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INTERNATIONAL CONGRESS OF THE

EGYPTIAN OPHTHALMOLOGICAL SOCIETY

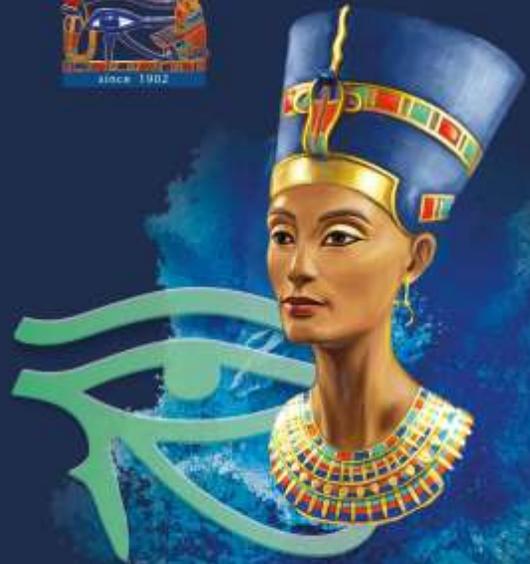
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Rare Orbital FBs

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- IOrbFBs are rare ophthalmic emergencies; that require proper decision making in almost no time.
- The term orbital FB is applied to the presence of any foreign object partially or completely within the orbit, with or without penetration of the globe.
- If the FB is confined to the orbit we call it **purely orbital FBs** and if involving orbit and adjacent space - intracranial or paranasal sinus or both it is called **transorbital FBs**



Orbital



Wood FB partially lodged in the orbit

Transorbital



A FB involving the orbit and maxillary sinus



The abbreviations;

- Intra orbital foreign bodies = **IOrbFBs**
- Orbital foreign bodies = **OrbFBs**
- To differentiate from ocular FBs; **IOFBs** and **OFBs**



- Orbital foreign body are not so common; so why we entitled this presentation Rare Orbital FBs??
- The common scenario is; high velocity projectiles during riots and war or wedding celebrations, or industrial accidents, enter the
- In this presentation I will throw light more on less common scenarios.



- IOrbFBs enter the orbit by 2 main ways:
 1. A high velocity FB enter the orbit by its momentum; this is almost always inorganic, metallic in more than 90% of cases, and less commonly inorganic non-metallic.
 - Striking concrete with a metal hammer; the FB may be metal or concrete.
 - May be single or multiple
 - Deep penetration





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2. The patient went to the FB, هو اللي خبط,

- Trauma with a tree branch while walking in a garden
- Falling child while holding a pencil
- Falling from a height

Most commonly organic FB, usually single and of shallow penetration

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- That is why a careful history of the nature of the injury may point to the type of foreign body (FB) and depth of penetration.
1. A history of explosion, gunshot wound, or striking of metal upon metal should raise suspicion for orbital or intraocular foreign bodies, most commonly metal and deep penetration, usually single but may be multiple



2. Gardening and agricultural accidents, point to an organic FB
3. motor vehicle accidents, point to glass FB from the windshield glass.



Diagnosis

A high index of suspicion is important to minimize the risk of missing a retained IOrbFB, particularly if the history is unclear or un-witnessed, such as in pre-verbal children and unconscious adults.

1. Any trauma with a wound consider an Ocular or orbital FB till proved other wise.
2. Wounds of entry in some cases may be concealed.



3. Sever inflammation unproportioned to trauma, or persistent post traumatic inflammation are highly suggestive
4. Traumatic injury to orbital contents: the globe, intra-orbital cranial nerves II, III, IV, V, VI, and EOMs, is very suggestive specially if multiple.



Diagnosis

When the scenario points to the possibility of a retained **OrbFB**, a thorough history and physical examination are crucial to answer some questions.

1. The nature of this FB
2. The induced morbidity mainly globe injury and traumatic optic neuropathy
3. The site of impaction and its accessibility



Diagnostic imaging

Imaging options include (CT), (MRI), ultrasound, and plain radiography, each of which has particular advantages and limitations.

How to select the proper modality to start with:

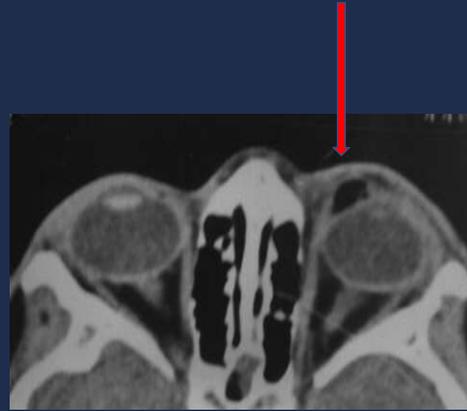
1. CT scan is an excellent modality **BUT** it may miss organic FBs specially wood, which is seen clearly in MRI.



Case 2

A 9-y old boy presented with a picture of persistent left orbital cellulitis following trauma with a tree branch. No entry wound could be detected.

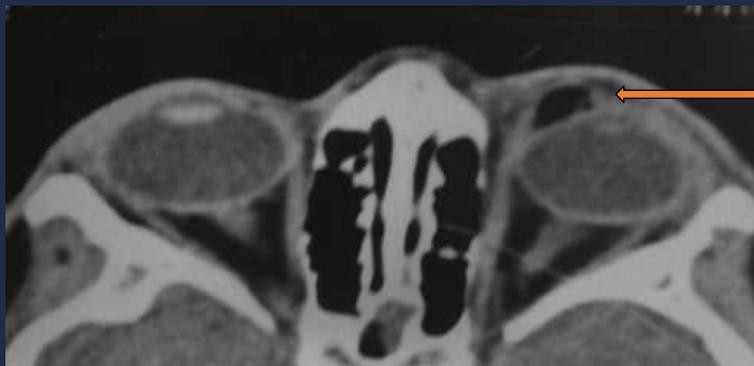
CT scan should a hypodense lesion in the anterior orbit, similar to air or fat in density



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Intra-orbital wooden Foreign Bodies

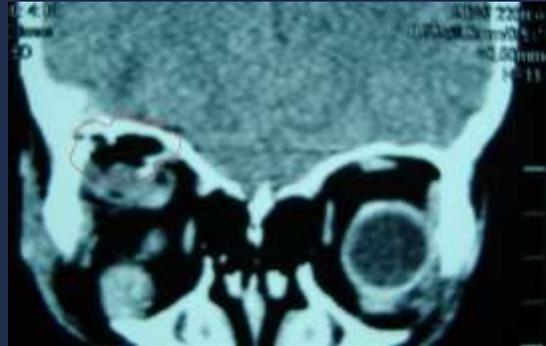


- On a wrong diagnosis of an abscess we did an incision and we got out a piece of tree branch.

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- a wood or organic foreign body is suspected if hypodense lesion, similar to air or fat, displays a geometric margin (geographic shape), not a bubble shaped, as air in tissue.



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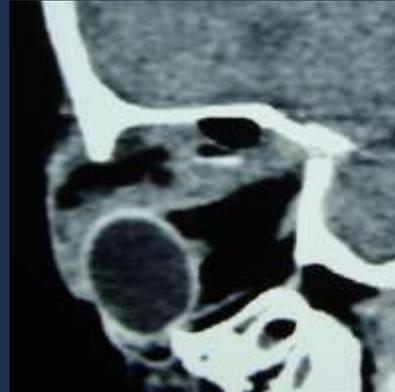
A 7-y old presented 3 days following trauma with tree branch with sever orbital cellulitis



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CT scan showed this black areas That was diagnosed by mistake as orbital abscess



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An incision and drainage



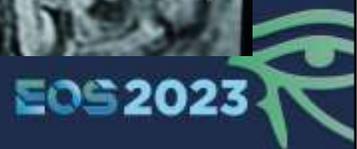
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Partial improvement



A retained FB was highly suggested;



Exploration and extraction followed by marked improvement



8 months later



A retained small fragments of wood are still in



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Lid retraction and lid lag are common complications



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Lesson | b, c

- b) For inorganic FBs specially wood; MRI is the imaging modality of choice, but we have to rule out metal nature first.
- c) During retrieval of a wood FB some particles may separate and retained inside causing abscess and/or fistula formation later on

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Diagnostic imaging

2. MRI is an excellent modality **BUT** because of the strong magnetic field may dislodge metallic OrbFBs, potentially causing damage to ocular structures or even blindness.
- So this modality is generally contraindicated as first-line imaging except if metallic nature of the FB is completely rolled out .

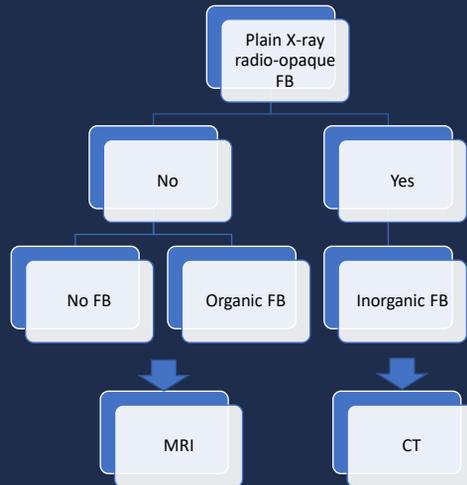


How to proceed??

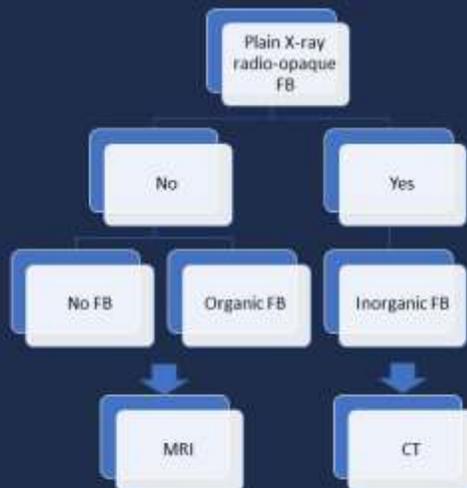
- Some centers depend on through history taking to confirm or rule out the metallic nature of the FB. If it is a possibility they start with CT. if not MRI is preferred.
- In Tanta we use a different approach; We do plane X-ray; if no detected FB so we may have No FB or an organic FB so we go to MRI.



The clinical scenario highly suggesting IOrbFB



The clinical scenario highly suggesting IOrbFB

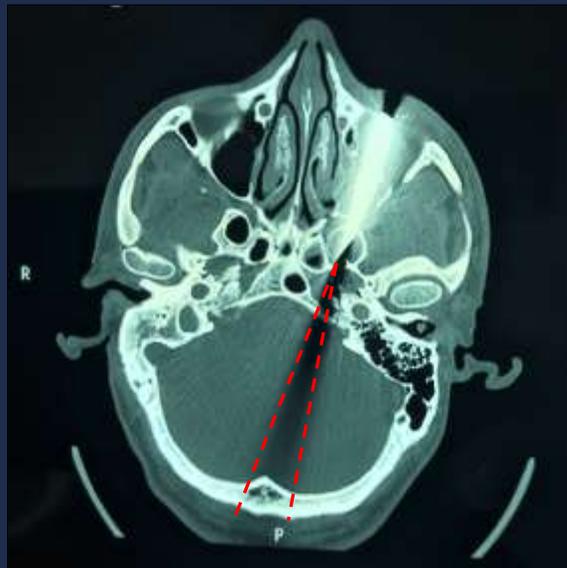
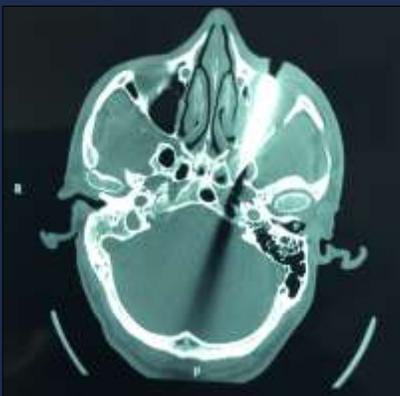


- If we get a radio-opaque FB in the plain X-ray so we have an inorganic FB that may be
 1. Metallic (MRI is contraindicated)
 2. Non-metallic as glass, plastic, grafit (MRI is not contraindicated)

Can be differentiated by the streak artifacts



The high intensity signal suggests inorganic OrbFB and the streak artifact suggests its metallic nature.



Radiopaque without streak artifacts



Plastic FB

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- In car accidents expect glass FBs from the wind shield glass.

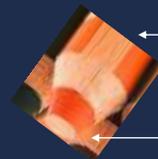
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Glass with high led concentration



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- In some case we may have a mixed inorganic and organic FB



wood

Graphite

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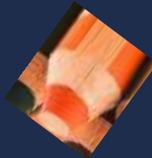
- A 19-month girl with red swollen left upper eyelid.
- Proptosis and down and out dystopia of the left eye.
- Following fall while holding a colored pencil 5 days ago

Toddler Crayons, Non Toxic 9
Colour Washable Palm-Grip
Egg Crayons



No entry wound could be detected





2 weeks



- Traumatic penetrating injuries to the orbit from pencils, have many presentations, both acute and delayed. With the most incidents occurring in the pediatric population where obtaining a detailed history is difficult, the ability to effectively examine the child is not easy added to these; **in many cases no external entry wound could be detected.**



- A child aged 18 months presented to ophthalmology emergency room with inability to close his right eyelids following (a simple regular) fall while running while holding a pencil in his hand.
- No external wound could be seen



CT scan

- CT scan showed a metallic FB, escaping the globe and **Penetrate** the orbital roof into the cranial cavity.



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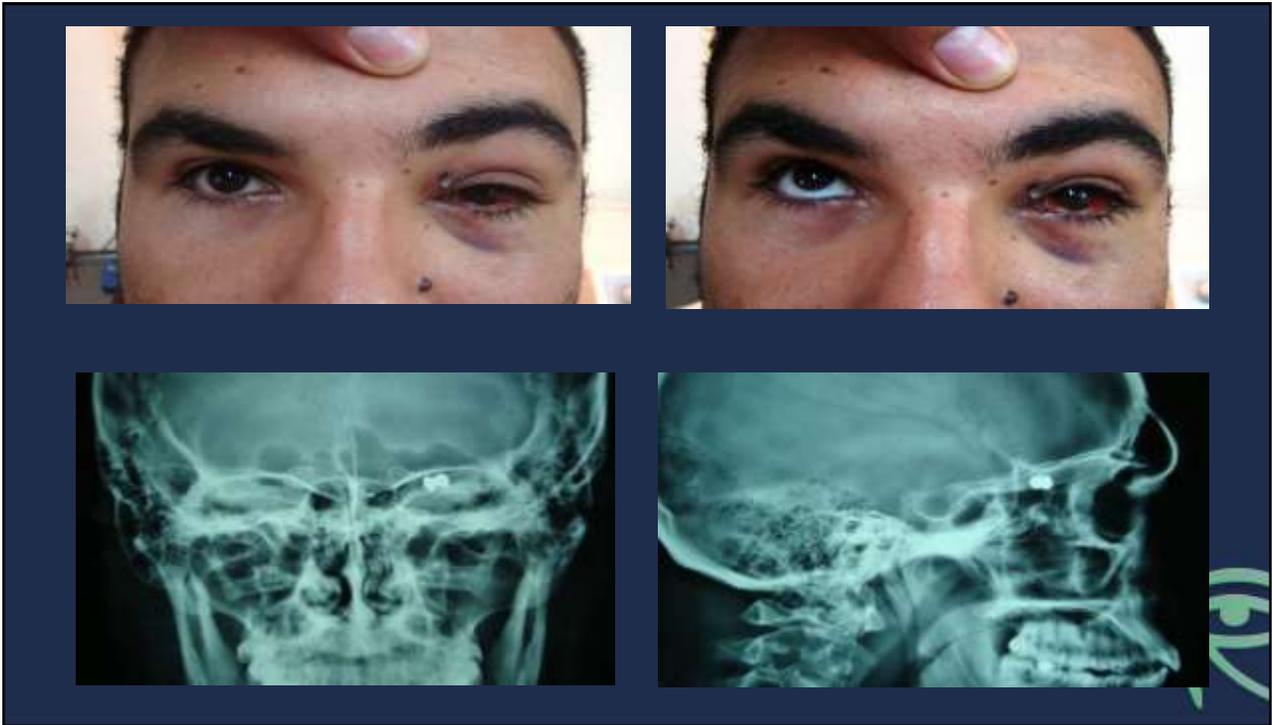
To leave or retrieve a FB

Based on composition



1. Metallic OrbFBs are the most common, resulting from small particles penetrating the orbit through high-velocity trauma, as with BB pellets.
- Indication for not to retrieve:
 - No affection to globe, optic nerve, EOM.
 - Sterile
 - Inert materile
 - Deep seated, difficult to access





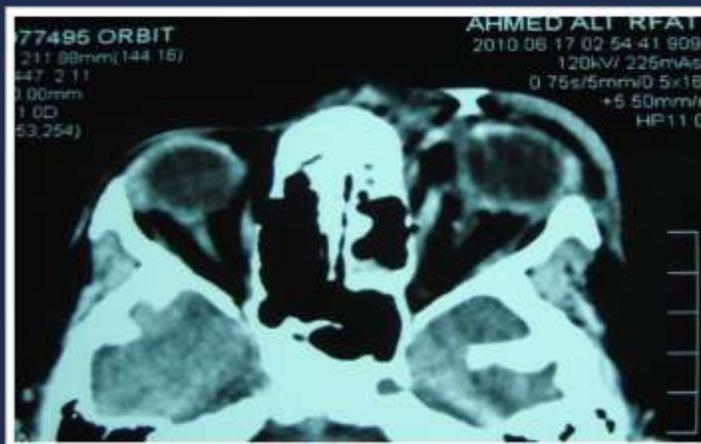
1 week



Sterile inert not causing mechanical effects



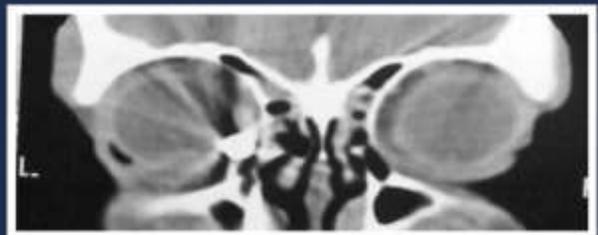
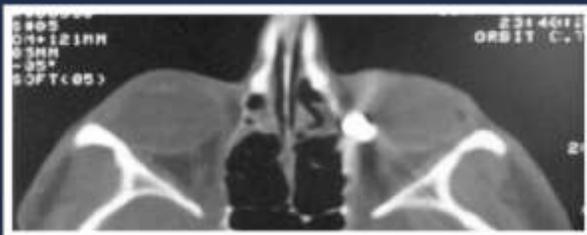
But easy to retrieve



Anteriorly located causing sever inflammation



FB settled at the MR insertion



Orbital apex compressing Optic nerve in a seeing eye (not NLP)



- If vision is completely lost do nothing
- If still vision immediate retrieval.

2. Organic FBs can cause significant inflammation and carry a higher risk of subsequent infection compared with inorganic materials.

- Should be removed immediately



Radiopaque without streak artifacts (plastic)



Inorganic non metallic (plastic or glass)



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3. some metallic FBs, particularly iron, copper, and lead, can cause specific complications such as retinopathy, siderosis, chalcosis, or systemic toxicity
4. Inorganic nonmetallic FBs are often inert. **Judge according to its sterility, size and co morbidity.**
5. **In general any accessible FB should be removed for 2 main reasons**

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1. Metallic FB may prevent MRI at any time and for any indication

2. Inorganic FB may induce delayed complications

- Delayed extrusion and fistula
- Severe orbital fibrosis



- A 12-year old boy received an orbital FB (BB pellet) without a detectable entry wound and without ocular injury. The decision at that time was to leave as it was very deep seated, causing no morbidity.





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13-y after trauma



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To leave or retrieve a FB

Based on site of impaction

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□ Site of impaction

- Any accessible FB should be removed
- Resting on the globe and EOM should be removed.
- In the orbital apex;
 - In a seeing eye should be removed
 - In a non seeing eye should not be removed (risky surgery)



Indication for not to retrieve

- No affection to globe, optic nerve, EOM.
- Sterile
- Inert materile
- Deep seated, difficult to access



FB impacted in orbital roof

- Sterile
- Not causing mechanical effect
- VA and VF not affected
- Very hard to retrieve

- Just regular follow up as delayed reaction may occur.

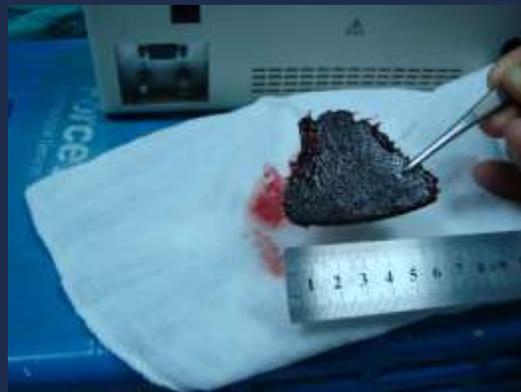


Special impaction sites



To leave or retrieve a FB

Based on its size



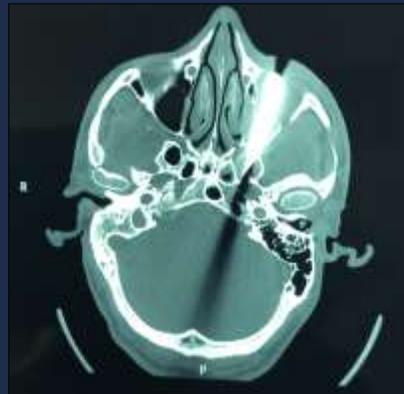
Externally; Left conjunctival chemosis , upward dystopia and a stitched sub brow wound



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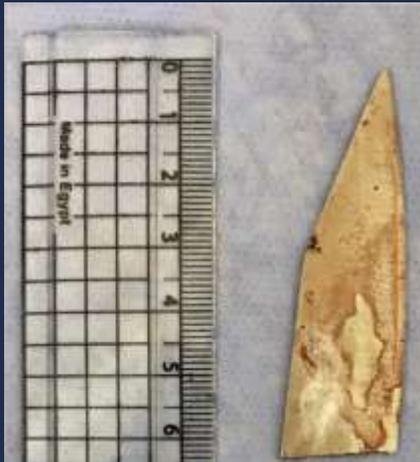


A metallic FB about 6.0 cm in length & 2 cm in width traversing the orbit end to end reaching backward to the nasopharynx



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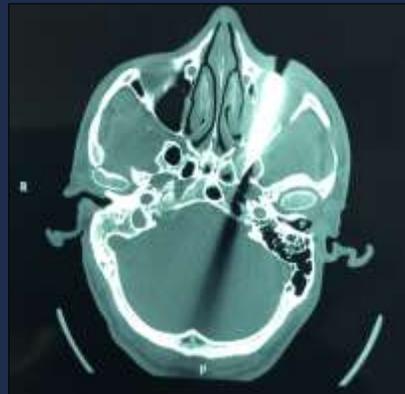




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A metallic FB about 6.0 cm in length & 2 cm in width reaching backward to the nasopharynx



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To leave or retrieve a FB

Based on ocular comorbidity



- Open globe injury should be repaired first, then re-evaluate to leave or retrieve.
- If vitrectomy is needed either to retrieve first or to postpone after vitrectomy according to urgency of the indication.



- A 21-y old male presented with sudden onset loss of vision and deep seated orbital pain Following entry of a FB while striking a concrete with a hummer



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- VA 4/60 and 6/6
- RAPD
- T- Tn
- Fundoscopy; vitreous hemorrhage masking the retinal details.

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U/S

- Vitreous hemorrhage
- Traction bands originating from a single point
- No evidence for an IOFB



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Plain X ray



Exclude organic FB which are hypodense

No metal streak artifact so is not iron



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- CT scan revealed the presence of an IOFB
- The case was diagnosed as a FB causing double perforation.
- On exploration a single wound under the lateral R muscle was detected and repaired.



- 2 questions about this case:
1. How can this FB enter the orbit without double perforating the globe?



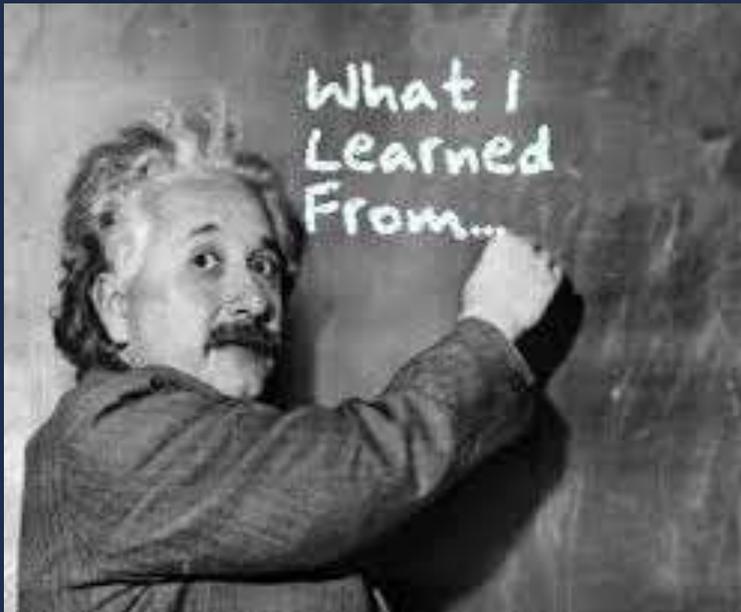
- An important question was; should we try to retrieve this FB at time of primary repair?
- The answer is no repair open globe first then re evaluate.
- 2 weeks later vitrectomy was performed and vision has improved to 6/36.



2. Following vitrectomy should we leave or retrieve this FB?

- ❖ Not interfering with functions
- ❖ Not seems to be contaminated
- ❖ Difficult to be retrieved
- ❖ is not iron (no streak)





Lessons from this case

1. When metallic foreign bodies are suspected or have to be ruled out, plain x-rays in the PA and Lateral views may be performed as a screening examination to detect streak artifact
2. In the first interference only repair the rupture globe and do not search for the FB.





THANK YOU

See you next year

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