



Original Article

A Clinical Assessment on Complications between Two Surgical Intervention Groups Using Single and Double Mini Plates for Fixation of Mandibular Angle Fracture

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ABSTRACT:

Background: The adequacy of mini-plate fixation for the repair of angle fractures is a continuing subject of debate. Despite advances, treatment of mandibular fractures has continued to be associated with multiple complications.

Objectives: The current prospective study aimed to compare the complications between two surgical intervention groups.

Methods: The study group receiving one mini-plate for rigid fixation of simple angle fractures of mandible were 21 in numbers and 25 patients received two mini-plates.

Results: Overall complication rate was 19.04% in case of single plate group whereas 16% cases in double mini-plate. But infection rate in single mini-plate intervention group was little less than double plate intervention group. Malocclusion was not reported in double plate intervention group where as approximately in 5 % cases of single plate intervention group reported malocclusion in this study. Statistical analysis and p-value showed no significant difference between two surgical intervention groups.

Interpretation & Conclusion: For better compliance of the patients having fracture at the angle of mandible, either one or two mini-plate can be applied.

Key words: mandibular fracture, miniplates, antibiotic therapy

1. Introduction

The use of non-compression mono-cortical mini-plate fixation for

osteo-synthesis of mandibular fractures was introduced by Michelet et al and further advanced by Champy et al. [1] Many experimental and clinical studies

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have shown that the adequacy of mini-plate fixation for the repair of angle fractures is a continuing subject of debate. Choi et al. [2] demonstrated that a second mini-plate along the inferior border helps to stabilize the fixation during functional loading.

Despite advances, treatment of mandibular fractures has continued to be associated with multiple complications [3]. Mandibular angle fractures, in particular, have been fraught with high post-surgical complication rates [4,5]. In 1991, however, Levy et al. demonstrated a low complication rate using double mini-plates for internal fixation of angle fractures vs. a higher complication rate when a single mini-plate was used, while Ellis and Walker suggested that the use of a single mini-plate at the angle provided a lower complication rate than the use of 2 miniplates [5,6].

Passeri et al. performed a retrospective review of complications in 96 patients, with 99 angle fractures, treated with either closed or non-rigid fixation combined with MMF. An overall complication rate of 17% was found, with infection being the most common. James et al. [7] reviewed non-rigid treatment of 253 patients; 136 fractures were through the angle. Nine infections occurred at the angle, accounting for an

infection rate of 7%[8]. The present study is aimed to assess the complications of single mini-plate and double mini-plates in the treatment of fractures of the mandibular angle.

2. Materials and Methods

This study was conducted in the year of 2008 among the admitted patient of Oral & Maxillofacial Surgery Department, Dhaka Dental College Hospital. Recruitment of the study subjects were done following the instructions of ethical clearance. Total 46 patients fulfilling the inclusion and exclusion criteria were included in the study.

The variables recorded for descriptive analysis were stability, malocclusion, infection, persistent pain around the wound, trismus, malunion, non-union, delayed union, lip parasthesia, added post operative short term IMF and need for removal of plates. The malocclusion was reported as occlusal disturbance was measured using molar relationship, canine relationship, anterior open bite, posterior open bite & cross bite. Molar relationship is classified in three types, Class-I, Class-II & Class-III. Similarly canine relationship is also classified.

The participants of the study were assigned either as group-A (single

miniplate) or group-B (double miniplate) after randomization.

i) **Group-A:** For whom, open reduction followed by internal fixation with one SS non-compression 2.0 miniplate and mono-cortical SS screw along the external oblique line (Champy line).

ii) **Group-B:** For whom, open reduction followed by internal fixation with two SS non-compression 2.0 miniplates and mono-cortical SS screw along the external oblique line and the inferior border of buccal cortex.

3. Result

The study group receiving single mini-plate for rigid fixation of simple angle fractures of mandible were 21 in numbers and 25 patients received double mini-plates. Among the respondents total male were 38(82.60%) and 8 (17.40%) were female. About ten percent (9.52%) cases in single mini-plate group had reported occlusal disturbance and no such report found in the double mini-plate group. In single mini-plate intervention group 4.76% were infected and plate was removed.

In double mini-plate intervention group 8% of the cases were infected, among them 4% cases required plate removal rest 4% infection were treated by antibiotic therapy and no plate removal was required. Total 1

case was infected post operatively in single mini-plate intervention whereas 2 cases were infected in double mini-plate intervention group. Both cases p value were .000 which is highly significant (<0.05). Only 1 malocclusion was reported in single mini-plate intervention whereas no malocclusion was reported in double mini-plate intervention group. Malocclusion occurred in 4.76% cases among the single mini-plate intervention, P =.000 which is highly significant (<0.05). Among 46 patients none had trismus, malunion, delayed-union, non-union and lip parasthesia so, chi-square of these data could not be measured. 1 patient of each group had to remove their plate due to infection and their rate of removal was 4.76% and P=.000(<0.05) which is highly significant. Overall complication rate was 19.04% in case of single plate group whereas 16% cases in double mini-plate.

4. Discussion

The present study shows incidence of different complications in two intervention groups and their significance. Total 1 case was infected post operatively in single mini-plate intervention whereas 2 cases were infected in double mini-plate intervention group. Both cases p value were .000 which is highly significant (<0.05). Persisting pain in and around the wound was not

reported and thus data could not be analyzed for testing significance. Only 1 malocclusion was reported in single mini-plate intervention whereas no malocclusion was reported in double mini-plate intervention group. Malocclusion occurred in 4.76% cases among single mini-plate intervention, p value .000 which is highly significant (<0.05). Among 46 patients none had trismus, malunion, delayed-union, non-union and lip parasthesia so, chi-square of these data could not be measured. One patient of each group had to remove their plate due to infection and their rate of removal was 4.76% and $P = .000$ (<0.05) which is highly significant. Overall complication rate was 19.04% in case of single plate group whereas 16% cases in double mini-plate.

Passeri et al performed a retrospective review of complications in 96 patients, with 99 angle fractures, treated with either closed or non-rigid fixation combined with MMF. An overall complication rate of 17% was found, with infection being the most common. James et al.[7] reviewed non-rigid treatment of 253 patients; 136 fractures were through the angle. Nine infections occurred at the angle, accounting for an infection rate of 7%[8].

Levy and coworkers reported on 32 angle fractures treated with paired mini-plates in which there was 1 complication (3.1%) (Infection) compared with 5 complications (26.3%) in 19 patients treated with a single mini-plate across the oblique line (infection, $n = 3$ (15.7%); delayed union, $n = 1$ (5.3%); and malocclusion, $n = 1$ (5.3%)[6].

Feller et al.[9] state that healing complications occur in 2.3% of cases, according to Dhariwal et al. [10], such percentage is 7.3%, Lamphier et al. [11] - 13.3%, Atanasov [12] - 25.2%, etc.. Such huge difference between the findings presented by different authors exists because some authors attribute bleeding, hematomas, infections, neural damage, and post-operative calluses to complications, while others think that complications include fracture fragments adhesion failure, damage to the lower alveolar nerve, osteomyelitis, and malocclusion [13].

Conclusion

In this study infection rate in single mini-plate intervention group was little less than double plate intervention group. Malocclusion was not reported in double plate intervention group where as approximately in 5 % cases of single plate intervention group reported malocclusion.

Competing Interests

Authors have declared that no competing interests exist.

Authors' Contributions

All authors designed the study, Azam and Rahman performed surgery and collected data, Islam analyzed data, Rahman and Islam drafted the paper, and all authors read and approved the manuscript.

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Figure 1: Infections in post-operative cases

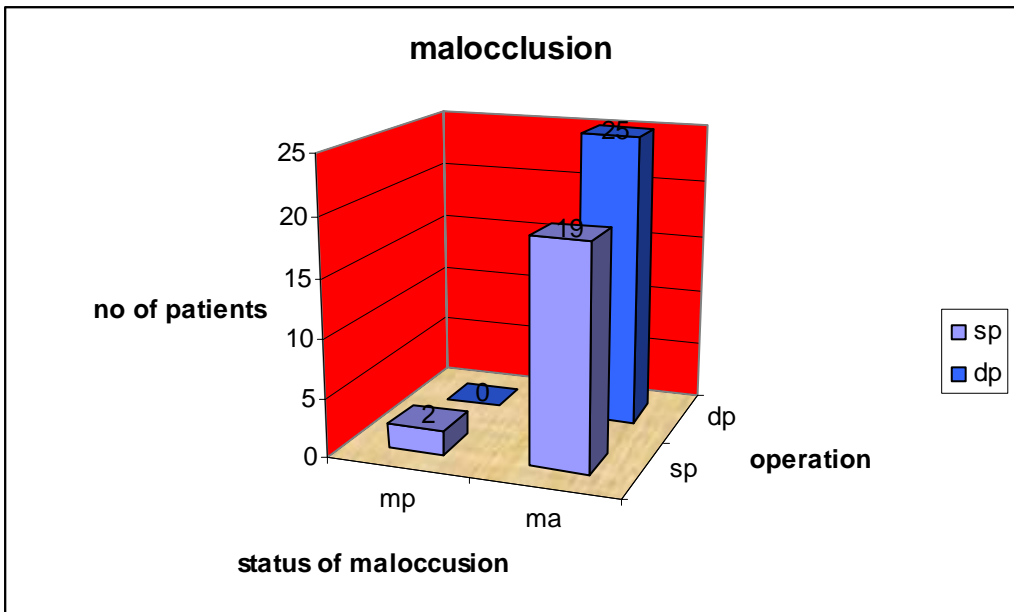


Figure 2: Malocclusion in post-operative cases

