

# Orbital Fractures in a Nigerian Tertiary Hospital: Ten-year Retrospective Study

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## ABSTRACT

**Background:** Despite the global documentation of studies on pattern of orbital fractures, there is limited data in Nigeria. We aim to determine the pattern of orbital fracture in a Nigerian tertiary hospital.

**Materials and Methods:** This retrospective study design was carried out at the department of oral and maxillofacial surgery of a Nigerian tertiary health facility from January 2012 to December 2022. All case notes of patients that had orbital fracture were recruited in the study. Those patients with incomplete information in their case notes were excluded. The data collected were age, gender, occupation, place of residence, time of trauma, cause of trauma, clinical presentation, type of orbital fracture, orbit involved, ocular injuries, mode of treatment and outcome of treatment. Descriptive statistics were performed.

**Results:** A total number of 6 patients were diagnosed with orbital fracture. The age range of the patients was 15-63 years with a mean age of 39.5 ± 6.2 years. There were four (66.7%) males. Periobital edema, subconjunctival ecchymosis, rim step deformity, enophthalmos, and diplopia were recorded in four (66.7%) patients. Bilateral and right orbital fractures were seen in one case each. The left orbit was involved in four (66.7%) cases. Road traffic accidents were the cause of all (100%) injuries. All (100%) cases of orbital fracture were impure blow-out fractures. Four (66.7%) cases of these were associated with zygomatic complex fracture while two (33.3%) were associated with naso-ethmoidal fracture. All (100%) patients had open surgery using titanium mesh as implant material. Only one (16.7%) case had exposure of titanium, and this was treated with second open surgery

**Conclusion:** Efforts should be geared to reducing Road traffic accidents.

**Keywords:** Pattern, Orbital fracture, Nigerian, Tertiary, Hospital

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## INTRODUCTION

Orbital fracture can result in significant functional and aesthetic/cosmetic defect and hence can significantly be disabling<sup>1</sup>. Orbital fracture is a common injury in midface trauma<sup>2</sup>. Orbital fractures may be isolated; however, many orbital fractures are part of the more extensive maxillofacial injury. Fracture of the orbit can involve the floor (blow-out), walls, and orbital rim. Although orbital fractures are not life-

threatening, they may be associated with intracranial or ocular injuries that require emergency management<sup>3</sup>. They are usually part of complex mid facial trauma and can be managed by different specialists<sup>4</sup>. Potential consequences include injury of orbital structures, which may lead to significant functional impairment when not diagnosed and managed in a timely and efficient manner. Orbital fracture was reported to vary with race<sup>5</sup>.

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The commonest causes of orbital fractures are motor vehicle crashes, assaults, industrial accident, falls and sport injuries<sup>6</sup>. Clinical presentations of orbital fractures are enophthalmos, diplopia, periobital paraesthesia, periobital ecchymosis and limited eye movement. Ocular injuries, such as globe rupture or laceration, hyphema, vitreous hemorrhage, severance of the optic nerve, and corneal abrasions have been reported<sup>7</sup>. Management of orbital fracture varies from conservative approach to surgical intervention depending on the nature of injury. Enophthalmos and diplopia are mainly indication for open surgery while minor clinical symptoms are conservatively treated<sup>8</sup>. The prevalence of isolated and complex (in combination with zygomatic or naso-ethmoidal complex fracture) orbital fracture varies from 4% to 16% and 30% to 55% respectively<sup>9,10</sup>.

Despite the global documentation of studies<sup>11-13</sup> on pattern of orbital fractures, it is unclear if same is documented in our environment. Therefore, the aim of this study was to determine pattern of orbital fracture in a Nigerian tertiary hospital.

## MATERIALS AND METHOD

This retrospective study design was carried out at the department of oral and maxillofacial surgery of a Nigerian tertiary health facility from January 2012 to December 2022. All case notes of patients that had orbital fracture were recruited in the study. Those patients with incomplete information in their case notes were excluded. The data collected were age, gender, occupation, place of residence, time of trauma, cause of trauma, clinical presentation, type of orbital fracture, orbit involved, ocular injuries, mode of treatment and outcome of treatment. Descriptive statistics were performed. All analysis was done using statistical package for social sciences (SPSS) software version 21 (IBM, Armonk, New York, USA).

## RESULTS

In this 10-year review, a total number of 6 patients were diagnosed of orbital fracture. The age range of the patients was 15-63 years with a mean age of  $39.5 \pm 6.2$  years. There were four (66.7%) males. Five (83.3%) of the patients had unskilled occupation while one (16.7%) was a skilled laborer. All (100%) the patients reside in rural settings. Five (83.3%) of the patients sustained the fractures in the afternoon while one (16.7%) had injury at night. Road traffic accidents were the cause of all (100%) injuries. Periobital edema, subconjunctival ecchymosis; rim step deformity, enophthalmos, and diplopia were recorded in four (66.7%) patients. Two (33.3%) patients had malar collapse and telecanthus, subconjunctival ecchymosis, rim step deformity, enophthalmos, and diplopia. Bilateral and right orbital fractures were seen in one case each. The left orbit was

involved in four (66.7%) cases. There were no ocular injuries seen in all the cases. All (100%) cases of orbital fracture were impure blow-out fractures. Four (66.7%) cases of these were associated with zygomatic complex fracture while two (33.3%) were associated with naso-ethmoidal fracture. There was no case of isolated pure orbital blowout fracture. All (100%) patients had open surgery using titanium mesh as implant material. Only one (16.7%) case had exposure of titanium, and this was treated with second open surgery.

## DISCUSSION

Orbital fractures are a consequence of middle third facial trauma and occur because of the application of forces that overcome the resistance of bone structures forming the orbital cavity<sup>9</sup>. These fractures are very frequently associated with damage to the surrounding soft tissue and they sometimes damage the orbital cavity contents or communicate the orbit with adjacent structures (cranial cavity, paranasal sinuses or nasal cavity)<sup>2</sup>. In this study, few cases of orbital fracture were recorded in 10 years, and this could be related to the anatomical location of the orbit which is less prominent. In addition, the accepted mechanism of blow-out orbital fracture so far been described is less encountered in road traffic accident. Most authors agree<sup>8,12</sup> that by far the most affected age group is the 20-40 years with an 80% plus male predominance. In the current study more males with average age of 39 years were observed. The high predilection of male gender to orbital fracture was similarly reported in previous studies<sup>12,13</sup> and this is related to involvement of males in unskilled works<sup>6</sup>. This study reaffirmed that road traffic accident is the leading cause of orbital fracture among the unskilled or self-employed population. In this study, orbital fracture commonly occurred in the afternoon, which correlates with high activities during this time of the day. However, this could not be compared with other studies due to lack of this finding in previous studies. All patients in the present study had clinical features suggestive of surgical intervention. As also reported in previous study, the left orbit was mostly affected, and this could be related to human defense reflex mechanism. Most orbital fractures are associated with zygomatic complex fracture as also recorded in this present study. Ocular injuries, such as globe rupture, globe laceration, hyphema, vitreous hemorrhage, optic nerve detachment and corneal abrasion have been reported<sup>9</sup> following orbital fracture, but none was seen in the current study. In our centre ophthalmological consultation is sorted through a multidisciplinary approach in treatment of orbital fracture. Management of orbital fracture varies from conservative approaches to surgical intervention depending on the nature of injury. The literature indicates that the choice of open surgery in orbital fractures should depend on the finding of enophthalmos and reduced globe motility, whereas a conservative approach should be used only in patients with discrete clinical symptoms<sup>10</sup>. Almost all patients were treated

with open reduction and fixation, and this is an indication of the severity of the injuries as most fracture fragments were displaced causing diplopia and enophthalmos. A favourable treatment outcome was observed in this study as only one case had exposure of titanium, and this was treated with second open surgery. This study had a limitation; some information may be missed due to its retrospective nature.

**Conclusion:** Orbital fracture is relatively uncommon in our climate. Road traffic accident is the major cause in more males who are unskilled in remote area. The outcome of treatment is relatively satisfactory in our centre.

**Data availability:** The data are available on request and under the custody of the corresponding author

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