Maxillofacial Fractures in a University Hospital in Central Brazil

Fraturas Oralmaxilofaciais em um Hospital Universitário do Brasil Central

Orlando Aguirre Guedes\textsuperscript{a};Andreza Maria Fábio Aranha\textsuperscript{a}; João Milanez Moreira-Júnior\textsuperscript{b}; Dyego do Estreito Deliberal\textsuperscript{b}; Alessandra Nogueira Porto\textsuperscript{a}; Fábio Luís Miranda Pedro\textsuperscript{a}; Cyntia Rodrigues de A. Estrela\textsuperscript{a}; Álvaro Henrique Borges*\textsuperscript{a1}

\textsuperscript{a}University of Cuiabá, Stricto Sensu Graduate Program in Integrated Dental Sciences, MT, Brazil. *E-mail: orlandoaguedes@yahoo.com.br
Received:29/08/18
Approved:27/02/19

Abstract

The objective of this study was to evaluate epidemiological aspects of maxillofacial fractures in 346 hospitalized patients treated at the Department of Oral and Maxillofacial Surgery at the University General Hospital, Mato Grosso, Brazil. The following information was collected from the patients’ medical records: gender, age, etiologic factor, type of injury, patient origin, seasonal distribution and hospital stay period. The statistical treatment analyzed data from frequency distribution and chi-squared test. The level of significance was set at 5% for all analyses. The highest incidence of maxillofacial fractures was found among males (n=290; 83.8%), with 21-30 years-old (n=120; 34.5%) and from inner cities of Mato Grosso (n=169; 48.9%). The main etiologic factor were vehicle traffic accidents (n=169; 48.9%), violence (n=65; 18.8%) and falls (n=25; 7.2%). The seasonal distribution showed that most of the cases occurred in the fall (n=89; 25.8%), winter and spring (n=77; 22.2% each). The lower third of the face was the most commonly involved region (n=276; 54.3%). The most frequently observed fracture involved the zygomatic complex (n=146; 28.7%), followed by the mandible body (n=99; 19.4%). The epidemiological aspects of maxillofacial fractures in this study were similar to those observed in other studies, regarding the prevalence of the male, age group and traffic accidents as the main etiologic factor.

Keywords: Tooth Injuries. Facial Bones. Epidemiology. Surgery, Oral.

Resumo

Avaliou-se os aspectos epidemiológicos de fraturas orálmilofaciais em prontuários de pacientes atendidos em um Hospital Universitário do Brasil central. A amostra do estudo foi proveniente da revisão de prontuários de 346 pacientes atendidos no Serviço de Cirurgia e Traumatologia Oralmaxilofacial do Hospital Geral Universitário na cidade de Cuiabá, Mato Grosso, Brasil. Os seguintes dados foram coletados dos registros hospitalares de cada paciente: sexo, idade, fator etiológico, região anatômica afetada, procedência, distribuição sazonal e período de internação. O tratamento estatístico analisou os dados frente à distribuição de frequência e qui-quadrado. O nível de significância foi de p<0,05. Observou-se elevada frequência de fraturas oralmaxilofaciais em indivíduos do sexo masculino (n=290; 83,8%), com idade variando entre 21-30 anos (n=120; 34,5%) e provenientes de cidades do interior do estado de Mato Grosso (n=169; 48,9%). Os principais fatores etiológicos foram os acidentes de trânsito motorizados (n=169; 48,9%), violência (n=65; 18,8%) e quedas (n=25; 7,2%). A distribuição sazonal evidenciou elevado número de lesões no outono (n=89; 25,8%), inverno e primavera (n=77; 22,2%, cada um). O terço inferior da face foi a região mais comumente envolvida (n=276; 54,3%). A lesão mais comum foi a fratura do complexo zigomático (n=146; 28,7%), seguida da fratura do corpo da mandíbula (n=99; 19,4%). Os dados obtidos se assemelham aos encontrados na literatura, no que diz respeito à prevalência do sexo masculino, da faixa etária e dos acidentes de trânsito como principal agente etiológico.

Palavras-chave: Traumatismo Dentários. Ossos Faciais. Epidemiologia. Cirurgia Bucal.

I Introduction

Special attention to the epidemiological knowledge of oral and maxillo facial fractures, highlights the guidelines for public health, particularly those that are related to the increase of violence, the number of traffic accidents and the participation of adolescents and young adults in sporting activities.

Fractures involving the maxillofacial complex represents one of the main public health problems in the world\textsuperscript{5-13}. Several studies have reported a considerable increase in the incidence of these injuries, mainly in areas of high social deprivation\textsuperscript{5-13}, with significant impact on individuals and society. Its sequels imply restrictions on physical, economic and emotional well-being, forming lasting problems, with repercussion to the patient and their relatives\textsuperscript{2,14,15}.

Facial trauma in the region often result in injuries to soft, dental tissues and the main bones of the skeleton of the face, including the mandible, maxilla, zygoma, naso-orbital-ethmoid complex and supraorbital structures\textsuperscript{8,16,17}. Several studies indicate the male patients as the main victims, with rates ranging between 67.7% - 89.0%. Another common characteristic of the various papers is that these lesions seem to be the most commonly observed in young patients aged less than 30 years\textsuperscript{2,18,24}. The etiology of facial fracture is heterogeneous, and the greater or lesser prevalence of an etiologic factor relates to some characteristics of the studied
population, as for example: age, gender, social class and location of trauma\textsuperscript{2,14,21,25,26}.

The Brazilian regions with population studies, such as the regions South, Southeast and Northeast, showed a prevalence of oral-maxillo-facial fractures ranging between 4.1\% - 32\%\textsuperscript{2,9-12,27,28}. These values reflect important cultural differences that include the environment and the population behavior, or reflect the different methodologies employed in the data collection from each study\textsuperscript{29,30}. In the Central-west region only the studies of Leles et al.\textsuperscript{31}, Pereira et al.\textsuperscript{32} and scartezini et al.\textsuperscript{4} were identified.

Before the gravity of the situation, public administrators need to establish priority actions with a view to prevention and attention to the victims. The planning of actions should consider the regional knowledge of the major involved risk factors. From the evidences of the limited amount of epidemiological investigations in the Brazilian population and due to considering the specificities and demographic differences, cultural and socioeconomic characteristics, the objective of this study was to analyze the epidemiological aspects of oral-maxillo-facial fractures in a University Hospital in Central Brazil.

2 Material and Methods

This was a retrospective cross-sectional study, conducted through review of medical records of patients with a history of maxillofacial fracture and treated in the Department of Maxillofacial Surgery and Traumatology (CTBMF) of the General University Hospital (HGU), located in Cuiabá, Mato Grosso, Brazil (latitude 15° 35′ 46″ South; longitude 56° 05′ 48″ West)\textsuperscript{33,46} in the period between December 2001 and June 2014. The search was developed based on records officially filed by the File and Statistical Service of HGU.

The inclusion criteria for this study were records of patients affected by maxillofacial trauma and treatment of facial fractures performed in that hospital. Data records were excluded from the study that were not specified.

Data related to sex, age, etiological factor, affected anatomic region, precedence, seasonal distribution and hospitalization period were collected from medical records and filed in digital spreadsheets. Prior to data collection, a pilot study involving 10\% of the final sample, was performed to test the feasibility study and train and calibrate the examiners regarding the criteria used.

The study protocol was reviewed and approved by the Ethics in Research Committee of the University of Cuiabá (protocol number 703.812/2014).

The data statistical analysis was performed using the program SPSS for Windows 21.0 IBM (IBM Corporation, Somers, NY, USA) and the distribution of frequency and association test were included. The statistical significance for the association among the variables was determined by use of the chi-square test. The significance level was $p<0.05$.

3 Results and Discussion

The analysis involved 346 patients with a history of oral-maxillo-facial fractures, with ages ranging between 3 and 76 years (mean of 30.17 years, a standard deviation of 11.92). The highest frequencies were recorded on the participants from 11-20 years of age (n=120; 34.5\%), followed by the participants from 31-40 years (n=95; 27.4\%) and 11-20 years (n=68; 19.7\%) (Table 1). Out of the total number of analyzed records, 290 (83.8\%) were male and 56 (16.2\%) of the female sex, being observed a ratio between men and women of 5.17:1.

Table 1 - Distribution of etiological factors (n=346) of oral-maxillo-facial fractures according to sex, age and seasonal and weekly distribution

| Etiological Factor | Fall | Motorized | Non-motorized | Work | Sport | Animal | Violence | Others |
|-------------------|------|-----------|---------------|------|-------|--------|---------|--------|
| **Gender**        |      |           |               |      |       |        |         |        |
| Male              | 19 (5.5\%) | 132 (38.2\%) | 14 (4.0\%) | 15 (4.3\%) | 8 (2.3\%) | 19 (5.5\%) | 61 (17.6\%) | 22 (6.4\%) |
| Female            | 6 (1.7\%)  | 37 (10.7\%)  | 4 (1.2\%)  | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  | 4 (1.2%)  | 5 (1.4%)  |
| **Age**           |      |           |               |      |       |        |         |        |
| 3 to 10 years     | 2 (0.6%)  | 3 (0.9%)  | 0 (0.0%)  | 0 (0.0%)  | 1 (0.3%)  | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  |
| 11 to 20 years    | 4 (1.2%)  | 29 (8.4%)  | 4 (1.2%)  | 3 (0.9%)  | 0 (0.0%)  | 0 (0.0%)  | 6 (1.7%)  | 16 (4.6%)  |
| 21 to 30 years    | 7 (2.0%)  | 65 (18.8%) | 8 (2.3%)  | 5 (1.4%)  | 5 (1.4%)  | 7 (2.0%)  | 16 (4.6%) | 7 (2.0%)  |
| 31 to 40 years    | 4 (1.2%)  | 47 (13.6%) | 2 (0.6%)  | 5 (1.4%)  | 1 (0.3%)  | 5 (1.4%)  | 24 (6.9%) | 7 (2.0%)  |
| 41 to 50 years    | 6 (1.7%)  | 16 (4.6%)  | 2 (0.6%)  | 2 (0.6%)  | 1 (0.3%)  | 5 (1.4%)  | 2 (0.6%)  | 0 (0.0%)  |
| 51 to 60 years    | 1 (0.3%)  | 7 (2.0%)  | 1 (0.3%)  | 0 (0.0%)  | 0 (0.0%)  | 1 (0.3%)  | 2 (0.6%)  | 3 (0.9%)  |
| ≥ 61 years        | 1 (0.3%)  | 2 (0.6%)  | 1 (0.3%)  | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  | 2 (0.6%)  | 1 (0.3%)  |
| **Seasonal distribution** |      |           |               |      |       |        |         |        |
| Spring            | 4 (1.2%)  | 41 (11.8%) | 4 (1.2%)  | 6 (1.7%)  | 0 (0.0%)  | 4 (1.2%)  | 13 (3.8%) | 5 (1.4%)  |
| Summer            | 9 (2.6%)  | 31 (9.0%)  | 2 (0.6%)  | 4 (1.2%)  | 3 (0.9%)  | 1 (0.3%)  | 18 (5.2%) | 2 (0.6%)  |
| Fall              | 4 (1.2%)  | 50 (14.5%) | 6 (1.7%)  | 4 (1.2%)  | 3 (0.9%)  | 6 (1.7%)  | 15 (4.3%) | 1 (0.3%)  |
| Winter            | 7 (2.0%)  | 40 (11.6%) | 6 (1.7%)  | 1 (0.3%)  | 2 (0.6%)  | 6 (1.7%)  | 15 (4.3%) | 0 (0.0%)  |
| Missing           | 1 (0.3%)  | 7 (2.0%)  | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  | 2 (0.6%)  | 4 (1.2%)  | 19 (5.5%)  |
Two hundred and fifty-four participants (73.4%) suffered oral-maxillo-facial fracture due to non-intentional causes and 65 (18.8%) due to intentional causes. Motorized transit accident (n=169; 48.9%), violence (n=65; 18.8%) and falls (n=25; 7.2%) were the main etiological causes. There was a variation between genders. Accidents at work (15/15), during sports practice (8/8) and involving animals (19/19) were predominantly related to fractures diagnosed in male patients (Table 1).

Of the 346 serviced patients, 169 (48.8%) were from cities in the interior of the state of Mato Grosso, 143 (41.3%) of the city of Cuiabá, 31 (9.0%) of the city of Várzea Grande and 3 (0.9%) from other States.

The seasonal distribution showed that most of the cases occurred in the fall (March to June) (n=89; 25.8%), followed by the winter (June to September) and spring (September to December) (n=77; 22.2% each). One hundred and eighty-seven traumatic events (54.1%) were recorded during the week (Table 1).

Overall 508 oral-maxillo-facial fractures were recorded. The lower third of the face was the third most commonly affected (n=276; 54.3%), followed by middle thirds (n=211; 41.6%) and superior (n=21; 4.1%). Zygomatic complex fractures (n=146; 28.7%) and the body of the mandible (n=99; 19.4%) were the most prevalent oral and maxillofacial injuries in the studied sample (Tables 2 and 3). The hospitalization period varied from 1 to 60 days. Most patients remained hospitalized for a period of 1-5 days (n=478; 94.1%). There were no statistically significant differences (p>0.05) among the variables collected from the records of the patients and the occurrence of maxillofacial fractures.

### Table 2 - Distribution of oral-maxillo-facial fractures (n=508) in the upper and middle thirds of the face based on sex, age, etiological factor and seasonal and weekly distribution

| Gender | The upper third of the Face | The middle third of the Face |
|--------|----------------------------|----------------------------|
| Front | Naso-orbital-ethmoid | LeFort I | LeFort II | LeFort III | Zig complex. | Nose | Orbit | Lanelong |
| Male | 12 (2.4%) | 8 (1.6%) | 3 (0.6%) | 8 (1.6%) | 14 (2.8%) | 6 (1.2%) | 121 (23.8%) | 19 (3.7%) | 7 (1.4%) | 2 (0.4%) |
| Female | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 2 (0.4%) | 0 (0.0%) | 0 (0.0%) | 25 (4.9%) | 2 (0.4%) | 2 (0.4%) | 0 (0.0%) |

| Age | The upper third of the Face | The middle third of the Face |
|-----|----------------------------|----------------------------|
| 3 to 10 years | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| 11 to 20 years | 3 (0.6%) | 2 (0.4%) | 1 (0.2%) | 0 (0.0%) | 1 (0.2%) | 1 (0.2%) | 22 (4.3%) | 5 (1.0%) | 2 (0.4%) | 0 (0.0%) |
| 21 to 30 years | 3 (0.6%) | 3 (0.6%) | 1 (0.2%) | 6 (1.2%) | 6 (1.2%) | 3 (0.6%) | 55 (10.8%) | 5 (1.0%) | 2 (0.4%) | 1 (0.2%) |
| 31 to 40 years | 3 (0.6%) | 3 (0.6%) | 0 (0.0%) | 1 (0.2%) | 4 (0.8%) | 1 (0.2%) | 32 (6.3%) | 6 (1.2%) | 5 (1.0%) | 1 (0.2%) |
| 41 to 50 years | 2 (0.4%) | 0 (0.0%) | 1 (0.2%) | 2 (0.4%) | 2 (0.4%) | 0 (0.0%) | 25 (4.9%) | 3 (0.6%) | 0 (0.0%) | 0 (0.0%) |
| 51 to 60 years | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 9 (1.8%) | 2 (0.4%) | 0 (0.0%) | 0 (0.0%) |
| ≥ 61 years | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.2%) | 1 (0.2%) | 2 (0.4%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |

| Etiology | The upper third of the Face | The middle third of the Face |
|----------|----------------------------|----------------------------|
| Fall | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 11 (2.2%) | 5 (1.0%) | 0 (0.0%) | 0 (0.0%) |
| Motorized | 8 (1.6%) | 5 (1.0%) | 1 (0.2%) | 7 (1.4%) | 7 (1.4%) | 3 (0.6%) | 81 (15.9%) | 6 (1.2%) | 3 (0.6%) | 2 (0.4%) |
| Non-motorized | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 9 (1.8%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| Work | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (0.2%) | 9 (1.8%) | 2 (0.4%) | 2 (0.4%) | 0 (0.0%) |
| Sport | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 5 (1.0%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) |
| Animal | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) | 0 (0.0%) | 1 (0.2%) | 2 (0.4%) | 6 (1.2%) | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) |
| Violence | 2 (0.4%) | 1 (0.2%) | 2 (0.4%) | 0 (0.0%) | 3 (0.6%) | 0 (0.0%) | 19 (3.7%) | 3 (0.6%) | 1 (0.2%) | 0 (0.0%) |
| Others | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 3 (0.6%) | 3 (0.6%) | 0 (0.0%) | 6 (1.2%) | 4 (0.8%) | 2 (0.4%) | 0 (0.0%) |

| Seasonal distribution | The upper third of the Face | The middle third of the Face |
|----------------------|----------------------------|----------------------------|
| Week | 18 (5.2%) | 93 (26.9%) | 13 (3.8%) | 10 (2.9%) | 4 (1.2%) | 9 (2.6%) | 34 (9.8%) | 6 (1.7%) |
| Weekend | 6 (1.7%) | 69 (19.9%) | 5 (1.4%) | 5 (1.4%) | 4 (1.2%) | 8 (2.3%) | 27 (7.8%) | 2 (0.6%) |
| Missing | 1 (0.3%) | 7 (2.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (0.6%) | 4 (1.2%) | 19 (5.5%) |

Source: Research data.
### The upper third of the Face

| Front           | Naso-orbito-ethmoid | Arch | Zig. | LeFort I | LeFort II | LeFort III | Zig complex | Nose | Orbit | Lanelong |
|-----------------|---------------------|------|------|----------|-----------|------------|-------------|------|-------|----------|
| Spring          | 3 (0.6%)            | 2 (0.4%) | 0 (0.0%) | 4 (0.8%) | 3 (0.6%) | 1 (0.2%) | 33 (6.5%) | 9 (1.8%) | 2 (0.4%) | 2 (0.4%) |
| Summer          | 1 (0.2%)            | 2 (0.4%) | 2 (0.4%) | 1 (0.2%) | 3 (0.6%) | 2 (0.4%) | 27 (5.3%) | 5 (1.0%) | 2 (0.4%) | 0 (0.0%) |
| Fall            | 3 (0.6%)            | 4 (0.8%) | 0 (0.0%) | 5 (1.0%) | 3 (0.6%) | 0 (0.0%) | 36 (7.1%) | 3 (0.6%) | 0 (0.0%) | 0 (0.0%) |
| Winter          | 3 (0.6%)            | 0 (0.0%) | 1 (0.2%) | 0 (0.0%) | 3 (0.6%) | 3 (0.6%) | 42 (8.3%) | 2 (0.4%) | 3 (0.6%) | 0 (0.0%) |
| Missing         | 3 (0.6%)            | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 2 (0.4%) | 0 (0.0%) | 8 (1.6%)  | 2 (0.4%) | 2 (0.4%) | 0 (0.0%) |

### The middle third of the Face

| Lower third of the Face | Angle | Condylar | Body | Branch | Symphysis | Para symphysis | Coronoind Process |
|-------------------------|-------|----------|------|--------|-----------|----------------|-------------------|
| Gender                  |       |          |      |        |           |                |                   |
| Male                    | 36 (7.1%) | 40 (7.9%) | 83 (16.3%) | 5 (1.0%) | 26 (5.1%) | 44 (8.7%) | 1 (0.2%) |
| Female                  | 7 (1.4%)  | 7 (1.4%)  | 16 (3.1%) | 0 (0.0%) | 3 (0.6%)  | 8 (1.6%)  | 0 (0.0%) |
| Age                     |       |          |      |        |           |                |                   |
| 3 to 10 years           | 0 (0.0%)  | 0 (0.0%)  | 3 (0.6%)  | 0 (0.0%) | 1 (0.2%)  | 1 (0.2%)  | 0 (0.0%) |
| 11 to 20 years          | 11 (2.2%) | 7 (1.4%)  | 22 (4.3%) | 0 (0.0%) | 8 (1.6%)  | 9 (1.8%)  | 0 (0.0%) |
| 21 to 30 years          | 18 (3.5%) | 18 (3.5%) | 32 (6.3%) | 0 (0.0%) | 10 (2.0%) | 17 (3.3%) | 0 (0.0%) |
| 31 to 40 years          | 10 (2.0%) | 16 (3.1%) | 22 (4.3%) | 2 (0.4%) | 8 (1.6%)  | 20 (3.9%) | 0 (0.0%) |
| 41 to 50 years          | 2 (0.4%)  | 3 (0.6%)  | 8 (1.6%)  | 1 (0.2%) | 2 (0.4%)  | 4 (0.8%)  | 0 (0.0%) |
| 51 to 60 years          | 2 (0.4%)  | 3 (0.6%)  | 6 (1.2%)  | 2 (0.4%) | 0 (0.0%)  | 1 (0.2%)  | 1 (0.2%) |
| ≥ 61 years              | 0 (0.0%)  | 0 (0.0%)  | 6 (1.2%)  | 0 (0.0%) | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%) |
| Etiology                |       |          |      |        |           |                |                   |
| Fall                    | 2 (0.4%)  | 1 (0.2%)  | 5 (1.0%)  | 0 (0.0%) | 3 (0.6%)  | 4 (0.8%)  | 0 (0.0%) |
| Motorized               | 14 (2.8%) | 31 (6.1%) | 45 (8.9%) | 0 (0.0%) | 17 (3.3%) | 29 (5.7%) | 0 (0.0%) |
| Non-motorized           | 2 (0.4%)  | 3 (0.6%)  | 3 (0.6%)  | 1 (0.2%) | 3 (0.6%)  | 3 (0.6%)  | 0 (0.0%) |
| Work                    | 2 (0.4%)  | 0 (0.0%)  | 6 (1.2%)  | 0 (0.0%) | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%) |
| Sport                   | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%) | 0 (0.0%)  | 1 (0.2%)  | 0 (0.0%) |
| Animal                  | 1 (0.2%)  | 1 (0.2%)  | 7 (1.4%)  | 1 (0.2%) | 0 (0.0%)  | 1 (0.2%)  | 1 (0.2%) |
| Violence                | 14 (2.8%) | 9 (1.8%)  | 27 (5.3%) | 2 (0.4%) | 3 (0.6%)  | 12 (2.4%) | 0 (0.0%) |
| Others                  | 8 (1.6%)  | 2 (0.4%)  | 6 (1.2%)  | 1 (0.2%) | 3 (0.6%)  | 2 (0.4%)  | 0 (0.0%) |
| Seasonal distribution   |       |          |      |        |           |                |                   |
| Spring                  | 8 (1.6%)  | 12 (2.4%) | 18 (3.5%) | 1 (0.2%) | 5 (1.0%)  | 10 (2.0%) | 1 (0.2%) |
| Summer                  | 9 (1.8%)  | 9 (1.8%)  | 17 (3.3%) | 1 (0.2%) | 7 (1.4%)  | 9 (1.8%)  | 0 (0.0%) |
| Fall                    | 11 (2.2%) | 15 (3.0%) | 34 (6.7%) | 1 (0.2%) | 9 (1.8%)  | 18 (3.5%) | 0 (0.0%) |
| Winter                  | 10 (2.0%) | 9 (1.8%)  | 21 (4.1%) | 1 (0.2%) | 4 (0.8%)  | 11 (2.2%) | 0 (0.0%) |
| Missing                 | 5 (1.0%)  | 2 (0.4%)  | 9 (1.8%)  | 1 (0.2%) | 4 (0.8%)  | 4 (0.8%)  | 0 (0.0%) |

### Weekly Distribution

| Lower third of the Face | Week | Weekend | Missing |
|-------------------------|------|---------|---------|
| Angle                   | 26 (5.1%) | 26 (5.1%) | 52 (10.2%) |
| Condylar                | 26 (5.1%) | 19 (3.7%)  | 38 (7.5%)  |
| Body                    | 4 (0.8%)  | 0 (0.0%)  | 9 (1.8%)  |
| Branch                  | 4 (0.8%)  | 9 (1.8%)  | 4 (0.8%)  |
| Symphysis               | 16 (3.1%) | 9 (1.8%)  | 17 (3.3%) |
| Para symphysis          | 31 (6.1%) | 1 (0.2%)  | 0 (0.0%)  |
| Coronoind Process       | 0 (0.0%)  | 0 (0.0%)  | 0 (0.0%)  |

Source: Research data.

The epidemiological knowledge contributes with valuable information in public health, which associated with clinical and laboratory investigations allows a set of essential observations to all segments of science. The analysis of the epidemiological profile of a given disease in different populations is required for the establishment of...
comparisons, moreover, allows the monitoring of health status, the observation of trends, the planning of health services and prevention programs, serving as a basis for future investigations[10,12,25,35].

The epidemiological analysis developed in the present study was retrospective, based on the verification of records of patients with oral-maxillo-facial fractures and treated in the Department of Maxillofacial Surgery and Traumatology (CTBMF) of the General University Hospital (HGU) from Cuiabá-MT, between December 2001 and June 2014. The Service of CTBMF of HGU offers medium and high complexity medical care, being considered as a reference, in the treatment of patients with oral-maxillo-facial fractures. The population attended in the service comes sectors with low socioeconomic level.

Retrospective studies are relatively easy and economical to be conducted, constituting a viable source for the establishment of hypothesis[33]. However, they present as the main restriction the impossibility of establishing temporal nexus, needed for the proof of cause and effect, since both are collected at the same time[34]. Furthermore, the quality of the information depends on the accuracy with which the initial examination is performed, and the correct filling out of the clinical records. Thus, when some examination or information may no longer be raised during the anamnesis or are not recorded in the medical records, the final result of this study is affected[4].

From the epidemiological point of view, the results of this study are in agreement with the data presented previously on Oral and Maxillofacial injuries[1,3,11,12,19,21,24,27,36]. Males suffered more significantly Oral and Maxillofacial injuries than females, at a ratio of 5.17:1. This finding is associated to the results obtained by Jin et al.[1] and Chrcanovic et al.[11] when proportions between men and women were observed of 4.6:1 and 5.4:1, respectively. However, Al Ahmed et al.[11], Cavalcanti et al.[31] and Motamedi[19] found higher relations recorded in the present study, 11:1, 8:1:1 and 8.6:1, respectively. In general, men are more involved in traffic accidents, acts of violence and tend to develop sports activities of greater physical contact, without the use of adequate protection[15,20].

In the present study, the age of patients with a history of fracture ranged from 3 to 76 years. High prevalence was observed in groups of 11-20 and 31-40 years, which together accounted for approximately 61.9% of the sample, which is in agreement with other studies[2,11,19,21,24,32]. A possible explanation is related to the fact that adults and young adults have a higher social activity than children, people of middle age and elderly. In other words, individuals belonging to the second and third decades of life participate with greater frequency of sports practice taken as dangerous, drive motorized vehicles carelessly, ingest a larger quantity of alcoholic drink and are more likely to engage in acts of violence[1,12,34].

Epidemiological surveys conducted in different countries suggest the motorized traffic accident as the most important etiological factor of Oral and Maxillofacial injuries[2,14,21,25,26]. Most of the fractures observed in the sample studied here, occurred due to unintentional factors (73.4%), with emphasis on the motorized traffic accident (48.9%). It has been emphasized that the place where the study was conducted, and the age group involved in the sample should receive appropriate consideration during the analysis of the etiological factor of oral-maxillo-facial fractures[32,34].

Regarding the seasonal distribution, the results showed that most of the cases occurred in the fall (n=89; 25.8%), winter and spring (n=77; 22.2% each), Scartezini et al.[4] studied the prevalence of oral maxillofacial injuries in patients treated at the Hospital for urgencies of Aparecida de Goiânia. The authors observed high number of traumas in the fall (38.0%) and summer (34.0%). Scariot et al.[5] assessed the epidemiological aspects of Maxillofacial injuries in a sample of 103 patients with ages ranging between 0 and 18 years in the city of Curitiba and observed a greater occurrence of lesions in the summer (28.1%) and fall (26.2%). Chrcanovic et al.[20] analyzed 911 medical records of patients presenting facial fractures treated in a public hospital in Belo Horizonte and observed a high number of visits on the weekends, especially in the spring. Studies carried out in Austria and in the United Kingdom[4] observed a high prevalence of Oral and Maxillofacial injuries in the summer. It is prudent to highlight that Brazil is a tropical country, where drastic changes of temperature are not observed, in most regions, during the year. This means that all four seasons of the year are not well defined, therefore, the establishment of comparisons among studies conducted in different geographical areas of Brazil and among studies conducted in other countries should be established with care[4].

The lower third of the face was the most commonly affected region (n=276; 54.3%). However, the fracture of the zygomatic complex was the most prevalent traumatic injury (n=146;28.7). This finding is similar to the results obtained in the studies developed by Leles et al.[31] and Pereira et al.[32] both in Brazil, Holmes et al.[37] in the USA and Roccia et al.[35] in Italy, who also observed a high number of fractures of the zygomatic complex and contrasts with the observations of Motamedi[19] in Iran, Brazilian and Passeri[2] in Brazil and Jin et al.[1] in China, who detected a high incidence of fractures in the jaw. Depending on the causative factor, oral-maxillofacial injuries of different patterns can be recorded. Fractures of the nasal bones and the zygomatic complex tend to occur with greater frequency after traffic accidents and acts of violence[31,37].

The lack of epidemiological data on oral-maxillo-facial fractures in various geographical regions of Brazil motivated this study, which aimed to collect information on several factors related to this type of disorder in a University Hospital, located in Cuiabá-MT. Such information, certainly, will assist in the development of prevention policies and adoption of clinical decisions with better defined therapeutic protocols.
Future prospective studies, based on the follow-up of these patients, with a view to evaluation of therapeutic protocols and their implications need to be developed. At the moment the best prognosis signals for the implementation of preventive campaigns as a viable, functional and operational alternative, regardless of gender, age, social class, etc.

4 Conclusion

Based on the methodology in this case it is prudent to conclude that:

The prevalence and patterns of oral-maxillo-facial fractures in the Bucco maxillofacial Surgery and Traumatology of the General University Hospital of Cuiabá-MT are similar to those observed in studies conducted in other populations. When it is verified:

A high number of injuries in male individuals below the age of 40 years, from municipalities in the interior of the state, resulting from motorized traffic accidents and involving mainly the lower third of the face.

References

1. Al Ahmed HEA, Jaber MA, Abu Fanas SHA, Karas M. The pattern of maxillofacial fractures in Sharjah, United Arab Emirates: A review of 230 cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2004;98(2):166-70.

2. Brasilheiro BF, Passeri LA. Epidemiological analysis of maxillofacial fractures in Brazil: a 5-year prospective study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006;102(1):28-34.

3. Jin Z, Jiang X, Shang L. Analysis of 627 hospitalized maxillofacial-oral injuries in Xi’an, China. Dent Traumatol 2014;30(2):147-53. doi: 10.1111/dtt.12044.

4. Scartezini GR, Guedes OA, Alencar AHG, Estrela CRA, Estrela C. Maxillofacial trauma in a public hospital in Central Brazil: A retrospective study of 405 patients. Rev Odonto Cienc 2016;31(4):153-7. doi: 10.15448/1980-6523.2016.4.21918.

5. Gassner R, Tuli T, Hächl O, Rudisch A, Ulmer H. Cranio-maxillofacial trauma: a 10 year review of 9,543 cases with 21,067 injuries. J Craniofac Surg 2003;31(1):51-61.

6. Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H. Cranio-maxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. J Oral Maxillofac Surg 2004;62(4):399-407.

7. Cavalcanti AL, Melo TR. Facial and oral injuries in Brazilian children aged 5-17 years: 5-year review. Eur Arch Paediatr Dent 2008;9(2):102-4.

8. Kotecha S, Scannell J, Monaghan A, Williams RW. A four year retrospective study of 1,062 patients presenting with maxillofacial emergencies at a specialist paediatric hospital. Bras J Oral Maxillofac Surg 2008;46(4):293-6. doi: 10.1016/j.bjoms.2007.11.007.

9. Scariot R, Oliveira IA, Passeri LA, Rebellato NLB, Müller PR. Maxillofacial injuries in a group of Brazilian subjects under 18 years of age. J Appl Oral Sci 2009;17(3):195-8.

10. Maliska MC, Lima Júnior SM, Gil JN. Analysis of 185 maxillofacial fractures in the state of Santa Catarina, Brazil. Braz Oral Res 2009;23(3):268-74.

11. Cavalcanti AL, Bezerra PKM, Oliveira DM, Granville-Garcia AF. Maxillofacial injuries and dental trauma in patients aged 19-80 years, Recife, Brazil. Rev Esp Cir Oral Maxillofac 2010;32(1):11-6. doi:10.1016/S1130-0558(10)70026-5.

12. Chrcanovic BR, Abreu MH, Freire-Maia B, Souza LN. 1,454 mandibular fractures: a 3-year study in a hospital in Belo Horizonte, Brazil. J Craniofac Surg 2012;40(2):116-23. doi: 10.1016/j.jcms.2011.03.012.

13. Afzali S, Saleh A, Seif Rabiei MA, Taheri K. Frequency of alcohol and substance abuse observed in drivers killed in traffic accidents in Hamadan, Iran. Arch Iran Med 2013;16(4):240-2. doi: 013164/AIM.0010.

14. Lee KH, Snape L, Steenberg LJ, Worthington J. Comparison between interpersonal violence and motor vehicle accidents in the aetiology of maxillofacial fractures. ANZ J Surg 2007;77(8):695-8.

15. Kostakis G, Stathopoulos P, Dais P, Gkinis G, Igoumenakis D, Mezitis M, Rallis G. An epidemiologic analysis of 1,142 maxillofacial fractures and concomitant injuries. Oral Surg Oral Med Oral Pathol Oral Radiol 2011;114:S69-73. doi: 10.1016/j.tripleo.2011.08.029.

16. Scherer M, Sullivan WG, Smith DJ Jr, Phillips LG, Robson MC. An analysis of 1,423 facial fractures in 788 patients at an urban trauma center. J Trauma 1989;29(3):388-90.

17. Gomes PP, Passeri LA, Barbosa JR. A 5-year retrospective study of zygomatic-orbital complex and zygomatic arch fractures in Sao Paulo state, Brazil. J Oral Maxillofac Surg 2006;64(1):63-7.

18. Azevedo AB, Trent RB, Ellis A. Population-based analysis of 10,766 hospitalizations for mandibular fractures in California, 1991 to 1993. J Trauma 1998;45(6):1084-7.

19. Motamedi MHK. An assessment of maxillofacial fractures: a 5-year study of 237 patients. J Oral Maxillofac Surg 2003;61(1):61-4.

20. Chrcanovic BR, Freire-Maia B, Souza LN, Araújo VO, Abreu MH. Facial fractures: a 1-year retrospective study in a hospital in Belo Horizonte, Braz Oral Radiol 2004;18(4):322-8.

21. Subhashraj K, Nandakumar N, Ravindran C. Review of maxillofacial injuries in Chennai, India: a study of 2748 cases. Br J Oral Maxillofac Surg 2007;45(8):637-9.

22. Love RM, Ponnambalam Y. Dental and maxillofacial skeletal injuries seen at the University of Otago School of Dentistry, New Zealand 2000-2004. Dent Traumatol 2008;24(2):170-6. doi: 10.1111/j.1600-9657.2007.00520.x.

23. Santos SE, Marchiori EC, Soares AJ, Asprino L, de Souza AF. Maxillofacial injuries and dental trauma in patients aged 5-17 years, Recife, Brazil. Rev Esp Cir Oral Maxilofac 2010;32(1):11-6. doi:10.1016/S1130-0558(10)70026-5.

24. Santos SE, Marchiori EC, Soares AJ, Asprino L, de Souza AF. Maxillofacial injuries and dental trauma in patients aged 5-17 years, Recife, Brazil. Rev Esp Cir Oral Maxilofac 2010;32(1):11-6. doi:10.1016/S1130-0558(10)70026-5.

25. Hogg NJ, Stewart TC, Armstrong JE, Girotti MJ. Epidemiology of maxillofacial injuries at trauma hospital in Ontario, Canada, between 1992 and 1997. J Trauma 2000;49(3):425-32.

26. Iida S, Kogo M, Sugiuara T, Mima T, Matsuya T. Retrospective analysis of 1502 patients with facial fractures. Int J Oral Maxillofac Surg 2001;30(4):286-90.
27. Ribeiro MFP, Marcenes W, Croucher R, Sheiham A. The prevalence and causes of maxillofacial fractures in patients attending accident and emergency departments in Recife-Brazil. Int Dent J 2004;54(1):47-51.

28. Chrcanovic BR, Abreu MH, Freire-Maia B, Souza LN. Facial fractures in children and adolescents: a retrospective study of 3 years in a hospital in Belo Horizonte, Brazil. Dent Traumatol 2010;26(3):262-70. doi: 10.1111/j.1600-9657.2010.00887.x.

29. Arosarena OA, Fritsch TA, Hsueh Y, Aynehchi B, Haug R. Maxillofacial injuries and violence against women. Arch Facial Plast Surg 2009;11(1):48-52. doi: 10.1001/archfacial.2008.507.

30. Hitosugi M, Mizuno K, Nagai T, Tokudome S. Analysis of maxillofacial injuries of vehicle passengers involved in frontal collisions. J Oral Maxillofac Surg 2011;69(4):1146-51. doi: 10.1016/j.joms.2010.05.030.

31. Leles JL, dos Santos EJ, Jorge FD, da Silva ET, Leles CR. Risk factors for maxillofacial injuries in a Brazilian emergency hospital sample. J Appl Oral Sci 2010;18(1):23-9.

32. Pereira CM, Filho MS, Carneiro DS, Arcanjo RC, Andrade LA, Araújo MGB. Epidemiology of maxillofacial injuries at a regional hospital in Goiânia, Brazil, between 2008 and 2010. RSBO 2011;8(4):381-5.

33. Almeida-Filho N, Rouquayrol MZ. Introdução à epidemiologia. Rio de Janeiro: Medsi; 2002.

34. Freire MCM, Pattusi MP. Tipos de estudo. In: Estrela C. Metodologia científica. São Paulo: Artes Médicas; 2005. p.185-209.

35. Roccia F, Bianchi F, Zavattero E, Tanteri G, Ramieri. Characteristics of maxillofacial trauma in females: a retrospective analysis of 367 patients. J Craniomaxillofac Surg 2010;38(4):314-9. doi: 10.1016/j.jcms.2009.10.002.

36. Lin S, Levin L, Goldman S, Peled M. Dento-alveolar and maxillofacial injuries – a retrospective study from a level 1 trauma center in Israel. Dent Traumatol 2007;23(3):155-7.

37. Holmes PJ, Koehler J, McGwin G Jr, Rue LW 3rd. Frequency of maxillofacial injuries in all-terrain vehicle collisions. J Oral Maxillofac Surg 2004;62(6):697-701.