

**AFRICAN JOURNAL OF
MEDICINE
and medical sciences**

VOLUME 30, NUMBER 3, SEPTEMBER, 2001



**EDITOR:
B. O. OSOTIMEHIN**

**ASSISTANT EDITOR:
A. O. UWAIFO**

ISSN 1116 — 4077

An audit of midfacial fractures in Ibadan, Nigeria

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Summary

A prospective study of 103 patients with middle third fractures of the facial skeleton seen and managed over a five-year period was done. Males were more involved in midfacial fractures than females (M : F of 7.6 : 1). Most of the fractures occurred in the 21 –30 year age group. Road traffic accidents were responsible for the majority of the fractures (78.7%). The zygomatic complex/arch was the most frequently involved area (63.0%) while the most common treatment was open reduction of zygomatic complex/arch fractures with trans-osseous wiring of suture lines (29.13%).

Keywords: *Audit, midfacial, fractures*

Résumé

Une étude prospective de 103 patients ayant des fractures de la moitié tiers du squelette facial et trait pendant une période de 5 ans avait été faite. Les hommes avaient été plus souvent des fractures faciales comparés aux femmes (M:F 7.6:1). La majorité des fractures est survenue dans le groupe d'âge de 21 à 30 ans. Les accidents de la route étaient responsables de la majorité des fractures (78,7%) Le complexe zygomatique/larc était le région. la fréquente des fractures (63.0%) alors que le traitement le plus commun avait l'ouverture et la réduction des fractures du complexe/larc zygomatique avec des fils de sutures trans-osseux (29.13%).

Introduction

Fractures of the middle third of the facial skeleton are relatively uncommon. However, these fractures are important because of their proximity to vital structures such as the brain, the eyes, nasal airways, paranasal sinuses and the tongue [1].

Although many studies have been done on the incidence and the aetiology of facial fractures in general [2,3] reports on fractures of the middle third of the facial skeleton are few. The dearth of literature on midfacial fractures and the need to determine the clinical features and management of these especially in our environment form the basis of study.

Patients and methods.

One hundred and three patients with middle third facial fractures seen and treated at the Department of Oral and Maxillofacial Surgery, University College Hospital, Ibadan between January 1, 1995 and December 31, 1999 were studied. Excluded from the study were patients with isolated maxillary dentoalveolar fractures and those who died preoperatively. Parameters that were recorded included the sex, age, aetiology and sites of middle third facial fractures. Others were the time interval between injury and presentation for treatment, associated injuries and treatment methods of the middle third fractures. The middle third fractures were classified according to Killey [1] and Rowe and Killey [4].

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Results

Prevalence

Out of a total of 483 cases of maxillofacial fractures seen over the 5-year period 103 (21.3%) patients sustained middle third fractures

Age and sex distribution

Of the 103 patients seen, the highest incidence was in the 21-30 year age group (48 cases, 46.6%) while the lowest incidence was in the age range of 51-60 and >60 (Table 1). There were 91 males and 12 females (7.6:1).

Table 1: Age distribution of 103 patients with midfacial fractures

Age-range (years)	No. of patients	%
<10	4	3.9
11-20	25	24.3
21-30	48	46.6
31-40	13	12.6
41-50	8	7.8
51-60	4	3.9
>60	1	0.9
Total	103	100.0

M:F = 7.6:1

Aetiology

The aetiological factors are as shown in Table 2. The most common aetiology was road traffic accidents. This accounted for 78.7% (81 cases) of the total number of patients. The next most frequent causes were assaults and sports which were responsible for 8.7% (9 cases) and 7.8% (8 cases), respectively. Other causes include industrial accidents and falls.

Table 2: Aetiology of midfacial fractures

Aetiology	No. of patients	%
Road traffic accidents	81	78.7
Assaults	9	8.7
Industrial	2	1.9
Falls	2	1.9
Sports	8	7.8
Miscellaneous	1	1.0
Total	103	100.0

Fracture patterns

Of the 127 fractures seen in 103 patients zygomatic complex/arch fractures occurred most commonly (63.0%). Next most common were nasal complex fractures (15.0%) and LeFort I fractures (10.2%). Less commonly seen fractures were LeFort II (6.3%), orbital blow out (3.1%) and LeFort III (2.4%) (Table 3).

Table 3: Anatomic site of mid-facial fractures

Type	No. of patients	% of fracture
Zygomatic complex/arch	80	63.0
LeFort I	13	10.2
LeFort II	8	6.3
LeFort III	3	2.4
Orbital blow out	4	3.1
Nasal complex	19	15.0
Total	127	100.0

Average number of fracture per patient = 1.23

Time interval between injury and presentation for treatment

Twenty-two patients (21.4%) were seen within the first 24 hours, 19 (18.4%) presented for treatment between 24-48 hours, 17 (16.5%) were seen between 2 and 4 days, 31 (30.1%) came for treatment between 4 and 7 days while 14 (13.6%) patients were seen after 7 days (Table 4).

Table 4: Time interval between injury and presentation for treatment

Time Interval	No. of patients	%
<24 hrs	22	21.4
24-48 hrs	19	18.4
48-96 hrs	17	16.5
4-7 days	31	30.1
>7 days	14	13.6
Total	103	100.0

Associated injuries

Out of the 103 patients, 21 (20.4%) sustained a middle third fracture as the only injury and 82 (79.6%) sustained other injuries as shown in Table 5. Facial lacerations were the most common occurring in 63.4% of the "other injury" group. Next most frequent were mandibular fractures which represent 41.5% of patients.

Table 5: Analysis of other injuries sustained by 82 patients with middle third fracture

Associated injuries	No. of patients	% out of patients with other injuries
Facial laceration	52	63.4
Ocular	6	7.3
Thoracic	7	8.5
Abdominal	5	6.1
Orthopaedic	10	12.1
Cranial	31	37.8
Cervical spine	7	8.5
Mandibular fractures	34	41.5

Treatment methods

The methods of treatment are as listed in Table 6. Simple methods of immobilization were used for most of the patients in this study. Open reduction and direct wiring of sutures through lateral eyebrow and infraorbital skin incision was the main method of treatment used for zygomatic complex fractures (29.1%). Circumzygomatic suspension wiring was used in 13 (10.2%) patients with LeFort I fractures

while frontomandibular suspension wiring was used in 11 (8.6%) patients with LeFort II and III fractures. Two (1.5%) patients refused treatment. Extra-oral fixation was not used in this study.

Table 6: Methods of treatment for 127 middle third fractures

Fracture type	No. of fractures	% of fractures
<i>Zygomatic Complex/Arch</i>		
Gille's lift	33	25.9
Open reduction with transosseous wiring	37	29.1
Conservative (no treatment)	8	6.3
Refused treatment	2	1.5
<i>Lefort I</i>		
Circumzygomatic mandibular suspension wire + archbar + IMF	6	4.7
Circumzygomatic-mandibular suspension wire + eyelet wires + IMF	7	5.5
<i>LeFort II and III</i>		
Frontomandibular suspension wire + archbar + IMF	5	3.9
Frontomandibular suspension wire + eyelet wires + IMF	6	4.7
<i>Orbital blow out</i>		
Reduction	3	2.3
No reduction	1	0.7
<i>Nasal complex</i>		
Closed reduction	12	9.9
No reduction	7	5.5
Total	127	100.0

IMF - Intermaxillary fixation

Method of anaesthesia

Surgical operations were done in 79 (76.7%) of the total number of patients. Local anaesthesia with intravenous sedation was used in 7 (8.8%) patients to reduce minimally displaced zygomatic complex/arch fractures. General anaesthesia was used for 72 (91.2%) patients. Out of these 72 patients, nasotracheal intubation was done in 45 (57.0%) patients, orotracheal intubation in 24 (30.40%) patients and tracheostomy in 3 (3.8%) patients. (Table 7).

Table 7: Method of anaesthesia employed for 79 patients who underwent surgical operations.

Method of anaesthesia	No. of patients	%
Local anaesthesia with intravenous sedation	7	8.8
General anaesthesia through:		
a. Nasotracheal intubation	45	57.0
b. Orotracheal intubation	24	30.4
c. Tracheostomy	3	3.8
Total	79	100.0

Discussion

The incidence and types of facial fractures are related to the aetiological factors [4]. The difference in aetiological factors vary with the type and location of the hospitals and the

socioeconomic status of the patient population. The middle third fractures of the facial skeleton constituted 21.3% of the total number of maxillofacial fractures seen over a five-year period of this study. This is higher than 16.8% reported by Abiose [2] but less than 24.0% and 39.7% reported by Khalil and Shaladi [5] and Brown and Cowpe [6], respectively. The very high value recorded by Brown and Cowpe [6] was attributed to injuries due to impact on steering wheels and dashboards. The availability of good supportive facilities and good road network allowed early transfer of these patients to the hospital. These factors helped to preserve the lives of patients who would have died from cranial injuries associated with middle third fractures.

In this study, most of the patients were males. This is consistent with the findings of previous similar studies [2,3, 5, 6]. Males are more affected in these injuries because their zealous activities and greater mobility. The age group of 21-30 years was most affected. This is in agreement with previous studies [3,5,6] which stated that trauma is a problem of the young adult. This age bracket shows high activity in assaults, sports, industry and high speed transportation.

The facial bones appear to be involved in traumatic injuries with increased frequency as rapid means of transportation develop [7]. Road traffic accident was responsible for majority of the cases. This finding is similar to 81.3% reported by Steidler et al. [8] but higher than 46.0% and 47.6% recorded by Turvey [9] and Cook and Rowe [10], respectively. However, road traffic accident was the leading cause in these two studies. Measures such as the use of seat belt and speed limit laws have been found to be very effective in reducing the incidence of maxillofacial fractures due to road traffic accidents [11]. Road traffic accidents would persist as a leading cause of facial trauma in this environment because traffic rules and regulations such as observation of speed limit and use of seat belt and helmet laws are hardly enforced.

The prominent facial features such as the zygomatic complex and the nasal pyramid are the most vulnerable because of mechanism of injury. The commonest site of injury in the study was the zygomatic arch/complex. The finding was similar to those of Adekeye [3] and Cook and Rowe [10] but differs from the findings of Schultz [12] and Nakamura and Gross [13] who found that the nasal complex was the commonest middle third fracture. In this hospital, nasal complex fractures are managed also by Plastic and ENT surgeons and thus escaping the scope of this study.

In sporting activities such as soccer, heading of the ball would lead to a side clash of players' heads leading to zygomatic complex fractures. Also, during assaults, the most likely site of hidden delivery of a fist punch is the cheek bone.

Only 21.4% of patients were seen within the first 24 hours of injury. This value is lower than 40.1% and 50.9% reported by Steidler et al. [8] and Anderson et al. [14]. This low value of early presentation could be attributed to ignorance of attending doctors, priority given to more serious injuries and the long distance from the accident site to the maxillofacial hospital [3].

Associated injuries were seen in 79.6% of patients in this study. This is higher than 51.0% and 51.6% reported by Schultz [12] and Gwyn et al. [15], respectively. This high value is not unexpected since most of the patients in this study were involved in road traffic accidents. Dawson [16] stated that complexity of injuries had risen following increased occurrence of high speed motor accidents. Multiple organs and systems are likely to be involved as a result of direct

violent force to the whole body in high velocity road traffic accidents [12].

Facial lacerations occurred in 50.4% of patients. It is advised that the depths of the wound is retracted and explored for foreign bodies before closure is done [12]. Primary suture of facial tissue is possible within the first 24 hours because of good blood supply to the face. Cervical spine injuries occurred in 8.5% of patients. This injury limits the opportunity to get adequate radiographs and early treatment because the movement of neck must be reduced so that the strain to the spinal nerves is minimized during radiographic and surgical procedures. Unilateral blindness was seen in 7.3% of the patients as a result of direct trauma to the eyes.

Local anaesthesia (2% Xylocaine in 1:80,000 adrenaline) with i.m. pentazocine and diazepam was used to lift zygomatic complex/arch fractures in 7 (8.8%) of 79 patients operated on. This inexpensive method was used in cooperative adult patients with minimally displaced fractures. Oro-tracheal intubation was done in most of the isolated zygomatic complex fractures where inter-maxillary fixation was not necessary. Nasotracheal intubation was done in majority of cases because of the need for intermaxillary fixation.

Only 3 (3.8%) patients required tracheostomy in this study. Tracheostomy was generally avoided because of its attendant complications and morbidity. Tracheostomy was done in 2 patients with LeFort fractures associated with nasal complex fractures and in the third case, there are associated chest injuries.

Simple and cheap methods of treatment were used in this study (Table 6). Non availability of the current forms of treatment such as rigid osteosynthesis with mini bone plates and absence of well stocked maxillofacial laboratory were responsible for the utilization of these methods.

In conclusion, the high incidence of concomitant injuries in middle third fracture patients in this study showed that there is a need for a multi-disciplinary care of these patients. Since the midface is the central focus of our gaze when we engage in interpersonal relationships, aberration of this region are likely to be more obvious than in the lower face [7]. Therefore it is advised that emphasis should be placed on life style changes and automobile safety so that there will be a marked reduction in middle third injuries.

Acknowledgements

This study was financially supported by the University of Ibadan Senate Research Grant Fund.

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