

Distribution and Etiology of Facial Fractures in Patients Admitted by the Oral and Maxillofacial Specialty at an Emergency Hospital in Recife

Distribuição e Etiologia das Fraturas Faciais em Pacientes Internados pela Especialidade Buco-Maxilo-Facial em um Hospital de Emergência de Recife.

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Abstract

Among the traumas, those that affect the oral and maxillofacial region stand out considerably, due to their high complexity and the fact that they affect a bodily region with great physiological, aesthetic and social importance. This study aimed to characterize the facial traumas that generate fractures, specifying their distribution and etiology, in patients who were hospitalized. For this, a cross-sectional study was carried out on secondary data, in which 407 medical records of patients hospitalized by the Oral and Maxillofacial Surgery Service of the public network at Hospital da Restauração Governador Paulo Guerra - HR, in the city of Recife-Pernambuco, were collected, from which 130 medical records were selected whose reason for admission into the hospital was trauma to the bones of the face, hospitalized in the period between January 1st and December 31st, 2021, representing the sample of this study. The results regarding the distribution of fractures showed that the mandible was the most affected bone (66% of the cases), followed by the maxilla with 35%, the zygoma with 29%, the orbit with 15% and the bones of the nose in 12%. As for the etiology, car accident was responsible for the highest frequency of fractures with 29%, followed by physical aggression, with 22%, Firearm Projectile (16%), falls (16%), others (10%). It can be concluded that, in the period studied, the mandible was the most affected bone by fractures and traffic accidents were the main causes of facial fractures requiring hospitalization, and men being five times more affected than women.

Keywords: Trauma. Face. Fracture. Etiology. Maxillofacial.

Resumo

Entre os traumas, os que acometem o campo buco-maxilo-facial se destacam consideravelmente, devido a sua alta complexidade e pelo fato de atingirem uma região corporal com grande importância fisiológica, estética e social. Este estudo teve como objetivo caracterizar os traumas faciais geradores de fraturas, especificando sua distribuição e etiologia, em pacientes que foram hospitalizados. Para isto, foi desenvolvido um estudo transversal em dados secundários, no qual foram coletados 407 prontuários de pacientes internados pelo Serviço de Cirurgia Buco-maxilo-facial da rede pública no Hospital da Restauração Governador Paulo Guerra – HR, na cidade do Recife-Pernambuco, dos quais foram selecionados 130 prontuários cujo motivo da internação foi trauma em ossos da face, internados no período entre 01 de janeiro a 31 de dezembro de 2021, representando a amostra deste trabalho. Os resultados quanto a distribuição das fraturas demonstrou que a mandíbula foi o osso mais atingido (66% dos casos), seguido pela maxila com 35%, o zigoma com 29%, órbita com 15% e Ossos Próprios de Nariz em 12%. Quanto a etiologia, o acidente automobilístico foi o responsável pela maior frequência das fraturas com 29%, seguida por agressão física, com 22%, Projétil de Arma de Fogo (16%), quedas (16%), outros (10%). Pode-se concluir que, no período estudado, a mandíbula foi o osso mais acometido pelas fraturas e os acidentes de trânsito foram os maiores causadores de fraturas faciais com necessidade de internamento, sendo os homens cinco vezes mais acometidos do que as mulheres.

Palavras-chave: Trauma. Face. Fratura. Etiologia. Maxilofacial.

1 Introduction

Traumas resulting from accidents or intentional assaults are frequent, causing significant concern and affecting society as a whole. According to the World Health Organization, traumas are among the leading causes of death and disability today, resulting in a large number of survivors who must learn to live with physical sequelae and the social challenges they will face due to these injuries¹.

According to Minayo², violent traumas in Brazil have peculiarities, including a rising trend in trauma rates over the last 25 years. The quantity and forms of trauma vary depending on the city. Traffic accidents are widespread,

distributed throughout the territory, unlike firearm-related traumas and physical violence, which are concentrated in major cities. Additionally, there is a gender, age, and place of residence-based concentration of these traumas.

According to the Urban Traffic and Transportation Authority of Recife - CTTU³, between the years 2018 and 2020, the city of Recife recorded significant numbers of traffic accidents. There were 27,565 accidents, including both those with and without fatal victims. In addition to traffic accidents, other causes of trauma, such as interpersonal violence and accidents unrelated to vehicle traffic, contribute to a higher overall number of traumas.

Within this realm of traumas, facial injuries represent one of the major health challenges on a global scale. They pose a significant complexity in treatment, come with high medical and hospital costs, can result in total or partial loss of essential human functions, and often lead to aesthetic deformities^{2,4}. Due to the exposed nature of the face and its lack of protection, it is an anatomical area that is easily affected, whether by accidents or various types of aggression. In recent decades, incidents involving facial traumas have been on the rise, largely due to car accidents and violence^{5,6}.

Mandibular fractures have a high incidence and are frequently diagnosed in emergency rooms. Due to its location, anatomy, and projection in the lower third of the face, the mandible is often affected by traumas, which can result in fractures, primarily due to traffic accidents, assaults, falls, or sports-related accidents^{7,8}.

Siqueira et al.⁹ assessed the financial expenses of the Unified Health System (Sistema Único de Saúde - SUS) related to patients who suffered facial trauma and were treated in the city of Passo Fundo, RS. They found that falls were the leading cause of hospitalization (45.34%), followed by traffic accidents and motor vehicle accidents. They also observed that the age group between 25 and 34 years represented 30% of all hospital admission authorizations (AIHs) paid for. However, while the elderly are the main victims of falls, the predominant age group in motor vehicle accidents is between 15 and 24 years old. The male gender was the most affected (81.38%), and it was also responsible for the largest portion of hospitalization costs (80.07%). The authors concluded that facial fractures are commonly encountered in emergency services worldwide, leading to significant morbidity and socioeconomic losses. In this context, it is important to highlight that the study of the epidemiology of facial traumas is relevant due to the repercussions they have on patients. It can assist in the initial management of this type of trauma and, consequently, in the implementation of preventive public policies. Furthermore, between the years 1998 and 2015, hospitalizations through the Unified Health System (Sistema Único de Saúde - SUS) due to traumas increased by 98% across Brazil, with an even higher increase of 167% in the Northeast region¹⁰.

When conducting an epidemiological study of facial fractures in children in an emergency service, studies found that there was a predominance of males, accounting for 81% of the cases. Mandibular fractures were the most prevalent, accounting for over 70% of the cases. Traffic accidents and falls were the leading etiological agents causing these fractures¹¹. They concluded that it is necessary to implement a prevention policy with a special focus on traffic accidents and falls, which were the leading etiological agents causing facial fractures.

The epidemiology of facial traumas can vary depending on the location. In a study conducted in the city of Porto

Alegre, RS, the most affected age group was between 21 and 30 years old, with the most frequent etiology being assault, accounting for approximately 38.8% of the traumas, mainly affecting the zygomatic and mandibular complex. In contrast, a study conducted in the state of Paraíba found that the age group most exposed to facial traumas was between 20 and 30 years old, predominantly male, with motorcycle accidents as the primary etiology, and the most recurrent injuries involving the nasal bones^{12,13}.

In this context, it is important to have knowledge of traumas, especially facial traumas, their causes, geographic distribution, anatomy, and the groups that are most vulnerable. The Oral and Maxillofacial Emergency Department can serve as a barometer for collecting data, enabling the development of strategies for preventing facial traumas and reducing costs associated with hospitalizations, examinations, surgeries, and treatments. It is also important to encourage further research in this area to address these objectives¹⁴.

This study aimed to characterize facial traumas leading to fractures, specifying their distribution and etiology, in patients who were admitted to the Oral and Maxillofacial Service in the year 2021 at an emergency hospital in the city of Recife, PE. It aims to contribute data for the planning of preventive actions.

2 Material and Methods

The cross-sectional observational retrospective study conducted a survey and analysis of data recorded through the Electronic Patient Record (EPR) and medical information in computerized systems (PACS - Picture Archiving and Communication System and iDCE - Digital Clinic Enterprise) at the Governor Paulo Guerra Restoration Hospital (HR), located in the city of Recife, PE.

This study was submitted to the Research Ethics Committee of the Federal University of Pernambuco (Universidade Federal de Pernambuco - UFPE) and received approval with the CAEE number 59092522.8.0000.5208.

Initially, all the medical records of patients treated and admitted by the Oral and Maxillofacial Surgery Service from January 1st to December 31st, 2021, were collected. Among these, the records of patients with facial fractures were selected for inclusion in the research, regardless of the individual's gender, age, or the presence of associated fractures in other parts of the body.

From these records, a database was constructed, including demographic data (gender, age, and place of residence). Age groups were divided into 0-19 years, 20-34 years, 35-59 years, and above 60 years. The database also included the anatomical regions where the fractures had occurred and the etiology of the trauma that caused these fractures. The results were analyzed descriptively and presented in tables, based on the variables and frequencies analyzed.

3 Results and Discussion

A total of 407 medical records of patients admitted by the Oral and Maxillofacial Surgery Service at the Governor Paulo Guerra Restoration Hospital were collected. After applying the inclusion and exclusion criteria for the study, a sample of 130 cases was obtained, corresponding to some type of facial fracture (Table 1).

Table 1 - Distribution of frequency of cases and their variables

Variables	Frequency
Gender	
Male	16% (21 cases)
Female	84% (109 cases)
Age / Age group	
Up to 19 years old	8% (10 cases)
From 20 to 34 years old	50% (65 cases)
From 35 to 59 years old	34% (44 cases)
Over 60 years old	8% (11 cases)
Region of residence	
Metropolitan Region of Recife.	64% (83 cases)
Mata Zone	18% (23 cases)
Agreste	16% (21 cases)
Sertão	1% (1 caso)
Not informed	2% (2 cases)
Etiology	
Car Accident	29% (38 cases)
Physical Aggression	22% (28 cases)
PAF	16% (21 cases)
Falls	16% (21 cases)
Others	10% (13 cases)
Not informed	7% (9 cases)
Anatomical distribution of fractures	
Mandible	66% (86 cases)
Maxilla	35%. (45 cases)
Zygoma	29% (38 cases)
Órbit (blow out e blow in)	15% (20 cases)
Nasal bones	12%. (15 cases)
Not informed	12% (15 cases)

Source: research data.

Table 1 shows that the most affected patients by facial trauma were males, accounting for 84% (n=109) of the total cases. Only 16% (n=21) of the occurrences involved female victims. These results are consistent with various studies, such as the one conducted by Cerqueira¹⁵, which analyzed the epidemiology of facial traumas in the metropolitan region of Feira de Santana, in the state of Bahia, and found a prevalence of 76.94% of fractures affecting males. These findings are also supported by the results of the study conducted by Siqueira et al.⁹, which identified the male gender as the most affected by traumas resulting in hospitalization at the hospital where their research was conducted (81.38%). Additionally, males were responsible for the majority of hospitalization costs (80.07%).

Santos¹⁶ also found similar results when researching facial traumas that occurred in the state of Pernambuco, with a focus on car accidents, identifying a prevalence of traumas

in males in approximately 92% of the cases. Similar findings were also reported in 2005 by Falcão et al.¹⁷ when analyzing 1486 patients with facial fractures treated at the Hospital da Restauração in Pernambuco. Their study revealed that males were the most affected, accounting for 84% of the cases.

The results of this research, as shown in Table 1, indicated that the age group most frequently affected by facial traumas requiring hospitalization in the Oral and Maxillofacial Surgery Department was adult males, ranging from 20 to 59 years of age. Studies like the one conducted by Siqueira et al.⁹ also found that the age group between 25 and 34 years represented a significant percentage in this aspect (30%). Similar results were observed by Ramos¹³, who conducted a cross-sectional study with 332 patients who were victims of facial traumas treated by the Oral and Maxillofacial Surgery Service at the Regional Hospital Deputado Janduhy Carneiro in the city of Patos, Paraíba, and obtained a prevalence of 75.9% of cases in the same age group of 20 to 59 years. Silva¹⁸, in an analysis of 544 medical records, found a lower prevalence compared to the one found in your study, with 59.4% of fractures occurring in patients in the same age group in research conducted at the municipal hospital of Paracatu, Minas Gerais. However, it should be noted that Silva considered fractures in other locations in addition to the face in their study.

Regarding the place of residence of these patients, divided according to the IBGE by mesoregion¹⁹, it was found that 64% of the cases originated from the metropolitan region of Recife, while 34% (more than one-third) of the patients lived in the Zona da Mata, Agreste, or Sertão regions. Compared to other studies^{20,21}, these numbers show significant similarity, as they also presented a proportion of 67.7% of patients from the metropolitan region of Recife and 30.4% from other regions of the state of Pernambuco.

Car accidents were the leading cause of hospitalization for victims in the Oral and Maxillofacial Surgery Department, with a notable predominance among male patients, accounting for 30% of the cases. This result aligns with previous studies^{10,22,23,24}. Among female patients, car accidents ranked second, accounting for 24% of the occurrences.

Studies have found falls to be the most frequent etiology leading to hospitalizations in the hospitals they investigated, and these incidents tend to affect older individuals. These findings diverged from the present research, in which falls, along with injuries caused by Firearms - PAF, ranked third among the most frequent etiologies (16%, n=21 for both)^{9,25,26}. Falls were more common among female individuals, which aligns with the findings of Montovani²³, who reported falls as the third most common cause of trauma in their studies.

Regarding injuries caused by firearms (PAF), it's worth noting that in 2019 alone, the Institute of Applied Economic Research (IPEA) recorded 32,302 deaths as a result of firearm-related aggression. In the gender breakdown, males were proportionally the most affected, ranking as the third leading cause of fractures. This finding aligns with the results

of other studies^{1,4,27,28}.

Physical assaults accounted for approximately 22% (n=28) of the occurrences. These results differ from various studies that have identified physical assault as the primary cause of facial fractures^{4,12,15,25}. In Table 2, it can be observed that the highest percentage of victims in this etiological category were male, accounting for 22 out of the 28 cases related to physical assault.

Table 2 - Distribution of etiology incidence by gender

Etiologies	Women 16% (21 cases)	Men 84% (109 cases)
Car Accident	24% (5 cases)	30% (33 cases)
Physical Aggression	29% (6 cases)	20% (22 cases)
PAF	10% (2 cases)	17% (19 cases)
Falls	14% (3 cases)	17% (18 cases)
Others	24% (5 cases)	7% (8 cases)

Source: research data.

Regarding the location of the fracture, the mandible was the most affected in all etiologies (Table 3), consistent with various research findings. Car accidents were the most common cause of fractures in this anatomical region, with some type of mandibular fracture reported in more than half of the cases^{10,11,14,18}. However, it's worth noting that the data from this study is not unanimous and may differ from some reports found in the literature. Some studies also point to the zygomatic bone as the most commonly affected^{13,23}.

The anatomical locations where fractures occurred are presented in Table 3, categorized by the etiology of the trauma.

Table 3 - Distribution of fractures by etiology (% calculated within the universe)

	Car Accident	Physical Aggression	PAF	Falls	Others
	38 cases	28 cases	21 cases	21 cases	22 cases
Mandible	63% (24 cases)	82% (23 cases)	81% (17 cases)	66% (14 cases)	36% (8 cases)
Ziyoma	45% (17 cases)	35% (10 cases)	35% (6 cases)	24% (5 cases)	0% (0 cases)
Maxilla	50% (19 cases)	32% (9 cases)	52% (9 cases)	38% (8 cases)	0% (0 cases)
Órbit	24% (9 cases)	14% (4 cases)	23% (4 cases)	14% (3 cases)	0% (0 cases)
Nasal bones	21% (8 cases)	14% (4 cases)	5% (1 caso)	10% (2 cases)	0% (0 cases)
Information unavailable	0% (0 cases)	0% (0 cases)	0% (0 cases)	5% (1 caso)	64% (14 cases)

Source: research data.

In this context, it becomes evident that facial traumas are a public health issue that can lead to hospitalizations and, consequently, increased expenses for the individual's recovery. It should be emphasized that research based on

epidemiological studies is of great importance for the constant progression and updating of this information. This can assist in directing policies for the prevention and promotion of public health, providing benefits both from a social and economic perspective.

4 Conclusion

Considering the data from this research, it can be concluded that approximately one-third of the patients admitted by the Oral and Maxillofacial Surgery Service were affected by some type of facial fracture. The anatomical distribution indicated that the mandible was the most affected bone, accounting for more than half of the observed fractures, followed by the maxilla and zygomatic bone.

It is also concluded that males in the 20 to 34 age group were the most affected. Regarding etiology, car accidents were the most common, accounting for almost 3 out of every 10 cases, followed by physical assaults, falls, and firearm projectiles.

Finally, given the importance of studies in this field, it is crucial to continually encourage new research with the aim of keeping the information up to date. This is especially necessary for the adaptation and improvement of preventive actions related to these events

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