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Referral practice of military corpsmen regarding dento-alveolar trauma

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Abstract – The aim of this study was to evaluate the Israeli military corpsmens' practice of referral to professional treatment regarding traumatic dental injuries. The study consisted of 250 corpsmen during their military service. Questionnaire and slide show were used to present clinical photos with short history descriptions of dento-alveolar traumatic injuries. Participants were asked to indicate the preferred referral destination for each case to state the urgency of referral to the destination and to note their regional emergency department with an oral and maxillofacial surgery consultant and the nearest 24-h emergency dental clinic. Corpsmen immediately evacuated the wounded with full-thickness lip laceration (59%), tooth avulsion (79%), alveolar fracture (88%) and mandibular fracture (100%). Most corpsmen referred crown fracture to a dental clinic and alveolar- or mandibular-bone fracture to the emergency department. Tooth avulsion cases were equally distributed between the emergency department and dental clinic and full-thickness lip laceration between the emergency department and general medical office. Familiarity with the nearest 24-h emergency dental clinic was found in 38% and with the regional emergency department with an oral and maxillofacial surgery consultant in 57%. The knowledge of this group of military corpsmen regarding referral practices was encouraging. However, further continuing education with regards to the regionally available emergency services is needed. Special emphasis should be given to provide primary caregivers with the relevant education to improve their knowledge and ability of dealing dental trauma.

Dental traumas comprise 2% to 8% of all military dental emergencies, with a rate of 3 to 12 wounds per 1000 US and UK military personnel per year (1–4). Military dento-alveolar injuries are first seen by a corpsman in 41% of the cases by a physician in 25% and by a dentist in only 7% (5). As the long-term prognosis of traumatized teeth is largely dependent on prompt and appropriate emergency management (6–8), the importance of on-site proper management of the wound by the affected person, the people nearby, or non-dental health care providers cannot be overestimated. However, inadequate knowledge in dental trauma management has been found among parents (9), teachers (10, 11), physical education teachers (12, 13), and other school personnel (14), and lack of knowledge among emergency department physicians (15), military corpsmen and physicians (5), and school nurses (14). Management of dental trauma is not usually taught in medic (16) and first-aid training courses (10, 13, 14) or reported in first-aid textbooks and manuals (17). As the on-site first-aid management of dental trauma is probably inadequate, the rapid professional treatment is of prime importance. The aim of this study was to evaluate the Israeli military corpsmen's practice of referral to professional treatment regarding traumatic dental injuries.

Methods

The study population consisted of 250 Israel Defense Forces corpsmen in their military service, randomly selected from the School of Military Medicine Continuing Education Program. Inclusion criteria required active service as corpsmen for at least 1 year in combat units before the study.

A questionnaire and slide show over a large screen were used to present clinical photos with a short history description of dento-alveolar traumatic injuries: tooth avulsion, crown fractures (simple and complicated), alveolar bone fracture, mandibular (symphysis) fracture, and full-thickness lip laceration. Participants were told that all of the traumatic injuries occurred during military operation where the corpsman was the only healthcare provider in the nearby region. Each participant was asked to respond to the case presented and to describe his or her mode of action following such an injury. In particular, they were asked to indicate the preferred referral destination (emergency department, general medical clinic or dental clinic) for each case and to state the urgency of referral to the destination. Participants were asked to note their regional emergency department with oral and maxillofacial surgery consultant and the nearest 24-h emergency dental clinic.

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To ensure anonymity, names were not recorded on the questionnaire. The study was voluntary and The Ethics Committee of The Medical Corps, Israel Defense Forces approved the study. Data were collected and analyzed by SPSS 10.0 (SPSS Inc., Chicago, IL, USA).

Results

The questionnaire was answered by 216 corpsmen (86% response rate), in which 40 (18.5%) were females and 176 (81.5%) were males. Table 1 summarizes the participants' response regarding referral urgency of the dento-alveolar trauma. Corpsmen immediately evacuated a patient with full-thickness lip laceration in 59% of the wounded, tooth avulsion in 79%, alveolar fracture in 88%, and mandibular fracture in 100%. Most of the corpsmen reported of enamel fracture referral as a non-urgent, whereas regarding complicated crown fracture 36% immediately refer the wounded patient and 28% within 3 h (Table 1).

Most of the corpsmen referred crown fracture to the dental clinic and alveolar- or mandibular-bone fracture to the emergency department. Tooth avulsion cases were equally distributed between the emergency department and dental clinic, and full-thickness lip laceration between the emergency department and general medical office (Table 2).

Corpsmen familiar with the nearest 24-h emergency dental clinic and with the regional emergency department with oral and maxillofacial surgery consultant were 38 and 57%, respectively.

Table 1. Distribution of the urgency level of dental trauma (%)

	Referral urgency				
		Within hours			
Trauma	Immediate evacuation	3	8	48	Not urgent
Tooth avulsion**	79	16	5	0	0
Enamel fracture**	0	11	15	15	59
Enamel and dentin fracture*	16	23	10	30	21
Complicated crown fracture**	36	28	14	11	10
Alveolar bone fracture**	88	9	1	2	0
Mandibular fracture	100	0	0	0	0
Full thickness lip laceration**	59	25	8	0	7

*$P < 0.05$, **$P < 0.001$.

Table 2. Distribution of dental trauma referral destinations by the corpsmen (%)

	Referral destination		
Trauma	Emergency department	General medical clinic	Dental clinic
Tooth avulsion*	47	6	47
Enamel fracture	0	0	100
Enamel and dentin fracture*	1	5	94
Complicated crown fracture*	3	14	83
Alveolar bone fracture*	68	8	34
Mandibular (symphysis) fracture*	89	7	5
Full-thickness lip laceration*	45	48	7

*$P < 0.001$.

Discussion

In the present study, the military corpsmen's referral practice was evaluated in dento-alveolar trauma situations. In the Israeli Defense Forces, dental education is not part of the corpsmen's basic training (16). It is important to emphasize that no corpsman will make a dental diagnosis, provide dental treatment other than to re-plant avulsed tooth, provide post-trauma diet recommendations, or administer mild analgesics. In dental trauma, the main role of the corpsman, often the only available health care provider on-site is to determine the urgency of referring the wounded to professional care. Often, especially during military operations, evacuation of soldiers to profession health care is difficult and can prevent the completion of the operation. Thus, from our experience, the corpsman often disagrees with the combat-unit officers on the necessity of the referral of the wounded patient.

Referral urgency

The most common dento-alveolar injuries, such as uncomplicated crown fracture, concussion and subluxation are defined as non-urgent, i.e., unlikely to result in significant morbidity or mortality if not seen within 24 h by a dental practitioner. However, other injuries, such as dental avulsion, luxation and complicated fracture are defined as urgent conditions that require treatment within a few hours (18). Mandibular fracture, even when not induced by high-velocity trauma but by assault, home accident and sport injury has the potential to be an acute threat to the airway (19) and/or be concomitant with a cervical spine fracture or neurologic, orthopedic, pulmonary, abdominal or cardiac injury (20, 21) and thus be treated as an emergency.

Delayed treatment could play a crucial role in the prognosis of dento-alveolar trauma. Dento-alveolar injuries that require urgent treatment have been summarized by Dale: avulsion or alveolar bone fracture should be treated within 1 h and complicated crown fracture within 3 h from the time of injury (22). Uncomplicated crown fracture that exposes the dentin should be treated within 48 h (22) to prevent bacterial penetration to the dentinal tubules (23). Restoration of enamel fracture is not urgent, if needed at all. A delay of several days or weeks in treating facial fractures makes an ideal anatomic reduction of the fracture difficult, if not impossible (24). Moreover, edema progressively worsens over 2 to 3 days postinjury and frequently makes management of the wound more difficult (24).

Although there is a 'golden period' of 4 to 6 h from the time of injury to close lacerations in other parts of the body, e.g., hand and forearm to achieve a low infection rate (25), facial lacerations in an otherwise healthy individual heals well regardless of the closure time, even after 19 h from the time of injury (26).

In the present study, most of the corpsmen immediately referred tooth avulsion, alveolar- or mandibular-bone

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fracture, and full-thickness lip laceration. Enamel fracture was defined as 'non-urgent' by most of the corpsmen, referral of enamel and dentin fracture was within 48 h and complicated crown fracture within 3 h. All trauma situations were handled within the appropriate period, although the immediate evacuation of lip laceration was unnecessary.

In a study of physical education students, 33% reported that treatment of avulsed teeth should be carried out immediately, 9% within 30 min and 8% within 1 h from the time of injury (27). In other survey among physical education teachers, Chan *et al.* (13) found that 62% of the participant would seek professional assistance for tooth avulsion immediately, 8% within 30 min, and 27% within few hours. Among Swiss and German handball team members, the average time given for re-plantation of an avulsed tooth was more than 13 h (28).

Referral destination

According to Haug (19), the oral-surgeon office or emergency department offers the most efficient and cost-effective setting for treatment of traumatic fractured teeth, luxated teeth, alveolar process injuries, simple mandibular fractures, and soft tissue wounds. Nevertheless, from practical point of view, the dental office is a more appropriate setting for restorative and/or endodontic treatment of crown fractures than an oral surgeon's office or emergency department. For mandibular fractures with a potential to create airway compromise (19) and/or be concomitant with a cervical spine fracture or neurologic, orthopedic, pulmonary, abdominal or cardiac injury (19, 20), admission to a general hospital is indicated. Appropriate treatment of peri-oral full-thickness laceration includes soft-tissue imaging to locate potentially embedded foreign-bodies (29) which is absent from most general medical offices.

The present results showed that dental traumatic injuries, *per se* were mostly referred to dental clinics and alveolar- or jaw-bone fractures to the emergency department. However, tooth avulsion cases were equally referred to the emergency department or dental clinic, and soft-tissue laceration to the general medical practice or emergency department. These results are similar to previous studies. About half of physical education teachers and students stated that they would contact the closest dentist for professional help in cases of dental avulsion (13, 27), whereas 30% would go to a general hospital (13).

Familiarity of the corpsman with the regionally available emergency service after-office hours is important; there is no need to waste precious time searching for professional assistance. Nevertheless, as little as 15 and 26% of Singapore preschool teachers and lay people, respectively, have knowledge of that information (9, 11). In the present study, familiarity of the corpsmen about the availability of dental and oral-maxillofacial surgical emergency services after-office hours was 38 and 57%, respectively. Although higher than previous reports, this level is still unacceptable among health-care providers.

Conclusion

The knowledge of this studied cohort of military corpsmen regarding referral practices was encouraging. Further continuing education, especially with regards to the regionally available emergency services is needed. Special emphasis should be given to provide primary caregivers with relevant education to improve their knowledge and ability of handling dental trauma.

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