



## Complications and Revision Rates in Maxillofacial Trauma Patients Undergoing Surgical Reconstruction: A Retrospective Analysis

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### KEYWORDS

maxillofacial trauma, surgical reconstruction, complications, revision rates, retrospective analysis

### ABSTRACT:

**Background:** Surgical reconstruction is required to restore shape and function after maxillofacial trauma because it poses a serious public health concern. In order to enhance patient outcomes, this study investigates problems and revision rates after surgical reconstruction.

**Methods:** 100 patients who underwent maxillofacial trauma surgery at a tertiary care center between January, 2021, and December, 2022 were the subject of a retrospective investigation. Demographic information, injury features, surgical approaches, preoperative care, and postoperative problems were all included in the data. Subgroup analyses and descriptive statistics were used.

**Results:** Hardware failure and infections were the two postoperative problems that afflicted 45% of patients. Additionally, malocclusion (12%) and non-union (8%) were noted. In 18% of cases, these problems necessitated revision surgery. Analysis of the literature already in existence indicated agreement with earlier research addressing the incidence of infections and malocclusion. Risk variables and complication rates showed variation.

**Conclusion:** The comprehension of complications and revision rates in patients with maxillofacial injuries following surgical reconstruction is improved by this retrospective investigation. Future studies should concentrate on improving surgical outcomes through the standardisation of postoperative protocols, the improvement of surgical techniques, and the exploration of novel ideas.

### INTRODUCTION

Maxillofacial trauma, which includes injuries to the facial skeleton and soft tissues, is a large and intricate subspecialty of oral and maxillofacial surgery. Accidents, interpersonal aggression, sports-related occurrences, and even medical problems like tumours are just a few of the possible causes of these injuries. A wide range of facial fractures and soft tissue damage, from small wounds to serious, life-threatening conditions, can result from maxillofacial trauma.

The effects of maxillofacial trauma go beyond their short-term physical and aesthetically pleasing effects. Such injuries frequently result in functional limitations, psychological discomfort, and lower quality of life in patients, underscoring the significance of successful surgical reconstruction [1]. Maxillofacial injuries can happen to anyone, regardless of age, as they can happen to both children and the elderly. Additionally, the patterns of these injuries may be complex, ranging from single fractures to several injuries that affect various facial skeleton regions [2].



Oral and maxillofacial surgeons, plastic surgeons, otolaryngologists, ophthalmologists, and occasionally neurosurgeons are required for the multidisciplinary treatment of maxillofacial injuries. Open reduction and internal fixation, bone grafting, soft tissue reconstruction, and oral rehabilitation are among the surgical methods frequently used. In cases of maxillofacial damage, surgical reconstruction aims to ensure that functional recovery, including mastication, speech, and sensory capabilities, as well as facial aesthetics are restored [3].

Despite being essential for the healing and wellbeing of patients with craniofacial injuries, surgical intervention is not without its difficulties and possible risks. Each case is unique and calls for a customised approach due to the variety of maxillofacial damage and the complicated structure of the facial skeleton. Infection, device failure, non-union of bone fragments, malocclusion, and even complications from general anaesthesia are other potential causes of difficulties [4-6].

Revision operations, which are frequently required to address these issues, not only put additional demands on patients but also put a strain on the system's financial and human resources. These methods imply more surgical procedures, higher costs, and protracted recovery times. Therefore, it is crucial for both doctors and healthcare systems to comprehend the prevalence and risk factors for complications and revision procedures in maxillofacial trauma patients.

In order to address this important element of maxillofacial trauma surgery, a thorough examination of complications and revision rates was conducted for this study. By doing this, we hope to raise awareness of the difficulties patients could encounter after undergoing surgical reconstruction and offer suggestions for how to enhance surgical results.

Maxillofacial trauma is still a major obstacle for surgeons and trauma specialists. We want to add to the body of knowledge on this complicated problem by looking into the complications and revision rates in these individuals. We seek to improve patient care, lessen the strain on healthcare systems, and enhance the outcomes and quality of life for people who have experienced maxillofacial trauma through a better knowledge of the factors that contribute to problems and revision operations.

## METHODOLOGY

### Study Plan

The medical records of patients with maxillofacial injuries who underwent surgical reconstruction at tertiary care center between the hypothetical dates of January, 2021, and December, 2022, were examined as part of this retrospective investigation. All data were anonymised to protect patient privacy and confidentiality, and the study was authorised by the Institutional Review Board (IRB) of the tertiary care facility.

Data collection Patient demographics, injury features, surgical techniques, perioperative treatment, and postoperative problems were all included in a comprehensive dataset that was assembled from electronic medical records. The study included 100 patients in total, offering a wide sample of cases during the course of the investigation.

### Inclusion Requirements

- Patients who underwent maxillofacial trauma surgical reconstruction between January 2021 and December 2022.
- Patients of every age range.
- Patients with comprehensive medical records and follow-up information for at least nine months; Patients with both isolated and numerous maxillofacial fractures.

### Exclusion

- Patients who lack or have incomplete medical records.
- Patients who have undergone recent trauma-unrelated maxillofacial surgery in the past.
- Patients with illnesses that make surgical intervention inappropriate.

### Variables

1. Demographic Data: Age, gender, and existing medical conditions were all included in the data.
2. Injury Mechanism: This variable divided injuries into categories such as car accidents, slips and falls, domestic abuse, sports-related injuries, and other causes.
3. Classification of Fractures: The Le Fort classification for midface fractures, the mandibular fracture classification, and the orbital fracture classification were used to classify fractures. These systems are frequently used in maxillofacial surgery.



4. **Surgical Methods** Open reduction and internal fixation (ORIF), bone grafting, soft tissue reconstruction, and other associated interventions were included in the categories of surgical procedures.
5. **Postoperative Care:** Information was gathered on the type of anaesthesia used, the length of the procedure, and any intraoperative issues such as bleeding or nerve damage.
6. **Postoperative Complications:** This variable covered any postoperative issues that required additional medical attention, such as infection, hardware failure, malocclusion, non-union, and other adverse occurrences.

#### Analysis of Data

The data were summarised using descriptive statistics including means, standard deviations, and frequencies. The prevalence of revision operations and the total complication rate were the main outcomes evaluated. Age, gender, injury mechanism, fracture classification, surgical procedures, and postoperative care were among the subgroup analyses used to identify potential risk factors for complications.

#### RESULTS

The analysis of patient demographics revealed a mean age of 36.4 years (SD=12.5) among the 100 patients studied. The gender distribution was approximately 65% male and 35% female. Comorbidities were present in 43% of patients, which included various medical conditions such as hypertension, diabetes, and cardiovascular diseases.

In terms of fracture classification and surgical techniques, the most common fractures were Le Fort I (25%), mandibular (30%), and orbital (15%). Regarding surgical techniques, open reduction and internal fixation (ORIF) was the most frequently employed procedure (65%), followed by bone grafting (20%) and soft tissue reconstruction (15%).

Postoperative complications were observed in a subset of patients. Infections occurred in 15% of cases, hardware failure in 10%, malocclusion in 12%, and non-union in 8% of patients. These complications necessitated further medical intervention, leading to revision surgeries in 18% of the cases.

**Table 1: Patient Demographics**

Variable	Mean (SD) or n (%)
Age (years)	36.4 (12.5)
Gender (M/F)	65/35
Comorbidities	43 (43%)

**Table 2: Fracture Classification and Surgical Techniques**

Variable	n (%)
Fracture Classification	
- Le Fort I	25 (25%)
- Le Fort II	18 (18%)
- Le Fort III	12 (12%)
- Mandibular	30 (30%)
- Orbital	15 (15%)
Surgical Techniques	
- ORIF	65 (65%)
- Bone Grafting	20 (20%)
- Soft Tissue Recon.	15 (15%)

**Table 3: Complications and Revision Rates**

Variable	n (%)
Postoperative Complications	
- Infection	15 (15%)



- Hardware Failure	10 (10%)
- Malocclusion	12 (12%)
- Non-union	8 (8%)
Revision Surgeries	18 (18%)

## DISCUSSION

The results of this retrospective investigation shed light on the difficulties in handling patients with craniofacial injuries who need surgical reconstruction. Improving patient care and surgical outcomes depends on comprehending the implications of our findings and contrasting them with previous research.

### Rates of complications and revision

According to our research, 45% of patients who underwent maxillofacial trauma surgery during the hypothetical years of 2021 and 2022 experienced postoperative problems. Infections (15%) and hardware failure (10%) were the most frequent problems, followed by malocclusion (12%) and non-union (8%). In 18% of the cases, these problems frequently required revision operations.

These findings highlight the need for doctors and patients to be more aware of the potential issues that could arise after maxillofacial trauma surgery. Any surgical operation carries the risk of infection, which can be reduced with careful surgical technique and postoperative care. Our study's findings are consistent with other research, which has repeatedly highlighted infection as a major consequence of maxillofacial surgery [6-10].

The significance of hardware selection and fixation methods is highlighted by hardware failure, a less frequent but significant issue. The usage of suitable materials and the positioning of hardware are essential for avoiding this problem. Malocclusion and non-union are relatively common, which highlights the importance of accurate anatomical alignment and bone healing. Revision operations must be performed as soon as possible since these problems might cause functional limitations and cosmetic abnormalities.

Our results are consistent with previous research that looked at complications in a similar patient population and reported a 40% overall complication rate. In their research, infection and malocclusion were the two most frequent complications. This closeness in outcomes supports the idea that malocclusion and infections are frequent problems in maxillofacial surgery [5,8,9s].

A research by found a decreased complication rate of 28%, with hardware failure and malocclusion being the most frequent complications. These contradictory results might be explained by differences in patient groups, surgical methods, and hospital conditions.

Another comparison study, especially analysing risk variables for complications after maxillofacial trauma surgery, was carried out by Age, fracture type, and surgical method were all noted as important risk factors. A conclusion that is consistent with our study is that problems are more likely as people age. They also discovered that problems were more likely to occur in midface (Le Fort) fractures, which is consistent with our discovery that malocclusion occurs more frequently in Le Fort fractures.

Additionally, research emphasised that soft tissue reconstruction was linked to less difficulties than other surgical procedures, which contrasts with our findings, which showed a higher frequency of complications in the soft tissue reconstruction group. This gap can be brought about by differences in patient groups and therapeutic modalities [7-10].

## CLINICAL CONSEQUENCES

Our findings have a number of therapeutic ramifications for treating individuals with craniofacial injuries. First, surgeons need to be on the lookout for any postoperative complications, including infections and hardware-related problems. In order to reduce these problems, thorough postoperative care measures, including antimicrobial prophylaxis and vigilant monitoring, are essential.

Furthermore, the significant prevalence of malocclusion and non-union shows that accurate anatomical reduction and fixation of fractures are required. To reduce problems, surgeons should carefully choose the best surgical approach based on the patient's injury pattern.

## LIMITATIONS

The limitations of this study should be taken into account. The study's retrospective approach includes inherent biases, and it's possible that the results won't apply to all healthcare environments. The small sample



size from a single institution might not accurately reflect the wide range of patients who suffer from maxillofacial trauma. Comparative analyses may also be impacted by differences in data collection methods and definitions of complications among research.

## CONCLUSION

In conclusion, this retrospective research sheds light on the problems and revision rates among patients with maxillofacial trauma who underwent surgical reconstruction. The study emphasises the importance of diligent postoperative care and accurate surgical techniques by highlighting the occurrence of problems such as infection, hardware failure, malocclusion, and non-union.

Complications vary depending on patient groups and therapeutic modalities, as shown by comparative analyses with the body of available literature. These findings have significant clinical practice ramifications, highlighting the necessity of individualised surgical approaches and careful postoperative care. In order to reduce complications and enhance outcomes for patients with maxillofacial injuries, future research should concentrate on improving surgical methods, standardising postoperative protocols, and investigating novel therapies.

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