

# Knowledge of Physical Education Teachers of Chandigarh with Regard to Emergency Management of Avulsed Teeth at School

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## ABSTRACT

**Objective:** To assess the knowledge of Chandigarh physical education teachers regarding emergency management of avulsed teeth at school.

**Methods:** A cross-sectional survey was conducted on 100 physical education teachers of Chandigarh using a questionnaire surveying demographic data and knowledge to manage tooth avulsion. A stratified random sampling technique was used to select the required sample. Data obtained was statistically analyzed using Chi-square test, descriptive statistics, and *t*-test.

**Results:** Out of 100 school physical education teachers surveyed, 61% of the physical education trainers (PET) were having first aid training and 39% were not having any training. 44% of PET said tap water is the best storage medium followed by 19% fresh milk and 11% child's saliva. There was a statistically significant difference in knowledge to manage avulsed teeth between trained and untrained dentists regarding the extra-alveolar duration method ( $p = 0.0001$ ), an extra-alveolar storage medium ( $p = 0.008$ ).

**Conclusion:** This study suggested that the knowledge about the concept of management of avulsed teeth was lacking in Chandigarh physical education teachers. Educational programs should be introduced to them to modify the approach of teachers to manage tooth avulsion at school.

**Keywords:** Attitude, Educational programs, Physical education teachers, School.

*Journal of South Asian Association of Pediatric Dentistry* (2022): 10.5005/jp-journals-10077-3216

## INTRODUCTION

Sports account for 60% of traumatic dental injuries and school is the place where one can find a noticeable risk of traumatic dental injuries (TDI).<sup>1</sup> Epidemiological studies have indicated that approximately one-third of toddlers and one-quarter of adolescents and adults have experienced tooth avulsion.<sup>2,3</sup> Prognosis of the tooth is directly related to the time taken to treat the tooth at the time of injury which relies upon prompt action taken by people such as peers, parents, or physical education teachers which are present there at the site of trauma. Children with avulsed teeth who approach the dentist quite late for treatment could be due to a lack of awareness among teachers and parents who are the first contact persons in this situation.<sup>4,5</sup> Keeping this in mind, the present study is planned to assess the knowledge of Chandigarh physical education teachers regarding emergency management of tooth avulsion at school.

## METHODOLOGY

This cross-sectional study was approved by the Panjab University Research Ethics Committee (No. PU/IEC/111/13/09) and granted by the Department of Science & Technology Chandigarh (No. S & T/Sanc/02/2014/1959-1964). A written informed consent form was signed by all the participants and authorized by the directors of the educational institutions selected.

The survey was undertaken on 100 physical education teachers (PETs) of Chandigarh area and the stratified random sampling technique was used to select the sample. The per school strength of PETs was only one or two per school. So about 70–80 schools were randomly selected from the list of schools obtained from the Department of Education, Chandigarh Administration.

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**How to cite this article:** Verma L, Passi S, Gupta J. Knowledge of Physical Education Teachers of Chandigarh with Regard to Emergency Management of Avulsed Teeth at School. *J South Asian Assoc Pediatr Dent* 2022;5(1):17–21.

**Source of support:** Nil

**Conflict of interest:** None

## Inclusion Criteria

- Only the physical education teachers were included for the study
- Teachers who gave consent for participation

## Sample Size Calculation

The calculation of sample size was done to obtain results at a confidence level of 95%, marginal error of 5%, and population variance (P) of 15%, and the sample size was found to be 100. All the PET who gave consent to participate in the study were included in the study and those who did not give their consent were excluded from our study.

The questionnaire was pretested in a pilot survey of 40 randomly selected PET of various Chandigarh schools. Cronbach's alpha value was found to be 0.80.

The questionnaire consisted of 16 questions in the simple English language and was sectioned into two parts.

Part 1: Enlisted seven questions for recording personal and professional data including age, sex, school, teaching experience, first aid training, orientation regarding dental trauma management.

Part 2: Consisted of seven questions related to knowledge of teachers in regards to management of tooth avulsion *via* an imaginary case of tooth avulsion in which knowledge of frequently traumatized teeth, importance of urgency in management of avulsed teeth, transport media used, transport method used, importance of time duration in managing avulsed teeth, concept of management, and knowledge of management of the tooth which has fallen on the ground, were evaluated to test the knowledge of school teachers regarding avulsed tooth management.

On the basis of general first aid training, the teachers were divided into:

- Trained teachers
- Untrained teachers

### Statistical Analysis

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) Version 17.0. Chi-square analysis was used to test whether there was a significant difference in knowledge between the untrained and trained physical education teachers ( $p$ -value < 0.05 statistically significant).

## RESULTS

The number of participants in this survey included 100 physical education teachers. The demographic details of the teachers are given in Table 1.

The assessment of knowledge of physical education teachers with respect to the management of tooth avulsion is assessed by a case series. About 27.9% of the physical education teachers knew that the fractured tooth is permanent anterior teeth and the result was statistically significant between level of education and level of training ( $p=0.004$  and  $p=0.001$ ), respectively. Results were again statistically insignificant with respect to level of education and level of training with respect to knowledge regarding reimplantation ( $p=0.44$  and  $p=0.28$ ), respectively. Regarding the extra-alveolar storage method, 11% suggested to place the tooth in ice, 33% suggested to put it in liquid, 10% opted to place the tooth in the child's mouth, while 35% said that they will place the tooth in their hands. A number as high as 43% said to wrap the tooth in handkerchief. Statistically significant difference in the storage method was seen between high school diploma, bachelor's degree, master degree holders and between trained and untrained teachers ( $p=0.0001$  and  $p=0.0001$ , respectively) (Table 2).

Regarding the extra-alveolar medium, 41% believed that tap water is the best transport storage media, 15% for fresh milk, 12% for child's saliva, 2% for alcohol, 11% for saline, 15% for disinfecting solution, and only 4% for chicken egg white as best transport storage media. About 25% considered the best time for putting back a tooth in the socket is immediately after the accident whereas 11% believed that the best time is 30 minutes and 16% said within the same day of the accident. About 48% did not know the answer (Table 3).

The Chi-square test was performed that showed a statistically significant difference in knowledge about extra-alveolar duration and extra-alveolar storage medium between trained and untrained teachers ( $p=0.001$  and  $p=0.008$ ) and between level of education (high school diploma, bachelor's degree, master's degree) with  $p$ -value 0.015 and 0.001, respectively (Table 4).

There was no statistically significant difference in the concept of management of an avulsed tooth between trained and non-trained teachers as well as between high school diploma, bachelor's degree and master's degree holder teachers ( $p=0.202$  and  $0.102$ , respectively). About 30.6% of trained teachers were of the views that the tooth should be first washed and then placed in socket but the results were statistically insignificant with  $p=0.52$  between different levels of education and  $p=0.205$  between trained and untrained teachers.

## DISCUSSION

Dental trauma especially tooth avulsion bears an important concern as it is associated with esthetics as well as dental health problems.<sup>6</sup> It becomes important to attend the tooth avulsion management in an appropriate manner.<sup>7</sup> It has been reported that 61% of physical education teachers (PET) had first aid training. This percentage is quite low despite the fact that as many as 62% of the total participants had completed their master's program. This suggests that dental trauma management is not a regular part of the curriculum for PETs. Similar were the findings in the survey reports of various other countries indicating that there was a lack

**Table 1:** Demographic details of the teachers (expressed in %)

Variables	Total n = 100
Gender	
Males	55%
Females	45%
Age	
<35	38%
35–45	28%
>45	34%
First aid training experience	
Yes	61%
No	39%
Level of education	
Bachelor's degree	35%
High school diploma	3%
Master's degree	62%
Teaching experience	
0–5 years	38%
6–15 years	35%
>15 years	27%
Physical education teachers who have gained information about dental trauma management during first aid training, radio/TV, leaflets, lectures with dentists	
Yes	11%
No	89%

**Table 2:** Analysis of individual predictors on knowledge regarding extra-alveolar method of avulsed teeth

Avulsed teeth			Level of education				First aid training		
			High school diploma	Bachelor's degree	Master's degree	p value	Yes (trained)	No (untrained)	p value
Knowledge of frequently traumatized teeth	Anterior teeth	Count (%)	2(66.70%)	40(100%)	57(100%)	0.004*	17(27.905)	1(2.60%)	0.001*
	Posterior teeth	Count (%)	1(33.3%)	0(0.00%)	0(0.00%)		44(72.10%)	38(97.40%)	
Would you reimplant the tooth in socket immediately? (urgency of management)	Yes	Count (%)	0(0.00%)	33(94.3%)	47(75.3%)	0.044*	16(26.9%)	4(5.6%)	0.28
	No	Count (%)	3(100%)	2(5.70%)	15(24.7%)		45(73.10%)	35(94.4%)	
If you did not reimplant, then how will you transport the tooth to the dentist? (Knowledge of Extra-alveolar storage method)	Put the tooth in ice	Count (%)	0(0.00%)	0(0.00%)	11(17.7%)	0.0001*	10(16.4%)	1(2.6%)	0.0001*
	Put the tooth in liquid	Count (%)	2(66.70%)	7(20.00%)	24(38.7%)		21(34.40%)	12(30.80%)	
	Put the tooth in child's mouth	Count (%)	0(0.00%)	0(0.00%)	10(16.10%)		10(16.40%)	0(0.00%)	
	Put the tooth in child's hand	Count (%)	0(0.00%)	3(8.60%)	0(0.00%)		3(4.90%)	0(0.00%)	
	Wrap the tooth in handkerchief	Count (%)	1(33.3%)	25(71.40%)	17(27.40%)		17(27.90%)	26(66.70%)	

Note: \* p-value < 0.05 significant resulting from Pearson Chi-square test

**Table 3:** Analysis of individual predictors on knowledge regarding extra-duration and extra-alveolar medium of avulsed teeth

Avulsed teeth			Level of education				First aid training		
			High school diploma	Bachelor's degree	Master's degree	p value	Yes (trained)	No (untrained)	p value
Extra-alveolar duration	Do not know	Count (%)	2(66.7%)	23(65.7%)	23(54.8%)	0.015*	23(52.5%)	25(66.7%)	0.001*
	Immediately after accident	Count (%)	1(33.3%)	2(5.7%)	22(35.5%)		23(37.7%)	2(5.1%)	
	Within 30 min after bleeding	Count (%)	0(0.00%)	2(5.7%)	9(14.5%)		8(13.1%)	3(7.7%)	
	Within same day	Count (%)	0(90.00%)	8(22.9%)	8(12.9%)		7(11.5%)	9(23.1%)	
Extra-alveolar storage medium	Tap water	Count (%)	0(0.00%)	22(62.9%)	19(30.60%)	0.001*	19(31.1%)	22(56.4%)	0.008*
	Fresh milk	Count (%)	1(33.30%)	2(5.7%)	12(19.40%)		13(21.3%)	2(5.1%)	
	Child's saliva	Count (%)	0(0.00%)	1(2.90%)	11(17.70%)		9(14.08%)	3(7.7%)	
	Alchoal	Count (%)	1(33.30%)	1(2.90%)	0(0.00%)		2(3.3%)	0(0.0%)	
	Saline solution	Count (%)	1(33.30%)	2(5.70%)	8(12.90%)		7(11.5%)	4(10.3%)	
	Disinfecting solution	Count (%)	0(0.00%)	3(8.60%)	12(19.40%)		11(18.0%)	4(10.3%)	
	Chicken egg white	Count (%)	0(0.00%)	49(11.40%)	0(0.00%)		0(0.00%)	4(10.3%)	

Note: \* p-value < 0.05 significant resulting from Pearson Chi-square test

of training in managing traumatic dental injuries (TDI).<sup>8-10</sup> About 11% physical education teachers were having information from radio, tv, talks with dentist, and first aid training about dental

trauma management. It has been seen that 58% of the teachers have no concept of management of an avulsed teeth and 10% said that no treatment is required. Although majority of PET did not

**Table 4:** Analysis of individual predictors on concept of knowledge of management of avulsed teeth

		Level of education				First aid training			
		High school diploma	Bachelor's degree	Master's degree	p value	Yes (trained)	No (untrained)	p value	
Avulsed teeth	Do not know	Count (%)	2(66.70%)	17(48.60%)	22(35.5%)	0.52	22(36.10%)	19(48.70%)	0.205
	Rinse the tooth under tap water and put it back in the socket	Count (%)	1(33.30%)	6(17.10%)	19(30.60%)		19(30.60%)	18(29.50%)	
	Rub away dirt by a sponge & soap and put it back in its place	Count (%)	0(0.00%)	3(8.60%)	6(9.70%)		8(13.10%)	1(2.60%)	
	Put it back into the socket immediately without cleaning	Count (%)	0(0.00%)	0(0.00%)	4(6.50%)		3(4.90%)	1(2.60%)	
	Discard the tooth	Count (%)	0(0.000%)	9(25.70%)	11(17.70%)		10(16.40%)	10(25.60%)	
If you decide to reimplant the tooth, but it has fallen on ground, what would you do?	Calm down the child & send her back to class	Count (%)	1(33.30%)	2(5.70%)	6(9.70%)	0.102	1(6.60%)	5(12.80%)	0.202
	Contact parents & advise them to send the child to the dentist	Count (%)	1(33.30%)	16(45.70%)	26(41.90%)		24(39.30%)	19(48.70%)	
	Look for the fractured piece & send the child to the dentist	Count (%)	0(0.00%)	16(45.70%)	28(45.02%)		29(47.50%)	15(38.50%)	
	Do not know	Count (%)	1(33.30%)	1(2.90%)	2(3.20%)		4(6.60%)	0(0.00%)	
Concept of management									

have a concept of dental trauma management but they were aware of storage medium of the avulsed teeth because tooth avulsion was the most common traumatic injury they have encountered in schools and the sports environment. About 59% of the participants did not even consider the urgency of dental trauma management (DTM), 16% refused to comment, and only 26% agreed for the urgency of the situation. Similar were the observations in two studies done by McIntyre et al.<sup>11,12</sup> where most teachers do not know to manage the tooth avulsion and have no knowledge regarding the benefits of providing appropriate early treatment.

Part II of the questionnaire includes questions related to knowledge about management of avulsed tooth.<sup>13-15</sup> When asked about the emergency course of action in this case, 45.7% and 41.9% of the participants with the bachelor's degree and master's degree, respectively, chose to contact the parents and advise them to send the child to the dentists while an equal percentage of the participants, that is, 45.7% and 45.02%, respectively, chose to locate the fragment and send the child to the dentist. No significant difference was noted between the trained and untrained PETs ( $p=0.202$ ). This percentage is appreciable but still low when compared to the study by Chan et al.<sup>16</sup> where 70% of the teachers understood the need for an urgent treatment and answered to send the child to the dentist. A good percentage of correct responses in this study may be due to a well-planned training program of the PETs. On the contrary, a similar study by Abidi et al.<sup>13</sup> showed that in case of avulsed tooth, 55% of the Karachi school teachers would call the patients' parents, 33% of them look for a dentist and a hospital, and 5% would do nothing at all. In our study, the difference in

responses was not statistically significant for trained and untrained teachers as regards to the concept of emergency management ( $p=0.202$ ), urgency of management of dental trauma ( $p=0.28$ ), and the knowledge regarding what to do if the tooth has fallen on the ground before reimplantation ( $p=0.205$ ). These findings suggest that irrespective of their exposure for first aid training, the participants had little or no difference in their knowledge related to avulsed tooth management, meaning thereby that, either the first aid training sessions have least information components related to dental trauma management or the participants could not recall and apply the knowledge due to lack of periodic re-enforcement.

The actions carried out following a tooth avulsion affect its prognosis.<sup>1</sup> For case II, presenting a case of a boy who is 10-year-old and has avulsed upper front tooth, the ideal course of action should be immediate reimplantation. Only 26.9% of the trained teachers suggested for an immediate reimplantation into its socket and the results were statistically not significant between the trained and untrained teachers ( $p=0.28$ ). Similar findings were observed in the study by Chan et al.<sup>16</sup> where 17% of teachers opted for immediate reimplantation with a significant difference between trained and untrained. A few other studies reported a very low percentage of teachers opting for immediate reimplantation.<sup>6,8,14</sup>

According to studies done by Baharin et al.<sup>17</sup> and Mohandas et al.,<sup>8</sup> 33.2% and 24.4% teachers did not correctly identify the fractured tooth which was permanent incisors in a 10-year-old child. The results were in agreement with our study where also about 72% gave the wrong answer and the results were statistically significant between trained and untrained teachers ( $p=0.001$ ). The

results were in disagreement with the study done by Kaul et al.<sup>5</sup> and Lima Ludegra et al. of Brazil<sup>6</sup> where 56.7% and 60.4%, respectively, teachers correctly identified the tooth. A study by Tzigkounakis and Merglova<sup>18</sup> reported that the success of treatment of avulsed teeth depends on extra-alveolar time and storage media. As many as 48% of the participants did not know what should be the minimum duration for which the tooth can be safely kept out of the socket and only 25% participants chose to place it back immediately. When asked about the storage method for the avulsed tooth, 45% percentage of participants told to hold it in a hanky while 33% suggested putting it in a liquid and only 10% suggested placing it in the child's mouth. When confronted with the query of chosen storage liquid media, 41% of them suggested for tap water, 15% for fresh milk, and 12% for child's saliva. About 15% of participants choose disinfecting solution for placing the tooth. The findings in our study stand in sharp contrast to the findings of Mohandas et al.<sup>8</sup> where none chose to store the tooth in saliva and as high as 58.3% did not have any clue about the storage media. Toure et al.<sup>19</sup> in their study reported quite similar findings as ours. With respect to the method adopted for reimplantation of avulsed teeth 30.60% of physical education teachers said that a soiled avulsed tooth has to be washed under water which were in agreement with to respect to studies done by Chandukutty et al.<sup>20</sup> Periodic re-enforcement of the concepts should be taken up through the interactions among the resident dentists and physical education teachers.

The government should provide funding opportunities to schools to encourage these schools to hold in-house training camps for their teachers to ensure appropriate first aid to children in cases of management of tooth avulsion.

### Limitations of the Study

The main limitation of this study was that the results obtained were limited to a particular population and broad coverage of regions was not included.

### CONCLUSION

The findings in this study show that most of Chandigarh's physical education teachers had no formal training in avulsed tooth management during their training programs which led to very low knowledge of managing avulsed teeth. So, the administration, health department, and education department should take initiative to include such a training module in their curriculum. There should be periodic re-enforcement of the concepts through seminars, training modules, and conducting mock drills.

### ACKNOWLEDGMENTS

We would like to acknowledge DST Chandigarh for funding this research.

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