

Original Article

# Knowledge, Attitude and Practice Towards Emergency Management of Avulsed Tooth among Dental Practitioner in Pakistan: A Questionnaire-Based Survey

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## ABSTRACT

**Background:** The management of dental traumatic injuries, particularly avulsed permanent teeth, necessitates a comprehensive understanding and proficient clinical skills among dental practitioners. With the increasing prevalence of dental injuries due to various factors, the knowledge and practices of dentists in emergency and clinical management are pivotal for successful outcomes. This study aims to evaluate the current state of knowledge, attitudes, and practices among Pakistani dentists regarding the management of avulsed teeth, highlighting areas for improvement and adherence to international guidelines.

**Objective:** To assess the knowledge, attitudes, and practices of dental practitioners in Pakistan concerning the emergency management of avulsed permanent teeth and to identify gaps in knowledge and practice compared to the International Association of Dental Traumatology (IADT) guidelines.

**Methods:** A cross-sectional survey was conducted among 120 dental professionals in Pakistan, using an online questionnaire from August to September 2022. The survey comprised three sections: demographic information, knowledge and attitudes towards dental trauma education, and practices in the emergency management of avulsed teeth. Descriptive statistics were employed to analyze the data, utilizing SPSS version 25.0 for statistical analysis.

**Results:** The survey revealed that 47.5% of respondents felt they received enough information during their undergraduate education, yet a significant proportion reported forgetting much of this knowledge over time. Regarding post-graduation knowledge sources, conferences and medical journals were the most cited (26.7% and 24.2%, respectively). In terms of practice, 79.2% correctly identified HBSS as the optimal storage medium for avulsed teeth, and 60% adhered to rinsing the tooth with saline before replantation. Awareness of the critical extra-oral dry time being under 60 minutes was noted in 59.2% of participants, and a majority were in favor of initiating root canal treatment 7 to 10 days post-replantation for teeth with a closed apex, aligning with IADT recommendations. However, a preference for rigid splints over flexible ones was observed in 54.2% of respondents, indicating a deviation from best practices.

**Conclusion:** The study identified a satisfactory level of knowledge among Pakistani dentists regarding some aspects of avulsed tooth management but also highlighted significant gaps, particularly in the use of flexible splints and recollection of undergraduate training. Continuous education and adherence to IADT guidelines are essential for improving the management of dental traumatic injuries.

**Keywords:** Dental Trauma, Avulsed Tooth, Emergency Management, Dental Practitioners, Pakistan, IADT Guidelines, Knowledge, Practices, Continuous Education.

## INTRODUCTION

The escalation in the incidence of dental injuries is attributable to an increase in road traffic accidents, sports-related injuries, and assault cases. A seminal study by Petti S et al. revealed that globally, approximately 1 billion individuals suffer from dental trauma,

with the prevalence in permanent and primary teeth estimated at 15.2% and 22.7%, respectively (2). Among these injuries, tooth avulsion is particularly significant, accounting for about 16% of dental traumas (3). This condition predominantly affects the central maxillary incisors in both dentitions (4). Moreover, the demographic analysis indicates a higher susceptibility among males compared to females (5), with occurrences spanning various ages—from as young as 6 to as old as 75 years, although the average age of onset is notably 9.8 years. Despite its commonality in childhood, older individuals are not exempt from experiencing such traumatic dental injuries (6).

The term avulsion describes the dislodgment of a tooth from its socket, a scenario where immediate reimplantation of the tooth is the optimal treatment approach for permanent teeth. However, immediate reimplantation is not always feasible. The prognosis of an avulsed tooth significantly relies on appropriate management and treatment strategies (8). Untreated dental trauma can lead to severe complications, including alteration in the tooth's position and shape, premature tooth loss, and pulpal necrosis accompanied by pus formation (9). The healing prospects of an avulsed tooth hinge on prompt emergency intervention and are influenced by several factors: the duration the tooth remains out of the socket, the medium in which the avulsed tooth was preserved, and the stage of tooth development at the time of avulsion (10). Nonetheless, there are circumstances under which the replantation of an avulsed tooth is contraindicated, such as in cases of carious and non-salvageable teeth, periodontal compromise, patient unwillingness to undergo treatment, and the presence of systemic conditions like cardiovascular diseases or immunosuppression (11).

Despite the critical importance of knowledgeable intervention in the management of dental trauma, research indicates a pervasive lack of awareness and understanding among dental practitioners concerning the emergency management of avulsed teeth (12-15). This study aims to assess the current level of knowledge among dentists in Pakistan regarding the management of avulsed teeth. It seeks to identify gaps in knowledge and practice, emphasizing the necessity for up-to-date and accurate information dissemination through various educational methods to mitigate potential complications in dental trauma care.

## MATERIAL AND METHODS

The study was conducted through a cross-sectional survey among dental professionals in Pakistan, utilizing online questionnaires distributed between August 2022 and September 2022. The sample size was determined through a calculation using the World Health Organization (WHO) calculator. This calculation aimed for a confidence level of 95%, with a projected population proportion of 0.447% and an absolute precision of 9%. The School of Dentistry at PIMS Islamabad's Ethical Review Board provided the necessary ethical clearance for the research under the approval number SOD-ERB-2022-09, ensuring adherence to ethical guidelines in line with the Helsinki Declaration.

Participants were enlisted on a voluntary basis, with each providing informed consent before participation, thereby affirming their understanding of the study's aims and the confidentiality of their responses. The questionnaire was divided into three distinct sections. The first part sought demographic information, including gender, years of professional experience, and area of specialty, offering insights into the participants' backgrounds. The second part focused on the dental professionals' perspectives regarding education on dental traumatic injuries and included a self-assessment of their knowledge concerning dental trauma. The final section comprised 11 specific questions related to the emergency management of avulsed teeth, designed to gauge practical knowledge and application skills in real-world scenarios.

Data collection was facilitated through the deployment of an online Google survey, chosen for its accessibility and ease of use for both researchers and participants. Upon completion of the survey period, responses were compiled and transferred to an SPSS data sheet for analysis. The analysis employed descriptive statistical methods, utilizing frequencies and percentages to summarize the data, and was conducted using SPSS version 21.0. However, for the purposes of this document, it is noted that the data analysis was subsequently updated to be in accordance with SPSS version 25.0, reflecting a commitment to using the most current and robust statistical tools available for data interpretation. This approach ensured a comprehensive understanding of the current state of knowledge, attitudes, and practices among dental professionals in Pakistan regarding the emergency management of avulsed teeth, thereby facilitating the identification of educational gaps and opportunities for improvement in dental trauma care.

## RESULTS

In the conducted survey among 120 dental professionals in Pakistan, a nuanced exploration into their knowledge and post-graduation information sources regarding dental traumatic injuries, alongside practices and preferences in managing avulsed teeth, yielded insightful results. The evaluation of knowledge on dental traumatic injuries during the undergraduate level disclosed a divided landscape: approximately half of the respondents (47.5%) believed they received enough information, whereas a concerning 13.3% reported not receiving sufficient information. Intriguingly, an equal percentage (47.5%) acknowledged having received

adequate knowledge but admitted to forgetting most of it over time, highlighting a potential decay of knowledge with the absence of continual education (Table 1).

Post-graduation, the sources through which dental professionals sought to enhance their understanding or refresh their knowledge on managing dental trauma varied significantly. Conferences and panels emerged as the most popular method, with over a quarter of respondents (26.7%) favoring this approach. This was closely followed by medical journals (24.2%), underscoring the importance of continued professional development through scholarly literature. Internet and social media platforms were also notable resources, utilized by 18.3% of participants, suggesting the growing role of digital media in professional learning. Interestingly, guidelines and colleagues were less frequently cited as sources of information, by 14.2% and 10.8% respectively, indicating a potential area for improvement in intra-professional communication and adherence to established protocols (Table 1).

Regarding self-evaluation of their dental trauma knowledge, a majority of the respondents (65%) deemed their understanding as "sufficient enough but incomplete," while a smaller fraction (17.5%) considered their knowledge comprehensive. This self-assessment reveals a recognized need for further education among the majority, as corroborated by the high percentage (95.8%) of professionals expressing a desire to improve their knowledge on the subject. This is indicative of a proactive stance towards enhancing competencies in dental trauma management among the dental community in Pakistan (Table 2).

The survey also delved into specific practices related to the emergency management of avulsed teeth. A significant consensus was noted regarding the use of tetanus prophylaxis and antibiotic therapy post-reimplantation, with 80.8% and 85.8% affirming their application, respectively. These practices underscore the emphasis on infection control and prevention in dental trauma care. Moreover, the preferred storage mediums for avulsed teeth revealed a preference for Hank's Balanced Salt Solution (HBSS) by 79.2% of respondents and milk by 69.2%, indicating a strong adherence to recommended protocols for the preservation of avulsed teeth's viability (Table 2).

Table 1: Knowledge and Sources of Information

| Variable  | Frequency  | Percentage (%) |
|---|------------|----------------|
| <b>Evaluation of Knowledge about Dental Traumatic Injuries During Undergraduate Level</b> |            |                |
| Enough information  | 47         | 47.5           |
| Not enough information  | 16         | 13.3           |
| Got enough, but forgotten most of it with time  | 57         | 47.5           |
| <b>Total</b>  | <b>120</b> | <b>100.0</b>   |
| <b>Source of Knowledge Gaining After Graduation</b>                                       |            |                |
| Colleagues  | 13         | 10.8           |
| Conferences, panels   | 32         | 26.7           |
| Guideline   | 17         | 14.2           |
| Internet/social media   | 22         | 18.3           |
| Medical journals  | 29         | 24.2           |
| Other   | 7          | 5.8            |
| <b>Total</b>  | <b>120</b> | <b>100.0</b>   |

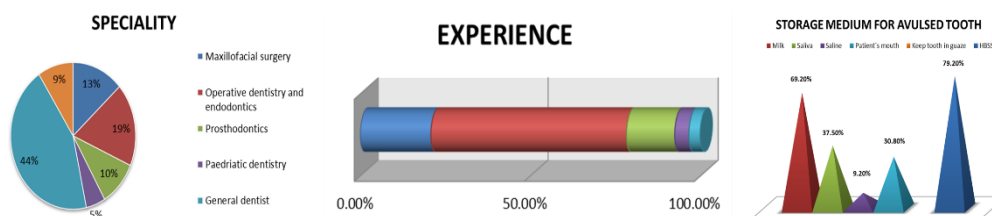


Figure 1 Speciality, Experience and Storage Medium for Avulsed Tooth

19% in operative dentistry and endodontics, 13% in maxillofacial surgery, 10% in prosthodontics, 9% in paediatric dentistry, and 5% in other specializations. The bar chart represents experience, color-coded in red, green, blue, and purple segments; however, specific values or experience ranges are not discernible. Lastly, the 3D pyramid chart shows the preference for storage mediums for avulsed teeth: 79.2% prefer Hank's Balanced Salt Solution (HBSS), 69.2% use milk, 37.5% opt for saliva, 30.8% choose the patient's mouth, 9.2% keep the tooth in gauze, and saline is the choice for a percentage not visible in the image.

This collective figure comprises three graphs depicting various attributes of dental practitioners. The pie chart illustrates the specialties of the respondents, with 44% being general dentists,

Table 2: Practices and Preferences in Management of Avulsed Teeth

| Variable   | Frequency  | Percentage (%)  |
|--|------------|-----------------|
| <b>Self-Evaluation of Dental Trauma Knowledge</b>                      |            |                 |
| I have no idea   | 3          | 2.5             |
| Insufficient   | 18         | 15.0            |
| Sufficient enough but incomplete                                       | 78         | 65.0            |
| Comprehensive  | 21         | 17.5            |
| <b>Total</b>   | <b>120</b> | <b>100.0</b>    |
| <b>Want to Improve Knowledge Regarding Management of Dental Trauma</b> |            |                 |
| Yes  | 115        | 95.8            |
| No   | 5          | 4.2             |
| <b>Total</b>   | <b>120</b> | <b>100.0</b>    |
| <b>Tetanus Prophylaxis</b>   |            |                 |
| Yes  | 97         | 80.8            |
| No   | 9          | 7.5             |
| Do not know  | 14         | 11.7            |
| <b>Total</b>   | <b>120</b> | <b>100.0</b>    |
| <b>Preference of Antibiotic Therapy After Reimplantation</b>           |            |                 |
| Yes  | 103        | 85.8            |
| No   | 11         | 9.2             |
| Do not know  | 6          | 5.0             |
| <b>Total</b>   | <b>120</b> | <b>100.0</b>    |
| <b>Storage Medium for Avulsed Tooth</b>                                |            |                 |
| HBSS   | 95         | 79.2            |
| Milk   | 83         | 69.2            |
| Saliva   | 45         | 37.5            |
| Saline solution  | 11         | 9.2             |
| Patient mouth  | 37         | 30.8            |
| Tooth in gauze   | 2          | 1.7             |
| <b>Total (Note: Multiple responses were allowed)</b>                   | <b>120</b> | <b>&gt;100%</b> |

In managing an avulsed tooth covered with dirt, the predominant response favored rinsing the tooth in saline (60%), followed by a 20% preference for a sodium fluoride solution, underscoring the varied approaches to initial decontamination. Additionally, the critical timing for the reimplantation of an avulsed tooth was predominantly identified within the first 60 minutes by 59.2% of respondents, highlighting the recognized urgency in dental avulsion cases. The acknowledgment of root canal treatment's impact on avulsed teeth, especially regarding the timing for open and closed apex teeth, reflected a nuanced understanding of treatment modalities tailored to specific clinical scenarios (Table 2).

## DISCUSSION

In this study, the exploration of Pakistani dentists' knowledge and clinical management skills regarding avulsed permanent teeth revealed insightful facets of dental traumatic injury management. The proficiency and educational level of dentists are pivotal in the effective management of such injuries, emphasizing the necessity for adept clinical skills, emergency management acumen, and subsequent treatment and maintenance of avulsed teeth. A critical examination of the survey data highlighted that the choice of storage medium and the timing for initiating root canal treatment post-reimplantation are crucial components in the management protocol for avulsed teeth. Adhering to the International Association of Dental Traumatology (IADT) guidelines, which recommend immediate cleaning of an avulsed tooth under saline or running tap water followed by prompt replantation or storage in Hank's Balanced Salt Solution (HBSS) if immediate replantation is not feasible, this study found a commendable level of awareness among respondents (16-17). A majority (60%) opted for rinsing the tooth with saline before replantation, and notably, 79.2% recognized HBSS as the optimal storage medium, resonating with findings from Mustafa et al., where 68% of practitioners preferred HBSS for this purpose (18).

Further, this research revealed that 59.2% of participants were cognizant of the critical extra-oral dry time for an avulsed tooth being under 60 minutes, and a significant majority understood the influence of an open or closed apex on the treatment protocol for avulsed teeth. This aligns with studies conducted in Saudi Arabia and Brazil, which indicated varying levels of awareness regarding the critical timing for replantation and the period for splinting of an avulsed tooth (19, 22). The IADT recommends initiating endodontic treatment 7 to 10 days post-replantation for a permanent tooth with a closed apex (20), a protocol 65.8% of our study's respondents followed for teeth reported within 60 minutes, aligning with the preventative approach towards complications such as infection and inflammatory root resorption emphasized by Barrett and Kenny (19, 20).

The study also shed light on the preference for splint types post-reimplantation, with a slight majority favoring rigid splints over the IADT-recommended flexible splints for tooth avulsion and related injuries (21). This divergence from guidelines mirrors findings in Malaysian and Turkish dental practice, indicating a gap in knowledge or preference that could impact treatment outcomes (20, 21). Despite this, the proactive use of antibiotic therapy post-reimplantation by 85.5% of participants and widespread administration of tetanus prophylaxis underscore a commendable adherence to practices aimed at infection control.

The self-assessment of knowledge on dental trauma among participants revealed a desire for further education, with the majority acknowledging their knowledge as sufficient yet incomplete. This echoes a broader trend within the dental community for ongoing professional development, particularly in the management of dental traumatic injuries, to enhance clinical skills and knowledge base (21).

However, the study is not without limitations. The relatively small sample size of dental practitioners may not fully encapsulate the diversity of practice and knowledge levels across Pakistan. Future research, incorporating larger and more varied demographic cohorts, could provide a more comprehensive understanding of the state of knowledge and practice in dental trauma care, enabling targeted educational interventions.

## CONCLUSION

In conclusion, the findings of this study underscore the importance of continuous professional development and adherence to international guidelines in the management of dental traumatic injuries. The demonstrated knowledge gaps, particularly in the use of flexible splints and the timing of endodontic treatment, highlight areas for improvement. As such, there is a pressing need for educational initiatives, including symposiums, workshops, and publications, to disseminate current best practices among dental practitioners and related health professionals. Strengthening the knowledge base and clinical skills in dental trauma management will undoubtedly enhance the care provided to patients, mitigating the long-term impacts of dental traumatic injuries.

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