

ORIGINAL ARTICLE

Mandibular fracture at HUSM: a 5-year retrospective study

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Abstract This is a retrospective study to determine the distribution site, associated fracture and causes of mandibular fractures at HUSM, over a 5 year period, from 1st January 2002 – 31st December 2006. Records of patients who had mandibular fracture were reviewed. Data of age, sex, site of fracture, causes and associated fracture were recorded and analyzed using SPSS version 15.0. There were 113 (84.3%) males and 21 (15.7%) females. The mean age for male was 84.3% and female was 15.7%. The fracture occurs mostly at the age of 11-20 years (45.5%), followed by 21-30 years (30.6%). Motor vehicle accidents (MVA) were the commonest causes of mandibular fracture (92.5%), followed by fight and assault (3.7%), industrial accidents (3.0%), fall (0.7%). There were no cases recorded due to sport injury. The commonest site of mandibular fracture occurs at angle and para-symphysis (23%), followed by body (20.1%), symphysis (16.7%), condyle (15.5%) and ramus (1.7%). The most common associated fractures were head injury (23.5%), followed by clavicle fracture (17.2%) and fracture of radius (10.7%). Mandibular fracture was common in males with the mean age 24.63 years and mostly due to MVA. Angle and para-symphysis is the commonest site of mandibular fracture with most of the patient suffered from concomitant head injury.

Introduction

Mandibular fractures constitute a substantial proportion of cases of maxillofacial trauma. It has been reported that fractures of the mandible account for 36% to 59% of all maxillofacial fractures (van Hoof *et al.*, 1977; Brook and Wood, 1983; Ellis *et al.*, 1985). Even though it is a very strong bone, its prominent position on the face makes it particularly vulnerable. Its fractures result in severe loss of function and disfigurement. The fracture can occur at different parts of the bone; depending on the site of impaction. Also, because of the mandible's rounded shape, a traumatic injury may cause the fracture in more than one place. The mandibular fractures could be caused by MVA, fight and assaults, accidental falls, sports injuries, industrial accident and many more (Ellis *et al.*, 1985).

Fractures occurring in the body, condyle and angle show a relatively similar incidence while ramus and coronoid fractures are rare

(Moshy *et al.*, 1996). Ellis *et al.* (1985) have reported that 33% of mandibular fractures occur at the body, followed by condylar process (29%) and angle (23%). Güven (1988), in another study has presented the following figures: body (34%), angle (25%) and symphysis (20%).

The purpose of this study was to describe the frequency of mandibular fractures at HUSM, age and sex of the patients' related to aetiology, distribution and associated injuries.

Materials and methods

The medical records of all patients with maxillofacial fractures over a 5-year period from 2002 to 2006 were retrieved with approval from School of Dental Sciences Elective Ethics Committee. Only patients with treated mandibular fracture whether admitted to hospital and treated in the operating room or seen as outpatients were included in this study. Sex, age, aetiology, site of mandibular fracture and associated fractures were recorded, and statistical analysis was completed in SPSS version 15.0 software. The mandibular fractures were classified according to the sites such as ramus, condyle, symphysis, body, parasymphysis and angle. Descriptive statistics were used to calculate the percentages.

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Results

A total of 134 patients, aged 7 to 78 years were treated for mandibular fractures during the study period. Most of the patients were male, 113 (84.3%) and 21 cases (15.7%) were female (Table 1). The ratio of male to female is 5.37:1. The number of mandibular fracture was higher in males in all age groups. Among males, the highest prevalence of fractures occurred in the age group 11-20 years followed by 21-30 years population, whereas among females, significantly more mandibular fractures occurred at the age of 21-30 years old. The elderly age group of 61–80 had the least mandibular fractures (Table 1).

Table 1: Age and sex distribution of patients

Age in years	Male, n	Female, n	%
0-10	3	3	4.5
11-20	56	5	45.5
21-30	34	7	30.6
31-40	8	0	6.0
41-50	5	5	7.5
51-60	4	0	3.0
61-70	2	0	1.5
71-80	1	1	1.5
Total	113	21	

Mandibular fracture was predominantly caused by the MVA 124 cases (92.5%). This was followed by fight and assault 5 cases (3.7%), industrial accident 4 cases (4.0%), falls 1 case (0.7%). No cases were reported due to sport injury (Table 2).

Table 2: Causes of mandibular fracture

Causes	n	%
Road traffic accidents	124	92.5
Industrial accidents	4	3.0
Fight and assaults	5	3.7
Falls	1	0.7

The site distribution of mandibular fractures is shown in Table 3. In our study the mandibular fractures were most commonly seen in the angle and parasymphysis region followed by body, symphysis, condyle and ramus areas. Regarding the concomitant injury with the mandibular fracture, head injury 55 cases (23.5%) were the most common followed by clavicle fracture 29 cases (17.2%) and radius fracture 18 cases (10.7%) (Table 4).

Table 3: Site distribution of mandibular fractures

Areas/Bones	n	%
Symphysis	29	16.7
Parasymphysis	40	23.0
Condyle	27	15.5
Angle	40	23.0
Ramus	3	1.7
Body	35	20.1

Table 4: Associated fractures of mandibular fracture

Injuries	n	%
Head injury	55	32.5
# of the clavicle	29	17.2
# of the radius	18	10.7
# of the femur	13	7.7
# of the tibia	10	5.9
# of the fibula	8	4.7
# of the ulnar	7	4.1
# of the ribs	7	4.1
# = fracture		

Discussion

The mandible is the heaviest and strongest facial bone, but prone to fractures for some specific reasons: 1) it is an open arch; 2) it is located in the lower portion of the face; 3) it is the mechanism of hyperextension and hyperflexion of the head in traffic accidents; 4) it gets atrophy as a result of aging (Holt, 1986).

Most patients in this study were male in the 11-20 year age group. This is also reported in other study (Berstein and McClurg, 1978; James *et al.*, 1981). However, this ratio varies considerably from country to country (Koorey *et al.*, 1992; Asadi and Asadi, 1997). This difference may be due to higher MVA risk of different societies.

Men are predominantly involved with mandibular fracture (Aksoy *et al.*, 2002; Al Ahmed *et al.*, 2004). Adekeye (1980) has reported that 74% of mandibular fractures are due to MVA. However, Olson *et al.* (1982) reported that MVA were only responsible for 48% of the cases. These differences may be explained by the environmental and social characteristics under the study.

Although there are road safety regulations to reduce MVA, the maxillofacial injuries resulting from traffic accidents occur quite frequently (Nakhgevan *et al.*, 1994; Bataineh, 1998). In our study MVA causes most of the mandibular fracture (92.5%), followed by fight and assault (3.7%). This is similar to the other studies (Tanaka *et al.*, 1994; Ugboko *et al.*, 1998; Tay *et al.*, 1999; Marker *et al.*, 2000). However, in developed countries assaults were reported as the main cause for mandibular fractures (Ellis *et al.*, 1985; Adi *et al.*, 1990; Ström *et al.*, 1991; Oikarinen *et al.*, 1993). In Sweden, alcohol or narcotic involvement in mandibular fracture has been reported to be as high as 56%, and most of the cases associated with violence (79%) are linked to alcohol abuse (Heimdahl and Nordenram, 1977). In Finland, 44% of mandibular fractures were associated with alcohol abuse (Oikarinen *et al.*, 1992).

In this study, parasymphysis (23%) and angle (23%) was the most common site of mandibular fracture, followed by symphysis (16.7%) and condyle (15.5%). The result was similar to Aksoy *et al.*, (2002). Elsewhere, the most common site of mandibular fractures were reported differently such as condyle of mandible (Eghedari and Khezri, 2003; Al Ahmed *et al.*,

2004), symphysis (Patrocínio *et al.*, 2005) and body (Obuekwe and Etetafia, 2004). The differences might be a reflection of the causative factor. Condyle fractures result mainly from traffic accidents and falls, while the mandibular body results from assault and firearm (Andrade Filho *et al.*, 2000).

Conclusion

Mandibular fractures were more prevalent in males, especially during the second and third decade of life. MVA remain cause of mandibular fracture. The more frequently affected regions were angle and parasymphysis.

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