Post-operative Complications of Mandibular fractures in Iraqi patients who attended Al-Jumhuri Hospital, Mosul City

By

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Abstract :

About 34 patients with fracture mandible who attended the center of oral & maxillofacial department in Al-Jumhuri Hospital in Mosul City, during the period from 2022 to 2023. Medically compromised patients, edentulous, older than 50 years of age and below 12 years are excluded from the study.For every patient in the study, the fracture was treated with the Wurzburg 2mm pure titanium miniplate system. **Method of application of the miniplate :**Patient with fracture mandible treated after 6-10 days of incidence of injury, all the patients underwent general anaesthesia via nasotracheal intubation. Either arch bars placed in both dental arches or eyelids with MMF, an intraoral or/and extraoral incisions were made . The fracture was reduced and establishment of ideal occlusion was obtained. The miniplate was adapted to the fracture line & secured with monocortical screws All patients received intravenous antibiotics from the time of admission until discharge. Then prescibtion of 7-10 days course of oral antibiotics.Care was taken to place the screws laterally to the roots & superior to the neurovascular bundle , the incision sites were closed in 2 layers & corrugated drain was placed. The MMF was placed in 7-10 days. & incision site irrigated with normal saline , intra & extraorally with daily dressing . Patients were instructed to continue a fluid diet for 4 weeks. All patients were followed for at least 8 weeks. Patients were observed for complications: soft tissue infection, non union, malunion, malocclusion, nerve injury, tooth damage, pain, post operative radiographs were obtained in all cases. **Results :**Seven complications (20%) were noted which include the following: Malocclusion, nonunion fracture, plate bending & displacement, plate exposure, wound dehiscence & malunion.so no significant effect of the age on the complications that found in our patients .Most of the patients have a complications was male & only one patient was female .We found a significant effect of the address on the complications. All the value of complications occurs in the patients from out side the Mosul city. More complications occur in the body of the mandible in which the percentage was 5 from the total complications so we found a 2 significant percentage here one related to the frequency of the fracture in which the more site of fractures found in the angle while the more site of complications in the body. The more complications occur in the fracture caused by missile injury. All the complications associated with missile ,We found more complication

in the workers patients than another patients. 30 cases was operated by extraoral approach & 6 of them has complications & 4 of the cases was operated by intraoral approach one of them has a complication & 30 cases was operated by extraoral approach & 6 of them has complications & 4 of the cases was operated by intraoral approach one of them has a complication.

keywords : Post-operative Complications , Mandibular fractures , Iraqi patients , Al-Jumhuri Hospital, Mosul City

Introduction :

Of all face fractures, 36% to 70% are mandibular fractures, making them one of the most frequent traumatic injuries to the head and neck(Ogundare *etal.*, 200 Brunicardi 2013). The care of mandibular fractures can vary, based on the surgeon's preferences and the fracture's features. Nonoperative measures like soft diets, closed reduction with maxillary fixation, and open reduction with internal fixation are all possible(Nasser,2013), Despite the significant occurrence Mandibular fracture treatment options are not new, but in this day and age, evidence-based management algorithms are being sought after, with a renewed emphasis on surgical and patient outcomes as well as the management aspects that impact them.

The second most frequent type of facial fracture, mandibular fractures account for a sizable percentage of patients who visit OMFS (Newlands and Kerawala ,2020) , the categories of complications are as follows: those that necessitate additional surgery, those that require medication administration, and those that don't(DINDO *etal.*, 2004). Mandibular fracture consequences may include neurological deficiency, nonunion, delayed union, infection, and malocclusion. It has been demonstrated that a number of factors affect the problems that follow mandibular fractures. These include the patient's age, noncompliance with treatment, length of antibiotic use, number and severity of fractures, and dental and mandibular bone condition(Kazanjian and Converse; 1980), On the other hand, several writers (Fashola *etal.*, 2002) contend that the mode of treatment has a significant impact on the emergence of these problems. This study, therefore, is aimed at analyzing the Post-operative complications of Mandibular fractures in Iraqi patients who attended Al-Jumhuri Hospital, Mosul City, Iraq.

Patients & Materials: About 34 patients with fracture mandible who attended the center of oral & maxillofacial department in Al-Jumhuri Hospital in Mosul City, during the period from 2022 to 2023. Medically compromised patients, edentulous, older than 50 years of age and below 12 years are excluded from the study.

For every patient in the study, the fracture was treated with the Wurzburg 2mm pure titanium miniplate system , the set consist of :

1. Miniplate, 1mm thick, different lengths & shapes, 4 holes, 6 holes, 10 holes H & L, straight shape
2. Screws: had an inner core diameter of 1-5 & another (thread) diameter of 2 mm.
3. Plate bending plier: for plate adaptation.
4. Plate holding forceps & Screw driver.

Method of application of the miniplate : Patient with fracture mandible treated after 6-10 days of incidence of injury, all the patients underwent general anaesthesia via nasotracheal intubation. Either arch bars placed in both dental arches or eyelids with MMF, an intraoral or/and extraoral incisions were made . The fracture was reduced and establishment of ideal occlusion was obtained. The miniplate was adapted to the fracture line & secured with monocortical screws All patients received intravenous antibiotics from the time of admission until discharge. Then prescibtion of 7-10 days course of oral antibiotics.

Care was taken to place the screws laterally to the roots & superior to the neurovascular bundle , the incision sites were closed in 2 layers & corrugated drain was placed. The MMF was placed in 7-10 days. & incision site irrigated with normal saline , intra & extraorally with daily dressing .

Patients were instructed to continue a fluid diet for 4 weeks. All patients were followed for at least 8 weeks. Patients were observed for complications: soft tissue infection, non-union, malunion, malocclusion, nerve injury, tooth damage, pain, postoperative radiographs were obtained in all cases.

Results :

Seven complications (20%) were noted which include the following: Malocclusion, nonunion fracture, plate bending & displacement, plate exposure, wound dehiscence & malunion.so no significant effect of the age on the complications that found in our patients & this is shown in the table-1.

Table (1): Relation of the age with the complications

Parameter	Comp. n=7		No Comp. n= 27		Total n= 3.4		P-value
	No	(%)	No	(%)	No	(%)	
< 20	1	(14.3)	2	(7.4)	3	(8.8)	2.742
20-30	2	(28.6)	10	37.0)	12	(35.3)	1.946
30-40	2	(28.6)	9	(33.3)	11	(32.4)	1.046
40-50	2	(28.6)	6	(22.2)	8	(23.5)	1.202

Most of the patients have a complications was male & only one patient was female & this is shown in the Table (2) & Fig (1).

Table (2) : Relation of the Gender with the Complication

Parameter			Comp. n=7		No Comp. n= 27		Total n= 3.4		P-value
			No	(%)	No	(%)	No	(%)	
Gender	M	1	6	(85.7)	24	(88.9)	30	(88.2)	0.622
	F	2	1	(14.3)	3	(11.1)	4	(11.8)	
M:F ratio			6:1		8:1		7.5:1		

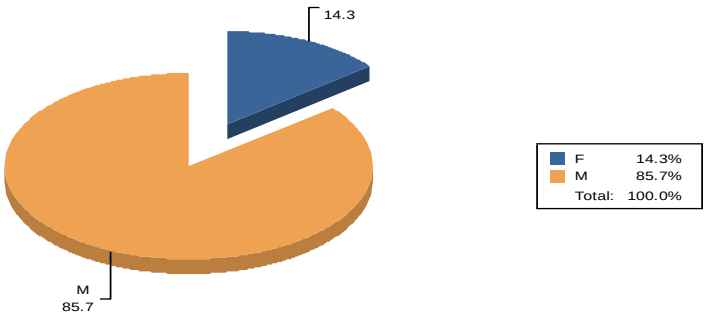
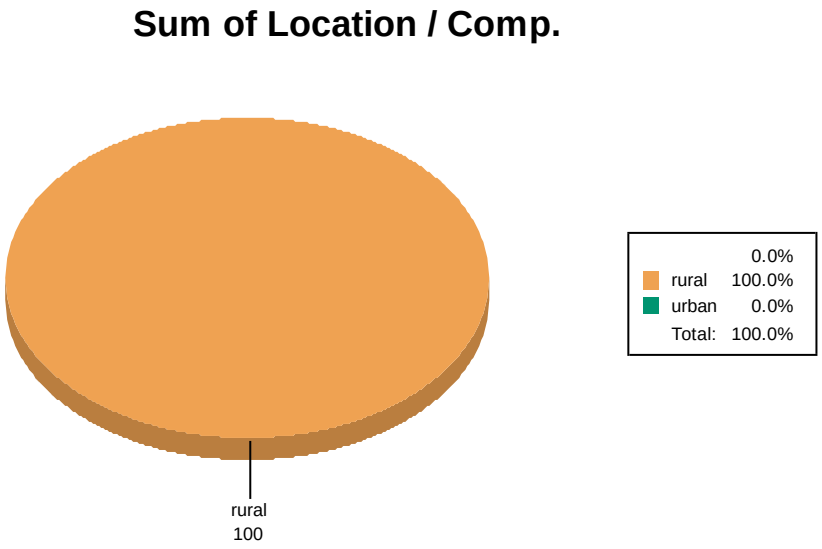


Figure (1) : Relation of the Gender with the Complication

We found a significant effect of the address on the complications. All the value of complications occurs in the patients from outside the Mosul city. This is explained in the figure (2.) & table (3).



Figure(2):effects of residence on complications

Table(3) The relation of the Residence with the Complication

Parameter			Comp. n=7		No Comp. n= 27		Total n= 3.4		P-value
			No	(%)	No	(%)	No	(%)	
Address	urban	(1)	0	(02.0)	18	(66.7)	18	(52.9)	< 0.01*
	rural	(2)	7	(00.0)	9	(33.3)	16	47.1)	

* significant value

Effect of site of fracture on the complications:

More complications occur in the body of the mandible in which the percentage was 5 from the total complications so we found a 2 significant percentage here one related to the frequency of the fracture in which the more site of fractures found in the angle while the more site of complications in the body. This explained in the figure (3).

Table(4) The relation of the Anatomical Location of the Fraction

Parameter		Complication		No Complication		Total(No.=34)		P. value
		No.	(%)	No.	(%)	No.	(%)	
Site #	Angle (1)	1	(14.3)	13	(48.1)	14	(41.2)	< 0.05*
	Body (2)	5	(71.4)	7	25.9)	12	(35.3)	< 0.05*
Parasymphyseal	PS (3)	1	14.3)	6	(22.2)	7	(20.6)	o.632
Symphyseal	Sym (4)	0	(0.0)	1	(3.7)	1	(2.9)	0.100

* significant value

Relation of cause of trauma:

The more complications occur in the fracture caused by missile injury. All the complications associated with missile also we found here a significant percentage of the complication & this is found in the figure (4).

Relation of occupation of the patient with the complications:

We found more complication in the workers patients than another patients. And this is found in the table (5.)

Table(5) Relation of Occupation of the Patients on the Complications

Parameter		Comp. n=7		No Comp. n= 27		Total n= 3.4		P-value
		No	(%)	No	(%)	No	(%)	
Occup.	worker (2)	6	(85.7)	11	(40.7)	17		< 0.05*
	employed (3)	0	(0.0)	4	(14.8)	4		o.332.
	policeman (1)	1	(14.3)	8	(29.6)	9	(26.5)	o.336.
	H. wife (4)	0	(0.0)	2	(7.4)	2	(5.9)	o.183.
	student (5)	0	(0.0)	2	(7.4)	2	(5.9	o.183.

* significant value

Effect of approach of operations on the complications:

30 cases was operated by extraoral approach & 6 of them has complications & 4 of the cases was operated by intraoral approach one of them has a complication. & this is shown in fig.5

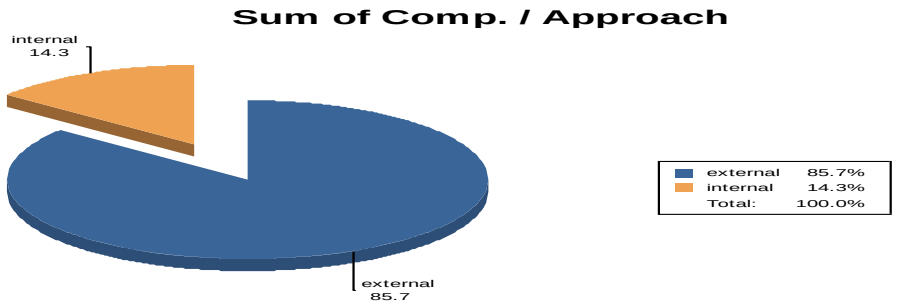


Figure.(5): Effect of approach of operations on the complications:

30 cases was operated by extraoral approach & 6 of them has complications & 4 of the cases was operated by intraoral approach one of them has a complication. & this is shown in fig .(5).

Table (6) Relation of Approach of Operation on the Complication

Parameter		Complication		No Complicatic		Total 34		P. value
		N	(%	N	(%	N	(%	
Approa	external (1		(85.	2	(88.9	3	(88.	o.63
	internal (2		(14.		(11.1		(11.	o.i5

Discussion :

Explanation the relation of the complications with the age, sex, site of fracture, residence, occupation, & surgical approach to the fracture site during the operation:

Age: The complications occur in about the same percentage in all age groups & we found no significant relation between the age group & the complications & explanation of this ;that all the patients selected with no relevant medical history contribute to the complication (i.e medically the patients considered healthy a part from the fracture) .& this agree with the study of (Renton *etal.*, 1996) in which study show that the complications rates was statistically similar in all age groups .

Gender : Male showed more complication than female patients this is due to the type of our life in which the male is more liable to sever trauma which cause a sever complicated type of fracture more than the female in which they have an easier work than male & also the females look after their general health better than male .we did not found a previous study to support this relation .

occupations: we found most complications occur in the worker & police man patients & this is due to type of the work of those patients in which they are more liable to the bullet & shell as they are working in open space. This type of injury leads to more severe trauma than other types of injuries. Also those patients has a neglected & bad oral hygiene & bad general health. After they sustain the injury they were indifferent & irregular visits during follow up periods. All these make them with more complications rates than other patients.

Residence: most of the patients complain of the complications come from outside the Mosul(rural area) this will cause decrease in the visits of the patient to the maxillofacial unit for the follow up, most of them with poor oral hygiene, with a high prevalence of poor living conditions, poor patients compliance , & this is in agree with the study of (LAMPHIER *etal.*, 2003).

Anatomical location of the fracture: It was found that the greatest percentage of complications occur in the body of the mandible 5(71.4%) this due to more exposure of this site to bullet and missiles This disagree with the study of (ANDREW *etal.*, 2007) in which more complications occur in the angle of the mandible.

Etiology of trauma: The most common cause of trauma of fracture mandible was missile injury as the country during this study is under a war condition. this lead to more

complications rates than other type of fracture. This war injury including shell & bullet causes sever type of trauma ,avulsion of the soft & hard tissue , comminuted fracture , which all lead to more complicated cases. this disagree with the result of study of (JOSE E BARRERA *etal.*, 2007) which found a Vehicular accidents was the main cause of complication occur .

Approach: The complications rate in relation to the surgical approach & technique , we found in our study that most complications were occur in the cases treated by extraoral approach & this is related to the type of cases treated in which most of them was complicated cases that need extraoral approach for reduction & fixation of the fracture This agree with the study of (PELED *et al*..1997) . who said that the complications occur in the treatment of the fracture mandible treated by miniplate related to the surgical approach & technique more than other causes.

Copmarison: The cases which showed complications were seven complications (20%) 3 of seven was minor complications which include: Malocclusion , Fracture to the tooth root, Plate exposure.

The other 4 complications which is major include: Nonunion fracture in 2 cases : Malunion fracture with malocclusion , Plate displacement & bending and Infection.

This study with agreement with the studied done by (Ellis & Graham,2002, ANDERW *et al.*, 2007) , in which they had the same percentage of complications (20%), While the study of (AYMAN CHRITAH, 2005) which show a less complications (6%) in which he used a 2.0 mm miniplate adapted along Champy's lines of ideal osteosynthesis & fixed with 8.0 mm locking monocortical screw plus 1 week of maxillomandibular fixation (AYMAN , CHRITAH, 2005) , & we place the minipltes at the inferior border of the mandible in most of the cases .

The complications in this study consist of minor & major complications the same result has been shown in the study of (Ayman Chritah in 2005), which include fibrous non union in one case with malocclusion , soft tissue dehiscence in another two cases .

The complications rates in our study was below the complications of the study of (Ammar Yass, 2003) in which the complications of this study was 25% which also include minor & major complications.

Report of the cases with complications in the sample :

Patient (1)

40 years old male presented with a bullet injury cause fracture mandible in the left body come from a rural area. The complication which is the malocclusion resolved with minor occlusal adjustment

Figure (6): surgical operation of the patient

Figure (7): postoperative x-ray of the patient

Patient (2)

About 30 years old male come with missile injury in the head & neck area caused burn in the face with displaced mandibular body fracture.the patient come from a rural area.

The complication occur in this patient which is a non union fracture & plate bending & displacement present in the same case . we think that this complication occur due to the condition of the patient in which he has a burn in the face & neck that lead to delay in the treatment of his fracture mandible & also this burn lead to scar with sever limitation of mouth opening due to the contracture in addition to this we use one plate with one screw in one side & 2 screw in the other side due to the shortage of the materials (plates & screws). All these lead to the displacement of the fracture segment bending & displacement of the plate

Also the follow up of the patient was not good because he came from outside the Mosul city (rural area) & the patient refuse another operation to remove the plate & re treatment the fracture.

Fig. (4.4) preoperative x-ray

Figure (8): postoperative x-rays

Patient(3)

15 years old female presented with fracture mandible bilateral body

due to FFH & the patient came from rural area, the complication occur was wound dehiscence & plate exposure. The patient was 15 years old female we do intra oral approach for the reduction & fixation of the fracture . there is a fracture in the teeth in the left side with loss of part of the alveolar process in the area, wound dehiscence of the mucosal incision appear after 10 days of the operation the patient was instructed oral mouth wash & antibiotic coverage we remove the plate after 3 months.

Figure (9): plate exposure intraorally

Patient (4)

33 years old male presented with fracture mandible in the body & angle bilaterally caused by bullet injury , he come from another city. (out side Mosul).

the complication was a fibrous non union fracture which is noted clinically at the right angle & left body fracture upon release of the maxillomandibular fixation at 20 days .The fracture healed after 3 additional weeks of maxillomandibular fixation .This complication was due to poor anatomical reduction & comminuted fracture & bone loss in the area .

Figure (10): preoperative X-ray explain the fracture

Patient (5)

29 years old male presented with fracture mandible in the body caused by RTA , he came from a rural a area .

the complication was a malunion fracture in which the healing of bone segment occur in a nonphysiological position in this case inadequate treatment of the displaced fracture occur due to inadequate number of screw used in the area .

Figure (11): malunion with open bite

Patient (6)

27 years old male presented with fracture angle , caused by bullet injury , he came from a rural area

the complication occur was postoperative infection , there is a wound dehiscence in the external skin incision, this infection caused due the hematoma that persist after removal of the drain .This is treated by adequate drainage & culture & sensitivity test daily cleaning of the wound & dressing.

Figure (12): postoperative hematoma

Figure (13): postoperative X-ray

Patient (7)

33 years old male presented with fracture body area caused by bullet injury , he came from a rural area the complication was injury to the tooth root which is the lower second molar tooth which is caused due to application of the plate & screw near to the apex of the root the patient complain of tenderness , swelling in the area appear intra orally we take periapical x- ray for the patient which explain periapical radiolucency related to the root tooth ,we do extraction of the tooth .

Figure (14): postoperative X-ray explain tooth injury by the plate

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