

Knowledge of registered dental practitioners regarding dental traumatic injuries

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Abstract- Objective: Dental traumatic injuries (DTI) refer to trauma occurring to the teeth, periodontium or surrounding hard and soft tissues of the oral cavity. Patient presenting with DTI usually has a fractured, loosened or a dislodged tooth. DTIs may occur due to falls, collision with object or a person, road traffic accidents or sports trauma. The aim of the current study was to explore the knowledge of practicing dentists in Karachi, Pakistan regarding DTI's arising from different case scenarios.

Methods: An analytical cross-sectional study was conducted through an Interview style questionnaire among 216 active dental practitioners in the city of Karachi, Pakistan selected through non-probability convenience sampling method. The knowledge of dentists in treating dental trauma cases was assessed using a fourteen-item questionnaire based on eight different clinical scenarios involving DTI's; with a score of one for each correct answer.

Results: Of a maximum of 12 correct answers to the questions given, respondents' scores ranged from 1 to 11 (7.06 ± 1.97). A significant connotation was found between the mean knowledge scores and previous trauma experience ($P = 0.015$). Similarly, practitioners' gender seemed to have a significant association with the mean knowledge scores ($P = 0.032$). Moreover, a poor correlation between knowledge scores and postgraduate trauma courses ($P = 0.615$) or years since graduation ($P = 0.894$). Conclusion: Although there were several limitations in this study but the study gives an insight of Pakistani dentist's knowledge in DTIs. The tremendous variation in knowledge scores of the dentists in this study suggests that more efforts should be focused on continuous professional development so that the knowledge of dentists in treating DTIs is improved.

Index Terms- Knowledge, Dental Trauma, Practicing Dentist

inadequate lip coverage, overbite, or overjet are more prone to have DTI in the primary dentition (2,7,10). Most commonly seen age group is from 3-5 years for the primary dentition and 10-12 years for the permanent dentition (8) and the maxillary incisors being the most prevalent of all the teeth presenting with injuries (9,11). Due to lack of awareness in general population DTI are not considered to be an emergency situation (12,13).

DTI may also result in early loss of the teeth, resulting in functional loss as well as have detrimental behavioral effects on the individual. Such events may also result in upsurge of self-consciousness among the children regarding their appearance and may increase the risk of being bullied by peers (14,15). Managing DTI can be challenging, as many general dental practitioners may not be prepared for it. Adequate knowledge and good clinical skills are crucial in the long-term prognosis of traumatized teeth (16). Numerous studies have been conducted in different parts of the world, which suggests that the general dental practitioners lack adequate knowledge and expertise regarding the management of a patient with DTI. It was found that they have poor to average knowledge regarding the subject (15,17,18).

To our understanding, from indexed literature no data is available on the knowledge of practicing Pakistani dentists in treating dental traumatic injuries. Consequently, we hypothesized that knowledge of licensed Pakistani practicing dentist will be adequate and up to date when treating dental injuries. Therefore, the objective of the current study was to explore the knowledge of practicing dentist in Karachi, Pakistan regarding DTI arising from different case scenarios. This in turn shall give an idea about the recent standards of care adopted by the dental practitioners regarding treatment of dental trauma.

I. INTRODUCTION

Dental traumatic injuries (DTI) refer to trauma occurring to the teeth, periodontium or surrounding hard and soft tissues of the oral cavity (1). Patient presenting with DTI usually has a fractured, loosened or a dislodged tooth (1). DTIs may occur due to falls, collision with object or a person, road traffic accidents or sports trauma (2-5). DTI accounts for a majority of dental related emergency visits occurring in dental clinics and outpatient department. Evidence suggests that approximately 46% of the children have a history of traumatic injuries in primary and/or permanent teeth at least once in their childhood (1,6,7). Approximately one-third of children and toddlers and one-fifth of adolescents and adults sustain a DTI (1,8,9). Children with

II. MATERIALS AND METHODS

An analytical cross-sectional study was conducted through an interview style questionnaire among active dental practitioners in the city of Karachi, Pakistan. The knowledge of dentists in treating dental trauma cases was assessed using a fourteen-item based questionnaire. The questionnaire for this study was piloted among (Eighteen dentists) using similar surveys previously conducted by Akhlaghi et al (19) and Hatem and Taher (20). The reliability of the questionnaire was calculated through Cronbach's alpha. Twenty practicing dentists completed the questionnaire within an interval of 3 weeks. The Cronbach alpha of the questionnaire was calculated as 87.4 %, which indicated the reliability of questionnaire. 216 dentists;

both specialist and general dental practitioners were selected through non-probability convenience sampling method from different parts of Karachi city, Pakistan. The data was collected for a period of 3 months from April-June 2021. The questionnaires were given to the participants under supervision of the main author and were collected afterwards completion. Survey forms, which were incompletely filled, were mislaid. Moreover, the confidentiality of the members was preserved, name and any other recognizing information was not asked.

The questionnaire was divided into two parts. The first part enquired about the demographic data of the participants i.e. the gender, age, year of graduation, experience related to dental trauma, postgraduate trauma course attended and their own self-assessment regarding the knowledge about DTIs. The second part of the form was related to dental trauma cases. Eight different case scenarios were given to the participants. Each scenario consisted of four options. The dentists were asked to select the option, which they found out to be best in relation to the situation. The questions asked to the participants were as follows:

1. Patient with incomplete root formation visits dentist after one hour of trauma involving both enamel and dentine.
2. Avulsed tooth storage medium and type of splint used for stabilization of replanted tooth.
3. Tooth fracture not exposing the pulp but involving enamel and dentine.
4. Immediate management of horizontal middle root fracture involving tooth 21.
5. Immediate treatment of avulsed tooth which has been in dry medium for more than 2 hours.
6. Change in color and internal resorption of tooth number 12 which got traumatized four years ago.
7. Avulsed tooth with complete root formation that was replanted within 30 mins.
8. Immediate treatment for tooth intrusion.

A score of one was dedicated to each correct answer. A score between 0-5 was given as poor knowledge. A score that was between 6-10 was set as good knowledge. A score of 10 onwards was agreed to be as excellent knowledge. The data was analyzed and managed by Statistical Package for Social Sciences 20 (SPSS Inc. Chicago, IL, USA). Descriptive analysis of the data including frequencies, percentages and means of dentist's knowledge were calculated. Association among the suggested treatment modalities and dentist year of experience, trauma experience was also assessed using one-way Anova.

III. RESULTS

(Table 1) Show that the mean age of 216 participants was 27.5 ± 4.8 years. 66.4% participants were graduates, while the rest had some kind of postgraduate qualification. The male to female ratio of the sample was 1:1.8. Most of the partakers (69.4%) had less than 5 years of experience since graduation. 73% of the participants had former trauma experiences in practice while less than 24% answered that they took courses on dental trauma management in their postgraduate programs. Out of a total 12 correct answers to questions attempted, respondents' scores ranged from 1 to 11, with mean score of 7.06 ± 1.97 .

A significant connotation was found between the mean knowledge scores and previous trauma experience ($P = 0.015$), as

dentists with trauma experience looked to have better knowledge (87.14% correct answers) than dentists with no trauma experience (43.25% correct answers). Similarly, doctors' gender seemed to have a substantial association with the mean knowledge scores ($P = 0.032$). Furthermore, there was a poor correlation between knowledge scores and postgraduate trauma courses ($P = 0.615$) or years since graduation ($P = 0.894$) (Table 2 & 3).

IV. DISCUSSION

Appropriate knowledge in treating DTIs reduces anxiety and improves prognosis among patients (21). Therefore, the dentist should be well equipped and familiar with the current evidence-based protocol in treatment of DTIs. The results in this study presented ruttet pattern of knowledge among dentists in treating DTIs and supports the finding of previously conducted studies (17,22). On some given scenarios, the knowledge of dentists was quite good and diverse however; some of the responses were quite unsatisfactory.

The sample in the study showed considerable and extensive knowledge when asked about the management of avulsed tooth. More than three-fourth (88.5%) knew that replanting the tooth back into the socket should be the first line of treatment. While, more than eighty percent were responsive of the correct procedure that can be done when a patient comes to dental clinic after tooth avulsion. In contrast, when questioned about immediate treatment of middle root fracture more than half of the respondent's claimed extraction of tooth and endodontic treatment as there first choice. Only Around one-fourth of the dentists advocated thermal test, rigid splint as correct treatment of choice. This is in concurrence from study by Krastl et al (17) that reported the same conclusions. Up to date literature and evidence suggests splinting of tooth for 3 to 4 weeks with closed reductions of root segments improves stability and prognosis (13).

A root fracture involving dentine, enamel and pulp exposure is referred to as complicated root fracture (10,23). Evidence suggests that partial pulpotomy should be done both for immature and mature teeth following traumatic pulp exposure (24). When asked about complex root fracture in a tooth with incomplete root formation 64.1% opted for pulpotomy. Similarly, when asked about the best medicament used in this scenario more than 80% (182 participants) chose calcium hydroxide as the best medicament. These results support the findings of studies done in other parts of the world on dentist's knowledge for the treatment of complicated root fractures (25,26).

The knowledge that the dentists had regarding best medium to store avulsed tooth when specialized culture medium was not available was surprisingly up to date and concurrent with the best available evidence. More than seventy percent of the participants proclaimed cold milk as the best culture medium from the given options of tap water, saline and clean handkerchief. These findings endorse the results from the previous studies (27,28). However, the best-specialized storage medium improving prognosis of replanted tooth is Dentosafe (Medice, Iserlohn GmbH Germany) but this choice was not presented in the survey

(29).

Evidence suggests that in case of avulsion of tooth semi rigid splint for 7-14 days is a treatment of choice whereas if alveolar fracture is associated with avulsion, then it is advisable to splint for at least 4-8 weeks (1,28). In the present study, 51.2% of the dentist chose the right option, which was higher than two previous studies done in Brazil and Libya (20,26).

V. CONCLUSION

Although there were several limitations in this study but the study gives a good insight of Pakistani dentist's knowledge in treating DTI. This is the first study of its kind in the country and will surely help the regulatory body in making changes in curriculum designs both at undergraduate and postgraduate level in order to enhance patient care and satisfaction and improving quality of the dentists. More effort should be focused on continuous professional development so that the knowledge of dentists in treating DTI is improved. Further, in depth studies must be conducted in other parts of the country may provide a wider picture of the situation.

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Table 1: Demographic data of the participants.

<u>Demographic data</u>	<u>Number (%)</u>
Age	
Age range	20 - 63 years
Mean \pm SD	27.5 \pm 4.84 years
Gender	
Males	79 (36.4)
Females	137 (63.6)
Years since graduation	
<5 years	150 (69.4)
5-15 years	45 (21.3)
>15 years	20 (9.3)
Trauma experience	
Yes	53 (36.8)
No	91 (63.2)
Postgraduate trauma courses	
Yes	158 (72.8)
No	59 (27.2)

Table 2: Mean knowledge scores in relation to demographic data of the respondents

<u>Participants information</u>	<u>Mean score \pm SD</u>	<u>P value</u>
Gender		
Male	6.96 \pm 1.98	0.032*
Female	7.10 \pm 1.97	
Years since graduation		
<5 years	7.15 \pm 1.95	0.894
5-15 years	7.02 \pm 1.96	
>15 years	6.65 \pm 2.16	
Trauma experience		
Yes	7.04 \pm 1.94	0.015*
No	7.10 \pm 2.08	
Postgraduate trauma courses		
Yes	7.14 \pm 2.23	0.615
No	7.01 \pm 1.88	

*Significant association, SD: Standard deviation

Table 3: Frequency and Percentage distribution of answers in the questionnaire.

Case 1: A patient comes with tooth fracture after 1 hour of the accident, on examination there is pulp exposure with incomplete root formation.

Q1: The immediate treatment of choice is?

A. Pulpectomy	55 (25.3)
B. <i>Pulpotomy</i>	139(64.1)
C. Endodontic treatment in a single session	16(7.4)
D. I don't know	7 (3.2)

Q2: Medication recommended to use in this case?

A. Aramon chloroform	3 (1.4)
B. <i>Calcium hydroxide</i>	182 (85.4)
C. Formalin	10 (4.7)
D. No medicament needs to be employed	8 (3.8)
E. I don't know	10 (4.7)

Case 2: A father called the dental clinic saying that his son has knocked out his tooth while playing at this instant.

Q3: What directions should you give to the father?

A. Store the tooth in water and visit the dental clinic immediately	13 (6.0)
B. Store the tooth in ice and visit the dental clinic immediately	9 (4.1)
C. <i>Replant the tooth or if not possible, store the tooth in saline and visit the dental clinic immediately</i>	192 (88.5)
D. I do not know	3 (1.4)

Q4: What is the next procedure to be done at the dental clinic?

A. Thermal test, radiographic examination, endodontic treatment	24 (11.1)
B. <i>Radiographic examination, splint and diet and hygiene instructions</i>	184 (84.8)
C. Do not know	9 (4.3)

Q5: Use what type of splint and how long should it in this case?

A. Rigid, for 2 weeks or until tooth mobility has reduced	69 (31.8)
B. Semi-rigid or rigid, a month	20 (9.2)
C. <i>Semi-rigid, for 2 weeks or until tooth mobility has reduced</i>	111 (51.2)
D. No splint should be used	5 (2.3)
E. don't know	12 (5.5)

Q6: Would you prescribe any medications

A. No	13 (6.0)
B. Yes, antibiotic of narrow spectrum, anti-inflammatory, analgesics	36 (16.7)
C. Yes, anti-inflammatory, analgesics	36 (16.7)
D. <i>Yes, antibiotic of extended spectrum, anti-inflammatory, analgesics</i>	128 (59.3)
E. I don't know	3 (1.4)

Case 3: Patient came to the dental clinic with complain of mild pain in tooth no. 41, he had an accident a day ago, on clinical examination there is enamel and dentine fracture but no pulp exposure.

Q7: The instant action is?

A. Endodontic treatment	5 (2.3)
B. <i>Calcium hydroxide liner applied on exposed dentin, and then it's decided whether or not to place immediate restoration</i>	161 (74.2)
C. Immediate restoration with composite resin	49 (22.6)
D. I don't know	2 (0.9)

Case 4: A patient came to the office clarifying a mishap that she suffered the day before, after radiographic investigation, tooth no. 21 showed a middle root fracture.

Q8: The instant management is?

- | | |
|--------------------------------------|-----------|
| A. Extraction of the tooth | 97 (44.7) |
| B. Endodontic treatment | 42 (19.4) |
| C. <i>Thermal test, rigid splint</i> | 38 (17.5) |
| D. Thermal test, semi-rigid splint | 34 (15.7) |
| E. I don't know | 6 (2.8) |

Case 5: A patient came to the office with an avulsed tooth, which has been dry for 7 h.

Q9: The instantaneous treatment is?

- | | |
|--|------------|
| A. Cleanse tooth and socket with saline solution, replant the tooth, splint, and antibiotic therapy | 36 (16.7) |
| B. Place the tooth in 2.4% fluoride solution, cleanse the alveolar socket with saline, replant, endodontic treatment, splint, and antibiotic therapy | 32 (14.8) |
| C. <i>Place the tooth in 2.4% fluoride solution, cleanse the alveolar socket with saline, endodontic treatment, replant, splint and antibiotic therapy</i> | 103 (47.7) |
| D. Replacement of missing teeth by prosthesis | 35 (16.2) |
| E. I don't know | 10 (4.6) |

Case 6: A patient came to the office complaining of change of color of tooth no. 12. He clarified that the tooth has been traumatized 4 years ago. Radiographic examination shows internal resorption.

Q10: The treatment is

- | | |
|--|------------|
| A. Extraction | 15 (7.0) |
| B. Pulpectomy | 12 (5.6) |
| C. Endodontic treatment in one session | 169 (78.6) |
| D. <i>Endodontic treatment by means of replacing filling with calcium hydroxide before the canal is obturated definitely</i> | 75 (52.7) |
| E. I don't know | 4 (1.9) |

Case 7: A 25yr old patient presented with an avulsed tooth, which was replanted within 30 min of the injury.

Q.11: The next stage is?

- | | |
|---|-----------|
| A. Immediate root canal treatment | 23 (10.8) |
| B. Perform apical resection and transdental fixation | 13 (6.1) |
| C. Not to perform root canal treatment within first month of the injury | 60 (28.3) |
| D. <i>Root canal treatment within 1-2 week</i> | 83 (39.2) |
| E. Root canal treatment should never be performed | 15 (7.1) |
| F. I don't know | 18 (8.5) |

Q12: If a specialized cell culture medium is not available, the best possible storage medium of the avulsed tooth would be?

- | | |
|-------------------------|------------|
| A. Tap water | 2 (0.9) |
| B. Saline | 49 (23.6) |
| C. A clean handkerchief | 6 (2.8) |
| D. <i>Cold milk</i> | 159 (73.6) |

The correct answers are printed in italics