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Knowledge of nurses working at schools in Bialystok, Poland, of tooth avulsion and its management

Joanna Baginska, Magdalena Wilczynska-Borawska

Department of Conservative Dentistry, Medical University of Bialystok, Bialystok, Poland

Correspondence to: Joanna Baginska, Department of Conservative Dentistry, ul. M. Sklodowskiej-Curie 24 A, 15-276 Bialystok, Poland
Tel./Fax: +48 85 742 17 74
e-mail: jbaginska@wp.pl

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Abstract – *Aim*: The purpose of this study was to evaluate the knowledge of first aid in tooth avulsion among nurses working at schools in Bialystok, Poland. A part of this population attended a lecture on the management of dental trauma 2 years before. *Methods*: The survey was conducted in September 2010 and covered 50 (96.15%) school nurses from Bialystok. Thirty-eight of them attended the dental trauma lecture conducted 2 years before the survey. They were asked to fill in an anonymous questionnaire consisting of 20 closed questions referring to demographic data, previous dental trauma experience, and training. Seven questions referred directly to the knowledge of management of dental avulsion and on that basis, the level of nurses' knowledge was evaluated. The data were analyzed statistically using the Mann–Withney *U*-test with $P < 0.05$ to find factors influencing the level of knowledge. *Results*: The study showed that nurses' knowledge about tooth avulsion was at an appropriate level. 86% of the participants chose the correct definition of the term of replantation, 92% understood that the time is crucial for the result of a replantation, 94% knew that an avulsed tooth should be held by the crown, and 96% pointed the proper transport medium. A half of the surveyed nurses declared that they would provide tooth replantation and another 16% would consult the procedures by calling a dentist. One statistically significant correlation between the level of knowledge and previous dental trauma training was revealed ($P < 0.01$). *Conclusions*: The lay knowledge of tooth avulsion in the population of nurses working at schools in Bialystok, Poland, was at an appropriate level. There was a strong correlation between this level and the participation in the lecture on the management of dental trauma conducted 2 years before.

The most serious injury of a tooth is its avulsion, and the proper procedure during the first minutes after the accident is a condition for satisfactory prognosis. The most appropriate treatment is the immediate tooth replantation into its socket or the transfer of the child to a dentist with the tooth stored in a proper medium. According to guidelines of the International Association of Dental Traumatology, the best transport medium is special storage solutions as Hank's balanced salt solution, milk, saline, or patient's saliva. The extra-oral dry time should be no longer than 60 mins (1).

The avulsion occurs most frequently in children aged from 7 to 9 years, particularly boys (2–4). Most frequently involved teeth are upper central incisors (2, 3). Avulsion is usually caused by accidental falls, sporting activities, fights, or health-related situations (3–7). Children are normally supervised by parents, school staff, coaches, and other adults, and the prognosis of injured teeth depends on appropriate emergency aid provided by these persons. Many surveys show that neither parents, teachers, children, nor even emergency unit staff are prepared to deal with such injuries (8–14). Glendor (15), having reviewed the recently published epidemiological studies, came to the conclusion that a large part of the educational process of caregivers and lay people has failed. According to him, it could not be expected that they would be able to handle difficult cases such as tooth avulsion. It seems to be very important to transfer sufficient information about emergency aid in the event of dental injuries to all kind of medical professionals: nurses, paramedics, physicians, general practitioners, and dentists.

In Bialystok, Poland, every school has a prophylaxis room dedicated for the school nurse. In most institutions, they are the only employee with medical knowledge. The duties of school nurses include organizing prophylactic examinations and protective vaccinations, planning, carrying out and evaluation of health education at schools, health promoting actions as well as provision of first aid to pupils and notifying the parents (guardians) of the pupil if medical assistance is required. All nurses are members of NZOZ Promed Schol and

have monthly training meetings. At one of such meetings, in September 2008, a lecture on first aid in dental injuries, prepared at the Department of Conservative Dentistry of the Medical University of Bialystok, was given.

The purpose of this study was to evaluate, by questionnaires, school nurses' knowledge of the management of avulsed teeth. It seems to be important to find whether school nurses are prepared to replant an avulsed tooth as they are often the first medical staff coming into contact with an injured child. We were also interested whether previous training on the first aid in dental injuries, conducted 2 years before, had any influence on these competences.

Materials and methods

In September 2008, 43 school nurses from Bialystok, Poland, had participated in a lecture on first aid for victims of dental trauma. After 2 years, in September 2010, an anonymous questionnaire survey was conducted during their regular monthly meeting, upon approval by the Biomedical Committee of the Medical University of Bialystok. The subjects were 50 nurses working at schools, including 38 who had attended the above-mentioned lecture. The form for data collection was developed at the Department of Conservative Dentistry of the Medical University of Bialystok, Poland. It consisted of 20 closed questions based on those employed in previous studies (5, 16, 17). The first section included demographic data: years of professional experience as a school nurse, sex, level of medical education, having own children, number of schools they work at, as well as number of children at these schools, having any experience with dental trauma, especially with tooth avulsion, participation in the lecture on dental trauma management conducted 2 years before, and acquisition of such kind of information for themselves. The second part consisted of seven questions referring directly to the knowledge of the management of dental avulsion. The purpose of these questions was to determine the level of knowledge. In each question, the respondents were asked to choose one answer that was the most appropriate in their opinion. In case of questions concerning the definition of replantation, the person who may conduct such surgery, the time, the way of holding an avulsed tooth, and the course of action if it has been made dirty, the respondents could get 1 point for giving the correct answer or 0 points if the answer was incorrect. In case of question concerning the course of action after an injury, 2 points were awarded for choosing immediate replantation as the correct answer and 1 point for choosing phone consultation with a dentist or immediate transport of the child to a dentist, while the scoring for other answers was 0 points. In the question concerning the appropriate storage medium, the respondents, in spite of an explicit request to indicate one answer, chose several possible mediums. Therefore, as correct answers were counted, 1 point was scored for choosing any of the following: milk, saliva, or saline, and 0 points were scored for choosing any of the other answers. Then, the results were summed up for each of the subjects to work out their level of knowledge. The maximum possible number of points to score was 8.

Data were processed using a personal computer and analyzed using the STATISTICA 6.0 (StatSoft, Tulsa, OK, USA) software with Mann–Whithney *U*-test. The statistical significance level was established at $P < 0.05$.

Results

Fifty, of the total number of 52, school nurses participated in the meeting and all of them filled in the form, so the proportion of evaluated individuals was 96.15% in relation to the whole population. All of them were female. Declared number of children under their care fluctuated between 120 and 1450 with a mean of 865.6 and altogether they took care for 42.873 children. At the moment of the survey, 43.186 pupils attended all kind of schools in Bialystok, so our respondents were responsible for medical care of 99.27% of the population.

The results of the demographic characteristics of the nurses are shown in Table 1. The majority of respondents (78%) were very experienced as they worked longer than 20 years as school nurses. Most of them (84%) did not have a university education. One person usually worked at more than one school, which means they stayed at one of them for 2–3 days a week. The explanation of the fact that a few of them worked at a greater number of schools (4–6) is that some of these

Table 1. Demographic characteristics of the participants

Demographic information	*n*	%
Length of work experience (in years)		
0–5	0	0
6–20	11	22
≤20	39	78
Education level		
Secondary	42	84
Bachelor's degree	2	4
Master's degree	4	8
No answer	2	4
Number of schools under care		
1	12	24
2	27	54
3	5	10
4	4	8
5	1	2
6	1	2
Type of school		
Primary	32	64
Lower secondary	30	60
Upper secondary	25	50
No answer	1	2
Class specializing in sports		
Yes	24	48
No	26	52
Own children		
Yes	47	94
No	3	6

institutions were located at the same building, e.g., primary and lower secondary schools or different kinds of upper secondary schools. Nearly a half of the institutions had classes specializing in sports.

Data regarding dental trauma experience and training are shown in Table 2. 42% of surveyed population had to deal with dental avulsion at work. The number of cases varied from 1 (nine people, 42.9%) to 6 (one person, 4.8%). Furthermore, 22 people (44%) experienced cases of any kind of dental trauma with their family or friends. The most popular reasons for dental avulsion they witnessed were accidents and sports-related situations. 38 nurses (76%) attended the lecture on the first aid in dental trauma conducted in September 2008. Moreover, almost half of the respondents tried to find such kind of information by themselves. The most popular way of acquiring additional knowledge was to consult a dentist (50%) or to find information in magazines or in the internet (37.5%).

Table 3 shows the distribution of answers to questions checking knowledge of dental avulsion. Forty-three individuals (86%) chose the correct definition of the term of replantation. However, in case of the question who is the right person to conduct such kind of procedure, only 44% of respondents knew that it could be any witness of avulsion. Almost all nurses understood that the time is crucial for the result of a replantation (92% of correct answers) and that an avulsed tooth should be held by the crown (94% of correct answers). In the event of the question for the best transport medium, again, we found 48 correct answers (96%) and only two wrong ones (4%). However, the most frequently chosen alternative was saline (82% respondents), while only eight people (16%) chose milk as a possible medium. Almost all respondents were able to choose the correct answer to the question what should be done if the avulsed tooth gets dirty. There was only one person who

Table 2. Participants' answers to questions regarding dental trauma experience and training

Dental trauma experience	*n*	%
Dental avulsion experience at work		
Yes	21	42
No. of cases		
1	9	42.9
2	4	19
3	1	4.8
4	1	4.8
5	1	4.8
6	1	4.8
No answer	4	19
No	28	56
No answer	1	2
Dental trauma experience in family/friends		
Yes	22	44
No	28	56
Situation connected with dental avulsion		
Sports	10	33.3
Fights	8	26.7
Accidents	11	36.7
Health related	0	0
Other	1	3.3
Received dental trauma education		
Yes	38	76
No	12	24
Self-study education		
Yes	24	48
Way of self-study		
Consultation with dentist	12	50
Medical literature	5	20.8
Magazines, internet	9	37.5
Consultation with colleagues	5	20.8
No	26	52

Table 3. Participants' answers to questions regarding the knowledge of tooth avulsion

Question	*n*	%
Give the correct definition for replantation		
Replacing avulsed teeth by other teeth	5	10
Placing back the same teeth which were avulsed	43	86
Placing an implant or denture in place of avulsed teeth	0	0
I don't know	2	4
Who is the right person to conduct replantation?		
Only a dentist	19	38
Every person with medical background	7	14
Everybody who witnessed tooth avulsion	22	44
I don't know	2	4
What time from trauma is crucial for the replantation?		
Up to 1 h	46	92
12 h	0	0
I don't know	4	8
Avulsed teeth should be held by		
The crown	47	94
The root	0	0
I don't know	3	6
Which medium is the best for the transport of an avulsed tooth?		
Saline	41	82
Patient's saliva	24	48
Milk	8	16
Sterile gauze	1	2
Water	1	2
Hand	0	0
Alcohol	0	0
Ice	0	0
What should be done if the avulsed tooth gets dirty?		
Wash it with water	49	98
Wash it using a detergent	1	2
Throw it away because if dirty it is useless	0	0
What would be your behaviour in case of tooth avulsion?		
Provision of tooth replantation	25	50
Calling a dentist and following his/her instructions	8	16
Transporting the patient to the nearest dentist	0	0
Calling patient's parents and advising them to take the child to a dentist	17	34
Keeping the child under observation	0	0

would wash it using a detergent. Exactly half of the surveyed nurses declared that they would provide tooth replantation and another 16% would consult the procedures by calling a dentist. On the other hand, 17 respondents (34%) would do nothing except calling child's parents and advising them to take the child to a dentist.

The level of knowledge of the management of dental avulsion was counted by summarizing points for correct answers. Then, the statistical analysis using Mann–Whithney *U*-test was carried out to determine the factors influencing the level of knowledge. The level of significance was established at 0.05. The only statistically significant difference was related to received or not dental trauma training ($P < 0.01$). Figure 1 shows the structure of obtained points in those two groups. The mean score for people who attended the lecture was 6.6 points ± 1.3, while it amounted to 5.16 ± 1.69 for those who had never been trained. However, there were no statistically significant differences between the level of knowledge and the work experience, the education level, the previous work or social experience of a dental trauma, the number of schools and children under their care, the presence of class specializing in sports, and the self-study education in the management of tooth injury.

Discussion

There are few studies evaluating the knowledge of the management of dental injuries by medical professionals (13, 18, 19), and none of them was dedicated directly to the medical staff working at schools. The only survey including school nurses was conducted by McIntyre et al. (20), but in that study nurses were one of three groups of surveyed professionals and their number was low (nine people). According to them, nurses possessed better knowledge of traumatic dental injuries than teachers and teacher assistants working at the same institutions. Such data were previously not available in Poland.

Forty-two percent of the interviewed individuals have ever come across tooth avulsion at work. This percentage was greater than reported for other professions, for example, 24% for physicians, between 9.6% and 35.8% for teachers (16, 18, 21–23), although lower than for dentists, which according to Cohenca et al. (24) amounted to about 60%. The stated number of cases of tooth avulsion witnessed by the interviewed nurses appears to be slightly underestimated in relation to the size of population of pupils under their care. However, one should remember that it concerns only such injuries that were treated by surveyed nurses. An avulsion can take place outside the school premises, and because of the work schedule of the nurses, they are not present at school during all opening hours. In addition, four persons stated that they witnessed a tooth avulsion, but did not specify the precise number of cases (Table 2). The great number of respondents had also experience of dental trauma in their families or friends. It could be expected that personal experience of a dental injury should influence the level of knowledge, but our survey did not show such kind of correlation. This finding is similar to those revealed by other authors (10, 25, 26).

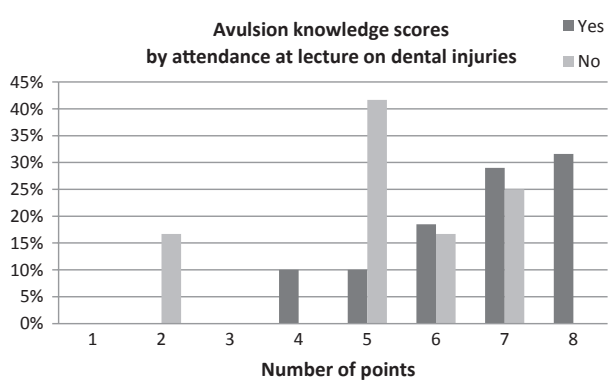

Fig. 1. Avulsion knowledge scores by attendance at lecture on dental injuries.

We observed that lay knowledge of surveyed population was at an adequate level. Only two persons scored two points for eight possible and 12 nurses (24%) made the maximum score. That result seems to be satisfactory taking into consideration the fact that our survey was made 2 years after a single lecture. Furthermore, nurses were not informed before the meeting about the planned questionnaire to avoid preparation for it. Respondents had adequate knowledge in such fields as explanation of the term of replantation, the best time for replantation, the best storage medium, and the cleaning of a dirty tooth. On the other hand, although a half of the respondents declared that they would provide tooth replantation if they faced an injured child, there were too many respondents who would let the parents decide about the course of action in case of an avulsed tooth, and only advise them to take him/her to a dentist. That way, the time from the moment of injury to the moment of replantation lengthens considerably. At the same time, it is not certain that parents would take appropriate action because it was proven that patients tended to wait before seeking treatment (15). According to Santos et al. (14), the level of parent and caregiver knowledge was independent of the family income, their schooling, and age.

Our survey revealed that previous training in dental trauma management was the only way of acquiring this knowledge by nurses working at schools in Bialystok, Poland. There were statistically significant differences in the level of the knowledge in people who attended and not attended the lecture conducted 2 years prior to the survey. Our observation corroborates the results showed by Levin et al., Frujeri and Costa & Holan et al. (26–28). Al-Asfoor et al. (9) proved that a 30-min lecture followed by discussion was sufficient to improve teachers' knowledge from low to at least adequate level. In that survey, the percentage of correct answers increased in some fields from 5% before the lecture to 93% after it. Although the second questionnaire was provided directly after the lecture, in other fields, for example, the importance of extra-alveolar time or storage medium, the improvement was not so spectacular. The authors suggest that the problem might be in too specialist language of delivering information. They also emphasized that the lecture should be given to homogenous groups with the same background. Holan et al. (28) have

noticed that education campaign with a seminar in the population of the physical education teachers improved the knowledge also among those persons who did not attend that seminar. Authors explain this phenomenon by contamination effect; people can discuss the topics and problems presented during such meetings and transfer the knowledge to work colleagues. In another study, Holan & Shmueli (11) found that physicians' knowledge about dental trauma might improve by having a dentist spouse, which means they acquired some information at home during family discussions. We think that the good result obtained in our survey despite the lapse of 2 years since the lecture was caused by great interest of the nurses in the subject presented as well as the accessible form of presentation. At the lecture, simple algorithms of action to be taken in case of different injuries were presented, and the nurses were asked to keep the notes in their treatment rooms to be able to refer to them at any time.

Not only lectures are an effective way to disseminate information about the management of dental avulsion. McIntyre et al. (20) found pamphlets as a good resource for the education of lay people on first aid in dental trauma. According to them, the combination of a lecture and pamphlets added no additional benefits compared to pamphlets alone. Lieger et al. (29) revealed the positive impact of educational poster campaign on the lay knowledge of school teachers. It seems to be important to develop and distribute in medical professionals a clear algorithm of first aid in dental trauma similar to that showed by Zadik (30).

Conclusions

The lay knowledge of tooth avulsion in the population of nurses working at schools in Bialystok, Poland, was at an appropriate level. There was strong correlation between this level and the participation in the lecture on the management of dental trauma conducted 2 years before. In some fields, additional training is still needed. Education is the simplest way to improve the knowledge of the management of dental injuries among medical staff and lay people.

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References

1. 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.
2. Andreasen JO, Andreasen FM, Andersson L. Textbook and colour atlas of traumatic injuries to the teeth, 4th edn. Oxford: Blackwell Munksgaard; 2007. 444 pp.
3. Eyuboglu O, Yilmaz Y, Zehir C, Sahin H. A 6-year investigation into types of dental trauma treated in a paediatric dentistry clinic in Eastern Anatolia Region, Turkey. Dent Traumatol 2009;25:110–4.
4. Altun C, Ozen B, Esenilk E, Guven G, Gürbüz T, Acikel C et al. Traumatic injuries to permanent teeth in Turkish children, Ankara. Dent Traumatol 2009;25:309–13.
5. Tzigkounakis V, Marglová V. Attitude of Pilsen primary school teachers in dental traumas. Dent Traumatol 2008;24:528–31.
6. Marcenes W, Alessi ON, Traebert J. Causes and prevalence of traumatic injuries to the permanent incisors of school children aged 12 years in Jaraguá do Sul, Brazil. Int Dent J 2000;50:87–92.
7. Traebert J, Perez 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.
8. Andersson L, Al-Asfor 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.
9. Al-Asfor A, Andersson L., Al-Jame Q. School teachers' knowledge of tooth avulsion and dental aid before and after receiving information about avulsed teeth and replantation. Dent Traumatol 2008;24:43–9.
10. Blakatny 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.
11. Holan G, Shmueli Y. Knowledge of physicians in hospital emergency rooms in Israel on their role in cases of avulsion of permanent incisors. Int J Peadiatr Dent 2003;13:13–9.
12. Traebert J, Traiano ML, Armênio R, Barbieri DB, Telino de Lacerda J, Marcenes W. Knowledge of lay people and dentists in emergency management of dental trauma. Dent Traumatol 2009;25:277–83.
13. Díaz J, Bustos L, Herrera S, Sepulveda J. Knowledge of the management of paediatric dental traumas by non-dental professionals in emergency rooms in South Araucanía, Temuco, Chile. Dent Traumatol 2009;25:611–9.
14. Santos MESM, Habecost APZ, Gomes FV, Weber JBB, de Oliveira MG. Parent and caretaker knowledge about avulsion of permanent teeth. Dent Traumatol 2009;25:203–8.
15. Glendor U. Has education of professional caregivers and lay people in dental trauma care failed? Dent Traumatol 2009;25:12–8.
16. Mori GG, Turcio KHL, Borro VPB, Mariusoo AM. Evaluation of the knowledge of tooth avulsion of school profesionals from Adamantin, São Paula, Brazil. Dent Traumatol 2007;23:2–5.
17. Abu-Dawoud M, Al-Enezi B, Andersson L. Knowledge of emergency management of avulsed teeth among young physicians and dentist. Dent Traumatol 2007;23:348–55.
18. Subhashraj K. Awareness of management of dental trauma among medical professionals in Pondicherry, India. Dent Traumatol 2009;25:92–4.
19. Walker A, Brenchley J. It's knockout: survey of the management of avulsed teeth. Accid Emerg Nurs 2000;8:66–70.
20. McIntyre JD, Lee JY, Trope M, Vann WF Jr. Effectiveness of dental trauma education for elementary school staff. Dent Traumatol 2008;24:146–50.
21. Mohandas U, Chandan GD. Knowledge, attitude and practice in emergency management of dental injury among physical edudacion teachers: a survey in Bangalore urban schools. J Indian Soc Pedod Prev Dent 2009;27:242–8.
22. Çaglar 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.
23. Pacheoco LF, Filho FG, Letra A, Menezes R, Villoria GEM, Ferreira SM. Evaluation of the knowledge of the treatment of avulsions in elementary schools teachers in Rio de Janeriro, Brazil. Dent Traumatol 2003;19:76–8.
24. Cohenca N, Forrest JL, Rotstein I. Knowledge of oral health professionals of treatment of avulsed teeth. Dent Traumatol 2006;222:296–301.

25. 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.
26. Levin L, Jeffer U, Zadik Y. The effect of short dental trauma lecture on knowledge of high-risk population: an intervention study of 336 young adults. Dent Traumatol 2010;26:86–9.
27. Frujeri MLV, Costa ED Jr. Effects of a single dental health education on the management of permanent avulsed teeth by different groups of professionals. Dent Traumatol 2009;25:262–71.
28. Holan G, Cohenca N, Bring I, Sgan-Cohen H. An oral health promotion program for the prevention of complications following avulsion: the effect on knowledge of physical education teachers. Dent Traumatol 2006;22:323–7.
29. 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.
30. Zadik Y. Algorithm of first-aid management of dental trauma for medics and corpsmen. Dent Traumatol 2008;24:698–701.