

**A COMPARATIVE STUDY IN FIXATION OF MANDIBULAR ANGLE FRACTURE WITH A SINGLE MINIPLATE PLACED EITHER TRANSBUCCALLY AND INTRAORALLY OR INTRAORALLY ALONE**

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**ABSTRACT**

**Aim and Objectives:** The aim of this study is to evaluate various parameters which includes various difficulties faced by the surgeon, total time taken for procedure and post-operative complication in fixation of mandibular angle fracture with single miniplate placed either transbuccally and intraorally or intraorally alone. **Material and Methods:** Patients with Mandibular Angle Fracture were selected for the study from department of Oral & Maxillofacial surgery at Teerthanker Mahaveer Dental College, Moradabad. The patients after inclusion were randomly divided into two group, Group A and Group B (10 patients in each group). In the group A, fixation was carried out in the area of the external oblique line of the mandible, with miniplate through intraoral approach. In group B, fixation was done through

intraoral incision and transbuccal approach combined using transbuccal trochar instrumentation. **Results:** After 2 weeks 8 patients in Intra-oral group had swelling compared to 9 in Combined group. But after 4 weeks none of the patients in combined group had

swelling comparing 2 in the Intra-oral group. Post –operative infection was less in combined group (0) after 2 weeks comparing Intra-oral group (2). Result shows that infection, wound dehiscence and plate exposure are directly interrelated. The chances of plate exposure and post- operative infection is proportional to wound dehiscence Intra- oral group had more change of above three complication. **Conclusion:** Although Intra-oral and Transbuccal combined approached had better outcome than Intra-oral alone approach. Further more study with more sample size is required for definite conclusion.

**KEYWORDS:** Intra-oral approach; Mandibular angle fracture; Transbuccal approach.

## INTRODUCTION

In a developing country like India, with increase in urbanization, rapid influx of high speed automobiles, poor road conditions, road traffic accidents are scaling heights and the incidence of traumatic injuries to the maxillofacial skeleton are increasing alarmingly. Fractures of mandibular angle along with condyl represent the largest percentage of mandibular fracture, because of the presence of 3<sup>rd</sup> molar in that area, also the angle can be considered a “lever” area.<sup>[1,2,3]</sup>

The current focus includes screws and miniplates.

### Intraoral Approach

Performed through an oral mucosal incision.

#### Advantage

- Results in no external scarring or injury to marginal mandibular nerve
- Allows direct visualization and confirmation of desired occlusion during placement of hardware.

Another approach is **TRANSBUCCAL APPROACH**

- It results in no external scarring.
- It allows direct visualization and conformation of the desired occlusion during placement of the bone plates.
- Lateral border plating.

This study was done to compare the intraoral alone or intraoral and transoral combined approach for exposure of the fractured angle of mandible for open reduction and internal bone plate fixation

### **Aims and Objectives of the Study**

Aim of this study is to

- To evaluate various parameters like.

### **A. Intraoperative**

- Various difficulties faced by the surgeon. - Mild/moderate/severe.
- Total time taken for procedure. -30 to 45 min./46 to 60min/>60min.

### **B. Postoperative Complications**

- Infections.
- Swelling.
- Paresthesia of the area involved
- Occlusion.
- Ease in mastication.
- Appearance.

## **MATERIAL AND METHOD**

Patients with Mandibular Angle Fracture were selected for the study from department of Oral & Maxillofacial surgery at Teerthanker Mahaveer Dental College, Moradabad. The patients after inclusion were randomly divided into two group, Group A and Group B. (10 patients in each group). Subjects of all the groups had undergone ORIF under general anesthesia. In the group A, fixation was carried out in the area of the external oblique line of the mandible, with miniplate through intraoral approach. In group B, fixation was done through intraoral incision and transbuccal approach combined using transbuccal trochar instrumentation.

**Surgical Technique:** After routine part preparation. Surgical approach was either through intraoral or intraoral and transbuccal combined approach.

**Intraoral Approach:** The lip was then retracted and an incision was taken beginning on the anterior border of ascending ramus at the level of maxillary occlusal plane. It was then carried down just along the lateral portion of anterior ramus and following the oblique line,

continued forward approximately 5mm from the junction of the attached mucosa and vestibule to extend anteriorly to the level of approximately the mandibular first molar. The mucoperiosteal flap was then raised and the fractured site exposed. The third molars which were not hindering the fracture reduction were retained and those which were loose or fractured were extracted. Fractured ends were reduced under direct vision; satisfactory occlusion was achieved and held in that position by MMF. The SS plate was then adapted to fracture site. A drill bit of 1.5mm diameter was inserted through the drill guide. Holes were drilled and screws (2mm diameter, 8 mm in length) were threaded into position till the proper depth and tightness was achieved. MMF was released and occlusion rechecked. Intraoral wound was closed using 3-0 silk sutures.



**Fig. 1: Intra-oral incision. Fig. 2: Exposure of fracture site.**



**Fig. 3: Fixation of Plate.**

**Fig. 4: Suturing.**

### **Intraoral and Transbuccal Combined Approach**

Incision was given similar to that of intraoral approach. Subperiosteal dissection is then performed, exposing the lateral surface of the mandibular angle and ramus region extending to the posterior and inferior border. Fractured ends were reduced under direct vision. Satisfactory occlusion was achieved and held in that position by MMF. A small stab incision

is made just through the cutaneous surface, approximately 1cm above the inferior border. A trocar is then inserted through the stab incision. A small four hole 2 mm with gap SS bone plate is then adapted and placed intraorally along the flat lateral surface of the mandible. The screw holes are drilled transorally with a 1.5 mm drill. Protection of the soft tissue is afforded by drilling through trocar. The screw holes are placed just through the lateral cortex. After placement of the bone plate, the patient is released from MMF and the occlusion is checked. If satisfactory, the wound was irrigated and closed using 3-0 Silk sutures. One or two 3-0 silk interrupted sutures were used to close stab incision. A pressure dressing is then placed for approximately 24 hours to prevent hematoma formation.



**Fig. 5: Intra-oral incision.**



**Fig. 6: Drilling via Transbuccal Trocar.**



**Fig. 7: Lateral border Plating.**



**Fig. 8: Suturing.**

## RESULTS

Table 1: Gender and Age Distribution of Patients.

Treatment Group	Gender	Total No. of patients	Age (Years)		
			RANGE	MEAN	S.D.
Group I (Intraoral)	Male	9	18 - 45	30.88	12.464
	Female	1	28 - 32	30	-
	Total	10	18 - 45	32	12.3
Group II (Combined)	Male	10	20 - 57	35	13.474
	Female	0	0	0	0
	Total	10	20 - 57	35	13.474
Overall	Male	18	18 - 57	32.6	12.817
	Female	1	32	32	-
	Total	20	18 - 57	33.5	12.21

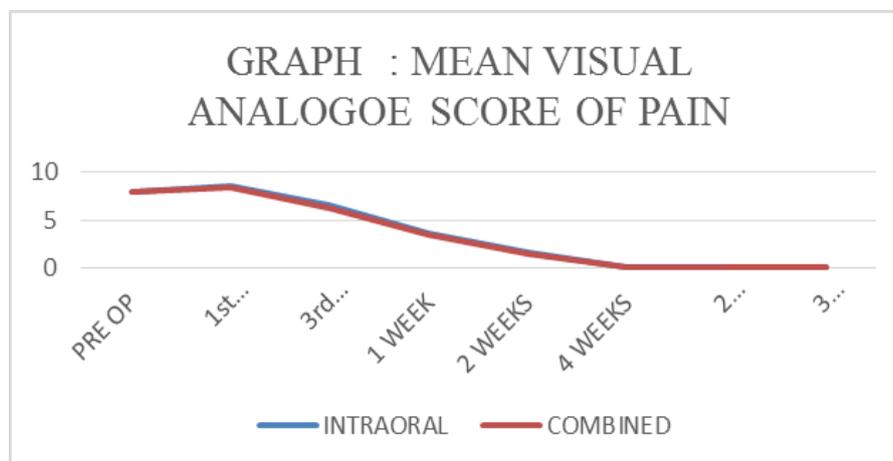
## Assessment By the Surgeon

Table 2: Assessment by the surgeon.

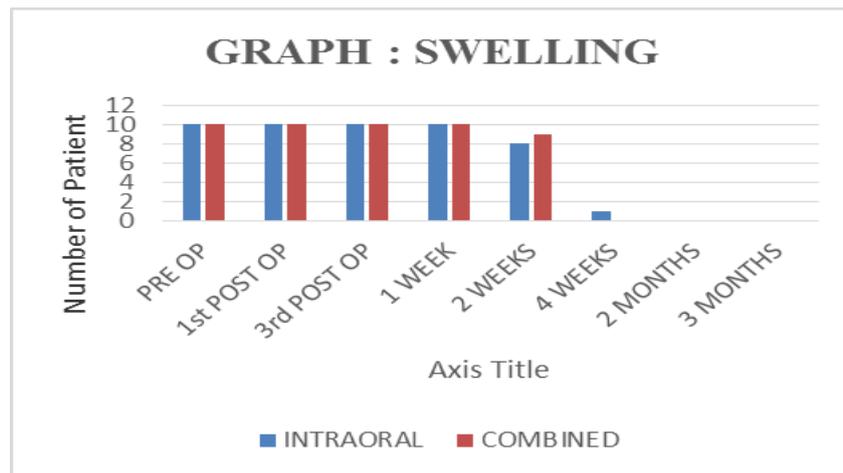
Criteria	'P' value	Interpretation
Rating of access gained	<b>0.121335</b>	<b>P &gt; 0.05, Not Significant</b>
Adequacy of Approach	<b>0.121335</b>	<b>P &gt; 0.05, Not Significant</b>
Ease of reduction	<b>0.3049017</b>	<b>P &gt; 0.05, Not Significant</b>
Ease of fixation	<b>0.531167837</b>	<b>P &gt; 0.05, Not Significant</b>
Quality of closure	<b>1</b>	<b>P &gt; 0.05, Not Significant</b>
Time taken for surgery	<b>0.131816</b>	<b>P &gt; 0.05, Not Significant</b>
Patient comfort after surgery	<b>0.263552477</b>	<b>P &gt; 0.05, Not Significant</b>

## Post-Operative Complications

## Pain



## Swelling



Criteria	Outcome
Infection	Better in combined group
Sensory changes	Equal
Wound dehiscence	Better in combined group
Plate exposure	Better in combined group
Altered masticatory ability	Equal
Occlusion (dearranged)	Better in intra-oral group

## DISCUSSION

The management of Mandibular angle fractures has been controversial because of the anatomic relations and complex biomechanical aspects of the mandibular angle, including thin cross-sectional area, abrupt change in the curvature, attachment of the masticatory muscles, and the presence of third molars. The debate has become even more heated since the evolution of rigid internal fixation and the ability to provide adequate stability of the fractured segments.

9 out of 10 patients in our study in Group I (Table I, Graph 1 & 2) were male patients with an age range of 18 – 45 years and an average age of 30.88 years and 1 female patient of 32 years old. In Group II all the patients were male with an age range of 20 – 57 years and an average age of 35 years. *This study was undertaken in order to compare the efficacy of single miniplate placed either intra-orally along with transbuccally approach, or intra-orally alone in the treatment of mandibular angle fractures with open reduction and internal fixation.* Access gained was graded as “good” for 9 (90%) out of 10 patients in group I and fair for remaining 1 (10%) patient. While in group II 4 (40%) patients were graded as “good” and 6 (60%) were graded as fair. The result shows that better access to the fracture site is gained with intraoral approach than combined approach. In a study by Toma et al (2002) Seven of 42

patients with angle fracture were converted from transoral to extraoral approach due to lack of exposure.<sup>[4]</sup>

Adequacy of approach was graded as “good” for 9 (90%) patients and fair for 1 (10%) patient in group I whereas in group II 6 (60%) patients were “good” and 4 (40%) were “fair”. These results show that intraoral approach yields better approach, though the difference was not statistically significant ( $P > 0.05$ ).

Ease of reduction was rated as “good” in 1 (10%) and “fair” in 9(90%) of patients in group I while in group II, 2 (20%) patients were rated as “good”, 8 (80%) patients as fair. This result shows ease of reduction was average in either group which is due to posterior location of the fracture. Any tooth in fracture line was removed if it was infected, fractured or was interfering with the reduction. (Stefan Berg 1992).<sup>[5]</sup>

Ease of fixation was graded as “good” in none of patients in group I and “fair” in 10 (100%). 4 (40%) were graded as “good”, 6 (60%) as “fair” and in group II. This difference shows better ease of fixation with combined approach. This result was statistically insignificant ( $P < 0.05$ ).

Fixation at lateral border doesn't require any bending of the plate and drilling hole and screw tightening via transbuccal trocar aids in proper fixation of the hardware. *Prabhakar et al in 2011 also emphasized use and importance of trocar in difficult place.*<sup>[6]</sup>

Quality of closure was graded as “good” in 6 (60%) patients and “fair” in 4 (40%) in group I while in group II 8 (80%) out of 10 were graded as “good” and 2 (20%) “fair”. This result shows that quality of closure is better with combined approach.

The mean and median time taken for the surgery in group I was 46.5 and 45 minutes respectively and in group II was 49.5 and 50 minutes. *In a prospective trial by Laverick et al in 2011 also found almost equal time in comparison of both methods.*<sup>[7]</sup>

**Patients were asked** for any discomfort present immediately after surgery and rate as poor / average / good. 7(70%) patients in group I rated their level of comfort as “good” while other 3 (30%) rated as “average”. In group II 9 (90%) rated as “good” and 1 (10%) as “average”. The result shows patient in group II were relatively more comfortable.

Swelling in each patient was noted as present or absent. In group I the swelling was present in all patients till one week and then considerably reduced. After 1 month in only one patient swelling was present. In group II swelling was present in all patients till 1 week and no patient had swelling after 1 month. This result shows that *initially the swelling was more in combined approach but after a month only one patient had swelling who belonged to the intra-oral group which may be due to related other complication such as exposed plate.*

**Pain** was determined by visual analogue scale.<sup>[8]</sup> In group I mean value = 6.5) group II (mean value = 7.7). *This result is may be due to higher periosteal stripping and piercing of masseter muscle.* However on conducting 't' test on overall pain score, there was almost no significant difference (P = 0.858).

**Postoperative presence of infection:** In group I, 1 patients developed infection which lasted till 1 month whereas in group II, 1 patients developed late infection on second week which lasted for 7 more days. Wound dehiscence was noted and was found to be present in 1 patients in each group but lasts for two more week in group 1. Plate exposure was noted in 1 patient in group I whereas none of the patient had exposed plate in group II patients, during minimum three months of followup. This result shows that **infection, wound dehiscence and plate exposure are directly interrelated.** The chances of plate exposure and post-operative infection is proportional to wound dehiscence *Intra- oral group had more change of above three complication and these are confirmatory to the finding of A W Sugar (2010).*<sup>[9]</sup>

## CONCLUSION

According to this study it can be concluded that the use of intraoral approach or intraoral and transbuccal combined approach for the treatment of mandibular fracture have almost similar manifestation in regards of outcome of surgery and patient comfort, however combined approach has certain advantage over intraoral approach in ease of fixation of bone plates and overall postoperative complications such as bone plate exposure and infection. Overall time taken in combined group is more than intraoral group, but it is not statically significant. In this study, it can also be concluded that by the placement of trocar in proper zone, the chances of facial palsy in combined approach is further reduced. However as sample size of patients recruited in this study was small, it is recommended that a large number of cases be studied before a statistically valid conclusion can be reached.

Although Intra-oral with transbuccal combined approach is simple at the hand of experienced surgeon, it is still technique sensitive for the beginner. A Gulses determined the safety zone for the placement for transbuccal trocar which further made more safe procedure regarding damage to facial nerve.<sup>[10]</sup>

Intra-oral approach has definite advantage when there is a need of removal of plate, as position of plate is more superficial than the combined approach. One more advantage of combined approach which is 90<sup>0</sup> placement of screw in relation to plate can be overcome by specialized instrumentation like use the 90<sup>0</sup> screwdriver in intraoral fixation alone.

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