

## ORIGINAL RESEARCH

### Comparisoin of Locking Plates Verses Convensional Mini Plates in Mandibular Fractures

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#### ABSTRACT

**Background:** The objective was the comparison effectiveness and evaluate the postoperative complications of locking and conventional mini plates in mandibular trauma.

**Materials and Methods:** The study group in this investigation consisted of 10 treated patients who presented to the Department of Oral and Maxillofacial Surgery, St.Joseph Dental College, Eluru for Open reduction and rigid internal fixation of mandible. The mean age was 20-30 years, the case of injury and type of injury, since how many days of injury were evaluated.

**Results:** Total of 20 patients have met the inclusion criteria in our study there are changes in pain, swelling, paresthesia , infection of the site of fixation. In locking plates there is subside of pain and swelling after 3rd week, we found difference between 1st week, 3rd week and 6th week but pain was present till 6th week in conversional miniplates Pre-operative swelling was present only in case of non-locking group. Swelling was present in 60% of non-locking group and 0% in locking group. After one week swelling was absent in 100% patients at 1rd, 3rd and 6th week. Swelling was considerably decreased in locking group as compared to the non-locking group.

**Conclusion:** Our findings in our study conclude that locking plates have enough stability, good adaptive capacity and withstand the masticatory forces in mandible and clinical results almost similar to those seen with non-locking plate osteosynthesis.

**Keywords:** Locking plates, miniplates, mandibular fractures

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#### INTRODUCTION

Trauma may be defined as “a physical force that results in injury”. Injuries to the maxillofacial region are clinically highly significant as they affect both function and esthetics. There is often a psychological aspect associated with the injury secondary to patients concern regarding permanent scarring and subsequent facial disfigurement.<sup>[1]</sup>

Mandibular fractures are common facial injuries accounting for 36 to 59% of all maxillofacial fractures and their treatment is one of the most frequent forms of therapy

provided by maxillofacial surgeons. The leading causes of mandibular fractures were motor vehicle accidents and assaults.<sup>[2-4]</sup>

### Association of osteosynthesis (AO principles)

The following guidelines for internal fixation based on the four basic principles formulated by AO in 1958.

1. Anatomic reduction: fracture reduction and fixation to restore normal anatomy
2. Stable fixation: fracture with relative or absolute stability as required by the patient's injury and type of fracture.
3. Preservation of blood supply: by gentle reduction and careful handling along with preservation of vascularity of soft tissue and the bone.
4. Early and active mobilization: rehabilitation of the injured part and the patient as a whole with early and safe mobilization

The screws, plate, and bone form a solid framework with higher stability than the traditional nonlocking plate screw system. Among the latest innovations, a major impetus to the field of maxillofacial trauma has been the introduction of locking plates/screws plating systems for the treatment of mandibular fractures. The basic concept for rigid fixation is absolute stability and there are a variety of techniques advocated to achieve this goal. Champy suggest that engaging a single cortex is sufficient for rigid osteosynthesis. Advantages of the locking system are the ease of plate adaptation, enhanced stability without transmitting excessive pressure to the underlying bone, leading to less impairment of blood supply.<sup>[5-7]</sup> Locking miniplates utilize double threaded screws, which lock to the bone and the plate, creating a miniinternal fixator. This results in a more rigid construction with less distortion of the fracture or osteotomy, less screw loosening and less interference with bone circulation since the plate is not too tightly pressed against the bone.<sup>[4]</sup> While the introduction of miniplates in the treatment of mandibular fractures led to a notable decrease in surgical soft tissue trauma and improved ease of handling, with sufficient stability and fixation of mandibular fractures, loosening of screws due to transmission of pressure to the underlying bone leads to loss of fracture stability and fixation failure.<sup>[7]</sup>

### MATERIALS & METHODS

This study comprised of 10 patients having mandibular fractures attending outpatient department of OMFS. They were randomly selected irrespective of cast, age and sex. Patient having mandibular fractures with pathological fracture comminuting, infection, continuity defect and trauma were taken. Informed consent was taken to participate in the study. The patients were divided in two groups consisting of 5 patients in each group. Surgery was performed under general anesthesia in the patients.

### Result

**Table 1: No Of patients and plates used**

No Of Patients	Osteosynthesis
Group A- 5 Patients	2 -2.5 MM LOCKING
Group B – 5 Patients	2- 2.5 MM NON LOCKING

**Table 2: Group A & B Patients**

Percentage of Swelling in Group A & B Weekly analysis			
Group A Patients	1 <sup>st</sup> week	3 <sup>rd</sup> week	6 <sup>th</sup> week
	50%	20%	10%
Group B Patients	70%	20%	10%

**Table 3: percentage evaluation in both group A & B**

<b>Percentage of Occlusion Function in Group A &amp; B Weekly Analysis</b>			
Group A Patients	1stWeek	3rdWeek	6th Week
	100%	100%	100%
Group B Patients	80%	90%	100%

**Table 4: percentage analysis of infection**

<b>Percentage of Without Post-Operative Infection in Group A &amp; B Weekly Analysis</b>			
Group A Patients	1 <sup>st</sup> week	3 <sup>rd</sup> week	6 <sup>th</sup> week
	100%	100%	100%
Group B Patients	100%	100%	100%

## DISCUSSION

Road traffic accident (85%) was the common cause of mandibular fractures in each group, followed by assault. Similar etiological factor was noted by Sadhwani and Anchlia,<sup>[8]</sup> who found that road traffic accidents were responsible for the majority of cases (57.14%) of mandible fractures. In addition, this finding was in accordance with the study by Bormann et al.<sup>[9]</sup> The factors contributing to this variation could be bad roads, poor implementation of traffic rules, and not using safety measures in developing countries. The mean operating time in minutes for locking plates was 54.82 (SD = 17.26). Whereas the mean operating time in minutes for 3D plates was 43.20 (SD = 5.37). Similar findings were noted by Feledy et al.<sup>[10]</sup> One unique advantage of locking plate/screw system is that it is not necessary for the plate to have an intimate contact with underlying bone, making its adaptation easier than conventional plates.<sup>[11]</sup> Whereas, the conventional non locking system showed two cases of both mandibular as well as maxillary fractures, in which additional maxillomandibular fixation was required, Collins et al assessed the complication rate to be approximately 5% for both locking and non locking group after keeping the intermaxillary fixation for 4 weeks.<sup>[11]</sup> In mandibular fractures, postoperative occlusion disturbance was seen in only (20%) in each of the group B patients in 1<sup>st</sup> week of period, with no functional disturbance, no case of occlusion disturbance was seen in locking group.

Advantages of locking system over non locking system reported in various biomechanical studies, our study did not show any statistical significant result between them, in both maxilla and mandible. Loosening of screws and plates are considered to be the main risk factors for increased rates of infection and complications. In locking group, pain decreases significantly at 1<sup>st</sup> week, 3<sup>rd</sup> week, 6<sup>th</sup> week from 1<sup>st</sup> week and pain was absent after 3<sup>rd</sup> week. In non-locking group, pain decreases significantly at 1<sup>st</sup> week, 3<sup>rd</sup> week and 6<sup>th</sup> week from 1<sup>st</sup> week but pain was present till 6<sup>th</sup> week. Pain was decreased significantly in locking system. Also swelling was decreased significantly in locking group.

## CONCLUSION

In our study we conclude that locking plates has demonstrated that treating of mandibular fractures has good results, no need for inter-maxillary fixation, and no need of postoperative occlusal correction, clinical parameters such as pain swelling and infections are less compared with convectional mini plates.

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