



What do polish parents know about dental trauma and its management in children's treatment? A questionnaire study

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ABSTRACT

Objectives: To evaluate the knowledge of Polish parents concerning traumatic dental injuries (TDIs) and their management in children and to assess the influence of TDI experience on parents' knowledge.

Methods: A questionnaire study conducted from May 2014 to February 2015 involved 741 randomly selected individual parents of children aged 1–17 receiving treatment at the Department of Pediatric Dentistry at the Medical University of Warsaw. The questionnaire consisted of 28 questions concerning TDI management.

Results: The study included 600 questionnaires subjected to statistical analysis using a χ^2 independence test and Spearman's rank correlation ($p < .05$). Results show that 68% of parents have never received information about TDI management. As many as 80.5% were unaware of the possibility of immediate replantation of an avulsed tooth; over 60% would not be capable of choosing a suitable transport medium for such a tooth. Over 12% of TDI-experienced parents were unaware of a suitable transport medium for an avulsed tooth. Three times as many inexperienced parents as parents with TDI experience would place an avulsed tooth in saline solution. The independence test presented a strong correlation between parents' education and their knowledge about TDI management. As many as 80% of parents assessed their knowledge about TDI as inadequate.

Conclusions: It appears necessary to introduce programmes for parents to raise their level of awareness concerning this topic.

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Introduction

Traumatic dental injuries (TDIs) are common among children in all age groups and constitute a global problem. It is estimated that about 40% of first-time dental surgery visits are due to TDIs [1]. Andersson [2] states that oral injuries constitute 17% of all body injuries. Therefore, a key factor in determining a tooth's prognosis and preservation is provision of first aid in a correct manner in the shortest possible time after the TDI [3,4]. This influences a child's aesthetic appearance, speech development, the functioning of its cranio-mandibular system and the psychic well-being of both the child and its parents [5,6]. According to Andersson's study [2], TDI incidence is estimated at 1–3%, its prevalence at 20–30%. Reports from many countries show that approximately one-third of preschool children and toddlers, one-fourth of all school children and one-fifth of adolescents have suffered a TDI involving primary dentition [7]. The patient's home has been reported as the main location for TDI occurrence for both primary and permanent dentition [7,8]; 40% of TDIs occur under parental supervision [8]. This is closely followed by injuries in kindergartens and schools (30%) [8–10]. However, reports from other countries show that parents, teachers and caregivers do not know how to intervene in cases of dental trauma [3,4,11–17]. Emergency management

should begin at the moment of injury. This highlights the importance of first aid and the need to educate the population. Therefore, researchers agree that post-traumatic prognosis depends largely on TDI management by parents and teachers [9–11].

The aim of the study was to evaluate the knowledge of a sample of Polish parents from Warsaw concerning TDIs and their treatment and management in children. The study's secondary aim was to assess the influence of TDI experience on parents' knowledge.

Material and methods

The questionnaires were collected from May 2014 to February 2015. One in every four children (1225) was selected for the study, along with its parents, from a sample of 4900 children aged 1–17 receiving treatment at the Department of Pediatric Dentistry at the Medical University of Warsaw. As many as 348 parents refused to take part in the study; 136 children were no longer receiving treatment at the department. Thus the study ultimately involved 741 randomly selected individual parents. Ethical approval for the study was obtained from the Bioethics Committee, Medical University of Warsaw (No. AKBE/15/15). The sample size was

determined at $n=600$ to obtain a margin of error less than 0.04 (4%) for binomial proportions at 95% of confidence level. The questions were validated and pilot-tested. The questionnaire was designed on the basis of discussions with researchers at the Medical University of Warsaw and references to TDI literature (questions used previously in other papers). The questions concerned management of TDIs of primary and permanent teeth, according to actual guidelines. The questionnaire as initially designed was first submitted to 40 individual parents to determine whether the questions were clear and understandable. The patients themselves, as well as researchers with long experience in working with TDI, were asked to verify the content of the questionnaire. As a result, four questions were eliminated from the final version of the questionnaire, as they added no value to the results and did not correspond directly to the aim of the study. These questions included information concerning most traumatic sport activities.

The final questionnaire included 28 multiple-choice questions, including information about sex, age, parents' socio-economic status (subjectively estimated by the parents), education and employment of the respondents, physical abilities of children and the cause of the TDI, along with knowledge concerning the adoption of adequate precautions during playtime. The next set of questions concerned knowledge about TDI management in cases where a tooth was broken or avulsed. Awareness of possible post-traumatic complications was also studied. Additionally, the questionnaire contained questions concerning the respondents' willingness to expand their knowledge about TDI management. The criterion for inclusion in the study was submission of a questionnaire completed in full by a parent, while the exclusion criterion was a questionnaire missing an answer to at least one question.

Answers were entered into Statistica version 8 (StatSoft, Tulsa, OK) and subjected to statistical analysis with a χ^2 independence test and Spearman's rank correlation ($p < .05$). In order to fulfil the selected criteria for defining correlation as certain and to ensure the necessary level of independence, a respondent had to choose at least one possible right answer to each question without choosing the wrong one. Moreover, multivariate statistical analysis was carried out for the dependent variable concerning knowledge about TDI management.

Results

The study involved 600 of 741 collected questionnaires; 141 questionnaires were excluded according to the exclusion criterion. The overall response rate calculation was 48.97%. The characteristics of the tested group are presented in Table 1.

As many as 27% of parents reported occurrences of TDIs, with 16% involving primary and 11% permanent dentition. In 69% of these cases, only one incident was reported. The results showed that only 32.83% of parents possess basic knowledge concerning TDI management, while 67.17% stated that they had never received any instruction on the subject. Of parents educated about TDI management, 49.75% stated

Table 1. Characteristics of the tested group.

Sing			N	%
1.	Sex	Women	459	76
		Men	141	24
2	Age	Women	37.88 ± 8.02 years	
		Men	37.14 ± 8.71 years	
	Children age		Range: 1–17 years old Mean: 8.34+ –8.54 Median: 8 years old	
3	Socio-economic status	Low	41	6.8
		Medium	481	80.2
		High	78	13
4	Education	Primary	26	4.3
		Secondary	159	26.5
		Vocational	105	17.5
		Bachelors	72	12
		Masters	238	39.7
5	Employment	Yes	475	79.2
		No	125	20.8

that a dentist, paediatrician, or general practitioner had served as the source of information, whereas 20.81% of such parents obtained information from the internet.

Analysis concerning TDI management reveals that over 80% of parents were unaware of the importance of immediate replantation in the case of an avulsed tooth (Table 2). Barely 19.5% would replant an avulsed permanent tooth, while only 6% of parents – having been previously instructed by the dentist on TDI treatment – would decide to perform immediate replantation. Over 60% of the parents were unaware of a suitable medium in which to transport an avulsed permanent tooth to the dentist. However, over 58% of respondents were able to choose a suitable method of cleaning an avulsed permanent tooth (Table 2). The results show that 71% of parents were not aware of the '60-minute golden time' needed to save an avulsed permanent tooth. Moreover, parents of children with TDI histories constituted only one-third of the respondents with knowledge about the topic (Table 3). The majority of parents (80%) wished to expand their knowledge about TDI management, preferring to obtain the information during a dental visit (51%) or by reading a leaflet (41.3%).

The answers of parents with TDI experience were compared to answers given by parents of children who had never experienced TDI. A significant difference was found between the groups, as 58% of the inexperienced parents had never been instructed in TDI management, compared to 8.67% of the experienced ones (Table 2). Nevertheless, over 63% of the inexperienced parents would immediately visit a dentist for a broken tooth crown, whereas only 21% of parents with TDI histories would choose to seek help in that situation ($p < .001$, χ^2 independence test, Table 2). According to analysis, 18.33% of parents of children with TDI histories claimed to possess adequate knowledge of TDI management, but only 8.5% of them would replant an avulsed permanent tooth, whereas the same percentage of those parents would replant an avulsed primary tooth. In comparison, 14.5% of inexperienced parents claimed to possess adequate knowledge of TDI management. Only 11% of these parents would replant a permanent tooth, whereas 28.5% would replant a primary tooth. However, inexperienced parents would be more likely to rinse a contaminated avulsed tooth in water or

Table 2. Questionnaire questions and answers.

Question	Answer	Total		According to the child dental trauma experience or not			
		N	%	Yes		No	
				N	%	N	%
What would you do in case of a broken crown in your child's front tooth?	<i>Inspect the wound</i>	208	34.6	60	10	148	24.6
	<i>Wash the wound</i>	117	19.5	27	4.49	90	15
	<i>Try to find the broken tooth crown</i>	177	29.5	57	9.44	120	20.06
	<i>Immediate visit to the dental surgery</i>	505	84.2	126	21	379	63.2
	Postponed visit to the dental surgery	37	6.2	15	2.54	22	3.66
	I do not know	37	6.2	8	1.36	29	4.84
Would you replant an avulsed permanent tooth?	Yes	117	19.5	51	8.58	66	10.92
	No	483	80.5	111	18.52	372	61.98
Would you clean an avulsed tooth, which had a contact with the ground?	Use a toothbrush	59	9.8	18	3	41	6.8
	<i>Rinse with water</i>	194	32.3	50	8.4	144	23.9
	<i>Rinse with saline solution</i>	156	26	51	8.58	105	17.42
	Insert it directly into the socket	17	2.8	8	1.3	9	1.5
	I do not know	77	12.8	22	3.71	55	9.09
	I would not have cleaned it	155	25.8	26	4.39	129	21.41

Correct answers are italicized in table.

saline solution (24 and 17.5%) than parents with TDI experience (8.33 and 8.5%) ($p < .001$, χ^2 independence test, Table 2). What is more, a greater percentage of inexperienced parents would carry an avulsed tooth in a handkerchief to a dental office (20.33%), compared to parents with TDI experience (6%) or a declared lack of knowledge on the topic (15 and 2.17%, respectively) ($p < .001$, χ^2 independence test, Table 3). On the other hand, 12.84% of parents with TDI histories were unaware of the correct way to transport an avulsed tooth. Three times as many inexperienced parents would place an avulsed tooth in saline solution compared to parents with TDI histories ($p < .001$, χ^2 independence test, Table 3). However, fewer inexperienced parents were aware of the consequences of TDI for primary dentition and its significance for the condition of permanent dentition (2.67%). In both groups, parents cited toothache as the most significant TDI complication (Table 4).

The results of the analysis showed a strong positive correlation between the level of parents' education and their preferred method of cleaning a contaminated avulsed tooth ($p = .88$) and chosen transport medium ($p = .84$). Respondents with a high level of education would choose to clean the contaminated avulsed tooth with saline solution and would transport it to a dental office in saliva or saline solution. Respondents with secondary or primary education would brush a contaminated tooth and transport it with a handkerchief. Analysis showed a weak positive correlation between the level of education and the respondents' knowledge about possible TDI complications ($p = .66$) and their effect on the condition of primary and permanent dentition ($p = .64$).

The χ^2 independence test showed a strong association of variables between a respondent's level of education and opinion on the potential for saving an avulsed permanent tooth ($p = .21$) and the procedure to be followed in the case of a broken tooth crown ($p = .04$). The test also showed a strong negative correlation between sex and declared knowledge about TDI (broken crown of a tooth: $p = .99$). Multivariate statistical analysis of a dependent variable concerning knowledge about TDI management showed the strongest relationship between parental experience with TDI

and the parents' method of cleaning a dirty avulsed tooth. The correlation was statistically significant (Table 5).

Discussion

The results of this study, conducted with the cooperation of 600 individual parents from Warsaw, show the prevalence of TDI in 27% of children. This result agrees with the investigations of other authors [18–21]. Most children have experienced TDI once, similarly to the results presented by Oldin et al. [21].

Research from various countries shows that knowledge about TDI management that parents claim to possess does not correspond with their actual knowledge [12–14]. In Warsaw, 32% of respondents claimed to possess basic knowledge about TDI management, while 51% of Italian parents claimed such knowledge [12]. This study shows that a greater percentage of parents (17.87%) with TDI experience than of inexperienced parents (14.13%) claim to possess knowledge about TDI management. Elkarmi et al. [13] state that 50% of questioned parents claimed that information provided to them on oral and dental health was sufficient, while 25% achieved low knowledge scores on the subject. Similarly to a study by Ozer et al. [14], the present research showed that over 60% of parents had not received any information about TDI management. Furthermore, only 19% of Polish parents would immediately replant an avulsed permanent tooth, with parents with TDI experience constituting barely 8.58%. A similar result, whereby 90.7% would not proceed with replantation, was presented by Turkish respondents [14], whereas 60% of respondents from India were unaware of the possibility of saving an avulsed permanent tooth [15]. Despite those pessimistic statistics, 66% of parents from Italy claimed to possess knowledge about permanent tooth replantation [12]. On the other hand, this study shows that significantly more inexperienced parents (28.5%) would attempt primary tooth replantation than those with TDI histories (8.5%).

What is more, as many as 71% of Polish parents admitted their lack of knowledge about reaction time in the case of permanent tooth avulsion, and only 15.3% of respondents would react within an hour after injury; only 5.63% of these

Table 3. Questionnaire questions and answers.

Question	Answer	Total		According to the child dental trauma experience or not			
				Yes		No	
		N	%	N	%	N	%
What is the time, in which the avulsed permanent tooth can be 'saved'?	<i>15 min</i>	19	3.2	3	0.5	16	2.69
	<i>30 min</i>	20	3.3	7	1.15	13	2.15
	<i>60 min</i>	71	11.8	28	4.65	42	6.98
	2 h	64	10.7	24	4	40	6.7
Where would you keep an avulsed tooth on the way to the dentist?	I do not know	426	71	100	16.67	325	54.17
	<i>In a saliva/mouth of a child</i>	68	11.3	37	6.15	31	5.15
	<i>In a cup of water</i>	103	17.2	28	4.68	74	12.36
	<i>In a cup of milk</i>	45	7.5	18	3	27	4.5
	<i>In a saline solution</i>	123	20.5	30	5	93	15.5
	In a handkerchief	158	26.3	36	5.99	122	20.31
Do you know the posttraumatic recommendations?	I do not know	185	30.8	41	6.83	143	23.81
	<i>Soft diet for 7–14 d</i>	351	59	107	17.99	242	40.68
	<i>Brushing teeth after each meal</i>	140	23	41	6.74	98	16.1
	<i>Using a soft toothbrush</i>	279	47	85	14.32	193	32.5
	Using a hard toothbrush	2	0.33	0	0	2	0.33
	<i>Rinsing with antibacterial liquid</i>	280	47	92	15.44	188	31.56
	No special recommendations are necessary	15	2.5	1	0.17	14	2.33
I do not know	115	19	25	4.13	90	14.87	

Correct answers are italicized in the table.

Table 4. Questionnaire questions and answers.

Question	Answer	Total		According to the child dental trauma experience dental trauma or not			
				Yes		No	
		N	%	N	%	N	%
Select the complication you think might be caused by TDI	<i>Teeth crown discoloration</i>	240	40	84	14	156	26
	<i>Toothache</i>	473	79	137	22.9	336	56.1
	Dental trauma does not cause any complications	19	3	3	0.48	16	2.52
	<i>Oozing of the pus from tooth area after trauma</i>	242	40	63	10.4	179	29.6
Do you think that trauma to the deciduous tooth can affect the permanent tooth?	<i>Tooth mineralization disorder</i>	110	18	37	6.12	73	11.88
	<i>Change of the appearance of a crown/root</i>	141	24	42	7.2	99	16.8
	<i>Damage to a tooth bud</i>	108	18	32	5.4	76	12.6
	<i>Relocation of a tooth bud</i>	176	29	55	8.99	121	20.01
	<i>Postponed eruption of a permanent tooth</i>	192	32	65	10.88	127	21.12
	There is no correlation	47	8	13	2.24	34	5.76
	I do not know	193	32	37	6.08	156	25.92

Correct answers are italicized in the table.

Table 5. Data and education correlation.

	Cleaning the tooth, which had contact with the ground	Transport media for the avulsed tooth	Possible tooth complications	Possible effect of deciduous tooth trauma on permanent dentition
Correlation coefficient	$p = .88^*$	$p = .84^*$	$p = .66^*$	$p = .64^*$

*Statistically significant result, $p < .05$.

represent parents with TDI experience. A retrospective study carried out in Poland showed that the mean time between avulsion and replantation was 6.39 h [22]. A study by Andreasen et al. [23] suggests that full regeneration of dental tissues occurs when the tooth is replanted within 5 min of avulsion. It is said that the 'golden time' for periodontal healing is less than 60 min, provided the tooth has been properly transported. Nevertheless, all efforts should be made to replant a tooth within 15–20 min following avulsion [23–25]. As opposed to Polish respondents, Italian and Turkish parents are more aware (56.8 and 68.2%, respectively) of the 60 min period during which a tooth should be replanted [12,14].

Previous research supports the results of this study concerning the lack of knowledge regarding transport media for avulsed teeth [4,14]. Most frequently, parents would store

such teeth in a dry environment (23.2–45%), occasionally in saliva (1–1.4%) [4,12,14,22]. In this study, only 10% of respondents would brush a contaminated avulsed tooth, while Ozer's research showed that 21.8% of Turkish parents would choose this procedure [14]. This study shows that parents both experienced and inexperienced in TDI would be more likely to rinse an avulsed tooth in water or saline solution. Nevertheless, most parents with TDI histories would keep an avulsed tooth in the child's mouth on the way to a dental office (6.15%), as compared to 5.15% of inexperienced parents. Unfortunately, more members of the latter group would carry the tooth in a handkerchief (20.31%), compared to 5.99% of the experienced parents. Research from Germany indicates that 65% of parents would immediately seek help in a case of TDI [8]. As many as 80–91% of Polish and Italian

parents would visit the nearest dental office [12], while in Ireland and Turkey, a hospital or dental faculty would be the most frequently chosen site for TDI management [13,14]. Regarding the effect of TDI on dentition, nearly 80% of Polish parents cited a toothache as the most common complication, whereas 99.1% of Irish respondents were mostly concerned about tooth discoloration [13].

This study shows that 80% of the respondents wished to expand their knowledge about TDIs. In his research, Glendor [17] points out the deficiency of public information concerning prevention and treatment of TDI, while Namdev et al. [11] highlight the necessity to educate individuals working with children.

This study shows a lack of knowledge among a very small percentage of parents from Warsaw and the suburbs, which, however, does not represent the whole range of this problem within the country. The weaknesses presented in the study should be addressed by questioning parents from smaller towns and villages in Poland, which constitute the largest group in the country. Therefore, actual knowledge about TDI management in such communities may be even more insignificant. What is more, the authors surveyed parents of children within a wide age range, which may have affected knowledge of TDI management in different types of dentition. Another study, one concerning TDI in a single type of dentition among parents of children of an appropriate age, should be carried out in order to collect more reliable responses. Nevertheless, the questionnaire raised the awareness of the parents surveyed, who willingly sought information about TDI management in children.

In conclusion, the research shows that parents' knowledge about first aid in TDI is inadequate; a great majority of them would not follow the code of conduct proposed by the literature. Parents with TDI experience claim to possess greater knowledge about TDI and its management than they possess in reality, but their actual knowledge is insignificantly less than in the case of inexperienced parents. It appears necessary to focus on the importance of TDIs and their effect on children's future health. Health policies aimed at preventing TDIs should be implemented. What is more, in order to raise social awareness of first-aid management during TDIs, clear protocols should be disseminated in strategic places to reach the public. Schools, kindergartens, dental offices and medical clinics should introduce specific educational programmes for parents in the form of posters, short films or handouts. Internet and mobile applications should be used to reach as many parents, teachers, coaches and children's guardians as possible to disseminate knowledge concerning the importance of healthy primary dentition in order to preserve the good condition of permanent teeth.

Disclosure statement

No potential conflict of interest was reported by the authors.

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