

2.0mm 3D VERSES 2.0mm MINI PLATES IN MANDIBULAR FRACTURES

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Abstract

Background: Since so many years there is fixation of mandibular fractures with conventional mini plates, to get the normal functioning of the mandible. The aim and objective are comparison of 3d mini plates and conventional mini plates of 2mm in mandibular symphysis fracture to check results of operating time, stability, infection. **Materials and Methods:** Patients with clinical and radiographical evidence of symphysis fracture of mandible and treated with 2mm 3D miniplate and conventional 2mm mini plate. The assessment was done immediate post op and 5th day 7th day 10th day after ORIF. **Result:** The operating time taken for 3D mini plate fixation is mean 30 mins where as conventional mini plate took 40mins of operating time, stability was well achieved with 3D and infection control was equal in both the cases. **Conclusion:** 3D mini plates are better when compared with conventional mini plates in mandibular symphysis fractures.

INTRODUCTION

Maxillofacial trauma is a prominent component of these accidents, with the mandible being one of the most commonly involved bone due to its forward facial projection. The concept of bone plating has changed over time, with the introduction of various modifications. Sequentially, bone plates such as compression plates, eccentric, dynamic compression plates, dynamic compression plates, miniplates, and microplates have been introduced, but miniplates are the ones most commonly used. The currently used conventional miniplate techniques require maxillomandibular fixation for a short period and are unable to render three-dimensional (3D) stability at fracture site. Champy's method of semirigid fixation uses easily bendable mono cortical miniplate along an "ideal osteosynthesis line." Developing forces are neutralized by masticatory force that produces a natural strain of compression along the lower border of the mandible. The 3D plating system is based upon the principle of obtaining support through geometrically stable configuration. Farmand and Dupoirieux presented 3D (three-dimensional) plates with quadrangular shapes.^[1-5]

MATERIALS AND METHODS

10 patients were selected at age group of 21 to 35 both include male and female, 5 in each group, Group A were treated with conventional 2mm mini plate and Group B treated with 3D mini plates.

All the cases are road traffic accident cases and one is assault female case, all the treated cases were involved not only with symphysis fractures but also with sub condylar and angle fractures, standard intra oral surgical procedures were followed for all the cases, for dissection and fracture site exposure, all the cases upper and lower arch bars were placed under clinical procedure before the ORIF. All the cases are posted under general anaesthesia for ORIF, Pre anaesthetic evaluation was done and all the cases done with nasal intubation. Transvestibular incision was given from mandibular canine to canine region for the exposure depending upon the location of the fracture site, 15 number bp blade in some cases and monopolar cautery tip, and at this point, time was noted, after injecting with local anesthesia and a curvilinear incision was given in the anterior subapical mandibular region leaving a height of 5 to 7 mm from the free gingival margin. After layer-by-layer dissection of the mucosa with the help of periosteal elevator, the mentalis muscle was sharply incised in an oblique manner till the bone was encountered; once the bone was visible, Subperiosteal dissection was done and the mentalis muscle was dissected in a subperiosteal plane, retraction of the labial tissues was facilitated by stripping them off to the inferior border of the mandible, and the fracture line was completely exposed. Fracture reduction done and IMF placed to stabilize the fracture segments. Fixation was done using either 3D 2-mm stainless steel, 4 holes plates (Group A) or a conventional miniplate of 2 mm, 4 holes with gap plates (Group B) using Champy's

principle of osteosynthesis. 3D plates were adapted across the fracture line in such a way that the horizontal crossbars were perpendicular to and the vertical struts were parallel to the fracture line. The time at which the plates were adapted in both groups was noted. In cases with oblique fracture, the plates were placed parallel to the lower border of the mandible. In symphyseal fractures, the upper crossbar was placed in subapical position. Champy plates in symphyseal, 2 plates, were placed to overcome the torsional forces. About 2.5 mm gap plates were placed at the lower border and 2 mm plates were placed at the upper border, either 2 holes with gap or 4 holes with gap. In both types of plating, 2.0 × 8 mm or 2.0 × 10 mm stainless steel screws were used to stabilize the plates in the lower border for 2D plates, for 3D plates the sizes of the screws were 2 × 8 mm or 2 × 10 mm, and for the upper border 2 × 6 mm screws were used for both plating system. After achieving homeostasis a well tight layer by layer closure was done with 3.0 vicryl suture material. Advice to shift the patients intence care unit for post op evalution, soft diet was allowed depending on type of fracture involved in mandible.

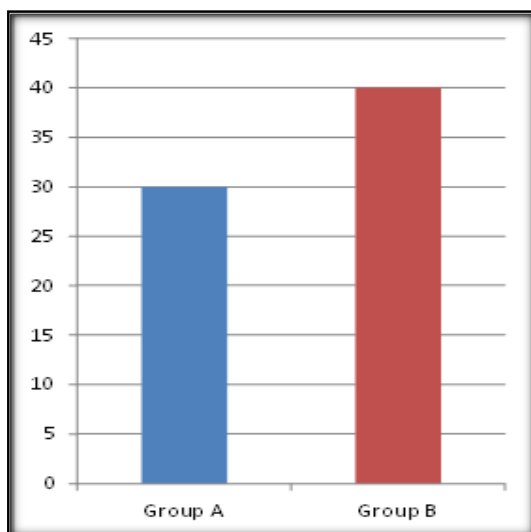
RESULTS



Case no 1 bilateral symphysis of the mandible



Case no 2 bilateral symphysis of the mandible



Operating time. In minutes

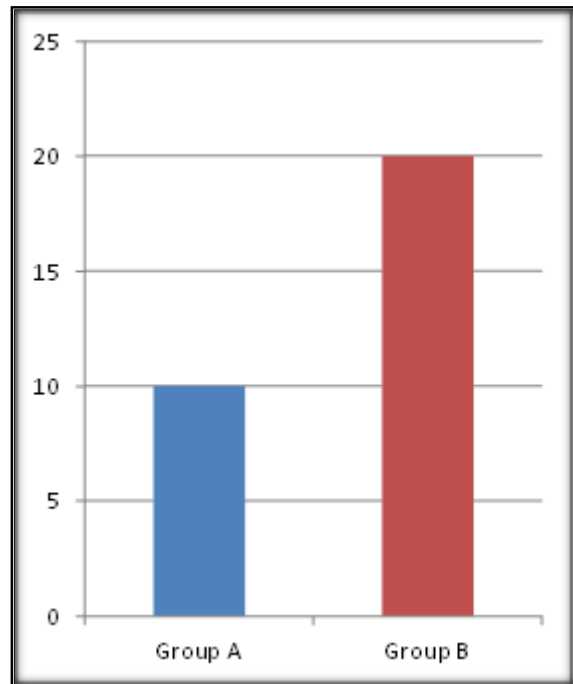
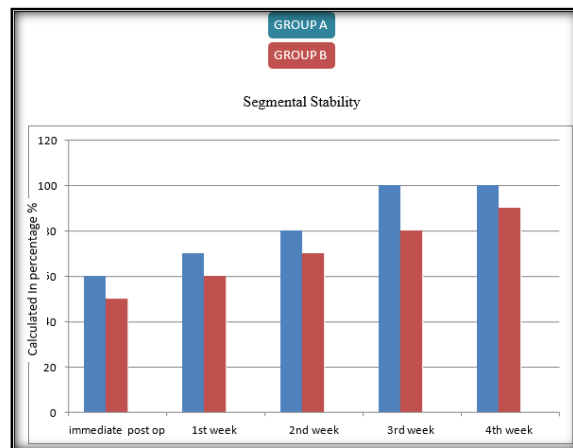


Plate adaption, drill and lag screw fixation



wound dehiscence status between the groups, it was found that the wound dehiscence was absent in all the cases of both the groups at the post op 1st week 2nd week and 8th week.

The segmental mobility of the fracture was mild to moderate from the 1st week to 8th week.

DISCUSSION

The operating time for the conventional mini plating was higher than 3D mini plate, There are different methods of direct fixation with an open approach. AO bicortical plating system such as twodimensional miniplating system and screws and 3-dimensional miniplating system are recent methods for mandibular symphysis fractures, single 3D plate stabilized the fracture both at the superior and inferior border at a time, hence time is saved in plate fixation. Feledy et al and Zix et al on a 3D plate with similar parameters as our study, reduced average operating time was reported (55 min) for the 3D group. The evaluation of operative time is a totally

operator-dependent parameter. Following the same surgical and instrumentation protocol and given the severity and favorability of the fracture if all these parameters remain the same, the difference in operating time can only depend upon the skill and experience of the operator.^[6-8]

Barde et al. conducted a study in 40 patients with anterior mandibular fractures. Group I consisting of 20 patients in whom 3D plates and group II consisting of other 20 patients in whom 4 holes straight plates were used. It was found that the mean operation time for group II was more compared to group I. There was significantly greater pain on day of surgery and at 2nd week for group II patients but there was no significant difference between the two groups at 4th week. The postoperative infection, occlusal disturbance, wound dehiscence, postoperative mobility at the fracture site, and neurological deficit were statistically insignificant.^[9,10]

CONCLUSION

As per the results of our study, the fixation of mandibular fractures with 3D plates provides 3D stability and carries low morbidity and infection rates. 3D miniplate system is more useful in the management of cases of mandibular fractures as compared to 2D miniplates.

REFERENCES

1. Mishra N, Thakkar N, Kar I, et al. 3-D miniplates versus conventional miniplates in treatment of mandible fractures. *J Maxillofac Oral Surg* 2017. 1–8.
2. Mukherjee R, Mukherjee G, McGuire M. Mandibular fractures: historical perspective. *Br J Oral Maxillofac Surg*. 2006;44:222-228.
3. Champy M, Lodde JP, Jaeger JH. Mandibular osteosynthesis according to the Michelet technique. I. Biomechanical bases (in French). *Rev Stomatol Chir Maxillofac*. 1976;77:569-576.
4. Budhraj N, Shenoi RS, Badjate SJ, et al. Three-dimensional locking plate and conventional miniplates in the treatment of mandibular anterior fractures. *Ann Maxillofac Surg* 2018;8(1):73–77. DOI: 10.4103/ams.ams_175_17.
5. Almoraisi EA, Ellis III E. What method for management of unilateral mandibular angle fractures has the lowest rate of postoperative complications? A systematic review and meta-analysis. *J Oral Maxillofac Surg* 2014;72(11):2197. DOI: 10.1016/j.joms.2014.05.023.
6. Comparison of 2 mm single locking miniplates versus 2 mm two non-locking miniplates in symphysis and parasymphysis fracture of mandible. Vashistha A, Singh M, Chaudhary M, Agarwal N, Kaur G. *J Oral Biol Craniofac Res*. 2017 Jan-Apr; 7(1):42-48. DOI: 10.1016/j.jobcr.2016.01.001, PMID: PMC5343153
7. Retrospective analysis of 1502 patients with facial fractures. Lida S, Kogo M, Sugiura T, Mima T, Matsuyu T. *Int J Oral Maxillofac Surg* 2001;30:286-90. DOI: 10.1054/ijom.2001.0056, PMID: 11518349.
8. A Comparative Evaluation of 2.0mm Two-Dimensional Miniplates Versus 2.0mm Three-Dimensional Miniplates in Mandibular Fractures. Godvine Sarepally, Swetcha Seethamsetty, Tanveer Karpe, Fazil A Nasyam, Umayra Fatima, Raia Fatema. *Cureus*. 2022 Jan; 14(1): e21325. DOI: 10.7759/cureus.21325, PMID: 35186584
9. Advancements in Management of Mandibular Fractures. Kanwaldeep Singh Soodan and Pratiksha Priyadarshni. *Acta Scientific Dental Sciences*. 2018; 2.5: 29-31.
10. Morris C, Bebeau NP. Mandibular fractures: an analysis of the epidemiology and patterns of injury in 4,143 fractures. *J Oral Maxillofac Surg* 2015;73(5):951. DOI: 10.1016/j.joms.2015.01.001.