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ORIGINAL ARTICLE

Analysis of Different Treatment Modalities for Mandibular Angle Fractures- A Clinical Study

Rajveer Singh Yadav

Consultant Maxillofacial Surgeon, Madhya Pradesh, India

***ABSTRACT*:**
Background: The mandibular angle is fractured in approximately 25%- 33% of all cases. Road traffic accidents and assaults are the primary cause of mandibular fractures. The present study was conducted to compare the 2.0 mm locking, 2.0 mm non-locking metal plating systems and 2.5 mm bioresorbable plates in the management of mandibular angle fracture. **Materials & Methods:** The present study was conducted in the department of Oral & maxillofacial surgery. It comprised of 45 patients of both genders. Patients were divided into three groups of 15 each. Group I were treated with 2 mm locking system, group II treated with 2 mm non- locking system and group III patients were treated with 2.5 mm resorbable system. **Results:** Out of 45 patients, group I patients were treated with 2 mm locking system, group II treated with 2 mm non- locking system and group III patients were treated with 2.5 mm resorbable system. Each group had 15 patients each. Mean age in group I was 28.9 years, in group II was 27.2 years and in group III was 30.5 years. In group I, males were 8 and females were 7, in group II, males were 10 and females were 5, in group III, males were 6 and females were 9. In group I, isolated fractures were 12 and combined fractures were 3, in group II, isolated fractures were 9 and combined fractures were 6 and in group III, isolated fractures were 8 and combined fractures were 7. The difference was non- significant (P> 0.05). Complications such as delayed union was seen in 1 patients in group II, infection in 1 patient in group III, malocclusion in 2 patients in group I, 1 in group II and 2 in group III, plate removal due to infection and at will in 1 patient each in all groups. The difference was non- significant (P> 0.05). **Conclusion:** Mandibular angle fracture is common among facial bone fractures. All systems found to be equally effective in the management of mandibular angle fracture.
Key words: Fracture, Mandibular angle, Road traffic accidents.

Corresponding Author: Dr. Rajveer Singh Yadav, Consultant Maxillofacial Surgeon, Madhya Pradesh, India

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INTRODUCTION

Human face is made up of multiple bones. The maxilla and mandible forms the jaw bones. Maxilla is known as upper jaw and mandible is termed as lower jaw. Mandible is the complex bone which forms the major part of the face. It is the bone which is attached to the skull with the help of condyles in the glenoid fossa.[1]

Mandible has body, ramus, angle, coronoid process, condyles, symphysis and sigmoid notch. People are prone to accidents due to which fractures of facial bones becomes common. In case of mandible, common site involved are ramus, body and angle. Fracture of the condyle is unilateral when trauma occurs on one side of the lower jaw and it is bilateral when injury occurs on chin. Coronoid process of the mandible is least to be fractured.[2]

The mandibular angle is fractured in approximately 25%-33% of all cases. Road traffic accidents and assaults are the primary cause of mandibular fractures. Signs and symptoms of mandibular angle fracture includes pain and edema, change in occlusion, paresthesia of lower lip, hematoma, ecchymosis, mobility of teeth, and crepitation on palpation.[3]

Presence of incompletely erupted third molars is associated with an increased risk of angle fracture. However, multiple factors influence fracture patterns in the mandible, such as presence of soft tissue bulk, direction and severity of the forces, impact, and biomechanical intrinsic characteristics of the mandible. The mandibular angle shows the maximum number of complications among all mandibular fracture sites.[4]

The management of mandibular angle fracture requires plating which can be locking, non- locking and resorbable plating. The hardware can be 2.4 mm, 2.0 mm locking, 2.0 mm non-locking metal plating systems or a 2.5 mm bioresorbable system, which has shown comparable efficacy.[5] The present study was conducted to compare the 2.0 mm locking, 2.0 mm non-locking metal plating systems and 2.5 mm bioresorbable plates in the management of mandibular angle fracture.

MATERIALS & METHODS

The present study was conducted in the department of Oral & maxillofacial surgery. It comprised of 45 patients of both genders. All were confirmed cases of mandibular fractures with the help of panoramic radiographs. Patients were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study.

General information such as name, age, gender etc. was recorded. Patients were divided into three groups of 15 each. Group I were treated with 2 mm locking system, group II treated with 2 mm non- locking system and group III patients were treated with 2.5 mm resorbable system.
All the patients were given perioperative oral antibiotics (Amoxicillin + Clavulanate) for five days. No patient was kept on maxillomandibular fixation postoperatively. They were kept on a liquid diet for one week, gradually switching to semi-solid intake in the coming weeks. In all groups, complications were also recorded. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 45		
Group I (2 mm locking system)	Group II (2 mm non- locking system)	Group III (2.5 mm resorbable system)
15	15	15

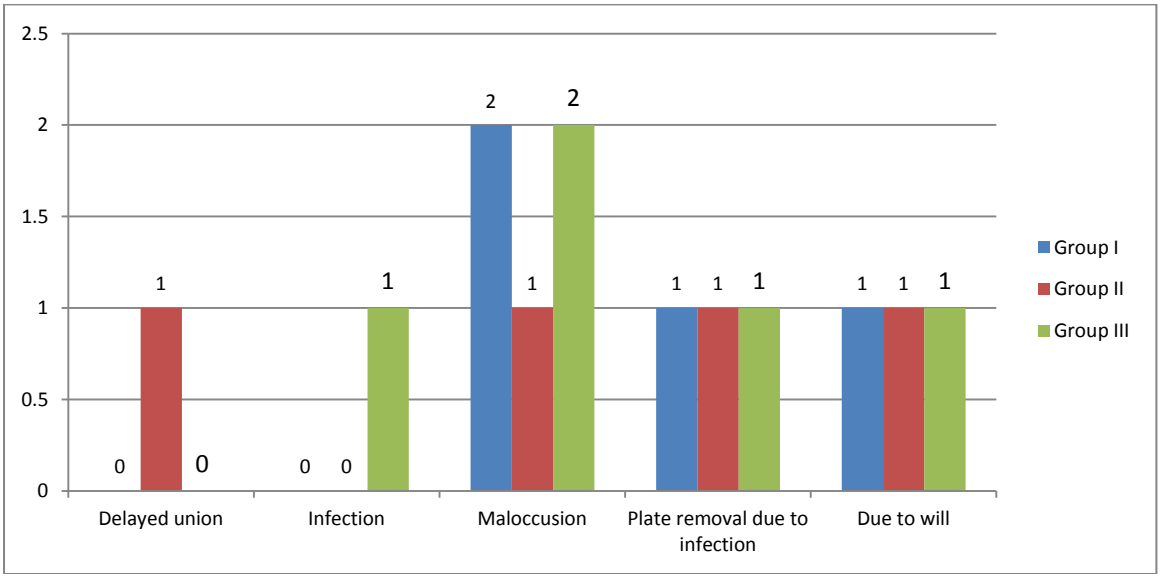
Table I shows that out of 45 patients, group I patients were treated with 2 mm locking system, group II treated with 2 mm non- locking system and group III patients were treated with 2.5 mm resorbable system. Each group had 15 patients each.

Table II Comparison of parameters

Parameters	Group I	Group II	Group III
Age (mean) years	28.9 years	27.2 years	30.5 years
Sex	M- 8, F- 7	M- 10, F- 5	M- 6, F- 9
Isolated fracture	12	9	8
Combined fracture	3	6	7

Table II shows that mean age in group I was 28.9 years, in group II was 27.2 years and in group III was 30.5 years. In group I, males were 8 and females were 7, in group II, males were 10 and females were 5, in group III, males were 6 and females were 9. In group I, isolated fractures were 12 and combined fractures were 3, in group II, isolated fractures were 9 and combined fractures were 6 and in group III, isolated fractures were 8 and combined fractures were 7. The difference was non- significant (P> 0.05).

Graph I Complications in groups



Graph I shows that complications such as delayed union was seen in 1 patients in group II, infection in 1 patient in group III, malocclusion in 2 patients in group I, 1 in group II and 2 in group III, plate removal due to infection and at will in 1 patient each in all groups. The difference was non- significant (P> 0.05).

DISCUSSION

Fractures of the mandibular angle account for the highest percentage of mandibular fractures in most of the studies. Several factors are associated with an increased risk of angle fracture incidence: site, direction and severity of force, musculature of the face, architecture of the mandible, soft tissue bulk, biomechanical intrinsic characteristics of the mandible, and presence or absence of third molars.[6]

According to Paza et al[7] displaced angle fractures can rarely be adequately reduced by maxillomandibular fixation alone. Therefore, an open reduction and internal fixation of these fractures should be performed. However, several studies have documented high complication rates after rigid internal fixation of the mandibular angle.

In this study, out of 45 patients, group I patients were treated with 2 mm locking system, group II treated with 2 mm non- locking system and group III patients were treated with 2.5 mm resorbable system. Each group had 15 patients each. This is in agreement with Ramkarishnan et al.[8]

The impacted mandibular third molars increase the risk of mandibular angle fractures and decrease the risk of mandibular condylar fractures by moderate trauma force. The partially erupted third molars disrupt the cortical integrity of the external oblique ridge which weakens the mandibular angle, thus decreasing the resistance to angle fractures. Mandibular strength would be derived from the maintenance of cortical bone integrity.[9]

In present study, we analyzed complications in all groups. Complications such as delayed union was seen in 1 patients in group II, infection in 1 patient in group III, malocclusion in 2 patients in group I, 1 in group II and 2 in group III, plate removal due to infection and at will in 1 patient each in all groups.

In the study by Loughlin et al[10], 50 patients were treated by single miniplate osteosynthesis according to Champy's principle. Bite force generated was used as a parameter for judging the efficacy of internal fixation. Most patients were of 21e30 yrs of age with unilateral angle fracture of mandible except one patient who had isolated bilateral angle fracture. The patients were treated successfully according to Champy's principle of osteosynthesis. There was a progressive improvement in the bite force generated after osteosynthesis.

In a study by Bhatt et al[11], trauma records were screened for linear angle fractures treated with open reduction and internal semi rigid fixation with single metal/bioresorbable plates. The outcome variable was the presence or absence of any complication. A total of 60 case records of over four years were included. The mean age of the patients was 27.4 years. Fifty five were males and five females.

There were 20 nonlocking and 16 locking metal miniplates and 24 bioresorbable plates. In 91.6% cases there was a third molar in the fracture line. 92.7% cases the third molar was retained. In seven patients postoperative complications were seen. There was no difference between the complication rates of the three treatment groups. Infection was the most common complication followed by delayed union and hardware failure.

CONCLUSION

Mandibular angle fracture is common among facial bone fractures. All systems found to be equally effective in the management of mandibular angle fracture.

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