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Original Article

# Epidemiology of facial fractures in the elderly

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## ARTICLE INFO

## Article history:

Received 31 October 2017

Accepted 5 March 2018

Available online 27 March 2018

## Keywords:

Elderly individuals

Fractures

Face

Epidemiology

## ABSTRACT

Facial fractures are considered more common in young individuals. However, they are also increasing in the aging population. Investigation of the characteristics of such fractures is important so as to be able to devise preventive measures and specifications for their proper treatment. We carried out a descriptive retrospective epidemiological study. The information was taken from a database of medical files of patients over 65 years of age in the setting of the emergency ward. Patient information was included for 157 patients aged 65 to 100 years. Two-thirds of the individuals with facial trauma were women. Twenty-eight had a prior history of cognitive impairment. For half of the cases, the trauma occurred at their place of residence, while accidents and falls in public areas were not uncommon. The most frequent site for the fractures was the middle third of the face. These facial fractures were serious in light of their location, as well as the associated skeletal and intracranial lesions. The number of such fractures can be expected to increase with time. Their hospital cost is higher than with younger individuals. Preventative measures need to be devised and the treatment should be all-encompassing.

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## Introduction

Maxillofacial traumatology is considered to be a pathology that is more common in young individuals.<sup>1–4</sup> However, as the population ages, fractures of the face are being seen more and more in elderly individuals.<sup>5–9</sup> The increase in the number of such fractures has been constant over the past

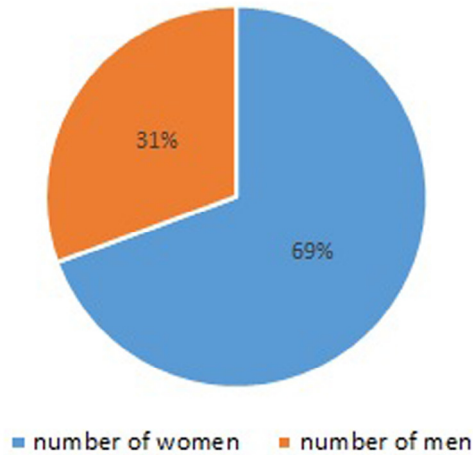
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<https://doi.org/10.1016/j.jpra.2018.03.002>

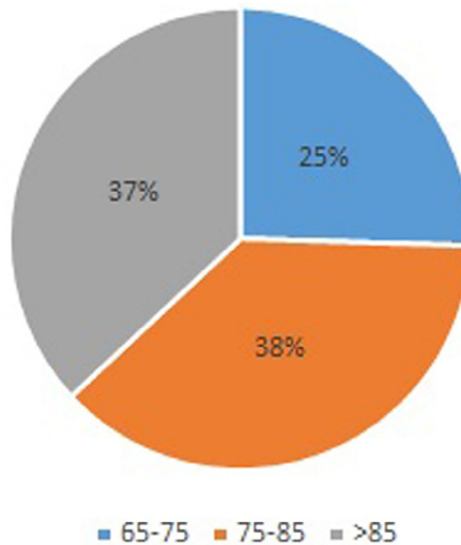
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30 years.<sup>9</sup> This may be because the increase in life expectancy has been accompanied by more active physical and social lifestyles. Such physical and social activities can lead to facial trauma, as well as falls due to precarious health.

In 2030, the elderly individuals are estimated to account for 20% of the population in the United States of America, which will probably also be the case for most other developed countries,<sup>9</sup> thereby posing an increasingly pressing public health issue.



**Figure 1.** Distribution based on gender. Sixty-nine percent of patients were women; 31% were men. N = 157.



**Figure 2.** Distribution by age group. Thirty-eight percent of patients were between 75 and 85 years of age; 37% were between 65 and 75; and 25% were older than 85. N = 157.

Osteoporosis delays the consolidation of fractures. Such patients require more care, and the cost relating to these traumas is higher than for younger individuals. Moreover, the prevention of such fractures requires proper knowledge of their characteristics.

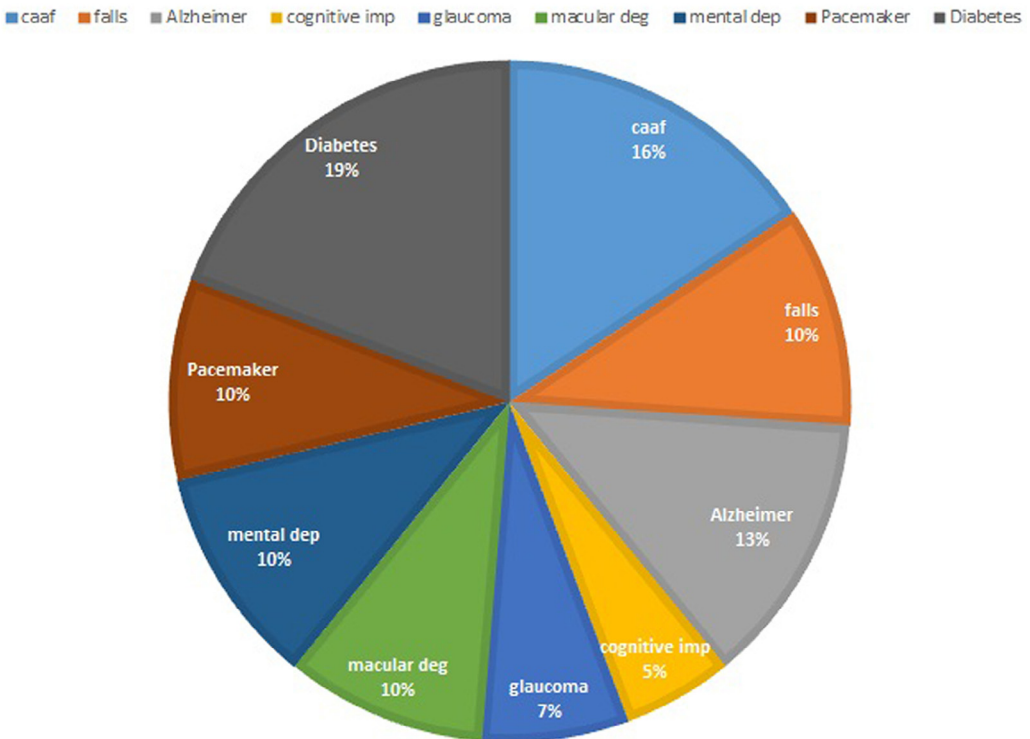
The studies performed to date have at times provided discordant results in regard to the frequency of the various types of maxillofacial fractures in elderly individuals. Hence, the aim of our study was to determine the characteristic epidemiological features of facial fractures in an elderly population.

## Patients and methods

We carried out a descriptive retrospective epidemiological study. Patient information was obtained from a database derived from medical files of patients aged over 65 years who presented to the emergency ward of the Intercommunal Hospital Center of Villeneuve-Saint-Georges between January 1, 2014 and April 30, 2017, and who had at least one radiologically proven fracture of a facial bone.

A total of 157 patients aged between 65 and 100 years fit the inclusion criteria and their information was included in this study. The studied variables were age; gender; prior medical history; lifestyle; the type of accident; time of the first medical consultation; types of fracture: nose, floor of the orbit, orbitozygomatic, lower jaw, maxillary sinus, upper jaw, etc.; site of the accident; and associated lesions.

The study was conducted according to the Declaration of Helsinki's "Ethical Principles for Medical Research Involving Human Subjects" and was approved by the local ethical committee.



**Figure 3.** Medical history. Patients' relevant medical history are detailed, including diabetes, cardiac arrhythmias by auricular fibrillation (caaf), Alzheimer's, cognitive impairment, glaucoma, and others. N = 142.

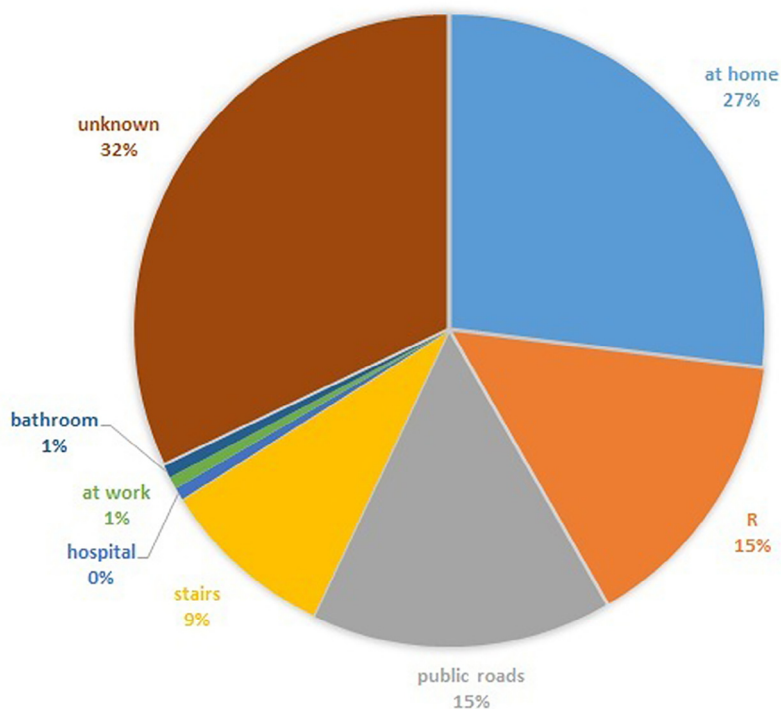
## Results

The study cohort included 157 patients, 31% were men, and 69% were women (Figure 1). Of these, 25% were aged 65 to 75 years, 38% were 75 to 85 years, and 37% were over 85 years of age (Figure 2).

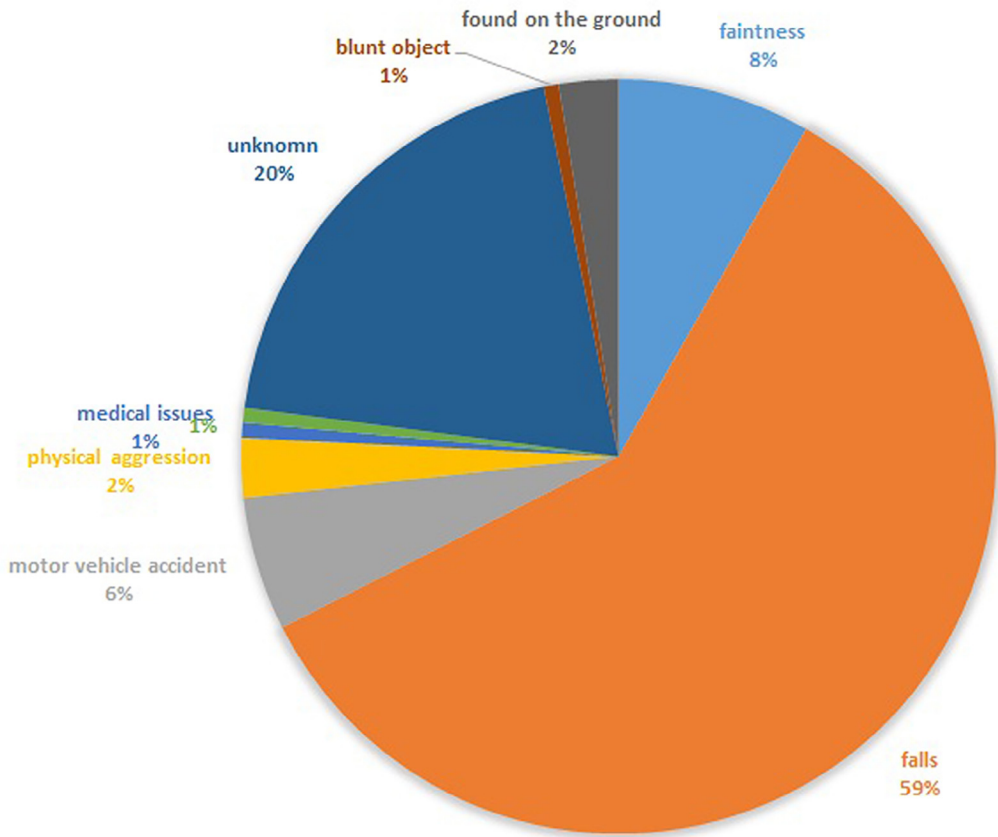
According to prior history (Figure 3), 142 (90.5%) had a medical history while 15 subjects (0.95%) did not have any prior medical history. We noted cognitive impairments in 40 of the patients with a prior history (28%), cardiac arrhythmias by auricular fibrillation in 23 patients (16%), age-linked macular degeneration in 14 patients (10%), and glaucoma in 10 patients (7%).

According to the site of the fall (Figure 4), in 50 patient files (32%), the site of the fall was not mentioned; in 42 files (27%), the fall took place at home; in 23 files (15%), the fall took place at a retirement home; in 23 files (15%), the fall occurred at the street; in 14 files (9%), the fall took place on a set of stairs without providing other details (e.g. at home, retirement home, in public, etc.); in 2 files (1%), the fall took place in a bathroom; in 2 files (1%), the fall took place at work; and in 1 case (<1%), the fall took place in a hospital.

For the circumstances of the fall (Figure 5), the circumstances were not mentioned in 20% of the files, a fall on a blunt object was the cause in 1% of the files, the subject was found on the ground in 2% of the files, the patient suffered a mechanical fall in 59% of the files, the patient suffered a motor vehicle accident on a public road in 6% of the files (drivers), the fall was a result of physical aggression in 2% of the files, the fall was a result of feeling faint in 8% of the cases, the fall was a result of other medical issues in 1% of the cases, and the fall was a result of an accident at work in 1% of the cases.



**Figure 4.** Site of the fall. Twenty-seven percent of falls occurred at home; 15 percent occurred at a retirement home (R); 15% occurred on public roads; 9% occurred on stairs; 1% occurred in bathrooms; < 1% occurred in a hospital; and 32% occurred in unknown locations, N=157.

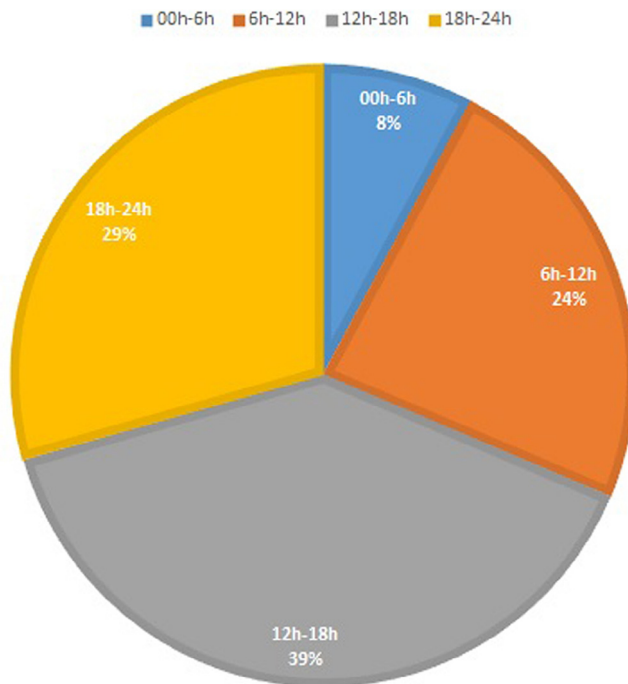


**Figure 5.** Circumstances of the fall. Fifty-nine percent of falls were mechanical falls; 8% occurred due to tiredness; 6% occurred due to a motor vehicle accident; 2% occurred due to physical aggression; 2% of patients were found on the ground; 1% was due to other medical issues; 1% was due to blunt objects; 1% was due to work-related causes (in green); and 20% were due to unknown causes. N = 157.

The time of admission to the emergency ward was recorded in 153 files for the 157 patients (Figure 6). Twelve admissions were made between 12:00 a.m. and 06:00 a.m., 36 admissions were made between 06:00 a.m. and 12:00 p.m., 60 admissions were made between 12:00 p.m. and 6:00 p.m., and 45 admissions were made between 6:00 p.m. and 12:00 a.m.

According to the types of fracture (Figure 7), fractures of the nasal bone represented 32% of the fractures; fractures of the jawbone represented 7% of the fractures; fractures of the eye socket, the zygoma, the zygomatic arch, and the upper jaw represented 60% of the fractures; Le Fort type craniofacial disjunctions amounted to 1% of the fractures.

Patients with associated lesions (Figure 8) had sores in 73% of the cases; intracranial lesions in 12% of the cases: cerebral frontal petechia (2%), intracerebral hematomas (5%), and meningeal hemorrhages in 5% of the cases; fractures of the humerus (9%), or of the radius (2%); and shoulder dislocations in 2% of the cases.



**Figure 6.** Time of admission. Thirty-nine percent of patients were admitted between 12:00 p.m. and 6:00 p.m.; 29% were admitted between 6:00 p.m. and 12:00 a.m.; 24% were admitted between 6:00 a.m. and 12:00 p.m.; and 8% were admitted between 12:00 a.m. and 6:00 a.m. N = 153.

## Discussion

In this study, maxillofacial fractures in elderly individuals tend to be fractures of the middle third of the face, they occurred more often in women, and they tend to occur at their place of residence. Retirement homes and the patient's own home were cited equally, at 15%, as the site of the fall.

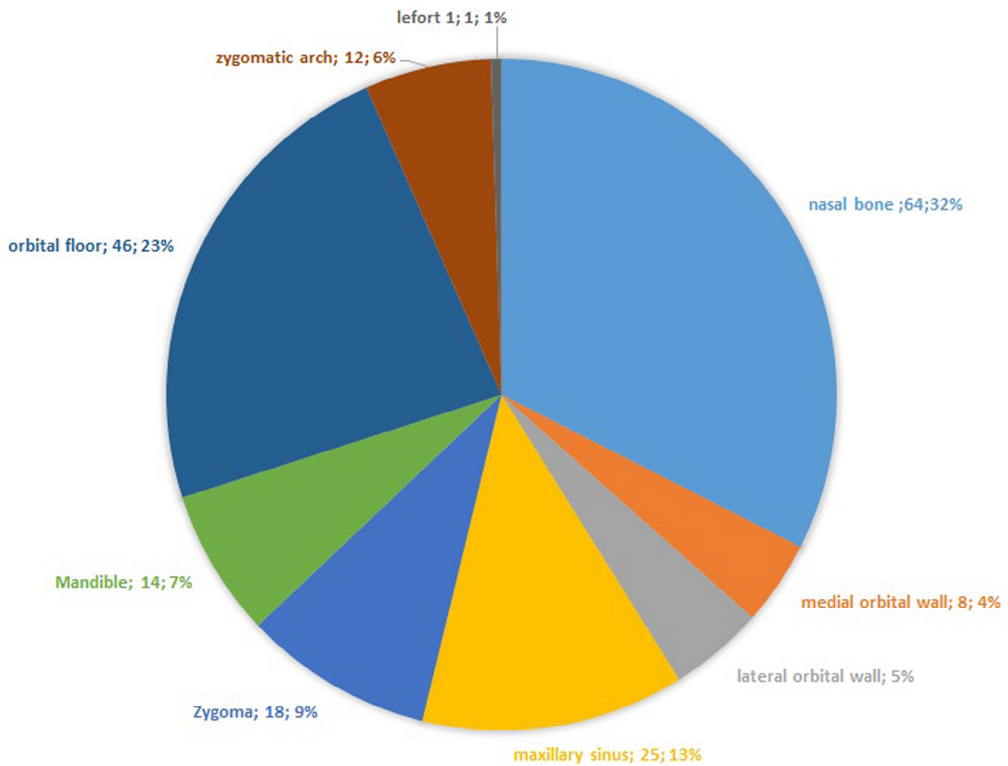
Facial fractures in elderly subjects have been reported to account for 11% of all facial fractures.<sup>9</sup> The fractures were caused by falls, and the stairs were the only site at their accommodation to attract sufficient attention to be specified. Cases involving feeling faint, physical aggression, or road accidents were also noted.

Unlike what is seen with young individuals, physical aggression and road accidents (8%) were not a predominant etiology.<sup>1-4</sup>

In 60% of the cases, the patients were admitted to the emergency ward between 12:00 p.m. and 6:00 p.m., and in 12% between 12:00 a.m. and 06:00 a.m. It was hard for us to specify the time that lapsed between the fall and the time the treatment was given and admission in the emergency ward took place. We are contemplating doing a prospective study to accurately determine this delay.

The predominant involvement of women and falls sets these fractures apart from fractures in young individuals. While there were cases involving road accidents and physical aggression, these were relatively uncommon. The predominance of facial fractures in women in our study may be due to the fact that they represent a larger proportion of the elderly population. Elements that are conducive to falls such as osteoporosis, decreased coordination of movements, and reduced muscle strength predispose to falls and fractures. This female predominance has also been found in other studies.<sup>5,9</sup>

Facial fractures are caused by multiple factors,<sup>6</sup> although falls were the main cause<sup>5-9</sup> in individuals aged over 65 years.<sup>3</sup> Our study confirmed that the epidemiology of facial fractures varies with age.



**Figure 7.** Types of fracture. Nasal bone fractures represented 32% of fractures; jawbone (mandible) fractures represented 7%; fractures of the eye socket, the zygoma, the zygomatic arch, and the upper jaw represented 60% of the fractures; Le Fort type craniofacial represented 1% of the fractures. N = 157.

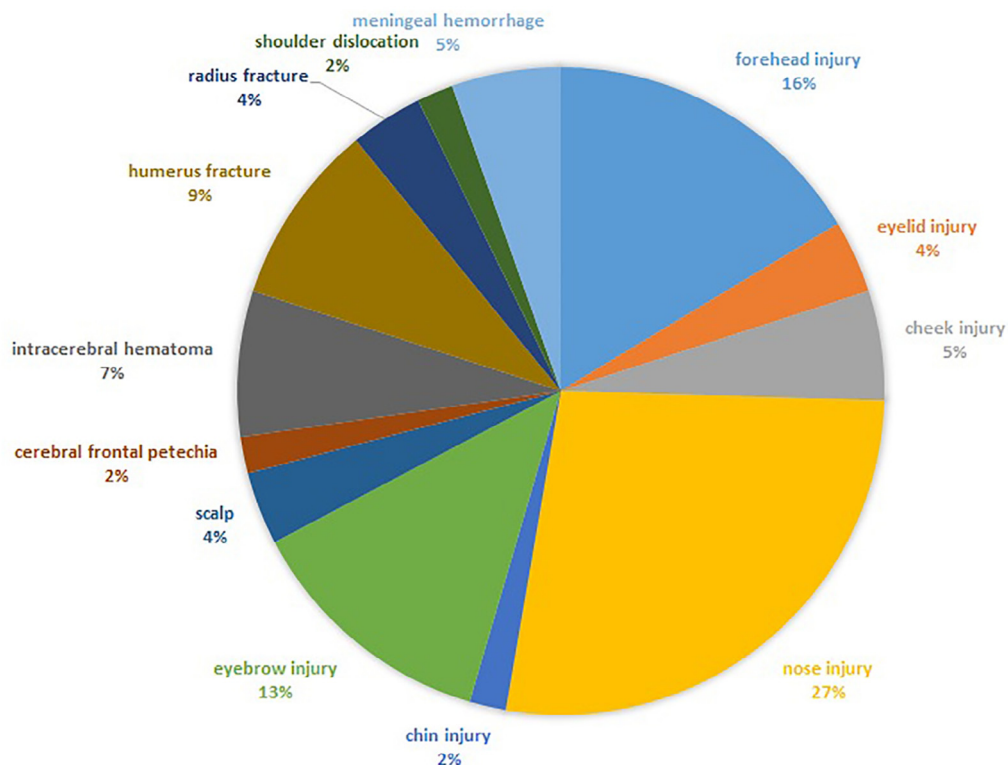
In our study, the fractures occurred mainly in women,<sup>3</sup> while other studies have shown a progressive increase in the proportion of women, becoming the majority from 85 years of age onward. However, some studies have shown a male predominance.<sup>9</sup>

In light of the increasing number of elderly individuals, preventative measures need to include making arrangements at the sites of residence that are aimed at avoiding items that can lead to falls (e.g. carpets, slick surfaces, electrical cords, etc.). As reported in most studies,<sup>5–9</sup> for the reasons outlined above, falls are the main cause of these fractures. Motor impairments and sensory deficits are contributing factors. Preventative measures should therefore be aimed at precluding falls from occurring. The refurbishment of the living quarters needs to occur in conjunction with a regular reevaluation of the treatments as well as regular and tailored assistance. Some patients had been driving a motor vehicle, and hence the need for regular health checks and advice regarding the habits of elderly individuals.

As reported in most studies,<sup>7–9</sup> fractures of the middle third of the face were the most common, while fractures of the lower jaw were relatively uncommon for this population.<sup>7</sup> Orbital fractures in patients on anticoagulants presented a risk of retrobulbar hematoma.<sup>8</sup> As in other studies,<sup>3</sup> in our study, fractures of the lower jaw represented 7% of all facial fractures in elderly individuals. Although a multivariate analysis does not allow the force delivered by the fall to be evaluated,<sup>9</sup> the mechanism of the fall and the relatively frequent involvement of the middle third of the face would explain this site of fractures in elderly subjects. Fractures of the lower jaw are less frequent in young individuals.

The associated lesions increased the morbidity and could become life-threatening. Bone lesions aside from the face occurred in 20% of the cases and intracranial lesions in 12% of the cases. The cost





**Figure 8.** Associated lesions. Associated lesions included sores in 73% of cases; intracranial lesions in 12% of the cases; cerebral frontal petechia (2%), intracerebral hematomas (5%), and meningeal hemorrhages in 5% of the cases; fractures of the humerus (9%), or of the radius (2%); and shoulder dislocations in 2% of the cases.

of such fractures is high due to comorbidities and the length of the hospitalization.<sup>7,9</sup> Osteoporosis increases the time for consolidation.<sup>10</sup>

There has been an increase in the number of facial fractures in recent years<sup>8</sup> and this will become more pronounced in coming years.<sup>3,4,7,9</sup> Surgical indications in elderly subjects are less frequent than in young individuals. Despite the surgical abstention, the duration of hospital stays are longer than for young individuals due to comorbidities and complications.<sup>5–9</sup> Managing facial fractures hence requires providing elderly patients with broad-based surgical, medical, and social care.<sup>10</sup>

In order to properly address and prevent fractures in elderly individuals, several aspects need to be kept in mind. These include refurbishing of the accommodation, elimination of all factors that can lead to falls (e.g. prevention by installation of ramps, support bars, etc.), regular reevaluation of all of the indications for treatments, correction of impaired vision, and constant and sustained assistance.

Despite its retrospective nature, our study has allowed for a comprehensive presentation of the characteristics of facial fractures in elderly individuals and the associated lesions.

#### Conflict of interest

None.



## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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