Section: Plastic Surgery

Original Research Article

SEGMENTAL MANDIBLE FRACTURES – EPIDEMIOLOGY, MANAGEMENT STRATEGIES AND FUNCTIONAL OUTCOMES IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Aim: Mandibular fractures constitute a major proportion of maxillofacial trauma cases in Thanjavur Medical College Hospital. Aim of the present study is to analyze and discuss the epidemiological characteristics of patients with segmental mandible fractures, treatments offered and the postoperative outcomes. **Materials and Methods:** The study was conducted in the Department of Plastic and Reconstructive Surgery of Thanjavur Medical College from January 2023 to December 2024. About 32% of the total faciomaxillary injury cases and 45% of patients with mandible fractures admitted during the period were Segmental mandible fractures. Age, sex, mechanism and aetiology of injury, site of fracture, type of fracture, associated injuries, treatment modalities, post-operative outcomes and results were studied. **Result:** Males were more affected than females. The most common association was parasymphysis with the contralateral angle fracture. The most common etiological factor was road traffic accident (RTA). Nearly 87% of the cases were treated by open reduction and internal fixation. More severe fractures were noted in alcoholics and patients without helmets. Around 27% of patients had an associated head injury which delayed the surgery. Mouth opening and occlusion were assessed postoperatively using visual analog scale and significant improvement in the mouth opening and the normal occlusion was attained in almost all the patients with minimal complications. **Conclusion:** The incidence and causes of mandibular fracture and the knowledge about the epidemiology can help in providing the desired treatment to prevent adverse complications and also educating the people about the road safety rules, helmet usage and also about the severity of injuries in alcoholics which will bring down the faciomaxillary injuries.

INTRODUCTION

Mandible is the largest and strongest facial bone. It is the second most commonly injured bone in the face. Mandibular fractures can cause a variety of impairments, including malocclusion, poor mastication, salivary disorders, obstructive sleep apnea, temporomandibular joint disorders and chronic pain.

Incidence of mandibular fracture vary with geographic region, socioeconomic status, culture. Mandibular fractures constitute a major proportion of maxillofacial trauma cases in our institute. The epidemiological characteristics of patients with segmental mandible fractures and etiology, pattern, gender, anatomical distribution of mandibular fractures, most common age group, mechanisms of injury, treatment offered, postoperative outcomes and complications were studied.

MATERIALS AND METHODS

The study was conducted in the Department of Plastic Surgery in Thanjavur medical college hospital for a period of 24 months from January 2023 to December 2024.

Total number of mandible fractures were 280 out of which 127 were segmental. The parameters studied were:

- Age

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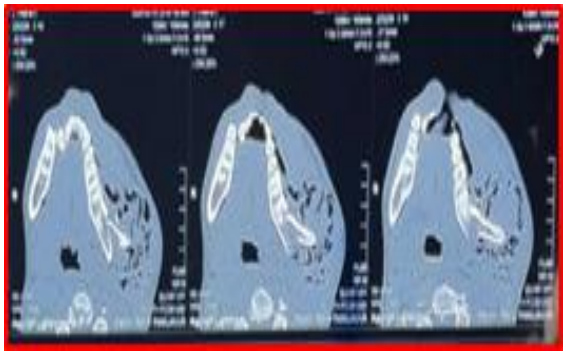
- Sex
- Mechanism and aetiology of injury
- Site of fracture
- Type of fracture
- Associated injuries
- Treatment
- Post-operative outcomes and complications

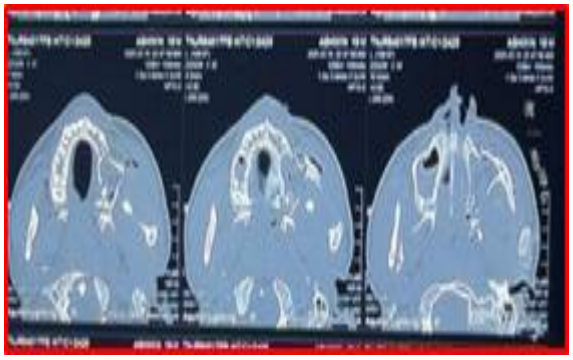
Inclusion Criteria

- All patients with more than one site of mandible fracture
- Patients who gave consent for follow-up for minimum 3 months postoperatively

Exclusion Criteria

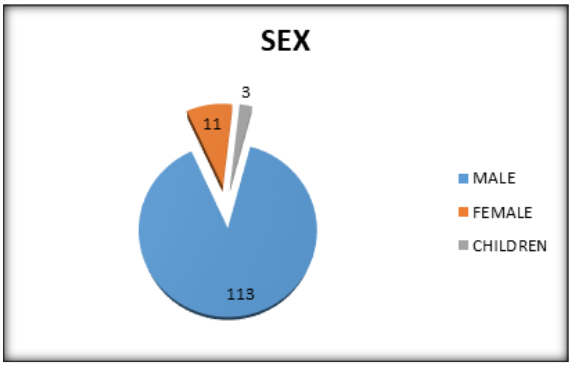
- Patients with mandible fracture at single site
- Comminuted mandible fractures





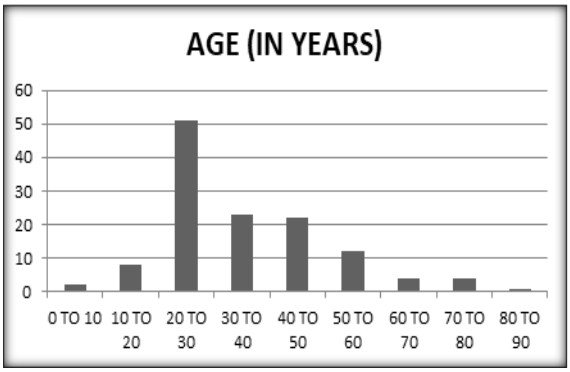
RESULTS

Total number of faciomaxillary cases were 390 of which patients with mandible fractures were 280. Total number of patients with segmental mandible fractures were 127 and M:F - 12:1. Total number of males were 113 and females were 11. 3 children were affected out of 127 patients.



The most common fracture pattern observed was Parasymphysis with the contralateral angle fracture and the most common side was Right angle with left parasymphysis.

The most common etiological factor was Road traffic accident (81) followed by accidental self falls and assaults.

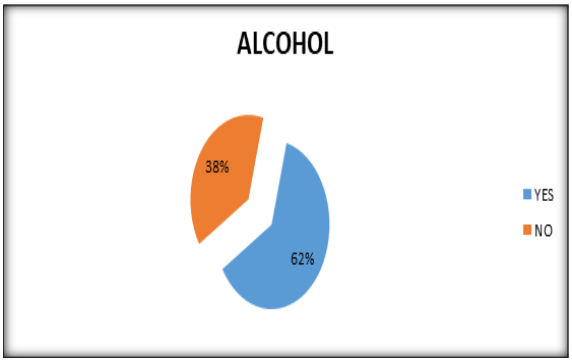


Men of 21 to 30 years of age were most affected.

The most common fracture sites (in descending order):

- the parasymphysis with contralateral angle - 46
- parasymphysis with contralateral condyle - 36
- symphysis with bilateral condyle - 21
- bilateral parasymphysis - 13
- Subcondyle with contralateral angle - 6
- Bilateral condyle - 5

ALCOHOL CONSUMPTION



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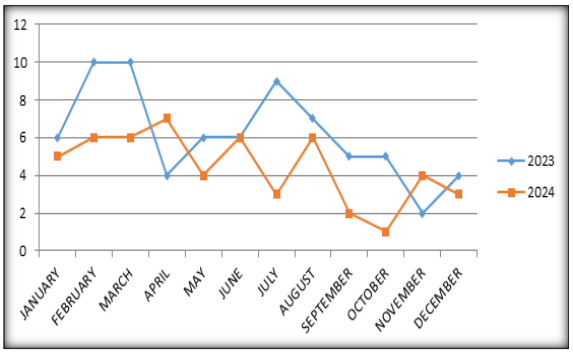
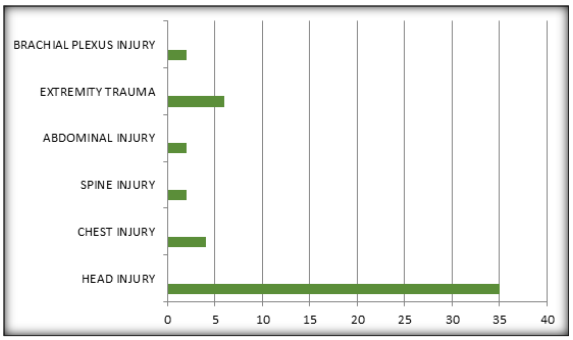
More severe fractures (grossly displaced) and associated injuries (head, chest and abdomen) were noted in alcoholics.

MONTHLY DISTRIBUTION

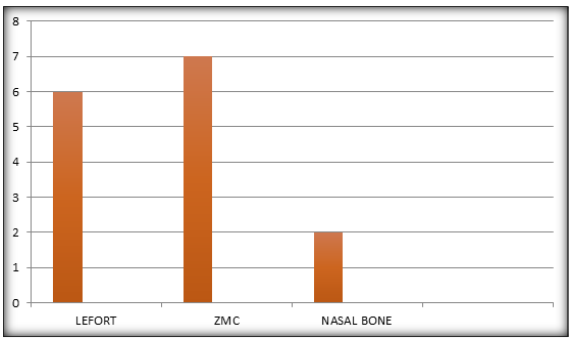


35 patients had an associated head injury which delayed the management of mandible fractures

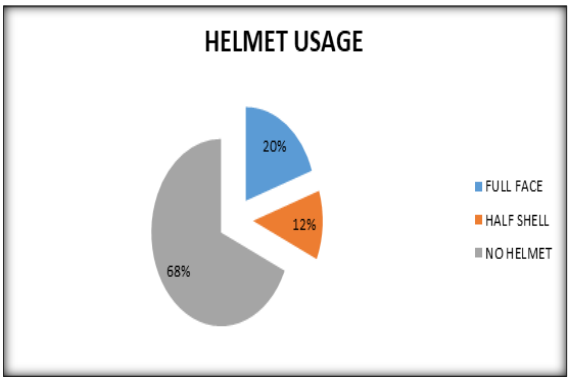
ASSOCIATED INJURIES



ASSOCIATED FACIAL FRACTURES

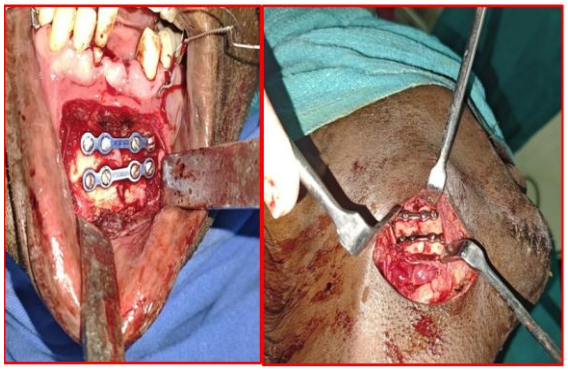


HELMET USAGE



Less severe fractures (undisplaced/ unicortical) were noted in patients who wore full face helmets and associated head injuries were seen in patients without helmets.

TREATMENT	NUMBER
CONSERVATIVE	2
ARCH BAR WITH MMF	15
ORIF WITH MMF	110



PARASYMPHYSIS ANGLE

Angle Class I occlusion was achieved in 118 patients. There were 3 cases of malocclusion after open reduction and internal fixation of which 2 patients were managed with Arch bar and elastics and one patient managed by redo ORIF. 6 patients were edentulous.

ARCH BAR AND MMF WITH ELASTICS AND SS WIRES

The mouth opening became near normal (45-50 mm) in both in conservative and surgical groups

COMPLICATIONS	NUMBER
MALOCCLUSION	3

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INFECTION/IMPLANT EXIT	6
MENTAL NERVE INVOLVEMENT	5
MARGINAL MANDIBULAR NERVE INVOLVEMENT/NEUROPRAXIA	3
IMPLANT EXPOSURE	2

87% were treated by open reduction and internal fixation.
2 patients were treated conservatively in view of age and the patients were unfit for surgery due to other medical conditions.
27% of patients had an associated head injury which delayed the surgery.

CONSERVATIVELY MANAGED EDENTULOUS FRACTURE

More severe fractures were noted in alcoholics.
Mouth opening and occlusion were assessed postoperatively and significant improvement in the mouth opening and the normal occlusion was attained in almost all the patients with minimal complications.

DISCUSSION

The mandible is the strongest facial bone and it is connected by the strong muscles for various functions which act as a splint and give protection to the mandible, and also cause massive displacement of the fracture fragments, if attached to the fracture segments.[6] If not treated properly, fractures of the mandible invariably produce malocclusion.
Mandible fractures if remains undiagnosed or inappropriately treated may lead to severe consequences on the cosmetic, functional and psychological aspects of the patients. The epidemiology of mandibular fractures has changed dramatically with the advent of increased urban violence, higher speed limits and new seat belt and helmet laws.
Males were predominantly affected, due to more involvement in outdoor activities. Most common pattern of fracture - the parasymphysis with angle. Road traffic accidents were the most common etiology in our patients.[11,12] In our study, the third decade was most commonly affected as it is the most vulnerable period to road traffic accidents, falls, and assault related injuries. Individuals in the extremes of life were found to be least affected.
The most common mode of presentation was deranged occlusion with restricted mouth opening.[16] The mechanism of hyperextension and hyperflexion of the head in traffic accidents makes it more vulnerable to fracture.[18] Intraoral approach was used for the parasymphysis, symphysis, and body fractures. Extraoral approach was used for angle fractures. Care was taken not to injure the mental nerve during intraoral and marginal mandibular nerve during extraoral approach.
In our study, undisplaced fractures, condylar, and intracapsular condyle fractures were treated with MMF, with good functional results.[23] The duration of MMF was 3-4 weeks in adults, 2-3 weeks in condylar fractures.[5] In both the conservative and surgical patients, the visual analog score - pre-operative pain score of 7 has come down to 2 during 5th week. The average mouth opening was 43 mm in the conservatively treated group and 47 mm in the surgically treated group. This was probably due to the TMJ dysfunction in the conservatively treated group in whom MMF was retained for 4-5 weeks.[24] Near normal mouth opening was found in the surgical group due to early mobilization. A total of 3 patients had malocclusion in the surgical group, of which 2 patients were managed with Arch bar and elastics and one patient with a redo ORIF. There were 6 cases of infection in the surgical group which was treated with higher antibiotics, and the implant was retained till the fracture union.[15] Mental nerve involvement was found in 5 patients at the fracture site and 3 patients had marginal mandibular nerve neuropraxia which recovered completely.

CONCLUSION

Most common association of segmental mandible fracture was parasymphysis fracture in association with angle fracture and Road Traffic Accidents were the leading cause of mandibular fractures. Males were more affected. More severe fractures were noted in alcoholics and in patients without helmets. Associated head injuries delayed the management and affected the outcome in few of the patients. The knowledge about the epidemiology can help in providing the desired treatment to prevent adverse complications and also educating the people about the road safety rules and helmet usage and also about the severity of injuries in alcoholics which will bring down the faciomaxillary injuries.

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