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Knowledge, attitudes, and behavior concerning dental trauma among parents of children attending primary school

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Abstract

Background. *Traumatic dental injuries occur frequently in children and adolescents. The purpose of the present study is to examine the levels of knowledge and behaviors regarding dental trauma among parents of children attending primary schools in the Apulia region of Italy.*
Methods. *The study was carried out using an anonymous questionnaire with closed answers distributed to 2,775 parents who were enrolled based on the entire regional school population. Analyses were conducted using the PROC CORRESP (procedure to perform multiple correspondence analysis) and PROC FASTCLUS (procedure to perform cluster analysis). Statistical significance was set at p-value < 0.05.*
Results. *A total 15.5% of the sample reported that their children had experienced dental trauma. Overall, 53.8% of respondents stated that they knew what to do in cases of dental injury. Regarding the time limit within which it is possible to usefully intervene for dental trauma, 56.8% of respondents indicated "within 30 minutes". Of the total sample, 56.5% knew how to preserve a displaced tooth. A total 62.9% of parents felt it was appropriate for their children to use dental guards during sports activities. The multivariate analysis showed that wrong knowledge are distributed among all kinds of subject. Parents with previous experience of dental trauma referred right behaviours, instead weak knowledge and wrong behaviours are associated with parents that easily worried for dental events.*
Conclusions. *This study showed that most parents reported no experience of dental trauma in their children, and half of them did not know what to do in case of traumatic dental injury and they would intervene within 30 minutes, suggesting that dental trauma may trigger panic. However, they did not have the information needed to best assist the affected child. Motivating parents to assume a preventive approach towards dental trauma may produce positive changes that would result an increase of long-term health benefits among both parents and children.*

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Background

Dental trauma can be defined as any thermal, chemical, or mechanical lesion affecting dentition (the hard tissues of the tooth, the pulp, or the periodontal structures); its effect is called traumatic dental injury (TDI) (1). They can be divided into nine kinds of fracture and six types of luxation or their combination, which frequently occur. These must be treated as separate entities and together with tooth decay and oral cancer are considered among the world's major public health challenges (2). TDI has been associated with feelings of being embarrassed to smile, laugh, or show one's teeth, difficulty in social relationships, irritability, and an inability to maintain a healthy emotional state. Therefore, TDI is considered to have a negative impact on the quality of life (3, 4). After dental trauma, the necessary therapeutic interventions may be targeted to the oral mucosa, the immediate restoration of an affected tooth, reattachment of a fractured coronal fragment, and eventual reimplantation of the avulsed tooth (5). Nevertheless, the multitude of possible trauma scenarios and broad variety of treatment options make it very difficult for practitioners to provide evidence-based treatment and recommend the best possible choice for the patient.

Among the most frequent etiological factors in primary dentition that can cause teeth to susceptible to trauma by favoring the distance between upper and lower incisors (overjet) are the first deambulation and bad habits such as thumb sucking or the use of pacifiers (6). With respect to the permanent teeth, facial injuries are usually the result of sports activities (7-9) or falls at home (10) or at school (11, 12). These occur more frequently in children than adults (1).

Although different methods have been proposed to classify TDI, there is no standardized diagnostic system that is considered suitable for epidemiological purposes because the protocols are often not comparable (1). Therefore, the magnitude of dental trauma in the foreseeable future will likely exceed that of dental caries and periodontal disease in younger populations (1, 13).

TDI also has an economic impact. A study conducted in Denmark and Sweden shows that the cost of the first "definitive" treatment for dental trauma in the late 1990s amounted to USD 5,000.000 per million inhabitants. This figure has doubled in recent years (14).

First-aid after dental trauma in the pediatric age group is important; however, parents, teachers, and sports coaches rarely know how to intervene in cases of dental trauma (15, 16). As a consequence, school, domestic, and sports environments are places where specific prevention strategies can be applied.

To investigate the level of knowledge about dental trauma among parents of children attending primary schools, a pilot survey was carried out in Apulia, Southern Italy, during January-May 2013 (17). The results showed overall parental lack of awareness, knowledge, and skill related to dental trauma, despite the publication of national guidelines (5). In light of these results, a larger project entitled "Prevention and management of dental trauma in children" was approved for the Apulia region within the context of educational programs offered in schools (18).

The aim of this work is to examine the level of knowledge and behaviors regarding dental trauma among parents of children attending primary schools.

Methods

Study design. The Italian school system includes 5 years of study in primary schools for all the children aged 5–6 through 10–11 years. All schools are composed of classes between 15 and 26 children each.

The regional sample was constructed based on the entire regional school population according to province, district, section, and was stratified by year. The sample size was determined by estimating the proportion of subjects with good knowledge about dental trauma, with a precision of 2%. The total number of subjects sampled was 2,373; the sample size was increased to 15% so as to have complete data for a minimum sample number as previously defined.

We developed a list of randomly selected, geographically representative primary schools. A request to enroll in the project was sent by mail to all schools. The head teacher of each school enrolled was contacted by telephone and asked to identify a referral teacher for the project, who was given the task of meeting with the parents of children from a randomly selected section of classes, to explain the study. During these meetings, we administered an anonymous questionnaire with closed answers to the parents, which they subsequently completed. The questionnaire was the same as that used in our pilot study (17) and was divided into three sections:

1. Parents' data (sex, age, level of education, number of children, employment status)
2. Child age and level of schooling
3. Questions related to parents' knowledge, management, and experience with respect to their child and dental trauma.

This study followed the principles of the World Medical Association Declaration of Helsinki. We did not report any data on humans or human samples, nor research on identifiable human material and data. All parents took part on a voluntary basis and were not remunerated for their contribution.

Statistical analysis. Data were summarized as counts and percentages, and comparisons between independent groups were performed using the chi-square test. To identify links between the characteristics of participants and their responses to the questionnaire, multiple correspondence analysis was carried out using responses as the main variables and participant age and sex as additional variables. To identify associations between subject characteristics and questionnaire responses, the value of each response on the two main axes was used as a quantitative variable in cluster analysis.

Clusters were identified based on the highest explained variability that corresponds with creation of valid groups of characteristics.

All analyses were conducted using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA) and the PROC CORRESP (procedure to perform multiple correspondence analysis) and the PROC FASTCLUS (procedure to perform cluster analysis). Statistical significance was set at p-value < 0.05.

Results

Overall, 2,775 parents were interviewed, of whom 506 were from school year I (18.2% of the sample), 625 from year II (22.5%), 562 from year III (20.2%), 536 from year IV (19.3%), and 546 from year V (19.7%). The main features of the sample are shown in Table 1.

There were no statistically significant differences in the proportions of male and female parents among the classes of children ($\chi^2 = 4.07$, $p = 0.3966$) nor among provinces ($\chi^2 = 6.4093$, $p = 0.2691$).

The answers to each item of the questionnaire are reported in Table 2. When asked, "Do you know what dental trauma is?" 84.2% (2,336/2,775) of respondents answered "yes" by indicating a fractured tooth (the correct answer); 6.5% (179/2,775) indicated dental caries, 6.1% (169/2,775) indicated a toothache, and the remaining 3.3% (91/2,775) indicated other disorders.

Table 1 - Demographic features of interviewed parents stratified by primary school classes

Demographic Features	Primary School Classes (No. Total Parents)										Tot (2,774)*	
	I (505*)		II (625)		III (562)		IV (536)		V (546)			
Gender	n	%	n	%	n	%	n	%	n	%	n	%
M	119	23.6	142	22.7	120	21.4	135	25.2	141	25.8	657	23.7
F	386	76.4	483	77.3	442	78.6	401	74.8	405	74.2	2,117	76.3
Age (years)												
20 - 29	42	8.3	40	6.4	19	3.4	17	3.2	11	2.0	129	4.7
30 - 39	268	53.1	317	50.7	250	44.5	190	35.4	196	35.9	1,221	44.0
40 - 49	189	37.4	246	39.4	273	48.6	299	55.8	303	55.5	1,310	47.2
≥ 50	6	1.2	22	3.5	20	3.6	30	5.6	36	6.6	114	4.1
N. of sons												
1	106	21.0	97	15.5	72	12.8	75	14.0	84	15.4	434	15.6
2	298	59.0	406	65.0	361	64.2	321	59.9	322	59.0	1,708	61.6
3	86	17.0	98	15.7	103	18.3	111	20.7	117	21.4	515	18.6
> 3	15	3.0	24	3.8	26	4.6	29	5.4	23	4.2	117	4.2
Educational Level												
University	102	20.2	127	20.3	90	16.0	79	14.7	83	15.2	481	17.3
High school	239	47.3	285	45.6	269	47.9	213	39.7	236	43.2	1,242	44.8
Middle school	151	29.9	198	31.7	182	32.4	224	41.8	190	34.8	945	34.1
Primary school	13	2.6	15	2.4	21	3.7	20	3.7	37	6.8	106	3.8
Employment												
Employed	274	54.3	312	49.9	262	46.6	241	45.0	271	49.6	1,360	49.0
Unemployed	61	12.1	87	13.9	79	14.1	68	12.7	79	14.5	374	13.5
Stay at home mothers	170	33.7	226	36.2	221	39.3	227	42.4	196	35.9	1,040	37.5

* Data for one participant is missing.

Parents who responded affirmatively about previous experience of dental trauma are the 84.5% (2,346/2,775); the most frequent kind of trauma experienced by children was tooth fracture (62.7%; 269/429), followed by avulsion (28.2%; 121/429), intrusion (7%; 30/429), and extrusion (2.1%; 9/429).

Overall, 53.8% (1,492/2,775) of respondents reported knowing what to do in case of dental trauma, and 84.8% (2,352/2,775) of participants would contact a dentist, while 10.7% (297/2,775) the emergency room, and 4.1% (115/2,775) answered they would contact a pediatrician.

Regarding the time limit within which it is best to intervene in case of dental trauma, 56.8% (1,577/2,775) indicated "within 30 minutes", 20.7% (574/2,775) "within 2 hours" (correct answer), 11.6% (323/2,775) responded "I don't know", and 10.8% (301/2,775) said "within a day". In total, 67.3% (1,868/2,775) were aware that a tooth that had fallen out could be replaced in its natural position and 56.5% (1,569/2,775) knew how to preserve a displaced tooth.

When asked "If the tooth or any fragments had fallen on the ground, how would you wash it?", 42.2% said they would use tap water (correct answer), 41.1% an antiseptic, 10.3% alcohol and 6.3% saliva.

Traumatic injury of a baby tooth was viewed with concern (responses of "quite

Table 2 - Answer to each item of the questionnaire submitted to 2,775 parents of school children

	N	%		N	%
Had your child ever experienced dental trauma?			**Do you know that a fallen tooth could be repositioned?**		
Yes	429	15.5	Yes	1,868	67.3
No	2,346	84.5	No	907	32.7
What kind of trauma (only those you experienced) (n=429)			**How would you preserve a displaced tooth?**		
Fracture	269	62.7	Handkerchief	1,206	43.5
Avulsion	121	28.2	In a container with some milk	438	15.8
Intrusion	30	7.0	In saliva or in the child's mouth	96	3.5
Extrusion	9	2.1	Physiological solution	1,035	37.3
Do you know what "dental trauma" is?			**If the tooth or any fragments had fallen on the ground, how would you wash it?**		
Fracture	2,336	84.2	Alcohol	287	10.3
Toothache	169	6.1	Saliva	176	6.3
Dental caries	179	6.5		1,170	42.2
Other	91	3.3	Antiseptic	1,141	41.1
Do you know what to do in the case of dental trauma?			**How much would you be concerned if the injured tooth was a baby tooth?**		
Yes	1,492	53.8	Not at all	584	21.0
No	1,283	46.2	Somewhat concerned	1,457	52.5
			Quite concerned	635	22.9
			Very concerned	99	3.6
If your child had a traumatic dental injury, who would you turn to for help?			**How much would you be concerned if the injured tooth was a permanent tooth?**		
Dentist	2,352	84.8	Not at all	17	0.6
Pediatrician	115	4.1	Somewhat concerned	72	2.6
Emergency room	297	10.7	Quite concerned	754	27.2
Other	11	0.4	Very concerned	1,932	69.6
What is the time within which it is best to intervene in case of dental trauma?			**Do you think that the use of mouth guards was appropriate for your children during sports activities?**		
30 minutes	1,577	56.8	Yes	1,746	62.9
Two hours	574	20.7	No	1,029	37.1
Day after	301	10.8			
I don't know	323	11.6			

concerned" and "very concerned") by 26.5% (734/2,775) of the sample, while traumatic injury to a permanent tooth was viewed with concern by 96.8% (2,686/2,775) of respondents. A total of 62.9% (1,746/2,775) of parents stated that the use of mouth guards was appropriate for their children during sports activities.

The multivariate analysis, with the aim of identifying behaviors and knowledge in association with specific characteristics of participants, did not identify any characteristic pattern (Figure 1). The first two components of multiple correspondence analysis explain only 12.1% of the total variability. This model showed that there

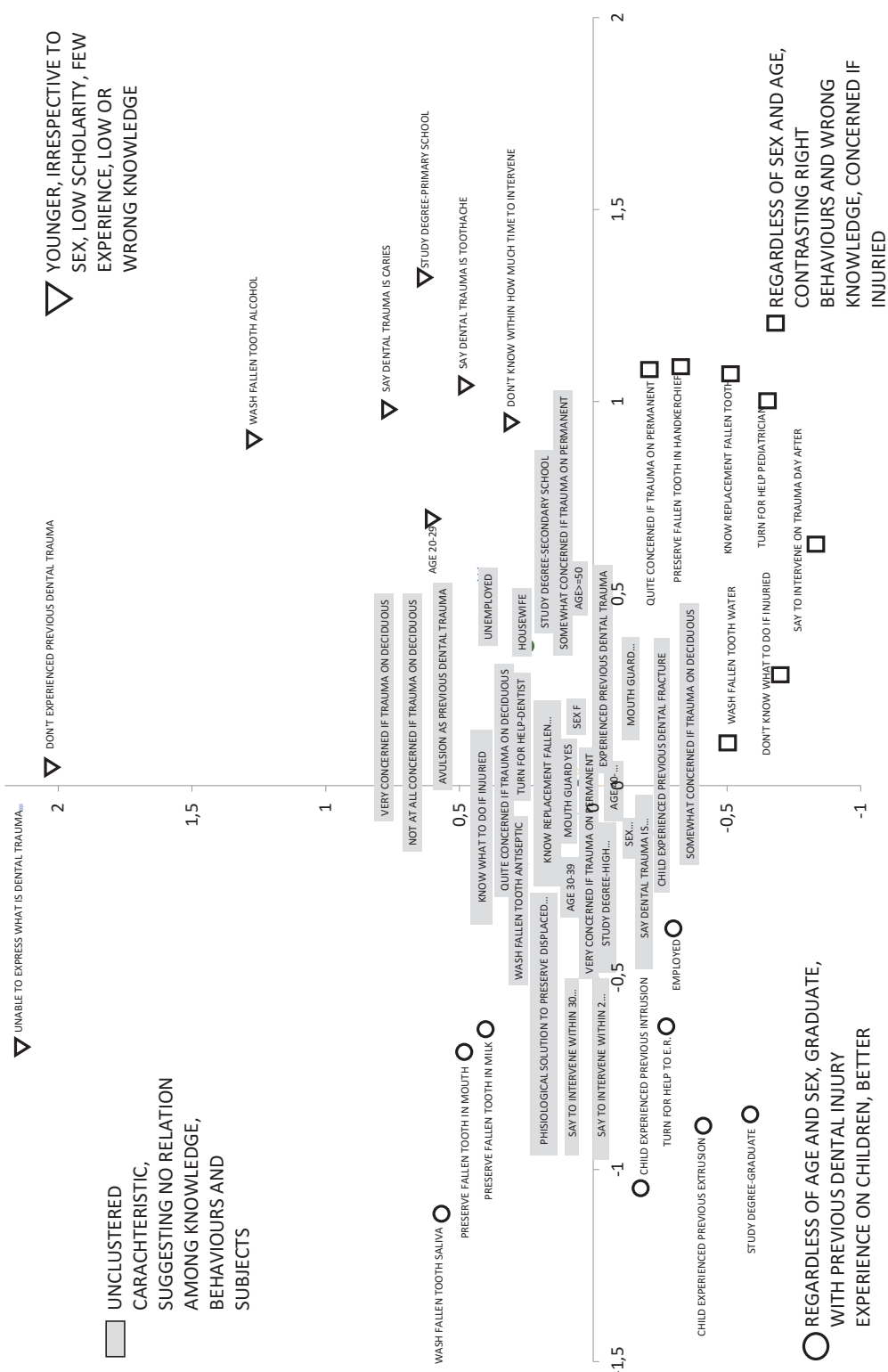

Figure 1 - Relations, evaluated with Multiple Correspondence Analysis, among interviewed subjects characteristics and knowledge on dental trauma

was a group characterized by participants aged 30-40 with primary school level education, who would not know what to do for a displaced tooth and would clean it with alcohol, and whose child, in most cases, had not experienced any dental trauma or had undergone extrusion but not fracture.

Another homogeneous group gave responses of not knowing what to do in a dental emergency and being very concerned about dental trauma. Responses in this group were also largely those of preserving a displaced tooth in a handkerchief, postponing any intervention until the next day, and seeking the help of a pediatrician or general practitioner. Respondents in this group also stated that they did not know that a tooth that has fallen out can be replaced. This group was not characterized by any specific age or sex.

Another homogeneous group included employed participants with a university degree whose children had experienced a dental intrusion or extrusion. These respondents said they would go to the emergency room in case of trauma and would wash a displaced tooth in saliva and would save it in the child's mouth or in a container with some milk.

Other respondents appeared grouped to form a single cluster, suggesting poor distinction between age groups and other characteristics not listed above and knowledge and solutions related to dental trauma. From multivariate analysis, no association between participant characteristics and the behaviors explored was evident.

Discussion

This study showed that most parents interviewed in our study had no experience of dental trauma in their children, or they did not know about or did not remember the event. Fortunately, most participants appeared to know what dental trauma is. This knowledge increased with parental age and level of education, but only half of respondents knew what to do in case of trauma, particularly older adults and those with the highest educational level. These data were consistent with those reported by other authors, demonstrating that parents do not have the information necessary to best assist a child in the event of dental injury (10, 11, 19-21).

In accordance with other studies (19, 21), most participants would turn to a dentist or the emergency room for help in the case of dental trauma. This is perhaps owing to a perception of professionalism regarding dentists and doctors and that these professionals possess the appropriate equipment for handling an emergency. Furthermore, most participants reported that they would intervene within 30 minutes, suggesting that a dental trauma event may trigger panic; this is in agreement with data from the literature (10, 19, 21).

Despite what has been reported in the literature (10, 19, 20), it was notable that most of our respondents were aware that permanent teeth can survive if replaced in their socket shortly after avulsion; this was particularly true among older adults. Nevertheless, respondents, especially younger parents, said they would store an avulsed teeth in a handkerchief.

Few parents were able to identify an appropriate method for cleaning a dirty avulsed tooth prior to replantation, which was also in line with earlier studies (10, 19-20). Approximately half of respondents would use tap water to wash a tooth or fragment that had fallen out, and approximately the remaining half would use an antiseptic. Parents under 30 years of age were the best informed about how to wash and preserve a tooth or tooth fragment.

Our survey showed that only a few parents would be concerned about trauma to a deciduous tooth, especially younger parents and university graduates; however, nearly all

participants said they would be concerned in the case of trauma to a permanent tooth. This could be attributed to poor perception about the risks related to deciduous teeth among the general population. In contrast, it is well known that high incidence of incisor trauma in deciduous teeth should be viewed with concern (22).

Our study showed that the use of dental guards does not fall within the ordinary behaviour of most families; other authors have reported the same findings (21, 23). This is particularly concerning if we consider that sports-related dental trauma accounts for between 8% and 45% (8) of dental injuries. A study conducted in Italy (24) among children and adolescents at sports clubs in southern Italy showed that despite nearly all athletes knowing about mouth guards as protective devices, only 5% used them. Nevertheless, more male than female parents in our survey were likely to recommend the use of guards for their children while playing sports. This information is important to better understand the best targets of oral health educational programs, so as to promote the use of mouth guards.

Conclusions

Knowledge of good practices and how to handle dental trauma, especially to deciduous teeth, is widely lacking among the general population. Dentists and hospital emergency rooms are the sources for treatment most often sought in cases of dental injury.

Parental attitudes about dental trauma were distributed by age group and socioeconomic level, such that it was difficult to identify a specific educational target. However, improving some aspects of information about how to act immediately (within 30 minutes) and the calm management of dental trauma is important for all parents. Raising public awareness about dental trauma is an essential public health goal because parents' lack of knowledge about good practices in cases of TDI will be reflected in the good oral health of their children.

Motivating parents to assume a preventive approach towards dental trauma may produce positive changes that would increase long-term benefits for the health of both parents and children. One way to achieve this goal is through implementation of health policies aimed primarily at the prevention of such accidents. Furthermore, a formal protocol for treatment of avulsed permanent teeth and other dental injuries is appropriate, as well as dissemination of accurate information regarding the management of TDI throughout strategic locations, such as in schools, sports facilities, and dentists' or pediatricians' offices.

Riassunto

Conoscenze, attitudini e comportamenti sui traumi dentari in genitori di bambini della scuola primaria

Introduzione. I traumi dentari (TD) avvengono frequentemente in bambini e adolescenti. Obiettivo del presente studio è di indagare conoscenze e comportamenti a tal riguardo tra genitori di bambini frequentanti un campione di scuole primarie della regione Puglia.

Metodi. Lo studio è stato condotto tramite un questionario anonimo con domande chiuse, distribuito a 2.775 genitori, selezionati sulla base dell'intera popolazione scolastica regionale. L'analisi è stata effettuata utilizzando le procedure PROC CORRESP (*procedure to perform multiple correspondence analysis*) e PROC FASTCLUS (*procedure to perform cluster analysis*) con il programma SAS, fissando il valore di significatività a $p<0.05$.

Risultati. Il 15.5% dei genitori ha riportato TD nei propri figli. Il verificarsi di TD è stato associato statisticamente con il grado di istruzione dei genitori. Il 53.8% degli intervistati ha dichiarato di sapere cosa fare in caso di TD. A riguardo del tempo massimo nel quale è possibile intervenire a seguito di TD, il 56.8% dei genitori ha indicato "entro 30 minuti". Il 56.5% del campione sa come conservare un dente avulso. Il 62.9% considera appropriato l'utilizzo di dispositivi di protezione dentale durante l'attività sportiva. L'analisi multivariata ha mostrato che le errate conoscenze sono distribuite in egual misura tra tutti i tipi di genitori. Quelli

con precedenti esperienze di TD riferivano comportamenti corretti, invece conoscenze e comportamenti non corretti sono più frequenti nei genitori che facilmente si preoccupano per TD.

Conclusioni. Lo studio mostra che la gran parte dei genitori non ha avuto esperienza di TD nei propri figli e circa la metà del campione non conosce le procedure da mettere in atto in caso di TD; infatti, buona parte interverrebbe in caso di TD entro 30 minuti, comportamento che potrebbe generare panico. Promuovere approcci preventivi alla gestione dei TD potrebbe produrre cambiamenti positivi che aumenterebbero gli effetti benefici a lungo termine tra genitori e figli.

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