

# Dentists' Awareness in Emergency Management of Traumatic Dental Injuries: Implications for Improved Care

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## Abstract:

**Objective(s):** The current study aimed to investigate the level of dentists' knowledge and understanding of traumatic dental injuries (TDIs) to pinpoint specific areas where emergency dental care protocols and practices can be enhanced and optimized. **Methods:** A cross-sectional survey of 70 dentists in the city of Ilam, Iran, explored their knowledge, attitudes, and practices concerning TDIs. Data were collected using a researcher-developed questionnaire encompassing demographic information, a history of trauma-related training, and responses to 15 TDI-related questions, which were scored according to pre-defined criteria. Statistical analysis included analysis of variance (ANOVA), Tukey's honestly significant difference [HSD] test, Chi-square test, and t-test at  $p < 0.05$ . **Results:** While gender did not demonstrate a statistically significant correlation with knowledge levels ( $p = 0.19$ ), dentists who frequently treated TDI exhibited significantly higher awareness ( $p = 0.04$ ). Prior training in TDI management, history of retraining, and years of practice exhibited no significant influence on awareness scores. Overall, participants achieved a mean accuracy of 43.4% on TDI-related questions, and no participant demonstrated a lack of basic knowledge. **Conclusion:** This study demonstrated a significant deficiency in dentists' understanding of emergency management protocols for TDIs, particularly concerning the diagnosis of intricate cases and the handling of associated complications. This highlighted the necessity for continued professional development and training in emergency dental care.

**Keywords:** Traumatic Dental Injuries; Emergency Management; Dentists; Awareness; Knowledge; Dental Trauma

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## Introduction

Traumatic dental injuries (TDIs) represent a prevalent clinical challenge with substantial consequences for patients' oral health and general well-being.<sup>1</sup> Timely and efficacious emergency dental intervention is essential following TDI to mitigate the risk of subsequent complications and maximize the potential for tooth preservation.<sup>2</sup> Dentists' knowledge and understanding of best practices in the emergency management of TDIs significantly influence patient outcomes.<sup>3</sup>

TDIs, such as fractures, luxations, and avulsions, pose significant clinical challenges in dentistry, necessitating prompt intervention and specialized treatment.<sup>4</sup> Research indicates that appropriate and timely management of these injuries substantially impacts the prognosis and long-term treatment outcomes.<sup>5, 6</sup> Critically, the efficacy of emergency care is contingent upon the knowledge and preparedness of dental practitioners.

While the timely management of TDIs is crucial, a significant paucity of research exists concerning dentists' preparedness in this domain. Existing literature offers limited insights into the knowledge, skills, and self-efficacy of dental professionals when managing these

emergencies.<sup>7, 8</sup> Therefore, an assessment of current awareness levels is critical to identify areas requiring intervention and to develop effective, targeted educational strategies.

This study aimed to explore dentists' comprehension of emergency treatment protocols for TDIs, a crucial factor in optimizing emergency dental services and patient outcomes.<sup>9</sup> Its goal was to identify current knowledge levels and areas requiring improvement, thereby contributing to the advancement of dental care practices.<sup>10</sup> Through an evaluation of dental professionals' knowledge, attitudes, and clinical practices concerning the management of these injuries, the research was performed to elucidate current deficiencies and obstacles within emergency dental care provision.

## Methods

A census-based, cross-sectional survey was administered to all eligible dentists practicing in various settings within the city of Ilam, Iran. Due to the limited number of Doctors of Dental Medicine (DMD) in the area, all 74 eligible DMDs were included. These participants represented a range of experience levels with dental trauma, from daily

management to infrequent encounters. This sample size of 74 was determined a priori, based on a previous study<sup>7</sup>, to account for potential attrition. Ethical approval was obtained from the Research Ethics Committees of Ilam University of Medical Sciences (IR.MEDILAM.REC.1399.206).

A researcher-designed questionnaire, standardized and validated through a thorough review of existing literature and consultation with experts in the field, served as the primary instrument for data collection. The questionnaire assessed dentists' knowledge related to the diagnosis and treatment approaches for traumatic dental injuries (TDIs) and explored appropriate referral pathways.

The mixed-methods questionnaire evaluated respondents' awareness, confidence, and decision-making abilities concerning TDIs. The questionnaire, administered in person, incorporated closed and open-ended questions, Likert scales, and clinical vignettes to elicit both quantitative and qualitative data. Content validity was established through expert review by 10 dental professionals. Internal consistency reliability was confirmed using Cronbach's alpha coefficient ( $\alpha > 0.8$ ).

The questionnaire consisted of two sections. The first section collected demographic information, including gender, age, graduation year, and history of dental trauma training. The second section comprised 15 questions specifically related to TDIs. Participant responses to the second section were evaluated, with correct answers assigned a score of 1 and incorrect answers a score of 0. Overall knowledge was categorized based on total scores: A score between 11 and 15 indicated strong knowledge, a score between 6 and 10 represented moderate knowledge, and a score between 0 and 5 denoted limited knowledge.

Prior to participation, subjects were provided with information regarding the study's objectives, the assurance of confidentiality, and the guarantee of anonymity. The submission of the completed questionnaire was interpreted as implied informed consent.

#### Data Analysis:

Data analysis was performed using SPSS version 26. Descriptive statistics, including frequency, percentage, mean, and standard deviation (SD), were calculated. Inferential statistical analyses comprised analysis of variance (ANOVA), followed by post-hoc analysis using Tukey's honestly significant difference (HSD) test, as well as Chi-square and t-tests. Statistical significance was determined at a  $p < 0.05$ .

## Results

In this study, a total of 74 dentists participated, of whom 70 completed the questionnaire, resulting in a response rate of 94.6%. Four dentists declined participation, citing fatigue or pre-existing commitments. The participants were aged between 24 and 56 years, with a mean age of  $36.11 \pm 9.9$  years. Among the participants, 42 were male (56.7%), with a mean age of  $36.11 \pm 9.9$  years (Table 1).

Age group (year)	Male	Female	N	Percent	Mean $\pm$ SD
24-30	15	20	35	50	36.11 $\pm$ 9.9
31-40	7	4	11	15.7	
41-50	13	3	26	22.9	
More than 50	7	1	8	11.4	
Total	42	28	70	100	

Of the study participants, nine had received extra academic training in the management of dental trauma, while 27 (65.9%) reported practical experience in treating patients with these injuries. Table 2 presents the participants' response accuracy, revealing an overall average of  $43.4\% \pm 2.73\%$ . Importantly, no participant exhibited a deficient understanding of traumatic dental injury management.

The overall mean score ( $\pm$ SD) for all participants, encompassing both male and female dentists, was  $8.29 \pm 2.78$ . No statistically significant difference in knowledge scores was observed between genders ( $p = 0.191$ ). Prior training in dental trauma management also did not correlate with significantly different knowledge levels ( $p = 0.129$ ). Likewise, previous retraining history ( $p = 0.979$ ) and years of professional experience ( $p = 0.834$ ) showed no significant correlation with knowledge scores. However, a statistically significant difference in knowledge was found based on exposure to TDIs ( $p = 0.029$ ). Post-hoc analysis using Scheffe's test revealed that dentists who frequently encountered such injuries demonstrated significantly higher awareness scores compared to those who reported never encountering them ( $p = 0.043$ ). Finally, the type of university attended was not associated with significant variations in awareness scores ( $p = 0.133$ ) (Table 3).

**Table 2- The number of correct responses of the dentists for each question**

Questions	Number (%) of correct responses
In your opinion, what aspects are crucial to consider in a history of dental injuries?	47 (67.1)
In your opinion, what is the likeliest scenario if the pulp vitality test shows negative results immediately following trauma?	54 (77.1)
How do you assess the treatment prognosis for a patient with a simple crown fracture?	45 (64.3)
What is the recommended course of action for treating an uncomplicated crown fracture promptly?	38 (54.7)
What medication is typically utilized for treating uncomplicated fractures in immature teeth?	49 (70.0)
How should a complex crown fracture in immature teeth that occurred two days ago be managed?	32 (45.7)
In your view, which traumatic dental injury listed has the most unfavorable prognosis?	44 (62.9)
When is it advisable to be vigilant for root fractures, in your opinion?	43 (61.4)
In which scenarios following tooth displacement from trauma, do you believe root canal treatment is unnecessary?	47 (67.1)
What duration of splinting would you suggest for a concussed tooth?	29 (41.4)
For which traumatic dental injuries do you recommend the longest splinting duration for your patients?	20 (28.6)
What is the recommended treatment for an intruded permanent tooth?	53 (75.7)
If the patient's avulsed tooth cannot be stored in HBSS, what alternative storage solution would you recommend until they can see a dentist?	42 (60.0)
Following the repositioning of a 25-year-old patient's avulsed central tooth, how long do you believe splinting the tooth is necessary?	9 (12.9)
How would you manage the treatment of adult avulsed teeth that have been stored in dry air for over an hour?	21 (30.0)

**Table 3- The mean score of knowledge to traumatic dental injuries in dentists**

Variable	N	Mean	Std. Deviation	95% Confidence Interval for Mean		P-value	
				Lower Bound	Upper Bound		
Gender	Male	42	8.21	2.78	5.43	10.99	0.191
	Female	28	7.98	2.77	5.33	10.97	
Having history of training	Yes	31	8.66	2.31	6.35	11.66	0.129
	No	39	8.78	2.55	6.67	12.06	
Having retraining history	Yes	22	8.72	3.24	5.48	11.96	0.979
	No	48	8.88	3.11	5.27	12.03	
Related work experience	36	8.42	2.36	6.06	10.78	0.834	
Exposure to TDIs	15	11.22	2.12	9.10	13.34	0.029	
Encountering TDIs	18	10.77	2.15	8.62	12.92	0.043	
Type of university graduated	65	8.22	2.42	5.80	10.64	0.133	

## Discussion

This study examined dentists' awareness of emergency management protocols for TDIs. A 15-item questionnaire was used to assess participants' TDI knowledge. For example, while 64.3% of respondents correctly identified avulsion followed by a dental visit as the appropriate management for lateral luxation, only 54.7% correctly recommended prompt dental consultation for intrusion. Furthermore, less than half of the participants selected the correct management strategy for tooth avulsion, both when presented with a scenario within one hour of the injury and when presented with a scenario exceeding six hours. The observed low response rates may be

attributable to the complexities inherent in emergency settings, where life-threatening conditions often take priority.<sup>11</sup>

Gender, as well as prior training and retraining in dental trauma courses, did not demonstrate a significant correlation with knowledge levels, underscoring the necessity for comprehensive training programs in dental trauma management. Epidemiological data reveal substantial variability in reported dental trauma prevalence, likely attributable to factors including patient nationality, age, gender, and the diverse classification methodologies employed across studies, thus hindering direct comparability.<sup>12, 13</sup> A recent review indicated that approximately one-third of preschoolers experience

trauma to their primary dentition, while roughly a quarter of school-aged children and nearly a third of adults sustain trauma to their permanent teeth, although the specific prevalence varies within and between countries.<sup>14</sup>

A substantial body of research has revealed a significant knowledge deficit concerning the management of TDIs among both healthcare professionals and the general public. Studies conducted in the United Arab Emirates, Turkey, and Iran have consistently shown low comprehension of the diagnosis and treatment of dentofacial trauma among emergency department physicians and residents.<sup>15, 16, 20</sup> Analogous findings of inadequate knowledge regarding the appropriate management of dental trauma, including avulsions, have been reported among emergency physicians, dentists, teachers, and parents in Germany, Saudi Arabia, and Brazil.<sup>16, 17</sup> These studies frequently observed a tendency among physicians to prioritize immediate dental consultation, often neglecting interim measures such as tooth splinting. Furthermore, discrepancies were observed between recommended procedures for avulsed teeth (e.g., storage in milk or saline) and actual knowledge levels. This knowledge gap extends beyond healthcare professionals, as evidenced by research involving primary school teachers in Brazil and in recent systematic review in Saudi Arabia<sup>18, 19</sup>, which demonstrated similarly deficient understanding. Collectively, these studies emphasize a widespread lack of awareness regarding established emergency management protocols for traumatic dental injuries across diverse populations and geographic regions.

## Conclusion

This study revealed a significant knowledge deficit among a substantial portion of surveyed dentists regarding critical elements of emergency management for TDIs, notably in the diagnosis of complex cases and the management of associated complications. Dentists who frequently encountered such injuries demonstrated significantly higher awareness scores compared to those who reported never encountering them. Furthermore, the research

documented diverse experiences among dentists in addressing these injuries, with recurring themes including obstacles to prompt intervention, communication difficulties with patients, and the necessity for enhanced training and support systems in emergency dental care. Participating dentists expressed a need for more practical training opportunities and the development of clear clinical guidelines for the management of such cases.

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## Author Contributions:

MA; designed the study, literature review, preparation, and editing of the manuscript. HS participated in the design of the study, data collection, preparation, and editing. AT; participated in the study design, data collection, preparation, and editing of the manuscript. All authors (MA, HS, and AT) reviewed the preliminary and final analyses and the drafts. Finally, all authors read and approved the manuscript.

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**Conflict of Interest:** The authors declare no conflict of interest.

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