

Radiology of the temporal bone



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We will cover

- **CT scan**
- **MRI**

Why bother?

- **Operative planning**
- **Risk assessment**
- **Informed consent**
- **Medico-legal**
- **Standard of care**

Why bother?

- TB CT Scans
are very common in the exams!

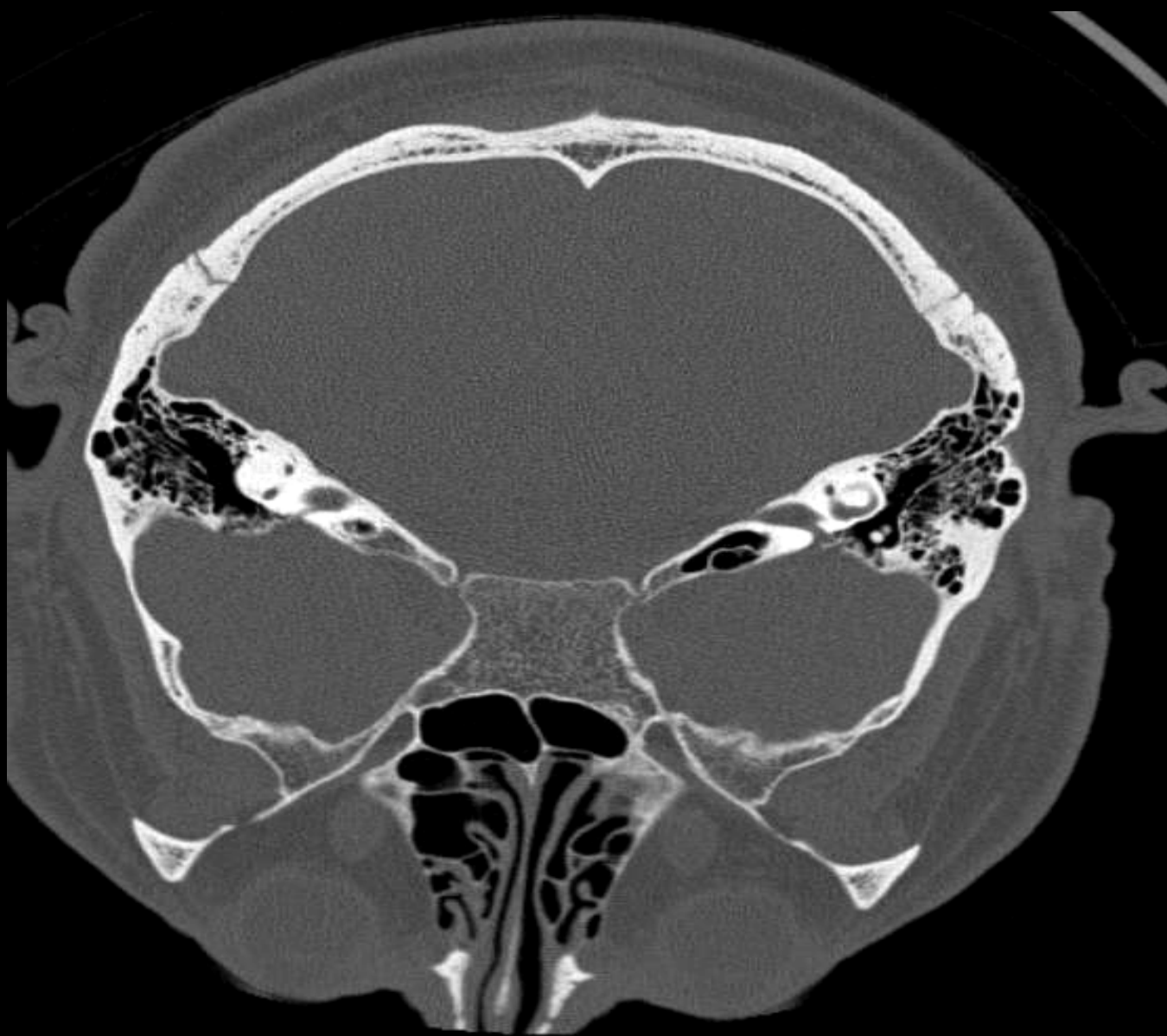


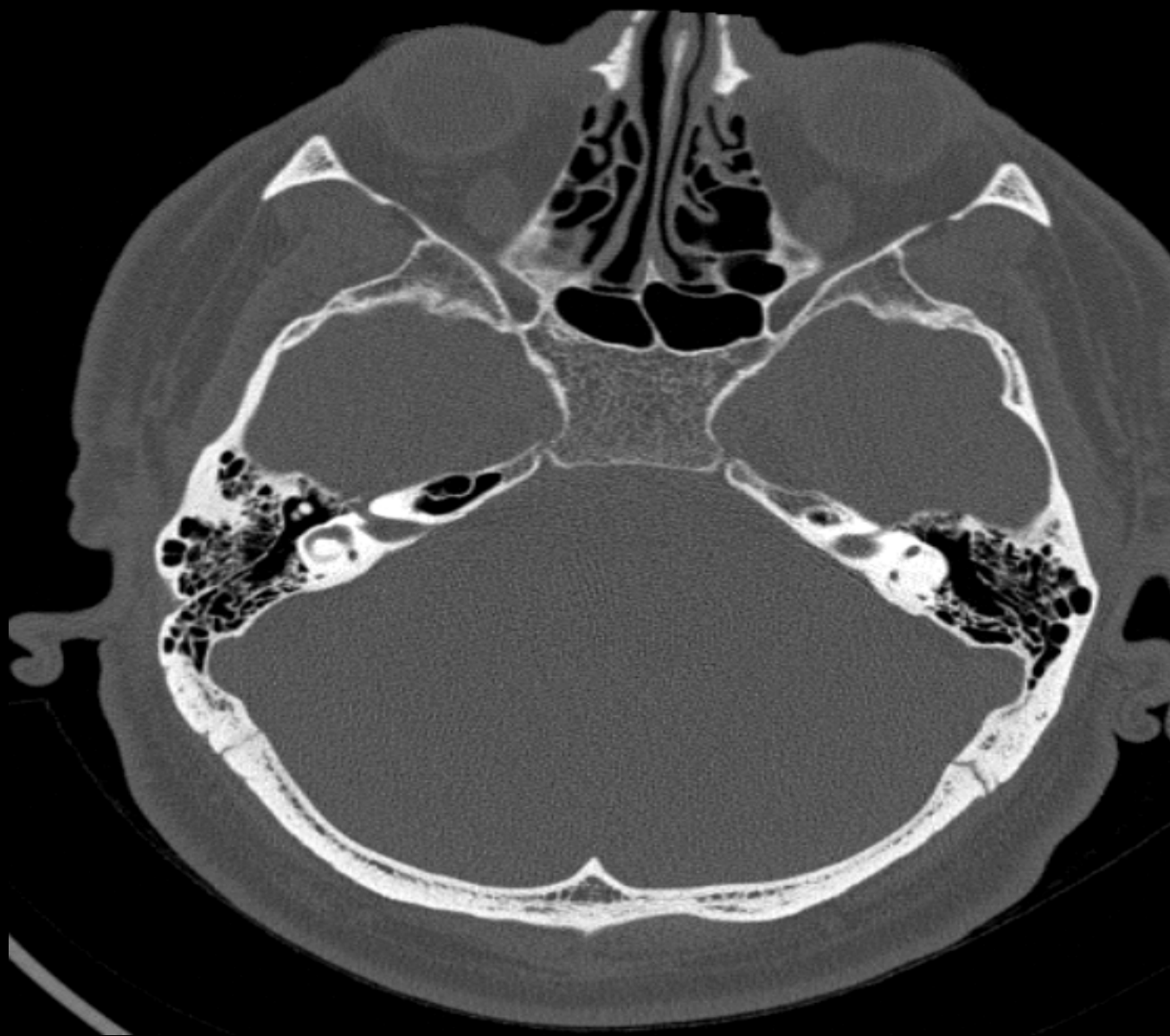
C.T.

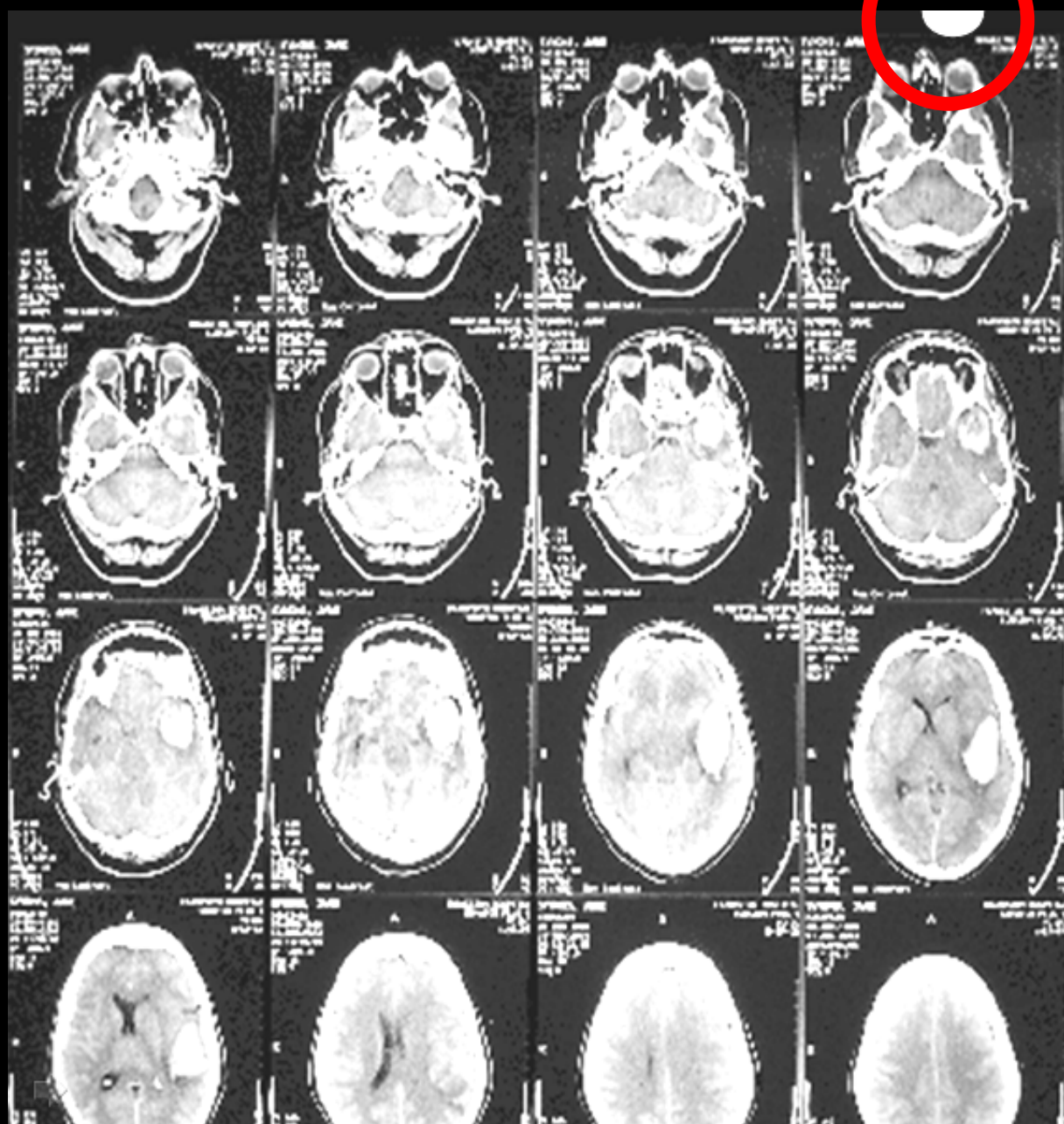
Primary survey (ABCD)

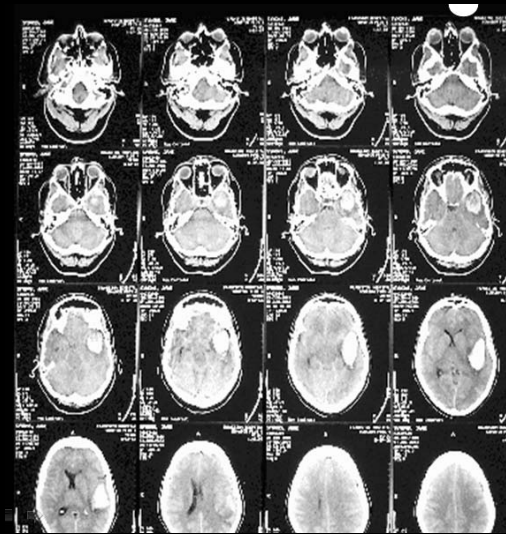
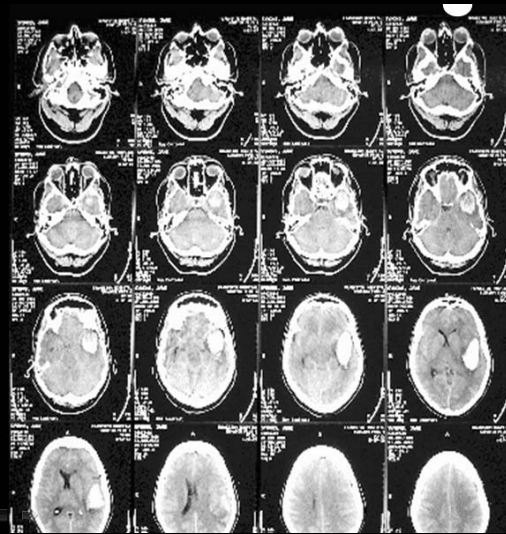
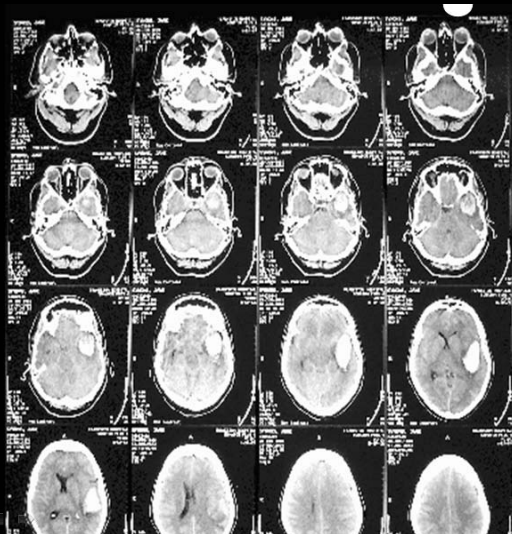
- Orientations (Rt/Lt)
- Name MRN
- Date
- Bony windows
- Axial, Coronal (Sagittal) planes
- With/without contrast
- Fine cuts











C.T.

Secondary survey

- Symmetry (? Tilted ? Fixed reference)
- Degree of aeration
- Position of dura, VII Nerve & vessels
- Labyrinth
- Extension of disease

Anatomy

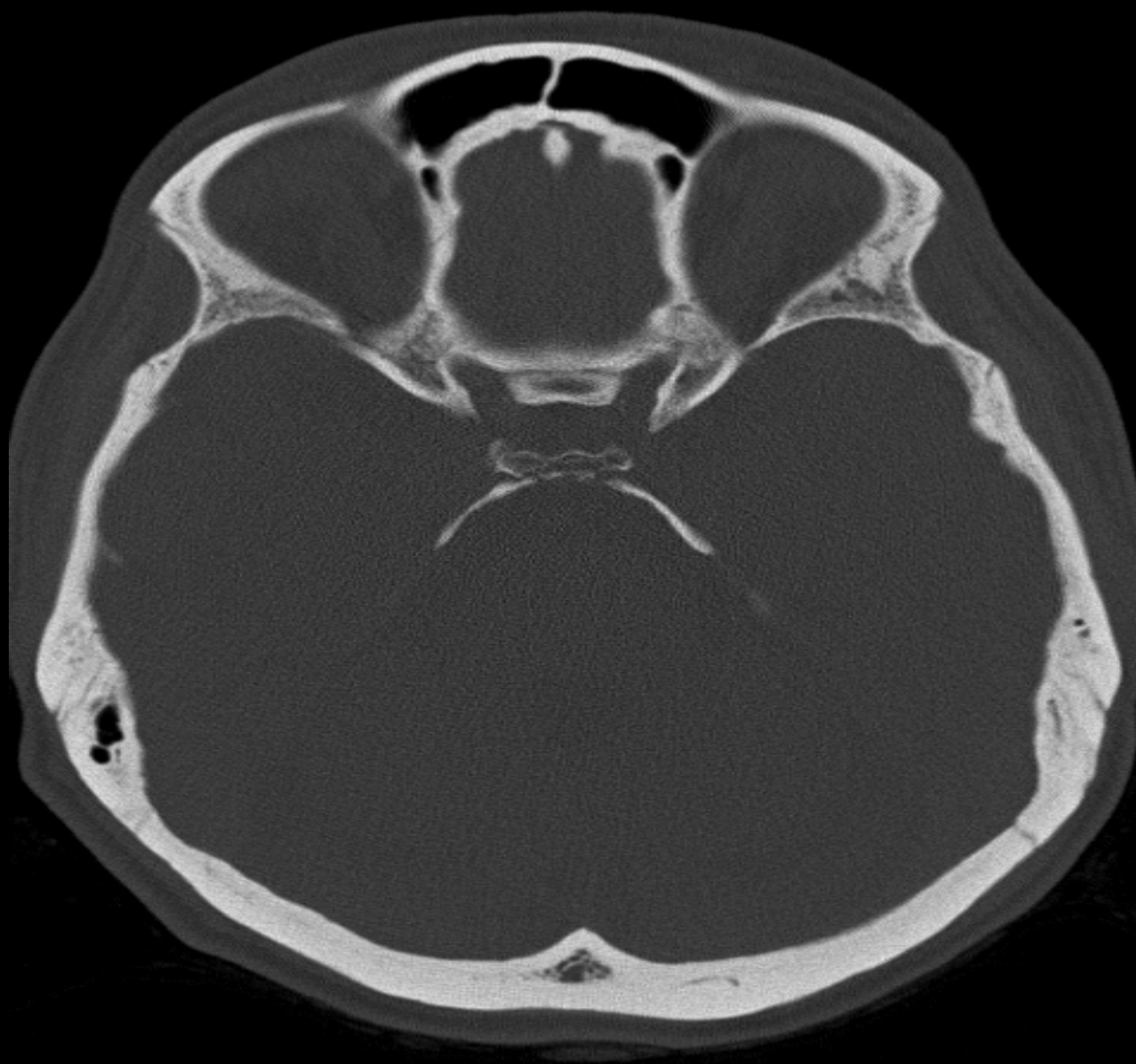


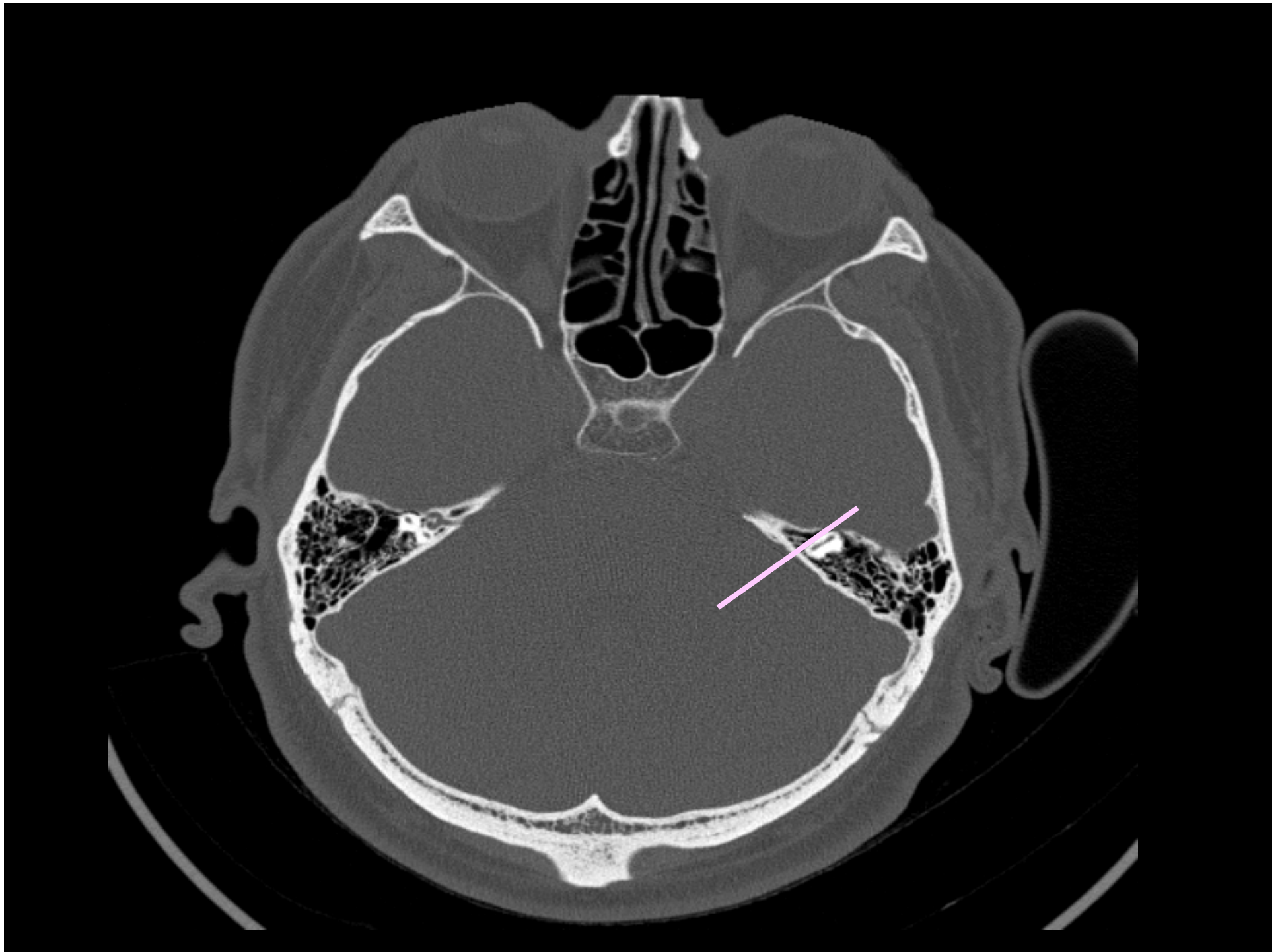
Direction Known to Unknown

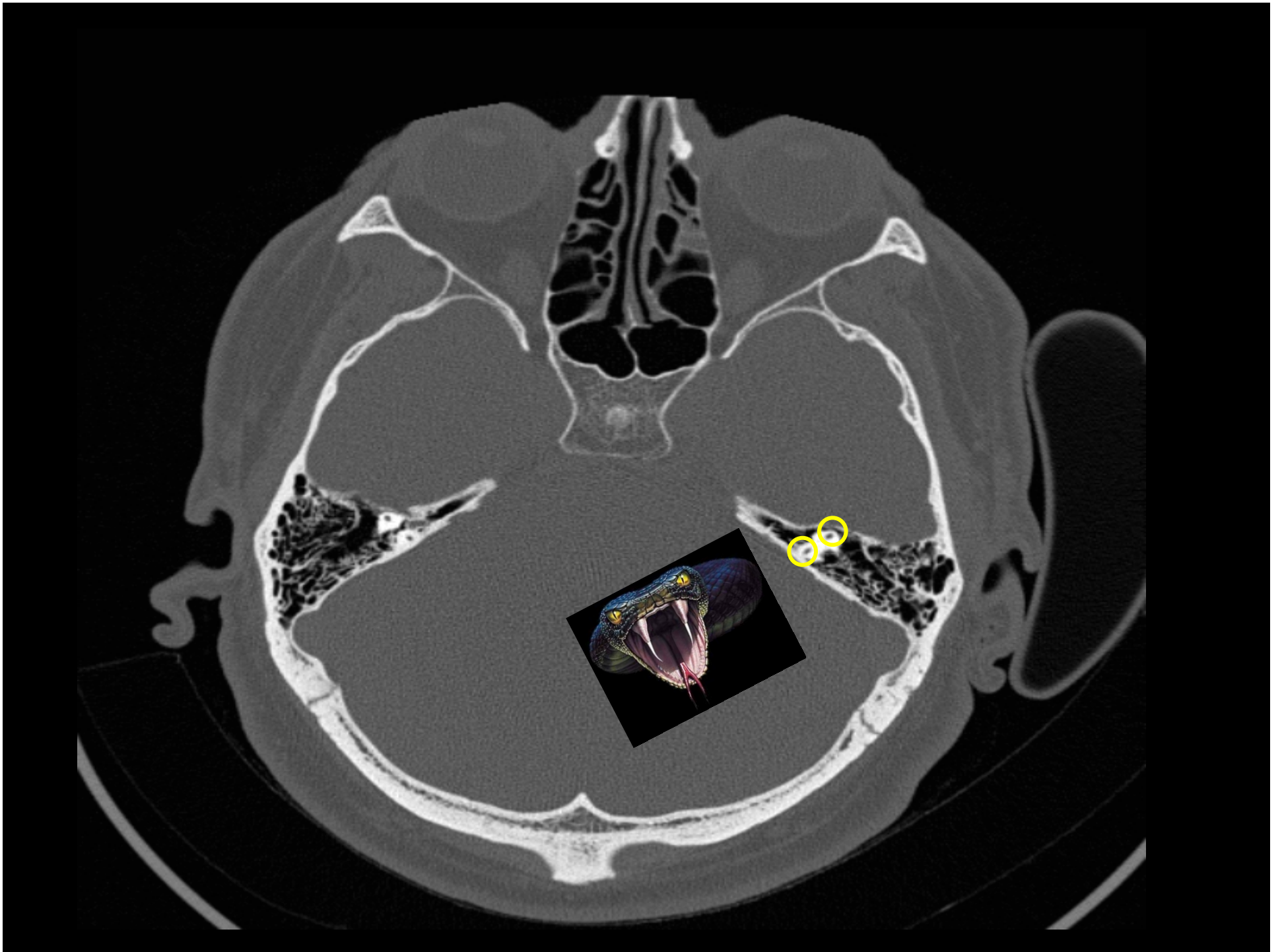


Axial scan: start at the top



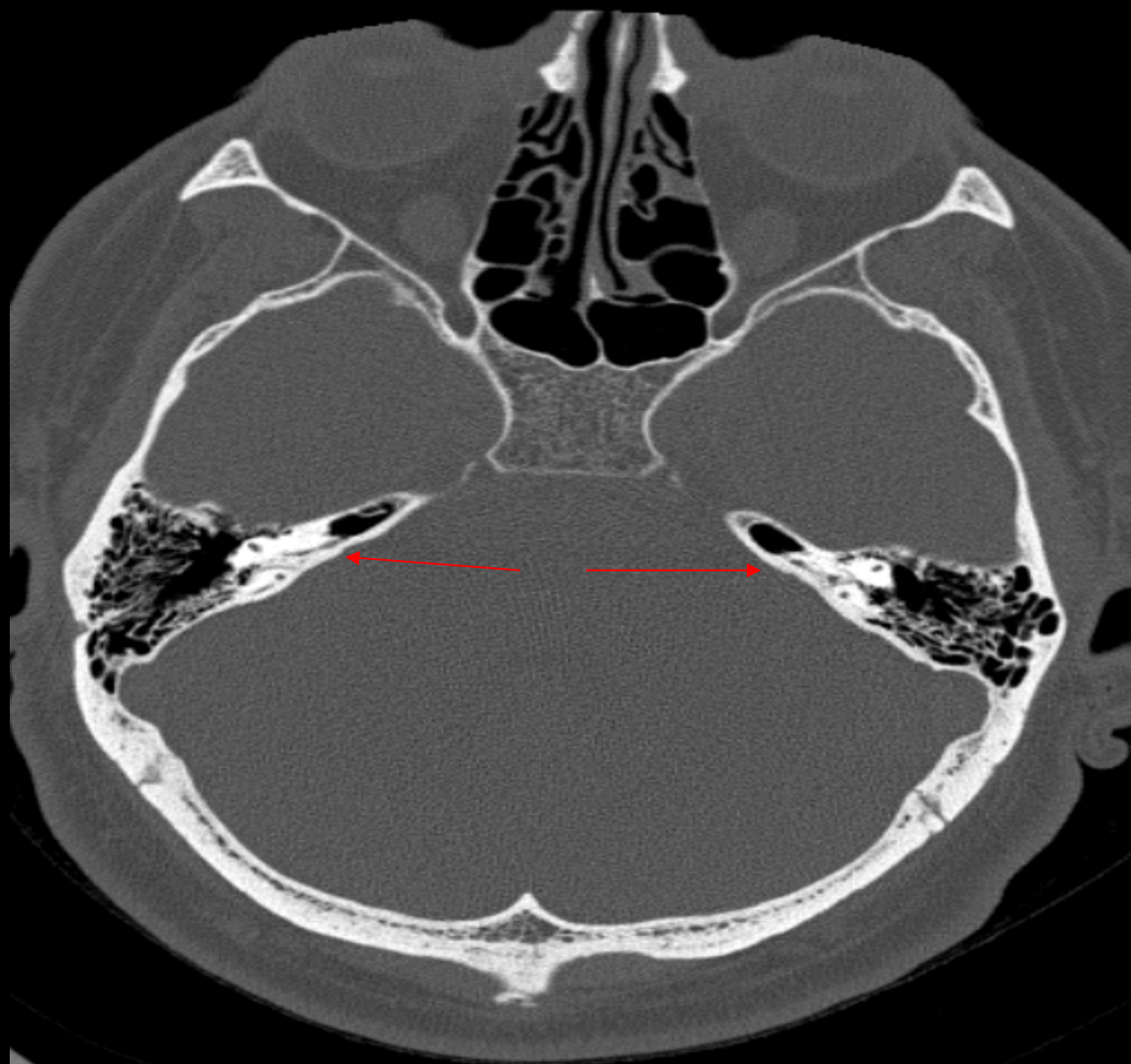






Axial scan

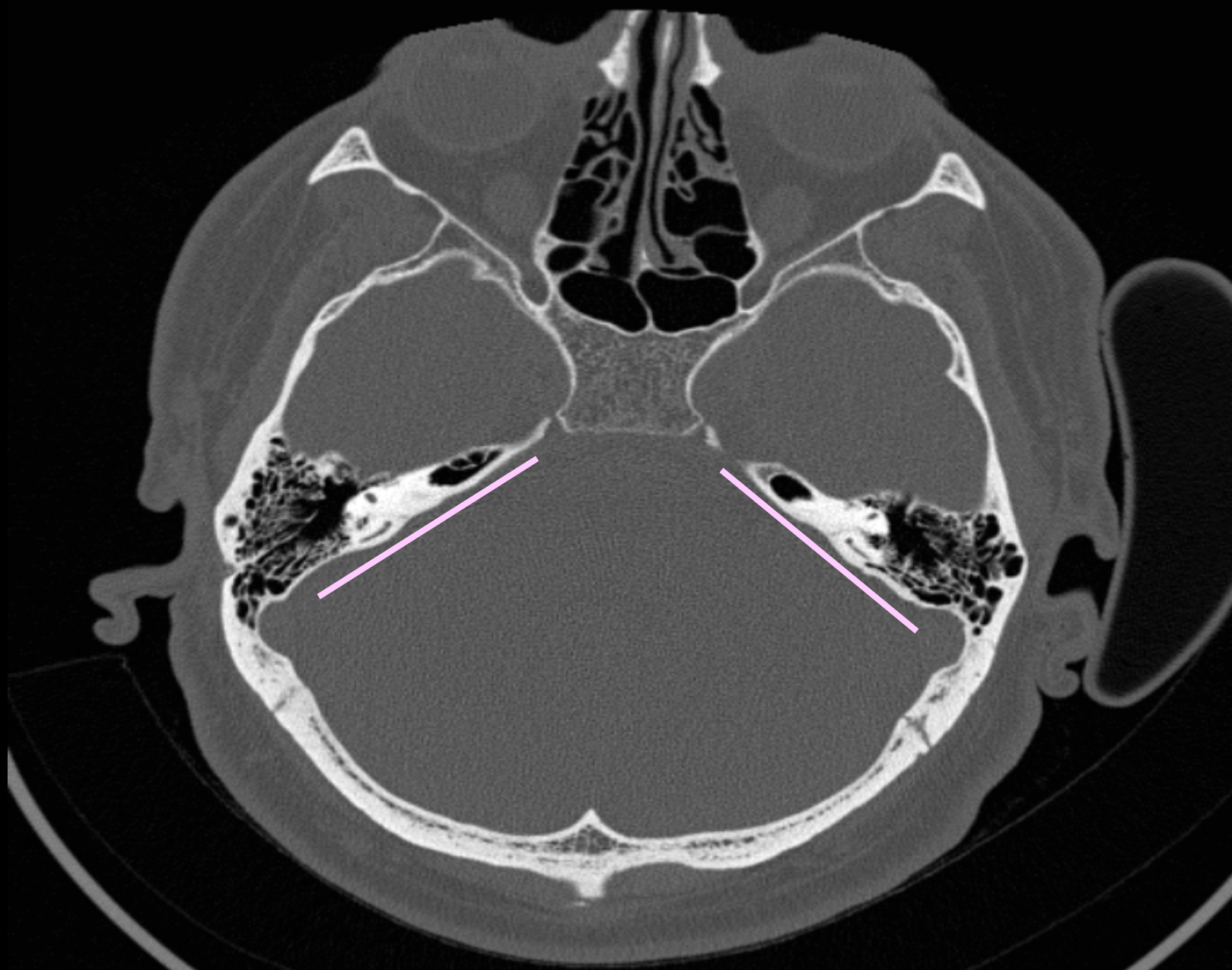
- The “blue-line” becomes “Snake Eyes”
- Note the Subarcuate Artery
Parallel to the IAC but a few cuts above it.



Axial scan

3P

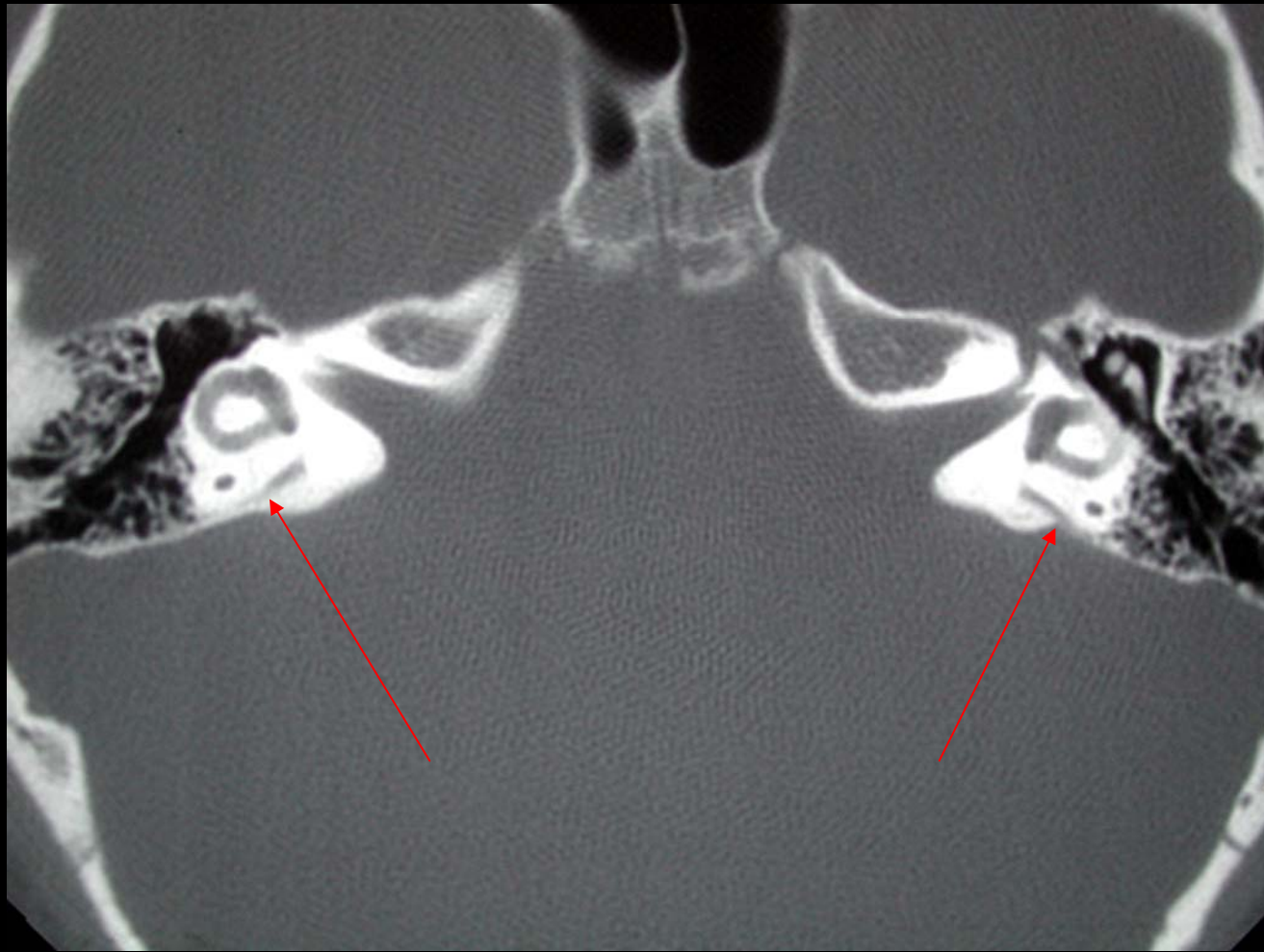
- **P**SCC comes into view running
 - **P**arallel to the long axis of the TB
 - **P**yramid



Axial scan

- **Vestibular Aqueduct** is **V**ariably noted as it **V**eers **V**entrally onto the postro fossa surface of the temporal bone.

Vestibular aqueduct



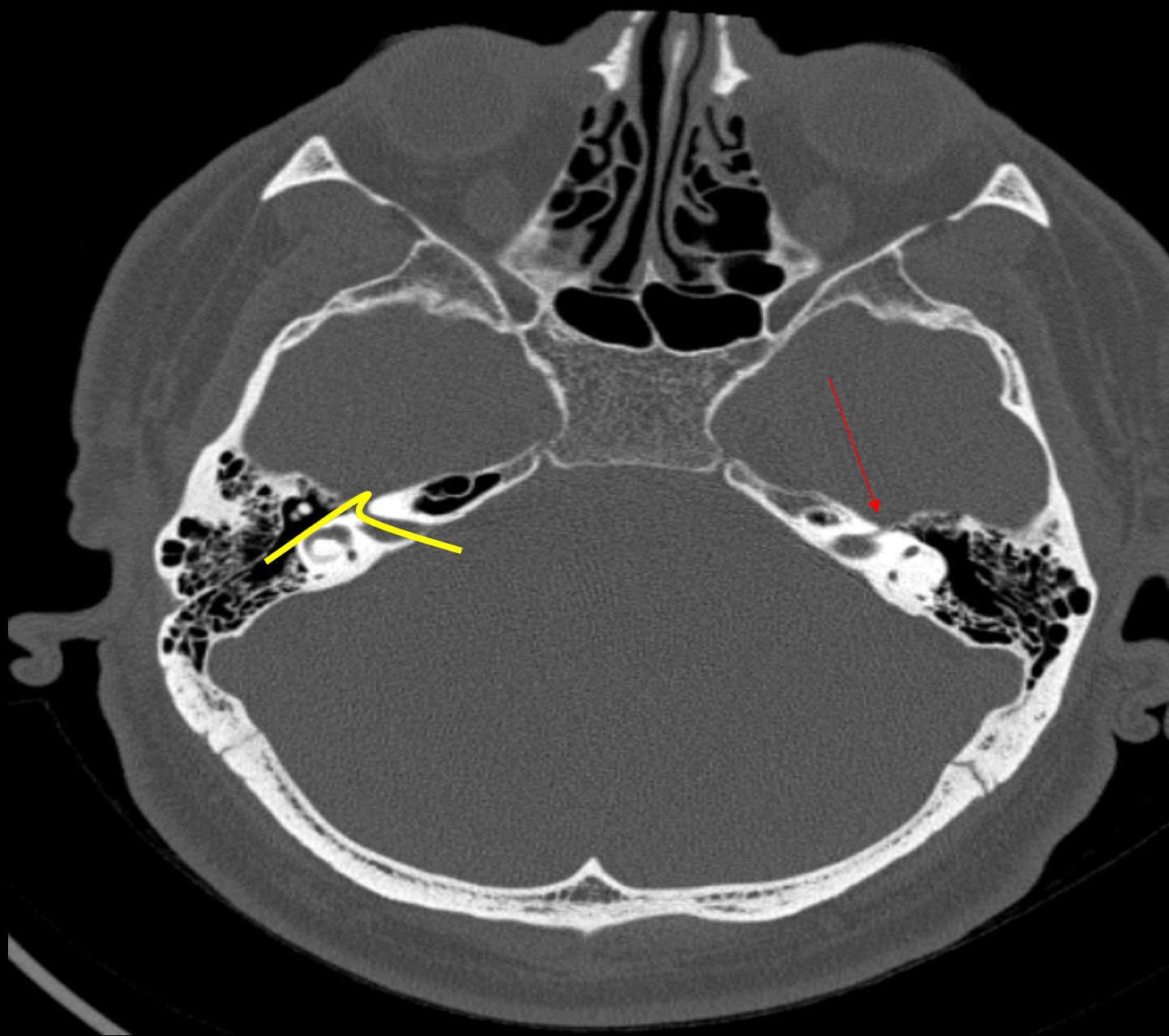
Vestibular aqueduct

- **Bony canal**
- **Parallel to the common crus**
- **Postr. fossa dura**
- **Antr to the sigmoid sinus**
- **Contains: the endolymphatic duct, a small artery and vein**
- **Surgical importance: Gusher**
 - **Stapes surgery**
 - **Cochlear implantation.**



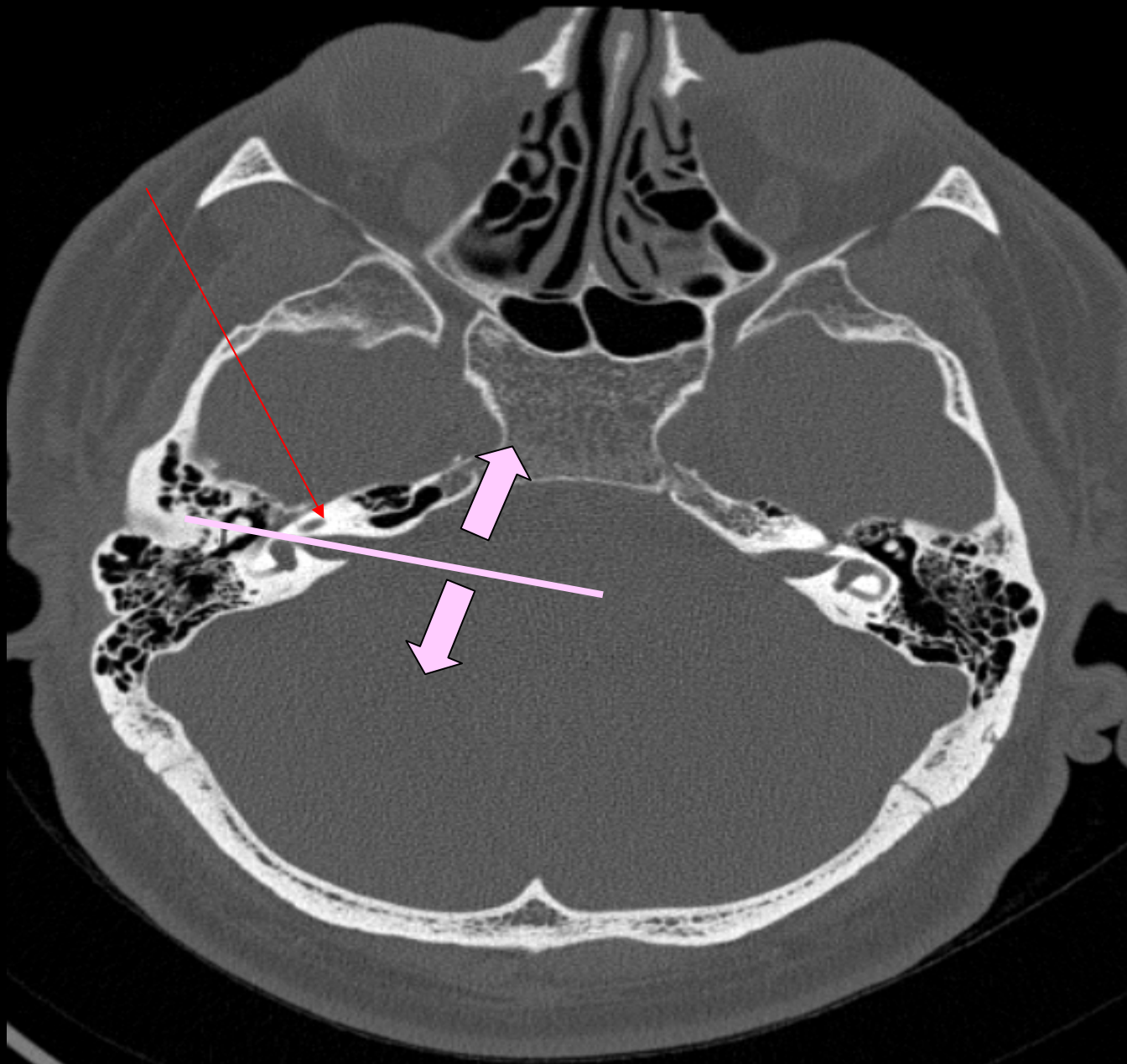
Axial scan

- The IAC is next to appear
- Note VII passing to the geniculate



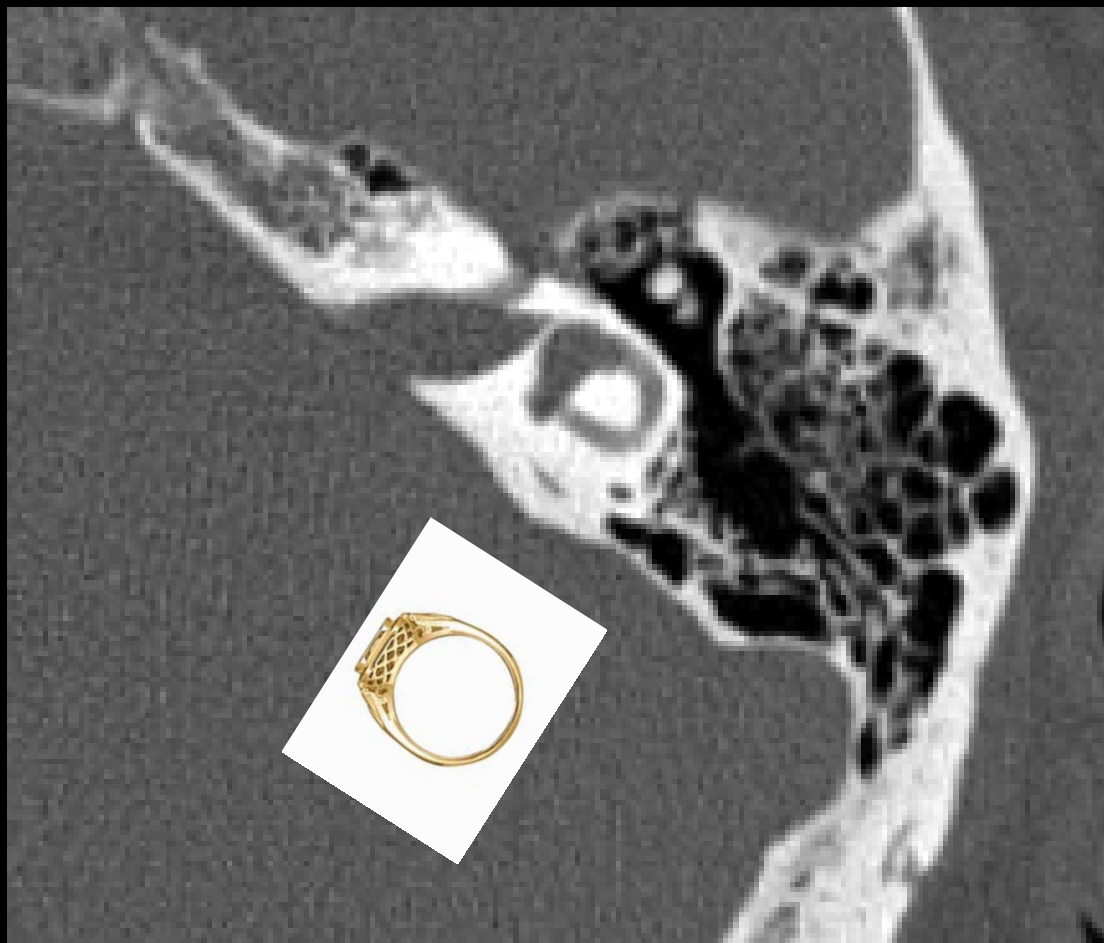
Axial scan

- The initial view of the globular basal turn of the cochlea may give rise to some confusion.
- **Remember IAC**
 - All structures anterior are Cochlear
 - All structures posterior are Vestibular



Axial scan

- At the same level note the **“Signet Ring”**
Appearance of the Vestibule and the LSCC
- The ossicles are seen for the first time.
- Note the characteristic
“Ice Cream Cone” or “World Cup”
appearance



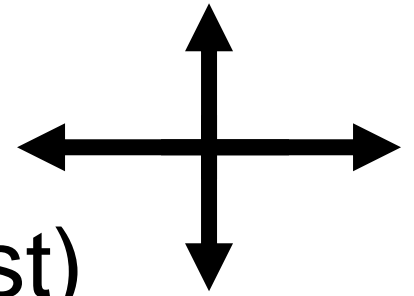


Axial scan

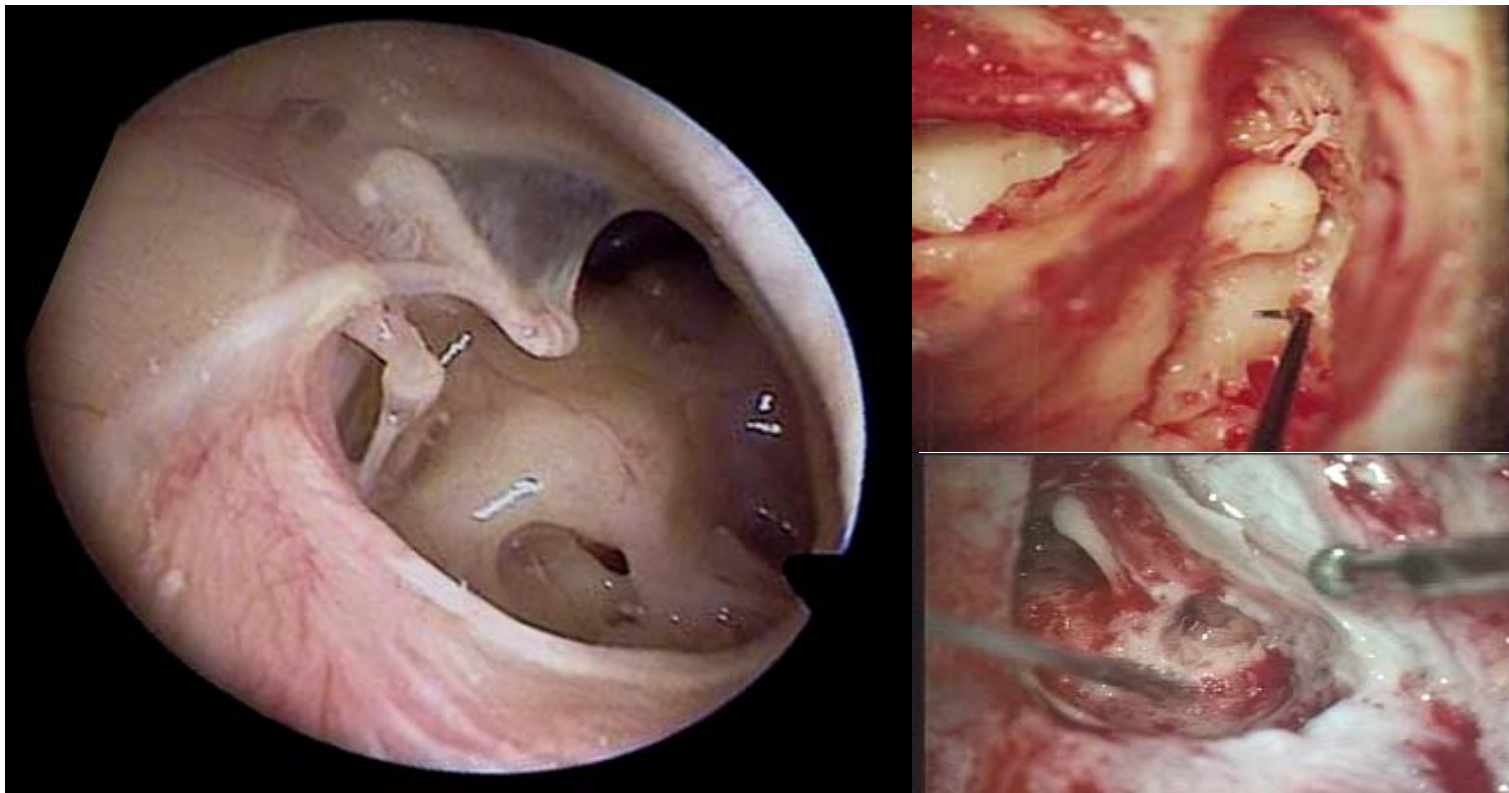
High definition scans

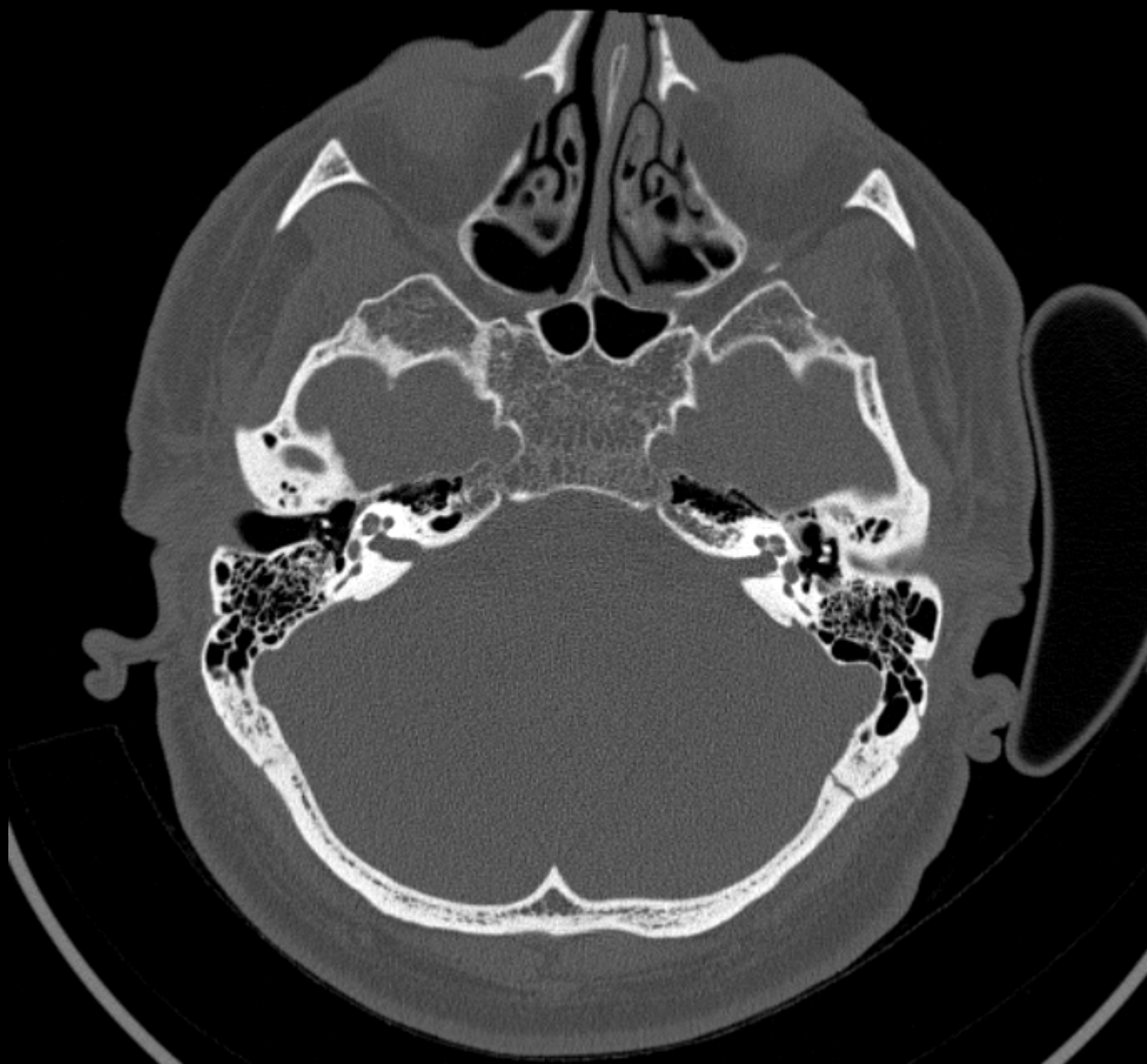
- Sinus tympani
- Pyramidal process
- Facial recess
- *Stapes*
- *Stapedius tendon.*

Axial scan



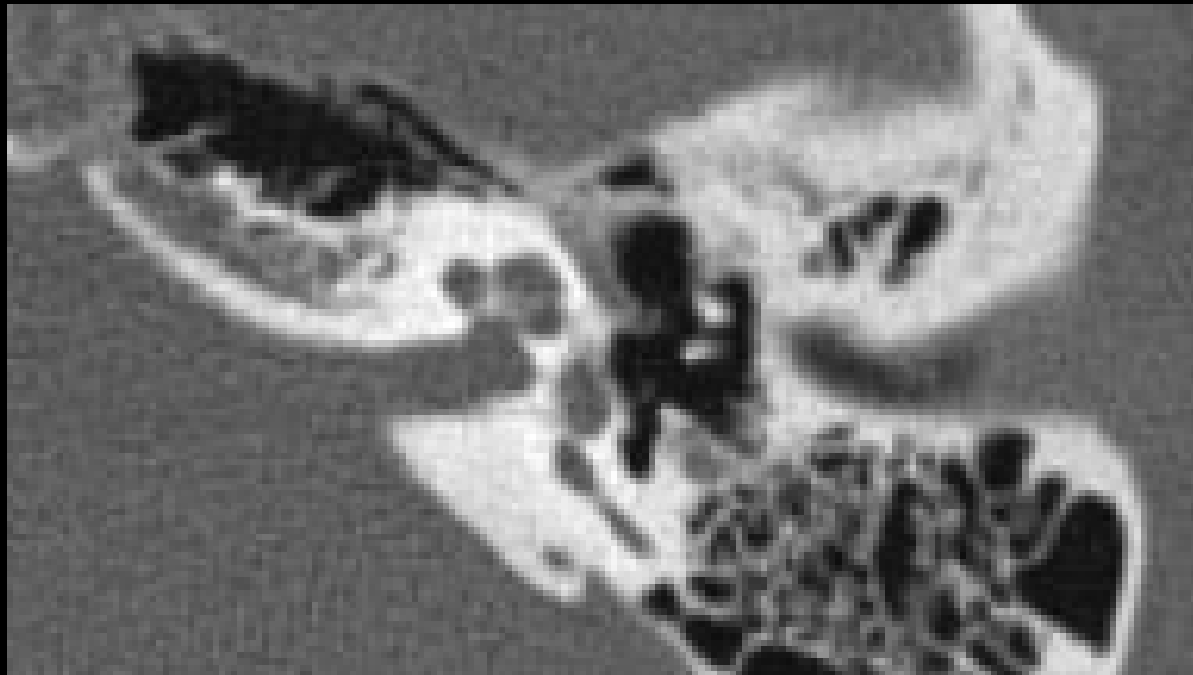
- Areas (epi/meso/hypo/pro/post)

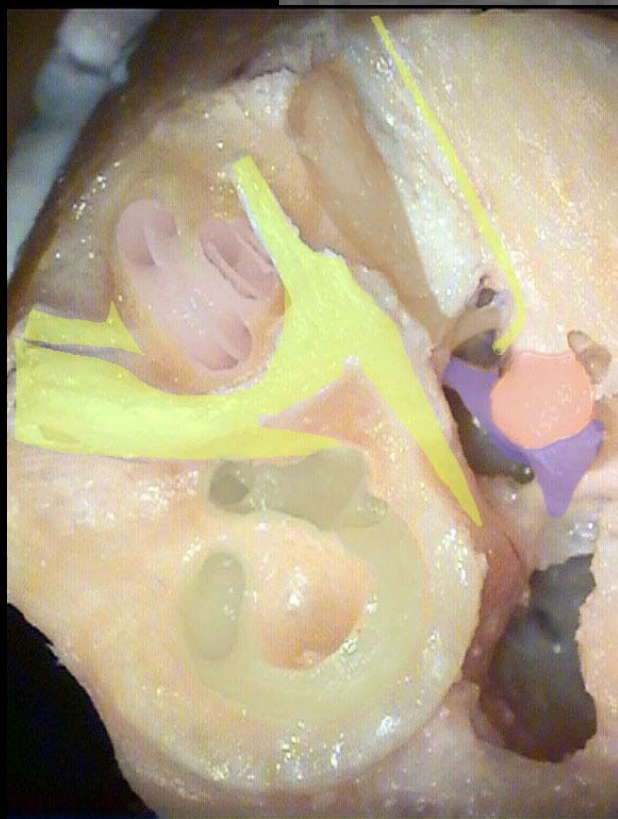




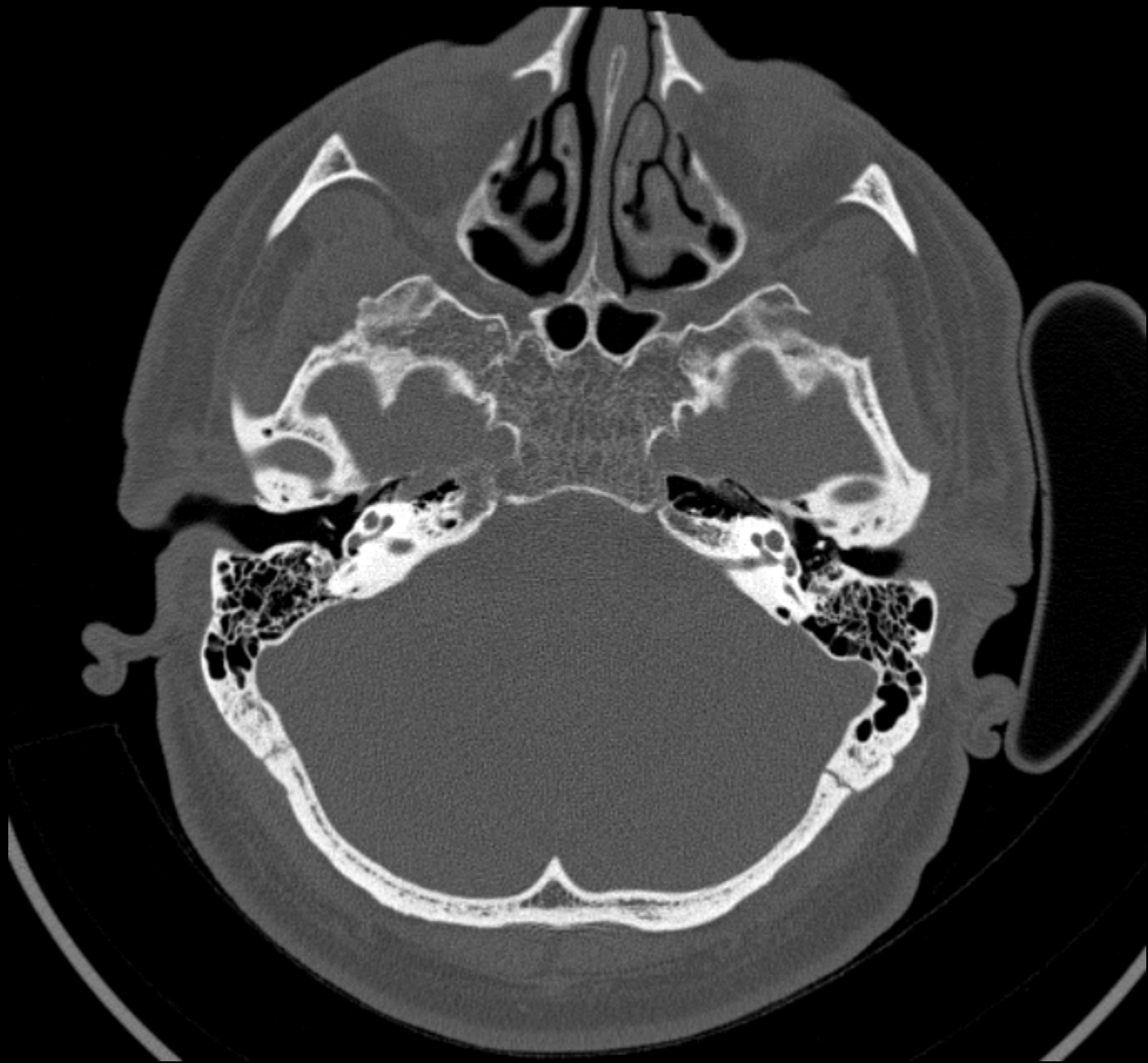
Axial scan

- Antrly the **Tensor tympani muscle** is seen passing postrly in its canal, around the **processus cochleariformis** to reach the neck of the malleus.
- Lower still the basal turn of the cochlea is followed laterally to the Round Window niche.



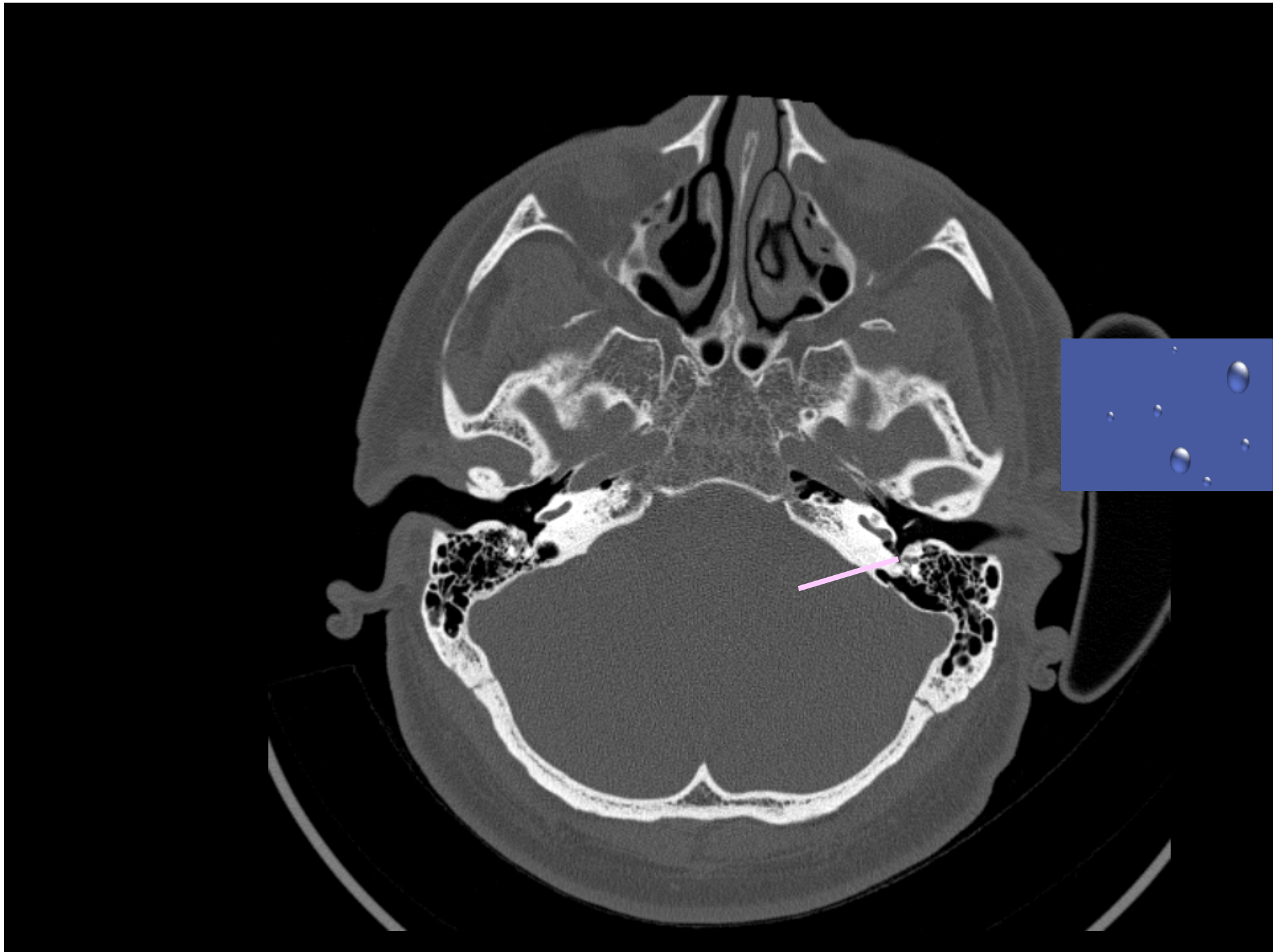






Axial scan

- At this point, just below the IAC a thin canal can be seen crossing the temporal bone parallel to the IAC. This is the **Cochlear Aqueduct.**
- **Air bubble (round window)**
 - **Subarcuate Artery**
 - **IAC**
 - **Cochlear Aqueduct**



Cochlear aqueduct (perilymphatic duct)

- **scala tympani of the basal turn of the cochlea $\leftarrow \rightarrow$ CSF of the postr. cranial fossa.**
- **Clinical importance: Suspected route of Menings $\leftarrow \rightarrow$ Ear**
- **Inner Ear \rightarrow meningitis**
- **Meningitis \rightarrow Deafness**

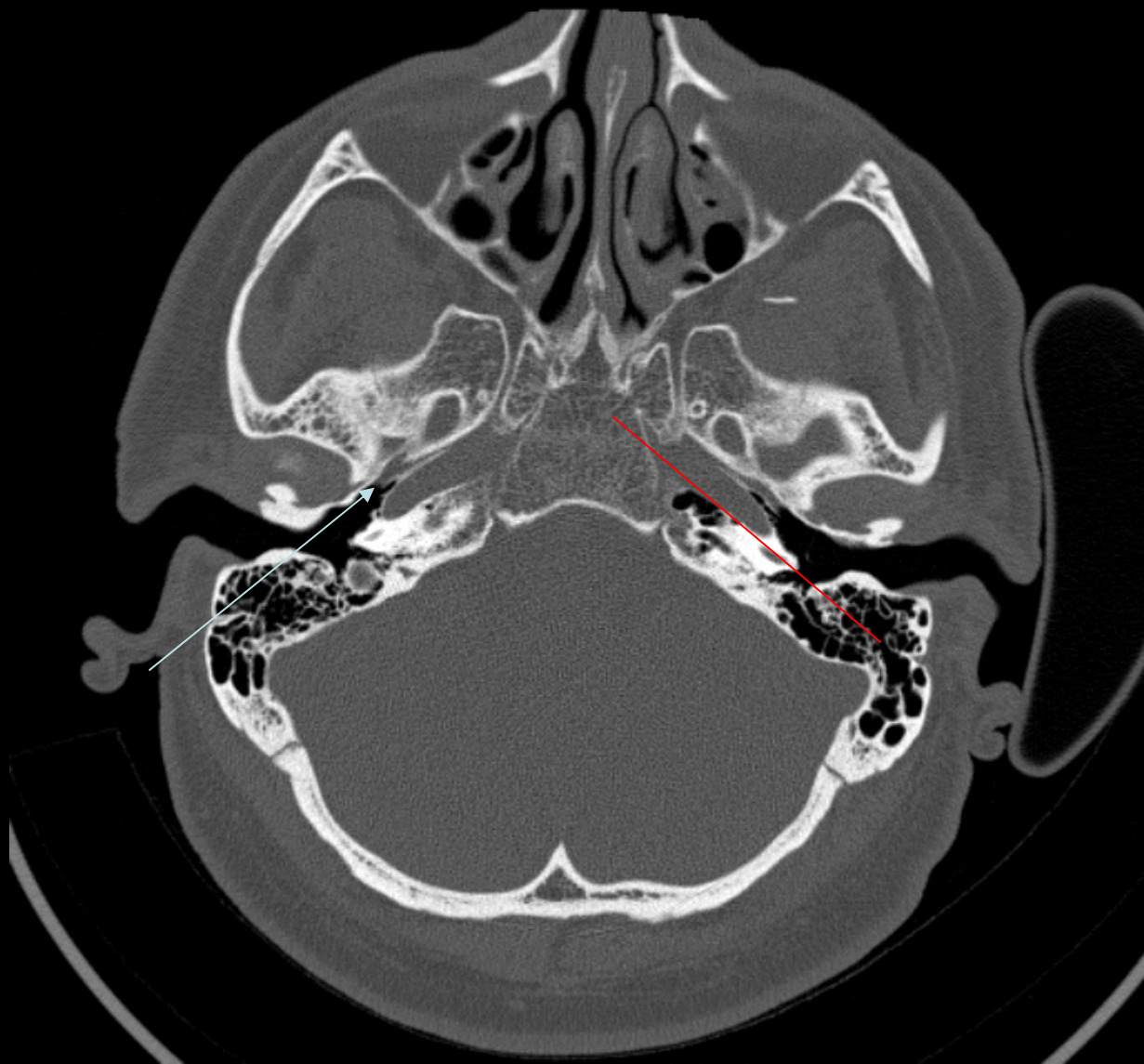
Cochlear aqueduct

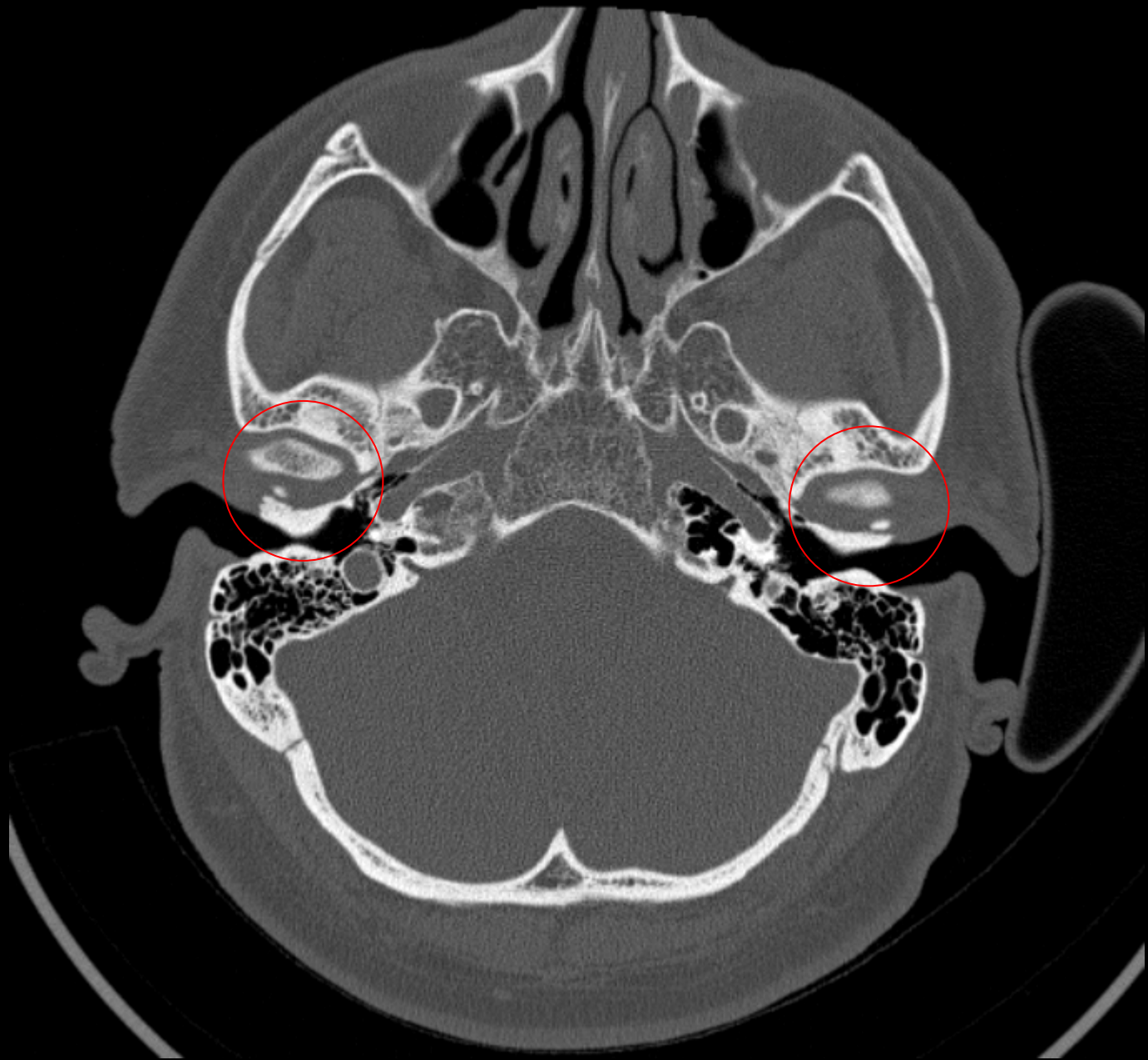
Air Bubble



Axial scan

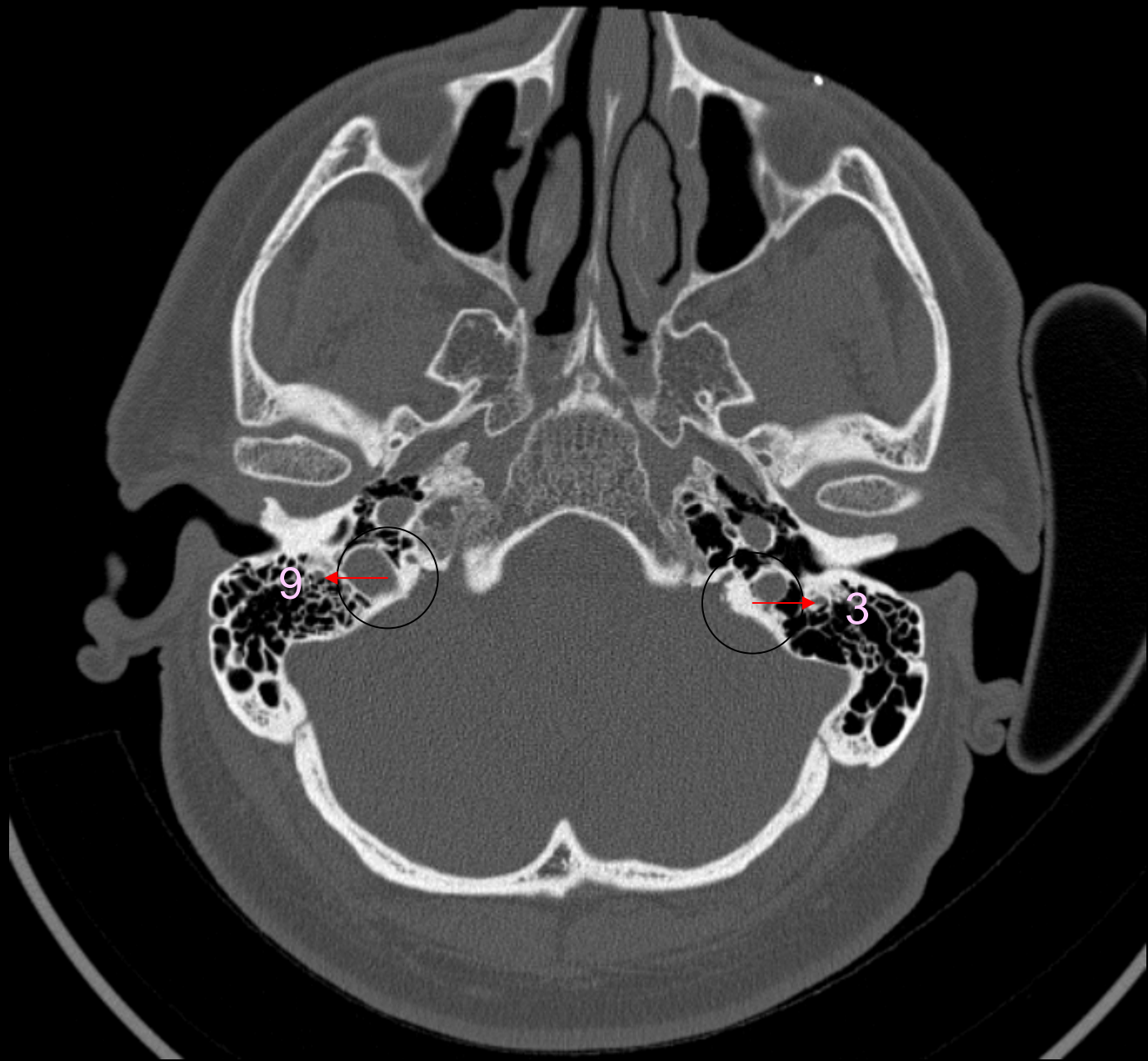
- At this level **there are two reliable pointers to the position of the facial nerve**
- **The Two C's...**
- You might like to call the Basal turn of the cochlear line the B – line..... for Basal or for Bance!
- The carotid line the C-line





Axial scan

- Once the TMJ is seen...relax
- You may now say that you are in the hypotympanum where the cArotid is Antr and the jugular bulb posterior.
- The vertical portion of the facial nerve is indicated by considering the jugular foramen as a clock face. The facial nerve is seen at 3 o'clock on the left and 9 o'clock on the right.



Coronal scan

- **The C-shaped Posterior canals form the postr. limits of the inner ear structures.**

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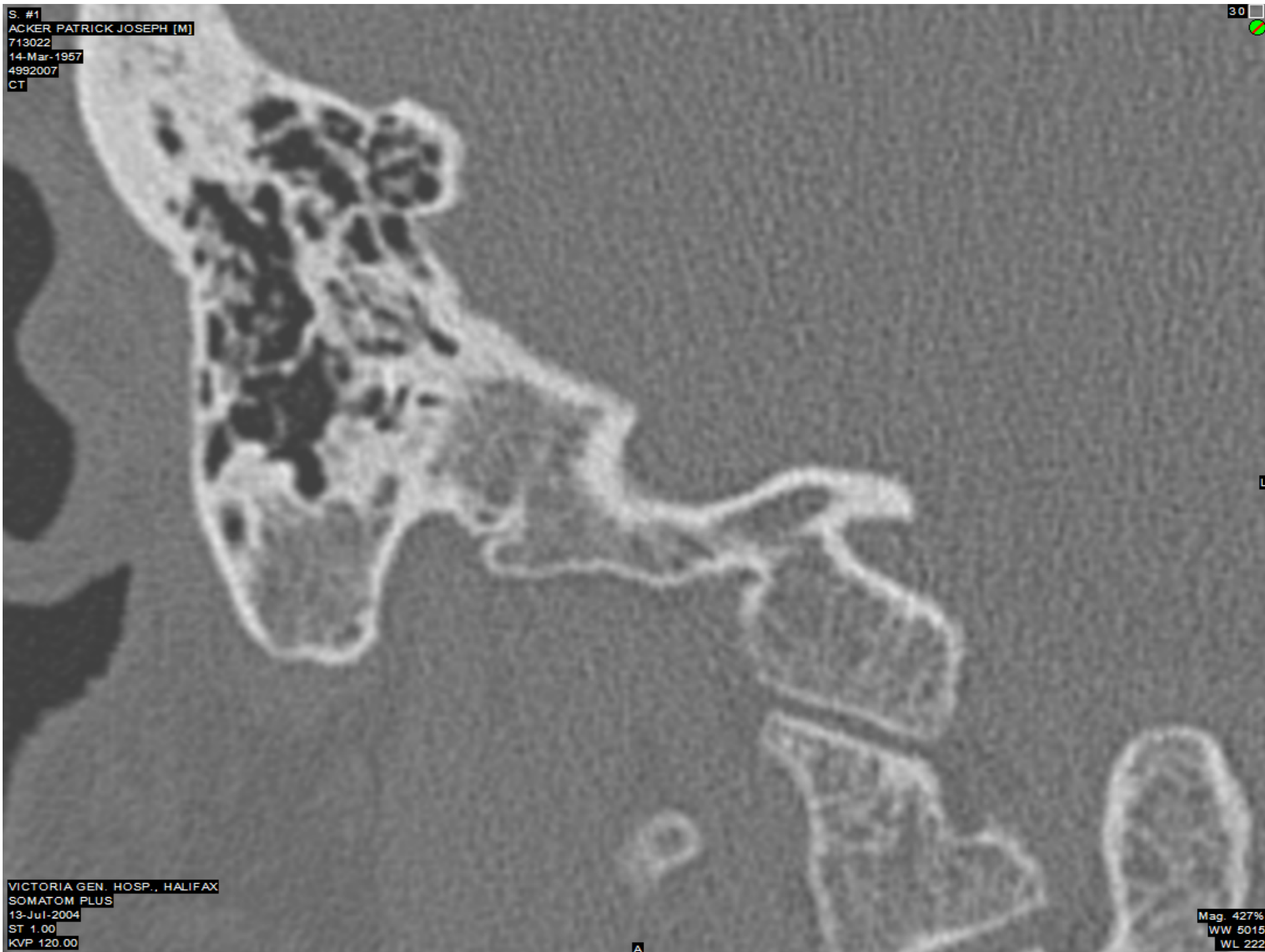


VICTORIA GEN. HOSP., HALIFAX
SOMATOM PLUS
13-Jul-2004
ST 1.00
KVP 120.00

Mag. 427%
WW 5015
WL 222

A

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**“From Sea to shining Sea”
(C to C)**

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Vertical (mastoid portion) facial nerve is within a couple of cuts antr to the Posterior SCC.

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WL 222

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Coronal scan

- **T-shape seen twice where Lateral and Supr. SCC's are sectioned.**
- **Think about it.**

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WL -335

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KVP 120.00

Mag. 427%
WW 4041
WL 629

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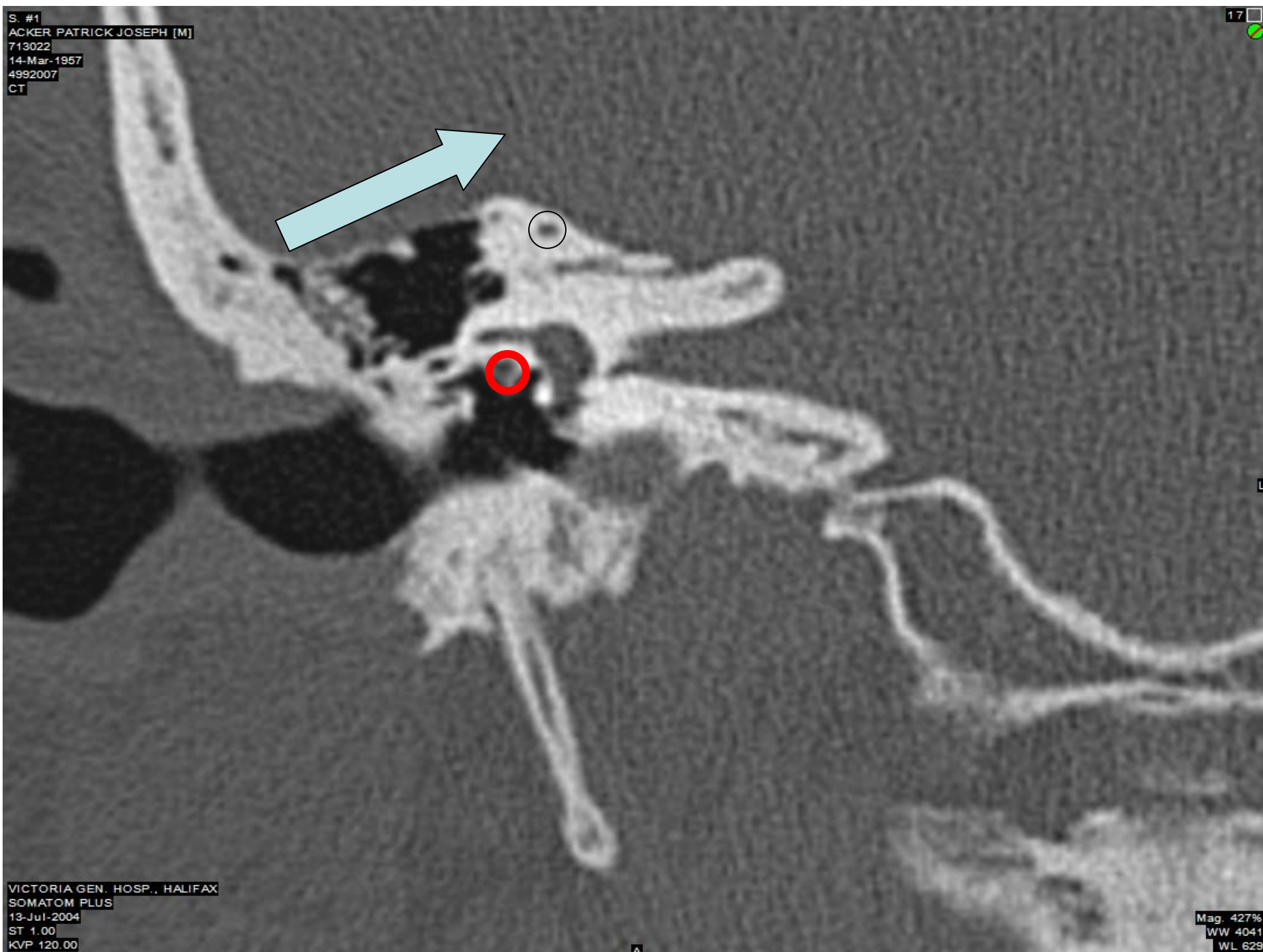
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KVP 120.00

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WL 629

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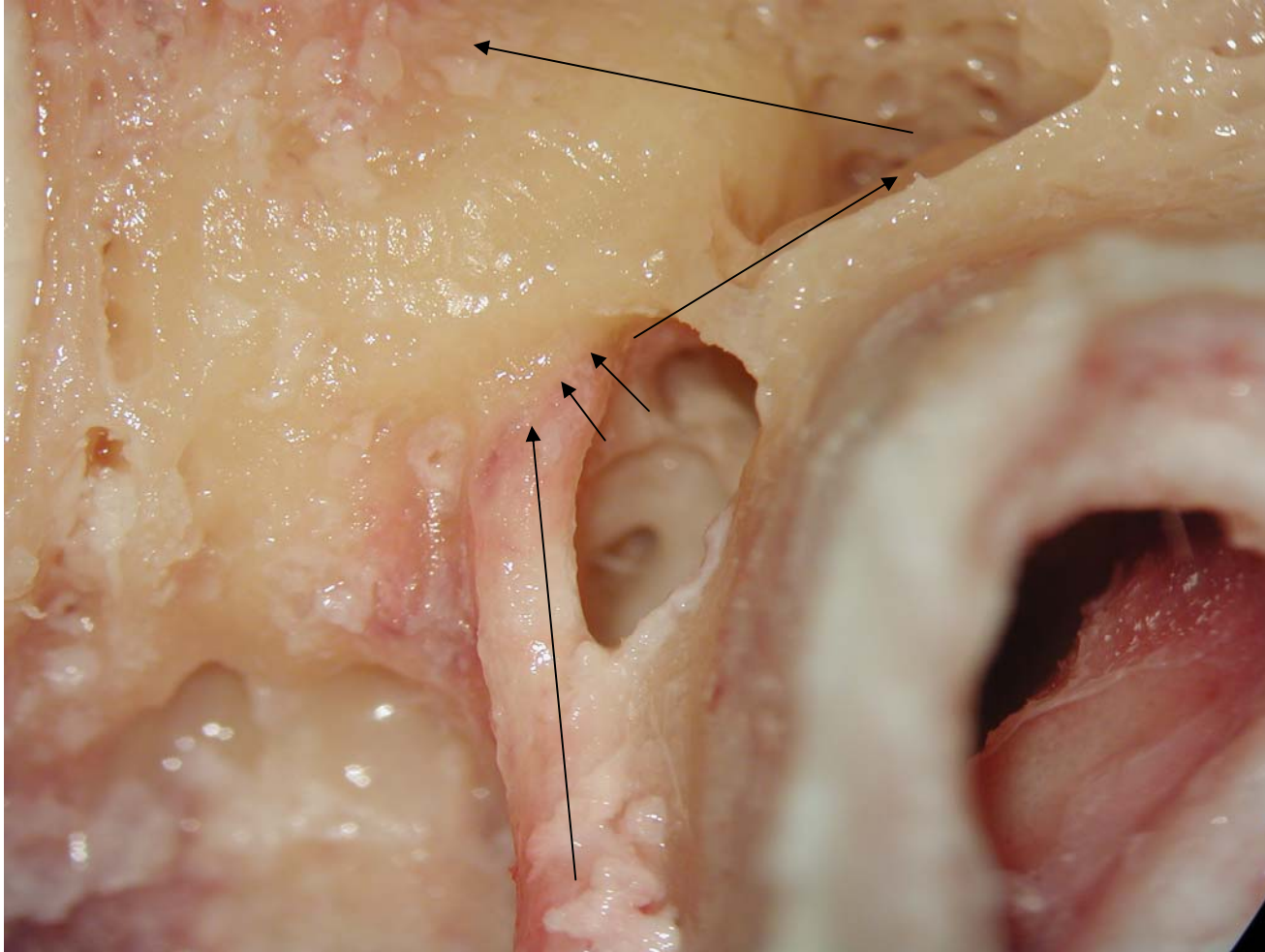
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KVP 120.00

Mag. 427%
WW 4041
WL 629

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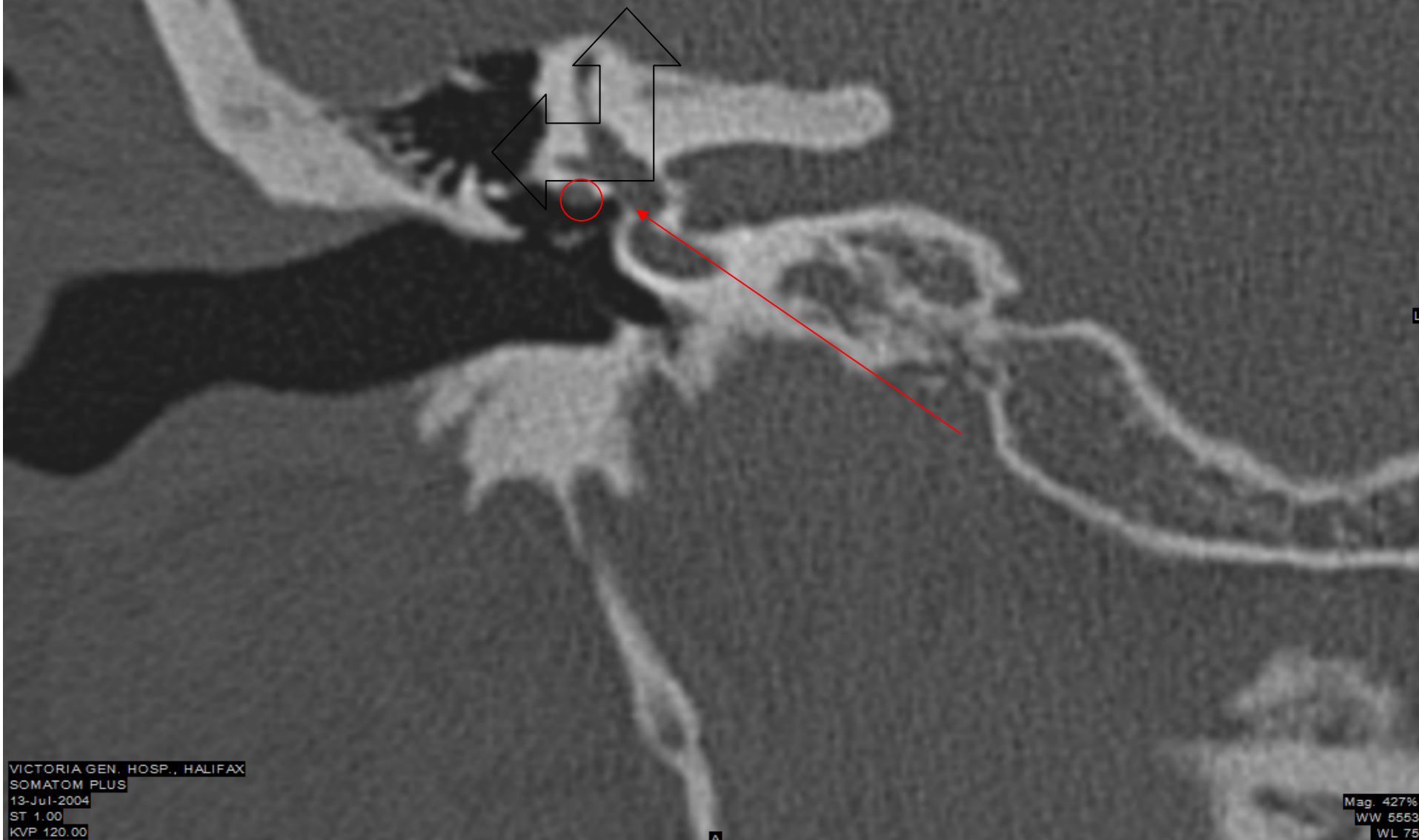
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KVP 120.00

Mag. 427%
WW 3954
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KVP 120.00

Mag. 427%
WW 5553
WL 75

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Mag. 427%
WW 4433
WL 321

A

Coronal scan

- **The Malleus head is seen at the junction or Meeting of cochlear and vestibular structures.**

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KVP 120.00

Mag. 427%
WW 3737
WL 459

A

L



Coronal scan

- *Vessel Identification:*
- Below the **C**ochlea is the **C**arotid.
- Below the **V**estibule is **V**enous ie the Jugular bulb.
- Any vessel seen where the TMJ also appears is the carotid

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Mag. 427%
WW 2705
WL 568

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Mag. 427%
WW 3726
WL 84

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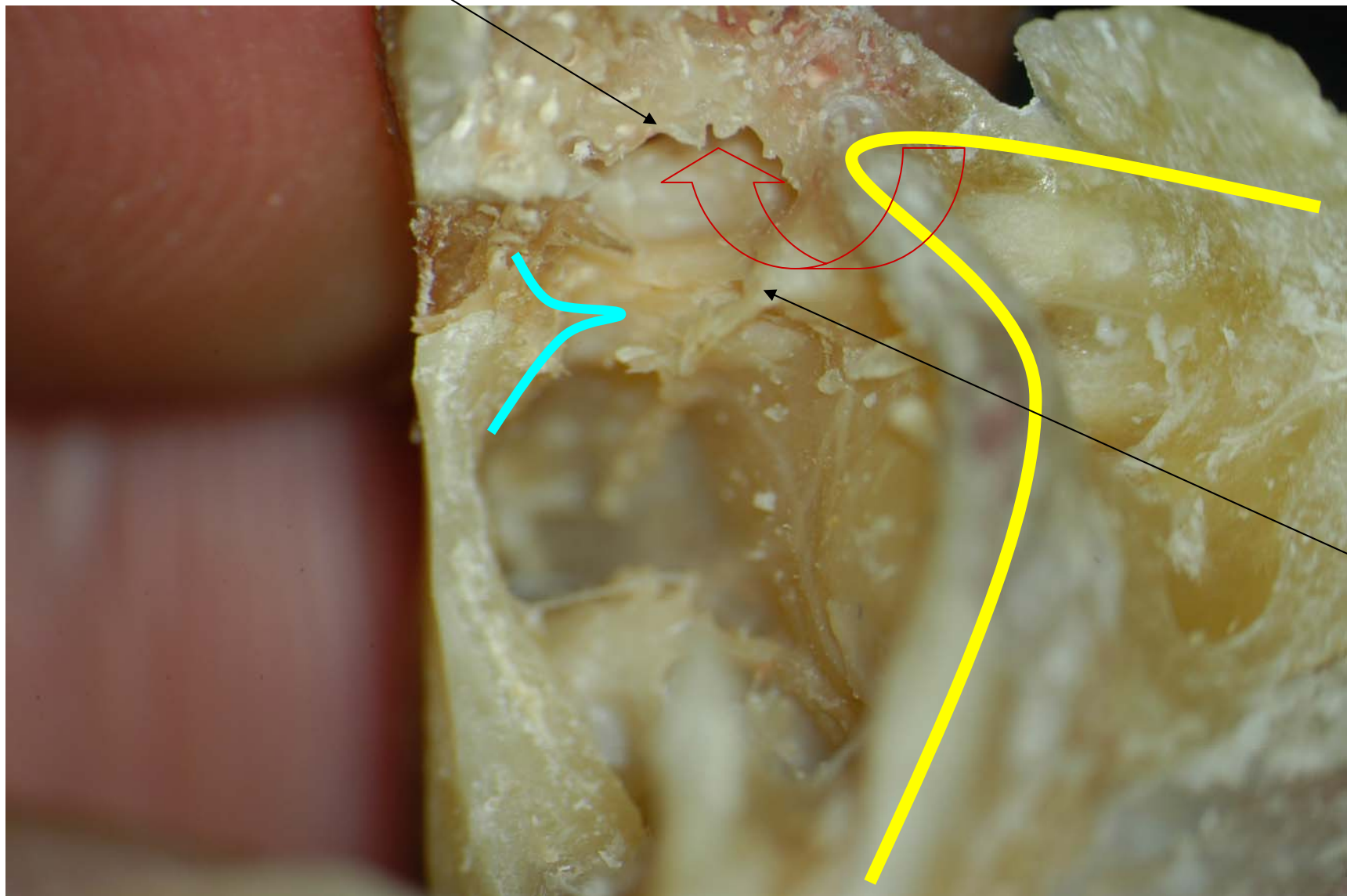
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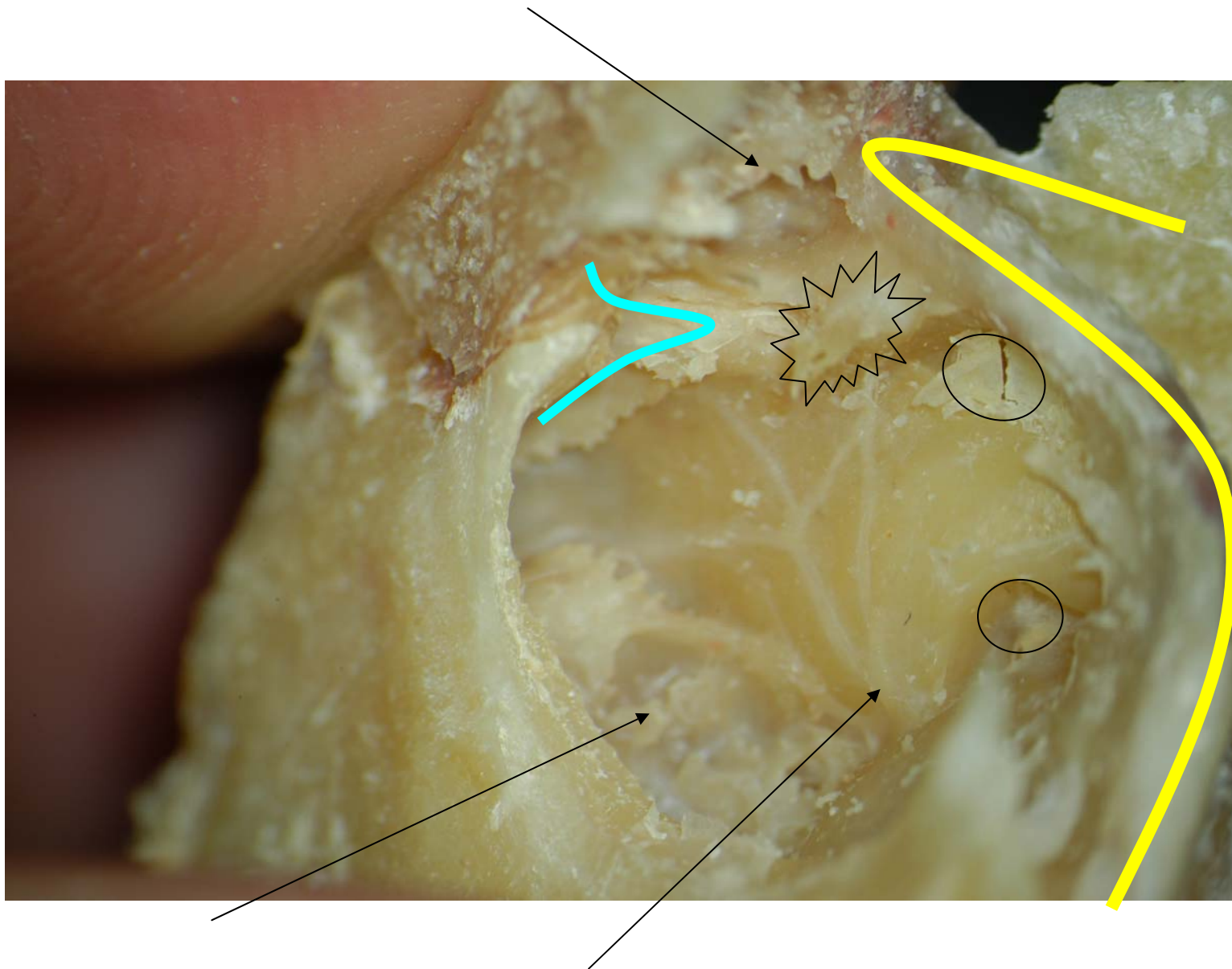
Mag. 427%
WW 2577
WL -68

A

Coronal scan

- **Snail with two eyes.**
- **Can you explain with a line diagram why the facial nerve is seen twice?**





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Mag. 427%
WW 2705
WL 568

Coronal scan

- The Antr end more likely if malleus, IAC or cochlea in same cut.

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WW 3193
WL 362

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WW 3193
WL 362

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WL 362

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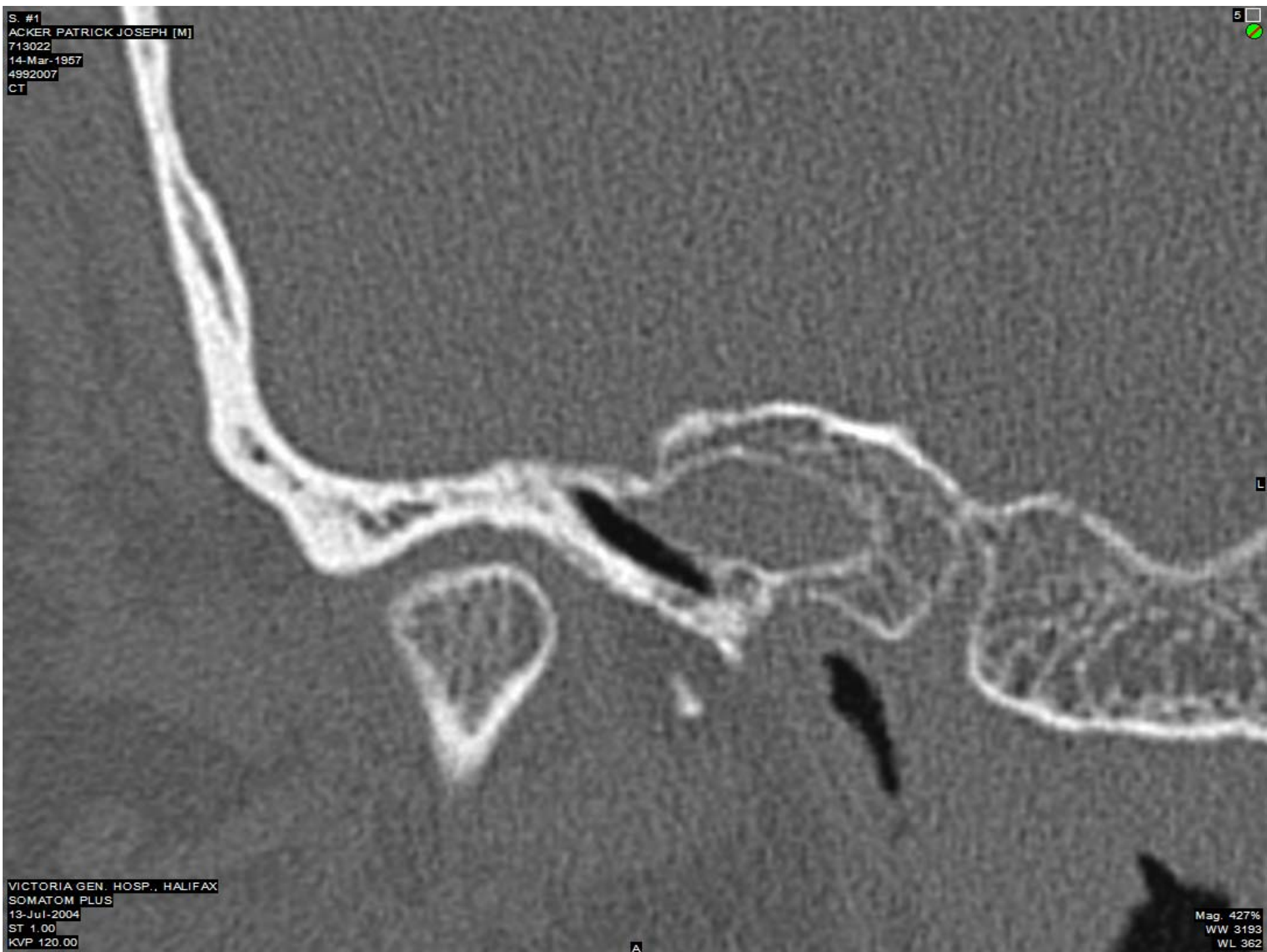
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Mag. 427%
WW 3193
WL 362

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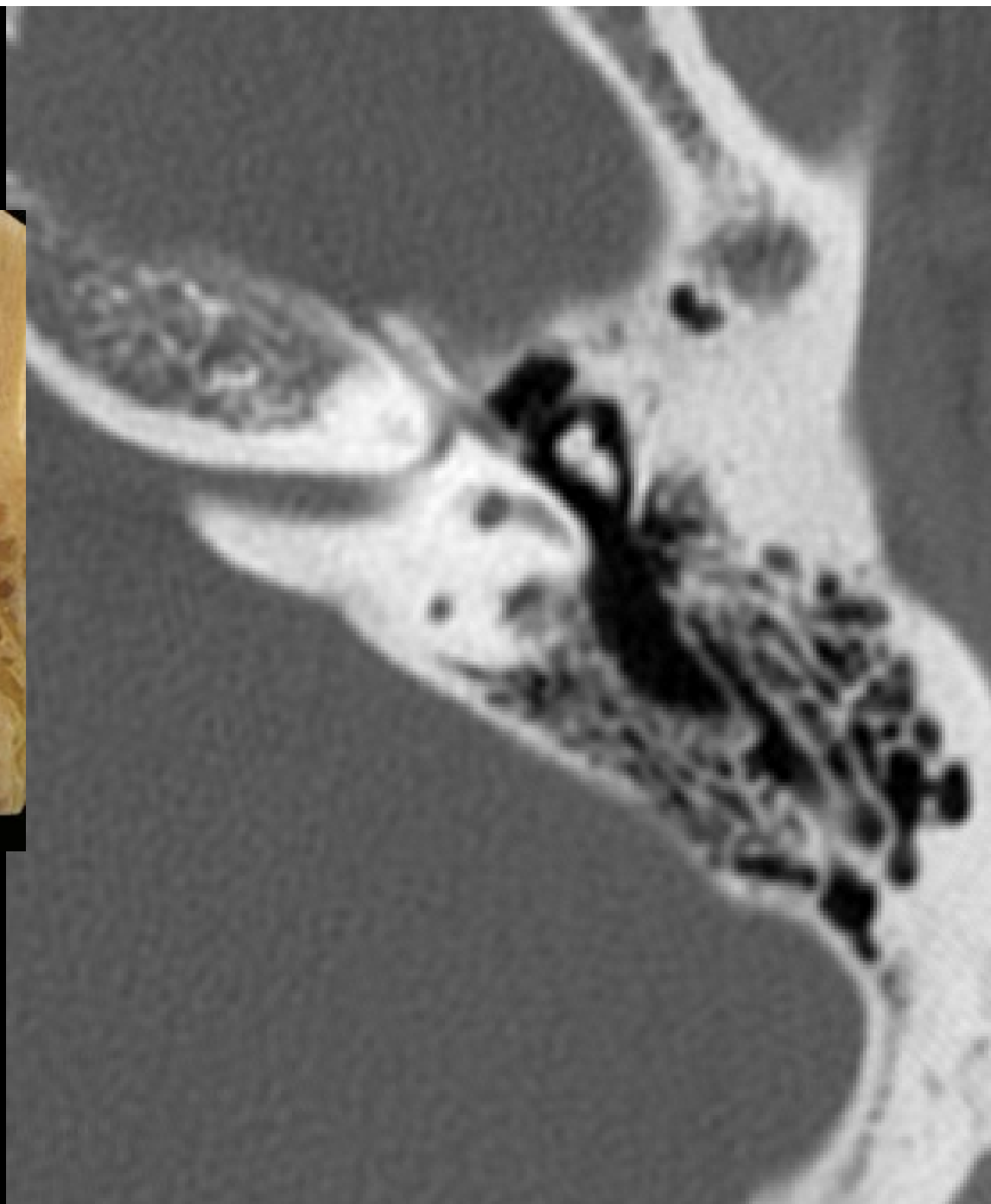
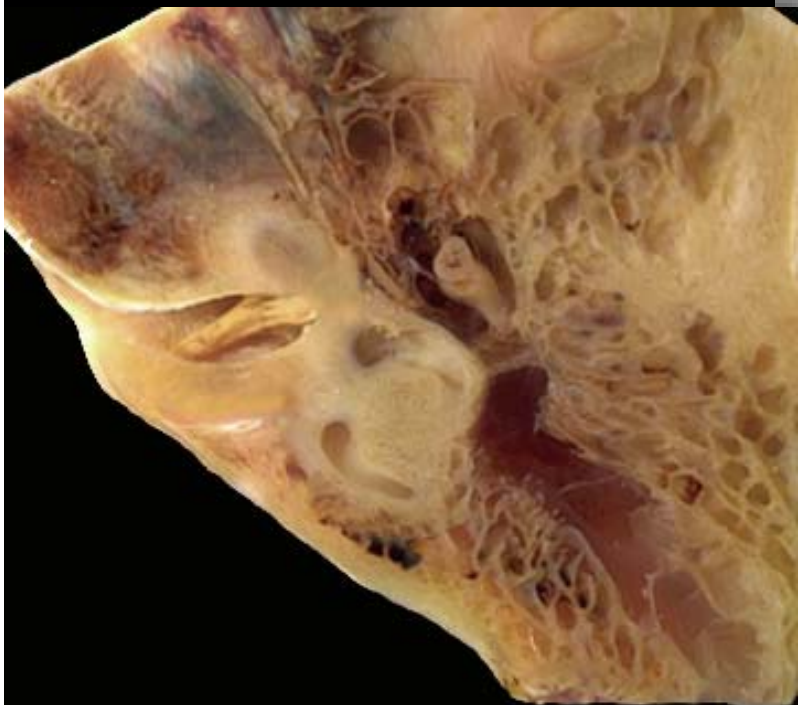


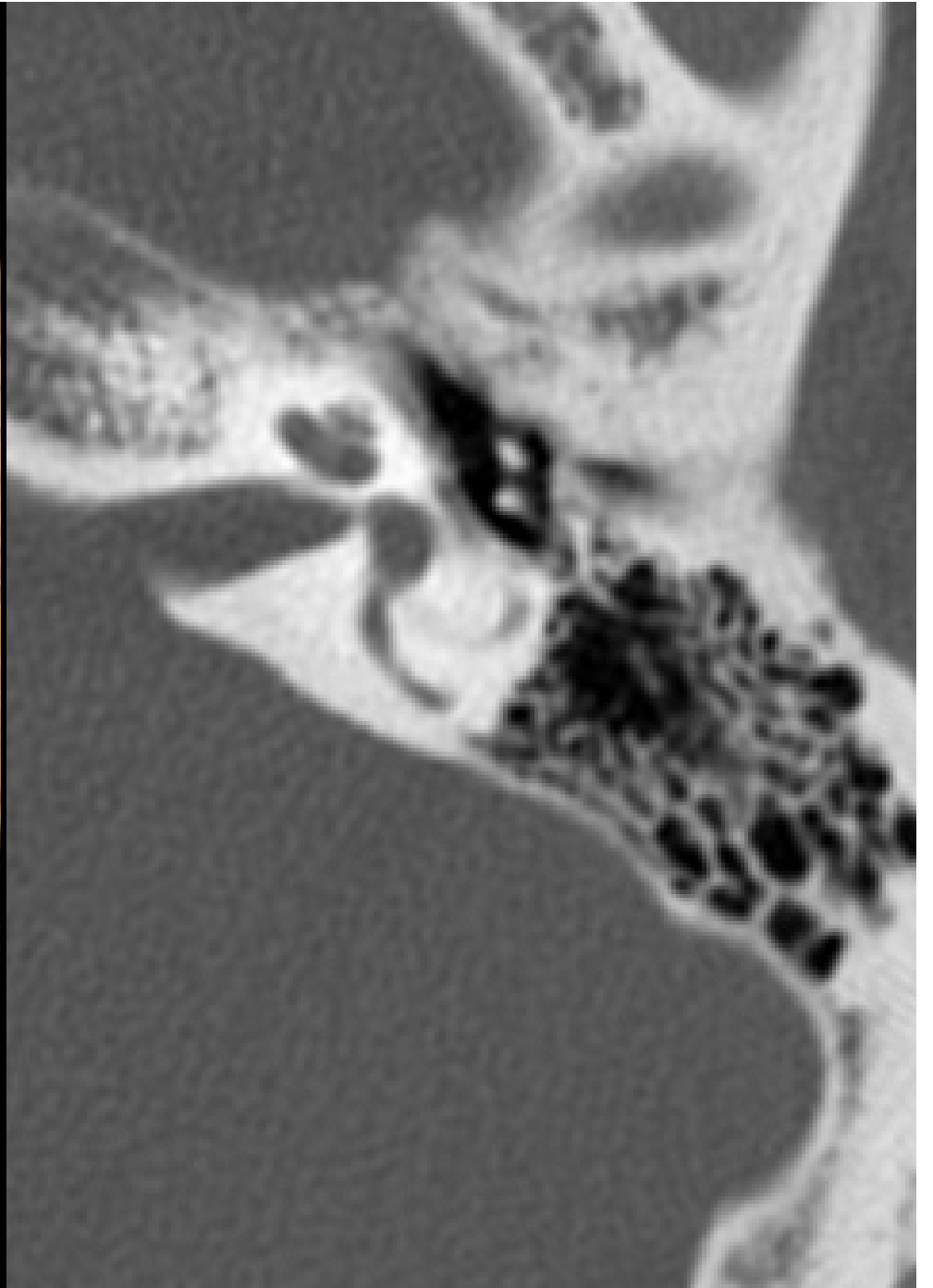
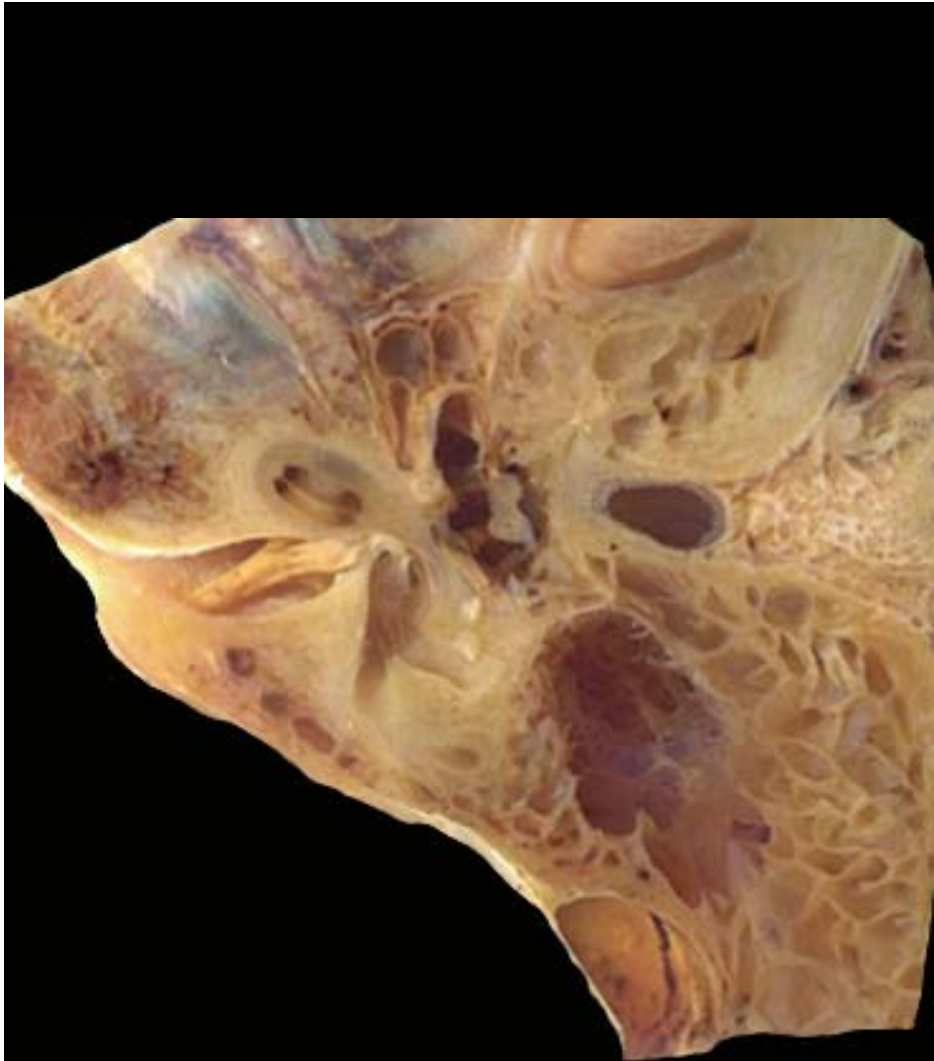
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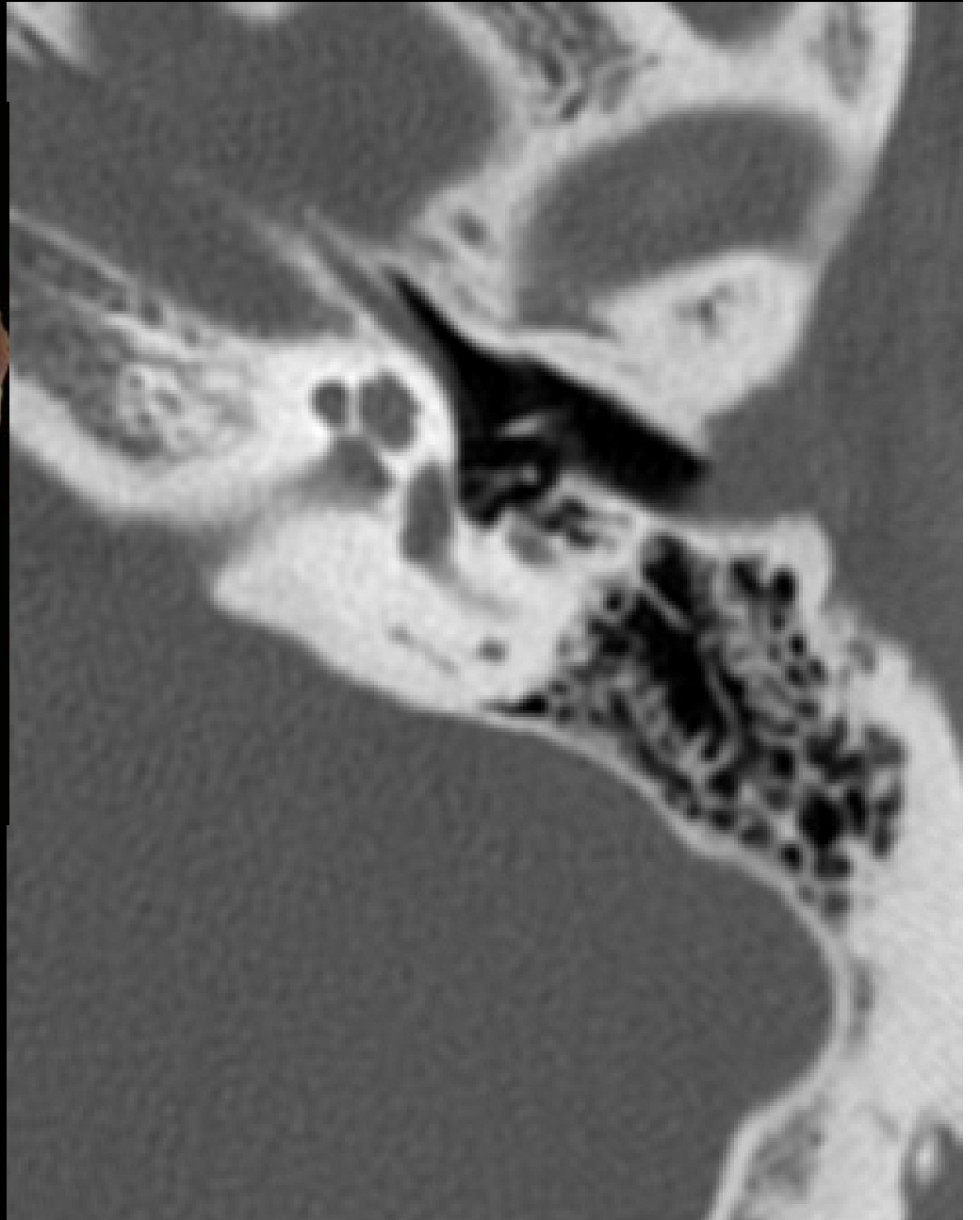
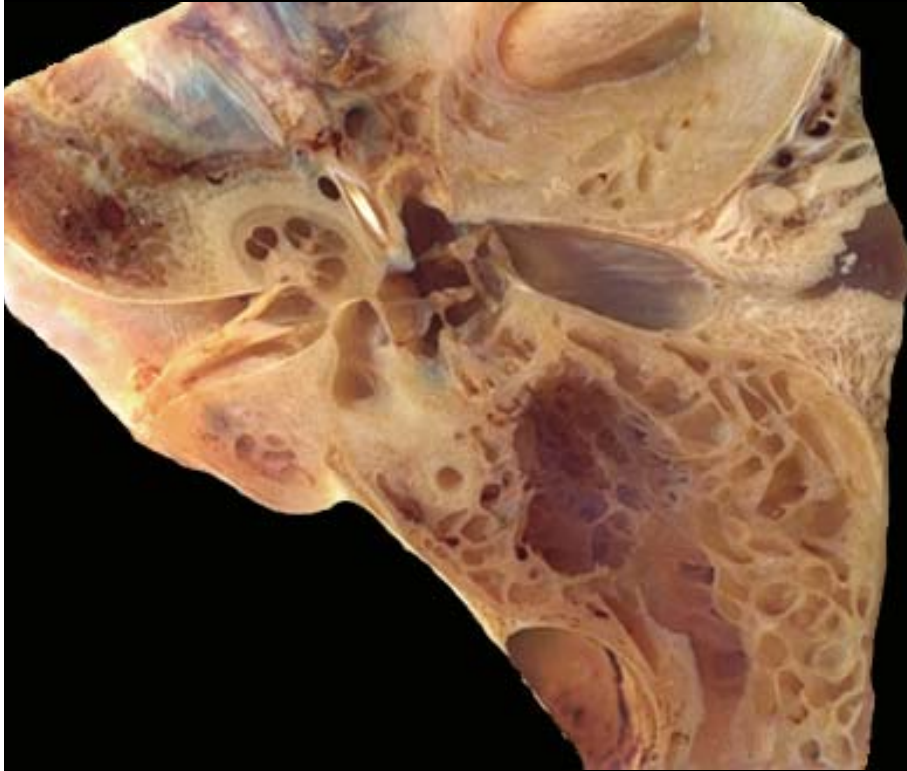
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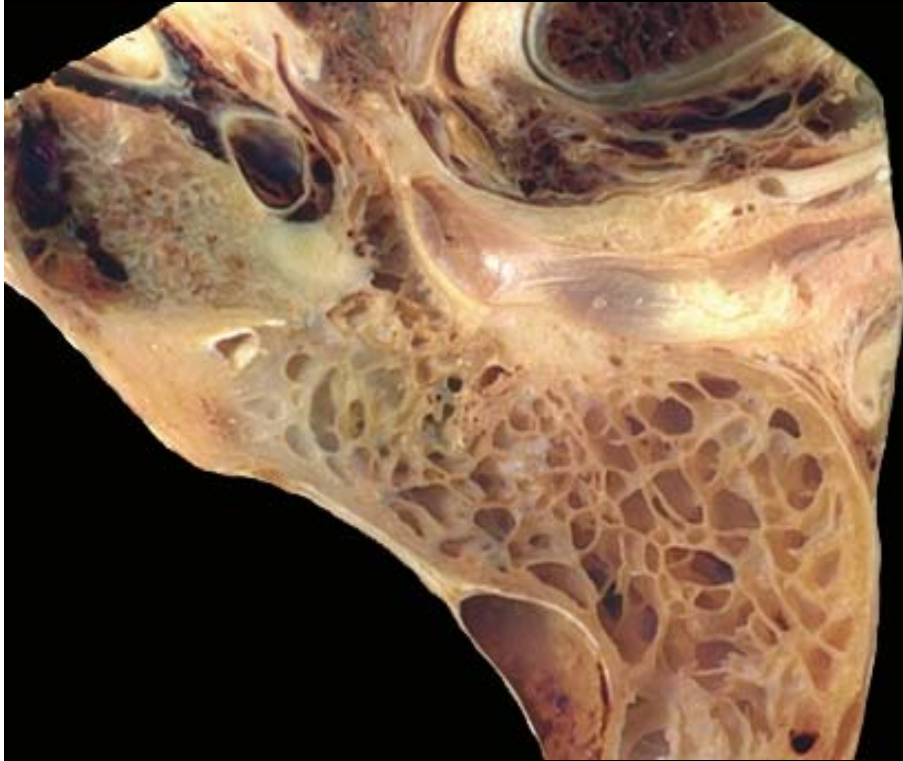
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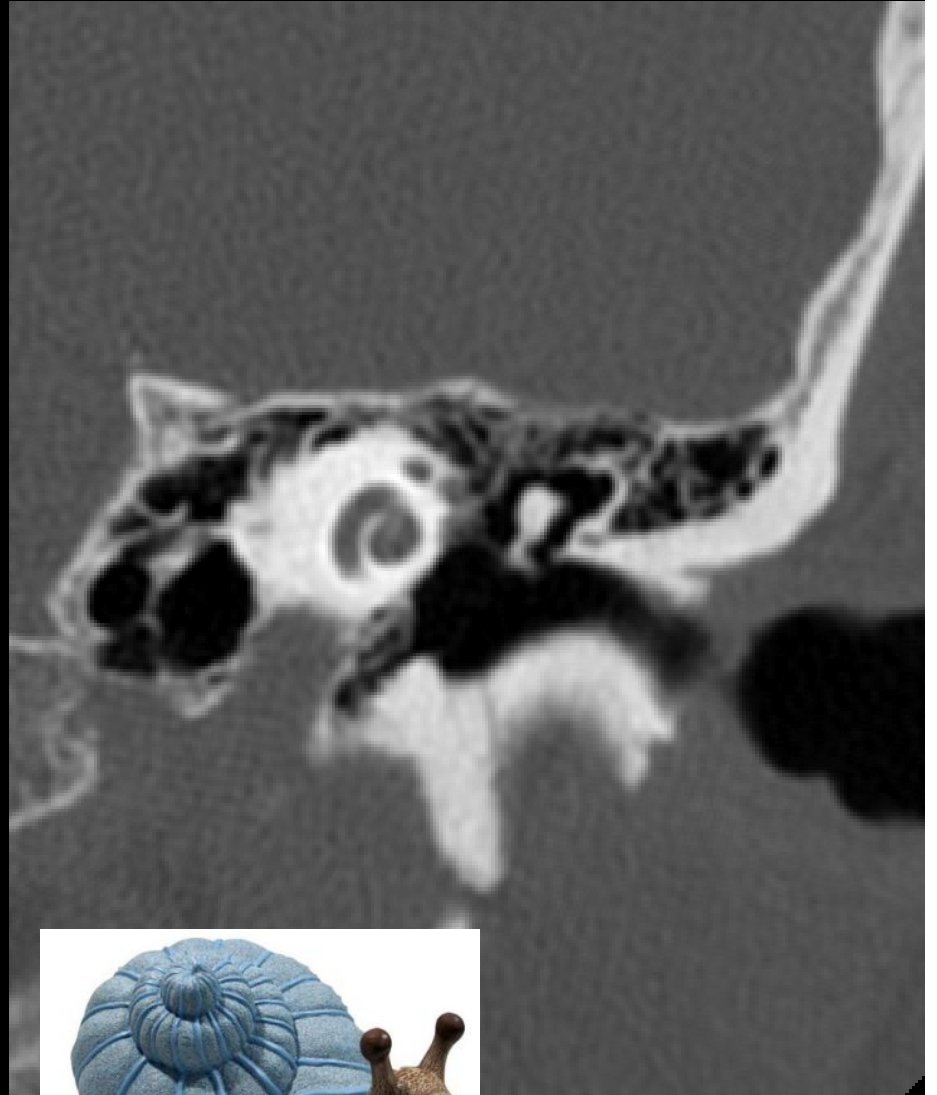
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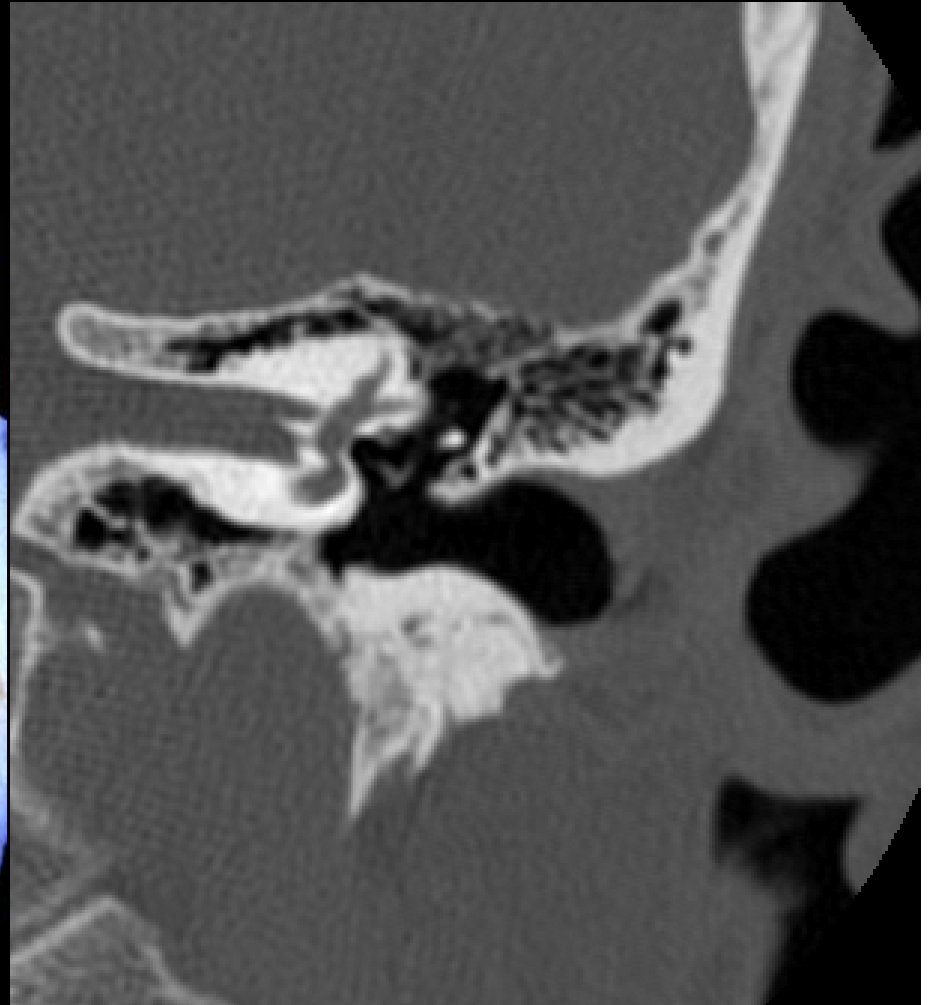
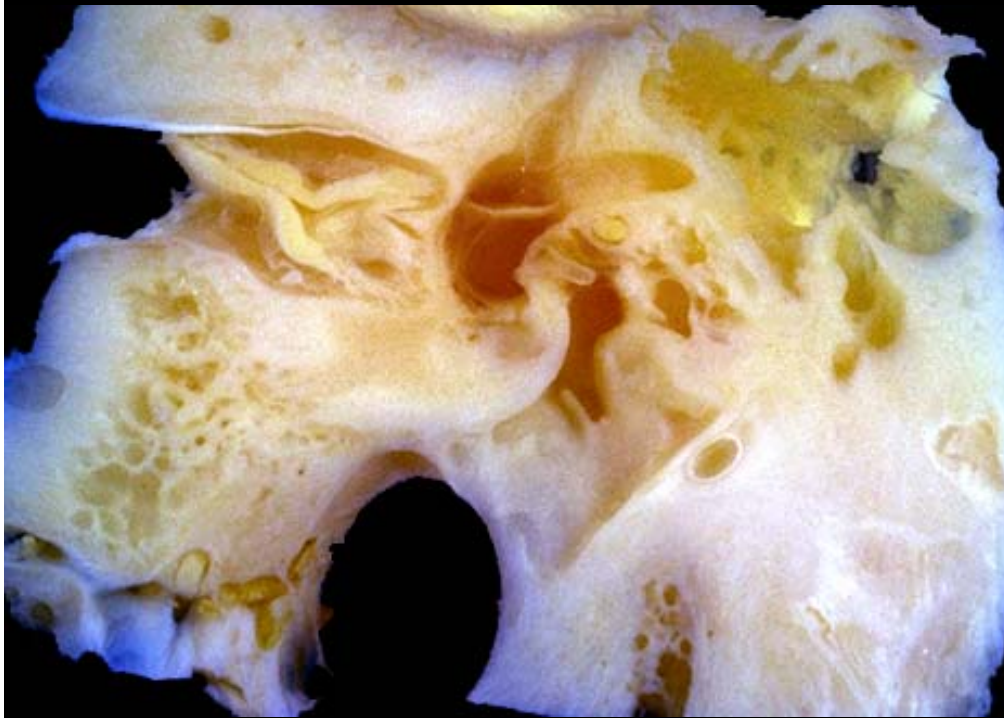


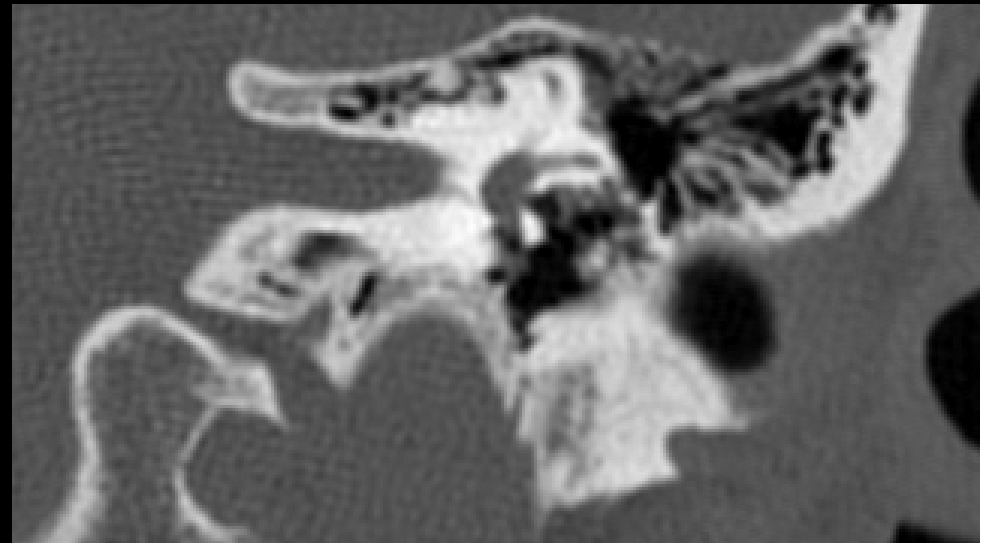
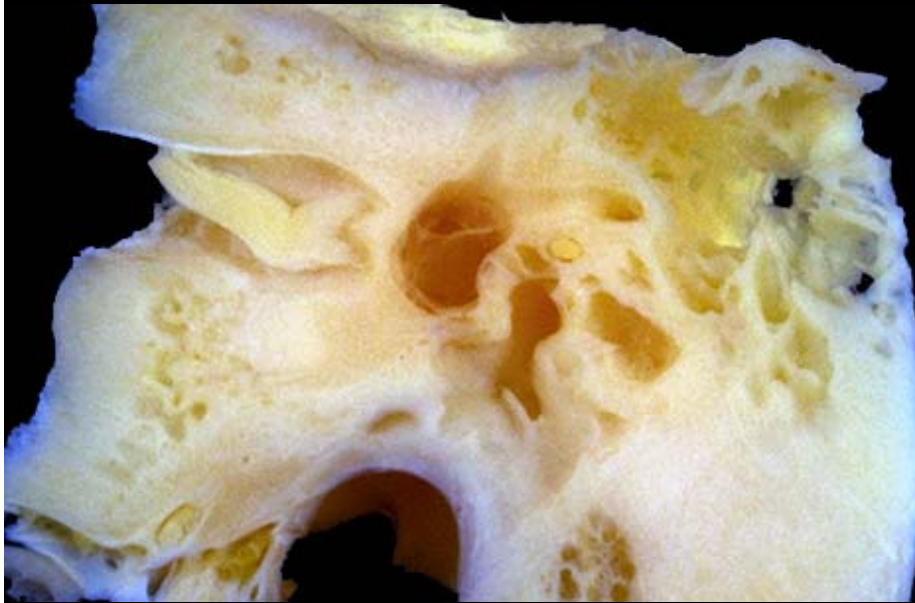


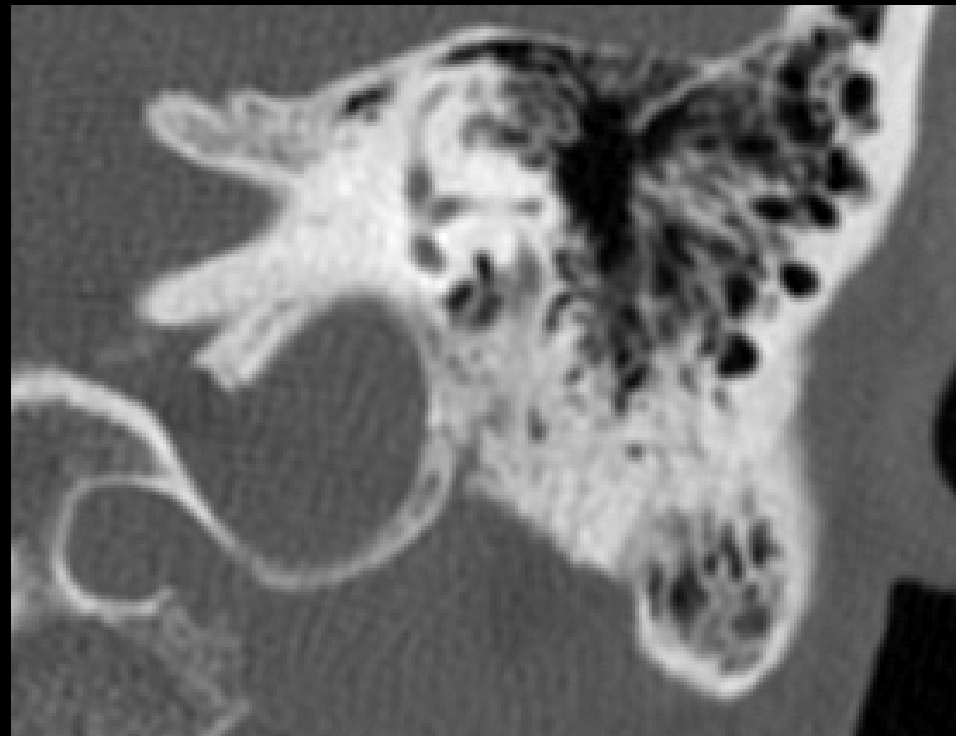
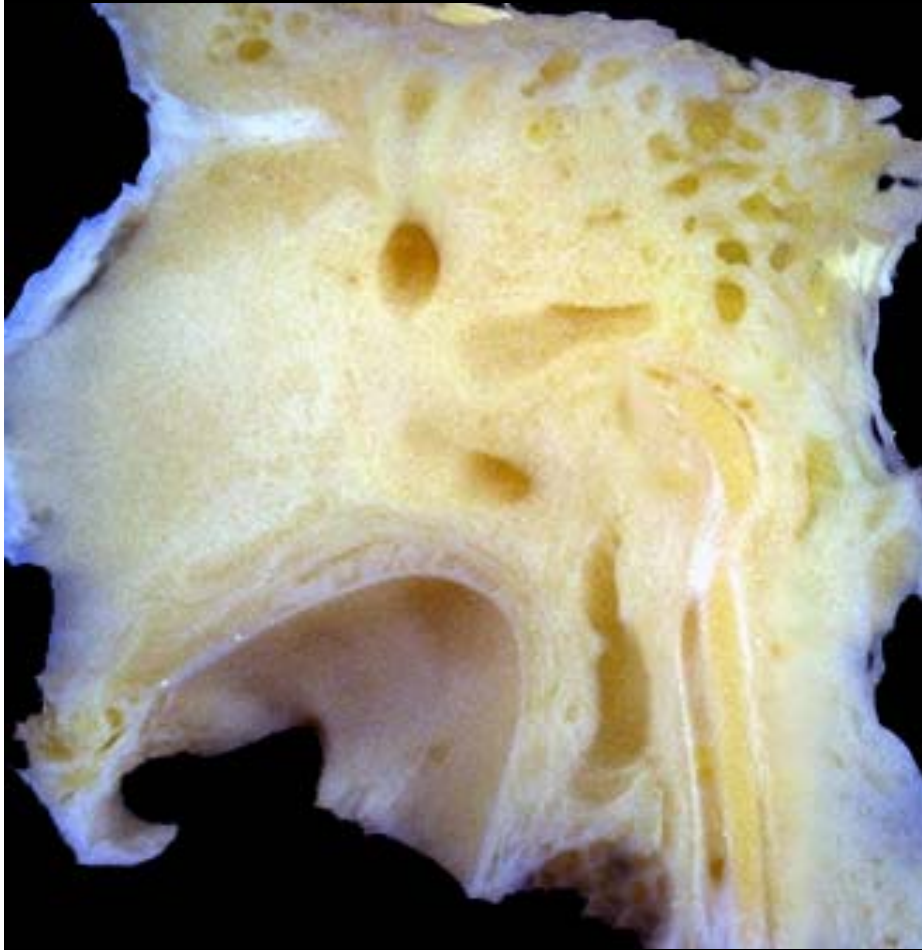












M.R.I.

M.R.I.

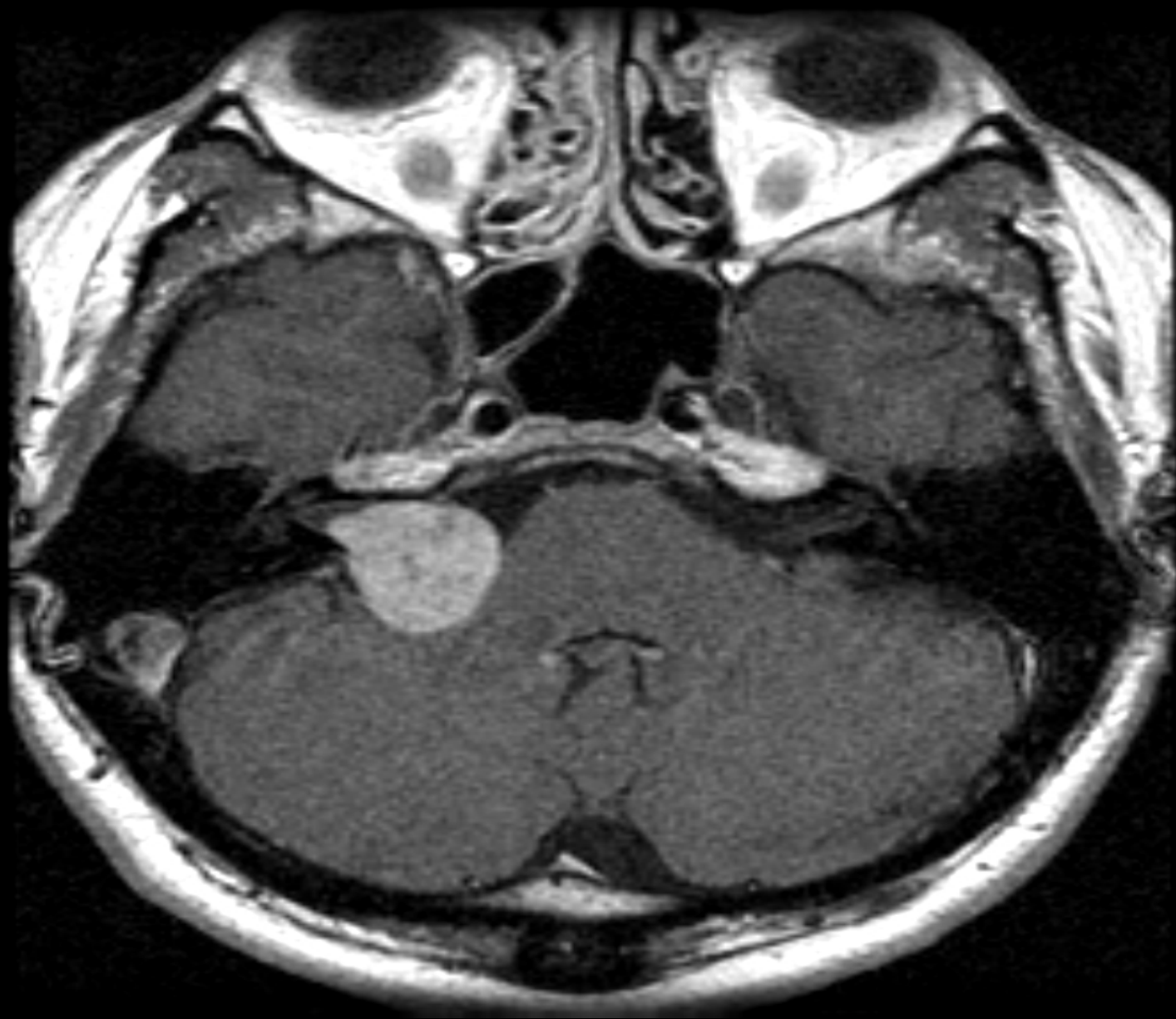
Primary survey (ABCD)

- Name MRN
- Date
- T1 /T2 windows
- Axial, Coronal or Sagittal planes
- With/without contrast (T1)

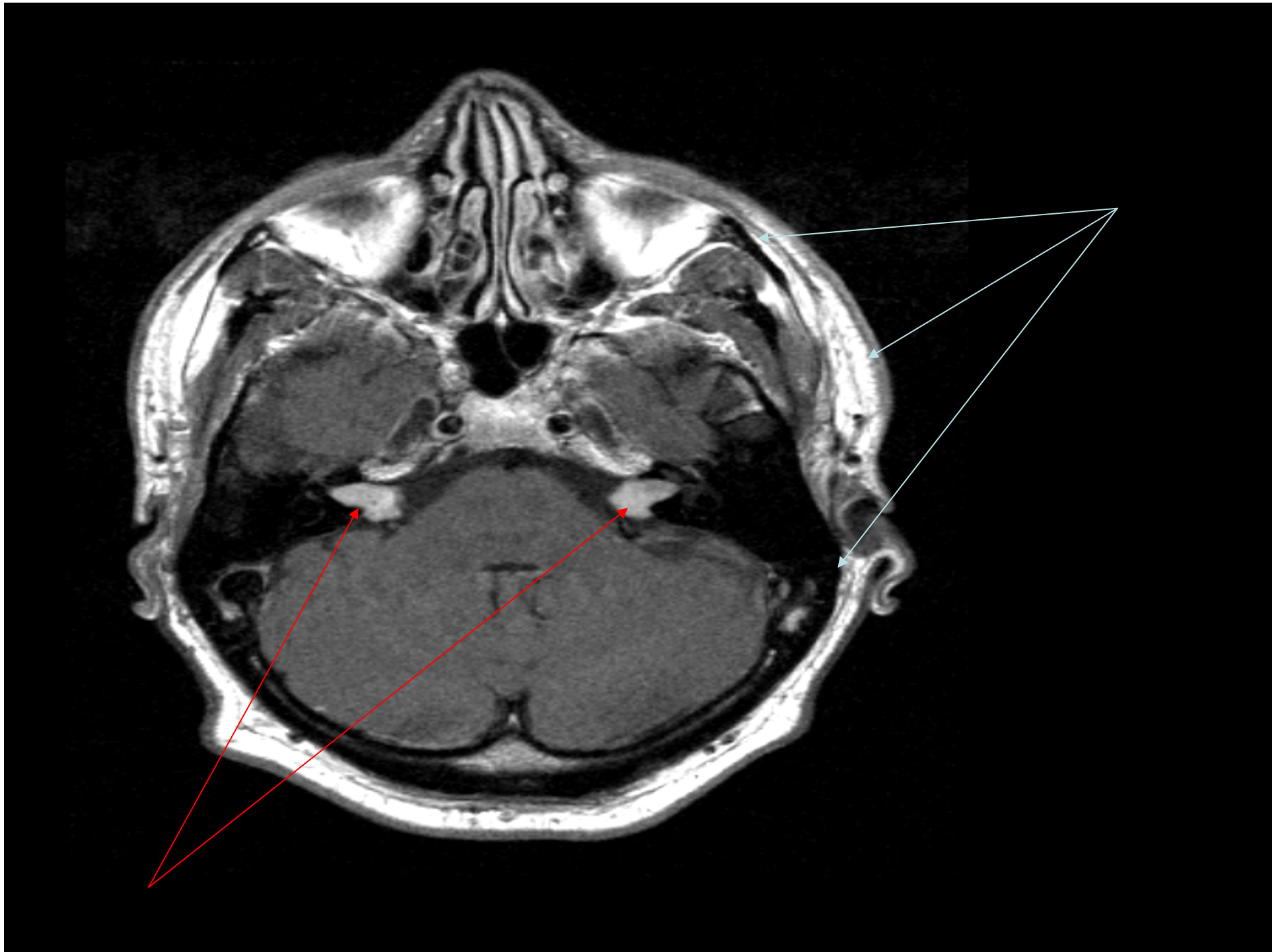
M.R.I.

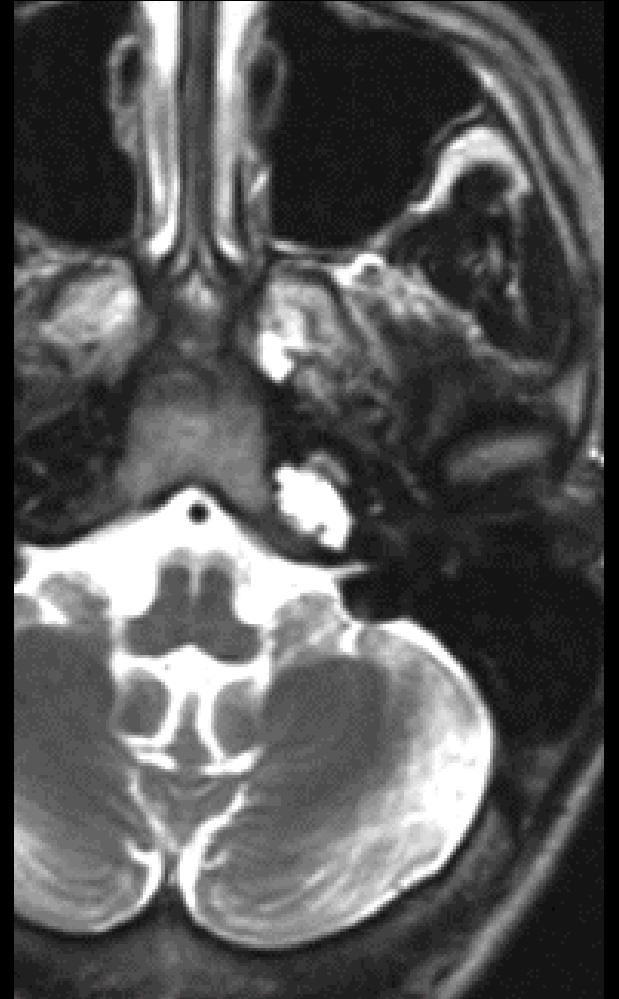
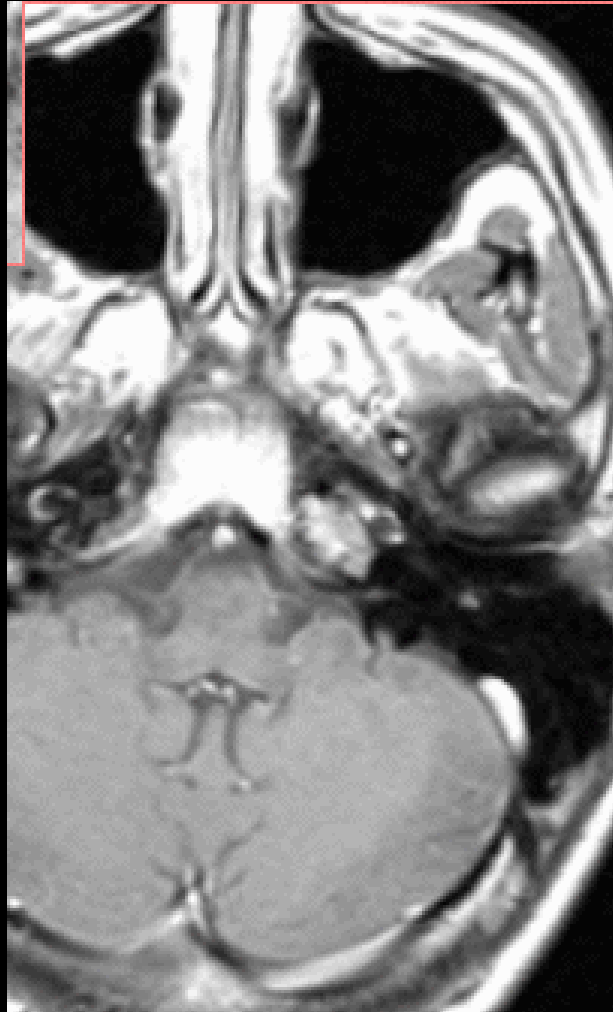
Secondary survey

- Symmetry
- Soft tissue
- Position of dura
- Labyrinth
- Extension of disease









C.D

Thank you for your kind attention

