



Knowledge Awareness among the General Public on Dental Avulsion - A Questionnaire-Based Survey

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Introduction:

Injuries to the orofacial region as a result of trauma are more common among school-going children that affect either primary dentition, permanent dentition, or both ¹. Several studies estimated over 50% have experienced trauma to the permanent dentition involving anterior teeth with the most common being the crown fracture followed by luxation injuries ^{2,3}. Anterior dentition are not only important for aesthetic reasons but are also essential for chewing, speech, phonetics, maintaining integrity of supporting tissues, and also for psychological well-being of an individual ⁴. These luxation injuries most frequently occur in primary teeth due to soft, immature alveolar bone and affect the surrounding structures at young ages between one to three years ^{5,6}.

Avulsion is the complete displacement of an entire tooth away from its alveolar socket due to accidental or non-accidental injury that represents 0.5-16% of cases in relation to anterior region traumas with greatest functional and esthetic impairment due to its poor prognosis with the peak incidence between 7- to 11-years and the maxillary central incisors being the most affected ^{7,8}. Immediate replantation of the avulsed tooth is the best treatment of choice, with 85-97% success rates. There are contraindications of replanting the avulsed tooth in situations, such as severe carious tooth, severe periodontal disease, extremely uncooperative child, and medical conditions. However the clinical outcome of the avulsed teeth requires knowledge of dealing with such emergencies and proper preservation of avulsed teeth before visiting the dentist ^{1-4,8,9}.

Management and prognosis of avulsed teeth present a challenge that largely depends on several factors such as depth of injury, type of injury, extra-oral time, duration and type of storage media and stage of tooth/root development ¹⁰⁻¹². Several studies carried out among school teachers, parents, dental practitioners and dental students have shown inadequate awareness towards the management of patients with traumatic dental injuries and the need for general public campaigns, vigorous training session, and programs both at the school and community level to save and preserve the natural primary/permanent tooth rather than replacing with an artificial one ¹³⁻¹⁵. Thus the present survey was carried out to assess awareness among the general public about dental avulsion, how the dislodged tooth can be preserved and saved and also to evaluate the existing awareness levels based on their personal experience.

Materials and methods:

A cross-sectional questionnaire-based assessment survey was carried out amongst the general population across Chennai, Tamilnadu to assess the knowledge among the general population on avulsion of the tooth and also to evaluate the existing awareness levels based on their personal experience. After obtaining the Ethical clearance, the prerequisite information was collected and fifteen relevant questions were prepared using available evidence-based literature pertaining to the present study. The self-administered questionnaire evaluated among the study participants had few selected responses to specific questions along with a few close-ended questions (Yes/ No/ don't know) in English language. Since this study was carried out during the COVID-19 Pandemic situation, online Google forms were generated and distributed through various social media platforms.

Statistical assessment:

Non-probability, random sampling method was preferred that provide information from 274 individuals belonging to the general population (Public) were taken into this cross-sectional observational study. Responses recorded were evaluated using SPSS (Statistical Package for the Social Sciences V22.0 Illinois, Chicago) software Version 22.0. The internal consistency of the questionnaire was adequate. All the study respondents were instructed about the purpose of the study and pre-filled online consent was obtained before the survey through Google forms and guaranteed that their participation was purely voluntary. On statistical evaluation it was observed all 274 samples were valid for the study with Cronbach's alpha reliability score being **0.829** (Significant score).

Results:

On analysis of the given data the mean age of the study population was observed as 38.255 ± 12.741 years (mean \pm S.D) with 1.515 at 95% confidence level comprising of 178 (64.96%) male and 96 (35.04%) female participants. Among the study participants 37.59% had experienced dental trauma or dental/tooth-related injuries in the past predominantly with 19.71% being fractured teeth followed by avulsed or dislodged teeth (6.93%). 65.69% have seen individuals with dental trauma or dental/tooth-related injuries in the past predominantly being fractured tooth about 31.75% followed by avulsed or dislodged tooth (16.06%). More than half of the study participants (64.60%) consider front tooth are more prone to get affected by dental avulsion/tooth dislodgement.

72.63% participants were aware and agree that an avulsed/dislodged tooth can be positioned back and saved by the dentist, if treated immediately among which 54.74% prefers cleaning the dislodged/avulsed tooth under running tap water followed by carrying it using a proper storage medium to ensure appropriate treatment (81.02%) or by preserving the tooth maximum of 1 hour (33.21%), 20 minutes (23.72%) with least being 1 day (20.44%) respectively.

37.96% study participants recommend HBSS storage medium followed by tap water (17.52%) and milk (16.42%) for an avulsed (dislodged) tooth that may help in protection against bacteria & viruses (59.12%) and/or prevents cell damage (28.47%) depending on external storage time and characteristics of storage medium (59.85%). 31.75% were unaware of the post-treatment management/Healing period while 33.58% believe 3-4 weeks as an ideal healing period to ensure complete recovery.

(Table 1) (Table 2)

Discussion:

The present questionnaire-based study was carried out among the general population showed 72.6% were aware and agreed that an avulsed/dislodged tooth can be positioned back (replantation) and saved by the dentist if treated immediately, which was similar to studies by Mustafa M⁴, Al-Zubair NM¹⁶ while contrasting to studies by Prathyusha P et al¹, Almulhim B², Zakirulla M et al¹³, Toure B et al¹⁴, Lin S et al¹⁷, and Ali FM et al¹⁸ carried among school teachers at various education levels across the world indicating the lack of orientation programs, campaigns regarding avulsion of tooth among the different study population. Zakirulla M et al¹³ and Pagliarin et al¹⁵ also stated that lower rates of replantation management may be attributed to a panic environment, fear, unfamiliarity, pain, possible bleeding, soft tissue lacerations, and lacked adequate skill or expertise. On the other hand the difference might be due to the belief that primary tooth may eventually fall hence does not require replantation, and permanent teeth will occupy their position after tooth development^{2, 13, 15}

The AAPD guidelines for the management of avulsed teeth recommends an immediate replantation of a tooth within 5 minutes to obtain the best clinical outcome. However if the tooth cannot be replanted, it should be stored in a medium like Hank's Balanced Salt Solution (HBSS), saline, saliva and cold milk that will help maintain the vitality of the periodontal ligament fibers^{3, 19}. In the present study 37.96% study participants recommend HBSS storage medium followed by tap water (17.52%) and milk (16.42%) for an avulsed (dislodged) tooth comparatively higher than studies by Prathyusha P et al (40.7% preferred water and 22.8% milk)¹, Almulhim B (19.7% water, 11.9% milk)², Zakirulla et al (46% water and 28% milk)¹³, and Toure et al (40.8% opted water, 21.9% milk)¹⁴, Prathyusha P et al¹, Poornima P et al¹¹ and Trope M²⁰ also recommended milk as the most desirable, household, easily available media that are not harmful to periodontal cells free of bacterial contamination. Thus appropriate biological media for storage of an avulsed tooth until the replantation keeps the integrity of the periodontal ligament cells, decrease the inflammatory reaction, and inhibit complications such as root resorption or ankylosis.

54.74% prefer cleaning the dislodged/avulsed tooth under running tap water. Similar results were observed with using tap water or cloth/paper for cleaning the dislodged/avulsed tooth in studies by Prathyusha P et al¹, Mustafa M⁴, Pagliarin CL et al¹⁵, Al-Zubair NM¹⁶ reflecting the fact that the majority of the respondents are not aware of proper handling of these avulsed teeth as it may damage/destroy the periodontal fibers thus compromising the integrity and viability of fibers resulting in loss of tooth sustainability. It is well known that the defining factors for a favorable prognosis of replantation of avulsed tooth are minimal time of the avulsed tooth outside the socket, the storage and transportation medium of the avulsed tooth, and also minimal handling of the root surface and the periodontal ligament^{4-6, 21, 22}.

In the present study a contrasting opinion among the participants regarding the ideal time of 1 hour (33.21%), 20 minutes (23.72%) with least being 1 day (20.44%) respectively for preservation and replanting the tooth was observed. 31.75% were unaware of the post-treatment management/healing period while 33.58% believed that 3-4 weeks as an ideal healing period to ensure complete recovery. According to Prathyusha P et al¹, Andreason JO⁹, teeth that are replanted within 30 minutes preserved with an appropriate storage medium have a better success rate than those with longer extra-oral duration. Even though there is a lack of knowledge regarding post-treatment management of avulsed tooth, respondents were aware of referring the child to the dentist as early as possible nonetheless it is essential to provide sufficient knowledge to the general population on storage media and its characteristics, method of handling the avulsed tooth, importance of external storage time and preservation/replacing the tooth, and especially, on the various management guidelines for both primary and permanent teeth.

Conclusion:

Within the limitations of the study, though the majority of the study participants were aware of avulsed or dislodged teeth based on their personal experience however insufficient knowledge was observed regarding the importance of tooth preservation, storage medium, and healing period. Thus,

signifies the need for general public campaigns, vigorous training sessions, and programs both at the school and community level to save and preserve the natural primary/permanent tooth rather than replacing with an artificial one.

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A SURVEY TO ASSESS AWARENESS AMONG GENERAL PUBLIC ABOUT DENTAL AVULSION**Table 1****Demographic Data:**

<i>Age wise distribution</i>	
Mean	38.25547445
Standard Error	0.769722256
Median	38.5
Mode	22
Standard Deviation	12.74117044
Sample Variance	162.3374241
Kurtosis	-0.6640256
Skewness	0.217212565
Range	60
Minimum	15
Maximum	75
Sum	10482
Count	274
Confidence Level (95.0%)	1.515345754

Table 2**QUESTIONNAIRE RESPONSES:**

Q1	Observed N (%)	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
YES	103	137	-34.00	1156.00	8.44
NO	171	137	34.00	1156.00	8.44
The Chi² value is 16.876. The p-value is .00004. The result is significant at p < .05					
Q2	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Fractured tooth	54	34	20.00	400.00	11.76
Avulsed/dislodged tooth	19	34	-15.00	225.00	6.62
Other	30	35	-5.00	25.00	0.71
The Chi² value is 19.097. The p-value is .00007. The result is significant at p < .05.					
Q3	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
YES	180	137	43.00	1849.00	13.50
NO	94	137	-43.00	1849.00	13.50
The Chi² value is 26.993. The p-value is < .00001. The result is significant at p < .05.					
Q4	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Fractured tooth	87	60	27.00	729.00	12.15
Avulsed/dislodged tooth	44	60	-16.00	256.00	4.27
Other	49	60	-11.00	121.00	2.02
The Chi² value is 18.433. The p-value is .0001. The result is significant at p < .05.					
Q5	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Front tooth	177	137	40.00	1600.00	11.68
Back tooth	97	137	-40.00	1600.00	11.68
The Chi² value is 23.358. The p-value is < .00001. The result is significant at p < .05.					

Q6	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
YES	199	137	62.00	3844.00	28.06
NO	75	137	-62.00	3844.00	28.06

The Chi² value is 56.117. The p-value is < .00001. The result is significant at p < .05.

Q7	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Wrap it in a paper as such	42	91	-49.00	2401.00	26.38
Clean it under tap water & carry it	150	92	58.00	3364.00	36.57
None of the above	82	91	-9.00	81.00	0.89

The Chi² value is 63.84. The p-value is < .00001. The result is significant at p < .05

Q8	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
20 minutes	65	69	-4.00	16.00	0.23
1 hour	91	69	22.00	484.00	7.01
6 hours	62	68	-6.00	36.00	0.53
1 day	56	68	-12.00	144.00	2.12

The Chi² value is 9.893. The p-value is .01949. The result is significant at p < .05.

Q9	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
YES	222	137	85.00	7225.00	52.74
NO	52	137	-85.00	7225.00	52.74

The Chi² value is 105.474. The p-value is < .00001. The result is significant at p < .05.

Q10	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Protection against bacteria & viruses	162	91	71.00	5041.00	55.40
Prevents the cell damage	78	91	-13.00	169.00	1.86
Avoids the side effects of the treatment	34	92	-58.00	3364.00	36.57

The Chi² value is 93.818. The p-value is < .00001. The result is significant at p < .05.

Q11	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
HBSS	104	55	49.00	2401.00	43.65
TAP WATER	48	55	-7.00	49.00	0.89
MILK	45	55	-10.00	100.00	1.82
SALIVA	29	55	-26.00	676.00	12.29
OTHER	48	54	-6.00	36.00	0.67

The Chi² value is 59.321. The p-value is < .00001. The result is significant at p < .05.

Q12	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
3-5 days	68	69	-1.00	1.00	0.01
3-4 weeks	92	69	23.00	529.00	7.67
3 months	27	68	-41.00	1681.00	24.72
Not aware	87	68	19.00	361.00	5.31

The Chi² value is 37.711. The p-value is < .00001. The result is significant at p < .05

Q13	Observed	Expected	Difference	Difference Sq.	Diff. Sq. / Exp Fr.
Extra oral storage time of the tooth	47	69	-22.00	484.00	7.01
Characteristics of storage medium	30	68	-38.00	1444.00	21.24
Both	164	69	95.00	9025.00	130.80
None of the above	33	68	-35.00	1225.00	18.01

The Chi² value is 177.062. The p-value is < .00001. The result is significant at p < .05.