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Oral and facial trauma among paratroopers in the Israel Defense Forces

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Abstract – *Background:* Military fighters are one of the highest risk populations for dental and oro-facial trauma. The aim of this study was to evaluate the incidence and etiology of oro-facial injuries among active duty paratroopers in the Israeli Defense Forces. *Methods:* Paratroopers from selected companies were interviewed using a structured questionnaire regarding oro-facial trauma during active service years. The study consisted of 311 male paratroopers, with a mean age of 21.1 years (± 1.7). Mean duration of military service until the study was conducted was 25.9 months (± 6.9). *Results:* Oro-facial injuries during military service was found in 87 (28.0%) of the participants, with an incidence rate of 129.6 cases per 1000-fighter-years. Extra-oral lacerations (lip, chin, cheek/facial muscles) were the most common injury. Tooth injuries were reported by 48 of the participants, of whom 44 (50.6%) suffered from dental fractures and four (4.6%) from subluxation/luxation. Most oro-facial injuries occurred in an isolated training or operational field. Thirty-seven participants (42.5%) reported postevent disturbance and 10 (11.5%) reported loss of operative activities because of the event (mean 8.6 ± 4.0 day loss). *Conclusions:* Military paratroopers are highly predisposed to oro-facial trauma. Besides the physical and mental associated damage, these injuries result in the interference of their continuous daily activity. Prevention, mouth-guard usage and treatment intervention are two important actions that should be adopted to reduce trauma and its interference.

Dental (1) and facial (2) injuries are most common in the third decade of life. Sport-active individuals are prone to dental injuries (3), affecting men 1.5-times more than women (1). Military fighters are one of the highest risk populations for oro-facial trauma, as they are action-oriented people and risk-takers (4). During military trainings and operations, dental casualties were among the most common injuries (5, 6). Dental traumas comprise 2–8% of wartime military dental emergencies, with a rate of 3–12 wounds per 1000 US and UK military personnel per year (5, 7, 8). In the middle 1970s, an average rate of 37.7 non-wartime oro-facial injuries per 10 000-person-years was reported among US Army personnel (4).

During the Vietnam War, 10–15% of the US wounded soldiers had injuries involving the maxillofacial region (9), and in the Falklands War, 29% of the British wounded soldiers had maxillofacial injuries (10). In the Israeli–Palestinian low-intensity conflict during 2000, one-fifth of the wounds among Israeli soldiers involved the face (11). A mean of 16% of maxillofacial involvement among wounded soldiers has been calculated from reports of conflicts between 1914 and 1986, which is higher than expected as the head and neck region is about 12% of the whole body surface area (12). There was a relatively low incidence (6.4%) of (non-dental) maxillofacial injuries during the Second Lebanon War among the Israeli Defense Forces troops (6).

Currently there is a lack of updated information regarding the epidemiology of military oro-facial trauma. The aim of this study was to evaluate the incidence and etiology of oro-facial injuries among active duty paratroopers in the Israeli Defense Forces.

Methods

Paratroopers in three battalions in the Israel Defense Forces were interviewed using a structured questionnaire regarding oro-facial trauma only during active service years. The questionnaire included the following issues: occurrence of injury in the lower third of the face and the oral cavity during military service, type of injury, the location of the soldier in time of injury (remoteness from professional care), type of activity in time of injury, extent of injury, and whether the injury caused disturbance (e.g. pain, esthetics or function) or cessation in operative activities (and for how long). Participants were asked whether treatment was given in the trauma cases and if so, to detail the type of treatment.

Participation was voluntary. There were no clinical examinations or evaluation of dental/medical records in these study settings. The study consisted of 311 male paratroopers with a mean age of 21.1 years (± 1.7), and mean duration of military service until the study was conducted was 25.9 months (± 6.9).

Table 1. Distribution of region/organ of injury among the 87 oro-facial trauma patients

Region/organ	*n* (%)*
Teeth	48 (55.2)
Lip	38 (43.7)
Chin	8 (9.2)
Cheek/facial muscles	8 (9.2)
Mandible/TMJ	2 (2.2)

*The sum is more than 100% since several patients involved multiple injuries

Results

Injuries in the oro-facial region during military service were reported by 87 (28%) participants. Table 1 presents the distribution according to the region or organ involved. Extra-oral lacerations (lip, chin, cheek/facial muscles) were the common oro-facial injuries. Among the 48 subjects who reported tooth injuries, 44 (50.6%) suffered from dental fracture and four (4.6%) from subluxation/luxation. A mandibular fracture and tempo-romandibular joint (TMJ) dislocation were reported by one (1.1%) each. The incidence rate of oro-facial trauma of the studied population was 129.6 cases per 1000-fighter-years.

Table 2 presents the distribution of activities during which the 87 trauma cases occurred. Most occurred in an isolated training or operational field. Of the 87 oro-facial wounded, 72 (82.8%) sought professional treatment after the injury (Table 3). Thirty-seven wounded subjects (42.5% of the 87 oro-facial wounded) reported of postevent disturbance (Table 4). Ten (11.5%) wounded subjects reported of loss of operative activities owing to the event, with mean of 8.6 (± 4.0) day loss (up to 30 lost days).

Table 2. Distribution of causative activities in which the 87 oro-facial trauma cases occurred

Activity	*n* (%)
Military training	51 (58.6)
Sport-activity	26 (29.9)
Military operation	4 (4.6)
Assault	3 (3.4)
Motor vehicle accident	2 (2.2)
Others	1 (1.1)

Table 3. Postevent professional treatment of the 72 oro-facial wounded*

Treatment	*n* (% of the 87 wounded)†
Restorative/endodontic treatment	32 (36.8)
Suturing/wound dressing	13 (14.9)
Dental splinting	3 (3.4)
Tooth extraction	1 (1.1)
General anesthetic operation and hospitalization	1 (1.1)
Medication/periodic observation only	22 (25.3)

*Fifteen wounded did not seek professional treatment after injury.
†For multiply-injured patients – only the major treatment is presented.

Table 4. Distribution of postevent disturbance reported by the oro-facial wounded

Cause	*n* (% of the 87 wounded)
Pain	18 (20.7)
Impaired function	10 (11.5)
Impaired esthetic	9 (10.3)

Discussion

Most studies that deal with the incidence of oro-facial trauma among soldiers regard only military operations (5–8, 13), which is only a small fragment of the duration of the individual's military service. The present study showed that dental injuries occurred mainly during training, traffic accidents, assaults and sports, which agrees with others (4, 14). Moreover, over two-thirds of the wartime injuries are ballistic injuries (also called missile injuries) caused by gunshot wounds or artillery, shell, or grenade explosion (6, 9, 15). These injuries have unique characteristics and do not represent the non-wartime injuries among soldiers.

There are contradictory reports of non-wartime oro-facial injuries among soldiers. A rate of 4.4 (in Head-quarter posts) to 98.7 (in basic training posts) cases to 10 000-person-years in the middle 1970s has been reported (4), as well as a rate of 1.9–3.4 cases/10 000-person-years among basic military trainees in 2000–2003 (14). In this study, a rate of 129.6 cases per 1000-fighter-years was found, which is much higher than the former studies. The difference in rate between the studies can be explained by the fact that in the current study, para-troopers in the Israeli Army, under constant operational stress in both training and operations, were interviewed in the beginning of 2007, several months after the Second Lebanon War, which has a significant influence on the casualty rate (6).

The previous studies were based on the military units' dental clinics records (4, 14), which could lead to under-estimated analysis. For example, these studies might omit wounded soldiers who did not have professional treatment (e.g. soft tissue lacerations, enamel fractures, non-reported fistfights injuries), or who had professional treatment but in a general medical clinic (e.g. soft tissue lacerations), or private (civilian) dental clinic; or who had major injuries and were evacuated and treated in a general or dental hospital. In this study, to avoid possible under-estimation, paratroopers were interviewed and every oro-facial injury was investigated. The obvious shortcoming of this method is the self-reported nature of the study rather than professional assessment.

Nevertheless, despite the controversy, all studies show that active soldiers are among the highest risk popula-tions for oro-facial trauma. It is our opinion that two directions of action should be used: prevention and treatment. Oro-facial protection devices, such as mouth- or faceguards should be assimilated into military

trainings and operations, as well as sport activities, which were common in this study population and in our previous reports (3, 16). Mouthguard and/or faceguard should be accepted methods similar to helmets which are accepted methods for head protection during military training and operations. Moreover, the positive experience of the Israel Defense Forces in assimilating safety goggles to protect the eyes of the tank crews in the last 30 years can serve as a model (17, 18).

The long-term prognosis of traumatized teeth largely depends on prompt and appropriate emergency management (19, 20). However, most of the wounds occur in an isolated training or operational field, where prompt professional dental or surgical management is not available. The lack of knowledge in corpsmen regarding first-aid management of oral and facial injuries could have an irreversible influence on the prognosis (21–24). An effort should be made to train corpsmen in treating these injuries (25).

Conclusions

Military paratroopers are highly predisposed to orofacial trauma, which interferes with the daily continuous activity of this extremely trained population. Prevention and treatment intervention are important actions that should be adopted to reduce trauma and its interference.

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