INJURIES
For the Ringside Physician
by
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• Recognize

• Decision BOX/STOP

• Medical Disposition

The injury photos in this article are rarely taken from amateur boxing. The headgear and close supervision provided in amateur boxing generally prevent them from happening. Although not seen often, the ringside physician will be immediately called upon to evaluate the boxer when they do occur. His job will be to decide if the contest may continue or stop and to recommend the best course of action for the safety of the athlete.
Boxing was introduced to the Olympics in 686 BC. Yet, a close examination of these Ancient Greek representations of a “Boxer” show a noble athlete whose nose has been broken and who has suffered auricular hematomas. The Greeks boxed without headgear using leather thongs to wrap the hands. The injuries pictured are still dealt with today and must be recognized and treated properly by the Ringside physician.
Facial Injuries in Boxing

Nose Bleed

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<td>Moderate Bleeding</td>
<td>BOX</td>
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<td>Blood running into throat</td>
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<td>Bright Red Pulsatile Arterial</td>
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<tr>
<td>Acute Compound Fracture</td>
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<tr>
<td>Acute Fracture (Stop)</td>
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<td>Heavy Venous Bleeding</td>
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The above pictured boxer from Wales has an uncomplicated “Bloody Nose”. He has a history of chronic nasal bleeding that could not be fixed with surgical cauterization. He was a world class competitor whose epistaxis was a constant threat to his ability to win international competitions.

This picture illustrates the conflict between a harmless injury and an image that a media uneducated in medicine might use against the sport itself. This picture also illustrates the maximum bleeding that might be allowed in an elite competition.
Epistaxis associated with an acute fracture. Note the nasal curvature. Instability was palpable to the examining hand.

If the nose bleed is not spontaneously resolved by the post bout exam, the mucosal membranes may be anesthetized with 5% Cocaine as topical anaesthetic of choice and the bleeding controlled as described in the curriculum section on nosebleed.

The Boxer should be referred for elective reduction of the nasal fracture unless the ringside physician is competent in immediate reduction techniques and elects to treat the problem immediately.
Every athlete with Epistaxis should be checked post bout for a nasal septal hematoma as seen in the left nostril of the above illustration.

Septal hematomas must be drained immediately to prevent septal necrosis, perforation, and saddle deformity.

Mucosal anesthesia is obtained with 4% cocaine soaked pledgets. The hematoma is evacuated with a number eleven blade and a small Penrose “drain” is left to prevent recurrence. A small rubber band may serve as the drain in urgent circumstances. Gauze or cotton dressing is then used to “pack” the nostril. The athlete is given oral antibiotics.
Saddle Nose Deformity

Left Side Boxer with undrained septal hematoma developed saddle deformity from collapse of septum. Right Side Defect corrected by rhinoplasty. This defect was mild.

The Usual Sources of Bleeding in Epistaxis

The usual sites of bleeding illustrated. The red circle above shows the location of Kiesselbach’s venous plexus. The usual arteries involved in the more dangerous arterial bleed are marked.

Arterial Bleeds are RARE and SERIOUS.
Bright red Pulsatile bleeding is cause for immediate stoppage of the competition with full attention to be given the bleeding problem. (cf. Nose Bleed section.)

The “Black Eye”

The simple “Black Eye” looks bad but is not dangerous to the athlete (unless complicated by swelling that interferes with vision, orbital fracture, ocular injury, etc.)
“Black Eye” STOP/BOX Decisions

Above, easy decision to let the bout continue. “BOX”
The associated swelling make this decision more difficult. The Ringside must access the effect of the swelling on peripheral vision. Good peripheral vision “BOX”. Limited lateral vision (ability to defend self) “STOP!”

- Examine
- Ice
“Black Eyes” that Stop the Contest

“Black Eyes” need Emergency Referral

When associated with:

- Double vision
- Loss of sight
- Fluid Leak from Eyeball
- Inability to move the eye
- Blood or clear fluid from the nose or the ears
- Blood on the surface or inside eyeball
- Assoc Signs of Medial Wall Orbital Fx
- Medial Wall Orbital Fx
- Crepitus
- Enophthalmus
- Entrapment
- Persistent headache
The “Swollen Eye” is not dangerous in and of itself. The danger comes from the limitation it places on the boxer’s lateral vision and therefore the ability to see and defend against opponent’s blows coming from the affected side. The Boxer in the picture above may not continue to compete.

This picture illustrates a second complication of a tightly swollen eye which should force the bout to STOP. The swelling is tight and appears ready to rupture with a hard punch. Contrast this with the swelling in the picture immediately above. In that picture the decision to continue is based on lateral vision. The probability of rupture of the swelling appears more remote.
Note the athlete in this picture has one eye set deep with respect to the other. This is because some of the contents of the left orbit have shifted into the left maxillary sinus after the “orbital floor” was fractured. This is not a black eye. This is a bout stopping injury that must be referred for specialty care.

Orbital Fractures--- The “Blow Out” Fracture

- Blowout fractures are caused when an object larger than the size of the orbit impacts the orbit. Symptoms of orbital floor fracture include: periorbital ecchymosis, eyelid edema, subconjunctival hemorrhage, diplopia (double vision), bony step-offs, and pain.

- Orbital floor fractures are best visualized with coronal CT scanning.
Orbital “Blow Out” Fractures

- The “buckling” theory maintains that an anterior force is transmitted back into the orbit.
- It states that the orbital rim buckles and transmits forces to the orbital walls, resulting in an orbital floor fracture.

- The “retropulsion” theory, advanced by Smith and Regan, refers to a fracture of the orbital floor caused by sudden increase in intraorbital pressure, a fracture may result from the hydraulic forces generated in the closed orbital cavity.
- Blows from a fist, for instance, or objects larger than the horizontal diameter of the orbit, are the most frequent cause of this type of fracture.

Diagnosis:
- Restricted Movement: Muscle entrapment:
- Enophthalmus
- Periorbital ecchymosis,
- Eyelid edema
- Subconjunctival hemorrhage,
- Diplopia (double vision),
- Bony step-offs
- Ptosis
Therapy

Conservative Therapy: Surveillance in slightly dislocated fractures without eye motility restriction and without restriction of the infra-orbital nerve.

Surgical Therapy:
- Orbit reconstruction
- Fragment stabilization (osteosynthesis)
- Decompression of the infra-orbital nerve
- Reconstruction of the lacrimumasal duct
- Removal of a functional impairment of the eye
- Repositioning of prolapsed soft tissue
- Reconstruction of the orbital floor, if indicated with implantation of alloplastic material
Indications for Surgical Therapy:

Clinical and/or radiological evidence of a fracture  Ocular motility disturbance  
Enophthalmus (>2 mm)  Herniation volume (> 1.2 cm³)  Palpebral emphysema  Sensory 
disturbance of the infra-orbital and/or supra-orbital Nerve Impairment  Double images 
Visual restriction

Note: Fracturing orbital Floor with content herniating into Maxillary Sinus.
X-Ray of Blow Out Fracture

Note: Left Maxillary sinus has lost its “air density” as fat from the orbit herniates into it.
Fractured Mandible

Fx Mandible

EMBBS
Symptoms of Fx Mandible:

- Pain on motion.
- Tenderness
- Unable to open and close mouth
- Swelling
- Mandibular Asymmetry
- Discoloration: hematoma formation.
- Crepitation: Motion --- grating or crackling sound.
- Salivation: with drooling.
- Bleeding --- profuse.

Findings:

- Malocclusion: cannot get teeth together.
- Mobility: Bimanual --- movement and pain
- Swelling: hematoma, gingival tear
- Abnormal mobility: Deviation of the Mandible
Treatment of Fractured Mandible:

- Analgesics
- Muscle relaxants – the fracture may cause painful spasm of the muscles of mastication.
- Barton’s bandage – a bandage that goes from under the mandible circumferentially, over the top of the head. If bandage materials are not available, reapplication of the headgear with the strap snugly tightened might suffice.
- Ice packs.
- Referral for radiographs and definitive (often ORIF) care.
TMJ Dislocation

- unilateral
- blow with the mouth open
- associated with mandibular fractures
- not able to fully open or close mouth
- feel a pop
- pain over the involved joint
- chin deviates to the opposite side
- bump is palpable over the joint (articular eminence)

Treatment TMJ Dislocation

- Barton’s bandage.
- Relocation: thumbs on the body of the mandible and exerting downward pressure while with the fingers exerting forward and upward pressure on the symphysis of the mandible.
- A soft diet for several days
- Competition: immediate with protection.
Luxation
• Forward
• Backward
• lateral

Rx:

Reduce using finger pressure prior to transport to the dentist.
Avulsed Tooth

- If Dirty--- Rinse in Running Water
- Do not Debride
- Put Back In Socket
- Bite Towel to Keep in Place
- Transport in Milk or Transport Solution
- Emergency Dental Referral

LACERATIONS

Cut impairs vision--- STOP

A  Tarsal Plate--- Stop
B  TEAR Duct ---- Stop
   InfraOrbital Nerve-----STOP
C  SupraOrbital Nerve --- Stop
D  BOX
E  BOX
F  Vermillion Border Lip --- Stop
H  Bridge of Nose
   R/O Cmpd Nasal Fx ---- Stop
Bout stopped after head butt causes laceration near SupraOrbital Nerve/Artery
Laceration over Supra Orbital Nerve and Artery

At time of closure the SupraOrbital nerve is identified and isolated (see yellow marker left photo). Repair complete on Right.
Uncomplicated cut in safe area of eyebrow. The decision to Box/Stop rests on whether blood is interfering with boxer’s ability to see. In this case with no bleeding into the eye, the boxer may continue.

Amateur boxers have suffered small cuts slightly above this area from improper headgear! Usually, they occur in “safe areas” so that the bout may continue.
Always stop bouts when the Boxer develops a cut on the eyelid. If the laceration should extend through the lid repair is difficult and a shield must be used to keep repair sutures from rubbing against the cornea.
EyeLid

1. **Align the lid margin.** The first step in eyelid margin repair is to pass 6-0 nylon through the meibomian gland orifices 1.5 millimeters from each wound edge and clamp the suture to the drape.

2. **Reapproximate the tarsus.** The next steps are to reapproximate the tarsus with partial thickness 5-0 Vicryl sutures, with the knots buried. Tie the first 6-0 nylon and leave it long. Use a 6-0 nylon at the lash line and leave long. Use 6-0 nylon interrupted sutures to close the vertical skin wound, and tie the two margin sutures into the first skin suture.

3. **Achieve a smooth margin.**—Align Key Landmarks

4. **Prevent retraction.** Frost suture (Thru outer part of the lower eyelid and then is either taped to the forehead or sutured to the eyebrow for four days after surgery.)
Eyelid Lacerations

3 Points to Remember

1. Soft-tissue loss is rare in eyelid trauma.

2. Always suspect tear duct drainage injuries when the medial third of the eyelid is involved.

3. Repair the framework of the eyelid first before managing the soft-tissue injury.

EyeLid

REPAIR 9 Months Later

Note shield protecting cornea from sutures. Good long term result obtained. Stop bout before complex repair is needed!
Lacerations that threaten the InfraOrbital Nerve or Tear Duct should terminate a bout. STOP!!!
Tear Duct injury leaves athlete with chronic external tear drainage on cheek.
When you see a cut on the Bridge of the nose, ask if it masks a Fracture.

Innocent cut masks OPEN FRACTURE of nose. Bridge of Nose unstable to palpation.
Broken Nose

Open Fracture
Masked by cut on Bridge of Nose

Broken Nose
Lip – Vermillion Border (Pink)

STOP!

Cuts thru the Vermillion Border of the lip should terminate competition. They tear and extend too easily!
Professional martial artist lost mouth piece, upper teeth chipped, lip cut! How would you treat this injury?
Enhanced X-Ray of lip. Identify foreign body.
Cut Lip/ Broken Tooth
Never suture lip without X-Ray

Any attempt to suture this laceration would result in abscess formation not healing. Note tooth chip being removed with forceps. Primary closure after foreign body removal is appropriate.

Anticipate normal healing after foreign body removed.
Note: 1st stitch approximates vermillion border.
Looks Awful – But Harmless

Hematoma
Harmless
Cauliflower Ear
Auricular Hematoma

Cause

- Shearing forces resulting in hematoma
- Cartilage Dies
- Scar Tissue forms
- Boxing, rugby, and wrestling because of not wearing protective headgear.
Cauliflower Ear

Treatment

- Cold pack applied to the ear immediately after injury
- Aspirate or Incisional Drainage
- molded dressing
  (molded dressing can be easily made using a collodion soaked gauze)
- Antibiotics

Friction-reducing agents applied to the ear when athlete participates in future competitions
**Afferent Pupillary Defect**

- Move light from one pupil to the other 1-2 seconds
- **Greater constriction both pupils when good eye**
- **Relative dilation both pupils when affected eye.**
- Not one pupil larger than the other.
- Differences in reactivity in both pupils depending on which eye is receiving the light.

**SIGNIFICANT RETINAL OR OPTIC NERVE DYSFUNCTION**

**Seeing Spots**

Seeing *Flashes of Light* or Multiple *Floaters* (Spots) is how the Retina indicates mechanical irritation. Must refer to ophthalmologist.
Corneal Abrasion

What it is:

A scratch on the eye in either the white portion or on the cornea itself.
Causes:

- Direct contact of an object to the eye. Athletes may also take a direct traumatic hit to the eye like be poked in the eye during an athletic competition without any eye protection.
- Athlete rubbing their eye with the presence of a foreign object under the eyelid.
- If an athlete wears contact lens it may also create a corneal abrasion.

Signs and Symptoms:

- Pain
- Watering of the eye
- Sensitivity to light
- Spasm of the eyelid
Treatment:

- patch
- antibiotic ointment applied with patch
- antibiotic and anesthetic eye drops
  (fluorescein strip to delineate)

Disposition

- Athlete may be sensitive to light, pain, or vision disturbance therefore may disqualify them from competition till symptoms resolve.
- Once healed back into competition
Immediate pain relief once drained!
Avulsion of extensor tendon

Splint DIP for 6 weeks!
Boutonniere Deformity

Injury to Central Slip
Extensor Tendon at PIP

PIP
- Swelling
- Pain
- Lim Extension

Splint in Neutral x 6 wks (DIP out of Splint)
**Jersey Finger**

Avulsion (tearing) of the flexor tendon to the fingertip usually occurs from grabbing a jersey during a tackle. It most often affects the ring finger. Following the injury, the fingertip cannot be flexed (bent down) and the tendon can often be felt in the finger or the palm. X-rays will rule out an associated fracture. Treatment consists of surgery to reattach the tendon to the base of the fingertip.

**Boxer’s Knuckle**

**DISRUPTION OF THE EXTENSOR TENDONS / SUPPORT STRUCTURES AT MCP JOINT**

- **Dx:**
  - tender swollen knuckle
  - damaged extensor tendon
  - limited joint motion

- **Rx:**
  - A partial or incomplete tendon rupture is effectively treated by non-surgical methods including splinting, anti-inflammatory medication, ice, heat, physical therapy and occasionally local injections.
  - Complete tendon rupture is optimally treated by surgical repair.

Before resuming punching, the hand must be healed and rehabilitated.
Boxer’s Fracture

FX V METACARPAL NECK

A Classic "Boxer’s Fracture"

Rx: Splint for 3 Weeks

Sore Hand

After a bout, boxers often present with a “sore hand”

Hitting power can quickly surpass the resilience of connective tissue. The result can be soreness and connective tissue injury…

If thorough exam is negative, the hand will often recover in 24-48hrs with Ice Packs.

The Boxer should be advised to seek re-evaluation if marked improvement does not occur.
Keinbock’s Disease

A painful disease of the wrist that results from Loss of circulation to the lunate bone
Finger Laceration

Never Need to Clamp/Tie Bleeders

Finger Laceration

BLOCK ANESTHESIA
This review of a gamut of injuries that the Ringside Physician may face is meant as a review. It is a “recognition and management” tool which would naturally come at the end of the curriculum.

It is posted now as it is ready now for posting. We apologize if many of the conditions here are treated under various systems and other articles above. This is meant as a measure of how well the Ringside Physician pulls all his knowledge together.

Credits: This section on Ringside Medicine is based on the knowledge obtained from many teachers and the work of many master physicians. I give them all credit and claim little original except the work of cataloging in one place what I owe to them.