



# MANDIBULAR FRACTURE MANAGEMENT; COMPARISON OF EFFICACY OF MAXILLOMANDIBULAR FIXATION OF SCREWS VERSUS ERICH ARCH BAR.

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## INTRODUCTION

The mandible bone has seen a substantial rise in the number of cases encountered as it is the only moveable and versatile bone of facial skeleton. Mandibular fractures take place two times more frequently than midfacial fractures.<sup>1</sup> Mandibular fractures fit into the category of the most common fractures associated in maxillofacial trauma.

According to several studies, mandibular fractures are responsible for 15-59% of all facial fractures.<sup>2,3</sup> Causative factors of mandible fractures have wide variable incidence depending on social, geographic and economic characteristics.<sup>4,5</sup> Road traffic accidents are reported to be the primary causes of mandibular fractures in USA and Pakistan.<sup>6,7</sup>

Management of mandibular fractures solely done

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**ABSTRACT... Objectives:** To compare the efficacy of Maxillomandibular fixation screws versus Erich Arch bar in the management of mandibular fractures. **Study Design:** Comparative case series study. **Setting:** Department of Oral & Maxillofacial Surgery, Faculty of Dentistry, Liaquat University Hospital Hyderabad, Jamshoro. **Period:** 29/03/2016 to 28/09/2016. **Methodology:** Forty patients of either gender with age above 18 years with mandibular fracture requiring closed reduction were included. 20 patients of Groups A, treated with Maxillomandibular fixation screws and 20 patients of Group B treated with Erich Arch bar. Mean operative time was noted. All patients were followed up on every week up to four weeks. The statistical analysis via t-test was used and P-value <0.05 was categorized as significant. **Results:** In MMF screw group 13(65.0%) patients were male and 7(35.0%) patients were female whereas in Arch Bar group, 15(75.0%) were male and 5(25.0%) were female. Evidence of wire stick injury was found positive in 2(10.0%) and 4(20.0%) patients among MMF screw and Arch Bar groups respectively. In MMF screw group, mean operative time was 84.20±18.04 minutes whereas in Arch Bar groups it was 121.80±13.68 minutes. The mean operative time is significantly reduced in MMF screw group as compared to Arch Bar group with p value <0.01. **Conclusion:** We conclude that Maxillomandibular fixation with screws was more worthwhile mode as matched to the conservative Erich arch bars for managing the mandibular fractures.

**Key words:** Efficacy, Erich Arch Bar, Mandibular Fractures, Maxillomandibular Fixation Screws.

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by Inter-maxillary fixation, or by osteo-synthesis or by combination of both procedures.<sup>8</sup> Intermaxillary fixation is usually done for fracture reduction to re-establish proper occlusion.<sup>9</sup> Intermaxillary fixation could be performed by various techniques including i.e; 1-arch bars, 2-Eyelets, 3-cast metal splints, 4-Bonded brackets, 5-splints of Vacuum formed, 6-Pearl steel wires, 7-Self-tapping or Self drilling IMF screws. Readymade arch bars, along with eyelet wires include some of the various ways that are practiced for intermaxillary fixation including Schuchardt arch-shaped splints composed of acrylic and metal material. Although, these methods take a lengthy amount of time, with a consistent risk of injury to the oral surgeon's hands and fingers by the prickly wire ends used for such procedure.<sup>8,10</sup>

Treatment with closed reduction technique can

be used on patients with simple mandibular fractures.<sup>11</sup> Arthur and Berardo<sup>12</sup> proposed that 2.7mm self-tapping screws can be applied and implanted into both the mandible and maxilla and finally IMF can be attained. Other approaches of closed reduction are MMF by using Erich arch-bars or Ivy loops wiring. The fixation of arch-bars with the stainless steel wire raises the possibility for the occurrence of skin punctures of not only the surgeon but also puts the assistant, here after growing the danger for the transmission of contamination.<sup>13,14</sup>

Erich arch bars are consider as standard and reliable fixation used since long time as fixation tool in mandibular fractures.<sup>15</sup> Although; they have few disadvantages, including the time consuming to fix in upper and lower jaw, needle stick injury risk, discomfort and trauma to the patients gingival and soft tissues of oral cavity.<sup>9</sup>

For simple mandibular fixation Maxillomandibular fixation (MMF) with bone screws was described as 4-point fixation pattern to treat fractures. In recent times, self-tapping MMF screws have been supported for intermaxillary fixation; easily applied, associated with the threat of harm to the root or roots of the teeth. Self-tapping screws are of relatively low cose and have low risk of needle stick injuries due to wires. Injury to healthy gums and gingival margin is also minimized with screws as compared to arch bars and eyelets.<sup>8</sup>

The benefits with Self tapping screws are time saving for fixation and removal of devices, minimum risk for needle stick injury and as such less discomfort to patients, easy cleaning and maintance of oral hygiene with healthy periodontal tissues.<sup>16</sup> current literature reported the beneficial outcomes of MMF screws in the management of mandibular trauma.<sup>17</sup> On the other hand, few studies evaluated bone screw performance in a probable and methodical manner.<sup>9</sup>

## DATA COLLECTION PROCEDURE

All cases were performed under local / general anesthesia by Single operator. For

Maxillomandibular fixation screws: All Patients were operated under General anesthesia/ Local anesthesia. After standard preparation and draping, time was noted before the start of procedure, self drilling/self tapping screws were placed above the root apices (sub apical) or at junction of attached and mobile mucosa. Total six screws were used; three in upper arch and three in lower arch, size of screw was (2mmx10mm, 12mm). After attaining occlusion Maxillomandibular fixation done with "24 gauge wires made of stainless steel".

For Erich type Arch Bar: Same protocol was taken; Arch bar fix in upper and lower arch and after attaining occlusion Maxillomandibular fixation done with 24 gauge stainless steel wires. On completion of procedure; mean operative time, evidence of wire stick injury were noted. All patients were observed for first 24 hours in ward and then discharged and patients were on follow up on every week up to four weeks.

## RESULTS

Figure-1 & 2 shows patient presentation according to gender.

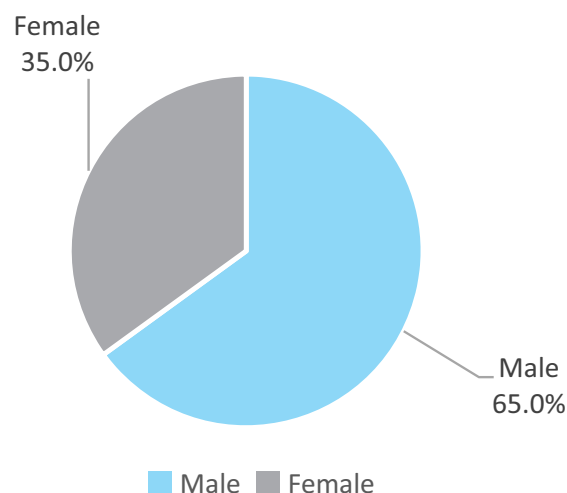


Figure-1. Percentage of patients according to gender in MMF screw group

Table-I shows descriptive statics of age according to age. In MMF screw group, the mean age was  $37.20 \pm 11.95$  years. The range was years with minimum 20 and maximum 56 years whereas in Arch Bar group it was  $37.80 \pm 9.79$  years. The

range was also 31 years with minimum 25 and maximum 56 years.

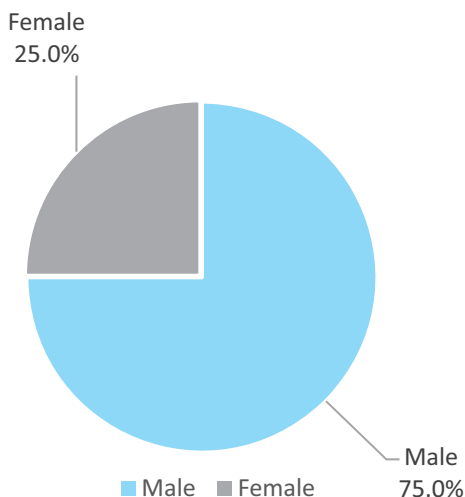


Figure-2. Percentage of patients according to gender in arch bar group

	MMF Screw	Arch Bar
n	20	20
Mean±SD	37.20±11.95	37.80±9.79
Range	36	31
Minimum	20	25
Maximum	56	56

Table-I. Descriptive statistics of age (years)

Table-II shows frequency distribution of location of fractures.

	MMF Screw	Arch Bar
Symphysis	3(15.0%)	4(20.0%)
Parasymphysis	3(15.0%)	2(10.0%)
Body	3(15.0%)	4(20.0%)
Angle	3(15.0%)	4(20.0%)
Ramus	2(10.0%)	4(20.0%)
Condyle	3(15.0%)	---
Coronoid	3(15.0%)	2(10.0%)

Table-II. Frequency distribution of location of fractures

Table-III. shows frequency of evidence of wire stick injury in both groups.

Figure-3 shows patients frequency according to mean operative time.

	Yes	No
MMF Screw	2(10.0%)	18(90.0%)
ArchBar	4(20.0%)	16(80.0%)

Table-III. Frequency distribution of evidence of wire stick injury

Figure-3 shows patients frequency according to mean operative time.

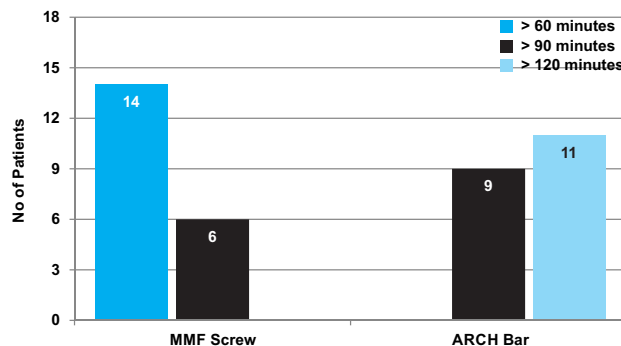


Figure-3. Frequency distribution of patients according to mean operative time

DISCUSSION

The mandibular fractures were more frequent in males (81.8%) as compared to females (18.2%) with the peak proportion of age between 21–30 years (28.8%).<sup>18</sup> In our study, overall 70% were male and 30% were female patients which is comparable with the mentioned study.

In another study, a total of 20 patients with mandibular fracture were taken in which the age group as earliest 19 years as youngest and eldest of 63years of age, with mean of 33.9 years age. And study found that Parasymphysis region was the most repeated spot of fracture. In study sample of 20 patients 18 had parasymphysis region fractures; 6 have isolated parasymphysis and remaining 12 have also associated fracture i: e; 6 condyle region, 4 angle region and 2 body region of the mandible. Only 2 patients have symphysis region fractures.<sup>19</sup>

In another study conducted by researcher and their results indicated the anatomical site of mandible was the mandibular body region (30.9%) most commonly followed by symphysis region (27.5%), condylar process (16.1%), angle (12.1%), alveolar process (7.4%), ramus (4%) and

coronoid process (2%).<sup>20</sup> In our study; symphysis, body, and angle are the most affected sides followed by ramus and parasymphysis.

In a study, the effectiveness of maxilla-mandibular fixation screws and arch bars was estimated and the patients were judged for the time prerequisite as in minutes for the settlement and elimination of screws and Erich type arch bar. Postoperative firmness after accomplishing the MMF of both clusters was explored and result reported that the normal occupied phase for placement of screws with all equipments was 18.67 minutes and elimination from oral cavity was 10.20 minutes, and 95.06 minutes for application of arch bar in upper and lower jaw and 29 minutes for elimination, correspondingly. No any occlusal riot was appreciated in both groups. Rate of MMF screws triggering injury to tooth root was 5.81% and occurrence of screw damage was seen in only 3.33% of study sample.<sup>17</sup>

Nandini et al noted the period occupied to accomplish intermaxillary fixation along with self tapping IMF screws and Erich arch bar. Conferring to the outcomes, it is marked that the maximum time taken for Erich type arch bar fixation was 100 min and the average time taken for IMF along with the self tapping IMF screw was found to be 8.5 minutes. The effects of the current study are in conformity with the statistics from several studies.<sup>8,16</sup>

## CONCLUSION

MMF bone screws are hostile but an influential method to attain reliable provisional (intraoperative as well as perioperative). MMF bone screw time saving and cost-effective fashion of treating the mandibular simple fractures. It seems pointless to take a conservative stance in the contest on MMF bone screws, as this technique is attractive and common as compared to others methods of MMF.

We conclude that Maxillomandibular fixation with screws is good alternative to Erich type arch bars, when correctly applied.

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Sometimes you have to **lose** the battle to **win** the war.



“Unknown”

#### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Manoj Kumar	Principal author, data collection.	
2	Syed Fida Hussain Shah	Data analysis.	
3	Suneel Kumar Panjabi	Assessment of complication.	
4	Soonhan Abdullah	Data collection, Results.	
5	Salman Shams	References	