

Assessment of youth knowledge and attitude toward managing avulsed tooth across Saudi Arabia: A cross sectional study

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Abstract

Introduction: An increase in sports' participation especially with youth, increase the risk of dental trauma. Many studies around the world focus on the knowledge of parents, guardian, and teachers regarding emergency management of tooth avulsion. It is important to educate children and young adults about appropriate dental treatment. The aim of this study is to evaluate the knowledge and attitude of young adults regarding the emergency management of tooth avulsion.

Materials and Methods: A cross-sectional descriptive study was conducted. The target group of this study was young adults aged from 11- to 19-years old in Saudi Arabia who read either Arabic or English. A questionnaire about tooth avulsion, mouthguards, and how to handle an avulsed tooth was sent electronically by Survey Legend tool. Access was made available until the desired sample size was reached.

Results: About 390 questionnaires were collected. Subjects who received advice in dental trauma or who had previous experience with dental trauma either by suffering from the injury ($P = 0.003$) or witnessing it ($P = 0.005$) were more confident in managing future dental emergencies. Participants who had a first aid training course had significantly more correct answers.

Conclusion: This study emphasizes the importance of youth education toward emergency management of tooth avulsion using different educational methods such as regular first aid training program to all middle and high school students. School students' knowledge and attitude for managing dental trauma are inadequate, and different educational strategies for middle and high schools' students are recommended.

Keywords: Attitude, dental trauma, first aid, knowledge, tooth avulsion

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Submission: 27-01-22 **Revision:** 28-02-22 **Acceptance:** 04-03-22 **Web Publication:** 01-09-22

INTRODUCTION

Dental emergency is a considerable type of emergency that affects young population and may exceed dental caries and periodontal disease.^[1] Sports-related accidents are common

cause of dental emergency, accounting for 30% of all dentofacial injuries in children.^[2,3]

The increasing popularity of youth sports increases the risk of dental trauma.^[4] Children commonly encounter dental trauma

Access this article online	
Quick Response Code:	Website: www.saudiendodj.com
	DOI: 10.4103/sej.sej_24_22

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How to cite this article: Alamoudi R, Alamoudi R. Assessment of youth knowledge and attitude toward managing avulsed tooth across Saudi Arabia: A cross sectional study. Saudi Endod J 2022;12:277-82.

during their daily activities.^[5] Around the world, dental trauma is very common in children, with rates as high as 35%.^[6,7] Sport-related dental trauma resulted in a significant number ranging from 13% to 39%.^[8,9] Petersson *et al.* reported that sport-related dental trauma rated the fourth common injuries among the 7–30 age group.^[10] In Saudi Arabia, the prevalence of sport-related dental trauma is 34% and 33% for the ages of 12–14 and 5–6 years, respectively.^[11]

Avulsion is a serious and complicated injury resulted in a complete detachment of a tooth from its socket. It accounted for 1%–16% of all dental trauma where the maxillary central incisors are the most affected teeth. Several studies reported that it commonly occurs between 7- and 11-year-old age group.^[12] It is 75% more frequent in children under the age of 15-years old.^[13] Tooth avulsion has a significant effect on oral health problems causing pain and distress. It can affect child's quality of life,^[14] causing functional, psychological, and social affects.^[15]

Since tooth avulsion often constitutes a real dental emergency requiring immediate management,^[16] its prognosis depends on the appropriate emergency treatment.^[17] The outcome is significantly rely on a prompt and appropriate management^[18] where the immediate re-plantation of cleaned tooth is the ideal approach with a success rate of 85%–97%.^[19]

Although sport-related dental trauma is unavoidable, yet it can be prevented using a protective mouthguard, which offer an excellent protection to young athletes during contact or noncontact sports.^[20,21] Mouthguards minimize the risk of injury occurrence by absorbing and distributing the impact force. Bourguignon (2009) reported that mouthguards reduced the occurrence of dental trauma up to 90% during contact sport.^[22]

Several studies evaluated the knowledge and attitude of parents, guardians, and teachers regarding the management of tooth avulsion.^[23–26] In Saudi Arabia, AlGhamdi *et al.*^[27] reported that over 60% of the parents were not familiar with the emergency treatment of tooth avulsion. Another study of Saudi Civilians showed insufficient knowledge regarding emergency management of knocked-out tooth.^[28] However, there are situations in which a guardian is not available to advise young athletes about adequate first aid care. Thus, it is important to educate children and young adults on how to perform simple yet essential emergency care before a patient suffering dental trauma receive a professional treatment. The aim of this study is to understand the knowledge and attitude of young adults regarding emergency management of tooth avulsion.

MATERIALS AND METHODS

The study protocol and consent form were approved by the Research Ethics Committee at the College of Dentistry of King Abdulaziz University, Saudi Arabia (Proposal no. 041-04-20). The target group of this study was young adults aged from 11- to 19 years old in Saudi Arabia who read either Arabic or English.

Sample size calculation

The calculation of sample size was performed to obtain results at 95% confidence level with confidence interval of 5 and population variance of 50%, and the appropriate sample size was found to be 384. To account for the incomplete returned questionnaires, we aimed to recruit an extra 15%, which resulted in 454 subjects.

Questionnaire design

This was a cross-sectional descriptive study. As avulsion is the most serious dental emergency, it is necessary to manage it right at the scene to save the avulsed tooth. We designed a questionnaire about tooth avulsions, mouth guards, and how to handle an avulsed tooth.

The instrument used in the present study was a pretested self-structured questionnaire. A version of the questionnaire was evaluated and framed and accredited by four experts in the field of dentistry and modified for ease of comprehension. The questionnaire was sent electronically by the Survey Legend tool. Access was made available until the desired sample size was reached. The questionnaire consisted of 2 sections with a total of 16 questions. The first section included basic demographic information; gender, age, type of school, first aid training related to sports injuries, and history of tooth injury. In the next section, the participants were asked about dealing with an avulsed tooth and their knowledge regarding mouth guards.

Each respondent was informed that the survey was voluntary and that strict confidentiality was assured. Respondents were not asked for their names or for any identification or marks on forms, to guarantee anonymity. Questionnaire was constructed in both Arabic and English. Multiple answers were not allowed except for one question. Guardians were asked to help participants to understand the question if needed without helping choose the answer. All survey data were retrieved and collated by the investigators and analyzed.

Data presentation and statistical analysis

Cross-sectional descriptive percentages were computed. A Chi-square test was used to compare between different

categorical variables to evaluate knowledge and attitudes. Bonferroni correction was calculated to adjust probability (P) values and to avoid the risk of a type I error. Microsoft® Excel® 2007 software was used to tabulate data. The significance level was set at 0.05. SPSS (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY, USA: IBM Corp) was used in the analysis.

RESULTS

Of the 454 web-based questionnaires collected, 391 were complete and used for statistical analysis. The 63 incomplete questionnaires were excluded.

Part I: Demographic section

A summary statistic of respondents' background was graphically presented in Table 1. 18.9% and 54.7% of the participants had experienced or witnessed dental trauma during sports, respectively. Out of the study population, 354 (90.5%) had no first aid training, but 23% of the respondents stated that they could perform first aid.

Chi-square test indicated that there was no statistically significant difference between the frequency of dental trauma in different age groups ($P = 0.547$) and the school system ($P = 0.591$), yet the majority (57%) were from international high schools. Males reported significantly more injuries than females (37.39% and 11.23%, respectively, $P \leq 0.001$). Participants who play sports both in school and out reported more dental trauma (26.26%) followed by those who play in one or the other, then who do not play at all ($P \leq 0.001$). Mixed sports such as soccer, basketball, volleyball, tennis were the most common in Saudi Arabia, and there was a significant relation between these sports and the frequency of dental trauma (60%, $P = 0.002$).

Part II: Attitude section

Subjects who received advice in dental trauma or who had previous experience with dental trauma either by suffering from the injury ($P = 0.003$) or witnessing it ($P = 0.005$) were more confident in managing future dental emergencies. The results showed that 36.5% of participants who had dental trauma can manage future dental trauma compared to 19.9% who had not. In addition, 28.5% of respondents who witnessed dental trauma stated that they could perform first aid compared to only 16.4% who did not witness. Similar results were reported from those who had first aid training in dental trauma, 70.3% of whom were confident that they could manage an emergency care compared to 18.1% of those with no training ($P \leq 0.001$).

Part III: Knowledge section

Regarding the immediate emergency management of avulsion injuries, participants who had a first aid training course had significantly more correct answers [Table 2]. Knowledge regarding the urgency in seeking professional help immediately and washing media was not influenced by subjects' training. 62.4% understood the need to seek immediate treatment from a dentist with no significant difference between attending training course ($P = 0.070$).

Table 1: Study population by demographical characteristics (n=391)

Variable	Category	n (%)
Age (years old)	11-12	59 (15.09)
	13-14	67 (17.14)
	15-16	142 (36.32)
	≥17	123 (31.46)
Gender	Male	115 (29.41)
	Female	276 (70.59)
School type	Governmental	59 (15.09)
	National	109 (27.88)
	International	223 (57.03)
Participating in sport	In school only	87 (22.25)
	Out school only	0
	In and out school	198 (50.64)
	No	106 (27.11)
Type of sport	Mixed	130 (33.25)
	Endurance	42 (10.74)
	Mixed and endurance	34 (8.70)
	Skill	18 (4.60)
	Others	167 (42.71)
History of tooth injury	Yes	74 (18.9)
	No	317 (81.10)
Witness of tooth injury	Yes	214 (54.70)
	No	177 (45.30)

Table 2: Frequency of answers relative to tooth avulsion (n=391)

Variable	Category	n (%)
Time to seek urgent care	Immediately	244 (62.4)
	Next day	47 (12.0)
	Only if the pain is noted	71 (18.2)
	I do not know	29 (7.4)
Cleaning before replantation tooth	Discard it	67 (17.1)
	Rinse it with water and keep it	182 (46.5)
	Wipe it with tissue and keep it	51 (13.0)
	I do not know	91 (23.3)
Storage media	In a cup of liquid (milk or water)	97 (24.8)
	In an empty cup	43 (11.0)
	Wrap it in a tissue or paper	143 (36.6)
	I do not know	108 (27.6)
Hold avulsed tooth	Crown end	116 (29.7)
	Root end	50 (12.8)
	It does not matter	87 (22.3)
	I do not know	138 (35.3)
Time to replant avulsed tooth	Within 1 h	65 (16.6)
	Within 6 h	43 (11.0)
	Next day	13 (3.3)
	I do not know	270 (69.1)
Tetanus vaccine control	Yes	64 (16.4)
	No	69 (17.6)
	I do not know	258 (66.0)
Mouthguard function	Protect lip	21 (5.4)
	Protect teeth	353 (90.3)
	Protect tongue	17 (4.3)

Cleaning an ablated tooth under tap water was cited by most of the subjects with no significant difference due to first aid training ($P = 0.384$). Surprisingly, 17.1% of respondents believed that the avulsed tooth is useless and should be discarded. When participants were asked about the appropriate storage medium for transportation of an avulsed tooth, 45.9% of respondents who attended training course reported the correct answers (milk or water) while only 22.6% of nontrained group showed the correct answer ($P = 0.011$). Unfortunately, among the respondents, 69.1% were unaware of the time limits for replanting teeth, and only 37.8% with the majority trained group would replant a knocked-out tooth within 1 h with a statistically significant between trained and nontrained groups (14.4%, $P = 0.001$). When asked about the need for a tetanus shot, mouth guards, or how to hold a knocked-out tooth, both groups showed minimal knowledge with no significant different between them ($P = 0.104, 0.660, 0.067$, respectively). Overall, 66% of the participant did not know about tetanus shots and 90.3% were aware that mouthguards prevent injuries to teeth.

DISCUSSION

This direct and closed-ended web-based questionnaire was conducted to explore the knowledge and attitude about dental trauma among students in secondary and high schools in Saudi Arabia. The result of this study showed that students were less favorable than we would like it to be for emergency management of tooth avulsion. The findings of the current study were consistent with the results of other studies^[29-32] which indicate a lack of knowledge about this issue and an educational campaign on emergency management is required to increase the public awareness of this topic.

The demographic background including age and school system did not have significant relation to the incidence of occurrence of dental trauma. The higher injury rates among males may be due to their generally more aggressive play or to the closed social culture in Saudi Arabia, which makes it less likely for females to participate in such sports.^[33]

Other factors such as the storage period, transport media, and handling method may affect the prognosis of the treatment of an avulsed tooth and are directly related to the viability of periodontal ligament tissue.^[34] Several studies advocated to avoid dryness of avulsed tooth and to keep it in a moist place to minimize the risk of ankylosis which increase significantly with increasing the dryness time over 20 min.^[35,36] Ideally, the tooth should be replant within 5 min for the best prognosis.^[37,38]

Different case reports demonstrated that delayed tooth replantation results in poor prognosis.^[39,40] However, if cannot, it should be stored in a medium that maintains cell viability.^[41] The best media for transportation are Viaspan™, Hank's balanced salt solution, and milk.^[17,42] In the present study, almost half of the trained respondents were certain about choosing the appropriate media (milk or saline) to preserve the avulsed tooth. In contrast, a previous study showed that 76% of the parents were not aware of the transportation medium for the avulsed tooth.^[43] Our study also showed that 62.4% would immediately visit a dentist or an emergency department. This likely means that they are aware of the importance of urgent dental care in managing dental trauma.^[44] In addition, most (75.2%) respondents were unfamiliar with the handling techniques and 17% of them will discard the tooth. A previous study by Alzahrani and Almaqboul^[43] reported that more than 50% of the parents thought that avulsed tooth cannot be replant. Nikam *et al.*^[34] showed that 20% of parents discard avulsed teeth while Oliveira *et al.*^[45] found that 10% of Brazilian mothers would discard the tooth as they may consider an avulsed tooth to be infected.

Moreover, most of the students (90.3%) were knowledgeable that mouthguards decrease the risk of sports-related dental trauma. This result is consistent with the result of other study where 80.5% of the children knew about mouthguards as protective devices.^[31] This indicates that athletes should be encouraged to wear mouthguards and taught that it will protect their teeth since understanding this should increase the use.

Another important finding was the widespread lack of understanding the need for a tetanus shot. Despite the widespread efforts to minimize the risk of tetanus, it remains a crucial health issue.^[46] It has been advised the need of tetanus shot if avulsed tooth contacted dirt or if tetanus coverage is uncertain.^[38]

Although most of the trained or experienced youth were confident with handling dental trauma, others were afraid to touch the victim without enough knowledge. Many articles have reached this same conclusion that training and experience with such injury help to know what to do.^[46-48]

Study limitation

This study was self-administered questionnaire, which caused conflict between objective findings and subjective experience. Furthermore, this study assessed young adults from mostly the western region of the Kingdom of Saudi Arabia. It is not known whether these findings

would be similar if broader population were surveyed. Further research should be extended to include students in secondary and high schools from more distributed area in the kingdom. Postevaluation survey following the completion of the learning module should be conducted to assure the change in knowledge acquisition of dental trauma management.

Recommendations

This study points up the importance to educate school-aged students regarding emergency care of different dental trauma using a variety of educational methods by:

- Regular first aid training including information about dental trauma, with emphasis on the importance of appropriate action to improve prognosis. This should be addressed as a part of the annual community services awareness campaign to increase students' confident in managing dental trauma for themselves and others
- All schools' nurses and physical education instructors should launch educational modules about dental trauma to increase the awareness and level of knowledge of that topic
- This survey should be given in participating schools to determine if students' knowledge and attitudes toward dental trauma management have improved after the interventions.

CONCLUSION

Young athletes are at high risk of dental trauma due to the growing number of sports-related injuries. They should be aware about all available means of prevention and treatment if needed. Saudi Arabian students' knowledge and attitude dealing with dental emergency are inadequate. Knowledge acquisition about first aid of dental trauma from different sources as well as awareness program will empower the level of knowledge. An educational campaign on the management of different dental trauma in school is required for middle and high school students.

Acknowledgment

The author would like to thank Professor Omar Fahim, Professor Ghada El Hilaly, Professor Omar El Meligy, and Dr. Heba Al Sabbagh for their participation in questionnaire validation.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Caldas AF Jr., Burgos ME. A retrospective study of traumatic dental injuries in a Brazilian dental trauma clinic. *Dent Traumatol* 2001;17:250-3.
2. Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H. Craniomaxillofacial trauma in children: A review of 3,385 cases with 6,060 injuries in 10 years. *J Oral Maxillofac Surg* 2004;62:399-407.
3. Lieger O, von Arx T. Orofacial/cerebral injuries and the use of mouthguards by professional athletes in Switzerland. *Dent Traumatol* 2006;22:1-6.
4. Iliä E, Metcalfe K, Heffernan M. Prevalence of dental trauma and use of mouthguards in rugby union players. *Aust Dent J* 2014;59:473-81.
5. Caglar E, Ferreira LP, Kargul B. Dental trauma management knowledge among a group of teachers in two south European cities. *Dent Traumatol* 2005;21:258-62.
6. Borssén E, Holm AK. Traumatic dental injuries in a cohort of 16-year-olds in northern Sweden. *Endod Dent Traumatol* 1997;13:276-80.
7. Hamilton FA, Hill FJ, Holloway PJ. An investigation of dento-alveolar trauma and its treatment in an adolescent population. Part 1: The prevalence and incidence of injuries and the extent and adequacy of treatment received. *Br Dent J* 1997;182:91-5.
8. Traebert J, Peres MA, Blank V, Böell R da S, Pietruza JA. Prevalence of traumatic dental injury and associated factors among 12-year-old school children in Florianópolis, Brazil. *Dent Traumatol* 2003;19:15-8.
9. Soriano EP, Caldas AF Jr., Góes PS. Risk factors related to traumatic dental injuries in Brazilian schoolchildren. *Dent Traumatol* 2004;20:246-50.
10. Petersson EE, Andersson L, Sörensen S. Traumatic oral vs. non-oral injuries. *Swed Dent J* 1997;21:55-68.
11. Al-Majed I, Murray JJ, Maguire A. Prevalence of dental trauma in 5-6- and 12-14-year-old boys in Riyadh, Saudi Arabia. *Dent Traumatol* 2001;17:153-8.
12. Glendor U. Epidemiology of traumatic dental injuries – A 12 year review of the literature. *Dent Traumatol* 2008;24:603-11.
13. Bhat M, Li SH. Consumer product-related tooth injuries treated in hospital emergency rooms: United States, 1979-87. *Community Dent Oral Epidemiol* 1990;18:133-8.
14. Zuhail K, Semra OE, Hüseyin K. Traumatic injuries of the permanent incisors in children in southern Turkey: A retrospective study. *Dent Traumatol* 2005;21:20-5.
15. Walker A, Brenchley J. It's a knockout: Survey of the management of avulsed teeth. *Accid Emerg Nurs* 2000;8:66-70.
16. Al-Jundi SH. Dental emergencies presenting to a dental teaching hospital due to complications from traumatic dental injuries. *Dent Traumatol* 2002;18:181-5.
17. Barrett EJ, Kenny DJ. Avulsed permanent teeth: A review of the literature and treatment guidelines. *Endod Dent Traumatol* 1997;13:153-63.
18. Andreassen JO, Andreassen FM, Skeie A, Hjørtting-Hansen E, Schwartz O. Effect of treatment delay upon pulp and periodontal healing of traumatic dental injuries – A review article. *Dent Traumatol* 2002;18:116-28.
19. Andreassen JO. Effect of extra-alveolar period and storage media upon periodontal and pulpal healing after replantation of mature permanent incisors in monkeys. *Int J Oral Surg* 1981;10:43-53.
20. Ferrari CH, Ferreria de Medeiros JM. Dental trauma and level of information: Mouthguard use in different contact sports. *Dent Traumatol* 2002;18:144-7.
21. Green JI. The role of mouthguards in preventing and reducing sports-related trauma. *Prim Dent J* 2017;6:27-34.
22. Bourguignon C, Sigurdsson A. Preventive strategies for traumatic dental injuries. *Dent Clin North Am* 2009;53:729-49.
23. Blakytyn C, Surbutts C, Thomas A, Hunter ML. Avulsed permanent incisors: Knowledge and attitudes of primary school teachers with

- regard to emergency management. *Int J Paediatr Dent* 2001;11:327-32.
24. Al-Jundi SH. Knowledge of Jordanian mothers with regards to emergency management of dental trauma. *Dent Traumatol* 2006;22:291-5.
 25. Al-Jundi SH, Al-Wacili H, Khairalah K. Knowledge and attitude of Jordanian school health teachers with regards to emergency management of dental trauma. *Dent Traumatol* 2005;21:183-7.
 26. Pacheco LF, Filho PF, Letra A, Menezes R, Villoria GE, Ferreira SM. Evaluation of the knowledge of the treatment of avulsions in elementary school teachers in Rio de Janeiro, Brazil. *Dent Traumatol* 2003;19:76-8.
 27. AlGhamdi NM, Alotthman SA, Assiri AM, Bijle MN, Togoo RA. Knowledge of Saudi parents toward the emergency management of avulsed permanent teeth: A cross-sectional survey. *J Dent Res Rev* 2016;3:85.
 28. AlShammari A, Aldakhil N, Alshammari H, Alsairafi M, Al-Saif E, Abduldayem A. Knowledge and practice of Saudi civilians towards management of dental trauma and avulsed tooth. *J Dent Health Oral Disord Ther* 2017;6:00183.
 29. Castilho LR, Sundefeld ML, de Andrade DF, Panzarini SR, Poi WR. Evaluation of sixth grade primary schoolchildren's knowledge about avulsion and dental reimplantation. *Dent Traumatol* 2009;25:429-32.
 30. Andersson L, Al-Asfour A, Al-Jame Q. Knowledge of first-aid measures of avulsion and replantation of teeth: An interview of 221 Kuwaiti schoolchildren. *Dent Traumatol* 2006;22:57-65.
 31. Biagi R, Cardarelli F, Butti AC, Salvato A. Sports-related dental injuries: Knowledge of first aid and mouthguard use in a sample of Italian children and youngsters. *Eur J Paediatr Dent* 2010;11:66-70.
 32. Young C, Wong KY, Cheung LK. A survey on Hong Kong secondary school students' knowledge of emergency management of dental trauma. *PLoS One* 2014;9:e84406.
 33. Al-Shamiri HM, Alaizari NA, Al-Maweri SA, Tarakji B. Knowledge and attitude of dental trauma among dental students in Saudi Arabia. *Eur J Dent* 2015;9:518-22.
 34. Nikam AP, Kathariya MD, Chopra K, Gupta A, Kathariya R. Knowledge and attitude of parents/caretakers toward management of avulsed tooth in Maharashtra population: A questionnaire method. *J Int Oral Health* 2014;6:1-4.
 35. Sigalas E, Regan JD, Kramer PR, Witherspoon DE, Opperman LA. Survival of human periodontal ligament cells in media proposed for transport of avulsed teeth. *Dent Traumatol* 2004;20:21-8.
 36. Chappuis V, von Arx T. Replantation of 45 avulsed permanent teeth: A 1-year follow-up study. *Dent Traumatol* 2005;21:289-96.
 37. Fouad AF, Abbott PV, Tsilingaridis G, Cohenca N, Lauridsen E, Bourguignon C, *et al.* International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol* 2020;36:331-42.
 38. Andersson L, Andreasen JO, Day P, Heithersay G, Trope M, DiAngelis AJ, *et al.* Guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Pediatr Dent* 2017;39:412-9.
 39. Rao A, Kommula A, Tummala M. Delayed replantation after prolonged dry storage. *Saudi Endod J* 2014;4:91.
 40. Abuhaimed T. Delayed management of avulsed mandibular incisor teeth: 4-year follow-up. *Saudi Endod J* 2017;7:199.
 41. McDonald N, Strassler HE. Evaluation for tooth stabilization and treatment of traumatized teeth. *Dent Clin North Am* 1999;43:135-49.
 42. Andreasen JO, Borum MK, Jacobsen HL, Andreasen FM. Replantation of 400 avulsed permanent incisors. 4. Factors related to periodontal ligament healing. *Endod Dent Traumatol* 1995;11:76-89.
 43. Alzahrani MS, Almaqboul FA. Parents' awareness and attitude toward urgent management of avulsed permanent tooth in AL-Baha city. *Saudi Endod J* 2019;9:82.
 44. Vergotine RJ, Koerber A. The relationship of dental visits to parental knowledge of management of dental trauma. *Pediatr Dent* 2010;32:329-32.
 45. Oliveira TM, Sakai VT, Moretti AB, Silva TC, Santos CF, Machado MA. Knowledge and attitude of mothers with regards to emergency management of dental avulsion. *J Dent Child (Chic)* 2007;74:200-2.
 46. Raoof M, Zaherara F, Shokouhinejad N, Mohammadalizadeh S. Elementary school staff knowledge and attitude with regard to first-aid management of dental trauma in Iran: A basic premise for developing future intervention. *Dent Traumatol* 2012;28:441-7.
 47. Al-Sehaibany FS, Almubarak DZ, Alajlan RA, Aldosari MA, Alqahtani ND, Almaflehi NS, *et al.* Elementary school staff knowledge about management of traumatic dental injuries. *Clin Cosmet Investig Dent* 2018;10:189-94.
 48. Sae-Lim V, Lim LP. Dental trauma management awareness of Singapore pre-school teachers. *Dent Traumatol* 2001;17:71-6.