

**AWARENESS AMONG DENTAL PRACTITIONERS ABOUT MANAGEMENT OF AN
AVULSED TOOTH: A QUESTIONNAIRE SURVEY****Dr. Nilabja Roy*¹, Dr. Amitabha Chakraborty², Dr. Bibhas Dey³, Dr. Sinjana Jana⁴ and Dr. Debasis Jana⁵**¹B.D.S, Final Year PGT, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.²B.D.S, M.D.S, Professor and Head, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.³B.D.S, M.D.S, Professor, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.⁴B.D.S, M.D.S, Associate Professor, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.⁵B.D.S, 2ND Year PGT, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.***Corresponding Author: Dr. Nilabja Roy**

B.D.S, Final Year PGT, Department of Pediatrics and Preventive Dentistry, Haldia Institute of Dental Sciences and Research.

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ABSTRACT

Objectives (stating the main purposes and research question): *The aim of this survey was to investigate the knowledge among general practitioner dentists about the emergency management of an avulsed tooth.* **Materials and Methods:** *A 21-itemed questionnaire was prepared related to the demographic and knowledge-based data concerning dental trauma, preliminary management, diagnosis and treatment of an avulsed tooth, and was distributed among the general dentists in Haldia and Kolkata.* **Results:** *It was seen that there is an uneven pattern of knowledge about avulsion among general dentists.* **Conclusions:** *There is a need for improving the knowledge regarding trauma according to the current guidelines for emergency treatment among the general dentists which can be done by conducting awareness program in order to improve the understanding about storage, transport and treatment of avulsed tooth among common people and dental practitioners.* **Clinical Relevance:** *Avulsion of permanent tooth is one of the most serious dental traumatic injuries. An avulsed tooth is a term used by dentists to describe a tooth that has been knocked out of its socket. Prompt and correct emergency management is essential for attaining the best outcome for an avulsed tooth. Management of traumatic injuries sometimes present themselves as a challenge to a non-specialized dentist, as they may occur when the dentist is least prepared for it.*

INTRODUCTION

Avulsed tooth (ex-articulation, total luxation) means total displacement of the tooth out of its socket. Now-a-days the incidence of accidents associated with traumatic dental injuries has increased. The incidence of dental trauma as a result of falls, bicycle accidents, skateboards and other sports activities is higher in children and adolescents and maxillary incisors are the teeth most commonly affected.^[1-4] More than 30% of accidents occur at home and about 25% occur in school.^[2] Overjet, maxillary incisor exposure and inter-labial gap are predisposing factors that increase the risk of trauma-associated dental injuries.^[5,6]

Avulsed teeth represent about 16% of all types dental injuries.^[1] When a tooth is avulsed, pervasive injury to the pulpal and the periodontal tissues come about problems such as pulpal necrosis, periapical inflammation and root resorption. Replacement root resorption is the most frequent complication associated

with replanted avulsed teeth.^[1] Extra-alveolar dry time and the storage media used to transport the tooth are critical factors for successful and long-term outcomes.^[7-9] Treatment is often complex, time-consuming, and expensive and requires multidisciplinary approaches such as endodontic and periodontal treatment, surgery, orthodontic movements and esthetic coronal restoration.^[1,10,11] Replantation-associated root resorption can often result in complications such as infra-occlusion leading to poor esthetics, tilting of adjacent teeth, loss of function and eventually loss of the affected teeth.^[1,10] The benefit of tooth replantation in such cases is mainly the time gained to establish an optimal permanent treatment plan and preservation of the width of the alveolar bone.

Recently, the guidelines suggested by the American Association of Endodontists (AAE) and the International Association of Dental Traumatology (IADT) for treatment of avulsed teeth have been updated, with

significant changes from previous versions.^[12,13] It is expected that dental practitioners be familiar with these recommendations in order to provide the most effective treatment for their patients and to take part in the education of their communities.

As dental professionals having a primary role in treating dental traumas, the purpose of this study was to assess their knowledge of the new guidelines for emergency treatment of avulsed teeth. In doing so, associations between knowledge of recommended treatment modalities for an avulsed tooth will be explored.

MATERIAL AND METHODS

A 24-item questionnaire was distributed among the dental practitioners around Haldia and Kolkata via google form. The questionnaire included seven items on practice and demographics and seventeen multiple-choice questions regarding dental trauma background and knowledge. Over a period of 4 months, "24" questionnaires were distributed. Questionnaires were individually distributed and confidentiality was assured, as participants were not required to give their names or any other identifying information.

Participation was voluntary and data obtained from returned questionnaires were entered into an SPSS database and statistically analyzed using the independent t test and one way ANOVA was used for the comparisons between the groups. The p value ≤ 0.05 was considered as statistically significant.

Clinician's details

- Email address-
- Qualification – Graduate/ Post Graduate
- If any then in which branch of dentistry?
- Type of practice- Generalized/specialized
- Whether attached to any institute? Yes / No
- If any then which type of institute? Private sector / public sector / academic institution
- How many years of clinical practice experiences do you have?
0-5 years / 5-10 years / 10-5 yeas / >15 years

Questionnaire

- Have you undergone any course/training about the Management of Dental Trauma? Yes / No
- Have you come across any case about avulsed tooth in your clinical practice? Yes/ No
- Which one according to you is the best transport medium for an avulsed tooth?
- Inside the oral cavity (in saliva) / Water / Physiologic saline solution / cold milk / coconut water / HBSS
- In which medium, patients do generally bring the avulsed tooth to your clinic?
In dried state / inside the oral cavity (in saliva) / water / physiologic saline solution / cold milk / coconut water / HBSS

- Can an avulsed tooth be saved, what is your opinion? Yes / No

- If yes

It must be a primary tooth / it must be a permanent tooth / Both of them can be saved / not aware

- If no

There is no way to save the tooth as it will come out anyway / there is risk of infection in the alveolar socket / not aware

- What is your opinion about the importance of extra oral time for the success of re-implantation?

Re-implantation should be done; within 30 minutes of avulsion / within 1 hour of avulsion / within 6 hours of avulsion / within 24 hours of avulsion / not aware.

- If you found the avulsed tooth to be dirty, what will you do?

Wipe the tooth with a tissue paper / scrub the tooth with a tooth brush / rinse the tooth under running tap water / rinse the tooth with normal saline / no need to clean as the tooth can't be re-implanted / rinse it with chlorhexidine or other antiseptic solution

- Should endodontic treatment be done before re-implantation of the avulsed tooth?

It depends on how long the tooth was out of socket and its root formation stage / immediate root canal treatment should be done before re-implantation / immediate pulp extirpation and calcium hydroxide placement before re-implantation

- Which has better prognosis according to you?
Closed apex / open apex / not aware.

- What type of splinting would you prefer after re-implantation of the tooth into the socket?

Semi rigid nylon wire / stainless steel wire / composite splinting / titanium trauma splint / none

- What should be the ideal splinting time for a avulsed tooth according to you?

7-10 days / 15-20 days / 25-30 days / >60 days

- Would you prefer to soak the avulsed tooth in any antibiotic solution prior to re-implantation? Yes / No

- If yes then which antibiotic solution would prefer to use

Doxycycline / minocycline / amoxicillin

- Do you advise administration of Tetanus Toxoid (TT) to the patient undergone injury? Yes / No

RESULTS

Frequency of responses is reported as a percentage of the total number of respondents for each question, and a percentage within groups is also provided. Of the 623 participants, 552 were completed and returned. Of these, 363 participants (65.8%) were graduate and 189 participants (34.2%) were post graduate. 412 participants out of 552 participants do generalized dental practice and rest of them do specialized practice in their own field. But when we come about the years of experiences majority 94.9% have their experience of less than or upto 5 years and only 1.3% participants have an experience of greater than 15 years (table 1).

A. CLINICIAN'S DETAILS

Table 1: Distribution of Clinician's details.

Clinician's details		N	%
Qualification	Graduate	363	65.8
	Postgraduate	189	34.2
Type of practice	Generalized	412	74.6
	Specialized	140	25.4
Whether attached to any institute	Yes	308	55.8
	No	244	44.2
Type of institute	Private sector	272	49.3
	Public sector	105	19.0
	Academic institution	175	31.7
Experience	0-5 years	524	94.9
	5-10 years	21	3.8
	10-15 years	0	0.0
	>15 years	7	1.3

In the next part of the questionnaire in response of the first question 21.6% participants responded "yes" as they undergone training about management of avulsed tooth

rest of them responded "no" (table 2). But in day to day clinical practice 67.7% practitioner faces cases of avulsed tooth (table 3).

Table 2: Distribution of responses to the Question 1.

Questions	Responses	N	%
Have you undergone any course/training about the Management of Dental Trauma?	Yes	119	21.6
	No	433	78.4

Table 3: Distribution of responses to the Question 2.

Questions	Responses	N	%
Have you come across any case about avulsed tooth in your clinical practice?	Yes	364	67.7
	No	174	32.3

55.5% participants choose Hank's balanced salt solution (HBSS) as the best storage medium for avulsed tooth, after that 28.4% choose inside the oral cavity (in saliva)

and respectively in a decreasing manner cold milk (10.6%) > water (4.1%) > physiologic saline solution (1.4%) > coconut water (0%) is chosen (figure 1).

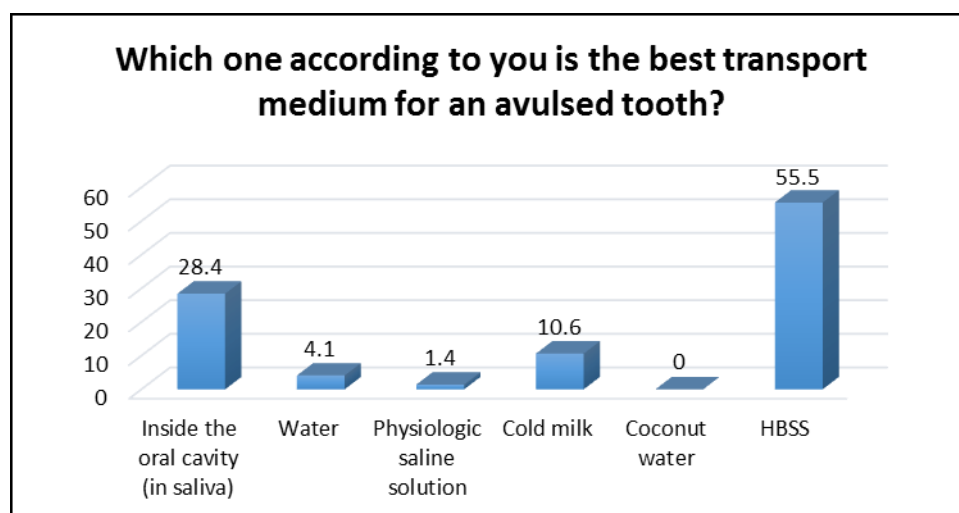


Figure 1

But a different result is seen in the question of "In which medium, patients do generally bring the avulsed tooth to your clinic?" "here 45.7% stated that usually patient bring the avulsed tooth in dried condition, 23.7% stated usually patient use normal water as storage media, 18.1%

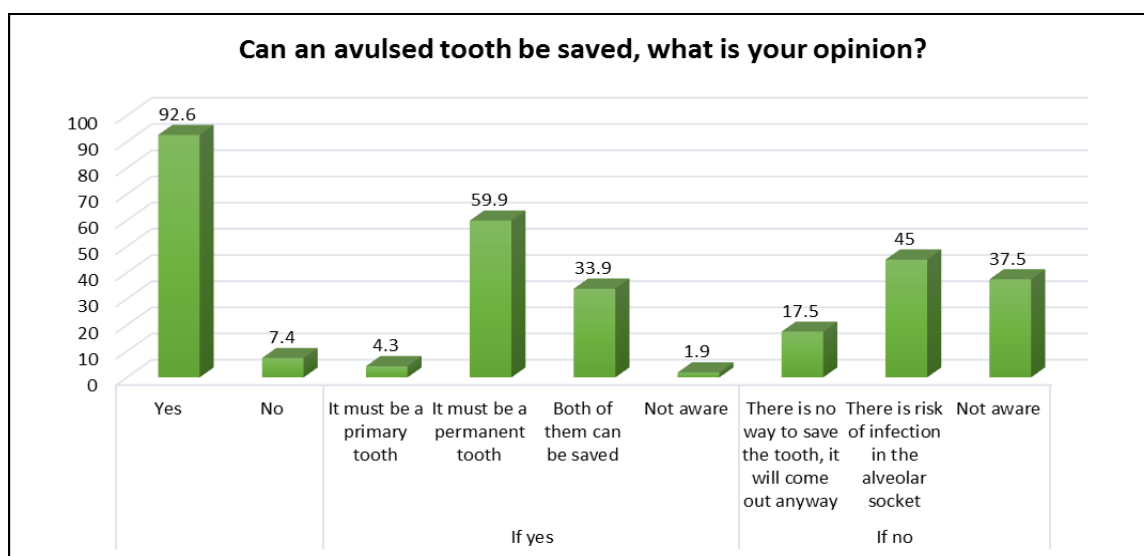
experienced that patient bring the tooth in their mouth, and other participant's experience recorded in a decreasing order respectively cold milk (9.7%) > HBSS (1.4%) > physiologic saline solution (1.4%) > and coconut water (0%) (table 4).

Table 4: Distribution of responses to the Question 4.

Questions	Responses	N	%
In which medium, patients do generally bring the avulsed tooth to your clinic?	In dried state	230	45.7
	Inside the oral cavity (in saliva)	91	18.1
	Water	119	23.7
	Physiologic saline solution	7	1.4
	Cold milk	49	9.7
	Coconut water	0	0.0
	HBSS	7	1.4

92.6% of the participants agreed that an avulsed tooth can be saved only 7.4% stated that avulsed tooth cannot be saved. Among the 92.6% participants, 59.9% participants stated that the tooth has to be a permanent one, 33.9% stated that both permanent and deciduous

avulsed tooth can be saved, only 4.3% stated that the tooth must be a deciduous one. Among 7.4% participants 17.5% participants stated that the avulsed tooth will come out again at any way, 45% participants stated that there is risk of infection in the alveolar socket (figure 2).

**Figure 2**

In the question of “What is your opinion about the importance of extra oral time for the success of re-implantation?” 46.7% answered that re-implantation should be done; within 30 minutes of avulsion and

46.6% stated that re-implantation should be done; within 1 hour of avulsion some of the participants 4% stated that re-implantation should be done; within 6 hours of avulsion (table 5).

Table 5: Distribution of responses to the Question 6.

Questions	Responses	N	%
What is your opinion about the importance of extra oral time for the success of re-implantation?	Re-implantation should be done; within 30 minutes of avulsion	245	46.7
	Re-implantation should be done; within 1 hour of avulsion	244	46.6
	Re-implantation should be done; within 6 hours of avulsion	21	4.0
	Re-implantation should be done; within 24 hours of avulsion	0	0.0
	Not aware	14	2.7

Majority of the participants 49.3% stated that they will use normal saline for rinsing the dirty avulsed tooth 29.6% choose the option to rinse with chlorhexidine and 19.7% choose the option to rinse with normal running tap water (table 6).

Table 6: Distribution of responses to the Question 7.

Questions	Responses	N	%
If you find the avulsed tooth to be dirty, what will you do?	Wipe the tooth with a tissue paper	0	0.0
	scrub the tooth with a tooth brush	0	0.0
	rinse the tooth under running tap water	98	19.7
	rinse the tooth with normal saline	245	49.3
	no need to clean as the tooth can't be re-implanted	7	1.4
	rinse it with chlorhexidine or other antiseptic solution	147	29.6

According to 54.1% participants closed apex avulsed tooth has better prognosis than open apex one (32%) (figure 3).

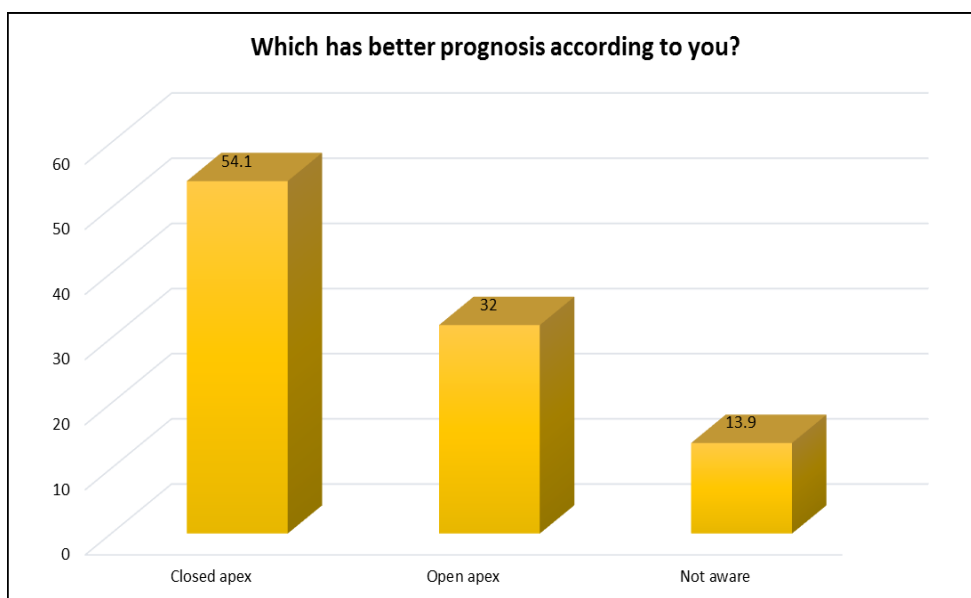


Figure 3

73.6% participants according to them endodontic treatment in the avulsed tooth depends on how long the tooth was out of socket and its root formation stage. 19.5% participants believed that immediate root canal

treatment should be done before re-implantation and only 6.9% participants stated that immediate pulp extirpation and calcium hydroxide placement should be done before re-implantation (figure 4).

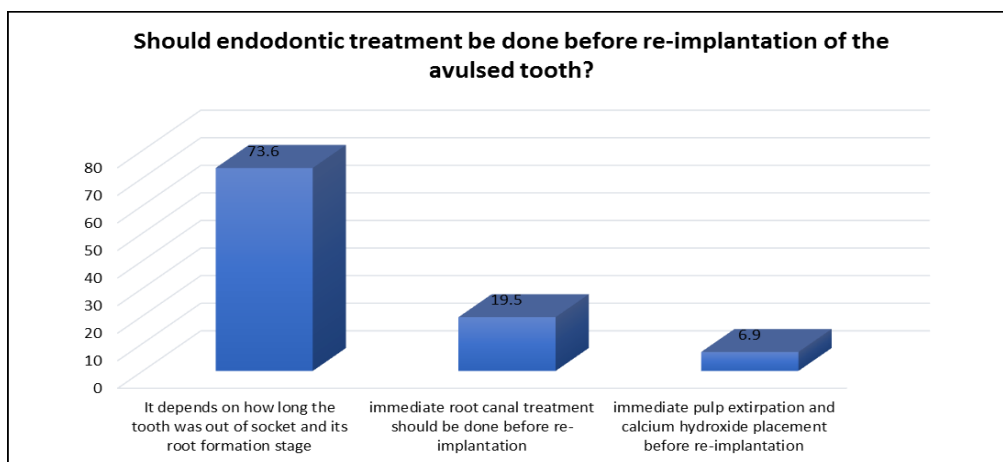


Figure 4

42.1% participants have preference of composite splint then 33.4% voted for the semi rigid nylon wire and respectively 14.5% for stainless steel wire, and 7.1% voted for titanium trauma splint to use as a splinting material in avulsion (table 7). Majority of the participants 43.9% stated that according to them 7-10 days should be

the ideal time for splinting and in a decreasing way the other responses and the percentages are respectively 15-20 days (35.7%) > 25-30 days (17.8%) > greater than 60 days (2.6%) (Table 8).

Table 7: Distribution of responses to the Question 10.

Questions	Responses	N	%
What type of splinting would you prefer after re-implantation of the tooth into the socket?	Semi rigid nylon wire	161	33.4
	Stainless steel wire	70	14.5
	Composite splinting	203	42.1
	Titanium trauma splint	34	7.1
	None	14	2.9

Table 8. Distribution of responses to the Question 11.

Questions	Responses	N	%
What should be the ideal splinting time for an avulsed tooth according to you?	7-10 days	224	43.9
	15-20 days	182	35.7
	25-30 days	91	17.8
	>60 days	13	2.6

Majority of the participants 84.3% stated that they would prefer to soak the avulsed tooth in antibiotic solution before re-implantation among them 71.4% prefer doxycycline, 11.9% prefer minocycline and 16.7% prefer

amoxicillin for the solution (figure 5). According to 15.7% participants there is no need to soak the avulsed tooth in antibiotic solution.

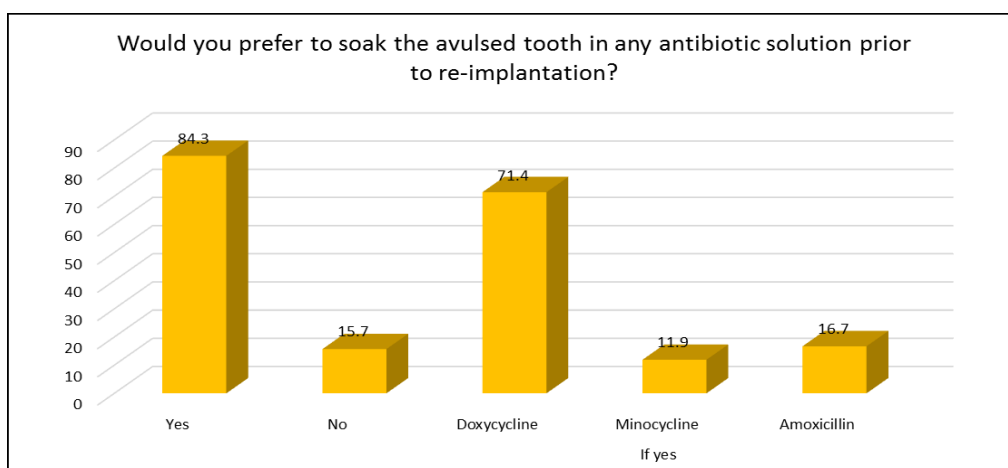


Figure 5

84.9% participant’s opinion is Tetanus toxoid should be administered to the patient undergone injury and 15.1% participants is not willing to do that (figure 6).

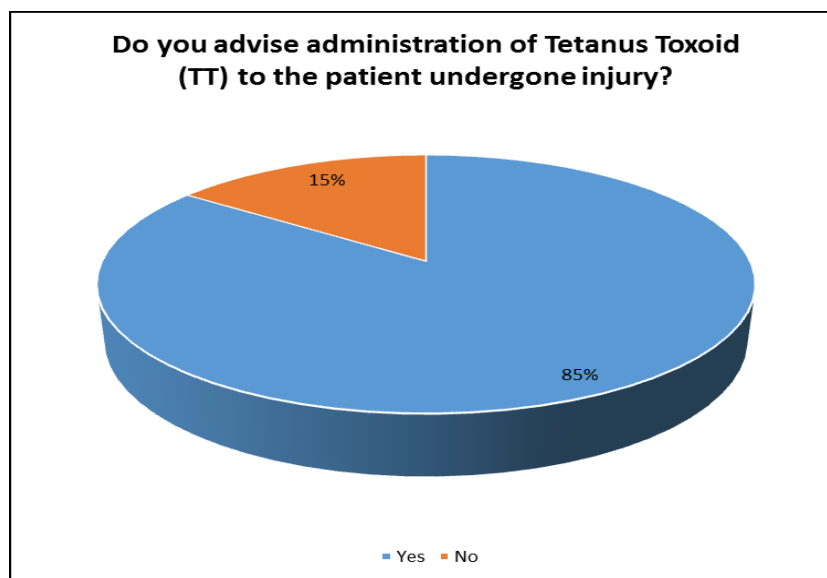


Figure 6

DISCUSSION

For the treatment of avulsed teeth it is required to assist and support dentists, in delivering the best care possible and in the most efficient manner. In addition, knowledge about the appropriate treatment plan can reduce stress and anxiety for both patients and the dental team. Therefore, it is important to promote awareness and up-to-date information among general dentist about risk regarding prevention and emergency treatment modalities. Correct application of these techniques immediately after the traumatic injury should improve both short- and long-term outcomes.

The results of this study revealed an uneven pattern of knowledge among the participating general dentists regarding the emergency management of an avulsed tooth. In our study majority of participants reported that they would not replant an avulsed primary tooth. This response is in accordance with the current guidelines and recommendations of the IADT.^[13] This also agree with the findings of Stokes et al. by whom it was reported that 83% of dentists unwilling to replant primary teeth.^[15] When the situation is about the permanent teeth, most participants in this study responded that they would replant an avulsed permanent tooth in every case, but this approach contradict the recommended guideline by the AAE and IADT.^[12,13] It has been stated that avulsed teeth presenting extensive caries, or severe root damage, should not be replanted. It is also recommended not to re-implant teeth with open apices that remained in dry conditions for more than 1 h.^[13] Almost 90% of our participants responded that they re-implant a permanent tooth in every cases. Other studies showed even a higher tendency for dentists to replant a permanent tooth in every cases.^[15] It looks like the tendency of general dentists to save teeth at any cost may have increased their willingness to re-implant teeth in every cases.

The majority of participants, were aware of the urgency to seek help as soon as possible, within 30 min of the accident and about the same percentage of the participants choose the option that the avulsed tooth should be re-implanted within 1 hour. The similar findings is also reported in other studies^[15,16] and with the current recommended guidelines of the AAE and IADT.^[12,13] It is well established that if periodontal ligament vitality is preserved and unnecessary additional damage is avoided to the root, it will enhance the prognosis of the re-implanted tooth.^[7-9]

Although, placing the avulsed tooth in fresh cold milk or HBSS may be a good option for transporting the tooth from the site of injury to the dental office, the current guidelines clearly recommend that, whenever possible, the avulsed tooth should be replanted back into its socket as soon as possible to avoid dehydration of the root surface, which starts to happen in a matter of a few minutes.^[12,13] The majority of the participants choose HBSS as the best transport media but as per the new guideline the preferences of transport media should be

milk, HBSS, saliva (after splitting into a glass for instance), or saline then water (as it is better than leaving the tooth to air-dry) in a decreasing order. But according to our participants patients bring the avulsed tooth in dried condition most of the time, which makes re-implantation impossible.

The majority of our study participants followed the recommended guidelines for treatment of the avulsed tooth in case it has fallen onto the ground. In such cases, a gentle wash of the contaminated surface with water is recommended prior to replantation. Most of the participants in this study choose normal saline to rinse the avulsed tooth, after that chlorhexidine is the second preference among our participants which is very much similar to the present guideline. According to our most of the participants the endodontic treatment of the avulsed tooth depends on how long the tooth was out of socket and its root formation stage but according to the guideline Root canal treatment should be carried out within 2 weeks if needed in closed apex tooth and revascularization of the pulp space, which can lead to further root development and maturation, is the goal when replanting immature teeth in children. But if spontaneous revascularization does not occur, apexification, pulp revitalization/revascularization, or root canal treatment should be initiated as soon as pulp necrosis and infection is identified in open apex cases.

As per guideline passive and flexible wire of a diameter up to 0.016" or 0.4 mm^[17] or alternatively, nylon fishing line (0.13-0.25 mm) can be used to create a semi-rigid splint and time of splinting will be 2 weeks or in cases of associated alveolar or jawbone fracture, a more rigid splint is indicated and should be left for about 4 weeks. In our study majority of the participants prefer wire composite splinting or nylon splinting and choose the time period of 7-10 days which will more or less same as the modern guideline.

As per the protocol the effect of topical antibiotics placed on the root surface prior to replantation with respect to pulp revascularization remains controversial.^[18,19] While animal studies have shown great potential^[20-22], human studies have failed to demonstrate improved pulp revascularization when teeth are soaked in topical antibiotics.^[23] Therefore, a specific antibiotic, duration of use, or methods of application cannot be recommended based on human studies. But in our study almost all the participants sated that they will prefer to soak the avulsed tooth in an antibiotic solution before re-implantation, and most of them choose Doxycycline for the suitable solution.

In our study majority of our participants voted "yes" as according to them Tetanus Toxoid (TT) should be administered to the patient undergone injury. But according to the guideline TT is not always require if patient already received boosters.

In our study we can see that most of our participants are graduate and they are doing generalized practice and having experience of near about five years. Although they have come across cases of avulsed tooth in their clinic frequently but only few of them undergone any courses or training about the management of avulsed tooth.

CONCLUSION

In conclusion, there is a need to improve and update the knowledge of dental practitioners in the current guidelines for emergency treatment of avulsed teeth. Knowledge improvement is mandatory as such injuries present multiple challenges for the dentist as well as complications to the patient that can result in life-long, time-consuming and costly treatments and maintenance. There were several limitations to this descriptive study, including the use of a convenience sample and lack of a control group. More studies are needed in near future for a concrete result. More awareness program and campaign needed to improve knowledge about the treatment plan of avulsed tooth, which will help dentist and also other people to get better treatment for the avulsed tooth.

Compliance with Ethical Standards

Conflict of Interest: None

Funding: None

Ethical Approval: Not Needed

Informed Consent: Not Needed

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