



Fracture patterns, associated injuries, management, and treatment outcomes of 530 pediatric mandibular fractures

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Background

- Facial fractures are among the most complex pediatric fractures to treat due to the vastly different skeletal topography from an adult skull and potential for growth impairments.
- Mandibular fractures, specifically, are a common type of pediatric facial fracture, and make up an estimated 40 to 70% of pediatric facial trauma cases.
- Despite the relative frequency of mandible fractures in children, they are difficult to study due to their heterogeneous nature, with anatomic, developmental, and social factors which are age dependent and lead to significant variation in fracture etiology and type.
- A paucity of literature exists examining risk factors for adverse outcomes among pediatric mandibular fracture patients. Existing studies are restricted by small sample size, short duration, or specific fracture type (e.g., condylar fractures), limiting potential for growth and development studies.
- The objective of this study was to codify predictors of adverse outcomes in pediatric mandibular fracture patients in one of the largest single-institution pediatric facial fracture cohorts to date. A secondary aim was to describe fracture patterns and treatment outcomes according to anatomic location.

Methods

- We conducted a retrospective review of 3,334 patients 18 years old or younger who presented to the Children's Hospital of Pittsburgh from 2006 to 2021. The International Classification of Diseases, Ninth and Tenth revision codes indicative of facial fractures were utilized to select patients
- Patient demographics, fracture etiology, associated injuries, treatments, and adverse outcomes were recorded.
- Mandibular management was subdivided into four categories: 1. Physical therapy and/or mandibular rest (without external stabilization), 2. External stabilization (cervical collar or elastic bandage), 3. Closed reduction and external fixation, with or without maxillomandibular fixation, 4. Open reduction and internal fixation, with or without maxillomandibular fixation.
- All statistical analysis and graphics were performed with R, results with a p value <0.05 were considered significant.

Results

Table 1. Descriptive statistics of patient characteristics

	Total (N=530)
Age	
Mean (SD)	11.2 (4.80)
Median [Min, Max]	11.9 [0.101, 18.8]
Age Group	
0-5	93 (17.5%)
12-6	197 (37.2%)
13-18	240 (45.3%)
Gender	
Male	389 (73.4%)
Female	141 (26.6%)
Race	
White	405 (78.3%)
Black	100 (19.3%)
Other	12 (2.32%)
Primary Insurance	
Private	299 (56.5%)
Public (Medicaid)	130 (24.6%)
Other	100 (18.9%)
Past psychiatric history	50 (9.43%)
Past medical history	117 (22.1%)
Past surgery history	60 (11.3%)
Mechanism of Injury	
Fall	63 (11.9%)
Collision	207 (39.1%)
Blow	154 (29.1%)
Road	55 (10.4%)
Other	51 (9.62%)
Cause of Injury	
Activities of Daily Living	87 (16.4%)
Sports	85 (16.0%)
Violence	78 (14.7%)
Motorized Vehicle	106 (20.0%)
Bicycle/Scooter/Non-motorized Vehicle	119 (22.5%)
Other	55 (10.4%)
Trauma Level	
1	40 (8.10%)
2	142 (28.7%)
3	312 (63.2%)
Admitted	307 (57.9%)
ICU Admission	46 (8.70%)
Mandible Fracture Treatment Level	
Physical therapy and/or mandible rest	253 (47.7%)
External stabilization (c-collar or elastic bandage)	61 (11.5%)
CREF with or without MMF	76 (14.3%)
ORIF with or without MMF	140 (26.4%)

Figure 1. Causes of injury by age group

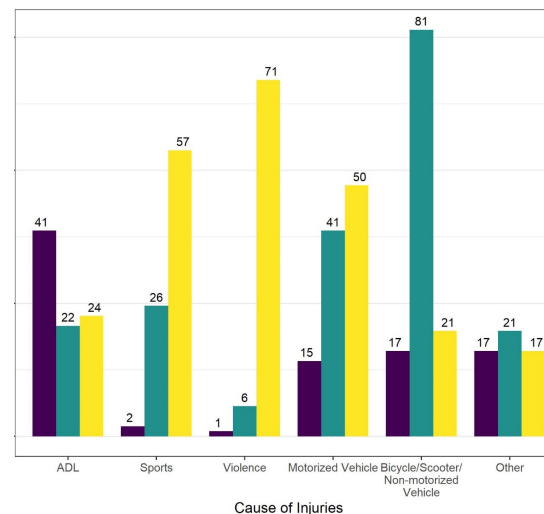
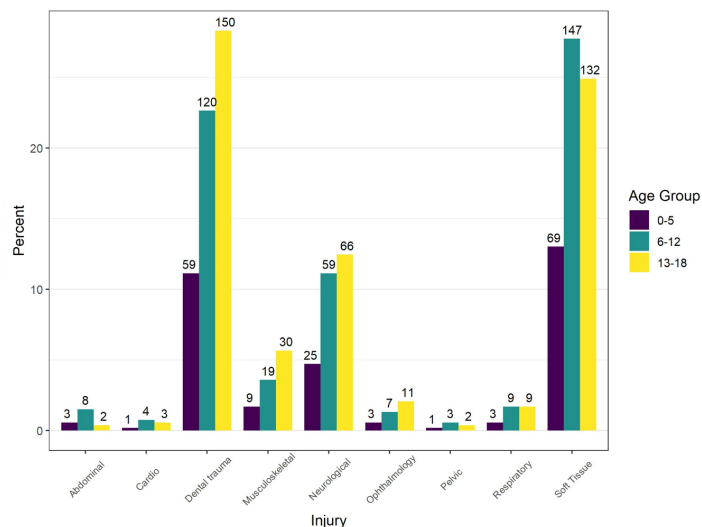


Figure 2. Associated injuries (total) by age group



Conclusions

- Older and male patients were also more likely to suffer adverse outcomes, which may be due to involvement in more adult-like behaviors. Older patients were also more likely to have psychiatric comorbidities.
- Isolated condylar fractures were the most common mandibular fractures seen in our cohort. Fractures of the angle and parasymphysis were more likely than other types of mandibular fractures to present with adverse outcomes.
- Most mandibular fractures in our cohort were treated conservatively (47.7 percent), rather than with surgery (CREF or ORIF).
- Our results showed that isolated mandible fractures were typically treated conservatively with physical therapy and rest.
- More heterogeneity was noted in the management of patients with two or more fractures, which were mostly treated either with rest and physical therapy or an open reduction and internal fixation.
- The odds of adverse outcomes were significantly higher for patients treated with CREF or ORIF compared to conservative treatment, though this was likely due to increased injury severity in this group.
- Understanding the patterns of mandibular fractures and their treatment and outcomes is key for medical providers to provide the best, evidence-based care for their patients.