

Clinical and Paraclinical Epidemiological Aspects of Multifocal Fractures of the Mandible in Chuo

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How to cite this paper: Makungu, A.P., Moubissa, D., Late, S.R. and Mofu, S.V. (2023) Clinical and Paraclinical Epidemiological Aspects of Multifocal Fractures of the Mandible in Chuo. *Open Journal of Stomatology*, 13, 189-196.
<https://doi.org/10.4236/ojst.2023.136016>

Received: April 14, 2023

Accepted: June 5, 2023

Published: June 8, 2023

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Abstract

Introduction: Multifocal fractures of the mandible are responsible for the modification of anatomy with functional and aesthetic repercussions. The aim of our work is to determine the clinical and paraclinical epidemiological aspects of multifocal mandible fractures. **Materials and Methods:** Retrospective, descriptive study conducted at the Department of Stomatology and Maxillofacial Surgery of the University Hospital of Owendo, from January 2018 to January 2021. All mandibular multifocal fractures with radiological images were included, while all incomplete records and monofocal fractures were not included. Data collection was done on a form from patient records. Age, sex, mode of transport, periodicity, mechanisms, etiologies, soft tissue lesions, dental joint disorder, sensitivity disorder, dental damage, radiological examination, the number and location of fracture features, and associated lesions were the variables studied. **Results:** 49 files collected; the average age of 28 ± 8.4 years; male predominance at 75.5%. Personal transport was used at 53%, November was the most accident-prone month, road accident was the dominant etiology at 59%, and direct mechanism at 88%. Stomatoragia predominated at 98%, and hypoaesthesia predominated at 30%. The lesional association with the facial massif was 20%. The CT scan was performed at 61%. The bifocal fracture was the most common at 84%. **Discussion:** According to Alexander violent assaults are the main cause but for Mala it is MVA. The dental panoramic is the basic examination. For Rocton and Mala, the bifocal fracture is the most frequent of the multifocal fractures. **Conclusion:** Multifocal fractures are the prerogative of the young subject and road accident is the dominant etiology.

Keywords

Diagnosis Epidemiology Mandible Multifocal Fracture

1. Introduction

Multifocal mandibular fractures are defined as any solution of bone continuity affecting several mandibular foci, they occupy an important place in facial traumatology because they constitute a severe attack of the mandibular anatomy and they induce significant sequelae both functionally and aesthetically. The mobility and anatomical position of the mandible explains the high frequency of mandibular fractures, *i.e.* 60% to 70% of facial fractures [1] [2]. It is a public health issue. It is thus one of the preferred seats of facial trauma because it constitutes a real bumper of the face [3] [4]. The most frequent causes are road accidents, brawls, sports accidents and domestic accidents [5]. These fractures preferentially affect young males. Clinical examination is initially difficult and must be thorough for signs pointing to a mandibular fracture. The diagnosis is confirmed by the radiological image whose orthopantomogram is the resting examination, but computed tomography takes a prominent place for a better rendering in front of certain complex fractures. The aim of our work is to determine the clinical and paraclinical epidemiological aspects of multifocal fractures of the mandible.

2. Materials and Methods

It is a retrospective, descriptive study conducted at the Department of Stomatology and Maxillofacial Surgery of the University Hospital of Owendo, from January 2018 to January 2021. The study population included all patients with maxillofacial trauma hospitalized in the service. All patients with multifocal mandible fractures with radiological images were selected for the study. However, all incomplete files and monofocal fractures of the mandible were not retained. Data collection was done on a form basis from patients' files. Age, sex, mode of transport, periodicity, mechanisms, etiologies, soft tissue injuries, dental lesions, sensitivity disorder, dental damage, radiological examination, the number and location of fracture features, and associated lesions were the variables studied. We used Microsoft Excel version 15.26 for the creation of the database, for the processing of the data and the elaboration of the graphs. The results of the quantitative variables were expressed as mean \pm standard deviation and those of the qualitative variables were expressed as numbers or percentages. The texts were entered in Word software version 15.26.

3. Results

3.1. Epidemiological Aspects

49 files were collected, and the average age was 28 ± 8.4 years with extremes of 4 years and 48 years. The breakdown by sex shows a clear male predominance at 75.5% or 37 men against 24.5% or 12 women, giving a sex ratio of 3.1.

Patients were transported in personal vehicles at 53%, by ambulances at 31% and 16% and by taxis at 13.5%. The mechanism of trauma was a direct shock at 88% and an indirect shock at 12%. November was the month with the most fracture (**Figure 1**). Road accidents were the predominant etiology (**Figure 2**).

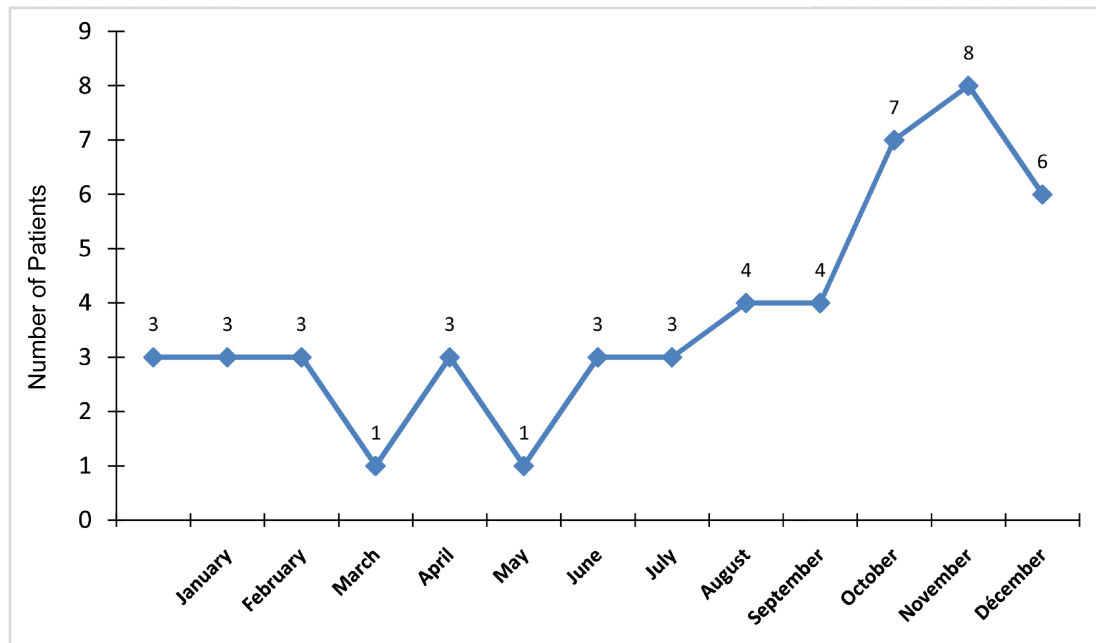


Figure 1. Monthly distribution of the number of cases of multifocal mandibular fractures.

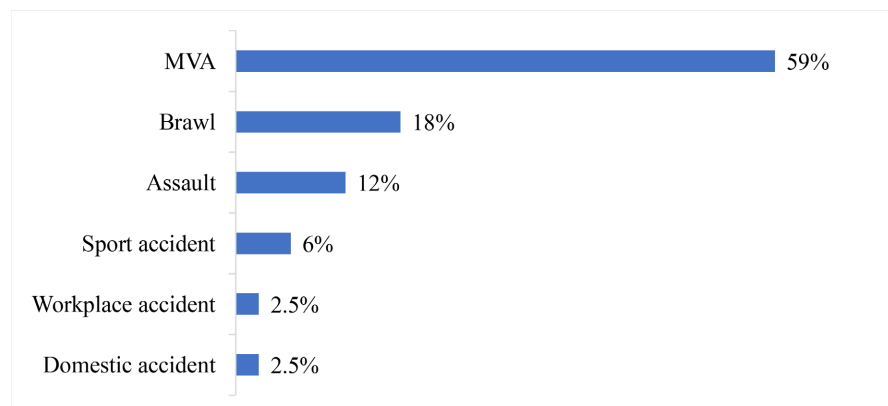


Figure 2. Distribution of multifocal mandibular fractures by etiology.

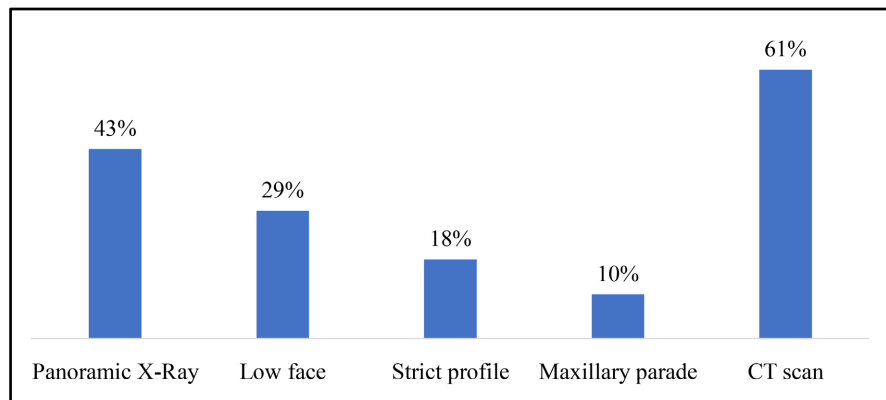
Among the 29 patients, or 59% of the cases of road traffic accidents, 14 cases, or 48% of the MVAs, occurred between a vehicle and a pedestrian, 10 cases, or 34%, between two vehicles, and 5 cases, or 18%, during a car skid.

3.2. Clinical and Paraclinical Aspects

Oedema of the face was found at 91.8%; the year of labio-chin anesthesia was noted in 30.6% of cases; stomatorrhage was present in 77.5% of cases and in 8.1% of cases; trismus was tight (**Table 1**). In this study, it was observed that mandibular fracture was associated with abdominal trauma in 5% of patients, trauma to the facial mass in 20% of patients, 6% with trauma to the musculoskeletal system and in 69% of cases with no other device. On radiological examination, 61% of our patients had benefited from a CT scan and 43% from a dental panoramic (**Figure 3**). The bifocal fracture was found in 84% of cases, trifocal fracture in 12%

Table 1. Distribution of clinical signs according to the number of cases.

Clinical signs	Number of cases	Percentage
Edema	45	91.8
Skin wound	27	55.1
Sign of Vincent	15	30.6
Trismus	42	85.7
Trismus tight	4	8.1
Premature molar contact	30	61.2
Previous gaping	22	44.8
Antero lateral gaping	8	16.2
Otorragie	10	20.4
Stomatorrhage	38	77.5
Dental avulsion	9	18.3
Dental mobility	24	48.9
Dental fracture	8	16.2

**Figure 3.** Distribution of radiological examinations by effectiveness.

of cases and quadrifocal fracture in 4% of cases. Bifocal angle and parasymphysis fracture accounted for 17 cases or 41% (**Table 2**). The most represented fracture association in trifocal fractures was the capital fracture (R/L) associated with the symphysis fracture with 2 cases or 33% (**Table 3**). Our study had only two cases of quadrifocal fractures namely corpus (R/L) associated parasymphysis (R/L).

The treatment carried out was only osteosynthesis by miniaturized plate. None of the patients had received maxillomandibular blockade in pre, per, or postoperatively. The results were considered satisfactory and patients were reviewed at 2 weeks, 6 weeks, 12 weeks and 24 weeks for removal of osteosynthesis material.

4. Discussion

Our study is limited by its small sample size because of its retrospective nature

Table 2. Distribution of the bifocal mandibular fracture line by number of staff.

Localization of the Trait	Patients	Percentage
Parasymphysis + Symphysis	1	2
Angle + Symphysis	8	20
Angle + Corpus	3	7
Angle + Parasymphysis	17	41
Capital + Corpus	1	2
Capital (R/L)	1	2
Corpus (R/L)	1	2
Parasymphysis (R/L)	5	12
Ramus + Parasymphysis	1	2
Subcondylar haurte (L and R)	1	2
Corpus + Parasymphysis	2	5
Total	41	100

Table 3. Distribution of the line of trifocal mandibular fractures according to the effect.

Localization of the Trait	Patients	Percentage
Capital (R/L) + Symphysis	2	33.3
Capital (G) + Parasymphysis (R/L)	1	16.7
Capital (L) + Angle (L) + Parasymphysis (L)	1	16.7
Subcondylar haurte (L) + capital (L) + symphysis (R)	1	16.7
Subcondylar haurte (L) + Subcondylar bass (R) + Symphysis	1	16.7
Total	6	100.0

and the fact that it is based on the exploitation of the files. There are poorly maintained files with poor archiving or files that are unusable because they are poorly filled. However, these limitations are not an obstacle to the exploitation of the data of this study.

4.1. Epidemiological Aspects

Multifocal fractures of the mandible mainly concern young subjects with an average age of 28 ± 8.4 years, which is in agreement with the work of de Coulibaly *et al.* and Mahamane *et al.* whose average age is 26 years or Mala *et al.* who is 30 years [2] [6] [7].

The male population is the most impacted by these fractures as noted in the study by Ba *et al.* with a sex ratio of 3.23 [8] and Mahamane *et al.* with a sex ratio of 10.45 [7].

This average age and male predominance can be explained by the fact that the country's population is very young and engages in physical and violent activities.

31% of the patient was transported by ambulance, which demonstrates the poor communication in the care of the traumatized at the scene of the accident and the difficulty of the population to be able to reach the rescue units in our country.

In terms of monthly frequency of trauma, we note that the month of November and incidentally of October and December are the most accident-prone. This period corresponds to that of social movements with large crowd movements.

The shock is direct at 88% which denotes the exposure of the mandible to any violent contact and its role as a protective shock shield of the base of the skull.

In our study the dominant etiology is the accident on the public road which confirms the work of Keubou *et al.* [9], Mala *et al.* [4] and Bancolé Pognon *et al.* [10] but contradicts the studies of Razafindrabe *et al.* [11], Phamdang *et al.* [12] and Alexander *et al.* [13] where brawls and assaults are the dominant etiologies. This contrast is explained by the quality of the road network and the non-respect of the rules of the road in our countries even if the study conducted in the city of Antananarivo with a rate of 56% of mandibular fractures following interpersonal violence shows the opposite [11].

4.2. Clinical and Paraclinical Aspects

Edema is the first clinical sign of our study which corroborates the work of Messina *et al.* who note it at 92.9% [14]. But our data are opposed to the sign of Vincent that they find at 2%. For the associated lesions we note a clear difference with the study of Czerwinski *et al.* where we have frequencies of 30% for the facial massif, 27% for abdominal trauma and 62% for the musculoskeletal system [15]. This high frequency of involvement of the facial mass is also noted in the study of Coulibaly *et al.* with 35% of cases [2]. On the other hand, Thapliyal *et al.* report a frequency of 11% for lesions associated with the facial mass [16] much lower than our study which is 20%.

The diagnosis of mandibular fractures always uses dental panning as shown by the studies of Mala *et al.* in 74.2% of cases and Messina *et al.* in 100% of cases [4] [14] but computed tomography which is used in 14% in the study of Coulibaly *et al.* [2] becomes the first-line diagnostic tool as also shown in the Messina *et al.* study where all patients benefited from this tool [14].

The bifocal fracture focus is the predominant focus in our study, this is also the case in the studies of Mahamane *et al.* and Ba *et al.* [6] [8]. In this type of fracture, our study finds the parasymphysis angle association as the most frequent, which is not the case in the Eboungabeka Trigo *et al.* [17] study where it is the horizontal branch symphysis association that is the most observed. Trifocal fractures are infrequent, as noted in the study by Mahamane *et al.* [6]. As for quadrifocal fractures, they are exceptional but serious and are found in horizontal branch and parasymphysis disorders.

5. Conclusion

Multifocal fractures are frequent and occur in young males. Edema, trismus and

stomatorrhage are the signs of calling. The panoramic remains a diagnostic tool even if the CT scan becomes the first-line tool. The bifocal fracture is the most observed fracture.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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