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Public school educator's knowledge of initial management of dental trauma

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Correspondence to: Rodney J. Vergotine, Department of Pediatric Dentistry m/c 850, College of Dentistry, The University of Illinois-Chicago, Chicago, IL 60612, USA. Tel.: 312 996 1984 Fax: 312 996 1982 e-mail: rodney@uic.edu Accepted 17 October, 2009 **Abstract** – *Objectives*: To compare the level of knowledge of physical education teachers/athletic coaches (PETs) and academic teachers (ATs) regarding dental trauma management. Methods: Surveys were sent to all high schools (17) and all middle schools (23) in the Milwaukee public school system. All PETs and approximately 20 ATs at each school were invited to participate. The survey evaluated knowledge of dental trauma management via two case scenarios. Results: Survey was completed by 140 ATs and 119 PETs. For the urgency of treatment for tooth fractures 81% of ATs and 53% of PETs responded correctly, a significant difference (P < .0001). With regards to avulsions, 56% of ATs and 46% of PETs responded that immediate professional assistance was needed. Only 7% of PETs would replant an avulsed tooth compared with 12% of ATs, a difference that was significant (P = .0062). Milk was chosen as a transportation medium for an avulsed tooth by 25% of ATs and 23% of PETs. Conclusions: Knowledge regarding the initial management of dental trauma was low for both groups. Educational campaigns regarding dental trauma should be targeted at all teachers.

Most epidemiological studies show that the majority of traumatic dental injuries (TDI) in school-aged children occur at home or at school (1–6). Sports-related activities have been reported as accounting for as low as 2% to as high as 49% of TDI in children (3, 5, 7–10). A number of studies have reported a very low level of knowledge amongst schoolteachers and/or physical education teachers regarding the initial management of TDI (11–26). Few studies in the US have assessed the level of knowledge of schoolteachers regarding the initial management of TDI (22). No studies have attempted to determine if there is a difference in the level of knowledge between academic teachers (ATs) and physical education teachers/athletic coaches (PETs).

The aim of this study was to assess the level of knowledge of schoolteachers in a public school district in regards to the initial management of TDI and then to ascertain whether there was a difference in the level of knowledge between ATs and PETs.

Materials and methods

A three-part survey (Appendixes 1 and 2) was sent to all high schools and all middle schools in the Milwaukee public school system. School secretaries were asked to distribute the survey to all PETs and approximately 20 ATs per school. The ATs were chosen at random by the school secretaries. A prepaid envelope was included with each set of surveys and all responses were kept anonymous. A second mailing was sent to schools that did not reply within 3 months of the initial mailing.

Part one of the survey contained demographic questions about the teachers including type of position, length of service and previous experience with dental trauma.

Part two consisted of two case scenarios, one involving a fractured tooth and the other involving an avulsed tooth. Questions in this section were multiple-choice with one possible correct response. The correct response was based on current guidelines regarding dental trauma management by the American Academy of Endodontists.

Part three asked whether respondents would value more information regarding the management of dental trauma.

The survey was initially piloted amongst staff and parents to evaluate readability, clarity and ease of completion.

Results

Out of a total of 1080 surveys that were sent, 295 (27%) were returned. Only eight out 17 high schools and nine out of 23 middle schools returned the surveys. Neither length of service, specific training with a dental component, nor previous involvement with dental trauma

^{*}At the time of the study Dr Vergotine was an attending pediatric dentist and Dr Govoni was a pediatric dental resident at Children's Hospital of Wisconsin, Milwaukee, WI, USA. Permission to survey the teachers were obtained from the Milwaukee Public Schools Board of Administrators.

significantly affected responses; therefore the data were pooled for analysis.

Table 1 summarizes the demographic data. Almost half of both ATs and PETs were employed in the school system for at least 10 years. PETs were significantly more exposed to dental trauma (33% vs 18%) than ATs. Sixty-two percent of PETs received a specific dental component to their trauma management training.

Table 2 summarizes the correct responses to questions regarding tooth fracture. ATs were more likely to seek professional care <2 h after the traumatic event than were PETs (81% vs 53%), a difference that was significant (P < .0001). A low number of teachers knew that a dentist can re-attach a tooth fragment (34% of PETs and 36% of ATs). Most teachers correctly identified the fact that 'fractured tooth bleeding from the inside' was the most urgent need in this case scenario (87% of PETs and 95% of ATs). Only 73% of PETs stated correctly that the school district policy indicates that it is mandatory for athletes to wear a mouth guard when engaged in contact sports.

Table 3 summarizes the correct responses to questions regarding tooth avulsion. More PETs would rinse an avulsed tooth with water (53%) and transport the tooth in a liquid medium (55%) than ATs. Milk was chosen as a transport liquid for the avulsed tooth by a small number of respondents (ATs 25% and PETs 23%). ATs were more likely than PETs to attempt to replant an avulsed tooth, although the percentage responding correctly was low in both cases (ATs 12% and PETs 8%). Most respondents (99%) indicated that more information is needed regarding the initial management of dental trauma (data not shown).

Discussion

Although most PETs received special training to interact with children in an athletic environment, only 62% received information regarding dental trauma. Surprisingly, this training did not increase the number of correct responses to the management of dental trauma, a finding also reported by Chan et al. (14). in their study. One explanation for this discrepancy could be that the dental component of their training was minimal and did not include the essential information. Another possibility is that the training may be out of date or forgotten. All coaches must be American Sport Education Program

Table 1. Characteristics of respondents

Characteristic	Academic teachers	Physical education teachers
Number of respondents Length of service (years)	140	119
<5	47 (34%)	33 (28%)
5–10	42 (30%)	26 (22%)
>10	51 (36%)	60 (50%)
Specific trauma training for athletic setting	12 (9%)	86 (72%) <i>P</i> <.0001
Dental component included in training	7 (58%)	53 (62%)
Experience with dental trauma	25 (18%)	41 (33%) <i>P</i> = .0024

Table 2. Teachers' understanding of management of tooth fracture

Question	Academic teachers	Physical education teachers
Urgency of treatment <2 h	114 (81%)	63 (53%) <i>P</i> < .0001
The most important injury is the fractured tooth bleeding from the inside.	133 (95%)	104 (87%)
It is important to locate the tooth fragment	90 (64%)	75 (63%)
A dentist can re-attach the tooth fragment	51 (36%)	41 (34%)
Mouth guards are mandatory in all contact sports in the school district	46 (33%)	87 (73%) <i>P</i> < .0001

(ASEP) certified before employed as coaches in the school system. This certification contains a first-aid component that contains a very small dental component. To their credit, the school board involved in this study has encouraged physical education teachers and coaches to take other credentialed courses that deal with injury prevention and management. To address this low level of knowledge, the school district should consider making dental trauma education mandatory and/or mandate recertification of physical education teachers and athletic coaches on a regular basis. The possible financial implications of especially the latter recommendation may be a significant deterrent to this type of mandate. Both groups of teachers showed fairly high levels of knowledge regarding management of fractured teeth. The fact that tooth fragments can be re-attached seems to be the only area of limited knowledge. It is notable that many academic teachers consider the management of a fractured tooth as an urgent matter. Possibly physical education teachers and athletic coaches may be exposed to traumatic events of greater severity and frequency and thus not consider a mere fracture of a tooth as urgent.

The school district policy on mouth guards is that their use is mandatory in all contact sports. At the time of the survey no distinction was made between contact and collision sports; the sports included in this mouth guard policy were soccer, basketball, football and ice hockey. It is conceivable that academic teachers may not know this regulation as they are not involved in

Table 3. Teachers' understanding of management of tooth avulsion

Question	Academic teachers	Physical education teachers
Urgency of treatment less than 30 min	78 (56%)	55 (44%)
Will attempt to replant avulsed tooth	17 (12%)	8 (7%) <i>P</i> = .0062
Rinse dirty avulsed tooth with tap water	53 (38%)	63 (53%)
Transport the avulsed tooth in a cup with liquid	62 (44%)	65 (55%)
Milk is the liquid of choice for transportation of tooth	35 (25%)	28 (23%)

day-to-day sport-related activities, thus their low correct response rate. More surprising is that only 73% of physical education teachers and athletic coaches knew of this policy. This specific policy is meant to protect student athletes from TDI. A response rate approximately 100% would be more acceptable. It would be prudent of all school districts to regularly assess knowledge and compliance with mouth guard policy so as to prevent the occurrence or minimize the effects of TDI at sports-related activities. In contrast, all teachers had low levels of knowledge about the management of avulsed teeth. Treatment of an avulsed permanent tooth within the first 30 min is essential for a good long-term prognosis, as is the transportation of the tooth in a liquid (27-30). The level of knowledge amongst respondents in this study regarding the urgency of care, milk as preferred liquid for transportation and re-plantation of avulsed teeth, was higher than that reported in some international studies (12-14).

When these areas of knowledge are compared with US data; however, the respondents in this study had lower knowledge levels (21). Regional differences may partly account for this discrepancy.

Increasing the comfort and ability to replant avulsed teeth is a perplexing problem. Programs which expend more resources on the urgency of early treatment and the appropriate transport of avulsed teeth should be tested for efficacy. It is encouraging to note that an educational poster (31), a simple leaflet (32) and a seminar (33) have all been shown to be effective in increasing the level of knowledge regarding management of TDI. This indicates that different or multiple approaches could be used to address lack of knowledge regarding the management of TDI amongst all teachers, especially management of avulsions.

Conclusions

- **1.** The overall level of knowledge of initial management of TDI was low for all teachers.
- **2.** Academic teachers' knowledge was similar to the knowledge of physical education teachers and athletic coaches, with a few exceptions.
- **3.** It would appear that specific training with a dental component and previous experience with dental trauma had little impact on the level of knowledge exhibited by all teachers.
- **4.** Most teachers believed that more education regarding the management of dental trauma is needed.

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Conflict of interest

None declared.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Figure S1. Survey form Page 1.

Figure S2. Survey form Page 2.

Please note: Wiley-Blackwell are not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

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