



# TRAUMATIC INJURIES TO THE EAR, MOUTH AND EYE

Guest Instructor: Dr. Warren McDonald

# INTRODUCTION

## **Guest Instructor: Dr Warren McDonald**

- Bachelor of Science (BSc) 1984
- Bachelor of Medicine/Bachelor of Surgery (MBBS) 1986
- Fellow of the Australasian College of Sport and Exercise Physicians (FACSEP) 1992
- Sport and Exercise Physician
- Adjunct Associate Professor in Sports Medicine University of Canberra
- Chief Medical Officer Rugby Australia
- No known conflicts or competing interests



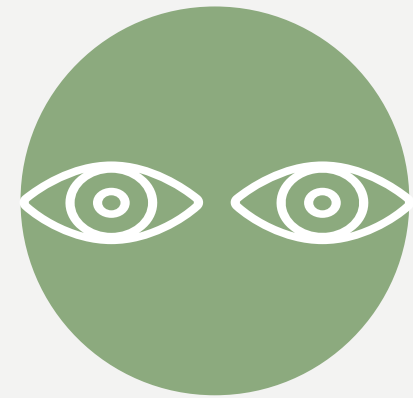
# UNIT OVERVIEW



**AURICULAR  
INJURIES IN SPORT**



**DENTAL & ORAL  
INJURIES IN SPORT**



**EYE & ORBITAL  
INJURIES IN SPORT**

# EAR ANATOMY



Outer Ear    Middle Ear    Inner Ear





# ASSESSMENT OF THE EAR

## Look

- The outer ear
- Surrounding tissues

## Feel

- The ear lobe
- Surrounding tissues

## Special tests

- Looking at the middle ear  
– doctor – use of an otoscope
- Hearing
- Balance

## Don't forget

- Associated injuries eg concussion



## **COMMON TRAUMATIC EAR INJURIES (AURICULAR INJURIES)**

### Outer Ear

- Haematoma
- Lacerations

### Middle Ear

- Tympanic membrane rupture

### Inner Ear

# OUTER EAR – HAEMATOMA (AURICULAR HAEMATOMA)

- **Definition** – a haematoma is a collection of blood
- **Pathology** - an accumulation of blood adjacent to the cartilage of the ear
- **Mechanism of injury** – a direct blow or rubbing of the ear
- **Sports commonly seen** – wrestling, martial arts, boxing, rugby (especially in front rower or second rower), water polo
- **Initial presentation** - may present acutely after a direct trauma or accumulate over time (minutes) with repeated blows or rubbing



# OUTER EAR – HAEMATOMA (AURICULAR HAEMATOMA)

- **Signs and Symptoms**

Painful swollen tender and tense collection

- **Assessment**

May be tender and soft to touch

- **Potential Problems, Complications**

Need to ensure the middle and inner ear have not been damaged or other trauma to the face or skull

- Recurrent bleeding may compromise the cartilage of the ear leading to permanent damage – a cauliflower ear

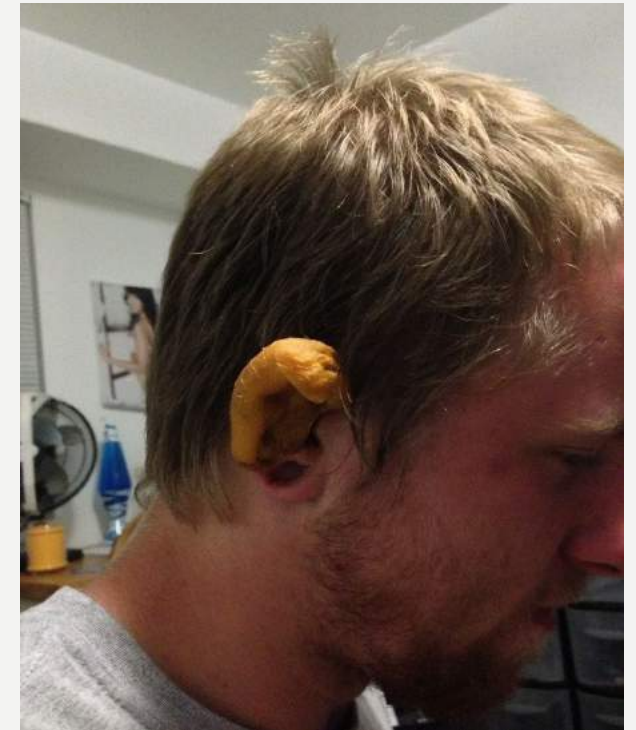




# OUTER EAR – HAEMATOMA (AURICULAR HAEMATOMA)

Emergency Care protocol/interventions  
(i.e., Emergency referral.)

- immediately apply ice and firm compression to the haematoma
- the best treatment of an acute haematoma is needle aspiration by a doctor; once aspirated the injury requires compression to prevent re-accumulation of the haematoma (which is common)



# OUTER EAR – HAEMATOMA (AURICULAR HAEMATOMA)

**Return to sports concerns:**

Precautions the ear should be protected when the player returns to sport



**Example:** Using a guard or headgear



# OUTER EAR – LACERATIONS

- **Definition**

A laceration is a cut in the skin

- **Pathology**

The skin of the ear is very thin and especially at the front of the ear

- **Mechanism of injury**

Direct blow or contact with a sharp object e.g.

- **Initial presentation / Signs and Symptoms**

Usually present with pain and bleeding





# OUTER EAR – LACERATIONS

- **Assessment**

As the skin is very thin in parts, ensure that the underlying cartilage is intact

- **Potential Problems, Complications**

Infection, slow or poor healing

- **Emergency Care protocol/interventions**

Should be assessed by a doctor to ensure the wound heals; may require surgery

- **Return to sports concerns, precautions**

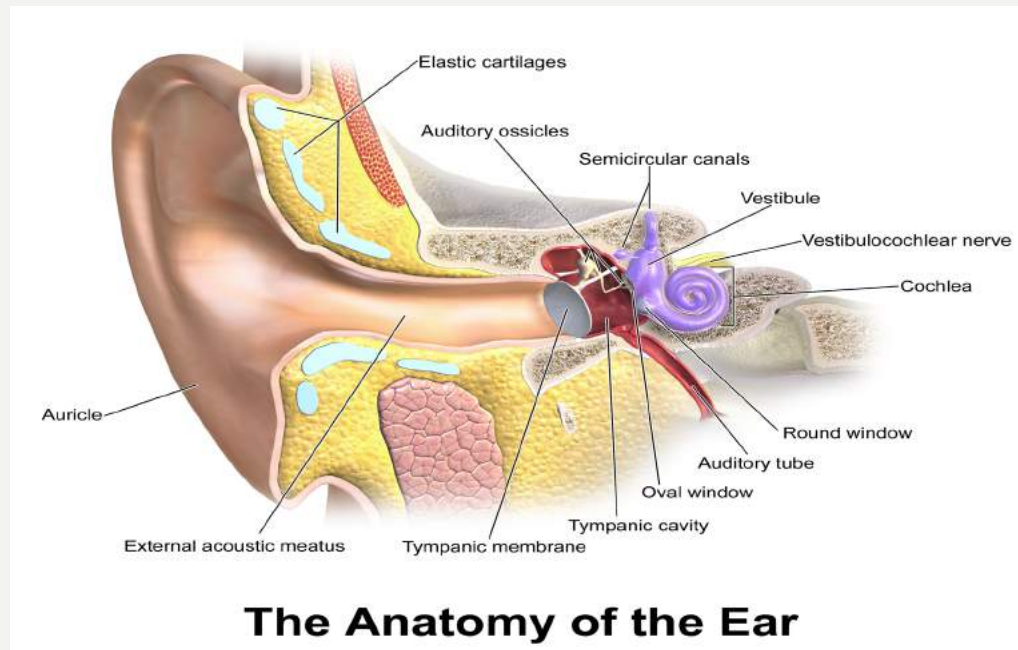
After laceration is healed



# MIDDLE EAR TYMPANIC MEMBRANE RUPTURE

- **Definition**

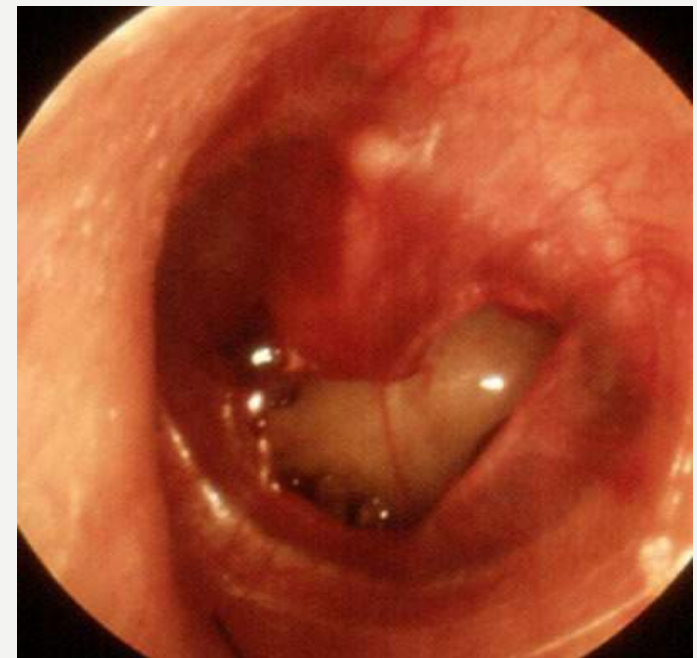
The tympanic membrane or eardrum is a thin layer of tissue stretched across the ear canal; it is a crucial component of the process of hearing and also prevent water or fluid entering the inner ear from the outer ear



# MIDDLE EAR **TYMPANIC MEMBRANE RUPTURE**

- **Pathology**

The tympanic membrane is usually damaged with a blow to the side of the head, especially with a cupped hand, which may force a rush of air into the middle ear, causing the tympanic membrane to tear (rupture)



# MIDDLE EAR **TYMPANIC MEMBRANE RUPTURE**

- **Mechanism of injury**

A blow to the head

- **Initial presentation**

Following a blow to the ear or head there is immediate symptoms

- **Signs and Symptoms**

Pain in the ear, loss of hearing on that side, ringing in the ear (tinnitus), bleeding from the ear





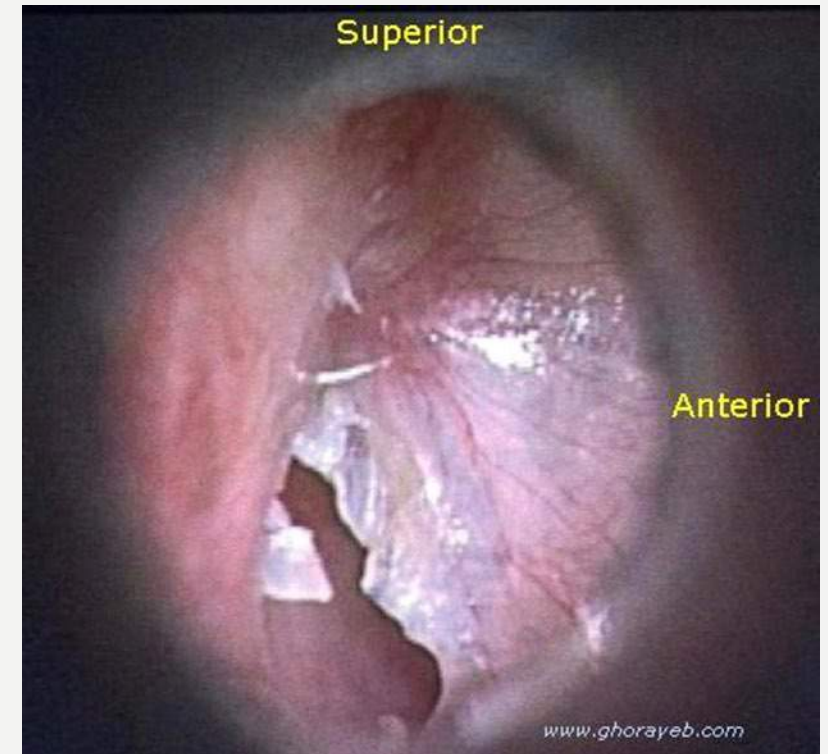
# MIDDLE EAR TYMPANIC MEMBRANE RUPTURE

- **Assessment**

The player should be assessed by a doctor to view the tympanic membrane via an otoscope

- **Potential Problems, Complications**

The membrane usually heals over a few days to weeks but occasionally; antibiotics may be required





# MIDDLE EAR **TYMPANIC MEMBRANE RUPTURE**

- **Emergency Care protocol/interventions**

Assessment by a doctor in the first 24 hours after injury is important to confirm the diagnosis and commence treatment

- **Return to sports concerns, precautions**

Once the rupture has healed, the player is usually able to return to sport. Headgear can protect / prevent



# INNER EAR

- **Definition**

Damage to the inner ear is uncommon in sport but may result in permanent hearing or balance disturbance

- **Pathology**

Various structures can be damaged by trauma including the semi-circular canals or the small bones of the inner ear

- **Mechanism of injury** – direct blow



# INNER EAR

- **Initial presentation / Signs and Symptoms**

Hearing loss and/or balance disturbance following trauma, tinnitus, balance, vertigo

- **Assessment**

Needs doctor assessment and possible scans and hearing tests

- **Potential Problems, Complications**

Any direct trauma causing inner ear injury may also cause concussion



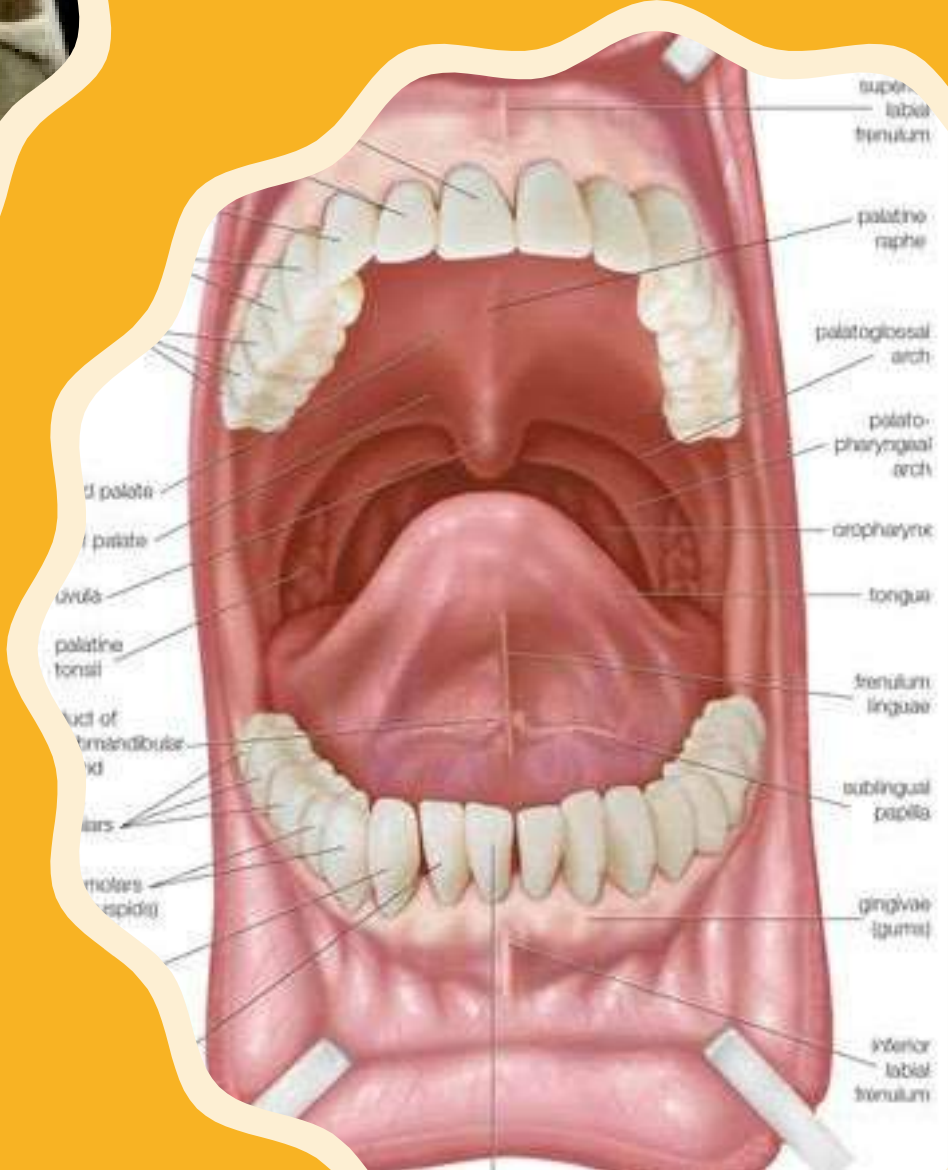
# INNER EAR

- **Emergency Care protocol/interventions**  
Refer to doctor for assessment
- **Return to sports concerns, precautions**  
Return to sport should not occur until all symptoms are settled, which may take some time for assessment and treatment to occur





# MOUTH ANATOMY





# ASSESSMENT OF THE MOUTH

## Look

- Mouth inside and out
- Teeth
- Lips

## Feel

- Mouth
- Don't touch teeth
- Lips

## Special tests

- Jaw movements – open/close/side to side
- Does the bite feel normal

## Don't forget

- Don't forget airways/breathing/circulation
- Other injuries to nose and eyes



# TRAUMATIC DENTAL AND ORAL INJURIES

## Mouth

- Lacerations

## Teeth

- Damaged teeth
- Losing a tooth

## Face and Jaw

- Zygomaticomaxillary complex (cheek)
- Maxilla
- Mandible

## Temporomandibular joint (TMJ) injuries

# LACERATIONS **INSIDE THE MOUTH**

- **Mechanism of injury**

Direct trauma, biting the tongue or soft tissue, fall e.g. from a bike

- **Definition**

Lacerations can occur in the lips, or in the soft tissues in such as the inner cheek or the tongue

- **Pathology**

The mouth has a good blood supply so lacerations in the mouth will usually bleed profusely





# LACERATIONS **INSIDE THE MOUTH**

- **Initial presentation / Signs and Symptoms**  
Usually occurs following a fall or heavy contact with pain, bleeding, swelling, altered speech
- **Assessment**  
Look, feel, move; do not put your fingers in the mouth of an unconscious or semi-conscious patient
- **Potential Problems, Complications**  
Be aware of other injuries e.g. teeth injuries, aspiration of teeth, concussion



# LACERATIONS **INSIDE THE MOUTH**

- **Emergency Care protocol/interventions**  
Don't forget **ABC (Airway, Breathing, circulation)**
- **Return to sports concerns, precautions**  
After appropriate repair and healing;  
players should use mouthguards in high risk sports



# FRACTURES - CHEEK (ZYGOMATICOMAXILLARY COMPLEX)

- **Definition**

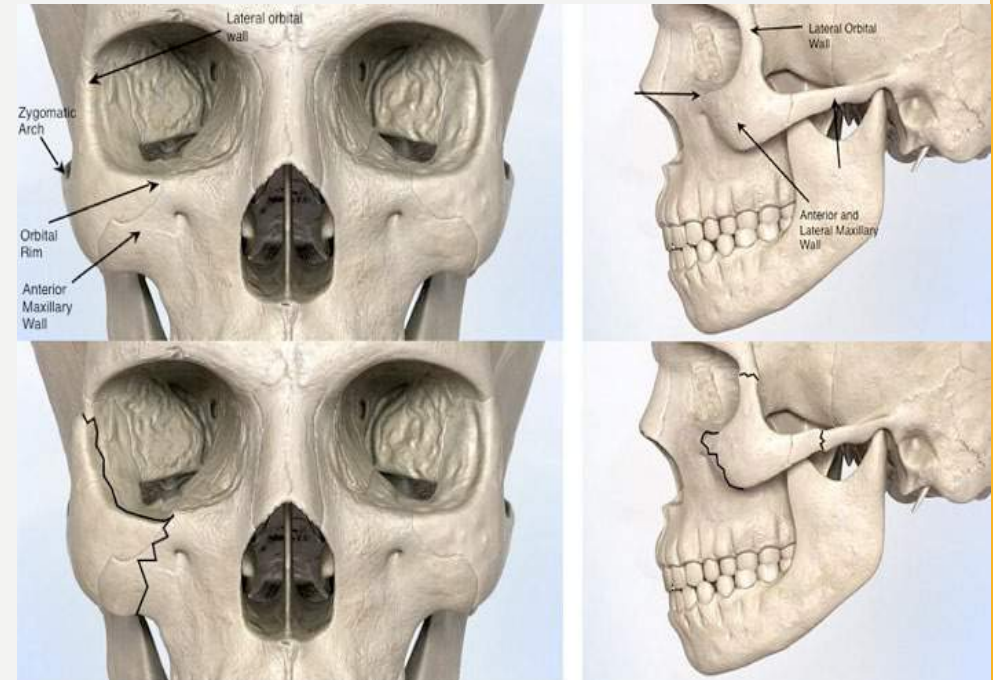
Fractures of the cheek bones occur from direct blow e.g. a fall, a fist, a hockey stick or cricket ball

- **Pathology**

Fractures of the cheek bones can be displaced or undisplaced; can extend to the orbit

- **Mechanism of injury**

Direct blow to the cheek



# FRACTURES - CHEEK (ZYGOMATICOMAXILLARY COMPLEX)

- **Initial presentation / Signs and Symptoms**  
pain, very tender to touch, swelling, flatness of the cheek; there may be crepitus (crackling of the skin when touched), there may be double vision, numbness of the cheek, movements of the eyes are limited and there is asymmetry of the eyes
- **Assessment**  
The player must be thoroughly assessed for facial injuries; **remember ABC**



# **FRACTURES - CHEEK**

## **(ZYGOMATICOMAXILLARY COMPLEX)**

- **Potential Problems, Complications**  
Associated other injuries e.g. eye injury, other fractures, concussion
- **Emergency Care protocol/interventions**  
Refer immediately for doctor review and x-ray/scans
- **Return to sports concerns, precautions**  
After all injuries are healed



# FRACTURES – MAXILLA AND FACIAL

- **Definition and pathology**

Fractures of the maxilla occur from direct blow e.g. a fall, a fist, a hockey stick or cricket ball; there may be greater fractures extending to the whole face and affecting the palate or the orbit.

Facial fractures usually require a large amount of force e.g. fall from a bike or a height onto the face

- **Mechanism of injury**

Direct blow to the face





# FRACTURES – MAXILLA AND FACIAL

- **Initial presentation / Signs and Symptoms**

Pain, very tender to touch, swelling, flatness of the cheek; there may be crepitus (crackling of the skin when touched), there may be double vision, numbness of the cheek, movements of the eyes are limited and there is asymmetry of the eyes; the person's face may look asymmetrical or unusual; there may be malocclusion

- **Assessment** – the player must be thoroughly assessed for facial injuries; **remember ABC**; there can be significant injury to airways



# FRACTURES – MAXILLA AND FACIAL

- **Potential Problems, Complications**

Associated other injuries e.g. eye injury, other fractures, concussion, airways and breathing

- **Emergency Care protocol/interventions**

Refer immediately to hospital for doctor review and x-ray/scans and further management; if in any doubt, call an ambulance

- **Return to sports concerns, precautions**

After all injuries are healed which may be months





# FRACTURE - MANDIBULAR

- **Definition and pathology**

Fractures of the mandible (lower jaw) is a common jaw fracture; most common at the angle of the jaw or the condyle; often fractures in more than one place

- **Mechanism of injury**

Results from a direct blow or fall



# FRACTURE - MANDIBULAR

- **Initial presentation/Signs and Symptoms**

Pain, tender, swelling, malocclusion, bruising in the floor of the mouth, palpable defects, crepitus, malalignment of the teeth, tingling or numbness of the lower lip and chin

- **Assessment**

The player must be thoroughly assessed for injuries; **remember ABC** – their airway can be compromised; players will be more comfortable sitting forward which maintains the airway



# FRACTURE - MANDIBULAR

- **Potential Problems, Complications**  
Airway complications, concussion, other head or neck injuries
- **Emergency Care protocol/interventions**  
Urgent referral to hospital (ambulance may be required). X-rays and/or scans required. May need surgery
- **Return to sports concerns, precautions**  
After all injuries are healed, which may be months



# TEMPEROMANDIBULAR (TMJ) INJURIES

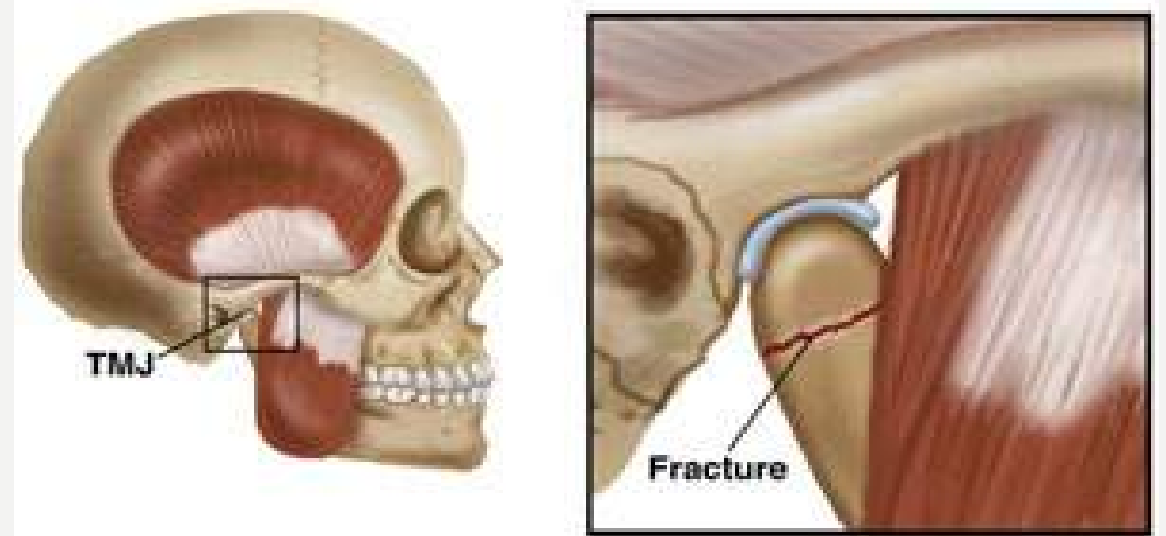
- **Definition and pathology**

Blows to the mandible can injure the TMJ joint; possible injuries include dislocation, bleeding into the joint (haemarthrosis), meniscal displacement, intracapsular fracture of the head of the condyle

- **Mechanism of injury**

Blow to mandible (jaw)

Temporomandibular Joint Fractures



# TEMPEROMANDIBULAR (TMJ) INJURIES

- **Initial presentation / Signs and Symptoms** Pain, tenderness, limited opening of the jaw, malocclusion, inability to close the mouth might indicate dislocation, asymmetry
- **Assessment**  
Assess tender areas and movement of the jaw, occlusion of the teeth
- **Potential Problems, Complications**  
Other facial injuries and fractures



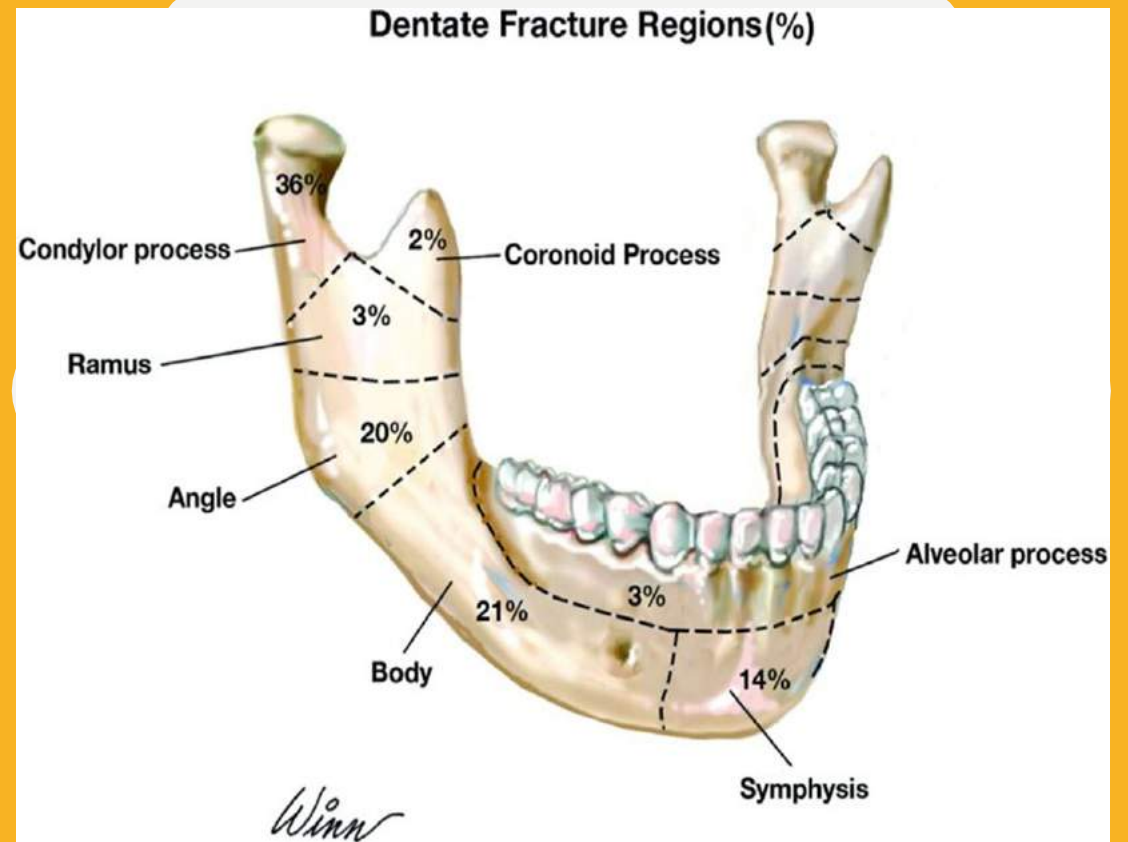
# TEMPEROMANDIBULAR (TMJ) INJURIES

- **Emergency Care protocol/interventions**  
Refer to doctor for assessment which may include x-rays or scans; dislocation or fracture may require surgery
- **Return to sports concerns, precautions**  
After injuries have healed which may take weeks





# DENTATE FRACTURE REGIONS



# DENTAL INJURIES

- **Definition**

Damage to teeth range from chips, loosening of teeth or complete avulsion of a tooth or teeth

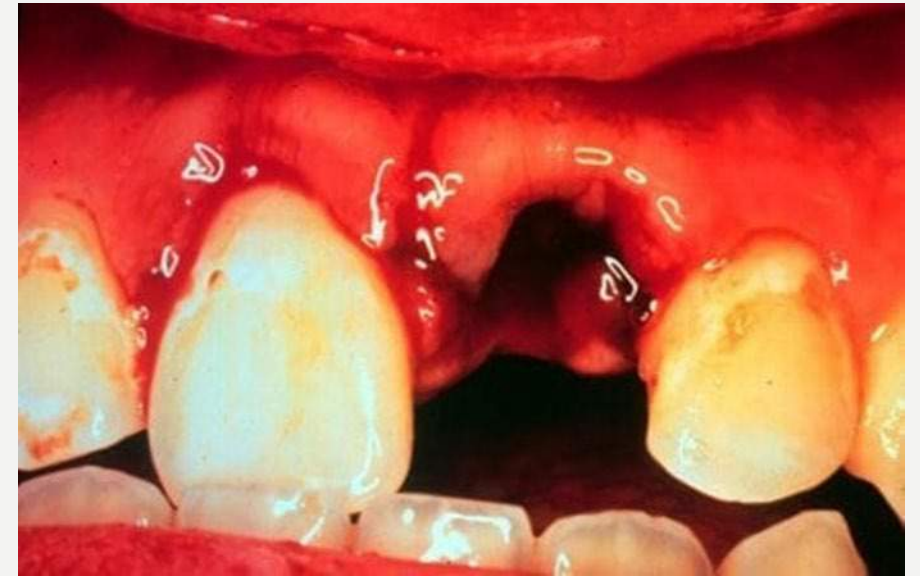
- **Pathology**

- **Mechanism of injury**

Collision with an opponent, trauma from equipment eg hockey stick, fall onto face eg from a bike

- **Initial presentation**

Pain, bleeding, swelling, uneven bite





# DENTAL INJURIES

- **Signs and Symptoms**

Pain, bleeding, swelling, uneven bite

- **Assessment**

Assess the patient; find the tooth

- **Potential Problems, Complications**

If a tooth or fragment of tooth cannot be found, especially in children, then a chest x-ray is required to exclude aspiration



# DENTAL INJURIES

- **Emergency Care protocol/interventions (i.e., Emergency referral.)**

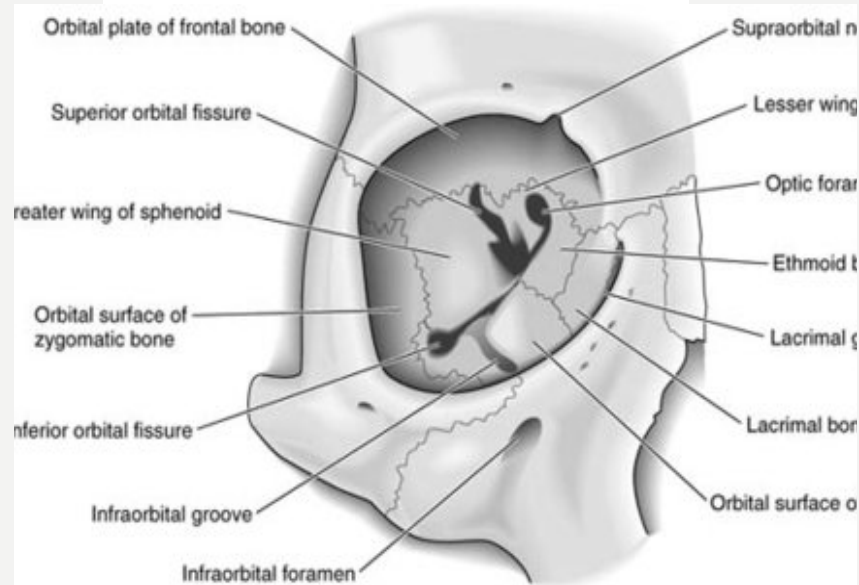
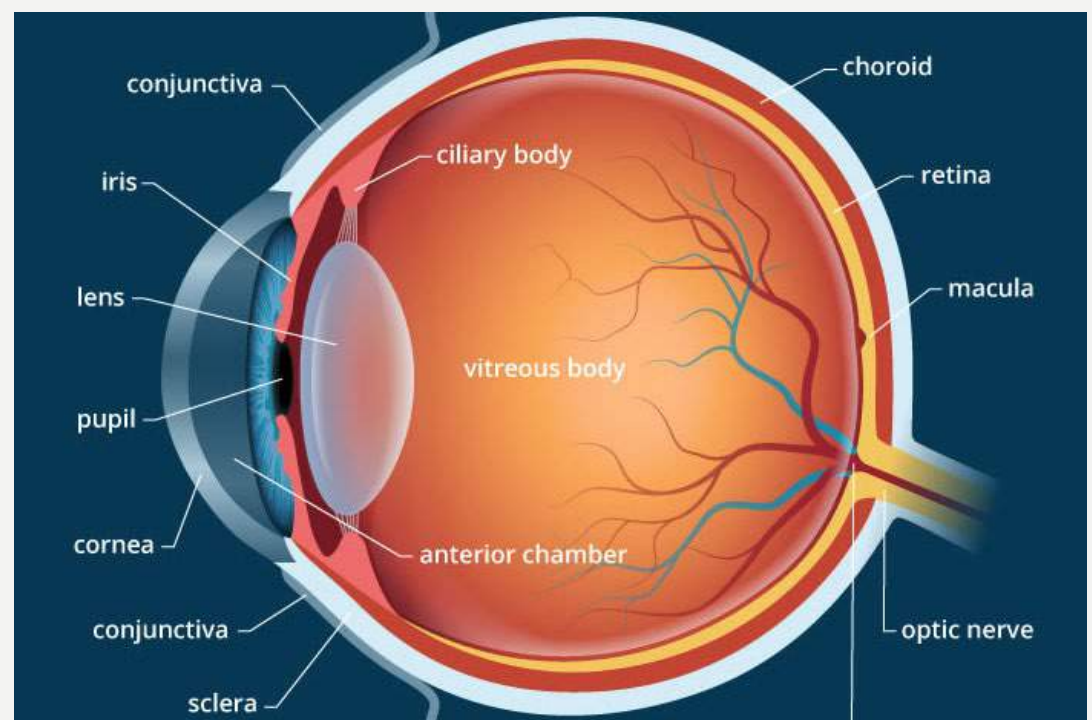
Tooth injuries require immediate specialist assessment if it is broken, loose, bleeding or completely avulsed

- **Return to sports concerns, precautions**

Only after the injuries are appropriately treated



# EYE ANATOMY





# ASSESSMENT OF THE EYE

## Look

- Eye and surrounding tissue

## Feel

- Tenderness or numbness

## Move

- Eye movement – full and equal
- Is there pain with movement
- Does light bother the eye



## ASSESSMENT OF THE EYE

### Special Test

- Can the patient see out of both eyes in all directions and all fields; examine both eyes individually
- Is their vision blurred
- Are there unusual spots
- Looking inside the eye requires a doctor assessment and use of an ophthalmoscope and other equipment (eg fluorescein eye drops, local anaesthetic drops)

### Don't Forget

- Associated injuries eg fractures of the face and nose
- Concussion



# TRAUMATIC EYE AND ORBITAL INJURIES

Corneal abrasions

Subconjunctival  
haemorrhage

Hyphaema

Retinal detachment

Orbital fractures



# CORNEAL ABRASIONS

- **Definition and Pathology**

Common injury in which the outer layer of the cornea is scratched

- **Mechanism of injury**

Fingernail or foreign body eg metal fragment scratches the cornea

- **Initial presentation / Signs and Symptoms**

Pain, irritation in the eye, a sensation that there is something in the eye, blurred vision





# CORNEAL ABRASIONS

- **Assessment**  
Should be referred to a doctor for assessment as soon as possible
- **Potential Problems, Complications**  
Risk of infection and scarring if not treated appropriately
- **Emergency Care protocol/interventions**  
Refer to doctor same day
- **Return to sports concerns, precautions**  
After all symptoms settled, usually a few days



# SUBCONJUNCTIVAL HAEMORRHAGE

- **Definition and Pathology**

Trauma to the conjunctiva leads to bleeding

- **Mechanism of injury**

Direct scratch or blow

- **Initial presentation / Signs and Symptoms**

Bright red area



# SUBCONJUNCTIVAL HAEMORRHAGE

## Assessment

If small, it is usually of no concern; if large or causing visual symptoms or photophobia, then it should be assessed; if you can't see the behind the haemorrhage, it could indicate a fracture of the orbit or zygomatic arch



# SUBCONJUNCTIVAL HAEMORRHAGE

- **Potential Problems, Complications**  
Be aware of fractures and significant injury in the eye
- **Emergency Care protocol/interventions**  
Doctor referral if vision is impaired or you can't completely see behind the haemorrhage
- **Return to sports concerns, precautions**  
Usually able to return immediately





# HYPHAEMA

- **Definition and Pathology**

Bleeding into the anterior chamber of the eye, in front of the iris

- **Mechanism of injury**

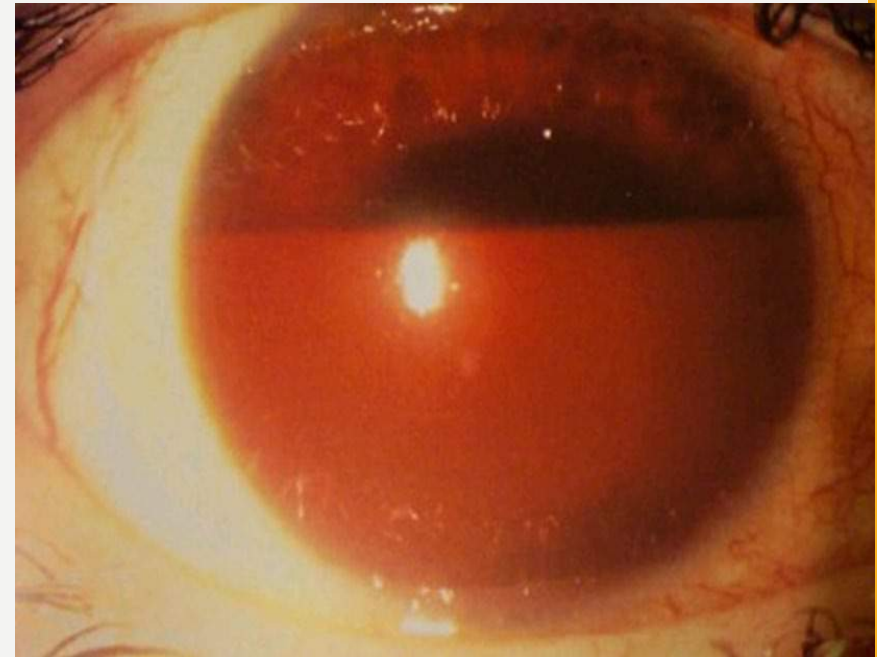
Blow to the orbit or blunt trauma

- **Initial presentation / Signs and Symptoms**

May see a fluid level of blood or clear fluid; may only be seen with a slit lamp

- **Assessment**

Needs referral immediately to ophthalmologist (eye specialist)



# HYPHAEMA

- **Potential Problems, Complications**

Bed rest is required for several days to prevent further damage to the cornea; no aspirin or anti-inflammatories

- **Emergency Care protocol/interventions**

(i.e., Emergency referral.)

All should be referred to an ophthalmologist

- **Return to sports concerns, precautions**

As guided by an ophthalmologist





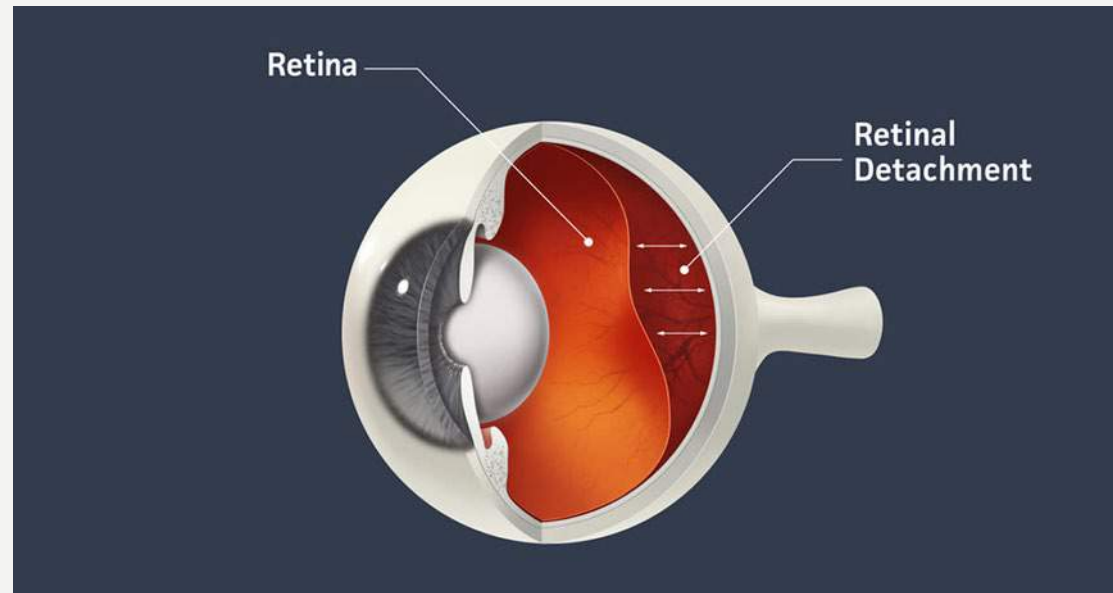
# RETINAL DETACHMENT

- **Definition and Pathology**

The retina is stripped or lifted off the posterior wall of the orbit

- **Mechanism of injury**

Blunt trauma or perforating trauma; may occur sometime after trauma eg months



# RETINAL DETACHMENT

- **Initial presentation / Signs and Symptoms**

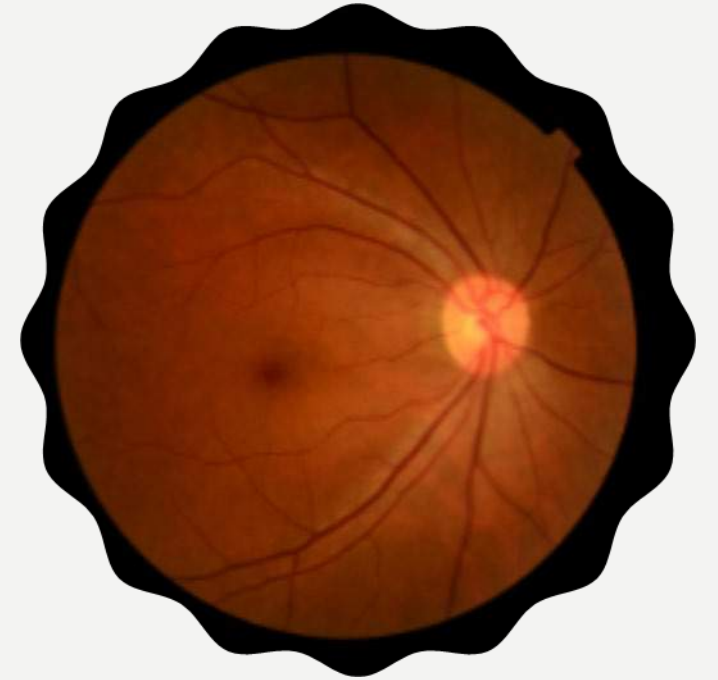
The patient reports flashing lights or the presence of a “curtain” coming across the field of vision

- **Assessment**

Immediate referral to ophthalmologist

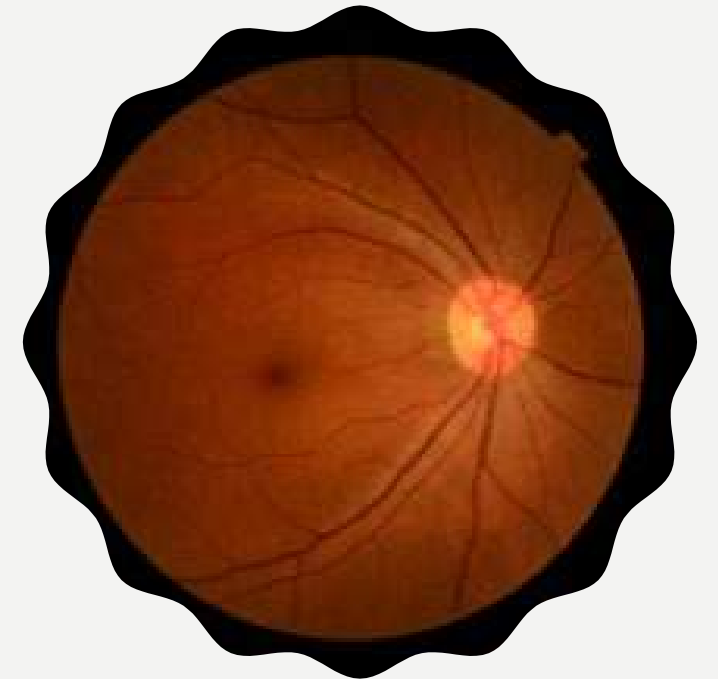
- **Potential Problems, Complications**

If not treated immediately it may result in permanently lost or impaired vision



# RETINAL DETACHMENT

- **Emergency Care protocol/interventions**  
Immediate referral to an ophthalmologist
- **Return to sports concerns, precautions**  
The patient will need to avoid risky or contact sports for a prolonged period, perhaps permanently



# ORBITAL FRACTURES

- **Definition and pathology**

The walls of the orbit are very thin inferiorly and medially and can be easily fractured with direct trauma, resulting in a blow-out fracture. The contents of the orbit can protrude (herniate) through the fracture and possibly be trapped by the fracture

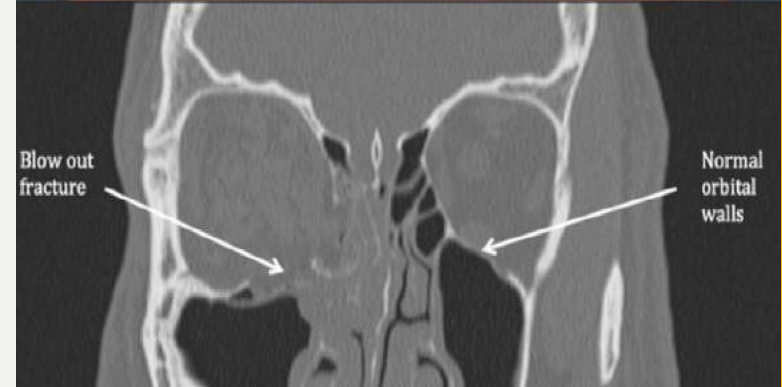
- **Mechanism of injury**

Direct blow to the eye e.g. squash ball, resulting in compression of the globe and orbital contents



# ORBITAL FRACTURES

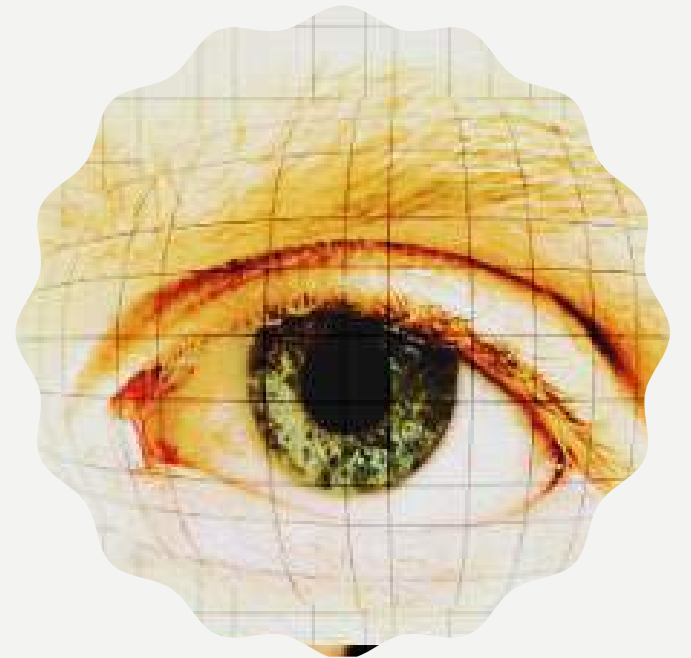
- **Initial presentation / Signs and Symptoms**  
Pain, blurred or altered vision, periorbital haematoma (especially after they blow their nose), restricted eye movements, the eye sinks into the orbit
- **Assessment**  
Needs immediate referral to doctor and scanning required. X-rays are often inadequate to see the fracture and CT scan is required
- **Potential Problems, Complications**  
Infection, impaired vision if the fracture is not reduced and stabilized





# ORBITAL FRACTURES

- **Emergency Care protocol/interventions**  
Referral to doctor ASAP for assessment and x-rays/scans
- **Return to sports concerns, precautions**  
After appropriate treatment and surgery; usually weeks to months



# *Team approach for the betterment of the athlete*

**In the absence of any emergency services at an event, the emergency care goals are to first stabilize the patient and provide basic life support.** Other sports medicine members who are emergency care certified working at an event should be primary care providers in the event of life-threatening trauma.

Any rapid return to sport may compromise the long-term health of the athlete

*If in doubt sit them out*



Thank  
you