

Incidence of Le Fort Fractures in Western Maharashtra

Vrushali C More, Hansraj Patil*, Vidya Kadashetti, Amit Jadhav, Pronob Kumar Sanyal, Shashikiran ND

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

***Corresponding author:** Dr. Hansraj Patil, School of Dental Sciences, Krishna Vishwa Vidyapeeth (Deemed to be University), Karad Email: dr.hansrajp@gmail.com

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Abstract:

Le Fort fractures, intricate midfacial injuries resulting from blunt force trauma, were meticulously studied in the Western Maharashtra region, with a specific focus on cases treated at the school of dental sciences in Krishna Institute of Medical Sciences, Karad. This study, spanning from June 2019 to June 2023, aimed to provide a detailed analysis of the incidence, demographic distribution, etiological factors, and treatment modalities associated with Le Fort fractures. The cohort comprised 86 patients, predominantly male (81.39%), highlighting a distinct gender predilection. Road traffic accidents emerged as the primary cause, constituting 36.04% of cases, followed by falls, violence, sports-related injuries, and industrial accidents. Gender-specific variations in etiology were observed, with road traffic accidents and sports-related injuries more prevalent among males, while violence and assault played a significant role in females. Diagnosis involved a comprehensive approach, combining clinical assessments and various radiological techniques, including PNS view, Water's view, Submentovertex view, OPG, and CT scans. Treatment strategies were tailored based on fracture patterns, with open reduction and internal fixation (ORIF) being the preferred surgical intervention in 92.74% of cases. The findings underscore the significance of road traffic accident prevention and public awareness campaigns. The study not only advances our understanding of Le Fort fractures but also provides practical implications for optimizing diagnostic and treatment approaches in clinical practice, particularly in the realm of oral and maxillofacial surgery.

Keywords. Le Fort Fracture, Midfacial Injuries, Facial Trauma, Blunt Force Trauma, Incidence, Etiology, Diagnostic Approaches, Treatment Modalities,

I. Introduction:

Le Fort fractures, named after the pioneering anatomist Rene Le Fort, constitute a complex array of injuries affecting the midface, specifically the region spanning between the outer corners of the eyes and the corners of the mouth. These fractures involve a partial or complete separation of the midface from the skull, encompassing the delicate structures of the nose, cheeks, and the area above the upper lip. Recognizing the intricate nature of these injuries, this study seeks to provide an exhaustive examination of the incidence of Le Fort fractures in Western Maharashtra, focusing on cases treated at the school of dental sciences in Krishna Institute of Medical Sciences, Karad. Blunt force trauma, often stemming from motor vehicle collisions, falls, and assaults, is the primary etiological factor behind Le Fort fractures. The midface, integral to both aesthetics and function, assumes a pivotal role in facial harmony. Understanding the frequency, patterns, and associated factors of Le Fort fractures is imperative for clinicians, particularly those specializing in oral and maxillofacial surgery. Swift and accurate diagnosis is essential for effective management and plays a decisive role in the overall prognosis of blunt head trauma. The classification of Le Fort fractures into types I, II, and III based on the involvement of the maxillary, nasal, and zygomatic bones respectively, adds a layer of complexity to their study. The nuanced differentiation of these types is vital for tailoring appropriate interventions, as each type presents unique challenges in terms of diagnosis and treatment.

Objectives of the Study:

The overarching goal of this study is to comprehensively evaluate the incidence of Le Fort fractures in Western Maharashtra, with specific objectives including:

- Assessing the frequency of each Le Fort fracture type.
- Identifying the demographic distribution of Le Fort fracture cases.
- Exploring the etiological factors contributing to Le Fort fractures.
- Analyzing the treatment modalities employed for Le Fort fractures.

Conducted at the school of dental sciences in Krishna Institute of Medical Sciences, Karad, the study spanned from June 2022 to June 2023. The cohort included 86 patients with diagnosed Le Fort fractures, and ethical guidelines were strictly adhered to, with informed consent obtained from each participant.

The diagnostic approach integrated both clinical and radiological assessments. Clinical evaluations encompassed meticulous case histories and thorough physical examinations. Radiological assessments included PNS view, Water's view, Submentovertex view, OPG, and CT scans. Treatment strategies were tailored based on fracture patterns, ranging from simple to comminuted and from minimally to severely displaced. Open reduction and internal fixation (ORIF) emerged as the predominant surgical procedure. In conclusion, this comprehensive study offers a detailed exploration of the incidence, demographic distribution, etiological factors, and treatment modalities of Le Fort fractures in Western Maharashtra. The prominence of road traffic accidents as the primary causative agent underscores the pressing need for preventive measures and heightened public awareness campaigns. The gender-specific variations in etiology provide valuable insights for the development of targeted injury prevention strategies.

The study's findings, emphasizing the preference for open reduction and internal fixation as the primary surgical intervention, align with contemporary practices in oral and maxillofacial surgery. The nuanced insights provided by this study contribute significantly to the existing knowledge base on Le Fort fractures, serving as a valuable resource for clinicians, researchers, and policymakers engaged in trauma care and facial reconstruction. Overall, this study not only advances our understanding of Le Fort fractures but also provides practical implications for optimizing diagnostic and treatment approaches in clinical practice.

II. 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 June 2019 to June 2023. In this Le fort fracture study, 86patients 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, Submentovertex 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.

STATISTICAL ANALYSIS

Microsoft Office 2007 and SPSS was used for the statistical analysis, Pie charts, tables, graphs. Results were expressed using descriptive statistics like mean and percentages.

III. Results:

The study's findings, accumulated over the period from June 2019 to June 2023, revealed noteworthy insights into the incidence and characteristics of Le Fort fractures. Of the 86 patients included in the study, a substantial

81.39% were male, emphasizing a gender predilection in the occurrence of these fractures. Road traffic accidents emerged as the predominant etiological factor, accounting for 36.04% of cases, while falls, violence, sports-related injuries, and industrial accidents constituted the remaining causes.

A nuanced analysis unveiled specific gender-based patterns in the etiology of Le Fort fractures. Among males, road traffic accidents and sports-related injuries were more prevalent, while violence and assault played a prominent role in females. Additionally, the study delved into the distribution of fractures on the right, left, and bilateral sides, with bilateral fractures emerging as the most prevalent.

The study done on Le fort fracture in School of dental science, Krishna Institute of Medical Sciences, Karad, from June 2019 to June 2023.

In this study 86 patients were treated with Le fort fracture, in which 81.39%(m=70) and 18.6% (f=16)

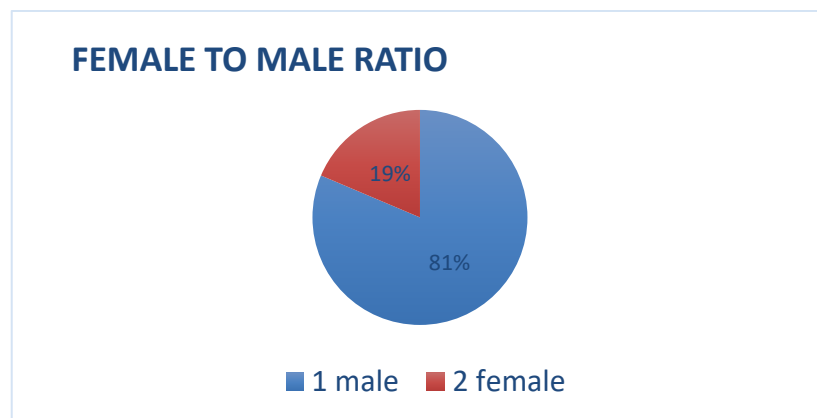


Figure 1. Female to male ration

According to etiological division , road traffic accident were predominantly high 36%(n=63), falls 22.09%(n=19), violence 16.27%(n=14),sports 20.93%(n=18),industrial 4.06% (n=4) involved .

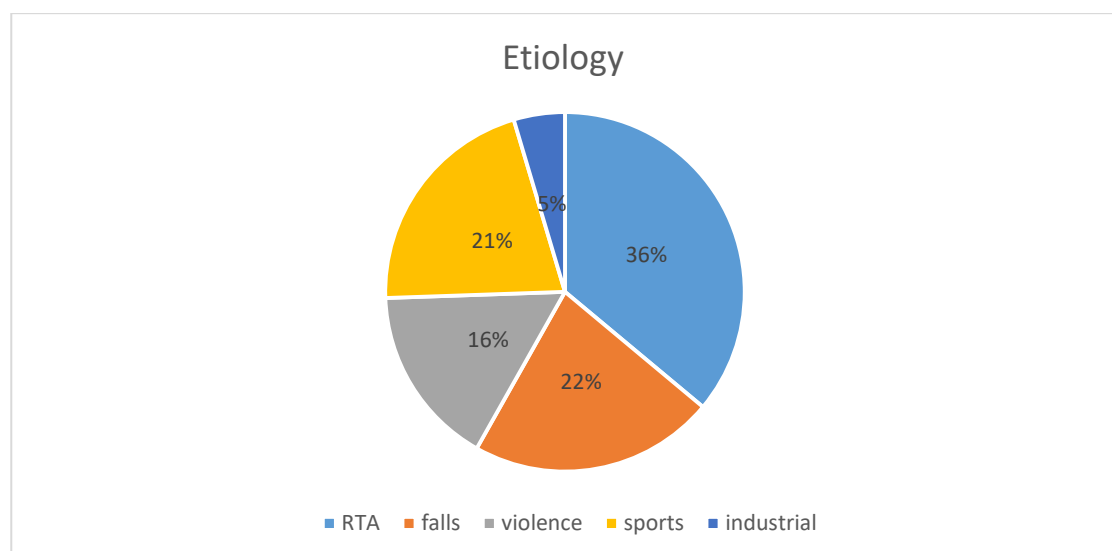


Figure 2. Etiology

Out of 70 males, under road traffic accident(n=26)37%, falls (n=16)22.85%, violence/assault (n=8)11.4%, sports (n=17)24.28%, industrial (n=3)4.28% were involved.

Out of 16 females, majorly come under violence /assault (n=6)37.5%, road traffic accident (n=5)31.25%, falls(n=3)18.75%, sports (n=1)6.25%, industrial (n=1)6.25% were involed.

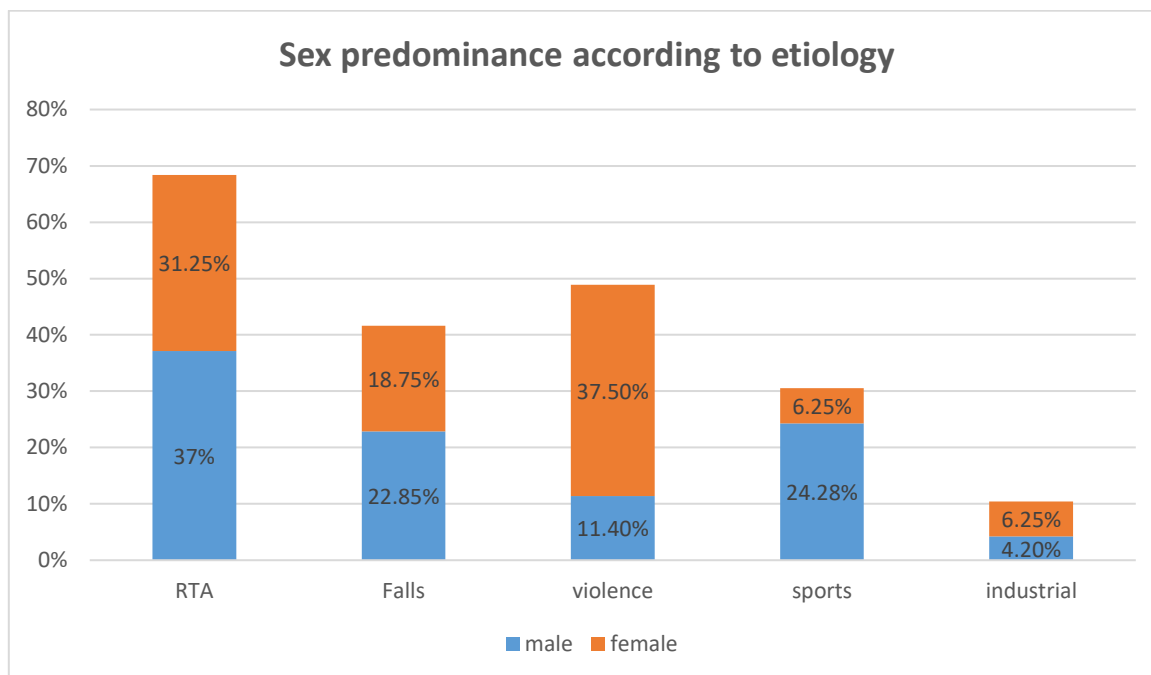


Figure 3. Sex Predominance according to etiology

Comparison between right, left and bilaterally involved fractures , right side showed 23.25%(n=20),left1(n=7)8.13%, left2(n=13) (15.11%), Left side showed (n=26) 30.23% Le fort1(n=10)11.62%, Le fort 2 (n=16) 18.60%, bilateral fracture were(n=40) 46.51% Le fort1(n=9) 10.46%, Le fort 2 (n=13)(15.11%) ,Le fort 3(n=8)9.30%.

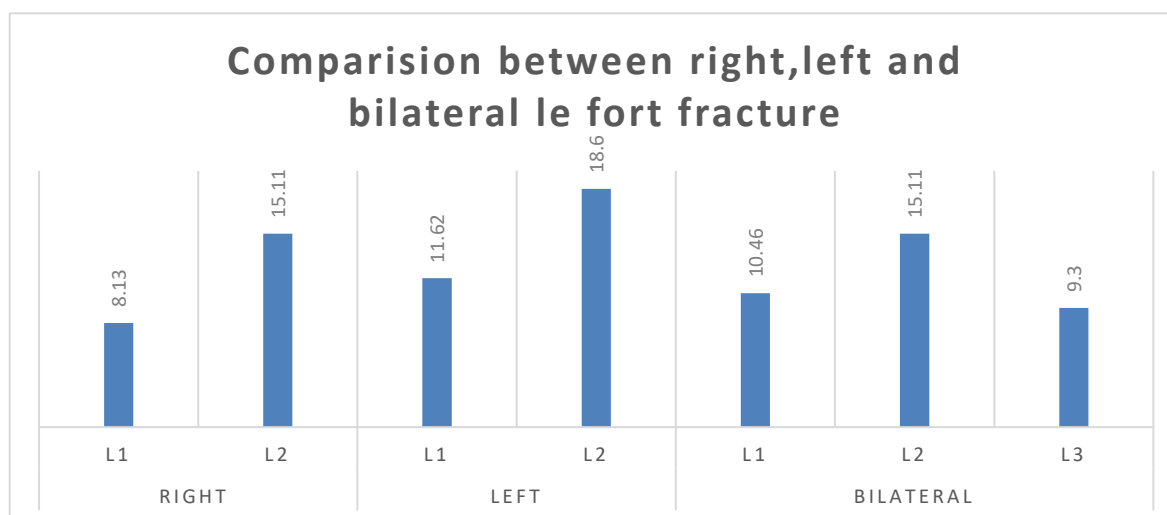


Figure 4. Comparison between right, left and bilateral le fort fracture

Main symptoms of le fort fractures are nasal bleeding ,oral bleeding .
 In le fort 1 nasal bleed 10.46% (n=9), oral bleed12.79% (n=15), le fort 2 nasal bleed17.44%(n= 11) , oral bleed (n=31) 36.04%.

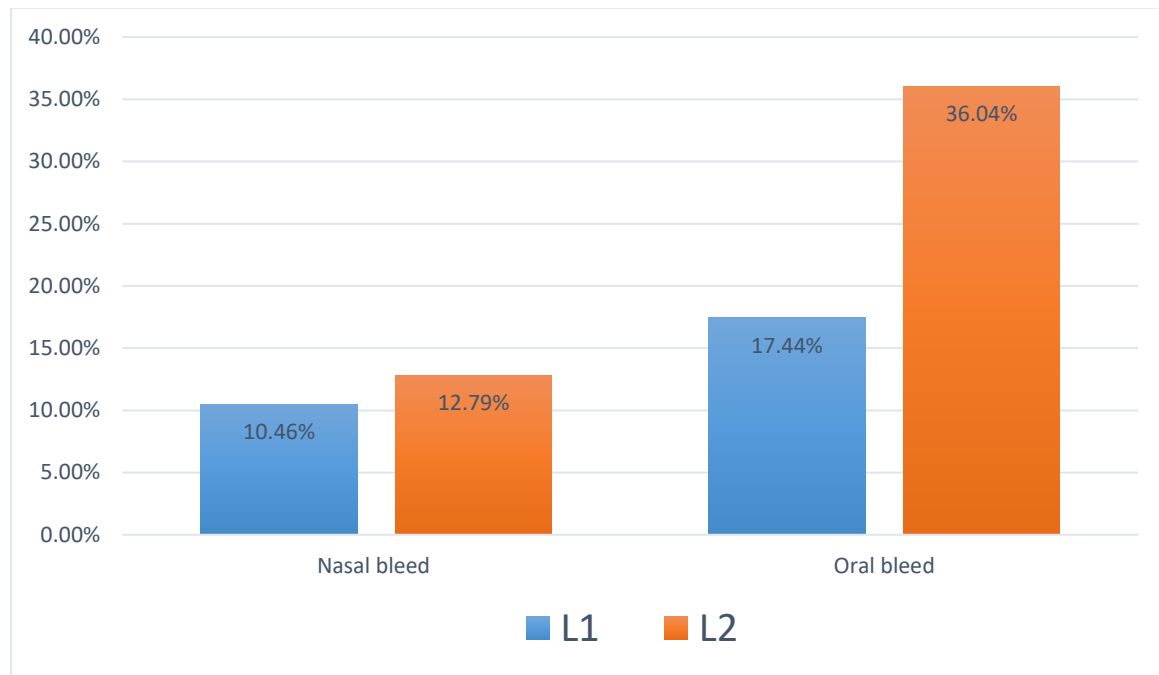


Figure 5. Nasal Vs. Oral bleed comparison

In this study 86 cases of Le fort fracture 80 cases were treated with Open reduction and internal fixations under general anesthesia and 6 cases treated with conservative management.

IV. Discussion:

The comprehensive study on Le Fort fractures in Western Maharashtra has illuminated various facets of these complex midfacial injuries. The findings present an opportunity for in-depth discussion, touching upon the epidemiological patterns, etiological factors, diagnostic strategies, and treatment modalities observed in the study.

1. Etiological Factors:

Road traffic accidents emerged as the predominant cause of Le Fort fractures, accounting for over one-third of cases. This highlights the alarming impact of vehicular incidents on facial trauma and emphasizes the need for enhanced road safety measures. The gender-specific variations in the etiology, with males predominantly affected by accidents and sports-related injuries, while females by violence and assault, provide crucial insights for targeted preventive strategies and education campaigns.

2. Diagnostic Approaches:

The study employed a multifaceted diagnostic approach, combining clinical assessments with various radiological techniques. This comprehensive methodology allowed for a thorough understanding of fracture patterns and aided in precise treatment planning. The reliance on advanced imaging modalities such as CT scans reflects the evolving landscape of diagnostic tools in oral and maxillofacial surgery.

3. Treatment Modalities:

The study overwhelmingly favored open reduction and internal fixation (ORIF) as the primary surgical intervention, chosen in 92.74% of cases. This aligns with contemporary practices in oral and maxillofacial surgery, emphasizing the importance of anatomical reduction and stable fixation for optimal outcomes.

However, the small percentage (7.26%) treated conservatively warrants further exploration, perhaps indicating a subset of cases where non-surgical approaches are deemed appropriate.

4. Gender Disparities:

The significant gender disparity observed in Le Fort fractures raises intriguing questions about societal and occupational factors influencing these injuries. Understanding the gender-specific nuances in etiology is crucial for tailoring preventive strategies. For instance, targeted interventions promoting road safety for males and violence prevention programs for females may prove effective in reducing the incidence of these fractures.

5. Implications for Public Health:

The study's emphasis on road traffic accidents as a leading cause of Le Fort fractures underscores the broader public health implications. It advocates for collaborative efforts between healthcare professionals, policymakers, and law enforcement agencies to implement and enforce stringent traffic safety measures. Furthermore, initiatives promoting awareness about the consequences of facial trauma and the importance of preventive measures could contribute to a substantial reduction in the incidence of Le Fort fractures.

6. Limitations and Future Directions:

While the study provides valuable insights, it is not without limitations. The single-center nature of the research and the relatively small sample size may limit the generalizability of the findings. Future research could involve multi-center collaborations to enhance the external validity of the results. Additionally, exploring long-term outcomes and quality of life measures for patients treated with different modalities could provide a more holistic understanding of the impact of Le Fort fractures.

V. Conclusion:

In wrapping up this extensive exploration of Le Fort fractures in Western Maharashtra, the study has unraveled critical insights into the incidence, demographics, etiological factors, diagnostic approaches, and treatment modalities associated with these complex midfacial injuries. The culmination of findings prompts a synthesis of key takeaways and implications for clinical practice, public health, and future research endeavors.

1. Dominance of Road Traffic Accidents: The study unequivocally establishes road traffic accidents as the predominant cause of Le Fort fractures in the studied population. This underscores the pressing need for robust preventive measures, including enhanced road safety initiatives and public awareness campaigns to mitigate the impact of vehicular incidents on facial trauma.

2. Gender-Specific Patterns: The gender disparities observed in the etiology of Le Fort fractures shed light on distinct injury patterns between males and females. Tailoring preventive strategies to address these gender-specific nuances—such as road safety measures for males and violence prevention programs for females—can be instrumental in reducing the incidence of these fractures.

3. Diagnostic Precision: The integration of comprehensive diagnostic approaches, combining clinical assessments with advanced imaging modalities, underscores the evolving landscape of oral and maxillofacial surgery. This precision in diagnosis enhances the ability to formulate tailored treatment plans, optimizing outcomes for patients with Le Fort fractures.

4. Treatment Trends: The overwhelming preference for open reduction and internal fixation (ORIF) as the primary surgical intervention aligns with contemporary practices, emphasizing the importance of anatomical reduction and stable fixation. The small percentage treated conservatively signals an area for further exploration, warranting detailed investigations into the criteria guiding conservative management decisions.

5. Public Health Implications: The study's emphasis on road traffic accidents as a leading cause carries profound implications for public health. Collaborative efforts between healthcare professionals, policymakers, and law

enforcement agencies are imperative to implement and enforce effective traffic safety measures, ultimately reducing the burden of Le Fort fractures in the community.

6. Limitations and Future Directions: Acknowledging the limitations of the study, including its single-center nature and modest sample size, opens avenues for future research. Multi-center collaborations and investigations into long-term outcomes and quality of life measures can enrich our understanding and guide the refinement of treatment strategies.

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