

COMPARATIVE ANALYSIS OF EXTRAORAL AND INTRAORAL APPROACHES IN MANDIBULAR ANGLE FRACTURE

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ABSTRACT

Objective: *The purpose of the present investigation is to analyze outcomes of intraoral and extra oral approaches and to provide an evidence for the effectiveness of superior border fixation to mandibular angle fractures.*

Material and Methods: *This study was conducted in the Department of Oral and Maxillofacial Surgery Khyber College of Dentistry Peshawar, Pakistan. A total of 60 patients with displaced mandibular angle fracture were included in this study, where 30 patients were treated with intraoral while 30 were approached extraorally. Post-operative complications as well as total time spent in surgery and cost involved was analyzed using SPSS version 17.*

Results: *Out of 60 patients, 37(61.67%) were male while 23(38.33%) were female in their second and third decades of life (31.67% and 26.67% respectively). Among the intra-oral group, majority of the procedures (80%) were completed within 30 minutes while among the extra-oral group most of the procedure (93.34%) were completed in 30-60 minutes time. Fifteen cases were recorded among the extra-oral group while the remaining 3 cases (16.66% of the total complications) were recorded in Intra-oral group.*

Conclusions: *Intra-oral approach in the management of mandibular angle fracture is more desirable in terms of cost especially if intra-osseous wire is used instead of mini-plates. Other advantages are less operative time, fewer chances of infections and nerve damage as compared to extra-oral approach.*

Key words: *Mandibular angle fracture, Maxillofacial trauma, Khyber College of Dentistry*

INTRODUCTION

Relative lack of support and prominence make the mandibular bone more vulnerable to fracture. Mandibular fracture accounts for 30-70% of all maxillofacial fractures. Fracture site depends upon the mechanism of injury, magnitude and direction of impact force, prominence of mandible and anatomy of site. About 25% of mandibular fracture occurs in angle region alone or in combination with other sites commonly as a result of road traffic accident (RTA) and assault^{1,2}.

The reason for angle fracture is the presence of thin bone in the area and the presence of impacted

3rd molar tooth. These two factors weakens the area considerably. Another important factor which makes mandibular angle more prone to fracture is the abrupt change in shape from horizontal to vertical rami³.

The basic principles of fracture reduction and fixation also apply to the angle region. Champy's tension lines are those lines where fixation is applied to stabilize an unfavorable fracture⁴. Such tension lines are present at the superior border of the mandible in the region of the angle. Open reduction and internal fixation (ORIF) is the treatment of choice for displaced, unfavourable fracture as proximal segment is often displaced superiorly and medially. Other approaches for management of angle fracture are close reduction and Mandibulomaxillary fixation (MMF), intraoral ORIF with single non-compression plate, intraoral ORIF with 2 non-compression plates, intraoral ORIF with lag screws, extraoral ORIF with reconstruction plate, and wire fixation^{5,6}.

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Complications associated with mandibular angle fracture are infection, malunion, malocclusion, and facial nerve damage. Advantages of intraoral approach include less risk of facial nerve damage and formation of hypertrophic scar, ease of adaptation, ability to confirm occlusion during surgery and less palpability of plates. Disadvantages of intraoral approach are inadequate access, increased infection rate. Extraoral approach provides better access and less infection rate. Disadvantages of extraoral approach are increased possibility of damage to marginal mandibular branch of facial nerve and extraoral scar^{7,8,9,10}.

The purpose of this study was to analyze outcomes of intraoral and extra oral approaches and to provide an evidence for the effectiveness of superior border fixation to mandibular angle fractures.

METHODS AND MATERIALS

This study was conducted in the Department of Oral & Maxillofacial Surgery Khyber College of Dentistry Peshawar, Pakistan from January 2013 to March 2015. A total of 60 patients with displaced mandibular angle fracture were included in this study. Patients who presented two weeks after the trauma, grossly comminuted and infected or edentulous cases were excluded from this study. First of all an institutional ethical committee approval was obtained. Out of 60 patients, 30 patients were treated with intraoral approaches using miniplates or steel wires while 30 were approached extraorally using miniplates and screws. During their post-operative evaluation period, patients were examined during ward stay, one week post operatively and at the time of MMF removal. Post-operative complications such as swelling, infection, nerve damage, cosmetic concerns and malocclusion were noted. Total time spent in surgery and cost involved was analyzed. Information so gathered were recorded on specially designed Performa and analyzed using SPSS version 17.

RESULTS

Out of 60 patients, the gender distribution was such that 37(61.67%) were male while 23(38.33%) were female with a male to female ratio of 1.8:1.

The age distribution of study subjects were such that majority of the patients were in second and third decades of life (31.67% and 26.67% respectively). The remaining distribution is given in Table-1.

Among the intra-oral group, majority of the procedures (80%) were completed within 30 minutes while among the extra-oral group most of the procedure (93.34%) were completed in 30-60 minutes time. Detail of time spent in surgical procedure is given in Table-2.

Out of total, 18 patients presented with some sort of complications and / or esthetic concerns. Of these, 15 cases (83.34% of total complications) were noted in Extra-oral group while the remaining 3 cases (16.66% of the total complications) in Intra-oral group. Details are given in Table-3.

Table-1: Age Distribution

Age in years	n	%
10-20	19	31.67
21-30	16	26.67
31-40	12	20.00
41-50	9	15.00
51-60	4	06.66
Total	60	100

Table -2: Time spent in surgical procedure

Time	Intra-oral		Extra-oral	
	n	%	n	%
< 30 minutes	24	80	1	3.33
30 -60 mintes	6	20	28	93.34
> 60 minutes	0	0	1	3.33
Total	30	100	30	100

Table 3: Comparison of Postoperative Complications (n=18)

Complications	Intra-oral		Extra-oral		p-value
	n	%	n	%	
Infection	1	5.56	3	16.67	0.301
Neuropathy	0	0	1	5.56	0.150
Malocclusion	2	11.10	3	16.67	0.640
Esthetic Concerns	0	0	8	44.44	0.001
Total	3	16.66	15	83.34	

DISCUSSION

In a society like Pakistan and specially Khyber Pukhtunkhwa province, males play a very dominant role in terms of activities and earning for living. This is the reason that they are involved in road traffic accidents, suffer the devastating effects of violence and terrorism as well as work related injuries. The results of the present study for gender and age distribution

reflect this aforementioned scenario. Another reason for this high incidence of mandibular angle fractures among patients in their young age groups is the poor law and order situation and lack of legislation in the region resulting in rash behavior while driving, particularly motorcycles. Certain other studies conducted at national and regional levels have the same observations^{11,12}.

Lengthy surgical procedures and prolong general anesthesia is bothersome for both the surgical team as well as for the patients. Maxillofacial surgery has acquired a very vital position in accident and emergency services, resulting in high bed occupancy and operative lists¹³. Maxillofacial surgical unit at Khyber College of Dentistry is the busiest center in the country providing services to the community within the available resources. Intra oral surgical approach and fixation of the angle fracture using mini-plates and screws or intra-osseous wires is the desirable treatment modality in terms of shorter operative time, as reflected by the results of the present study. Among the intraoral procedures, 80% of cases took less than 30 minutes from exposure till fixation of the segments. Contrary to this, 93.34 % cases among extra-oral group took 30-60 minutes to complete ORIF.

No single surgical procedure is said to be free from complications. Certain minor complications such as mild infection and slight malocclusion can be effectively treated by antibiotics and revisiting the surgical site for minor corrections. Other complications are those which can cause considerable morbidity both in terms of function and esthetics and can only be prevented by meticulous surgical planning and observing the principles of surgery^{5,6}.

Very few complications were noted in cases treated with intra-oral procedure as compared to extra-oral one. Considerable esthetics concerns (44.44%) were shown by patients treated with extra-oral ORIF as compared to Intra-oral procedures. This difference is statistically significant (p -value=0.001). Another finding which makes the extra-oral approach undesirable is threat to the vitality of marginal mandibular branch of facial nerve. In the present study, infection rate was more evident in extra-oral group as compared to intra-oral group (16.67% versus 5.56% respectively). Hsueh et al¹⁴ showed that infection and nerve damage while approaching angle fracture extra-orally is 20% each in frequency while cosmetic dissatisfaction was

noted in 60% cases. These complications are much higher in frequency than the results of the present study, reflecting the advantage of state of the art surgical environment and infection control measures in our setup¹⁵. Intra operative use of nerve conduction studies may remarkably be advantageous in preventing nerve damage¹⁶.

CONCLUSIONS AND RECOMMENDATIONS

Intra-oral approach in the management of mandibular angle fracture is more desirable in terms of cost especially if intra-osseous wire is used instead of mini-plates. Other advantages are less operative time, fewer chances of infections and nerve damage as compared to extra-oral approach. Students and young surgeons must be encouraged to master themselves in more esthetically acceptable and less morbid modalities of treatment in the management of angle fractures. Attention must be given to patient concerns as reflected by the preoperative assessment and observation of meticulous surgical principles.

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