

# Patient Satisfaction and Functional Outcomes of Treatment of Parasymphysis Fractures Using two Mini-plates and One Mini-plate with Arch Bar, A One Year Comparative Study

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## ABSTRACT

**Objective:** The purpose of this study is comparison of patient satisfaction and functional treatment outcomes of parasymphysis fractures treated with two mini-plates and one mini-plate along with arch bar.

**Study Design:** Prospective Comparative study

**Place and Duration of Study:** This study was conducted at the Department of Oral & Maxillofacial Surgery, Sardar Begum Dental College and Hospital, Peshawar and Northwest General Hospital Peshawar from July to Dec. 2018.

**Materials and Methods:** 60 patients with diagnosed isolated parasymphysis fracture were included in the study. Two mini-plates were used for treatment in 30 patients in Group (A), while 30 patients in Group (B) were treated with one mini-plate with arch bar. The operative time and cost of the treatment was noted from start till end. Patient were checked at 15 days & 1, 3 and 6-months follow up visits for effect on the quality of life by measuring the number of days missed from work, return to normal diet and duration of bed rest and was comparison was made between both the groups.

**Results:** The mean operating time in group A was 61.49 minutes while in group B it was 47.93 minutes. The average cost of treatment in group A was 8533.33 rupees while in group B it was 4383.33 rupees. The effect on quality of life was more for patients with group B than A.

**Conclusion:** Patients treated with two miniplates have higher cost and greater operating than patients treated with one miniplate along arch bar but have improved quality of life than arch bar group

**Key Words:** Parasymphysis Fracture, Miniplate, Arch Bar, Patient Satisfaction

**Citation of article:** Umar M, Sulaiman M, Rashid S, Sarfaraz A, Noreen A, Sattar N. Patient Satisfaction and Functional Outcomes of Treatment of Parasymphysis Fractures Using two Mini-plates and One Mini-plate with Arch Bar, A One Year Comparative Study. *Med Forum* 2020;31(10):52-55.

## INTRODUCTION

In present era, there is a significant increase in the occurrence of craniofacial trauma due a mass increase in the number of vehicles and bad conditions of the roads<sup>1</sup>. Due to its prominent position, mandible is the second most common fractured bone in craniofacial trauma and parasymphysis is most commonly fractured after condyle and angle<sup>2</sup>.

Therefore, treatment goals are aimed to improve diet, increase comfort, and earlier return to work with a decrease joint damage to prolong immobilization,

which has replaced prolong maxillomandibular fixation (MMF) with open reduction and internal fixation (ORIF) for early mobilization and early return to work<sup>3,4</sup>.

Due to complex mandibular anatomy and the direction of forces due to muscles attachment, parasymphysis fractures are problematic during treatment because these forces separate the lower border of mandible at fracture area<sup>5,6</sup>. Therefore, high level of torsional forces the parasymphyseal region need to be balanced by two miniplates one at the inferior border and the other below the apices of the teeth to provide stable occlusion during mastication and uneventful osteogenesis of reparative bone<sup>7</sup>. But placement of two miniplates in parasymphyseal region results in damage to the mental nerves and roots of the teeth in many cases<sup>8, 9</sup>. Additionally the operating time and cost of the treatment is increased by using two miniplates<sup>10, 11</sup>. To eliminate the placement of second plate, alternate possibility could be placement of arch bar on mandibular teeth that acts as a tension band and thereby eliminates the necessity of upper miniplate and only lower miniplate is placed along with arch bar<sup>11</sup>.

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Received: July, 2020

Accepted: September, 2020

Printed: October, 2020

Therefore, this study was carried out to find the effectiveness of two miniplates and one miniplate along with arch bar, in terms of patient satisfaction and functional outcome.

## MATERIALS AND METHODS

**Study Design and Population:** After approval from the ethical committee and Research Centre, this comparative study was carried out at the Department of Oral & Maxillofacial Surgery, Sardar Begum Dental College and Hospital, Gandhara University, Peshawar, and Northwest General Hospital Peshawar from July to Dec. 2018.

A total number of 60 patients presenting with isolated parasymphysis fracture in the age group of 14 to 75 years were included in the study irrespective of gender, after detail history followed by clinical and radiological examination. Patients presenting with preexisting infection, mandibular defect, edentulous mandible, parasymphysis with condyle fracture, medically compromised and non-compliant patients were excluded from the study. Informed consent was taken after explaining both the risks and benefits of both procedures to all the patients. The selected sample was randomly assorted by lottery method into two equal groups (A and B), 30 patients in each group. Patients with Group A was treated with two miniplates while patients with group B was treated with on miniplate along with arch bar. The principal outlined by Chapmy for Standard miniplates system were applied in this study.

Patient satisfaction and functional outcome was measured on the basis of effect on quality of life, days missed from work, time needed to get normal diet and total cost of the procedure. All the patients were followed at 2 weeks, 1 month, 3 months and 6 months period to check the outcome measurements.

The plates used in this study was made of titanium with 2 mm AO system of plating of 1.5mm thickness and mono cortical screws with a diameter of 1.7mm. Erich arch bar were used for intermaxillary fixation in group B patients.

**Interventions:** Standardized treatment protocol was used in all patients. All patients were given intravenous antibiotics prophylaxis preoperatively with Amoxicillin 1g or Erythromycin 1g in case of Amoxicillin allergy and was continued for 3 days post operatively. Buccal sulcus approach was used for exposure of the fracture segments in all the patients under general anesthesia. Erich arch bar was applied and occlusion was achieved using intermaxillary wiring. Reduction clamps were used for anatomic alignment of the fractures segments and fixation was done with 2 titanium miniplates in Group A and 1 miniplate in group B. Intermaxillary fixation was released after repair of the soft tissues and arch as removed in patients with group A and maintained in Group for 6 weeks. The time needed for

surgery completion was recorded. All the interventions were done by a single surgeon to eliminate operator dependent bias.

All the patients were kept on liquid diet for 2 weeks and then were slowly advanced to soft diet for the next 2 weeks. Thereafter, diet well tolerated were recommended for the all the patient.

**Outcome Measures:**

Comparison of satisfaction of both the surgeon was done with both subjective and objective evaluation.

### a. Objective Evaluation:

Objective outcome was measured by the total time taken by the procedure for surgeon and total cost of the procedure for the patient and comparison was done in both the groups.

### b. Objective Elevation:

This was based on patient's satisfaction in both the groups. Objective assessment was done by measuring and comparing the functional outcome in terms of Effect on the quality of life in both the groups. The effect of quality of life was measured by three variables:

1. Working days missed by the subjects from the job.
2. Bed rest of the subjects.
3. After how many days normal diet was started.

**Statistical Analysis:** All the data was calculated using SPSS version 22. Simple t-test was used for comparison of patient and surgeon satisfaction in terms of defined variable in both the groups, with a significant P value of less than 0.05. All the results were presented as Tables/Charts.

## RESULTS

After following inclusion and exclusion criteria, 60 patient of age range from 14 to 70 years were included. The mean age for group A and B was 28.83 and 32.36 4 respectively, with a nonsignificant P value of 0.317 ( $p>0.05$ ).

Both the operating time and cost of the treatment were highly significant statistically. The mean operating time in Group A was  $61.49 \pm 12.95$  minutes while Group B has mean value of  $47.93 \pm 7.16$  minutes. Group A patient was having a total cost of the treatment mean of  $8533.33 \pm 2029.66$  Rupees, While Group B with a total cost of the treatment mean of  $4383.33 \pm 730.29$  Rupees.. Details given in table.

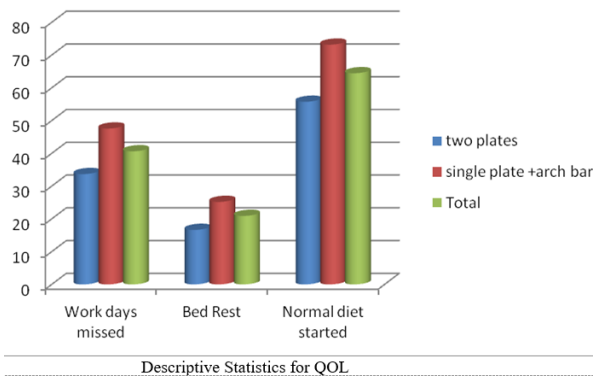
The effect on quality of life of patients were highly significant. Mean work days missed from work in group A were  $33.67 \text{ days} \pm 5.28$  days, while in group it was  $47.57 \pm 6.86$  days reported by the patients. Patients in Group A reported with a mean bed rest of  $16.63 \pm 4.18$  days and group B with a mean value of  $25.17 \pm 4.39$  days. Group A patients started their normal diet in a mean value of  $55.73 \pm 11.59$  days while Group B in a mean value of  $73.17 \pm 10.17$  days. So, statistical analysis of Quality of life get a highly

significant value (p=0.000) using chi square test. Details given in the table.

**Table No.1: Comparison of Group A and Group B**

Variables	Mean values		P value*
	Group A	Group B	
Operating time in Minutes	61.49	47.93	0.000
Cost of treatment in Rupees	8533.33	4383.33	
Work days missed	33.67	47.57	
Bed Rest in days	16.36	25.17	
Days after Normal diet started	55.73	73.17	

\*Chi square test



**Figure No.1 Descriptive statistics for QOL**

## DISCUSSION

Treatment of mandibular fracture is the most frequent form of therapy provided by oral and maxillofacial surgeons, to restore the pre-injury form & function with least disability and shortest recovery period<sup>10, 12</sup>. Champy et al. presented the concept of 'ideal osteosynthesis lines' by the use of multi-disciplinary approach considering anatomical, biochemical and clinical factors. According to Champy, osteosynthesis plates should be fixed according to these lines to get the best results. Champy principles also stated that there are two types of forces acting in the symphysis and parasymphysis region. Tensile forces are present on the alveolar part while compressive forces are present on the inferior border of the mandible. Hence two plates should be used in area anterior to mental foramen to counteract the compressive and torsional forces, one at the lower border and the other 4 mm subapical to the roots of the anterior teeth<sup>13, 14</sup>. Placement of two miniplates increases the total cost of the treatment for the patient and maximize the possibility of injury to the teeth roots, mental nerve injury, and also increase the operating time for the surgeon. So, if arch bar is applied in open reduction

cases for mandibular fractures, then the use of lower arch bar as a tension band for para-symphysis fractures is addressed. This will eliminate the use of two miniplates in the para-symphysis region<sup>14</sup>. This study was carried out to determine the functional outcome and patient satisfaction using two miniplates and one miniplate along with arch bar in para-symphysis fractures.

In this study, the mean value for patients treated with two miniplates was more than one miniplate along with arch bar. Same results were reported by Saluja et al.<sup>11</sup> in his study. According to him average intra operative time for patients treated with two miniplates in mandibular parasymphysis fracture was 54.9mins and average intraoperative time for patients treated with one miniplate along with arch bar was 41.5mins<sup>11</sup>. Less intra operative time is because more time is consumed in placing the upper tensionband plate in the subapical region of the teeth in mandibular parasymphysis fracture and hence easy placement of arch bar intraorally. Also it is thought that intraoperative time is operator dependant which directly relates to the expertise of the surgeon and his command of the procedure, but in this study the surgeries was done by single operator to eliminate this bias.

In our study the cost of the treatment was more for the patients with two miniplates than one miniplate along with arch bar which was highly significant statistically. Same results were reported by Hussain et al.<sup>3</sup> in his study in which 2 miniplates were compared with one miniplate along with arch bar. The placement of a single miniplate followed by a relatively strong SS half round wire as dental tension band, showed upto maximize the advantages of an ORIF technique, and also it has minimized implanted material which minimises the cost effectiveness of the patients without compromising the stability of the fractured segment<sup>3</sup>.

Quality of life (QOL) in medicine is specifically known as health related QOL<sup>15</sup>, in which not only the evaluation of patient's point of view is done in terms of outcome of the treatment, but it gives the clinicians valuable data about the impact of disease and their management, symptoms and side effect. It also determine the impact of illness, disease and treatment on patients<sup>16</sup>. In our study effect on QOL was determined by measuring the number of days missed from job, bed rest post-operatively, and number of days after which normal diet was restarted. Mean work days missed by the subjects in group A with two miniplates were less as compared with group B in which one miniplate along with arch bar was used. Same was the case with bed rest and days after which normal diet was started. Patients with group A was having less time for bed rest and started they daily work and normal earlier than the patients with group B. The overall results were highly significant for effect on the QOL. In a study by Omeje et al.<sup>17</sup> about the prospective analysis of QOL after management of fractured mandibul was done and was measured by the use of General Oral Health Assessment Index(GOHAI) and QOL score.

According to him the score declined in the initial day but it improved steadily after some days. There was no significant difference between the mean QOL of those treated by closed in comparison to those subjects treated with open reduction. In another study by Omeje et al.<sup>18</sup> the which QOL were compared for mandibular fracture managed with closed reduction with open reduction and internal fixation. The results of the study showed a greater impact of treatment on QOL in terms of psychosocial, physical and pain domain differentially<sup>18</sup>. Hence the results of our study don't show resemblance with above-mentioned studies. The reason behind this is the parameter used for the assessment of QOL is different in all studies.

## CONCLUSION

The placement of two miniplates in the parasymphysis region is associated with greater operating time for the surgeon and more cost of the treatment for the patient as compared to one miniplate along with arch bar, but in return it increases the quality of life for the patients.

**Recommendations:** There is no published study on quality of life outcomes, therefore, another study with a large sample size is required to determine the effect on quality of life.

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### Author's Contribution:

Concept & Design of Study: Mohammad Umar  
 Drafting: Muhammad Sulaiman, Saad Rashid  
 Data Analysis: Amna Sarfaraz, Rabia Noreen, Nigam Sattar  
 Revisiting Critically: Mohammad Umar, Muhammad Sulaiman  
 Final Approval of version: Mohammad Umar

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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