

Knowledge, Awareness, and Practice Regarding Management of Dental Trauma in Children among Dental Practitioners: A Cross-sectional Survey

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ABSTRACT

Aim: The aim of this study was to determine the current level of knowledge and understanding about dental trauma and its management in children among dental practitioners.

Materials and methods: The study was conducted after obtaining the ethical clearance from the Institutional Review Board (IRB). A structured questionnaire was prepared, which comprised 20 questions and was validated by dental trauma experts. The questionnaire, which covers all aspects of traumatic dental injuries (TDIs) in both primary and permanent dentition, was distributed online to 850 dental practitioners. The questionnaire was open from January 2022 to April 2022, with a 3-month time frame to complete it. The responses were collected and statistical analysis was done using SPSS software.

Results: The mean age of the participants were 22–30 years. Furthermore, 515 participants were females and 263 were males. In this survey among 784 responses, 449 dentists were trained in dental trauma and 618 participants had personal experience in managing dental trauma. All other questions about knowledge and awareness of dental trauma management received fewer correct answers.

Conclusion: According to the present study, dental practitioners have only mild-to-moderate knowledge and awareness about dental trauma. From the latest the International Association for Dental Traumatology guidelines, dentists need to consistently update their knowledge through dental trauma conferences, workshops, trainings, and symposiums.

Clinical significance: This study informs us about the existing level of dental knowledge about dental trauma, which is significantly low. This will considerably boost dental practitioners' interest in TDIs. As a result, practitioners' expertise will grow, allowing them to better care for their patients.

Keywords: Attitude, Dental trauma, Traumatic dental injuries.

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INTRODUCTION

Traumatic dental injuries are the fifth most prevalent disease worldwide.¹ The estimated number of individuals from 7 to 65 years of age with injured permanent teeth is approximately 900 million.² The projected number of kids with a minimum of one TDI involving primary teeth is 180 million globally according to Petti et al.

Traumatic dental injuries occur frequently in children and young adults, comprising 5% of all injuries. It affects the masticatory function as well as the overall quality of the child's life.² Traumatic dental injuries in children even have indirect effects on parental emotional and financial well-being.³ Twenty-five percent of all school children experience dental trauma and 33% of adults have experienced trauma to the permanent dentition, with the bulk of the injuries occurring before age 19. Luxation injuries are the foremost common TDIs within the dentition, whereas crown fractures are more commonly reported for the permanent teeth. Proper diagnosis, treatment planning, and follow-up are important to assure a positive outcome. Although TDIs are common in both primary and permanent teeth, more emphasis is usually given to the permanent teeth.⁴

Children are typically the ones who experience trauma to both primary and permanent dentitions, as well as to the supporting systems, and its incidence lies between 8 and 11 years of age.^{5,6} Based on the studies from dental traumatology, most of the dental mishaps happen with the evidence at their workstation.⁷ Dental injuries can range from minor concussions to serious damage to the tooth's supporting tissues.⁸ Avulsion, or complete tooth

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dislodgement from the socket, is the most complex and common, with a peak incidence in 7- to 11-year-olds, and the maxillary central incisors are the most affected one.⁹ The ideal management of traumatically avulsed tooth is critical and mandatory for the survival of the tooth.¹⁰⁻¹² The International Association for Dental Traumatology (IADT) released a set of recommendations for treating permanently lost teeth. These recommendations guide the practitioners for treating avulsed permanent teeth immediately, assisting dentists and other medical professionals in making a call regarding avulsion situations.¹³ Numerous studies have evaluated the emergency management of teeth avulsion knowledge of

various demographics, including dentists, instructors, and doctors. The majority of those studies noted the need for improved communication between dental professionals and the population as a whole to increase awareness. The knowledge, awareness, and practice assessment of dental traumatology among dentists will provide us with the current level of knowledge among practitioners, allowing us to improve our understanding of the subject further.

Most of the time specialists or experts in the field of dental trauma will not always be encountered in the management of TDIs; therefore, every dental practitioner should have a basic understanding of TDI because these clinical scenarios may suddenly appear in everyday practice and managing them is critical. The purpose of this study is to assess dental practitioners' educational knowledge and attitudes forward toward the treatment of dental trauma in children in Tamil Nadu and Puducherry, India.

MATERIALS AND METHODS

This study consisted of a cross-sectional survey among dental practitioners in Tamil Nadu and Puducherry during January 2022–April 2022. Registered dental practitioners were allowed to take part in the study. The study was approved by the institutional review board, and the IRB number was obtained.

A structured questionnaire was adapted from pretested questionnaires that have been used in similar studies by Fujita et al. with some modifications to suit the recent IADT guidelines. The questionnaire comprises 20 questions (Table 1), which included demographic details and questions assessing the knowledge of practitioners about dental trauma.^{8–14}

The questionnaire was sent through online for all the practitioners who were willing to participate in the study. The estimated

Table 1: Questions regarding knowledge, awareness, and practice about dental trauma among dental practitioners with their responses

Personal experience in management of dental trauma	Yes (21.2%)		No (78.8%)	
Knowledge of the guidelines of IADT	Yes (35.3%)		No (64.7%)	
Formal training in dental trauma	During degree (57.3%)	After graduation (7%)	Self-education (5.6)	No training (30.1)
In case of any special media the most appropriate storage condition for an avulsed tooth would be	Tap water (10.1%)	Saline (29.5%)	Hand kerchief (1%)	Cold milk (59.4%)
Management of root fracture with undisplaced crown in primary tooth	Splint (42.6%)	No treatment (14.2)	Extraction (28.6%)	Don't know (14.6%)
For an existing mobility of a mature maxillary right central incisor associated with a root fracture, which can be seen in the radiographic evaluation as a result of trauma that occurred 1 day ago, the treatment procedure is	Extraction (23.5%)	Follow-up (9.9%)	Immediate splinting and endodontic treatment (33.7%)	Splinting and follow-up, endodontic management if necessary (32.9%)
For an intruded immature central incisor (–5 mm), which happened 2 hr back, the treatment procedure is	Surgical repositioning using forceps (34.8%)	A spontaneous re-eruption is expected (21.2%)	Orthodontic extrusion of the tooth (21.7%)	Don't know (22.3%)
The replantation time for the best prognosis of an avulsed tooth, which stored under dry conditions is	30–60 min after trauma (40.8%)	Within 3 hr of trauma (14.5%)	During the first 24 hr of trauma (9.9%)	As soon as possible, less than 30 min after the trauma (34.7%)
In case of an avulsion the duration of splinting is	7 days (36.5%)	7–14 days (51%)	More than 14 days (7.7%)	1 month (4.8%)
Immediate treatment for slight mobility and palatal displacement of mature permanent incisor is	Repositioning and splinting (69.6%)	Allow for spontaneous eruption (19%)	Splint without repositioning (11.4%)	Don't know (0%)
Immediate treatment option for 4 mm intrusion in a 7 year old child with dull percussion is	Repositioning and splinting (39.5%)	Allow for spontaneous eruption (38.8%)	Orthodontic extrusion (21.7%)	Don't know (0%)
Immediate treatment for mobile mature permanent teeth, which has been extruded	Repositioning and splinting (59.2%)	Allow for spontaneous eruption (19.8%)	Orthodontic intrusion (21%)	Don't know (0%)
Management of an avulsed primary incisor in a 4 years old child is	Replant with pulpectomy and splint (43.8%)	Replant without pulpectomy (25.3%)	Do not replant (31%)	Don't know (0%)
Mature avulsed permanent incisor with 7 hours extra-oral time should be	Immerse in 25% sodium fluoride (46.2%)	Immerse in 5% HCl (22.3%)	Immerse in 5% NaOCl (31.5%)	Don't know (0%)
Best transport media for avulsed teeth is	Viaspan (13%)	HBSS (51.5%)	Low fat milk (6.8%)	Cold mild (28.7%)

HBSS, hanks bank salt solution



sample size was 800. Registered dental practitioners from Tamil Nadu and Puducherry were included in the study, and practitioners who were not interested to take part in the survey were excluded from the study. The questionnaire was sent to 850 dental practitioners through social media (Emails and WhatsApp messenger).

The questionnaire also included about the educational qualification of the practitioner whether they are undergraduate or postgraduate practitioner and if they had any training in dental trauma. The other part of the questionnaire (13 questions) covered knowledge and attitude about dental trauma according IADT guidelines. The questionnaire evaluated the knowledge about storage media for avulsed tooth, splinting protocol for luxation injuries, and the duration of splinting.

The questionnaire was open from January 2022 to April 2022, and 3-month time period was given to complete the questionnaire. The responses were represented as percentage with graphical representation.

Statistical package for social studies (SPSS) version 22.0 (IBM Corporation, Chicago, IL, USA) was used for data entry and descriptive statistics including frequencies and proportions. Chi-squared test was used to compare groups. A $p < 0.05$ was considered significant.

RESULTS

About 850 practitioners received the questionnaire among which we got response from 784 participants giving a response rate of 92.23%. According to the demographic data regarding age, educational qualification, around 65.7% of the participants were females (Tables 2 and 3). Most of the practitioners were undergraduate (about 89%).

About 36.5% of the practitioners worked in a public hospital, while 27% worked in both a public and private hospital, and 25.6% were solely private practitioners.

Among all the 784 participants, 57.3% (449) practitioners had training in dental trauma management during their under graduation, surprisingly 30.1% (236) participants did not get formal training in dental trauma management (Table 4).

Among all the practitioners, 78.8% of the dentist did not have personal experience in managing dental trauma in their practice (Fig. 1).

When asked about appropriate storage media, the options were tap water, saline, handkerchief, and cold milk. In the given options, 59.4% of the participants correctly identified cold milk as the appropriate storage media (Fig. 2).

Table 2: Age of the participants

Age	Percentage
25–30	98
30–45	1
45–60	1

Table 3: Gender of the participants

Gender	Percentage
Male	65.7
Female	33.5
Prefer not to say	0.8

The practitioners lack a clear understanding of the management protocol for root fractures in primary dentition (Fig. 3). Similarly, a question about avulsed primary dentition received an average correct response, indicating a lack of knowledge among practitioners about managing TDIs in primary dentition (Fig. 4).

A total mixed response was obtained for most of the questions related to TDIs in primary dentition, questions related to permanent dentition trauma also got mixed responses but the percentage of correct response was more compared to the primary dentition scenario.

Table 4: Percentage of participants who underwent formal training in dental trauma

Formal training in dental trauma	Percentage
During degree	57.3
After degree	7
Self-education	5.6
No training	30.1

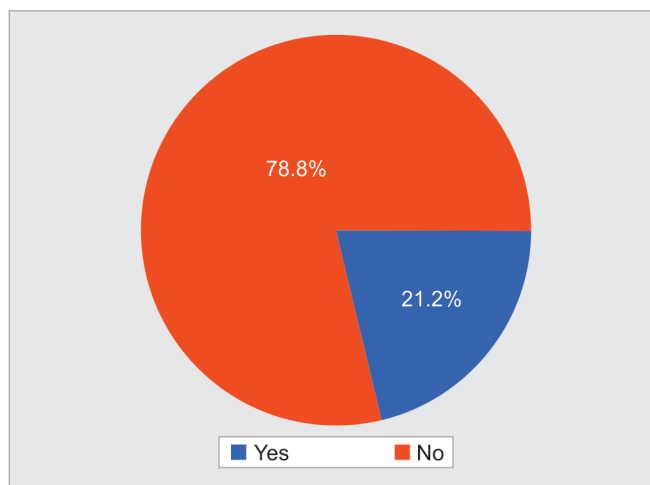


Fig. 1: Personal experience in management of trauma

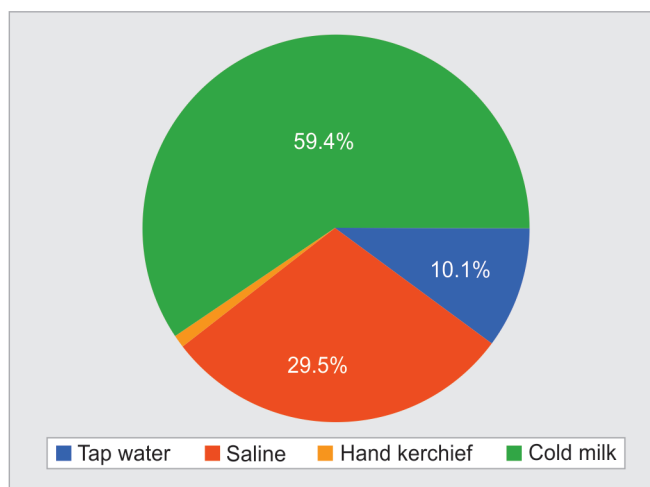


Fig. 2: Question assessing the knowledge of practitioners about appropriate storage media

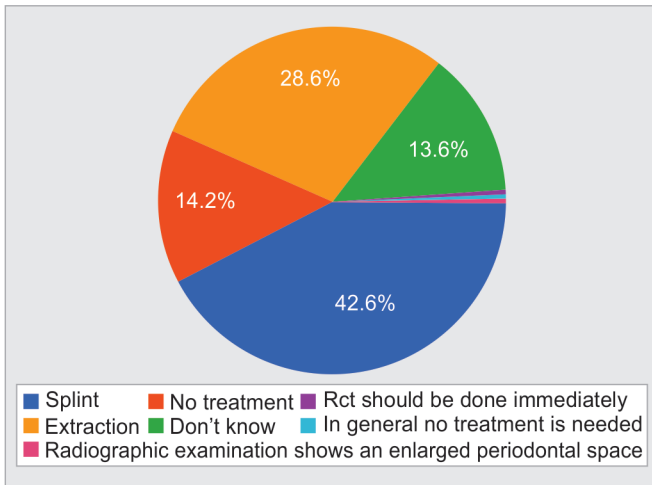


Fig. 3: Response for management of root fracture with undisplaced crown in primary teeth

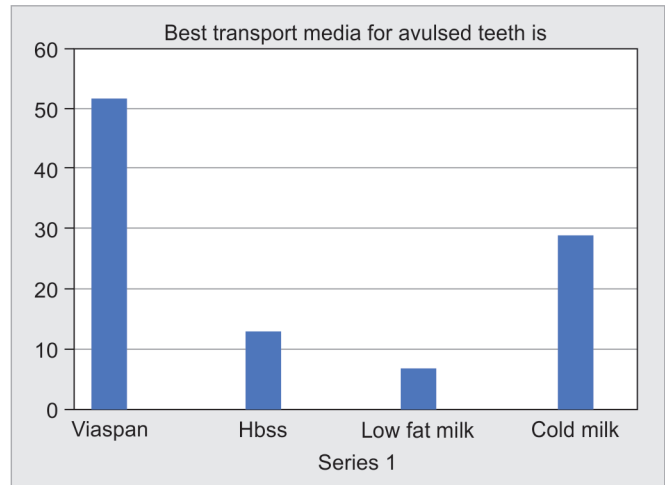


Fig. 5: Responses for best transport media given by practitioners

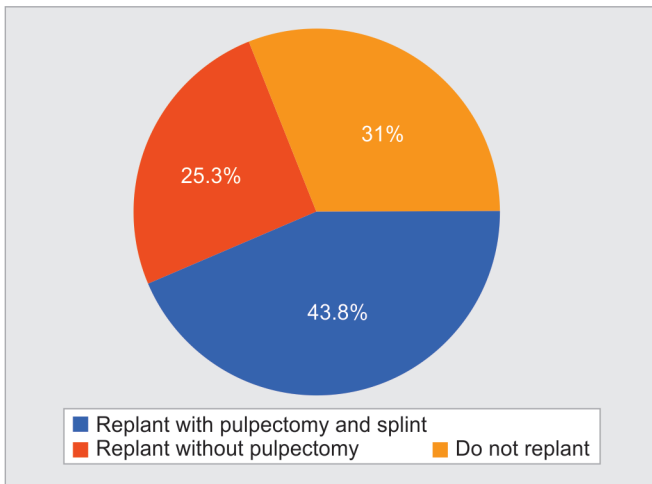


Fig. 4: Practitioners response for management of an avulsed primary incisor in a 4-year-old children

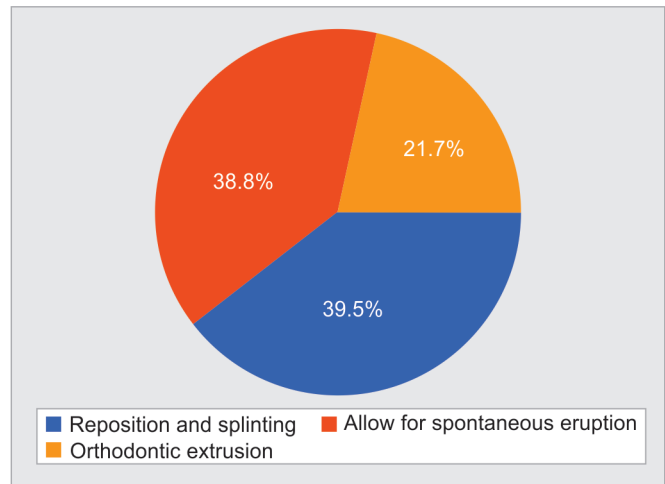


Fig. 6: Practitioners response for intrusion related immediate treatment option

About 50% of the practitioners gave correct response for best transport media (Fig. 5).

In a question assessing the knowledge of practitioners in an age-specific scenario of intrusion injury, which has to be addressed according to the maturation of the tooth again did not get specific response (Fig. 6).

According to this questionnaire, survey practitioners were having moderate knowledge about the management of dental trauma in permanent dentition but only mild knowledge about dental trauma in primary dentition.

DISCUSSION

Traumatic dental injuries are an inevitable clinical situation that needs a radical knowledge to support the proper diagnosis and treatment. During this study, the extent of data of dental students was found to be starting from low to moderate. Similarly, many previous studies have reported the dearth of data about the management of dental trauma among dental practitioners.¹⁴ The results also revealed that gender and also the year of study had no significant effect on the mean knowledge score.

Most of the practitioners included in this study lacked efficient training in dental traumatology. Hence, the curriculum of dental under graduation must have a structured plan to teach and also should give hands-on experience in dental trauma. A research among undergraduate students in the United Arab Emirates conducted by Hashim et al. found that students who attended the dental trauma lecture had significantly improved knowledge on managing avulsion injuries.¹⁵

Transport media is incredibly important in any transplant including the tooth. In response to a critical question about transport media, over 60% of practitioners selected milk as the correct answer. Furthermore, milk remains the most convenient, inexpensive, and easily available alternative in most instances, while also being competent of keeping periodontal ligament (PDL) cells alive. Hence, milk remains the medium of choice for avulsed teeth that can't be replanted immediately or very soon after the avulsion.¹⁶ A systematic research published in 2018 by Adnan et al. concluded that natural products such as milk and propolis are more efficient than synthetic products in sustaining PDL cell viability.¹⁷ Similarly, Sharma et al. conducted a survey in Madhya Pradesh among

school teachers where he concluded that extreme minimal knowledge about reimplantation of avulsed teeth was observed.¹⁸

The incidence of root fracture in the dentition is only about 1–4% of all dental traumatic injuries, and, in general, in accordance with IADT recommendations, an undisplaced root fracture does not require treatment.¹⁹ But many practitioners selected splinting as a treatment option. This also clearly explains the lack of knowledge and awareness among practitioners about TDI.

Intrusion injuries to permanent incisors are reported with an incidence of 0.2–2% of all the TDIs to permanent dentition.²⁰ According to dental traumatology guidelines, the protocol for intrusion injuries is based on the root closure and the amount of intrusion that has occurred in millimeters. When a permanent tooth with an open apex is intruded, no immediate intervention is required because the tooth will spontaneously erupt back to its normal position. The responses are not only based on knowledge but also has an impact on practice. Practical hands-on experience in dental trauma will automatically improve the knowledge and awareness.

Splinting protocol is extremely important in management of TDIs. Flexible splinting is ideal for most of the TDIs. According to IADT recommendations, the flexible splinting duration for subluxation, extrusive luxation, and avulsion are roughly 2 weeks according to Kahler et al.²¹ The rest of the TDIs, excluding root fracture, require 4 weeks of flexible splinting.²⁰

“Immediate Treatment for Mature Permanent Incisor Mobility and Palatal Displacement Is” repositioning and splinting, which many practitioners (69.9%) answered. This question has the most correct answer; the others have mixed answers. We might infer from this that practitioners have a far better understanding of trauma with displacement and also its management. In primary teeth, the prevalence of TDI is 24.2%.²² In comparison to injuries to the primary dentition, the responses to permanent dentition were quite moderate.

Because the majority of the participants in the study are young practitioners, a lack of experience in dental trauma management may be the cause of the low to moderate level of knowledge. This is in contrast to a knowledge, awareness, practice (KAP) study done by Uthman, which also shows a lack of KAP among dental students in the Saudi Arabian population.²³

Practitioners have lack of knowledge in managing TDI in primary dentition, which has to be addressed.

The utilization of dental trauma simulation training offers a further means of learning about dental traumatology. Simulation has the potential to be used as an adjunct tool within the learning and management of dental traumatology because it has demonstrated increased student engagement.²⁴

Limitations of this study are to be acknowledged: this study does not completely represent the entire dental practitioner’s community. The study can further be expanded as a pan Indian study with increased sample size to predict the exact knowledge and awareness of the practitioners across India.

The knowledge and awareness of dental practitioners can be improved by conducting workshops and video demonstration hands-on training in splinting. This exclusively includes modern android applications based on artificial intelligence (injured tooth application that helps in diagnosis and management of dental trauma).

CONCLUSION

Within the limitations of the study, we conclude that dental practitioner’s knowledge regarding TDIs ranged from low to

moderate. Moreover, knowledge about primary dental trauma was very low compared to permanent dentition. The present findings provided baseline information on the existing knowledge and highlighted the need to improve the knowledge of dental students regarding TDIs and their management by adding additional courses covering dental trauma in dental undergraduate programs.

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