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Review of recommendations for the management of dental trauma presented in first-aid textbooks and manuals

REVIEW ARTICLE

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The last decades have observed a dramatic increase in the number of research articles related to dental trauma among children and adolescents. This may indicate that traumatic dental injury has evolved into a major public health problem. Studies indicate that in industrialized countries, about one in five children have had a traumatic dental injury to permanent teeth before leaving school. Prevalence of injured teeth presented in the literature varies from 10% to 51% (1, 2).

Most of the available literature emphasizes that awareness of the correct procedure following dental trauma is unsatisfactory (3–7). It is recognized that the prognosis of traumatic dental injuries is dependent on the time between the injury and the initiation of treatment (8, 9). Emergency dental treatment by a physician is sometimes required when a dentist is unavailable. Holan and Shmueli's survey findings suggest, however, that only 4% of physicians would provide an appropriate initial treatment that could help to save an avulsed tooth (10). Even in medical courses and first-aid training, management of dental trauma is seldom covered (11, 12).

In view of the widespread lack of knowledge with regard to first-aid procedures in cases of dental trauma, we report a review of dental trauma recommendations of first-aid textbooks and manuals.

It is of the utmost importance that this knowledge is widely available to all interested parties and that it is presented correctly in the first-aid books in accordance with the newest findings and recommendations of the relevant bodies.

Methods

The review was carried out on first-aid textbooks and manuals available in Medical University Libraries in Poland. The great majority of the books is available internationally as 34 of them were written in English, 1 of them in German, and only 10 originated in Polish language. The inclusion criteria were textbooks and manuals on first aid that were written for medical staff and lay persons and were published between 1969 and 2007. The texts were read carefully and screened for dental trauma treatment recommendations. The topics checked were:

- management of tooth avulsion (immediate replantation, storage media, time management factor, splinting procedures),
- tooth luxations,
- tooth fracture,
- recommendations for dental visit.

Results

Forty-five texts met the inclusion criteria. Of those, 34 texts were in English, 10 in Polish and 1 in German. Nine of the 34 English texts had also Polish edition. Eight

first-aid texts published between 1969 and 1983 had no information about dental trauma management at all. In the years 1984 to 1998, we found 16 books and 7 of them had some information concerning dental trauma management. In the last 10 years, the situation has changed favourably, because among 21 books, we found 12 texts dealing with dental trauma (Fig. 1). Out of all 45 first-aid textbooks available, we could only find information about dental trauma management in 19 texts (13–31). The other 26 books had no information concerning firstaid procedures after dental injury (32-57). Treatment of an avulsed tooth appears in 15 texts, whereas the other books do not mention dental avulsion at all (Table 1). Of the 15 textbooks, 13 detail the storage media of an avulsed tooth until replantation and all of them point out the importance of the time factor in the management of avulsion: only nine of those, however, mentioned that the most important time is the first 30 to 60 min after injury. Only nine texts mentioned splinting procedure: three of those elaborate on temporary splinting procedure, but only three texts give the proper recommendation of splinting duration. Only nine books recommend immediate self-replantation as the treatment of choice. The management of traumatic tooth fracture is described in 12 books and tooth subluxation in 10. Recommendation of immediate referral to dental surgery is mentioned in seven first-aid texts, another four suggest that it should take place as soon as possible, and one text published in 2000 still recommends seeing the dentist after 7 days. The latter advice is inadmissible nowadays.

Discussion

Tooth avulsion, a complex injury affecting multiple tissues with complete displacement of a tooth from its alveolar support, requires prompt and appropriate management to improve prognosis significantly (58). The other dental injuries like luxation or dental fracture does not require such prompt action, but should be seen by a dentist within the first 24 h. Tooth avulsion, which should be considered the real emergency in dentistry, represents up to 21% of all dental injuries (59). Although everyone should know that avulsed teeth can be



Fig. 1. Number of texts published between 1969 and 2007 with and without information about dental trauma.

replanted with relative ease, the literature shows that this is not common knowledge (3–7). It would seem obvious that an oro-facial injury requires the immediate attention of a dentist, but some studies show that many individuals do not seek treatment or advice after an injury at all (59–61). Avulsed tooth should be replanted within first 30 min and if not it should be placed in a transport media to avoid damage of root periodontal ligament cells. The longer the time lapse between tooth avulsion and replantation, the greater the risk of replacement resorption and inflammatory root resorption (62, 63).

It goes without saying that the best way to preserve the vitality of periodontal ligament cells is immediate replantation. In a hospital scenario where the first aid is given by medical staff, fixation of an avulsed tooth can be made by a suture by an easily performed temporary fixation method (64). A temporary splint made from aluminium foil, available in every kitchen or from any chocolate bar, can also be applied prior to emergency dental surgery (25, 31). Alternatively, if there is no one around brave enough to replant and stabilize the tooth, an avulsed tooth can be placed in milk, which is the preferred transport media, or in saliva (between the cheek and the lower molars). Other possible transport media – if available at the site of the injury – are Viaspan, Hank's Balanced Salt Solution and physiologic saline (63).

All health professionals or other people managing dental trauma should be aware of first-aid procedure in order to avoid extra-oral dry time of a tooth. For the future outcome of tooth avulsion treatment, the tooth extra-oral dry time is much more important than when the patient was able to reach a dentist. In view of the above, the literature that recommends a dental visit up to 7 days after tooth avulsion should be corrected or removed from circulation.

The general public and non-dental professionals have very limited opportunity to gain knowledge of oral trauma management. The most popular sources are first-aid textbooks but, as we can see in this study, only some books have this kind of information. The other problem is that just 10 of the 45 books screened in this study contain all the information necessary for non-dental professionals about first care of tooth avulsion.

First-aid textbooks are used in medical courses and first-aid training and also as a self-help guide or manual in a real-time event. That is why the dental trauma management procedure should be described as simply as possible, but including all important factors.

Our study clearly shows that explanation of first-aid procedures after dental injury is insufficient and compounds lack of knowledge among doctors, teachers and other lay persons, for whom first-aid textbooks were written (3–5, 7). Our results are also in agreement with previous report presented by Zadik (65).

There is also a positive element to report from our study. Some improvement of the dental trauma management recommendations can be observed in the content of lately published textbooks: that is encouraging and we hope for further improvement.

		2	•						
			Tooth avulsion						
Authors	Year of publication	Language	Immediate replantation	Storage media	Time factor	Splinting	Luxation	Dental fracture	Time to see the dentist
Beers MH. The Merck manual of medical information (13)	2003	EN	Recommended	Milk	30 min	7-10 days	+	+	Immediately
Burtain WL. Management of pediatric trauma	1995	EN	Recommended	Milk, water, saliva	60 min	7-10 days	I		Immediately
Caroline NL. Study guide for emergency care in the streets (15)	1995	EN		Gauze soaked in saline	Soon enough		I	I	
Cline DM, et al. Emergency Medicine (16).	1999	EN	Recommended	Hank's solution, saliva, milk wat canza	180 min		+	+	As soon as possible
Dziak A, Rusin Z. Traumatologia sportowa (17). Finley JM, McConnell RY. Emergency wound	2000 1984	PL EN	- Recommended	οσαστο 	Couple of hours 60 min		I +	+	Couple of hours Immediately
repair (10). Kaminski B, Dziak A. Dorazna pomoc lekarska (19).	1984	PL				4 weeks	+	+	
Keim SM. Emergency Medicine on Call (20).	2004	EN	As soon as possible	Milk	60 min	ı	+	+	
King Ch, Henretig FM. Pocket Atlas of Pediatric	2000	EN	Recommended				I	+	Immediately
Markovchick VJ, et al. Emergency Medicine Servate 720	1993	EN		Saliva, milk, saline, wet dauze	120 min		I	+	
Marx JA, et al. Rosen's emergency medicine: concents and clinical neartine (23)	2006	EN	Recommended	Hank's solution, milk, saliva saline	30 min	Acrylic splint or wiring 2 weeks	+	+	
May HL, et al. Emergency medicine (24).	1992	EN	,			4 weeks	+	+	As soon as possible
Murtagh J. Pracice tips (25). National Safety Council Basic First Aid (26)	1999 2005	EN FN	Recommended	Saliva, milk Milk saliva water	30 min Verv soon	Temporary Alu-foil -		1 1	As soon as possible -
Plantz SH, Wipfler EJ. NMS: Emergency Medicine	2007	EN	As soon as	Saliva, milk, wet gauze	AS SOON AS	+	+	+	Immediately
Schimelpfenig T. Wilderness Medicine (28). Sheridan RL. The trauma handbook of the	2000 2004	EN EN	- +I	Wet gauze, saliva -	30 min		1 1	1 1	7 days As soon as possible
Massachusetts General Hospital (29). Strange GR, et al. Pediatric Emergency Medicine	1998	EN	Recommended	Saliva, milk, saline	30 min	Temporary dental	+	+	Immediately
(30). Wyatt JP, et al. Oxford Handbook of Accident and Emergency Medicine (31).	1999	EN	+I	Milk	Couple of hours	wax Temporary Alu-foil	+	+	Immediately

Table 1. First-aid textbooks and manuals - dental trauma management presented in the texts

Conclusion

Rarely can extensive consequences of injury be prevented by such simple knowledge and action. An effort should be made to train general medical practitioners and other emergency room staff to perform appropriate first-aid procedures for dental trauma. Worldwide, this would result in an improved outcome for everyone who injures his/her teeth. That is why current first-aid procedures after dental trauma should be incorporated in forthcoming editions of first-aid textbooks and manuals as the best way to promote simple knowledge of the subject. This, however, cannot be realized until outdated texts are revised and the appropriate procedures are included in all new first-aid books and manuals. Only in this way will those looking for this specific knowledge be able to apply the correct action at the site of the injury.

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