A photograph of a baseball game in progress. A player in a white pinstriped uniform is swinging a bat, while another player in a red uniform is sliding into a base. The background is a blurred green field.

# **Concepts of Athletic Training**

**FIFTH  
EDITION**

***Ronald P. Pfeiffer  
Brent C. Mangus***

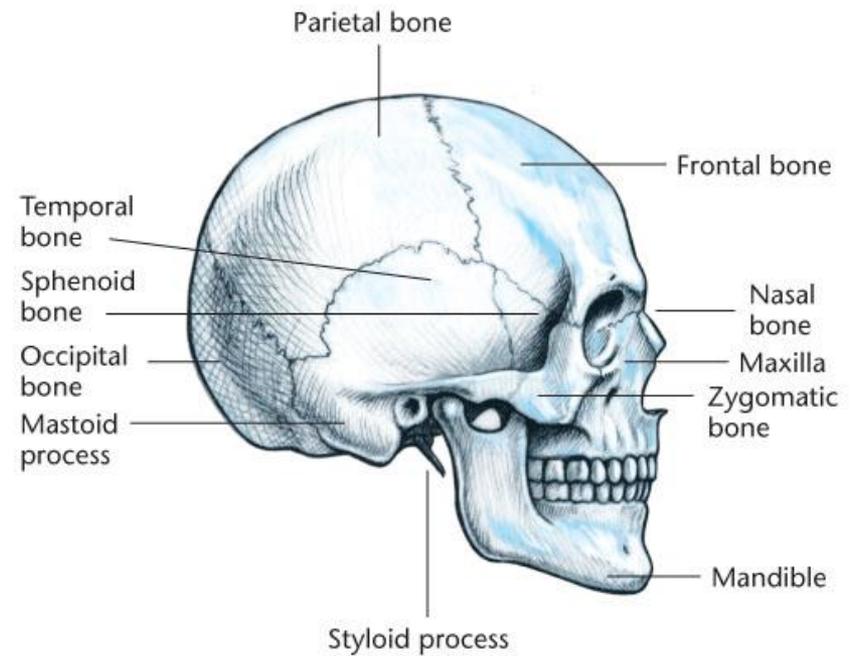
## **Chapter 9**

### **Injuries to the Head, Neck, and Face**

# Anatomy Review

## Skull

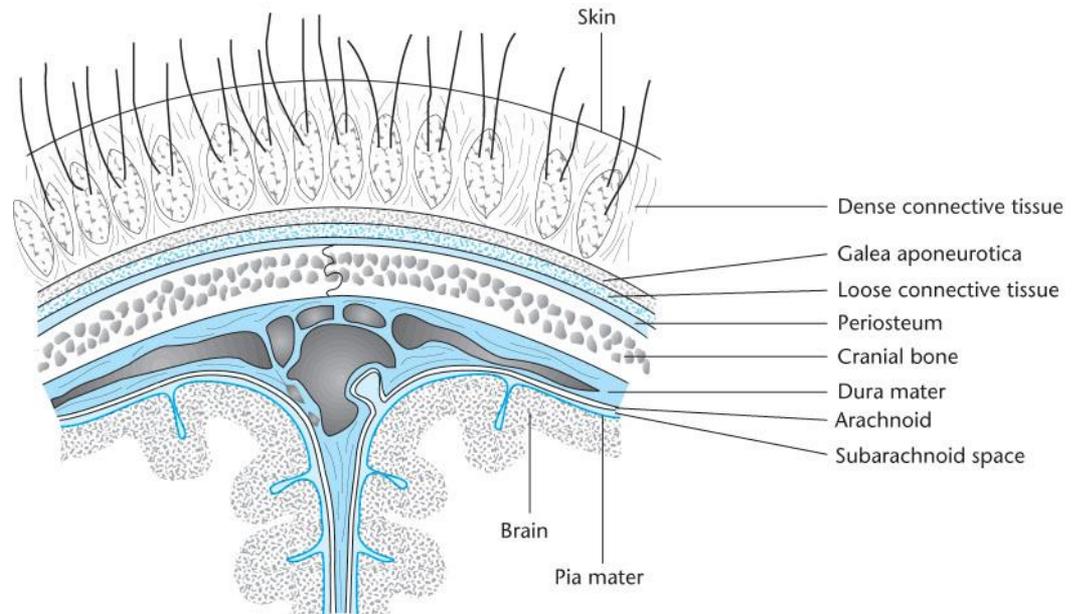
- 



-

# Anatomy Review (cont.)

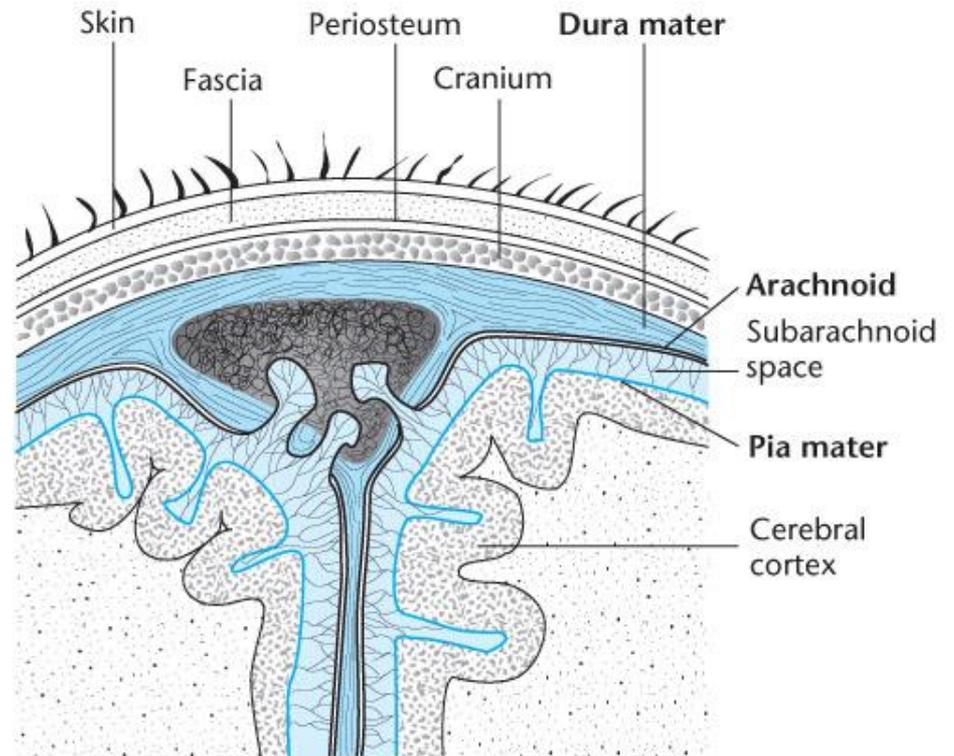
- Soft tissue structures protect the cranium and the brain.



# Meninges

## The Meninges

- 



# Meninges (cont.)

- Dura mater is
- Arachnoid (middle layer) is less dense and avascular.
- Sub-arachnoid space

CSF cushions the brain and spinal cord from external forces.

- Pia mater (innermost layer)

# Central Nervous System

## Central Nervous System (CNS)

- 
- CNS is protected by
- CNS consists of \_\_\_\_\_ and weighs 3 to 3.5 lbs (adult).
- Brain has three basic components –
- Neural impulses travel to and from the CNS via 12 pairs of cranial nerves and 31 pairs of spinal nerves.

# The Face

## The Face

- 

- Subcutaneous muscles, cartilage, and fat provide minor protection.

- 

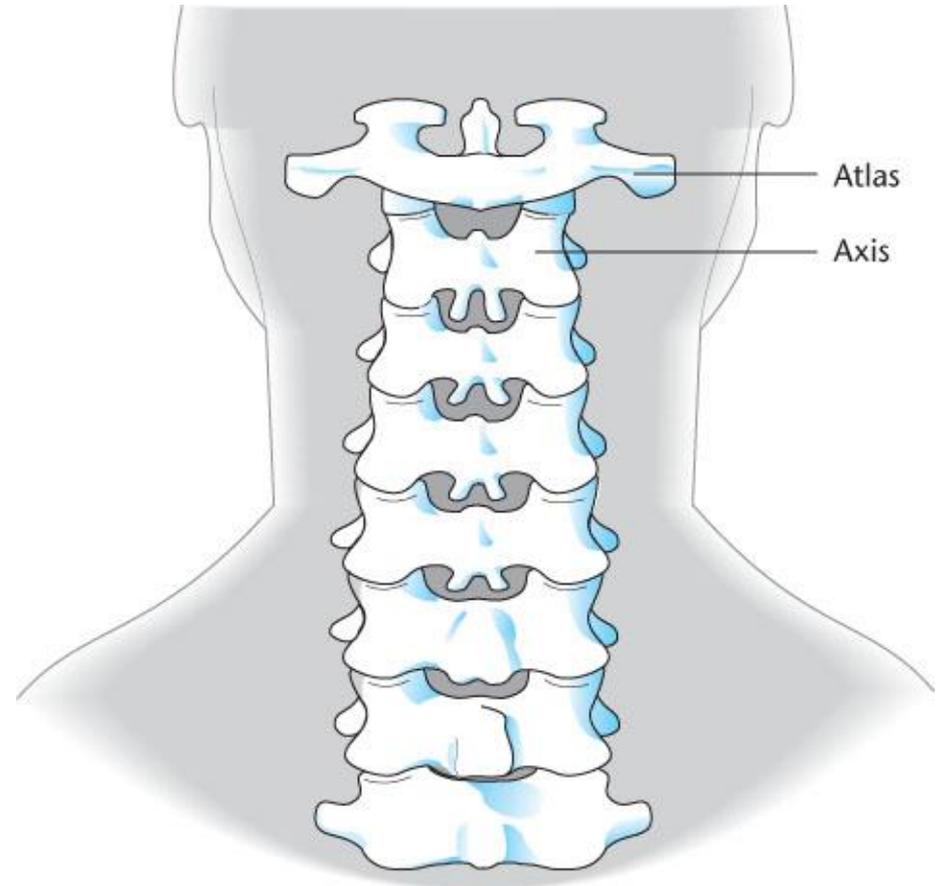
---

\_\_\_\_\_, particularly orbits of the eyes, nasal bones, and mandible.

# The Neck

The Neck ( \_\_\_\_\_  
\_\_\_\_\_ )

- 



# The Neck (cont.)

- The first cervical vertebra (C-1) is called the \_\_\_\_\_.
- The atlas articulates with the occipital bone to form R and L atlanto-occipital joints.
- 
-

# Head Injuries in Sports

- Brain tissue is unable to repair itself.
- Any tissue loss results in some level of permanent disability.
- 
- Coaches can learn to recognize head injuries and render first aid when necessary.

# Mechanisms of Head Injury

Direct mechanism of injury involves \_\_\_\_\_  
\_\_\_\_\_ or on the  
opposite side of the skull from impact  
(*contracoup injury*).

Indirect injury to the head results \_\_\_\_\_  
\_\_\_\_\_

# Concussions

A **concussion** is \_\_\_\_\_

---

---

---

- Symptoms include:

# Concussions (cont.)

## Cantu classification

- Grade 1 (mild) involves:
- Grade 2 (moderate) involves:
- 
- Grade 3 (severe) involves:

# Second Impact Syndrome

Second Impact Syndrome (SIS) can be a serious problem.

- 
- 
- SIS can result in death.

Any athlete sustaining a head injury, no matter how minor, should be referred to a physician before being cleared to return to participation.

# Head Injuries in Sports

## Cranial injury:

- 
- May also have associated soft tissue injury.
-

# Head Injuries in Sports (cont.)

## Intracranial Injury:

- 
- Majority result from blunt trauma to the head.
-

# Intracranial Injuries

Major forms of intracranial injury include:

- 
- 
- 
- 

Epidural hematoma develops quickly due to arterial bleeding, while subdural hematoma develops slowly due to venous bleeding.

---

---

# Initial Check



Immobilize head and neck immediately; do not remove athlete's helmet.

Always assume a neck injury has also occurred.

- **Check vitals first.**
- Note body and limb positions, as well as helmet, face mask, and mouth guard positions.
- If unconscious, attempt to arouse and note approx. time of injury.

# Initial Check (cont.)

- If unconscious, detect breathing by:
  - Listening near the athlete's face for typical breathing sounds.
  - Looking for movements of the thorax and/or abdomen.

**If no signs of circulation are present, begin CPR and summon EMS.**

# Physical Examination

**The physical exam must include assessments of:**

- 
- 
- 
- 
- 
-

# Physical Exam (cont.)

If head injury is suspected:

- 
- 
- 
-

# Physical Exam (cont.)

## If athlete is conscious:

- 
- Check bilateral strength by asking athlete to dorsiflex feet.
- Check for sensations on both sides of body by pinch tests.
- Monitor athlete's eyes by checking pupil sizes and response to light, and eyes' ability to follow moving object side to side.
- 
- Palpate neck for deformity, moving from base of skull to bottom of neck.

# Physical Exam (cont.)

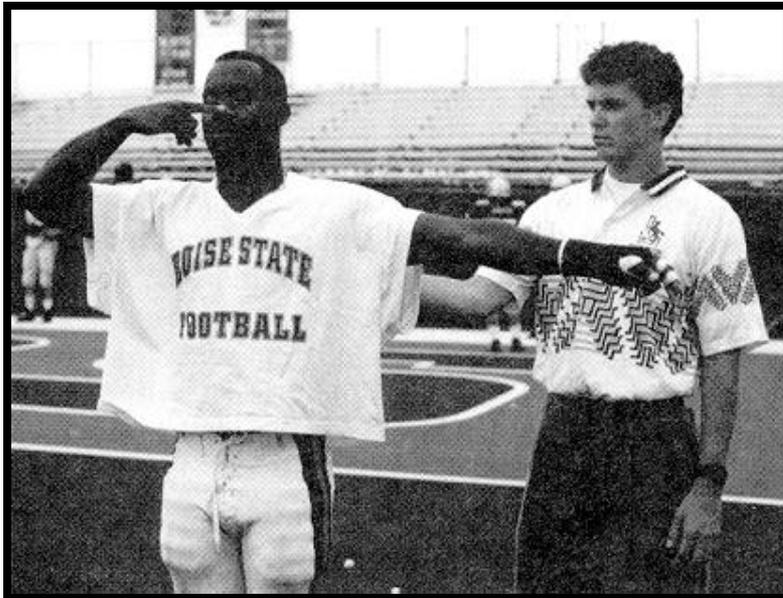
Based on these observations, determine level of consciousness.

- Athlete with grade 1 concussion should be able to walk with assistance.
- - Monitor vital signs.
  - Summon EMS.

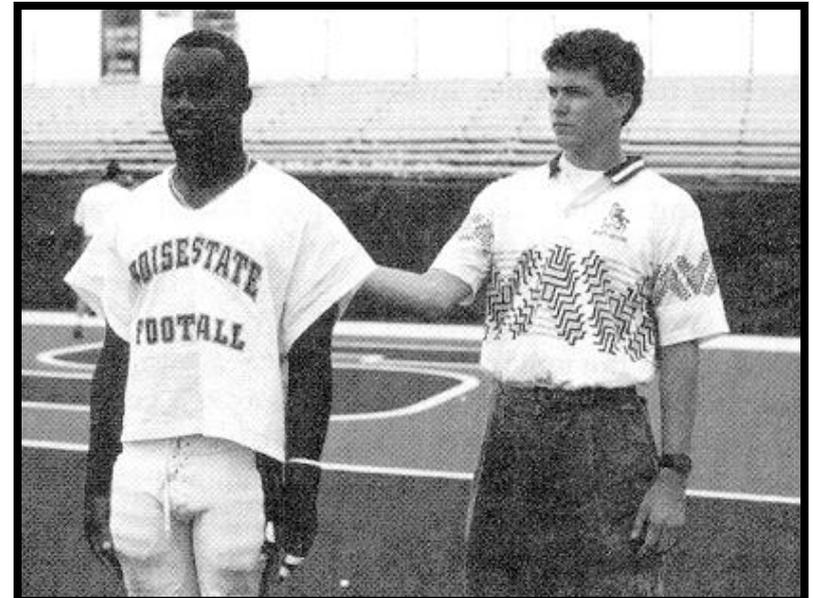
Any athlete with a concussion should be removed from field of play and examined by a physician.

# Quick Neurological Tests

## Finger-to-Nose Test



## Romberg's Test



Courtesy of Ron Pfeiffer

# Cervical Spine Injuries

- 
- Majority occur in football, rugby, ice hockey, soccer, diving, and gymnastics.
- Catastrophic injuries are rare – less than 2 in 100,000 of all neck injuries reported in the United States.

# Cervical Spine Injuries (cont.)

- 
- Muscle strains in the neck rarely involve neurologic damage.
- Brachial plexus injuries can produce significant but transient symptoms.
-

# Mechanism of Cervical Spine Injuries

- 
- 
- Spearing in football produces axial load (NCAA prohibited technique in 1976).
- In 2005, there was an increased emphasis on proper technique to eliminate spearing and minimize neck injuries.

# General Treatment Guidelines

Coaching personnel must take great care when conducting an examination of an athlete suspected of having a neck injury.

- Neck sprains
- Neck strains
- Neck fractures and dislocations

# Initial Treatment of Neck Injury

- Medical care team leader supervises the process.
- Determine if the athlete is conscious. If unconscious, check airway, breathing, and pulse (circulation).
- Stabilize the head and neck.
- Summon EMS.
- Continue monitoring “ABCs.”

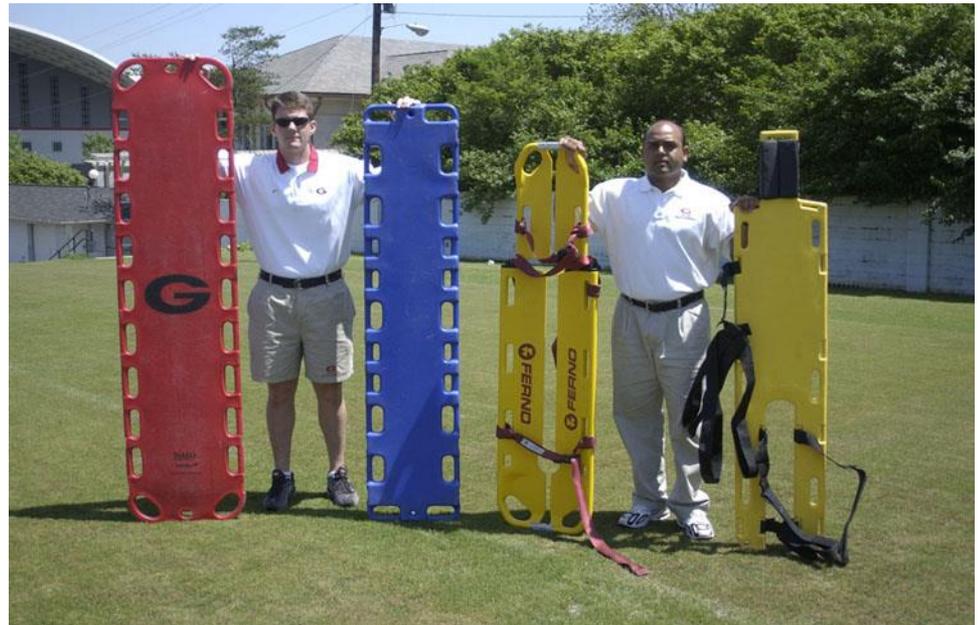
# Initial Treatment of Injury Guidelines

- If conscious, question the athlete regarding extremity numbness or loss of feeling, weakness, and/or neck pain.
- If athlete reports the inability to move a limb or limbs or significant strength loss, stabilize head and neck and summon EMS.

# Initial Treatment of Neck Injury (continued)

If EMS arrival is delayed, place the injured athlete on a properly constructed spine board.

This requires the coordinated effort of at least 5 people.



# Spine Boarding an Athlete

1



2

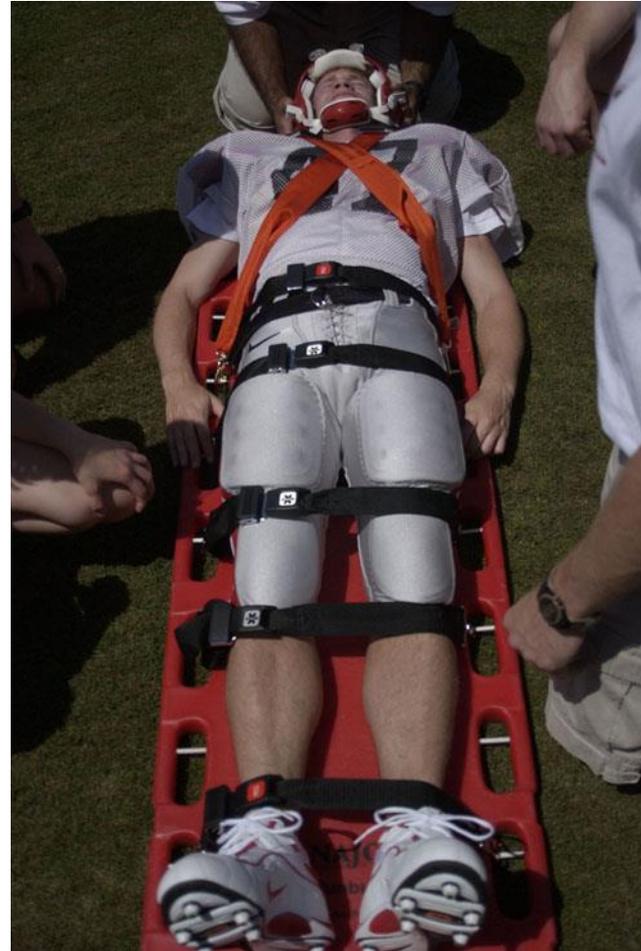


# Spine Boarding an Athlete

3

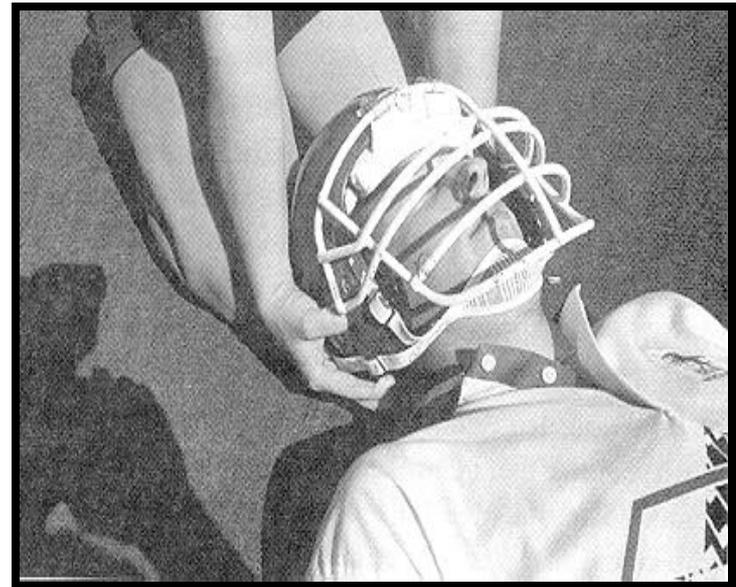


4



# Removal of Athlete's Helmet

- Management of the helmeted player is a major issue.
- Football head and face protective equipment create special problems.
- In cases involving a neck injury, a football helmet provides means of cervical immobilization.



- Coaches should **not** remove the helmet.

# Football Face Mask Removal



Courtesy of Ron Pfeiffer

- 
- Cut the clips with a device like the “\_\_\_\_\_”.
- Once the clips are removed, the face mask can be rolled up, and out of the way of the airway.
- If Trainer’s Angel is not available, removal of screws that hold the clips with a screwdriver is an option.

# Injuries to the Maxillofacial Region

- 
- Modern protective equipment has reduced significantly the incidence of these injuries. Such equipment includes:
  - 
  - 
  -

# Dental Injuries

- 
- Teeth are vulnerable to external blows that are common in many sports.
- Teeth are secured by cementum and periosteum.

# Dental Injuries (cont.)

- 
- When rendering first aid, take precautions to avoid bloodborne pathogens.
- When examining dental injuries:
  - Can athlete open and close mouth w/o pain?
  - What is the general symmetry of the teeth?
  - Are there any irregularities in adjacent teeth?
  - Is there bleeding, especially along gum line?

## Dental Injuries (cont.)

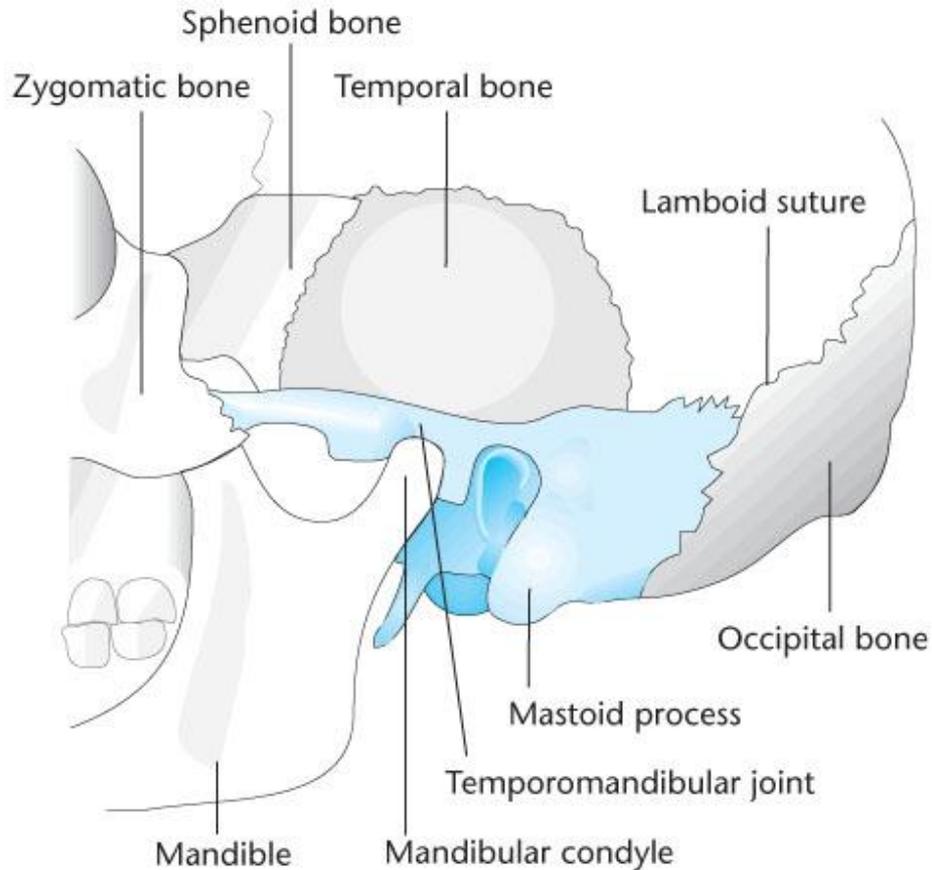
Loosened tooth:

- Gently push back into place.
- 

High-risk sports should require use of mouth guard.

- Required for high school football players since 1966; NCAA followed suit in 1974.
-

# Eye Injuries



- Eye consists of a ball-like structure housed within the orbit.
- Globe is filled with vitreous body.
- 
-

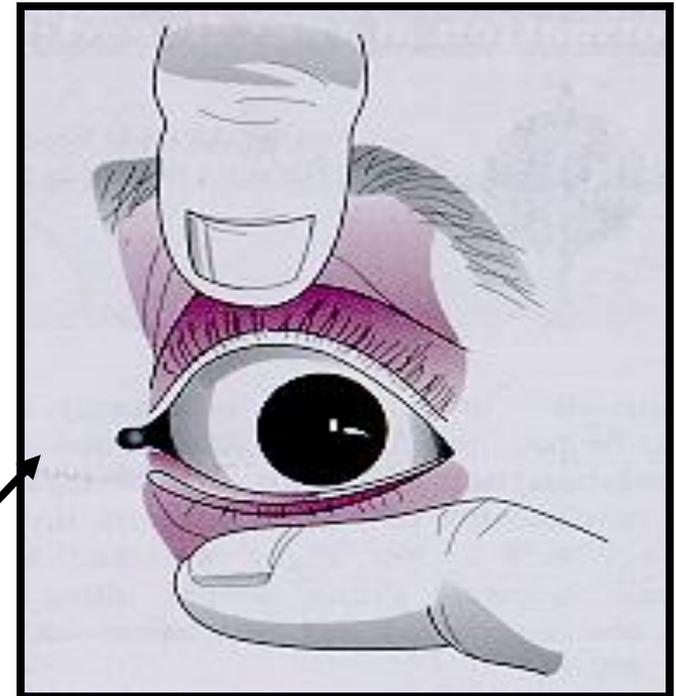
# Eye Injuries (cont.)

Approximately 40,000 sports-related eye injuries occur annually in the United States.

Majority of eye injuries are preventable.

Eye injuries in the U.S. are on the increase; basketball, baseball, and softball are leading sports for eye injuries. Racket sports are also responsible for eye injuries.

Proper position of the fingers for an initial examination of the eye



# Eye Injuries (cont.)

Two categories of eye injuries are \_\_\_\_\_  
**and** \_\_\_\_\_

- Contusional injuries vary in severity from simple corneal abrasions to major injuries such as rupture of the eye, fracture of orbit, or combinations of the two. Detached retina can also occur.
- 

**Protective eyewear is strongly recommended.**

# Eye Injuries (cont.)

## Initial Check and Treatment Guidelines

- 
- Hold upper eyelid away from anterior eye.
- Small foreign bodies usually found below lower eyelid or in the medial canthus.
-

# Eye Injuries (cont.)

- 
- Contusions may result in hemorrhage around the eye known as a “black eye.”
- More severe cases may involve bleeding into the anterior eye (“hyphema”) and orbital blowout. **Refer to medical facility immediately.**
  - Symptoms of orbital blowout include:

# Eye Injuries (cont.)

Symptoms of retinal injuries develop slowly.

Early symptoms include:

- Floating particles in field of vision.
- Distorted vision.
- Changes in the amount of light seen.

Any athlete with a history of blunt trauma to the eye who later complains of these symptoms should be referred immediately for medical evaluation.

# Contact Lens Problems

- Many athletes wear contacts with few problems
- 
- Major problems include having a lens slip out of place or debris become trapped between the lens and the eye.
- Coach should have first aid kit to treat common contact problems including: wetting solution, small mirror, and contact-lens case.

# Nose Injuries

- The nose is often injured because of its location
- 
- Anatomically, the nose is a bone-cartilage framework with skin attached. The nose includes R & L nasal bones and the frontal processes of the maxilla.
-

# Nose Injuries (cont.)

## Evaluation & Treatment Guidelines

- Any blow to the nose can cause a fracture.
  -
- If a fracture is suspected, control the nosebleed and refer to a medical doctor.
  - Finger pressure applied directly against the nostril that is bleeding can control simple nosebleeds. Wear gloves to avoid contact with blood.

# Nose Injuries (cont.)

Care of a nose bleed includes:

- Application of a cold compress against the nasal region.
- Having the athlete lie on side—the same side as bleeding nostril.
- Can pack with gauze that protrudes from nostril.

Be alert to the presence of septal hematoma:

- 
- Must be referred to medical doctor for evaluation and treatment.

# Ear Injuries

## Anatomy of the Ear

- Ear has a cartilaginous framework covered with a layer of skin.
- 
- The middle ear contains small group of bones that transmit sound vibrations to tympanic membrane.
- Inner ear contains the labyrinth, which has a role in equilibrium.

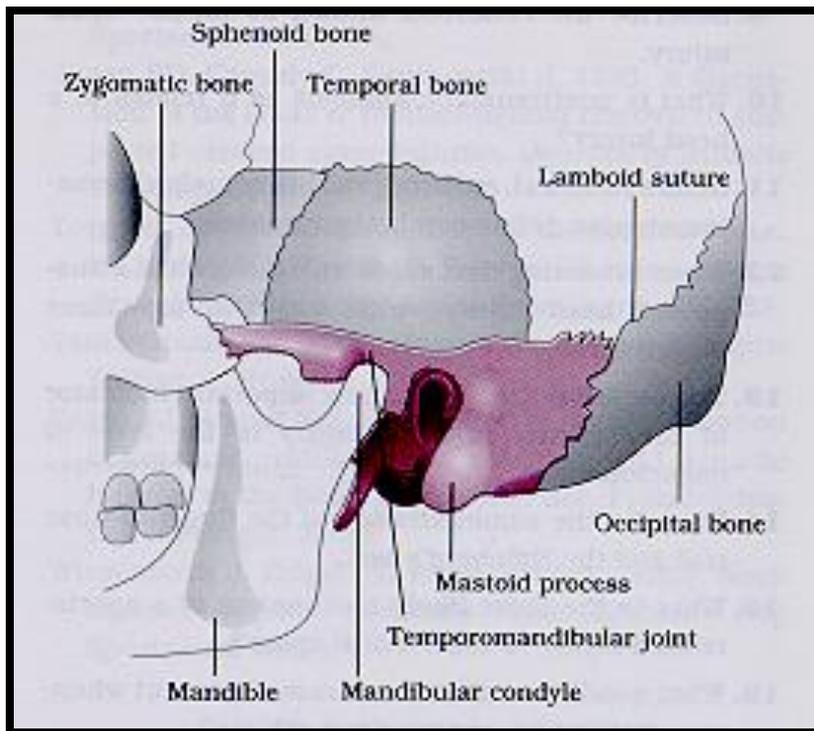
# Injuries to the Ear (cont.)

- 
- Some athletes, such as wrestlers, develop ear problems because of contact with opponents and/or playing surface.
  - Such contact can result in abrasions and contusions to auricle.
  - Required head gear has reduced incidence of such injuries.
- Auricle has some vascularity and can develop a hematoma leading to cauliflower ear.

# Injuries to the Ear (cont.)

- Auricular hematoma should be treated with cold pack and immediately referred to a medical doctor.
- Severe blows to the outer ear can result in a ruptured ear drum.
-

# Fractures of the Face



- In collision sports, a mandible fracture is a common injury.

-

# Jaw Dislocation

Signs and symptoms include:

- Extreme pain and deformity in the region of the temporomandibular joint (TMJ).
- Inability to move lower jaw.
- Jaw is “locked.”

–

– Treatment includes application of ice pack and medical referral.

# Zygomatic bone fracture

## Signs and symptoms:

- 
- 

Refer athlete to a physician for diagnosis and treatment.

# Wounds of the Facial Region

- Carefully clean with mild soap and warm water; apply sterile dressing.
- Any facial wound, even abrasion, can present cosmetic issues.
- Refer to a physician.

# Facial Wounds (cont.)

- 

- After suturing, the return-to-play decision is made by the physician.