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An audit of the time to initial treatment in avulsion injuries

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Abstract – The prognosis of avulsed teeth depends on prompt and appropriate treatment. Good outcome requires education of the general public and non-dental professionals. *Aim*: Retrospective observational survey of case records of avulsion injuries attending a dental hospital trauma clinic. *Method*: Data collected included: hospital number, date of birth, gender, source of patient's referral, date of trauma, number of avulsed teeth, place of initial presentation, storage, hours till initial presentation, and initial treatment. *Results*: One hundred and twenty teeth with avulsion were identified in 75 children. The mean age of the patients was 9.8 years (SD = 2.3 years) at the time of trauma with avulsions recorded in 44 (58.7%) boys and in 31 (41.3%) girls. Only 51 (42.5%) teeth were stored in an appropriate medium before attendance at any site and only 48 (40%) of the teeth were seen within 1 h. 83.3% received emergency treatment at general hospital, 89.7% in dental practice and 92.9% at dental hospital. *Conclusions*: A minority of avulsion injuries were seen within the first hour and a minority were in appropriate storage medium at presentation. Geographical location plays a huge role in the time taken to reach secondary care. However, improving public and non-dental professional knowledge about tooth storage in avulsion injuries is critical to long-term prognosis of the teeth.

It is recognized today that traumatic dental injuries are widespread (1–3) and represent a serious problem among children. Trauma may exceed dental caries and periodontal disease as the most significant threat to dental health among young people (4). Studies in the United Kingdom and Scandinavia have shown that 34 and 22% of schoolchildren, respectively, had experienced trauma in the permanent dentition. The majority of dental injuries involves the anterior teeth and thus may have both physical and psychological impacts (5, 6).

Knowledge of dentists about dento-alveolar trauma is critical to the prognosis of traumatized teeth especially for those that are avulsed (1, 5, 7).

Dental trauma is a common dental problem and may exceed dental caries and periodontal disease as the most significant threat to dental health among children and adolescents. One of the most complicated dental injuries is complete exarticulation of the tooth (avulsion) Avulsion implies total displacement of the tooth out of its socket(4, 8) Avulsions were found to be the most common type of dental injury recorded for children under 15 years of age seeking treatment in hospital emergency rooms. In these circumstances, it is reasonable to expect non-dental health care workers to know how to manage avulsed teeth. (9).

Avulsion of permanent teeth is the most serious of all dental injuries. The prognosis depends on the measures taken at the place of accident or at the time immediately after the avulsion. Replantation is the treatment of choice, but cannot always be carried out immediately. An appropriate emergency management and treatment plan is important for a good prognosis. (10) If immediate replantation is not possible, then a storage medium should be used to store the avulsed tooth until professional dental care is available. (8).

It is well established that the prognosis of traumatized teeth in general and of avulsed teeth in particular depends on prompt and appropriate treatment (11, 12). The management and immediate treatment of an avulsed permanent tooth will determine the long-term survival of the tooth (13). Professional dental assistance may be generally obtained from dental practitioners, oral and maxillofacial surgeons, or pediatric dentists. However, the management of traumatic injuries, mainly avulsion, may be a challenge even to the non-specialized dentist, as it occurs sporadically and often when professionals are least prepared for them (14).

Method

Retrospective observational survey of case records of all avulsion injuries attending a dental hospital trauma clinic (TC) between 2001 and 2007 was carried out. Data collected included: hospital number, date of birth, gender, source of patient's referral, date of trauma, number of avulsed teeth, place of patient's initial presentation, hours till patient's initial presentation,

treatment at patient's initial presentation, and time until ultimate presentation at the TC.

Results

One hundred and twenty successive avulsed teeth were identified from the trauma database in 75 children aged 6–15 years. The mean age of the patients was 9.8 years (SD 2.3 years) at the time of the trauma with avulsions recorded in 44 (58.7%) boys and in 31 (41.3%) girls. The mean ages were 10.4 ± 2.6 for boys and 9.1 ± 2.3 for girls. Sixty (50%) teeth were initially seen in accident and emergency departments of general hospitals (GH), 39 (32.5%) in dental practice (DP), and only 14 (11.7%) at the dental hospital (Table 1).

Only 22 (36.7%) of those presenting at accident and emergency departments of GH were seen within 1 h of the injury (Table 2), compared with 20 (51.3%) in DP (Table 3), and six (42.9%) of those presenting at the dental hospital (TC) (Table 4).

Fifty (83.3%) patients presenting at GH received initial treatment compared with 35 (89.7%) in DP and 13 (92.7%) patients at the TC (Table 5).

Only 48 (40%) of all avulsion injuries were seen by professionals within 1 h of the injury compared with 81 (67.5%) within 24 h of the injury (Table 6).

Unfortunately, only 51 (42.5%) of all teeth were placed in an appropriate storage medium prior to initial attendance. Twenty-one (41%) teeth were placed in milk prior to attendance at GH, 23 (45%) prior to attendance at DP, and 7 (14%) prior to attendance at TC.

Table 1. Place of initial examination

Place	*n* (%)
General hospital	60 (50)
Dental practice	39 (32.5)
Dental hospital (GDHS)	14 (11.7)
No information	7 (5.8)
Total	120

Table 2. Time to presentation at general hospital (GH)

Hours till presentation at GH	*n* (%)
0–59 min	22 (36.7)
1–5 h	21 (35.0)
>24 h	1 (1.7)
No information	16 (26.7)
Total	60

Table 3. Time to presentation at dental practice (DP)

Hours till presentation at DP	*n* (%)
0–59 min	20 (51.3)
1–5 h	6 (15.4)
6–12 h	2 (5.1)
>24 h	1 (2.6)
No information	10 (25.6)
Total	39

Table 4. Time to presentation at dental hospital (trauma clinic)

Hours till presentation at dental hospital	*n* (%)
0–59 min	6 (42.9)
1–5 h	3 (21.4)
13–24 h	1 (7.1)
>24 h	3 (21.4)
No information	1 (7.1)
Total	14

Table 5. Initial treatment at presenting hospital

	Treatment at general hospital *n* (%)	Treatment at dental practice *n* (%)	Treatment at dental hospital *n* (%)
Yes	50 (83.3)	35 (89.7)	13 (92.9)
No	10 (16.7)	4 (10.3)	1 (7.1)

Table 6. Summary of all presentation times

Presentation time	General hospital	Dental practice	Dental hospital	Total (%)
0–59 min	22	20	6	48 (40)
1–5 h	6	3	21	30 (25)
6–12 h		2		2 (1.6)
13–24 h		1		1 (0.8)
>24 h	1	3	1	5 (4.2)
No information	17	1	16	34 (28.3)
Total				120

Discussion

It is well established that the prognosis of traumatized teeth in general and of avulsed teeth in particular depends on prompt and appropriate treatment. The initial treatment at the site of the accident often relies on the children's parents, friends or their schoolteachers prior to the initial professional contact. This initial treatment may vary from doing nothing to immediately replanting the teeth, but there is no consensus regarding the urgency in seeking professional assistance following an avulsion injury.

There is no consensus amongst laypeople as to where dento-alveolar injuries should be presented for care in case of avulsion injuries. A majority would visit a nearby dentist but a significant number would go directly to an accident and emergency department of a GH. Out of normal dental working hours, patients with injuries would increasingly attend GH. Professional dental assistance for non-dental professionals may be obtained from either dental practitioners, oral and maxillofacial surgeons, or pediatric dentists.

Provision of emergency dental care is a vital part of National Health Service Community Services care in the UK, but this is not available at all hours. A 24-h service, including weekends, could prove to be of a greater value (15).

The delay between injury and treatment was the focus of this study, as there appears to be a paucity of information in the literature regarding the causes of delayed management. The time from injury to treatment in the patients in this study was not encouraging. Those patients who were referred by other practitioners or institutions without initial treatment had a greater delay prior to definitive treatment. This is probably because of increased transit and waiting times. One of the greatest delays occurred in transit from the referring practitioner or institution to the Dental Hospital especially in the patients transferred from out of the catchment area of the Dental Hospital.

The urgency of the emergency visit and multidisciplinary nature of follow-up evaluations require both the lay public and practitioners from different dental disciplines to possess knowledge on the treatment strategies involved (16). Other factors may extend this transit time to the place of initial examination such as parents returning home to obtain clothing, deal with other children or make distance travel arrangements etc. prior to presenting to the hospital. The urgency of timely presentation at any hospital or dental clinic needs to be reinforced by the referring practitioner (17).

This study demonstrates that a minority of avulsion injuries were seen within the first hour and a minority had been placed in appropriate storage media prior to presentation. Obviously, geographical location plays a huge role in the time taken to reach secondary care and locations close to hospitals will be able to reach services quicker than those in more isolated communities. Improving public knowledge about tooth storage is therefore absolutely critical to the short- and long-term prognosis of avulsed teeth.

The majority of avulsions seen in secondary care presented initially in GH in this study. It is therefore imperative that non-dental professionals in these institutions know about the necessity for urgency in avulsion injuries and also know about appropriate storage and where to obtain dental advice. Knowledge of dentists about management of dento-alveolar trauma is critical as it is beholden on us all to educate both the general public and non-dental professionals about what can be achieved with appropriate care in avulsion injuries.

In summary, the short- and long-term prognosis of avulsed teeth depends on prompt and appropriate treatment. Good outcome requires education of the general public and non-dental professionals and the availability of the dental profession for advice (and treatment) when requested from non-dental professional colleagues.

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