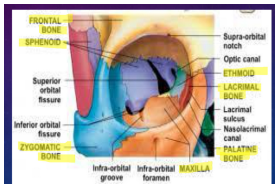
Orbit

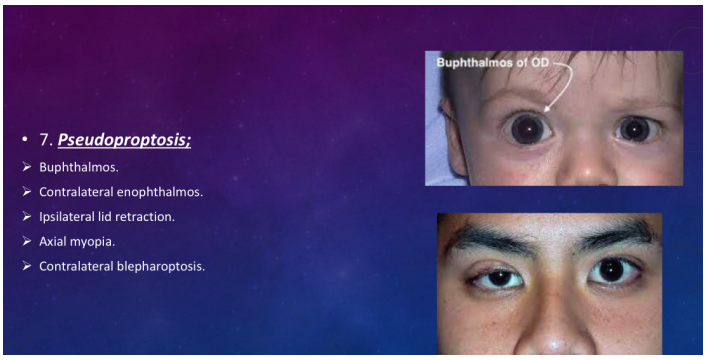
Definition

The orbit is a **bony socket** that contains:
- The **globe (eyeball)**
- **Optic nerve**
- **Extraocular muscles**
- **Blood vessels**
- **Lacrimal gland**
- Shape: **Pyramidal**
- size**~30 cc**

Bones Forming the Orbit (7 bones)

1. **Frontal**
2. **Ethmoid**
3. **Lacrimal**
4. **Sphenoid**
5. **Maxilla**
6. **Palatine**
7. **Zygomatic**



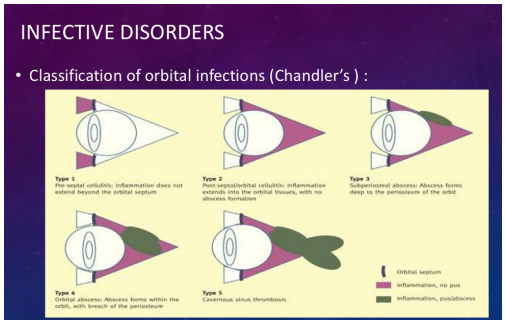


Orbital Apex
- Located within the **sphenoid bone**
- Contains:
- **Optic canal**

Optic Canal contains

Transmits:
1. **Optic nerve (CN II)**
2. **Ophthalmic artery**

3. Central retinal vein



Superior Orbital Fissure (SOF)

Located between the **lesser and greater wings of the sphenoid**

Transmits:
- **CN III (oculomotor)**
- **CN IV (trochlear)**
- **CN VI (abducens)**
- **Lacrimal nerve**
- **Frontal nerve**
- **Nasociliary nerve**
- **Superior ophthalmic vein**

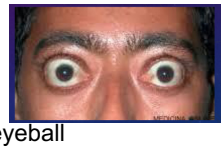
. Superior orbital vein
Orbital branch of medial meningeal artery
Reccurent branch of lacrimal artery.

Inferior Orbital Fissure (IOF)

Transmits:
- **Infraorbital nerve**
- **Zygomatic nerve**
- **Inferior ophthalmic vein (to pterygoid venous plexus)**
- Autonomic fibers

Provides **venous drainage from the orbit to the pterygoid venous plexus (face)**

Proptosis (Exophthalmos)



Forward displacement of the eyeball

Causes
- **Bilateral**:
- **Graves' disease (most common)**
- **Unilateral**:
- Orbital tumors
- Infections
- Inflammation
- Neoplastic disease
- Vascular lesions
- Thyroid eye disease
- **Pseudo-proptosis** (apparent, not true)

Measurement of Proptosis

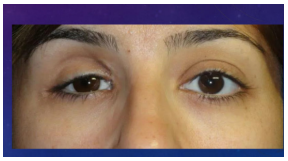
Hertel Exophthalmometer

Measures the distance between:
- Corneal apex and lateral orbital rim

Normal: 10–21 mm
Mild: 21–23 mm
Moderate: 24–27 mm
Severe: ≥28 mm

Enophthalmos

Backward displacement of the globe



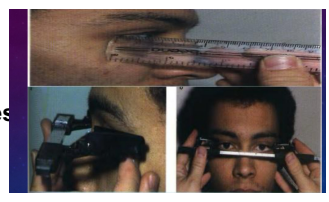
Causes
- Orbital fracture
- Orbital fat atrophy
- **Horner's syndrome (pseudoenophthalmos)**
- Trauma

Graves' Ophthalmopathy (Thyroid Eye Disease)

Most commonly affected muscle
- **Inferior rectus muscle**

Order of muscle involvement

IM SLOW
- **I**nferior rectus
- **M**edial rectus
- **S**uperior rectus
- **L**ateral rectus
- **O**blique muscles



Signs & Symptoms of Graves
- Red, painful eyes
- **Periorbital edema**
- **Lid retraction**
- Conjunctivitis

• **Diplopia**
• **Proptosis**
• Decreased visual acuity
• **Chemosis** (conjunctival edema due to fluid retention)

Complications of Graves' Ophthalmopathy (Thyroid Eye Disease)
• **Exposure keratitis** → due to lid retraction & proptosis
• **Corneal ulceration**
• **Chemosis** (conjunctival edema)

• **Lid retraction**
• **Compressive optic neuropathy**
→ optic nerve compression at the orbital apex
→ decreased visual acuity, color vision loss, RAPD

Treatment of Graves' Ophthalmopathy

Medical Treatment
• **Systemic corticosteroids** (2–3 days)
• **Radiotherapy**

Surgical Treatment
• **Orbital decompression surgery** (for optic nerve compression or severe proptosis)

Supportive / Symptomatic Treatment
• **Lubrication** (artificial tears)
• **Prisms** for diplopia
• **Corrective surgeries**

Other Causes of Proptosis
• **Cavernous sinus fistula**
• **Cavernous sinus thrombosis**
• **Orbital cellulitis**
• **Retrobulbar hemorrhage**
• **Orbital tumors**
• **Spheno-orbital meningioma**
• **Glaucoma** (rarely causes apparent proptosis)

Diplopia (Double Vision)

Definition

Perception of two images of a single object.

Types of Diplopia

1. Monocular Diplopia
• Persists when one eye is covered
• Causes:
• **Refractive errors**:
• Myopia
• Hypermetropia
• Astigmatism
• Lens abnormalities
• Corneal irregularities

If diplopia **remains when one eye is closed → monocular**

2. Binocular Diplopia
• Disappears when either eye is covered

• Causes:
• **Extraocular muscle disorders**
• **Cranial nerve palsies**
• **Neuromuscular junction disorders**

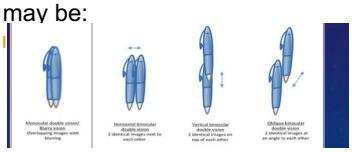
If diplopia **disappears when one eye is closed → binocular**

Causes of Binocular Diplopia
• Muscle disease
• Nerve palsy
• **Neuromuscular junction dysfunction**

Third Nerve (CN III) Palsy
• Eye position: **Downward and outward**
• **Ptosis** (levator palpebrae paralysis)
• **Dilated pupil** (parasympathetic fiber involvement)
• Loss of:
• Elevation
• Depression
• Adduction

Ocular Alignment

Misalignment may be:
• **Horizontal**
• **Vertical**
• **Oblique**



Measured by:
• **Angle of deviation**

Myasthenia Gravis (MG)
• Neuromuscular junction disorder
• Causes:
• **Fluctuating ptosis**
• **Diplopia**
• **Worse at the end of the day or at night**
• Improves with rest

High-Yield Exam Tips
• Diplopia gone when one eye is closed → **Binocular**
• Diplopia persists → **Monocular**
• Most commonly affected muscle in Graves → **Inferior rectus**
• CN III palsy → **Down & out + ptosis + dilated pupil**

Preseptal cellulitis:

1

2

Infection of the soft tissue **anterior to the orbital septum**.
Cause: Trauma or dermal infection.
Presentation: Tenderness, sudden onset, gradual swelling, fever. More severe cases may progress to **orbital cellulitis**.
Treatment: Topical antibiotics. If severe or in children, treat as **orbital cellulitis** (emergency).

Orbital cellulitis:
Inflammation of the orbital contents **posterior to the orbital septum**.
Common in: Children, elderly, immunocompromised.
Causes: Usually 2ry from **sinusitis (ethmoid), tooth infection, or trauma**. Most common microorganisms: *Staphylococcus*, *Streptococcus*.
Presentation:
• Red eye
• Periorbital inflammation and swelling
• Painful eye movement

• Headache, fever
• Lid edema, proptosis
• Conjunctival injection, chemosis
• Possible **ophthalmoplegia** and **vision changes** (e.g., RAPD if optic nerve involved)
DX: MRI or CT
Treatment:
. admission
• IV antibiotics: **Ceftriaxone + Vancomycin**
• Imaging: **CT orbit**, blood cultures
• Surgical drainage if abscess present, with close follow-up
• **Optic nerve decompression** if compromised (removal of part of the bony orbital canal)

Complications:
1. Optic nerve inflammation
2. Cavernous sinus thrombosis
3. Meningitis or brain abscess
4. Possible loss of vision
5. Death

*Rhabdomysarcoma **in children:** Absence of red reflex *

Dermoid cysts:
• Common, **ectodermal origin**
• Usually located in the **medial or lateral aspect of the superior orbit**
• **Treatment:** Surgical excision
• **Notes:** Avoid traumatic rupture; preoperative **imaging (CT scan) is necessary** before surgery