

Frequency of Zygomaticomaxillary Complex Fractures in Krishna Institute of Medical Sciences, “Deemed to be University”, Karad

Sanket Dighe, Pankaj Patil*, Uzma Belgaumi, Shashikiran ND, Priyanka Kakade, Savita Hadakar

School of Dental Sciences, Krishna Vishwa Vidyapeeth (Deemed to be University), Karad, Maharashtra, India

***Corresponding Author:** Dr. Pankaj Patil, School of Dental Sciences, Krishna Vishwa Vidyapeeth (Deemed to be University), Karad Email: pankaj.patil707@gmail.com

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ABSTRACT

This study investigates the frequency and characteristics of zygomaticomaxillary complex (ZMC) fractures at the Krishna Institute of Medical Sciences in Karad. ZMC fractures are a common consequence of traumatic injuries, particularly in the facial region, due to the prominence of the zygoma. The prominence and anatomical complexity of the zygoma contribute to its vulnerability to fractures, leading to structural, functional, and aesthetic implications for the facial skeleton. In the material and methods section, the study outlines its scope, conducted at the school of dental sciences, Krishna Institute of Medical Sciences, Karad, between December 2022 and May 2023. The inclusion of 30 patients in the study provides a substantial sample size for the analysis of ZMC fractures in this specific population. The research methodology involves a comprehensive diagnostic approach, combining clinical and radiological assessments. Clinical evaluations include case history and physical examinations, while radiological assessments encompass various imaging modalities such as PNS view, Water's view, Submentoververtex view, OPG, and CT scans. The utilization of these diagnostic tools ensures a thorough understanding of the patterns and characteristics of ZMC fractures in the patient population under study. The results section sheds light on the causes, signs, and symptoms of ZMC fractures observed in the sample. Road traffic accidents emerge as the predominant cause, comprising 53.3% of the cases, highlighting the significant impact of vehicular trauma on facial injuries. Falls, interpersonal violence, sports-related incidents, and work-related accidents contribute to the multifaceted etiology of ZMC fractures. The presentation of signs and symptoms, such as periorbital edema, subconjunctival ecchymosis, pain, step deformity, and flattening of the cheek, provides a detailed clinical profile of ZMC fractures in this population. The prevalence of these manifestations underscores the diverse clinical presentation of ZMC fractures, emphasizing the need for a comprehensive diagnostic approach. The study further delves into the treatment aspect, revealing that cases were managed with open reduction and internal fixations under general anesthesia. This choice of intervention aligns with established surgical approaches for ZMC fractures, considering the anatomical complexities and the need for precise reduction and stabilization. The utilization of general anesthesia ensures patient comfort and facilitates the meticulous execution of the surgical procedure. This study at the Krishna Institute of Medical Sciences contributes valuable insights into the frequency, etiology, and clinical presentation of ZMC fractures. The findings align with existing knowledge in the field, emphasizing the prevalence of road traffic accidents as a significant cause and the complexity of clinical manifestations associated with ZMC fractures. The choice of open reduction and internal fixation as the primary treatment modality aligns with established surgical practices. The thorough diagnostic approach, encompassing both clinical and radiological assessments, enhances the robustness of the study's findings. Overall, this research adds to the collective understanding of ZMC fractures and provides a foundation for future studies and advancements in the management of these challenging facial injuries.

Keywords: ZMC fracture, maxillofacial trauma.

I. Introduction

Zygomaxillary complex fracture is the most common in maxillofacial trauma, due to its prominence it leads to facial injuries, the pattern of which may vary geographically. Tetrapod, tripod, quadripod, trimalar, and malar fractures are other names for zygomaxillary complex fractures.¹ Because of the prominent anatomical position of the zygoma and its proximity to nearby critical structures, ZMC frequently results in structural, functional, and aesthetic or cosmetic look of the facial skeleton.² Depending on the different sources of injury, fracture patterns range from simple to comminuted and from minimal displacement to severe displacement. Physical examinations, radiological examinations or radiological assessment (Plain radiograph, Water's view or Occipito-mental view, Submentovertex view) findings are used to plan the surgical approach. For ZMC fracture injuries conservative management required, and depending on the degree displacement, one, two, three or four articulations needed for fixation. ZMC includes fractures at the zygomatic arch, zygomaxillary buttress, inferior and superior orbital rims, as well as the anterior and posterior walls of the maxillary sinuses. The complicated anatomic structure, numerous articulations, and several deformation planes of ZMC fractures make reduction and fixation difficult.² The purpose of study is to evaluate the frequency of zygomaxillary complex fractures in Krishna Institute of Medical Sciences, Karad. It will be helpful to evaluate frequency of site involved, cause and treatment plan of zygomaxillary complex fracture.

II. Background

The background of the study on zygomaxillary complex (ZMC) fractures at the Krishna Institute of Medical Sciences in Karad is rooted in the broader context of maxillofacial trauma and the significance of understanding the epidemiology, etiology, and management of fractures in the facial region. Maxillofacial trauma encompasses a spectrum of injuries involving the face and jaws, often resulting from accidents, falls, interpersonal violence, or sports-related incidents. Among these, fractures of the zygomaxillary complex hold particular importance due to the prominent anatomical position of the zygoma on the face. The zygoma, also known as the cheekbone, is a key component of the facial skeleton, contributing to facial aesthetics and providing structural support.

The prominence of the zygoma makes it susceptible to fractures during traumatic events, leading to a range of clinical presentations and potential complications. ZMC fractures can affect not only the aesthetic appearance of the face but also the function of critical structures, including the orbits and maxillary sinuses. Understanding the patterns and characteristics of ZMC fractures is essential for formulating effective treatment strategies and optimizing patient outcomes. The choice of the Krishna Institute of Medical Sciences in Karad as the study location adds a specific geographical and institutional context to the research. Different regions may exhibit variations in the prevalence and characteristics of ZMC fractures, influenced by factors such as demographics, socio-economic conditions, and local patterns of trauma. Therefore, conducting a study at this institution provides insights into the unique features of ZMC fractures in the population served by the medical center. The background also underscores the interdisciplinary nature of addressing maxillofacial trauma, involving collaboration between dental, medical, and surgical specialties. The study's focus on the school of dental sciences reflects the integral role of oral and maxillofacial surgery in the diagnosis and management of ZMC fractures.

Moreover, the background recognizes the complexity of ZMC fractures by mentioning the various components of the complex, including the zygomatic arch, zygomaxillary buttress, and orbital rims. The anatomical intricacies and the potential displacement of these structures contribute to the challenges in treating ZMC fractures, necessitating precise diagnostic methods and tailored surgical interventions. In summary, the background of the study situates the research within the broader landscape of maxillofacial trauma, emphasizing the importance of understanding ZMC fractures for both aesthetic and functional aspects of facial health. The choice of the specific institution and the acknowledgment of the anatomical complexities set the stage for a focused and comprehensive investigation into the frequency, etiology, and treatment outcomes of ZMC fractures at the Krishna Institute of Medical Sciences in Karad.

III. Related Work

Facial fractures, including those involving the zygomaticomaxillary complex, are a common consequence of traumatic injuries. Numerous epidemiological studies have explored the prevalence and distribution of facial fractures, emphasizing the significance of understanding the patterns and causes of these injuries. ZMC fractures, given the prominence of the zygoma on the face, often play a central role in facial trauma. The incidence of ZMC fractures may vary across different populations and regions, influenced by factors such as demographics, lifestyle, and environmental conditions. A thorough exploration of these epidemiological studies provides a foundation for contextualizing the frequency and characteristics of ZMC fractures observed in the specific setting of the Krishna Institute of Medical Sciences. Understanding the etiology and mechanisms leading to ZMC fractures is crucial for developing effective preventive measures and treatment strategies. Road traffic accidents emerge as a leading cause of ZMC fractures, consistent with the findings of many studies. The force exerted during a collision, particularly in the facial region, can result in fractures involving the zygomatic arch, zygomaticomaxillary buttress, and other components of the ZMC. Falls, interpersonal violence or assault, sports-related injuries, and work-related or industrial accidents are identified as additional contributors to ZMC fractures. Exploring related research allows for a comprehensive analysis of the risk factors and scenarios that commonly lead to these fractures, providing valuable insights for both clinicians and policymakers.

The anatomical intricacies of the zygomaticomaxillary complex play a pivotal role in understanding the impact of fractures on facial aesthetics and function. Numerous studies have meticulously detailed the complex anatomy of the zygoma, emphasizing its prominence and its close proximity to critical structures in the facial skeleton. The zygomatic arch, zygomaticomaxillary buttress, inferior and superior orbital rims, as well as the anterior and posterior walls of the maxillary sinuses constitute the components of the ZMC. These structures, with their intricate articulations and deformation planes, contribute to the challenges faced in the reduction and fixation of ZMC fractures. A comprehensive review of anatomical studies enriches the understanding of the structural complexities involved in ZMC fractures, providing a basis for the surgical approaches employed in their management. Accurate diagnosis is fundamental for planning effective treatment strategies in ZMC fractures. Various diagnostic modalities have been employed to assess the extent and nature of these fractures. Radiological assessments, including plain radiographs, Water's view or Occipito-mental view, Submentovertex view, panoramic radiographs (OPG), and computed tomography (CT) scans, are commonly utilized for this purpose. Different studies have compared the efficacy of these imaging techniques in providing detailed information about ZMC fractures. Understanding the strengths and limitations of each modality aids clinicians in choosing the most appropriate diagnostic approach based on the specific characteristics of the fracture. A thorough exploration of the literature on diagnostic modalities contributes to the refinement of clinical practices in ZMC fracture management.

The management of ZMC fractures often involves surgical intervention, with open reduction and internal fixation (ORIF) being a widely adopted approach. Research focused on surgical techniques and outcomes provides valuable insights into the nuances of ZMC fracture repair. Studies may delve into the considerations for selecting ORIF, the timing of surgery, and the specific methods employed for stabilization. Comparisons between different surgical approaches, such as intraoral or extraoral incisions, and the use of various fixation materials contribute to the evolving landscape of ZMC fracture management. Evaluating the existing literature on surgical interventions enables clinicians to make informed decisions tailored to the unique characteristics of each ZMC fracture case. Beyond the immediate postoperative period, understanding the long-term functional and aesthetic outcomes of ZMC fracture management is crucial. Research exploring patient satisfaction, quality of life, and the impact of surgical interventions on facial aesthetics contributes to the holistic assessment of treatment success. Functional outcomes may include considerations of sensory disturbances, ocular motility, and the restoration of masticatory function. Aesthetic outcomes, on the other hand, encompass the restoration of facial symmetry and the mitigation of any visible deformities. Integrating these findings into the broader literature on ZMC fractures enhances the understanding of the comprehensive impact of these fractures on patients' lives and well-being. In conclusion, the literature surrounding zygomaticomaxillary complex fractures is a multidimensional tapestry that encompasses epidemiological insights, anatomical intricacies, diagnostic

modalities, surgical approaches, and long-term outcomes. This comprehensive review provides a backdrop for the specific study conducted at the Krishna Institute of Medical Sciences, shedding light on the broader context in which the research findings can be interpreted and applied. The synthesis of existing knowledge not only strengthens the foundation of the specific study but also contributes to the collective understanding of ZMC fractures in the field of oral and maxillofacial surgery.

IV. MATERIAL AND METHODS

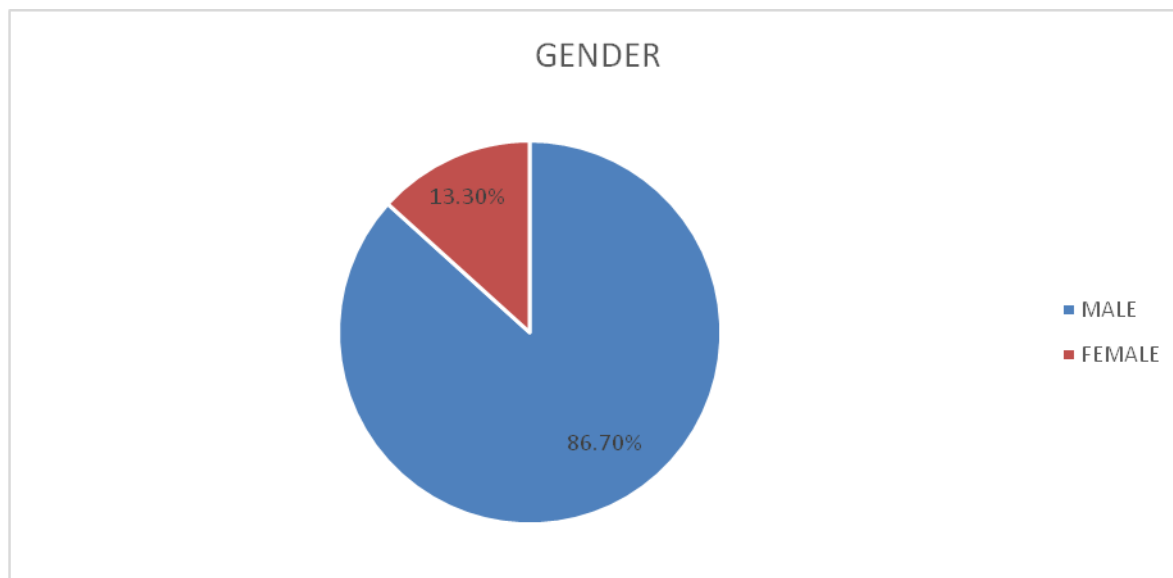
The study was done in the department of oral and maxillofacial surgery at school of dental sciences, Krishna Institute of Medical Sciences, Karad. Duration of study was from December 2022 to May 2023. In this ZMC fracture study, 30 patients were included. Before collecting the data from patient inform consent was taken from patient regarding the study. Age, sex, types of fracture, etiology, and treatment were examined in the obtained data.

Diagnosis was done by clinical and radiological assessment. Clinical assessment by taking case history and examine the patient physically and radiological assessment by PNS view or Water's view, Submentoverte view, OPG, CT scan (computed tomography).

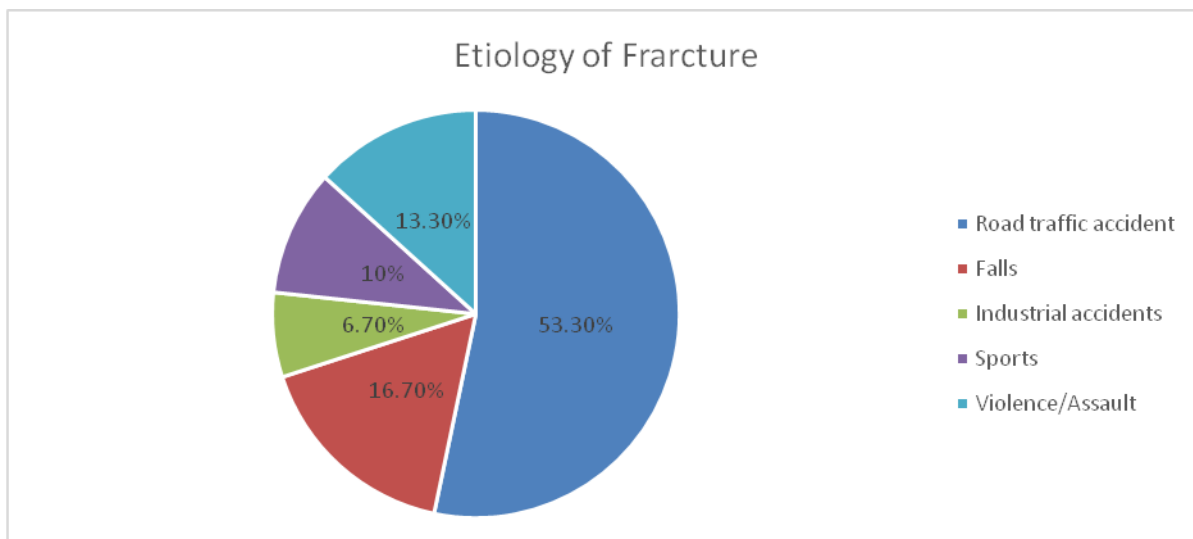
Depending on patterns of fractures (simple or comminuted) and from displaced to undisplaced (minimally to severely) treatment plan decided. Open reduction and internal fixation (ORIF) was most commonly used surgical procedure.

V. RESULTS

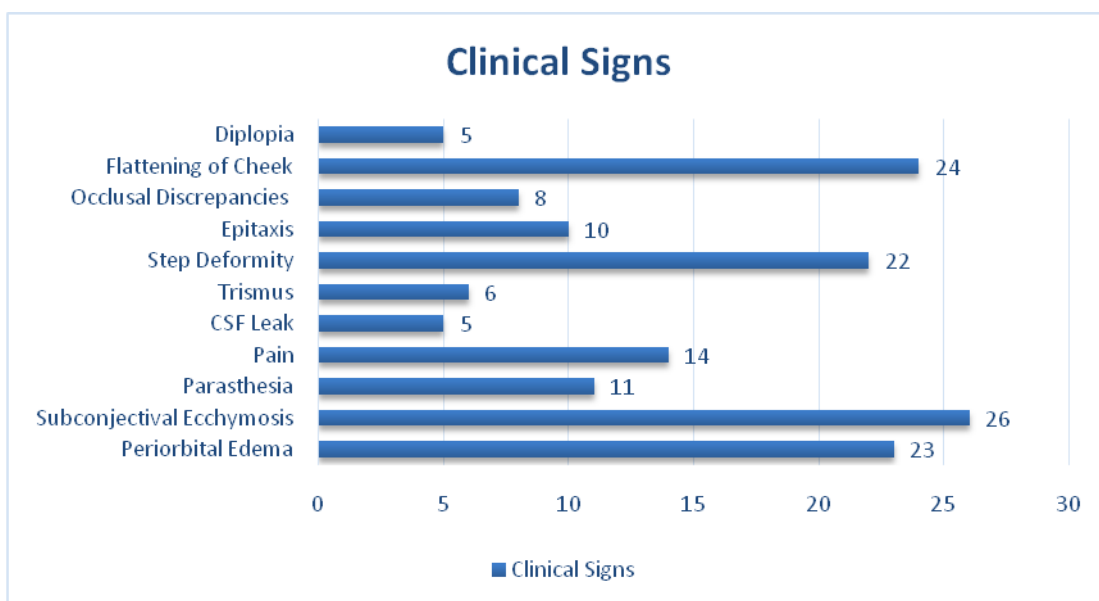
The study done on ZMC fracture in School of dental science, Krishna Institute of Medical Sciences, Karad, from December 2022 to May 2023. In this study 30 patients were treated with ZMC fracture, in which 86.7% (n=27) male and 13.30% (n=3) females.



The study show that most of cases are of road traffic accident around 53.3% (n=16) followed by fall 16.7% (n=5), interpersonal violence or assault 13.3% (n=4), sports related 10% (n=3), work related or industrial accident 6.7% (n=2) .



After doing clinical examination on the ZMC fracture patient some common signs and symptoms are noticed that are Periorbital Edema in 23 (76.7%) patients, Subconjunctival ecchymosis in 26 (86.7%), Paresthesia 11 (36.7%), Pain 14 (46.7%), CSF leak 5 (18%), Trismus 6 (20%), Step deformity 22 (73.3%), Epistaxis 10 (33.3%), Occlusal discrepancies 8 (26.7%), Flattening of cheek 24(80%), Diplopia 5 (16.7%) patients.



In this study 30 cases of ZMC fracture 28 cases weretreated with Open reduction and internal fixations under general anesthesia and 3 cases treated with conservative management.

VI. Discussion:

Patients with severe injuries most frequently experience zygomatic complicated fractures. Given the prominence of the zygoma on the face, zygomatic complex fractures are frequently seen in facial trauma cases. Depending on the severity of damage from different mechanisms, fracture patterns can be simple to comminuted and mildly to substantially displaced.

Worldwide, facial trauma is the most prevalent type of trauma. Because the zygoma is a prominent feature of the face and nasal bone fractures come second, zygomaticomaxillary complex fractures are the second most common type of facial skeleton fractures. The articulation of the orbitozygomatic complex, zygomaticomaxillary complex, and zygomatic complex proper are disrupted by zygomatic complex fractures. In

addition to impairing other ocular and mandibular functions, fractures and dislocations of this bone result in aesthetic problems.

Common etiological variables include road accidents, falls, assaults or acts of interpersonal violence, accidents involving sports, work-related accidents, and industrial accidents. Due to alcohol consumption and increased aggression, males had higher percentages of maxillofacial injuries than females. Facial bruises, pain, swelling, midface flattening, headaches, periorbital ecchymosis, facial paresthesias, loss of consciousness, vertigo, soft tissue emphysema, epistaxis, trismus, exophthalmos, enophthalmos, ophthalmoplegia, diplopia, and altered mastication are all signs of ZMC fractures. Zmc fracture were treated with open reduction with or without internal fixations and conservative management. Restoring the face and orbit to their original functional and attractive state is the primary goal of decreasing ZMC fractures.

VII. Conclusion:

The study provides a 6-month summary of 30 patients who reported having zygomaticomaxillary complex fracture. The male to female ratio was 9:1, meaning that men are more likely than women to sustain ZMC injuries. The goal of the study was to determine the incidence of patients suffering from zygomaticomaxillary complex fractures. Healthcare professionals may find the material useful in assessing and creating a plan to lower the frequency of facial injuries. Strict legal measures requiring the usage of seat belts, speed limits, helmets, and other traffic regulations must be implemented.

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