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Comparison of Knowledge of General Dental Practitioners and Specialists about Emergency Management of Traumatic Dental Injuries in Pakistan

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ABSTRACT

Background: Traumatic dental injuries pose significant challenges in dental practice, requiring prompt and accurate management to optimize patient outcomes.
Objective: To compare the knowledge between General Dental Practitioners and specialists regarding the emergency management of traumatic dental injuries.
Materials and Methods: A comparative cross-sectional study was conducted with 40 participants (20 General Dental Practitioners and 20 operative dental specialists) using a convenience sampling technique through an online survey. Participants were selected based on their qualifications, age (25-60 years), and Pakistani nationality. Exclusion criteria included dental students, house surgeons, technicians, and postgraduate residents. The questionnaire included 12 questions assessing Traumatic dental injuries management knowledge. Chi-square tests were used to compare awareness levels between General Dental Practitioners and specialists.
Results: No significant differences were found in age, gender, or experience between General Dental Practitioners and specialists. Specialists showed significantly higher awareness and knowledge in managing traumatic dental injuries (TDIs). Specifically, specialists were more knowledgeable about orthodontic repositioning for immature permanent maxillary tooth intrusion ($p < 0.001$), management strategies for mature maxillary tooth extrusion ($p = 0.005$), and handling of avulsed teeth ($p = 0.001$). Significant differences were also observed in pulp exposure management ($p < 0.001$ for pinpoint exposure; $p = 0.001$ for large exposure) and storage media preference ($p = 0.001$). No significant differences were found for splint duration ($p = 0.2$), antibiotic choices ($p > 0.9$), and replantation of avulsed primary teeth ($p = 0.2$).
Conclusion: Specialists demonstrated significantly higher knowledge than General Dental Practitioners in managing traumatic dental injuries
Keywords: General Dental Practitioners, Knowledge, Specialists, Traumatic Dental Injuries

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INTRODUCTION

Dental traumatic injuries (TDIs) affect the teeth and surrounding oral structures due to external forces.[1] These injuries can range from minor enamel fractures to more severe conditions such as avulsions, luxations, and fractures involving both the hard and soft tissues of the mouth.[2] They are commonly classified into types such as uncomplicated crown fractures, complicated crown fractures, root fractures, and luxations, including concussion, subluxation, and extrusion.[3] A customized treatment approach is essential to mitigate long-term complications such as loss of vitality and root resorption.[4] TDIs affect approximately 30% of children with primary dentition and 22% with permanent dentition, with over 50% of children experiencing a TDI before graduating from school.[5]

Emergency management often includes actions such as splinting for mobile teeth, pulp capping, pulpal extirpation, re-implantation of avulsed teeth, and controlling pain and infection. Splinting involves stabilizing loose teeth by attaching to adjacent teeth with a flexible wire.[6] Pulp capping is used when the tooth's pulp is exposed but not severely damaged; a medicated material is applied to protect and promote healing of the pulp before placing restoration.[7] Pulpal extirpation, involves removing damaged pulp, cleaning the root canal system, and then sealing it.[8] Re-implantation is the process of carefully cleaning and placing of avulsed teeth back into its own socket, and splinting to reattach and heals. Each intervention has specific indications and techniques required for successful execution. Dentists must be knowledgeable to effectively treat these patients.[9]

In a Saudi Arabian study, general dental practitioners (GDPs) scored an average of 5.57 out of 12, while specialists scored 6.69 on 10-point Lickert scale. Specialists were better at handling avulsion injuries. Higher knowledge was linked to being female, being a specialist, and having experience with traumatic dental injuries ($P < 0.05$).[10] Another study assessed the knowledge of Brazilian dentists regarding the emergency management of dento-alveolar trauma. The study reported a mean awareness score of 6.4 ± 1.6 among general dental practitioners (GDPs) and 7.7 ± 1.3 among endodontists.[11]

The rationale for this study stems from the recognition that knowledge gaps exist among dental practitioners concerning the emergency management of traumatic dental injuries. Identifying these gaps and addressing them through targeted educational interventions can improve treatment outcomes and overall patient care.

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Understanding how well practitioners are informed and their adherence to recommended practices is essential for improving the standard of care.

The objective of this study is to evaluate the level of knowledge and preparedness among general dental practitioners and specialists regarding the emergency management of traumatic dental injuries. By assessing current knowledge, identifying areas for improvement, and providing recommendations for enhanced training, the study aims to contribute to the advancement of emergency dental care practices and better patient outcomes in cases of dental trauma.

MATERIALS AND METHODS

This comparative cross sectional study was conducted on 40 participants (20 general dental practitioners and 20 operative dental specialists) using a convenience sampling technique through an online survey via Google Forms. The Google Forms were distributed through email and WhatsApp to the participants. Their contact information was obtained through personal connections, WhatsApp groups, or their published papers. The inclusion criteria were qualified dentists with a BDS degree and a postgraduate qualification of at least two years (for specialists), aged 25 to 60 years, and Pakistani nationals. Dental students, technicians, and postgraduate residents were excluded. Written informed consent was obtained as part of the questionnaire, and ethical approval was granted by the hospital committee of Saidu College of Dentistry and Saidu medical college, Swat (162-ERB/024, dated: 19/9/2024).

The sample size calculation was performed in OpenEpi with a 95% confidence interval and 80% power. The mean awareness score was 6.4 (SD 1.6) for GDPs and 7.7 (SD 1.3) for endodontists from previous study.[11] Each group had 20 participants, totaling 40 for the study.

The questionnaire was adapted from previous study.[11] The first part had informed consent demographics (age, gender) and qualification and second part contained 12 questions assessing knowledge on the emergency management of traumatic dental injuries management(TDIM) of dental injuries involves various approaches for different conditions. For intruded primary maxillary anterior teeth, practitioners used spontaneous, orthodontic, or surgical repositioning. Immature permanent maxillary intrusions were managed with repositioning, semirigid splints, and root canal treatment, while mature tooth extrusions typically involved rigid splints for 2–4 weeks. Pulp exposure treatments included capping, pulpotomy, pulpectomy, or root canal therapy, depending on severity. Storage media for avulsed teeth included milk, ice, tap water, and Hanks' Balanced Salt Solution. Replantation methods varied, with some teeth rinsed or left unwashed and antibiotics like tetracycline, penicillin, or doxycycline used, with follow-ups from 2 weeks to 4 months.[10]

Data analysis was done in R software 4.3.2. Mean and SD were computed for numeric variable like age and frequencies with percentage for categorical like gender, experience and awareness parameter. Chi-square test was run to compare awareness level between GDP and specialist at $p<0.05$ significant level.

RESULTS

The comparison between General Dental Practitioners (GDPs) and Specialists revealed no significant differences in age, gender distribution, or years of experience. GDPs had a mean age of 41.30 ± 10.65 years, while specialists averaged 39.35 ± 10.25 years ($p = 0.6$). Gender distribution was similar ($p = 0.7$), with 60% of GDPs and 65% of specialists being female. Experience levels were comparable, with 60% of GDPs and 50% of specialists having 2-4 years of experience, and 40% of GDPs versus 50% of specialists having 5-6 years ($p = 0.5$). (Table 01)

The most common qualifications were BDS (20, 50%), followed by FCPS (17, 42.5%), and MCPS (3, 7.5%). (Figure 01)

Specialists showed significantly higher awareness regarding the management of traumatic dental injuries compared to general dental practitioners (GDPs). For immature permanent maxillary tooth intrusion, 19 (95%) specialists were aware of orthodontic repositioning, whereas only 8 (40%) GDPs were aware ($p < 0.001$). Conversely, 4 (20%) only GDPs knew about spontaneous repositioning. In managing mature maxillary tooth extrusion, 14 (70%) specialists recommended semirigid splint along with root canal treatment (RCT), compared to just 4 (20%) GDPs ($p = 0.005$). For extruded incisors, 14 (70%) specialists preferred semirigid splint along with RCT, while only 4 (20%) GDPs did ($p = 0.002$) this. Regarding immature teeth with pinpoint pulp exposure (≤3 hours), 20 (100%) specialists were aware of pulp capping, whereas only 8 (40%) GDPs knew this method ($p < 0.001$). For mature teeth with large pulp exposure, all specialists (100%) preferred root canal treatment, compared to 55% of GDPs ($p = 0.001$). For avulsed teeth storage, 80% of specialists preferred fresh milk, versus 50% of GDPs ($p = 0.001$). For handling immature avulsed teeth (≤60 min), 19 (95%) specialists left the tooth unwashed, compared to 9 (45%) GDPs ($p = 0.001$). No significant difference was found in splint duration for mature avulsed teeth (>60 min) ($p = 0.2$), and antibiotic choices after replantation showed no significant difference ($p > 0.9$). However, 9 (45%) GDPs replanted avulsed primary teeth, compared to 5 (25%) specialists, though the difference was not statistically significant ($p = 0.2$). (Table 02)

Table 01. Age , gender and experience among two groups

Characteristic	GDP, N = 20	Specialist, N = 20	p-value
Age (Years)	41.30 ± 10.65	39.35 ± 10.25	0.6**
Gender			0.7***
Female	12 (60.00)	13 (65.00)	
Male	8 (40.00)	7 (35.00)	
Experience			0.5***
2 - 4 Years	12 (60.00)	10 (50.00)	
5 - 6 Years	8 (40.00)	10 (50.00)	

*Mean ± SD; n (%), ** student t test; **Pearson's Chi-squared test

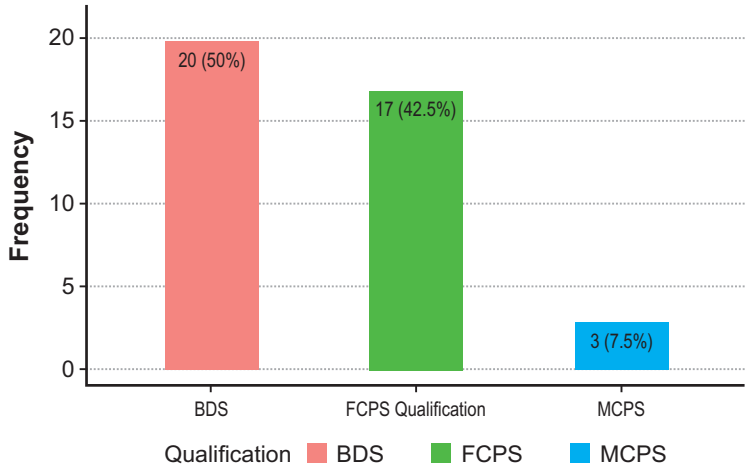


Figure 01. Distributions of qualification

Table 01. Age , gender and experience among two groups

Characteristic	GDP, N = 20	Specialist, N = 20	p-value
Immature permanent maxillary tooth intrusion			
don't know	3 (15.00)	0 (0.00)	
Extraction	2 (10.00)	1 (5.00)	
Orthodontic repositioning	8 (40.00)	19 (95.00)	<0.001
Spontaneous repositioning	4 (20.00)	0 (0.00)	
Surgical repositioning	3 (15.00)	0 (0.00)	
Mature maxillary tooth extrusion	3 (15.00)	0 (0.00)	
don't know			
Rigid splint, 2 weeks	7 (35.00)	2 (10.00)	
Rigid splint, 4 weeks	4 (20.00)	1 (5.00)	0.005
Semirigid splint + RCT	4 (20.00)	14 (70.00)	
Semirigid splint + RCT (pulp necrosis)	2 (10.00)	3 (15.00)	
Splint for extruded incisors			
don't know	3 (15.00)	0 (0.00)	
Rigid splint, 2 weeks	11 (55.00)	3 (15.00)	0.002
Semirigid splint + RCT	4 (20.00)	14 (70.00)	
Semirigid splint + RCT (pulp necrosis)	2 (10.00)	3 (15.00)	

Immature tooth with pinpoint pulp exposure (≤3 hours)			<0.001
Cervical pulpotomy	2 (10.00)	0 (0.00)	
Do not know	1 (5.00)	0 (0.00)	
Follow up	3 (15.00)	0 (0.00)	
Partial pulpotomy	3 (15.00)	0 (0.00)	
Pulp capping	8 (40.00)	20 (100.00)	
Pulpectomy	3 (15.00)	0 (0.00)	
Immature tooth with large pulp exposure (>24 hours)			0.4
Extraction	1 (5.00)	0 (0.00)	
Partial pulpotomy	2 (10.00)	2 (10.00)	
Pulpectomy	15 (75.00)	18 (90.00)	
Root canal treatment	2 (10.00)	0 (0.00)	
Mature tooth with large pulp exposure (>24 hours)			0.001
Extraction	2 (10.00)	0 (0.00)	
Partial pulpotomy	3 (15.00)	0 (0.00)	
Pulpectomy	4 (20.00)	0 (0.00)	
Root canal treatment	11 (55.00)	20 (100.00)	
Storage media for avulsed tooth			0.001
Fresh milk	10 (50.00)	16 (80.00)	
Hanks' Balanced Salt Solution	0 (0.00)	4 (20.00)	
Ice	2 (10.00)	0 (0.00)	
Mouth	1 (5.00)	0 (0.00)	
Paper tissue	2 (10.00)	0 (0.00)	
Patient's mouth	2 (10.00)	0 (0.00)	
Tap water	3 (15.00)	0 (0.00)	
Handling immature avulsed tooth (≤60 min)			0.001
Cleaned with any type of solution	2 (10.00)	0 (0.00)	
Doxycycline (5 min)	3 (15.00)	0 (0.00)	
Kept in fluoride solution for 20 min	2 (10.00)	0 (0.00)	
Left unwashed	9 (45.00)	19 (95.00)	
Rinsed with tap water	3 (15.00)	0 (0.00)	
Scrubbed gently	1 (5.00)	1 (5.00)	
Splint for mature avulsed tooth (>60 min)			0.2
2 months	3 (15.00)	1 (5.00)	
2 weeks	8 (40.00)	15 (75.00)	
3 weeks	1 (5.00)	0 (0.00)	
4 weeks	5 (25.00)	2 (10.00)	
No splint	3 (15.00)	2 (10.00)	
Antibiotic after replantation			>0.9
No	2 (10.00)	3 (15.00)	
Penicillin	8 (40.00)	7 (35.00)	
Tetracycline (>12 years)	10 (50.00)	10 (50.00)	
Replant avulsed primary teeth	9 (45.00)	5 (25.00)	0.2

*n (%), **Fisher's exact test; Pearson's Chi-squared test

DISCUSSION

Our study revealed that Specialists had greater awareness of managing traumatic dental injuries compared to General Dental Practitioners (GDPs). Specialists were more knowledgeable about treatment options for immature permanent maxillary tooth intrusion and preferred methods like semirigid splinting combined with root canal treatment for managing mature maxillary tooth extrusion. They also had a better understanding of handling immature teeth with pinpoint pulp exposure and selecting appropriate storage media for avulsed teeth.

Ali et al.[12] assessed knowledge among GDPs and specialists in Qassim, Saudi Arabia. The mean knowledge score for GDPs was 5.57, whereas specialists scored 6.69 out of 12. Significant differences were observed in the management of avulsion injury, where specialists demonstrated superior knowledge ($p < 0.05$). Our findings align with these results, confirming that specialists generally have better knowledge about managing traumatic dental injuries compared to GDPs.

Al-Mahmoud et al.[13] carried out a study focused on emergency department physicians and residents in the UAE. It found that specialists had higher knowledge scores compared to general practitioners ($p = 0.001$). However, a significant difference in knowledge based on years of experience was also noted, with those having less than five years of experience scoring higher ($p = 0.034$). Our results support the notion that specialists are more adept at managing TDIs, though the focus of our study was on GDPs and specialists rather than emergency department physicians.

Assadi et al.[14] in northern Iran, reported that emergency medicine specialists had good knowledge (71.5%), while general practitioners had an average knowledge level (93.4%) [4]. This study highlighted the need for further training to improve knowledge among GPs. Our findings are consistent with this observation, as we noted that specialists had more extensive knowledge about TDI management compared to GDPs.

Yigit et al.[15] in Turkey found that the majority of emergency medicine physicians had low knowledge regarding the management of dentofacial traumatic injuries ($p < 0.01$) [5]. Although our study focused more on the comparison between specialists and GDPs, it underscores the broader issue of insufficient knowledge among healthcare providers, which is corroborated by our findings.

Cınar et al.[16] in Ankara, Turkey, showed that specialists did not significantly outperform GDPs in terms of correct answers regarding TDI management ($p > 0.05$) [6]. Our study found that specialists were generally more knowledgeable, which might reflect different study methodologies or participant groups.

The strengths of this study are its comparative design and the inclusion of both general dental practitioners and specialists, offering valuable insights into the differences in their knowledge of traumatic dental injury management. However, the limitations include the small sample size, convenience sampling method, and reliance on online surveys (selection bias), which may affect the generalizability of the results.

CONCLUSION

Based on our results, it can be concluded that there is a significant difference in the knowledge and management practices between specialists and General Dental Practitioners (GDPs) concerning traumatic dental injuries (TDIs). Specialists exhibit greater awareness and demonstrate superior management strategies across various TDI scenarios. This highlights the need for targeted training and continuing education for GDPs to enhance their knowledge and skills, ultimately leading to improved care for patients with traumatic dental injuries.

Ethical Consideration

This study was approved by Institutional Review Board of Saidu College of Dentistry, Swat, Pakistan.

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Conflict of Interest

Authors declared no conflict of interest.

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DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

AUTHORS' CONTRIBUTION

The following authors fulfill authorship criteria as per ICMJE guidelines;

Alam F, Ubaid W: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.

Afzal A, Munir B: Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.

Ayoub F: Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.

Rehman FU: Analysis and interpretation of data, critical revision, final approval, agreed to be accountable for all the work.

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