ORIGINAL ARTICLE

Facial traumas among females through violent and non-violent mechanisms☆

Mário César Furtado Costaa, Gigliana Maria Sobral Cavalcantea,b, Lorena Marques da Nóbregaa, Pierre Andrade Pereira Oliveiraa,c, Josuel Raimundo Cavalcantea,c, Sergio d’Avila a,b,*

a Universidade Estadual da Paraíba (UEPB), Campina Grande, PB, Brazil
b Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil
c Universidade de Pernambuco (UPE), Santo Amaro, PE, Brazil

Received 21 June 2013; accepted 12 October 2013

KEYWORDS
Cross-sectional studies; Violence against women; Wounds and injuries; Violence

Abstract
Introduction: Injuries stemming from facial trauma have both physical and emotional consequences among affected individuals as well as an economic impact on the healthcare system. Objective: The aim of this retrospective study was to determine the occurrence of facial trauma among females of different age groups treated at an urgent care ward in the northeast of Brazil in a two-year period. Materials and methods: A cross-sectional study was carried out involving 247 charts. Data on patient age, etiological agent and site of trauma were recorded. Results: Adults accounted for 48.6% of the sample. Falls were the most frequent cause of trauma (38.5%); soft tissue injuries were the most prevalent ones (67%); age was significantly associated with the etiology of the injuries; falls were the most common cause among children/adolescents and elderly individuals, and acts of violence were more common among adults. Conclusion: Adult females were affected by facial trauma more than the other age groups studied, with a predominance of soft tissue injuries and injuries to the mandible, maxilla, zygomatic arch and nasal bones. Falls were the most prevalent cause of facial trauma and significantly associated with the youngest (children/adolescents) and oldest (elderly individuals) age groups.

© 2014 Associação Brasileira de Otorrinolaringologia e Cirurgia Cérvico-Facial. Published by Elsevier Editora Ltda. All rights reserved.

PALAVRAS-CHAVE
Estudos transversais; Violência contra a mulher; Ferimentos e lesões; Violência

Traumatismos faciais em mulheres por mecanismos violentos e não violentos

Resumo
Introdução: O trauma facial pode ser considerado uma das agressões mais expressivas devido às consequências emocionais, à possibilidade de deformidade e também ao impacto econômico que os mesmos causam em um sistema de saúde.
Objetivo: Este estudo retrospectivo verificou a ocorrência de traumas faciais em mulheres,
Facial traumas among females through violent and non-violent mechanisms

Introduction

Injuries to the face are more common in comparison to other regions of the body.\(^1\) The main causes of facial trauma are traffic accidents, falls, and sports injuries.\(^2\) The high prevalence of this form of trauma stems from the fact that the face is highly exposed and unprotected. Such injuries can result in complex esthetic problems, loss of function, and high treatment costs.\(^3\)\(^-\)\(^5\) Moreover, facial trauma often requires a multidisciplinary approach due to the effects on both soft tissues and bones as well as possible involvement of the eyes, nerves, and brain.\(^6\)\(^,\)\(^7\)

Violence against women committed by either family members or strangers is a social problem found in all categories of age, religion, schooling and socioeconomic class. Most cases occur within the family, committed by individuals with personal and emotional ties with the victim, and can leave severe physical and emotional scars.\(^8\)\(^,\)\(^9\)

The aim of the present study was to evaluate cases of facial trauma among female victims at the urgent care ward of a hospital in a medium-sized city in northeastern Brazil.

Materials and methods

A retrospective, inductive, observational, cross-sectional study was carried out involving 247 patient charts of female victims of facial trauma treated at the urgent care ward between January 2010 and December 2011 in Campina Grande, state of Paraíba, Brazil. This city is the second largest city in the state (population: approximately 695,931 inhabitants), and is located 125 km distant from the capital.\(^10\)

Data were recorded on a form specifically drafted for the present study addressing sociodemographic data (age and gender) as well as etiology, type and site of the trauma. Age was categorized as follows: children/adolescents (0 to 19 years), adults (20 to 59 years) and elderly individuals (60 years or older). Etiological agent was categorized as traffic accident (automobile, motorcycle and bicycle), interpersonal aggression or fall. Type of facial trauma was categorized based on descriptions used by Silva et al.:\(^11\) soft tissue injury, fracture (simple and multiple), dentoalveolar trauma or others. Anatomic site was categorized as intraoral region, mandible/maxilla/zygomatic arch, nasal bones/peri-orbital region/brow or others.

This study was carried out in compliance with national and international guidelines for research involving human subjects (Declaration of Helsinki and Resolution 196/96 of the Brazilian National Health Board), is registered with Brazilian National Research Ethics System (SISNEP) and has received approval from the Human Research Ethics Committee of Universidade Estadual da Paraíba, process CAAE n° 02266.0.133.000-10.

The data were submitted to univariate and bivariate analysis using Pearson’s chi-square test and Fisher’s exact test. The level of significance was set to 5% (\(p < 0.05\)). All analysis were performed with the aid of the SPSS program, version 18.0.

Results

Two hundred forty-seven patient charts of female victims of facial trauma were examined. Adults accounted for 48.6% of the sample. A similar number of victims occurred in both years analyzed (2010 and 2011), with 51.4% of the total number of cases occurring in 2010 (Table 1). Fall from one’s own height was the most frequent cause of trauma (95 cases; 38.5%). Soft tissue injuries were the most prevalent (67.6%). The most affected anatomic structures were the mandible, maxilla and zygomatic arch (Table 2).

Age was significantly associated with the etiology of the injuries (\(p > 0.001\)) with acts of violence, the most common cause among adults. Falls were the most common cause among children/adolescents and elderly individuals (Table 3). A greater prevalence of soft tissues injuries occurred in all age groups and children/adolescents were the only group to suffer dentoalveolar trauma (Table 4). Injuries to the mandible, maxilla and zygomatic arch were the most prevalent in all age groups. Intraoral injuries were more prevalent among children/adolescents. Nasal bones/peri-orbital region/brow injuries were more prevalent among elderly individuals (\(p = 0.007\)) (Table 5).
### Table 1
Percentage distribution of age groups and year of occurrence of facial trauma: Campina Grande, Brazil, 2012 (n = 247).

| Variable                        | n   | %   |
|---------------------------------|-----|-----|
| **Age group**                   |     |     |
| Children/adolescents (0 to 19 years) | 96  | 38.9 |
| Adults (20 to 59 years)         | 120 | 48.6 |
| Elderly individuals (60 years or older) | 31  | 12.6 |
| **Year**                        |     |     |
| 2010                            | 127 | 51.4 |
| 2011                            | 120 | 48.6 |
| Total                           | 247 | 100 |

Source: Direct research, 2012.

### Table 2
Percentage distribution of etiology, type and site of facial trauma: Campina Grande, Brazil, 2012 (n = 247).

| Variable                        | n   | %   |
|---------------------------------|-----|-----|
| **Etiology**                    |     |     |
| Traffic accident                | 56  | 22.7 |
| Physical aggression             | 79  | 32.0 |
| Fall                            | 95  | 38.5 |
| Others                          | 17  | 6.9 |
| **Type of injury**              |     |     |
| Soft tissue injury              | 167 | 67.6 |
| Fracture (multiple or simple)   | 59  | 23.9 |
| Dentoalveolar trauma            | 9   | 3.6 |
| Unidentified                    | 12  | 4.9 |
| **Site of injury**              |     |     |
| Intraoral region                | 57  | 23.1 |
| Mandible/maxilla/zygomatic arch | 108 | 43.7 |
| Nasal bones/periorbital region/brow | 33 | 13.4 |
| Others                          | 49  | 19.8 |
| **Total**                       | 247 | 100 |

Source: Direct research, 2012.

### Table 3
Percentage distribution of age groups and year of occurrence of facial trauma: Campina Grande, Brazil, 2012 (n = 247).

| Variable                        | Traffic accident | Physical aggression | Fall | Others | Total |
|---------------------------------|------------------|---------------------|------|--------|-------|
| Age group                       | n    | %   | n    | %     | n    | %     | n    | %     | n    | %     | n    | %     | Total | %     |
| Children/adolescents (0 to 19 years) | 19  | 19.8 | 23  | 24.0 | 50  | 52.1 | 4    | 4.2    | 96  | 100    |       |       |
| Adults (20 to 59 years)         | 34  | 28.3 | 51  | 42.50| 24  | 20.0 | 11   | 9.2    | 120 | 100    |       |       |
| Elderly individuals (60 years or older) | 3   | 9.7  | 5   | 16.1 | 21  | 67.7 | 2    | 6.5    | 31  | 100    |       |       |

Fisher’s exact test: p < 0.001.
Source: Direct research, 2012.

### Table 4
Distribution of age groups according to type of injury: Campina Grande, Brazil, 2012 (n = 247).

| Variable                        | Soft tissue injury | Fracture | Dentoalveolar trauma | Unidentified | Total |
|---------------------------------|--------------------|----------|----------------------|--------------|-------|
| Age group                       | n     | %     | n     | %     | n     | %     | n     | %     | n     | %     | Total | %     |
| Children/adolescents (0 to 19 years) | 68  | 70.8 | 16    | 16.7 | 9     | 9.4  | 3     | 3.1  | 96    | 100    |       |       |
| Adults (20 to 59 years)         | 76    | 63.3 | 37    | 30.8 | -     | -     | 7     | 5.8  | 120   | 100    |       |       |
| Elderly individuals (60 years or older) | 23  | 74.2 | 6     | 19.4 | -     | -     | 2     | 6.5  | 31    | 100    |       |       |

Fisher’s exact test: p = 0.002.
Source: Direct research, 2012.
Facial traumas among females through violent and non-violent mechanisms

Discussion

The Human Development Index - HDI - ranges from 0 to 1, the closer to 1, the higher the HDI of a site. Brazil has a HDI of 0.728, which is considered high, currently ranks 85 in the world ranking. Brasilia, the capital of the country, has an index of 0.874; the state of Paraíba, 0.718; and the city of the study, 0.72, a value similar to the national HDI.10

The hospital where the present study was carried out is one of the main reference service for trauma victims in the region, with a mean of 1.28 cases of facial trauma per day and a total of 467 per year. A total of 36.5% of these victims require surgery, with an annual mean of 170 surgeries performed for facial trauma.

Facial trauma is considered one of the most serious types of injury and affects both men and women of all ages and social classes. The incidence of facial trauma has risen significantly in recent years, especially among the younger population. Such injuries can lead to permanent scars with accompanying emotional consequences.4,8

Falls were the primary cause of facial trauma, affecting 38.5% of the sample. This finding is in agreement with data reported in previous studies.11-14 However, healthcare professionals often find it difficult to investigate and register trauma resulting from aggression due to the emotional state of the victim, who, due to either omission or shame, is unable or unwilling to explain the reasons that led to the act of aggression, which often may have been induced by the use of alcoholic beverages or illicit drugs.15,16 Thus, the greater frequency of reports of falls raises the question as to whether this etiological factor truly represents the experience of these women or may be masking cases of violence practiced in the home environment. When refusing to report violent practices, women become increasingly exposed to risk factors and unreported cases limit the actions of health professionals to initial care, surgery and hospitalization.

Brazilian law (nº 10.778) stipulates the mandatory notification of any type of violence practiced against women treated at public or private healthcare services. Medical/hospital care in such cases should address all problems and needs, with no discrimination in terms of age group, race, gender or religion.17 The particular attention given to this issue encourages respect for women’s rights and represents a reaffirmation of support through public policy. Clarifying this information signifies the recognition of the victim’s main needs in terms of both primary care and follow-up, allowing the determination of the extent of the consequences of such injuries, which often go beyond physical aspects. Thus, a more in-depth evaluation is needed to ensure the effectiveness of treatment.

The greater prevalence of cases of facial trauma among adults is in agreement with findings reported in previous studies.3,13 Women have been the victims of different forms of trauma, the occurrence of which has been associated with their inclusion in the workforce at jobs previously exercised by men. Moreover, such activities need to be reconciled with household responsibilities, which can lead to greater exposure to problems of a psychological nature. The literature reports a tendency toward equal frequencies of facial trauma between males and females, which has been attributed to the greater participation of women in the job market, including high-risk occupations.18

In a retrospective study at an urgent care unit in the United Kingdom, Gerber et al.19 found that the majority of the 219 cases of facial trauma among females occurred due to accidents and women over 20 years of age were at greater risk of domestic violence. The results of the present study are in agreement with these findings. Indeed, falling from one’s own height was the leading cause of facial trauma among children/adolescents and elderly individuals. Hussain et al.20 report similar findings in a comprehensive analysis of trauma, in which falls occurred with greater frequency among children and elderly individuals, whereas acts of interpersonal violence constituted the main cause of occurrences among individuals aged from 15 to 50 years.

Kotech et al.21 also found that the majority cases of facial trauma in children stemmed from falls, with soft tissue injuries the most common and cases of interpersonal violence less common. Likewise, in a series of 793 cases of facial fractures in children, Mericli et al.22 found that 98 cases

Table 5 Distribution of age groups according to site of injury; Campina Grande, Brazil, 2012 (n = 247).

| Variable | Intraoral region | Mandible, maxilla, zygomatic arch | Nasal bones, periorbital region, brow | Others | Total |
|----------|------------------|----------------------------------|-------------------------------------|--------|-------|
| Age group | n   | %    | N   | %    | n   | %    | n   | %    | n   | %    |
| Children/adolescents (0 to 19 years) | 32 | 33.3 | 39 | 40.6 | 6 | 6.3 | 19 | 19.8 | 96 | 100 |
| Adults (20 to 59 years) | 22 | 18.3 | 56 | 46.7 | 18 | 15.0 | 24 | 20.0 | 120 | 100 |
| Elderly individuals (60 years or older) | 3 | 9.7 | 13 | 41.9 | 9 | 29.0 | 6 | 19.4 | 31 | 100 |

Fisher’s exact test: p = 0.007.
Source: Direct research, 2012.
stemmed from violent events, and 695 were due to other causes. Eggensperger et al.23 also found that falls were the most common cause of facial trauma, followed by traffic accidents and sports injuries. In contrast, a study carried out in Korea found that interpersonal violence was the most common cause of facial fractures in children.24 In a study on characteristics and trends of hospitalization due to head trauma among children carried out in China, while only 4.6% were cases of suspected child abuse, the authors stress the importance of recognizing such cases to gain a better understanding of the scope of this social/health problem.25

Falls constitute the most common etiologic agent of facial trauma among elderly individuals in a number of studies.26-28 This finding underscores the importance of preventive measures aimed at risk factors for falls, the majority of which occur in one’s own home. Although interpersonal violence accounts for less cases of facial trauma than falls in this age group, it is plausible to consider that women may have been exposed to violence and the consequences of such events throughout life. In a sample of 995 women aged 55 years or older, nearly half had had experience with some type of abuse and were more likely to report negative effects of trauma on health in comparison to women who had not suffered abuse.29

Soft tissue injuries were the most common type of facial trauma in the present investigation, accounting for 67.6% of cases, which is similar to findings reported in previous studies.11,19 The effects of such injuries include pain, numbness of the lips, chin and nose, difficulty opening one’s mouth, visible gap between dental crowns and deep lacerations over bones.1,9,11,12

Due to the physical and psychological impacts as well as the high healthcare costs related to facial trauma, the recognition of associations with gender and age underscores the need for specific measures aimed at addressing this problem. Oral and maxillofacial surgery plays an important role in the rehabilitation of trauma victims and the establishment of preventive measures for specific groups through the recognition of the underlying social implications of facial injuries.

Conclusion

Adult females were affected by facial trauma more than the other age groups studied, with a predominance of soft tissue injuries and injuries to the mandible, maxilla, zygomatic arch and nasal bones. Falls were the most prevalent cause of facial trauma and significantly associated with the youngest (children/adolescents) and oldest (elderly individuals) age groups.

Funding

This study was supported by Fundação de Apoio a Pesquisa do Estado da Paraíba (FAPESQ, Edital 02/2009 PPSUS) Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) (Edital MCT/CNPq No. 14/2010).

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Rodrigues FHOC, Miranda ES, Souza VEM, Castro VM, Oliveira DFR, Leão CGE. Avaliação do trauma bucomaxilofacial no Hospital Maria Amélia Lins da Fundação Hospitalar do Estado de Minas Gerais. Rev Soc Bras Cir Plást. 2006;21:211-6.
2. Scarlott R, Oliveira IA, Passeri LA, Rebelatto NLB, Müller PR. Maxillofacial injuries in a group of Brazilian subjects under 18 years of age. Appl Oral Sci. 2009;17:195-8.
3. Makenzie EJ. Epidemiology of injuries: current trends and future challenges. Epidemiol Rev. 2000;22:112-9.
4. Macedo JLS, Camargo LM, Almeida PF, Rosa SC. Perfil epidemiológico do trauma de face dos pacientes atendidos no pronto socorro de um hospital público. Rev Col Bras Cir. 2008;35:9-13.
5. Oliveira CMCs, Santos JS, Brasilino BF, Santos TS. Epidemiologia dos traumatismos buco-maxil-faciais por agressões em Aracaju/SE. Rev Cir Traumatol Buco-Maxilo-Fac. 2008;8:57-68.
6. O’Meara C, Witherspoon R, Hapangama N, Hyam DM. Alcohol and interpersonal violence may increase the severity of facial fracture. Br J Oral Maxillofac Surg. 2012;50:36-40.
7. Wulkan M, Parreira JRJG, Botter DA. Epidemiologia do trauma facial. Rev Assoc Med Bras. 2005;51:290-5.
8. Adeodato VG, Carvalho RR, Siqueira VR, Souza FG. Quality of life and depression in women abused by their partners. Rev Saude Publica. 2009;39:108-13.
9. Cavalcanti AV, Cavalcante JR, Cavalcanti AL. Fraturas faciais em pacientes atendidos no Hospital Antônio Targino – PB. RFO UFPI. 2004;9:52-6.
10. Brasil. Instituto Brasileiro de Geografia e Estatística. Censo demográfico 2009. 2010. [accessed 2012 Feb. 8]. Available at: http://www.ibge.gov.br
11. Silva CJP, Ferreira EF, Pacheco LPP, Drummond MN, Gomes VE. Perfil dos traumatismos maxilofaciais em vítimas de violência interpessoal: uma análise retrospectiva dos casos registrados em um hospital público de Belo Horizonte (MG). Cad Saude Colet. 2011;19:33-40.
12. Cavalcante JR, Guimarães KB, Vasconcelos BCE, Vasconcelos RGH. Estudo epidemiológico dos pacientes atendidos com trauma de face no Hospital Antônio Targino – Campina Grande/Paraíba. Braz J Otorhinolaryngol. 2009;75:628-33.
13. Hashemi HM, Beshkar M. The prevalence of maxillofacial fractures due to domestic violence – a retrospective study in a hospital in Tehran, Iran. Dent Traumatol. 2011;27:385-9.
14. Lopes AL, Rangel CLG, Paiva KG, Camara THQ, Ferreira MAF. Prevalência dos Traumas Buco-faciais em Pacientes Atendidos no Hospital Walfredo Gurgel (Natal-Rio Grande do Norte). Rev Cir Traumatol Buco-Maxilo-Fac. 2011;11:123-30.
15. Bruschi A, Paula CS, Bordin IAS. Prevalência e procura de ajuda na violência conjugal física ao longo da vida. Rev Saude Pública. 2006;40:256-64.
16. Zaúlar A. Agressão física e gênero na cidade do Rio de Janeiro. Rev Soc Bras Hist Ciênc. 2009;24:9-24.
17. Brasil. Presidência da República do Brasil. Casa Civil. Subchefia para Assuntos Jurídicos. Lei Federal no 10.788, de 24 de novembro de 2003. Estabelece a notificação compulsória, no território nacional, do caso de violência contra a mulher que for atendida em serviços de saúde públicos ou privados. [acesso em 2013 Jan 15]. Disponível em: http://www.planalto.gov.br/ccivil_03/leis/2003/10.788.htm
18. Gassner R, Tuli T, Hachl O, Rudisch A, Ulmer H. Cranio-maxillofacial trauma: a 10 year review of 9,543 cases with 21,067 injuries. J Cranio-maxillofac Surg. 2003;31:51-61.
19. Gerber B, Ahmad N, Parmar S. Trends in maxillofacial injuries in women, 2000-2004. Br J Oral Maxillofac Surg. 2009;47:374-7.
20. Hussain K, Wijetunge DB, Grubnic S, Jackson IT. A comprehensive analysis of craniofacial trauma. J Maxillofac Trauma. 1994;36:34-47.
21. 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. Br J Oral Maxillofac Surg. 2008;46:293-6.
22. Mericli AF, DeCesare GE, Zuckerbraun NS, Kurland KS, Grunwaldt L, Vecchione L, et al. Pediatric craniofacial fractures due to violence: comparing violent and nonviolent mechanisms of injury. J Craniofac Surg. 2011;22:1342-7.
23. Eggensperger Wymann NM, Hölzle A, Zachariou Z, Lizuka T. Pediatric craniofacial trauma. Br J Oral Maxillofac Surg. 2008;66:58-64.
24. Kim SH, Lee SH, Cho PD. Analysis of 809 facial bone fractures in a pediatric and adolescent population. Arch Plast Surg. 2012;39:606-11.
25. Xia X, Xiang J, Shao J, Smith GA, Yu C, Zhu H, et al. Characteristics and Trends of Hospitalized Pediatric Abuse Head Trauma in Wuhan, China: 2002-2011. Int J Environ Res Public Health. 2012;9:4187-96.
26. Yamamoto K, Matsusue Y, Murakami K, Horita S, Sugura T, Kirita T. Maxillofacial fractures in older patients. Br J Oral Maxillofac Surg. 2011;69:2204-10.
27. Thomson WM, Stephenson S, Kieser JA, Langley JD. Dental and maxillofacial injuries among older New Zealanders during the 1990s. Int J Oral Maxillofac Surg. 2003;32:201-5.
28. Al-Qamachi LH, Laverick S, Jones DC. A clinico-demographic analysis of maxillofacial trauma in the elderly. Gerodontology. 2012;29:147-9.
29. Fisher BS, Zink T, Regan SL. Abuses against older women: prevalence and health effects. J Interpers Violence. 2011;26:254-68.