Blowout Fracture

WHAT IS A "BLOWOUT" FRACTURE?

A blowout fracture is a break of one or more of the bones that surround the eye.

When an object strikes the eye, the force is transmitted into the eye compartment (orbit) [see figure 1], and the thinnest bones within the orbit will buckle or break from the force of the trauma. This is referred to as a "blowout" fracture. The release of this force may protect the eye from more serious injury. Commonly, the bone at the bottom of the orbit (orbital floor) is fractured as it is the thinnest bone.

Due to more elasticity in their bones, children are susceptible to a special type of orbital fracture called a "trapdoor" or "white-eye fracture". A hinged bone fragment is created by the trauma, which opens allowing soft tissue like muscle to escape, but then snaps closed like a trapdoor. Tissue caught in the fracture instantly loses its blood supply and severely restricts movement of the eye.

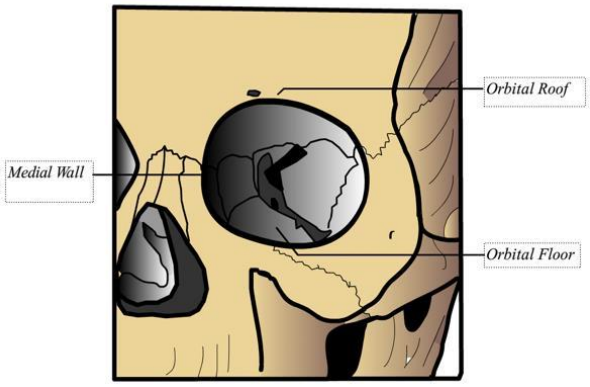

Figure 1. Bones of the orbit which form the roof, inside (medial) wall, outside (lateral) wall and floor.

The orbit holds the eye in the correct position and protects the eye. Following trauma, the muscles, fat and connective tissue can be bruised and displaced. If enough volume is lost from the orbit, the eye sinks back into the orbit (enophthalmos) causing both cosmetic and functional concerns. If the eye muscles are impacted by the fracture, there is a change in the motility of the eye with possible double vision.

WHAT CAUSES A BLOWOUT FRACTURE?

Blowout fractures result from trauma to the orbital bones. When an object hits the orbital bones (usually the eye brow and upper cheek bone) the force is transmitted to the bones. If the force is great enough, the bones buckle and break. Any large object with force or speed can cause a blowout fracture. Typical causes include motor vehicle accidents, sports with missile objects such as baseballs or tennis balls, violence from fists and elbows, and falls. Fractures are much more common in boys than in girls. Protective glasses can reduce the possibility of serious eye injury in sports with missile objects and should be encouraged.

The sinuses in children develop as they age which makes the bones thinner. Children under 7 do not have a fully developed maximally sinus and are as likely to break the orbital roof bone as the floor bone.

WHAT ARE THE SYMPTOMS OF AN ORBITAL BLOWOUT FRACTURE?

The most common symptoms are bruising, tenderness and swelling around the eye; redness of the eye; double vision, or diplopia (seeing two images at the same time); numbness of the cheek, nose or teeth. Signs of an orbital fracture include disruption of the smooth contour of the orbital floor to touch, reduced motility especially upward and downward movements, and air under the skin around the eye. [See figure 2]. Symptoms that typically indicate a “trapdoor fracture” are pain on eye movement, nausea or vomiting, and double vision. Nausea and vomiting predicted a trapdoor fracture in 75% of cases. These hinged fractures may have little or no associated redness of the eye. In cases of any orbital fracture, consultation with an ophthalmologist to evaluate the eye is imperative.

Fig. 2: Bruising around the eye is a common symptom of a blowout fracture.

HOW DO YOU KNOW IF THERE IS A FRACTURE?

Thin cut computed tomography (CT) scans of the orbit are used to make the diagnosis [See figure 3]. In cases where radiation exposure is a major concern, magnetic resonance imaging (MRI) may be used.

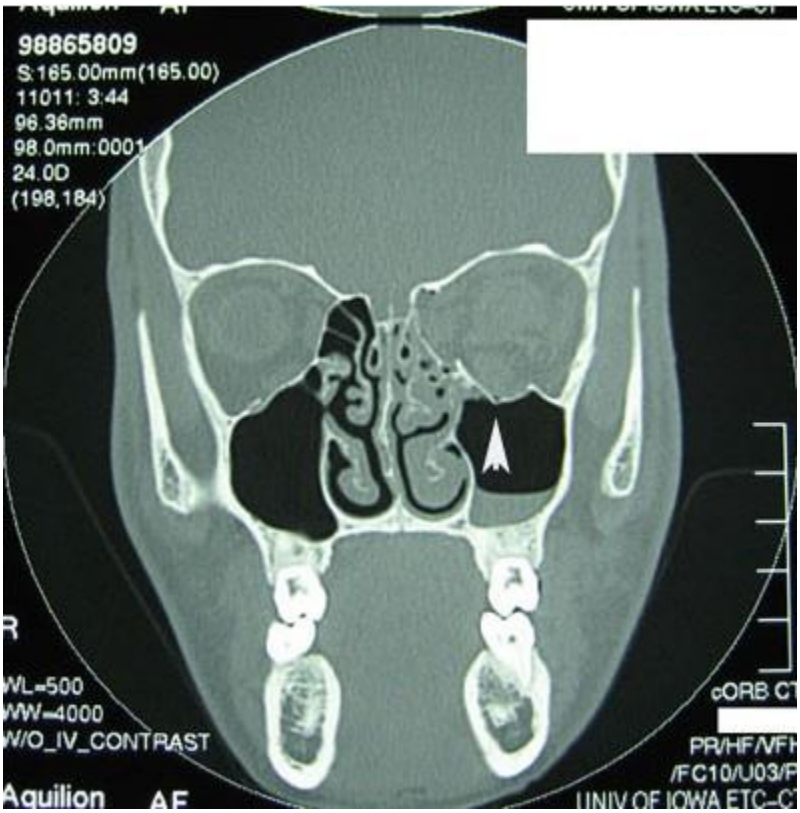

Fig. 3: Computed tomography (CT) Scan

ARE THERE DIFFERENT TYPES OF BLOWOUT FRACTURES?

Blowout fractures are classified on several features including:

- size (big or small)
- location (front or back)
- bone in place or displaced
- tissue/muscle entrapped in fracture, "trapdoor fracture"
- accompanying symptoms (double vision, pain, eye position)

A "simple" fracture is one with minimal or no double vision and minimal or no loss of orbital volume (enophthalmos) upon resolution of acute swelling.

WHAT CAN BE DONE FOR A SIMPLE BLOWOUT FRACTURE?

Most simple blowout fractures do not require surgical repair and do not cause lasting problems.

Immediate treatment consists of:

- ice to decrease swelling
- decongestants to aid in the drainage of blood and fluid accumulating in the sinuses
- avoidance of nose blowing to prevent pressure from propelling the sinus contents into the orbit
- oral steroids in some cases to decrease swelling and scarring
- sometimes oral antibiotics

WHEN SHOULD SURGICAL REPAIR OF BLOWOUT FRACTURES BE CONSIDERED?

Trapdoor fractures require repair to release the trapped tissue within 24-48 hours for best outcomes. In all other fracture types, observation may be prudent, as double vision tends to improve over several weeks. Fractures with persistent symptoms (typically double vision or enophthalmos) are usually candidates for surgical repair. Timing of the

repair varies, but most often is within a few weeks of the injury. Initial repair may consist of any of the following:

- exploration of fracture site and repositioning of bone
- release of trapped tissue from fracture site
- covering of fracture site with synthetic material

WHAT LONG-TERM PROBLEMS MAY DEVELOP FOLLOWING BLOWOUT FRACTURES?

Most fractures heal without long-term effects. However, strabismus surgery (eye muscle surgery) is sometimes necessary for persistent double vision. Occasionally, persistent double vision can be treated with non-surgical methods (prism glasses or botulinum toxin injections).

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