

Assessment of Management Outcomes of Mandibular Fracture at a Tertiary Care Centre

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Abstract

Introduction: The facial area is one of the most frequently injured areas of the human body. Mandibular fractures form a major proportion as it is the second most facial bone to be fractured next only to nasal bone despite being the largest and the strongest facial bone. The main goal in the treatment of fracture is to predictably restore preinjury anatomical form and occlusion. If treated incorrectly, significant functional and aesthetic sequelae may happen which includes malocclusion, temporomandibular joint disorders and facial asymmetry. This study attempts to define the outcomes for the mandibular fracture after different treatment measures were employed.

Method: This is an observational study design done in the period between November 2021 to October 2022 in the department of ENT at RIMS Ranchi. The study comprises of 50 patients of mandibular fracture that were included. This study evaluated the outcome of mandibular fracture after treatment on the basis of pain, occlusion, mouth opening and infection.

Results: The study reviewed 50 patients with mandibular fractures of age ranging from 18-70 years significantly higher for males. The highest incidence was in the age group of 21–30 years. The main cause were road traffic accidents (RTAs, 76%) followed by self fall (16%) and assaults (8%). Parasymphyseal fractures were the most frequent (48%), followed by condyle (32%) and angle (26%) fractures in occurrence. Pain and occlusion improved to near normal in all the patients. Mouth opening improved to normal in 86% and was a bit less than normal in 14% following treatment. Infection was present in only 4 patients (8%) following treatment.

Conclusion: Following treatment pain resolved in almost all of the cases irrespective of the site or treatment used. Same was true for occlusion while mouth opening reverted back to normal except in cases involving condylar fractures especially bilateral condylar fractures. Infection at fracture site was seen only in 8% of the cases that had age of more than 50 years, suffered multiple fractures and underwent open reduction. Outcome for parasymphysis was better than that for condylar fractures.

Keywords: Mandibular Fracture, Parasymphyseal, Pain, Occlusion, Mouth Opening.

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Introduction

The human face is the first focus of interaction and a source of man's fascination with the idea of beauty. Ironically, the facial area is one of the most frequently injured areas of the human body. Over the past century maxillofacial trauma has emerged as a serious health problem.

Of these maxillofacial injuries mandibular fractures forms a major proportion as it is the second most facial bone to be fractured next only to nasal bone despite being the largest and the strongest facial bone.[1] The main causes of mandible fractures are Road Traffic Accidents (RTA), assault, fall, sports related injuries and industrial trauma. Road traffic accidents constitutes the most (79%), followed by assault (10%), accidental fall (10%) and sports injury (1%).[2]

Signs and symptoms include pain and edema, change in occlusion, lower lip paresthesia, hematoma, ecchymosis, loose teeth and crepitation on palpation.[10]The main goal in the treatment of fracture is to predictably restore preinjury anatomical form and occlusion, with associated aesthetics and function and immobilization of reduced fractured ends.[3] If treated incorrectly, significant functional and aesthetic sequel may happen which includes malocclusion, temporomandibular joint disorders and facial asymmetry.[4] The treatment options ranges from conservative closed reduction procedures like maxillomandibular fixation to open methods of internal fixation using plates and screws.

This study attempts to define the outcomes for the mandibular fracture after different treatment measures were employed which will be a useful guide for management of these fractures.

Material and Methods

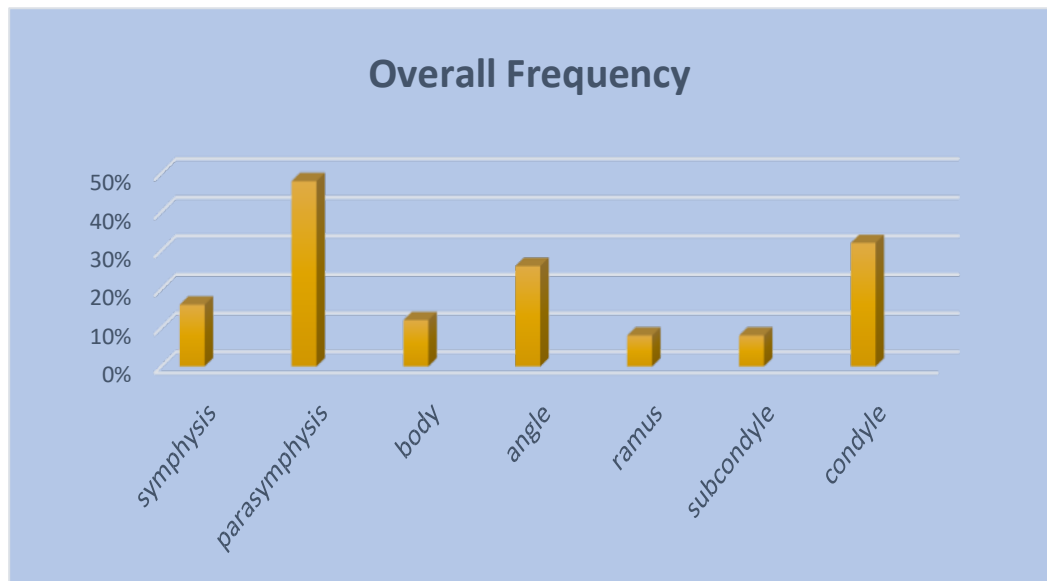
This observational study was conducted during the period of November 2021 to October 2022 in RIMS Ranchi, in the selected groups of patients (n=50) who presented in ENT emergency/ OPD with mandibular fracture and was approved by the Institutional Ethics Committee, RIMS Ranchi vide memo no. 69 dated 7th of June, 2022. The inclusion criteria's were – Age 18-70 year, fair general condition, diagnosis of mandibular fracture, maximum cut off of presentation up to 10 days and those willing to participate.

Exclusion criteria's were- compound fracture, those with head injuries, limb fractures, abdominal and chest injuries and those who refuse investigation and treatment.

Then data were collected, recorded and analyzed based on age, sex, mechanism of trauma, anatomic location of fractures, the treatment modality employed and the outcomes with regard to pain, occlusion, mouth opening and infection.

Results

Majority of the mandibular fractures were seen in males (n= 43; 86%) in respect to females (n= 07; 14%) and majority of the patients who sustained mandibular fracture were in the age group 21 – 30 (n= 19; 38%) followed by those in the age group 11 – 20 (n= 12; 24%). Road traffic accident was the most common cause in the present study (n= 38; 76%) followed by self falls (n= 8; 16%) and assault (n= 4; 8%).Overall parasymphysis was the most common site as it occurred in 48% of the patients. This was followed by the condyle (32%), angle (26%), symphysis (16%), body (12%), and lastly ramus and subcondyle were the least common (8% each).



Graph 1: Overall frequency of fracture site.

Majority of the patients were treated with surgical intervention, that being open reduction and internal fixation (n=39;78%) as compared to conservative modalities(n=11;22%).

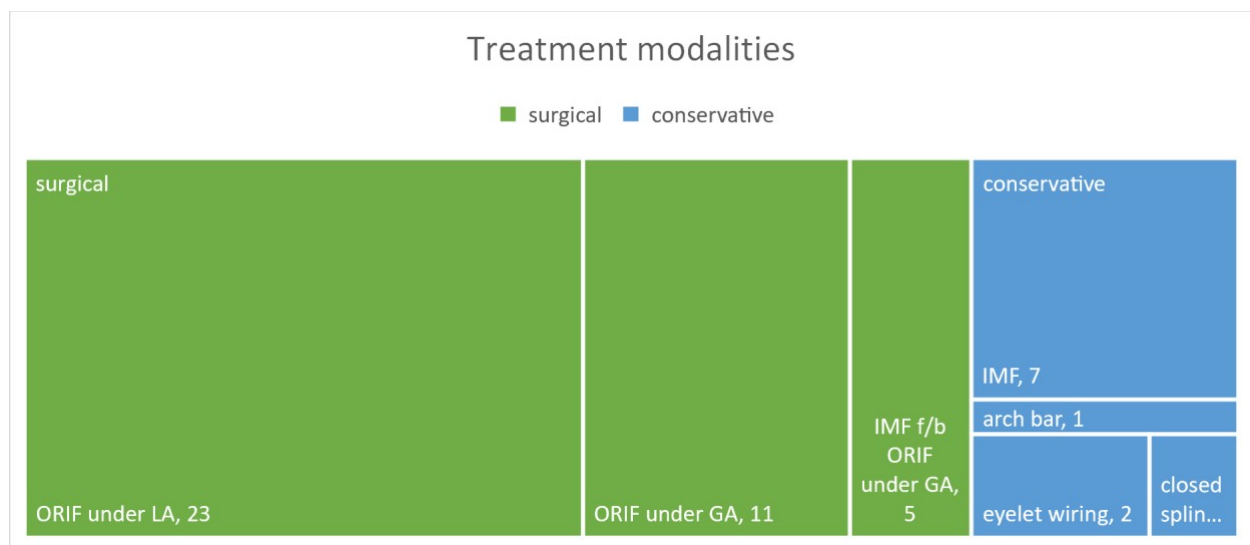


Chart 2: Treatment modalities

Outcomes

Pain: Majority of the patients had pain in the extremes of Visual Analog Scale (VAS) that being in the range 7 – 10. Immediately following treatment pain on Visual Analog Score (VAS) either remained same or increased (remained same = 29;58%, slight increase =

21;42%). VAS at 1 week further decreased to the range of 3 – 5 in all of the patients. VAS at 12 weeks was down to 0 (n= 44;88%), was 1 in 4 of the patients (8%) and remained 2 in 2 of the patients (4%).

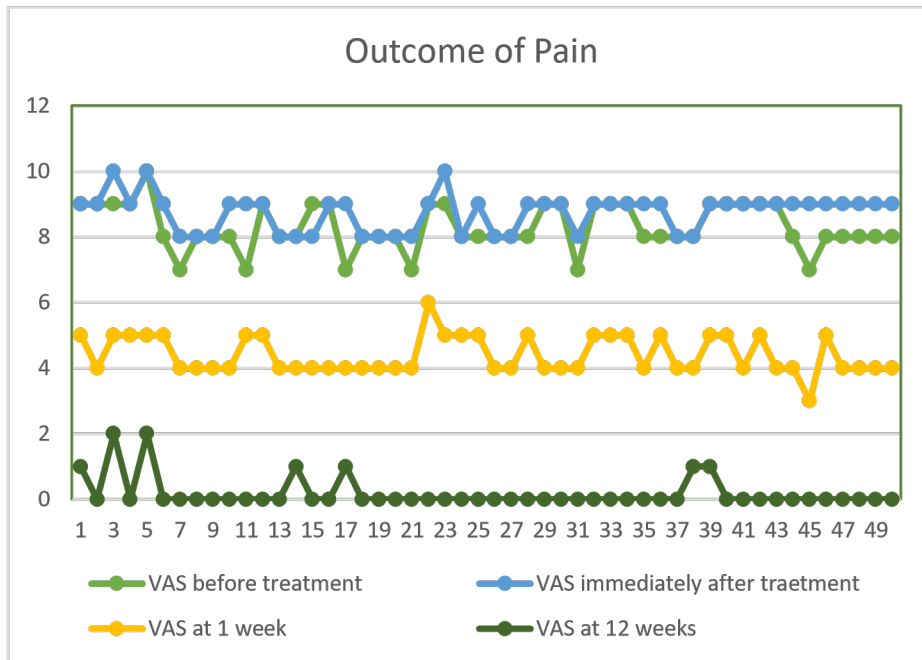


Chart 3: Outcome of Pain

Occlusion

Occlusion was deranged in majority of the patients following injury (n=49;98%). Only one of the patients had satisfactory occlusion following injury. Occlusion was achieved in all the patients (100%) following treatment.

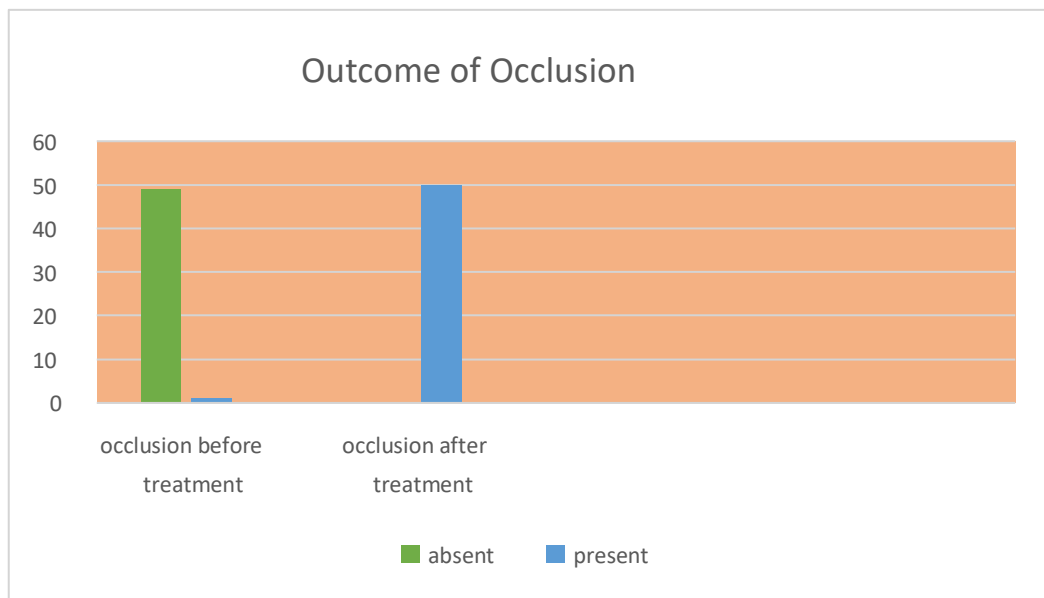


Chart 4: Outcome of Pain

Mouth opening

Mouth opening was reduced than the normal (more than 35mm) in all the patients following trauma. It was in the range of 25 to 35 mm in 40 patients (80%) and in the range of 15 to 25 mm in 7 of the patients (14%) whereas it was markedly reduced to less than 15 mm in 3 of the patients (6%). Following treatment mouth opening improved to normal in 43 of the patients (86%) and was a bit less than the normal i.e., between 25 to 35 mm in 7 of the patients (14%).

Mouth opening	Pre Treatment		Post Treatment	
	Frequency	Percent	Frequency	Percent
>35 mm	00	-	43	86%
25 – 35 mm	40	80%	07	14%
15 – 25 mm	07	14%	00	-
<15 mm	03	6%	00	-

Infection: Following treatment only 4 patients showed signs of infection (8%) while the rest 46 patients had no such features of infection (92%).

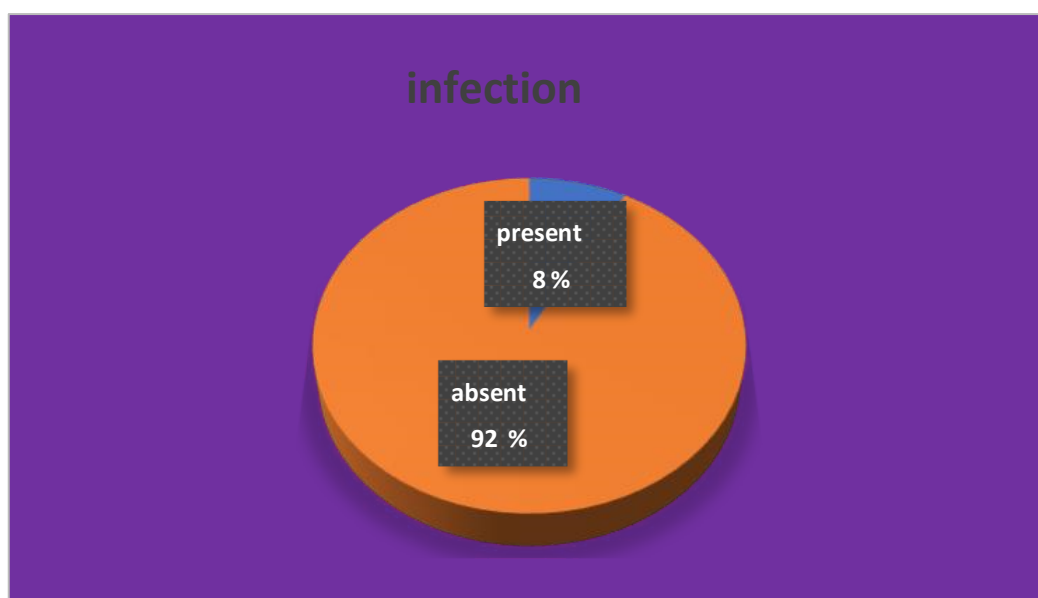


Chart 5: Infection

Discussion

Irrespective of the treatment the VAS on pain either remained same or increased in the immediate post operative period. It further reduced to the mid of the VAS scale at one week and came further down to nearly painless in about 12 weeks. G Zineb *et al* in 2017 stated that postoperative pain has been reported in upto 77% of patients with 80% of these have moderate to severe pain. Pain reduced to zero in about 30 days.[5]

Occlusion was malaligned in almost all of the cases except one where it present from the beginning following injury. After intervention all of the patients (100%) had normal occlusion at 12 weeks time. The results are similar to that noted by Karthik Raghupathy *et al* (2015) and also to that of Ajoy Kr. Shahi and V. K. Prajapati *et al* in 2019.[6,7]

Mouth opening was reduced to normal in all the patients following trauma. According to Alexandre Meireles Borba *et al* (2017) , as facial fractures occur the masticatory muscles zygomatic, mandibular and maxillary bones undergo spasms that will definitely have an effect to the amplitude of mouth opening.[8] Following treatment it improved in almost 80% of cases and slightly less than normal in 7 of the cases. All of the 7 patients that had not achieved near normal mouth opening had condylar fractures and 6 of them had bilateral condylar fracture. This tallys with a study done by E. T. Neizen *et al*.[9]

Infection at the fracture site was reported in only 4 of the patients (8%). The result is consistent with many other studies like one conducted Munante Cardenas *et al* (2015).[10] Vladsilav *et al* (2010) in their study on risk factors for development of

infection in patients with mandibular fracture that the main contributing factor were delayed medical care, accompanying pathological disorders, angular location, multiple and communitated fracture.[11] Abdelfadil *et al* (2013) also suggested aging to be a important risk factor and also that compared to open reduction closed reduction is reported to be associated with lower rates of postoperative complications. This has been ascribed to the exposure of fracture site as well as the hardware to the oral cavity flora.[12]In concordance with the above studies, in the present study the 4 patients that suffered post intervention infection were all of age more than 50 years, had multiple fractures and were treated by open reduction and internal fixation.

Henceforth the anterior fractures i.e., the parasymphyseal and symphyseal have a better outcome of treatment than the condylar fracture that too in particular bilateral condylar fracture.

Conclusion

In the present study, 50 patients of mandibular fracture at Rajendra Institute of Medical Sciences, Ranchi between May 2021 to October 2022 were clinically recorded, evaluated and appropriate treatment was provided. An analysis of the data obtained in course of this study, coupled and compared with data obtained during reviewing literature, direct us to the conclusions that following treatment pain resolved in almost all of the cases irrespective of the site or treatment used. Same was true for occlusion while mouth opening reverted back to normal except in cases involving condylar fractures especially bilateral condylar fractures. Infection at fracture site was seen only in 8% of the cases that had age of more than 50 years, suffered multiple fractures and underwent open reduction. Outcome for parasymphysis was better than that for condylar fractures.

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