Oral and maxillofacial injuries in preschool children: a study in a hospital in southern Brazil

Lesões orais e maxilofaciais em crianças pré-escolares: estudo em um hospital do sul do Brasil

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Abstract

Objective: Oral and maxillofacial (OMF) injuries in children may lead to developmental and functional disorders. In this cross-sectional study, we analyzed the pattern of OMF injuries in preschool children admitted to the emergency department of a hospital in southern Brazil. Subjects and method: We retrospectively reviewed the medical records of 1,533 patients admitted from January to December 2011 to identify children aged 0 to 5 years with a diagnosis of OMF trauma. Data were collected on demographic, seasonal and clinical variables. Results: The sample consisted of 288 preschool children (aged 0-5 years) with OMF injuries. Of these, 61.1% were male and 53.2% were <3 years of age. Most children (84.8%) received first medical care from an dentist. Isolated facial injuries were the most common type of injury (85.1%) in this age group. Soft tissue injuries were the most common injury outcome (77.9%), occurring mainly in the nose and lips. Random accidents were the most common cause of OMF trauma (87.7%), and injuries due to falls occurred in 85.9% of these cases. The most common dental trauma was tooth displacement (69.6%). Conclusion: In conclusion, our findings indicate a higher prevalence of OMF injuries in soft tissues, especially in boys in the first three years of life. Falls were the leading cause of injury. Information related to OMF injuries in children are essential for the control of accidents and development of public health policies.

Keywords: Facial injuries; emergency medical services; descriptive epidemiology.

Introduction

Facial injuries due to accidents or interpersonal violence are a serious public health problem in early childhood¹. After the first year of life, facial trauma is the leading cause of hospitalization and death². The prevalence of oral and maxillofacial (OMF) injuries in preschool children ranges from 8.9 to 48.1%³⁻¹⁰. Also, an important consideration is the vulnerability of this age group to accidental trauma, as even minor injuries may lead to developmental, functional and psychological disorders^{9,11}.

Home falls and accidents are the most common cause of OMF injuries in children, while motor vehicle accidents, sports and interpersonal violence account for most injuries in older individuals¹⁰. Environmental, cultural and social factors, however, contribute to the incidence, etiology and site of injury^{12,13}. Traumatic dental injuries and soft tissue injuries are the most common type of injury in children and adolescents^{4,10,14}. Anatomical features such as increased bone elasticity, decreased thickness of the soft tissue covering the facial skeleton and lack of development and pneumatization of the paranasal sinuses contribute to reducing the frequency of facial fractures in this age group^{4,15}.

Epidemiological studies are essential for the development of emergency protocols and implementation of public policies to prevent and reduce OMF injuries and their effects. However, studies addressing facial trauma and associated factors in

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children are scarce^{8,10,11,16}. Therefore, the objective of the current study was to analyze the pattern of OMF injuries in preschool children admitted to the emergency department (ED) of a hospital in southern Brazil, considering demographic, seasonal and clinical variables. Also etiology, affected soft tissue injury, bone fractures, and traumatic dental injuries were investigated.

Subjects and method

Study Setting

The study was conducted in the ED of Hospital de Pronto Socorro, a hospital-based that provides emergency care to adults and children in the city of Canoas, southern Brazil. The city has a population of approximately 324,000 and primary care is provided in 24 community health centers. The hospital's ED operates 24 hours a day and triage procedures are used to prioritize the need for medical care based on risk assessment, i.e., the most severe cases are given priority. In addition, the Advanced Trauma Life Support (ATLS) protocol, developed by the American College of Surgeons, is used in the management of acute trauma cases at the hospital¹⁷.

Participants and Study Design

This was a cross-sectional study with retrospective medical record review of all patients admitted to the ED between January 1 and December 31, 2011. Eligible participants were all children aged 0 to 5 years who had a diagnosis of OMF trauma.

Data Collection

All data were extracted by a single investigator, previously trained by an experienced researcher, using a standardized data collection form for each patient. The following data were collected from the patients' medical records: demographic variables (sex and age); seasonal variables (month, day of week, and time of arrival in the ED); clinical variables (health professional who provided the first medical care in the ED, type of injury, injury outcome, and clinical outcome); etiology of injury; affected soft tissue injury, bone fractures and traumatic dental injuries.

Data Analysis

We did not exclude incomplete medical records but rather used the information provided in the analysis. To address this issue, we indicated the number of patients for each variable analyzed. Data were expressed as absolute and relative frequencies. Data analysis was performed using SPSS, version 13.0.

Ethical Considerations

The study was approved by the Research Ethics Committee of the institution (protocol number 170,173) and conducted in accordance with the provisions of the Declaration of Helsinki. Informed consent was waived due to the non-interventional design of the study and retrospective nature of data collection.

Results

A total of 1,533 patients were admitted to the ED from January to December 2011. Of these, 288(18.8%) were preschool children (aged 0 to 5 years) with a diagnosis of OMF trauma and were included in the analysis. Because of incomplete data recording, different patient numbers are presented for some variables.

The demographic, seasonal, and clinical features of the patients are shown in Table 1. Most patients (61.1%) were male, and 53.2% were <3 years of age. ED visits occurred more frequently in the months of June (12.5%) and July (11.8%), during the afternoon (37.2%) and evening/night (42.0%), and on weekends (38.6%). Isolated facial injuries were the most common type of injury in this age group, accounting for 85.1% of ED visits. Soft tissue injuries were the most common injury outcome, accounting for 77.9% of cases. Transfers and hospitalizations accounted for only 2.1% of clinical outcomes. Most children (84.8%) received first medical care from an dentist.

Table 1 – Demographic, seasonal, and clinical features of pediatric patients with oral and maxillofacial injuries admitted to the emergency department of a hospital in southern Brazil

	N (patients)*	n (%)
Demographic variables	200	
Sex	288	176 (61 1)
Male		176 (61.1)
Female	200	112 (38.9)
Age (months)	288	25 (0.7)
0-11		25 (8.7) 71 (24.7)
12-23 24-35		57 (19.8)
36-47		41 (14.2)
48-59		39 (13.5)
60-71		55 (19.1)
		33 (13.1)
Seasonal variables Visits/Month	288	
•	200	10 (2 E)
January February		10 (3.5) 29 (10.1)
March		24 (8.3)
April		24 (8.3)
May		29 (10.1)
June		36 (12.5)
July		34 (11.8)
August		27 (9.4)
September		27 (9.4)
October		16 (5.6)
November		09 (3.1)
December		23 (8.0)
Visits/Week	288	25 (6.6)
Sunday		50 (17.4)
Monday		31 (10.8)
Tuesday		41 (14.2)
Wednesday		30 (10.4)
Thursday		41 (14.2)
Friday		34 (11.8)
Saturday		61 (21.2)
Visits/Time	274	
1 – 6 a.m. (early morning)		21 (7.7)
7 a.m. – 12 p.m. (morning)		36 (13.1)
1-6 p.m. (afternoon)		102 (37.2)
7 p.m. – 12 a.m. (evening/night)		115 (42.0)
Clinical variables		
First medical care	231	
Dentist		123 (53.2)
Both		73 (31.6)
Physician		35 (15.2)
Type of injury	288	
Isolated facial trauma		245 (85.1)
Facial trauma and TBI		35 (12.2)
Multiple trauma		08 (2.8)
Injury outcome	285	
Soft tissue injuries		222 (77.9)
Associated injuries		44 (15.4)
Bone fractures		04 (1.4)
Traumatic Dental Injury		15 (5.3)
Clinical outcome	233	
Resolutive		228 (97.9)
Transfer and/or hospitalization BI = traumatic brain injury.		05 (2.1)

TBI = traumatic brain injury.

Data associated with the etiology of OMF injuries are shown in Table 2. Random accidents were the most common cause of OMF trauma, accounting for 177 cases (87.7%); of these, 152 (85.9%) were associated with falls. Traffic accidents accounted for 10.8% of OMF injuries, most of which were bicycle-related (56.3%). Only 2 injuries (1.5%) were caused by interpersonal violence.

Table 2 – Etiology of oral and maxillofacial injuries in pediatric patients admitted to the emergency department of a hospital in southern Brazil

	N (%)	n (%)
Random accidents	177 (87.7)	
Falls		152 (85.9)
Other		14 (7.9)
Animal bite		08 (4.5)
Human bite		03 (1.7)
Traffic accidents	16 (10.8)	
Bicycle		09 (56.3)
Motor vehicle		05 (31.3)
Being run over		02 (12.5)
Interpersonal violence	2 (1.5)	
Physical aggression		01 (50.0)
Knives		01 (50.0)

The most common sites of soft tissue injury were the nose (27.4%) and lips (27.0%). Nasal bone injuries accounted for 75.9% of all bone fractures. The most common dental trauma was tooth displacement (69.6%), including luxation, intrusion and extrusion, followed by avulsion (13.0%), associated tooth injuries (8.7%), crown fracture (6.5%), and dentoalveolar fractures (2.2%) (Table 3).

Table 3 – Soft tissue injuries, bone fractures and traumatic dental injury in pediatric patients admitted to the emergency department of a hospital in southern Brazil

	Ν	n (%)
Soft tissue injuries		
Site – region	215	
Nasal		59 (27.4)
Labial		58 (27.0)
Associated injuries		34 (15.8)
Periorbital		18 (8.4)
Chin		18 (8.4)
Intraoral		15 (7.0)
Frontal		13 (6.0)
Bone fractures		
Site – region	54	
Nasal		41 (75.9)
Periorbital		04 (7.4)
Zygomatic complex		03 (5.6)
Mandibular		02 (3.7)
Alveolar		01 (1.9)
Maxillary		01 (1.9)
Frontal		01 (1.9)
Associated injuries		01 (1.9)
Traumatic dental injury	46	
Tooth displacement		32 (69.6)
Avulsion		06 (13.0)
Associated injuries		04 (8.7)
Crown fracture		03 (6.5)
Dentoalveolar fractures		01 (2.2)

^{*} Because of incomplete data recording, different patient numbers are presented for different variables.

Discussion

The present study showed a high prevalence of OMF injuries in preschool children admitted to the ED of a hospital in southern Brazil. Most were an isolated facial trauma due to falls in boys and main outcomes were related to soft tissue injuries. In addition, 85% of cases of OMF injuries were resolutive and dentist attended in the most cases.

The higher frequency of OMF injuries in boys is consistent with studies in different countries and different age groups^{4,5,10,11,18-20}. A possible explanation for the difference between boys and girls is that boys may be more hyperactive and more frequently participate in contact sports and outdoor activities than girls even in preschool age^{5,11,21}.

Most cases of OMF trauma among preschoolers occurred in the first three years of life and were mostly due to falls. In this young age group, children are learning to walk, but their motor skills are still immature. Moreover, the large size of the head relative to the body contributes to falling forward and they become more prone to facial injuries [5,10,11]. In older children and adolescents, injuries are often associated with traffic accidents, interpersonal violence, and contact sports^{4,5,10}.

Seasonal data are rarely described in epidemiological studies and are dependent on the urban dynamics of the area of data collection. Although no significant differences were observed in seasonal variables, ED visits occurred more frequently in the afternoons and evenings, especially on weekends. Childhood is characterized by vulnerability and dependence, and the parents or caregivers hold the responsibility for safety and accident prevention; therefore, simple carelessness can cause accidents²².

Isolated facial injuries were the most common type of injury, followed by facial trauma associated with brain injury. Regarding injury outcome, soft tissue injuries were more prevalent and identified most frequently in the nose and lips, a finding consistent with observations in the literature^{4,5,10,11}. The prevalence of traumatic dental injuries and bone fractures was low in the present study. When present, fractures involved more often the nasal, periorbital and zygomatic bones, while dental trauma included mostly tooth displacement and avulsion.

Gassner et al., $(2004)^5$ and Rahman et al., $(2007)^{10}$ reported that soft tissue injuries and traumatic dental injury are more common in the first years of life. Yang et al., $(2014)^{11}$ reported that soft tissues of the lower face are most commonly affected, especially in the lip region, due to the prominence of the mandible in the facial skeleton. Kotecha et al., $(2008)^5$ and Haug et al., $(2000)^{20}$ pointed out that facial fractures often involve the nasal, orbital and zygomatic bones, and that nasal fractures predominate because of the prominence of the nose

and its highly cartilaginous structure in the early years of development.

The dentists in the hospital team is important to the delivery of better oral health care to patients and to the provision of comprehensive oral health care services for the population. According to Silva et al., $(2011)^{23}$, of the organization of hospital services, emergency dental services and OMF surgery should be handled in the same unit and by the same team. In the present study, in approximately 85% of OMF injury cases, children received first medical care from an dentist. It is worth highlighting the importance of the presence of dentist in the hospital setting and of policies to develop interdisciplinary team competencies aiming to improve the relationship with patients and their families²⁴.

The limitations of this study are related to its retrospective and cross-sectional design, which precludes inferences regarding causality. Therefore, our results should be interpreted with caution. In addition, we believe that longitudinal studies should be performed and patients should be monitored for sequelae of the injury.

The impact of accidental injury or violence-related injuries is directly related to the inherent vulne-rability of children during growth and development. Thus, epidemiological studies involving different age groups should be encouraged as they can contribute to the planning of public policies focused on the prevention and treatment of OMF injuries. Information generated from health systems is therefore essential for improving and updating protocols for clinical care.

Conclusion

The results of the present study indicate a high prevalence of OMF injuries in early childhood. Falls were the leading cause of injury, and the main injury outcome was soft tissue injuries in the nose and lips. The effective treatment of OMF injuries and involvement of the dentist characterized most clinical outcomes, highlighting the value of interdisciplinary actions in the context of health care.

Resumo

Objetivo: lesões orais e maxilofaciais (OMF) em crianças podem levar a inúmeros distúrbios funcionais e do desenvolvimento. Este estudo transversal analizou o padrão das lesões OMF em crianças pré-escolares atendidas no departamento de emergência de um hospital do sul do Brasil. Sujeitos e métodos: Foram analizados 1533 registros médicos dos pacientes atendidos de Janeiro a Dezembro de 2011 para selecionar crianças de 0 a 5 anos de idade com diagnóstico de lesões OMF. Resultados: A amostra é composta por 288 crianças pré-escolares (com idade variando de 0 a 5 anos) com lesões OMF. Observou-se que 61.1% eram meninos e 53.2% eram menores de 3 anos de idade. A maior

parte das crianças (84.8%) recebeu o primerio atendimento de um dentista. Lesões facias isoladas foram o tipo de injúria mais comum (85.1%) nesta faixa etária. O principal desfecho clínico foi a presença de lesões de tecidos moles (77.9%), afetando principalmente nariz e lábios. Acidentes casuais foram a principal causa de traumas OMF (87.7%) e as injúrias ocasionadas por quedas ocorreram em 85.9% destes casos. Os traumatismos dentários mais comuns foram as luxações dentárias (69.6%). Conclusão: Os achados indicam uma alta prevalência de lesões OMF em tecidos moles, especialmente em meninos, nos primeiros três anos de vida. A queda foi a principal causa dessas injúrias. A obtenção de informações relacionadas as lesões OMF em crianças possibilita o controle de acidentes e o desenvolvimento de políticas públicas voltadas a esse tipo de injúrias nesse estrato populacional.

Palavras-chave: lesões faciais; serviços médicos de emergência; epidemiologia descritiva.

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