

Postoperative Intermaxillary Fixation in Maxillofacial Trauma: A Questionnaire Survey Assessing Evidence-Based Practice

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Abstract

Background: Intermaxillary fixation (IMF) has traditionally been an essential component in the management of mandibular fractures. With the development of rigid internal fixation techniques, the necessity of postoperative IMF has been increasingly questioned. Despite the advances in fixation methods, many surgeons continue to use IMF as an adjunct following open reduction and internal fixation (ORIF).

Aim: This study aimed to evaluate the current clinical practices regarding postoperative IMF among surgeons managing maxillofacial trauma and to determine whether these practices align with evidence-based recommendations.

Materials and Methods: A cross-sectional questionnaire-based survey was conducted among surgeons involved in the management of mandibular fractures. A structured questionnaire consisting of multiple-choice questions was distributed to participants. The questionnaire assessed preferred treatment modalities, indications for postoperative IMF, duration of fixation, commonly used techniques, and perceived complications. Responses were collected and analyzed descriptively using percentage distribution.

Results: The majority of respondents preferred ORIF as the primary treatment modality for mandibular fractures. However, a significant proportion of surgeons reported routine use of postoperative IMF even after rigid internal fixation. Occlusion was identified as the most important factor influencing the decision to apply IMF. The duration of fixation varied widely among surgeons, ranging from one week to more than four weeks. Traditional wiring techniques were the most commonly used method for IMF, although IMF screws and guiding elastics were also reported. Many respondents acknowledged complications such as weight loss, difficulty in maintaining oral hygiene, and patient discomfort during the period of IMF.

Conclusion: The findings suggest that postoperative IMF continues to be widely practiced despite the availability of stable internal fixation techniques that permit early mobilization. The results highlight a discrepancy between evidence-based recommendations and clinical practice. Adoption of standardized guidelines and increased awareness of current evidence may help reduce unnecessary immobilization and improve patient outcomes in the management of maxillofacial trauma.

Keywords: Intermaxillary fixation, mandibular fractures, maxillofacial trauma, open reduction internal fixation, evidence-based practice.

Introduction

Maxillofacial trauma is a significant clinical concern encountered by oral and maxillofacial surgeons worldwide. Among facial fractures, mandibular fractures are particularly common due to the anatomical prominence and mobility of the mandible. The management of mandibular fractures aims to restore anatomical alignment, re-establish functional occlusion, and facilitate early return of normal mandibular function ^[1].

Historically, intermaxillary fixation (IMF) played a fundamental role in the treatment of mandibular fractures. By immobilizing the maxilla and mandible together, IMF provided stabilization of fractured segments and allowed bone healing through immobilization. For many years, IMF was considered the standard method of treatment for mandibular fractures and was often used as the sole modality of therapy ^[1]

Despite its effectiveness in maintaining occlusal stability, IMF has several disadvantages. Patients undergoing IMF frequently experience difficulties with nutrition, speech, and oral hygiene. Prolonged immobilization may also lead to complications such as temporomandibular joint stiffness, muscle atrophy, and respiratory compromise. ^[2] These limitations have encouraged the development of alternative treatment strategies that allow early mobilization of the mandible.

The introduction of open reduction and internal fixation (ORIF) represented a major advancement in the management of maxillofacial fractures. The use of plates and screws allows direct reduction of fracture fragments and provides stable fixation, enabling early functional rehabilitation. Modern fixation systems such as miniplates have further improved surgical outcomes due to their ease of application and ability to provide adequate stability ^[2]. Recently, wire free fixation of fractures seems to be finding favor among surgeons ^[3].

Several studies have demonstrated that rigid internal fixation can allow satisfactory fracture healing without the need for prolonged postoperative IMF ^[4-6]. Immediate mobilization following internal fixation has been shown to produce outcomes comparable to those achieved with postoperative immobilization ^[7,8]. These findings have led to a gradual shift toward treatment protocols that emphasize early functional recovery rather than prolonged

immobilization. However, despite these advances, many surgeons continue to use IMF during the postoperative period as an adjunctive measure following ORIF. The rationale behind this practice is often to maintain occlusal stability and prevent postoperative displacement of fracture fragments. Nevertheless, the scientific evidence supporting routine postoperative IMF remains limited. This variation in clinical practice raises an important question regarding whether the continued use of postoperative IMF is based on strong scientific evidence or whether it persists primarily due to traditional training and personal clinical preference. Understanding current practice patterns among surgeons is essential to identify gaps between evidence-based recommendations and real-world clinical practice.

Therefore, the present study was conducted as a questionnaire-based survey to evaluate the current trends in the use of postoperative intermaxillary fixation among surgeons managing maxillofacial trauma and to assess whether these practices align with contemporary evidence-based principles.

Materials and Methods

Study Design

This study was designed as a cross-sectional questionnaire-based survey aimed at evaluating clinical practices related to postoperative IMF in the management of mandibular fractures.

Study Population

The study included oral and maxillofacial surgeons involved in the treatment of mandibular fractures in the city of Kanpur and Kanpur Dehat. Participation was voluntary, and all respondents were informed about the purpose of the survey.

Questionnaire Development

A structured questionnaire was developed to collect information regarding the participants' clinical practices. The questionnaire consisted of multiple-choice questions addressing the following areas:

- Preferred treatment modality for mandibular fractures
- Routine use of postoperative IMF following ORIF
- Indications for applying postoperative IMF
- Duration of postoperative IMF
- Methods used for IMF placement
- Complications encountered during IMF
- Patient acceptance and compliance

The questionnaire was designed to be concise and easy to complete in order to encourage participation.

Data Collection

The questionnaire was distributed electronically and through direct communication to surgeons involved in the management of maxillofacial trauma. Participants were requested to provide responses based on their routine clinical practice.

Data Analysis

All responses were compiled and analysed using descriptive statistics. The results were expressed in terms of frequency and percentage distribution.

Results

Treatment Preference

The majority of respondents indicated that open reduction and internal fixation was their preferred treatment modality for mandibular fractures. However, a small proportion of surgeons still reported using IMF alone as the primary treatment option in selected cases.

Routine Use of Postoperative IMF

A significant number of surgeons reported routine use of postoperative IMF even after performing ORIF. Others indicated that they applied IMF selectively depending on fracture characteristics and clinical circumstances.

Indications for IMF

Occlusion was identified as the most important factor influencing the decision to use postoperative IMF. Other factors included fracture displacement, patient age, medical condition, and fracture location.

Duration of IMF

There was considerable variability in the duration of postoperative IMF. Some surgeons preferred short-term fixation for approximately one week, while others maintained IMF for longer periods depending on fracture severity and stability.

Techniques Used for IMF

The most commonly used technique for IMF was arch bar wiring. Other techniques reported included IMF screws and guiding elastics.

Questionnaire Used in the Study

Section 1: Demographic Information

1. What is your professional designation?

- Oral and Maxillofacial Surgeon (Consultant)
- Senior Resident
- Junior Resident
- Other (please specify)

2. How many years of clinical experience do you have in oral and maxillofacial surgery?

- Less than 5 years
- 5–10 years
- 10–15 years
- More than 15 years

3. What is your primary practice setting?

- Academic institution
- Government hospital
- Private hospital/clinic
- Mixed practice

Section 2: Clinical Practice Patterns

4. How frequently do you use postoperative intermaxillary fixation after open reduction and internal fixation (ORIF) of mandibular fractures?

- Routinely in all cases
- Selectively depending on fracture type
- Rarely
- Never

5. What factors influence your decision to apply postoperative IMF?
(Select all that apply)

- Maintenance of occlusion
- Comminuted fractures
- Multiple fracture sites
- Associated condylar fractures

- Poor bone quality
- Surgeon preference
- Other (please specify)

6. Which mandibular fracture sites most commonly require postoperative IMF in your practice?

- Symphysis/parasymphysis
- Body fractures
- Angle fractures
- Condylar fractures
- Multiple fractures

Section 3: Technique and Duration

7. What technique do you most commonly use for intermaxillary fixation?

- Arch bars with interdental wiring
- Eyelet wiring
- IMF screws
- Orthodontic brackets with elastics
- Other (please specify)

8. What is the typical duration of postoperative IMF in your practice?

- 3–5 days
- 1 week
- 2 weeks
- More than 2 weeks

9. Do you use guiding elastics instead of rigid IMF in some cases?

- Yes, frequently
- Yes, occasionally
- Rarely
- Never

Section 4: Clinical Outcomes and Opinions

10. In your opinion, what is the main advantage of postoperative IMF?

- Maintenance of occlusion
- Additional fracture stabilization
- Improved neuromuscular adaptation
- Prevention of postoperative complications

11. What complications or disadvantages have you encountered with IMF?
(Select all that apply)

- Patient discomfort
- Difficulty maintaining oral hygiene
- Nutritional problems
- Temporomandibular joint stiffness
- Risk of airway compromise
- Needle-stick injuries during arch bar placement

12. Do you believe postoperative IMF is necessary in the era of rigid internal fixation?

- Yes, in most cases
- Yes, but only in selected cases
- No, rarely necessary
- No, unnecessary

Table 1. Demographic Characteristics of Respondents

Variable	Category	Number (n)	Percentage (%)
Years of experience	< 5 years	18	24
	5- 10 years	22	29
	>10 years	35	47

Table 2. Frequency of Postoperative IMF Use After ORIF

Usage pattern	Number of surgeons	Percentage %
Routine use in all mandibular fractures	20	27

Selective use depending on fracture type	45	60
Rarely used	10	13

Table 3. Indications for Postoperative Intermaxillary Fixation

Indication	Number of responses	Percentage %
Maintenance of occlusion	50	67
Comminuted fractures	30	40
Multiple fracture sites	25	33
Associated condylar fracture	15	20
Poor bone quality	10	13

Table 4. Duration of Postoperative IMF

Duration	Number of surgeons	Percentage%
3-5 days (guiding elastics)	28	37
1 week	22	29
2 week	18	24
>2 weeks	1	10

Table 5. Techniques Used for Intermaxillary Fixation

technique	Number of responses	Percentage%
Arch bars with interdental wiring	40	53
IMF screws	20	27
Eyelet wiring	10	13
Guiding elastics only	5	7

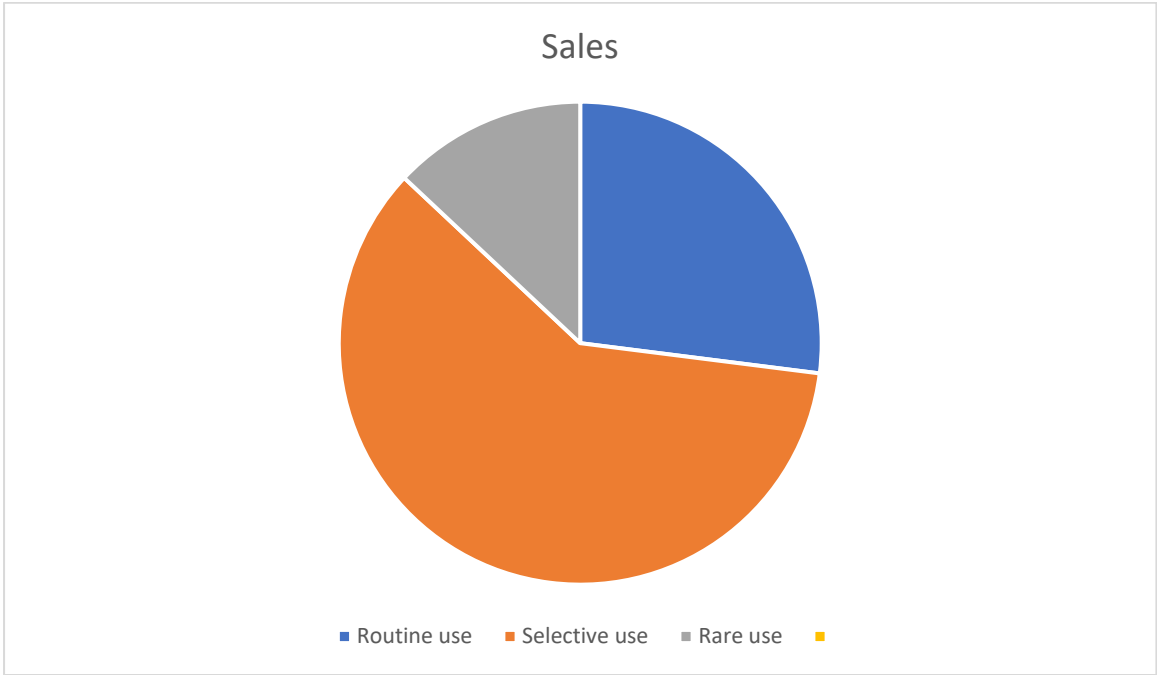


Figure 1. Frequency of Postoperative IMF Use

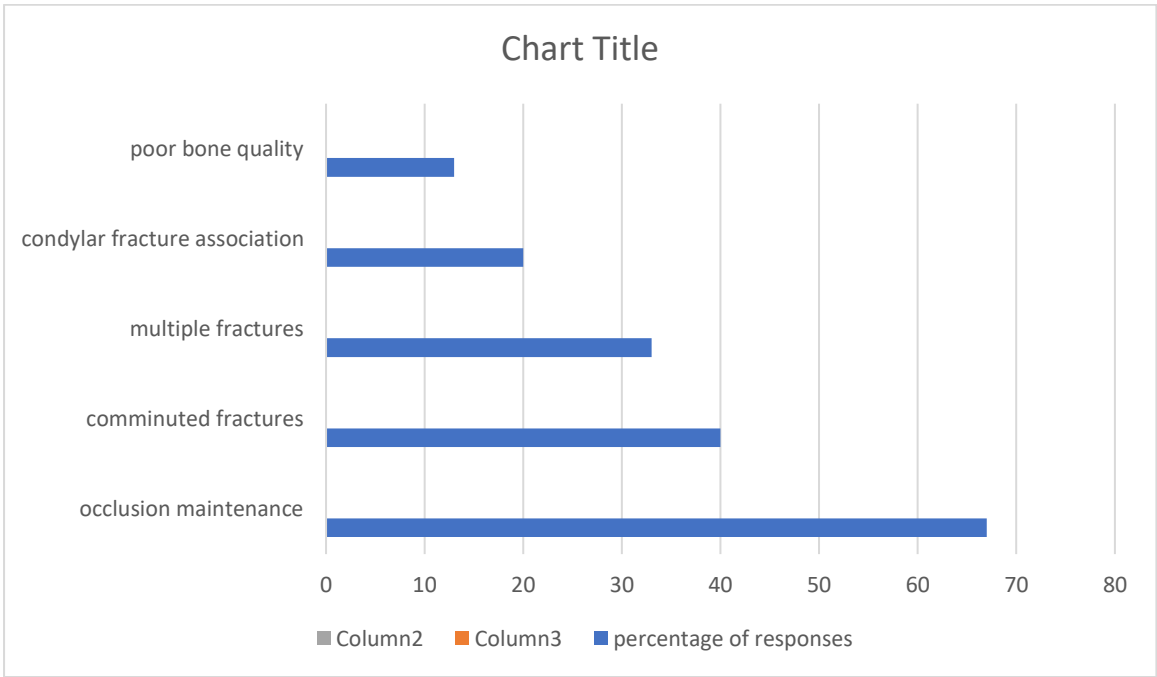


Figure 2. Indications for Postoperative IMF

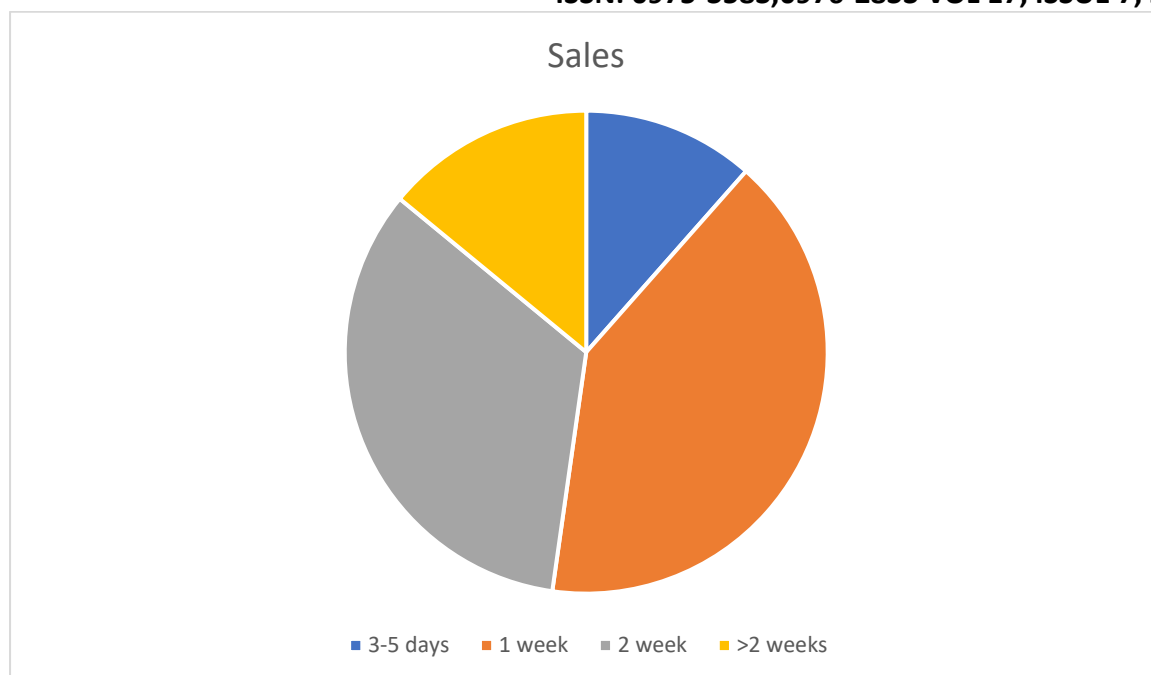


Figure 3. Duration of IMF Application

Complications

Respondents reported several complications associated with IMF, including:

- Patient discomfort
- Difficulty maintaining oral hygiene
- Weight loss during the period of immobilization
- Difficulty in speech and nutrition

Many surgeons also noted that patients often find IMF stressful and difficult to tolerate.

Discussion

The management of mandibular fractures has evolved considerably over the past few decades with the introduction of improved fixation techniques and biomaterials. Historically, intermaxillary fixation (IMF) served as the cornerstone of treatment for mandibular fractures. By immobilizing the maxilla and mandible together, IMF allowed fractured segments to heal while maintaining occlusal relationships. However, this approach often required prolonged immobilization, which could negatively affect the patient's comfort, nutrition, oral hygiene, and overall quality of life ^[1].

The introduction of open reduction and internal fixation (ORIF) marked a major shift in the treatment philosophy for mandibular fractures. With the use of plates and screws, surgeons are now able to achieve accurate anatomical reduction and stable fixation of fracture segments. This stability allows early mobilization of the mandible and restoration of function without the need for prolonged immobilization^[2]. Several studies have emphasized that rigid or semi-rigid fixation can provide sufficient stability for fracture healing, thereby eliminating the routine requirement for postoperative IMF ^[4-6]

Despite these advances, the results of the present survey indicate that many surgeons still employ postoperative IMF as an adjunctive treatment following ORIF. This finding reflects the persistence of traditional practices in clinical decision-making. The continued use of IMF may be influenced by the training background of surgeons, personal clinical experience, and concerns regarding postoperative occlusal discrepancies.

In the present study, occlusion was identified as the most important factor influencing the decision to apply postoperative IMF. Surgeons frequently rely on IMF to stabilize the occlusion and facilitate neuromuscular adaptation during the healing process. However, previous studies have demonstrated that immediate mobilization following stable internal fixation does

not compromise occlusal outcomes. Kaplan et al. reported comparable healing results in patients who underwent immediate mobilization compared to those who received postoperative IMF [7]. Similarly, Sindet-Pedersen and Jensen found no significant difference in treatment outcomes between fractures managed with ORIF alone and those managed with additional IMF [8]. Rigid internal fixation has several Limitations and complications [9.] These limitations led to the advent of miniplate system which were easier to apply and gave equally good results [10]. IMF can lead to osteoporosis, hypercapnia, hypoxia and decreased Ph in the nutrient veins of immobilized bones. [11]. These changes are reversible to varying degrees, depending on when function is reinstituted, only one case has been reported regarding allergy to material to IMF [12]

Another important consideration is the potential complications associated with prolonged IMF. Immobilization of the jaws can lead to several physiological changes affecting both bone and muscle tissues. Experimental studies have shown that prolonged immobilization may result in metabolic alterations in bone, muscle atrophy, and reduction in the cross-sectional area of masticatory muscles [11,13]. Additionally, immobilization of the temporomandibular joint (TMJ) for extended periods can lead to joint stiffness and structural changes within the joint [14.]

From a patient-related perspective, IMF can significantly affect daily activities and overall well-being. Patients often experience difficulty in maintaining adequate nutrition due to restricted oral intake, leading to weight loss and reduced energy levels. Oral hygiene is also compromised during periods of immobilization, increasing the risk of dental caries and periodontal disease. Furthermore, IMF may impair speech and social interactions, contributing to psychological stress and decreased patient satisfaction.

Respiratory complications are another concern associated with IMF. Immobilization of the jaws may affect pulmonary function, particularly in patients with underlying respiratory disorders. Previous studies have reported decreased pulmonary efficiency and increased risk of airway compromise in patients undergoing prolonged intermaxillary fixation [15]. These factors highlight the importance of minimizing unnecessary immobilization whenever possible.

In addition to patient-related complications, the placement of IMF using traditional wiring techniques poses risks to the surgeon and operating staff. Needle-stick injuries and glove perforations are relatively common during the placement of arch bars and interdental wiring, increasing the potential risk of cross-infection [3]. As a result, alternative methods such as IMF screws and guiding elastics have gained popularity in recent years due to their ease of application and reduced risk of injury.

Modern fixation systems have further strengthened the argument against routine postoperative IMF. The development of miniplate osteosynthesis has improved surgical

outcomes by providing stable fixation with minimal surgical trauma. These systems allow functional loading of the mandible soon after surgery, which may promote bone healing through controlled micromovements at the fracture site.

The findings of the present survey highlight an important gap between evidence-based recommendations and actual clinical practice. Although substantial evidence suggests that postoperative IMF is not always necessary when stable fixation is achieved, many surgeons continue to use it routinely. This may reflect a cautious approach aimed at preventing postoperative complications or occlusal discrepancies.

Another possible explanation for the continued use of IMF is the variability in fracture patterns and clinical scenarios encountered in maxillofacial trauma. In certain cases, such as comminuted fractures, multiple fracture sites, or situations where stable fixation cannot be achieved, postoperative IMF may still be beneficial. Therefore, while routine IMF may not be necessary in all cases, selective use based on individual patient factors and fracture characteristics remains reasonable.

Overall, the management of mandibular fractures should aim to balance fracture stability with early functional rehabilitation. Evidence increasingly supports treatment strategies that minimize immobilization and promote early return of mandibular function. Adoption of evidence-based protocols and continuous professional education may help bridge the gap between traditional surgical practices and modern treatment principles.

Conclusion

Postoperative intermaxillary fixation continues to be used by many surgeons in the management of mandibular fractures despite the widespread use of rigid internal fixation techniques. The findings of this questionnaire survey demonstrate considerable variability in clinical practice. Although IMF may still be useful in selected cases, routine use after stable internal fixation is not strongly supported by current evidence. Greater emphasis on evidence-based treatment approaches and standardized clinical protocols may help improve patient comfort, reduce complications, and enhance functional recovery in the management of maxillofacial trauma.

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