

## EPIDEMIOLOGY AND MANAGEMENT OF MANDIBULAR FRACTURE : TWO YEAR EXPERIENCE IN TERTIARY CARE DENTAL HOSPITAL

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### Summary

*Injuries of the maxillofacial complex represent one of the most important health problems worldwide. The incidence of maxillofacial skeleton fractures is rising globally, the main contributors being road side accidents, interpersonal violence and falls from heights. If not treated properly, such fractures may lead to life long functional and structural disability. This study was designed to determine demographics, clinical features, patterns of mandibular bone fractures, treatment and postoperative evaluation of such fractures. This was a descriptive study, based on data of 30 patients of mandible fractures, from March 2010 to February 2012. Variables examined included demographic & clinical features, patterns of mandibular bone fractures and results of open and closed reduction of isolated mandibular fractures using surgical stainless steel wire and miniplates. Patients were followed up for one year. There were 30 patients, 26 male and 4 females, age ranged from 5-70 years (mean age was 25 years). Most common causes were road traffic accident (50%), and interpersonal violence (30%). Parasymphysis (53%) and angle (20%) of mandible was most common site of mandibular fracture and Postoperative complication rate was higher in closed reduction than in open reduction cases with internal fixation (ORIF). Long-term collection of epidemiological data regarding maxillofacial skeleton and management aspects of mandibular fractures are important for the evaluation of existing preventive measures and useful in the development of new methods of injury prevention and treatment.*

### Key words

Closed Reduction (CR); Open Reduction with Internal Fixation (ORIF); Mandibular fractures.

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### Introduction

Fractures of maxillofacial skeleton remain a challenge for maxillofacial surgeons. Most common causes of these injuries are road traffic accidents and interpersonal violence [1]. Facial trauma may be limited to superficial abrasions and lacerations, or may be severe enough to cause fractures of maxillofacial skeleton associated with multiple injuries to head, cervical spine, chest, abdomen or extremities. In developed countries and in well developed trauma centers, these injuries are usually dealt by trained maxillofacial surgeons [2]. Mismanagement or delay in treatment may lead to serious structural or functional disability of nasal or oral region. Mandible occupies very prominent and vulnerable position on the face and is a much favored target in intentional and unintentional impact [3]. It is the tenth most often injured bone of the body and the second most in the face. Type and site of fracture depends on multiple factors, firstly: nature, magnitude, and direction of impacting force; and secondly: condition and position of mandible at the time of impact. Fractures of mandible may be present alone or in any combination with other facial bones or fractures of any other region [4]. At the time of impact, powerful contraction of muscles of mastication on internal and external aspects of mandible especially around the angle, may lead to disimpaction and overlapping of fractured segments causing serious occlusion problems. These are called unfavorable fractures [5]. If fractured segments remain in contact with each other, then these are called favorable fractures. Whenever the mandible is fractured, treatment is mainly directed to the restoration of form and function of stomatognathic system. Hippocrates was the first to describe reapproximation and immobilization using circumdental wires and external bandaging to immobilize the fracture [6].

Current established methods in the management of mandibular fractures include conservative treatment with maxillomandibular fixation (MMF) by surgical dental wiring, arch bars and Gunning splints, open reduction and intraosseous wiring, open reduction with rigid internal fixation by miniplate osteosynthesis [7].

Whether closed or open reduction methods are used, main objective is to restore the integrity of mandible to original position so that normal healing process

may be completed [8]. Presently, most of these fractures are dealt with by open reduction with internal fixation (ORIF) which causes earlier and better patient recovery with oral functions [9]. Because of unavailability of trained maxillofacial surgeons in most of District hospitals, management of these patients creates problems, both for surgeons and patients [10]. As most of these patients belong to poor families and repeated visits are required for reassessment purpose to a distant specialized center, there is always fear of mismanagement of these patients leading to complications like malunion, non union, malocclusion and psychosomatic problems associated with facial disfigurement [11]. This study was planned to determine demographic & clinical features, patterns of mandibular bone fractures, management and postoperative evaluation of such fractures.

#### Materials and methods

In this two year descriptive study done in Chattagram International Dental College and Hospital, data was collected from 30 cases of isolated mandibular fractures and their demographic aspects and management details were evaluated. This study was based on the patient data files from March 2010 to February 2012. During this period total number of admissions in Oral and Maxillofacial department of Chattagram International Dental College and Hospital were 35 and among them there were 30 cases who had isolated mandibular fracture selected. Regarding management of the mandibular fractures in majority of the patients, we used miniplate and stainless steel wires for internal fixation and maxillomandibular fixation(MMF). Clinical and radiographic data of patients with single mandibular fractures was collected and post operative results of closed and open reduction with internal fixation were analysed. Patients with multiple fractures of mandible, pathological fractures and systemic metabolic diseases like diabetes were excluded. Data was collected and analysed based on age groups, gender distribution, pattern and type of fractures, mechanism of injury and treatment modality. Out of 30 selected cases of mandibular fractures, eleven patients had favorable fractures of mandible, whereas, nineteen patients had unfavorable fractures with overlapping or displaced fractured fragments. In the group of favorable fracture, eyelets wiring was passed and after proper dental occlusion, MMF was done to ensure stabilization of fractured jaw and was kept for four weeks. In three children below ten years of age, general anesthesia was given. Other eight patients got closed reduction under local anesthesia.

Nineteen patients with unfavorable fractures underwent ORIF under general anesthesia. After exposing the fractured segments by combined corresponding skin and intraoral incision and ensuring anatomical reduction of fractured segment with proper dental occlusion, miniplate.

And transosseous wiring osteosynthesis done. Patients with closed reduction were discharged within twenty four hours on average, while patients with ORIF were discharged between twenty four to seventy two hours with instructions about feeding and antiseptic measures. In all the patients with ORIF, we removed MMF wiring after surgery and with closed reduction, we removed MMF wiring after six weeks. State of dental occlusion and temporomandibular joint along with complications were noted down and evaluated for six months.

#### Results

In this study, data was collected on 30 cases of mandible fractures and management aspects of fractures cases were evaluated. During study period patients with age range from five years to seventy years(5-70 years) and male to female ratio of 7:1 were enrolled. The most common age group involved was 21 to 30 years with the mean value of  $25.8 \pm 9.4$  years. In four female patients, two got mandibular fracture due to fall from height, two by slipping of the tubewell handle. Road traffic accident and interpersonal violence were the most common causes.

Regarding postoperative complications, infection was the most common. In total, it was 9.67% (n=6). In favorable fracture group, it was 18.18% while in unfavorable fracture group, treated with ORIF it was 5%.

**Table I :** Mode of Injury

Etiology	No. of Cases	Percentanges (%)
Road traffic accidents	15	50 %
Interpersonal violence	9	30 %
Falls from height	02	6.6 %
Slips	04	13.4 %
Total	30	100 %

**Table II:** Sites of Fracture

Site of fracture	No.of Cases	CR	ORIF	Perstage age
Para-symphysis	16	04	12	53.34 %
Angle	6	0	6	20.0 %
Body	5	02	03	16.6 %
Symphysis	3	0	03	10.0 %
Total	30	06	24	100 %

**Table III :** Treatment Option

Variables	Number	Percentages
Closed reduction	8	26.6
Open reduction with transosseous wiring	6	20.0
Open reduction with miniplate osteosynthesis	16	53.4

**Table IV:** Postoperative Results

Variables	Number	Percentages(%)
Infections	2	6.6
Normal		
Occlusion	25	83.5
Mal occlusion	2	6.6
Mal union	1	3.3
Delayed union	No case	No case
Non union	No case	No case
Sensory disturbances	No case	No cases

### Discussion

Restoration of physical integrity and earliest possible functional life with minimum morbidity is the ultimate goal of maxillofacial surgeons for the management of maxillofacial fractures [12]. In cases of mandibular fractures, goal of treatment is to restore anatomical and functional integrity and to minimize postoperative complications [13].

Prevalence of maxillofacial fractures depends on geographical conditions, socioeconomic status, cultural characteristics [13,14,15]. Because of the prominence of nose and mobile nature of mandible, these two bones are more prone to fractures [16,17,18]. Like other studies, our study also indicates higher prevalence of these fractures [8].

The age and gender distribution of this study population over a two year period indicates predominant age range of 15 to 30 years and male to female ratio of 7:1. accordance with most of the studies.

Etiology of maxillofacial fractures varies according to the socioeconomic status of the region under study [19]. Many authors have reported motor vehicle accidents as a major cause of mandibular fractures whereas others have recorded physical assault as dominant cause. Motor vehicle accidents were the most frequent cause of jaw fracture in our study (50%) followed by physical violence (30%). Our study shows similarities with many studies but differs from others. This allows the conclusion that the pattern of presentation is a multi-factorial variable.

In our study, infection was the most common complication (Table III). In total it was 6.6% (n=2). Post operative wound infections depend on multiple factors like degree of antiseptic measures adopted during reduction procedures or contamination of wound through wound margins by not following postoperative instructions by the patients.

Regarding malocclusion, mal union and delayed union there were collectively three patients. Our findings show similarities with the results of Adim et al and Smith WP et al, however, differ from the findings of Kuriako MA et al and Iizuka et al [19,20,21,22]. They found higher postoperative complications in ORIF as compared to closed reduction cases. This again allows the conclusion that postoperative complications depend on multifactorial variables.

Our study also revealed that none of the motor bike drivers was wearing helmet and following traffic rules and majority did not have a driving license.

### Conclusion

Our results suggest that at District hospital most of the cases of mandibular fractures can be dealt by Oral and Maxillofacial surgeon. Using strict aseptic techniques and surgical wires gives satisfactory results, which can be used in non affording patients. It can reduce the difficulties of patients as well as burden on already over burdened Maxillofacial centers in Bangladesh.

Since, road traffic accidents are the major cause of these injuries, which in turn seems to be largely due to drivers without driving licenses and the fact that people donot strictly follow traffic rules and regulations, so strict measures are suggested to reduce the incidence of these serious injuries.

### Disclosure

All the authors declared no competing interest.

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