

# Knowledge and Practice of General Dental Practitioners Concerning Dental Trauma Management in Children in Ahvaz, Iran

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## Abstract

**Background and Objectives:** Traumatic dental injuries (TDIs) are unpleasant experiences for children and they necessitate to be treated as soon as possible. This cross-sectional study aimed to assess the knowledge and practice of general dental practitioners (GDPs) regarding emergency management of TDIs in Ahvaz, Iran.

**Subjects and Methods:** In this study, a two-part questionnaire was responded by 100 GDPs. The first section included questions on demographic information and the second section was composed of questions on different dental injuries. One score was assigned to each correct answer; the total score of 10 to 30 was considered as low knowledge and practice, while scores 30-50, 50-70 and above 70 were considered as moderate, good, and high levels of knowledge and practice, respectively. The data were analyzed using Pearson's Correlation, t-test and regression.

**Results:** With regards to the level of GDP's knowledge, the mean score was 59.2%. A total of 100 (51%) dentists showed a good level of knowledge. A significant association was found between knowledge and practice of GDPs in their practice encountering and treating TDI (P=0.001).

**Conclusion:** The overall knowledge of GDPs about management of TDI in the selected community was good.

**Keywords:** Children, General Dental Practitioner, Knowledge and Practice Assessment, Traumatic Dental Injuries

## 1. Introduction

Physical activity is a basic need for children's growth and the World Health Organization gave the slogan of "move for health" in 2002, which refers to the role of physical activity in health (Bastone, 2000). Dental trauma is a public health concern which may affect an individual's everyday efficiency and quality of life. School absence as well as financial and psychosocial effects resulting from dental-orofacial injuries have significant impacts on health of children, their families, people, and community (Sae-Lim, 2001; Chan, 2001; Ramos-Jorge, 2008). It has also been observed that an injury to the tooth crown that causes an unsightly fracture has adverse effects on children's progress in school, their mental health, and their behaviors in other situations. Malocclusion may occur in a short time after trauma due to the loss of proximal and incisal contacts of the teeth (Basrani, 1985). Despite tendency to decreased incidence and prevalence rate of tooth decays in developed regions according to reports, one out of two children suffers from a dental injury, most between the ages of 8 and 12 (Andreasen, 1990; Mc Donald, 2011). The prevalence of dental injuries is 60% and the maxillary anterior teeth are involved in more than 48% of cases (Grimm, 2004). The majority of traumatic injuries occurs at home and school because of sport activities and training exercises, transportation, domestic violence, traveling, and argument and conflict among children (Shashikiran, 2006; Navabazam, 2010; Fiores, 2001; Malikaew, 2006; Kinoshita-Kawan, 2008; Trebert, 2009). It is believed that in most cases of dental trauma, a prompt and appropriate treatment can prevent subsequent oral and cosmetic problems (Mc Donald, 2011). After a trauma occurs, the dentist asked for counseling and treatment is obliged to treat the patient using emergency procedures and quickly and timely refer him/her to a relevant specialist, because in the absence of properly and timely treatment, child's dental and mental health are compromised and also it may increase the risk of tooth loss (Grimm, 2004).

The knowledge and skills of general dentists play a decisive role in the management of dental trauma in children. (Holan, 2013) The emergency treatment, restoration and preservation of the anterior teeth of children need clinical

skills, knowledge of problem diagnosis, excellent emergency treatment, and appropriate long-term follow-up (Kostopoulou, 2005). The ultimate goal in treating teeth trauma is the long term prognosis of the involved teeth. The proper and prompt treatment of traumatic dental injuries is an important factor in prognosis of teeth, due to the importance of the vitality of the periodontal ligament cells in most cases (Jaramillo, 2010). Therefore, every dentist should be prepared to deal with such injuries, which are among the most diverse cases of dental emergencies. Hence, making proper decisions help dentists to act more skillfully and with more self-confidence (Basrani, 1985). Dentist's enough information about dental injuries and how to treat them can greatly reduce the stress and concerns of patients and their families. In addition, performing required treatments at the time of the injury will prevent subsequent adverse complications (Maguire, 2000). The lack of proper and immediate treatment and long-term follow-up results in an increased chance of multiple complications in the involved tooth such as pulp necrosis or even tooth extraction. Numerous cases of unsuccessful treatment are due to dentist's neglect to provide primary counseling and long-term follow-up after treatment (de Franca 2007).

The knowledge of dentists concerning the diagnosis and treatment of different dental injuries has been assessed in different countries. Kostopoulou and Duggal (2005) showed that the knowledge of dentists regarding the treatment of traumatized teeth was inadequate in the UK and Krastle et al. (2009) also reported that German dentists' Knowledge was not adequate. The aim of this study was to evaluate the knowledge and practice of general dentists regarding management of dental injuries in children in the city of Ahvaz, Iran.

## 2. Methods

This was a cross-sectional study and the study population was general dental practitioners (GDPs) in the city of Ahvaz. Considering the number of dentists and using Cochran formula, a sample size of 100 was calculated. The data collection instrument was a questionnaire. The content validity of the questionnaire was assessed by a number of professors of Pediatrics Department, School of Dentistry and their comments were applied. To ensure the reliability of the results (reliability of the questionnaire), before starting the study, 15 copies of the questionnaire were prepared and provided to the dentists as a pilot sample. Then, Cronbach's alpha was calculated and finally, considering the possible lack of response and cooperation of dentists, 140 questionnaires were provided to the dentists through referring to their offices in regions 1, 2, 3 and 4 of Ahvaz and explaining the purpose and method of the study. In order to avoid disturbance at the time of treatment, we referred to their offices to gather the answers one week later. Among the 140 dentists, approximately 30 were not willing to cooperate and 10 dentists did not fill out the questionnaires completely. Therefore, sampling continued to achieve a number of 100 completed questionnaires. Descriptive statistics were used to analyze the results. We used Pearson's correlation to evaluate the relationship between knowledge and practice and the quantitative variables. T-test was applied to assess two-state variables, and multivariate variables were analyzed by linear regression. All the data were calculated using SPSS software version 20 at confidence interval of 95%.

## 3. Results

Among the 140 questionnaires provided to the dentists, 40 were excluded, 30 of them due to lack of dentist cooperation and 10 due to incomplete replies. Ultimately, 100 completed questionnaires were evaluated. According to the demographic data, 54% of the dentists participated in this study were female and 46% were male; 31% of dentists had work experience of less than four years, 20% 4-7 years, 10% 7-10 years, and 39% more than 10 years. In terms of attendance at continuing education courses regarding dental injuries, 11% had attended these courses in the past six months, 20% in the past one year, 20% in the past two years, and 49% more than two years ago (Table 1).

Based on the results, there was an adverse relationship in the dentists' age with knowledge ( $P = 0.00$ ) and practice ( $P = 0.198$ ). It means that the higher age of dentists, the less their knowledge. The knowledge ( $P = 0.00$ ) and practice ( $P = 0.089$ ) of males were lower than females. There was an adverse relationship in work experience of dentists with their knowledge ( $P = 0.00$ ) and practice ( $P = 0.123$ ). This means that the more work experience, the less their knowledge. Attendance at continuing education courses about dental injuries had no effect on their knowledge and practice. (Knowledge  $P = 0.573$ , practice  $P = 0.592$ ) (Table 1).

In response to the questions about luxation injuries (Table 3), approximately 58.1% of respondents gave correct answers; the most correct responses were obtained for Lateral luxation and avulsion and the least correct responses were observed for intrusion injuries. In response to the questions regarding crown fracture (Table 2), about 62.4% of the participants answered correctly.

In response to the questions related to knowledge of trauma to primary dentition, 55.1% of responses were correct (Table 4). It should be noted that all the items related to knowledge of primary and permanent dentition were

higher in females than males. Among different variables, the most effective factor in the practice of dentists was their knowledge toward dental trauma. Therefore, the higher level of their knowledge, the better their practices.

Table 1. Relationship between Knowledge of Traumatic Dental Injuries and Demographic Variables of Dentists

Variable		Frequency,	Knowledge		Practice	
		%	Mean (SD)	P value	Mean (SD)	P value
Gender	Male	46	13.39 (3.73)	0.000	39.26 (6.47)	0.089
	Female	54	17.27 (3.59)		41.16 (4.57)	
Age, y	26-39	66	17.37 (3.23)	0.000	40.87 (5.14)	0.036
	40-64	33	11.54 (2.68)		38.87 (6.16)	
Work experience, y	Less than 4	31	16.96 (2.02)	0.000	42.03 (6.32)	0.093
	4-7	20	18.35 (3.60)		39.75 (3.75)	
	7-10	10	18.00 (4.78)		41.60 (4.59)	
	More than 10 years	39	12.20 (3.24)		38.8 (5.68)	
Attendance at continuing education courses	Last 6 months	11	13.18 (2.89)	0.000	39.27 (5.12)	0.151
	Last year	20	18.95 (3.80)		42.30 (6.51)	
	Last 2 years	20	14.30 (2.77)		38.40 (4.67)	
	More than 2 years ago	49	15.08 (4.21)		40.46 (5.47)	
Knowledge	Low, 10-30%	2			38.50 (6.36)	0.001
	Moderate, 30-50%	19			36.57 (5.04)	
	Good, 50-70%	51			40.19 (4.61)	
	High, more than 70 %	28			43.10 (6.17)	
Practice	Low, 10-30%	-	-	0.001		
	Moderate, 30-50%	1	13			
	Good, 50-70%	40	(3.68)			
	High, more than 70%	59	16.76 (3.99)			

Table 2. Questions Related to Crown Fractures

Crown Fracture Questions	Correct answers, %
1. What is the primary goal of treatment after the fracture of crown in which the dentin is exposed?	93
2. What is the preferred treatment for the patient referring within 1-2 hours after the crown fracture injury with little exposure and adequate remaining crown?	73
3. After complicated crown injuries (enamel-dentin-pulp involvement), when is the pulpotomy treatment performed?	19
4. Which type of injury is most likely to lead to pulp necrosis?	69
5. In crown-broken tooth (enamel-dentin involvement) with subluxation, if it is decided to perform composite restoration, when should the treatment start?	58

Table 3. Questions related to luxation

Lux Type	Questions	Correct Answers, %
<b>Avulsion</b>	1. What is the best treatment for avulsed permanent teeth with closed apex 1.5 hours after injury?	49
	2. In case of closure of the apex, how long after avulsion should the pulp of tooth be removed?	76
	3. For how long should an avulsed permanent tooth with open apex after implantation be splinted?	56
	4. What is the best solution for storage of avulsed tooth?	51
<b>Lat luxation</b>	5. In which case of injury should the tooth be splinted for the longest time?	73
<b>Intrusive</b>	6. In your opinion, what is the treatment plan for maxillary lateral incisors in a 12-year-old child with a lateral displacement of 3 mm?	48
<b>Extrusion</b>	7. What is the recommended treatment for an intruded permanent tooth with closed apex?	59
	8. Intruded permanent teeth have ..... prognosis than intruded deciduous teeth.	30
	9. What is the best treatment for permanent teeth with extrusion?	81

Table 4. Questions Related to Deciduous Teeth

Questions	Correct Answers, %
1. What is the best treatment for avulsed deciduous teeth?	74
2. What is the best treatment if a child's deciduous incisor root is displaced as a result of trauma to the lingual side?	70
3. What is the best treatment for the fractured crown of deciduous tooth (enamel fracture with enamel-dentin fracture)?	19
4. What is the best treatment in case of enamel-dentin fracture with pulp involvement in deciduous tooth?	57
5. What is the treatment in case of damage leading to severe loosening of a deciduous tooth?	72
6. In a deciduous tooth, the crown has been diverted toward the labial side as a result of intrusion. How is it seen in the X-ray and what is its treatment?	39

#### 4. Discussion

According to the present study, the knowledge score in females was higher than in males ( $P = 0.000$ ). Re (2014) also had similar results, while Seraj (1384) and Hamilton (1997) did not report any differences in the level of knowledge between males and females. On the other hand, there was an adverse relationship between work experience and dentists' knowledge ( $P = 0.000$ ); but concerning practice, this relationship was not significant ( $P = 0.093$ ). It meant that the dentists who had recently been employed had higher knowledge scores. In addition, Kostopoulou (2005) and Hamilton (1997) in their studies found similar results. The reason is that the more time goes by, the more the content learned in school is forgotten and their information level declines. Attendance at continuing education courses increased their knowledge about the management of dental injuries and this result is similar to the results of Kostopoulou (2005), Hamilton (1997) and Prisco (2006).

Based on the results, dentists' age was adversely related to their knowledge scores ( $P = 0.000$ ) and younger dentists had higher levels of knowledge. Kostopoulou (2005) and Hamilton (1997) also concluded the same. It seems that the less the time since graduation, the more their knowledge, which is an obvious matter.

Dentists' response rate has been reported to be different in various studies. In this study, the response rate of dentists was 59.2%; Kostopoulou (2005) reported this rate to be 68%, Seraj (1384) 70% in Tehran, Jackson (2005) 74% in England, Yeng (2008) 61% in Australia, Hamilton (1997) 90% in England, Prisco (2006) 42% in Brazil, and Stockes (1992) 35% in New Zealand. The cause of differences in the response rate of colleagues can be attributed to differences in the statistical population, the studied researchers, practitioners' interests in the type of research, and social aspects. In the present study, in the majority of participants, the level of knowledge was higher than 50%, suggesting that dentists' knowledge concerning dental trauma was at a good level.

Clinical guidelines in case of crown fractures without pulp involvement varied from a simple abrasion and polishing sharp enamel margins to prevent rupture of the tongue and lips to a repair or pasting isolated enamel pieces. Anderson recommends one month, two month, and one year follow-ups after enamel and dentin fracture to detect pulp necrosis symptoms such as loss of sensitivity, crown discoloration, and periapical lesions (de Franca, 2007). Based on the recommended guidelines, in this study, GDPs had a high level of knowledge (93%) (Table 2 question 1) regarding the management of teeth with enamel and dentin fracture with or without luxation. Luxation injuries associated with enamel and dentin fractures requires subsequent assessments. In France's study (de Franca, 2007), this approach was carried out by the majority of participants, which is very similar to our study. Furthermore, according to the study of Re (2014), composite restoration by sealing dentine was chosen by 88% of participants as a choice of conservative treatment for the fractures not involving the pulp. In a study by Akhlaghi (2014), 42.7% responded correctly in the case of involved tooth repair; their knowledge was at a low level compared to our research. In general, knowledge of other fields of dentistry such as restorative may be helpful for clinician to manage specific cases of crown fractures. With regard to the best time for the restoration of the crown (Table 2, question 5) 58% of participants chose the correct procedure and performed temporary restoration in the emergency session and avoided further manipulation of the tooth. While in Hatem's study (2015), 3.5% of participants performed composite restoration in the same session.

In complicated crown fractures in which pulp involvement is evident, time, size of exposure and root development stage are important variables in planning appropriate treatment. According to the treatment guidelines for complicated crown fractures in immature teeth, when there is a large pulp exposure (more than 2 mm), or when exposure to oral cavity is more than 24 hours, partial pulpotomy has been shown to be a highly successful approach (Robertson, 2000). However, preferential treatment in complicated permanent tooth fractures is root canal treatment (Diangelis, 2012) and in our study, knowledge of GDPs concerning the management of the pulp in such injuries was at a high level (Table 2 question 2).

Regarding the indications of pulpotomy treatment, only 19% of the participants responded correctly indicating their insufficient knowledge. (Table 2, question 3). In a study by Hatem (2015), 55.5% of dentists responded correctly regarding the treatment of dental pulp, which shows higher level of knowledge compared to the present study. In addition, Yeng (2008) reported that 86% of dentists mentioned performing vital pulp therapy for open apex teeth. Kostopoulou (2005) also reported a rate of 78% for performing pulpotomy in the treatment of fractured mature tooth with a large exposure size. Two recent studies showed a higher level of knowledge than the knowledge of our participants. However, Krastle (2009) mentioned this rate to be 25%, which is consistent with our results.

In the injuries resulting in avulsed tooth, the most important factors in achieving long-term success and sustaining the vitality of a tooth are the root development stage at the injury time, the duration of the extra-alveolar period, and the storage environment of the tooth before the implantation (Andreasen, 2006; Golpayegani, 2006). In response to the questions related to the root treatment of avulsed tooth, respectively 49% and 76% of the dentists responded correctly (Table 3 questions 1 and 2). According to the International Association of Dental Trauma (IUST) guidelines, the selective treatment for avulsed mature tooth with more than 60 minutes of extra-oral time is removing the necrotic tissue by a piece of gauze, root canal therapy, and removing clot from the tooth socket using saline, immersion in 2% sodium fluoride, replanting, splinting, and antibiotic therapy (Mc Donald, 2011). According to Andreason's research, removing the pulp may help to control early process of inflammatory root resorption. He suggested that the ideal time for filling the canal with calcium hydroxide is one week after the replant (Golpayegani, 2006).

Of the GDPs in this study, 56% performed dental splinting for 7-10 days (Table 3 question 3), showing a higher level of their knowledge of this case than the study of Hamilton (1997) (19%) and Kostopoulou (2005) (29%). In addition, in the study of Le, 58% of the study participants responded incorrectly. In Yeng's research (2008) also, the knowledge about splinting time for replanted teeth was insufficient.

With regard to the storage environment of avulsed tooth (Table 3 question 4), 51% of dentists in our study chose milk. When tooth replantation is not possible, milk is a better option than saliva, tube water or tissue, due to the composition and proper osmolality of milk. Krastle (2006) reported that two-thirds of the participants chose saline and one third of them selected cold milk as the storage environment of tooth. In the study of Yeng (2008), about 50% of GDPs also chose milk. According to the study of Kostopoulou (2005), 60% of participants stated that milk was a selective environment for avulsed permanent incisors tooth, which shows a higher level of knowledge in this regard compared to the present study. Moreover, in this study, 38% of dentists recommend to keep the avulsed tooth inside the child's mouth, which is not an acceptable and ideal environment according to studies. However, saliva and saline are comparable and are better than storing in a dry environment. France (2007) reported that knowledge of dentists concerning root treatment and washing before replant was 33%, which is insufficient.

In response to the question related to splinting in lateral luxation injuries with alveolar fracture (Table 3 question 5), about 73% chose the correct option. Therefore, when these two traumas are present, splinting duration increases. However, regarding the need for repositioning the tooth luxated laterally 3 mm (Table 3 question 6), about 48% of the participants chose the correct answer. The Principle of emergency treatment for lateral luxation injuries is repositioning the tooth properly and promptly. The knowledge of dentists about repositioning these teeth was at a moderate level, while in the study of Kostopoulou (2005), 90% of participants mentioned performing the proper reposition and splinting a luxated permanent tooth at the injury day. According to Krastle's research (2009), one third of dentists had knowledge about root treatment of a tooth with lateral luxation.

In the injuries leading to tooth intrusion, intrusion level and eruption stage of the involved tooth are the important items to decide about the treatment. If there is a permanent tooth with closed apex and the intrusion level is more than 7 mm, the best approach is gradual correction of the tooth position with orthodontic force within 2-3 weeks and then splinting it (Zhao, 2010); about 59% of GDPs chose the correct option (Table 3 question 7). Andreason (2012) reported that active repositioning of the immature tooth using either orthodontic or surgical forces causes detrimental effects on the healing capability of an intruded tooth. However, the long-term outcome of surgical exposure and endodontic treatment followed by orthodontic repositioning in cases of severe intrusive luxation is satisfactory (Andersson, 2012).

In cases with extrusion of permanent tooth, selective treatment is rapid reposition and splint of the tooth, which the majority (81%) of GDPs performed (Table 3 question 9). In the study of Akhlaghi (2014), the majority (82%) of participants considered this treatment, which is similar to our data.

In response to the questions about deciduous teeth (Table 4 question 1), 74% of dentists did not replant deciduous teeth, which is according to the recommended guidelines of IADT. In the study of Akhlaghi (2014), most

participants also chose the correct answer. Cinar (2013) reported a rate of 70%. In the trauma resulting in tooth intrusion, in case of lingual inclination of the tooth or exceeding the limit of permanent tooth bud, the tooth should be extracted; 39% of participants followed this protocol (Table 4 question 6).

According to the study findings, further studies on the knowledge of GDPs concerning dental trauma in children are suggested and teaching hours in this field should be increased during general courses. Further seminars and scientific conferences should be held about the research object. Training after graduation such as systematic education courses concerning the management of children's dental trauma and its prevention methods should be continued and older dentists must be encouraged to attend these courses.

## 5. Conclusions

- 1) The level of knowledge and practice of dentists regarding the management of dental trauma were interrelated. The higher knowledge they had, the better their practices were.
- 2) The knowledge of dentists had a direct association with gender, age, work experience, and attendance at continuing education courses and this association was adverse for the variables of age and work experience.
- 3) The knowledge of dentists about the management of permanent and deciduous teeth injuries was at a good level.

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## References

- Andreasen, J. O. (1990). Etiology and pathogenesis of traumatic dental injuries A clinical study of 1298 cases. *Scand J Dent.*, 78, 42-229.
- Andreasen, J. O., Bakland, L. K., & Andreasen, F. M. (2006). Traumatic intrusion of permanent teeth. Part 3. A clinical study of the effect of treatment variables such as treatment delay, method of repositioning, type of splint, length of splinting and antibiotics on 140 teeth. *Dent Traumatol.*, 22(2), 99-111.
- Andersson, L., Andreasen, J. O., Day, P., Heithersay, G., Trope, M., Diangelis A. J., et al. (2012). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol.*, 28(2), 88-96.
- Basrani, E., & Rappaport, H. M. (1985). *Fracture of the teeth, preventive and treatment of the vital and nonvital pulp* (2nd ed., pp. 22-39). Philadelphia: Quintessence Books.
- Bastone, E. B., Freer, T. J., & McNamara, J. R. (2000). Epidemiology of dental trauma: a review of the literature. *Aust Dent J.*, 45(1), 2-9.
- Chan, A. W., Wong, T. K., & Cheung, G. S. (2001). Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong. *Dental Traumatol.*, 17(2), 77-85.
- Cinar, C., Atabekb, D., & Alaçamc, A. (2013). Knowledge of Dentists in the Management of Traumatic Dental Injuries in Ankara, Turkey. *Oral Health Prev Dent.*, 11(1), 23-30.
- De Franc,a, RI', Traebert, J., & de Lacerda, J. T. (2007). Brazilian dentists' knowledge regarding immediate treatment of traumatic dental injuries. *Dent Traumatol*, 23, 287-290.
- De Franc,a, RI', Traebert, J., & de Lacerda, J. T. (2007). Brazilian dentists' knowledge regarding immediate treatment of traumatic dental injuries. *Dent Traumatol*, 23, 287-290.
- Diangelis, A. J., Andreasen, J. O., Ebeleseder, K. A., Kenny, D. J., Trope, M., Sigurdsson, A., Andersson, L., Bourguignon, C., Flores, M. T., Hicks, M. L., Lenzi, A. R., Malmgren, B., Moule, A. J., Pohl, Y., & Tsukiboshi, M. (2012). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dent Traumatol*, 28(1), 2-12.
- Fiores, M. T., Andreasen, J. O., & Bakland, L. K. (2001). Guidelines for the evaluation and management of traumatic dental injuries. *Dent Traumatol*, 17, 48-145.
- Grimm, S., Frazao, P., Antunes, J. L. F., Castellanos, R. A., & Narvai, P. C. (2004). Dental injury among Brazilian schoolchildren in the state of Sao Paulo. *Dent Traumatol*, 20, 8-134.

- Hamilton, F. A., Hill, F. J., & Holloway, P. J. (1997). An investigation of dentoalveolar trauma and its treatment in an adolescent population. Part2: Dentists' knowledge of management methods and their perceptions of barriers to providing care. *Br Dent J.*, 182(4), 33-129.
- Holan, G., & Mctigue, D. (2013). Intruduction to dental trauma: Managing traumatic injuries in the primary dentition. In P. Casamassimo, H. Fields, D. Mctigue, & A. Nowak (Eds.), *Editor Pediatric dentistry: infancy through adolescen* (9th ed., pp. 213-215). Missouri: Elsevier.
- Jackson, N. G., & Berggren, U. (2005). Management of dental trauma in primary care: A postal survey of general dental practitioners. *Br Dent J.*, 198(5), 7-293.
- Jaramillo, D., Rosas, R., & Angelov, N. (2010). Dental Trauma: Case-Scenario Protocol for Dentists. *Maced J Med Sci.*, 3(1), 61-67.
- Kinoshita-Kawan, S. H., & Sugibashi, Y. (2008). Lay people knowledge and attitudes on the management of traumatically avulsed teeth. *Dent J.*, 18(2), 30-124.
- Kostopoulou, M. N., & Duggal, M. S. (2005). A study into dentists' knowledge of the treatment of traumatic injuries to young permanent incisors. *Int J Paediatr Dent.*, 15(1), 9-10.
- Krastl, G., Filippi, A., & Weiger, R. (2009). German general dentists' knowledge of dental trauma. *Dent Traumatol.*, 25(1), 88-91.
- Malikaew, P., Watt, R. C. & Sheiham, A. (2006). Prevalence and factors associated with traumatic injuries to anterior teeth. *Community Dent Health*, 23, 7- 222.
- Maguire, A., Koch, G., & Johansson, U. B. (2000). A retrospective study of treatment provided in the primary and secondary cares ervices for children attending a dental hospital following complicated crown fracture in the permanent dentition. *Inter J Paediat Dent. Jun*, 10, 182-190.
- Marwa, Hatem., & Elsanousi, M. Taher. (2015). Libyan general dentists' knowledge of dental trauma Management. *IDMJAR.*, 3(1), 1-6.
- Mc Donald, R., Aver, D., & Dean, J. (2011). *Managgement of trauma to the teeth and supporting tissues*. In: Mc Donal, R., Avery, D., Dean, J. Editor. *Dentistry for the child and adolescent*. 9th ed. Indianapolis: Mosby, P.403-404.
- Mc Donald, R., Aver, D., & Dean, J. (2011). *Managgement of trauma to the teeth and supporting tissues*. In: Mc Donal, R., Avery, D., Dean, J., Editor. *Dentistry for the child and adolescent*. 9th ed. Indianapolis: Mosby, P.433.
- Akhlaghi, N., Nourbakhsh, N., Khademi, A., & Karimi, L. (2014). General Dental Practitioners' Knowledge about the Emergency Management of Dental Trauma. *IEJ Iranian Endodontic Journal*, 9(4), 251-256.
- Navabazam, A., & Shahrabi Farahani, S. (2010). Prevalence of traumatic injuries to maxillary permanent teeth in 9- to 14-years-old school children in Yazd, Iran. *Dent Traumatol*, 26, 7-154.
- Prisco, L. W., Croll, T. P., & Persson, L. G. (2006). Knowledge of Brezilian general dentists and endodontists about the emergency management of dento-alveolar trauma. *Dent Traumatol. Jun*, 22(3), 7-113.
- Re, D., Augusti, D., Paglia, G., Augusti, G., & Cotti, E. (2014). Treatment of traumatic dental injuries: evaluation of knowledge among Italian dentists. *E JPD.*, 15(1), 23-28.
- Ramos-Jorge, M. L., Peres, M. A., Traebert, J., et all. (2008). Incidence of dental truma among cohort study. *Dent Traumatol*, 24, 63-159.
- Robertson, A., Andreasen, F. M., Andreasen, J. O., & Noren, J. G. (2000). Long-term prognosis of crown-fractured permanent incisors. The effect of stage of root development and associated luxation injury. *Int J Paediatr Dent.*, 10(3), 9-191.
- Sae-Lim, V., & Chulaluk, L. P. (2001). Dental trauma management awareness of Singapore pre-school teachers. *Dent Traumatol*, 17, 6- 71.
- Seraj, B., Shahrabi, M., Bijani, M., & Haeri mehrizi, A. (1384). Assessment of Tehran general dental practitioner knowledge about tramatic dental injuries to children. *JIDA*, 19(4), 18-22.
- Shashikiran, N. D., Redy, V., & Nagaveni, N. B. (2006). Knowledge and attitude of 2000 parents with regard to avulsed permanent incisors and their emergency management. *Indian Soc Pedod Prev Dent J*, 24(3), 21- 116.

- Stokes, A. N., Anderson, H. K., & Cowan, T. M. (1992). Lay and professional knowledge of methods for emergency management of avulsed teeth. *Endod Dent Traumatol*, 8(4), 2-160.
- Trebert, J., Traino, M., Bariari, B., Larced, J. & Marcens, W. (2009). Knowledge of the Lay people and dentists in emergencies management of dental trauma. *Dent Traumatol*, 25, 89- 277.
- Vahid Golpayegani, M., & Tadayon, N. (2006). A multidisciplinary approach to the treatment of traumatically intruded immature incisors. A 6-year follow up. *Iran Endod J*, 1(4), 5-151.
- Yeng, T., & Parashos, P. (2008). An investigation into dentist management methods of dental trauma to maxillary permanent incisors in Victoria, *Australia. Dent Traumatol*, 24(4), 8-443.
- Zhao, Y., & Gong, Y. (2010). Knowledge of emergency management of avulsed teeth: a survey of dentists in Beijing, China. *Dent Traumatol*, 26(3), 4-281.

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