

Facial Fractures in Children



Jennings R. Boyette, MD

KEYWORDS

- Pediatric facial trauma • Maxillofacial trauma • Orbital fractures • Mandible fractures
- Facial growth

KEY POINTS

- The stages of facial growth and development often determine the fracture patterns seen for each age group.
- Children are more likely to sustain an intracranial injury in combination with a facial fracture.
- Extraocular muscle entrapment is more common in children and may present with a fairly normal-appearing eye.
- Most mandibular fractures can be treated with either soft diet or a closed reduction.
- Long-term follow-up to assess for growth disturbances is needed.

INTRODUCTION

Pediatric facial trauma can be especially disturbing to the family and to the physician faced with the task of reconstruction. The expectation and goal of complete resolution to the premorbid facial structure and appearance can be a daunting task. Fortunately, many advances in the diagnosis and treatment of maxillofacial trauma have helped bring the achievement of this goal closer. Although much of the understanding and experience in regards to maxillofacial trauma comes from the adult population, one must recognize that there are additional concerns in the growing facial skeleton and that the solution for an adult may be entirely different than the solution for a child. Nevertheless, the principles of a comprehensive initial evaluation, a correct diagnosis of the injury, and a patient-based treatment plan remain the same.

GROWTH AND DEVELOPMENT

Many of the unique features of pediatric facial trauma are directly related to the underdevelopment and continuing growth of the facial skeleton. Most of the bone of the

Disclosures: None.

Department of Otolaryngology – Head and Neck Surgery, Arkansas Children’s Hospital, University of Arkansas for Medical Sciences, 4301 West Markham Street, Slot 543, Little Rock, AR 72205, USA

E-mail address: jrboyette@uams.edu

Otolaryngol Clin N Am 47 (2014) 747–761

<http://dx.doi.org/10.1016/j.otc.2014.06.008>

0030-6665/14/\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

oto.theclinics.com

craniofacial structure is derived from membranous ossification, although there are portions of the skull base and temporomandibular joints that undergo endochondral ossification.¹ The functional matrix concept of growth posits that the growth of the facial skeleton is directed by the overlying muscles acting on the bone.² This translates to the theory that scarring and contraction of the soft tissue envelope is responsible for growth disturbances secondary to trauma or surgery.¹

One of the key factors that relates to the incidence of pediatric facial injuries is the ratio between cranial and facial volume, which is approximately 8:1 starting at birth. This small proportion of the midface in comparison with the cranium is thought to be responsible for the higher incidences of cranial injuries in young children.^{3,4} Brain growth continues to expand the cranium to reach approximately 85% of adult size by the age of 5 years.^{5,6} During the same time period the orbit is growing rapidly and reaches about 90% of its adult size by age 5.⁷ However, mid and lower facial growth lag behind considerably. Midfacial growth proceeds in a vertical and anterior direction and nasal growth typically does not reach full adult size until the late teenage years.⁸ The mandible reaches its adult width early, by about age 1 year; however, its height is not complete until the teenage years.⁸

The gradual pneumatization of the paranasal sinuses is also thought to contribute to the decreased frequency of facial fractures, because the bone is more solid. The paranasal sinuses grow at different rates. In the newborn period the ethmoid sinuses are present but the remainder of the paranasal sinuses is relatively underdeveloped. The maxillary sinus may begin to develop before 1 year of age, but significant growth may not be seen until 5 years.^{9,10} The frontal sinus is the slowest to pneumatize, starting around 2 years of age, and may not even be identifiable radiologically until around 8 years of age.¹¹ The frontal sinus continues to grow past puberty to reach full size in young adulthood.¹²

The unerupted teeth in the maxilla and mandible are also thought to contribute to form more dense and stable bone thus increasing the force required to produce a fracture in pediatric patients.¹³ Additionally, the prominent buccal fat pads in children are thought to help disperse the force of a blow to the midface region. The bone in this region is also considered more elastic and therefore less likely to completely fracture, but more likely to result in greenstick fracture patterns.

The variations seen in the types of facial injuries that occur between children and adults are related to these variations in the structural anatomy. Initially, children younger than age 2 have much more of the surface anatomy of their craniofacial skeleton centered on the cranium and are therefore more likely to experience more fronto-orbital injuries.¹⁴ As children age and their facial structure begins to grow downward and outward their injury patterns begin to mirror those of adults. Therefore, by the teenage years the patterns of injury are very similar to adult patients.

EPIDEMIOLOGY

Despite advancements in child safety, trauma remains the most common cause of pediatric morbidity and mortality in this country.¹⁵ It has been reported that facial trauma may comprise up to 11% of pediatric emergency department visits.¹ However, most of these visits are related to dentoalveolar and soft tissue injuries.^{16,17} Imahara and colleagues¹⁸ examined 277,008 pediatric trauma patients requiring admission and found facial fractures present in 4.6% of cases. In regard to the total population of maxillofacial fracture patients, children younger than age 17 comprise approximately 14.7% of patients.¹⁹ However, a large number of these patients are teenagers, because the reported incidence of fractures in children younger than the age of 5 years

Download English Version:

<https://daneshyari.com/en/article/4123722>

Download Persian Version:

<https://daneshyari.com/article/4123722>

[Daneshyari.com](https://daneshyari.com)