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Assessment of Knowledge, Attitude and Practices of School Teachers Regarding Traumatic Dental Injuries Management

Neha Desai[1*], Deepak Jha[2], Priyanka Razdan[3], Swapnil Mhatre[4]

[1]*Postgraduate Student, Department of Pediatric and Preventive Dentistry, Yogita Dental College and Hospital, Khed, India*
[2,3]*Reader, Department of Pediatric and Preventive Dentistry, Yogita Dental College and Hospital, Khed, India*
[4]*HoD, Department of Pediatric and Preventive Dentistry, Yogita Dental College and Hospital, Khed, India*

Abstract*: Introduction: Traumatic dental injuries (TDIs) are widespread public health problems affecting children causing esthetic and functional problems and consequently impacting their quality of life. School teachers are likely to be the first point of contact with the child soon after injury. Aim: To investigate teachers' knowledge, attitude and practices about emergency management of TDIs in children. Materials and Methods: A total of 307 teachers from a total 20 schools of Khed, Maharashtra were included in the study. Data were collected through a multiple choice self-administered questionnaire consisting of 12 questions. Results: The knowledge, attitude and practices of the teachers regarding basic care of managing TDIs was satisfactory. Around 85.7% of the teachers acknowledged dentist had to be approached immediately. Furthermore, 83.1% of teachers demonstrated knowledge of managing soft tissue injuries with higher frequency for the response by PhD degree holders (p=0.009). Around 89.9% of the teachers knew that missing teeth had to be looked for, and bleeding had to be stopped by compression with a greater frequency of response by teachers greater than 10 years of experience(p=0.003). Around 80% knew correctly placing the tooth back into the socket and 82.7% knew about reimplantation of the tooth. However, there were varied opinions regarding the storage and washing medium of avulsed teeth. Conclusion: This study reflected the need for professional training of school teachers by dentists through various aids in managing dental emergencies.

***Keywords*: Avulsed tooth, School children, Traumatic Dental Injury, Traumatic dental injuries management, Replantation.**

1. Introduction

Smile is the reflection of a person's self-confidence it is the best means of communication for social interaction. A good set of dentition has a crucial role in creating a pleasant smile, it affects the appearance and interpersonal relationships. and overall well-being of an individual [1]. Though oral structures comprise only 1% of the total body area, injuries to the oral region account for almost 5% of all body injuries [2].

Traumatic dental injuries (TDIs) pose a widespread dental public health problem among children [3]. It may cause both functional and esthetic problems, with possible impacts on the patient's quality of life [4], [5]. The prevalence of dental injuries is 60% over 16% are in the school environment [6], [7] affecting both primary and permanent anterior and posterior teeth [8]. Anterior teeth are not only important for esthetics but also are essential for phonetics, mastication, the integrity of supporting tissues, as well as the psychological and social well-being of children [6]. Therefore, it becomes essential to manage such injuries.

Dental injuries can be categorized as enamel fracture, crown fracture with or without pulpal involvement, root fracture, crown-root fracture, luxation, avulsion, and fracture of the alveolar process. When teeth and their supporting structures encounter impact trauma, the resulting injury manifests as a separation or crushing injury, or a combination of both. Separation injuries involve the displacement of teeth because of a rupture of the periodontal ligament (PDL). Some instances are avulsions and extrusive luxations [9]. Traumatic dental injuries (TDIs) can also be characterized by trauma to the perioral soft tissues, teeth, and their supporting structures. Among the different types of dental trauma, avulsion is known to have the worst prognosis resulting in the worst functional and esthetic impairment [10].

The prognosis of an avulsed tooth is best if it is reimplanted in the first 30 minutes of tooth avulsion [11]. Teachers are the first ones who encounter a situation of managing TDI. Despite this proximity, teachers often possess limited knowledge about the recommended measures to be taken. Hence, it becomes important to be adequately informed about the correct first-aid measures for addressing such injuries.

With the aforementioned background, the present study aimed to assess the knowledge, attitude and practices toward the emergency management of dental trauma among the teachers in government and private schools of Khed, Maharashtra..

2. Methodology

A cross-sectional survey of school teachers working in private and government schools of Khed, Maharashtra, India was carried out to assess the knowledge of school teachers

*Corresponding author: nehasdesai136@gmail.com

towards the emergency management of dental trauma. Ethical approval was obtained from the Institutional Review Board of Yogita Dental College and Hospital, Khed (YDCH Ethic A-21/2023). Prior permission was obtained from the Deputy Director of Education, Kolhapur Division under whose jurisdiction Ratnagiri District falls. Information regarding the number and distribution of schools in Khed Taluka was collected from the Block Education Officer (BEO), Education Department, Khed, Ratnagiri. Subsequently, formal permission was sought from the principals or heads of the respective selected schools prior to data collection.

The calculation of sample size was done to obtain results at a 95% confidence level, with a margin of error of 2.5% and a population proportion (P) of 50%. A sample size of 251 was calculated using this assumption. Considering the possibility of non-responses, an additional 5–25% participants were added to the sample size to ensure the minimum required number completed the survey within two months. Therefore, a final sample size of 307 participants was obtained through convenience sampling.

The study was conducted in Khed Taluka, Ratnagiri District, Maharashtra. A multistage sampling technique was used. In the first stage, Khed was divided into four zones: North, East, Central, and South. From each zone, one government and one private school were randomly selected. In the second stage, 20 schools were selected using stratified random sampling across the zones. All teachers aged over 18 years, residing in Khed Taluka, and willing to give informed consent were included. Teachers absent during data collection or who declined consent were excluded.

All teachers who were permanent residents of Khed Taluka, Ratnagiri District, aged more than 18 years and willing to participate in the study were included. Teachers who did not give consent or were absent on the day of the survey were excluded.

A close-ended, pre-validated questionnaire containing twelve questions was used in the study to assess knowledge, attitudes and practices.

The questionnaire consisted of two parts: Part 1 included questions related to personal and professional information (e.g., age, gender, teaching experience, type of school), while Part 2 comprised multiple-choice questions designed to assess participants' knowledge, attitude and practices regarding the emergency management of traumatic dental injuries. The nature and objectives of the study were explained to all participants in their preferred language (Marathi, Hindi, or English). Participation was voluntary, and confidentiality was strictly maintained. The questionnaire was adapted from previously validated instruments used in related studies [12]. It was pretested among 10 school teachers from a neighboring school outside the study area, and necessary modifications were made based on their feedback. A test–retest analysis yielded a Cohen's kappa value of 0.7, indicating acceptable reliability. Two trained investigators were present during data collection to provide clarifications when needed. The questionnaires were distributed and collected on the same day to ensure completeness.

Statistical analysis was carried out using SPSS version 23.0. Data were initially entered into Microsoft Excel 2010 for cleaning. Descriptive statistics such as mean ± standard deviation and percentages were calculated. The Chi-square test was used to assess associations between categorical variables. A p-value of <0.05 was considered statistically significant.

3. Results

The Demographic characteristics of the participants like gender, age, teaching experience, level of education and type of school are described in table 1. The mean (SD) age of the participants was 35.98(8.91).

Table 1
Demographic details of the participants

Details Of Variable	Number	Percentage
Gender		
Male	106	34.52%
Female	201	65.48%
Age Groups		
<20	2	0.7%
21-30	95	30.9%
31-40	115	37.5%
41-50	72	23.5%
>51	23	7.5%
Teaching Experience (Yrs)		
>10	138	45.0%
5-10	63	20.5%
1-5	88	28.7%
<1	18	5.9%
Level of Education		
PHD	2	.7%
Post-Graduate	129	42.0%
Graduate	167	54.4%
Undergraduate	9	2.9%
Schoolteachers		
Private	228	74.6%
Government	78	25.4%

The mean (SD) age of the participants was 35.98(8.91).

The study findings indicated that knowledge and attitude among teachers regarding managing dental emergencies of avulsed teeth varied considerably. When queried about action taken if a student breaks his upper front tooth while running, 85.7% of the teachers acknowledged that the child had to be taken to the dentist immediately.

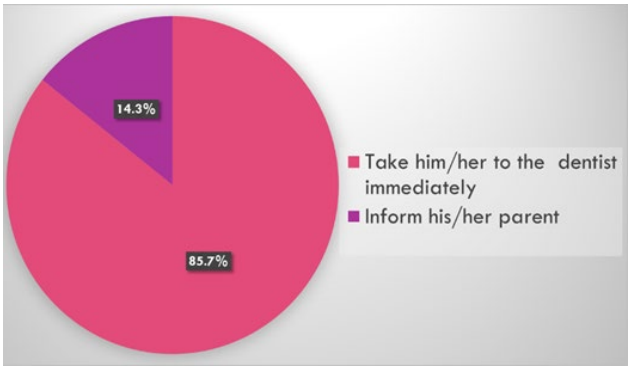

Fig. 1. Q1. What would you do if your student falls down while running & breaks his upper front tooth?

Furthermore, 83.1% of teachers demonstrated knowledge

that soft tissue injuries like lip tear, chin injury & tongue biting had to be managed by cleaning with Dettol, applying ointment and referring to the dentist. There was a statistically highly significant difference seen for the frequencies between the groups ($p<0.01$) with higher frequency for the response by PhD degree holders ($p=0.009$).

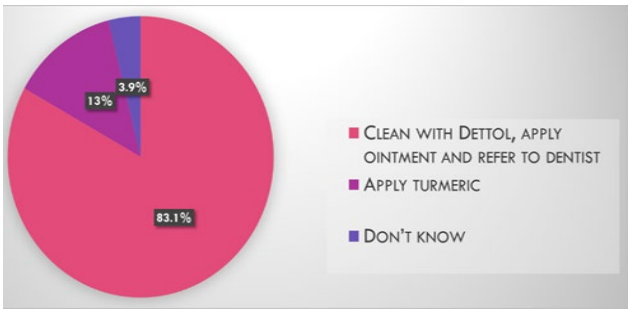

Fig. 2. Q2. How will you manage soft tissue injuries? (lip tear, chin injury & tongue biting)

When queried about a scenario of a missing tooth with bleeding in the mouth 89.9% correctly answered by stating bleeding cessation by compression and looking for the missing tooth. The correct response was statistically highly significant for frequencies between the groups with higher frequency for teachers with greater than 10 years of experience ($p=0.003$).

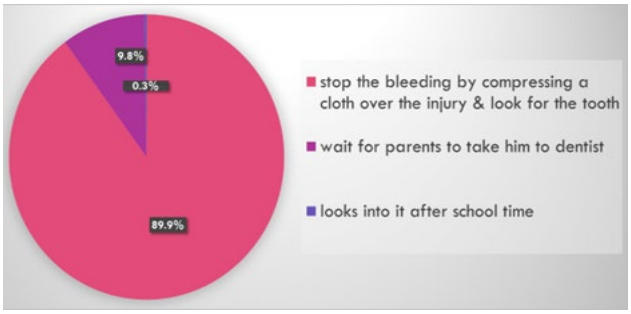

Fig. 3. Q3. Child is hit on the face and his upper front tooth is missing and there is blood in his mouth. Immediate emergency action you would take is?

Around eighty per cent knew replanting the tooth back into the socket and referring the case to the dentist.

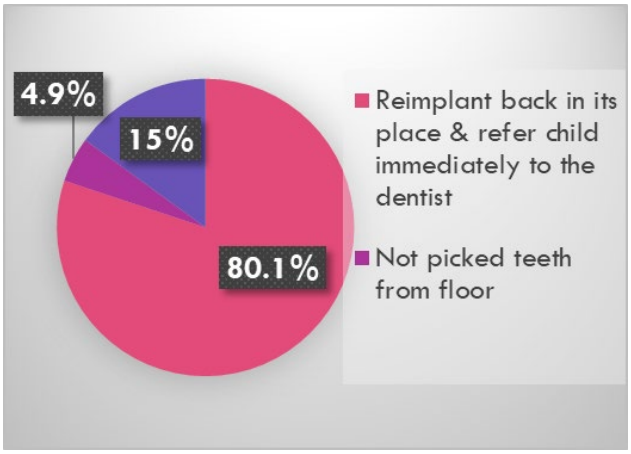

Fig. 4. Q4. What would you do if tooth is knocked out of socket?

Around 82.7% knew about the reimplantation of teeth & rest all i.e., 17.3 % were unaware of reimplantation.

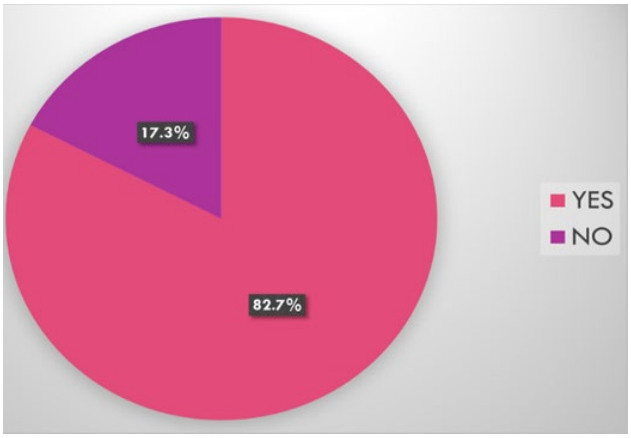

Fig. 5. Q5. Have you ever heard about reimplantation of tooth?

Assessment of teachers' understanding of the replacement of a tooth that had fallen on the ground back into its socket revealed that 83.4% possessed the knowledge to pick the tooth by crown, rinse with water and place it back into the socket, the knowledge was significant among teachers between the groups with the correct response given by teachers greater than 10 years' experience ($p=0.023$).

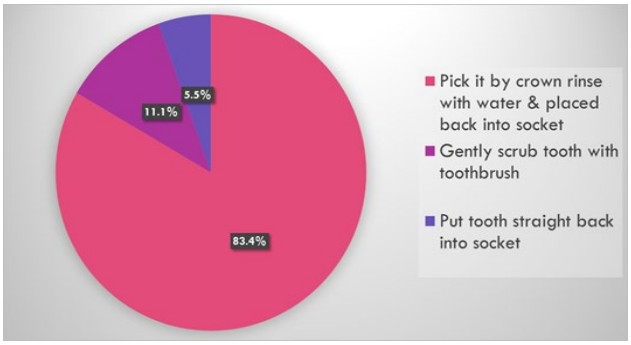

Fig. 6. Q6. If you decide to reimplant tooth back in its place, but it had fallen on floor what would you do?

Diverse opinions existed regarding transport medium for a knocked-out tooth, with 13.7 suggesting milk, 74.6% suggesting tissue paper and 11.7% preferring tap water.

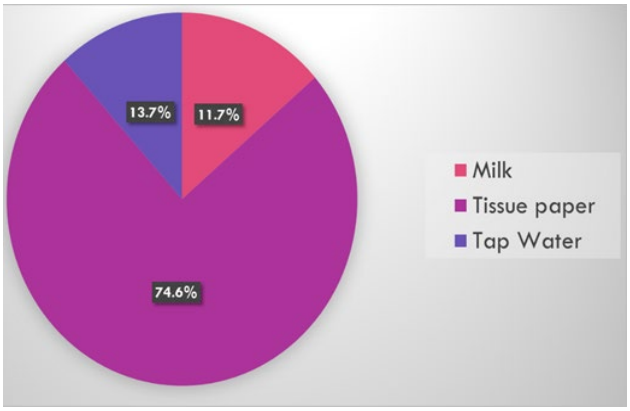

Fig. 7. Q7. How would you carry the fallen tooth to the dentist?

The suggested medium to wash teeth varied from saline solution (31.9%), tap water (19.5%) and antiseptic solution (48.5%).

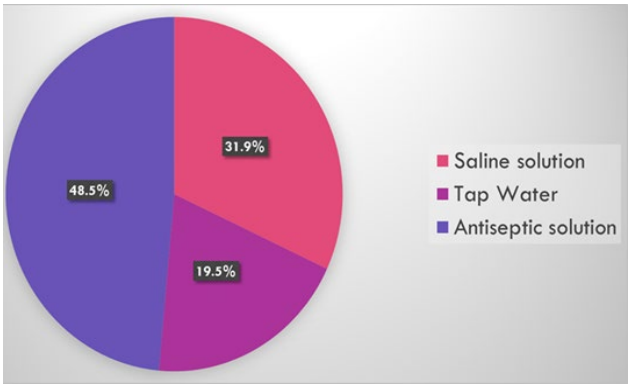

Fig. 8. Q8. If you choose to wash tooth, which solution would you use to wash?

A significant number (93.5%) knew the importance of seeking emergency management for dental trauma.

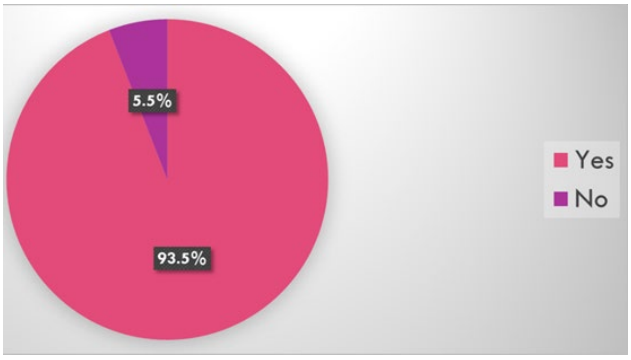

Fig. 9. Q9. Do you think it is important to seek emergency management for dental trauma?

A substantial number (87.9%) reported not having received any guidance on managing a knocked-out tooth.

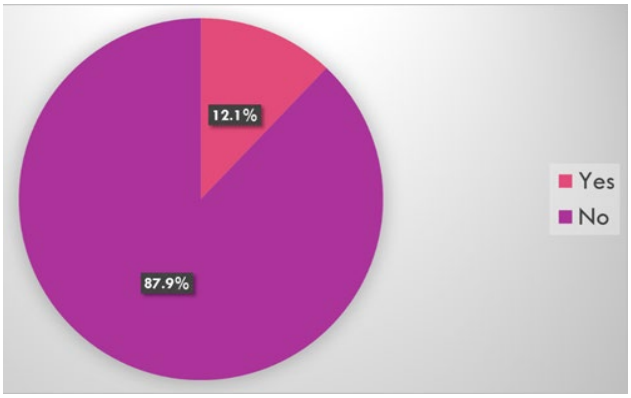

Fig. 10. Q10. Have you ever participated in first aid training courses on dental trauma?

Regarding the urgency of professional help for an avulsed tooth 90.2% opined the need for immediate action.

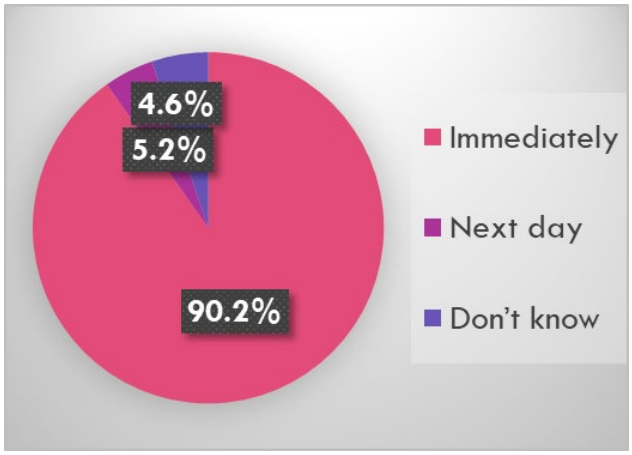

Fig. 11. Q11. How urgently you should seek professional help if tooth is knocked out?

The use of mouthguards during sports was strongly supported by 87% of the participants.

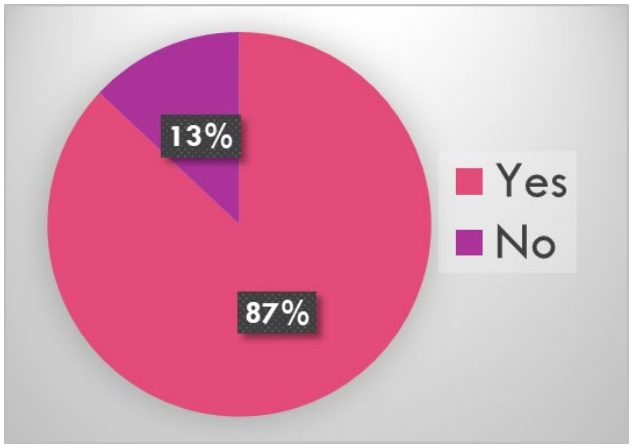

Fig. 12. Q12. Do you recommend the use of mouth guards during sports and physical activity?

The study results indicated varying levels of awareness among teachers regarding the management of dental emergencies, particularly avulsed teeth. The teachers in our study demonstrated strong knowledge in handling traumatic dental injuries to upper front teeth. The prevalence of such injuries was higher in permanent dentition (58.6%) compared to primary dentition (36.8%), falls (31.7 to 64.2%), and sports activities (up to 40.2%) were identified as common causes [13]. Boys experienced more dental injuries than girls, possibly due to their greater involvement in contact sports and fights [13], [14]. However, the trend has been changing in the last decade because of the greater participation of girls in sporting activities [15].

Teachers demonstrated adequate knowledge of taking immediate measures and first aid in dental hard and soft tissue trauma management. Experienced and highly educated teachers exhibited better practical knowledge, particularly in handling tooth reimplantation. This contradicted previous findings that highlighted a significant lack of knowledge among primary school teachers, possibly attributed to insufficient awareness campaigns in those regions. Past studies revealed that over 50%

of the teachers were unfamiliar with tooth replantation which could possibly be because of insufficient campaigning or exposure regarding tooth avulsion management in those studies [1].

A study done by Srilatha et al showed a positive impact of school-based dental trauma management training programs, with increased mean scores on the management of dental trauma among teachers from baseline which was 5.37 ± 2.61, which increased to 9.57 ± 0.88 [16]. It is worth mentioning that regular awareness sessions in schools through dental camps, impacted positively on our study results.

The success of tooth reimplantation depends significantly on the choice of storage medium, with ideal pH and osmolarity crucial for maintaining Periodontal Ligament (PL) cell vitality. Trope M emphasized the need for a biological medium that preserved PL cell vitality, reduced inflammation and prevented sequelae. The choice of the medium should focus on maintaining PL cell viability rather than making the tooth germ-free [17].

Milk is a medium that is readily available during accidents and is considered optimal due to its physiological properties, sustaining PL cell vitality for up to six hours, Tap water, should be considered the last-resort option because of its hypotonicity, which might risk PL cell causing rapid cell lysis and increased inflammation upon replantation and at times cell necrosis [6], [18]. In the current study opinions among teachers varied regarding the transport and washing medium for avulsed teeth. Only a small percentage (13.7%) of teachers were knowledgeable about it. Comparative studies done earlier found that only 5% of respondents recognized 'milk' as the preferred medium for washing and transporting avulsed teeth [19]. A significant portion (74.6%) of the participants indicated the use of tissue paper. There is a concerning practice of 'dry storage' mentioned in the literature among rural parents indicating a lack of knowledge about appropriate post-trauma handling of knocked-out teeth as it jeopardises normal healing and repair of reimplanted teeth [1]. It is noteworthy that there is a lack of consensus among dental professionals on the ideal storage medium for avulsed teeth emphasizing the need for greater awareness and consensus in both professional and general populations [20], [21].

Avulsion of the tooth is accompanied by severe damage to the periodontal ligament. The cells of the periodontal ligament are predominantly damaged by inadequate storage of the avulsed teeth. Following replantation of avulsed teeth with inadequate storage methods could result in inflammatory root resorption of the tooth [22]. Though a significant number knew the importance of seeking emergency care for dental trauma substantial number reported not having received any exclusive professional training in dental trauma management.

The teachers were aware of the importance of mouthguards. Absence of mouthguards while playing sports caused dental trauma in past studies) [23], [24]. Anatomic features like increased overjet (>3.0 mm), inadequate lip coverage of the upper anterior teeth etc. [25] and distinct age groups 0 to 4, 5 to 9 and 10 to 14 years age groups were identified as predisposing factors for dental trauma, hence the use of mouth guard was justified [15].

The limitations of the study include the use of convenient sampling, there was lack of a control group and the extrapolation of results is difficult because of the small sample size.

4. Recommendation

The International Association of Dental Traumatology (IADT) [26] guidelines states ‘that in the first aid treatment of an avulsed tooth.

- one should make sure the tooth is a permanent tooth (primary teeth should not be replanted),
- patient should be kept calm
- if the tooth is found it should be picked up by the crown (the white part of the tooth).
- Avoid touching the root
- if the tooth is dirty, wash it briefly (10 seconds) under cold running water and reposition it. Try to encourage the patient/parent to replant the tooth. Bite on a handkerchief to hold it in position
- if it is not possible, place the tooth in a suitable medium e.g. a glass of milk or in saline. The tooth can also be transported in the mouth, keeping it between the molars and inside the cheek. Avoid storage in water.
- seek emergency dental treatment immediately.

5. Conclusion

In conclusion it is recommended that dentists should collaborate with school teachers for the dissemination of oral health knowledge through teacher training programs with an emphasis on the management of dental trauma, various methods may be used to improve the knowledge of school teachers, incorporating educational brochures, posters and seminars during school visits for dental camps, training course modules on dental trauma management can be introduced on Massive Open Online Courses (MOOC) platforms. Inclusion of dental first aid in the first aid curriculum of teachers’ training course. Dentists as health educators must reach the teachers via radio, TV interviews and social media.

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