenous Children (LSIC) was analysed. The main outcome was dental attendance of the Baby (B) cohort and Child (K) cohort.

### Results

There was an increase in dental attendance in both B and K cohorts from 2008 to 2016. With respect to the introduction of the CDBS in 2014, there was an increase in dental attendance amongst both cohorts with the B cohort rising from 51.0% (95% CI 47.3-54.6) in 2013 to 60.3% (95% CI 56.8-63.9) in 2014. Similarly, for the K cohort, dental attendance increased from 55.2% (95% CI 51-59.5) in 2012 to 62.4% (95% CI 58.2-66.5) in 2014. However when comparing both cohorts at the age of 7.5 to 9 years old in which the CDBS was available for the B cohort 61% (95% CI 57.5, 64.5) and not the K cohort 55.2% (95% CI 51, 59.5), there was no enough evidence of a difference in the rates of attendance.

### Conclusion

Dental attendance of Indigenous children increased over the years of 2008 to 2016, however it cannot be concluded that this is directly attributable to the introduction of the CDBS.

## An Assessment of the Quality of Referrals to a public Oral Medicine Department: Orofacial Pain

**Researchers:** Yong Jie Tan, Min Jae Kim, Yujin Lee  
**Supervisor:** Dr Sarah Chaw

### Background

Oral Medicine is a dental specialty that includes the management of patients referred for orofacial pain. Orofacial pain conditions are pain disorders involving the head, face and neck, which can be debilitating and requires management within the appropriate time frame. Currently, there is a long waitlist of patients for the public Oral Medicine department in Queensland. Thus, an efficient triaging system is necessary to allow specialists to assess clinical urgency and provide treatment in a timely manner. The quality of orofacial pain referrals heavily impacts the efficiency of the triaging system.

### Objective

This study assessed the quality of orofacial pain referrals made to a major public Oral Medicine department in Queensland. Potential factors affecting the referral quality were also investigated.

### Method

All orofacial pain referrals received by the public Oral Medicine department in Queensland Health (Herston Oral Health Centre (OHC), Metro North Hospital and Health Service (MNHHS)) between January 2017 and February 2020 were collected. The referrals were assessed against a criterion with 13 essential items for writing orofacial pain referrals. The referral quality was determined by calculating the number and percentage of referrals that fulfilled all essential items. An independent samples T-test and one way between groups ANOVA was conducted to investigate the effect of potential factors on the referral quality.

### Results

Out of 166 accepted orofacial pain referrals, only 17 (10.2%) fulfilled all 13 essential items. From the criterion, 'clinical information provided' was the least adequate component with only 20 (12%) of the total referrals fulfilling adequacy. A significant difference in quality was noted between proforma and non-proforma referrals.

### Conclusion

The orofacial pain referrals made to the public Oral Medicine department lack sufficient detail for effective triaging. To improve the referral quality, the use of Oral Medicine specific proforma and education of referrers are recommended.

## An Audit of the Quality of Referral Letters to a Public Oral Medicine Department: Oral Mucosal Lesions

**Researchers:** Ivy Wu, Sean Kah Chuen Ho, Xin Sharon Chen  
**Supervisor:** Dr Sarah Chaw

### Background

Oral mucosal lesions (OML) make up a large percentage of Oral Medicine referrals. High quality referrals, containing sufficient helpful information, lead to a more efficient triaging process. This ultimately results in better patient treatment outcomes.

### Objective

This study audited the quality of OML referral letters to a public Oral Medicine department in Queensland, Australia. Features of a referral that were adequate or lacking were identified, and referral quality between referrers' experience level, healthcare fields and whether a proforma was used, were compared.

### Method

All referrals made to Oral Medicine department in Queensland, Australia (Herston Oral Health Centre (OHC), Metro North Hospital and Health Service (MNHHS)), between January 2017 and February 2020 were collated and compared against a modified criteria of essential referral components in a binary pass system ("1" or "0"), to record passes and fails respectively.

### Results

A total of 583 referrals were audited. Over 92% of referrals failed to meet all essential criteria required. The section within the essential criteria, 'Clinical information' was considerably lacking, with only 58 (9.95%) referrals containing adequate information. Of the sub-criteria within that section, information regarding 'Past Consultations, investigations and treatments' (39.45%), 'Onset or duration' (41.48%) and 'Size' (44.08%) were provided the least. 'Dental' referrers outperformed 'Medical' referrers in all sub-criteria of 'Clinical information' except the inclusion of 'Past consultation, investigations and treatments', where medical referrers excelled. 'General Dental Practitioners' performed significantly better than 'Specialist Dental Practitioners' and 'Dental Students' overall. Although the 'use of a Proforma' performed better than that of 'no Proforma' overall, this was not statistically significant.

### Conclusion

The majority of referrals were missing details which would be useful in the triaging process. Improvements in referral writing may be achieved by the use of a proforma and educating referring practitioners about the scope of Oral Medicine and referral writing.



## Reliability of the London Atlas for age estimation in Australian Children

**Researchers:** Amanda Chua, Christabel Halim, Ethan Pham  
**Supervisor:** Sakher AlQahtani, Sobia Zafar

### Background

Dental age is frequently used to assess maturity and age estimation in the absence of appropriate documents. It is an important method in identifying human bodies in cases of occurrence of natural and mass disasters.<sup>1, 2</sup> In children, it aids in monitoring the growth and development and may also be used as a guide in starting specific age-related treatment.

### Objective

To assess the age prediction reliability of the London Atlas on Australian children and to determine if there is a difference in prediction accuracy between males and females. **Methods:** A total of 193 panoramic radiographs of children (96 females and 97 males) with the known age of 5-25 years were selected from a pool of 600 archival records of The University of Queensland (Figure 1). Dental age was estimated using charts of The London Atlas. Dental and chronological ages were compared using a paired student's t-test using SPSS. The absolute mean difference between dental and chronological age was calculated.

### Results

Of the entire sample, the difference between the mean estimated age (11.56 years) and mean chronological (11.92 years) age was 0.36 years. This difference was found to be significant ( $p < 0.001$ ). The over-estimation of ages was significant in age groups 6, 7, 8, 10 and 11. The mean age difference for males was 0.038 years, while the difference for females was 0.471 years. However, the difference between both genders (0.509 years) was insignificant ( $p > 0.001$ ). The London Atlas shows a tendency to over-estimate the ages of females and under-estimates the ages of males.

### Conclusion

The London Atlas was found to overestimate the ages of children in an Australian population by approximately four and a half months (0.37 years). However, there was no difference in age prediction accuracy between males and females. Overall, the London Atlas has comparable accuracy with other dental age estimation methods and should be considered as an adjunct tool for age estimation.

## Exploring Medicine and Dentistry students' personality traits: a five-year study of student cohorts

**Researchers:** Martin Seysan, Matin Mirabediny, Dominic Wall  
**Supervisor:** Nicole Stormon, Professor Di Eley

### Background

Studies have previously explored personality traits of students within the degrees of medicine and dentistry. However, the differences between the two and the potential impact it has on their ability to cope against the challenging demands has yet to be investigated.

### Objective

This study explored the differences in personality traits between students of medicine and dentistry and its potential influence on their academic and clinical performance.

### Method

Cloninger's Temperament and Character Inventory was used to measure student's personality traits across five different cohorts (between the years of 2015-19) of dentistry and medicine at one Australian University. The differences in these personality traits were explored between programs and demographics of each cohort through descriptive comparison.

### Results

Across the five years of data collected a high response rate of 82.7% and 93.7% was obtained from students studying medicine and dentistry respectively. Medicine students exhibited significantly lower harm avoidance (0.31 mean difference), higher persistence (0.27 mean difference), self-directedness (0.41 mean difference) and cooperativeness (0.29 mean difference) than their dentistry student counterparts. Medicine consisted of a higher proportion of male students, older students and students in relationships compared to dentistry.

### Conclusion

Comparisons between the samples of medicine and dentistry students throughout this study have demonstrated medical students exhibited mature profiles of personality traits that may be more likely to thrive within a demanding degree. These differences may indicate older students or students recruited via more rigorous entry requirements may possess more favourable personality traits. Studies are needed to identify challenges within the two professions and how specific personality traits may translate to a better clinician post-graduation. Personality traits could support universities in their recruitment of students and identifying students who require support throughout their degree.

## Students' Perception and Understanding of Ethics and Professionalism Through Dental School

**Researchers:** Thomas Kim, Alan Kwok, Gi-Yong Park  
**Supervisor:** Christopher Sexton

### Background

With changing realities of dental practice largely affected by the introduction of consumer-based practices, the values of ethics and professionalism have deteriorated within dentistry. There may be possible factors and motivations behind the pursuit of dentistry as a career that drive a disinterest towards ethical and professional behaviour.

### Objective

This study assessed how the clinical and ethics courses may have changed the perception and understanding of ethics and professionalism across cohorts of all year levels in The University of Queensland (UQ) dentistry.

### Method

Results from an online survey distributed to the UQ dental school across first to fifth year students were gathered and analysed in a Likert Scale and multiple-choice format.

### Results

The greater ethics/clinical exposure group (GEC) demonstrated an overall greater understanding of ethics and professionalism over the none to minimal ethics/clinical exposure group (NEC), whilst demonstrating the opposite trend for the perception of its importance. In the NEC group, 73.9% (n=17) voiced personal interest as a factor for studying dentistry, as compared to 26.7% (n=4) of the GEC group (Figure 4). In the NEC group, 17.4% (n=4) had voted for familial pressure, as opposed to 53.3% (n=8) in the GEC group. A greater proportion of the GEC group preferred 'financial benefits' in contrast to the 'NEC' group

### Conclusion

The study demonstrated that similar trends in the lesser perceived importance of ethics and professionalism was discovered when investigating the different cohorts in a cross-sectional study. Personal interest, familial pressure and financial benefits may serve as additional factors that influence the perception and understanding of ethics and professionalism.

## Short Term International Dental Experiences in Recent Dental Graduates and Undergraduate Dental Students at an Australian University

**Researchers:** Wei-Yi Chen, Natalie La, An-Lun Cheng  
**Supervisor:** Dr Sowmya Shetty

### Background

Learning through international experience has been well documented in the literature. Multiple US studies have shown that international dental experiences may improve clinical skills, communication and confidence. Currently, there is a lack of literature investigating Australian dental students' and recent graduates' participation, interest and perceptions of international dental experiences.

### Objective

The aim of this study is to understand Australian dental students' and recent graduates' experiences and perceptions of international dental experience by: (i) capturing past participation; (ii) identifying potential interests for participants that have not been on a trip; (iii) ascertaining perceived benefits of the trip/s.

### Method

A 19 question paper survey was distributed to undergraduate dental students of The University of Queensland (UQ). An online counterpart survey was created via Google Forms and promoted on relevant Facebook groups targeted at recent dental graduates of UQ.

### Results

A total of 203 of the 310 eligible UQ undergraduate dental students and 18 of the 214 eligible recent graduates responded to the distributed paper and electronic surveys making the response rate 65.5% and 8.4% respectively. A total of 13 undergraduate respondents and 7 recent graduate respondents participated in an international experience trip. The majority of respondents who had not participated in an international dental experience trip were interested in participating in one. Education (84.6%) and improved dental skills (84.6%) were the most reported perceived benefits by the undergraduate students who had participated in an international dental experience.

### Conclusion

A majority of respondents were interested in participating in international dental experiences. Despite this, only one in fifteen undergraduate respondents had participated in an international dental experience. Further exploration of this concept is needed, however dental schools within Australia could potentially explore integration of international short term dental experiences into formal curricula in the future.

## Perceived incidence of academic integrity breaches in an undergraduate dental program, and students' attitudes towards such breaches

**Researchers:** Furqan Ahmed, Adrian T. Balendra, Daniel Karam  
**Supervisor:** Dr Sandra March

### Background

Academic integrity is one of the foundations of tertiary education and accreditation. Students have been known to occasionally act in ways that breach this integrity. There exists a wide variation of opinion amongst students and academics alike as to what actions breach academic integrity.

### Objective

This study assessed the perceived incidence of academic integrity breaches in an undergraduate dental program. It further assessed and discussed the prevalence and awareness of contract cheating.

### Method

Data was sourced from undergraduate dental students in the University of Queensland in the form of an online survey conducted in 2020. The outcomes were perceptions towards cheating in three forms of assessment, perceptions towards contract cheating and university policies, as well as perceived incidence of cheating in three forms of assessment. Independent variables are year level within the program, domestic/international status, and age.

### Results

14% of participants were aware of cheating in practical exams, 31.9% were aware of cheating in theoretical exams and 22% were aware of cheating in take-home assignments. Cheating in theoretical exams had the highest perceived incidence (63). Difficulty of assessment and lack of preparation were identified as the most significant motivators of cheating. More than one-third of the participants (43.8%) were aware of the existence of contract cheating, with 85.7% of those believing contract cheating is a breach of academic integrity. 84.2% of respondents believed take-home assignments had the highest prevalence of cheating.

### Conclusion

The awareness of contract cheating amongst participants was greater than expected. Contract cheating is likely to increase in prevalence in the future.

## Trends and awareness of percutaneous injuries at a dental school

**Researchers:** Richard Huynh, Deborah Du, Jun-Ho Im  
**Supervisor:** Dr Jessica Zachar, Dr Sobia Zafar

### Background

A percutaneous exposure injury (PEI) to a healthcare worker can represent substantial medical, financial and economic costs to the casualty and healthcare system.

### Objective

First, this study aimed to retrospectively examine trends in PEI at The University of Queensland's School of Dentistry (UQ SoD) from the period 2009-2019. Second, the study aimed to report on the underreporting rate of PEI's, current attitudes and awareness of PEI safety protocols from clinical staff and students at UQ SoD in 2019.

### Method

Retrospective data was collected from de-identified archival incident reports from 2009-2019 from UQ SoD's incident and hazard reporting system (UQSafe and Legacy Database). Additionally, cross-sectional data was collected via the validated Percutaneous Exposure Incident Questionnaires (PEIQ) completed by clinical staff and students of UQ SoD in 2019.

### Results

From the archival data, the majority (79.9%) of the 618 reported PEIs were from students, showing that students were at greater risk of sustaining a PEI. Concurring with the literature, local anaesthetic-related procedures were the most common cause found in the archival (31.5%) and survey data (23.7%) whereas the needle-prick was the most common causative instrument in both the archival (16.4%) and survey data (27.5%). Additionally, the finger was the most common bodily site of injury found in both the archival (53.0%) and survey data (52.8%). From the 345 responses to the survey, 42.1% of PEIs sustained were not reported. Most survey respondents (51.9%) reported not having an awareness of post-exposure prophylaxis (PEP), however 80.3% of respondents also believed there should be further PEI education.

### Conclusion

Students were consistently at a higher risk of sustaining a PEI than staff members between 2009-2019. The reported knowledge on PEI awareness, classification and preventative measures are inadequate, with an underreporting rate of 42.1% of sustained PEIs, suggesting further PEI education is necessary.

## A retrospective analysis of non-sharps related injuries in a dental school setting

**Researchers:** Soyeon Jeon, Mark Chong, Gwanghyun Jin  
**Supervisor:** Dr Sobia Zafar, Dr Jessica Zachar

### Background

Workplace non-sharps injuries are a common occurrence in a dental school setting, and they have the potential to cause significant harm and distress to those involved. However, the importance of preventing non-sharps injuries is often overlooked due to the emphasis on sharps-related injuries such as percutaneous needlestick injuries.

### Objective

The aim of this study was to analyse the incidences of non-sharps injuries at The University of Queensland School of Dentistry (UQ SoD) between 2009 and 2019 to identify trends and the possible causative factors.

### Method

De-identified injury reports of the UQ Workplace Health and Safety (WHS) databases were obtained after ethics approval. The injuries were allotted into seven categories: general incidents, medical emergencies, chemical-related injuries, thermal burns, inhalation, near misses and other. Descriptive statistics were then extracted and analysed using SPSS.

### Results

Of 1156 incidents reported, 35.7% (n=413) were for non-sharps injuries. In a dental school setting, the most common type of non-sharps injury was general incidents such as trips, falls and abrasions (48.4%, n=200). The most common body site for injury was the hands (19.4%, n=80) and the most common location of injury was the patient clinics (53.8%, n=222). The personnel type most at risk of a non-sharps injury fluctuated from students to staff throughout the study period.

### Conclusion

Non-sharps injuries are a frequent occurrence within a dental school setting. All personnel, including students and staff, are at similar risk of encountering such injuries. The equipment and facilities of a dental clinic as well as safety protocols were identified as contributing factors for non-sharps injuries. Therefore, these factors should be continuously reviewed and improved on in order to minimise these injury experiences.

## Emerald™ Intra-Oral Scanner and Compare® Software in Paediatric Dental Simulation

**Researchers:** Kent Nakahashi, Cheryl M.L. Chin, Jason Y.H. Ting  
**Supervisor:** Dr Sobia Zafar, Professor Laurence Walsh, Dr Bilal El Masoud

### Background

Intra-oral scanners and digital assessment software in dental education have been proposed as novel tools for objective and reliable preclinical assessment. In fixed prosthodontics, digital assessment systems can measure tooth reductions and generate a percentage similarity score against a gold standard. Its applicability has not been validated with pre-formed metal crown (PMC) preparations used in paediatric dentistry, which are distinct in preparation and criteria assessed.

### Objective

To compare a digital measurement and percentage similarity method using the Planmeca Emerald™ intra-oral scanner and Romexis Compare® software to assess PMC preparations. Their reliability and agreement with traditional visual grades were investigated to evaluate the feasibility of implementation in preclinical assessment.

### Method

Three operators graded 30 PMC preparations of tooth #75 across two trials, with the intra-oral scanner and Compare® software using a digital measurement and percentage similarity method. For the digital measurement method, key points were measured and graded following

a standardised rubric. For the percentage similarity method, a similarity score against an unprepared model was generated. The Intra-class correlation (ICC) was computed to investigate the inter- and intra-rater reliability. The Cohen's Kappa coefficient was used to determine the agreement between the digital method grades and traditional visual grades.

### Results

Both digital assessment methods showed excellent to good inter- and intra-rater reliability (ICC>0.75, 95% CI) across operators and trials. However, there was only nil to slight agreement for both digital methods with visual grades.

### Conclusion

The intra-oral scanner and Compare® software were reliable in assessing preclinical paediatric PMC preparations, but the software grades had minimal agreement with visual grades. Optimisation of the grading rubric may improve the agreement of the digital grading methods. Additionally, software improvements including ledge detection, and assistance tools for measurement and orientation may enable its use as a more efficient and applicable adjunct in paediatric dental education.

## Evaluation of training dental practitioners in Stainless Steel crown placement in West Moreton Hospital Oral Health Service (WMOHS)

**Researchers:** Li Yeoh, Irvin S. H. Tang, Vanessa T. E. Ling  
**Supervisor:** Dr Jessica Zachar, Dr Kelly McGowan, Nicole Stormon

### Background

Stainless steel crowns (SSC) are ideal restorative options for primary molars as they allow better clinical outcomes with reduced cost. The Hall Technique (HT) has greatly simplified SSC placement. However, many general dentists still prefer restoring compromised primary molars using traditional restorative materials.

### Objective

This study investigated confidence levels and trends in SSC placement from a group of dental practitioners from West Moreton Oral Health Service (WMOHS) who had attended a continuing professional development (CPD) course. This study evaluated whether skills acquired from training translated into increased confidence levels and outcomes in SSC placement, the barriers they faced before and after training and suggestions for ways to improve CPD delivery.

### Method

Dentists, Oral health therapists and Dental therapists (n=30) undertook CPD training for the HT of SSC placement. Participants were surveyed at three time-points: pre-CPD, three and ten month post-CPD, to compare their level of confidence (LOC) in SSC placement at each point. The ratio of SSCs to primary molar restorations were compared pre and post-CPD as a means to measure whether the CPD translated into clinical competence.

### Results

Training resulted in an overall increase in confidence, most significantly at the three month mark. The ratio of SSCs to primary molar restorations placed increased at three months post-CPD but then decreased again ten months post-CPD.

### Conclusion

Training increased practitioner confidence levels in SSC placement. Despite this, training did not appear to effectively facilitate clinical behaviour change, for reasons such as a lack of suitable cases and a lack of proper armamentarium.

## The effects of different irrigating solutions on MTA penetration into dentinal tubules

**Researchers:** Jethro Siao, Khai Yi Liew, Shaun Wong  
**Supervisor:** Dr George Bogen, Dr Yu-Yao Teoh

### Background

Numerous studies have confirmed the penetration effect of mineral trioxide aggregate (MTA) cement as a bulk obturation material or a component in sealers, using scanning electron microscopy (SEM) analysis. However, the penetration depth of MTA into dentinal tubules over time and the effect of various final-rinse chelating agents on its penetrating ability are not well understood.

### Objective

This study investigated the penetration depth of MTA into dentinal tubules at various time points, and the effect of different final rinse chelating agents on this phenomenon.

### Method

Forty-seven single-rooted teeth were decoronated leaving 12mm of root length and standardised using nickel-titanium rotary files under copious irrigation with 4% NaOCl. The roots were randomly assigned to three final irrigant groups (n=15): 4% NaOCl, 15% EDTA or Edgemix. Group samples were obturated with sodium fluorescein tagged MTA and allowed to set in 100% humidity. Five samples from each group were removed at two-week intervals, mounted in acrylic resin and sectioned at the coronal, middle and apical thirds to obtain three samples per specimen. The samples were scanned using confocal laser scanning microscopy (CLSM) and evaluated for maximum penetration depth ( $\mu\text{m}$ ) and area penetration (%) using ImageJ. The data was analysed with Prism™ using ANOVA/Kruskal-Wallis for intergroup comparison.

### Results

No statistical difference was found in the mean maximum penetration depth ( $\mu\text{m}$ ) or area of penetration into dentine (%) ( $p > 0.05$ ) between the three groups at all time intervals. The mean penetration depth of MTA into dentine was highest in the coronal third and least in the apical third.

### Conclusion

Penetration of ProRoot MTA into dentinal tubules is not affected by the final irrigant. Consequently, the use of chelating agents for smear layer removal prior to obturation of the root canal with ProRoot MTA may not be beneficial.

## A comparison of the dissolution of various glass ionomer cements in open sandwich Class II restorations by acids commonly found in the oral cavity.

**Researchers:** Dinuki Perera, Sean Yu, Henry Zeng  
**Supervisor:** Professor Ian Meyers, Professor Laurence Walsh

### Background

Glass ionomer cements (GICs) are an important part of restorative dentistry for their properties of fluoride release and chemical adhesion, but have limitations in load-bearing situations compared to their composite resin (CR) counterparts. Open sandwich Class II restorations are becoming increasingly popular, as they utilise the benefits of both GICs and CRs.

### Objective

This study compared the dissolution and behaviour of five GICs (GC Fuji® VII, GC Fuji® Bulk, GC Fuji® IX Fast, GC Fuji® IX Extra and GC Equia® Forte Fil) when exposed to three acids (citric acid, phosphoric acid and lactic acid), and ultrapure deionised water, which was used as a control.

### Method

Discs of each GIC were submerged in the media and weighed at 0, 3 and 7 days to determine the effects of GIC material, media, time and acid concentration on GIC dissolution. Subsequently, four GICs were placed in open sandwich Class II restorations in bovine teeth (n=24), and submerged in the acids to qualitatively determine GIC dissolution and effects on the adjacent tooth and CR.

### Results

The results from both the discs and teeth showed that the most destructive medium was 10% citric acid, the least destructive medium was water, the least destructive acid was 0.1% lactic acid, and the least soluble materials were GC Fuji® IX Fast and GC Fuji® Bulk. The disc results also showed that the most soluble material was GC Fuji® IX Extra, and one of the least soluble materials was GC Equia® Forte Fil. Effects were time-related and acid concentration-related.

### Conclusion

Conventional GICs may have a role in buffering against lactic acid threats. Newer high-viscosity GICs demonstrated some degree of increased acid resistance, but significant weight loss was still observed, especially for citric and phosphoric acids.

## Dissolution of Novel Bioactive Dental Restorative Materials in Common Oral Acids

**Researchers:** Darryl WJ. Lock, Natalynn JM. Ong, Shijia Sun  
**Supervisor:** Professor Ian Meyers, Professor Laurence Walsh

### Background

Glass Ionomer Cements (GICs) are traditional bioactive materials known for their fluoride ion release which aids in caries prevention. However, studies have established that GICs are susceptible to chemical degradation. Newer bioactive materials aim to improve on the acid resistance of GICs. Due to the recency of these bioactive materials, there are limited studies evaluating and comparing their acid resistance.

### Objective

This study aims to evaluate the resistance to chemical degradation of Activa, Biodentine®, Shofu Beautifil® and ProRoot® MTA when exposed to common acids in the oral environment.

### Method

Ninety-six standardised bioactive material discs and 24 bovine teeth restored using the bioactive materials were exposed to deionised distilled water (DDW), 0.1% lactic, 10.0% citric and 0.2% phosphoric acid for seven days at 25°C. Percentage mass loss of the discs and depth of surface defect of the bioactive materials in the bovine teeth were measured using a mass balance and periodontal probe respectively after seven days. A microscope camera was also used to record visual changes in the bioactive materials.

### Results

Biodentine® and ProRoot® MTA discs showed dissolution in citric and phosphoric acid with significant dissolution in citric acid at the concentration tested ( $P < 0.001$ ). Activa and Beautifil® discs did not show any statistically significant dissolution in all acids. In bovine teeth, Biodentine® and ProRoot® MTA experienced severe dissolution in citric acid with complete loss of restoration noted in some samples and slight dissolution in phosphoric and lactic acid. Activa experienced slight dissolution in citric and phosphoric acid while Beautifil® showed no dissolution in bovine teeth.

### Conclusion

The results demonstrated the resistance of Activa and Beautifil® to chemical degradation and their suitability to be used in patients with a highly acidic oral environment. Biodentine® and ProRoot® MTA are vulnerable to severe damage in an acidic environment and would benefit from being placed in a closed sandwich restoration in such cases.

## Flowable lined proximal restorations: the influence of overlying material radiopacity, liner thickness and clinical experience on radiographic interpretation

**Researchers:** Sari Simawy, Rahul Rana, Tam-Minh Nguyen  
**Supervisor:** Professor Laurence Walsh, Dr Alyssa Zhang

### Background

Many clinicians use flowable resin as liners in their proximal composite resin restorations. Flowable resin liners often appear more radiolucent than conventional resins, and therefore may often be confused for secondary caries and other radiolucent presentations by clinicians.

### Objective

The study aimed to assess clinician accuracy in the correct identification of a marginal radiolucency as a flowable liner in a radiograph. The effects of clinician experience, flowable liner thickness, and the radiopacity of the overlying restoration on clinician accuracy were also assessed.

### Method

Class II preparations were made in 5 molar and 5 premolar extracted teeth. All teeth were restored with different combinations of flowable and conventional composite resin. Radiographs were taken of each tooth before the restoration was replaced with another combination of materials. Absorbance values (mmAI) were also determined for each material. An online survey was then completed by 38 dental students and graduates. Correlation between clinician accuracy and flowable presence, clinician experience, flowable liner thickness, and overlying conventional resin radiopacity was determined through Fisher's Exact Test.

### Results

The results showed that participants misdiagnosed restorations with flowable lining more compared to restorations with no liner ( $p=0.0014$ ). Little association was noted between clinician experience ( $p=0.63$ ) and flowable liner thickness ( $p=0.63$ ) on accuracy. Experienced clinicians were more willing to investigate restorations ( $p=0.22$ ). A more radiopaque overlying conventional resin led to slightly more accurate diagnosis ( $p=0.43$ ).

### Conclusion

The results from our study demonstrated that flowable presence resulted in more misdiagnosis compared to standard restorations. However, they did not show any significant association between clinician experience, flowable liner thickness, radiopacity of the composite resin restoration and the Mach Band Effect on radiographic accuracy. Measures to reduce misdiagnosis of flowable lined restorations should be implemented in clinical practice.



The UQ School of Dentistry gratefully acknowledges the support of Colgate-Palmolive for the Undergraduate Research Conference.

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Copyright School of Dentistry, The University of Queensland  
Student Research Conference 2020, Abstract Booklet

ISBN: 978-1-74272-340-2 (e-copy)  
CRICOS Provider Number 00025B