


Awareness, Knowledge and Attitudes Toward Management of Avulsed Permanent Incisors Among Primary School Teachers

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Introduction: Dental trauma is known as main concern for public health and is a prevalent issue among children as it leads to functional, aesthetic, and psychological complications. This study aimed to evaluate the awareness and knowledge of primary school teachers regarding emergency first aid management for tooth avulsion at Agadir.

Methods: The study was conducted in 46 randomly selected primary schools in Agadir and included all teachers from these schools. Data collection was carried out through a self-administered questionnaire focusing on teachers' socio-demographic characteristics, understanding of the importance of emergency management and familiarity with emergency procedures. Data analysis was performed using Jamovi Version 2.3.21.0.

Results: A total of 202 teachers participated in the study, 61% being female and 39% male. It has been found that 59.4% of the teachers had encountered an avulsed tooth accident at school. Of these, 23.9% indicated they would immediately replant the avulsed tooth, while 76.7% would contact the child's parents. Regarding storage, 6.8% would preserve the avulsed tooth in milk, while 30.1% preferred using paper. No significant differences were found in term of seniority and age groups ($p > 0.05$).

Discussion: An educational programs is needed to enhance the management and prognosis of permanent tooth avulsion among children in Morocco.

Keywords: dental trauma, tooth avulsion, children, management, teachers

Introduction

Tooth avulsion stands out as one of the most serious emergencies in traumatology, characterized by a traumatic dental injury where a tooth is completely dislodges from its socket. This type of injury accounts for 0.5% to 16% of all permanent dentition trauma, with the maxillary central incisors being the most commonly affected teeth.^{1,2} It tends to occur most frequently within the age group 8–11 years, as during this period, the ligament fibers are more flexible and root length is shorter, making them more susceptible to such incidents.³

Numerous studies have shown that the prognosis of avulsion significantly hinges on the immediate actions taken at the site of the accident and shortly after the tooth is dislodged.^{4–6} Immediate reimplantation is the preferred therapeutic option. If not possible, it is recommended to preserve the avulsed tooth in a suitable environment to assist pulpal and periodontal healing. Factors influencing this secondary option include the duration and method of tooth storage, the extent of root contamination, and the stage of root maturity.⁷

Epidemiological studies have consistently shown that the majority of traumatic dental injuries in school-aged children occur either at home or at school.⁸ Consequently, those most likely to be present at the moment of the accidents are the children's parents and teachers. Thus, their awareness of emergency management protocols is crucial for ensuring a favorable prognosis.

The present study aimed to evaluate the awareness and knowledge of primary school teachers regarding emergency first aid management for tooth avulsion at Agadir, Morocco.

Materials and Methods

A cross sectional study was conducted from December 27, 2022 to February 16, 2023 among primary school teachers from Agadir.

The study was authorized by the authorities of the Regional Academy of Education and Training of Souss Massa and consent has been allowed.

Based on a list of schools, forty-six schools were randomly chosen. All teachers at the selected schools were included in the study, the participants were anonymous and assured about the confidentiality of their responses.

The informed consent was obtained from the study participants prior to study commencement. The questionnaires were distributed to the participants and were accompanied by an explanatory letter specifying that by completing and returning the questionnaire, the participant consents to participate in this research.

A specific questionnaire in French of Toure et al⁹ was used, and it was divided into three sections:

- The first section collected general data concerning the teachers' age, gender, level of education, seniority;
- The second section focused on the importance of emergency management and the teacher's experiences with tooth avulsion incidents at school;
- The third section addressed emergency procedures.

Data management and statistical analysis were conducted using Jamovi Version 2.3.21.0. Quantitative variables were presented in numbers and proportions. The chi square test was employed to compare results based on gender, level of education, age groups and seniority. The significance level was set at $p \leq 0.05$.

Results

A total of 202 teachers responded the questionnaire. The teachers were mostly female, with a percentage of 61%.

The age group of 41 to 60 years age group constituted the largest proportion, representing 51% followed by the age group of 20 to 40 years age group comprising 42.6% of the teachers. Among the surveyed teachers, 86.6% held a higher level of education (Table 1).

Table 1 Socio-Demographic Characteristics of Study Participants

	n (%)
Gender	
Male	79 (39)
Female	123 (61)
Age	
Under 20	1 (0.5%)
20–40	86 (42.6)
41–60	103 (51)
61 or more	12 (5.9)
Level of education	
High school	27 (13.4)
Higher education	175 (86.6)
Seniority	
<1	3 (1.5)
1–5	41 (20.3)
6–10	29 (14.4)
10–15	19 (9.4)
16–20	20 (9.9)
21 years or more	90 (44.6)

Note: Expressed in number (percent).

Table 2 Comparison Between the Different Groups of Ages

	< 20	20–40	40–60	> 60	p
Had experienced tooth avulsion incidents	0(0)	9(11)	62(75.6)	11(13.4)	<0.001

Note: Khi2, Expressed in number (percent).

Table 3 Comparison Between the Different Levels of Seniority

	< 1	1–5	6–10	10–15	16–20	21 years or more	p
Had experienced tooth avulsion incidents	0	0	9 (11)	10 (12.19)	52 (63.41)	11 (13.4)	<0.001

Note: Khi2, Expressed in number (percent).

The socio-demographic characteristics are represented in [Table 1](#).

Among the sample, 59.4% % of the teachers reported having experienced tooth avulsion incidents at their school. Older and more experienced teachers have encountered more cases of expulsion, and this difference is statistically significant ($p < 0.001$) ([Tables 2](#) and [3](#)). Furthermore, tooth avulsion was recognized as a dental emergency by 69.9% of the teachers.

Regarding the solutions used to wash the avulsed tooth, the details are presented in [Figure 1](#).

It has been found that 23.9% of our participants performed immediate reimplantation at the site of injury ([Table 4](#)). In cases where reimplantation was not feasible, 50.1% of the teachers chose wet media to store the avulsed tooth, while 6.8% opted for milk, 5.8% for antiseptics, 8.7% for tap water and 1% for saliva ([Table 5](#)). No statistically significant difference was found between gender, level of education, age groups and seniority.

Discussion

The objective of this study was to evaluate the knowledge of primary school teachers in Agadir regarding the management of permanent incisor avulsion in children. While numerous studies have been conducted globally on this topic, none have been undertaken in Agadir until now.

This study was conducted on 202 teachers at elementary school of Agadir. Findings revealed that 59.4% of the teachers had encountered cases of avulsed teeth at school. Interestingly, older and more experienced teachers reported the highest number of such incidents ($p < 0.001$).

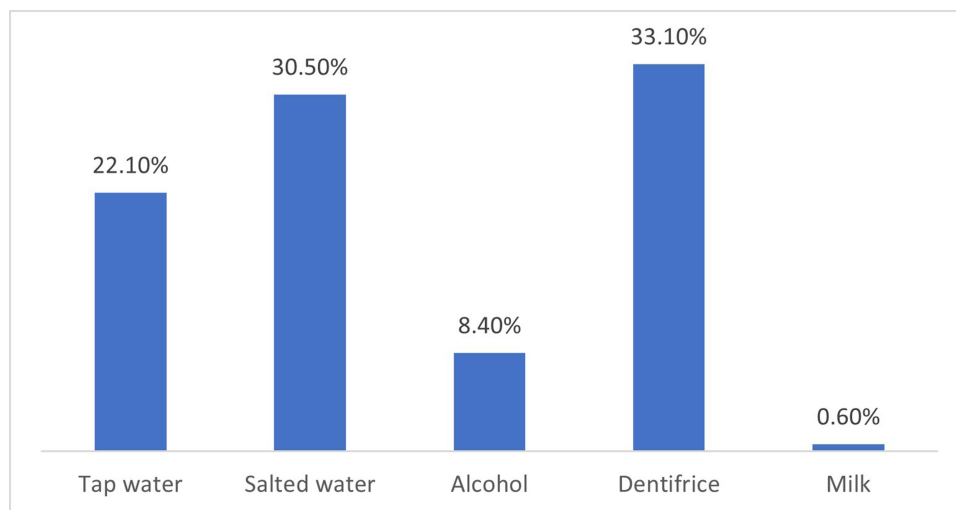


Figure 1 Solution used to wash the avulsed tooth.

Table 4 Management of Avulsed Permanent Tooth

	n (%)
Would you reimplant the avulsed tooth?	
Yes	48 (23.9)
No	154 (76.1)
Would you wash the avulsed tooth?	
Yes	154 (76.2)
No	48 (23.8)

Note: Expressed in number (percent).

Table 5 Storage Media

	n (%)
If you would not reimplant the tooth, would you maintain it in any storage?	
Ice	23 (11.7)
Compress	35 (17.5)
Tape water	17 (8.7)
Iced water	4 (1.9)
Milk	14 (6.8)
Paper	61 (30.1)
Plastics	6 (2.9)
Saliva	2 (1)
Antiseptics	12 (5.8)
Physiological serum	8 (3.9)
Child's mouth	12 (5.8)

Note: Expressed in number (percent).

Comparative data from other studies showed varying levels of experience among teachers with avulsed teeth incidents. Toure et al reported a rate of 44.5% among teachers in Casablanca,⁹ while Mori in Brazil and Addo in England reported rates of 13.75% and 34.7% respectively.^{10,11}

Furthermore, 69.9% of the teachers in our study recognized the importance of emergency management. This is slightly lower than the 82.82% reported by Toure et al.⁹ However, 23.9% of our participants performed immediate reimplantation at the site of injury, contrasting with Toure et al's finding of 15.8%.⁹

Studies from other regions, such as Hong Kong, Colombia, Brazil, and Tanzania, have reported varying rates of awareness and practices regarding reimplantation of avulsed teeth among teachers.^{10,12-14} For instance, in Hong Kong, only 5.4% of teachers were aware of the possibility of reimplantation, with even fewer attempting the procedure.¹² As in a study conducted in Colombia, 5.8% of teachers performed immediate reimplantation of the tooth.¹³ In Brazil, Mori and al. noted that 18.8% of teachers do reimplant the tooth.¹⁰ In Tanzania, 12% of teachers attempt reimplantation.¹⁴

Experiments conducted by Andreasen in 1981 on Monkeys confirmed that immediate reimplantation (less than five minutes) is one of the main factors contributing to the healing of the alveolar dental ligament with a success rate ranging from 85% to 97%. After 60 minutes of extraoral dry time, it is widely believed that viable ligament cells are no longer present.¹⁵ The International Association of Dental Trauma (IADT) recommend handling the tooth by the crown, rinsing it under cold water if the tooth is dirty, and if not immediate reimplantation is not possible, placing it in a suitable medium.¹⁶

In our study, 76.2% of teachers reported rinsing the avulsed tooth. The most commonly used solutions included toothpaste (33.1%), salt water (30.5%), tap water (22.1%), antiseptic (8.4%) alcohol (3.9%) and other solutions (1.8%) such as milk, warm water and cold water. While tap water was frequently cited in the literature as the primary rinsing solution,^{9,10,12} our study revealed a predominant use of alternative solutions known for their novice impact on cellular vitality, such as toothpaste, salt water, antiseptic and alcohol (75.9%).

When immediate reimplantation is not feasible, proper storage of the avulsed tooth becomes crucial for preserving cellular vitality for as long as possible. Some storage media have the capacity to stimulate cell proliferation.

Among the proposed storage options, cell culture storage solutions like Viaspan[®] or Hank's Balanced Salt Solution, recommended by the American Society of Endodontists, stand out.⁹ These solutions can maintain periodontal ligament vitality for up to 24 hours.

Storage in saliva is not recommended due to its high infectivity and hypotonic nature. Water is also not favored as a storage medium because of its potential to cause rapid cell lysis and acute inflammation.¹⁷ Milk, on the other hand, is considered a suitable storage medium for periods ranging from 2 to 6 hours, as its pH, composition and osmolarity support the conservation of mitotic activity of periodontal cells for up to 6 hours, providing sufficient time for a dental appointment. For longer storage periods, optimal media such as HBSS (Hanks' Balanced Salt Solution) and VIASPAN are recommended.¹⁸

Despite milk being a readily accessible storage medium, only 6.8% respondents in our study indicated they would use milk to preserve an avulsed tooth. Surprisingly, compresses and paper were the most commonly chosen storage methods, accounting for 47.6% of responses. However, it's important to note that storing an avulsed tooth in such environments can potentially lead to necrosis of periodontal structures.

Comparative data from Toure et al showed a slightly higher rate of 21.95% of teachers opting for milk as a storage medium.⁹

In Sudan, only 2.3% of teachers selected milk, versus 33.1% who opted for a disinfectant solution and 49.1% for dry storage.¹⁹ In India, a significant portion of parents 80% did not use any storage medium with only 2% found it necessary to use saliva or saline solution.²⁰

Despite that the older teachers and the more experienced one reported the highest number of cases of avulsion, our survey did not reveal any correlation between years of experience and teachers' attitudes towards this type of dental trauma.

The results of our study highlight a concerning lack of knowledge among school teachers regarding the management of avulsed teeth. Therefore, it is imperative to provide comprehensive education and training to teachers regarding appropriate storage media, proper handling of avulsed teeth, and the importance of reimplantation. This would significantly contribute to improving outcomes for children experiencing dental trauma.

Conclusion

Dental trauma presents a real health issue due to its frequency, their complications, and their social implications.

However, there is currently insufficient awareness and knowledge among school teachers regarding the management of avulsed teeth. Consequently, education programs focusing on the management of traumatic dental injuries are necessary.

In order to improve the prognosis of avulsed teeth and address this gap in knowledge among teachers in Morocco, several actions can be taken:

- Planning informational campaigns for school teachers.
- Integrating a section dedicated to the management tooth avulsion in the national prevention program organized in schools.
- Exhibition of posters on the management of avulsed teeth in schools.

Data Sharing Statement

The data are contained within this article.

Ethics Approval and Consent to Participate

The study was approved by the ethical committee of the college of health sciences of International University of rabat.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Andreasen JO, Andreasen FM, Andersson L. *Textbook and Color Atlas of Traumatic Injuries to the Teeth*. 4th ed. John Wiley & Sons; 2013.
2. Andersson L, Andreasen JO, Day P, et al. Guidelines for the management of traumatic Dental injuries: avulsion of permanent teeth. *Pediatr Dent*. 2017;39(6):412–419. doi:10.1111/j.1600-9657.2012.01125.x
3. Oliveira TM, Sakai VT, Moretti AB, Silva TC, Santos CF, Machado MA. Knowledge and attitude of mothers with regards to emergency management of dental avulsion. *J Dent Child*. 2007;74(3):200–202.
4. Andreasen JO, Hjørtting-Hansen E. Replantation of teeth. 1. Radiographic and clinical study of 110 human teeth replanted after accidental loss. *Acta Odontol Scand*. 1966;24(3):263–286.
5. 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;10(1):43–53. doi:10.1016/S0300-9785(81)80007-5
6. 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.
7. Sae-Lim V, Chulaluk K, Lim LP. Patient and parental awareness of the importance of immediate management of traumatised teeth. *Endodontics*. 1999;15(1):37–41. doi:10.1111/j.1600-9657.1999.tb00747.x
8. Saikiran KV, Gurunathan D, Nuvvula S, Jadadoddi RK, Kumar RH, Birapu UC. Prevalence of dental trauma and their relationship to risk factors among 8-15-year-old school children. *Int J Dent*. 2022;2022:3343827. PMID: 36589212; PMCID: PMC9800100. doi:10.1155/2022/3343827
9. Touré B, Benoist FL, Faye B, Kane AW, Kaadioui S. Primary school teachers' knowledge regarding emergency management of avulsed permanent incisors. *J Dent Tehran Iran*. 2011;8(3):117–122.
10. Mori GG, Castilho LR, Nunes DC, Turcio KH, Molina RO. Avulsion of permanent teeth: analysis of the efficacy of an informative campaign for professionals from elementary schools. *J Appl Oral Sci*. 2007;15(6):534–538. doi:10.1590/S1678-77572007000600015
11. Addo ME, Parekh S, D. R. M, Roberts GJ. Knowledge of dental trauma first aid (DTFA): the example of avulsed incisors in casualty departments and schools in London ». *Br Dent J*. 2007;202(10):E27–E27. doi:10.1038/bdj.2007.328
12. Chan AWK, Wong TKS, Cheung GSP. Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong: PE teachers' knowledge of dental trauma management. *Dent Traumatol*. 2001;17(2):77–85. doi:10.1034/j.1600-9657.2001.017002077.x
13. Marciano-caldera M, Mejía-cardona JL, Sanchez P, et al. Knowledge about emergency dental trauma management among school teachers in Colombia: a baseline study to develop an education strategy. *Dental Traumatol*. 2018;34(3):164–174. doi:10.1111/edt.12393
14. Kahabuka FK, Van't Hof M, Willemsen W, Burgersdijk R. Influence of seminar and mailed guidelines on knowledge of school teachers regarding emergency treatment for dental injuries. *East Afr Med J*. 2003;80(2):105–109. doi:10.4314/eamj.v80i2.8655
15. Andreasen JO. Exarticulations. In: *Munksgaard, Traumatic Injuries of the Teeth*. Vol. 2. Philadelphia: W.B.Saunders Company, édit; 1981.
16. Fouad AF, Abbott PV, Tsilingaridis G, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol*. 2020;36:331–342. doi:10.1111/edt.12573
17. Blomlöf L, Lindskog S, Andersson L, Hedström K-G, Hammarström L. Storage of experimentally avulsed teeth in milk prior to replantation. *J Dent Res*. 1983;62(8):912–916. doi:10.1177/00220345830620081301
18. Hiltz J, Trope M. Vitality of human lip fibroblasts in milk, hanks balanced salt solution and viaspan storage media. *Dent Traumatol*. 1991;7(2):69–72. doi:10.1111/j.1600-9657.1991.tb00187.x
19. Mergany NN, Ibrahim Y, Abuaffan AH. Knowledge and attitude of Sudanese school health teachers regarding first aid management of dental trauma. *Dent Oral Craniofac Res*. 2016;2(2):242–246.
20. Nikam AP, Kathariya MD, Chopra K, Gupta A, Kathariya R. Knowledge and attitude of parents/caretakers toward management of avulsed tooth in Maharashtrian Population: a questionnaire method. *J Int Oral Health*. 2014;6(5):1–4.

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