



MANDIBULAR FRACTURES; ETIOLOGY, PATTERN OF PRESENTATION AND MANAGEMENT IN A TERTIARY HEALTH FACILITY, NORTHWESTERN NIGERIA.

Oral & Maxillofacial Surgery

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ABSTRACT

Background: The mandible is the largest bone of the craniofacial bony structure forming the lower jawline and shaping the contour of the lower third of the face. Being it independent and prominent structure, it is vulnerable to traumatic injuries. Hence this study aimed to present the analysis of the aetiology, pattern of presentation and management of mandibular fractures in a tertiary healthcare facility in Sokoto, Northwestern Nigeria. **Materials and Method:** This was a retrospective study of cases of mandibular fractures presented and managed over 10 years. After obtaining ethical approval from the institution's research and ethics committee, all case record of maxillofacial trauma managed were retrieved. Cases without radiographic evidence of mandibular fractures were excluded. Sociodemographic variables, aetiology, type of mandibular fractures and treatment given were recorded in a proforma. Data obtained were analysed using statistical package for social sciences version (IBM SPSS version 25). **Result:** A total of 692 cases of maxillofacial trauma were recorded during the study period out of which 328 had mandibular fractures accounting for a prevalence of 47.4%. There were 276 (84.1%) males and 52 (15.9%) females in the age range of 8-65 years with a mean±SD of 29.72±13. Most of the patients 143 (40.9%) were in the age range of 20-30 years. The relationship between age group and the etiology was found significant ($\chi^2=80.561$, $df=18$ $p=0.000$). Road traffic accident 246 (75%) from motor vehicle was the commonest etiology of mandibular fracture. Parasymphseal 92 (28.0%) constitute the majority and mandibulo-maxillary fixation 136 (41.5%) was the main treatment opted. **Conclusion:** Mandibular fracture constitutes a relatively considerable portion of the maxillofacial injuries with Parasymphseal fracture as the most common. Mandibulo-maxillary fixation is still being opted as valuable option in its treatment.

KEYWORDS

Mandibular Fractures, Parasymphseal, ORIF, MMF

INTRODUCTION

A considerable percentage of facial trauma cases that present to emergency rooms and oral and maxillofacial surgery units involve mandibular fractures, which continue to rank among the most frequent maxillofacial injuries globally.¹ Fractures of the mandible are a serious public health concern because of its prominent and mobile anatomical position, which makes it especially susceptible to high- and low-energy impacts.² Due to socioeconomic factors, cultural customs, and the accessibility of trauma care services, mandibular fracture patterns, causes, and management outcomes differ significantly between regions.^{3,4}

The prevalence of mandibular fractures is high in many low and middle-income nations, including Nigeria, and is frequently made worse by elements like an increase in traffic accidents, interpersonal violence, falls, and workplace dangers.⁴ Rapid urbanisation, rising motorbike use, poor road safety compliance, and lax enforcement of traffic laws are all contributing factors to the rising trauma incidence in Northwestern Nigeria in particular.^{5,6} The epidemiological profile and clinical presentation of mandibular fractures in the area are influenced by these factors taken together.⁷

Planning successful prevention strategies, allocating resources, and enhancing clinical outcomes all depend on an understanding of the local aetiology and presentation patterns.⁸ Additionally, institutional capacity, surgeon skill, fracture characteristics, and patient factors all influence the management technique choice, whether it be conservative or surgical.

Despite the frequency of mandibular fractures in Nigeria, there remains a need for more region specific data to guide evidence-based

practice and improve healthcare delivery. Therefore, the purpose of this study is to assess the causes, presentation patterns, and management results of mandibular fractures in a Northwestern Nigerian tertiary healthcare facility. The study aims to support the region's maxillofacial trauma care optimisation by adding up-to-date data from our setting to the body of existing knowledge.

MATERIALS AND METHOD

This was a retrospective study of cases of mandibular fractures presented and managed over 10 years (January, 2015 to December, 2024). After obtaining ethical approval from the research and ethics committee of Usmanu Danfodiyo University Teaching hospital Sokoto, all case record of maxillofacial trauma managed were retrieved. Diagnosis was confirmed using clinical assessment and radiological findings including plain radiograph (orthopantomogram, posteroanterior mandible view), and/or computed tomography (CT) when possible. Cases without radiological evidence of mandibular fractures were excluded. Sociodemographic variables such as age, sex and occupation, as well as aetiology, isolated and combined cases of mandibular fractures, fracture types, treatment provided and clinical outcome were recorded using structured proforma. Data obtained were analysed using statistical package for social sciences version (IBM SPSS version 25).

RESULT

A total of 692 cases of maxillofacial trauma were recorded during the study period out of which 328 had mandibular fractures accounting for a prevalence of 47.4%. There were 276 (84.1%) males and 52 (15.9%) females (Figure 1), in the age range of 8-65 years with a mean±SD of 29.72±13. Most of the patients 143 (40.9%) were in the age range of 20-30 years (Figure 2). The distribution of the etiology of the injuries include: Road traffic accident 246(75%), assault 34(10.4%), gunshot

32(9.8%), and others 16(4.9%). The relationship between sex and the etiology was found significant ($\chi^2=31.315$, $df=3$ $p=0.000$) (table 1). The categories of road traffic accident among the study subjects include: Motor vehicle 127(51.6%), motorcycle 83(33.7%), motorcycle 2(0.8%), and others 34(13.8%) (Figure 3). There was a total of 557 mandibular fracture sites constituting of parasymphseal 162(29.1%), mandibular body fractures 131(23.5%) angle 77(13.8%) symphyseal 82(14.7%), condyle 56(10.1%) coronoid 4(0.7%) and isolated dentoalveolar 45(7.5%) (Table 2). Record of computed tomography (CT) scan was available in 327(58.7%). The treatment status include: Intermaxillary fixation 408(73.2%), open reduction and internal fixation 126(22.6%) whereas 23(4.1%) left the hospital untreated the on 136 (41.5%) (Figure 4). Follow up data was scanty and 2 months follow up record was found in 186(33.3%). Figure 5 and 6 shows CT scan and clinical pictures respectively

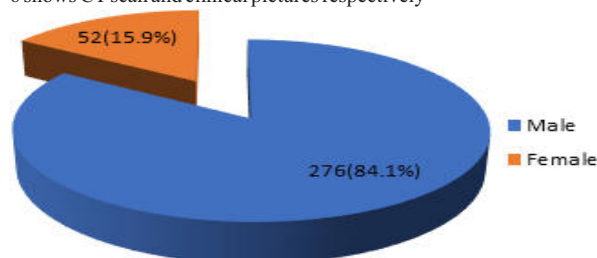


Figure 1: Sex Distribution of the Study Subjects

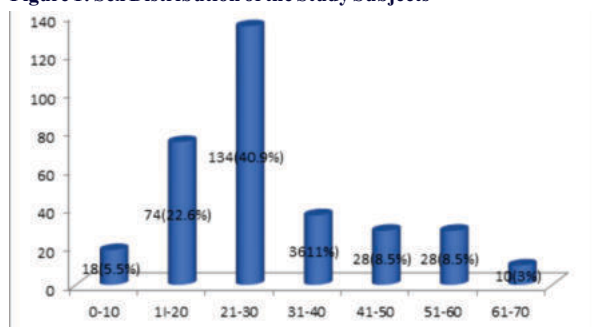


Figure 2: The Distribution of Age Categories Among the Study Subjects

Table 1: The Relationship Between Sex and the Etiology

	SEX		Total n (%)	Test statistics	p-value
	Male n (%)	Female n (%)			
Etiology				$\chi^2=31.315$, $df=3$	$p=0.00$
RTA	218 (66.5)	28 (8.5)	246 (75.0)		
Assault	28 (8.5)	6 (1.8)	34 (10.3)		
Gunshot	25 (7.6)	7 (2.2)	32 (9.8)		
Others	6 (1.8)	10 (3.1)	16 (4.9)		
Total	277 (84.4)	51 (15.6)	328 (100)		

Table 2: Types of Fractures Among the Study Population

Type of fracture	Frequency	Percentage
Parasymphseal	162	29.1%
Mandibular body fractures	131	23.5%
Angle	77	13.8%
Symphyseal	82	14.7%
Condyle	56	10.1%
Coronoid	4	0.7%
Isolated dentoalveolar	45	7.5%

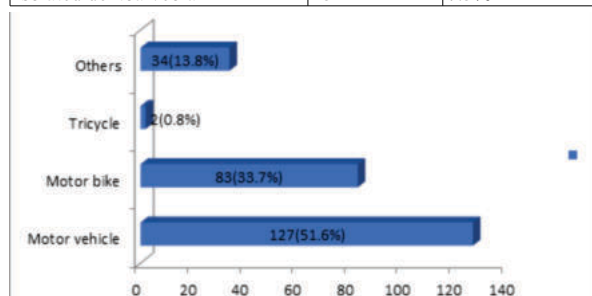


Figure 3: Distribution of Road Traffic Accident Type Among the Study Subjects

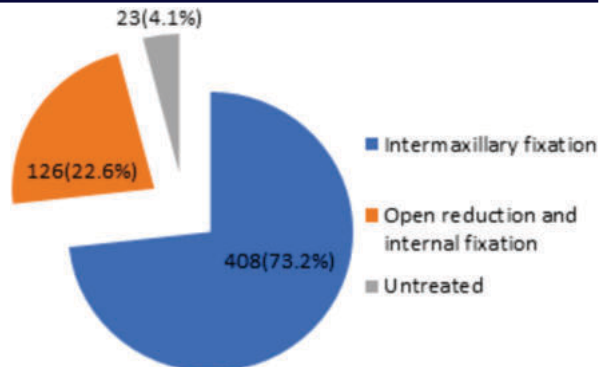


Figure 4: The Distribution of Treatment Status Among the Study Subjects

DISCUSSION

This study evaluated the aetiology, pattern, and treatment of mandibular fractures in a Northwestern Nigerian tertiary healthcare facility. 47.4% of all maxillofacial injuries reported during the study period were mandibular fractures, highlighting the mandible's vulnerability because of its prominence and lack of bony support in comparison to other facial structures. This result is consistent with findings by Yildirgan et al.⁹ and Pickrell et al.¹⁰ that show a significant percentage of facial skeletal injuries are mandibular fractures.

It was found that the male dominance was very high (84.1%), as is the case with most of the published literature.^{10, 11, 12} Males are generally more engaged in high-risk behaviors, work-related exposure and travel on the road, which places them in a disproportionately disadvantaged position of being affected by facial trauma. The fact that the highest incidence was in persons aged 20-30 years (40.9%), adds weight to the importance of socioeconomic and behavioral factors since the latter are the most active in the population.¹³ The large correlation between age groups and aetiology ($2=80.561$; $p=0.001$) indicates that there are age groups that might be predisposed to particular processes of injury. Road traffic accidents (RTAs) were discussed as the most frequent cause of mandibular fractures; this is 75 percent of all fractures, most of which are motor vehicle collisions. This is an indication of the ongoing national health problem of RTAs in Nigeria, where insufficiency of road safety systems, lack of enforcement of the road laws, and the high usage of motorcycles as commercial transport vehicles are some of the causes of trauma burden.¹⁴ Other lower and middle-income countries report RTAs as the leading cause of maxillofacial injuries (similar to Nigeria)^{15,16} whereas in high-income countries interpersonal violence can frequently lead to the maxillofacial injury as a result of more difficult traffic laws and better safety standards in the road.^{17, 18, 19} In this study, the parasymphseal area was the most common fracture site. This follows the biomechanical characteristics of the mandible, in which the parasymphysis, in structure, is weaker and fractures easily when it is struck directly or indirectly.²⁰ Other past researches have also identified the parasymphysis, angle, and condylar area as typical places of fracture.^{12, 13, 21} The most prevalent modal of treatment in terms of management, was mandibulo-maxillary fixation (MMF). This may be explained by a number of factors such as patient affordability, preference of the surgeon, expertise availability, and limited resources like in most tertiary hospitals in developing environments. Whereas open reduction and internal fixation (ORIF) is becoming the preferred choice worldwide, particularly because of its functionality and aesthetic benefits, MMF is still extensively applied in resource-limited settings because of its cost-effectiveness and satisfactory results in the selected cases.¹⁴ Comprehensively, the results indicate a continuum of high rates of RTA-related mandibular fractures in young adult male patients and high reliance on conservative management methods. The findings highlight the necessity of the enhancement of road safety policies, educating people about injury prevention, and enhancing the facilities of maxillofacial trauma care. Future research that takes into account long-term outcomes and complication rates would serve as an addition to the research, shedding more light on how mandibular fractures can be best managed in this area.

CONCLUSION

Mandibular fractures constitute a significant proportion of maxillofacial injuries in Northwestern Nigeria, with young adult males being the most affected. Road traffic accidents-particularly motor

vehicle collisions-remain the leading cause, underscoring persistent gaps in road safety enforcement and public awareness. Although open reduction and internal fixation is widely regarded as the standard of care globally, mandibulo-maxillary fixation remains the predominant treatment modality in this setting, likely due to financial constraints, surgeon preference, and limited availability of specialized resources.

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