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52281: Concomitant Cervical Spine Injuries in Pediatric Maxillofacial Trauma: An 11 Year Review of the National Trauma Data Bank

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Introduction: Given anatomic proximity and common trauma etiologies, maxillofacial trauma can be associated with concomitant injuries to the cervical spine. The pediatric and adult facial skeleton differ in important ways, and while bony craniofacial trauma is less common among pediatric patients, it still causes significant morbidity and mortality. Contemporary adult literature describes epidemiology, fracture patterns, and factors associated with maxillofacial trauma and concomitant cervical injuries, however, to date, there have been no large series studies determining the same in the pediatric population. In this study, we use the National Trauma Data Bank (NTDB) to assess the incidence, risk factors, and outcomes of concomitant maxillofacial and cervical fractures within the pediatric population over an 11 year period.

Methods: Using the NTDB from 2007-2017, pediatric patients (<18 years) suffering isolated facial fractures were identified based on ICD 9 and ICD 10 diagnostic codes. Demographics, injury characteristics including presence of concomitant cervical fractures (CCF), and a range of in-patient outcomes were analyzed using two-tailed t-test and multivariate binary logistic regression.

Results: 8,726,496 records from the 2007-2017 NTDB were analyzed to identify 32,952 pediatric patients who had experienced isolated facial bony trauma, with 2,695 of these suffering CCF. 83.4% of the CCF patients were aged 13-18 ($p<0.001$), 61.8% were male ($p<0.001$), 62.6% had suffered poly facial trauma, and overall had a higher median injury severity score (16-24 vs 1-8, $p<0.001$). Statistically significant differences were noted in mechanism of injury, and hospital complications – deep vein thrombosis, pulmonary embolism, unplanned intubation, and unplanned return to OR being more common in patients that had CCF ($p<0.001$). 6.8% of patients with mandible fractures had associated cervical fractures. Regression analyses showed nasal, maxillary, and poly facial trauma patients had higher odds ratios of having CCF when

compared to mandible fractures. CCF patients had longer total length of stay compared to patients with facial fractures only (mean, [SD]) (9.4, [10.4] vs 3.6, [5.7], $p < 0.001$), had higher rehab needs (27.1% vs 7%, $p < 0.001$), and were more likely to have all-cause mortality (4.4% vs 0.9%, $p < 0.001$).

Conclusions: Differences exist between pediatric and adult facial trauma patients, including the incidence of CCF. Specifically, our study found mandible fractures in the pediatric population had a lower association with CCF when compared to rates commonly cited from adult literature. We also found age, gender, injury severity score, facial region, and mechanism of injury to be associated with differences between pediatric patients with facial bony trauma only compared to those with CCF. CCF patients had higher rates of complication and worse outcomes, indicating a higher disease burden. Overall, the pediatric facial trauma patient is at risk for CCF, and clinicians should tailor management accordingly to minimize morbidity and mortality.