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# Dental students' clinical and academic experience during placement in a UK tertiary care children's hospital

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## Abstract

**Introduction:** There are well-recognized difficulties across UK dental schools in recruiting paediatric patients who are willing to attend, have manageable dental disease, and do not require the behaviour management skills of an experienced dentist. This presents a concern for the skill development of the future workforce. At the School of Dentistry in Liverpool, the challenge to enable students to develop these core skills is supported by attendance at a tertiary care children's hospital. The present study investigates whether attendance of final-year dental students at a children's hospital affects perceptions of their surgical experience, self-reported preparation for working independently as a dentist, and understanding of specialist care.

**Materials and Methods:** A self-administered online survey was distributed to final-year dental students (2020–2021). Quantitative and qualitative data were gathered using mixed item formats for descriptive analysis. Questions addressed themes including experience of primary tooth exodontia, understanding of general anaesthetic dental care and multidisciplinary patient management.

**Results:** The response rate was 90% ($n = 66$). Attendance was beneficial to student learning and experience; responders reported increased surgical experience, self-confidence and understanding of multidisciplinary care. Students developed insight into future career pathways.

**Conclusion:** The present study supports the use of external clinic rotations, known as outreach placements, for dental student training. The findings support existing literature demonstrating the value of outreach placements in providing an experience not available in dental school environments. Dental students' perceptions of their surgical experience, knowledge of specialist care, and preparedness for independent practice may be enhanced by attendance to outreach placements.

KEYWORDS
dental education, outreach placement, paediatric dentistry

## 1 | INTRODUCTION

In many UK dental schools, outreach placements have a core role in undergraduate curricula.[1,2] Outreach placements are defined as 'all places where a student will work clinically outside the provider's main clinic(s), or vocationally in the workplace and away from the central education institution'.[3] Such placements are designed to provide learning in an environment distinct to that of dental schools, which are often based within dental hospitals. There are variations in outreach settings that reflect their purpose. It has been reported that multiple, contrasting placements might increase the uniformity of learning experiences.[2] Experience gained on placements may be particularly relevant for developing practical skills, including pulp therapy and oral surgery.[2,4,5] Furthermore, across the UK, Europe and the rest of the world, it has been reported that student confidence increases with diverse and cumulative clinical experience.[4–11] Accordingly, dental students have reported feeling better prepared for future independent dental practice following attendance to placements outside of their usual learning environment.[5,6,8,9,11,12] Supervising staff may contribute to this preparation by encouraging students to develop confidence and independence as placements progress.[13] Additionally, attendance to placements may aid the development of team working skills and increase awareness of future career pathways.[8,14]

Newly qualified dentists are expected to be able to plan treatment effectively, be aware of referral guidelines, and be able to communicate with other healthcare professionals, yet these expectations are not always met.[15] Outreach placements are commonly used to provide a breadth of clinical experience that cannot be achieved when learning solely within dental hospital environments, enabling the completion of the learning outcomes mandated by the profession's governing body.[1,2,14,16,17]

The provision of dental students' hands-on experience of paediatric dentistry can be notoriously challenging; many children referred to dental hospitals within the UK have experienced poor dental access, the consequences of severe dental disease, and frequently require extensive restorative and surgical care delivered under general anaesthesia (GA) by specialist clinicians.[1,4] Children with high-dental needs may be less likely to attend scheduled dental visits and might demonstrate heightened dental anxiety that can be difficult for relatively inexperienced student learners to manage. Additionally, children in the UK have free access to dental care within the National Health Service (NHS), therefore, families that regularly access dentistry may have little incentive to attend dental hospitals and entrust their children to student learners. Consequently, there are well-recognized difficulties across UK dental schools in recruiting paediatric patients who are willing to attend, who have manageable dental disease, and who do not require the behaviour management skills of an experienced dentist. This presents a significant concern with regard to skill development of the future dental workforce.[1,5,18] Newly qualified dentists may subsequently lack the ability and confidence to manage children presenting to their care, potentially leading to the delayed and inappropriate referral of paediatric patients to pressurized specialist services at a time when it is not unusual for a child to wait 52 weeks for consultation.

Alder Hey Children's Hospital (AHCH) is a tertiary care hospital with consultant-led specialist paediatric dentistry facilities in Liverpool, UK. The hospital provides a day-long outreach placement for final-year dental students of the University of Liverpool. Prior to the final year, dental students attend regular clinics at a local secondary care dental hospital, throughout years three to five, to develop experience and skills in paediatric dentistry for children with no medical or dental complexity. Patients attending AHCH are referred from primary or secondary care services as a result of severe dental anxiety, traumatic dental injury, craniofacial anomaly and medical compromise. These patients represent a diverse cohort in a distinct learning environment compared to that typically experienced by students while at dental school. Students attending AHCH carry out exodontia under GA and observe consultant-led clinics. Conversely, patients attending the local dental school for student treatment tend to undergo restoration of a single tooth per visit with or without local anaesthesia (LA). Increased competence in performing extractions for children is essential for future independent practice, at a time when caries remains the leading cause of hospital admission in England for children aged 5–9 years.[19] Therefore, the opportunity to extract multiple teeth under GA at AHCH is considered imperative for surgical skill development, further justifies the off-site learning opportunity, and may support learning with respect to treatment planning for appropriate behaviour management modalities. Student experience of this service provides a currently unique opportunity in the paediatric dentistry program which might inform the future working lives and career choices of newly qualified dentists.

To the best of our knowledge, there are no previously reported studies addressing whether dental outreach placements impact the self-reported preparedness of students to carry out primary and permanent exodontia independently. The present study investigated whether attendance of final year dental students to a children's hospital affects perceptions of their surgical experience, self-reported preparation for working independently as a dentist and understanding of specialist care.

## 2 | MATERIALS AND METHODS

This research was considered to be within the established practice of student evaluation, with minimal risk to participants and was thus granted exempt status from the institution's review board. An anonymous, self-administered, online questionnaire was determined to be the most appropriate method of surveying the target population in order to address the objectives of the study. Literature review and focus groups with specialists and educators in paediatric dentistry informed the design of a novel survey tool using SurveyMonkey®. Concepts for the exploration of the research question were defined, and item reduction was completed to restrict the questionnaire length and to minimize responder burden. The tool was pre-tested via face-to-face feedback discussion with paediatric dentistry

clinicians, educators and researchers and subsequently piloted by recently qualified dentists and paediatric dentistry tutors. Written and verbal feedbacks were encouraged, and the tool was edited to reduce questionnaire length and duplication.

Quantitative data were gathered using mixed item formats, visual analogue scales (VASs) and Likert agreement scales. Survey questions addressed key learning outcomes of the placement including experience and confidence in exodontia and understanding of specialist paediatric dental care. *t*-test analysis ($p < .05$) was used to examine the difference in perceived preparation to carry out primary and permanent exodontia independently. Closed-ended questions included binary and dichotomous formats, which were exhaustive and mutually exclusive. Qualitative data was gathered using a single free text question allowing evaluation of the opinions of responders. The questionnaire was distributed to 100% of final-year dental students who had completed the AHCH placement ($n = 73$) at the end of the dentistry program, prior to qualification. Objective data for extractions completed in dental school paediatric clinics by the same cohort was obtained from the school's digital development and assessment platform (LiftUpp) and compared with extraction data recorded on placement. This allowed a comparison of surgical experience gained in each environment. Quantitative data were exported to Microsoft Excel for descriptive analysis. Qualitative data was thematically analysed as part of an inductive approach. No IP data were gathered to ensure participation was truly anonymous.

## 3 | RESULTS

The response rate was 90% ($n = 66$). A majority, 67% ($n = 49$), of responders also provided responses to the free text question.

### 3.1 | Surgical experience

Placement was beneficial for students' clinical skills development; 97% ($n = 64$) of responders reported increased exodontia experience (Figure 1). This opinion was supported with a review of objective data; the mean number of extractions performed by students at dental school during the final year was 2.03 (range 0–6) whilst the mean number of extractions performed by students at placement was 12.66 (range 2–24). Qualitative responses reflected responder satisfaction with the opportunity to develop clinical skills; 'The experience in extracting multiple teeth under GA was invaluable and helped me develop my technique', 'I enjoyed the placement and think it has definitely helped me develop my skills extracting primary teeth'.

### 3.2 | Self-reported preparation for working independently as a dentist

Almost all responders, 98% ($n = 65$), believed they gained clinical experience that may not have been possible without attending outreach placement, and 86% ($n = 57$) reported that their self-confidence in surgical procedures increased following placement (Figure 1). Responders reported feeling more prepared to complete primary exodontia independently in the future (VAS mean 80.04, range 33–100) when compared with permanent tooth exodontia (VAS mean 76.74, range 34–100) (Figure 2). However, the *t*-test ($p < .05$) analysis showed differences were not statistically significant. Furthermore, 18% ($n = 12$) reported no difference in their preparedness to extract either permanent or primary teeth, whilst 32% ($n = 21$) reported feeling better prepared to extract permanent teeth than primary teeth.

Qualitative responses reflected responder confidence; 'I now feel more confident managing extractions in a child and I am more aware of different techniques used', 'I extracted 20 teeth on 4 different children under GA, I now feel a lot more confident'. Awareness of the difference in experience available at dental school clinics and outreach placement was apparent; 'I was able to gain a lot of clinical experience that I have not been exposed to before', and 'I extracted about 18 primary teeth in one day and hadn't previously extracted any'.

### 3.3 | Understanding of specialist paediatric dental care and career pathways

Placement was beneficial for students' understanding of paediatric dental care; 82% ($n = 54$) of responders reported that their understanding of the dental management of paediatric patients with complex medical histories or behavioural difficulties had improved during placement (Figure 1). An improved understanding of children's experience of GA and when this modality is most

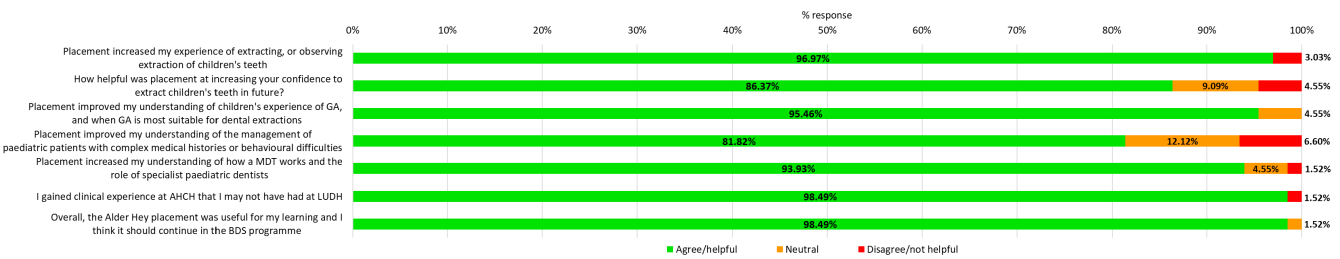


**FIGURE 1** Student perceptions of experiences on the AHCH placement, Likert scale responses collapsed to trichotomous values. LUDH—Liverpool University Dental Hospital, where dental school clinics take place.

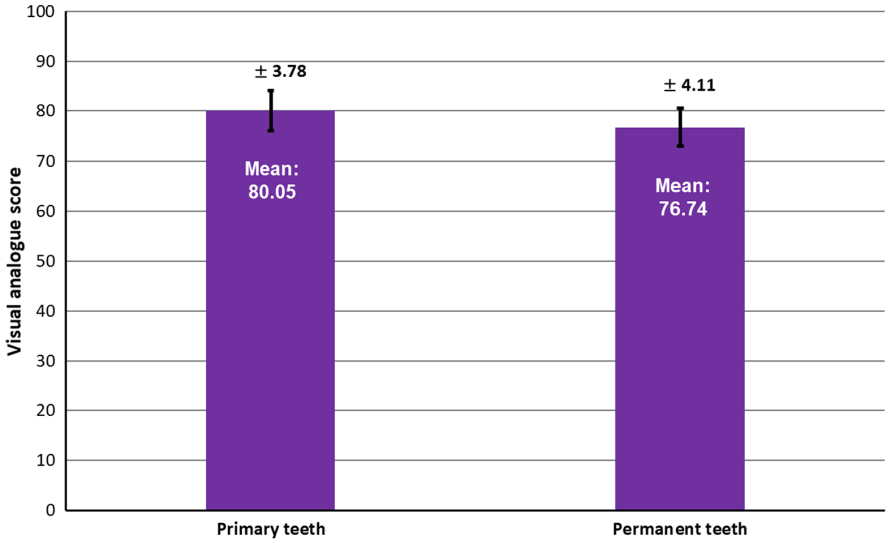


**FIGURE 2** Student self-reported preparedness to extract teeth in a medically well, cooperative child. Error bars shown represent 95% confidence intervals. Ranges; 33–100 for primary teeth and 34–100 for permanent teeth.

suitable for dental care was reported by 95% ($n = 63$) (Figure 1). One responder stated '(placement) helped me understand paediatric medical conditions much better', while another believed the best thing about the day was 'seeing anxious children with many medical conditions, high needs and on various medications'. Some reflected upon how this impacted their understanding of referral guidelines; 'placement was brilliant to see the types of patients to be referred for extractions with GA', although one responder stated 'to see the whole process of (a) child being admitted and placed under GA' would have been more useful, potentially allowing more accurate information to be given when patients are referred. A minority of responders noted the lack of opportunity to practice patient management skills; 'it didn't enable me to encounter a child's reaction to an extraction as they were asleep, so in this sense it doesn't prepare you in the patient management side of things', '(placement) doesn't make me much more confident as behaviour management (is the) most challenging part'. Observing consultant-led clinics did, however, provide an opportunity to develop understanding of comprehensive patient management; 'observing holistic treatment planning (was) useful'. Notably, attendance to these clinics appeared to impact students' appreciation of the care of medically compromised patients; 'it's extremely under-appreciated how much patience and effort is required to work with children with special needs or disabilities, this experience was an eye opener' and 'I was able to appreciate how important preventative dentistry really is'.

Almost all responders, 94% ($n = 62$), reported that placement increased their understanding of multidisciplinary teamwork and the role of specialist paediatric dentists (Figure 1); 'It was really useful to work with a multidisciplinary team (MDT)', 'good to… see the role of a paediatric dentist in a MDT', 'it was good to see how paediatric specialists work outside the dental school and community setting'. Many students attributed a positive experience of being on placement to feeling part of the team; 'welcoming staff made the day enjoyable and made us feel part of the team', 'the staff were… great at teaching and helping us learn'.

## 4 | DISCUSSION

The present study supports the use of placement activity for dental training by reporting student perceptions of impact on preparedness to carry out exodontia independently upon graduation and understanding of specialist dental care. The findings support the existing literature demonstrating the value of outreach placements in providing an experience not available in dental school environments.[1,2,9,14]

Although paediatric extraction experience gained at dental school clinics was limited, national[5,12,18] and international[20,21] studies indicate that this is a common finding. It should be noted that the objective data reported in this study represents student extraction experience in the final year, and does not account for experience gained in earlier years of the programme. Previous literature has documented increased dental student extraction experience as a result of attendance to placements, although none to the extent of the placement reported here. For example, Smith et al.[12] reported students extracted just over one more tooth on average during placement when compared with dental school clinics. In the present study, students extracted on average 10.63 more teeth on a single day of placement than in dental school clinics during their final year. As dental caries is the leading cause of hospital admission in England for children aged 5–9 years,[19] the technical skill development afforded by placement may provide significant value in preparation for working life and patient care.[22]

Improved student confidence as a consequence of outreach placement as reported in this study is supported by the existing literature.[4–11] Confidence describes judgements influencing whether an individual is willing to undertake a task[23] and could, therefore, play a role in preparing students for working independently. That many students feel more prepared to extract primary teeth independently than permanent teeth is perhaps unsurprising (Figure 2). However, indices of care suggest caries in the primary dentition remains largely untreated, suggesting a discrepancy in the confidence of newly qualified dentists and behaviours in general dental practice.[24–26] The statistically insignificant difference in preparedness

reported here could also be attributed to the relative novelty and the short-lived nature of the experience. The highly individualized nature of self-reported confidence may explain the discrepancy between increased experience and increased confidence reported, and may also reflect the students' ability to recognize that longer-term competency might be achieved by experiencing extractions of varying complexity and number. Furthermore, students recognized that a successful extraction technique necessitates optimal behaviour management skills and that their inability to put these to practice under GA is not representative of general dental practice.

The self-reported improvement in students' ability to recognize appropriate patient selection for GA may contribute to their wider understanding of specialist paediatric care and appropriate referral practice for the future. The experience of witnessing children undergoing GA reportedly provided insight, encouraged empathy and enhanced understanding of the importance of providing accurate information for the treatment planning of such cases.

Students may lack confidence when managing complex presentations of paediatric dentistry,[5] possibly due to lack of experience in hospital clinics.[1,5] Placement provided an opportunity to gain confidence, which was reflected in their increased understanding of multidisciplinary teamwork, mirroring the findings of Smith et al.[8] Understanding of teamwork is essential for their future practice, as communication with the dental team is reported to be the third most important single skill for a 'good dentist' to have behind communication with patients and diagnostic skills.[22] Spending the placement alongside specialist paediatric dentists of differing levels of experience, reportedly greatly improved knowledge of the various roles witnessed. This insight may be relatively rare within outreach placements, as previous studies relating to dental student paediatric experience have been reported in primary care[1] or the community dental service (CDS).[4] Responses suggested placement stimulated interest in the career pathway, thus conforming to the literature.[8,14]

There are a number of limitations to this study and its findings should be interpreted with caution. The study population consisted of a single cohort of final-year students at one dental school, thus limiting its external validity. Many students participated in the survey some months after attending placement, due to survey administration towards the end of the final year, possibly encouraging detachment and reflection bias. However, variations in the time between placement and survey completion may be insignificant due to the uniformity of responses shown. It should be noted that the experiences of participants are self-reported and no data regarding dental student competency was collected. Experience does not necessarily translate to competence, which is more complex and involves the assessment of risk.[23] It is possible that students' competence did not increase during placement despite the increase in confidence and understanding reported, however, the purpose of this study was to report student perceptions of their experience. In mitigation, confidence and competence are often used synonymously in similar studies and the widely held belief that 'professional practices are refined by science and corrected by wisdom'[27] supports the conclusion that this placement provided a useful experience.

Future researchers might choose to determine the effect of similar placements on students' independent practice and career decisions post-qualification; focus groups and semi-structured interviews may provide additional qualitative data to that collected here. Furthermore, it may be of interest to develop a pre- and post-attendance assessment of knowledge and skills to demonstrate the benefits of placement using quantitative data.

## 5 | CONCLUSION

This study has reported dental students' perceptions of their surgical experience, knowledge of specialist care and preparedness for independent practice as a result of attendance to an external clinic rotation, referred to as 'outreach placement'. Results suggest even a short placement can positively impact student perceptions and may influence future career choices.

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### CONFLICT OF INTEREST STATEMENT

There are no financial, economic or professional interests that may have influenced the design, execution or presentation of this scholarly work.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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