PROPTOSIS

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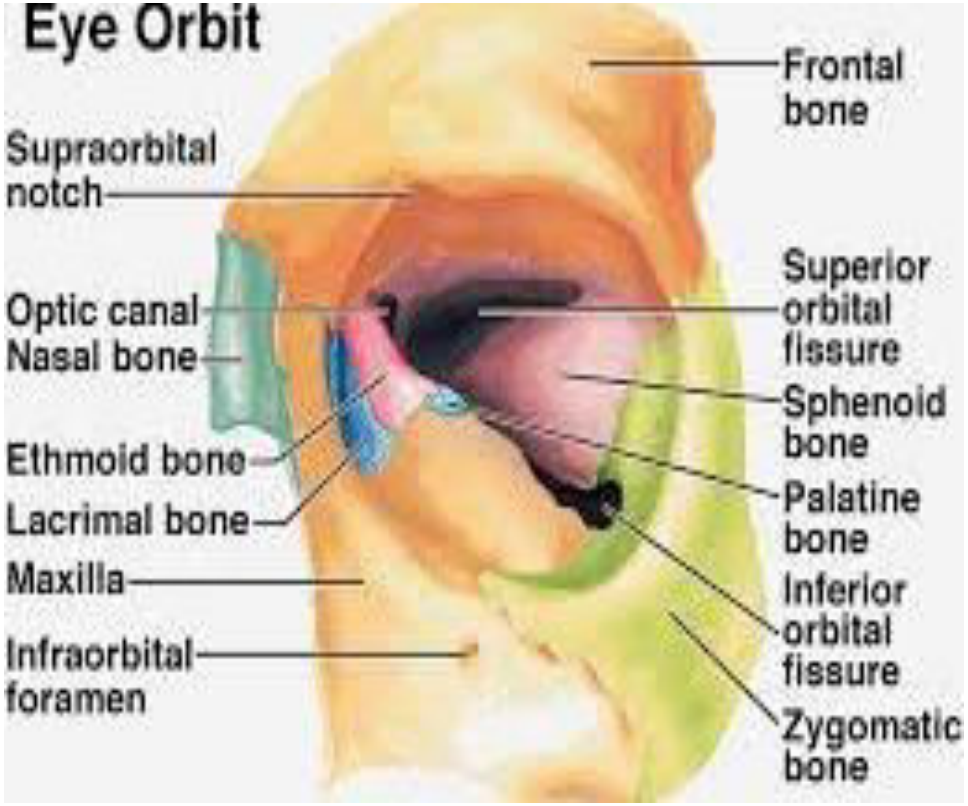
PRESENTATION LAY OUT

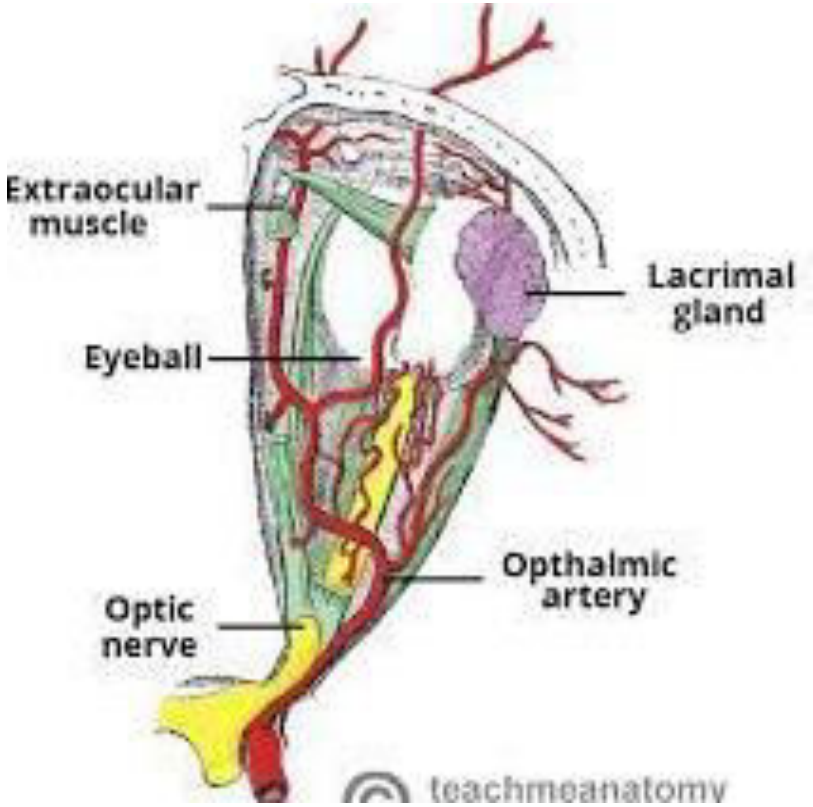
- Anatomy
- Definition
- Presenting features

Approach to a patient with Proptosis

History
Ocular/systemic examination
Local examination
Measurements
Lab investigations
Imaging
Histopathology
Conclusion

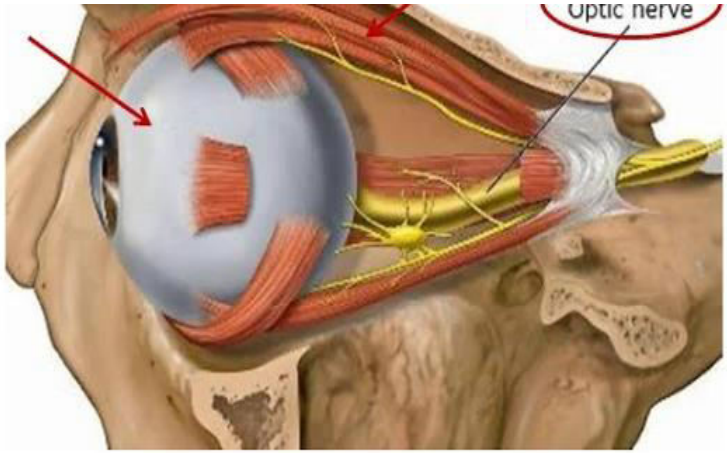
ANATOMY OF THE ORBIT

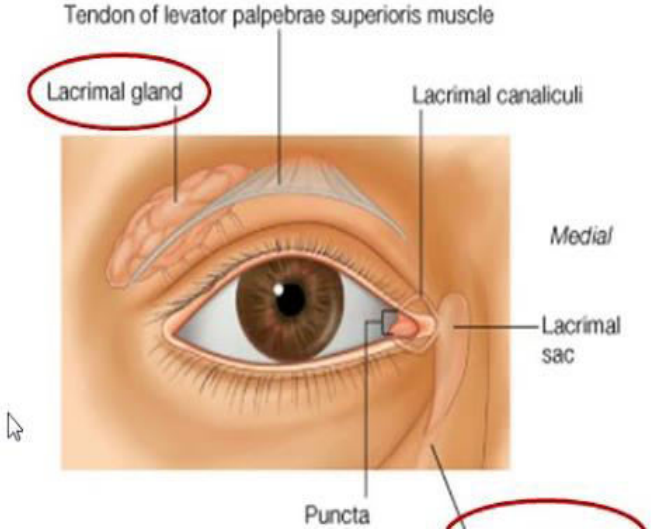


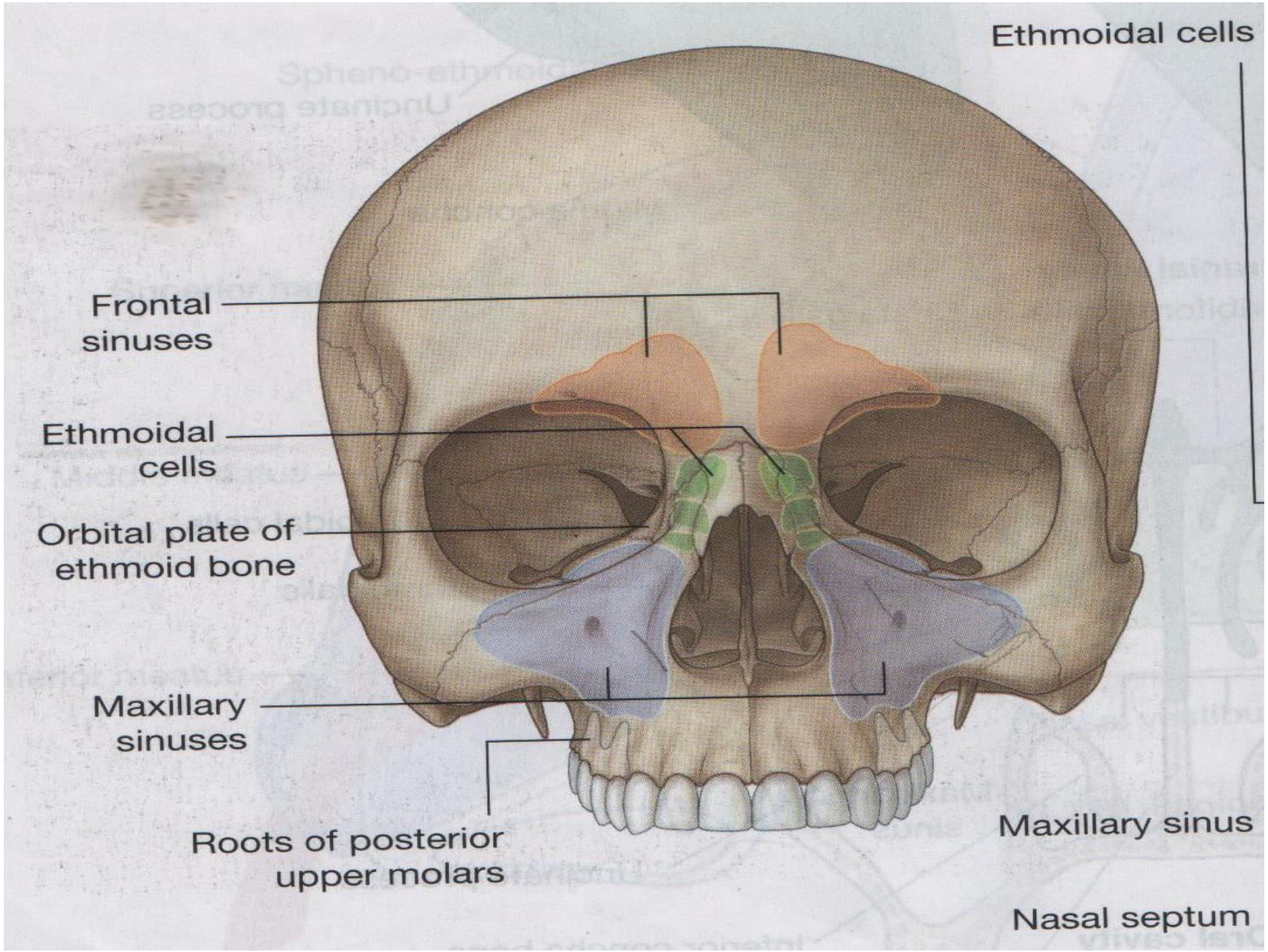


Contents of the orbit:

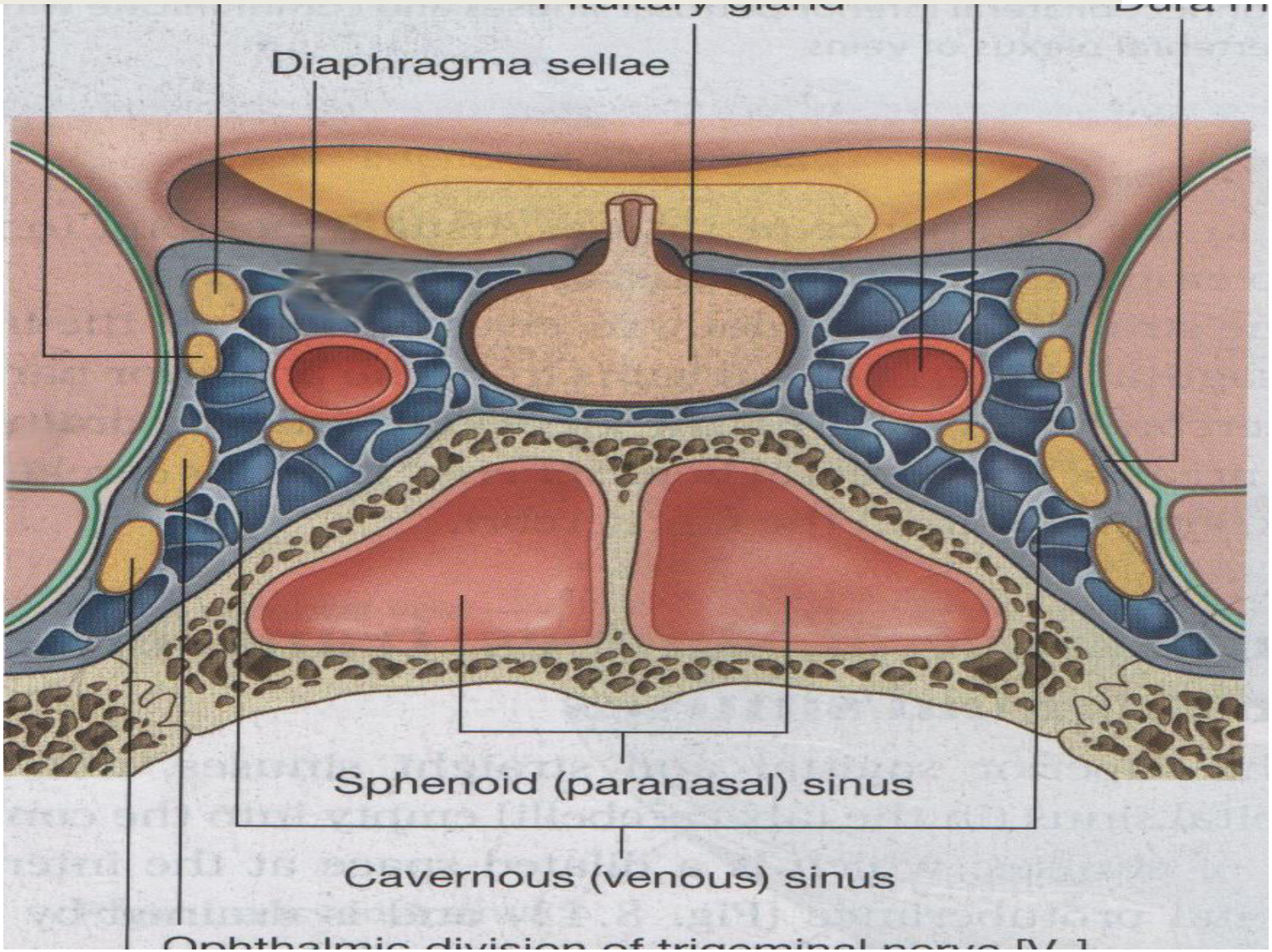
- Eye ball.
- Fascia.
- Ocular muscles: intra-ocular and extra-ocular muscles.
- Nerves: sensory and motor nerves.
- Blood vessels: ophthalmic artery and ophthalmic veins.
- Lacrimal apparatus: lacrimal gland and nasolacrimal duct.






Ethmoidal cells
Frontal sinuses
Ethmoidal cells
Orbital plate of ethmoid bone
Maxillary sinuses
Roots of posterior upper molars
Maxillary sinus
Nasal septum

POSTERIOR RELATION



- **PROPTOSIS** is defined as forward protrusion of the eyeball

➡ Proptosis of more than 21mm or more than 2mm asymmetry between the two eyes is abnormal

- ***EXOPHTHALMOS***

  Prominence of the eyeball secondary to thyroid disease

- ***PROPTOSIS***

  Prominence of the eyeball due to all other causes

- ***DYSTOPIA***

  Displacement of the globe in coronal plane

  It may coexist with proptosis or exophthalmos

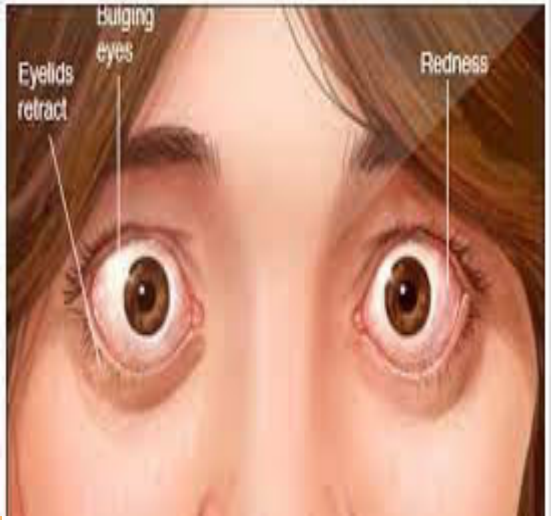
- ***EXORBITISM***

Due to decrease in the volume of orbit causing the contents to protrude forwards, Should be differentiated from proptosis and exophthalmos

PSEUDOPROPTOSIS

- It is the false impression of proptosis
- Seen in conditions like

1. Buphthalmos
2. High myopia
3. Contralateral ptosis
4. Contralateral enophthalmos



PRESENTING FEATURES

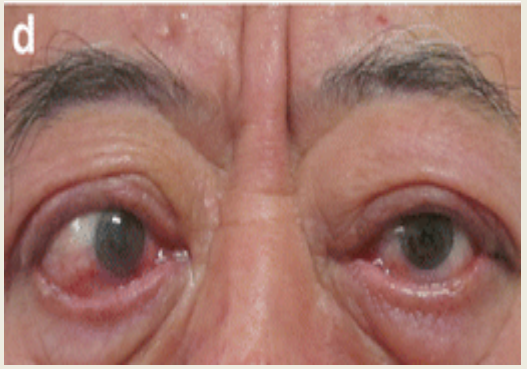
Disfigurement

Gradual vision loss

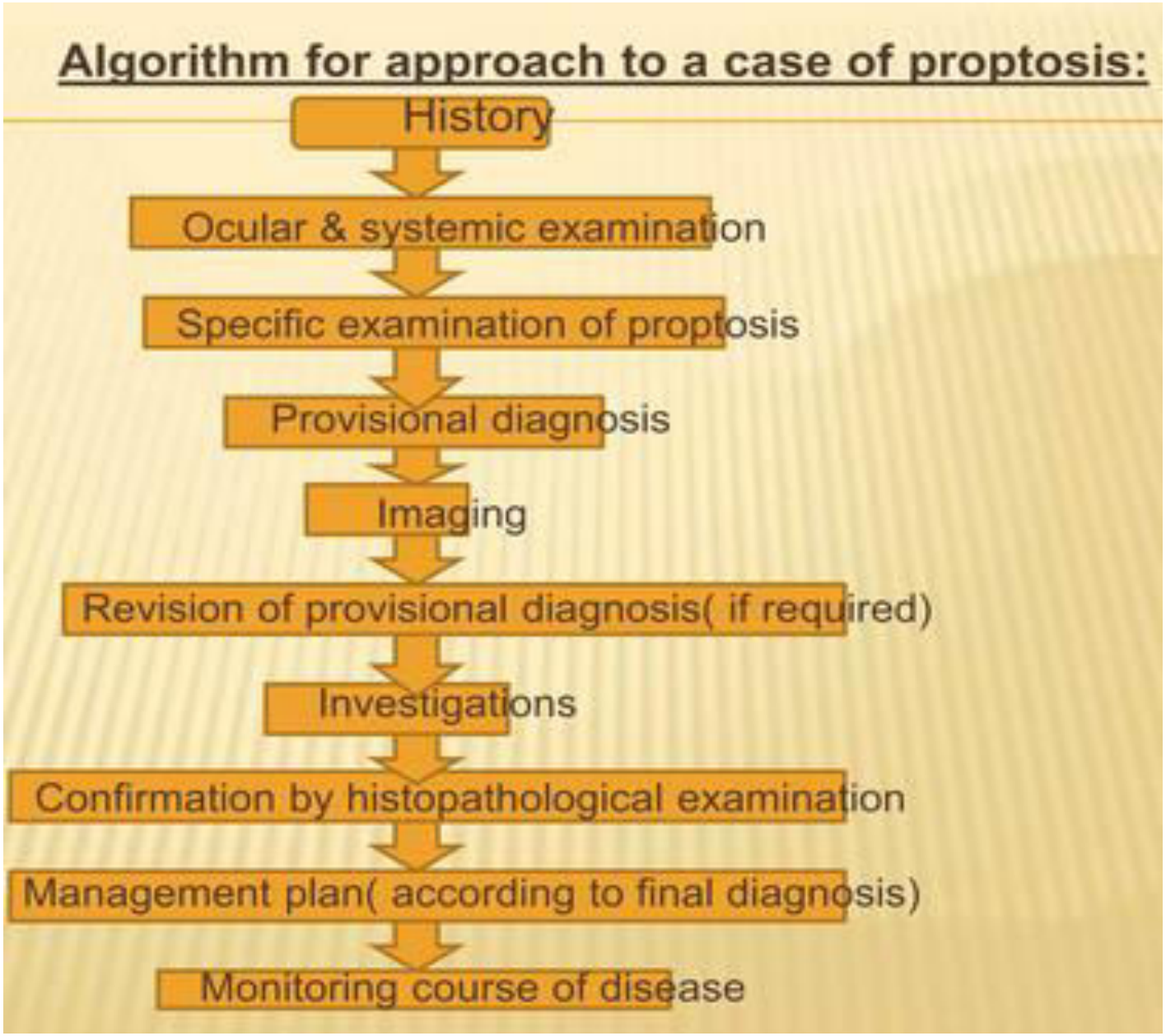
Diplopia

Pain

Reddness/chemosis



APPROACH


Algorithm for approach to a case of proptosis:
History
Ocular & systemic examination
Specific examination of proptosis
Provisional diagnosis
Imaging
Revision of provisional diagnosis(if required)
Investigations
Confirmation by histopathological examination
Management plan(according to final diagnosis)
Monitoring course of disease

HISTORY

(A Thorough Medical /Ophthalmic History)

- Protrusion of eyeball - Age of Onset , duration , progression
- Constant or intermittent
- Variation with posture / strain
- Decreased vision – preceded/followed
- Stationary/progressive
- Associated field defects

- h/o Pain
- h/o Double vision
- h/o Trauma
- h/o fever , chills ,systemic symptoms
- h/o cancer
- h/s/o thyroid disease ,TB , DM ,HTN ,HIV , Syphilis

CLASSIFICATION

LATERALITY UNILATERAL & BILATERAL

TYPE AXIAL OR ECCENTRIC

DURATION ACUTE ,CHRONIC & INTERMITTENT

NATURE PULSATILE OR NON PULSATILE

COURSE OF THE DISEASE/ONSET

ACUTE	SUBACUTE	CHRONIC
Hours-Days	Weeks	Months/years
Traumatic –orbital hematoma Orbital emphysema	Inflammatory-OID	Neoplastic – benign/malignant
Infective (orbital cellulitis)	Thyroid eye disease	Inflammatory
	Neoplastic	

PROGRESSION OF PROPTOSIS

ACUTE (HOURS-WEEKS)	SUBACUTE (1-4 WEEKS)	CHRONIC (≥ 1MONTH)
Infection	Inflammation	TAO
Inflammation	Parasitic infections	ORBITAL VARICES
Parasitic infections	Metaplastic neoplasia	Cavernous Hemangioma
Trauma		Schwannoma
Metastatic lesions /Haemangioma		Optic nerve Glioma

TEMPORAL ONSET OF COMMON ORBITAL DISEASES

Hours	**Days**	**Weeks**	**Months**	**Years**
Traumatic	Inflammatory	Inflammatory	Neolpastic	Neoplastic
Hemorrhagic	Infections	Neolpastic	Lymphoid	Degenerative
Infectious	Traumatic	Traumatic	Vascular	Lymphoid
	Hemorrhagic	lymphoid	Inflammatory	Vascular
	Vascular	Vascular	Degenerative	Inflammatory

NATURE OF PROPTOSIS

Intermittent proptosis

1. Orbital Varices
2. Periodic orbital edema
3. Recurrent orbital hemorrhage

Pulsating proptosis

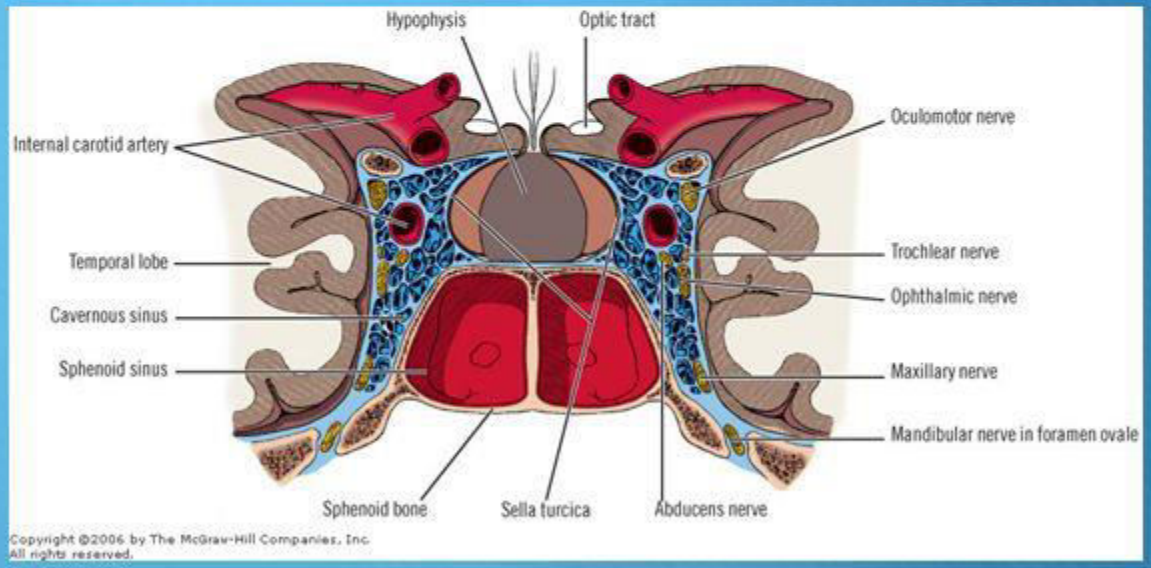
1. Carotid cavernous fistula
2. Congenital meningocele
3. Meningo encephalocele
4. Traumatic/Operative hiatus in orbital roof
5. Sacular aneurysm of ophthalmic artery

Carotid-Cavernous Fistula (CCF)

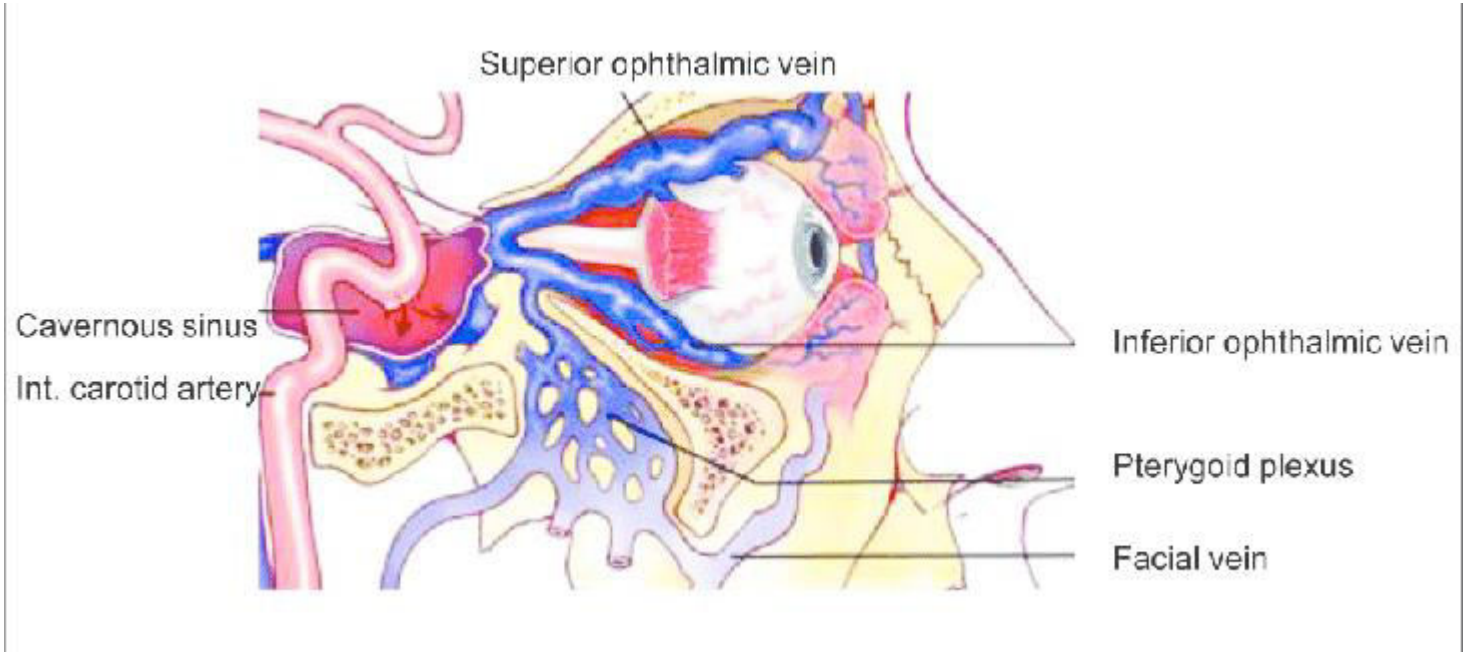
- Abnormal artery-vein communication
- #1 cause – trauma
- Chemosis, pulsatile proptosis, ocular bruit
- Cavernous sinus:

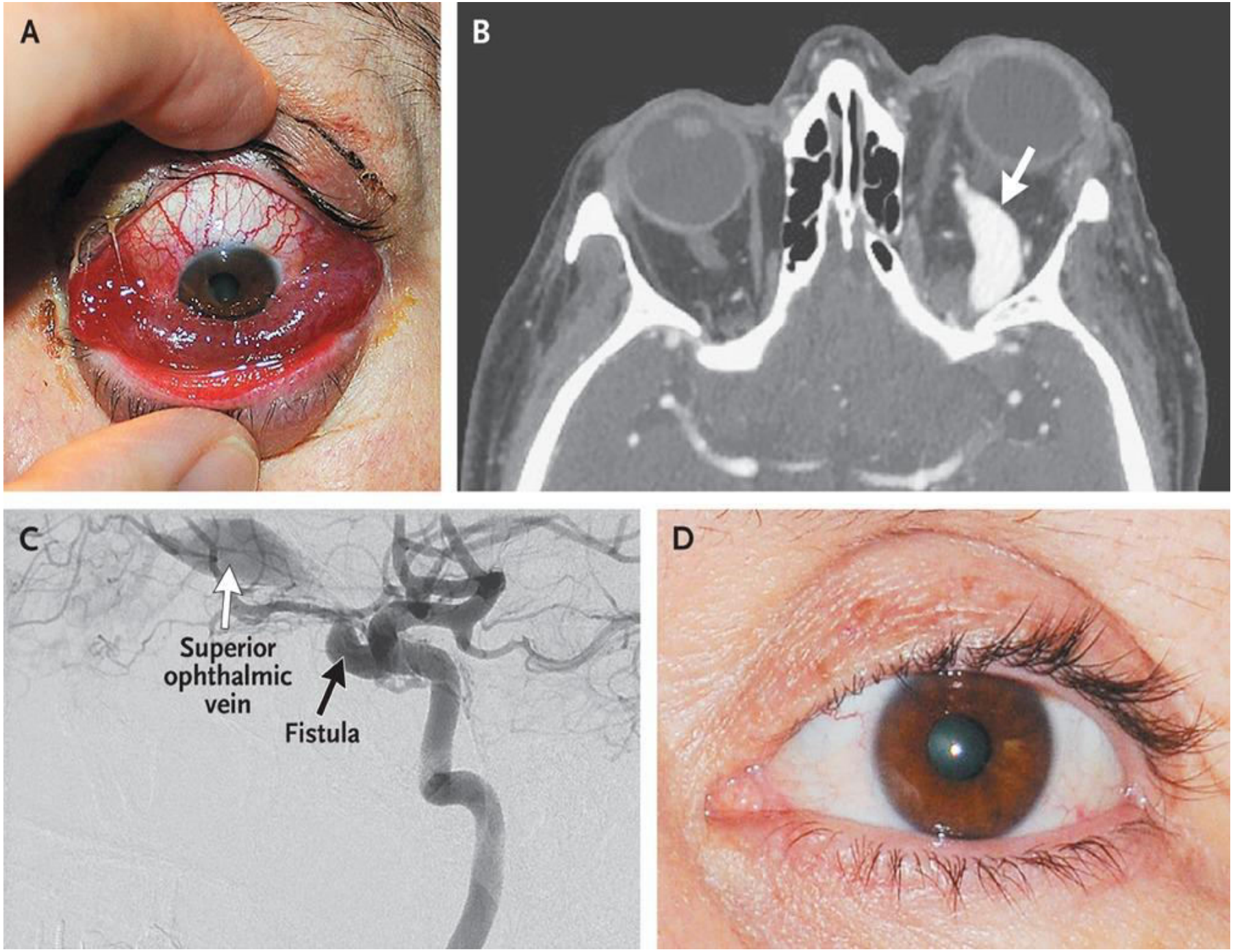
  3, 4, 6, V1, V2

  V3 & 7 do not go through

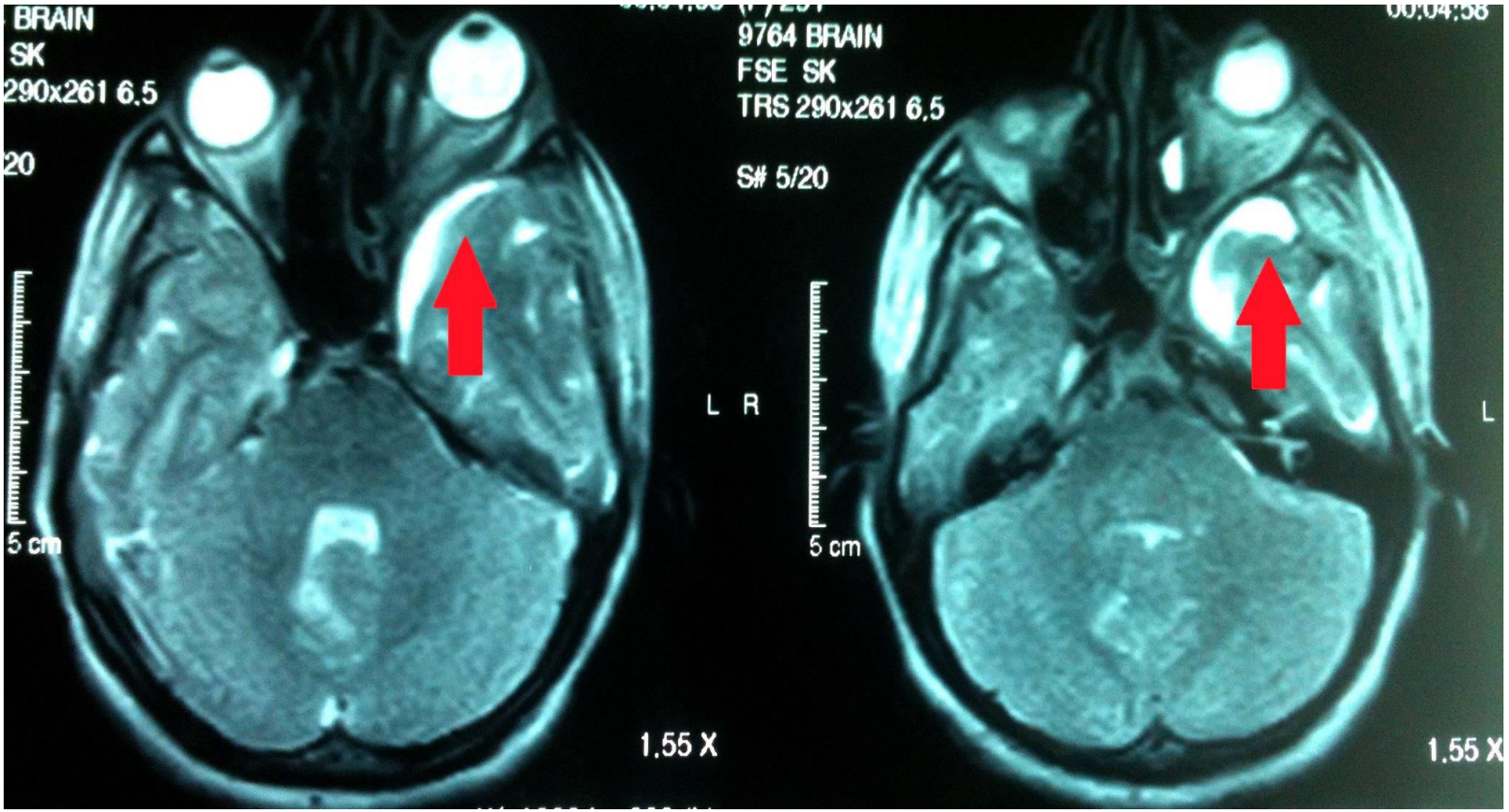


DIRECT CAROTID CAVERNOUS FISTULA

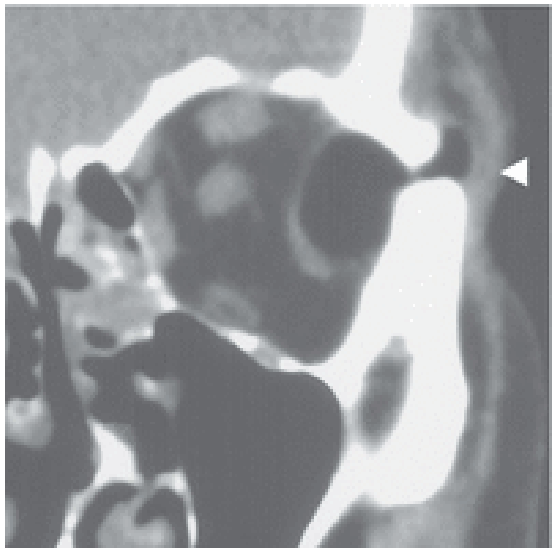



A
B
C
Superior ophthalmic vein
Fistula
D

PULSATILE PROPTOSIS



- **Progression:** The proptosis my be progressive,static or waxing-waning.
- Rare cases of ***intermittent proptosis*** are caused by ***dumb-bell dermoids***,with components in the orbit & the temporal fossa.
- **Medical & systemic history**: pt asked for h/o malignancy,weight loss,smoking.
- **Biological effects of disease**: ***pain***, swelling around the eye,diminished vision,watering, diplopia.

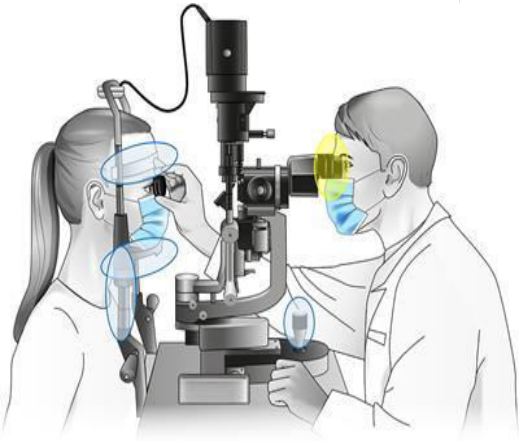


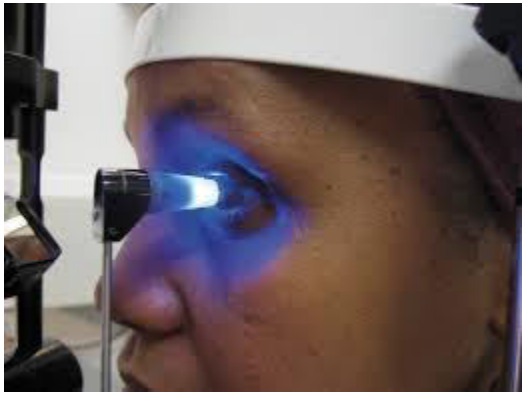
PAIN

SEVERE	MODERATE	DULL BORING PAIN
INFECTIONS	IOID	BONE EROSION DUE TO NEOPLASTIC TUMOR
INFLAMMATIONS	RUPERED DERMOID CYST	
ORBITAL ABCESS	TRAUMA	
METASTATIC LESIONS	MYCOCYSTICERCOSIS	
ACUTE ONSET TAO		
LYPMHANGIOMA		
HIGH FLOW CCF		

OCULAR EXAMINATION

- VISION
- PUPIL
- IOP
- OCULAR-MOTILITY & ALIGNMENT
- PROPTOSIS
- PALPRABERAL FISSURE HEIGHT
- CONJUNCTIVAL CHEMOSIS
- CORNEA
- FUNDUS





OCULAR EXAMINATION

- *Visual acuity*: diminution d/t optic nerve compression, corneal exposure.
- *Refraction:* acquired hyperopia d/t mass indenting the posterior pole of globe, high myopia causing pseudoproptosis.
- *IOP:* thyroid orbitopathy(d/t restriction of movt.), aretriovenous fistula (d/t elevated venous pressure)
- *Conjunctiva:* chemosis (in severe inflammation
  salmon colored patch (in lymphoma),
  dilated episcleral vessels (carotid cavernous fistula)

Eyelids: lid retraction,lid lag in thyroid orbitopathy,
S-shaped lid thickening (neurofibromatosis),lagophthalmos

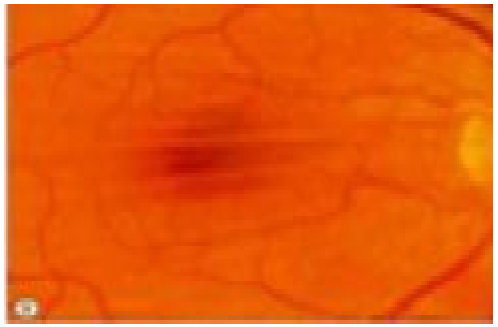
Bilateral lid retraction
- **Bilateral proptosis**

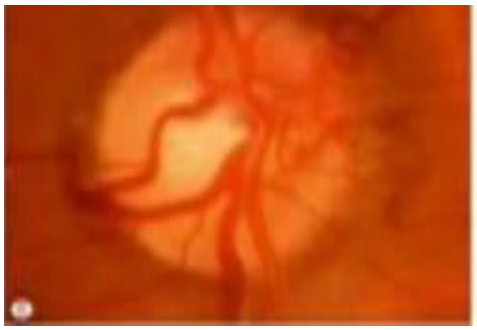
Cornea: exposure keratopathy.

Iris: lisch nodules. (neurofibromatosis

- Dilated episcleral vessels – AV shunt
- Optociliary shunt vessels- optic nerve sheath meningioma
- Salmon patch beneath upper eyelid – orbital lymphoma
- Eversion of upper lid – waxy yellow infiltrate with tortuous vessels- amyloid
- S shaped deformity of upper lid – plexiform neurofibroma
- Lid retraction or lidlag - thyroid ophthalmopathy

- ***PUPILS-RAPD***
- ***EOM*****-direct muscle involvement by the disease, mechanical limitation,compression of nerves, cavernous sinus thrombosis**
- ***FUNDUS exam*****-Swollen disc, optic atrophy,optociliary shunt vessels, choroidal folds**





SYSTEMIC EXAMINATION

- Thyroid examination
- Primary tumors elsewhere in the body – CVS/RS/Abdomen/PV/Rectal
- ENT examination

LOCAL EXAMINATION

- 1) INSPECTION –
- ★ Proptosis or pseudoproptosis
- ★ Unilateral or bilateral
- ★ Axial or eccentric
- 2) PALPATION – size ,shape,surface,margins consistency , tenderness , compressibility

  Thrill /increase with valsalva/ orbital rims / regional lymph nodes
- 3)AUSCULTATION - bruit

PULSATION:

-best detected on lateral view/ while using applanation tonometer.

-e.g arterio-venous fistula (high flow carotid-cavernous fistula), Aneurysms.

(dilated episcleral vessels in arterio-venous fistula)

OR

Due to transmitted pulsation through a defect in the bony orbital wall.

e.g : Sphenoid wing dysplasia (in neurobibromatosis),

Meningo encephalocele,

Herniation of frontal lobe of brain into orbit following trauma

AUSCULTATION:

- carotid-cavercous fistula→ bruit heard best by the bell of

- Globe/temporal region for bruit

Valsalva maneuver

PROPTOMETRY

It is the measurement of the distance between apex of the cornea and the

bony point usually taken as deepest portion of the lateral orbital rim with

the eye looking in primary gaze.

MEASUREMENTS:

Asymmetry > 2mm or more b/w the eyes.

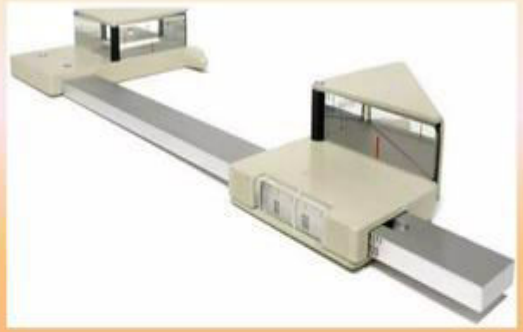
OR

Protrusion greater than

-***13-15mm*** in east asians

-***21mm*** in caucasian adults.

-***23mm*** in adult african-americans



Clinical methods for measurement of proptosis:

- A) **PLASTIC RULER**: can measure proptosis from the lateral orbital rim to the corneal apex,holding the ruler parallel to ground.

- B)**LUEDDE'S EXOPHTHALMOMETER**: has several advantages

-notch confirms to lateral orbital rim.

-the scale starts from tip of instrument,where the notch meets the lateral orbital rim.

-markings on both sides help to avoid parallax error.

-luedde's exophthalmometer is better than hertel's if there is facial asymmetry.

C) **HERTEL'S EXOPHTHALMOMETER**: m/c used.

-it may use prisms or mirrors set at 45 degree angles.

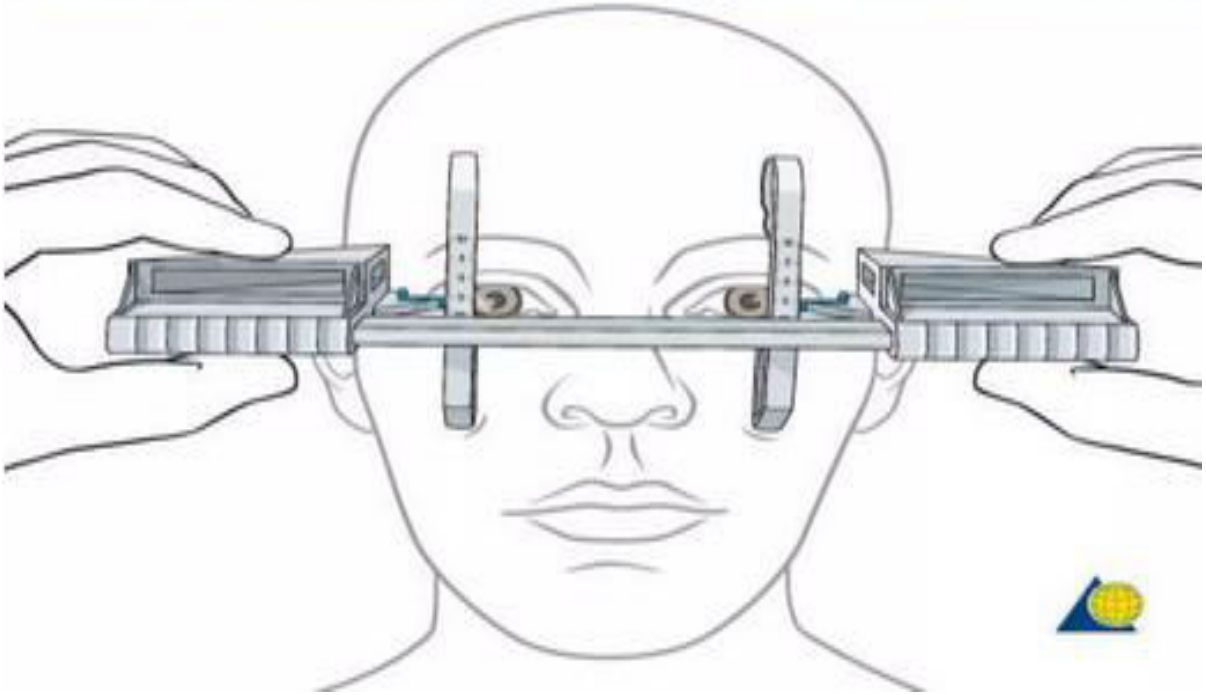
-it is best for serial follow up of patients.

D) NAUGLE'S EXOPHTHALMOMTER:

-In case of acquired or congential asymmetry of the lateral orbital rims a Hertel exophthalmometer is misleading

-This is an inferior & superior rim based instrument.

-may be used when the lateral orbital rim is not intact.



MEASURING PROPTOSIS ON A CT SCAN

HILAL AND TROKEL METHOD:

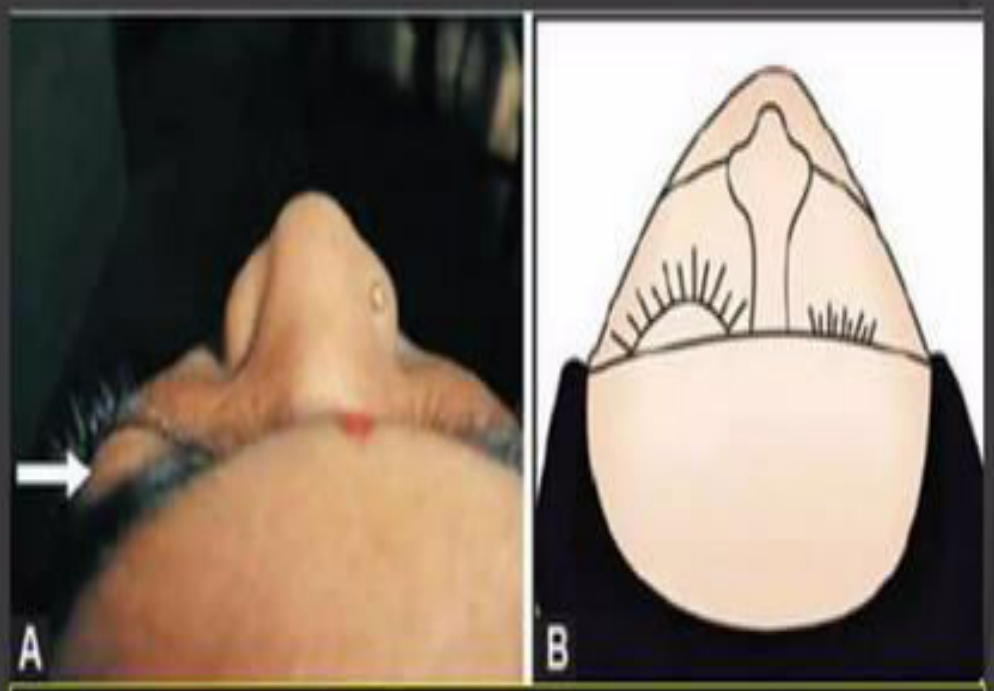
-In a mid axial CT scan image,a baseline between the tips of lateral orbital rims is drawn.

-a perpendicular from each corneal apex to this line is dropped & measured to scale.

if each line > 21mm
or
if asymmetry >2mm b/w two

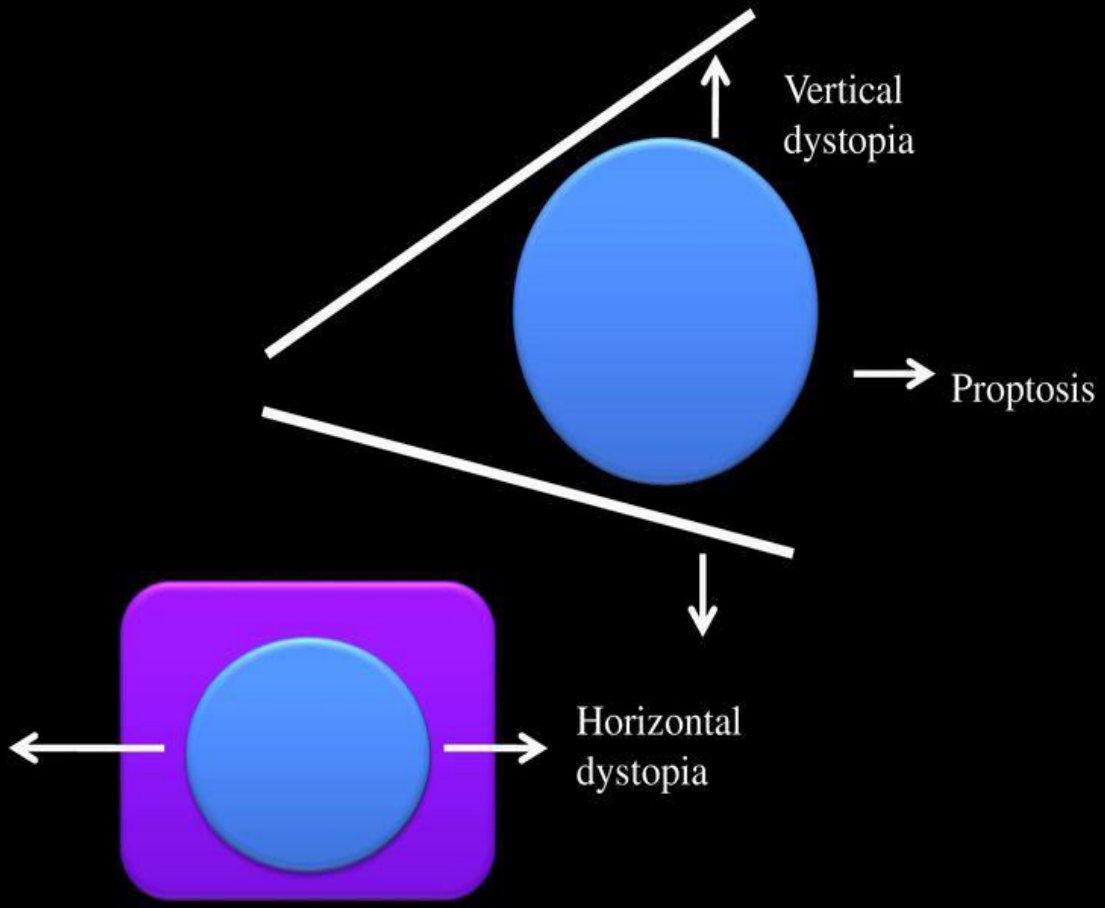
indicates abnormality.

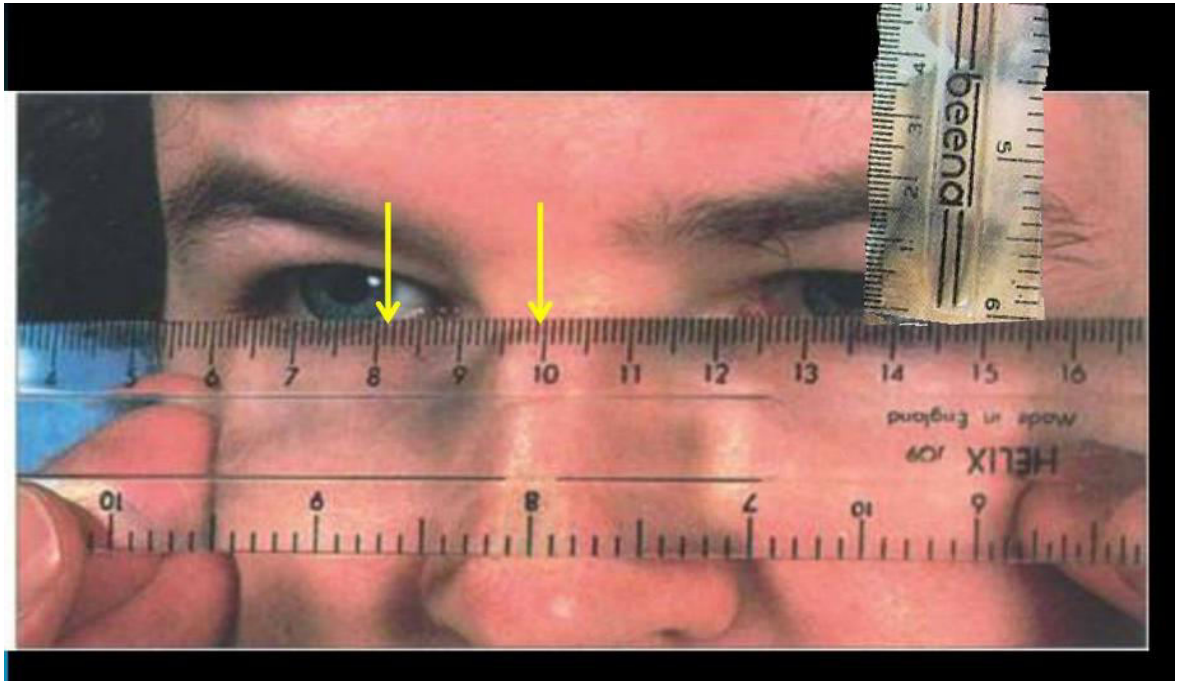
ASSESSMENT & MEASUREMENT OF PROPTOSIS



NAPHZEIGER'S TEST: NOTE THE PROMINANCE OF LEFT EYE. THE RIGHT IS NOT VISIBLE

Proptosis & dystopia



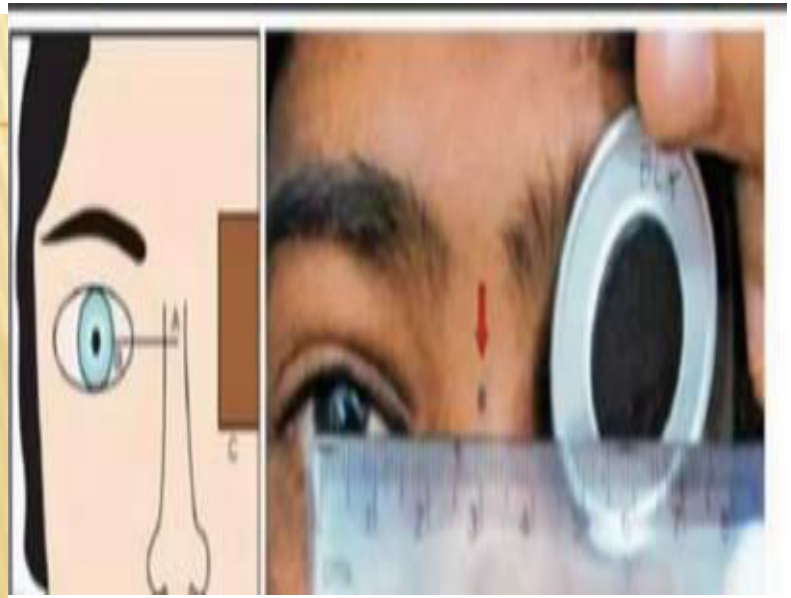

beena
HELIX
made in England

Measurement of dystopia:

-In an eccentric or non axial proptosis, the horizontal & vertical dystopia of globe is to be measured.

-***Horizontal dystopia*** :is measured by the distance from the midline of bridge of nose to the nasal limbus, compared bilaterally.

-***Vertical dystopia*** :is measured by the superior or inferior deviation of the central corneal reflex of the proptotic eye from a horizontal line passing through the centre of normal eye.



LAB INVESTIGATIONS

- Hematological - CBC , ESR, VDRL
- Thyroid function tests
- Serum ANA , c- ANCA , ACE
- BUN , Creatinine
- C-XRAY , Mantoux test
- Casonis test – r/o hydatid cyst
- Stool examination – cysts /ova
- Urine analysis – bence jones proteins - MM

IMAGING

- XRAY –
- Calcification/hyperostosis – Meningiomas
- Waters view – blow out fractures
- Rhese view – optic foramen and SOF

- CT- SCAN
- USG
- MRI

→ Size , position and shape of lesion

- ORBITAL VENOGRAPHY – Orbital varix
- CAROTID ANGIOGRAPHY – Aneurysms /AV communications

HISTOPATHOLOGICAL STUDIES

- FNAB
- Incisional biopsy
- Excisional biopsy

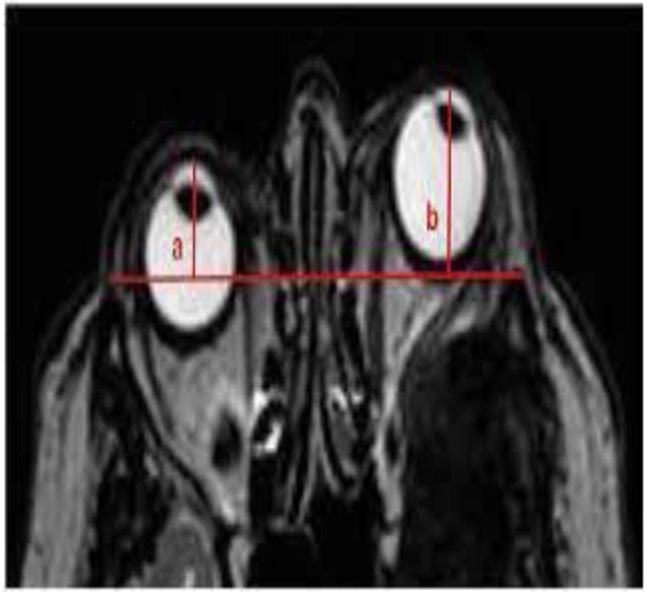
XRAYS

VIEW	STRUCTURES APPRECIATED
Caldwell view:	greater and lesser wing of sphenoid. Superior orbital fissure, most of the paranasal sinuses
Water's view:	orbital rim, orbital roof and floor and maxillary sinuses
Lateral view:	sphenoid, sphenoid air sinuses, anterior clinoid and sella turcica
Townne's view:	Infraorbital fissure , Superior orbital fissure
Axial	Basal view

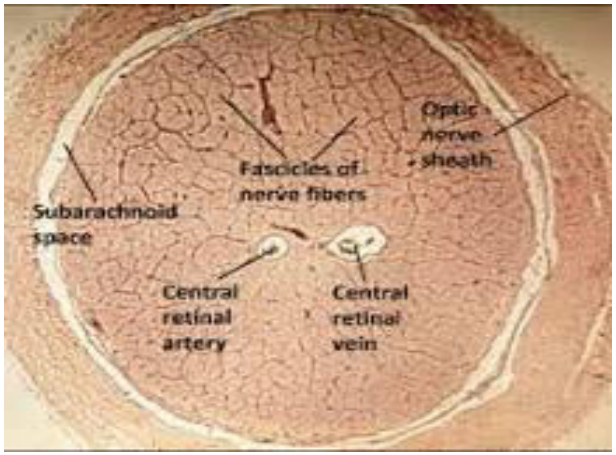
Water's view/Orbital view

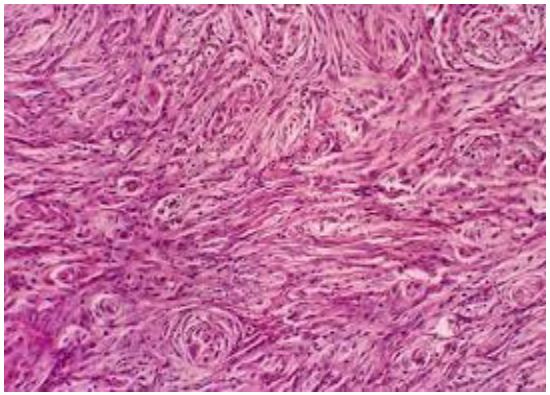
Structures seen- anterior 2/3rd of orbital floor

CT SCAN/MRI SCAN IN PROPTOSIS

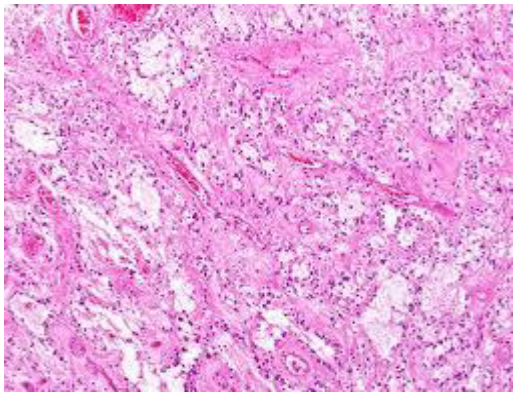


Biopsy for definitive diagnosis

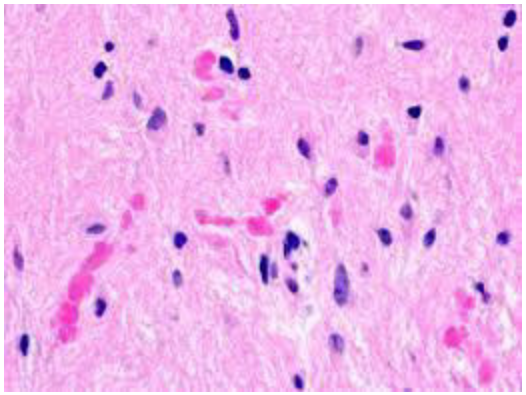




Meningioma



Glioma

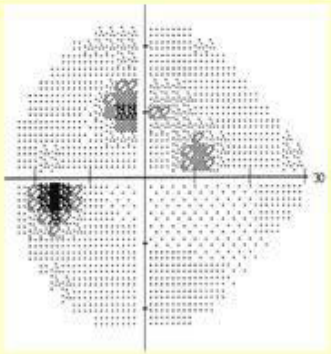


Pilocytic astrocytoma

CONCLUSION

- ***Orbital diseases have sight threatening and at times life threatening sequelae***
- ***Commonest presentation is proptosis***
- ***Sight threatening signs are corneal exposure, disc swelling, pupillary abnormalities***
- ***A proper work up would lead to the definitive diagnosis***

What do we do in eye clinic

	Note symptoms/appearance Measure exophthalmos/TED group
	Afferent pupillary defect Test visual fields, colour vision, eye pressure, examine optic disc
	CT scan..diagnosis, especially if unilateral

KEY POINTS

- The most common cause of bilateral proptosis is Graves disease.
- Acute unilateral proptosis suggests infection or vascular disorder (eg, hemorrhage, fistula, cavernous sinus thrombosis).
- Chronic unilateral proptosis suggests tumor.
- Do CT or MRI and thyroid function testing when Graves disease is suspected.
- Apply lubrication to exposed cornea.


THANK YOU..