

## Original Research

### Erich arch bar and hanger plate technique for intermaxillary fixation in fracture mandible

<sup>1</sup>Ravi Kumar, <sup>2</sup>Sudhir Kumar Prasad

<sup>1</sup>Assistant Professor, Department of Dentistry, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India;

<sup>2</sup>Private Practitioner, Mahamada, P.S- Bhagwanpur, Siwan, Bihar, India

#### ABSTRACT:

**Background:** Intermaxillary fixation (IMF) is integral in the management of facial fractures. The present study was conducted to compare Erich arch bar and hanger plate technique for intermaxillary fixation in fracture mandible. **Materials & Methods:** 40 patients of mandible fracture were randomly divided into 2 groups of 20 each. Group I received IMF with Erich arch bar. Group II received IMF with hanger plate method. Parameters such as time duration of intermaxillary procedure, total duration of surgery, oral hygiene score, postoperative occlusion, and complications were compared in both groups. **Results:** Surgical time taken for intermaxillary fixation was 78.5 minutes in group I and 21.8 minutes in group II. The mean oral hygiene score was 3.8 minutes in group I and 1.2 minutes in group II. Wire prick injury was present in 9 in group I and 2 in group II and absent in 11 in group I and 18 in group II. Postoperative occlusion was satisfactory in 20 each in group I and II. **Conclusion:** Hanger plate method of IMF is a safe and effective alternative to Erich arch bar in mandibular fractures.

**Key words:** Erich arch bar, Hanger plate, Mandibular fractures

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**Corresponding author:** Ravi Kumar, Assistant Professor, Department of Dentistry, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India

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#### INTRODUCTION

Maxillomandibular fixation (MMF) is a basic and fundamental principle in the management and treatment of the maxillofacial trauma patient. MMF serves as a cornerstone of maxillofacial reconstruction, providing a stable base from which facial form and function can be restored.<sup>1</sup> It re-establishes the patient's premorbid occlusion assisting in the reduction and fixation of simple and complex facial fractures. A variety of MMF techniques have been described. In modern practice, however, arch bars are considered the standard.<sup>2</sup>

Intermaxillary fixation (IMF) is integral in the management of facial fractures. The methods include arch bars, dental and interdental wiring, prosthetic splints, and IMF screw.<sup>3</sup> Erich arch bar has drawbacks of wire prick injury, difficult application in carious, crowded, and periodontally compromised teeth, and poor oral hygiene. The IMF screw described by Arthur and Berardo had several advantages such as quick and easy application, stable fixation, patient

tolerance, better oral hygiene, and less wire prick injury.<sup>4</sup>

Many clinicians elect their use based on the decreased risk of penetrating personal exposures, ease of placement, and decreased operating room time.<sup>5</sup> Since their introduction they have been met with both enthusiasm and criticism. Anecdotal reports in the literature have illustrated several inherent risks and limitations of IMF screws. Hanger plate technique has been described by the Association of Osteosynthesis Craniomaxillofacial (AO-CMF). Despite the advantages of hanger plate technique, it is less commonly used.<sup>6</sup> The present study was conducted to compare Erich arch bar and hanger plate technique for intermaxillary fixation in fracture mandible.

#### MATERIALS & METHODS

The present study comprised of 40 patients of mandible fracture of both genders. The consent was obtained from all patients.

Data such as name, age, gender etc. was recorded. They were randomly divided into 2 groups of 20 each. Group I received IMF with Erich arch bar. Group II received IMF with hanger plate method. Parameters such as time duration of intermaxillary procedure,

total duration of surgery, oral hygiene score, postoperative occlusion, and complications were compared in both groups. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table I Distribution of children**

Groups	Group I	Group II
Method	Erich arch bar	Hanger plate
M:F	12:8	11:9

Table I shows that group I had Erich bar and group II had hanger plate. There were 12 males and 8 females in group I and 11 males and 9 females in group II.

**Table II Comparison of parameters**

Variables	Group I	Group II	P value
Surgical time taken for Intermaxillary fixation (min)	78.5	21.8	0.01
Oral hygiene score	3.8	1.2	0.04

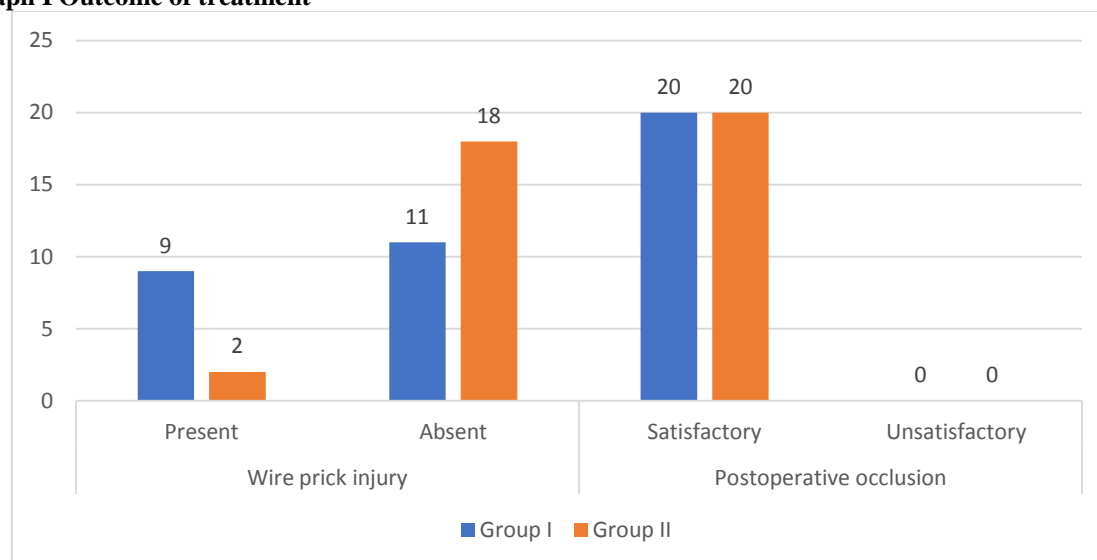
Table II shows that surgical time taken for intermaxillary fixation was 78.5 minutes in group I and 21.8 minutes in group II. The mean oral hygiene score was 3.8 minutes in group I and 1.2 minutes in group II. The difference was significant ( $P < 0.05$ ).

**Table III Outcome of treatment**

Parameters	Variables	Group I	Group II	P value
Wire prick injury	Present	9	2	0.01
	Absent	11	18	
Postoperative occlusion	Satisfactory	20	20	0.03
	Unsatisfactory	0	0	0.05

Table III, graph I shows that wire prick injury was present in 9 in group I and 2 in group II and absent in 11 in group I and 18 in group II. Postoperative occlusion was satisfactory in 20 each in group I and II. The difference was significant ( $P < 0.05$ ).

**Graph I Outcome of treatment**



## DISCUSSION

The ultimate goal of treating mandibular fracture is to restore the mandibular form and function to its pre-traumatic condition.<sup>7</sup> Intermaxillary fixation is an indispensable requirement to achieve temporary dental occlusion during preoperative, operative and postoperative phase of treatment.<sup>8</sup> However, in the

present era of small plate osteosynthesis, both the patient and surgeon prefer open reduction, reducing the duration of hospitalization with minimal discomfort to the patient and early return to the work.<sup>9</sup> The mandibular fracture cases are taken up for early surgical intervention to eliminate the need of preoperative intermaxillary fixation. Intraoperative

application of tooth borne intermaxillary fixation devices are time consuming and increases the duration of anesthesia.<sup>10</sup> The present study was conducted to compare Erich arch bar and hanger plate technique for intermaxillary fixation in fracture mandible.

In present study, group I had Erich bar and group II had hanger plate. There were 12 males and 8 females in group I and 11 males and 9 females in group II. Kumar et al<sup>11</sup> compared the advantages and disadvantages of this method over Erich arch bar in mandibular fracture. Sixty patients of only mandibular fracture presenting to trauma center requiring open reduction and internal fixation under general anesthesia were randomly allocated to Group A and Group B comprising thirty patients in each. Group A included patients who received IMF with Erich arch bar. Group B included patients who received IMF with hanger plate method. The two groups were compared for time duration of intermaxillary procedure, total duration of surgery, oral hygiene score, postoperative occlusion, and complications. The average time of intermaxillary procedure, total duration of surgery, and wire prick injuries were more in Group A. Oral hygiene score was significantly better in Group B. Postoperative occlusion was comparable between the two groups. There was screw loosening in four patients in Group B, but none had tooth root injury. The cost of material for IMF was more in Group B.

We found that surgical time taken for intermaxillary fixation was 78.5 minutes in group I and 21.8 minutes in group II. The mean oral hygiene score was 3.8 minutes in group I and 1.2 minutes in group II. Colletti et al<sup>12</sup> evaluated hardware-associated complications for self-drilling/ tapping IMF screws. A retrospective study on 49 patients requiring IMF was performed. The diagnosis, duration of IMF, screw site, use of elastic or wire fixation, and associated complications were recorded. IMF screws were used to adjunct open reduction techniques, for definitive closed reduction, or fracture prevention following dentoalveolar surgery. A single adverse event occurred in 19 patients (39%) while 4 patients (8%) had more than 1 complication. The most common event was screw loosening; 29% of patients had at least 1 screw dislodged in the treatment period. Of the total number of screws placed (229), 15 (6.5%) became loose, and were equally distributed among the mandible and maxilla. The remaining complications noted were root fracture, 4% (2 of 49); loosened wires, 6% (3 of 49); screw shear, 2% (1 of 49); malocclusion, 2% (1 of 49); and ingested hardware, 2% (1 of 49).

We observed that wire prick injury was present in 9 in group I and 2 in group II and absent in 11 in group I and 18 in group II. Postoperative occlusion was satisfactory in 20 each in group I and II. Nandini et

al<sup>13</sup> found that the stability of IMF was found to be satisfactory and comparable in both groups during intraoperative assessment.

## CONCLUSION

Authors found that Hanger plate method of IMF is a safe and effective alternative to Erich arch bar in mandibular fractures.

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