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# Facial Fractures in the Elderly: Epidemiology and Outcome in 103 Patients

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**Abstract:** Facial fractures are a worldwide health problem as they constitute a potential cause of functional and morphological disabilities and death. In elder patients more than in the younger, facial fractures expose to difficulties of treatment and risks of unfavourable outcome due to limited physiological reserves, osteoporosis, frequent defective dental status and underlying medical conditions. The aim of this study was to analyse facial fractures' frequency, aetiologies, gender distribution and treatment outcome in elder patients at a referral hospital in Burkina Faso. The medical records of patients with facial fractures and who were 60 years of age at least, during a 13 year-period, were retrospectively analysed. All the patients had clinical and radiological evidence of facial fractures. Surgical treatment of the facial fracture was performed by plates and screw system or by a 0.5mm-diameter soft stainless steel wire internal fixation which was always combined with jaws immobilization in patients with occlusal fractures. Out of 2400 facial fractures patients, 103 (4.3%) were 60 years old or over. Patients' age ranged from 60 to 85 years and fractures' frequency decreased gradually with age. There were 107 males and 27 females (male to female ratio 3.9:1). The leading circumstance of trauma was road traffic crashes (87.3%) followed by far by interpersonal violence (7.8%). Nearly two third of facial fractures involved the midface with at first rank the zygomatic complex (45.7%) while mandibular fractures accounted for 29.1%. In 29 patients (28.1%), extra facial lesions were noted which consisted mostly in cranial trauma and limb fractures. There was a need of surgical treatment in 23 of the 103 patients (22.3%) but 7 patients (6.8%) declined this approach. Out of the 96 patients treated according to indication, 88 (91.6%) had an uneventful and satisfactory treatment outcome. Complications or unsatisfactory outcome comprised operative site infection, facial sensory disturbance, delayed bone union, diplopia, and temporomandibular joint dysfunction. The findings of this study command enforcement of road traffic security in Burkina Faso.

**Keywords:** Maxillofacial Trauma, Facial Fracture, Elderly

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## 1. Introduction

Trauma is a worldwide health problem as it constitutes a potential cause of functional and morphological disabilities and death [1]. Facial fractures are common given the anatomically exposed position of the face and the fragility of its bones. They may result in masticatory, respiratory and visual impairments and facial asymmetry. Furthermore, they may result in death mostly due to extra facial concomitant injuries such as those of the brain. In elder patients more than

in the younger, facial fractures expose to difficulties of treatment and risks of unfavourable outcome due to limited physiological reserves, osteoporosis, frequent defective dental status and underlying medical conditions. Like era, gender and geographic, socioeconomic, and cultural factors, age influences epidemiology of facial fractures [2, 3, 4]. In the literature, data on facial fractures in the elderly are mostly from the developed world where falls are classically reported as the leading aetiology [4]. Published data from developing countries particularly those of Africa are scarce whilst the World Health Organization (WHO) reports an increasing

proportion of aging individuals in the population with the increase of life expectancy [5]. This study aims to report the frequency, aetiologies, gender distribution and outcome of facial fractures in elder patients at a referral hospital in Burkina Faso. Such knowledge can assist for better treatment and prevention.

## 2. Methods

### 2.1. Study Design

This is a retrospective descriptive study carried out at CHU Sourou Sanou, a referral hospital of about 5 million inhabitants in Burkina Faso. The data collected included patient's age and gender, aetiology and type of the facial fracture, type of an eventual associated injury (AI), fracture treatment modality and outcome. AI referred to any extra facial injury excluding brain commotion and wounds i.e. intracranial, vascular, thoracic or abdominal organs injuries, fractures other than those of the face. Facial fracture surgical treatment was performed by plates and screw system or wire internal fixation. Wire fixation used a 0.5mm-diameter soft stainless steel wire and was always combined with jaws immobilization in mandibular or Le Fort fracture patients. Patients were checked for malocclusion after mandibular or Le Fort fracture treatment. Diplopia, enopthalmos and face asymmetry were checked after zygoma fractures treatment. All the patients were checked for face sensitive disturbance, operative site infection and delayed bone union. Delayed bone union referred to persistent mobility at the fracture site 8 weeks after the fracture treatment as defined by Leach J and Truelson J [6].

### 2.2. Inclusion Criteria

Were included in the study all patients of 60 years at least who had facial fractures with radiological evidence between 2005 and 2017.

## 3. Results

### 3.1. Patients' Characteristics

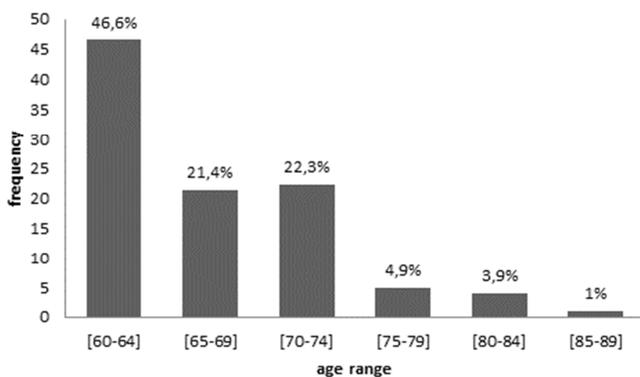


Figure 1. Patients' distribution according to age.

Out of 2400 facial fractures patients recorded during the

study period, 103 (4.3%) were 60 years old or over. Their age ranged from 60 to 85 years. A pic of frequency was noted between 60 and 64 years and the frequency decreased gradually (figure 1). More than two third of patients were of the 60-69 years age group and less than 10% of them were 75 years old or over. There were 82 (79.6%) males and 21 (20.4%) females, giving a male to female ratio of 3.9:1.

### 3.2. Facial Fractures Circumstances, Types and Associated Injuries

Facial fractures circumstances, types and associated injuries are given in table 1. The leading circumstance was road traffic crashes followed by far by interpersonal violence. Falls were noted in none of the patients. Nearly two third of the facial fractures involved the midface with mostly the zygomatic complex. Additionally to the facial fractures, 29 patients (28.1%) sustained 33 other corporeal lesions. These were predominantly cranial trauma followed by limb fractures.

Table 1. Facial fractures circumstances, types and associated injuries.

Fractures circumstance	n	%
Road traffic crashes	92	89.3
Interpersonal violence	8	7.8
Animals attack	2	1.9
House landslide	1	1
Total	103	100
Fracture type	n	%
Le Fort fracture	17	16.5
Zygomatic complex fracture	47	45.7
Mandibular fracture	30	29.1
Maxillary sagittal fracture	3	2.9
Dentoalveolar fracture	6	5.8
Total	103	100
Fracture AI	n	%
Spine injury	1	0.9
Brain injury	17	16.5
Limbs fracture	9	8.9
Superior eyelid ptosis	1	0.9
Eye ball rupture	1	0.9
Total	29	28.1

### 3.3. Fractures Treatment and its Outcome

For their facial fractures, 16 patients underwent surgical treatment, 35 had orthopedic treatment. In 52 patients, only antibiotics, analgic and an anti-inflammatory were given. Out of these, 37 had non-displaced or minimally displaced fractures of zygomatic complex, 8 had non displaced Le Fort fractures and 7 declined surgical treatment. In total, surgery was required in 22.3% (23/103) of the patients. Of the 96 patients treated according to indication, 88 (91.7%) had an uneventful and satisfactory treatment outcome defined as timely bone healing and restoration of morphology and functions. In the other patients, complications or unsatisfactory outcome occurred as listed in table 2. Operative site infection consisted in surgical wound infection after mandibular fracture osteosynthesis which resolved after antibiotics therapy. Sensory disturbance was cheek hypoesthesia in 1 zygoma fracture patient and anesthesia of

the lip and the chin after mandibular surgical treatment which improved respectively 3 and 6 months postoperatively. Delayed bone union occurred after a fracture of the mandible treated orthopedically. Diplopia occurred after zygomatic complex fracture treated by wire internal fixation.

**Table 2.** Complications and unsatisfactory outcome in 96 facial fractures patients' treatment.

Fracture treatment outcome	n	%
Operative site infection	2	2.1
Delayed bone union	1	1
Sensory disturbance	2	2.1
Diplopia	2	2.1
TMJ dysfunction	1	1
Total	8	8.3

## 4. Discussion

Traumatic injuries are among the main causes of morbidity and mortality in developing as well as in the developed world [1, 3]. Of these, facial fractures are common, given the anatomically exposed position of the face and the fragility of its bones. They may result in functional and morphological impairments and even death. Facial fractures are classically reported as afflicting more young population as the group more involved in road traffic crashes and interpersonal violence than elder people. According to WHO, old age begins at 60 years in developing countries and at 65 years in developed countries [7]. Although this definition is not standard, an increasing proportion of aging individuals is reported worldwide, due to increase of life expectancy [5]. The frequency of 4.3% of facial fractures in elderly in this study is in the range of frequencies reported in some studies from developing countries which ranges from 3.1% to 6.2% [8, 9, 10]. There could be however underestimation of this frequency in this study as facial fractures in some patients may be over looped by a life threatening trauma such as brain, chest, pelvis or spinal injuries. Apart from the decrease of individuals with age in elderly, gradual decrease of facial fractures with augmentation of age noted in this study can be explained by diminution of road crashes and violence with age. Out number of male victims is reported by studies from developing countries as well as from the developed world [9, 10, 11, 12]. The male to female ratio in the present study compared to 7.1:1 noted in a previous study on facial fractures in patients of all ages [13] may suggest lower life expectancy of men in elderly in the study population. Observance of road traffic crashes as the leading circumstance of facial fractures in the elderly is reported in studies from developing countries [3, 9, 10]. In literature of high income areas, falls are reported at the first rank [11, 12, 14]. Frequencies reaching up to 81% are reported by Velayutham *et al* [15]. Difference in the major causes of facial fractures between low and high income countries may come from population aging and road accidents prevention efficacy. Even if life expectancy has increased worldwide, there is still a huge discrepancy between the developed world and the developing one. Out of a world global life

expectancy at birth of 72.0 years reported in 2016s, 61.2 years were recorded in the WHO African region while 77.5 years were recorded in the WHO European region, giving a ratio of 1.3 between the two regions [5]. In those areas, effective strategies of prevention and namely traffic laws enforcement and motor vehicles safety devices decrease risk of road traffic accidents. In addition, decrease of mobility with age reduces risk of non-domestic accidents. However, age-related factors and preexisting conditions, frequent in elder people, expose them to falls and subsequent fractures. These factors include numerous physiological changes such as decreased visual and auditory acuity, bone mass and muscle strength, cardiovascular and metabolic conditions. The setting of this study fulfills the conditions of increased risk for road accidents such as insufficiency of public transport, increasing number of motorcycles and second hand four-wheeled vehicles, bad condition of roads and non-compliance with road traffic laws. In that setting, elder people are exposed to road accidents as they are involved in economic and particularly in social activities as long as they are alive, moving usually by motorcycles and classically reluctant to wearing helmet. Second cause of facial fractures although very far behind road traffic accidents, interpersonal violence deserves especial awareness as a worldwide emerging health problem [16, 17, 18]. The setting of this study is that of potential increased violence as that of a rapid urbanization, unemployment, and uncontrolled movement of firearms. In such setting, elder people are potentially involved in violence as victims and even as aggressors. Absence of falls in the etiologies of facial fractures in this study may be explained by the fact that in African setting, elder people have classically assistance of families for their daily needs. Furthermore, the lower life expectancy in low income setting compared to that of industrialized world decreases risk of age-related factors of falls. Reporting bias cannot however be excluded as facial fractures could be over looped in some falling-related fractures such as hip fracture. Besides, in African setting, it is classical that patients don't seek care in hospitals. In this study, this may be particularly true in patients with mild or supposed mild facial falling-related fractures. Preponderancy of fractures of the midface noted in this study is in accordance with the findings of some reports [4, 10, 11, 14]. This may let speculate like Zelken *et al* that facial trauma in the elderly is mostly of low-energy, more sufficiently ample to fracture the thinner bones of the midface than the mandible [11]. Despite this presumed low velocity of its trauma, the elderly patient is reported to be at higher risk for associated injuries [19, 20]. Toivari *et al* report a 1.8-fold risk for AI and a 2.6-fold risk for multiple AIs in geriatric patients compared to younger controls [19]. Frequency of 28.1% of AIs in this study supports increased risk for AIs in the elderly as a previous study in the overall population reports 18.2% of AIs [21]. Facial fracture treatment has the goals of restoring the face functions and anatomy impaired by the displacement of the fracture segments and avoiding the treatment-related complications. This may be achieved by closed reduction and more, open

reduction and internal fixation [22]. Proclivity for non-operative approach in treatment of facial fractures in the elderly is classically reported [9, 11, 15]. Velayutham et al report 17% of maxillofacial injuries operated on in elder patients versus 72% in the younger [15]. Propensity for non-operative treatment can be explained by several reasons. Facial fractures in the elderly have propensity to be non-displaced or minimally displaced and thereby don't impose surgical treatment. Frequency of underlying morbidities in the elderly is well known. Takakura et al note a significant medical history including hypertension at the first rank, in 100% of elder maxillofacial fractures patients [12]. Such conditions may preclude general anesthesia. The patient or his family may decline surgery by fear or because they are unable to afford the cost of the surgery, particularly in a low income setting. Wire internal fixation in some patients in this study may have contributed to complications and unsatisfactory outcome as the method is not strong enough to ensure stable alignment and contact of the fracture fragments.

## 5. Conclusion

This study provides the trends of distribution of facial fractures in the elderly in terms of frequency, aetiologies, gender distribution and outcome. Facial fractures in the elderly are mainly encountered in individuals whose age ranges between 60 and 74 years, male, and victims of road traffic crash. They authorize non-surgical management with an uneventful and satisfactory outcome in nearly 90% of patients. These findings commend better prevention of road traffic accidents.

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