

# Pediatric Head Injuries

Bruce B. Horswell, MD, DDS, MS\*, Michael S. Jaskolka, MD, DDS

## KEYWORDS

• Head injuries • Children • Scalp injury • Growing skull fracture

## KEY POINTS

- Scalp and head injuries are more common and more potentially life threatening in children than in adults, because of the large area of exposure relative to body size in children.
- Ischemic soft-tissue wounds will often improve with patient rewarming and correction of hypovolemia in children, resulting in salvage of complex avulsive wound flaps.
- Most avulsive scalp wounds in children that result in tissue loss will require staged reconstruction through tissue expansion.
- Initial diagnosis of pediatric skull fractures may be delayed owing to the desire to limit infant radiation exposure, making clinical follow-up critical.
- A small proportion of pediatric cranial fractures may develop into a growing skull fracture, which presents as a widening skull fracture, pulsatile mass, and neurologic symptoms.
- Computed tomography and magnetic resonance imaging are important tools in the workup of growing skull fractures, to delineate cranial and intracranial injuries.
- Patients benefit from multidisciplinary surgical care, which requires wide scalp exposure, craniotomy access, intracranial debridement, dural repair, and cranial reconstruction.

## INTRODUCTION

Head injuries in children are common, estimated by the American College of Surgeons (according to data over the last 10 years in the National Trauma Data Bank) to comprise more than half of all injuries sustained by children.<sup>1</sup> The mortality and morbidity associated with traumatic head injury is staggering, and the cumulative effect of such on the pediatric and general populations is propagated through related health care measures and subsequent socioeconomic burden. The majority of deaths due to trauma in children are caused by brain injury.<sup>2,3</sup>

Many children who sustain injury to the craniofacial region will have scalp injuries and underlying skull fractures. Although there are many data that reflect the high association of traumatic brain injury with head trauma, there are few data on the percentage of those children who have associated scalp injuries.<sup>4</sup> And the converse is true: there are few data on the percentage of those children

sustaining isolated scalp injury (no underlying fractures) who may have a brain injury. The mechanism of injury may point to the likelihood of sustaining a scalp injury in certain age groups: younger children in motor vehicle crashes and falls and older children (adolescents) in motor/recreational vehicular crashes and personal violence. Skull fractures in children are highly related to mechanism: vehicular crashes, falls, and abuse or violence.

This article reviews the evaluation and management of scalp injuries in the pediatric patient. The second portion addresses skull fractures, the specter of child abuse, management of acute fracture, and the phenomenon of growing skull fractures.

## SCALP INJURIES

*"I closed the scalp in 2 layers."*

—Harvey Cushing, Neurosurgeon and Medical Educator

---

Charleston Area Medical Center, 830 Pennsylvania Avenue, Suite 302, Charleston, WV 25302, USA

\* Corresponding author.

E-mail address: [bruce.horswell@camc.org](mailto:bruce.horswell@camc.org)

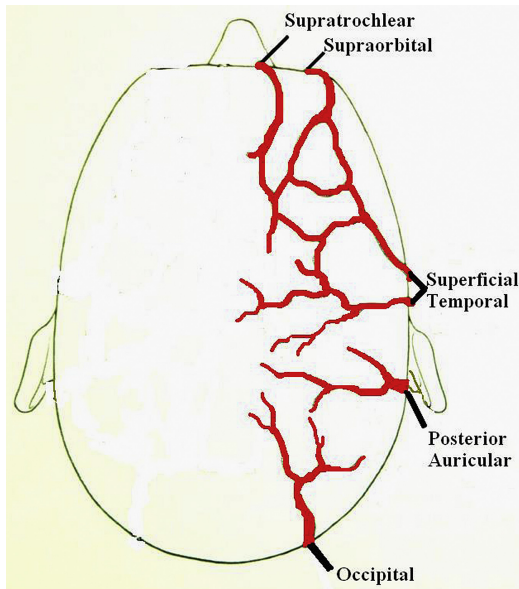
Oral Maxillofacial Surg Clin N Am 24 (2012) 337–350

doi:10.1016/j.coms.2012.05.003

1042-3699/12/\$ – see front matter © 2012 Elsevier Inc. All rights reserved.

The child presenting to the emergency room (ER) with a scalp injury must be fully evaluated for other injuries, particularly to the intracranial compartment. Simultaneously, attention must be given to immediate control of hemorrhage because the scalp is rich in vascularity. Scalp vasculature is derived primarily from 4 main arterial sources, as shown in **Fig. 1**. These major vessels then divide into many smaller branches that communicate with underlying arteries and arterioles running under the firm galea (aponeurosis), which tends to stent the vessels and not allow vessel constriction after injury.<sup>5</sup> The scalp continues to ooze, often without being attended to or noticed by medical personnel who are perhaps focused on other injuries. If the wound lies to the back of the head or has been loosely bandaged in the field, these injuries can have devastating consequences of hypovolemia and shock in the younger child. Every effort must be made to thoroughly and quickly evaluate scalp wounds in children, particularly those with complex injuries and instability. Control of hemorrhage, via either a firm dressing or actual tamponade of the vessels with instrumentation or sutures in a whip-stitch fashion, should be undertaken.

It is important to confirm and document medical status and immunization history. If there is a question as to tetanus prophylaxis in the past 5 years, a tetanus booster of Td or Tdap may be given,



**Fig. 1.** Diagram of the 4 main arterial branches to the scalp. The supratrochlear and supraorbital arteries are branches of the ophthalmic artery (internal carotid); the superficial temporal, posterior auricular, and occipital arteries are branches of the external carotid.

depending on the patient's immunization history.<sup>6</sup> This action is particularly important with soil or agricultural contaminant exposure. After the child has been stabilized and cleared for further management, plans for wound closure should be made in the controlled environment of the operating theater. The patient can be adequately resuscitated, if necessary, and careful monitoring undertaken. Only the simplest of scalp wounds in older children should be repaired in the ER. Many scalp wounds, once cleared of matted hair, clots, and debris, are more complex than perhaps originally thought, and a thorough evaluation through direct observation and digital exploration is necessary. Mechanisms of injury, for example, striking the pavement or a tree, may suggest the need for opening a wound even further to adequately explore, debride, and retrieve foreign bodies (**Fig. 2**). Gross contamination from soil, rotted vegetation, agricultural exposure, and so forth will necessitate a vigorous washout with pulse irrigation. The addition of antibiotics to the irrigant has not been shown to decrease the incidence of postoperative infection and wound breakdown.<sup>7</sup>

### Initial Evaluation

When the child has been stabilized and other life-threatening injuries addressed, further evaluation can be undertaken. For any head injury in children involving a scalp wound, noncontrasted computed tomography (CT) should be obtained to rule out fractures or intracranial injury (**Fig. 3**). Because of the rich vascularity to the calvarium and scalp, there may be a great deal of swelling accompanying scalp wounds, particularly if the wound is not completely open. Particular attention should be given to infants or young children with cranial trauma and swelling, to identify possible cause of abuse and also for suspect bleeding.<sup>8</sup> In very



**Fig. 2.** Retrieving a foreign body from the scalp wound of an adolescent boy who was thrown into a wooden fence from an all-terrain vehicle.

Download English Version:

<https://daneshyari.com/en/article/3163305>

Download Persian Version:

<https://daneshyari.com/article/3163305>

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