

ORIGINAL RESEARCH**Correlation of Pattern of Mandibular Fracture and the Mechanism of Injury: A Study at a Tertiary Care Centre****¹M. Junaid Alam, ²Sandeep Kumar, ³Naodeep Kumar, ⁴Md Anas**¹Junior Resident, ²Professor & Head, ^{3,4}Senior Resident, Department of Otorhinolaryngology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India**Correspondence:**

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Email: mdanas089@gmail.com**ABSTRACT**

Introduction: Mandible is the second most common facial fracture after nasal bone. There has been a significant increase in the number of cases in recent years. Mandibular fractures constitute a substantial proportion of maxillofacial trauma cases in Ranchi and adjacent districts. Road traffic accidents were the most common cause of fracture with para symphysis being the commonest site. There was no gender bias in etiology with number of fracture sites.

Method: This is an observational study design done in the period between March 2021 to August 2022 in the department of ENT at RIMS Ranchi. The study comprises of 35 patients of mandibular fracture that were included. This study evaluated the pattern of mandibular fracture, on the basis of site involved presenting at RIMS Ranchi.

Results: The study reviewed 35 patients with mandibular fractures of age ranging from 18-70 years significantly higher for males. The highest incidence (60%) of mandibular fractures was in the age group of 21–35 years. The main cause were road traffic accidents (RTAs, 85.7%) followed by assaults (8.5%) and other reasons (5.7%). Parasymphyseal fractures were the most frequent (71.4%), followed by condyle (8.5%) and angle (8.6%) fractures in occurrence.

Conclusion: The mechanism of injury correlates significantly with the anatomic location of fracture. In contrary to the general teaching, here in this study, instead of condylar, parasymphysis fracture was the most common presenting type of mandibular fracture; thus, a surgeon should better know all the aspect of management of this type. Because RTAs are the most frequent cause, every centre should follow basic ATLS protocol simultaneously with management of mandibular fracture.

Keywords: Mandibular Fracture, Parasymphyseal, ATLS.

INTRODUCTION

Mandible is the second most commonly fractured bone after nasal bone, though it is the largest and strongest facial bone.¹ Mandibular fractures can involve only one site or can often involve multiple sites simultaneously as in comminuted fracture, specially in high velocity trauma.

The etiology and pattern of mandibular fracture vary considerably among different study populations. There is reported variability in the pattern of mandibular fractures resulting from different causes of injury, such as road traffic accidents (RTAs), assaults, falls and other reasons.² Increased frequencies of RTA and domestic violence (specially in females) have emerged as the etiological factors in mandibular fractures. Furthermore, there is an increase

in the proportion of adolescent and young adults sustaining these injuries, as those are the commonest age groups involved in RTA.

The type and direction of traumatic force can be extremely helpful in diagnosis. Fractures sustained in RTA are usually far different from those sustained in personal altercation. Since the magnitude of force can be much greater, victims of automobile and motorcycle accidents tends to have multiple mandibular fractures, whereas the patient hit by a fist may sustain single, nondisplaced fracture. Despite many reports about the incidence, diagnosis and treatment of mandibular fracture there is limited knowledge about the specific type or pattern of mandibular fractures. This study attempts to define current epidemiology and predictable patterns of fracture based on patient demographics and mechanism of injury. The development of reliable predictors of injury pattern will be a useful guide for prompt and accurate diagnosis and management of mandible fracture in the trauma patient population.

MATERIAL AND METHODS

This observational study was conducted during the period of March 2021 to August 2022 in RIMS Ranchi, in the selected groups of patients (n=35) who presented in ENT emergency/OPD with mandibular fracture in 18 months of duration of study.

The inclusion criteria's were – Age 18-70 year, fair general condition, diagnosis of mandibular fracture, exclusion of other potential injuries and maximum cut off of presentation up to 1 week.

Exclusion criteria's were- torso trauma, severe Pan-facial trauma, extensive soft tissue facial crushing injury and shocked patients.

Then data were collected, recorded and analyzed based on age, sex, mechanism of trauma, anatomic location of fractures and number of segments fractured. The pattern of mandibular fracture along with mechanism were correlated and observed.

RESULTS

The most common involved age groups were 21-35 years of age ie; 21/35 (60%).

18-20 years: 2/35(5.7%)

21-35 years: 21/35(60%)

36-49 years: 9/35(25.7%)

50-70 years:3/35(8.5%)

The commonest cause of mandibular fracture seen in this study was RTA.

Road Traffic Accidents including high velocity trauma: 30/35(85.7%)

Assaults including domestic violence: 3/35(8.5%)

Pathological fracture, secondary to osteomyelitis: 1/35(2.8%)

Other causes: 1/35(1.05%)

The commonest pattern of mandibular fracture found in this study was Para symphyseal fracture.

Parasymphyseal type: 25/35(71.4%)

Condylar type: 3/35(8.5%)

Angle type: 3/35(8.5%)

Symphyseal type: 2/35(5.7%)

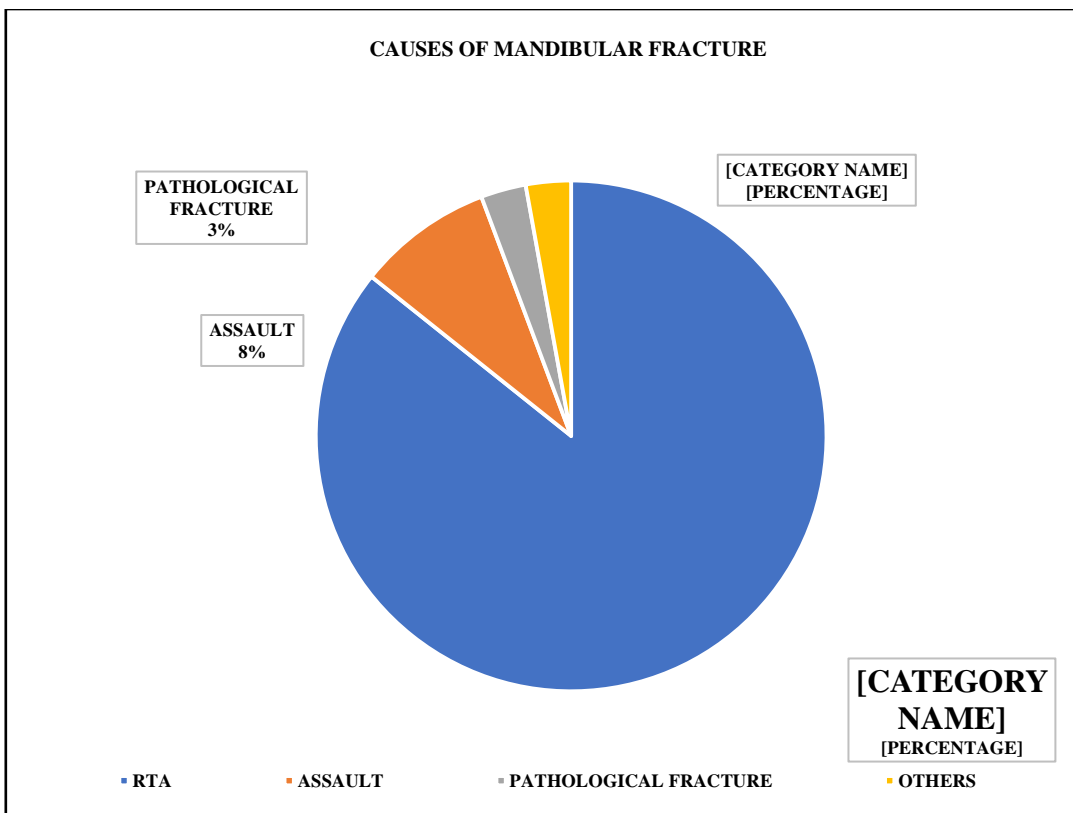
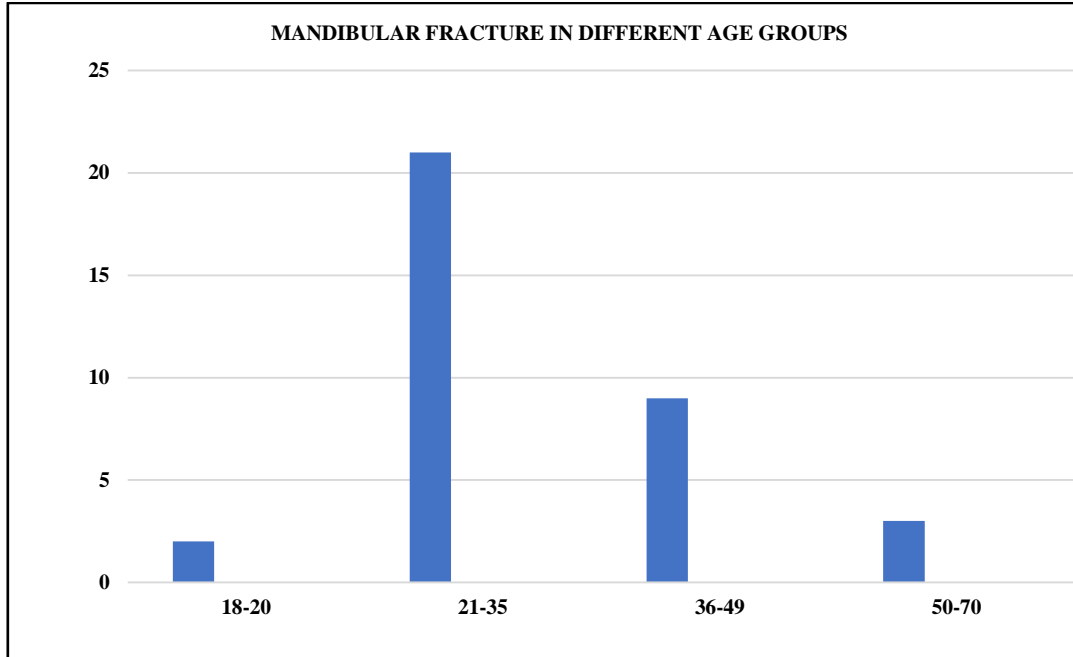
Other sites: 1/35(2.8%)

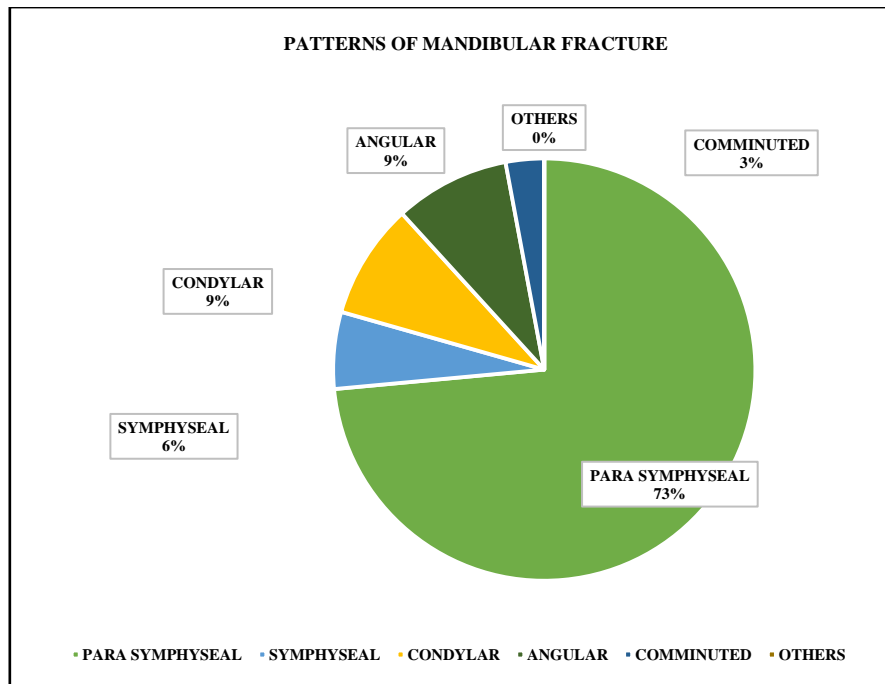
Comminuted fracture: 1/35(2.85%)

The correlation between the site involved and the mechanism of injury were found as following in this study:

1. Parasympyseal and symphyseal fractures are mostly associated with RTA incidents.
2. Condylar fracture can be due to any of the above-mentioned cause and combined mechanism.

3. Angular fracture is mostly seen due to assault including domestic violence. A special case here to be mentioned in this study is a case of pathological fracture that was at angle and was due to underlying mandibular osteomyelitis in a diabetic patient.
4. Comminuted multi segmented fracture was associated to high velocity trauma mostly due to RTA.





DISCUSSION

This study had been done as an observational study to assess the pattern of mandibular fracture presenting at RIMS Ranchi. Various similar analyses³ had been reported in the literature to have in-depth insights about etiological factors as well as the site of fractures. In our study, the highest incidence of mandibular fractures is found in the age group of 21–35 years (60%). The results of this study of mandibular fracture coincide with previous reports, particularly regarding age and sex of patients.⁴ The possible reasons for this in our geographic area may be due to high use of vehicles, early age of riding, lack of safety measures in the form of helmets and improper road conditions, as most of fractures in this group belong to RTAs. There was male dominance in the gender distribution shown in our study that is obviously due to work culture.

The common cause of mandibular trauma in our region is RTAs followed by assault. Our findings also support the same, as in 86% of our patients; RTA was the cause of injury.

As Bither *et al.*⁵ pointed out, reasons for increased RTAs in India might be related to socioeconomic reasons such as poor traffic sense of the drivers and pedestrians as well as poor road conditions, rainy weather, inadequate enforcement of road safety regulation and speed limit, reluctance to use helmets, use of alcohol or illicit drugs, decreasing tolerance, and increasing personal competitions among young.

In 71% of our patients parasymphiseal fracture were seen, this is consistent with the report of Adi *et al.*⁶ who showed that the parasymphiseal fracture is the most common site of mandibular fractures. However, Olson *et al.*⁷ showed that there was a higher incidence of angle involvement in patients with mandibular trauma.

The direction and magnitude of force, the nature of object leading to impact are responsible for the varied clinical outcomes.⁸ Knowing the direction of force can help the clinician to diagnose the pattern of fracture. An anterior blow directed to the chin can result in bilateral condylar fracture and an angled blow to the parasymphysis may cause a contralateral condylar or angle fracture.

In our study, the most common parasymphiseal fractures were found to be related to high velocity trauma in RTAs, while angular fractures were related to mostly to assault cases including females. There was one case of pathological fracture due to underlying jaw osteomyelitis resulting at the angle. Condylar fracture can be due to direct blow, or any of the

above mentioned or combined mechanism of injuries region. In our study, symphysis injury was seen only in a couple of cases related to RTA.

Also, in contrary to the classical teaching⁹; in our study we found the para symphyseal type as the most common type of fracture instead of condylar fracture.

CONCLUSION

Knowing the pattern of mandibular fracture associated with the mechanism involved can be very useful in order to perform an early management and prevention of any malunion and facial disfigurement. The etiology is closely associated with the anatomic location of mandibular fractures.¹⁰ The diagnosis of parasymphyseal and symphyseal fractures should be suspected in every case of facial trauma in RTA cases¹¹ while an angular fracture should arouse a suspicion of assault. The diagnosis, pattern of fractures, and their management should be associated with a concern for medico-legal appropriateness too.¹²

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