Primary School Teachers' Knowledge on Tooth Avulsion

Znanje učitelja osnovnih škola o avulziji zuba

Abstract

Objective: Permanent teeth trauma is most frequent in children aged 7-9 years, and the primary school teachers (PSTs) are often the first to notice it. The aim of this study was to evaluate the competence in tooth avulsion clinical issues and knowledge on dental trauma of PSTs, as they can occasionally take on the role of school nurses. Material and Methods: Questionnaires were handed to 312 PSTs from 24 randomly selected primary schools in Zagreb, Croatia. An algorithm was designed for PST competence assessment. Results: Response rate amounted to 81.37% (N=255). Only 3.14% (N=8) of the PSTs would replant the permanent tooth properly and only 43.92% of them (N=112) would immediately take the child to a doctor of dental medicine. Dry tissue, as a transport medium for an avulsed tooth, was chosen by 50.20% (N=128) of the respondents. Altogether, 4.71% (N=12) of PSTs were graded as competent in case of child’s tooth avulsion. Conclusion: These results provided significant implications for school health, showed the educators’ serious lack of knowledge in cases of dental trauma and stressed a need for continuous education of PSTs on the topic.

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Address for correspondence
Professor Darko Macan, PhD
University of Zagreb
School of Dental Medicine
Department of Oral and Maxillofacial Surgery
University Hospital Dubrava
Av. Gojka Suska 6, 10000 Zagreb, Croatia
Phone: 00385 91 466 4075
Fax: 00385 1 4684 441
darkom@kbd.hr

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Introduction

Tooth injury is the most common trauma of the orofacial region (1). Dental trauma can vary from a simple fracture to the avulsion of the tooth (2). Studies have shown different incidence rates of dental trauma, from 10.2 to 69.2% (3, 4), out of which tooth avulsion makes an average of 13.6% (3, 5).

Tooth avulsion is a complete tooth displacement from the tooth socket and is most frequent with children aged between 7 and 9 years (1). It leads to drying, ischemia and bacterial contamination of the tooth pulp and the periodontal ligament which supports the tooth in the alveolus (tooth socket). Even after short extra-alveolar time (outside the tooth

Uvod

Trauma zuba naječša je u orofacialnoj regiji (1) i može varirati od jednostavne frakture do avulzije (2). Istraživanja su pokazala incidenciju dentalne traume od 10,2 do 69,2 % (3, 4), među kojima se avulzija zuba prosječno pojavljuje u 13,6 % slučajeva (3, 5). Avulzija zuba potpuna je dislokacija zuba iz alveole te je najčešća među djecom u dobi između 7 i 9 godina (1). Ako se dogodi, počinje isušivanje, ishemija i bakterijska kontaminacija pulp zuba i parodontnoga ligamenta. Čak i nakon kratkoga ekstraalveolarnog razdoblja nastaje trajno oštećenje parodontnoga ligamenta i stanica pulp zuba. Zbog svoga toga trajni zub valja replantirati u najkraćem mogućem roku. Ako je ekstraalveolarno vrijeme kraće...
Traume zuba

Material and Methods

Participants

Questionnaires were personally handed to 312 PSTs from 24 primary schools in Zagreb, Croatia. Systemic sampling randomization technique was used to select primary schools.

Sample size analysis with power of 90% and the alpha level of 0.05 showed a minimum of 140 respondents for conducting this study (16, 17).

Procedure

Questionnaires were handed only to PSTs who wished to participate in research. All PSTs from one school filled the questionnaire at the same time. While filling the questionnaire, PSTs were monitored by the investigators, thus assuring the accuracy of the data provided.

The survey was conducted between July and September 2014 on weekdays.

With the purpose of raising awareness and educating the respondents, an information leaflet was provided after each respondent, an information leaflet was provided after

Materijal i metode

Sudionici i postupak

Anketni upitnik dobilo je osobno 312 učitelja iz 24 osnovne škole u Zagrebu.

U odabiru osnovnih škola korištene je tehnika sistemskih randomizacija. Analiza veličine uzorka, uz snagu 90 % i alfa razinu od 0,05, pokazala je da je za provođenje ovog istraživanja potrebno najmanje njih 140 (14, 15).

Postupak

Upitnik su dobili isključivo učiteljici koji su izrazili želju za sudjelovanjem. Svi učitelji iz jedne škole istodobno su ispušteni upitnik. Tijekom popunjavanja istraživači su nadzirali učitelje osiguravajući kako točno dostavljene podatke.

Istraživanje je provedeno radnim danima između srpnja i rujna 2014. godine. Nakon ispitivanja, u svrhu podizanja svjesnosti i edukacije ispitanika, učitelji su dobili informativni letak u kojem je opisan točan postupak u slučaju avulzije zuba prema smjernicama Međunarodne udruge za dentalnu traum...
amining all of the primary school teachers involved in this study, containing the proper procedure in case of tooth avulsion, equivalent to the one released by the International Association of Dental Traumatology (IADT) (7).

Questionnaire

The questionnaire consisted of 27 questions and was divided in four parts. The first part was comprised of five questions concerning personal and professional data i.e. gender, age, educational level, years of employment and personal background.

The second part consisted of six questions that revealed PST’s experience with dental trauma and assessed the knowledge on tooth avulsion and primary and secondary dentition.

The third part, i.e. questions 12-20 noted PST opinion and response in tooth avulsion situations.

The fourth part contained questions about tooth replantation, rinsing, storage and transport media of the avulsed tooth and PSTs’ wish to learn more about the topic.

Competence assessment

The assessment of competence was evaluated by questions 15-26 of the survey and was rated individually. Within these questions, there was a possibility of more than one correct answer. The researchers determined a PST as “competent” and “incompetent” through a competence assessment algorithm. In order for a PST to be assessed competent, he/she could either choose to adequately replant a permanent tooth, choose the appropriate irrigation media, replant the tooth, or ensure quick transport to the doctor.

Anketni upitnik

Anketni upitnik sastojao se od 27 pitanja i bio je podijeljen u četiri dijela. Prvi dio sadržavao je pet pitanja o osobnim i profesionalnim karakteristikama, tj. o spolu, dobi, obrazovnom i godinama staža i podrijetlu. Drugi dio sastojao se od šest pitanja o iskustvu s dentalnom traumom kako bi se procijenilo znanje o avulziji zuba te o mliječnoj i trajnoj denticiji.

Treći dio, tj. pitanja od 12. do 20., postavljena su zato da se dozna o stajalištu i snažnosti učitelja u slučaju avulzije zuba. Četvrti dio bila su pitanja o replantaciji zuba, ispiranju, skladištenju i izboru transportnog medija za izbijeni zub.

Procjena kompetencije

Procjena kompetencije ocjenjivana je u anketnom upitniku od 15. do 26. pitanja i to za svakog ispitanika pojedinačno. U sklopu tih pitanja moglo se dati više točnih odgovora. Istraživači su procijenili učitelja kao kompetentnoga i nekompetentnoga na temelju algoritma za procjenu kompetencije. Da bi učitelj bio ocijenjen kompetentnim, morao je adekvatno replanirati trajni zub ili osigurati najbrži prijevoz djeteta.

Figure 1 Competence assessment algorithm for tooth replantation

Slika 1. Algoritam za procjenu kompetentnosti za replantaciju trajnog zuba

Figure 2 Competence assessment algorithm for tooth transportation to a doctor of dental medicine

Slika 2. Algoritam za procjenu kompetentnosti za transport doktoru dentalne medicine
tooth or secure the quickest transportation to the doctor of dental medicine. Both solutions were expressed as separate algorithms (Figures 1 and 2). Proper replantation implied choosing the adequate irrigation media, avoiding the mechanical cleaning of the permanent tooth root surface and its proper handling.

This survey was reviewed and approved by the Ethic Committee of the School of Dental Medicine, University of Zagreb, Croatia. The teachers who agreed to take part in the survey were assured of strict confidentiality and signed a written consent for taking part in the survey.

Statistical analysis

All submitted surveys were coded and analyzed. The results were processed in numerical order and expressed in percentages. The data were organized into files (Microsoft Excel, Microsoft Inc., USA) and processed by JMP7 module from the software package SAS (SAS Institute Inc., Cary, NC, USA). Fischer’s test was applied to test the hypothesis. The Chi-squared test, where applicable, was used to compare qualitative data. Statistically significant results were found only if $p<0.05$.

Results

Out of 312 handled questionnaires, 57 (18.3%) PSTs refused to take part in the survey; therefore the response rate was 81.73%. Only completely filled questionnaires met the inclusion criteria. Sample description by age and sex is presented in Table 1. Significantly larger numbers of female respondents were included in this study (96.47% of all respondents).

Eighty-four (32.94%), out of 255 primary school teachers, encountered dental trauma during their professional career. More than half (N=163; 63.92%) of PSTs did not know the age at which a child has all the permanent teeth and 108 (42.35%) of them would not seek professional help after the avulsion of a primary tooth. Altogether, 25 (9.80%) PSTs would not seek professional help after the avulsion of a permanent tooth. In case of a tooth avulsion, 43.92% (N=112) u ordinaciju doktora dentalne medicine. Oba rješenja izražena su kao zasebni algoritmi (slike 1. i 2.). Pravilna replan- tacija podrazumijevala je odabir odgovarajućeg medija za is- piranje, izbjegavanje mehaničkog čišćenja površine kotrijena trajnoga zuba i pravilno rukovanje zubom.

Ovo istraživanje pregledalo je i odobrilo Etičko povjeren- stvo Stomatološkog fakulteta Sveučilišta u Zagrebu. Učite- ljima koji su pristali sudjelovati u anketi osigurana je stro- ga povjerljivost podataka i svi su morali potpisati informirani pristanak.

Statistička analiza

Svaki anketni upitnik bio je kodiran i analiziran. Rezultati su obrađeni numeričkim redoslijedom i izraženi relativnim frekvencijama. Podaci su bili organizirani u datoteke (Microsoft Excel, Microsoft Inc., SAD) i obrađeni modulom JMP7 iz softverskoga paketa SAS (SAS Institute Inc., Cary, NC, SAD). Za provjeru hipoteze primijenjen je Fischerov test. Za usporedbu kvalitativnih podataka korišten je hi-kva- drat test gdje je to bilo primjenjivo. Statistički značajni rezul- tati pronađeni su samo ako je $p<0.05$.

| Table 1 | Sample description | Tablica 1. Opis uzorka |
|---------|--------------------|----------------------|
| Age • Dob | 20-30 | 31-40 | 41-50 | >51 | Total • Ukupno | Statistics • Statistika |
| Male • Muškarci | 1 | 2 | 4 | 2 | 9 | $\chi^2=0.45$; $P=0.93$ |
| Female • Žene | 30 | 75 | 85 | 56 | 246 | |
| Total • Ukupno | 31 | 77 | 89 | 58 | 255 | |

| Table 2 | Primary school teachers’ selection of professional help in case of permanent tooth avulsion | Tablica 2. Odabir stručne pomoći učitelja u osnovnoj školi u slučaju avulzije trajnog zuba |
|---------|---------------------------------------------------|--------------------------------------------------|
| Professional help • Stručna pomoć | N | % |
| Doctor of dental medicine • Doktor dentalne medicine | 112 | 43.92 |
| Only the child’s parents • Samo roditelje | 95 | 37.25 |
| Wouldn’t seek for professional help • Ne bih tražio/la stručnu pomoć | 25 | 9.80 |
| Hospital • Bolnica | 10 | 3.92 |
| Other • Ostalo | 8 | 2.92 |
| General practice doctors • Doktor opće prakse | 5 | 1.96 |
of PSTs would seek help from a doctor of dental medicine, while 27.06% of PSTs (N=69) would not seek for the permanent avulsed tooth. Primary school teachers' selection of professional help in case of permanent tooth avulsion is presented in Table 2.

The selection of an irrigation solution and transport medium to the professional care giver are presented in Tables 3 and 4. Replantation of a primary tooth as a treatment option would be considered by 11 PSTs (4.31%), while replantation of the permanent avulsed tooth by 15 PSTs (5.88%). From those who considered permanent tooth replantation, only 8 teachers (3.14%) would do it properly.

The competence algorithm showed that 12 (4.71%) PSTs were competent, while 36 (14.12%) PSTs considered themselves personally competent in cases of tooth avulsion.

There was no connection between age (Fisher’s test, p=0.504), educational level (Fisher’s test, p=0.546), origin (Fisher’s test, p=0.398) or duration of employment (Fisher’s test, p=0.586) and level of competence.

Respondents showed interest in the topic and 98.04% (N=250) of them expressed a wish to learn more about dental trauma.

Discussion
Because of an impressive clinical picture, often followed by distress and bleeding in the area of face and mouth, seeking for the avulsed tooth does not present a priority for PST-a (N = 69) ne bi tražilo izbijeni trajni zub. Izbor stručne pomoći koji bi tražili učitelji osnovnih škola u slučaju avulzije trajnoga zuba prikazan je u tablici 2.

Odbir učitelja, kad je riječ o otopini za ispiranje i transportnom mediju u slučaju avulzije zuba, nalazi se u tablicama 3 i 4. Replantaciju mliječnoga zuba kao mogućnost liječenja uzelo bi u obzir 11 učitelja (4,31 %), a replantaciju trajnoga avulziranoga zuba njih 15 (5,88 %). Od svih onih ispitanika koji bi replantirali trajni zub, samo 8 učitelja (3,14 %) učinilo bi to pravilno.

Algoritmom za procjenu kompetencije 12 učitelja (4,71 %) ocijenjeno je kompetentnima, a sveukupno se njih 36 (14,12 %) smatra osobno kompetentnima u slučaju avulzije zuba.

Nije bilo povezanosti između dobi (Fisherov test, p = 0,504), stupnja obrazovanja (Fisher-ov test, p = 0,546), podrijetla (Fisherov test, p = 0,398) ili godina staža (Fisherov test, p = 0,586) i kompetencije učitelja.

Ispitanici su pokazali zanimanje za temu i 98,04 % učitelja (N = 250) izrazilo je želju da doznaju više o dentalnoj traumi.

Rasprava
Zbog impresivne kliničke slike, često praćene izrazitom anksioznosću i krvarenjem u području lica i usta, traženje avulziranoga zuba nije prioritet u kontaktu s traumatizira-
people in contact with a traumatized child. Firstly, it is essential that life-threatening injuries are excluded. However, afterwards, it is necessary that the permanent tooth is found and properly handled. The fact that 27.06% of PST (N=69) would not seek the permanent tooth when knocked out demonstrates incompetence “a priori”. According to the IADT, an avulsed tooth has the best prognosis if rinsed under running tap water for 10s maximum, without mechanical cleaning and if replanted within 30-60 minutes in the dental alveolus (7). Unfortunately, only 5.88% of PSTs (N=15) would replant a permanent tooth, out of which only eight of them would do it properly. This piece of information does not differ from foreign research (18, 19).

Primary avulsed teeth should not be replanted, nevertheless 4.31% (N = 11) of our respondents would do so. This procedure can damage the bud of the permanent tooth. Even though a systemic review on primary tooth replantation showed outcomes without negative consequences in 15 out of 41 cases, there remains no evidence on its validity (20).

If it’s decided not to replant the avulsed permanent tooth, a selection of transport media and quick transportation to the doctor of dental medicine is crucial.

Most of PSTs (50.20%; N=128) in our study would use a dry tissue as a transport medium, which, as well as tap water, distilled water, ice, alcohol and mouthwash leads to dehydration of cells and causes their degradation (6,10,19). Similar results are noted in other papers (21-23). Milk has obtained acceptance as storage medium. As a transport medium was selected by 12.54% (N=32) of our respondents. A solution similar to saline solution is easily prepared by dissolving a teaspoon of salt in two deciliters of water. Milk has obtained acceptance as storage medium. Likewise, a readily accessible saline solution can be used as a transport medium. None of PSTs selected it as a transport medium. Every household with children should own a specialized media kit, not to mention the necessity of it in kindergartens and schools.

Since every avulsed tooth has a good prognosis if replanted within an hour, it is worrisome that 37.25% (N=93) of PSTs would only inform the parents, thus leaving the child’s future care to them and wasting precious time, that only 43.92% (N=112) of them would ensure immediate transportation to the doctor of dental medicine, that 80.00% (N=204) of them would not choose the right medium for transporting the avulsed tooth, that most of them would not consider tooth replantation, and that 63.92% (N=163) of them do not even know at what age a child has all of his/her permanent teeth (not including wisdom teeth).

Unfortunately, school policy on dental trauma and healthcare is often not defined at the national level, but varies from school to school. Consequently, school teachers sometimes must completely take on the role of school nurses.

The results of this study have not brought new insights on the level of PST knowledge since the lack of it is reported in other similar studies on the topic (24-28). However, the novel algorithm proved rigorous, simple and exact. Compe-
Conclusions

Our results provide significant implications for school health and show the current lack of knowledge on dental trauma among primary school educators. Dental trauma in primary school is not uncommon. Teachers are the first to notice dental trauma, hence they will occasionally have to justify the need for their obligatory continuous education.

It is satisfying that 98.04% (N=250) of PSTs expressed a wish to find out more about the topic. Since only 14.12% (N=36) of teachers found themselves competent in tooth avulsion issues, their awareness of the lack of knowledge is clear. We expected a connection between the level of education, years of employment, background, experience and the assessed competence. However, we found no statistically significant difference.

A questionnaire, presented as a tool for knowledge and competence assessment, has its already familiar limitations as an indirect measurement tool (29, 30), since there are difficulties concerning the reproduction of real-time clinical situations, ensuring the truthfulness of the answers and respondents’ recall or the response rate bias. Even though every researcher tends to provide the most accurate data, observer bias cannot be excluded, due to the respondents’ questions during the examination. The answers given to them could not have been credible, but surely any information given was influential.

In order to educate PSTs about tooth avulsion, they were handed an information leaflet that simply describes the methods of managing the avulsed tooth.

A similar study, involving school nurses, would complement the evaluation of dental trauma management in primary schools.

Zaključak

Rezultati istraživanja pokazali su trenutačni nedostatak znanja učitelja osnovnih škola u zbrinjavanju avulzije zuba. Dentalna trauma u osnovnoj školi nije rijetkoća i u sastavu kompetencije prvi koji će je primijetiti te će katkad morati preuzeti i ulogu školskih medicinskih sestara.

Procjena kompetencije s pomoću predviđenih algoritama u svim scenarijima je jednostavna, rigorozna i inovativna tehnika za procjenu znanja o avulziji zuba. Međutim, prema našim razumijevanjima, algoritam za procjenu kompetencije još nije korišten za procjenu sposobnosti u slučaju avulzije zuba.

Rezultat je 95,29% učitelja ocijenjeno nekompetentnim za zbrinjavanje avulziranog zuba upućuje na to da je potrebno stalno organizirati tečajeve o dentalnoj traumi. To
nizing continuous obligatory courses on dental trauma. This can only be performed by studies like this one, aiming school teachers and school nurses through undergraduate and postgraduate curricula.

Acknowledgments and conflict of interest

The questionnaire and the information leaflet are available on request. The authors declare no conflict of interest.

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