The orbits

Anatomy

Orbital spaces

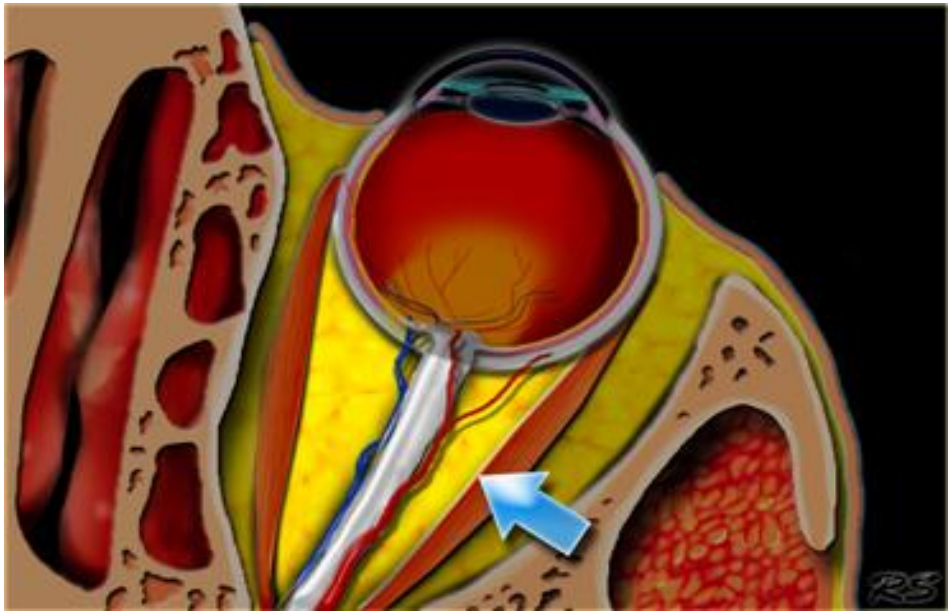
1- Intraconal space: space inside the rectus muscle pyramid .

2- Extraconal space: space outside the rectus muscle pyramid

3-Preseptal space

4- Postseptal space

5- Lacrimal fossa



Orbital structures:

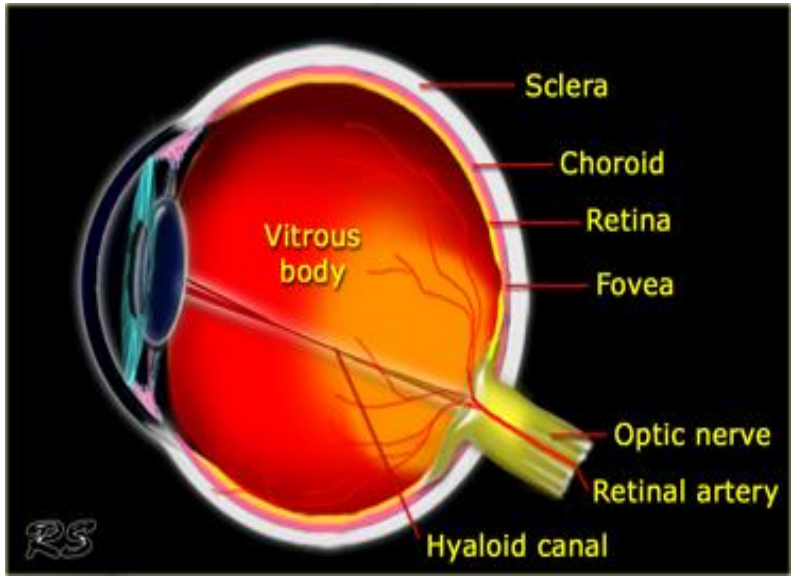
1- Globe (lens, anterior chamber, posterior chamber, vitreous, Intraconal, extraconal fat.

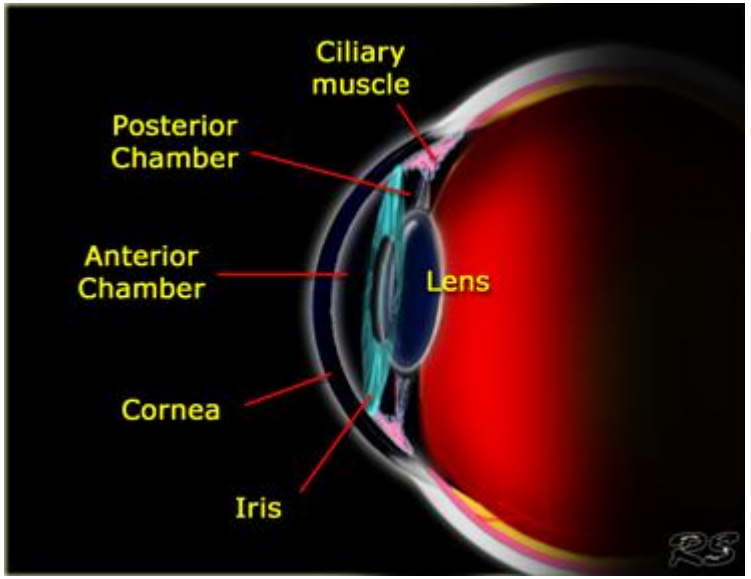
2- Optic nerve and sheath.

3-Ophthalmic artery and vein.

4-Rectus muscles

5- the orbital septum is a thin, fibrous membrane that acts as the anterior boundary of the orbit, separating the eyelid from the orbital contents. It originates from the orbital rim and extends into the upper and lower eyelids





Orbital Imaging Techniques

X-Ray

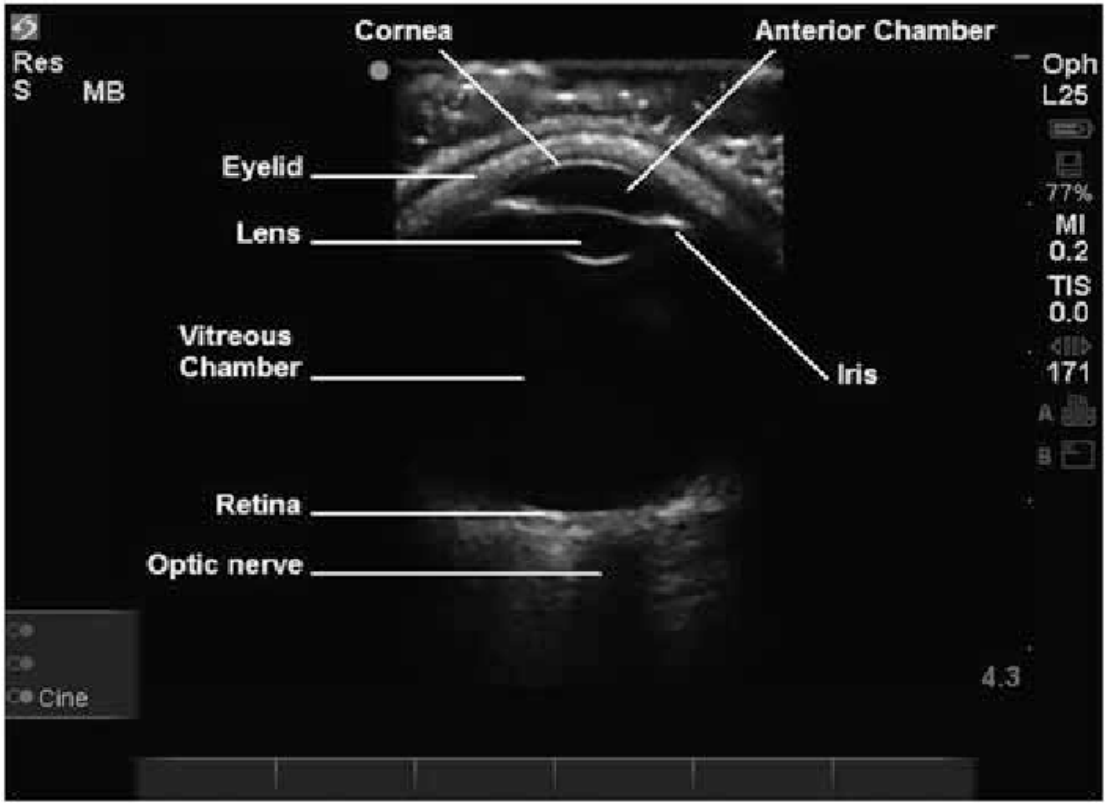
The use of x-ray is limited to patients with trauma or suspected intraorbital foreign body.

Standard views include : PA view and **lateral view(superimposed of skull base bone).**

For optic foramen and superior oblique fissure, Rhese projections are used.

Ultrasound

1- It is non-invasive, cost-effective and easy to perform.
2- It is an important first line for evaluating intraocular pathology.
3- It helps in differentiating cystic from solid lesions.
4- It has two modes A scan and B scan.



Computed Tomography (CT scan)

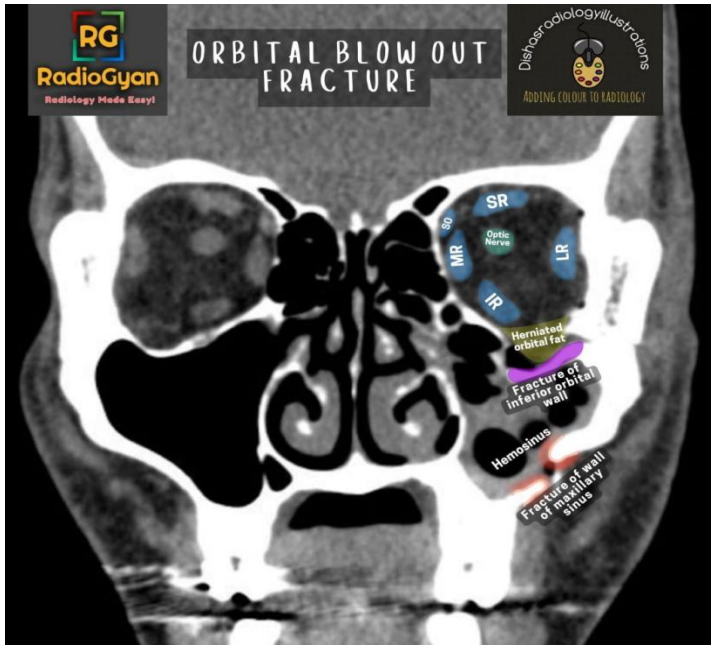
CT is an important modality of orbital imaging.

1- It provides volumetric cross- sectional image in orbital trauma to assess bony fracture or extraocular muscle injury

2- intraorbital foreign body localization.

3- It has an advantage over MRI in assessing orbital osseous lesions and lesions that cause bony erosion

4- differentiate acute hemorrhage from mass lesions.



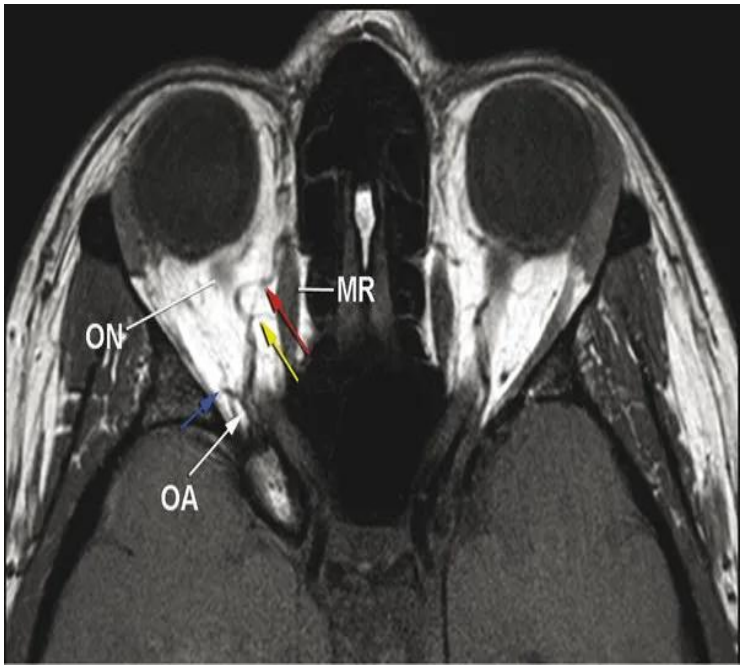
Magnetic Resonance Imaging (MRI)

MRI provides :

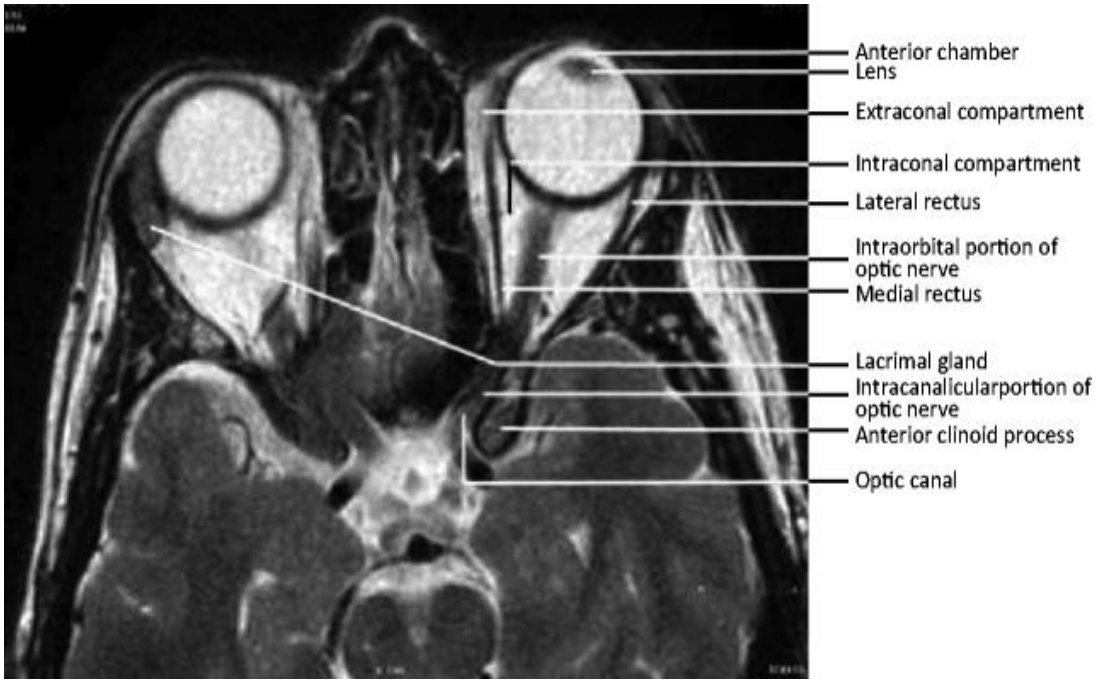
1- higher soft issue resolution ,with better visualization of different orbital components.

2- It helps in the diagnosis of neoplasm, vascular malformation, inflammatory disorders, and optic nerve lesions.

3- Diffusion Weighted Images (DWI) help in further characterization of orbital masses. (ex. separates abscess which is more diffusion restricted from other inflammatory processes).



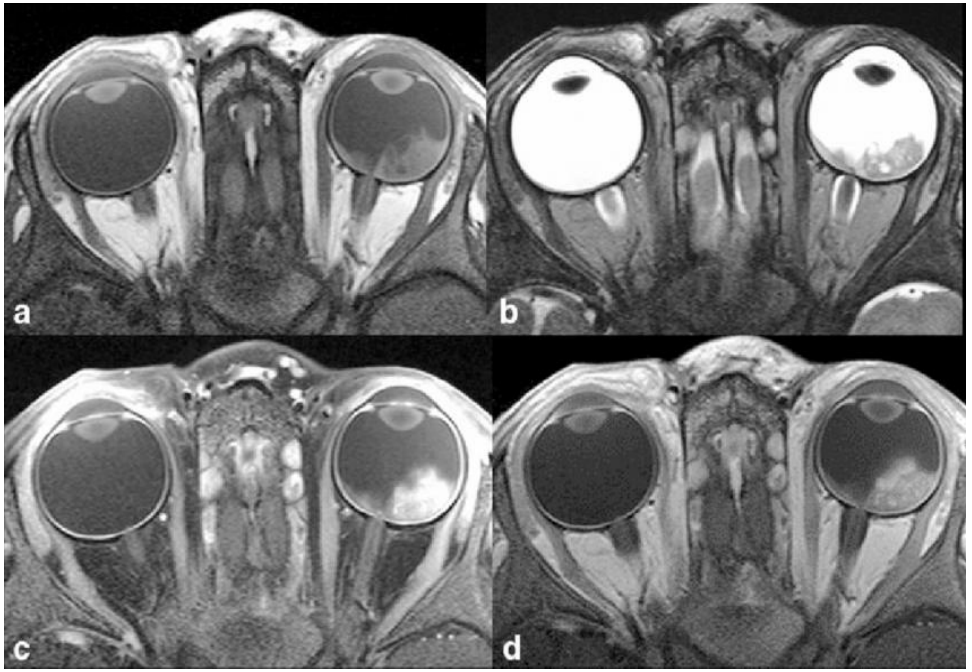
T1



T2

RETINOBLASTOMA

* Malignant tumor that arises from neuroectodermal cells of retina .
* Age: (70%) < 3 years .
* 30% bilateral and 30% multifocal within one eye.
* 10% of patients have a familial history of retinoblastoma.
* Radiographic features : Dense vitreous, Calcifications are common(90%); in absence of calcifications suspect other mass lesions



MELANOMA

* **Most common (75%) ocular malignancy in adults.**

* **Arises from pigmented choroidal layer.**

Radiographic features:

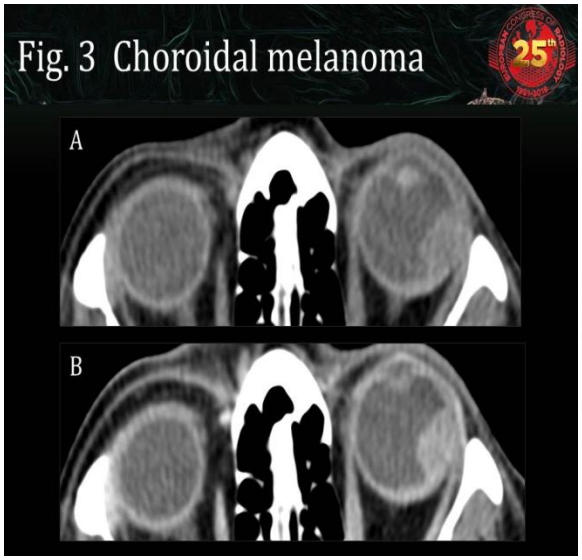
1-Thickening or irregularity of choroid (localized, polypoid or flat)

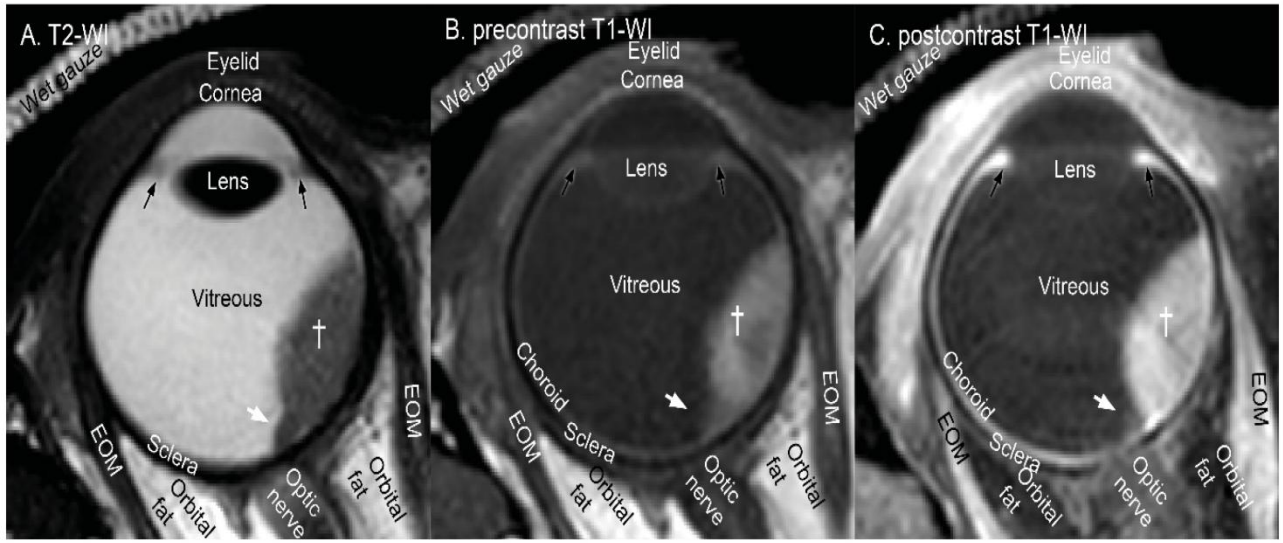
2- Exophytic, biconvex mass lesion usually unilateral.

3- posterior location.

4- Retinal detachment is common .

5- MRI: TI hyperintense, T2 hypointense with contrast enhancement





OPTIC NERVE GLIOMA

1- Most common cause of diffuse optic nerve enlargement, especially in childhood.

2- Pathology: **usually well-differentiated pilocytic astrocytoma**.

3- Clinical signs : **loss of vision**, **proptosis (bulky tumors).**

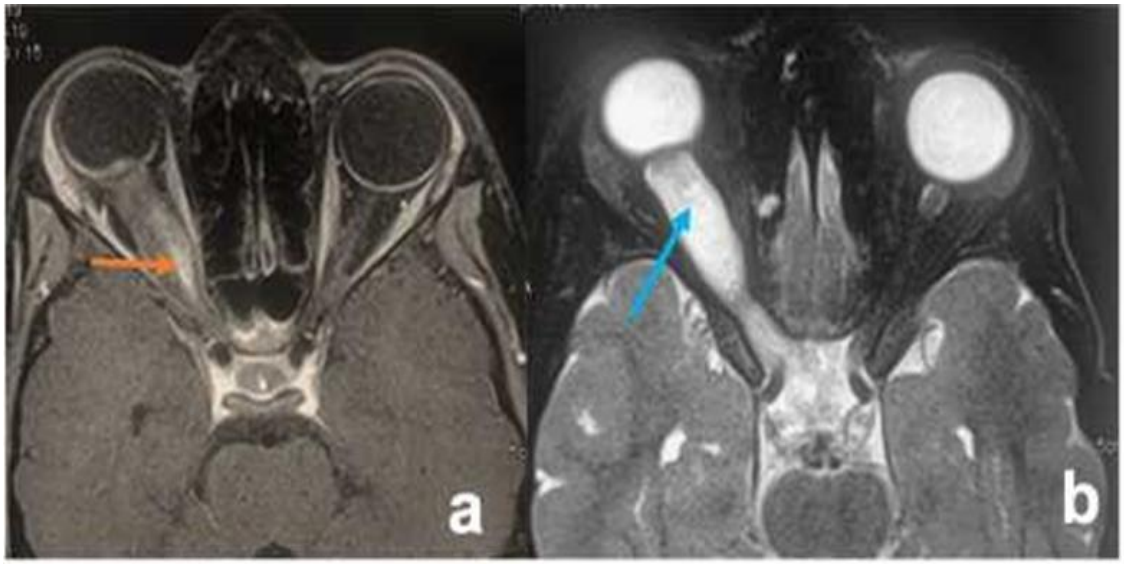
4- 80%occur in first decade of life.

5- In neurofibromatosis (NF) the disease may be bilateral.

Radiographic features

Types of tumor growth: tubular, excrescent, fusiform widening of optic nerve .Lower CT density than meningioma. Contrast enhancement is variable.

Calcifications are rare ,tumor extension best detected by MRI



HEMANGIOMA

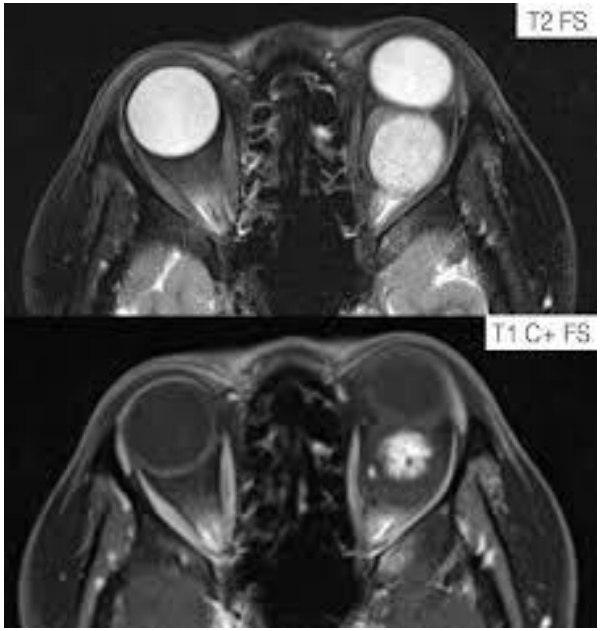
Common benign tumor of the intraconal space.

Types:

1- Capillary hemangioma in children , no capsule seen .

2- Cavernous hemangioma in adult , there is true capsule (benign Large dilated venous channels with fibrous capsule).

3- Both show dense enhancement with contrast . Signal intensity similar to fluid on T2W.

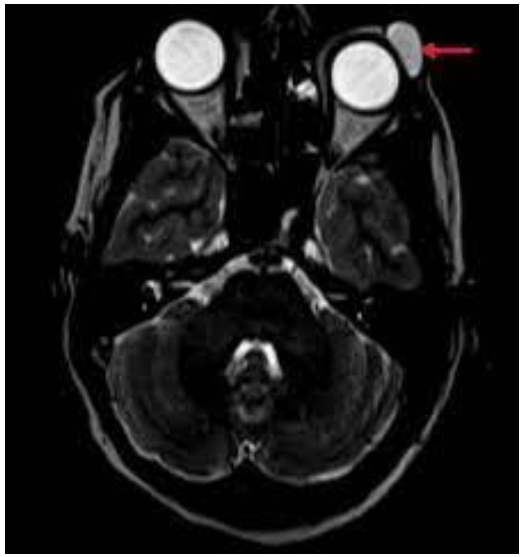


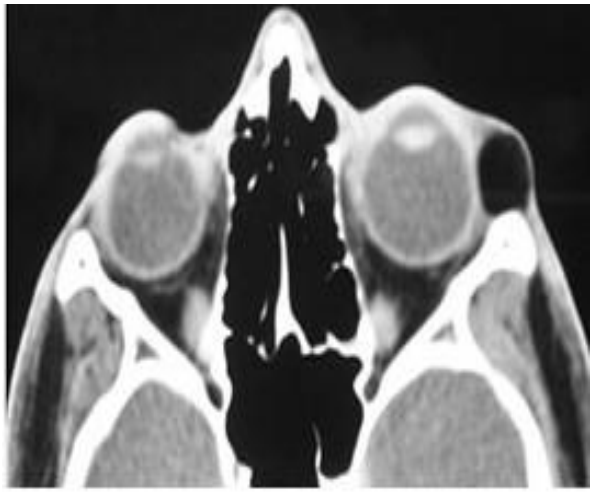
DERMOID CYST

Common orbital tumor in childhood.

Age: 1st decade.

Radiographic features : Low CT attenuation and hyperintense in T1 and T2 is diagnostic

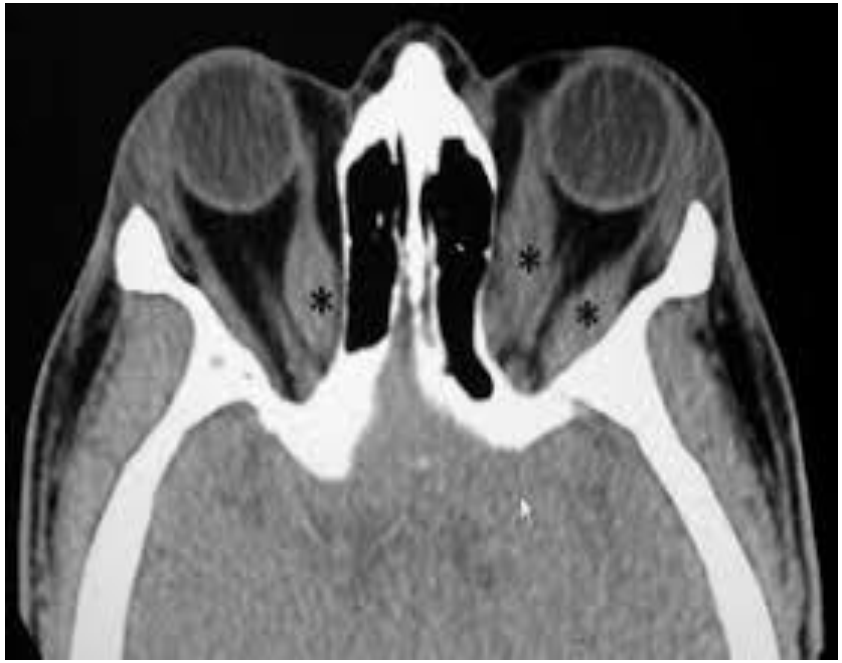




THYROID OPHTHALMOPATHY

Radiographic features:

Exophthalmos , **Muscle involvement (Inferior rectus is most common), spares tendon insertions** , Often bilateral symmetrical , **Optic nerve thickening** and Expansion of orbital fat.



ORBITAL PSEUDOTUMOR

Inflammation of orbital soft tissues of unknown origin.

Clinical signs : unilateral , painful proptosis, steroid responsive.

Causes:

Idiopathic , Systemic disease: sarcoid, endocrine , Unrecognized focal infections, foreign bodies.

Radiographic features

* **intraconal or extraconal inflammation** presenting as ill-defined infiltrations or less commonly as a mass.

Typical features : Unilateral , Unlike thyroid opthalmopathy it involve tendons of muscles (because it is inflammatory disease) , Stranding of orbital fat (inflammation)