

Original Article

Use of Arch Bar versus Ivy Eyelet for IMF- A Comparative Study

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ABSTRACT:

Background: Nowadays though open reduction and rigid internal fixation is becoming the standard method for reduction and fixation of simple as well as complex mandibular fractures, but temporary intermaxillary fixation or postoperative fixation using wire or elastic placement is still being achieved. The present study was aimed to establish the MMF technique using Erich arch bars and Ivy eyelet wiring for closed reduction. **Materials and methods:** This observational study enrolled 50 subjects of mandibular fracture that were randomly divided into two groups. In Group I arch bar were performed and in Group II, ivy eyelet wiring was done. A detailed record or demographics, medical and dental history of all the subjects were obtained prior to initiation of the procedure. MMF was performed for a period of 4 weeks. All the data was arranged in a tabulated form and analysed using SPSS software. Chi square test and student t test were used for the analysis of data. Probability value of less than 0.05 was considered significant. **Results:** The study enrolled 50 subjects with the mean age of 38.37+/- 10.22 years. There were 29 males and 21 females in this study. Patient acceptance was good in 13 cases of arch bar and 19 cases of ivy eyelet. It was poor in 12 arch bar and 6 ivy eyelet cases. There was no significant difference between the two groups. The oral hygiene was poor in 10 cases of arch bar and 8 cases of ivy eyelet. On applying chi square test there was no significant difference between the two groups as the p value was more than 0.05. **Conclusion:** In our study, when ivy eyelets and Arch bar were compared there was no significant difference between the two as far as stabilization and needle stick injuries were concerned.

Key words: Masticatory, Needle stick, Occlusion.

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INTRODUCTION

The successful trauma surgery practice there should be due consideration given to the principles of fracture reunion, those are, proper anatomical alignment and rigid fixation. Majority of the postoperative sequel which are seen in the clinical practice of maxillofacial trauma are attributed to the bypassing of one or few of these fundamental principles. The principles for management of mandibular fractures have changed dramatically but the chief objective of re establishment of the occlusion and masticatory capabilities still remains the same. Various techniques have been put forward in the literature for doing Maxillomandibular fixation.¹⁻¹¹ Nowadays though open reduction and rigid internal fixation is becoming the standard method for reduction and fixation of simple as well as complex mandibular fractures,^{2,12} but temporary intermaxillary fixation or postoperative fixation using wire or elastic placement is still being achieved using Erich arch bars, splints, interdental eyelet wiring, pin

fixation, embrasure wires and bonded brackets. Every technique has its own set of advantages and disadvantages. In the year 1870, Hammond⁹ introduced arch bars in the field of oral and maxillofacial surgery. An arch bar provides an efficient and versatile technique for maxillomandibular fixation and has their own set of consequences. There is a risk of penetrating injury to the operator, increased surgical time for removal and placement, traumatic injury to periodontium, and poor oral hygiene maintenance are all few disadvantages of traditional arch bars.^{13,14} Even with Ivy eyelets it is a risky procedure with chances of percutaneous injury by the ends of wire and there are also increased chances of serological disease transmission.¹ The present study was aimed to establish the MMF technique using Erich arch bars and Ivy eyelet wiring for closed reduction.

MATERIALS AND METHODS

This observational study enrolled 50 subjects of mandibular fracture that were randomly divided into two

groups. In Group I arch bar were performed and in Group II, ivy eyelet wiring was done. The study was conducted for a period of 1 year. Ethical committee clearance was obtained from the institutional ethical board and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Subjects either came directly to the hospital or were referred from local dentists. A detailed record or demographics, medical and dental history of all the subjects were obtained prior to initiation of the procedure. Under complete aseptic conditions, a single operator performed all the surgical procedure. The surgical time was noted the time from the start of anaesthesia till completion of MMF. Patients were made to rate the MMF based on their convenience and comfort into good or poor. MMF was performed for a period of 4 weeks. After 4 weeks the postoperative occlusion was rated as satisfactory or if there was any discrepancy like tipping or malocclusion then it was graded as unsatisfactory. Subject's oral hygiene record was maintained throughout the study period. A double pair of gloves was used during the procedure and the incidence of glove perforation was notes. All the data was arranged in a tabulated form and analysed using SPSS software. Chi square test and student t test were used for the analysis of data.

Probability value of less than 0.05 was considered significant.

RESULTS

The study enrolled 50 subjects with the mean age of 38.37+/- 10.22 years. There were 29 males and 21 females in this study.

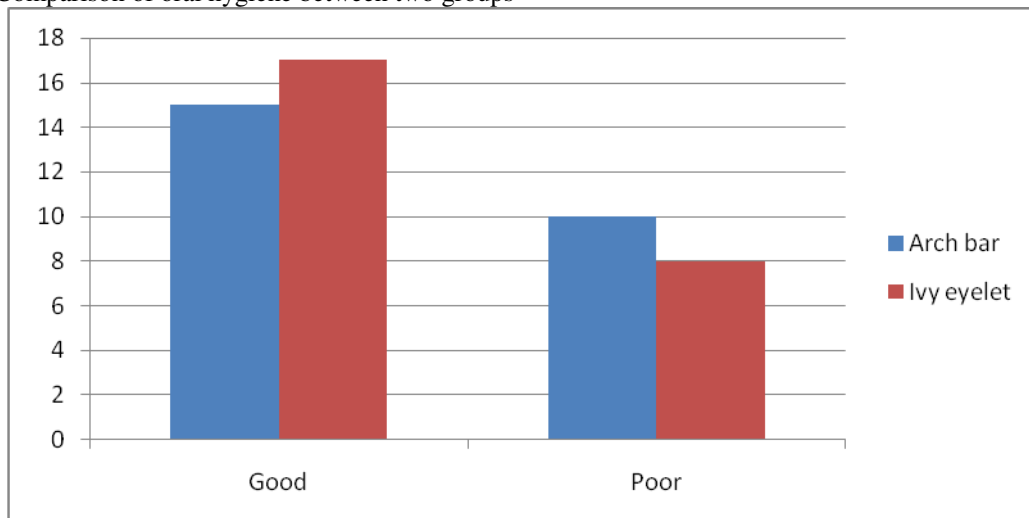
Table 1 shows the comparison of various parameters that were assessed during the study. Patient acceptance was good in 13 cases of arch bar and 19 cases of ivy eyelet. It was poor in 12 arch bar and 6 ivy eyelet cases. There was no significant difference between the two groups. Postoperative occlusion was satisfactory in majority of the cases in both the groups. There were 7 arch bar and 8 ivy eyelet cases with unsatisfactory occlusion. There was no significant difference between the two groups. The surgical time range in arch bar cases was 90-128 minutes and in ivy eyelet it was 80-110 minutes. Glove perforation was seen in nearly all the cases. The MMF stability was up to the mark in 22 arch bar and 24 ivy eyelet cases.

Graph 1 shows the oral hygiene status in both the groups. It was good in 15 cases of arch bars and 17 cases of ivy eyelet. The oral hygiene was poor in 10 cases of arch bar and 8 cases of ivy eyelet. On applying chi square test there was no significant difference between the two groups as the p value was more than 0.05.

Table 1: Comparison of Arch bars and Ivy eyelet wiring

PARAMETER		ARCH BAR	IVY EYELET	P VALUE
Patient acceptance	Good	13	19	>0.05
	Poor	12	6	
Post operative occlusion	Satisfactory	18	17	>0.05
	Unsatisfactory	7	8	
Surgical time (mins)	Range	90-128	80-110	>0.05
Glove perforation	Present	23	24	>0.05
	Absent	2	1	
Oral hygiene	Good	15	17	>0.05
	Poor	10	8	
Stability	Adequate	22	24	>0.05
	Inadequate	3	1	

Graph 1: Comparison of oral hygiene between two groups



DISCUSSION

The history of Maxillomandibular fixation dates back to 17th century when an ancient Greek, Edwin Smith documented this treatment for mandibular fractures. During 25 BC and 11th Century AD many surgeons came forward for conservative treatment of jaw fractures. Sushruta gave the technique of bandaging to manage mandibular fractures. Avicenna illustrated the importance of occlusion during the management of maxillofacial fractures. This is a unique and characteristic feature of jaw fractures that helps in reducing it to correct anatomical location.¹⁵ With the advent of bone plating there has been a dramatic reduction in the time required for MMF however it is required intraoperatively to stabilize the occlusion and also postoperatively to manage minor occlusal discrepancies.¹² Sauer in Germany, and Gilmer in the US used a flat round bar and fixed it with brass ligature wires to teeth. Blair and Ivy modified this flattened bar to a width of 2 mm for better stability and conformation to shape.¹⁶ As per our study, Patient acceptance was good in 13 cases of arch bar and 19 cases of ivy eyelet. It was poor in 12 arch bar and 6 ivy eyelet cases. There was no significant difference between the two groups. Postoperative occlusion was satisfactory in majority of the cases in both the groups. There were 7 arch bar and 8 ivy eyelet cases with unsatisfactory occlusion. There was no significant difference between the two groups. The surgical time range in arch bar cases was 90-128 minutes and in ivy eyelet it was 80-110 minutes. Glove perforation was seen in nearly all the cases. The MMF stability was up to the mark in 22 arch bar and 24 ivy eyelet cases. In the year 1989, self drilling inter maxillary fixation screws were introduced that overcome the disadvantages of both arch bars and ivy eyelets.¹² They carried minimal risk of needle stick injury and were easy to apply and remove. They didn't cause trauma to gingival margins.² According to a study conducted by Sanjay Rastogi et al, comparing embrasure wire and arc bar for Maxillomandibular fixation, they found that time for the placement and risk of needle stick injury were less with embrasure wire compared to arch bars. Patients that were managed by embrasure wires were more comfortable compared to arch bars.¹⁷ In our study, it was good in 15 cases of arch bars and 17 cases of ivy eyelet. The oral hygiene was poor in 10 cases of arch bar and 8 cases of ivy eyelet. On applying chi square test there was no significant difference between the two groups as the p value was more than 0.05. According to a study conducted by Ahtesham et al, when IMF screws were compared with arch bars patient hygiene was better with IMF screws compared to arch bars and patient acceptance was also better with IMF screws but stability was more with Arch bars as compared to IMF screws.¹⁸

CONCLUSION

Managing maxillofacial fractures is a challenging task as there is little access and it is a time consuming procedure. With the advent of open reduction there has been a decrease in the duration of Maxillomandibular fixation

but it's mandatory to perform MMF during intraoperative period for stabilization of occlusion. In our study, when ivy eyelets and Arch bar were compared there was no significant difference between the two as far as stabilization and needlestick injuries were concerned.

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