# Dental Traumatology

Dental Traumatology 2008; 24: 698-701; doi: 10.1111/j.1600-9657.2008.00649.x

# Algorithm of first-aid management of dental trauma for medics and corpsmen

SHORT COMMUNICATION

## Yehuda Zadik

The Zrifin Central Dental Institute, Medical Corps, Israel Defense Forces, Jerusalem, Israel

Correspondence to: Dr Yehuda Zadik, 16 Shlomo Zemach St, 96190 Jerusalem, Israel Tel.: +972 52 2385675 Fax: +972 3 9571820 e-mail: yzadik@gmail.com Accepted 10 July, 2007 **Abstract** – In order to fill the discrepancy between the necessity of providing prompt and proper treatment to dental trauma patients, and the inadequate knowledge among medics and corpsmen, as well as the lack of instructions in first-aid textbook and manuals, and after reviewing the dental literature, a simple algorithm for non-professional first-aid management for various injuries to hard (teeth) and soft oral tissues, is presented. The recommended management of tooth avulsion, subluxation and luxation, crown fracture and lip, tongue or gingival laceration included in the algorithm. Along with a list of after-hour dental clinics, this symptoms- and clinical-appearance-based algorithm is suited to tuck easily into a pocket for quick utilization by medics/corpsmen in an emergency situation. Although the algorithm was developed for the usage of military non-dental health-care providers, this method could be adjusted and employed in the civilian environment as well.

A discrepancy exists between the importance of providing prompt and proper treatment in case of trauma to the oral cavity (1, 2) and the inadequate knowledge in oral medicine and oral trauma among medics, corpsmen and physicians (3–11). Moreover, often, oral trauma is not included in medical courses and first-aid trainings (6, 11–14) or in first-aid textbooks and manuals (15).

The author presents a simple protocol of first-aid management of oral trauma for (military) medics and corpsmen.

## Methods and results

With the purpose of enhancing Israeli military medics' awareness and knowledge of oral trauma, a 1-h lecture is given during the 1-week continuing education program for senior medics and corpsmen in the Israel Defense Forces School of Military Medicine. The author has developed an algorithm for first-aid management of common oral injuries situations (Tables 1 and 2). The algorithm was taught during the lecture, and participants received a laminated waterproof pocket-sized version of the algorithm (Figs 1 and 2b), along with a list of locations and telephone numbers of after-hour dental clinics (Fig. 2a), for quick use in dental emergency situations.

## Discussion

Dental traumas comprise 2-8% of all military dental emergencies, with a rate of 3 to 12 oral wounds per 1000 US and UK military personnel per year (16–19). Military dental injuries are first seen by a medic or corpsman in 41% of the cases, by a physician in 25%, and by a dentist in only 7% (11). Despite that, military medics have inadequate knowledge of managing these situations (6, 11).

The main and critical role of the medic/corpsman in most dental traumas, is to provide a temporary treatment before the professional dental treatment, and determine the urgency of the referring the patient to the dental practitioner. Often, especially during military operations, evacuation of soldiers to professional health care is difficult, and such attempt can prevent the completion of the operation. Thus the corpsman, as the only available health care provider in the local area, has to provide primary care and decide whether emergency professional treatment is necessary. It is important to emphasize that there is no intention that a medic/ corpsman will perform a dental diagnosis, prescribe medications nor provide dental treatment other than re-plantation of avulsed tooth, provide post-trauma diet recommendations, administer over-the-counter mild-tomoderate analgesics, local (external) antiseptic agent and mouth-wash, and refer the patient to professional evaluation (Table 2).

The algorithm based on the literature relates to the prognosis of dental traumas in relation to first-aid management and speed of professional treatment (20-23). The most common dento-alveolar injuries, such as uncomplicated crown fracture, tooth concussion and sub-luxation, are defined as non-urgent, i.e., unlikely to result in significant morbidity if not seen within 24 h by a dental practitioner. Complicated tooth fracture can be treated in a sub-acute (within 24 h) or delayed (after 24 h) approach (23). However, dental avulsion is defined as real emergency situation that requires acute treatment (21). Uncomplicated crown fracture that exposes the dentin should be treated within 48 h (22) to prevent bacterial penetration to the dentinal tubules (23, 24). Restoration of enamel (only) fracture is not urgent, if needed at all. Facial lacerations in an otherwise healthy individual heal well regardless of the closure time, even

						Yes. Refer to a dentist within 48 h No. Continue to $\# 6^*$	Yes. Refer to a dentist or ED within several hours No. See comments		
Table 1. The Dental Trauma Algorithm for medics and corpsmen (translated from Hebrew)		Yes. Refer to a dentist within 24 h. Continue to # 3 No. Place the tooth in milk, saline or inside the patient's mouth Refer immediately to a dentist or ED		Yes. Refer to a dentist within 24 h. Continue to # 5 No. Continue to # 5*		Is restoration needed?	A suspected foreign body embedded in the soft tissue and/or infection		
		Success in replantation?			Yes. Refer to a dentist within 24 h. Continue to # 6	No*	Refer to ED within several hours Administer local antiseptic agent Re-evaluate in 24 h*		
	Yes. Immediately refer to ED No. Continue to # 2	Yes. Find the tooth. Hold it by the crown and wash under gentle running saline or water (Do not scrub!). Replant the tooth into the socket	No. Continue to # 3 Yes. Refer to a dentist within 24 h No. Continue to # 4	Yes More than 2 mm mobility?	No. Continue to # 5 Yes. Tooth fracture with pulp exposure, intra-coronal bleeding or pain?	No. Continue to # 6	Yes. Through-and-through laceration Superficial laceration	No. See comments	
	<ol> <li>Loss of consciousness or confusion? Nausea or vomiting? Facial or jaw deformation? Hematoma in the face or in the floor of the mouth?</li> </ol>	2. Avulsion ('knock-out') of a tooth?	3. Tooth displacement (other than avulsion)?	4. Tooth mobility (other than avulsion)?	5. Tooth fracture?		6. Soft tissue laceration?		ED, Emergency Department. *See comments.

ş lated fm. ÷ Ş 4 ÷ E Ļ Ę -410

#### **700** *Zadik*

Table 2. General comments for the medic/corpsman regarding managing of dento-alveolar wound, presented in the outer side of the card (Fig. 2a)

Note: In all oral trauma cases, good oral hygiene with 0.1% chlorhexidine mouthwash, a soft and cold diet, as well as avoidance of smoking, are recommended for several days. Mild to moderate analgesics can be useful. Avoid over-dose and/or over-medication. Re-evaluation must be done 24 h post-injury to eliminate complications (e.g. infection, undiagnosed root fracture). Instruct the patient to seek professional dental care in case of long term pain, mobility, swelling, color change or other disturbing changes in hard or soft tissues of the face and mouth. In any case of doubt, consult with a dentist.



Fig. 1. The laminated (waterproof) card. The folded card is pocket-sized.

after 19 h from the injury (25), in contrast to the 'golden period' of 4–6 h from time of injury to close lacerations in other parts of the body, to achieve a low infection rate (26). Finally, the medics and corpsmen are instructed to provide oral hygiene recommendations, with chlorhexidine mouthwash, as maintenance of proper oral hygiene has an important role in good healing of oral traumas (20, 21).

The pocket-version of the algorithm includes a list of after-hour military dental clinics (Fig. 2a), as previous reports demonstrated the unavailability of this information in dental trauma situations (27–29).

Dunne (30) and Ma et al. (31) demonstrated the use of dental emergencies protocol and algorithm by patients, emergency department physicians and dental office secretaries. Ma et al. (31) developed written guidelines of toothache management for patients and medical practitioners (based of referral to evaluation in community dental clinics and the use of non-steroidal antiinflammatory drugs). Correspondingly, there were decreasing in the number of Emergency Department

(a) חובש שים לב! בכל חבלה בפה, עליך להמליץ על הגיינה טובה בליווי שטיפת פה של 0.1% כלורהקסידין, דיאטה רכה וקרה והימנעות מעישון למשך מספר ימים. משככי כאב בינוניים יכולים לעזור, אך יש להימנע ממינון יתר ! במיקרים בהם לא הפנת את הפצוע, בדוק אותו 24 שעות לאחר הפציעה וחפש סיבוכים. יש להפנות את הפצוע לגורם מקצועי (רופא שיניים או כירורג פה ולסת) במקרים של כאב ממושך, ניידות, נפיחות, שינוי צבע בשן או שינוי מטריד אחר ברקמות הרכות או הקשות של הפה והפנים. במקרה של ספק – התייעץ עם רופא שיניים.

b)	תרשים פעולות בעת חבלה בפה או בלסת									
			כן. הפנה פייזיים לחדר פיון. לא. הפשך ל-2.	ב. אינכור אכרוג'ו בלבול? הקינות בודילות? שווות בפלים או הפיאות?						
	כן, הפנה לרופא שיניים זון 24 שעות, לא. שמוד את השן בחלב, כסליון אז בתוך הפה של הפצרע הפנה ביידית לרופא שיניים או לחדר מין,	ацента Сацият Сацият	כן, כבא אח משן החוק בכתירת השן ושסוף בעריכים בניים ארירים נאל הקיצולי), הכנס אח משן חורה למקומה בלסת. לא. הנוסך ל-נ.	ב - יניאנה של משן כולה מהלימות						
			כן, הפנה לרופא שיניים בחוך 24 שעות. לא, המשך ל-4.	כ יון שינחה מעדשו (אך לא יראה לבחיי)ל						
	כן, הפנה לרופא שיניים כחוד 24 שינות, המשך ל- 5 לא, המשך ל-9.	בייתה לבימה a-c ב"מז -	ą	r ai seat						
			לא. המשך ל-2.							
	כן. הפנת לרופא שיניים כחוד 24 שינות, המשך ל- א	מאם יפנו רימום מחק משן או כאב?	đ	ב אבר כחורת כאון						
כן. הפנה לרופא שיניים בחוך 44 שימית. המשך ל- 4	לא. האם יש צורך בישרוור השוק									
KR. 6807 74.			לא. ההשך ל-4.							
	א חווך או שפשיף ברקבה רכה?									

*Fig. 2.* The (a) external and (b) internal sides of the Hebrew card. (a) The external side includes the list of regional afterhour emergency dental clinics and general comments for the medic/corpsman regarding dento-alveolar trauma (the English translation of the comments is presented in Table 2). (b) The internal side includes the algorithm (the English version is presented in Table 1).

visits for toothache (-28%), return visits (-54%), and narcotic prescriptions written for dental pain (-68%)(31). Thus, written guidelines have the potential to alter behavior and improve performance in urgent situations,

© 2008 The Author. Journal compilation © 2008 Blackwell Munksgaard

even in a non-professional population. Future research is needed, however, to evaluate the practical utilization of the presented algorithm by the medics and corpsmen.

#### References

- 1. Trope M. Avulsion and replantation. J Isr Dent Assoc 2002;19:6–15.
- Ram D, Cohenca N. Therapeutic protocols for avulsed permanent teeth: review and clinical update. Pediatr Dent 2004;26:251–5.
- Pennycook A, Makower R, Brewer A, Moulton C, Crawford R. The management of dental problems presenting to an accident and emergency department. J R Soc Med 1993;86: 702–3.
- Birrer R, Cardo VA, Zambito RF. Dental medicine in the emergency department. In: Zambito RF, Black HA, Tesch LB, editors. Hospital dentistry. St Louis, MO: Mosby-Year Book Inc.; 1997. p. 92.
- 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 Paediatr Dent 2003;13:13–9.
- Levin L, Lin S, Dinte AF. Do physicians and medics know how to diagnose and treat dental trauma? J Isr Mil Med 2005;2:8–10 (in Hebrew).
- McCann PJ, Sweeney MP, Gibson J, Bagg J. Training in oral disease, diagnosis and treatment for medical students and doctors in the United Kingdom. Br J Oral Maxillofac Surg 2005;43:61–4.
- 8. Gardener C. Injury assessing. Br Dent J 2005;198:521.
- 9. Zadik Y. Dentist versus doctor. Br Dent J 2005;199:355.
- 10. Zadik Y. Antibiotic coverage for lip wound. Dent Traumatol 2006;22:56.
- 11. Lin S, Levin L, Emodi O, Fuss Z, Peled M. Physician and emergency medical technicians' knowledge and experience regarding dental trauma. Dent Traumatol 2006;22:124–6.
- Hamilton FA, Hill FJ, Mackie IC. Investigation of lay knowledge of the management of avulsed permanent incisors. Endod Dent Traumatol 1997;13:19–23.
- 13. Chan AW, Wong TK, Cheung GS. Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong. Dent Traumatol 2001;17:77–85.
- Blakytny 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.
- Zadik Y. Oral trauma and dental emergency management recommendations of first-aid textbooks and manuals. Dent Traumatol. 2007;23:304–6.

- Mahoney GD, Coombs M. A literature review of dental casualty rates. Mil Med 2000;165:751–6.
- Chaffin J, King JE, Fretwell LD. U.S. Army dental emergency rates in Bosnia. Mil Med 2001;166:1074–8.
- Dunn WJ, Langsten RE, Flores S, Fandell JE. Dental emergency rates at two expeditionary medical support facilities supporting operations enduring and Iraqi Freedom. Mil Med 2004;169:510–4.
- 19. Richardson PS. Dental morbidity in United Kingdom Armed Forces, Iraq 2003. Mil Med 2005;170:536–41.
- Flores MT, Andersson L, Andreasen JO, Bakland LK, Malmgren B, Barnett F et al. Guidelines for the management of traumatic dental injuries. I. Fractures and luxations of permanent teeth. Dent Traumatol 2007;23:66–71.
- 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.
- Dale RA. Dentoalveolar trauma. Emerg Med Clin North Am 2000;18:521–38.
- Andreasen JO, Andreasen FM, Skeie A, Hjorting-Hansen E, Schwartz O. Effect of treatment delay upon pulp and periodontal healing of traumatic dental injuries – a review article. Dent Traumatol 2002;18:116–28.
- 24. Love RM. Bacterial penetration of the root canal of intact incisor teeth after a simulated traumatic injury. Endod Dent Traumatol 1996;12:289–93.
- 25. Berk WA, Osbourne DD, Taylor DD. Evaluation of the 'golden period' for wound repair: 204 cases from a Third World emergency department. Ann Emerg Med 1988;17:496–500.
- Singer AJ, Hollander JE, Quinn JV. Evaluation and management of traumatic lacerations. N Engl J Med 1997;337:1142–8.
- Sae-Lim V, Chulaluk K, Lim LP. Patient and parental awareness of the importance of immediate management of traumatised teeth. Endod Dent Traumatol 1999;15:37–41.
- Sae-Lim V, Lim LP. Dental trauma management awareness of Singapore pre-school teachers. Dent Traumatol 2001;17:71–6.
- 29. Zadik Y, Levin L. Referral practice of military corpsmen regarding dento-alveolar trauma. Dent Traumatol. 2008;24: 366–9.
- 30. Dunne SM. The dental emergency. Br Dent J 1997;183:188-9.
- Ma M, Lindsell CJ, Jauch EC, Pancioli AM. Effect of education and guidelines for treatment of uncomplicated dental pain on patient and provider behavior. Ann Emerg Med 2004;44:323–9.

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.