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INCIDENCE, ETIOLOGY AND PATTERN OF MANDIBULAR FRACTURE IN CIMS, BILASPUR, CG, INDIA

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ABSTRACT: The aim of this study was to determine the incidence, etiology of mandibular fractures among different age and sex group to determine the frequency of anatomical distribution of fracture site. The study was conducted in the Department of ENT in association with Department of Dentistry, CIMS, and Bilaspur. We included total 100 patients particularly with mandibular fracture and associated maxillofacial injuries. These patients were treated at Chhattisgarh Institute of Medical Sciences, Bilaspur from May 2012 to April 2015. Among these 100 patients the most common cause of mandible fracture is Road Traffic Accidents with parasymphysis fracture as most common site. Incident of Mandibular fracture is mainly observed in male patients with 20 – 30 years of age group.

KEYWORDS: Mandibular Fracture, Road Traffic Accident, Parasymphysis Fracture, alcoholism,

INTRODUCTION: The maxillofacial region is the most prominent position in the human body being usually vulnerable to injury.^{1,2} Mandible is the most common susceptible bone to be fractured due to its position, prominence, anatomical configuration, mobility and less bone support³. Mandible fracture is the second most frequent facial injury, which can be single fracture, double fracture or in associated with mid-face fractures.^{1,2} The sheer pace of modern life with high speed travel as well as an increasingly violent and intolerant society has made facial trauma a form of social disease from which no one is immune.^{1,4} The mandible fractures can be caused by Road traffic accident, Assault, Interpersonal violence, Fall, Sports injury, Gunshot injuries, Industrial trauma,^{1,5} and Animal attacks.^{6,7} The Road Traffic Accidents appear to be leading cause of the mandibular fracture in the developing countries, where as in developed countries (like in North America, North Europe, Australia and Finland) Assault/inter personnel violence is the most common etiological factor.¹ This etiology is affected by geography, socio-economical status, religious and road traffic legislations which are different from different countries.^{4,6}

AIMS AND OBJECTIVES:

1. To study the incidence of mandible fracture.
2. Age and sex distribution of mandibular fracture.
3. To know the etiology and association of mandible fracture with associated maxillofacial injuries.
4. To study pattern of mandibular fracture.

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MATERIALS AND METHODS: This prospective study was conducted in department of ENT Surgery in association with department of Dentistry, CIMS government medical college, Bilaspur from May 2012 to April 2015. A total of 100 patients were included in this study.

Detailed information consisting of age, sex, residence, socio-economic status, chief complain, history of present illness, past medical history, duration of injury, etiology, alcohol intake and use of vehicles was recorded. After recording the history, a thorough clinical examination as well as OPG and those patients assault with mid-face fracture CT-PNS with 3D reconstruction has done for each patient, in this study for establishing the diagnosis.

The data were analyzed in relation to age, sex, etiology of the fracture, site of fracture line, unilateral or bilateral, isolated fracture versus mandibular fractures associated injuries, commonest combination of fracture site in mandible, interrelation of incidence of etiology, and location of fracture; type of fracture whether single, double, or multiple with etiology, gender and age respectively.

Inclusion Criteria: Patients with mandibular fracture and other associated maxillofacial fractures.

Exclusion Criteria: Patients with other maxilla facial fractures with normal mandible.

OBSERVATIONS AND RESULTS:

SL. NO.	AGE GROUP	MALE	FEMALE
1.	0 – 10 YEARS	02	01
2.	11 – 20 YEARS	15	01
3.	21 – 30 YEARS	36	04
4.	31 – 40	20	03
5.	41 – 50	10	01
6.	51 – 60	03	01
7.	>60	02	01
TOTAL	100	88	12

TABLE : 1 AGE AND GENDER DISTRIBUTIONS

SL. NO.	ETIOLOGY	NO. OF PATIENTS	PERCENTAGE
1.	RTA	72	72%
2.	ASSAULT	12	12%
3.	FALL	08	08%
4.	ANIMAL ATTACK/ BEAR BITE	03	03%
5.	INDUSTRIAL ACCIDENTS	03	03%
6.	SPORTS INJURY	02	02%

TABLE 2: DISTRIBUTION OF MANDIBULAR FRACTURES ACCORDING TO ETIOLOGY

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SL. NO.	SITE OF FRACTURE	TOTAL NO. PATIENTS	PERCENTAGE
1.	PARASYMPHYSIS	27	27%
2.	SYMPHYSIS	12	12%
3.	CONDYLAR	08	08%
4.	ANGLE	05	05%
5.	BODY	03	03%
6.	DENTOALVEOLAR FRACTURE	03	03%
7.	RAMUS	01	01%
8.	CORONOID	01	01%
9.	MORE THAN ONE SITE: A) CONDYLE+PARASYMPHYSIS	12	12%
	B) ANGLE+PARASYMPHYSIS	06	06%

TABLE 3: ANATOMICAL LOCATION OF MANDIBLE FRACTURE

SL. NO.	SITE OF FRACTURE MANDIBLE	ASSOCIATED FRACTURE	NO. OF PATIENS AND PERCENTAGE
01.	PARASYMPHYSIS	LE FORTE 1	06 (27 %)
02.	PARASYMPHYSIS+ANGLE	ZMC	05 (22.7 %)
03.	PARASYMPHYSIS+CONDYLE	ZMC+ LE FORTE 2	05 (22.7 %%)
04.	SYMPHYSIS+ANGLE	ZMC+ LE FORTE 2	03 (13.6 %)
05.	PARASYMPHYSIS+CONDYLE	LEFORTE 3	03 (13.6 %)

TABLE 4: MANDIBLE FRACTURE ASSOCIATED WITH OTHER FACIOMAXILLARY FRACTURE

In the present study total 100 patients were included in which 88 subjects were males and 12 females. The age groups were ranging from 8 year to 60 year; Male to female ratio is 7.3:1. The highest incidence of mandibular fracture occurred between the age group of 21 to 30 years followed by 31 to 40 years age group (Table No. 1.)

Etiology: The most common cause of mandible fracture were road traffic accidents (72%) followed by assault (12%), fall (8%), bear bite (03%), industrial accidents (03%) and sports injury (02%) (Table No. 2).

Parasymphysis (27%) was the most common fracture site followed by symphysis (12%), condyle (08%), angle (05%), body (03%), dentoalveolar fracture (03%), ramus (01%), coronoid (01%), condyle with parasymphysis fracture (12%) and angle with parasymphysis (06%).(Table No. 3)

Mandible associated with other faciomaxillary fracture also observed in 22 subjects in which most common associated fracture with mandible was parasymphysis with leforte 1(27%), parasyphysis with angle with zmc (22.7%), parasymphysis with condyle with zmc with leforte 2(22.7%), symphysis with angle with zmc with leforte 2 (13.6%) and parasymphysis with condyle with leforte 3(13.6%). the commonest mid-facial fracture is ZMC (59%), followed by leforte 1(27%). (Table No. 4)

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DISCUSSION: This study showed that the mandibular fractures predominantly occurred in the age group of 21-30 years (46%), followed by 31-40 years (25%), and 11-20 years (15%). This study is being similar with previous studies.^{1,8} The high incidence in 3rd decade of life might be due to fact that people belonging to this age wish to enjoy the pleasures of modern life and thus are more likely to consume alcohol, exceed speed limits and even get involved in physical conflicts as a result of their increased physical energy. All these risk behaviours make this age group more susceptible to trauma.⁹ The low frequencies in the very young and old age groups are due to reduced activity.

In this study the incidence of mandibular fracture had a sex ratio of 7.3:1, which can be attributed to the fact that males make up the most active group in society, drive motorcycle carelessly and are also exposed to violent interactions as compared to females due to social and religious limitations. Similar study of male- female ratio of 8.9:1, 8:1 and 6.6:1 has been found by Bansod S. (2013),⁸ Ghodke M.J. et al (2013),¹⁰ and Martini M.Z. et al (2006),¹¹ and the most of the studies overall ratio of male to females have range from 4.1 to 12.1.

The aetiology of fracture mandible or faciomaxillary trauma have extremely variable incidence depending on social, geographical and economical characteristics. In our study the road traffic accidents (72%) was the most common cause of fracture mandible, followed by assault (12%) and fall (8%). It was similar to other studies.^{1,8} The high number of mandibular fractures attributed to RTA is explained by an inadequate road safety awareness (wearing helmets/ seatbelt), use of alcohol or other intoxicating agents while driving, violation of speed limits, unsuitable road conditions without expansion of motor works, inexperienced young drivers. In this study, all RTA (100%) patients didn't wear helmets while driving and 80 % of them were found to be under the influence of alcohol. This contradicts the finding of Dongas P et al (¹²) and Olosoji et al (2002) which reported assault (the incidence rate being around 55%) as the most common etiological factor. Other rare cause of fracture mandible is Industrial Accidents (03%), Bear Bite (03%), and Sport Injuries (02%) in our study.

In this study out of 100 subjects 60(60%) were reported as single while double accounting for 18 cases(18%). 78% of the cases were isolated mandibular fractures and 22% of cases had other associated injuries as mid-face fractures. This is almost similar to observations of Natu SS et al,⁴ who reported 62.12% cases as a isolated mandible fracture and 37.88% cases with associated fracture.

Among the 164 fracture site recorded in this study, the commonest site is the Parasymphysis which accounted for a total of (n=27) followed by Symphysis (n=12), Condylar (n=8), Angle (n=5), Body (n=3), Dentoalveolar (n=3), Ramus (n=1), and Coronoid (n=1). In combination of mandibular fracture, parasymphysis/condyle (n=24) was the most common followed by angle/ parasymphysis (n=12). In this study the parasymphysis being the commonest site of fracture is similar to Malik S. et al¹, S.S. Natu et al⁴, Khan A. et al², Thapliyal GK et al¹³ Bali R. et al⁵. But contrary to Ghodke HM. et al (2013)¹⁴, who reported condylar fracture as the most common site where as Dongas P. and Hall¹² reported angle, Kraft A et al(2012)¹⁵ observed symphysis and Rajput D et al (2013)¹⁰ reported body of the mandible as the common site.

The parasymphysis fracture is probably due to the horizontally directed impact to parasymphysis region resulting fracture at the site of impact also this axial force of impact against

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parasymphysis proceeds along the mandibular body to the cranial base through the condyle leading to the concentration of the tensile strain at the condylar neck, which itself is a weak region, hence resulting in its fracture.⁴

The commonest combinations of fractures in this study are parasymphysis with condyle accounting for 12%, followed by parasymphysis with angle 6%. This is similar with Natsu SS et al⁴ who reported parasymphysis with subcondylar fracture (18.8%) as the commonest combination fracture site.

This is in contrary to Dongas P and Hall et al (2002)¹² who found parasymphysis with angle as the commonest combination site.

In this study 22 subjects had mid-face fracture (22%) along with mandibular fractures, in which the commonest mid-face fracture was (ZMC) zygomatico maxillary complex fractures (59%) followed by le-forte 1 (27%). This is similar to Rajnikant et al (2014)¹⁶ and Martini MZ et al (2006),⁸ who reported ZMC fracture as the commonest combination with mandibular fractures (30.92%) and 25% respectively.

The association of site of mandibular fracture with etiology had no significant variations, as the most common site is parasymphysis followed by symphysis, condylar, angle, showing the relation of site of the fracture with point and integrity of impact rather than etiological factor.

The treatments of these maxillo facial fractures consisted of non-surgical and surgical protocols. Surgical protocol is the gold standard i.e. open reduction and internal fixation using mini plates and screws and non-surgical being maxillo- mandibular fixation.

CONCLUSION: In the present study, the incidence of mandibular fracture was more prevalent in males, especially during 3rd decade of life. The most common cause being RTA with alcohol intoxication and not wearing of helmet. The most common site of fracture being parasymphysis region and in combination with other mandibular fracture it is condyle fracture which is commonest.

In this study we also found that the mandibular fracture occurred most commonly with ZMC fracture.

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