

Primary School Teachers' Knowledge Regarding Emergency Management of Avulsed Permanent Incisors

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Abstract:

Objective: The goal of this study was to evaluate primary school teachers' knowledge regarding emergency management of avulsed permanent incisors.

Materials and Methods: The study was conducted in fifty randomly chosen primary schools from Casablanca, Morocco. All teachers of the selected schools were included in the study. The data were collected by self administered questionnaires. The questions focused on the teachers' general characteristics, experience of avulsed teeth and the importance of emergency management. The data were analyzed using chi square test.

Results: A total of 501 teachers, of which 23.6% were male and 75.4% were female, answered the questionnaire. The results showed that 44.5 % of the teachers had an experience of avulsed tooth at school, 82.82% of them knew the importance of emergency management and 32.6% would look for a dentist for treatment of the cases. Only 15.8% would reimplant the tooth themselves. Regarding the storage media, 21.95% would keep the avulsed tooth in milk. There was no significant difference between gender and education level ($p>0.05$).

Conclusion: This study shows school teachers' lack of knowledge regarding dental trauma and especially tooth avulsion. Therefore, the results indicated that educational programs are necessary for improvement in their level of knowledge.

Key Words: Storage Medium; Dental Trauma; Tooth Avulsion; Knowledge

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INTRODUCTION

Dental trauma is described in the literature as a common problem among children and adolescents throughout the world [1-3]. Several epidemiological studies show that the majority of traumatic dental injuries in school-aged children occur at home or at school [1-5]. A large number of studies reported that 34.9% of boys and 23% of girls might be assumed to have sustained damage to their teeth by the age of 14 years [5,6]. Post traumatic complications including crown discoloration, coronal fracture, ankylosis root resorption and avulsion may occur. Among the different types of dental trauma, avulsion leads to the greatest func-

tional and esthetic impairment due to its worse prognosis. Avulsion represents 0.5% to 16% of the cases of dental traumas [6]. The prognosis of an avulsed tooth depends upon prompt and appropriate treatment which often relies on lay people such as the children's parents and their school teachers who are present when the accident happens [7-9]. However, they have limited knowledge regarding the recommended course of action in such situations [10-12]. It is therefore of fundamental importance for teachers to be duly informed concerning the correct first-aid measures. In Casablanca, there have been no studies to assess the knowledge of lay people about dental injury management.

Therefore, the aim of this study was to evaluate primary school teachers' knowledge on tooth avulsion in Casablanca, Morocco by a questionnaire.

MATERIALS AND METHODS

This cross-sectional study, which was approved by the academic authorities of Casablanca, was conducted among primary school teachers from Casablanca, from February to March 2010.

Based on a list of schools, fifty schools were randomly chosen.

All teachers of the selected schools were included in the study with respect of confidentiality.

A specific questionnaire inspired by that of Mori et al [12] was used.

It was divided into three parts; the first part related to general data about the teachers' age, gender, level of education, seniority (Table 1); the second part related to the importance of emergency management and the experiences of tooth avulsion at the school (Table 2); and the third part concerned the emergency procedures (Table 3).

Questionnaires corresponding to the number of teachers, associated by an explanatory letter, were registered and a period of 2 weeks was considered for gathering of the questionnaires. The data were collected and analyzed using SPSS software version 14.0 (Inc., Chicago, USA). The results are expressed in number and proportion. The chi square test was used to compare the results according to gender, level of education, age groups and seniority. The level of significance was set at $p \leq 0.05$. The aforementioned variables related to the teachers and the emergency procedures were computed. The different qualitative variables are given as their absolute value and percentage. The association between qualitative variables was tested using χ^2 . The statistical analysis was performed with the SPSS software (Statistical Package for Social Sciences version 11.5 Chicago, Illinois).

RESULTS

A total of 501 teachers answered the questionnaire. The sample consisted of 118 male (23.6%) and 378 females (75.4%) and five teachers did not indicate their gender.

Table 1. Questions in part I related to general data about teachers

Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Age	<input type="checkbox"/> Under 20 <input type="checkbox"/> 20–40 <input type="checkbox"/> 41–60 <input type="checkbox"/> 61 or more
Level of education	<input type="checkbox"/> High school <input type="checkbox"/> Superior education
Seniority	<input type="checkbox"/> <1 year <input type="checkbox"/> 1–5 years <input type="checkbox"/> 6–10 years <input type="checkbox"/> 10–15 years <input type="checkbox"/> 16–20 years <input type="checkbox"/> 21 years or more

Table 2. Questions in part II related to the importance of emergency management

Experience with tooth avulsion	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
Importance of emergency management	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
What would you do with the child in case of tooth avulsion?	<input type="checkbox"/> Would look for a dentist
	<input type="checkbox"/> Would contact the dental hospital
	<input type="checkbox"/> Would call the child's parents
	<input type="checkbox"/> Would not do anything

The 41 to 60 years age group represented 47.3% followed by the 20 to 40 years age group representing 44.1% of the teachers (Fig 1). Of the questioned teachers, 81.2% had a high level of education.

According to seniority, 21.4% of the teachers had 6-10 years and 23% had over 20 years seniority. Among the sample, 44.5% of the teachers had an experience of tooth avulsion at their school. The difference was not significant between genders. Tooth avulsion was considered as dental emergency by 82.82% of the teachers. No difference was detected regarding emergency between gender and level of education ($p>0.05\%$). In case of tooth avulsion, 16.2% of the teachers would get in contact with dental service, 16.4% would send the child directly to a dentist, 64.3% would call the child's parents and 3.1% would do nothing. The tooth was systematically rinsed by 50.9% of the teachers, no difference was found between genders ($p=0.9$). Solutions most often used were tap water (40.8%), antiseptics (14.9%), dentifrices (5.1%), salted water (3.52%), alcohol (1.18%) and other solutions (7.05%) such as milk, bicarbonate and formalin (Table 4).

Table 3. Questions in part III concerning the emergency procedures

Would you reimplant the avulsed tooth?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Would you wash the avulsed tooth?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If you would wash it, which solution would you use?	
If you would not reimplant the tooth, would you maintain it in any storage containers or storage media?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What would you use?	<input type="checkbox"/> ice <input type="checkbox"/> tissue papers <input type="checkbox"/> plastic <input type="checkbox"/> gauze <input type="checkbox"/> place in the child's mouth <input type="checkbox"/> some liquid
If you would maintain the tooth in any liquid, what would it be?	

Reimplantation was chosen by 15.8%, the differences between gender, education level and age group were not statistically significant ($p=0.43$). Without reimplantation, the tooth was preserved by 77%. There were no differences between gender ($p=0.056$) and level of education ($p=0.8$). The tooth was stored in a wet medium by 57.3%, in compress by 8%, paper by 6.2%, ice by 3% and saliva by 2.8%. The most often used solutions were tap water (24.74%), milk (21.95%), ice water (19.52%), antiseptics (17.77%), physiological serum (14.98%) and saliva (the child's mouth) (1.04%) (Table 5).

DISCUSSION

The present study was conducted on 501 teachers and showed that 44.5 % of the teachers had an experience of avulsed tooth at school, 82.82% knew the importance of emergency management and a low percentage (15.8%) performed immediate reimplantation in the site of injury.

Table 4. Rinsing solutions

Solutions	Percentage (%)
Tap water	40.8
Antiseptics	14.9
Dentifrice	5.1
Salted water	3.52
Alcohol	1.18
Others*	7.05

*Milk, bicarbonate and formalin

It has been reported that 21.95% would keep the avulsed tooth in milk.

The major factors that may influence the success of treatment of an avulsed tooth are the extra alveolar time and the storage medium (17-19). Andreasen [13], in a study with monkeys, showed that the reimplanted teeth after 2 hours had more root resorption than after 18 min. In 1981, he affirmed that the prognosis is better when the extra alveolar time is short [9]. However, when the tooth is not immediately reimplanted, it must be preserved in an appropriate media to maintain cellular vitality as long as possible. Oswald et al [20] found better results for preservation in a wet medium like saliva for 90 minutes than in a dry medium. Between various wet media, milk is better than saliva due to its composition and its osmolarity. In milk, the storage may be as long as 6 hours. In addition Lindskog & Blomlöf [21] showed that saliva contains microorganisms which may affect the survival of the cells. Other storage media, such as HBSS (Hank's Balanced Salt Solution) and Viaspan, showed better results compared to milk with longer storage times [18, 21, 22]. In this study, almost half the teachers systematically rinsed the tooth. Solutions most often used were tap water (40.8%) and antiseptics (14.9%). These results have also been encountered in other studies carried out in other countries [12,14]. Immediate reimplantation is the most indicated measure for avulsion of permanent teeth, as it is the conservative procedure most suggested in treatment protocols for dental trauma. Although in this study there was no statistically significant difference between gender and level of education regarding tooth replantation, the percentage of teachers who would perform an immediate reimplantation was very low (15.8% of the teachers). Similar results were found in studies carried out in Brazil [12] as well as in other countries [13,14]. In Chicago, a recent study comparing sports teachers and others found that 7% versus 12% of the men-

tioned groups, respectively would perform an immediate reimplantation [13]. At Hong Kong, Chan et al [14] noted that only 5.4% of the teachers knew the possibility of reimplantation. This attitude may be explained by lack of information, absence of this topic in the classroom curriculum and capability of the teachers regarding the procedure. In this study, a wet media was cited by 57.3%. However, 42.7% of the teachers would keep the avulsed tooth in a dry medium which is not appropriate for conservation of the cellular vitality. Milk was chosen by 21.95% of the teachers. Maintaining the avulsed tooth in milk for as much as six hours favors cell integrity of the periodontal ligament and contributes toward a good prognosis. This result is in the mean found in the literature. Chan et al at Hong Kong reported only 3.6% of the teachers preserved the avulsed tooth in milk.

In the Czech Republic and Brazil, milk was chosen by 4% and 7.6% of the teachers, respectively [12, 16]. In Ireland, Blakytyn et al [10] reported 45.6% of the teachers chose milk as the storage medium.

Table 5. Distribution of wet storage media used by teachers for tooth avulsion

Wet storage media	Percentage (%)
Tap water	24.74
Milk	21.95
Ice water	19.52
Antiseptics	17.77
Saline	14.98
Saliva and mouth of the child	01.04

Furthermore, milk is a storage medium of relatively easy access at the location of trauma. All of these studies show school teachers' low level of knowledge regarding first-aid measures for tooth avulsion.

CONCLUSION

This present study found that teachers had inadequate knowledge regarding first-aid measures in cases of tooth avulsion. As a result, education programs and the future implantation of an information and training program in first-aid procedures regarding tooth avulsion, directed at teachers at all teaching institutions in Casablanca are necessary.

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REFERENCES

- 1-Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. *Aust Dent J* 2000 Mar;45(1):2-9.
- 2-Baghdady VS, Ghose LJ, Enke H. Traumatized anterior teeth in Iraqi and Sudanese children-a comparative study. *J Dent Res* 1981 Mar;60(3):677-80.
- 3-Ravn JJ. Dental injuries in Copenhagen schoolchildren, school years 1967-1972. *Community Dent Oral Epidemiol* 1974;2(5):231-45.
- 4-Sgan-Cohen HD, Yassin H, Livny A. Dental trauma among 5th and 6th grade Arab schoolchildren in Eastern Jerusalem. *Dent Traumatol* 2008 Aug;24(4):458-61.
- 5-Andreasen JO, Andreasen FM. Essentials of traumatic injuries to the teeth. 2nd ed. Copenhagen: Munksgaard Mosby; 2000. p. 115-31.
- 6-Andreasen JO, Ravn J. Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. *Int J Oral Surg* 1972;1(5):235-9.
- 7-Andreasen JO, Hjorting-Hansen E. Replan-

- tation of teeth. 1. Radiographic and clinical study of 110 human teeth replanted after accidental loss. *Acta Odontol Scand* 1966 Nov;24(3):263-86.
- 8-Andreasen JO. Effect of extra-alveolar period and storage media upon periodontal and pulpal healing after replantation of mature permanent incisors in monkeys. *Int J Oral Surg* 1981 Feb;10(1):43-53.
- 9-Andreasen JO, Kristerson L. The effect of limited drying or removal of the periodontal ligament. Periodontal healing after replantation of mature permanent incisors in monkeys. *Acta Odontol Scand* 1981;39(1):1-13.
- 10-Blakytyn C, Surbutis C, Thomas A, Hunter ML. Avulsed permanent incisors: knowledge and attitudes of primary school teachers with regard to emergency management. *Int J Paediatr Dent* 2001 Sep;11(5):327-32.
- 11-Zuhal K, Semra OE, Huseyin K. Traumatic injuries of the permanent incisors in children in southern Turkey: a retrospective study. *Dent Traumatol* 2005 Feb;21(1):20-5.
- 12-Mori GG, Turcio KH, Borro VP, Mariusso AM. Evaluation of the knowledge of tooth avulsion of school professionals from Adamantina, São Paulo, Brazil. *Dent Traumatol* 2007 Feb;23(1):2-5.
- 13-Andreasen JO. Analysis of topography of surface and inflammatory root resorption after replantation of mature permanent incisors in monkeys. *Swed Dent J* 1980;4(4):135-44.
- 14-Vergotine RJ, Govoni R. Public school educator's knowledge of initial management of dental trauma. *Dental Traumatol* 2010 Apr;26(2):133-6.
- 15-Chan AW, Wong TK, Cheung GS. Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong. *Dent Traumatol* 2001 Apr;17(2):77-85.
- 15-Sae-Lim V, Lim LP. Dental trauma management awareness of Singapore pre-school teachers. *Dent Traumatol* 2001 Apr;17(2):71-6.
- 16-Tzigkounakis V, Merglová V. Attitude of Pilsen primary school teachers in dental traumas. *Dent Traumatol* 2008 Oct;24(5):528-31.
- 17-Andreasen JO. Interrelation between alveolar bone and periodontal ligament repair after replantation of mature permanent incisors in monkeys. *J Periodontal Res* 1981 Mar;16(2):228-35.
- 18-Trope M, Friedman S. Periodontal healing of replanted dog teeth stored Viaspan, milk and Hanks balanced salt solution. *Endod Dent Traumatol* 1992 Oct;8(5):183-8.
- 19-Pettiette M, Hupp J, Mesaros S, Trope M. Periodontal healing of extracted dogs' teeth air-dried for extended periods and soaked in various media. *Endod Dent Traumatol* 1997 Jun;13(3):113-8.
- 20-Oswald RJ, Harrington GW, Van Hassel HJ. A postreplantation evaluation of air-dried and saliva stored avulsed teeth. *J Endod* 1980 May;6(5):546-51.
- 21-Lindskog S, Blomlof L. Influence of osmolality and composition of some storage media on human periodontal ligament cells. *Acta Odontol Scand* 1982;40(6):435-41.
- 22-Hiltz J, Trope M. Vitality of human lip fibroblasts in milk, Hanks balanced salt solution and Viaspan storage media. *Endod Dent Traumatol* 1991 Apr;7(2):69-72.