Int. J. Oral Maxillofac. Surg. 2015; 44: 998–1004
http://dx.doi.org/10.1016/j.ijom.2015.02.022, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical Paper

Trauma

Mandibular trauma: a two-centre study

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P. Boffano, S.C. Kommers, K.H. Karagozoglu, C. Gallesio, T. Forouzanfar: Mandibular trauma: a two-centre study. Int. J. Oral Maxillofac. Surg. 2015; 44: 998–1004.

Abstract. The aims of this study were to assess and compare epidemiological data on mandibular fractures from two European centres and to perform a review of the literature. Between 2001 and 2010, a total of 752 patients with a total of 1167 mandibular fractures were admitted to a hospital in Turin, and 245 patients with a total of 434 mandibular fractures were admitted to a hospital in Amsterdam. The mean age in Turin was 34.8 years and in Amsterdam was 32 years. The age group 20–29 years showed the highest incidence of mandibular fractures in both centres. The fractures were mainly the result of assaults, in agreement with several articles in the recent literature, followed by falls. The continuous long-term and multicentre collection of data on the epidemiology of maxillofacial trauma is important because it provides the information necessary for the development of preventative measures aimed at reducing the incidence of facial injuries.

Key words: mandibular fracture; facial trauma; maxillofacial; epidemiology; multicentre; database.

Accepted for publication 24 February 2015
Available online 23 March 2015

The epidemiology of facial fractures varies widely in different countries.[1–29] These differences can be explained by varying economic and social conditions, local patterns of behaviour, and laws.[13]

The maxillofacial region is one of the most frequently injured areas of the body, and in particular the mandible is the second most frequently fractured adult facial bone because of its prominent and unprotected facial position.[5,10] Furthermore, mandibular fractures can cause a variety of impairments, including temporomandibular joint syndrome, poor mastication, malocclusion, and chronic pain.[10–14]

Knowledge of the epidemiology of mandibular fractures is critical for effective prevention and for the establishment of accurate trauma evaluation protocols.[10] Therefore, the analysis of the aetiology, patient gender and age, types, and most common sites of fracture is crucial for a more detailed knowledge of these injuries.[5] The continuous long-term collection of data on the epidemiology of maxillofacial fractures is important because it provides information necessary for the development and evaluation of preventative measures to reduce the incidence of facial injuries.[14]

The aims of the present study were to report, assess, and compare epidemiological data on mandibular fractures from two European centres and to perform a review of the literature.

Materials and methods

This study was based on information obtained from two systematic computer-assisted databases that contain continuously recorded data on patients hospitalized with maxillofacial fractures treated surgically in the Division of Maxillofacial Surgery, San Giovanni Battista Hospital, Turin, Italy, and the Department of Oral and Maxillofacial Surgery, Vrije Universiteit Medical Centre (VUMC), Amsterdam, the Netherlands; the data used were recorded between 1 January 2001 and 31 December 2010. Both hospitals are university hospitals that accept all types of facial trauma, although other general hospitals treating facial fractures are present in both cities.

Only patients who were admitted with mandibular fractures were considered for this study. Patients affected by other associated fractures of the maxillofacial region and those with incomplete charts were excluded in order to reduce bias.

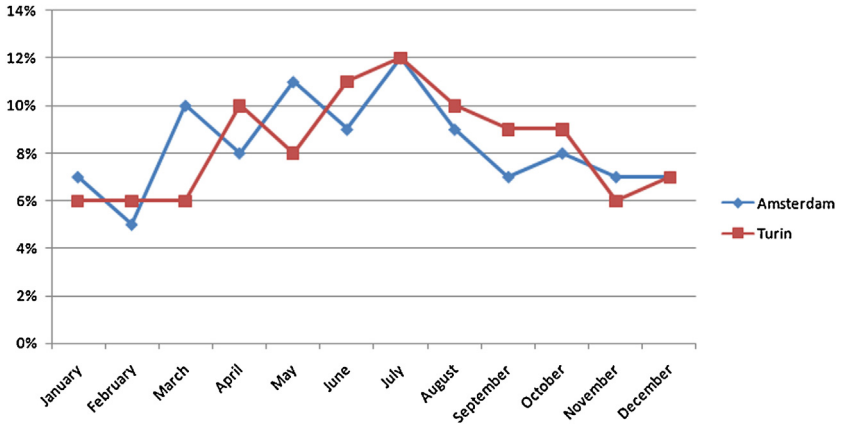

Fig. 1. Monthly distribution of mandibular fractures in the two study populations.

The following patient data were considered: sex, age, site and severity of facial fractures (Facial Injury Severity Scale, FISS), aetiology, associated dental injuries, and signs (malocclusion, inferior alveolar nerve paresthesia, mental lacerations). Mandibular fractures were categorized as symphyseal, body, angle, ramus, condylar, and coronoid fractures. Crown or root fracture, luxation, intrusion, and avulsion were considered in the category 'associated dental injuries', whereas dental concussions were not assessed.

The cause of injury was divided into six main categories: (1) motor vehicle accidents (MVA), which included accidents involving automobiles, motorcycles, and MVA – pedestrian accidents; (2) assault, which included interpersonal violence and attacks with weapons; (3) falls; (4) sports injuries; (5) bicycle accidents; and (6) other causes, which included pathological fractures, occupational accidents, domestic accidents, suicide attempts, accidents with animals, tooth extraction, and unknown aetiology.

This retrospective study was exempted from institutional review board approval. The guidelines of the Declaration of Helsinki were followed.

A statistical analysis was performed to identify associations among multiple variables. Statistical significance was determined using the χ^2 test, or Fisher's exact test if the sample sizes were too small.

Results

During the time frame considered, 1818 patients with maxillofacial fractures were admitted to the Division of Maxillofacial Surgery, San Giovanni Battista Hospital, Turin (UNITO), and 523 patients were admitted to the Department of Oral and Maxillofacial Surgery, Vrije Universiteit University Medical Centre (VUMC), Amsterdam.

Between 2001 and 2010, a total of 752 patients (563 males, 189 females) with a total of 1167 mandibular fractures not associated with further maxillofacial fractures were admitted to UNITO, and 245 patients (169 males, 76 females) with a total of 434 mandibular fractures were admitted to VUMC. The male to female ratio was 2.98:1 in the UNITO study population and 2.22:1 in the VUMC case series.

The mean age of patients in the UNITO study population was 34.8 years (range 5–99, median 30, standard deviation (SD) 18.5 years), in comparison to a mean age of 32 years in the VUMC patients (range 2–87, median 29, SD 15.2 years).

At UNITO, 402 patients presented a single mandibular fracture, giving a single-to-multiple fracture rate of 1.15:1, whereas at VUMC the single-to-multiple fracture rate was 0.39:1, with 69 patients out of 245 presenting a single fracture.

The monthly distribution of mandibular fractures in the two study populations is presented in Fig. 1. The highest incidence of mandibular fractures in the VUMC series occurred between March and July, whereas the peak incidence of mandibular injuries in the UNITO series was observed in the months between April and August. The lowest incidence was observed in January and February in both study populations.

The age and gender distribution of the VUMC and UNITO study populations is summarized in Table 1. The age group 20–29 years had the highest incidence of mandibular fractures in both centres (34% at VUMC, 30% at UNITO) (Fig. 2).

Table 2 summarizes the causes of the fractures and their distribution according to gender in the two study populations. The fractures were mainly the result of assaults (27% at VUMC, 29% at UNITO), in agreement with several articles in the recent literature (Table 3), followed by falls (20% and 24%, respectively). In the VUMC study population, bicycle accidents accounted for 20% of mandibular trauma, whereas in UNITO, the third most frequent cause was represented by MVAs (23%) (Fig. 3). This distribution of mandibular fractures according to aetiology is consistent with those reported in previous articles (Table 3).

Table 1. VUMC and UNITO study populations by gender and age.

Age, years	Amsterdam (VUMC)				Turin (UNITO)			
	Male	Female	Total	Total %	Male	Female	Total	Total %
0–9	1	3	4	2%	3	4	7	1%
10–19	31	12	43	18%	108	34	142	19%
20–29	57	26	83	34%	182	34	216	30%
30–39	40	14	54	22%	123	37	160	21%
40–49	24	9	33	13%	59	19	78	10%
50–59	9	3	12	5%	39	15	54	7%
60–69	4	4	8	3%	20	13	33	4%
70–79	0	3	3	1%	20	17	37	5%
80+	3	2	5	2%	9	16	25	3%
Total	169	76	245	100%	563	189	752	100%

VUMC, Vrije Universiteit Medical Centre, Amsterdam; UNITO, San Giovanni Battista Hospital, Turin.