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Epidemiological Analysis of Maxillofacial Fractures in a Hospital in Brazil: A 10-Year Retrospective Study

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Abstract : *The goal of this study was to perform an epidemiological survey of the facial bone fractures served in a hospital of Brazil, from 2007 to 2017. The patients' prompt-books served by the maxillofacial surgical team which presented facial fractures were analyzed. A total of 1979 prompt-books were evaluated, of which 1413 presented one or more fractures on the face. The most committed gender was the male one (76,7%), the predominant age was between 21 and 35 years old (39%). The etiology was represented by traffic accidents (45,1%), interpersonal violence (25,8%), falling (13,8%), work accidents (5,3%), sporting accident (5,1%) and trauma in screens (4,9%). From 1856 total fractures diagnosed, the nose bones were the most affected (33,4%), followed by the mandible (23,8%), zygomatic orbital complex (22,6%), maxilla (7,2), zygomatic arch (6,6%), frontal (4,4%), naso-orbitoethmoid complex (1,4%) and panfacial fractures (0,6%). The ongoing disclosure about epidemiology of the maxillofacial is important because provides the fundamental information for the development of politics destined to reduce facial injuries.*

Keywords – *epidemiological, maxillofacial, fractures.*

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I. Introduction

The traumas present a big importance on the current society being between the main causes of morbimortality of population. Daily, around 16.000 people die from traumas1-2. As a result of the face projection and vulnerability, the facial traumatism is among the most prevailing ones, in isolation or associated to polytrauma, representing around 8,7% of the consultations performed in emergency centers[3]. From the maxillofacial region, the mandible and nose fractures are the most prevailing ones, followed by the zygomatic bone2.

The epidemiology of the facial fractures varies with the kind, gravity and cause of the lesion, depending of the studied population4. In regard to the etiology, the automobile accidents constitute the main cause, followed by physic aggressions5-6. The fractures arising from both etiologies usually involve patients from 20 to 29 years old, being the most part of them from the male gender2. The interpersonal aggressors commonly have the mandible and/or zygomatic as the target because of the greater prominence of the facial anatomy, while the automobile accidents tend to result in more complex fractures due to the high speed impact. Anyway, the facial traumas present emotional, functional and aesthetics repercussions, permanents or not, and the necessity of surgical and hospitalization intervention7-9.

Therefore, it is needed to have clear comprehension of the affected population, so it can be guaranteed an appropriate intervention and the understanding of factors such as cause, severity and temporal distribution of the maxillofacial traumas can help on the understanding of the problem and contribute on the implementation of preventive, educational and technical measures, then, it can be reached the excellence on the lesion management10. Unfortunately, in Brazil, comparing to other countries, these information are still scarce4,11.

The present study aims to perform an epidemiological survey of the fractures on face bones served in a hospital of Brazil, from 2007 to 2017, in order to disclose the standards related to age, gender, etiology, affected area and surgical treatment necessity.

II. Materials and methods

The survey consists in a retrospective, exploratory and descriptive study, which it was analyzed prompt-books and clinic reports of patients affected by maxillofacial traumas served at the Hospital Universitário do Oeste do Paraná, in the city of Cascavel/PR, Brazil, from August, 2007 to January, 2017. The study was approved by the ethics committee in research of Universidade do Oeste do Paraná under the protocol CAAE: 58658116.0.0000.0107.

In the research the prompt-books were included, properly filled, where all the relevant information for the study are duly specified. The collected datas for the analysis were: gender, age, trauma etiology, diagnosed fractures, period of hospitalization and form of treatment. In relation to age, it was divided in groups of 0 to 10, 11 to 20, 21 to 35, 36 to 50 and 51 years old or more. The etiology was subdivided in traffic accidents, interpersonal violence, falling, trauma in screens, sporting accidents and work accidents.

The fractures were classified as nasal, zygomatic maxillary complex, isolated of maxilla or zygomatic arch, of the naso-orbitoethmoid complex, of frontal bone, of mandible and panfacial. Given that the mandible fractures were subdivided in symphyseal fracture, parasymphyseal, body, angle, segment, mandibular condyle and coronoid process. The treatment was classified as surgical or non-surgical. It was excluded from the research those ones that did not fill the requirements referred before (prompt-books improperly fulfilled or of carriers patients of other pathologies.

The survey was performed through the prompt-books and a form to data collection used by the Residência em Cirurgia e Traumatologia Bucomaxilofacial program. It aims to easy the further analysis of the obtained information and contains relevant information to research in question. The statistic analysis was performed though the descriptive and perceptual appreciation via absolute (n) and relative (%) frequency values of the obtained datas.

III. Results

1979 prompt-books of the patients served by the surgery and maxilofacial traumatology service of Hospital Universitário do Oeste do Paraná were analyzed, which 1413 presented one or more fractures on the face. The prevailing gender was the male one, representing 76,7% (n=1084), while the female was 23,3% (n=329). The age varied from 1 and 93 years old, with the average of 34,18 years. The most affected age group was the one between 21 and 35 years old with 39% (n=553), followed by: 23% (n=326) between 36 and 50 years old; 18% (n=259) with more than 50 years; 16% (n=219) of 11 to 20 years and 4%(n=56) of 0 to 10 years.

In relation etiology the traffic accidents were the mentioned by 45,1% (n=637) from the total of the face fractures, while the interpersonal violence in 25,8% (n=364) of the fractures. Other causes related by the patients were the fallings 13,8% (n=195), work accidents 5,3% (n=75), sporting accidents 5,1% (n=72) and traumas in screens 4,9% (n=70) (Graphic 1). Among the traffic accidents, the motorbike ones represent 35% (n=223), the automobile 32,8% (n=209), the running over 16,2% (n=103) and the bicycle ones 16% (n=102).

The physical aggression was responsible for 77,5% (n=282) of the face fractures occasioned by interpersonal violence, the projectile by firearms for 14,5% (n=53) and the hurts caused by sharp objects for 8% (n=29) of the cases.

In relation to fallings, 52,8% (n=102) resulted from fall from own heights and 47,2% (n=92) of greater heights falls.

On the total of 1856 fractures diagnosed, the nasal bones were the most impacted 33,4% (n=621), followed by the mandible 23,8% (n=441); zygomatic orbital complex (ZOC) 22,6% (n=420), maxilla 7,2% (n=133), zygomatic arch 6,6% (n=122), frontal 4,4% (n=81), naso-orbitoethmoid complex (NOE) 1,4% (n=26) and panfacial fractures 0,6% (n=12) (Graphic 2).

From the mandibular fractures the most prevailing was the one in body, which represented 30,6% (n=135), the fractures in angle corresponded to 22,9% (n=101), the one which affected the condylar 17,5% (n=77), in symphyseal 13,1% (n=58), parasymphyseal 13,1% (n=58), coronoid 5% (n=22) and in mandibular segment 3% (n=13) (Graphic 3).

In relation to the hospitalization period, there was a variance from zero to 59 days, with na average of 1,2 days. The surgical treatment was employed in 74,2% (n=1048) of the cases, while the watchful waiting in 25,8% (n=365).

IV. Discussion

The epidemiology of the face traumatisms is extremely important, because it provides necessary information on the development and evaluation of preventive measures to reduce the incidence of the facial lesions[2]. The present study evaluated the profile of the patients of facial trauma, served by the surgical team and maxillofacial traumatology of a Hospital-School of secondary level, in the countryside of the state of Paraná.

The fractures on the face affected in its great majority the male gender in a proportion of 3:1, agreeing with literature that it is unanimous in affirming that the male gender is always the most affected, in proportions which vary from 2,6:1 to 11,8:17, 13-14,21,242,5,12-15. Many factors have been related to the greater vulnerability of the men such as the fact that generally, in society, the men work outside home, being more active in the traffic, performing physical activities with higher risks5,13,15. However, it has been occurring a tendency of the increase of incidence of women who are each more being exposed to risk factors16. It was shown the prevailing of the ages between 21 to 35 years old, corresponding to 39%. This result compares to other studies, which this lapse of age was also predominant10,13-18. Just as on Mantovani et al., 2006 and

Godoi et al., 2013 study, the children were the least affected. Possibly due to the cares which the family has at this age group12,19.

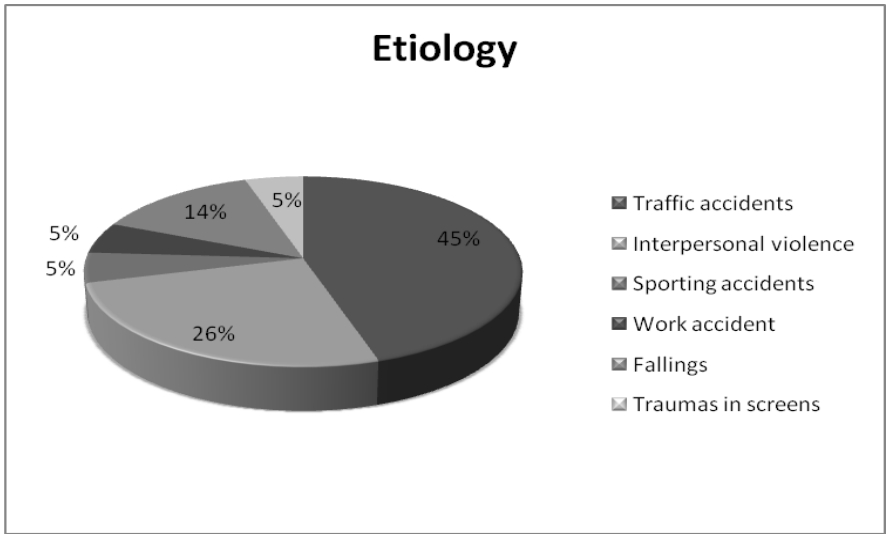
The traffic accidents were the main cause of the maxillofacial fractures, followed by the interpersonal violence. On the literature there are controversies in relation to the main responsible for this fractures. For Cavalcanti et al. 2004, Falcão et al., 2005 and Ferreira et al., 2013 the traffic accidents also represent the main etiology, while for Cavalcanti et al. 2009 and Tino et al., 2010 the interpersonal violence was the main cause. The motobyke accidents represent 35% of the traffic accidents, corroborating with other articles which highlights the prevailing of motorbike accidents on the traffic accidents which lead to maxillofacial trauma2,5,10,16. The bicycle accidents represent 16% of the cases, comparing to the study of Cavalcanti et al., 2009; Motta et al., 2009 and Pacheco et al., 2015. It is important to highlight that the use of the helmet which covers all the face of the cyclist is a great importance conduct which must be always followed to avoid major consequences of this kind of accident5.

On the present research, the most diagnosed fractures were the nasal ones, in agreement with the founds of other authors14,20-23. It is believed that this fact is associated to the prominent position of the nose, as well as the slim structure of the bones which constitute it23. Although considered lower, the nasal fractures require attention for presenting a significant potential of aesthetic and functional complications22.

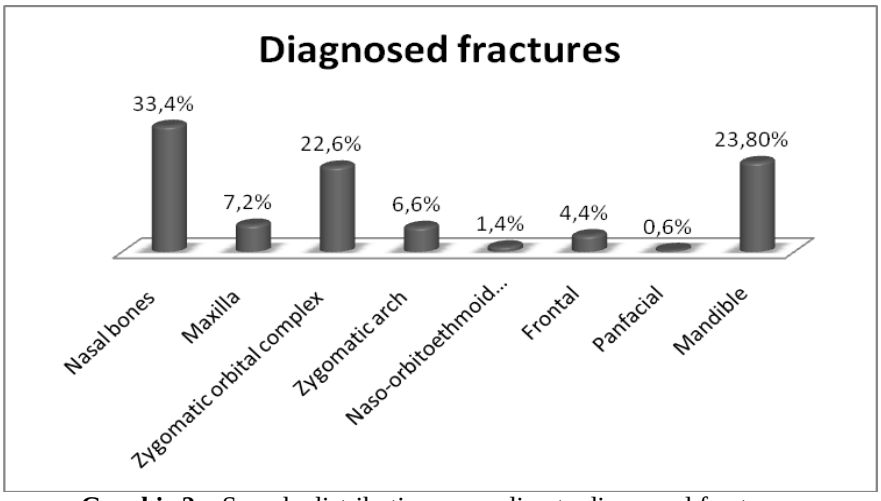
The second most affected bone in fractures was the mandible, this data shows itself different from some studies that noticed the mandible the bone region most affected by the maxillofacial fractures 4,14-15,24-25. The mandible vulnerability can be associated to the fact that it is the only mobile bone of the face, so, it could be more vulnerable to receive strong impacts and fracture20. While for Melo et al., 2004, the zygomatic orbital complex was the most affected region, on the present study this structure has been in third place among the most affected ones26.

Between the mandible fractures the most prevailing were: body, angle, condyle, symphyseal, parasymphyseal, coronoid and mandibular segment. This distribuction is not consensus on literature, for Falcão et al., 2005 the most affected region was the body, followed by the segment, chin and condyle20. Martini et al., 2006 had as the anatomyc localization most affected the body, symphyseal and condyle27. Godoi et al., 2013, found more incident fractures in body, condyle and symphyseal12. In relation to the treatment, on the present study most part of the fractures (74,2%) received a surgical treatment, which is a very similar result as the ones of Cavalcanti et al., 2009, Godoi et al., 2013, Samieirad et al., 2015 and Pacheco et al., 2015, where the surgical treatment was employed on most part of the cases. Restoring the union of the fractured segments and giving them stability, occurs the favouring of a precocious functional recuperation, corroborating to what was described before5,12,14-15.

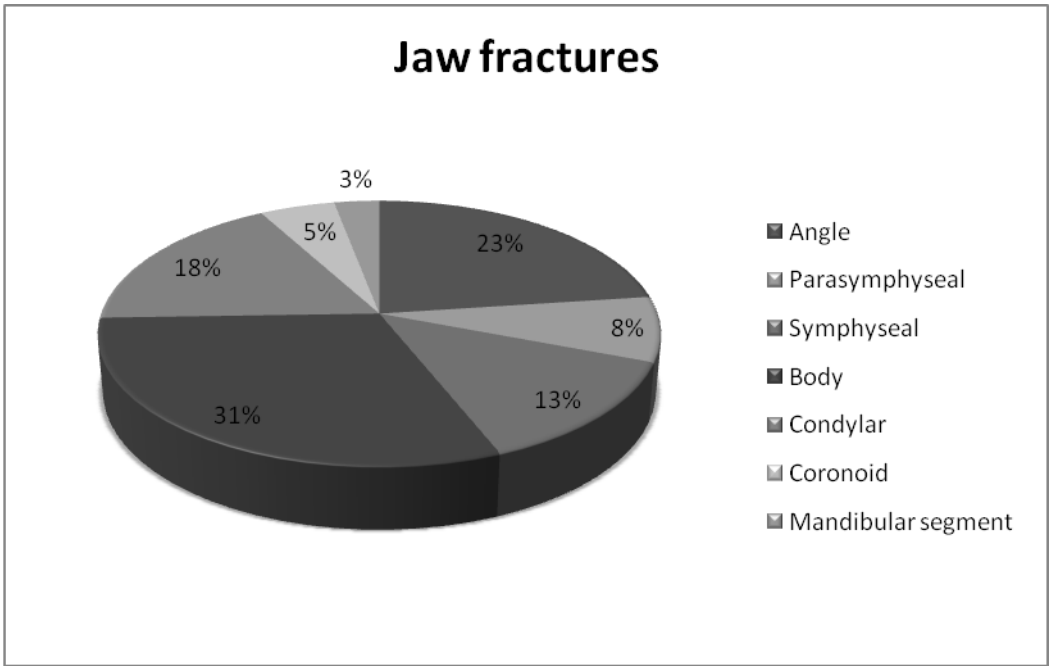
V. Figures and Tables



Graphic 1 – Sample distribution, according to the etiology.



Graphic 2 – Sample distribution, according to diagnosed fractures.



Graphic 3 – Sample distribution, groups affected by mandibular fractures, according to the classification of mandibular fractures.

VI. Conclusion

Considering the methodology of the present study and evaluated population, it can be concluded that the most affected patients by traumas on the maxillofacial region are men, age from 21 to 35 years old, arising from traffic accidents. The fractures involve more frequently the nasal bones, mandible and zygomatic.

The ongoing disclosure of epidemiological data of facial traumatisms is extremely important, due to the tendency of changes on the frequency of causing mechanisms, in order to collaborate with the preparation of politics in management of health care.

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