

## Incidence of Mandibular Fractures in A Public Hospital in Venezuela: Ten Years Experience

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### Abstract

**Introduction:** The purpose of this study was to describe epidemiological trends of mandibular fractures in Venezuela.

**Materials and methods:** A prospective database of patients presenting to the Oral and Maxillofacial Surgery service at Dr Angel Larralde University Hospital, Valencia Venezuela during a 10-year (2009-2019) period was reviewed. 1045 patients with mandibular fractures were identified. Patients' data including gender, age, mechanism of accident, fracture site and associated injuries were analysed.

**Results:** More than 80% of patients were men, with 61,43% in the 18–30 years age group. Motor vehicle accidents (MVAs) accounted for 38,57%, followed by motorcycle accidents Firearm (24,29%), Interpersonal violence (17,14%), sports (16%) and falls (13%). Hospitalization was required for 53% of patients with 89% of these treatments being open reduction and internal fixation. Women most commonly sustained mandibular fracture from MVAs (53.7%), followed by assault (14.5%) and falls (23.7%). Falls were a significantly more common mechanism in patients who were at least 65 years old

**Conclusions:** Mandibular fracture is a common facial injury. A well understanding of the epidemiology of mandibular fracture and variables' correlations is clinically important in advancing the prediction, diagnosis, treatment, and prevention of mandibular fractures in a particular population. The incidence is highest in young men who are victims of MVAs. This study sought to characterize the population-based sample of mandibular fractures in Venezuela

**Keywords:** Trauma; Epidemiology; Mandibular Fracture; Public Hospital; Facial Trauma

## Introduction

Mandibular fractures are the second, most-frequent facial injuries treated at a trauma center. According to several studies, they account for 15.5% to 59% of all facial fractures [1-4].

The aetiology and epidemiology of mandibular fractures vary by country, socioeconomic group, culture and geographical region [5,7,9]. However, there are common features. Mandibular fracture has been reported as the most common maxillofacial fracture, followed by the zygomatic complex. It often involves young adults, with several studies showing the highest incidence of fractures in

Interpersonal violence is the most common cause for mandibular fractures in North-American countries,5-8 North European countries [2,9,10], Australia [11].

This study aims to present mandibular fracture data over an 10-year period in one center. It discusses the epidemiology, site, associated fractures and mechanism of injuries. Due to the absence of epidemiological information in Venezuela about these types of injuries, the aim of this study was to determine the incidence of mandibular fractures in Venezuela.

## Materials and Methods

A retrospective study was conducted to evaluate the incidence of mandibular fractures at the Oral and Maxillofacial Surgery Unit, "Dr. Angel Larralde" University Hospital, Venezuela, over a 10-year period (August 2009 to August 2019). The institutional review board approved the study protocol, and all sensitive patient information was removed before analysis.

All the patients who presented one or more proven mandibular fractures with auxiliary imaging studies since august 2009 to August 2019; patients were excluded who did not accept surgical medical treatment, who did not have continuity in their follow-up postsurgical and those whose record is no longer was in existence in the clinical archive due to Its age.

Age was classified into 5 groups: 4 to 10 years old; 11 to 17 years old, 18 to 30 years old, 31 to 50 years old, and >50 years old.

Anatomic location was classified as symphysis, body, angle, condyle, subcondylar, ramus, alveolar, coronoid, or multiple.

## Results

A total of 634 mandibular fractures were computed in 493 patients from august 2009 to august 2019. According to gen-

der, the most affected was the male with 667 patients (78,20%), while 186 (21,8%) females were found (Figure 1).

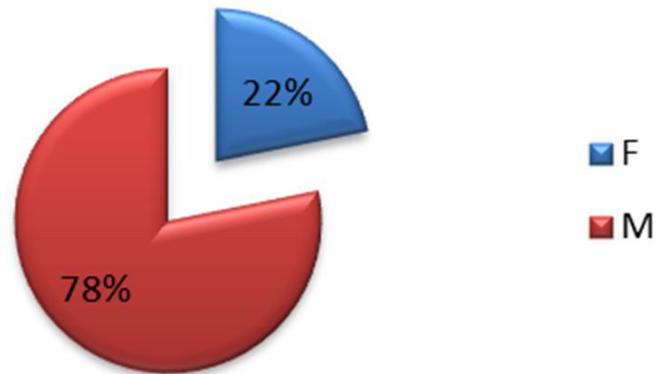


Figure 1: Sex distribution of mandibular fractures

The 16–30-year age group accounted for 61,43% of all fractures, followed by by the 31 to 50 years age group who were responsible for 17% of mandibular fractures (Figura 2).

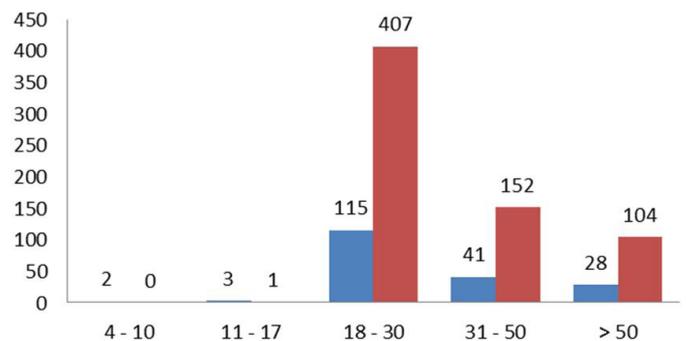


Figure 2: Distribution by age groups and gender

The etiology most frequently observed in this study was Motor vehicle accidents (MVAs) accounted for 44,67%, followed by motorcycle traffic accidents which affected 33,76% with a male: female ratio of 7.7:1; Eighty patients (8,09%) suffered gunshot wounds; Interpersonal violence (8,79%), sports (1,76%) and falls (2,93%), and seventy patients (21%) suffered assaults. (Table 1).

Falls were a significantly more common mechanism in patients who were at least 65 years old.

Alcohol was a major aetiological factor. The 16–30-year age group had the highest proportion of alcohol-related mandibular fractures, with 65% having alcohol involvement, followed by the 18–30-year age group with 55% involving alcohol. A high rate of alcohol involvement was reported in both and MVA-related fractures (89%) IPV related fractures (67%).

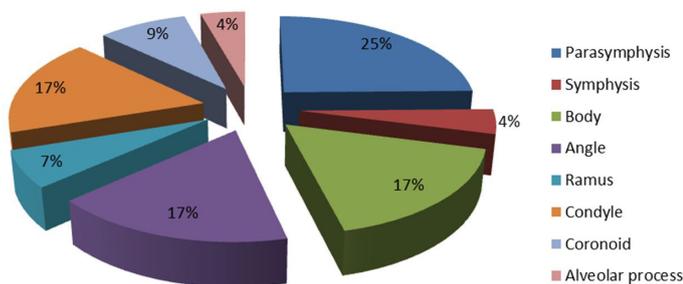
Hospitalization was required for 53% of patients with 89% of these treatments being open reduction and internal fixation.

Year	MVAs		MA		Firearm		IPV		Sports		Falls	
	F	M	F	M	F	M	F	M	F	M	F	M
2009	9	41	8	29	0	11	3	6	0	1	0	0
2010	11	31	6	33	0	8	4	3	0	1	0	1
2011	7	30	7	19	0	9	1	4	0	3	0	0
2012	8	34	6	12	0	7	1	3	0	1	0	0
2013	6	23	7	14	0	4	1	7	0	3	1	0
2014	9	32	7	19	0	8	1	5	0	2	0	1
2015	7	31	8	18	0	2	0	8	0	0	1	0
2016	8	20	4	19	1	8	1	10	0	2	2	4
2017	8	21	6	15	0	4	1	7	0	1	2	5
2018	9	17	6	19	0	4	1	5	0	1	2	3
2019	5	14	9	17	0	3	1	2	0	0	1	2
<b>Total</b>	<b>87</b>	<b>294</b>	<b>74</b>	<b>214</b>	<b>1</b>	<b>68</b>	<b>15</b>	<b>60</b>	<b>0</b>	<b>15</b>	<b>9</b>	<b>16</b>

MVAs: Vehicle motors accidents; MA: motorcycle accident

**Table 1:** number of patients with mandibular fractures according to aetiology during the study period

In patients with isolated fractures, the commonest site was the Parasymphysis (24,73%), followed by the condyle, angle and body with 17,20% respectively. Multiple fractures (fractures involving more than one site) were noted 37%. The most common combination of fractures was angle and parasymphyseal fractures (103 patients), followed by bilateral condylar fractures (47 patients). (Figure 3)



**Figure 3:** Anatomic distribution of mandibular fractures

The degree of total complication in the treatment of patients with mandibular fractures, the global result was 4.7%; first of all the surgical site infection (14 patients), and rejection of the material (8 patients) two years after the surgery in all the cases without pseudoarthrosis.

## Discussion

As with other diseases and injuries, epidemiological data provide an important basis for the evaluation of access to treatment, resource allocation and planning within the health services. It may also be used to develop preventive strategies and may provide information about the quality of care provided [12].

The finding that age group 21-30 years constituted the group with the highest frequency of jaw fractures is consistent

with previously published studies. 13-19 Trauma is now considered a problem of young people, which may be because of their aggressive nature and careless driving on roads [20].

Fridrich, *et al*, [16] revealed that motorcycle accident-related mandibular fractures are mainly observed in the symphysis and parasymphysis regions. Furthermore, the angle was the most common site of assault-related mandibular fractures. In our study, with the majority (82%) of the patients were MVA victims, symphysis and parasymphysis fractures were the most common (38.9%) sites of fracture.

Men sustained mandibular fractures at a rate 7 times that of women. Overall, most mandibular fractures occurred at 18 to 30 years old.

The male sex is the most frequently affected by mandibular fractures in the current study, with a male/female ratio of 7.7:1, which is in agreement with the results reported by the literature [1, 5, 8, 15, 19, 22, 24]. In the literature, the sex ratio varies from one author to another between 1.2:1 and 16:1. [4,5,12,16,19] It is not surprising that male patients are predisposed to mandibular fractures given that they have a higher rate of alcohol use and an increased tendency to engage in conflicts. The predominance of male gender is due to the fact that this group make up the most active group in society [4,6,12,16] is, more prone to traffic accidents since they drive motor vehicles carelessly and is most likely to be involved in interpersonal violence and is normally associated with use of alcoholic beverage [12,13,16]. The higher frequency of mandibular fractures among males compared to females may also be attributed to the fact that the females, most often, are confined to housework and they

drive vehicles less frequently and carefully, and are less exposed to accidents, fights, industrial works, and sports and more participate in trading or farming [20].

Epidemiological reviews of these injuries are needed to identify the risk factors leading to such trauma and help to train medical and dental practitioners to diagnose facial trauma and to provide immediate and long-term treatment [15,21]. These reviews are useful for reaffirming previously established trends and identifying new patterns of disease frequency. Additionally, the success of treatment and the implementation of preventive measures are more dependent on the epidemiological assessments [24].

## **Conclusion**

MVAs are the major cause of mandibular fractures in a public center hospital en Venezuela, and patients aged <30 years sustained the most mandibular fractures. With this study we seek to provide information statistics of the fractures most commonly are presented in our service; however still much information is missing in our country that reference to maxillofacial trauma. It is extremely important to know and document all cases that are attended in the different units hospitals in our country to process the information and make publications that help us provide better treatment to our patients. This study sought to characterize the population-based sample of mandibular fractures in Venezuela.

## **Ethical disclosure Protection of people and animals**

The authors declare that procedures conformed to the ethical standards of the responsible committee on human experimentation and in accordance with the World Medical Association Declaration of Helsinki.

## **Confidentiality of data**

The authors declare that they have followed the protocols of their workplace on the publication of data from patients and that all patients included in the study have received sufficient information and have given their written informed consent to participate in the study.

## **Right to privacy and informed consent**

The authors have obtained the informed consent of patients and/or subjects referred to in the article. This document is in the possession of the author of correspondence.

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