

Trends in Maxillofacial Trauma: A Comparison of Two Cohorts of Patients at a Single Institution 20 Years Apart

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Purpose: The purpose of this study was to compare and characterize 2 cohorts of patients with maxillofacial fractures within the same institution over 2 6-year time frames 20 years apart.

Materials and Methods: A retrospective review of patients with maxillofacial fractures at the authors' institution from 2004 to 2010 was performed, and a comparison was made with the authors' experience from 1984 to 1990.

Results: The 1990 study showed 458 maxillofacial fractures (152 midface and 306 mandibular fractures). In the 2010 study, there were 1,731 maxillofacial fractures (1,313 midface and 418 mandibular fractures). There were significant differences in the mechanism of injury between the 1990 and 2010 studies: assaults decreased from 48.8% to 29.7%, motor vehicle collisions decreased from 39.1% to 29.6%, and falls increased from 3.6% to 22.1%. Comparison by age categories showed major changes in the following groups: maxillofacial fractures in patients 21 to 40 years old decreased from 61.7% to 35.3%, those in patients 41 to 65 years old increased from 13.1% to 35.4%, and those in patients at least 66 years old (elderly) increased from 0.2% to 14.5%. All these changes were statistically significant ($P < .0001$).

Conclusion: Maxillofacial trauma has changed significantly over the past 2 decades in the authors' institution. A decrease in assault-related injuries in the younger populations and an increase in the incidence of falls in the elderly were the main differences. There was a significant increase in elderly patients with maxillofacial trauma. This change emphasizes the need for adequate prevention programs and appropriate maxillofacial surgery teams to manage these injuries in the older patient.

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The incidence and etiology of maxillofacial fractures in trauma centers vary by geographic region, type of population (urban vs rural), population density, and socioeconomic status, among other factors. Common causes of maxillofacial trauma are motor vehicle collisions (MVCs), assaults, sports injuries, occupational injuries, domestic violence, and falls. There are significant correlations between maxillofacial fractures and

soft tissue injuries, neurologic trauma, and orthopedic injuries.¹

The facial skeleton can be divided into 3 anatomic regions for maxillofacial fracture classification: upper, middle, and lower. Fractures of the upper third include fractures of the superior orbit and frontal sinus. Those of the middle third (midface) include fractures of the nasal bones, naso-orbito-ethmoidal

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region, the zygomaticomaxillary complex, the maxilla, the medial, lateral, and inferior orbital walls, and Le Fort I, II, and III fractures. Fractures of the lower third (mandible) include all mandibular fractures.

The mechanism of injury varies by study. In a study by Haug et al¹ performed at the MetroHealth Medical Center (Cleveland, OH) from 1984 to 1990, most maxillofacial injuries were the result of MVCs (60%). In a similar study performed at Grady Memorial Hospital (Atlanta, GA) evaluating 1,382 patients with mandibular fractures, the primary cause was assault (68.2%) followed by MVCs (11.6%).² Concomitant injuries have been reported frequently, with percentages ranging from 6 to 20%.³⁻⁵ In a recent 4-year retrospective review of the National Trauma Data Bank, the incidence of facial fractures in patients with cervical spine fractures ranged from 4.9 to 8.0%; in those with head injury, it ranged from 28.7 to 79.9%; and concomitant cervical spine and head injury was present in 2.8 to 5.8%.⁶ Some concomitant injuries that present with maxillofacial fractures may be life threatening, including cerebral trauma, hemorrhagic shock, hemopneumothorax, and airway compromise, with more than 6% of patients requiring a life-saving emergency intervention.⁷

The purpose of this study was to compare and characterize 2 cohorts of patients with maxillofacial trauma in the same institution during 2 different periods, namely 1984 to 1990 (1990 study) and 2004 to 2010 (2010 study).

Materials and Methods

Institutional review board approval was obtained from the authors' institution. During the course of the study, all guidelines and protocols from the Declaration of Helsinki were followed.

The trauma registry from the authors' institution was queried using 2005 Abbreviated Injury Scale codes for maxillofacial fractures, including:

Head: 150400.2, 150402.2, 150404.3, 150406.4, 150408.4, 150200.3, 150202.3, 150204.3, and 150206.4

Midface: 250800.2, 250804.2, 250806.2, 250808.3, 251099.1, 251000.1, 251002.2, 251006.2, 251006.2, 251201.2, 251205.2, 251206.2, 251211.2, 251212.2, 251213.2, 251214.2, 251215.2, 251216.2, 251221.2, 251222.2, 251223.2, 251224.2, 251231.2, 251232.2, 251235.2, 251236.2, 251800.1, 251802.1, 251804.1, 251806.1, 251808.1, 251810.1, 251812.1, and 251814.1

Mandible: 250600.1, 250602.1, 250603.1, 250604.1, 250605.1, 250606.1, 250607.1, 250608.1, 250610.2, 250611.2, 250612.2, 250613.2, 250614.2, 250615.2, and 250616.2

Panfacial fractures: 251900.3

To have similar data for comparison with the 1990 study, all head (skull) fractures were excluded.

DATA ANALYSIS

Analysis included descriptive statistics, such as frequency distribution and cross tabulation. Comparison of data was evaluated statistically using χ^2 and Fisher exact tests, with significance attributed to a *P* value less than .05.

Results

The 1990 study showed 152 midface fractures and 306 mandibular fractures, for a total of 458 maxillofacial fractures. Of these, 206 patients (48.8%) were assault victims, 165 patients (39.1%) had MVCs, 17 patients (4%) had motorcycle collisions (MCCs), 16 patients (3.8%) had sports-related injuries, 15 patients (3.6%) had home-related accidents (falls), and 3 patients (0.7%) had occupational injuries.

The 2010 study showed 1,313 midface fractures and 418 mandibular fractures, for a total of 1,731 maxillofacial fractures. To compare the 2 cohorts, some categories were merged: MVCs included pedestrians struck and ATV crashes, MCCs included moped crashes, and assaults included abuse and penetrating injuries. Mechanisms of injury were assault in 516 (29.7%), MVCs in 515 (29.6%), falls in 383 (22.1%), MCCs in 147 (8.5%), sports related in 64 (3.7%), and other in 111 (6.4%). **Figure 1** shows a comparison of the 5 main categories between the studies.

Characterization by age group was modified from the 1990 study and simplified into 5 main categories (**Table 1**).

The 1990 study showed a peak prevalence in patients 21 to 40 years old (282; 61.7%), whereas 85 patients (18.6%) were 16 to 20 years old and 80 patients (13.1%) were 41 to 65 years old. The 2010 study showed that the population was older: 615 patients (35.4%) were 41 to 65 years old, 613 patients (35.3%) were 21 to 40 years old, and 251 patients (14.5%) were at least 66 years old (**Fig 2**).

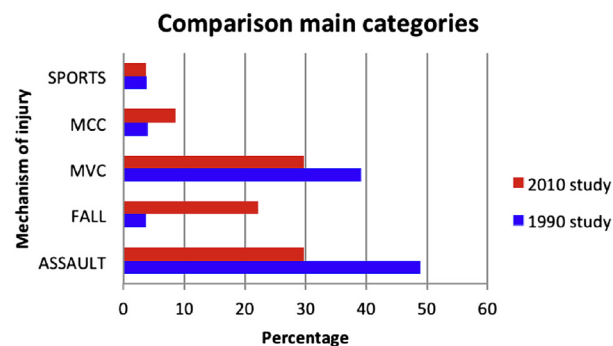


FIGURE 1. Comparison of main mechanisms of injury. MCC, motorcycle collision; MVC, motor vehicle collision.

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