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Maxillofacial Fractures in Owo, South Western Nigeria. A 4 Year Retrospective Review of Pattern and Treatment Outcome

Ogundipe OK^{1*}, Afolabi AO¹ and Adebayo O²¹Dental Services Department, Federal Medical Centre, Nigeria²Department of Community Health, Federal Medical Centre, Nigeria**Abstract**

Aims and objectives: Earlier reports have shown that maxillofacial fractures have a geographic and socio-demographic pattern. The aim of this paper is to document the pattern of maxillofacial fractures and evaluate the treatment outcome for such injuries in Owo, a suburban community in South Western Nigeria.

Materials and methods: Medical records of patients who sustained maxillofacial fractures and were treated between January 2007 and December 2010 at the Dental Services Department of Federal Medical Centre (FMC), Owo were retrospectively reviewed. Demographic data and clinical information were recorded and analyzed using SPSS.

Results: Seventy-nine patients representing 12.3% (79/644) of all trauma related admissions in the hospital and 1.3% (9/6226) of all attendees at the dental clinic for the period under review were seen by the maxillofacial Unit (yearly total =19.8). Patients' ages range from 2 to 75 years (mean 32.9 +/- 13.3 years). Male to female ratio was 12.2:1. The majority of the facial fractures were due to motorcycle accident and Inter-Maxillary Fixation (IMF) was the commonest treatment modality. Post-operative complications were recorded in 11 patients (17.7%).

Conclusion: Young males on motorcycle are more at risk and should be targeted for education on preventive measures. Relevant legislations should be enacted and enforced to curb motorcycle accidents.

Keywords: Maxillofacial fracture; Pattern; Outcome**Introduction**

Maxillofacial injuries remain a common health problem representing 20-60% [1] of traumatized population. Though rarely fatal, it frequently results in varying degrees of disfigurement and dysfunction usually difficult to treat. This can diminish both the quality of life and productivity of affected individuals resulting in significant social and economic burdens.

The pattern of maxillofacial fractures varies in type, severity, and cause depending on the population studied, socio-economic, cultural and environmental factors. A review of the literature reveals that road traffic crashes account for majority of injuries in many parts of the world [2-6], a significant proportion of which being motorcycle related [7,8]. Other causes are assaults, falls, sport-related facial trauma. Studies from some industrialized countries indicate assault as the major cause [9-11]. In Nigeria, road traffic crashes remain the major etiological factor of maxillofacial injuries despite increases reported by other causes like assaults, sport injuries, and industrial accidents [12-14].

Because effective injury prevention efforts depends on reliable and detailed information on the incidence, causes and pattern of injury, periodic epidemiological studies are imperative. The purpose of this study is to add to the descriptive epidemiology available for civilian maxillofacial fracture. It is intended that data from this study will also serve as template for comparison for future intended prospective study.

Methods

All patients who presented at the dental clinic of Federal Medical Center, Owo, Ondo State, South-Western Nigeria between January 2007 and December 2010 were retrospectively reviewed. The hospital was the only tertiary medical center in Ondo State at the time of the study serving a catchment area of 3.4 million.

Medical records including relevant radiographs of all cases of maxillofacial fractures were retrieved. A questionnaire was used to record the patients' demographics, including age, gender, occupation,

cause of injury, type of injury, site of injury, associated injuries, length of hospital stay, and time from presentation to treatment. Other factors recorded are method of treatment and post treatment complications.

Causes were grouped into six categories: road traffic collisions (vehicular, motorcycle, pedestrian), sports related, occupational related, gunshot related, falls, and assault. Associated injuries were recorded according to site(s) and type as orofacial soft tissue, dentoalveolar and concomitant injuries.

The fractures were classified as mandible fractures (condyle, coronoid process, ramus, body, parasymphysis, symphysis,) and midface (zygomatic, left I, II, III, orbital, nasoethmoidal and palatal fracture). Treatments were divided into closed reduction (maxillomandibular fixation) and open reduction (open reduction and internal fixation).

Data were analyzed using SPSS 15.0.1 statistical software package (SPSS Inc., Chicago, IL, USA). Measures of location and of dispersion were computed for all quantitative variables while frequency distribution and cross tabulation were generated for categorical variables. Differences with p-value of 0.05 or less were considered statistically significant.

Results

Seventy-nine patients representing 12.3% (79/644) of all trauma

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related admissions and 1.3% (9/6226) of all attendees at the dental clinic for the period under review were seen by the maxillofacial Unit (yearly total =19.8).

Patients' ages range from 2 to 75 years (mean 32.9 \pm 13.3 years). The overall male: female ratio was 12.2: 1. The majority of fractures (38.0%) occurred amongst the 21-30 year age group (Figure 1).

With respect to time of presentation, 25.3% presented within first hour, 29.1% within 24 hours while the remaining 45.6% presented after 24 hours.

The commonest etiology in this series was road traffic crash of which 64.6% were motorcycle related while 27.8% was due to vehicular crash. Other causes included occupational incidents and assault 2.5% each, sports and gunshots 1.3% each (Table 1).

One hundred and fifty fractures were recorded in 79 patients giving a mean of 1.9 fractures per patient. This comprises 67 (44.7%) fractures located in the mandible and 83 (55.3%) fractures located in the mid-facial region. Dentoalveolar fractures occurred in 44.3% of patients. Of the mandibular fractures, 59.7% involved symphyseal/ parasymphyseal region, 32.8% body/ angle region while 7.5% involved the condyle.

Le fort I, II, III, zygomatic, palatal, orbital and nasoethmoidal fractures accounted for 3.6%, 18.1%, 6.0%, 39.6%, 13.3%, 6.0% and 13.3% respectively.

Isolated mandibular fracture was the most prevalent (39.2%) followed by isolated mid-facial fracture (34.2%) and combined mandibular / mid-facial fracture (26.6%).

There were associated orofacial soft tissue and concomitant body injuries in 70.9% and 45.6% of patients respectively. The commonest concomitant body injuries were brain and limb injuries (Table 2).

Sixty-two patients (78.5%) received treatment for the fracture,

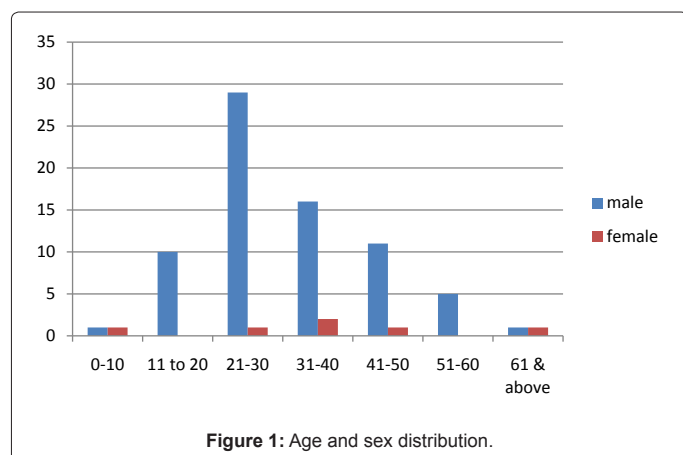


Figure 1: Age and sex distribution.

Etiology	Gender		Total (%)
	Male	Female	
Road Traffic crashes	19	3	22 (27.8)
Motorcycle	48	3	51 (64.6)
Occupational	2	0	2 (2.5)
Gunshot	1	0	1 (1.3)
Sport related	1	0	1 (1.3)
Assault	2	0	2 (2.5)
Total (%)	73 (92.4)	6 (7.6)	100

Table 1: Etiology of maxillofacial fractures according to gender.

Concomitant body injury	Number of patients
Brain	20
Limb	13
Ocular	5
Chest	2
None	39
Total	79

Table 2: Concomitant body injuries in 79 cases of maxillofacial fractures.

Treatment	Number of patients (%)
No treatment	17 (21.6)
Conservative treatment	14 (17.7)
IMF only	24 (30.4)
IMF plus others	14 (17.7)
Gilles only	5 (6.3)
Plate only	5 (6.3)
Total	79 (100)

Table 3: Treatment of Maxillofacial fractures.

thirteen (16.5%) sought discharge against medical advice, 3 (3.7%) requested referral on account of proximity while one patient (1.3%) with Le-fort III fracture and severe head injury died within 24 hours of presentation (Table 3).

Thirteen cases of mildly displaced zygomatic fractures and one case of mandibular fracture in a child of 2 years were successfully treated with jaw rest and supportive medications.

For those patients who required surgical intervention, the average time of treatment after initial presentation was 7.2 \pm 4.0 days (range 1-21) while length of hospital stay was 9.6 \pm 5.7 days (range 1-29). Majority were admitted in the general ward with only 8/48 (16.7%) treated on an outpatient basis. Inter maxillary fixation (IMF) using arch bar/eyelet wire/gunny splint was used in 30.4% of the patients followed by IMF plus internal wire suspension/transosseous wiring/plate fixation (17.7%), Gilles zygomatic elevation (6.3%) and bone plate fixation (6.3%) (Table 3). One edentulous mandibular fracture was treated with gunny-type splint. Of the 62 patients treated, 11 (17.7%) had complications. Facial deformity, infection and malocclusion occurred in 8, 2 and 1 patients respectively. Majority of patients refused a second operation to treat deformity.

Discussion

The pattern and presentation of maxillofacial injuries have been studied in many parts of the world with varying results.

Between 2007 and 2010, about 20 maxillofacial fractures were seen each year. This is well below the recent Nigerian range of incidence of facial fractures [12,15]. Low awareness arising from recent introduction of maxillofacial service in this part may be responsible. Increasing availability of centres for the treatment of facial injuries in Northern Nigeria has been noted by Adebayo et al. [12]. It is also probable that many fractures are being seen by unorthodox practitioners due to financial constraints, despite the fact that our hospital is a major referral centre in the environment. Furthermore, the overall maxillofacial fracture incidence of 12.3% is lower than 20-60% [1] generally quoted in the literature. Many of these studies however focused broadly on maxillofacial injuries rather than fractures.

Most reports agree on third decade as the peak age of incidence and on rarity of facial fracture at the extremes of life [2-5,8,9,15,16], few reports however indicate fourth decade [12,17]. Majority of

patients in this series are in the third decade. Similarly, the significant male preponderance in all injury types as noted in this study has been reported in other similar studies. This finding is understandable as people in this age group and gender are active and are more likely to engage with high risk activities.

The predominance of traffic related maxillofacial fractures observed in this study is supported by other studies from developing countries with poor infrastructural development and nonexistent mass transit system. The predominant means of transportation in these urban and semi urban areas are poorly maintained vehicles. Owo is a sub-urban area, bordered by bigger cities with a major interstate highway passing through it. Interestingly, a significant proportion of these injuries are motorcycle related reflecting the popularity of this means of transport in this suburban population. Motorcycles have become a prominent mode of transportation in both urban and suburban cities in Nigeria. Frequent traffic jams as a result of poor road network in the country have made motorcycles attractive to commuters because motorcycles can pass through narrow ways. Many of the motorcycle riders are however, neither formally trained nor licensed to ride motorcycles, and do not follow traffic rules and regulation. It is instructive to note that assault related cases have been on the increase [18], a finding not demonstrated by this study. Future studies may help determine this.

Remarkably, a significant proportion of our patients presented either within the first hour or the first 24 hours of injury which may have contributed to the favorable outcome in most of them. Even though hospital ambulance services are poor, alternative means of transport such as private and commercial vehicles and motorcycles are frequently employed. Proximity between location of accident and the hospital may have also facilitated early presentation. .

Our observation that mandibular fractures are the most commonly fractured bone of the facial skeleton agrees with published reports from Nigeria and different parts of the world [15,18].

Low prevalence of orbital, naso- ethmoidal and condylar fractures observed in this study have been reported by other Nigerian studies but contrast with other studies where relatively higher prevalence was reported [19]. Such injuries are frequently overlooked in surveys that review maxillofacial fractures. Advanced imaging techniques such as Computerized Tomography (CT) scan will allow better visualization of intricate overlapping bony anatomy of the mid-face and orbit. Such facilities are not usually readily available and affordable in our centre.

The close association of concomitant body injuries in maxillofacial fracture is well known. Brain injuries have been described as the most commonly associated concomitant body injury with facial fractures [15] which is consistent with the findings result of this study. Limb and ocular injuries are ranked second and third respectively.

IMF using either arch bar or eyelet wiring is still a popular method of treatment as revealed in this study. The prohibitive cost of bone plate coupled with the added cost of general anesthesia is largely responsible. Nevertheless, satisfactory results were obtained using simple conservative methods of closed reduction and inter- maxillary fixation.

Conclusion

This study provided relevant data on pattern and outcome of maxillofacial fractures presenting to our hospital. Majority of the fractures were caused by motorcycle related crashes and are

associated with considerable morbidity and mortality. There is a need for the relevant authorities to enact and enforce legislation to curb motorcycle related accident. Continuous education of riders is equally recommended.

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