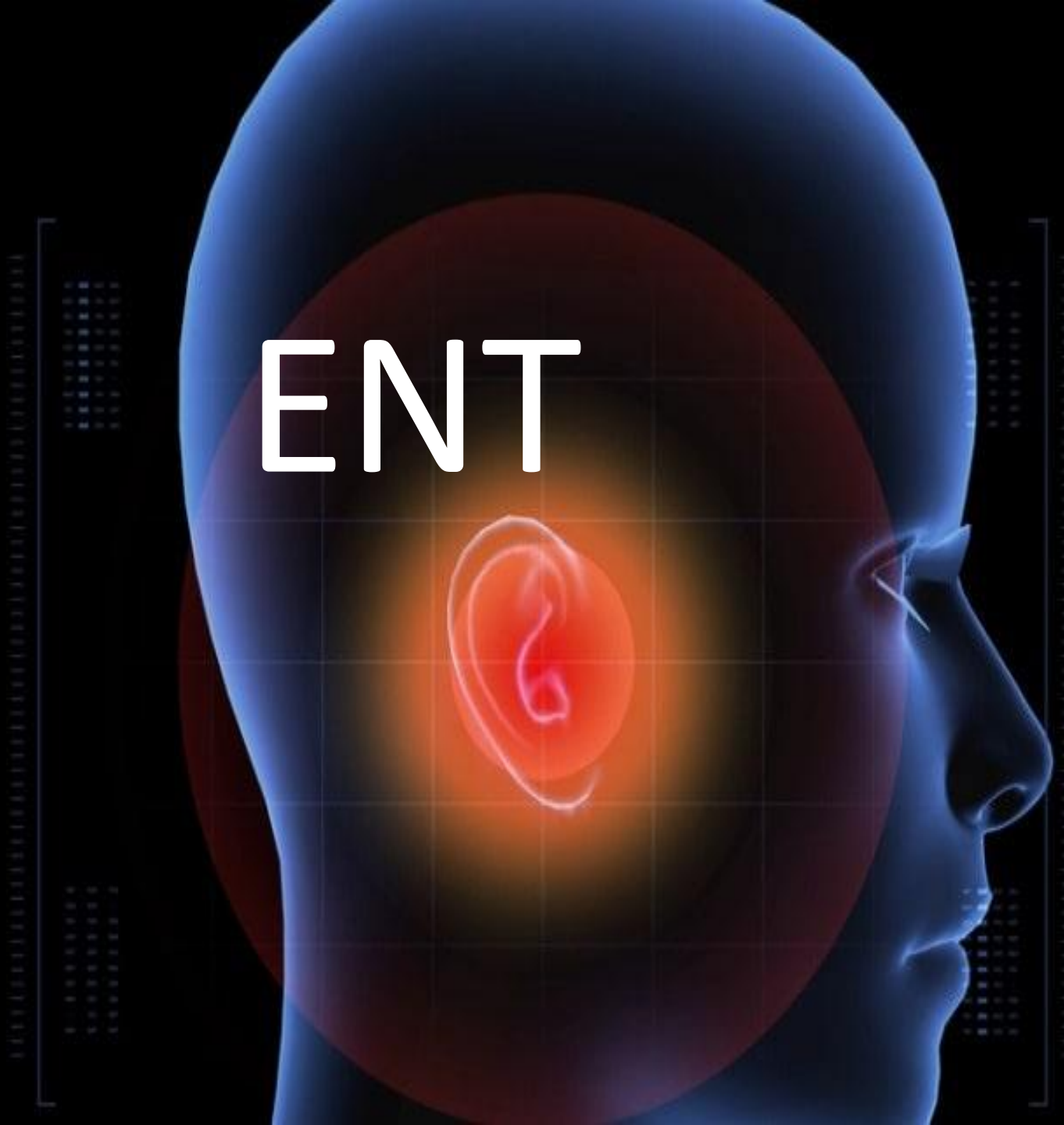
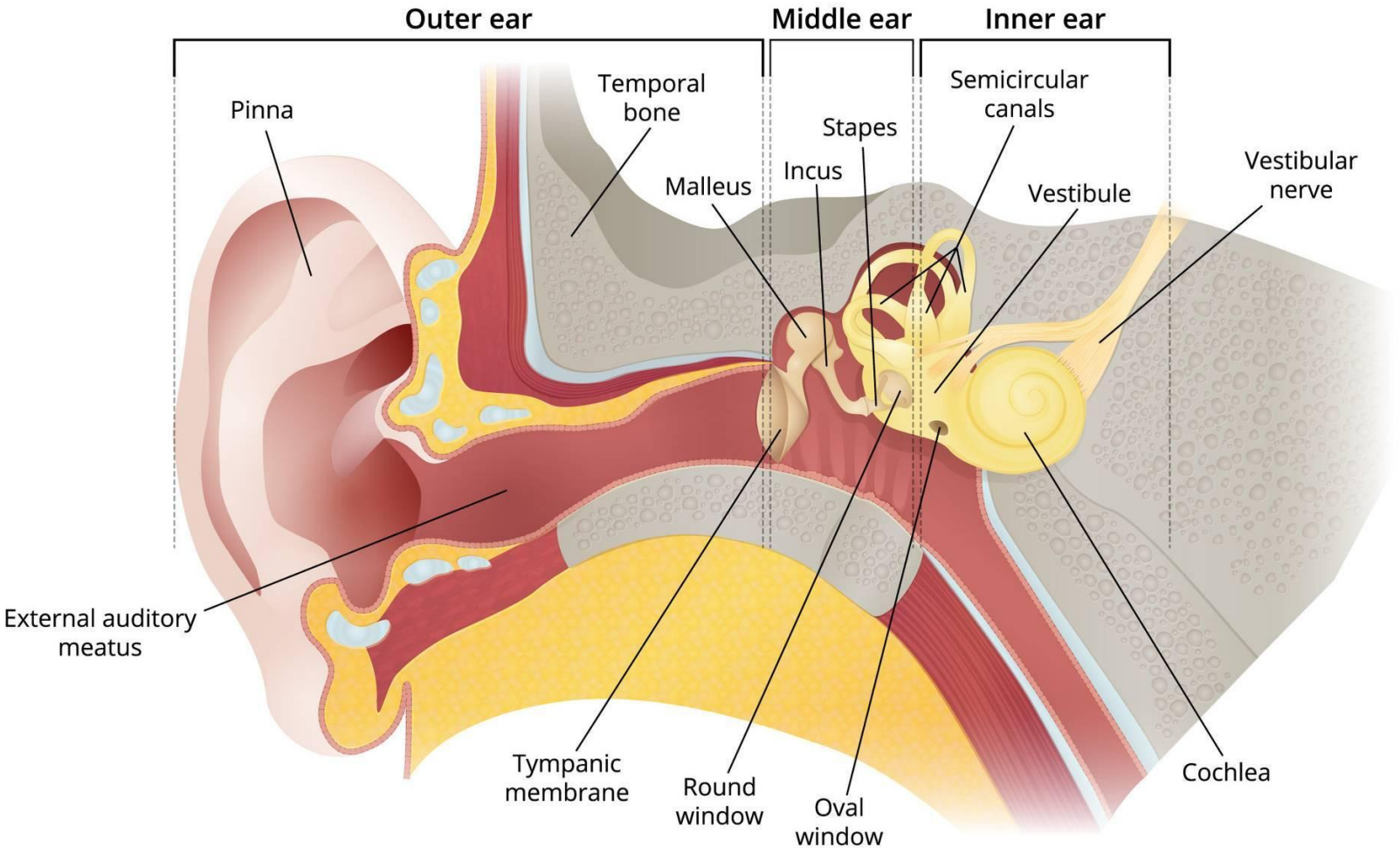
ENT



Ear

Neck


Outer ear
Middle ear
Inner ear
Pinna
Temporal bone
Malleus
Incus
Stapes
Semicircular canals
Vestibule
Vestibular nerve
External auditory meatus
Tympanic membrane
Round window
Oval window
Cochlea

Otitis Externa

Inflammation of the external auditory canal

Most common in children 7-14 years old

Risk factors: swimming, humidity, trauma and others

Causes: Pseudomonas aeruginosa, Staphylococcus aureus, Candida and Aspergillus species

Symptoms: otalgia, purulent discharge, pruritis

Exam: pain with movement of ear, auditory canal is erythematous and edematous

Otitis Externa

Diagnosis: clinical, otoscopy, culture (for refractory cases), imaging (mastoiditis)

Treatment:

- Clean the ear canal
- Antibiotic drops (ciprofloxacin)
- Antiseptics, acetic acid
- Control pain: glucocorticoids

Malignant (necrotizing) Otitis Externa

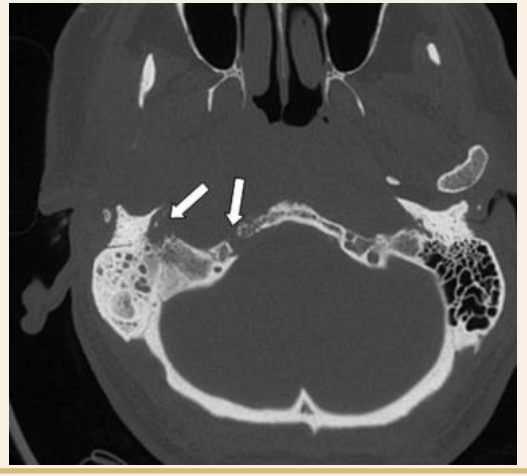
Infection of the temporal bone

Most common in elderly, diabetics, immunocompromised patients

Symptoms: severe ear pain, foul-smelling, purulent, CN paralysis 9,10,11

Dx: CT scan of the temporal bone, cultures, biopsy of the ear canal

Treatment: intravenous antibiotics (ciprofloxacin)



Acute otitis media

Most common in children 3 month-3years

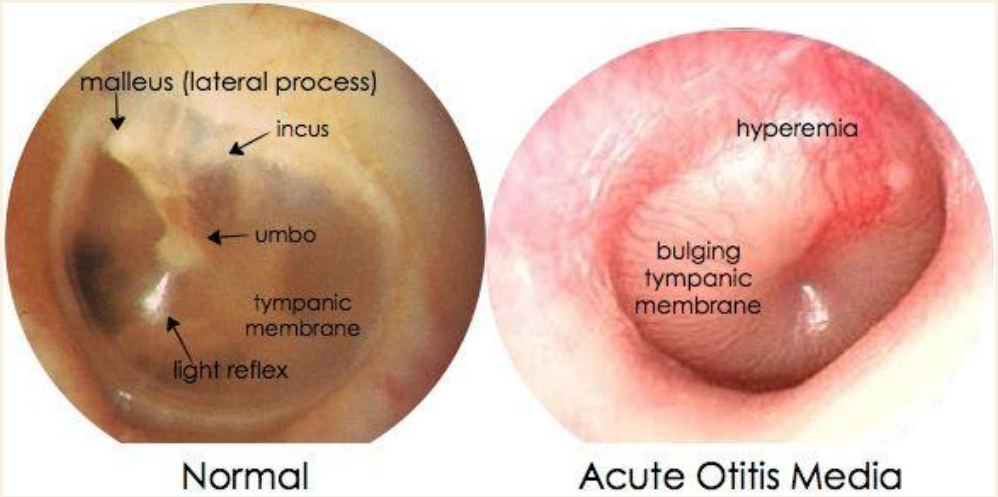
Symptoms: blocked ear feeling, pain and fever. Discharge may follow if the TM perforates, with relief of pain and fever

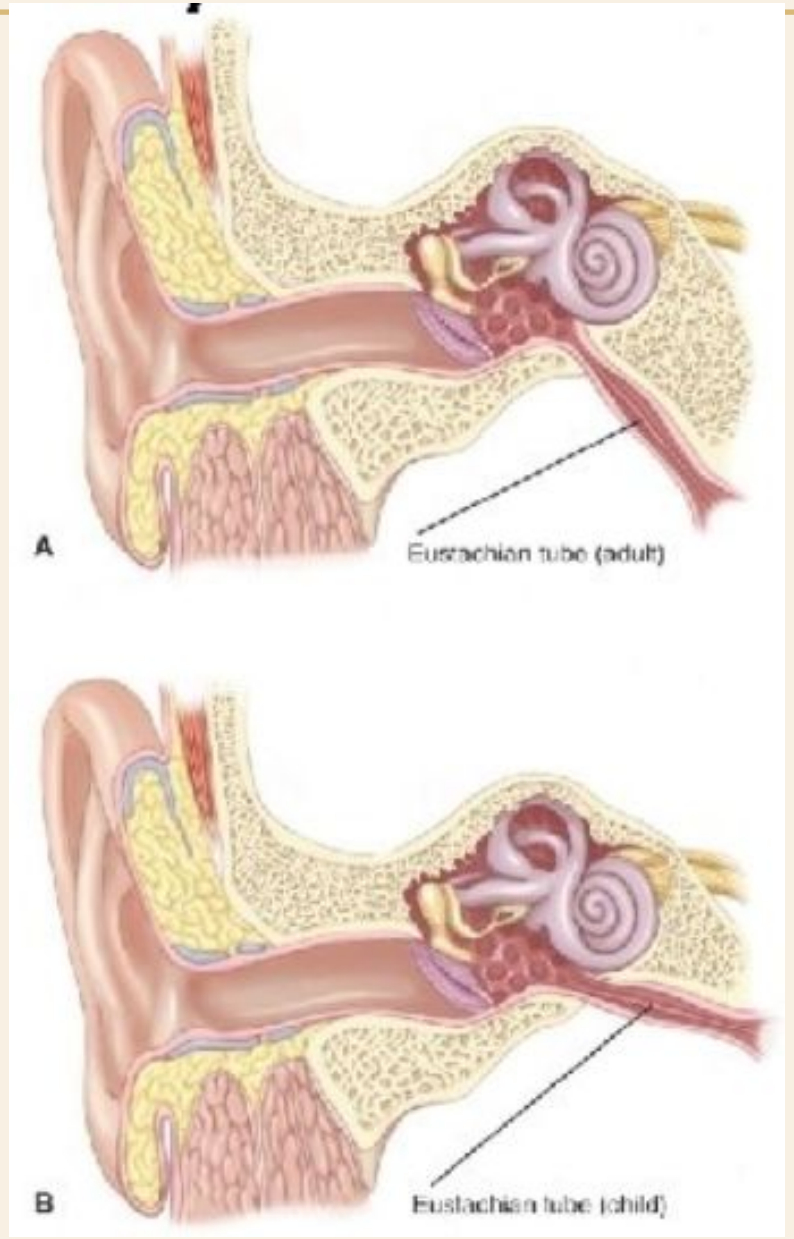
Causes: adenovirus and enterovirus and the bacteria H. influenzae, S. pneumoniae, Moraxella Catarrhalis and β-haemolytic streptococci.

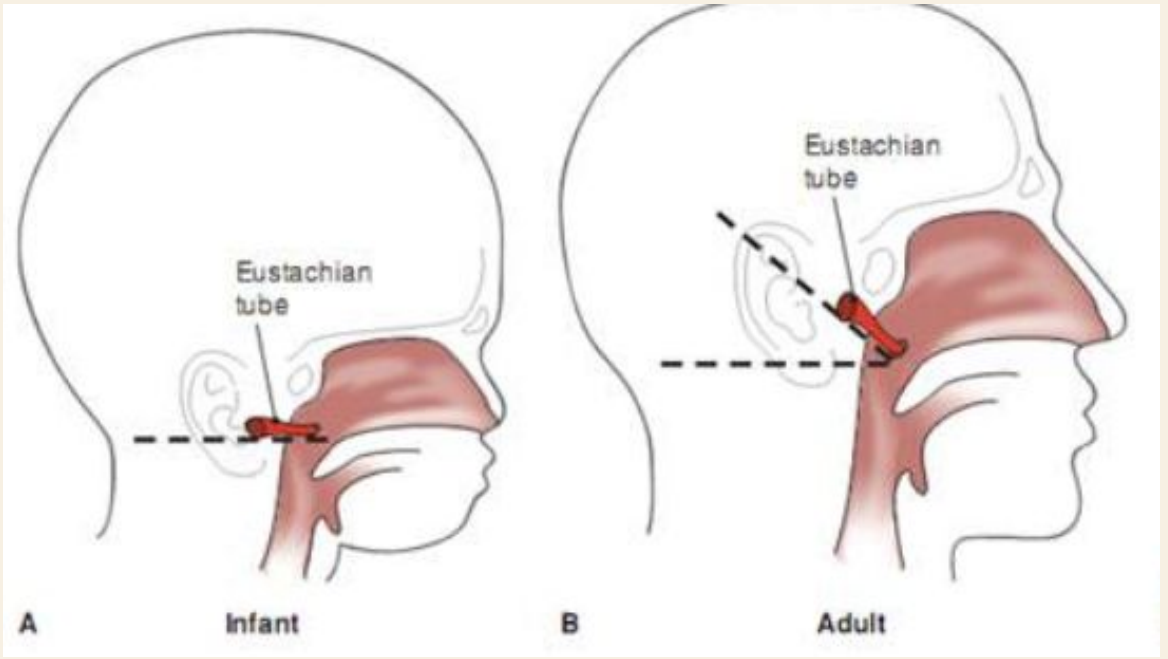
Diagnosis: the redness of the TM. Bulging eardrum, yellow or white in color with dilated vessels, decreased movement on pneumatic otoscopy

Children frequently present with:

- Sudden onset of fever
- Ear pain
- Fussiness




A
Eustachian tube (adult)
B
Eustachian tube (child)


Eustachian tube
A
Infant
Eustachian tube
B
Adult

Acute otitis media

Treatment

- Analgesics to relieve pain
- Adequate rest in a warm room
- Nasal decongestants for nasal congestion
- Antibiotics until resolution of all signs of infection (amoxycillin, doxycycline, cefaclor)
- Treat associated conditions (e.g. adenoid hypertrophy)
- Follow-up: review and test hearing audiometrically

Mild reddening or dullness of the eardrum and absence of systemic features (fever and vomiting) - antibiotics are not warranted

Acute otitis media

Complications:

- Conductive hearing loss
- Sensorineural hearing loss
- Tympanic membrane perforation
- Retraction pocket
- Mastoiditis
- Petrositis
- Labyrinthitis
- Perilymphatic fistula
- Cholesteatoma
- Tympanosclerosis
- Cholesterol granuloma
- Facial paralysis
- Ossicular chain fixation
- Ossicular chain discontinuity

Mandy, a 4 year old girl, is due to accompany her parents on a flight to England in two months time. Her mother is worried about the effect of air travel on Mandy's ears. Which of the following will NOT increase the likelihood of ear pain during the flight?

a) A recent cold
b) Nasal congestion
c) Hay fever
d) Recent otitis media
e) Perforation of the ear drum

A 8 year old boy with recurrent attacks of otitis media is suspected of developing a glue ear. If his sound conduction is tested, which of the following is most consistent with a unilateral middle ear effusion?

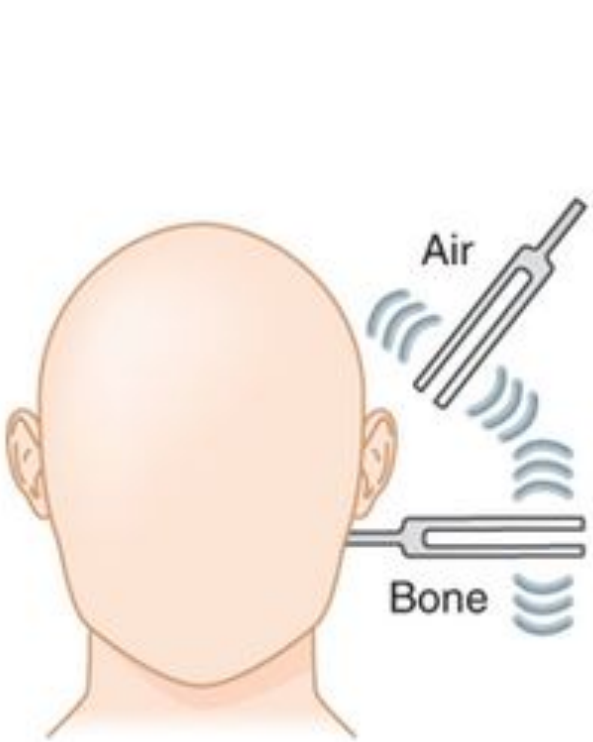
A) Negative Rinne’s test on the ipsilateral side

B) Positive Rinne’s test on the ipsilateral side

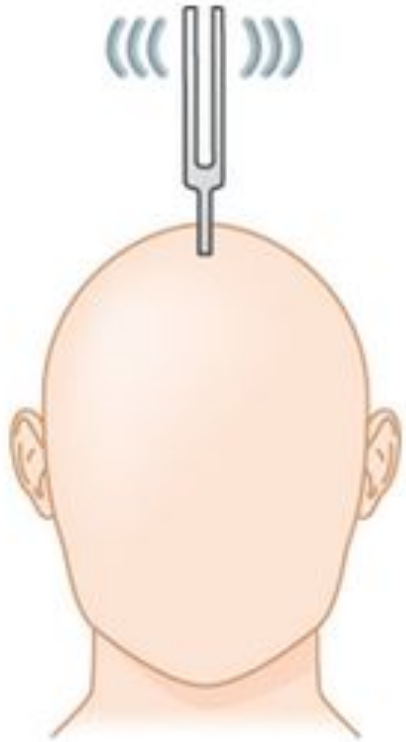
C) Positive Webers and Rinnes test on the ipsilateral side

D) Positive Rinne’s test on the contralateral side

E) Negative Webers test only on the contralateral side



Rinne test



Weber test

Hearing loss	Rinne test (Conduction)	Weber test (Localization)
None	Air > bone	Midline
Sensorineural	Air > bone	Normal ear
Conductive	Bone > air	Affected ear

Chronic otitis media

Symptoms:

- deafness and discharge without pain

Causes:

- Pseudomonas aeruginosa
- Staphylococcus aureus
- Proteus sp.
- E. coli
- Bacteroides fragilis

Diagnosis: Cl, culture of drainage, imaging (erosion or abscess)

Safe

- If aural discharge persists for >6 weeks after a course of antibiotics

Treatment: topical steroid and antibiotic combination drops, following ear toilet.

Unsafe

- Perforation of the attic region

Treatment: antipseudomonal penicillin or cephalosporins (children), ear drops & quinolones (adults)

Chronic otitis media

Safe Perforation

- Affects mucosa of the lower front part of the ME cleft (tubotympanic portion)
- Central perforation – always a rim of drum or annulus around the edge
- Involves the vibrating part of the TM – pars tensa, below the malleolar folds at the level of the lateral process of the malleus

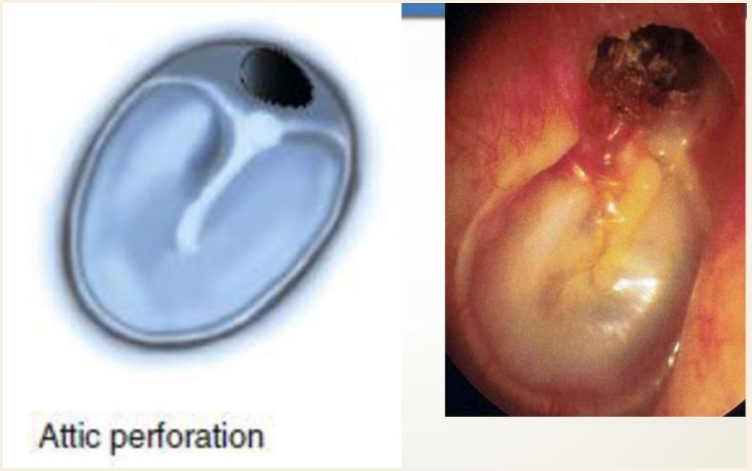
Unsafe Perforation

- Threatens the hazard of spread of the infection intracranially
- Associated with erosion of surrounding bone

Chronic otitis media

Signs of an unsafe perforation on otoscopy:

- Superior and/or posterior edge of tympanic membrane perforation
- Perforation involving the fibrous edge or annulus of the tympanic membrane
- Associated granulation tissue
- White mass within middle ear seen through perforation
- Bone erosion



A 14-year old teenager is diagnosed with a tympanic membrane perforation secondary to chronic otitis media. Which of the following conditions will not progress to significant complications if left untreated?

a. Perforation associated with a cholesteatoma

b. Marginal perforation with discharge

c. Continuously discharging central perforation

d. Perforation that is surrounded by granulation tissue

e. Large dry central perforation

Cholesteatoma

Expanding lesions of the temporal bone composed of a stratified squamous outer epithelial lining and a desquamated keratin center

Clinically defined as an abnormal extension of skin into the middle ear and mastoid air cell spaces

Red flags for cholesteatoma include meningitis-type features, cranial nerve deficits, sensorineural hearing loss and persistent deep ear pain.

Symptoms:

- Presenting history (in order of most common)
- Conductive Hearing Loss
- Foul-smelling ear discharge
- Persistent otitis media
- Otalgia
- Vertigo
- Facial weakness

Cholesteatoma

Complications:

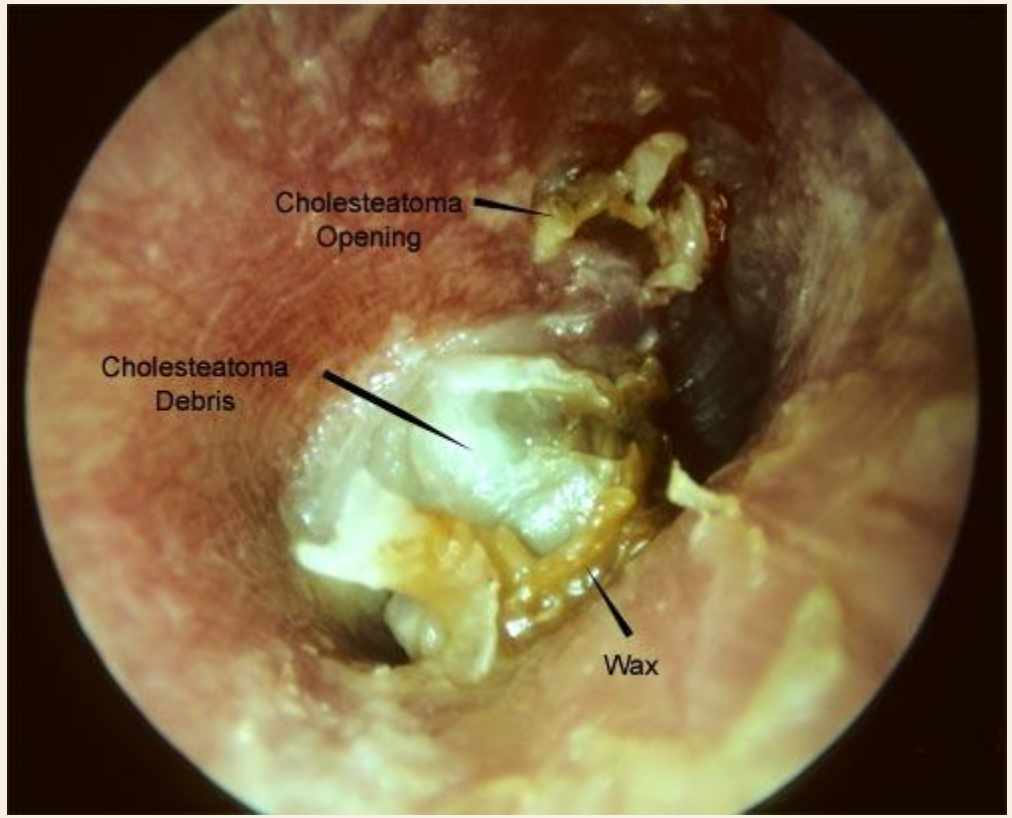
- Hearing loss secondary to necrosis of the long process of the incus
- Erosion into the lateral semicircular canal
- Dizziness
- Subperiosteal abscess
- Facial nerve palsy
- Meningitis
- Brain abscess

Cholesteatoma

Diagnosis: otoscopy, audiogram, CT scan

Treatment:

- Surgery - Mastoidectomy and removal of cholesteatoma
- Tympanoplasty – an operation to repair a hole in the eardrum (transcranial or post-auricular approach)
- Continuous monitoring to look out for recurrence



Audiology

Rinne Test	Weber without lateralisation	Weber lateralises to left	Weber lateralises to right
Both ears Air>Bone	Normal	Sensorineural loss on right	Sensorineural loss on left
Left Bone > Air		Conductive loss on left	Combined loss on left
Right Bone> Air		Combined loss on right	Conductive loss on right
Both Bone > Air		Combined loss on right and conductive on left	Combined loss on left and conductive on right

MCQ 3.022

A 25-year-old woman presents with progressive deafness over the past few months, worse in her right ear. She is currently pregnant with her first child at 6 months of gestation – her antenatal progress has so far been normal. She has had some associated mild tinnitus. She has noted that she can hear better in noisy surroundings. Her mother also has a hearing problem.

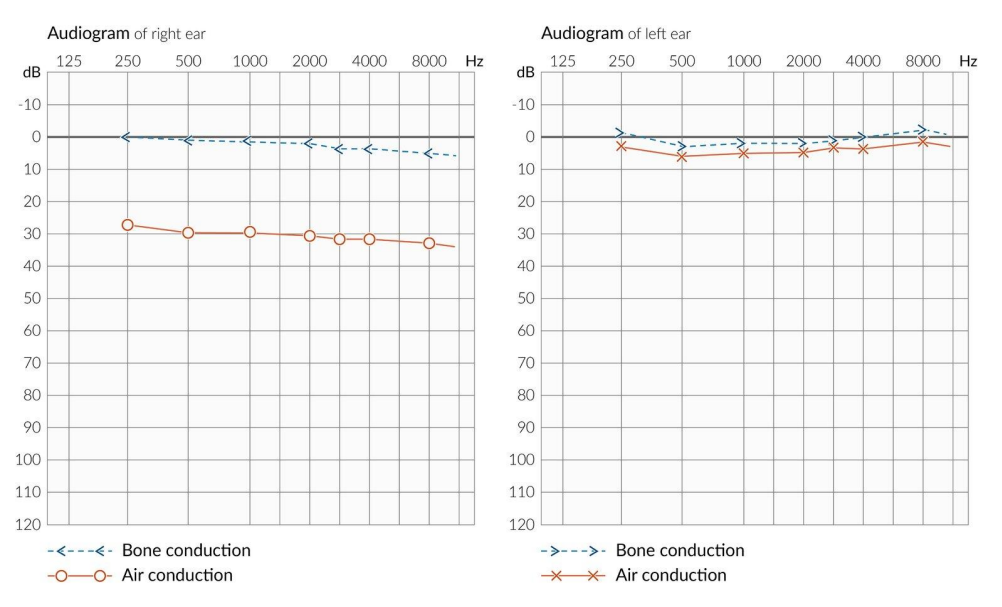
Hearing tests are performed and are as follows:

A Rinne test, comparing air conduction and bone conduction shows bone conduction (BC) is better than air conduction (AC) in the right ear and also in the left ear.

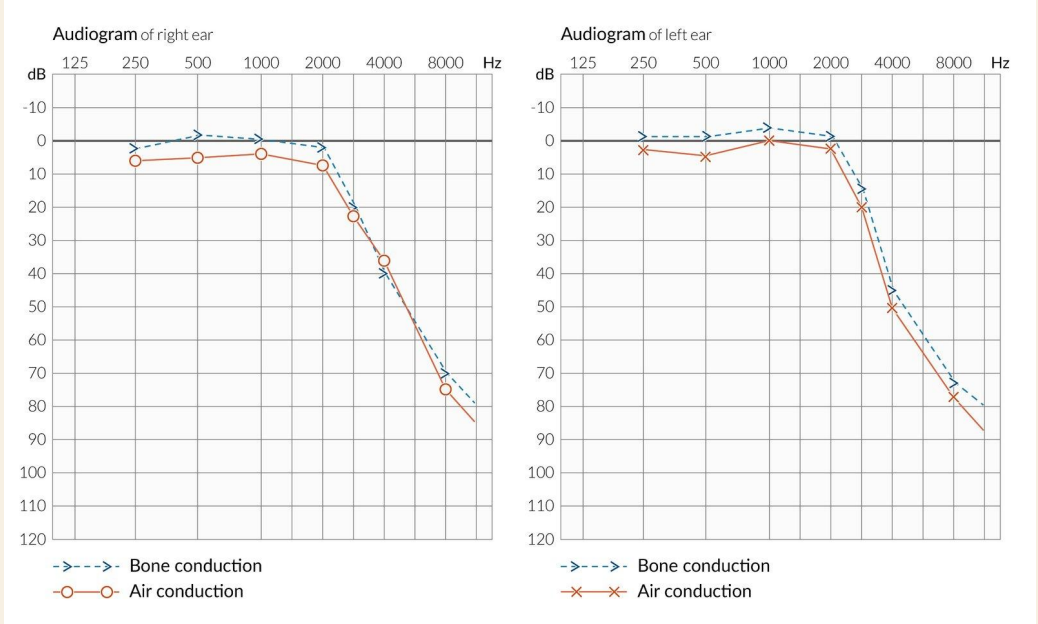
On a Weber test, comparing hearing in each ear when a tuning fork is placed on the vertex, she states that she hears the sound better in the right ear. Which one of the following is the correct interpretation of the hearing tests?

A. Conductive deafness in both ears, particularly on the right.
B. Sensorineural deafness in both ears, particularly on the right.
C. Conductive deafness in the right ear only.
D. Sensorineural deafness in the right ear only.
E. Sensorineural deafness in the left ear only.

Pure tone audiogram



Conductive hearing loss



Sensorineural hearing loss

This pure tone audiogram is recorded from a 12 year old Maori girl complaining of deafness in her right ear. The MOST likely explanation for this problem is:

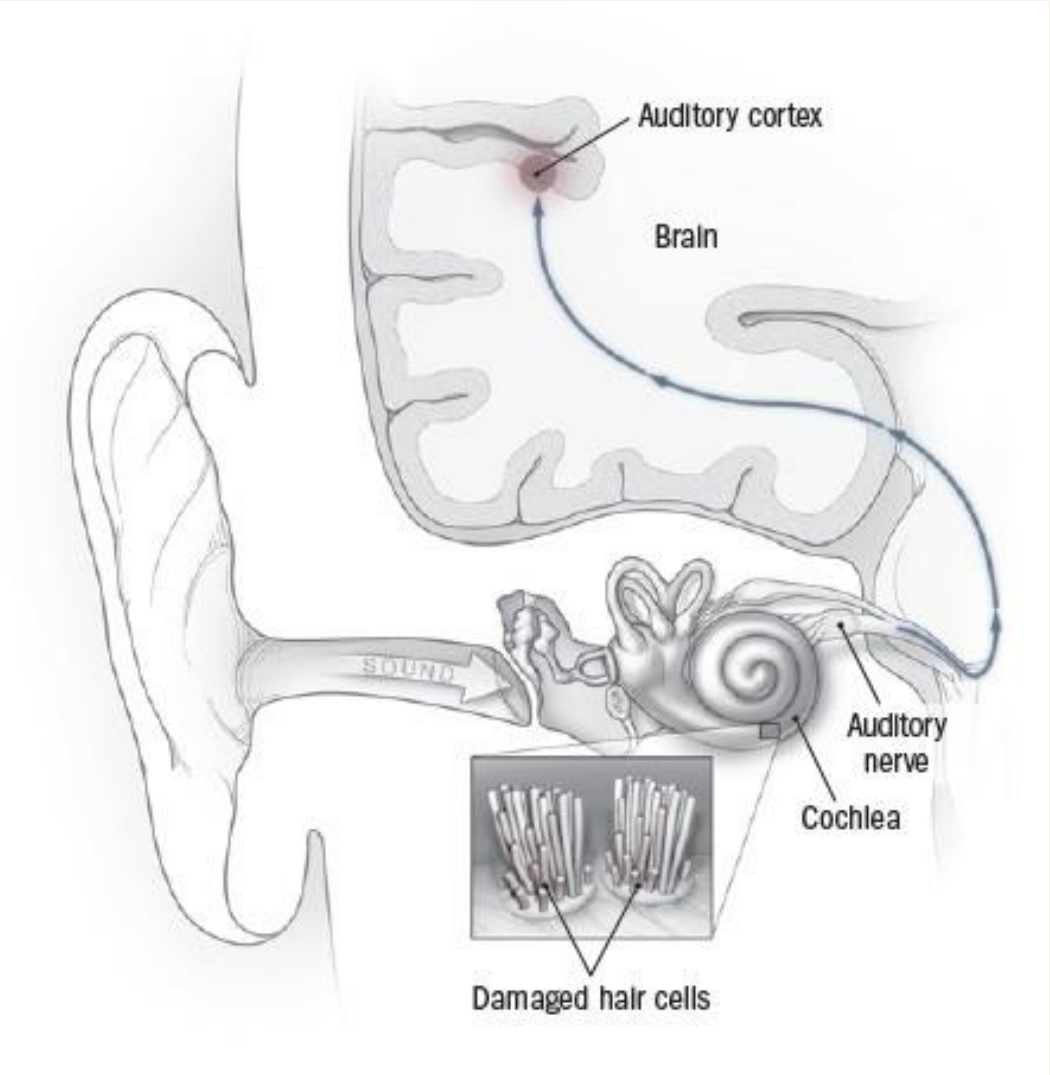
a) Debris in the external auditory meatus
b) Cholesteatoma
c) Middle ear effusion
d) Toxin-induced nerve damage
e) Necrosis of the ossicular chain

Tinnitus

Exact cause is unknown but is though to be due to inappropriate activity in the hair cells of the cochlea

Diagnosis

- Audiological examination by audiologist
- Tympanometry and speech discrimination
- MRI or CT scan (if serious cause suspected or head injury)



Tinnitus

Subjective Tinnitus

Otologic

- Presbycusis
- Noise-induced hearing loss
- Otitis media with effusion
- Menière's disease
- Otosclerosis
- Cerumen
- Foreign body against TM

Drugs

- ASA
- NSAIDs
- Aminoglycosides
- Antihypertensives
- Heavy metals

Objective Tinnitus

Vascular

- Benign intracranial hypertension
- Arteriovenous malformation
- Glomus tympanicum
- Glomus jugulare

Arterial bruits:

- High-riding carotid artery
- Vascular loop
- Persistent stapedial artery

- Carotid stenosis
- High jugular bulb
- Hypertension
- Hyper/hypothyroidism
- Mechanical
- Patulous eustachian tube
- Palatal myoclonus
- Stapedius muscle spasm

Tinnitus

Holistic approach (options)

Mainly based on acoustic de-sensitisation:

- Relaxation techniques
- Tinnitus retraining therapy (clinical psychologist)
- Cognitive behaviour therapy
- Background ‘noise’ (e.g. music played during night for masking)
- Tinnitus maskers
- Hearing aids (based on audiologist assessment)
- Consider hypnotherapy

Medical (trials of options)

- Clonazepam 0.5 mg nocte
- Minerals (e.g. zinc and magnesium)
- Betahistine (Serc) 8–16 mg daily (max. 32 mg)
- Carbamazepine
- Antidepressants
- Acute severe tinnitus
- Lignocaine 1% IV slowly (up to 5 mL)

You review a 70-year-old woman who is on multiple medications. For the past few months she has noticed bilateral tinnitus and hearing loss. Which one of the following medications may be responsible?

A) Lofepramine
B) Ezetimibe
C) Furosemide
D) Tramadol
E) Digoxin

Pharmaceutical Mnemonics

Loop diuretics include: remember of **"E.T. is FABulous"**

Ethacrynic acid
Torasemide
Furosemide
Azosemide
Bumetanide

Clinical uses of Loop diuretics include: remember of **"he he"**

Heart failure
Hypertension
Edema

Side effects of Loop diuretics include: remember of **"HypO"**

Hyponatremia
Hypokalemia
Hypomagnesemia
Ototoxicity

Benign paroxysmal positional vertigo

Acute vertigo that is induced by changing head position

Caused by sediment, such as **otoconia (calcium carbonate crystals)** that have become free floating within the inner ear

- Affects all ages, especially the elderly
- The female to male ratio is 2:1
- Recurs periodically for several days
- Each attack is brief, usually lasts 10–60 seconds, and subsides rapidly
- Severe vertigo on getting out of bed
- Can occur on head extension and turning head in bed
- Attacks are not accompanied by vomiting, tinnitus or deafness (nausea may occur)

Diagnosis:

Pathognomonic sign: nystagmus toward the affected ear on doing a Dix-Hallpike test

Treatment:

- Avoidance measures: encourage the patient to move in ways that avoid the attack
- Drugs are not recommended
- Epley repositioning maneuver
- Brandt-Daroff exercises
- For pations: Brandt-Daroff Exercises

A 52-year-old woman presents with dizziness and vertigo when she moves her head towards right and in extension of head.

She is asymptomatic when she is lying still on the bed and is not moving her head. She is having these symptoms since last 3 hours. She had similar symptoms 5 years ago when she recovered in two days. There is no neurological deficit on examination apart from positional nystagmus.

Which of the following is best management?

a. Hallpike manoeuvre
b. Epley manoeuvre
c. Frusemide
d. Intravenous fluids
e. Steroids

Vestibular neuritis

- Second most common disorder affecting the labyrinth
- Viral etiology with consequent inflammation of the vestibular nerve
- Frequently associated with recent flu symptoms

Signs/symptoms:

- Sudden onset of severe rotatory vertigo
- Nausea and vomiting
- Spontaneous nystagmus and diminished VOR

- Usually subsides over a course of several days or weeks

- Differential diagnoses: cerebellar hemorrhage and infarction

- Labyrinthitis refers to the simultaneous loss of hearing and balance in the affected ear

Vestibular neuritis

Treatment:

- Bed rest, vestibular sedatives and anti-emetics in the first 24-72 hours
- Dimenhydrinate
- Prochlorperazine
- Diazepam
- Short tapering course of oral steroids
- Vestibular adaptation exercises/rehabilitation in the recovery phase

Table 3. Differential Diagnosis of Vertigo

Condition	Duration	Hearing Loss	Tinnitus	Aural Fullness	Other Features
Benign Paroxysmal Positional Vertigo (BPPV)	seconds	none	none	none	
Meniere's Disease	minutes-hours precedes attack	uni/bilateral	+	pressure/warmth	
Recurrent Vestibulopathy	minutes to hours	none	none	none	
Vestibular Neuronitis	hours-days	unilateral	none	none	
Labyrinthitis	days	unilateral	whistling	none	recent AOM
Acoustic Neuroma (see OT14)	chronic	progressive	none	none	ataxia CN Vll palsy

Meniere’s disease

- It is commonest in the 30–50 years age group
- Triggers: high salt intake, chocolate, alcohol, smoking, stress, menstrual cycle
- Attacks last 30 minutes to several hours.
- There is a variable interval between attacks (twice a month to twice a year).
- Nystagmus is observed only during an attack (often to side opposite affected inner ear).

Symptoms:

- **Typical history consists of recurrent attacks of vertigo, tinnitus, and ipsilateral hearing loss**
- Nausea and vomiting
- SNHL is fluctuating and progressive

Meniere disease

- **DxT** vertigo + vomiting + tinnitus + sensorineural deafenss → Ménière syndrome

Treatment:

- Low salt diet +/- diuretic for maintenance treatment (hydrochlorothiazide, acetazolamide)
- Vestibular sedative, antiemetic for acute episodes
- Prochloperazine
- Diazepam
- Vasodilators - Betahistine
- Meniette device
- Intra-tympanic therapy – steroids, aminoglycosides
- Surgery for refractive cases

An elderly patient has acute onset unilateral deafness, tinnitis & vertigo. What is the diagnosis?

a) Meniere’s disease

b) Acoustic neuroma

c) Vestibula neuronitis

d) Positional vertigo

A 39-year-old woman arrives at the hospital after her third episode of dizziness.

Her first episode was 6 months ago and her most recent episode occurred yesterday. She describes feeling as if the room was spinning around her. During each of these episodes she has experienced significant nausea, often accompanied by emesis. Upon further questioning she tells you that she has been hearing a low rumbling noise in her right ear.

What test is required to confirm your diagnosis?

(A) CT head

(B) MRI head

(C) Audiogram

(D) Tilt table test

(E) No need for further testing

Acoustic neuroma (vestibular schwannomas)

- Benign tumour of Schwann cells surrounding auditory nerve

- Usually unilateral
- Bilateral tumour associated with Type 2 Neurofibromatosis

- Chromosome 22 abnormality
- Autosomal dominant transmission

- **DxT** (unilateral) tinnitus + hearing loss + unsteady gait ➔ acoustic neuroma

Symptoms:

- Unilateral progressive SNHL 85%
- Sudden hearing loss 15%
- Tinnitus 56%
- Vertigo 19%
- Midface hypesthesia,
- Cranial nerve V and VII Facial paresis
- Diplopia, dysphagia, hoarseness, aspiration,

cerebellar ataxia

- Hydrocephalus: headache and vomiting

Acoustic neuroma

Diagnosis: audiometry (SNHL), MRI, CT

Treatment:

- Conservative: monitoring
- Surgical resection

Translabyrinthine, middle fossa, or suboccipital retrosigmoid approaches

Stereotactic radiosurgery (gamma knife)

Which of the following is least likely to cause facial nerve palsy?

a) Skull fracture

b) Mastoiditis

c) Chronic parotitis

d) Parotid tumour

e) Acoustic neuroma

Seconds	Benign Positional Vertigo
Minutes	Vertebrobasilar insufficiency, migraine
Hours	Meniere's disease
Days	Vestibular neuritis, labyrinthine infarct

Otosclerosis

- Disease of the bone surrounding the inner ear and is the most common cause of conductive hearing loss in the adult with a normal tympanic membrane

- The normal middle ear bone is replaced by vascular, spongy bone that becomes sclerotic

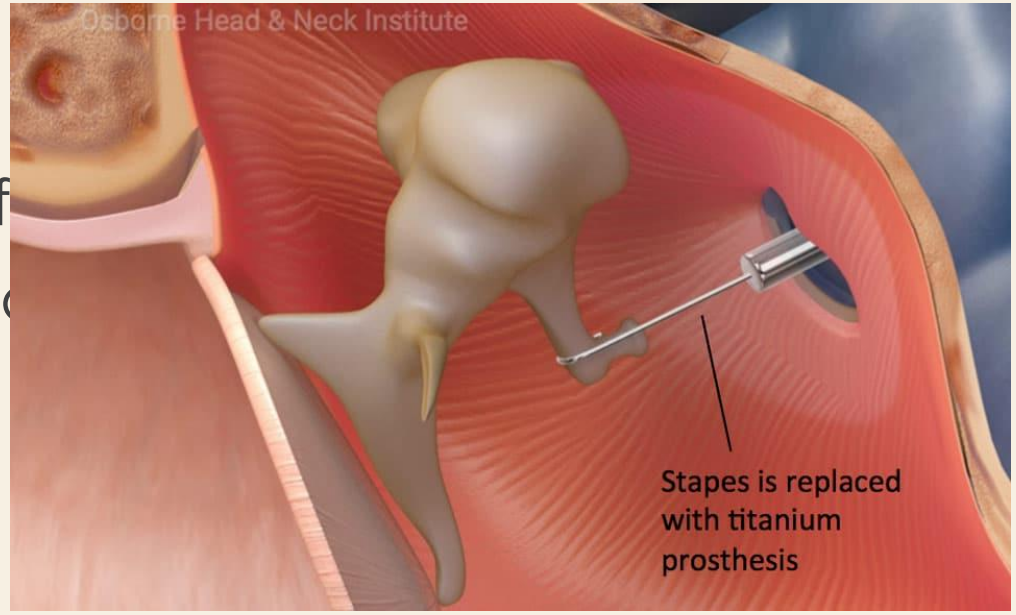
Features:

- Progressive disease
- Develops in the 20s and 30s
- Family history (autosomal dominant)
- Unilateral or bilateral
- Female preponderance
- Stapes footplate is affected
- May progress rapidly during pregnancy
- Conductive hearing loss

Otosclerosis

Treatment

- Referral to an ENT consultant
- Stapedectomy (approximately 90% eff
- Hearing aid fitting (less effective alterna



Which of the following is most likely to be associated with otosclerosis?

a) Normal tympanic membrane

b) Red & inflamed tympanic membrane

c) Tense & transparent tympanic membrane with fluid level behind

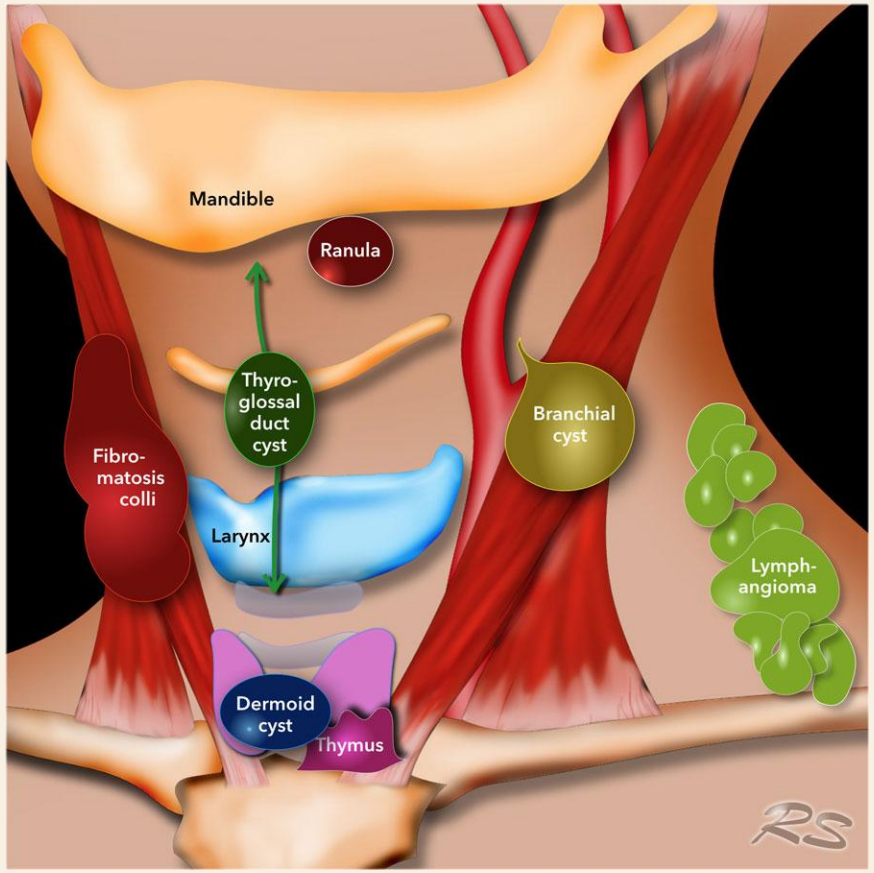
d) Blue gray sclera

e) Obstruction of the Eustachian tube

Head and neck masses

MIDLINE	ANTERIOR TRIANGLE	POSTERIOR TRIANGLE
Thyroid nodule	Branchial cleft cyst	Developmental remnants - Cystic hygroma - Bronchial sinuses & cysts
Thyroglossal duct cyst	Carotid body tumour	Pancoast tumour (from apex)
Dermoid cyst	Carotid aneurysm	Cervical rib
Midline cervical lymph node swelling	Lateral thyroid tumour (metastasis)	

Cystic lesions of the neck



Cystic hygroma

- Commonly involves the posterior cervical space
- May be macrocystic or microcystic
- MRI is the gold standard for radiologic evaluation

Branchial deft cyst

- located inferior to the external auditory meatus or anterior to the sternomastoid muscle. The opening may
- discharge mucous. A skin tag or cartilage remnant may be present. Refer when diagnosed for excision.

- Most common cystic lesion of the anterior triangle of
- the neck in children
- Unilocular, cystic mass displacing the submandibular
- gland anteriorly and the sternocleidomastoid
- muscle posteriorly

Thyroglossal duct cyst

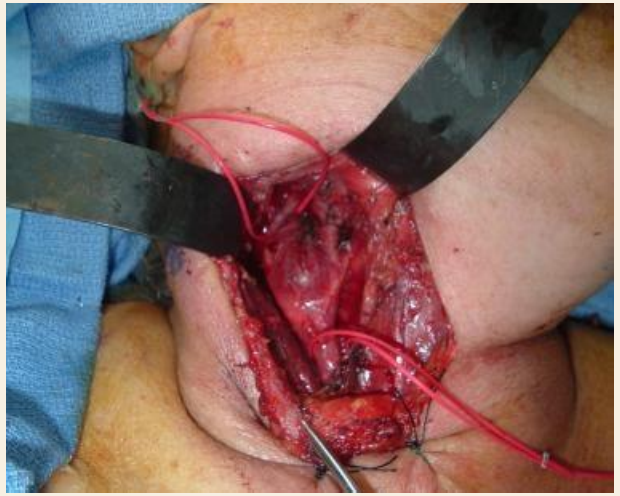
- the most common childhood midline neck swelling

- It moves with swallowing and tongue protrusion. It is prone to infection, including
- abscess formation. The cyst and its tract are best excised before it
- becomes infected.

- Midline lesion anywhere from foramen caecum and
- the thyroid gland
- Moves with protrusion of the tongue
- May contain ectopic thyroid tissue
- May contain all of the functioning thyroid
- Ultrasound, thyroid scans
- Surgical excision -- Sistrunk procedure

Carotid body tumor

- Carotid body tumors (CBTs) present most commonly as an asymptomatic palpable neck mass in the anterior triangle of the neck
- They are slow-growing tumors that can remain asymptomatic for many years.
- Symptoms cranial nerve palsy 10%, pain, hoarseness, dysphagia, Horner syndrome, or shoulder drop.
- Diagnosis: ultrasonography with color Doppler, CT,MRI
- The carotid body is a small, reddish-brown, oval structure, located in the posteromedial aspect of the carotid artery bifurcation.



- Treatment: surgery or radiotherapy

SCM tumor

- hard painless lump (2–3 cm long) within sternomastoid muscle
- tight and shortened sternomastoid muscle
- usually not observed at birth
- appears at 20–30 days of age
- associated torticollis—head turned away from but tilted towards the
- Tumour restricted head rotation to side of tumour