PURPOSE: Pediatric cervical spine injuries are uncommon events, but can be devastating injuries. Facial fractures have been associated with injuries to the cervical spine in children. The objective of this study was to describe the mechanisms, associated injuries and outcomes of pediatric cervical spine injuries in patients with known maxillofacial trauma at a level 1 trauma center.

METHODS AND MATERIALS: After institutional review board approval, an analysis was performed of all admissions to a single level 1 trauma center pediatric maxillofacial trauma, from 2006 to 2015. Patients were stratified based on the presence or absence of a cervical spine fracture. Data was abstracted to include demographic, mechanism and clinical outcomes data. Statistical analysis using chi-square and Mann-Whitney U tests were performed to compare these groups.

RESULTS: There were 1277 patients who were admitted with maxillofacial trauma during the study period. Of these, 72 (5.6%) experienced a cervical spine injury. Factors associated with cervical spine injuries include older age (14.0 v 12.2 years, p = 0.02) and penetrating mechanism (13.8 v 5.5% p<0.01). All penetrating facial injuries associated with cervical spine injuries were secondary to gunshot wounds. Cervical spine injuries were associated with concomitant traumatic brain injuries (p<0.01) and skull fractures (p<0.01). Patients with spine injuries were more likely to experience a longer length of stay (11.9 v 5.2 days, p<0.01) and death (12.5% v 3.1%, p<0.01).

CONCLUSION: Our database demonstrated a 6% incidence of pediatric cervical spine injuries in patients with known maxillofacial trauma. This incidence is higher than previously published reports of smaller cohorts. Specifically, the incidence of spine trauma in our database was highest with gunshot wounds causing maxillofacial trauma. Clinicians must take care to stabilize the cervical spine in any patient with facial fractures, especially during work up and diagnostic maneuvers performed before spinal injuries are ruled out. Additionally, clinicians should maintain a high index of suspicion for cervical spine injuries in pediatric patients with trauma to the head and neck.

The Impact of Age on Late Complications after Nasal Bone Fractures from Blunt Trauma: A 10-Year Retrospective Review

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BACKGROUND: Nasal bone fractures are the most frequent fractures in facial trauma due to its central location and protruding framework. The impact of age on development of late complications after nasal bone fractures has not been well-studied. A greater understanding of the impact of age-related differences on outcomes after nasal bone fractures is essential in order to improve clinical assessment and management.

METHODS: A 10-year retrospective chart review of adults with nasal bone fractures presenting to a Level 2 trauma center was performed to evaluate the late complications related to nasal bone fractures. This study variables considered include age, gender, mechanisms of injuries, nasal deformities, sinusitis, olfactory disturbances, airway obstruction, septal perforation, synechiae, types of fractures, and any post-injury operative interventions. Our data was organized into 2 cohorts: adult (aged 18–64 years) and elderly (>64 years). The impact of age on late complications was statistically assessed with statistical significance of p-value less than or equal to 0.05.

RESULTS: There were 833 adult patients who sustained nasal fractures from 2007 to 2017. There was 123 patients in the elderly cohort and 710 adult patients aged 18–64 years. The most common mechanism of injury resulting in nasal bone fractures in the elderly was mechanical falls (52%), and the most common mechanism in the adult cohort was motor vehicle accidents (33.8%). There was no statistically significant difference in nasal bone fracture patterns between both groups (p>0.05). Adult patients were more likely to undergo a post-injury operative intervention (p<0.05). There was a higher percentage of elderly patients who had late complications compared to the adult cohort. The most common late complication was olfactory disturbances in both groups. Nasal deformities and airway obstruction, however, were more often reported in the adult cohort, and sinusitis as well as olfactory disturbances are more frequently reported in the elderly (p<0.05).

CONCLUSION: Mechanical falls accounted for the majority of nasal bone fractures in the elderly, whereas a motor vehicle accident was the common mechanism of injury in the adult cohort. There was no difference in nasal bone fracture patterns between the elderly and the adult cohorts.
Age, however, did affect the decision to undergo operative interventions, especially in the adult cohort. Elderly patients experienced more complications than their adult counterpart. Posttraumatic olfactory disturbance was the most frequent complication reported in both groups, secondary to distortion of the sinus tract. Sinusitis and olfactory disturbances are more likely to be experienced in the elderly.

The Impact of Age, Injury Severity, and Mechanism on Orbital Blow-out Fracture Patterns after Blunt Trauma: An 11-Year Review

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BACKGROUND: Craniofacial injuries contribute substantially to morbidity after blunt trauma, with orbital fractures seen in approximately 10–25% of all traumatic facial fractures. Orbital blow-out fractures occur when an orbital wall is fractured with an intact orbital rim, and usually occurs after significant blunt trauma from an object larger than the orbital aperture. The aim of this study is to determine the impact of age, injury severity, and mechanism of injury on orbital blow-out fracture patterns.

METHODS: We retrospectively reviewed all patients admitted to a regional Level 2 Trauma Center, who sustained blunt orbital fractures, over an 11-year period, from January 2006 to December 2016. We excluded all patients who had orbital rim fractures and all penetrating trauma. Only patients who had a computed tomography scan of their face on presentation were included. There were 825 patients who met inclusion criteria. Individual charts were reviewed for demographics, length-of-stay (LOS), mechanism of injury (MOI), injury severity score (ISS), and mortality. Individual facial CT scans were reviewed along with the formal radiologist report to determine fracture locations. Statistical significance was set at a p value ≤0.05. This study was approved by our Institutional Review Board.

RESULTS: Our cohort consisted of 825 patients, with 42 mortalities (5.1%). The mean age was 40.4 years old (range 1–97) and there was an approximate 4:1 male:female ratio. The mean LOS was 5.4 days (range 0–78) and the mean ISS was 14.7 (range 1–50). The most common MOI was motor vehicle collisions (MVC) in 211 patients, followed by assault, ground-level mechanical falls, All-Terrain Vehicle (ATV) accidents, motorcycle collisions (MCC), and other mechanisms in 171, 151, 112, 53, and 127 patients, respectively. Overall, the most common orbital blow-out fracture involved the orbital floor in 567 patients (68.7%), followed by the lateral, medial, superior (roof), and posterior walls in 310 (37.6%), 183 (22.2%), 160 (19.3%), and 16 (1.8%) patients, respectively. The most common fracture pattern combination was orbital floor and lateral wall fractures in 202 patients (24.5%). The mean number of orbital blow-out fractures per patient in the entire cohort was 1.50. Orbital floor fractures remained the most common blow-out fracture in all age groups, accounting for 72.4% in pediatrics (1–17 years old), 66.4% in adults (18–64 years), and 77.7% in the elderly (age ≥65 years). Patients with ISS <15 were significantly more likely to have an orbital floor fracture when compared to patients with ISS ≥15, with fractures present in 81.1% and 56.9% of patients, respectively (p<0.05). MCC resulted in the highest mean number of orbital blow-out fractures per patient (1.83), which was significantly higher than other mechanisms (p<0.05). Patients who had ground-level mechanical falls were most likely to have orbital floor blow-out fractures (90.0%) compared with other mechanisms (p<0.05).

CONCLUSION: Orbital blow-out fractures are a common injury after significant blunt craniofacial trauma. The orbital floor is most frequently involved, and patients who have mechanical falls seem particularly prone to this injury. Patients with lower ISS in our cohort likely had more concentrated craniofacial injuries, explaining their worse fracture patterns. MCC appears to confer the greatest craniofacial trauma with the most severe orbital blow-out fracture patterns. Age did not independently predict fracture patterns.

Intra-Operative Navigation Assisted Surgery with 2-Dimension Planning for Orbital Wall Fracture Reconstruction, Benefit and Limitation

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