

Sport Injuries of the Ear and Temporal Bone



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KEYWORDS

• Sports • Trauma • Injury • Auricular • Temporal bone

KEY POINTS

- Systematic evaluation of the ear and all its anatomic subunits must be performed when investigating ear and temporal bone trauma.
- Lacerations of the pinna require meticulous multilayer repair to reduce the risk of infection and deformity.
- Auricular hematoma requires prompt drainage and application of a bolster dressing to avoid chondronecrosis and permanent deformity.
- Facial nerve function and hearing status should be investigated thoroughly and documented as soon as possible after temporal bone trauma.
- Early subspecialty referral should be obtained in patients with facial paresis, suspected sensorineural hearing loss, temporal bone fracture, suspected cerebrospinal fluid leak or suspected intracranial injury.

OVERVIEW

When the ear or temporal bone is injured, it is important to perform a thorough and systematic evaluation. If a cursory or haphazard examination is performed, it is likely that subtle signs of important injuries may be overlooked. Whenever possible, relevant details regarding the mechanism of trauma should be obtained, including high or low impact, penetrating or blunt injury, and use of protective equipment.

Owing to the complex nature of the ear and temporal bone anatomy, ear injuries can occur in many forms and the potential risks vary greatly according to the individual

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sport. For example, wrestling is associated commonly with perichondritis and auricular hematoma, whereas surfing, water skiing, and kayaking are associated commonly with acute otitis externa and external auditory canal exostosis. The objective of this review is to provide the reader with a basic understanding of the relevant anatomy, evaluation, and management of sport-related injuries involving the ear and temporal bone.

RELEVANT ANATOMY OF THE EAR AND TEMPORAL BONE

Before discussing specific injury types, it is valuable to review the relevant anatomy and physiology of the ear and temporal bone. Understanding these details will provide the background necessary to appreciate the specific concerns that arise from various injuries as well as treatment considerations.

Anatomy of the External Ear

The external ear is composed of the pinna and external auditory canal. In comparison with the rest of the superficial head and neck, the skin of the ear is thin with minimal subcutaneous tissue. Similar to the surrounding scalp, neck, and face, the external ear receives a robust and redundant blood supply from several terminal branches of the external carotid artery system, including the superficial temporal artery, occipital artery, and anastomosing arteries of the scalp. The rich vascular supply of the external ear helps to explain why even simple lacerations may bleed profusely, how the ear may survive even near-complete avulsion injuries with proper management, why infection is uncommon even with gross contamination, and why primary closure can be considered in almost all cases, even several days after injury. Despite common teaching, local anesthetic injection such as 1% lidocaine with epinephrine 1:100,000 can be used safely in simple laceration repair without consequence; however, epinephrine should be avoided strictly near a tenuous vascular pedicle, as in complex lacerations or avulsions. Although the external ear has an excellent blood supply, during prolonged exposure to cold temperatures blood is shunted toward the body's core, making the ear especially prone to frostbite.¹⁻³

The supporting framework of the pinna is composed of a fibroelastic cartilage, which is only absent in the fatty lobule. It is crucial to understand that the cartilage of the ear receives its blood supply solely from the overlying perichondrium and skin (**Fig. 1**).¹ Traumatic auricular hematomas develop in the subperichondrial space and deprive the underlying cartilage of critical nutrients. If not treated in a timely manner, auricular hematomas may result in long-term auricular deformity, as discussed elsewhere in this article. The cartilage of the ear is relatively thin and soft; therefore, a fine, monofilament, absorbable suture should be used to approximate cartilage edges with minimal direct handling with forceps. Repeated pinching with forceps will result in torn edges owing to the friable nature of auricular cartilage.

The lateral one-half of the ear canal is supported by cartilage and the medial one-half is encased by the temporal bone. Similar to the pinna, the skin of the ear canal is extremely thin. This is relevant for several reasons. First, external auditory canal lacerations are found commonly in the setting of longitudinal temporal bone fractures that involve the bony ear canal. This is because the thin skin of the ear canal is torn in the absence of any fatty layer to cushion it from the underlying fractured bony edges. Second, without the thermal insulation a fatty layer would provide, external auditory canal skin subjected to repetitive cold water exposure can lead to endosteal irritation and resultant focal bone growth, leading to exostosis (**Fig. 2**).

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