

Knowledge and Attitude about Emergency Management of Avulsed Tooth Amongst Paramedical Students of Visnagar, Gujarat, India: A Questionnaire-based Cross-sectional Study

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ABSTRACT

Introduction: Dental trauma has emerged as a significant aspect of dental public health. Traumatized teeth require early and appropriate treatment, which frequently relies on the competence of the dentists, doctors and nurses, who provide the primary care.

Aim: To assess the knowledge and attitude of paramedical students about the emergency management of avulsed tooth.

Materials and Methods: A cross-sectional questionnaire survey consisting of 17 questions was designed and circulated among 365 paramedical students (nursing, pharmacy and physiotherapy) of Sankalchand Patel University, Visnagar, Gujarat, India, to assess their knowledge and attitude about the emergency management of avulsed tooth. Descriptive statistics were applied by Statistical Package for Social Sciences (SPSS) software version 20.0.

Results: Total 260 (71.23%, mean age of 23 years) students responded, with 71 students from Physiotherapy, 106 from Nursing and 83 from Pharmacy. A total of 178 (68.46%) students comprehend the meaning of avulsion. While 193 (74.23%) students had knowledge that tooth re-implantation is possible. Of all the respondents, 192 students (73.84%) were familiar about the benefit of mouth guards for prevention of sports injury and 125 students (48.07%) had the opinion, that it is very important to be acquainted with emergency management of dental trauma.

Conclusion: Though the paramedical students had good understanding about tooth avulsion, they were unaware about the emergency management of the situation. This warrants the need of incorporating training programmes, dedicated to the subject in their curriculum.

Keywords: Dental trauma, Mouth guards, Questionnaire survey, Re-implantation, Tooth avulsion

INTRODUCTION

Dental avulsion comprises of 0.5-16% of all traumatic dental injuries [1]. The International Dental Traumatology Association (2012) guidelines dictates that the correct approach to a case of dental avulsion is extremely important. The choice of treatment for avulsed permanent tooth is by immediate replacement (re-implantation) of the tooth into the socket [2,3]. The success of such replantation is dependent on factors such as extra alveolar dry time, storage media in which the tooth is transported before re-implantation and viability of the Periodontal Ligament (PDL) cells on the root prior to re-implantation [4]. The prognosis for avulsed permanent tooth is not favourable if there is improper handling of the emergency situation. Literature show that the first hour forms the critical time frame at the site of accident for successful management of avulsed tooth [1]. Thus, it is important that health professionals, to know the measures to be taken in dental avulsion cases.

Emergency medical services, which operate 24 hours a day, receive many patients with dental trauma, such as avulsion. The dentist may not always be the professional who administers first aid at the accident site. Paramedics are healthcare workers, who provide clinical services to patients under the supervision of a physician, they may be the first to offer emergency primary treatment for these injuries [4]. Literature has reported that majority of non dental professionals and paramedical technicians are unaware about traumatic dental injury [4]. There appears to be paucity of published literature regarding attitude and practice of paramedical students in relation to traumatic tooth avulsion in this part of the world.

Hence, the purpose of the present study was to assess the knowledge and attitude of paramedical students, about the emergency management of avulsed tooth.

MATERIALS AND METHODS

This cross-sectional questionnaire survey was conducted in Department of Paediatric and Preventive Dentistry, Sankalchand Patel University (SPU), Visnagar, Gujarat, India, from 1st November 2021 to 15th December 2021. Ethical approval was obtained from Institutional Ethics Committee (IEC) [No.: NPDC/IEC/2021/34 dated 28/09/2021]. Permission to collect the relevant data from the students was obtained from the respective college authorities. Informed consent was obtained from the students after explaining the purpose and the procedures involved in the study.

Inclusion criteria: All the undergraduate and postgraduate students from Physiotherapy, Nursing and Pharmacy colleges of SPU, Visnagar, Gujarat, India were included in the study, irrespective of age and gender.

Exclusion criteria: Students who declined to participate in the study were excluded.

Sample size calculation: Based on the pilot study, the sample size was calculated considering confidence interval of 95% and precision of 0.05. The proportion of subjects having knowledge about the topic were considered as 20% and the sample size calculated was 256. To compensate for any missing data entry and considering the missing responses, an extra 30% was added, the sample size of 365 students was finalised.

Questionnaire

Based on the aim, a precise self-designed questionnaire was created with reference to previous literature [5,6] and managed in Google forms. It was circulated among paramedical students via the social media platform. The validation was carried out by a panel of 10 experts in the subjects. Cronbach's alpha was calculated ($\alpha=0.70$) and test-retest analysis showed a good reliability.

The Questionnaire was distributed to all the 365 students. It consisted of 17 questions divided into two sections. Section 1 consists of 4 questions for socio-demographic data and professional details of participants. While section 2 consists of eight questions to evaluate knowledge and five questions to assess attitude of the participants. The Questionnaire consisted of multiple-choice questions pertaining to training provided for avulsion, handling of the avulsed tooth and capability to manage the avulsed tooth on their own [Annexure-I]. The prepared questionnaire was circulated among the paramedical students studying in Sankalchand Patel University (SPU).

STATISTICAL ANALYSIS

The data was compiled and tabulated systematically in Microsoft Excel spreadsheet and subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) version 20.0 (IBM Corporation, SPSS Inc., Chicago, IL, USA) Descriptive statistics was employed in terms of percentages. Inferential Statistics were done using Chi-Square Test.

RESULTS

Total 260 students (47 males, 213 females) with the mean age of 23 years (Standard Deviation 1.71) participated in the study (response rate 71.23%). Out of them, 71 students were from Physiotherapy, 106 from Nursing and 83 from Pharmacy [Table/Fig-1]. A total of 178 respondents (68.48%) were aware about the correct meaning of 'avulsion' and 111 students (42.69%)

Socio-demographic details		n (%)
Gender	Male	47 (18.07)
	Female	213 (81.92)
Subject	Physiotherapy	71 (27.3)
	Nursing	106 (40.76)
	Pharmacy	83 (31.92)
Year of study	First year	28 (10.76)
	Second year	72 (27.69)
	Third year	51 (19.61)
	Fourth year	81 (31.15)
	Intern	10 (3.84)
	Postgraduate student	18 (6.92)

[Table/Fig-1]: Socio-demographic data of study participants; total N=260.

Q. No.	Questions	Options	Total N (%)	Category			p-value
				Physiotherapy	Nursing	Pharmacy	
1.	Received first aid course covering dental trauma?	Yes	64 (24.61%)	15 (5.77%)	28 (10.77%)	21 (8.08%)	0.715
		No	196 (75.38%)	56 (21.54%)	78 (30%)	62 (23.85%)	
2.	What is avulsion?	Fracture of tooth	82 (31.53%)	20 (7.69%)	29 (11.15%)	33 (12.69%)	0.147
		Complete displacement of tooth from its socket	178 (68.46%)	51 (19.61%)	77 (29.61%)	50 (19.23%)	
3.	Received information on management of avulsion?	Yes	100 (38.46%)	22 (8.46%)	45 (17.31%)	33 (12.69%)	0.294
		No	160 (61.53%)	49 (18.85%)	61 (23.46%)	50 (19.23%)	
4.	Can tooth re-implantation be done?	Yes	193 (74.23%)	55 (21.15%)	75 (28.85%)	63 (24.23%)	0.642
		No	67 (25.76%)	16 (6.15%)	31 (11.92%)	20 (7.69%)	
5.	How would you handle the avulsed tooth?	By the crown	111 (42.69%)	31 (11.92%)	39 (15%)	41 (15.77%)	0.008
		By the root	65 (25%)	11 (4.23%)	38 (14.62%)	16 (6.15%)	
		Anywhere	21 (8.07%)	4 (1.54%)	11 (4.23%)	6 (2.31%)	
		Not sure	63 (24.23%)	25 (9.62%)	18 (6.92%)	20 (7.69%)	

had knowledge that a dirty avulsed tooth should be handled by the crown. Among them, 41 (15.77%) were Pharmacy students, 39 (15%) were Nursing students and 31 (11.92%) were Physiotherapy students ($p=0.008$). Only 87 students (33.46%) chose milk as a transport medium for an avulsed tooth [Table/Fig-2].

With regards to respondents' attitude of handling the tooth at the site of a traumatically avulsed tooth, only 53 students (20.38%) preferred to replant the tooth in its socket immediately, whereas, 101 of them (38.84%) preferred to find the tooth and seek professional help. Awareness regarding time elapsed before seeking professional help for avulsed tooth was elicited in 125 (48.07%) participants and this was highest among Nursing students 62 (23.85%), followed by Pharmacy 40 (15.38%) and Physiotherapy students 23 (8.85%) and this difference was statistically significant ($p=0.005$) [Table/Fig-3].

Of all the respondents, 125 (48.07%) opined that it is very important to be acquainted with emergency management of dental trauma among which 48 (18.46%) were Pharmacy students, 40 (15.38%) were Nursing students and 37 (14.23%) were Physiotherapy students [Table/Fig-3].

DISCUSSION

A paramedic is a healthcare personnel who provides rapid response, emergency medical assessment, treatment and care out of the hospital environment. They are often one of the first healthcare professionals at the scene of an accident or emergency. The paramedic is often required to make complex and critical clinical judgment without direct supervision [4]. Thus, it is very important that they are acquainted with emergency management of traumatic tooth avulsion. Out of all students that participated in the present study, 196 (75.38%) had received some kind of first aid course covering dental trauma.

In children, sports accidents reportedly account for 10-39% of all dental injuries [7,8]. It is established that wearing of a "properly fitted mouthguard" eliminates mouth injuries during contact sports [9,10]. In the present study, 192 participants (73.84%) of the present study had knowledge about the use of mouth guard for prevention of sports injury. In the present study, most of the students (68.46%) were aware about correct meaning of avulsion. These findings were consistent with other studies conducted among paramedical students of Nigeria and paramedical staff of Uttarakhand, India [4,11]. Similar studies have been tabulated in [Table/Fig-4] [4,6,11-13].

The predominant and widely accepted treatment regimen for an avulsed tooth is to replant immediately. This tends to preserve the attachment apparatus, significantly reducing the occurrence of root resorption and prevents desiccation of the Periodontal Ligament (PDL) cells which leads to their death [14-16]. In this study, 193 students (74.23%) were aware that, it is possible to re-implant an avulsed tooth. Andersson L and Bodin I, stated that the prognosis of an avulsed tooth is mainly determined by its re-implantation time [17]. Earlier the tooth is re-implanted into the socket, better the prognosis. There is a chance of

6.	How would you transport avulsed tooth to the dentist?	Ice	47 (18.07%)	12 (4.62%)	17 (6.54%)	18 (6.92%)	0.310
		Any liquid	75 (28.84%)	24 (9.23%)	30 (11.54%)	21 (8.07%)	
		Child's mouth	26 (10%)	8 (3.07%)	13 (5%)	5 (1.92%)	
		Paper tissue or clean handkerchief	82 (31.53%)	24 (9.23%)	33 (12.69%)	25 (9.62%)	
		Plastic wrap	30 (11.53%)	3 (1.15%)	13 (5%)	14 (5.38%)	
7.	Most suitable storage medium?	Milk	87 (33.46%)	23 (8.85%)	34 (13.07%)	30 (11.54%)	0.435
		Tap water	12 (4.61%)	3 (1.15%)	6 (2.31%)	3 (1.15%)	
		Isotonic saline	38 (14.61%)	12 (4.62%)	14 (5.38%)	12 (4.62%)	
		Saliva	28 (10.76%)	9 (3.46%)	8 (3.07%)	11 (4.23%)	
		Allow the tooth to dry and cover in sterile gauze	49 (18.84%)	8 (3.07%)	28 (10.77%)	13 (5%)	
		No idea what medium to use	46 (17.69%)	16 (6.15%)	16 (6.15%)	14 (5.38%)	
8.	Have you heard of mouth guards?	Yes	192 (73.84%)	54 (20.77%)	72 (27.69%)	66 (25.38%)	0.175
		No	68 (26.15%)	17 (6.54%)	34 (13.08%)	17 (6.54%)	

[Table/Fig-2]: Knowledge based questions and their responses.

Pearson's Chi-square test; Level of significance ≤ 0.05 ; bold p-value is significant

Serial No.	Questions	Options	Total N (%)	Category			p-value
				Physiotherapy	Nursing	Pharmacy	
1.	If you are present at the site of an accident where a 12-year-old boy knocked out one of his teeth. You would:	Try and stop the bleeding	31 (11.92%)	11 (4.23%)	8 (3.07%)	12 (4.62%)	0.064
		Stop the bleeding and search for the tooth and put it back into the socket	53 (20.38%)	21 (8.08%)	17 (6.54%)	15 (5.77%)	
		Stop the bleeding, search for the tooth and call for help	101 (38.84%)	20 (7.69%)	51 (19.62%)	30 (11.54%)	
		Ignore the tooth, stop the bleeding and search for help	75 (28.84%)	19 (7.31%)	30 (11.54%)	26 (10%)	
2.	How fast do you think professional help should be sought in case of a tooth avulsion?	within 30 mins	125 (48.07%)	23 (8.85%)	62 (23.85%)	40 (15.38%)	0.005
		within few hours	61 (23.46%)	27 (10.38%)	20 (7.69%)	14 (5.38%)	
		within a day	28 (10.76%)	8 (3.08%)	11 (4.23%)	9 (3.46%)	
		No need to seek professional help, if bleeding is stopped	46 (17.69%)	13 (5%)	13 (5%)	20 (7.69%)	
3.	You found the avulsed tooth and it is dirty. What would you do?	Throw it because it is dirty	13 (5%)	4 (1.54%)	5 (1.92%)	4 (1.54%)	0.475
		Wipe the tooth with tissue paper or towel	26 (10%)	4 (1.54%)	12 (4.62%)	10 (3.85%)	
		Clean the tooth with isopropyl alcohol or soap and water and a brush	64 (24.61%)	23 (8.85%)	26 (10%)	15 (5.77%)	
		Rinse the tooth under tap water gently without scrubbing it	102 (39.23%)	24 (9.23%)	45 (17.30%)	33 (12.69%)	
		Do not know	55 (21.15%)	16 (6.15%)	18 (6.92%)	21 (8.08%)	
4.	How important do you think is the knowledge of dental trauma management in your clinical practice?	Very important/Important	125 (48.07%)	37 (14.23%)	40 (15.38%)	48 (18.46%)	0.006
		Good to know	102 (39.23%)	31 (11.92%)	50 (19.23%)	21 (8.07%)	
		Not important as I am not a dentist	16 (6.15%)	3 (1.15%)	6 (2.31%)	7 (2.69%)	
		I do not know	17 (6.53%)	0 (0%)	10 (3.85%)	7 (2.69%)	
5.	Do you feel capable of immediate management of KNOCKED OUT tooth by yourselves?	Yes	181 (69.61%)	47 (18.07%)	76 (29.23%)	58 (22.31%)	0.736
		No	79 (30.38%)	24 (9.23%)	30 (11.54%)	25 (9.62%)	

[Table/Fig-3]: Attitude based questions and their responses.

Pearson's Chi-square test; Level of significance ≤ 0.05 ; bold p-values are significant

S. No.	Name of the Author and Year of study	Place of study	No. of subjects	Population studied	Parameters assessed	Conclusion
1.	Awasthi BB and Singh S, 2015 [11]	Haldwani, Nainital, Uttarakhand	656	School teachers, paramedical staff, parents	Knowledge of avulsion	Lack of knowledge among school teachers, parents and paramedical staff though paramedical staff is better off than two other groups
2.	Yunus GY et al., 2015 [12]	Davangere, India	240	Nursing students	Knowledge, attitude, and practice towards management of Traumatic Dental Injuries (TDI)	Nursing students have a good attitude toward management of dental injuries, but lack of knowledge in regarding the storage media and time management for avulsed tooth
3.	Enabulele JE and Omo JO 2016 [4]	Nigeria	100	Paramedical students	Knowledge on traumatic tooth avulsion, and skills in selecting pre-hospital care modalities.	Paramedical students had adequate knowledge on traumatic tooth avulsion, but had inadequate knowledge and skills on pre-hospital care.
4.	Joybell CC et al., 2019 [13]	Kancheepuram, Tamil Nadu	100	Employees working in emergency ambulance services	Knowledge, awareness, and attitude towards traumatic dental injuries	There is lack of proper knowledge on emergency management of dental trauma among the employees, there was willingness among them to gain knowledge
5.	Aras A and Dogan M, 2020 [6]	Turkey	389	Emergency Medical Technicians (EMTs) and paramedics	Training received about TDI, knowledge levels about the issue.	EMTs and paramedics did not have a sufficient level of knowledge about the TDI
6.	Present Study	Visnagar, Gujarat, India	260	Paramedical students	Knowledge and attitude about the emergency management of avulsed tooth.	Participants had basic understanding about tooth avulsion but lack information for the emergency management.

[Table/Fig-4]: Global perspective of comparative literature [4,6,11-13].

cemental/periodontal ligament healing when extra alveolar dry time is less than 30 minutes and extra alveolar total time is less than 90 minutes when stored in an appropriate storage medium [18]. In present study, almost 1/2 (48.07%) of them had awareness that professional help should be sought within 30 minutes of tooth avulsion. A total of 30% of the nursing students responded that the critical time for replantation to be within 20 min in a study done by Yunus GY et al., in 2015 [12].

Immediate re-implantation is sometimes not practical; hence, tooth has to be transported in a liquid medium [15,16]. The most suitable transport media is the Hank's Balanced Salt Solution (HBSS) which provides extraoral time of eight hours [1]. Other transport media are viaspan, milk, normal saline, saliva and coconut water [1,14]. If an avulsed tooth is stored in milk, its prognosis would be enhanced after implantation [19-21]. The composition and osmolarity of milk render it favourable for preservation of PDL cells. Hence, it is often recommended for transportation of avulsed tooth, as it is readily available and preserves cell viability for upto two hours [1]. Saliva is the last alternative when there is unavailability of other media. Andreasen JO et al., elucidated that due to the shortcomings of saliva like hypotonic nature and bacterial content, the role of saliva as a transport media is limited to a maximum of two hours [1].

In present study, 33.46% of paramedical students knew that milk is one of the suitable transport media for an avulsed tooth whereas Hugar SM et al., in their study concluded that only 2.2% nurses demonstrated this knowledge [22]. Other media considered by participants of the current study were isotonic saline (14.61%) and saliva (10.76%). According to the Nursing students at Davangere (30%), saliva is the most preferable storage media for avulsed tooth, which is similar to the knowledge of dental assistants of Riyadh [12,23]. Overall, 125 students (48.07%) believed that it is important to be acquainted with emergency handling of dental trauma. Although the paramedical students had fair knowledge about tooth avulsion, they were untutored regarding the emergency management. Therefore, it is necessary to provide education programs concerning traumatic dental injuries, especially tooth avulsion, for paramedical students and staff.

Limitation(s)

The convenience sampling methodology adapted, limited the study population to this university, thus, the results of present survey cannot be generalised to the other paramedical students. A state-wide survey, would provide a better overall perspective for implementation of awareness programmes.

CONCLUSION(S)

Since, the paramedics had good understanding of tooth avulsion but were unaware about the emergency management of the same, hence, training programmes dedicated to dental trauma must be incorporated in the curriculum of paramedics. Additionally, clinical postings in dental teaching set-ups would provide practical exposure to deal with dental trauma.

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ANNEXURE-I

Questionnaire

Knowledge and Attitude about Emergency Management of Avulsed Tooth Amongst Paramedical Students: a Questionnaire Based Study

*Required

1. Email *

2. Select your subject *

Mark only one oval.

 Physiotherapy Nursing Pharmacy Other:

3. Year of study *

Mark only one oval.

 1 2 3 4 Intern Postgraduate Student

4. Gender *

Mark only one oval.

 Male Female Other:

5. Did you have any first aid course covering dental trauma? *

Mark only one oval.

 Yes No

6. What is Avulsion? *

Mark only one oval.

 Fracture of tooth Complete displacement of tooth from its socket

7. Have you received any information on what to do if a tooth is avulsed(knocked out)? *

Mark only one oval.

 yes No

8. Can tooth re-implantation be done? *

Mark only one oval.

 yes No

9. If you are present at the site of an accident where a 12-year old boy knocked out one of his tooth. You would: *

Mark only one oval.

 Try and stop the bleeding Stop the bleeding and search for the tooth and put it back into the socket Stop the bleeding, search for the tooth and call for help Ignore the tooth, stop the bleeding and search for help

10. How fast do you think professional help should be sought in case of a tooth avulsion? *

Mark only one oval.

 within 30 mins within few hours within a day No need to seek professional help if bleeding is stopped

11. You found the avulsed tooth and it is dirty. What would you do? *

Mark only one oval.

 Throw it because it is dirty Wipe the tooth with tissue paper or towel Clean the tooth with isopropyl alcohol or soap and water and a brush Rinse the tooth under tap water gently without scrubbing it Do not know

12. If you find an avulsed tooth, how would you handle the tooth? *

Mark only one oval.

 By the crown By the root Anywhere Not sure

13. If you did not replant (put back) the tooth, how would you transport it to the dentist? *

Mark only one oval.

 Ice Any Liquid Child's mouth Paper tissue or clean handkerchief Plastic wrap

14. What would be the most suitable medium for storage? *

Mark only one oval.

 Milk Tap Water Isotonic saline Saliva Allow the tooth to dry and cover in sterile gauze No idea what medium to use

15. Have you heard of mouth guards used for prevention of sports injury? *

Mark only one oval.

 Yes No

16. How important do you think is the knowledge of dental trauma management in your clinical practice? *

Mark only one oval.

 very important/important Good to know Not important as I am not a dentist I do not know

17. Do you feel capable of immediate management of KNOCKED OUT tooth by yourselves? *

Mark only one oval.

 Yes No