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Mandibular Fractures: A Pilot Study OfTwelve Patients

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Abstract
Background: Mandibular fractures are common maxillofacial injuries with variable etiologies and management options. There is a need for preliminary data from smaller cohorts to guide clinical practice and future studies.
Aim: To conduct a pilot study assessing clinical features, fracture patterns, management approaches, and outcomes in patients with mandibular fractures.
Methods: Twelve patients with mandibular fractures were retrospectively reviewed. Demographics, etiology, fracture sites, imaging, treatment modalities, and outcomes were recorded. Treatment included load-sharing fixation with mini-plates, intermaxillary fixation (IMF) using arch bars or screws, and conservative measures where appropriate. Outcomes were assessed by occlusion, healing, and complications.
Results: The most frequent cause was road traffic accidents (75%). Parasymphysis was the most common fracture site (75%), followed by condyle (33.3%) and angle (25%). OPG was used in all cases for diagnosis and follow-up. ORIF with mini-plates was performed in 91.7% of cases. One complication (8.3%) was noted: plate exposure in a smoker at 3 months. All other patients had satisfactory healing and stable occlusion.
Conclusion: This pilot study demonstrates that parasymphysis is the most common fracture site, OPG is reliable for evaluation and follow-up, and load-sharing mini-plates with arch bars provide stable outcomes. Larger prospective studies are needed to validate these preliminary findings.

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I. Introduction

Mandibular fractures are among the most frequent maxillofacial injuries due to the exposed position of the mandible and the loads it bears. Road traffic accidents (RTAs) are the leading cause in developing countries, while falls, assaults, and sports injuries are also common. Young adult males are most often affected, although fracture incidence varies with age, sex, socioeconomic status, and lifestyle factors such as substance use.

As defined by Dingman and Natvig, the mandible may be divided into anatomical regions prone to fracture: Symphysis and Parasymphysis, Body, Angle, Ramus, Condylar process (subcondylar, condylar neck,

and head), Coronoid process, and Alveolar process. This classification aids in understanding fracture biomechanics and guides management strategies.

Clinically, mandibular fractures present with step deformity, malocclusion, trismus, gingival lacerations, sublingual ecchymosis, and segmental mobility. Through-and-through lacerations and avulsed teeth may also accompany fractures. Imaging is central to diagnosis: while CT is the gold standard, orthopantomogram (OPG) remains reliable, affordable, and widely used.

The aim of treatment is restoration of occlusion, continuity, function, and esthetics. Options range from closed reduction with intermaxillary fixation (IMF) to open reduction and internal fixation (ORIF) with titanium mini-plates or reconstruction plates. Complications such as infection, hardware failure, and malunion are influenced by risk factors including smoking, delayed treatment, poor oral hygiene, and systemic comorbidities.

Given the limited availability of regional data, this pilot study consolidates twelve consecutive mandibular fracture cases into a single-cohort analysis. It provides preliminary insights into fracture distribution, treatment methods, outcomes, and complications, with the intention of informing larger-scale research.

II. Materials And Methods

Study Design: Retrospective observational pilot study.
Setting: Single center.
Participants: Twelve consecutive patients with mandibular fractures, including pediatric and geriatric cases.
Data Collected: Age, sex, etiology, fracture site(s) per Dingman & Natvig classification, imaging modality, treatment modality, and outcomes.
Imaging: OPG was performed in all patients for diagnosis and follow-up; CT was reserved for selected complex cases.
Treatment: Load-sharing mini-plate fixation was the primary modality. Arch bars were preferred for occlusal stability; IMF screws were used selectively. Teeth in the fracture line were extracted if infected or obstructing reduction. Conservative management was chosen for pediatric patients where appropriate.
Outcome Measures: Restoration of occlusion, radiographic healing, and complications (infection, hardware failure, malunion/nonunion).
Follow-up: 1–6 months.
Ethics: Patient data anonymized; retrospective chart review design did not require formal approval.

III. Results

Demographics and Etiology: Of the 12 patients, 10 were adults, 1 pediatric, and 1 geriatric. Nine fractures (75%) resulted from RTAs, two from falls (16.7%), and one from a bike fall (8.3%).

Fracture Distribution: Parasymphysis was the most common site (9 cases, 75%), followed by condyle (4 cases, 33.3%), angle (3 cases, 25%), symphysis (2 cases, 16.7%), and isolated cases of maxillary and edentulous fractures (each 8.3%).

Treatment: ORIF with mini-plates was performed in 11 patients (91.7%). Arch bars were used in 8 cases (66.7%), IMF screws in selected cases, and arch bar alone in 1 pediatric case (8.3%). Teeth in fracture lines were extracted when interfering with reduction or infected.

Outcomes: All but one patient achieved stable occlusion and satisfactory healing. One patient (8.3%), a smoker with parasymphysis–condyle–maxilla fractures, developed plate exposure at 3 months; other sites healed satisfactorily. The patient with initial infection achieved uneventful healing after staged management.

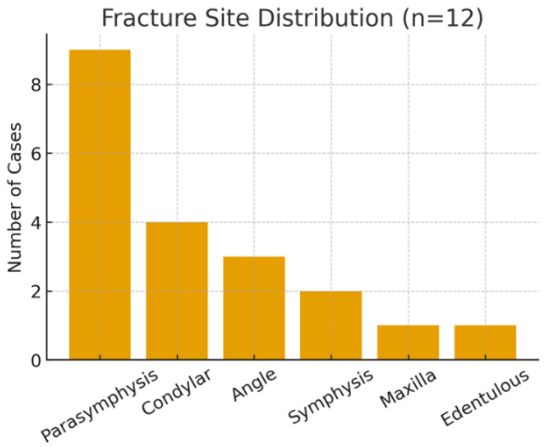


Figure 1: Distribution of mandibular fracture sites in 12 patients.

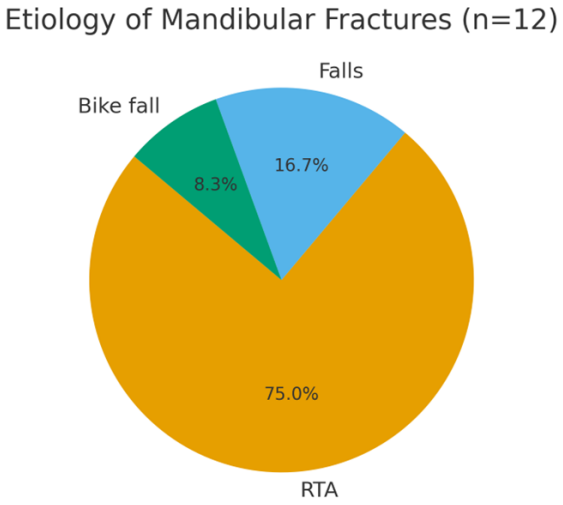


Figure 5: Etiology of mandibular fractures in 12 patients.

IV. Discussion

This pilot study highlights trends in mandibular fracture etiology, distribution, and management. **Parasymphysis predominated as the most frequent fracture site**, consistent with global reports. RTAs were the leading cause, underscoring the continued role of high-energy trauma in mandibular injuries.

All patients underwent OPG, which proved effective for diagnosis and follow-up, supporting its role as a practical alternative to CT in routine cases. Load-sharing mini-plates provided predictable stability, while arch bars were superior to IMF screws for establishing occlusion, especially in multi-site fractures.

However, in our series, **most of the cases managed with IMF screws achieved desirable occlusion**, confirming their utility as a less invasive and time-efficient alternative in selected cases. Similarly, **closed reduction of condylar fractures showed good results** with restoration of function and occlusion, reinforcing evidence that not all condylar fractures require open surgery.

Complications were rare, with only one case of plate exposure observed. Notably, this occurred in a smoker, emphasizing the role of patient-related risk factors such as tobacco use in wound healing and hardware exposure. Another case demonstrated the value of staged fixation after initial infection control.

Although outcomes were favorable, the small sample size limits generalizability. Nevertheless, these findings provide preliminary guidance and support the feasibility of expanding this work into larger prospective studies.

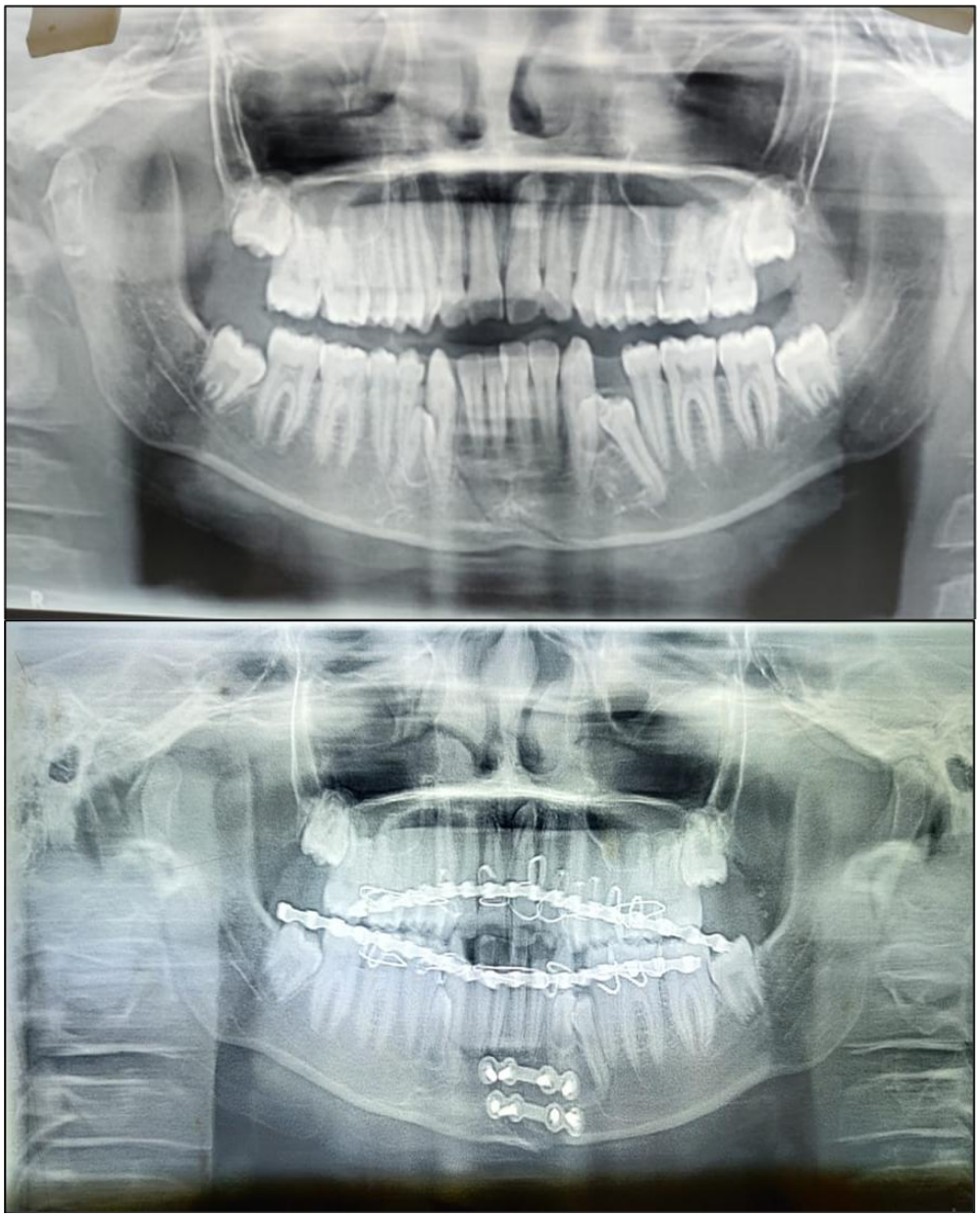
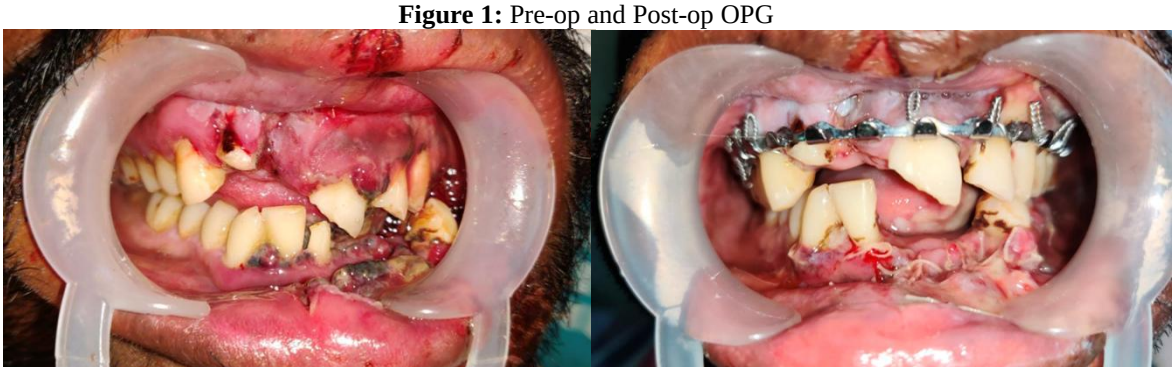


Figure 1: Pre-op and Post-op OPG



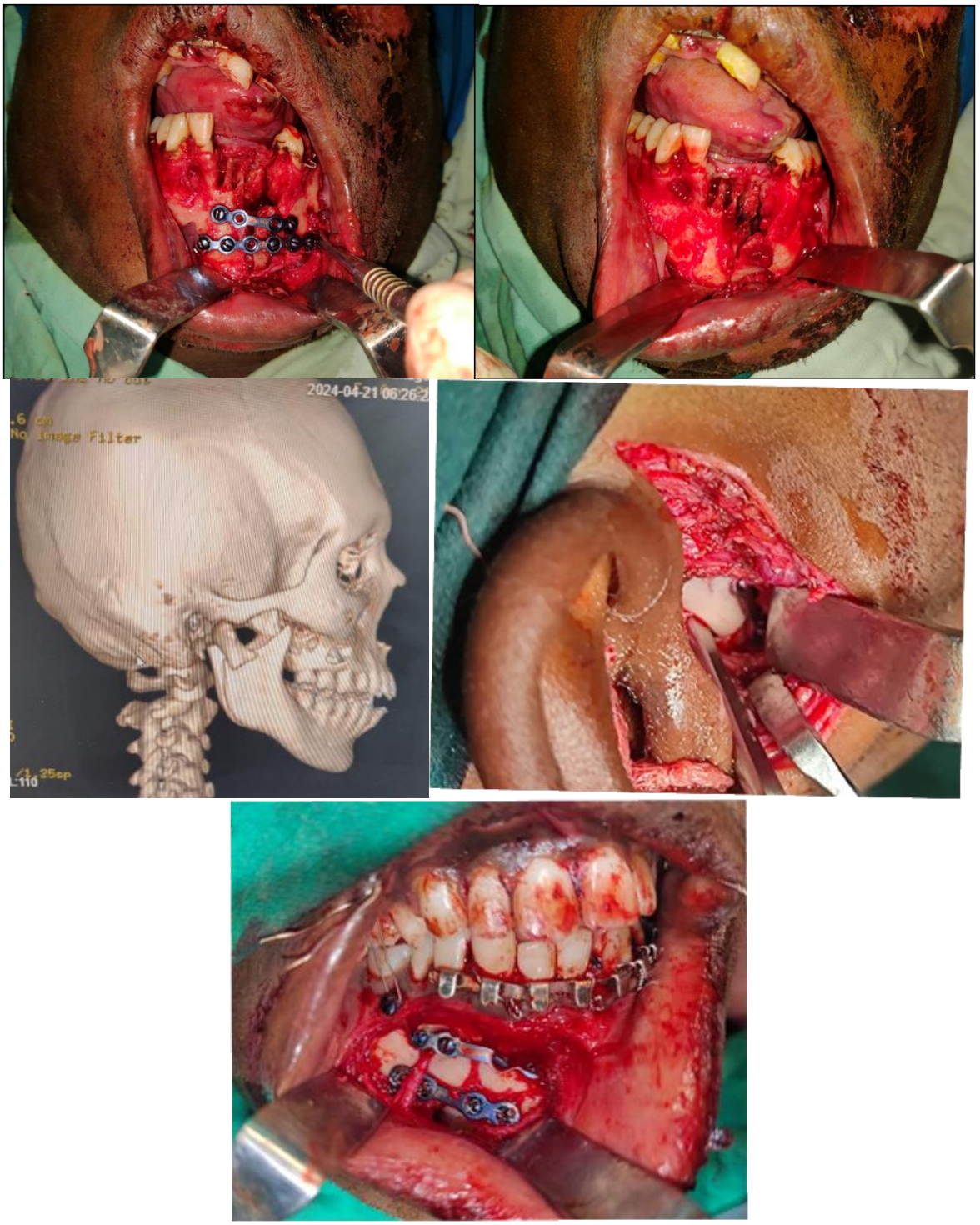


Figure 2: Clinical photo (e.g., lip laceration + plating).

Figure 3: Complication (plate exposure case).

V. Conclusion

This pilot study of twelve mandibular fracture patients identified parasymphysis as the most common fracture site and confirmed OPG as a reliable, affordable tool for diagnosis and follow-up. Load-sharing fixation with mini-plates, supported by arch bars for occlusal control, produced stable outcomes. The findings underscore the importance of addressing risk factors such as smoking and infection control. While limited by small sample size, this pilot study provides useful preliminary data and highlights the need for larger-scale research to validate these results.

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