

# FREQUENCY AND ETIOLOGY OF ZYGOMATIC COMPLEX FRACTURES IN ORAL AND MAXILLOFACIAL TRAUMA PATIENTS, A STUDY DONE AT AYUB TEACHING HOSPITAL, ABBOTTABAD

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## ABSTRACT

*The objective of this study was to determine the frequency and etiology of Zygomatic Complex Fractures in oral and maxillofacial trauma patients. A descriptive cross-sectional study was carried out at the Oral & Maxillofacial Surgery Department of Ayub Teaching Hospital, Abbottabad over a period of six months using a consecutive (non- probability) sampling technique. The study subjects were 195 fracture patients. Data were entered in SPSS 17 for analysis. Mean with standard deviation was calculated for quantitative variables and percentages and frequencies were calculated for qualitative variables. The overall frequency of zygomatico maxillary-complex [ZMC] fractures was 53(27%) in which road traffic accidents were the highest at 75%, sport injuries were 4%, accidental fall 9% while interpersonal violence was 12%. Mean age was 27±1.26 years and gender distribution showed 77% were male. The study shows an increased frequency of Zygomatic bone fractures in this part of the country. Road traffic accidents were the main etiological factor. Patients in Third decade of life were found more effected.*

**Key Words:** Zygomaticomaxillary complex fractures, etiology, frequency.

## INTRODUCTION

One of the most prevalent injuries presenting to general and hospital practices alike are maxillofacial in nature, which often tend to be overlooked during initial evaluation.<sup>1</sup> Their occurrence in Pakistan paired with various other facial fractures is seen at an alarmingly high rate.<sup>2</sup> Outnumbered only by the nasal bone, the Zygoma remains the second facial bone most susceptible to fracture, with men in their third decade of life being the chief victims.<sup>3</sup> Its pronounced position within the facial skeleton renders it prone to traumatic force.<sup>4</sup>

Although the causes of fractures may vary between countries, most can be ascribed to social, cultural and environmental influences.<sup>5</sup> Statistics show the prime etiology as being road traffic accidents (RTA) (83.56%), proceeded by accidental falls (8.9%), sport injuries

(4.65%), and interpersonal violence (2.81%).<sup>6</sup> As is evident from the aforementioned values, road traffic accident stands as the main causative agent, with the right side more commonly involved. This seems to reveal poor road traffic sense amongst users and a general lack of adherence to precautionary safety measures and regulations.<sup>7</sup>

The zygomatic complex fracture exhibits a wide range of signs and symptoms which includes pain, sensory deficit, deformity or displacement, trismus, ecchymosis (periorbital or maxillary vestibular), a flattened arch or malar prominence, periorbital edema, displacement of palpebral fissure, conjunctival hemorrhage, diplopia, chemosis, enophthalmos, exophthalmos, and crepitus from air emphysema.<sup>8</sup>

The zygomatic bone is one of those underlying structures that determine facial shape and contour. Its esthetic and functional involvement makes it essential to correctly diagnose and treat such injuries.<sup>9</sup> This study will attempt to identify the common causes of zygomatico maxillary complex fractures in the region in order to help its people take adequate precautionary measures, hereby effectively reducing its occurrence and complications associated with the fracture.

## METHODOLOGY

This descriptive cross-sectional study lasting six months was carried out at Ayub Teaching Hospital's Oral and Maxillofacial surgery Department, Abbottabad using consecutive (non- probability) sampling technique. Patients of either gender with a history of oral and maxillofacial trauma were included in the

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study while victims of fire arm injuries were excluded to prevent any bias. Approval of the hospital ethical review committee was taken. Patients referred from other Outdoor Patient Department and other departments fulfilling inclusion criteria were also included in the study. A detailed history was taken, followed by relevant intra and extra-oral clinical examination respectively. Appropriate radiographic confirmation of zygomatic complex fracture was done in the form of an OPG (ortho-pantomogram), occipito-mental (OM) view and sub-mento-vertex (SMV) view. All the information was recorded in a pre-designed proforma with strict adherence to the exclusion criteria. The subsequent data were entered in the Statistical Package for Social Sciences (SPSS) version 17. Descriptive statistic was used to analyze the data. Quantitative variables like age were calculated by taking mean +/- standard deviation. Qualitative variables like gender and etiological factors of zygomatico complex fractures (RTA, sport injuries, accidental falls, domestic violence etc) were calculated by taking frequencies and percentages. Effect modifiers like age and gender were controlled by stratification. All results were presented in the form of tables/graphs.

**RESULTS**

In a period of six months, 195 patients were seen in the OMFS Department including 150(77%) males and 45(23%) females. Age distribution, frequency and etiology of zygomatico complex fractures and stratification of etiology of zygomatico complex fractures with age and gender are shown in table 1-3 and Fig 1-3.

**DISCUSSION**

Amongst the fractures of face, zygomatic bone fracture is the most common fracture that forms the most anterolateral projection on either side of the middle face.<sup>10</sup> 25% of all facial fractures account for ZMC (zygomaticomaxillary complex) fractures mostly resulting from industrial accidents, sports injuries, and interpersonal violence.<sup>11</sup> The available demographic data for ZMC fractures differs in regional, economic

TABLE 1: AGE DISTRIBUTION (N=195)

Age	Frequency	Percentage
21-30 years	100	51%
31-40 years	68	35%
41-50 years	27	14%
Total	195	100%

TABLE 2: FREQUENCY OF ZYGOMATIC COMPLEX FRACTURES (N=195)

Zygomatic Complex Fracture	Frequency	Percentage
Yes	53	27%
No	142	73%
Total	195	100%

TABLE 3: STRATIFICATION OF ETIOLOGY OF ZYGOMATIC COMPLEX FRACTURES WITH GENDER

Etiology of ZMC	Male	Female	Total
Road traffic accidents	31	9	40
Sports injuries	2		2
Accidental Fall	3	2	5
Interpersonal violence	6		6
Total	42	11	53

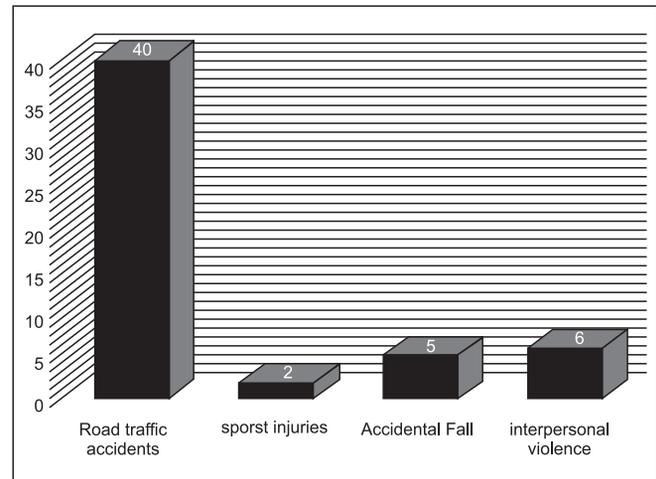


Fig 1: Etiology of zygomatic complex fractures

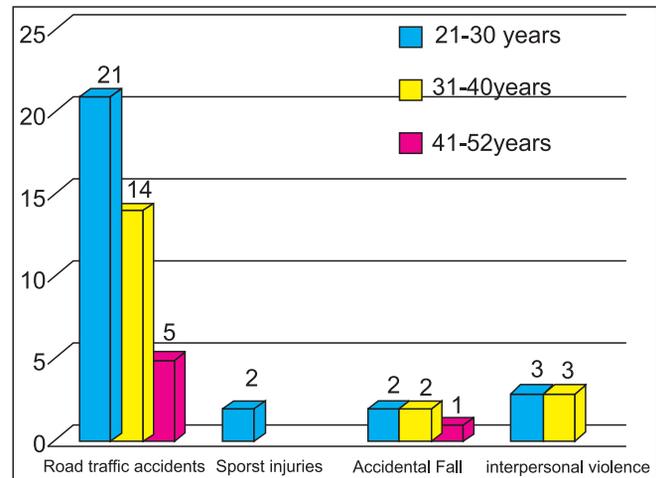


Fig 2: Stratification of etiology of zygomatic complex fractures with age

and social differences mostly affecting males in their twenties.<sup>12</sup> One of the major functional complication resulting from zygomatic bone fracture is limited mouth opening. A rapid and swift diagnosis of ZMC fracture and associated soft tissue injuries is essential because it may result in impairment of ocular and mandibular functions causing psychological, cosmetic and functional effects.<sup>13</sup>

This study shows that the bulk of patients (85%) were <20 to 40 years of age, with a mean age of 27 years

with SD  $\pm$  1.26. Vast majority (77%) were males. This 5.30:1 ratio is comparable to similar studies conducted in other countries where 84.14% (n=69) patients were males, and 15.85% (n=13) females.<sup>14</sup> The predominant male numbers could be explained by the simple reality that men work more outside hence their chances of involvement in assault, road traffic accidents, activities leading to falls, sport injuries etc is relatively higher resulting in fractures.<sup>15,16</sup> Due to the socio-religious nature of this region, females are less active in outdoor activities and therefore significantly low ratio of fractures in female.

The overall frequency of zygomatic complex fractures was 27% in which road traffic accidents were 75%, accidental fall 9%, sports injuries 4% while interpersonal violence was 12%. Another study analyzed the same factors (RTA) at 52.5%, followed by falls at 17.5%, fire arm injury (FAI) 15%, interpersonal violence (IPV) 7.5% and sport injuries at 2.5% respectively.<sup>19,20</sup>

In other ethnic groups conducting similar studies the predominant age group was also found to be 21 to 30 years<sup>21,22,23,24</sup>, illustrating that young adults are more vulnerable to the fracture under study due to being actively engaged in outdoor activities e.g. social activities, sports, high speed transportation etc. at this stage of their lives.

It comes as no surprise that the factors leading to maxillofacial trauma have changed with the passage of time and are likely to continue to do so.<sup>16</sup> The present-day cases of facial bone fractures stand as interpersonal violence, sport injuries, falls and road traffic accidents, in order of increasing frequency. This altering pattern of maxillofacial injuries has been most recently reviewed by Van Beek and Markx,<sup>17,25</sup> who compared their studies from the Netherlands with similar statistics from Great Britain and Hamburg. There is a gross reduction in road traffic accidents with increasing interpersonal violence rates in developed countries.<sup>18,26</sup> However, present study produced differing results where the highest incidence of Zygomatic bone fractures was due to road traffic accidents (50%), with assault accounting for only (23.17%) of a total of 82 cases. These results are more fitting with a local study done by Noorul Wahab et al<sup>14,27</sup> who evaluated the cause of Zygomatic bone fractures in another city, Lahore, Pakistan and declared that road traffic accidents (RTA) was the most common cause at a staggering 52.5%(n=21), followed by falls 17.5% (n=7), fire arm injury (FAI) 15%(n=6), interpersonal violence (IPV) 7.5%(n=3), occupational trauma and sport injuries 5%(n=2) and 2.5%(n=1) respectively. Another local study done by Qayyum Z et al<sup>28</sup> described the same ratio after assessing the population of the capital city of Pakistan, Islamabad which also showed road traffic accident as the most common reason for ZMC fractures followed by the other factors as mentioned above. These results demonstrate that the social, cultural and geographic apparatus is liable for maxillofacial injuries.<sup>29</sup>

In Pakistan, the appalling figure of road traffic accidents leading to maxillofacial injuries is proven to

be due to a lack of road sense amongst users, defective state of vehicles and roads and poor compliance with transportation regulations. Most of the people in this region belong to a low socio-economic background and are subsequently compelled to use public transport driven by underage, illiterate and negligent drivers devoid of road sense and a value for human life. On the other hand, in most other developed and under developed countries, alcohol and drug abuse, illiteracy and social frustration has denoted assault as the common cause of trauma. Its incidence in the study was found to be 23.17%, the same as brought forth by a study in the U.A.E by Gusztav and Haider,<sup>26</sup> from Jordan. In European countries, the consumption of alcohol is usually a contributing factor in both assault<sup>14</sup> and RTA.<sup>16,31,32</sup> Fall was the third cause in line at 20.73%, being slightly low in this study population than the rest.<sup>33</sup> A growing interest in sport activities throughout the world has made fractures due to sports increasingly common, with some researchers showing statistics as high as 8.8%.<sup>19</sup> However, a much lower incidence of merely 3.65% was observed in this study due to a lack of recreational sports facilities in the region. The results of this study (100% unilateral Zygomatic bone fractures) can be collaborated with previous findings where majority of the fractures were unilateral in nature<sup>34</sup> involving the right side. A parallel study in India reported that trauma to the face in cases of assault was more commonly encountered on the left 35 probably due to the predominance of a right handed population.

There is no dearth of discussions and comparisons made by authorities in various parts of the world regarding the management of Zygomatic bone fractures.<sup>35</sup> Many have recommended distant or direct reduction only, without fixation by any means whereas others have suggested reduction and fixation of the fractured parts of the Zygomatic bone with bone plating or wire osteosynthesis. All the aforementioned techniques are valid and applicable depending upon the type of fracture, dexterity of the operating surgeon and availability and choice of hardware. If working under optimal conditions, the results of reduction and fixation with bone plating are preferable. Wu H, Zhu Z and Li Y also reinforce this statement by reporting that mini bone plate fixation for mid face fractures is more reliable and suitable as opposed to wire osteosynthesis.<sup>20</sup>

## CONCLUSION

In a nutshell, the study shows an increased frequency of Zygomatic bone fractures in this part of the country with road traffic accidents being the chief etiological factor. The most common age group lies between 21-40 years, indicating that this is the most active phase of life when people choose to indulge in daring activities.

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## CONTRIBUTIONS BY AUTHORS

- |   |                                |
|---|--------------------------------|
| <b>1 Muhammad Jamal:</b>                  | Manuscript writing.            |
| <b>2 Alaf Khan:</b>                       | Data collection.               |
| <b>3 Alaf Khan and Anam Javed:</b>        | Data analysis.                 |
| <b>4 Muhammad Asim and Hassan Sardar:</b> | Manuscript and results review. |