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**Primary care dentists' experience of treating avulsed permanent teeth.  
Kenny KP, Day PF, Douglas GVA, Chadwick BL**

**Abstract**

**Introduction:** An avulsed permanent tooth is one of the few true emergencies in dentistry. Children who suffer this injury require urgent dental care and prompt follow-up care. There is very limited evidence available regarding the provision of treatment for avulsion injuries in primary dental care. **Objectives:** To explore the experience of UK dentists in relation to the management of avulsed permanent teeth. **Method:** A self-completed questionnaire was designed and piloted. Questionnaires were sent to a random selection of one thousand General Dental Practitioners (GDPs) with a stamped addressed return envelope. A second mailshot was sent to non-responders after 8 weeks. Simple descriptive analysis was undertaken using Microsoft Excel. The results were compared with those from an earlier, similar study in Wales. **Results:** A total response rate of 61% was achieved. Just over forty per cent of responding dentists recalled replanting an avulsed permanent tooth in a child. **Conclusions:** Many dentists have limited or no experience of treating children with avulsed permanent teeth. Thirty four per cent of dentists have children with avulsion injuries under their care. Children with these traumatic injuries may benefit from shared care involving an interdisciplinary specialist team, in line with recommendations from the BSPD National Clinical Guidelines for Management of Avulsed Permanent Teeth in Children.

**INTRODUCTION**

An avulsed permanent tooth is one of the few true emergency situations in dentistry.<sup>1</sup> This type of injury occurs infrequently (avulsions account for 0.5% - 3% of trauma to permanent teeth) so it could be expected that few dentists will see or treat a child with an avulsed permanent tooth throughout their career. Children who suffer an avulsion injury require emergency dental care immediately after the injury. There is evidence to suggest that, in the UK, only 10% of children receive adequate emergency care within the appropriate time frame.<sup>2</sup> All children with an avulsion injury, whether treated adequately or not, require access to appropriate follow-up care within a well-defined time period after the injury. Early involvement of specialist inter-disciplinary teams to identify the likely prognosis and treatment planning over the short, medium and long term is strongly recommended.<sup>3</sup> This needs to be supplemented by clear communication between parents, children and primary and specialist care providers to ensure each is clear about the treatment required and who will provide it.<sup>3</sup>

In the UK, the National Health Service provides children's dental care free at the point of delivery with the main providers of dental care being General Dental Practitioners (GDPs)<sup>4</sup> and the Community Dental Services. It is imperative that dentists working in primary care have a sound working knowledge of dental trauma, especially the initial treatment and management. Results from a questionnaire study in Northern England<sup>4</sup> showed that many dentists feel that managing acute dental trauma is within their scope of responsibility and practice. A review from the 1980's could find no pattern for the distribution of trauma through the week or the year,<sup>5</sup> however more recent studies have reported that a majority of TDIs occur during normal working hours.<sup>6,7</sup> It could thus be expected that acute dental trauma would

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present itself in the primary dental care setting within normal working hours. A retrospective study undertaken in a UK dental hospital found that most of the dental trauma cases seen in the secondary care setting had initially presented in general dental practice.<sup>8</sup>

Research regarding the provision of treatment for dentoalveolar trauma in primary dental care is limited. A review by Australian authors identified only four published studies investigating dentists' knowledge of the management of dental trauma injuries, and one study investigating dentists' experience and confidence in treating dental trauma.<sup>9</sup> These studies have been conducted as survey questionnaires investigating GPs in either private practice or community dental services.<sup>9</sup> In general it has been found that dentists have poor knowledge of the management of dentoalveolar trauma. It was noted that many had minimal experience in treating traumatised teeth, and that most had low confidence in their ability to treat more complex traumatic injuries such as root fractures and avulsions.<sup>4,9,10</sup> There is very limited evidence on the quality of care and outcomes of management of avulsion injuries in primary dental care.

The aim of this study was thus to explore the experience of primary care dentists' in Yorkshire in relation to the management of avulsed permanent teeth in 2012. The results were then compared to those of a similar study in Wales, conducted in 2008.

## **METHODS**

An audit of dentists' experience of avulsion injuries was undertaken in Wales in 2005. The questionnaire used in this audit was piloted by Senior House Officers in Cardiff School of Dentistry. All dentists on the Department of Postgraduate Dental Education, Cardiff University database [n=1121] were included in the study sample.

Permission was granted from Professor Chadwick, University of Cardiff, to modify and use the questionnaire used in the Welsh audit.<sup>11</sup> Questions on post-graduate education in dental trauma and use of clinical guidelines were added. The modified questionnaire was piloted by post-graduate students at the School of Dentistry, University of Leeds. Some minor modifications were made after the pilot. The modified questionnaire is shown in Figure 1.

### Ethical Approval

The University of Leeds Dental Research Ethics Committee (DREC) and the Research and Development Committee of the Leeds Teaching Hospitals Trust granted ethical approval for the project [PCT Ref: NP/0102].

### Study Sample

The Dental Performers Lists in Yorkshire were used as the database for the region. There are over 2,000 dentists working in primary care in Yorkshire. Costs precluded the inclusion of all dentists in the survey. It was felt that a sample size of 50% of the

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total number of dentists in the region (n=2000) would allow for non-responders and still ensure a representative sample. Therefore a sample size of 1000 Yorkshire GDPs was decided upon.

A random number generator was accessed on the Internet. One thousand GDP names and addresses were randomly selected from the Dental Performers List database. Each dentist was assigned a unique identifier number from 1 to 1000 inclusive.

#### Printing and Posting

A letter of invitation and the questionnaire were printed on white A4 paper and placed in an envelope along with a stamped addressed envelope for return of the questionnaire. The questionnaire and the envelope were numbered with the identifier number assigned to each dentist on the list. This was carried out in order to ensure anonymity for the respondents and to enable tracking of returns. A second mailshot was posted to non-responders eight weeks later.

#### Analysis

The anonymised data was entered on an Excel spreadsheet by the first author and checked for errors. Simple descriptive analysis was undertaken in Excel.

## **RESULTS**

#### Response Rate

Four hundred and fifty five (45.5%) were returned after the initial mailing and a further 158 (15.8%) were returned after the second mailshot. Thus, a total of 613 questionnaires were returned (response rate 61%). Sixteen questionnaires were excluded from analysis because the practitioner had changed address (n=14), or the questionnaire was returned incomplete (n=2). A final total of 597 questionnaires were analysed.

#### Questionnaire Participants

Fifty-eight per cent of respondents were male. Just under half of the sample had qualified since 1991. Ninety-five per cent of the sample worked in general dental practice.

#### Replantation data

All respondents (n=597) were asked 'Have you ever replanted an avulsed incisor yourself?' Thirty-nine per cent (n=232) of respondents had replanted an avulsed incisor.

These two hundred and thirty two respondents were then asked further questions about their experience of replantation. The majority had replanted one or two teeth, but one quarter (25.4%, n=59) had replanted five or more teeth. Most replantations took place in either the general dental services or the community dental services. Some respondents had replanted teeth in a variety of dental settings. A majority (n=187) of respondents were responsible for the follow-up care for the patient following their replantation. Many dentists (n=143) used clinical guidelines when treating child patients with avulsed teeth, most commonly the BSPD guidelines (n=105).

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Thirty-eight per cent of all respondents currently have children with avulsion injuries under their care. Forty per cent of all respondents had undertaken further training in dental trauma since graduation. The results are summarised and compared to the results of the earlier Welsh study in Table 1.

## **DISCUSSION**

### Avulsion Experience

Thirty nine per cent of respondents from Yorkshire (n=232) had replanted an avulsed permanent tooth in a child, slightly less than the 46.2% (n=206) who had carried out such a procedure in Wales.<sup>11</sup> There is thus, a majority of dentists in both regions who have not replanted an avulsed tooth. This is not surprising, considering that avulsion injuries are rare. Owing to its rarity, a dentist who has replanted an avulsed tooth is likely to remember it, even if it occurred several years ago. However it is not possible to deduce the likely number of avulsion injuries that occur in Yorkshire, England or Wales in any given period of time, due to the paucity of epidemiological data available. It is important to remember that this may be an over-estimation of GDPs experience as it could be expected that the cohort of non-responders may include many dentists with no experience of treating children with avulsion injuries. However, a sentence to encourage dentists to reply even if they had not replanted a tooth was included in the letter of invitation.

For those who had replanted avulsed teeth, the demographic details were different to those of the entire study sample. Just over 70% (n=162) were male. This may be explained by the fact that male dentists are more likely to work full-time, and less likely to take a career break. Seventy per cent of the dentists had graduated before 1991 (n=160) – this makes sense as the longer your career is, the greater the chance of treating an avulsion injury.

### Work setting in which the replantation took place

The vast majority of these replantations took place in either the general dental services or the community dental services. This was also the case in the Welsh study. This could indicate that when an avulsion injury occurs during normal working hours, parents are likely to bring their child to their GDP. It was possible for the respondents to tick more than one option – a number of the respondents had replanted avulsed teeth in a variety of work settings. Eighty-one dentists in Yorkshire had at some stage replanted a tooth as an out-of-hours emergency. This data cannot tell us whether the dentist had opened their practice to facilitate this emergency treatment, or if they were working for an out-of-hours dental service at the time.

It is important to note that the organization of out-of-hours dental care has changed considerably in the past decade. Prior to the introduction of the 2006 NHS dental contract in England and Wales, GDPs were responsible for the provision of out-of-hours emergency dental care. This led to great national variation in service provision.<sup>12</sup> It had become apparent that not all dentists provided, or made arrangements to provide out-of-hours care for their patients. Under the contractual arrangements introduced in 2006, local commissioning agencies became formally

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responsible for the provision of out-of-hours emergency dental care.<sup>12</sup> The responsibility for providing out-of-hours care no longer lay with the individual GDP.

#### Responsibility for follow-up care

The answers for this question were again mutually exclusive, in that the respondent could answer both yes and no. The majority indicated that they were responsible for the follow-up care following the replantation. Some respondents noted that this depended on where they were working at the time – if they were in a junior hospital post they were less likely to be responsible for the follow-up care for the child.

#### Use of guidelines and other information.

These novel questions were included in the modified questionnaire to Yorkshire GDPs to assess the work practices of dentists, in this increasingly evidence-based era of dental practice. They were added as an indirect way of assessing what dentists are doing in relation to the treatment of children who have avulsion injuries. They may also provide an indication what value (if any) primary care dentists place on the available clinical guidelines. Almost 30% of those who had replanted avulsed teeth have not used clinical guidelines during their treatment (n=66). A number of respondents' had noted that they didn't use guidelines because they had "years of clinical experience". Guidance on the appropriate management of avulsed permanent incisor teeth has changed over the past decades and so these dentists are less likely to be up to date with the recommended treatments and procedures for children who have sustained this injury.

Of those that do use clinical guidelines, the BSPD guidelines are by far the most popular (n=105). Interestingly, more dentists indicated that they used other sources of information when providing treatment for avulsed teeth. The majority indicated that they used a general paediatric dental textbook (n=73), but a good proportion (26%, n=60) have used the relatively recently introduced web-based resource [www.dentaltraumaguide.org](http://www.dentaltraumaguide.org). It is difficult to validate this question as it has not been asked previously. There is no other source of information on the use of clinical guidelines in primary care with which to compare this data to. It is possible that the respondents indicated that they have used guidelines and other information resources because they are aware they should be using them in their clinical practice.

#### Dentists with avulsion injuries under review at present

All respondents were asked if they currently have children who have suffered avulsion injuries on review – 24% of Welsh respondents and almost 40% of Yorkshire respondents indicated that they did. It is perhaps surprising that a relatively high percentage of respondents in Yorkshire have a child with an avulsion injury on review as there are proportionately more specialist paediatric dentists working in the Yorkshire area than in Wales (1 specialist per 39,906 children in Yorkshire, compared with 1 per 79,688 children in Wales). These Paediatric Dentistry specialists in Yorkshire work not only in the Hospital Dental Services, but also within a wide range of Community Dental Services. Thus, dentists in Yorkshire should have less difficulty in arranging local specialist follow-up and care for these children. This is perhaps an indication that either they are not aware of the importance of specialist input in the management of these cases, or they are aware of the potential benefits, but choose not to make the referral. #

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Specialist and interdisciplinary management from an early stage are important so that the child and parents are fully aware of the possible outcomes and treatment options.<sup>2</sup> Treatment planning can then take place for the short, medium and long term, particularly for teeth that are likely to fail, and a tailored follow-up regime devised.

However, the questionnaire did not ask if any of the children with avulsion injuries on review were under shared care with a specialist team. Shared care can reduce the burden on busy specialist services and/or on families who cannot easily access specialist care services – for example due to distance to travel to specialist centre#

### Postgraduate training in dental trauma

All respondents in Yorkshire were asked this question, and almost 40% (n=237) reported that they had engaged in postgraduate training in dental trauma at some stage since qualification. This question was not asked in the Welsh study, but was included in other surveys of dentists' experiences in dental trauma,<sup>4,10</sup> and thus it can be used as an indirect way of measuring the validity of the sample. In Jackson's study of dentists in North East England, 36% had undertaken postgraduate training in dental trauma. The figure was higher in the Kostopolou study<sup>10</sup>, which was based on dentists in Yorkshire – 47% had engaged in postgraduate training in dental trauma. Dentists in Yorkshire are likely to be able to access this training more easily because of the number of paediatric dentists working in the region and because of the significant publicity that was undertaken during a recent multi-centre randomised controlled trial on treatment for avulsed teeth, where the lead centre was in Leeds.<sup>2</sup>

In this study, over half of the dentists who had replanted avulsed teeth had received postgraduate training in dental trauma (57%, n=133). This is greater than the 40% who had post graduate training in the entire sample. This increase may be because these dentists sought out postgraduate training in dental trauma, because of the experience they had in replanting an avulsed tooth or teeth. Or it could be the converse – the dentists felt able to proceed with replantation of an avulsed tooth because of the postgraduate training they had received. The questionnaire did not request any further information on the type of course undertaken, or when it was undertaken. This is pertinent as there have been significant changes in the management of avulsed permanent teeth in the recent past. Hence there is a need for dentists to maintain an up to date knowledge in order to provide timely and appropriate care. A focus group involving primary care dentists would be useful to ascertain this sort of detailed information, which is difficult to procure from a self-completion questionnaire.

### **LIMITATIONS**

A number of limitations must be acknowledged when considering the results of this study:

The sampling frame did not include all dentists' in primary care in Yorkshire. However, there was a good geographical spread of dentists included in the database. Looking at the gender and year of qualification of respondents, they appear representative of the primary dental care workforce in Yorkshire.

There is also limited information on the non-responders to the questionnaire and because of this, it has not been possible to undertake a non-response analysis.

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The response rate of 61% for the Yorkshire survey is not optimal, although similar to the proposed average for response to Health Care Professional questionnaire surveys.<sup>13</sup> It is also less than other questionnaire surveys on dental trauma in the region.

These limitations may impact both the validity and the reliability of the Yorkshire study results.

The surveys were not conducted contemporaneously and so a true direct comparison of the results is not possible, rather the results provide an interesting snapshot of the experiences of two groups of dentists in different geographical locations.

## CONCLUSIONS

Many dentists working in primary care in the Yorkshire region have very limited or no experience of treating children with avulsed permanent teeth.

Their experience is broadly similar to that of dentists working in primary care in Wales. Dentists are thus unlikely to see sufficient numbers of children with avulsion injuries to develop a wide experience and thus if presented with such a clinical situation are reliant on academic training from their undergraduate or postgraduate training.

A significant percentage of both groups currently have children with avulsion injuries under their care: this differs from the guidance issued by the BSPD that an interdisciplinary team should see children with avulsion injuries soon after the initial injury.

Methods to collect outcome data in primary dental practice need to be devised. The development of a new paediatric specialist care pathways offers the potential to develop clinical networks to ensure specialist advice and referral, for these rare cases which frequently need long term care and follow-up, is available. This will help to meet the BSPD guideline recommendation for the early involvement of an interdisciplinary specialist team.

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