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## Who Can Treat Mandibular Trauma Better?

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**Abstract**

Oral and maxillofacial surgery, a specialty responsible for the diagnosis, treatment of trauma, congenital, developmental and iatrogenic lesions in the maxillofacial complex. Despite all the progress that has occurred in the specialty of this fraternity, many people are still unaware of the specialty. Even today, difficulties are experienced owing to the lack of knowledge of the general public and health professionals concerning the scope of oral and maxillofacial surgery. To investigate recognition of the scope of oral and maxillofacial surgery; 50 questionnaires about mandible angle fracture were sent to the oral & maxillofacial surgeons and plastic surgeons, in 2 equal groups. The questionnaire covered 9 questions regarding peri-operative care of mandible angle fracture. Each interviewee had to answer the clinical situation with their own perspective and knowledge. On the basis of questionnaire responses, a good knowledge of treatment plan in terms of function and aesthetics were evaluated, which were instituted by oral and maxillofacial surgeons and plastic surgeons gave little consideration on functional outcome. Results obtained from this questionnaire signified that less number of plastic surgeons operated on mandibular angle fractures as compared to oral surgeons, with not much a discrepancy in the choice of radiographs. The plastic surgeons usually prefer an extraoral approach over an intraoral, with the main aim to re-establish esthetics whereas oral surgeons preferred functional establishment. Both the surgeons treat these fractures with the help of rigid osteosynthesis and intermaxillary fixation. Not many plastic surgeons opt for Champ's technique of osteosynthesis. Both the surgeons do not prefer to remove plates postoperatively. Moreover, the plastic surgeons do not wish to extract tooth in line of fracture majorly. Thus, we conclude that oral and maxillofacial surgeons are better proficient than plastic surgeons in handling mandibular angle fracture and the specialty needs to broaden its horizons in order to ensure the correct referral of all patients.

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## Introduction

Oral and maxillofacial (OMF) surgery is a specialty responsible for the diagnosis, and clinical and surgical treatment of traumatic, congenital, developmental and iatrogenic lesions in the maxillofacial complex [1]. This entire purview of oral and maxillofacial surgery is not completely comprehended by both the general public and some medical professionals as well. Even today, difficulties are experienced owing to the lack of knowledge concerning the scope of oral and maxillofacial surgery. The difficulties encountered are owing to the confined presentation of OMF fraternity, and thus reference of patients to OMF surgeons for treatment of maxillomandibular trauma is very limited. This scenario makes it mandatory that surgeons involved in the care of maxillofacial trauma patients familiarize themselves with the treatment plan in treating such fractures. It also becomes important to identify the lapses in management that lead to many complications. Mandibular fractures represent approximately two-thirds of all the maxillofacial fractures (nearly 70%). Out of which, fractures of mandibular angle represent for 26-35% [2]. Management of mandibular angle fractures is often challenging and results in the highest complication rate amongst fractures of the mandible. Optimal treatment for angle fractures remains controversial [3]. Presently mandibular fractures are being treated by both OMF surgeons as well as plastic surgeons. Most of the confusion and debate exists about the right approach for fractures of the mandibular angle. Unlike in western countries, the public literacy level and awareness in India are very disproportionate [4]. Therefore, we did not include the opinion of general public in the study. We realised that understanding the perception and attitude of our medical colleagues will be more vital than assessing the knowledge of the public. Thus, we included the viewpoints of OMF surgeons & Plastic Surgeons in our survey. To overcome this confined knowledge about OMF surgery fraternity; we commenced this study regarding the treatment protocols followed by both the surgeons to treat mandible angle fracture.

## Aim of the Study

The aim of the study is to judge the competency of an OMF surgeon versus plastic surgeon and creating awareness in the management of mandibular angle fracture.

## Objectives of Study

The objectives of the following study are:

To evaluate the treatment plan of both OMF surgeons as well as plastic surgeon.

To judge the final outcome of this treatment plan.

To verify if the treatment provided by both surgeons governs all aspects, such as re-establishing function, concern for esthetics and postoperative care of the patient.

## Materials and Methods

A questionnaire-based study was conducted amongst a selected group of 50 surgeons of Rajasthan. Amongst these were 25 plastic surgeons and 25 OMF surgeons.

A sample of questionnaire is given below:

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Please spare few minutes of your time to answer following questions. For a question, more than one option can be checked.

Name (Optional):

Educational Qualification:                      Department:  
Email                      (Optional-Preferable):                      Mobile  
(Optional):

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Q.1) How many patients of mandibular angle fracture visits you for their treatment in the span of one year (approximately)?

a. Less than 10

b. 10-30

c. More than 30

Answer.....

....

Q.2) Which Pre-Operative radiograph would you like to prefer for mandibular angle fracture?

a. Oblique lateral radiograph

view b. PA (Posterior-anterior) skull  
radiograph c. Periapical/ Occlusal  
d. Panoramic tomography  
e. Computed tomography (CT)

Answer.....

....

Q.3) Which approach will you prefer for mandibular angle fracture?

- a. Extraoral
- b. Intraoral

Answer.....

....

Q.4) What will be your main goal while treating mandible angle fracture?

- a. Re-establish function
- b. Aesthetics
- c. Both

Answer.....

....

Q.5) What is your preferred modality of treatment for mandibular fracture?

- a. Rigid osteosynthesis
- b. Semi-rigid osteosynthesis
- c. Trans-osseous wiring
- d. Intermaxillary fixation

(IMF) only

Answer.....

....

Q.6) What criteria do you choose to select postoperative intermaxillary fixation as an adjunctive modality of treatment in mandibular fracture?

- a. Displacement of fracture
- b. Medical condition of the patient
- c. Age of the patient
- d. Occlusion
- e. Any other

Answer.....

.....

Q.7) For a simple, noncomminuted mandibular angle fracture, what is your preferred method of treatment?

- a. Champ technique
- b. Champ technique + arch bar
- c. Two miniplates
- d. Tension band plate+ biocritical plate (nonlocking screw plate)

e. Locking screw plate  
f. Tension band plate + locking screw plate

- g. Lag screw technique
- h. Other (please specify)

3D (3-dimensional) plate

Open approach with neutral, universal plate?

Answer.....

....

Q.8) Do you prefer to remove plates later? And why?

- a. Yes
- b. No

Reason.....

.....

.....

.....

.....

.....

Q.9) Do you always extract teeth in line of fracture?

- a. No
- b. Yes

Answer.....

.....

## Results

Responses given by both plastic & OMF surgeons in relation to each survey question is given in the following Table 1.

The results obtained were, 3 plastic surgeons received less than 10 patients for angle fractures and 9 OMF surgeons received less than 10 references in a year. 14 plastic surgeons and 11 OMF surgeons had reference of 10-30 patients. And 8 plastic surgeons had more than 30 patients, whereas 5 OMF surgeons had more than 30 reference. This clearly indicates that plastic surgeons had more reference for mandibular angle fractures. Amongst the investigation advised, 7 plastic surgeons preferred lateral oblique views as compared to 6 OMF surgeon's preference. Only 3 plastic surgeons ask for poster-anterior view, whereas 5 OMF surgeons advise it. no plastic surgeons refer for periapical or occlusal views and 5 OMF surgeons ask for it. 15 plastic surgeons

depend on panoramic tomography and 22 OMF surgeons depend on it. 24 plastic surgeons and 20 OMF surgeons advise computerised tomography. When considering approach for fracture treatment, 21 plastic surgeons and 9 OMF surgeons choose extraoral approach. 4 plastic and 16 OMF surgeons go for intraoral access. The main goal of treatment for 9 plastic surgeons and 24 OMF surgeons is re-establish function. 22 plastic and 21 OMF surgeons give consideration to esthetics. 24 plastic and 25 OMF surgeons weigh both function and esthetics equally. When choosing treatment modality, 22 plastic surgeons and 24 OMF surgeons select rigid osteosynthesis, 3 plastic and 4 OMF surgeons prefer semi-rigid osteosynthesis, 4 plastic and 2 OMF surgeons depend on troussaus wiring, 1 plastic and 3 OMF surgeons hinge on intermaxillary fixation. The criteria of choosing intermaxillary fixation as an adjunct were- displacement of fracture of for 15 plastic surgeons and 11 OMF surgeons, medical condition of the patient for 3 plastic surgeons and 2 OMF surgeons, age of the patient for 2 plastic surgeons and 4 OMF surgeons, occlusion for 12 plastic surgeons and

21 for OMF surgeons. For a simple, noncomminuted mandibular angle fracture, the preferred method of treatment for 8 plastic surgeons and 20 OMF surgeons was to follow Champ's technique. 10 plastic and 12 OMF surgeons go for Champ's technique as well as arch bars. No surgeons prefer tension band and biocritical screws. 11 plastic and 2 OMF surgeons place locking screw plates. 3 plastic surgeons only do tension band and locking screw plate. Lag screws are preferred by 8 plastic as well as OMF surgeons. Few surgeons, 6 plastic and 5 OMF surgeons use 3 dimensional plates and 10 plastic, 8 OMF surgeons undertake open approach with neutral, universal plate. 7 plastic and 8 OMF surgeons prefer to remove these plates; whereas 19 plastic and 21 OMF surgeons do not remove these plates. 3 plastic and 16 OMF surgeons do not extract tooth in line of fracture, whereas 24 plastic and 9 OMF surgeons always extract these teeth in question.

**Table 1:** Responses to Survey Questionnaire on Mandible Angle Fracture.

Serial No.	Questions:	Plastic Surgeons	OMF Surgeons
1.	How many patients of mandibular angle fracture visits you for their treatment in the span of one year(approximately)?		
	a. Less than 10	3	9
	b. 10-30	14	11
	c. More than 30	8	5
2.	Which Pre-Operative radiograph would you like to prefer for mandibular angle fracture?		
	a. Oblique lateral radiograph	7	6
	b. Posterior-anterior view	3	5
	c. Periapical/ Occlusal radiograph	0	5
	d. Panoramic tomography	15	22
	e. Computed tomography (CT)	24	20

3.	Which approach will you prefer for mandibular angle fracture?		
	a. Extraoral	21	9
	b. Intraoral	4	16
4.	What will be your main goal while treating mandible angle fracture?		
	a. Re-establish function	9	24
	b. Aesthetics	22	21
	c. both	24	25
5.	What is your preferred modality of treatment for mandibular fracture?		
	a. Rigid osteosynthesis	22	24
	b. Semi-rigid osteosynthesis	3	4
	c. Trans-osseous wiring	4	2
	d. Intermaxillary fixation only	1	3
6.	What criteria do you choose to select postoperative intermaxillary fixation as an adjunctive modality of treatment in mandibular fracture?		
	a. Displacement of fracture	15	11
	b. Medical condition of the patient	3	2
	c. Age of the patient	2	4
	d. Occlusion	12	21
	e. Any other	0	0
7.	For a simple, noncomminuted mandibular angle fracture, what is your preferred method of treatment?		
	a. Champ technique	8	20
	b. Champ technique + arch bar	10	12
	c. Two miniplates	23	13
	d. Tension band plate+ biocritical plate (nonlocking screw plate)	0	0
	e. Locking screw plate	11	2
	f. Tension band plate + locking screw plate	3	0

	g. Lag screw technique	8	8
	h. Other (please specify)	6	5
	i. 3D plate	10	8
	ii. Open approach with neutral, universal plate?		
8.	Do you prefer to remove plates later? And why?		
	a. Yes	7	8
	b. No	19	21
9.	Do you always extract tooth in line of fracture?		
	a. No	3	16
	b. Yes	24	9

## Discussion

Mandibular angle fractures are common [5,6]. Reasons for this may include a thin cross-sectional area relative to the body, symphysis and Para symphysis anteriorly, and the presence of the third molars [7,8]. Treatment of angle fractures is plagued by the highest complication rates amongst mandible fractures, and no consensus exists regarding optimal treatment [5-9-11]. Currently both OMF surgeons as well as plastic surgeons are known to be treating orofacial trauma. In our survey, we found that number of plastic surgeons is more than oral surgeons, to treat mandibular angle fracture. Appropriate use of a panoramic examination to diagnose fractures of the mandible might yield excellent diagnostic results [12]. A 3D reconstructed view with CT, allows the classification and severity of the fracture to be evaluated due to the spatial information it provides. This can also be achieved with an OPG (orthopantomography) but requires an ambulant patient and a radiographer with high technical skill [13]. Most of the plastic surgeons preferred CT scan to evaluate mandibular angle fracture whereas OMF surgeons relied more on panoramic & PA skull view to make a diagnosis. This point can be taken into consideration that CT is not easily accessible to all the patients & surgeons everywhere in India. Mandibular angle fracture can be approached both extra orally as well as intraorally. Fracture line starting anterior to mandibular third molar and ending at antero-inferior border of the insertion of the masseter muscle or posterior

body of mandible can be approached trans-orally. In cases where fracture line starts posterior to the third molar/insertion of the masseter muscle to the angle of the mandible, fracture line extending high in the ramus, highly unfavourable angle fractures, oblique angle fractures, muscle entrapment between the fractured segments, existing laceration; extraoral approach provides a better choice for reduction and fixation of the fractured segments with restoration of anatomical and functional occlusion[2]. Patter et al said that female and young patients were concerned about the extraoral scar & intraoral approach was favoured [14]. In our study, we found that most of the plastic surgeons preferred extraoral approach over intraoral irrespective of the type of fracture, whereas OMF surgeons preferred intraoral approach whenever it was possible. The ultimate goal when addressing any mandibular fracture is safe and successful establishment of the patient's preinjury occlusion and function [15]. Our survey encountered that plastic surgeons had more inclination towards aesthetics of the patient whereas OMF surgeons had a view of re-establishing function as well as aesthetics. The advantages of plate fixation, includes decreased time of intermaxillary fixation and cost effectiveness, makes this the method of choice in complex mandibular fractures, even in a high-risk population [16]. International AO faculty, a majority of whom have OMF surgery training, will often attempt to repair linear and uncomplicated angle fractures without MMF (mandibulomaxillary fixation) [3]. We found



that both plastic surgeons and OMF surgeons were in favour of using rigid osteosynthesis equally. Patients having IMF (intermaxillary fixation) for long periods may manifest more dramatic problems and differences than those who have immediate mobilization. The benefits of immediate function following ORIF (open reduction & internal fixation) seem to be multiple such as good nutrition, lesser chance of complication, better healing through micro movements, good speech, etc [17]. Several scientific studies have opined that IMF is not necessary while performing internal fixation. By avoiding the use of perioperative IMF, the surgeon increases operative efficiency through economy of time and cost, increases operative safety, and increases postoperative comfort for the patient, all without any detrimental effect to the final treatment outcome [17]. Animal studies suggest that IMF can lead to atrophy, weakness, and decrease in the cross-sectional areas of the masseter and temporalis muscle fibres after five weeks of IMF. IMF can initiate condylar changes in the TMJ (temporomandibular joint) if instituted for longer duration [17]. In our survey, all surgeons choose occlusion & displacement of fracture as criteria for post-operative IMF as an adjunct to ORIF.

Champ performed a series of experiments with miniplates that delineated “ideal lines of osteosynthesis” within the mandible. Plates placed along these lines were thought to provide optimal fixation and stability. Ideal plate placement for angle fractures was along the superior border of the mandible above or just below the superior oblique ridge. Because these plates were small and the screws noncortical, placement was possible without damaging the tooth roots [3]. Most surgeons find the Champ’s technique faster and easier in comparison to the use of a tension and biocritical plate. This trend away from eccentric screw placement and compression may be a reflection of difficulty obtaining an accurate reduction with compression [3]. In our survey it is found that OMF surgeons usually follow Champ’s principles whereas plastic surgeon usually prefers to put two miniplates as it requires less efforts via extraoral approach.

Complications due to the presence of a mini-plate are unlikely. Mini-plates may not generally require removal, as various complicating factors must be considered when the mini-plate is removed. In addition, mini-plate removal generally occurred within one year after placement and was mostly influenced by patient’s psychological factors [18]. In our survey we observed that both plastic and OMF surgeons usually followed the same concept. Intact teeth in the fracture line should be left in situ if they show no evidence of severe loosening or inflammatory change. Permanent teeth maintained in the line of fracture should be followed up clinically and radiographically for at least 1 year to ensure that any unnecessary endodontic treatment is avoided. Teeth in the line of fracture that prevents reduction of fractures, teeth with fractured roots, a partially impacted wisdom tooth with pericoronitis, and a tooth with extensive periapical lesion should be removed [19]. We found that most of the plastic surgeons usually prefer to remove teeth in line of fracture but OMF surgeons prefer to retain them until deemed necessary.

In the last few years, rapid progress has occurred in the field of OMF surgery, still large portion of the population is unaware of the specialty. Therefore, they may fail to take advantage of the most favourable care that is already available. If patients are to receive the best treatment available, it is necessary to introduce programs to enlighten healthcare consumers and providers about OMF surgery and its different subspecialties, and their role within the healthcare structure. There is a paucity of factual evidence about the public discernment of OMF surgery; this study seeks to fill this gap. In conclusion, we would like to state that, the horizon of OMF surgery can be widened by making patients and referring physicians more aware about the scope of treatment protocols followed by this fraternity.

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