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Understanding school teacher's knowledge regarding dental trauma: a basis for future interventions

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Abstract – *Background*: Traumatic dental injuries frequently occur at school environment. However, teachers are not prepared to provide the adequate emergency management. *Aim*: The objectives of this study were to identify the factors associated with teachers' knowledge about dental trauma and to describe school managers' perception of possible strategies to change the scenario. *Subjects and methods*: Our sample comprised 405 teachers from 17 public schools in Canoas, state of Rio Grande do Sul, Brazil, whose data were collected regarding demographic variables, training and professional experience information. The outcome was completely inadequate knowledge regarding trauma measured based on the answers to a structured questionnaire about dental fractures and tooth avulsion. The sample also included 14 school managers who answered a semi-structured questionnaire about the causes of teachers' inadequate knowledge and possible strategies to change the scenario. *Results*: The multivariate analysis demonstrated that the probability of completely inadequate knowledge was higher among male teachers, with less professional experience, who had not achieved a graduate degree, who had not witnessed at least one dental trauma case at school and who had not been trained in first-aid. School managers identified the following causes of inadequate knowledge: the fact that the topic is not approached during the teachers' training and continual education and lack of experience involving dental trauma at school. In addition, they suggested that lectures and courses including written and visual communication should be offered, as well as training workshops. *Conclusions*: Strategies to improve the teachers' knowledge about dental trauma must take into consideration the results of the present study and optimize the inclusion of this topic in the teachers' curricular training and pedagogical education in a continuous manner.

Traumatic dental injuries (TDI) are highly prevalent from infancy to adolescence and may have an impact on the quality of life, being an emergent public health problem worldwide (1–7). Its treatment is very complex and expensive. In addition to the immediate costs, there are expenses with follow-up medical visits that may be necessary for many years after the TDI (8).

As traumatic injuries affecting permanent dentition often occur at school or at its surroundings, teachers and other non-dental professionals play an important role in managing TDI and improving its prognosis (9). However, studies conducted in different regions of the world have demonstrated that teachers and other lay people's knowledge about TDI is inadequate and their behaviour does not contribute to reduce the sequelae (9–11). Furthermore, a recent review of the literature has demonstrated that the education of lay people about dental trauma care has failed, this topic being a field where much remains to be explored (12).

In order to contribute to establish effective strategies of education regarding TDI, the objective of this study was to identify the factors associated with the knowledge of teachers from public schools about dental trauma in a city located in the South region of Brazil. In addition, we investigated school manager's perceptions of the possible causes of inadequate knowledge and their suggestions to change the scenario.

Methods

The present cross-sectional study was based on data collected between March and June 2007. Data were obtained from teachers and school managers from public schools in Canoas, a city that has 300 000 inhabitants and is located in the South region of Brazil. The study population comprised: (i) 405 elementary school teachers from 17 public schools, which were randomly selected for quantitative data collection and (ii) 14 school managers

from the selected schools for qualitative data collection. The study was approved by the Research Ethics Committee of Universidade Luterana do Brasil. The subjects of the study agreed to participate and signed a written consent form.

Quantitative data collection

The sample size calculation was based on the following parameters: 95% confidence interval, 80% power, non-exposed (highest level of education) vs exposed ratio of 1:2, outcome frequency (inadequate knowledge regarding avulsion) in non-exposed and exposed subjects of 18% and 32%, respectively (13). The necessary sample size was 373 teachers. Considering a prediction of 30% of non-respondents, it was necessary to administer the research instrument to 550 teachers. As the city of Canoas has 42 public schools that provide elementary education, and 1404 teachers work at these schools, we randomly selected 17 schools. A structured questionnaire was handed out to all these teachers in order to collect predictor variables (related to the school and to the teachers) and outcome variables (teachers' knowledge regarding dental fractures and permanent tooth avulsion).

The evaluation of the teachers' knowledge regarding dental fractures was based on questions traditionally used (14): (i) what to do in case of dental fracture (closed question) and (ii) opinion about searching for the lost tooth fragment (closed question). When the teacher did not believe that the following items were important, his/her knowledge was considered inadequate: (i) immediately contact the child's parents or make sure the child's receive emergency care and (ii) look for the tooth fragment. If one or two of these requirements were met, knowledge was classified as partially inadequate or adequate, respectively.

In order to check knowledge regarding avulsion, teachers were asked about which measures should be taken (open question). Answers were classified according to certain criteria considered as essential for the definition of the prognosis regarding avulsed teeth (15): (i) knowledge of replantation as the treatment of choice; (ii) storage media and (iii) referral to specialized care. The teachers' knowledge was classified as adequate (three criteria met); partially inadequate (only one or two criteria met); inadequate (no criterion met).

The main outcome of the quantitative evaluation in the present study – completely inadequate knowledge regarding dental trauma – was reached when the teacher demonstrated inadequate knowledge about both types of trauma. This definition was aimed at identifying those teachers who did not have any information about TDI, whose participation and assistance could compromise the prognosis of traumatic injuries.

Qualitative data collection

The sample size for qualitative data collection was defined by the number of school managers who agreed to participate in the study ($n = 14$) among the 17 managers from the schools selected. Before handing out the questionnaires, we informed the school managers about the teachers' inadequate knowledge regarding emergency care of dental trauma. Data collection consisted of a written document containing two open-ended questions about the teachers' knowledge regarding dental trauma (i) 'WHY is the teachers' knowledge regarding dental trauma INSUFFICIENT?' and (ii) 'Which STRATEGIES do you suggest to improve the teachers' knowledge about dental trauma?' An answer was defined as a word or sentence that contained at least one keyword describing one reason why the teachers' knowledge is insufficient or a strategy to improve their knowledge. To guarantee data reliability, two researchers independently analyzed the responses and grouped words or phrases according to similar relationships. Therefore, the causes of the teachers' insufficient knowledge such as 'never witnessed' or 'never was present during' or 'never experienced the fact of witnessing' a case of dental trauma were grouped into the category 'never witnessed a dental trauma case'. Any discrepancies were discussed by the two researchers to define the most logical assignment of a word or phrase. To train the researchers and reduce the possibility of information bias, a pilot project was conducted consisting in the administration of the data collection instruments to 15 teachers.

Statistical analysis

The statistical analysis software SPSS (SPSS Inc., Chicago, IL, USA), version 16.0, was used to analyze the quantitative data. The factors associated with the teachers' insufficient knowledge were investigated using robust Poisson regression models, as the outcome frequency was $>20\%$. First, prevalence ratios and 95% confidence intervals (95% CI) of each variable were estimated separately (crude analysis). For the multivariate analysis, all variables were initially included in the model. Next, each variable with the highest *P*-value was removed from the model in a sequence. When only those variables significantly associated with the outcome remained in the model ($P < 0.05$), each one of the effects of the inclusion of the variables previously eliminated was tested. Finally, the interactions between the variables that remained in the final model were tested.

For qualitative data description, after grouping into categories, the managers' answers to both questions were tabulated and categorized, and the simple frequencies were described. In order to establish a link to the original answers, excerpts of the managers' answers were transcribed.

Results

The final sample of elementary school teachers included 405 individuals, whose characteristics are presented in Table 1. The analysis of the teachers' answers regarding both types of trauma showed that 22.5% (91/405) did not know any of the items suggested regarding avulsion and dental fractures, being classified as having completely inadequate knowledge about dental trauma. The crude analysis showed that the following factors are

Table 1. Simple and relative frequencies of the teachers' inadequate knowledge regarding predictor variables, crude prevalence ratio (PR) and 95% confidence interval (95% CI)

	Whole sample	Inadequate knowledge			
Variables	*N* (%)	*n* (%)	*P*-value	PR	95% CI
Total	405 (100.0)	91 (22.5)			
Gender					
Male	75 (18.5)	23 (30.7)	0.052	1.49	(1.00–2.22)
Female	330 (81.5)	68 (20.6)		1.00	
Age (years)					
<35	139 (34.3)	38 (27.3)	0.183	1.54	(0.96–2.46)
35–44	148 (36.5)	32 (21.6)		1.22	(0.74–1.99)
≥45	118 (29.2)	21 (17.8)		1.00	
School with dentist					
Yes	350 (86.4)	81 (23.1)	0.425	1.27	(0.70–2.30)
No	55 (13.6)	10 (18.2)		1.00	
Professional experience (years)					
≤10	156 (38.6)	48 (30.8)	0.002	2.04	(1.19–3.49)
11–18	114 (28.2)	26 (22.8)		2.26	(1.36–3.77)
>18	134 (33.2)	17 (12.7)		1.00	
No. of schools in which the teacher works					
1	206 (50.9)	46 (22.3)	0.946	0.99	(0.69–1.42)
≥2	199 (49.1)	45 (22.6)		1.00	
Educational level					
High school or university	293 (73.0)	84 (28.7)	0.000	4.50	(2.15–9.43)
Graduate	110 (27.0)	7 (6.4)		1.00	
Subject taught					
Physical education	41 (10.2)	6 (14.6)	0.224	1.00	
Other	362 (89.8)	85 (23.5)		1.60	(0.75–3.44)
Has witnessed a dental trauma case at school					
Yes	168 (41.7)	23 (13.7)	0.001	1.00	
No	235 (58.3)	68 (28.9)		2.11	(1.38–3.25)
First aid training					
Yes	159 (39.3)	21 (13.2)	0.001	0.46	(0.30–0.72)
No	246 (60.7)	70 (28.5)		1.00	
Dental trauma training					
Yes	26 (6.4)	2 (7.7)	0.104	0.33	(0.08–1.26)
No	379 (93.6)	89 (23.5)		1.00	

associated with completely inadequate knowledge about dental trauma: professional experience, educational level, having witnessed a dental trauma case at school and having being trained in first aid.

The multivariate analysis (Table 2) showed that the probability of having completely inadequate knowledge about trauma was 55% higher in male teachers, almost two times higher for teachers with less professional experience and four times higher for professionals who did not have a graduate degree. In addition, the fact of not having witnessed trauma and not having been trained in first aid also had a negative influence on the teachers' knowledge. There was no interaction between the variables included in the final model.

With regard to the qualitative evaluation, three managers refused to answer the questionnaire. Table 3 shows the managers' answers regarding the possible causes of the teachers' lack of knowledge and the strategies to change the scenario. As for the causes of the teachers' insufficient knowledge, six categories of answers emerged, and four of them were mentioned by more than one manager. The category mentioned by more than half of the managers (8/14) was lack of pedagogical education. In this category, the following answers were especially interesting:

Unfortunately, this topic is not approached in the pedagogical meetings at school or at the City's Department of Education and Culture…

Table 2. Final model of the factors associated with the teachers' inadequate knowledge regarding dental trauma

Variables	PR[a] (95%CI)	P-value
Gender		0.023
Male	1.55 (1.06-2.27)	
Female	1.00	
Professional experience (years)		0.036
≤ 10	1.74 (1.07-2.83)	
11 to 18	1.95 (1.15-3.33)	
> 18	1.00	
Educational level		0.000
High school or university	3.96 (1.85-8.49)	
Graduate	1.00	
Has witnessed a dental trauma case at school		0.017
Yes	1.00	
No	1.66 (1.09-2.53)	
First aid training		0.012
Yes	0.57 (0.37-0.88)	
No	1.00	

PR[a]: Prevalence ratios adjusted for the other variables in the model

Table 3. Managers' answers to the qualitative questions (N = 14)

"Why is the teachers' knowledge regarding dental trauma INSUFFICIENT?"	N
Lack of pedagogical training	8
Lack of experience involving trauma at school	5
Deficiency in the teachers' education	3
Teachers do not need to have this type of knowledge	2
Little time for extracurricular studies	1
Lack of guidance from the school's dentist about trauma	1
"Which STRATEGIES do you suggest to improve the teachers' knowledge about dental trauma?"	N
Lectures and courses	11
Written information (written communication)	4
Visual information (visual communication)	3
Workshops	3
Regular visits to the school's dentist	2
Educational campaigns	1
Teachers do not need to have this type of knowledge	1

During my 22 years of professional experience, dental trauma was never mentioned in the pedagogical meetings…

In addition, one-third (5/14) of the managers mentioned the fact that the teachers did not witness a case of dental trauma involving students at the school, and one-fifth (3/14) reported deficiency in the teachers' education. Two managers mentioned that teachers do not need to have this type of knowledge by giving very similar answers:

Our training is related to education, which does not require that we have technical knowledge on health topics.

School plays many roles related to the activity of educating children, and the teachers do not need to have this kind of knowledge. There are other professionals more suitable for that activity…

In addition to the managers' answers regarding the causes of the teachers' insufficient knowledge, some other reasons were mentioned:

Even though knowing about dental trauma is interesting for all, there is little time for extracurricular studies…

The dentist that works at the school teaches about caries and brushing, but does not talk about trauma…

With regard to the strategies suggested by the managers to improve the teachers' knowledge, seven categories of answers emerged, five of them were mentioned by more than one manager. The most frequently suggested strategy was offering lectures and courses (11/14). Written (4/14) and visual (3/14) information, as well as workshops (3/14) and regular visits from dentists to the school (2/14) were also highlighted. One out of 14 managers did not make any suggestions because he/she believed that knowing about trauma was not necessary for teachers.

Discussion

The main result of the present study was the identification of factors related to the teachers' education and experiences that may contribute to the development of strategies to improve their knowledge and behaviour regarding dental trauma, reducing the sequelae caused by these injuries that affect students while they are at school. An interesting aspect is that the two data collection methods employed with different groups – teachers and managers – revealed similar causes for the teachers' inadequate knowledge, and these causes should be subject to intervention in future studies.

Among the variables assessed in this study, the magnitude of the association between the outcome and the teachers who achieved a graduate degree is particularly interesting, showing that the level of education has a positive impact on the teachers' knowledge about topics that do not belong to their specific area of study, including dental trauma. Similarly, school managers explained the teachers' little knowledge based on deficiencies in the teachers' formal and continuing education. Similar results, although to a smaller degree, were reported involving teachers from Singapore (16).

A clearly fragmented vision, in which the teachers' education does not require or even should not include 'other aspects', such as knowledge and behaviour regarding health and disease, became evident through the statements of at least two managers. The fact that the traditional teachers' education does not include the topic of dental trauma (9, 13, 17–19) indicates the need of a more effective communication between dentists and the professionals involved in the education and training of teachers in general. However, the managers' opinion that the teachers' training should not include 'other aspects', such as knowledge and behaviour regarding health and disease, shows that the simple transmission of information is not enough if it is not based on an integral vision of health.

The evidence that first aid training increased knowledge about dental trauma was previously found in a study with teachers from Jordan, and it suggests that this strategy possibly makes teachers capable of providing emergency care in case of dental trauma (20). It is possible that by offering such kind of training during the teachers' continuing education, mainly by means of workshops, as it was suggested by the managers, there will be an improvement of the approach of dental trauma and other related outcomes.

The professional experience, translated into years of work as a teacher, contributes to the teachers' knowledge about dental trauma. Although it has been previously suggested (13), the analysis carried out in this study emphasizes even more the importance of such variable, as its effect was present regardless of the fact that the teacher witnessed cases of trauma or had a higher level of education. Further studies will be able to investigate which factors related to the professional experience contribute to increase the knowledge about this topic. A similar study involving teachers from Jordan did not find a positive influence of the teachers' experience (20), which might be explained, at least partially, by the small range of variation of the time of professional activity among the teachers included in the sample.

The fact that the teachers who did not witness cases of trauma have less knowledge, which was identified in our quantitative analysis and by means of the managers' reports, suggests that experiencing situations that involve traumatic injuries make teachers more capable

of managing these cases. Although previous experience involving this kind of event did not provide better knowledge about trauma in a similar study (20), it was found that there was a positive effect on the teachers' sensitivity in face of a case of trauma. At least in an indirect manner, it is possible that experiencing episodes of trauma has an influence on the search for specific knowledge.

In the present study, the higher frequency of the male teachers' inadequate knowledge was significant. This may be explained by the fact that women are more concerned about health (21, 22), which might result in higher sensitivity and care involving the students' health. The exact mechanisms through which female individuals show higher self-perception and care have not been revealed, and the present study cannot provide such information.

An aspect of the present study that may be a reason for concern is the fact that the presence of a dentist at the schools and the training in dental trauma do not contribute to improve the teachers' knowledge. Even if they do not work full-time at the schools, it was expected that the presence of a professional directly involved in the prevention and treatment of dental trauma could improve the teachers' knowledge. It is possible that dentists limit their work to prevention and treatment of caries and gingivitis, failing to provide teachers with guidance on dental trauma. However, dentists should consider the impact of such injuries on students, as they are technically trained to manage and prevent dental trauma.

Therefore, another explanation for this phenomenon cannot be ruled out. Most studies that measured the dentists' knowledge on dental trauma found insufficient knowledge. In addition, dentists do not use standardized treatment procedures and are not familiar with scientific evidence-based protocols (23–26). Thus, even the health professional who has been trained to manage dental trauma seems to be inadequately prepared, which was mentioned by one of the managers.

The managers' suggestions seem to be relevant and feasible, including requirements for an efficient communication, such as 'message strategies' and 'creative strategies' (27). Educational handouts or brochures are a usual and effective means of communication to provide information about health. Improvement of knowledge, as well as its retention during a long period of time, may be achieved if, in addition to the educational brochure, there are also lectures or courses taught by especially trained professionals, also including pictures of trauma episodes, leaflets, lectures followed by discussion or educational posters (19, 20, 28–30). Using these resources, it is possible to illustrate, at least partially, the experience of dental trauma, an item that was related to better knowledge.

The strategies to change the scenario of lack of knowledge should also involve first aid training. This approach must include visual resources of trauma situations in order to provide a better understanding and higher retention of information, so that the teachers can become more sensitive and better prepared to adequately manage emergency situations, changing their behaviour. Such training must be offered frequently enough to reinforce and retain the knowledge acquired (31).

Furthermore, considering the organization of the schools, it would be important to develop action protocols regarding dental trauma. Protocols are quick guides for a more efficient approach of trauma (15), mainly in terms of emergency situations, in which the quality of the procedures directly affect the prognosis. Technical and protocol information must be designed based on scientific evidence and on written and visual language adapted to the target audience. Educational topics and contents must have an interdisciplinary characteristic, taking into consideration that the material must be designed together with other health professionals and educators, including doctors, nurses, managers and teachers (32).

Schools are a social environment appropriate for the development of activities that promote oral health. Such activities should include students, school assistants and even members of the community. If it establishes deeper relationships with the students' parents and develops health projects together with the community and the local health agencies, school becomes a supportive environment for health (33). The development of public awareness about dental trauma depends on a clear, objective and motivating message in order to make lay people not only aware of their role in saving teeth in case of accidents but also to make them feel responsible for their own health (14).

Among the limitations of the present study, we should highlight the fact that some questions used to identify the teachers' inadequate knowledge about dental trauma were not validated. However, they were based on questions traditionally used and on criteria considered essential for the definition of the prognosis of dental trauma (14, 15). The findings of the present study, taking into consideration the sample assessed and the confidence intervals obtained, can be extrapolated with a reasonable degree of accuracy to populations with socioeconomic and cultural characteristics similar to those of the inhabitants of Canoas, with special emphasis on lower income and level of education.

In conclusion, the present study identified professional experience, level of education, first aid training, transmission of information and experience involving dental trauma cases at school as factors associated with the teachers' inadequate knowledge regarding dental trauma. Strategies to improve the teachers' knowledge and behaviour must take into consideration these findings and include a scientific evidence-based and integrated action among dentists, teachers, school managers and other actors. These actions may include spoken and written communication focused on training workshops with the purpose of providing adequate information and experiences during the several different phases of the teachers' formal and continuing education.

References

1. Cortes MI, Marcenes W, Sheiham A. Impact of traumatic injuries to the permanent teeth on the oral health-related

quality of life in 12–14-year-old children. Community Dent Oral Epidemiol 2002;30:193–8.
2. Hamdan MA, Rajab LD. Traumatic injuries to permanent anterior teeth among 12-year-old schoolchildren in Jordan. Community Dent Oral Epidemiol 2003;20:89–93.
3. Kramer PF, Zembruski C, Ferreira SH, Feldens CA. Traumatic dental injuries in Brazilian preschool children. Dental Traumatol 2003;19:299–303.
4. Traebert J, Peres MA, Blank V, Böell RS, 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.
5. Malikaew P, Watt RG, Sheiham A. Prevalence and factors associated with traumatic dental injuries (TDI) to anterior teeth of 11–13-year old Thai Children. Community Dent Health 2006;23:222–7.
6. Ramos-Jorge ML, Bosco VL, Peres MA, Nunes AC. The impact of treatment of dental trauma on quality of life of adolescents – a case–control study in southern Brazil. Dental Traumatol 2007;23:114–9.
7. Feldens CA, Kramer PF, Vidal SG, Faraco Junior IM, Vítolo MR. Traumatic dental injuries in the first year of life and associated factors in Brazilian infants. J Dent Child (Chic) 2008;75:7–13.
8. Glendor U, Jonsson D, Halling A, Lindqvist K. Direct and indirect costs of dental trauma in Sweden: a 2-year prospective study of children and adolescents. Community Dent Oral Epidemiol 2001;29:150–60.
9. 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.
10. Chan AW, Wong TK, Cheung GS. Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong. Dent Traumatol 2001;17:77–85.
11. 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. Dental Traumatol 2006;22:57–65.
12. Glendor U. Has the education of professional caregivers and lay people in dental trauma care failed? Dent Traumatol 2009;25:12–8.
13. Sae-Lim V, Lim LP. Dental trauma management awareness of Singapore pré-school teachers. Dent Traumatol 2001;17:71–6.
14. Andreasen JO, Andreasen FM, Andersson L. Textbook and color atlas of traumatic injuries to the teeth, 4th edn. Oxford: Blackwell Munksgaard; 2007.
15. Flores MT, Andersson L, Andreasen JO, Bakland LK, Malmgren B, Barnett F et al. Guidelines for the management of traumatic dental injuries. II. Avulsion of permanent teeth. Dent Traumatol 2007;23:130–6.
16. Sae-Lim V, Chulaluk K, Lim LP. Patient and parenteral awareness of the importance of immediate management of traumatized teeth. Endod Dent Traumatol 1999;15:37–41.
17. Blakytny C, Surbuts 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.
18. Mori GG, Turcio KH, Borro VP, Mariusso AM. Evaluation of the knowledge of tooth avulsion of school professionals from Adamantina, São Paulo, Brazil. Dent Traumatol 2007; 23:2–5.
19. Mcintyre JD, Lee JY, Trope M, Vann WF Jr. Effectiveness of dental trauma education for elementary school staff. Dent Traumatol 2008;24:146–50.
20. Al-Jundi SH, Al-Waeili 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.
21. Verbrugge LM. Sex differentials in health. Public Health Rep 1982;97:417–37.
22. Verbrugge LM. The twain meet: empirical explanations of sex differences in health and mortality. J Health Soc Behav 1989;30:282–304.
23. Kostopoulou MN, Duggal MS. A study into dentists' knowledge of the treatment of traumatic injuries to young permanent incisors. Int J Paediatr Dent 2005;15:10–9.
24. Cohenca N, Forrest JL, Rotstein I. Knowledge of oral health professionals of treatment of avulsed teeth. Dent Traumatol 2006;22:296–301.
25. Hu LW, Prisco CR, Bombana AC. Knowledge of Brazilian general dentists and endodontics about the emergency management of dento-alveolar trauma. Dent Traumatol 2006;22:113–7.
26. França RI, Traebert J, de Lacerda JT. Brazilian dentists' knowledge regarding immediate treatment of traumatic dental injuries. Dent Traumatol 2007;23:287–90.
27. Malhotra NK, Hall J, Shaw M, Oppenheim PP. Essentials of marketing research: an applied orientation. Frenchs Forest: Pearson Prentice Hall; 2004.
28. Al-Asfour A, Andersson L. The effect of a leaflet given to parents for first aid measures after tooth avulsion. Dent Traumatol 2008;24:515–21.
29. Al-Asfour A, Andersson L, Al-Jame Q. School teachers' knowledge of tooth avulsion and dental first aid before and after receiving information about avulsed teeth and replantation. Dent Traumatol 2008;24:43–9.
30. Lieger O, Graf C, El-Maaytah M, Von Arx T. Impact of educational posters on the lay knowledge of school teachers regarding emergency management of dental injuries. Dent Traumatol 2009;25:406–12.
31. Addo ME, Parekh S, Moles DR, Roberts GJ. Knowledge of dental trauma first aid (DTFA): the example of avulsed incisors in casualty departments and schools in London. Br Dent J 2007;26:202–10.
32. Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. Community Dent Oral Epidemiol 2000;28:399–406.
33. Moysés ST, Moysés SJ, Watt RG, Sheiham A. Associations between health promoting schools' policies and indicators of oral health in Brazil. Health Promot Int 2003;18:209–18.