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Incidence and pattern of mandibular fractures in rural population: a review of 324 patients at a tertiary hospital in Loni, Maharashtra, India

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Abstract – The aim of this study was to document the pattern and incidence of mandibular fractures occurring in rural population, at Rural Dental College and Hospital, Maharashtra, India. A retrospective analysis of patient records and radiographs for the 5-year period from January 2003 to December 2007 was conducted. Data were identified and analyzed based on age group, gender distribution, anatomic location, and cause of injury. A total of 324 patients with 486 injuries were reviewed, males formed 80.9% and females 19.1% of the studied population, with peak incidence occurring in the 21–30 years age group. The most common fractures site was parasymphysis (39.3%). The etiology of mandibular fractures was road traffic accidents (42.9%), followed by falls (25.9%), assaults and interpersonal violence (20.7%), and animal injuries (10.5%). Our results exhibit that road traffic accidents remain the major cause of mandibular trauma and animal injuries being found exclusively in rural population. There is a variation of incidence and pattern of maxillofacial trauma from region to region.

Trauma is the leading cause of death in the first 40 years of life. In addition, traumatic injury has been identified as the leading cause of lost productivity, causing more loss of working years than heart disease and cancer combined (1). There is a direct relationship between the severity of facial injury and patients reporting work disabilities (1).

The management of fractures to the maxillofacial complex remains a challenge for oral and maxillofacial surgeons, demanding both skill and high level of expertise. It has been reported that the fractures of mandibular region, are very common (second to nasal bone fractures), account for 36–80% of all maxillofacial fractures (2–6). In contrast to this opinion was the study by Scherer et al. who reported that mandibular fractures accounted for only 15.5% of all facial fractures (2). Since the first writing on mandibular fractures dating back to 1650 BC in Egypt, oral and maxillofacial surgeons have studied the patterns of mandibular fractures without reaching the consensus on the most common patterns (2, 7), the large variability in reported prevalence is due to variety of contributing factors such as the sex, age, environment, socioeconomic status of the patient as well as mechanism of injury (8). WHO Statistics indicates that one million people die and between 15 and 20 million are injured annually in road traffic accidents (9).

According to the Census 2001, in India, out of the total population of 1027 million, about 285 million live in urban areas and 742 million in rural areas. Thus, around 28 out of every one hundred persons in India live in urban areas. Maharashtra has the largest share of urban population of the country (14.4%). In Maharashtra, out of a population of 96 752 247, there are 52.1% males and 47.9% females. The percent urban population is 42.4%, the rural population is 57.6%, comprising 51% males and 49% females (10).

Social problem of illiteracy, interpersonal violence, deteriorating infrastructure such as bad roads; driving under the influence of alcohol; and non-compliance with crash helmet and seat belt legislation along with increased volume of traffic have contributed to the traumatic facial injuries in the studied population group. The aims of this retrospective analysis were to determine the incidence and pattern of mandibular fractures; to determine age group in which injury occurred most often; to examine the etiology, in rural population, over a 5-year period from January 2003 to December 2007.

Materials and methods

A retrospective analysis of 324 patients who presented with signs and symptoms associated with mandibular fractures on reporting to the Department of Oral and Maxillofacial Surgery, Rural Dental College and Hospital – a tertiary institution, from January 2003 to December 2007, was conducted. The rural dental college and hospital being a tertiary center, receives patients from the entire region. Patient information was collected on the basis of well-documented in-patient and out-patient records, as well as radiographs. The data were identified and analyzed based on age group, gender distribution, anatomic location [based on Dingman and

Table 1. Patients particulars and distribution

	N	%
Gender distribution		
Males	262	80.86
Females	62	19.14
Site of mandibular fracture		
Parasymphysis	191	39.30
Angle	96	19.75
Condyle	81	16.67
Body	66	13.58
Ramus	26	5.35
Symphysis	7	1.44
Coronoid	3	<1
Dentoalveolar	16	3.29
Etiology of mandibular fractures		
Road traffic accidents	139	42.90
Falls	84	25.93
Assault	67	20.68
Animal	34	10.49
Age distribution		
0–10	15	4.63
11–20	58	17.9
21–30	133	41.05
31–40	81	25
41–50	23	7.1
>50	14	4.32

Natvig classification (11)] and cause of injury. Classification of maxillofacial trauma is best considered with respect to etiology under six broad headings: assaults, falls, industrial accidents, road traffic accidents, sports injuries, and war injuries (11); we have added another term – the animal injuries to it.

Results

A total of 324 patients with 486 injuries were reviewed, (Table 1) males formed 80.9% (262) and females 19.1% (62) of the studied population. The patients at the time of injury were aged in the range from 3 to 67 years, with most injuries seen in 21–30 years age group (41.1%). The most common fractures site was parasymphysis (39.3%), followed by angle (19.8%). The major etiologic factor being road traffic accidents (42.9%).

Discussion

All over the world, maxillofacial injuries have continued to intrigue researchers because of the functional and cosmetic deformities that the affected individuals have to contend with. Many articles pertaining to the pattern, incidence, and etiology have been published (12–17).

The causes of maxillofacial fractures have changed over past three decades and they continue to do so. The main causes worldwide are: traffic accidents, assaults, falls, sports-related injuries and civilian warfare. This study identified road traffic accidents as a major cause of injury and, interestingly, animal injuries, which are seen exclusively in rural areas. Earlier studies from Libya, Nigeria, Europe, and United States showed that road traffic accidents were the most frequent cause of maxillofacial fractures, but most recent studies have shown that assault is the most common cause in developed countries, whereas road traffic accidents remain the most frequent cause in many developing countries (12–18).

As a result of obvious socioeconomic reasons, the most common mode of transportation in rural India is bicycle and motorbike, which increases the risk of injuries. The location of our rural hospital, which is on a national highway and in close proximity to a place of religious importance, increases the number of road traffic accident casualties reporting to us. Interpersonal violence and assaults among the youth could be associated with rising unemployment, alcohol and narcotic abuse, and lack of proper education. Alcohol and narcotic substances either directly, or indirectly, alter the central nervous system, leading to depression of inhibitory control mechanism in brain. Trauma because of animal injuries – horses, buffalo, cow, and bull – is almost exclusively seen in rural area, as animals are being used for dairy and poultry purposes and for help in agriculture fields.

Male-to-female ration is approximately 4:1. The male predominance is a relatively consistent finding in most studies (17). In India, especially in rural areas, the females are generally confined to home and males run outdoor errands; this can explain the lesser incidence in fairer sex group.

Parasymphysis fractures were more commonly seen than rest of the mandible. However, according to the study by Hall and Ofodile, mandible body is the most commonly fractured site, whereas angle fracture is most commonly involved as in study by Asadi et al. and Ogundare et al. (2).

Age group of 21–30 years showed higher frequency of fractures. This is consistent with other study reports.

There should be a legislation and awareness program encouraging safe driving, slower speeds, use of crash helmets and seat belts. A study by Telfer et al. reported that the incidence of maxillofacial fractures has been significantly reduced by passage of legislative measures such as compulsory seat belt use and a reduction in drunken driving (13).

A clearer understanding of the demographic pattern of maxillofacial fractures will assist health care providers as they plan and manage treatment of traumatic facial injuries. Such epidemiological information can also be used as to guide the future funding of public health and awareness programs, health planning and infrastructural development in the studied population. Prospectively monitoring the etiology, severity and treatment outcomes of maxillofacial trauma must assume a higher profile if accurate service planning is to take place. If this occurs, it should be possible to balance service demand and provision in the most optimal way.

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