

Maxillofacial Injuries in Calabar South-South, Nigeria: A 5 Year Study of Jawbone Fractures

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ABSTRACT

OBJECTIVES: The aim of this study is to highlight the overall uniqueness of the pattern of presentation of maxillofacial injuries seen at the Department of Oral and Maxillofacial Surgery of the University of Calabar Teaching Hospital, Calabar south-south Nigeria between January 2000 and December 2004 and to share our experience in terms of occurrence, seasonal fluctuations and the adequacy of treatment methods in our environment.

MATERIALS AND METHODS: Case notes of all the 200 maxillofacial trauma patients were retrieved, examined and analyzed with regards to age, gender and cause of injury, socio-demographic data, diagnosis, pattern of presentation, distribution and treatment.

RESULTS: A male-to-female ratio of 3.65:1 was obtained. Out of the 200 patients the highest incidence of injury was in the 20-30 year age group 85 (n=85; 42.5%). The major causes of injuries were motorcycle (n=74; 37%), vehicle (n=62; 31.5%) and assault (n=40; 20%). Six (3%) river-related or boat accidents were recorded. Industrial and sports related accidents contributed the least (n=5; 2.5%).

CONCLUSION: Road traffic accident had the highest proportion of the entire maxillofacial injuries with more males affected than females. Seasonal distribution showed a bimodal peak variation of May-June and September-January. This paper calls for the reinforcement of measures for the prevention of automobile accident and the establishment of more maxillofacial specialist centers with modern equipment for effective management of maxillofacial injuries.

KEYWORDS: Road traffic accidents; jawbone fractures; Calabar south-south Nigeria.

INTRODUCTION

Studies on pattern of presentation and treatment options for maxillofacial fractures have been carried out and documented by various authors in Nigeria¹⁻³ and in other parts of the world.⁴⁻⁶ In the West African

sub region, the changing socioeconomic, political and cultural situations with time have subtly reflected in the pattern of presentation of facial fractures in respect to the incidence, etiological factors and management methods.^{1,3,7,8} The University of Calabar Teaching Hospital is situated in the South - South area of the Federal Republic of Nigeria. This area has its unique and peculiar socioeconomic, political and cultural characteristic which reflects on the pattern of presentation of maxillofacial fractures. The Department of Maxillofacial Surgery is a reference center that serves parts of three other states and nearby towns in the neighbouring countries of Equatorial Guinea and Cameroun. It is located in a coastal town that has thriving river transport systems. This route of transportation is common, cheap and fast in the Calabar area when assessing nearby coastal towns but extremely hazardous on long distance inter country trips especially between Nigeria and the Camerouns. As a result, boat accident in the sea often occur which also contributes to the increasing occurrence of maxillofacial injuries. This study is therefore, aimed at highlighting the overall uniqueness of the pattern of presentation of maxillofacial injuries and our clinical experience in terms of occurrence, seasonal fluctuations and the adequacy of treatment methods in this environment.

PATIENTS AND METHODS

All the 200 patients with maxillofacial fractures seen and treated in the Department of Maxillofacial Surgery of the University of Calabar Teaching hospital Calabar south-south Nigeria between January 2000 and December 2004 were included in this study. Data for each patient was extracted from their records and the treatment log book maintained by the unit. Information obtained from the records included age, gender, cause of injury, the date of injury and time interval before presentation, patients' occupation, clinical and radiographic findings and treatment given, notable follow-up developments and post treatment complications. For the purpose of this study, we defined maxillofacial injuries as fractures of the mandible and the fracture of middle third of the face. The focus was on the fractures of the condyle, ramus, angle, body and symphysis, Le Fort I, II and III and either body or arch fractures of the zygomatic bones. Fractures of the ocular, nasal bone, dentoalveolar structures and cranium were excluded from the study because the management of these

fractures involved specialists in other fields. Follow-up period was for six weeks post-removal of mandibulo-maxillary fixation. The complications recorded were those that were seen in the patients during and after treatment which persisted beyond the follow-up period and could be objectively verified. The data obtained were analyzed with the use of Microsoft Excel computer software.

RESULTS

The age ranges of the 200 patients studied were between 6 and 70 years with a mean of 29.5 years. The peak age incidence was between 21 and 30 years; n=85; 42.5% (Fig. 1). In all except the age group of 0-10 years, there was male preponderance with overall male-to-female ratio of 3.7:1. Road traffic accidents (both motorcycle and vehicle) constituted the majority of patients (n=137; 68.5%) with motorcycle accidents contributing more 74 (37%). River route transportation accidents contributed 6 (3%) of total number of patients. Industrial and sports related accidents contributed the least 5 (2.5%) in each category and all were males (Table 1). Seasonal distribution showed a bimodal peak variation of May-June and September-January with 24 (14.5%) and 115 (57.5%) respectively. The least recorded was in February; n=9; 4.5% (Table 2). Sixty-seven (33.5%) patients presented within 24 hours. Forty (60%) out of the 67 that presented early were females while 58 (90%) of the 65 late presenters were males (Fig. 2). Isolated mandibular fracture occurred in 144 (72%)

patients while the zygomatic bone was the least fractured bone in isolation with only 15 (7.5%) patients recorded. Out of the total 161 fractures that involve the mandible, 44 (27.5%) occurred on the body while 22 (56.4%) out the 39 fractures with maxillary involvement were le fort I. The arch was the most fractured of the zygomatic complex with 11 (57.9%) out of a total 19 involving the bone (Table 3). One hundred and ten patients (55%) out of the total 200 patients had fractures in two places while nine patients (4.5%) had fractures in four or more places. Treatment methods indicate that 167 patients had intermaxillary wire fixation done out of which 114 had upper and lower arch bar wiring. Twenty-four (12%) were treated without any form of mandibulo-maxillary wiring while nine (4.5%) were conservatively managed (Table 4). The average period of hospitalization was 2 weeks. However, 27 (13.5%) were discharged after one month of hospitalization because of the extensive nature of fracture sustained as well as inability to carry out definitive treatment which, was partly due to patients default and partly due to unavailability of theatre space in our hospital. Eight patients (4%) who were unconscious at the time of presentation died after few days of hospitalization in our intensive care unit despite the multidisciplinary approach in their management. Sixteen (8%) had various types of post-management complications. Infection was high with 7 (43.8%) out of the 16 patients. One patient had oro-antral fistula while another presented with facial asymmetry. Malunion, non-union, diplopia and temporomandibular joint clicking were also observed in one patient respectively.

Fig. 1: Gender and age distribution of maxillofacial fracture.

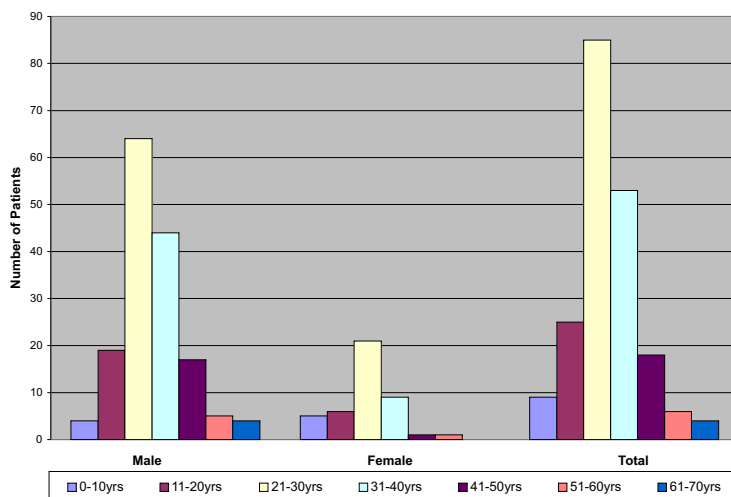


Fig. 2: Time interval between injury and hospital presentation.

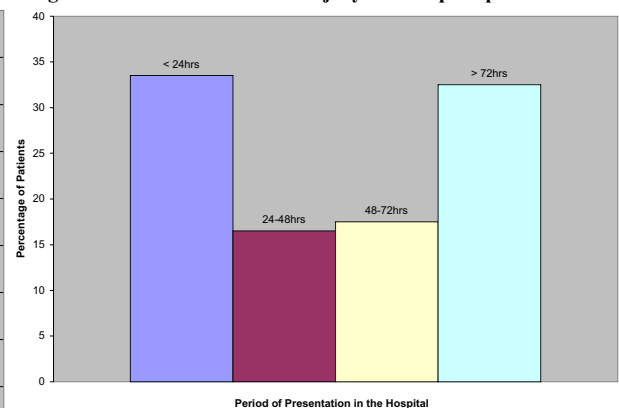


Table 1: Aetiological distribution of jawbone fractures according to gender **Table 3: Anatomical distribution of the jawbone fractures.**

AETIOLOGY	NO. OF PATIENTS	MALES	FEMALES
Motorcycle	74(37%)	63(85.14%)	11(14.86%)
Motor vehicle	63(31.5%)	49(77.78%)	14(22.22%)
Assault	40(20%)	27(67.50%)	13(32.50%)
Falls	7(3.5%)	4(57.14%)	3(42.86%)
Boats	6(3%)	4(66.67%)	2(33.33%)
Industrial accidents	5(2.5%)	5(100%)	0
Sports	5(2.5%)	5(100%)	0
TOTAL	200	157(78.5%)	43(21.50%)

BONE FRACTURED	NO. OF PATIENTS	PERCENTAGE
SINGLE		
Mandible	144	72%
Middle third	25	12.50%
Zygoma	15	7.50%
COMBINED		
Mandible/middle third	12	6.0%
Mandible/Zygoma	2	1.0%
Mandible/Middle third/ Zygoma	2	1.0%
TOTAL	200	100%

TABLE 2: Average monthly distribution of jawbone fractures.

MONTHS	MALES	FEMALES	TOTAL (%)
JAN	20	9	29(14.5%)
FEB	8	1	9(4.5%)
MAR	9	1	10(5%)
APR	10	4	14(7%)
MAY	12	3	15(7.5%)
JUN	12	2	14(7%)
JUL	9	2	11(5.5%)
AUG	10	2	12(6%)
SEP	12	3	15(7.5%)
OCT	16	4	20(10%)
NOV	205	2	5(12.5%)
DEC	19	7	26(13%)
TOTAL	157	43	200

Table 4: Treatment modalities of jawbone injuries.

TREATMENT TYPE	No OF PATIENTS	PERCENTAGE
WITH INTERMAXILLARY FIXATION		
Upper/Lower arch bars	114	57.0%
Upper or Lower arch bars with eyelet wires	22	11.0%
Upper and Lower eyelet wires	16	8.0%
Circumzygomatico-maxillary wires	13	6.5%
Circumzygomatico-mandibular wires	2	1.0%
WITHOUT INTERMAXILLARY FIXATION		
Elevation with Bristows'or Periosteal elevator	13	6.5%
Circum-mandibular wires	8	4.0%
Transosseous wires	2	1.0%
Monomandibular arch bars	1	0.5%
CONSERVATIVE MANAGEMENT		
No treatment for mandibular cases	5	2.5%
No treatment for maxillary cases	2	1.0%
No treatment for zygomatic cases	2	1.0%
TOTAL	200	100%

DISCUSSION

Studies in the different geographical areas of Nigeria indicate that the incidence of maxillofacial fractures have been on the increase over the years.^{1,3, 8} In the Northern part of Nigeria Adekeye¹ treated 1447 patients in 60 months with approximately 24 patients per month while at Ile-Ife in the western part of Nigeria, Ugboko et al⁹ recorded about 442 patients in 144 months which is approximately 3 patients per month. Abiose¹⁰ in his study recorded an average of 4 patients per month in Ibadan, a city near to Ile-Ife in the Western Nigeria that is more densely populated and has more socioeconomic activities. Though no record of this trend in Calabar which is the catchments area of the south-south Nigeria has been documented in the past to enable comparative analysis, however, in this study we recorded an average of monthly occurrence of 3 out of the 200 patients seen in the 5-year period. We equally observed a gradual yearly increase in the number of patients seen between the years 2000 to 2004. The discrepancies observed by different authors^{1,9,10} reflected the varied social and cultural background of the areas in which the studies were carried out. The 200 patients seen within the 5-year period with an

average monthly occurrence of 3 patients in our center seem to be on the low side. It thus reflects the relative rate of urbanization, the peaceful nature of its inhabitants (less assaults) and the low level of economic activities. The possibility that the commercial and social life of the people of Ile-Ife may be comparable to those of the Calabars' could account for the similarity of the findings of the authors in these areas. The low figure in the number of patients seen within the 5-year period may also be due to the non inclusion of soft tissue, orbital and cranial fractures in the study.

Different etiological factors were also be responsible for the discrepancies in number of figures reported by authors. Oloroji, et al¹¹ in their study of a Northern Nigerian population between 1996 and 1999 recorded more assault related fractures while Ugboko et al⁹ in Western Nigeria at about the same period of study recorded more road traffic accident. This finding is comparable to what was obtained in this study. The only difference being that more patients were involved in motorcycle than vehicular accident in this study which is contrarily to the findings of Ugboko et al.⁹ This difference may be due to the fact that the use of motorcycles for commercial transportation had earlier

been popularized in the Calabar in the mid seventies than in the Western parts of the Country. Overall road traffic accidents constituted the majority of patients (n=137; 68.5%) while home related events constitutes 40 (20%) in comparison to Lin et al.¹² who observed in their recent study that most of these injuries were traffic-related (54.5%), followed by events at home (18.7%). On the other hand, Levin et al.¹³ observed that out of the 565 war related recorded injuries, maxillofacial injuries were found in 36 (6.4%) and all the patients were males, ranging in age from 20 to 44 years.

This study also highlights the emerging importance of boat accidents as an etiological factor in jawbone fractures in Nigeria. A review of the literature shows that boat accidents are rare etiological factor and very little information in this respect is documented in Nigeria and other West African countries. This report emphasizes that this etiology is responsible for 3% of the wounded, thus, although rare; the clinician may face such an injury. More research regarding pathophysiology and managing of facial boat injury is warrant.

An age range of 6 and 70 years was obtained in this study. Generally, fractures of the facial bones are not as common in children as they are in the adult population.¹ Chidzonga¹⁴ in 1996 reported only eight cases of facial fractures in Zimbabwean children below one year old. In the study of 1447 cases of facial fractures, Adekeye¹ put the figure at between 0.87 and 1%. This may not be the case, as undisplaced and asymptomatic fractures in very young patients may heal without hospital visitation. Rowe and Williams¹⁵ attributed the low figures in children to the high resilience of bones at that age while Chidzonga¹⁴ associated it to the relative small size of the facial bones compared to the cranium in children. A combination of these factors in addition to the minimal post-school out door activities of children in these areas may account for the low figure in this study. This also explains the low figures obtained for patients of about sixty years and above as they are mostly retired and less active.

The ages between 21 and 30 years were almost half the total numbers of patients recorded. This appears to be the case in almost all the studies carried out in blacks and caucasians^{1,9,10,16,17,18,19} The extreme of ages are less affected, probably due to the fact that they are less active and most of the times indoors.²⁰ A male-to-female ratio of 3.6:1 obtained in this study is in agreement with those recorded by Fredrick¹⁹; 3:1 and Fasola et al¹⁷; 4:1 but at a wide variance with those obtained by Adekeye¹; 16.9:1 who carried his studies

in an area where women were predominantly house wives and for religious reasons, do not engage in out door activities. However, in the same area, 22 years later, Olororji et al¹¹ recorded a male-to-female ratio of 2.19:1 reflecting a change with time of the socioeconomic and cultural nature of a society. With the recent introduction the law barring female passengers traveling long distances from sitting in the front passenger seat in cars, the compulsory sitting astride on motorcycle by females and the fact that less females ride motorcycles in this area may see that ratio being maintained for some time. In addition, sporting activities amongst the female folks are uncommon. However, more females below the age of 10years had facial fractures than their male counterparts and these were due to motorcycles that knock the children down as they cross the roads. Their often-smarter male companions run across these roads faster.

We observed from this study that last three months of the year popularly known as the 'Ember months' and April May months witnessed higher number of road traffic accident. This is similar to the observations made by Ugboko et al⁹. These periods coincide with the festivities of Christmas and Easter respectively for the Christians and post Ramadan fast for the Muslims. During this period, long distance travels are undertaken and the free uses of alcoholic beverages are common.

CONCLUSION

Road traffic accident had the highest proportion of the entire jawbone fractures with more males affected than females. Seasonal distribution showed a bimodal peak variation of May-June and September-January. Young adult between the ages of 21 and 30 years are more affected than other age groups. Various factors such as poverty, ignorance, few and distant maxillofacial specialist centers all contribute to late presentation of jawbone fractures in Calabar south-south Nigeria.. This paper therefore, calls for the reinforcement of measures for the prevention of automobile accident. Such measures should include the use of protective helmets for motor bike riders, seat-belts for motorist and speed limits regulations by the law enforcement agents in Nigeria. In the same light more maxillofacial specialist centers should be established with modern methods of treatment for effective management of jawbone fractures in Nigeria.

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