

ORIGINAL RESEARCH

Locking miniplate in the management of mandibular fractures without intermaxillary fixation

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ABSTRACT

Background: Mandibular fractures refer to fractures or breaks in the lower jawbone, known as the mandible. These fractures can occur as a result of various causes, including trauma, accidents, sports injuries, assaults, falls, or dental procedures. The present study was conducted to assess the efficacy of locking miniplate in the management of mandibular fractures without intermaxillary fixation. **Materials & Methods:** 90 patients with mandibular fractures of both genders were treated by open reduction and internal fixation using the 2.0 mm locking plates. Parameters such as site of fracture, etiology of mandibular fracture, complications rate etc. was recorded. **Results:** Out of 90 patients, males were 55 and females were 35. The site of fracture was left body of mandible in 26, right body of mandible in 19, left angle of mandible in 11, right angle of mandible in 9, and parasymphysis in 15 patients. The difference was significant ($P < 0.05$). The etiology of fracture was RTA in 48, sports injury in 22, fall in 13 and miscellaneous in 7 cases. The difference was significant ($P < 0.05$). The common complications was infection in 8 cases, delayed union in 4 cases, and non-union in 3 cases. The difference was significant ($P < 0.05$). **Conclusion:** It was discovered that the locking miniplate method worked effectively for treating mandibular fractures. The complication rate was low in these patients.

Key words: locking miniplate system, mandible fractures, non-union

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INTRODUCTION

Mandibular fractures refer to fractures or breaks in the lower jawbone, known as the mandible. These fractures can occur as a result of various causes, including trauma, accidents, sports injuries, assaults, falls, or dental procedures.¹ Mandibular fractures are relatively common and can lead to significant functional and aesthetic issues if not properly treated.² Mandibular fractures can involve different parts of the mandible, including the body, angle, ramus, condyle, or symphysis. They may be classified based on the location, severity, displacement, and complexity of the fracture.³

Intermaxillary fixation (IMF) is a procedure used in the treatment of certain maxillofacial injuries, particularly mandibular fractures, where the upper and lower jaws are temporarily immobilized to allow for proper healing of the fractured bones. IMF is also known as maxillomandibular fixation (MMF).⁴ Stabilizing the broken jaw segments is the main

objective of IMF, especially when the fracture is misplaced or necessitates surgical intervention. Immobilizing the jaws lowers the chance of complications like nonunion or malunion by allowing the fractured bones to heal in the proper position. To accomplish IMF, different kinds of tooth-mounted devices such as metallic and non-metallic splints, dental and interdental wire, and arch bars are typically utilized. An extending over approach for mandibular angle fracture is monocortical miniplate osteosynthesis.⁵ Currently being explored are miniplate modifications such as locking plate/screw systems. restoration and the application of screw/locking miniplates. The screws are unlikely to come loose from the bone plate thanks to the locking plate/screw arrangement. This implies that the screw will not loosen even if it is placed within the fracture line.⁶ A locking plate/screw system may have the benefit of a lower risk of inflammatory problems due to hardware loosening.⁷ The present study was

conducted to assess the efficacy of locking miniplate in the treatment of mandibular fractures without intermaxillary fixation.

Data such as name, age, gender etc. was recorded. Patients were treated by open reduction and internal fixation using the 2.0 mm locking plates. Parameters such as site of fracture, etiology of mandibular fracture, complications rate etc. was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

MATERIALS & METHODS

The present study consisted of 90 patients with mandibular fractures of both genders. All selected patients gave their written consent for the participation in the study.

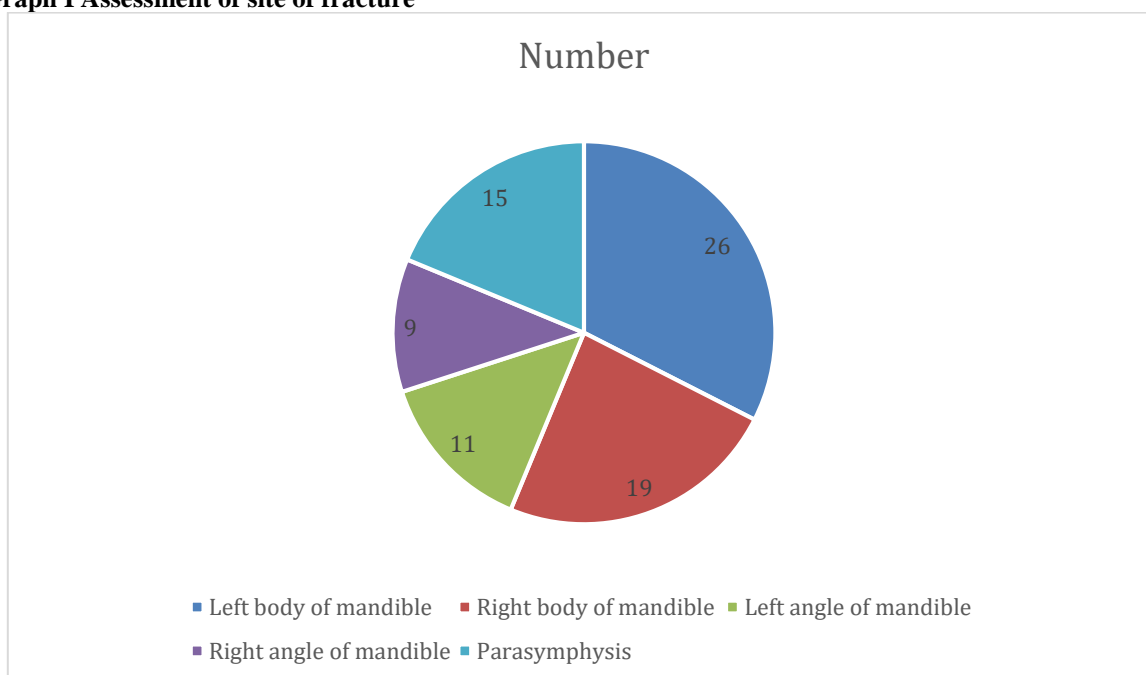
RESULTS

Table I Distribution of patients

Total- 90		
Gender	Males	Females
Number	55	35

Table I shows that out of 90 patients, males were 55 and females were 35.

Graph I Assessment of site of fracture



Graph I shows that the site of fracture was left body of mandible in 26, right body of mandible in 19, left angle of mandible in 11, right side angle of mandible in 9, and parasymphysis in 15 patients. The difference was significant (P< 0.05).

Table II Assessment of etiology of fracture

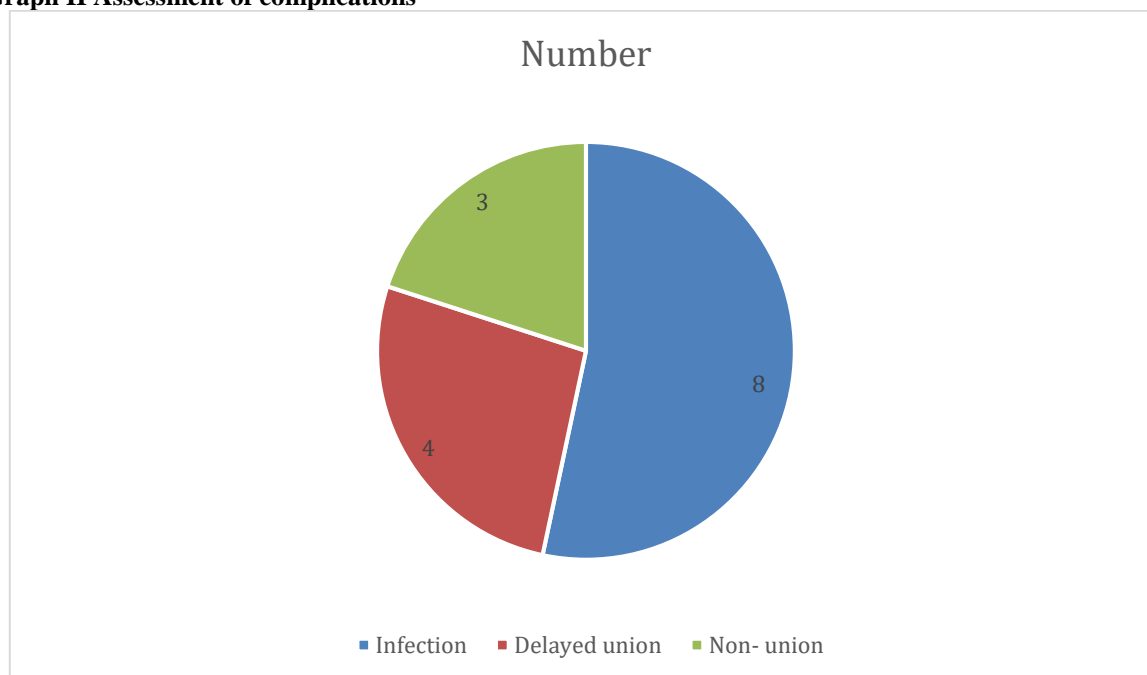
Etiology	Number	P value
RTA	48	0.01
Sports injury	22	
Fall	13	
Miscellaneous	7	

Table II shows that etiology of fracture was RTA in 48, sports injury in 22, fall in 13 and miscellaneous in 7 cases. The difference was significant (P< 0.05).

Table III Assessment of complications

Complications	Number	P value
Infection	8	0.05
Delayed union	4	
Non- union	3	

Table III, graph II shows that common complications was infection in 8 cases, delayed union in 4 cases, and non- union in 3 cases. The difference was significant (P< 0.05).

Graph II Assessment of complications**DISCUSSION**

An established method for treating fractures involving the maxillomandibular complex is intermaxillary fixation (IMF).⁸ The overall management of mandibular angle fractures follows the same guidelines as other body fractures, with a primary focus on realigning and immobilizing the fractured bone fragment. The use of Champy and colleagues' concepts has grown in popularity when non-compressive miniplate fixation is implanted transorally. Numerous bone-plating technologies have been created to offer osteotomies and mandibular fractures reliable care.^{9,10} Three-dimensional (3D) miniature locking plates varying in size, form, and quantity were developed. The monocortical, juxta alveolar, and subapical osteosynthesis without compression principles serve as the foundation for this IMF approach. It makes use of tiny, flexible plates. It makes use of little malleable plates that resist shearing, bending, and torsional stresses on the fracture segments by controlling rotation in the angle fracture and preventing the screws from becoming loose.^{11,12} Its special double lead thread promotes fracture healing, increasing stability and minimizing occlusal relationship change while promoting the growth of the periosteum beneath the plates by creating minimum interference with the blood supply to the bone. Monocortical plates are being used in maxillofacial surgery more frequently because of their intraoral approach, small size, convenience of implantation, and ease of adaptation.^{13,14} The present study was conducted to assess the efficacy of locking miniplate in the treatment of mandibular fractures without intermaxillary fixation.

We found that out of 90 patients, males were 55 and females were 35. Sweta et al¹⁵ examined the new

locking bone plate screw system's clinical efficacy in cases of mandibular fractures without internal mechanical support (IMF) after surgery. Using locking 2 mm micro plates and screws without IMF, the fracture site was exposed in 18 individuals, and the fracture segments were reduced and approximated while maintaining the desired occlusal relationship. The individuals were observed weekly for the first four weeks of the study, after which they were evaluated for up to six months each month to evaluate radiographic and clinical healing, and the findings were formulated. Ten participants (55.5%) reported that a road traffic collision was the cause, with assault accounting for 22.2% (n = 4) and falls from height accounting for 16.6% (n = 3) of the cases. 44.4% (n = 8) of the individuals had parasymphysis, while 11.1% (n = 2) had symphysis. 5.5% (n = 1) of the individuals experienced a mild complication of wound dehiscence, which was handled conservatively. One subject experienced a significant complication of infection, which necessitated removal of the plate at the 4-week follow-up. After that subject's plate was removed, IMF was completed. Every other site recovered without any problems. Of the participants, 94.4% (n = 17) showed primary healing in the bone, but in the infected instance, primary healing was not observed.

We observed that the site of fracture was left body of mandible in 26, right body of mandible in 19, left angle of mandible in 11, right angle of mandible in 9, and parasymphysis in 15 patients. Nayak et al¹⁵ ascertained the effectiveness of locking plates and screw systems in the management of mandibular fracture surgery. 100 patients received treatment using the standard method, while 100 patients received treatment using locking plates and screws. A

statistically significant difference was seen in the following areas: mobility of the shattered pieces, postoperative screw loosening, postoperative plate fracture, postoperative occlusal discrepancy, and working time between

We found that etiology of fracture was RTA in 48, sports injury in 22, fall in 13 and miscellaneous in 7 cases. The common complications was infection in 8 cases, delayed union in 4 cases, and non-union in 3 cases. The effectiveness of 2.0-mm 3D locking miniplates and 2.0-mm mini locking plates in treating mandibular angle fractures was compared by Subramaniyan et al.¹⁶ In this study, 34 patients with mandibular angle fractures were randomized into two groups: Group 1 (treated with a standard 2.0-mm micro locking plate) and Group 2 (managed with 3D miniplates). Occlusal stability, fracture displacement, inflammatory indicators, and any postoperative hardware failure were among the measures assessed. Group 2 saw a considerably shorter mean operation duration ($P < 0.05$). Group 2 had a higher rate of normal healing compared to Group 1, and no hardware failure was seen in either group. The third week of follow-up for Group 2 patients revealed more satisfactory postoperative occlusal stability, which was statistically insignificant.

Prabhakar C et al¹⁷ evaluated the efficacy of locking miniplate/screw system in the treatment of mandibular fractures without maxillomandibular fixation. 20 patients with undisplaced or minimally displaced mandibular fractures cases were treated by open reduction and internal fixation using the 2.0 mm locking plate/screw system. Open reduction and internal fixation with the 2.0 mm locking plate/screw system were achieved in all the 20 cases with satisfactory stability of the fracture fragments. The system was found to be reliable and effective intraoperatively.

CONCLUSION

It was discovered that the locking miniplate method worked effectively for treating mandibular fractures. The complication rate was low in these patients.

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