

## Prevalence of Zygomatic Complex Fractures: A 10-Year Retrospective Study

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### ABSTRACT:

**Purpose:** Zygomatic complex fractures are very common in facial fractures in maxillofacial injuries. The frequency of these fractures differs geographically and aetiologically among countries and even regions. Differences in socio-economic status and the aging population seem to be two causes. This 10-year retrospective study evaluates the prevalence of Zygomatic complex fractures in the Bareilly population.

**Material and methods:** This study included 93 patients who were diagnosed with ZMC fractures in the Department of Oral and Maxillofacial Surgery at the Institute of Dental Sciences, Bareilly between January 2008 and December 2018. Complicated fractures such as LeFort III and bilateral ZMC fractures were excluded. The prevalence of variables such as age, gender, cause of injury, and associated facial injuries in patients with zygomatic complex fractures was calculated and reported.

**Results:** Of all 93 patients, the highest prevalence was seen in the 3<sup>rd</sup> decade (33.3%) of life followed by the 2<sup>nd</sup> (22.5%) & 4<sup>th</sup> decade (18.27%). In terms of the cause of injury, the highest frequency was of road traffic accidents (n = 65, 69.89 %) followed by sport-related injuries (n = 12, 12.9 %). In terms of the association of zygomatic fractures with other fractures, the most commonly associated injury was mandibular fracture (n = 29).

**Conclusion:** By assessing the parameters such as type of injury, age, gender distribution, and etiology helps in managing zygomatic fracture as early as possible to achieve better results. The incidence and causes of zygoma fracture reflect trauma patterns within the community

and can provide a guide to the design of a program geared towards its prevention and management.

**Keywords:** maxillofacial injuries, prevalence, zygomaticomaxillary complex fracture, facial fracture.

## INTRODUCTION:

The zygomatic bone is an important buttress of the face, also said to be the principle structure of the midface. The zygoma is thick, strong and roughly quadrilateral in shape, with an outer convex (malar) surface and an inner concave (temporal) surface. The outer surface convexity of the zygomatic body forms the greatest prominence of the cheek and majorly contributes to defining facial contour. It has four processes namely temporal, orbital, maxillary, and frontal processes, which articulate with - the frontal, sphenoid, maxillary, and temporal bones<sup>1</sup>.

It has a major function in protecting the eye by participating in the formation of the orbital cavity and also helps in the temporal fossa, the maxillary sinus, and the zygomatic arch. The protrusion and convexity of the zygoma, in addition to giving aesthetic facial contour to the cheek also make this area more susceptible to fracture or injury<sup>1</sup>.

An in-depth understanding of maxillofacial injuries plays an important role in the management of facial fractures. Orofacial injuries produce psychological, physical, and economic consequences of great importance to the patient, therefore the surgeon must direct his efforts toward the restoration of aesthetics and function as expeditiously as possible. It has been suggested that there is an absolute necessity for careful evaluation of the patient and the type of procedure to suit the needs of each individual.<sup>2</sup>

In this study, 93 patients over a period of 10 years (2008 to 2018) were analyzed to evaluate the prevalence of zygomatic complex fractures in a Tertiary Care Center, in Bareilly.

## MATERIAL AND METHODS:

This retrospective study analyzed on medical records of patients who were referred to the Department of Oral And Maxillofacial Surgery in the Institute of Dental Sciences, Bareilly during the period of 10 years (2008 to 2018) who presented with zygomatic complex fractures. The inclusion criteria were all treated patients who had zygomatic complex fractures from December 2008 to January 2018. Patient records were retrieved from the archives of the hospital and data was extracted from the files (n = 93). Patient records with incomplete data and facial injuries not involving zygomatic complex fractures were excluded from the study. Factors such as gender, age, etiology, and associated facial fractures were recorded from the files. Data were analyzed using SPSS version 22.0 using descriptive analysis.

## RESULTS:

In this study, the highest prevalence was seen in the 3<sup>rd</sup> decade (33.3%) followed by the 2<sup>nd</sup> (22.5%), and the least prevalence was seen in the 1<sup>st</sup> decade of life (Table 1).

Of all 93 patients, 84 (90.3%) were male and 9 (9.6%) were female. Males were more frequently affected than females (Graph 1).

In terms of the etiology of fracture, road traffic accidents had the highest frequency (n = 65, 69.89 %), and the least prevalence was seen in interpersonal violence (n = 8, 8.6 %) (Graph 2).

While analyzing the data it was found that most of the zygomatic complex fractures were isolated (n = 48). Along with zygomatic complex fractures, there were other associated facial fractures in which the most common involved bone was mandible (n = 29, 64.4%) followed by maxilla (n = 11, 24.4%), NOE fractures (n = 3, 6.66%) and Frontal bone fracture (n = 2, 4.44%). The most common fracture occurring in the mandible was parasymphysis fracture (n = 11) followed by the mandibular body (n = 7), condyle (n = 3), angle (n = 2), subcondylar (n = 1) and coronoid (n = 1) (Table 2).

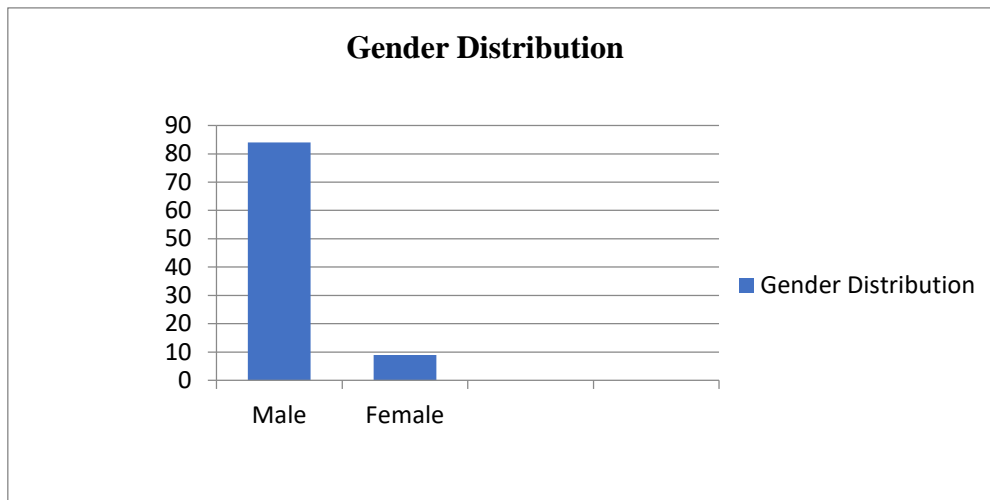
The diagnosis of Zygomatic Complex Fractures was based on the classification proposed by Knight And North (1961)<sup>3</sup> in which group V was more prevalent (40.5 %) and least common was group VI (0.8%) (Table 3).

### Classification

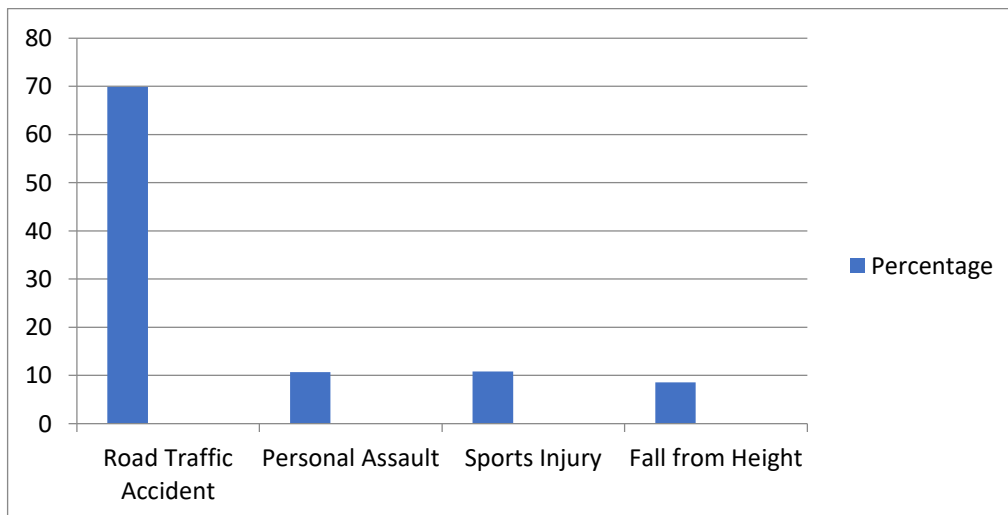
GROUP I	No Significant Displacement
GROUP II	Arch Fractures
GROUP III	Unrotated Body Fractures
GROUP IV	Medially Rotated Body Fractures
GROUP V	Laterally Rotated Body Fractures
GROUP VI	Complex Fractures

Table 1: Age Distribution

Age of Subjects	Frequency	Percentage
Up to 10 years	1	1.07 %
11 to 20 years	21	22.5 %
21 to 30 years	31	33.3 %
31 to 40 years	17	18.27 %
41 to 50 years	12	12.9 %
51 to 60 years	9	9.6 %
61 to 70 years	2	2.1 %



Graph 1: Gender Distribution



Graph 2: Etiology of Zygomatic complex Fractures

Table 2 - Facial Fractures in association with Zygomatic Complex Fractures

Associated facial fractures			
Maxilla	Mandible	Frontal Bone	NOE
11	29	2	3
	Parasymphysis 13		
	Body 7		
	Angle 3		
	Condyle 4		
	Subcondylar 1		
	Coronoid 1		

Table 3 – Diagnosis made based on Knight and North classification (1961)<sup>3</sup>

<b>DIAGNOSIS [ACCORDING TO KNIGHT AND NORTH (1961) ]</b>	
Group 1	3.2%
Group 2	12.8%
Group 3	37.6%
Group 4	5.1%
Group 5	40.5%
Group 6	0.8%

## DISCUSSION:

Zygomatic complex fractures are commonly caused by road traffic accidents, assaults, accidental falls, and sport related injuries. Our study is in corroboration with Menon S et al<sup>4</sup> who also demonstrated that the commonest age group was the 3<sup>rd</sup> decade followed by the 2<sup>nd</sup> decade. Mohajerani H<sup>5</sup>& Bradley D et al<sup>6</sup> also documented the 3<sup>rd</sup> decade predominance. The reason is attributed to the fact that individuals in the third decade of life are more active physically<sup>7</sup>.

In our study 90.3 % of the patients were male (in a ratio of 9:1). All the previous studies have also reported a higher frequency of zygomatic fractures in young males<sup>8</sup>. Ungari et al<sup>9</sup> also reported a male predominance of 88.4%. The higher prevalence of zygomatic complex fractures in males is mainly due to higher negligence of traffic rules while driving along with the use of alcohol and illicit drugs and greater participation in sports-related activities. Also, interpersonal violence is more commonly seen in males<sup>5</sup>. All these factors are responsible for a higher risk of zygomatic complex fractures among the male population.

The role of road traffic accidents as a leading etiologic factor in zygomatic complex fractures has been earlier described by Hollier LH et al<sup>7</sup>, Banks P et al<sup>8</sup>, Muraoka T et al<sup>10</sup>, and Batanieh AB et al<sup>11</sup> which is in corroboration with our study. The young Indian male is more likely to engage in jobs that require intercity vehicular transport. Due to job-related stress, and non-enforcement of road traffic laws, many Indian drivers notoriously exceed the speed limit, do not use seat belts, and drive under the influence of alcohol and other psycho-active substances. Developed countries generally have a lower prevalence of road traffic accidents due to rigid traffic laws whereas interpersonal violence carries a higher incidence rate in such countries. In contrast, in developing countries like "India", the major cause of facial injury results from road traffic accidents.

The diagnosis in our study was based on the classification proposed by Knight and North 1961<sup>3</sup> in which group V (lateral rotated body fracture) was most prevalent (40.5 %).

In our study, zygomatic complex fractures were most commonly associated with mandibular fractures (26.88%). The study was similar to the results of Obuekwe et al<sup>12</sup>, who reported a prevalence rate of 21% for zygomatic fractures which were associated with mandibular fractures.

Considering the complications associated with zygomatic complex fractures, ocular complications have the highest prevalence rate and therefore special attention should be given to these types of fractures. Ocular consultation must be reviewed for patients before the surgery. Zygomatic complex fractures are often associated with various other complications such as visual disturbances, enophthalmos, sensory disturbance of the cheek, and malar malposition. Postoperative complication mainly includes diplopia and enophthalmos.

### **CONCLUSION:**

During a 10-year study period, the data extracted from patients with zygomatic complex fractures were having the highest prevalence in males with most cases occurring during 3<sup>rd</sup> decade of life. In terms of the etiology of fracture, road traffic accidents had the highest frequency. The data also concluded of having mandibular fractures as the most commonly associated facial fracture along with zygomatic complex fractures.

The incidence and etiology of zygoma fractures reflect trauma patterns within the community and can provide a guide to the design programs geared towards its prevention and management.

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