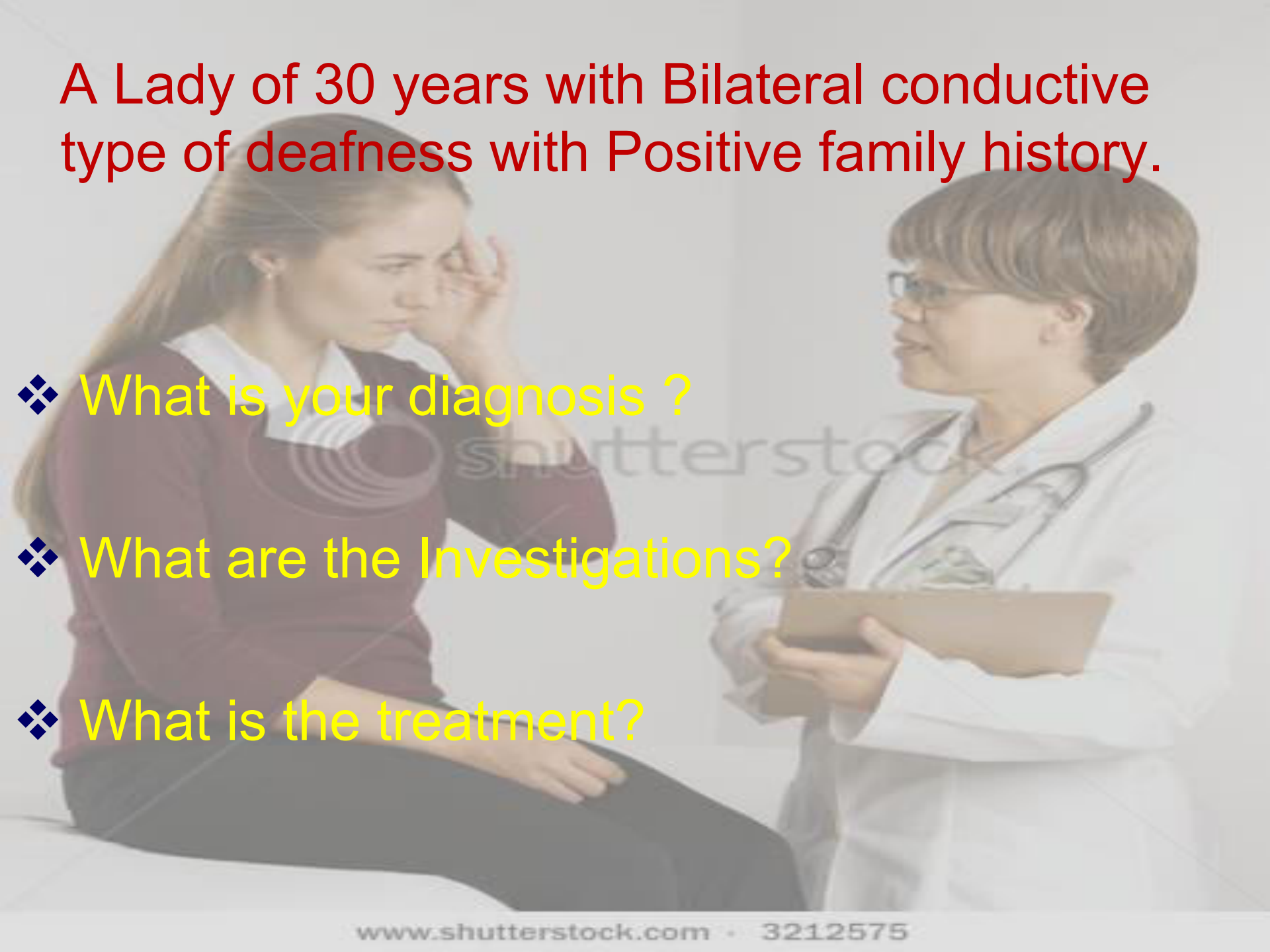
TO DAY'S TOPICS-

OTOSCLEROSIS

&

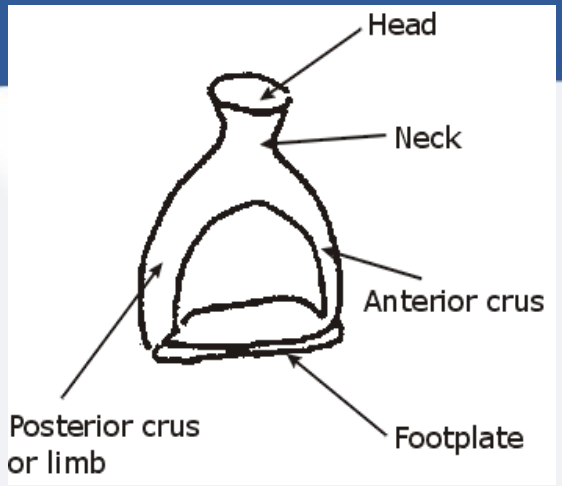
OTOTOXICITY

A Lady of 30 years with Bilateral conductive type of deafness with Positive family history.



- What is your diagnosis ?
- What are the Investigations?
- What is the treatment?

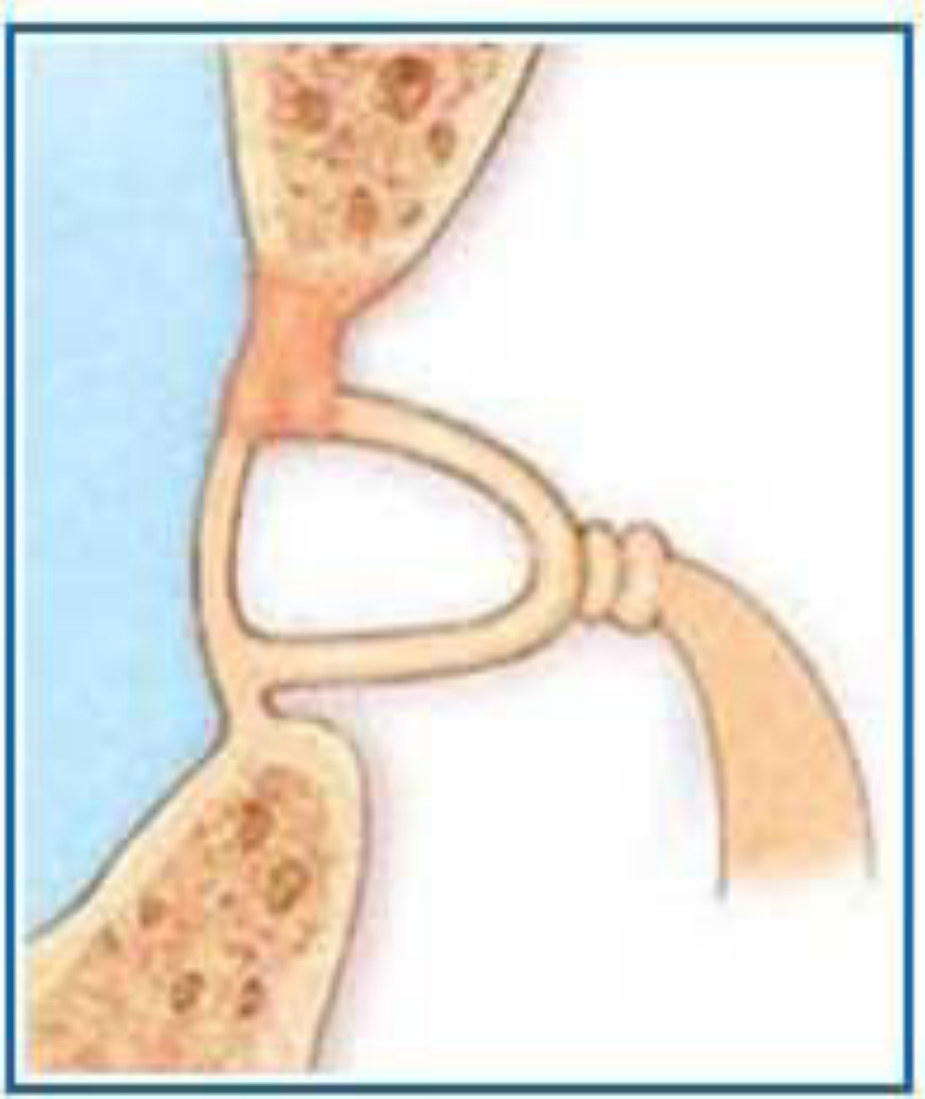
Stapes


Head
Neck
Anterior crus
Posterior crus
or limb
Footplate


IN GOD WE TRUST
LIBERTY
1973
D

Otosclerosis : Definition

- A localized disease of the otic capsule in which new spongy bone formation causing ankylosis of the footplate of stapes or invades the cochlea.
- Its an autosomal dominant disease.



Aetiology:

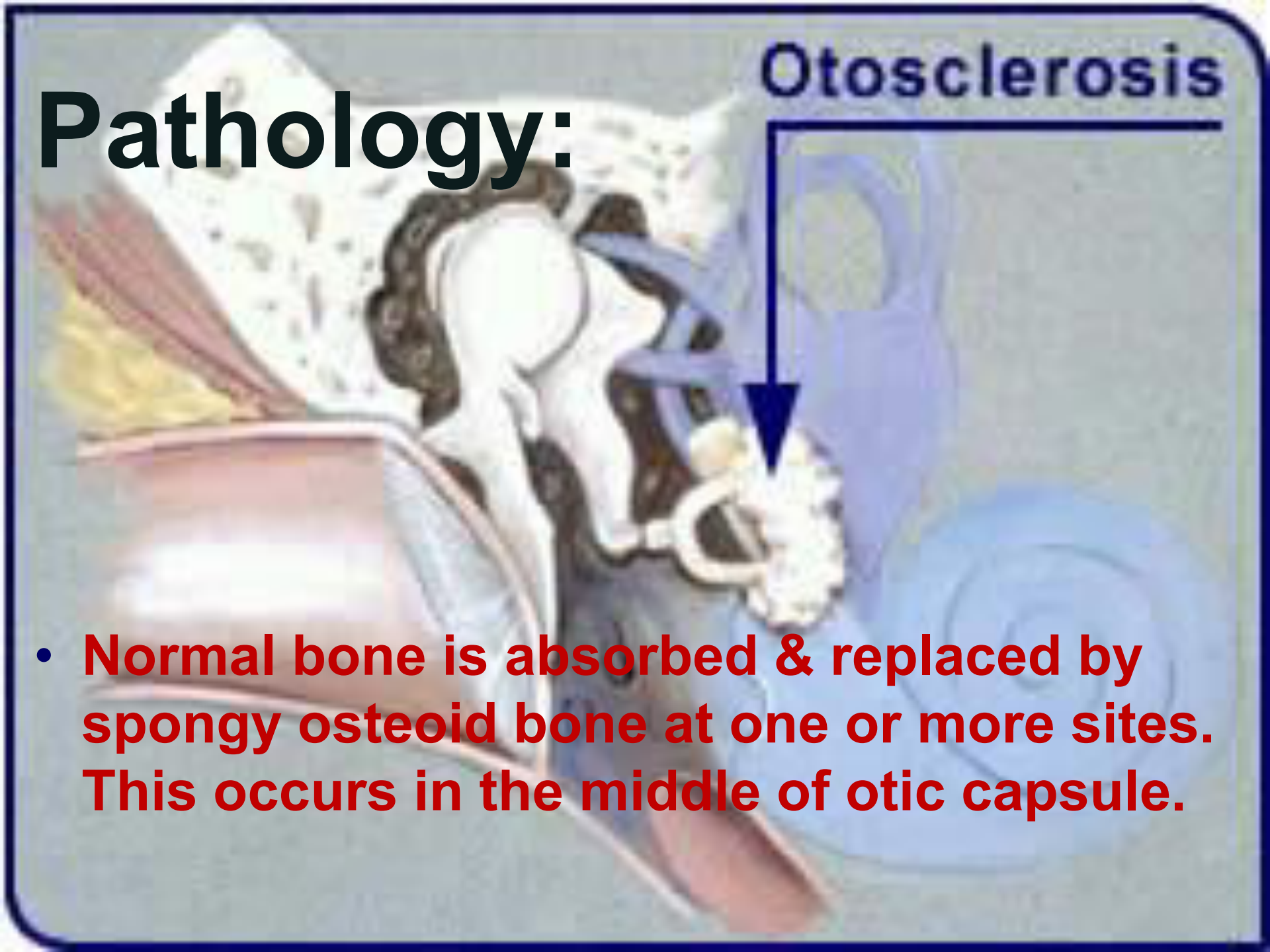
- Exact cause is not known.
- Various theories:

- Hereditary - family history is about 70% cases.
- Racial distribution- Common in Indians and in whites while it is rare in Negroes, Chinese and Japanes.
- Sex- more common in females.
- Age of onset- usually begins between 15 to 35 years of age in 90% cases.
- Sites of predilection: Fissula ante-fenestram is the most common site for otosclerosis.

Aggravating Factors:

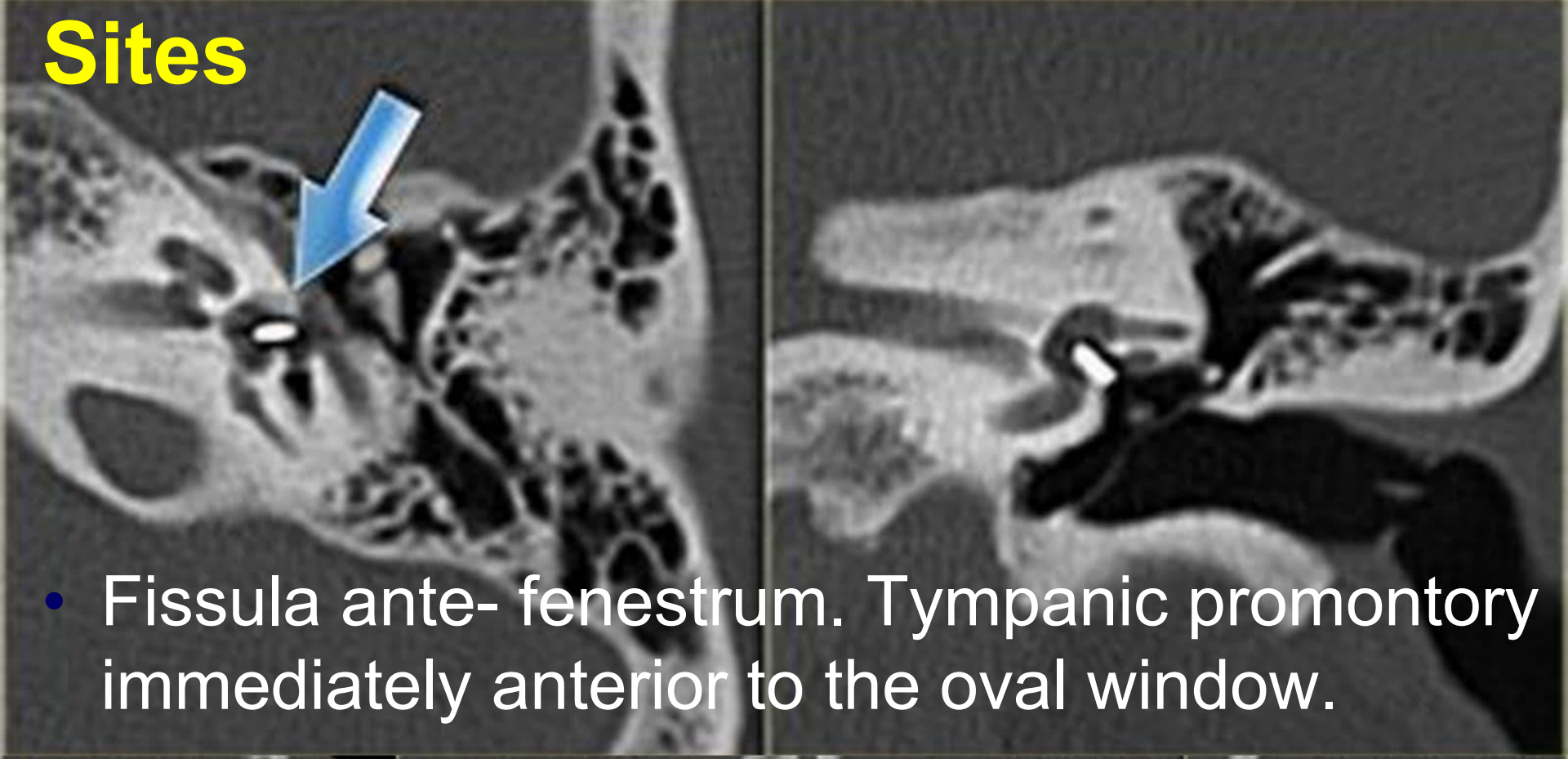
- ✓ Pregnancy.
- ✓ Contraceptive pills.
- ✓ Hormone replacement .
- ✓ Local infection and trauma.

Pathology:

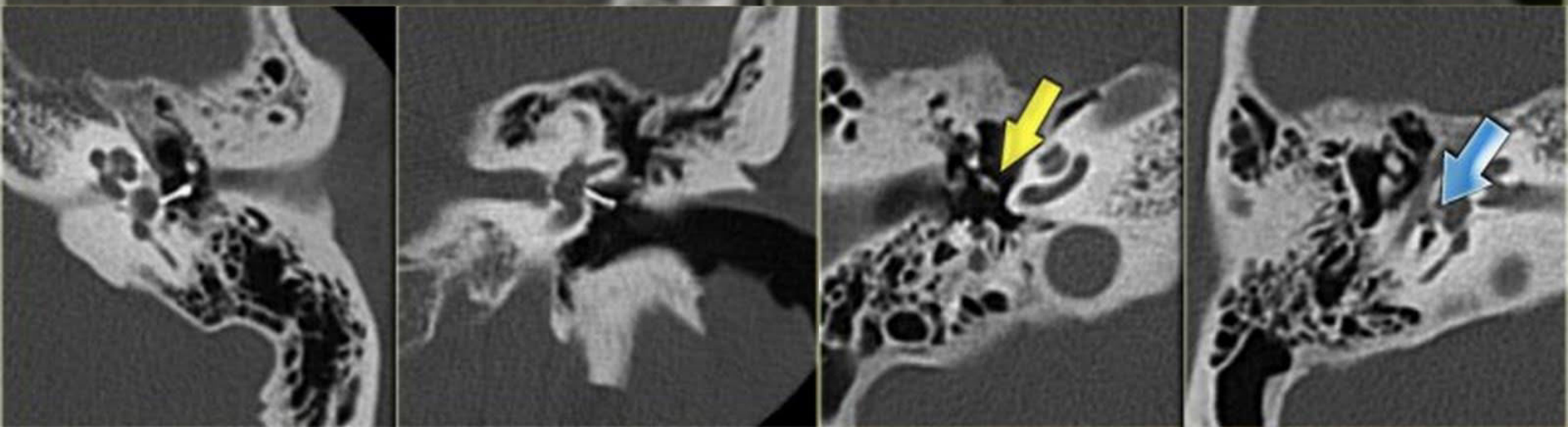


- Normal bone is absorbed & replaced by spongy osteoid bone at one or more sites. This occurs in the middle of otic capsule.

Sites



- Fissula ante- fenestrum. Tympanic promontory immediately anterior to the oval window.



Types of otosclerosis

- Histological otosclerosis - does not produce any symptoms.
- Clinical otosclerosis -

- Stapedial otosclerosis: otosclerotic focus may produce ankylosis of the stapes causing conductive deafness.
- Cochlear otosclerosis: otosclerotic process encroaches upon the membranous labyrinth producing sensori- neural deafness.
- Mixed otosclerosis: Otosclerosis causes both fixation of the stapes and involvement of the labyrinth so that there is mixed hearing loss.

Clinical features

- Deafness- is a common and outstanding symptom.
- ✓ Usually bilateral in 80% case.
- ✓ Tends to be symmetrical in progress and degree.
- ✓ Onset of deafness is Insidious & the rate of progress is usually slow.
- ✓ Conductive in type.
- ✓ Rarely sensory neural.
- Paracusis willisi- the ability to hear speech better in noisy surroundings, like in public transport, machine shops engine rooms etc.
- Tinnitus- commonly seen in cochlear otosclerosis and in active lesions.
- Vertigo- occasional symptom.

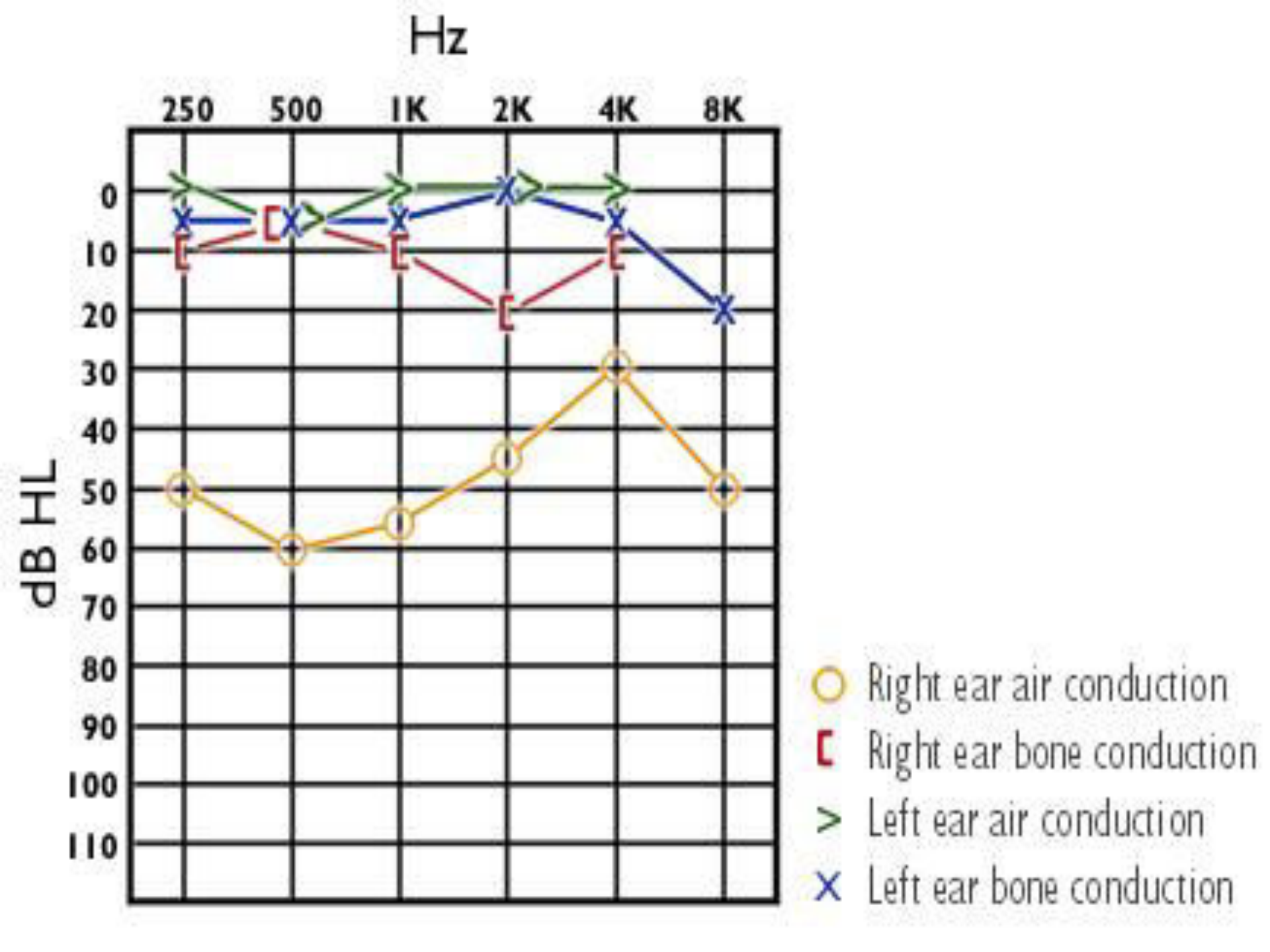
Findings (Signs)

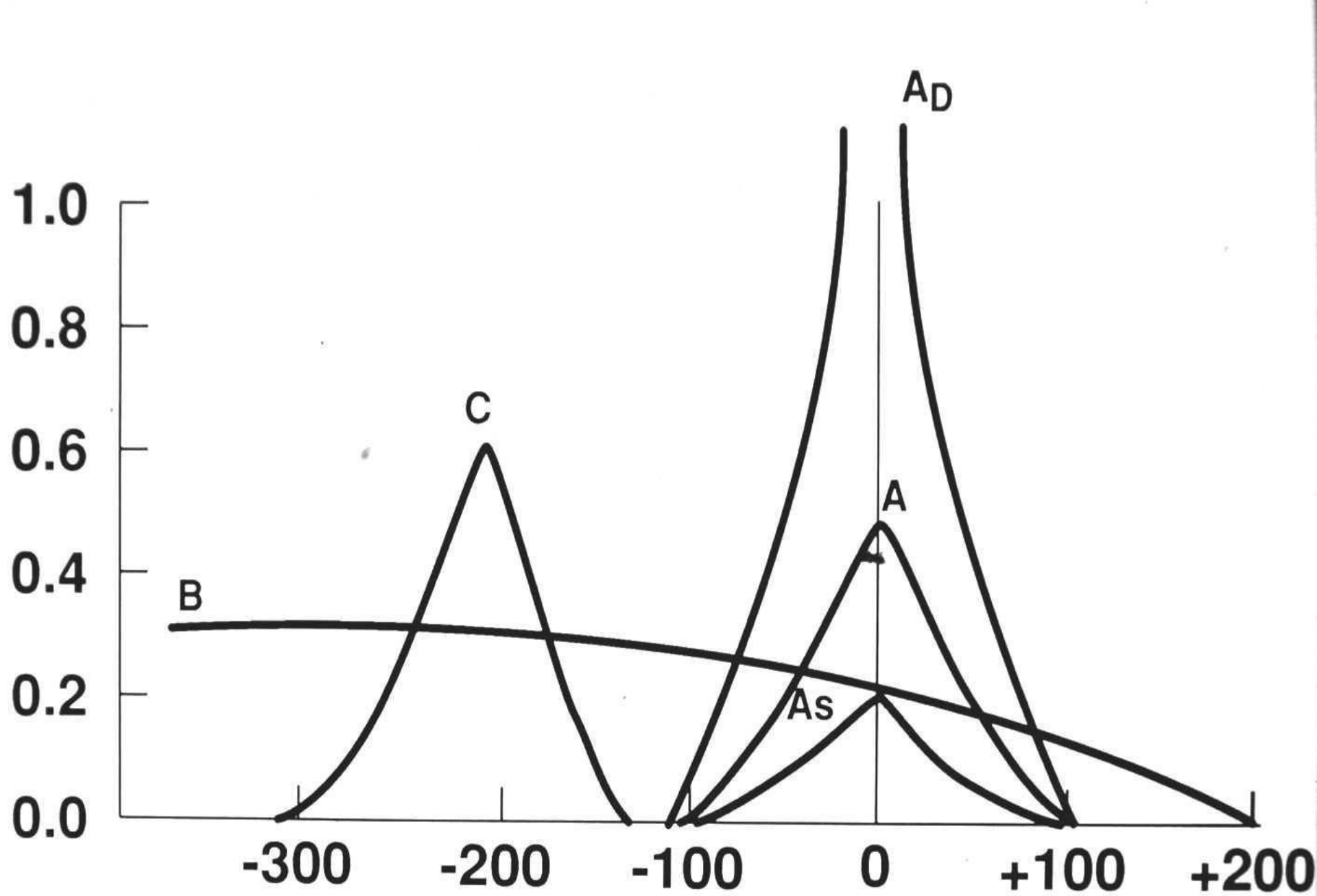
- ❖ TM is quite normal and mobile.
- In 2% cases, a flemingo-pink ting may be seen through the TM known as Schwartze sign, which is indicative of a highly vascular active otosclerotic focus.
- ❖ Tuning fork tests- reveal conductive deafness.
- Rinne's test– negative (BC > AC).
- Weber test- will be lateralized to the ear with greater conductive loss.
- ABC test- normal.

In 2% case Flemingo pink tinge may be seen through the TM.

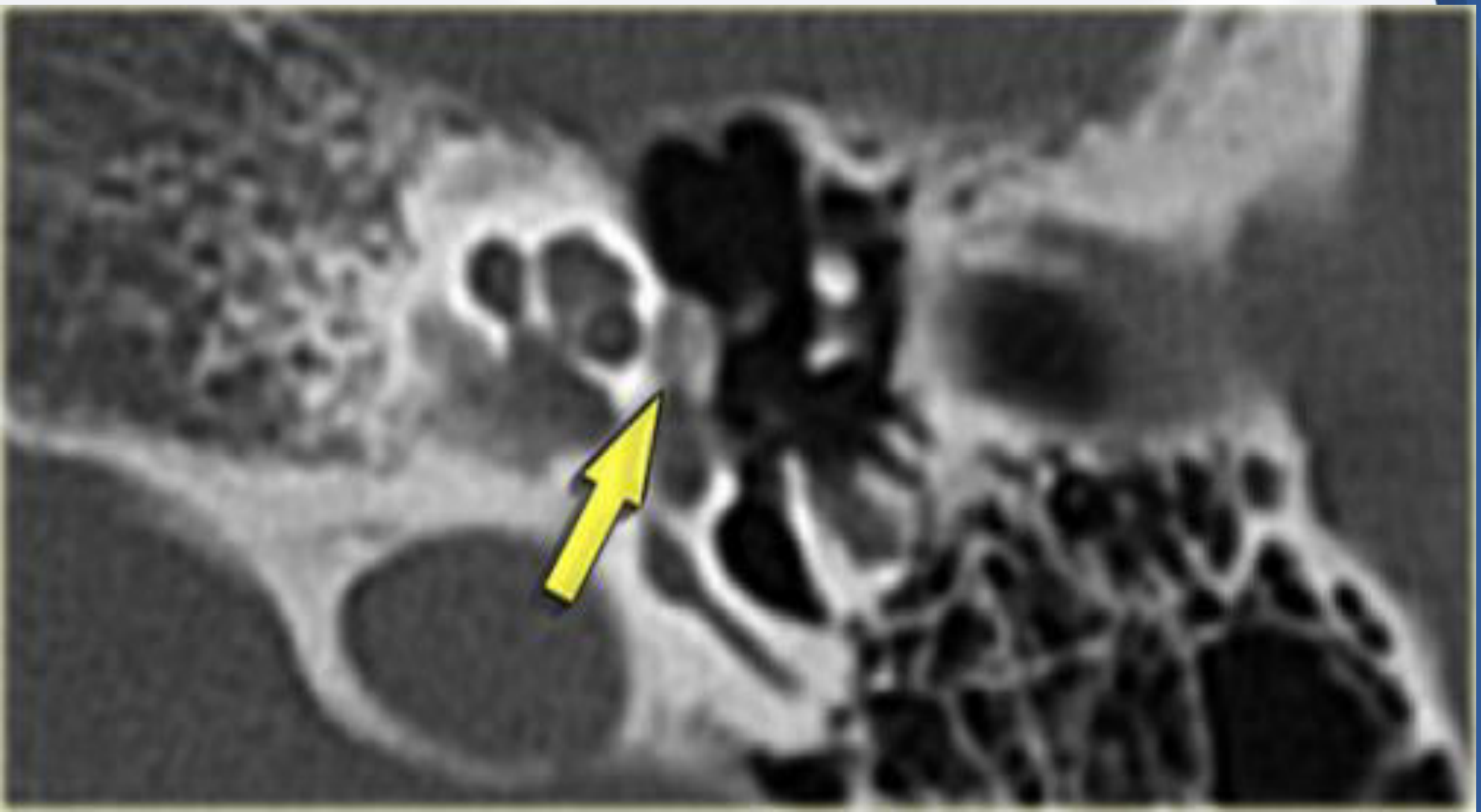
Investigations

- PTA- loss of air conduction,
  - bone conduction is normal.
  -There is a dip in bone conduction curve, maximum at 2000 Hz and is called the Carhart's notch.
- Mixed hearing loss is not uncommon.
- Tympanometry- may be normal.
- Stapedial reflex- Reduced or absent when stapes is fixed.
- Speech audiometry- normal discrimination score.
- Radiology- CT scan shows fixing of footplate or evidence of bony cochlear involvement


Hz
250
500
1K
2K
4K
8K
dB HL
0
10
20
30
40
50
60
70
80
90
100
110
Right ear air conduction
Right ear bone conduction
Left ear air conduction
Left ear bone conduction


A_D
1.0
0.8
0.6
0.4
0.2
0.0
C
A
B
As
-300
-200
-100
0
+100
+200

CT scan



D/D

- Secretory otitis media (OME).
- Adhesive otitis media
- Ossicular chain disruption.
- Congenital ossicular fixation.
- Tympanosclerosis.
- Persistent stapedial artery.

Treatment

- Medical treatment- Drugs
  Hearing aids
- Surgical treatment- Stapedectomy
  Stapedotomy

Medical treatment:

- Assurance.
- Early stage

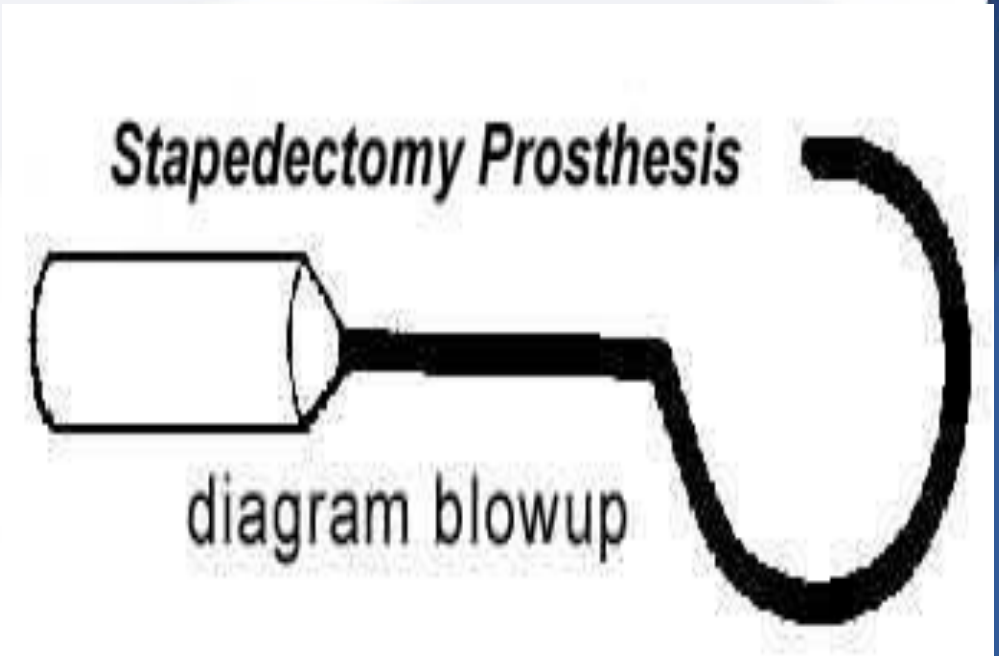
✓ Sodium fluoride 20 mg 8 hourly for 6 months.

✓ It reduces osteoclastic bone resorption and increases osteoblastic bone formation.

Surgical treatment:

Is treatment of choice:

- Stapedectomy.
- Stapedotomy.



Complications

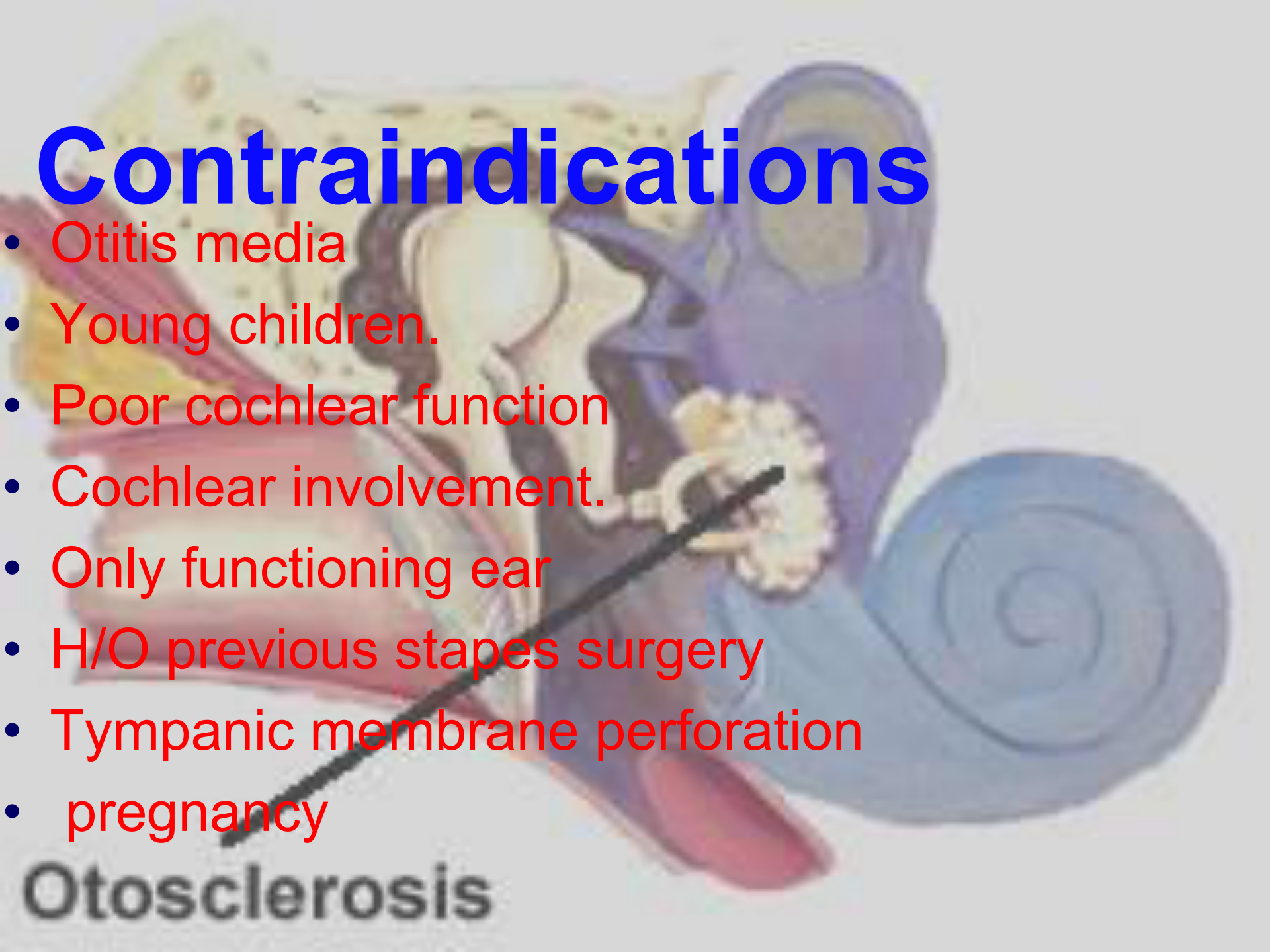
- Injury to the chorda tympani nerve
- Tear in the tympanic membrane.
- Haemotympanum
- Perilymph fistula— Vertigo
- Sensory neural hearing loss.
- Labyrinthitis
- Acute otitis media
- Subluxation of the foot plate
- Meningitis
- Post operative granuloma

Results

- In 90% cases, there is good improvement in hearing after stapedectomy.

Contraindications

- Otitis media
- Young children.
- Poor cochlear function
- Cochlear involvement.
- Only functioning ear
- H/O previous stapes surgery
- Tympanic membrane perforation
- pregnancy



Ototoxicity

- Various drugs and chemicals can damage the inner ear and cause SNHL and tinnitus.

Common ototoxic drugs:

1. Aminoglycoside antibiotics:

- Streptotomycin, Gentamycin, Tobramycin- primarily vestibulotoxic, seclectively destroy type I hair cells of crista ampullaries.
- Neamycin, kanamycin, amikacin, sisomycin and dihydrostreptomycin- are cochleotoxic, they selectively destroy the outer hair cells.

2. Diuretics: Frusemide, Ethacrynic acid.- cause oedema and custic changes in the stria vascularis of the cochlear duct.

Ototoxicity (cont.)

3. Analgesics: Salicylates (Aspirin, NSAID), Indomethacin, phenul butazone, Ibuprofen
4. Antimalarials : Quinine, chloroquine.
5. Cytotoxic drugs: Nitrogen mustard, cisplatin, carboplatin- affect the outer hair cells of cochlea.
6. Chemicals: Alcohol, tobaco, marijuana, carbon monoxide poisoning- cause damage to the inner ear.
7. Miscellaneous: Erythromycin, ampicillin, propanolol, propyl thiouracil, deferoxamine.
8. Topical ear drops: ear drops containing aminoglycoside antibiotics ,(neomycin, framycetin, gentamycin) can damage the cochlea by absortion through oval and round windows.

Ototoxicity (cont.)

Symptoms of ototoxicity;

- Hearing loss.
- Tinnitus
- Giddiness
- May menifest during treatment or after completion of the treatment (delayed toxicity)

Treatment :

- Withdrawl of the drugs as early as possible.

Ototoxicity (cont.)

Common ototoxic drugs;

- Gentamycin.
- Aspirin.
- Frusemide.
- Quinine.
- Cisplatin


Thank You.