

COMPARISON OF TWO SURGICAL PROCEDURES IN REDUCTION OF MANDIBULAR ANGLE FRACTURE

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ABSTRACT

The purpose of this study was to determine various post operative complications associated with two surgical procedures used for reduction of mandibular angle fractures. A Quasi-Experimental study was carried out in the Department of Oral and Maxillofacial Surgery, King Edward Medical University / Mayo Hospital, Lahore. The study was carried out from 30th April 2006 to 30th April 2007 on sixty patients with mandibular fractures. They were divided in to two categories. Thirty patients were treated by intra oral approach (Group A) and thirty by extra oral approach (Group B). At different intervals of their post operative visits, these patients were evaluated for post operative complications of infection, nerve damage, hypertrophic scar, esthetic dissatisfaction, malocclusion and limitation in mouth opening. 20% of the patients treated with extraoral approach presented with post operative nerve damage and no patient treated by intra oral approach showed nerve damage ($p=0.02$). Similarly postoperative esthetic dissatisfaction was present in only 6.67% of the patients treated with intraoral approach as compared to 63.33% patients treated with extraoral approach ($p=0.00$). Based on this study intra oral approach was considered as more suitable method for the treatment of mandibular angle fractures.

Key words: Mandibular angle fracture, Intra / Extra Oral approach, Postoperative complications

INTRODUCTION

Mandibular fractures tend to be more common than those of the middle third of the face.¹ They occur alone or in combination with other facial bone fractures resulting in severe loss of function and disfigurement.^{2,3} Mandibular fractures tend to be more common than those of the middle third of the face.¹ They occur alone or in combination with other facial bone fractures resulting in severe loss of function and disfigurement.^{2,3}

The pattern of mandibular fractures varies with geographic location, physical activity, social, cultural and environmental factors. The main causes^{4,5} of mandibular fracture are; Road traffic accidents, interpersonal violence, falls, sports injuries, industrial trauma, pathological fractures etc. In developing countries road traffic accident⁶ is the common cause of mandibular fractures due to lack of implementation

of traffic laws while in developing countries alcohol related⁷ interpersonal violence is the leading cause. Any age and sex group may sustain trauma to the lower jaw but children below the age of 12 years are less susceptible to fracture because their bones are more resilient.^{5,6} The management of mandibular fractures varies in various maxillofacial units depending on the presentation, surgical expertise and the facilities available. The general principles of treatment for mandibular fractures do not differ from the treatment of fractures elsewhere in the body. The fragments are reduced into a proper position and then immobilized until such time bony union occurs.⁸

Different modalities^{8,9} available for the treatment of mandibular fractures are:

Maxillo mandibular fixation (MMF) alone eg. dental wiring, arch bar etc.

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Maxillo mandibular fixation with osteosynthesis: eg. Transosseous wiring, circumferential wiring, external pin fixation.

Osteosynthesis without maxillo mandibular fixation eg, Mini plating, Non compression and compression plates, Lag screws.

Previously traditional methods i.e. Maxillomandibular fixation and Transosseous wiring were the most popular methods used for mandibular fracture fixation. These are still commonly used methods¹⁰ and have got various disadvantages such as preventing normal jaw function, weight loss due to restriction of food to liquid consistency, oral hygiene problem and reduction of ventilatory volume.^{8,11}

Currently, fixation with one or two mini- plates has become a widely acceptable method of providing internal fixation and eliminating the need for post operative maxillo mandibular fixation. The fixation of mandibular angle can be carried out by two methods i.e. Intra oral approach^{12, 9} and Extra oral approach. For intra oral approach buccal sulcus incision while for extra oral approach sub-mandibular (Risdon)^{13, 14} incision is given.

METHODOLOGY

This clinical study which followed a Quasi Experimental design was carried out on 60 patients presenting with mandibular angle fracture at the department of Oral and maxillofacial Surgery, King Edward Medical University/Mayo Hospital, Lahore. Both male and female patients aged 16-60 years were included in the study which was carried out from 30th April, 2006 to 30th April, 2007. The patients were divided into two groups A and B by using random number table. After randomization, any patient who was not found to be suitable for the assigned treatment group was excluded from the study. Two standardized surgical techniques were used to treat these patients. Thirty patients of group A were treated with extra oral approach and 30 patients of group B were treated with intra oral approach. Patients were selected by following inclusion and exclusion criteria. Inclusion Criteria: Patient aged 16 to 60 years, medically fit to undergo surgery, sufficient bilateral dentition to allow Maxillo-Mandibular Fixation, Patient consent to participate in the study. Exclusion criteria: Pathological fractures, Condy-

lar and sub-condylar fractures, edentulous patients, Fire arm injury (FAI), Fractures of the middle third of face.

A standard history and clinical examination chart was completed for each patient included in the study to reach a conclusive diagnosis. A pre-formed proforma was used to obtain the following information:

Age and gender of the patient. The etiology of the injury, recorded as road traffic accident, falls, assaults, and sports injuries.

Orthopantomogram was the standard radiograph which was supplemented by posterior anterior view of face. Patient with history of trauma, swelling, pain and step deformity on palpation at the angle of mandible along with disturbed occlusion, showing bony discontinuity on radiograph were diagnosed as fracture. The experimental outcome of the surgical procedure was explained to every patient included in this study and informed consent was taken before surgery. Each patient was followed for 6 weeks. Postoperative radiograph was taken in follow-up for each patient, whenever required. During follow-up period any postoperative complication found, was recorded on the pre-formed proforma under the following heading for the two treatment modalities of the mandibular angle fracture:

Immediate postoperative complication (nerve damage)

Late postoperative complication (i.e. infection, limited mouth opening, malocclusion, hypertrophic scar and esthetic dissatisfaction).

These have been explained with the help of tables. The collected data was entered and analyzed using SPSS version 16.0.

RESULTS

The detailed distribution of gender of the patients is shown in Table 1.

The results related to the etiology of the fracture have been categorized as a road traffic accidents, falls, assaults, sports injuries and iatrogenic. Table 2 shows the distribution of sample according to the etiology of fracture.

TABLE.1: GENDER DISTRIBUTION OF PATIENTS

Gender	Number & Frequency (n%)
Male	47(78.33%)
Female	3(21.67%)
Total	60(100%)

TABLE2: ETIOLOGY OF FRACTURE

Etiology of fracture	No of patients (n %)
Road traffic accidents	41 (68.33%)
Assaults	9 (15%)
Falls	8 (13.33%)
Sports	1 (1.66%)
Iatrogenic	1 (1.66%)

Details about postoperative complications related to both types of treatment modalities are given in Table 3.

The key findings of table 3 are that the post operative marginal mandibular nerve damage was not present in any of the patients treated with intraoral approach (Group A), as compared to this post operative marginal mandibular nerve damage was present in 20% of the patients treated with extraoral approach (Group B). This finding was found to be statistically significant at $p=0.02$. Post operative esthetic dissatisfaction was present in only 6.67% of the patients (Group A) as compared to 63.33% patients (Group B) $p=0.00$.

DISCUSSION

The aim of this study was to compare the two surgical procedures i.e. intraoral approach and extraoral approach, used for reduction of mandibular angle fractures in terms of various post operative complications i.e. infection, nerve damage, malocclusion, esthetic dissatisfaction, hypertrophic scar and limited mouth opening, in order to determine which of the two procedures show better post operative results. The results confirm that post operative complication rates in terms of nerve damage (20%) and aesthetic dissatisfaction (63%) were much higher in patients where extra oral approach was used. This finding is similar to other studies which have reported the advantages of the intraoral route over the extraoral route.^{15,16} The results of the study show that infection occurred in 13.3% of the patients treated through intra oral approach whereas it was 16.6% with extra-oral approach. These results are comparable with the study conducted by Moreno JC, in which the infection rate in patients treated with open reduction and internal fixation for mandibular fractures was 12.5%.¹¹ Malocclusion was assessed in this study solely through patient complaints as in other studies.¹⁷ It was observed in 10% of the cases operated by intra-oral approach and 16.6% in the cases operated by extra-oral approach. This is comparable to studies by Renton¹⁰ and Moreno et al.¹¹ Nerve damage in terms of both sensory and motor neuropathies was noted according to the patient's complaint. Motor disturbances were seen in the patient's treated by extra oral approach, which is similar to

TABLE 3: COMPLICATIONS RATES IN THE ENTIRE TREATMENT

Postoperative Complication	Intra oral approach		Extra oral approach		Significance (p value)
	Present	Absent	Present	Absent	
Infection	4(13.3%)	26(86.6%)	5(16.6%)	25(83.3%)	0.71
Marginal Mandibular Nerve damage	0 (0%)	30(100%)	6(20%)	24(80%)	0.02
Malocclusion	3(10%)	27(90%)	5(16.6%)	25(83.3%)	0.44
Mouth opening Compromised	2(6.6%)	28(93.3%)	5(16.6%)	25(83.3%)	0.22
Esthetic Dissatisfaction	2(6.6%)	28(93.3%)	19(63.3%)	11(36.6%)	0.00
Hypertrophic scar	0 (0%)	30(100%)	1(3.3%)	29(96.6%)	0.31

study by Iizuka.¹⁸ Hypertrophic scars were seen in 3.3% of the patients in extraoral approach which is comparable with study which reported 2.56 % hypertrophic scar¹⁸ through extra oral approach. In this study, interpersonal assaults was the second most common cause of mandibular fractures which is different than the study of Emshoff¹⁹ and Abbas et al⁴ who have reported falls as the second most commonest factor of mandibular fractures. Falls in this study were related to kite flying which is again well supported by the study of Abbas et al.⁴

The possible limitation of the study is the sample size. However since this study followed an experimental study design, the sample size was sufficient enough to fulfill the aims and objectives of the study. Based on the findings of this study it is recommended that the law for the use of seat belts must be strictly enforced.

CONCLUSION

Based on the results of this study it was concluded that the intra oral approach is an effective and better technique.

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