Advanced Ear Examination for Clinical Decision Making

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Risks/Benefits

- The applicability and accuracy of the course content may vary by the clinical, geographical, and cultural context; you should evaluate the course accordingly.
- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learner Outcomes

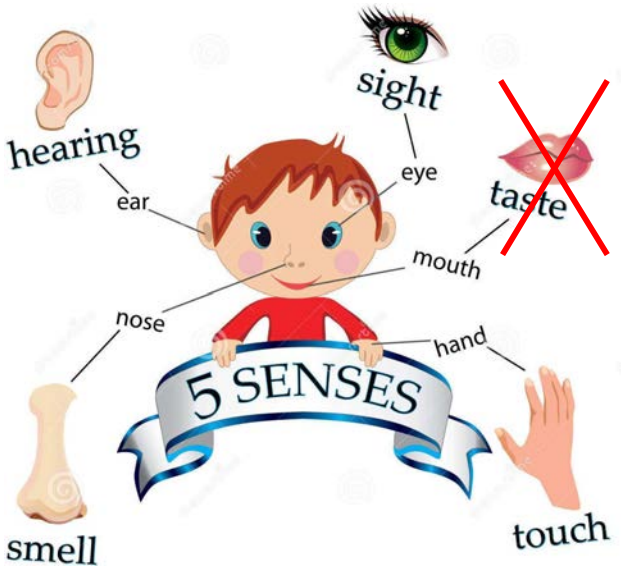
- After this course, participants will be able to identify and classify otoscopic findings that require medical referral, impact impression-taking, or alter the acoustics of the ear for proper hearing aid fitting.
- After this course, participants will be able to list the correct procedural steps for conducting a thorough otoscopic examination, ensuring accurate identification of outer and middle ear pathologies.
- After this course, participants will be able to describe the clinical significance of specific ear conditions and determine appropriate intervention strategies to optimize patient outcomes and safeguard vulnerable individuals.

Image Resources

- https://www.google.co.uk/images
- http://www.earatlas.co.uk
- https://dnbhelp.wordpress.com/otology-6/
- http://www.entusa.com/eardrum_and_middle_ear.htm
- https://www.entbristol.co.uk/gp-education

Copyright

Eclecticism in Otoscopy: Scope and range!



- Importance of looking at the back and front of the ear
- Importance of smell and touch in otoscopy
- Diagnostic otoscopy in safeguarding children and vulnerable adults

Outcome Oriented Approach

Otoscopic findings will reveal conditions that:

- Require a medical referral
- Require a safeguarding referral
- Affect impression taking
- Affect the ‘normal’ acoustics of the outer and/or middle ear (for fitting)

Procedural Considerations

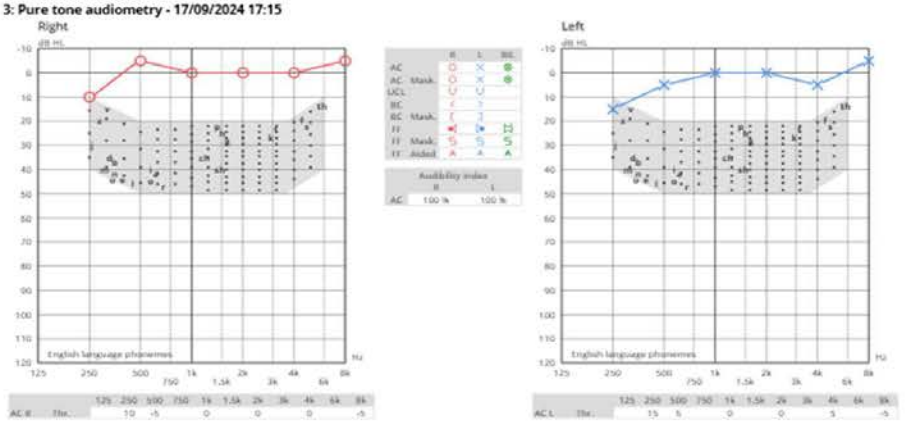
- History and informed consent
- Infection control
- Record keeping-before and after: close the loop(hole)
- Size/shape of speculum and instrument/lighting

Let’s begin ear examination

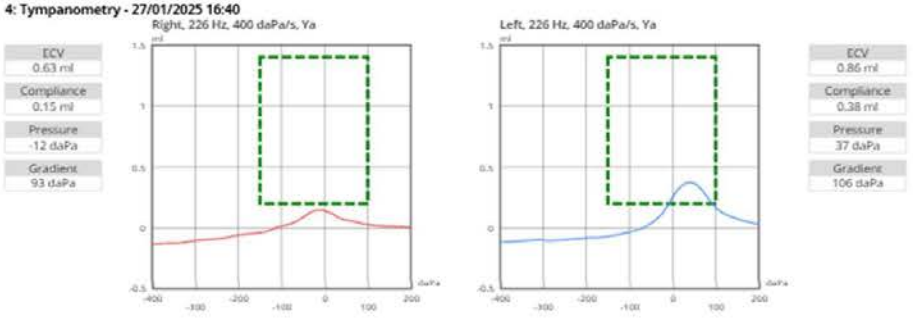
1: Video-Otoscopy - 17/09/2024 17:03
Side: Left

2: Video-Otoscopy - 17/09/2024 17:04
Side: Right

3: Pure tone audiometry - 17/09/2024 17:15



4: Tympanometry - 27/01/2025 16:40



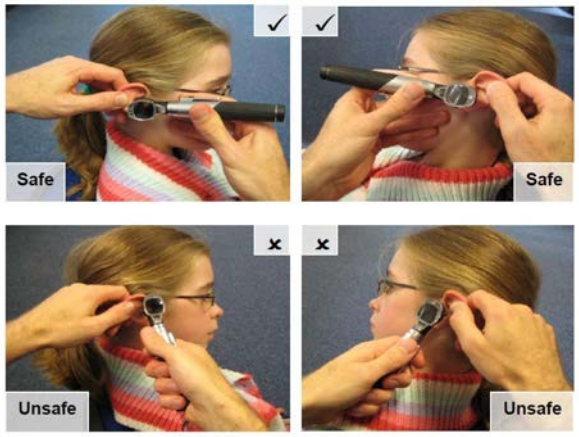
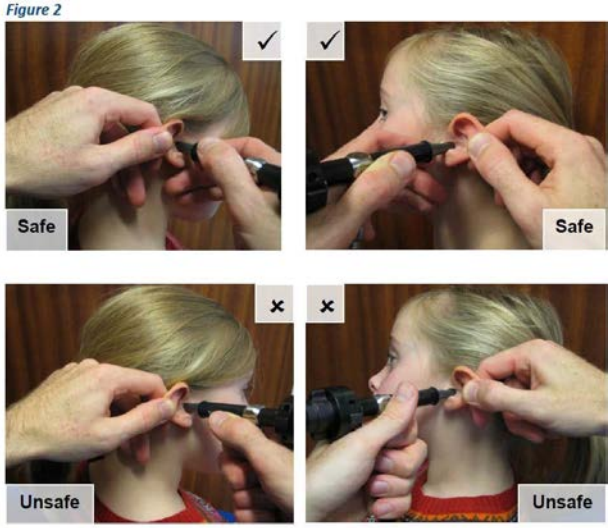


Figure 1

The pictures in the top row illustrate safe practice, with the otoscope braced securely again. subject's head by the examiner's hand; it also illustrates appropriate manipulation of the subject's pinna. The pictures in the bottom row illustrate unsafe practice with no bracing.

Figure 2



An example with a video otoscope. Arrangement as with Figure 1.

Recommended Procedure Ear examination BSA 2016

www.thebsa.org.uk

Advanced Ear Examination

I- Inspect and palpate the auricles

Palpating the ear

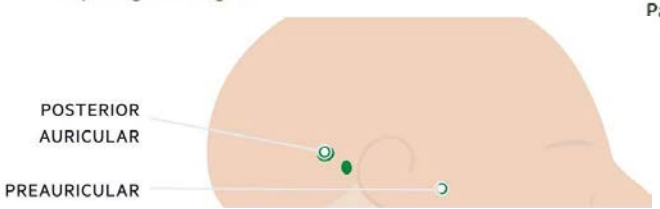
- color
- symmetry of size
- Angle of attachment
- Drainage: cerumen

☑ texture
☑ elasticity
☑ tenderness

Pulling helix forward

Palpating the tragus

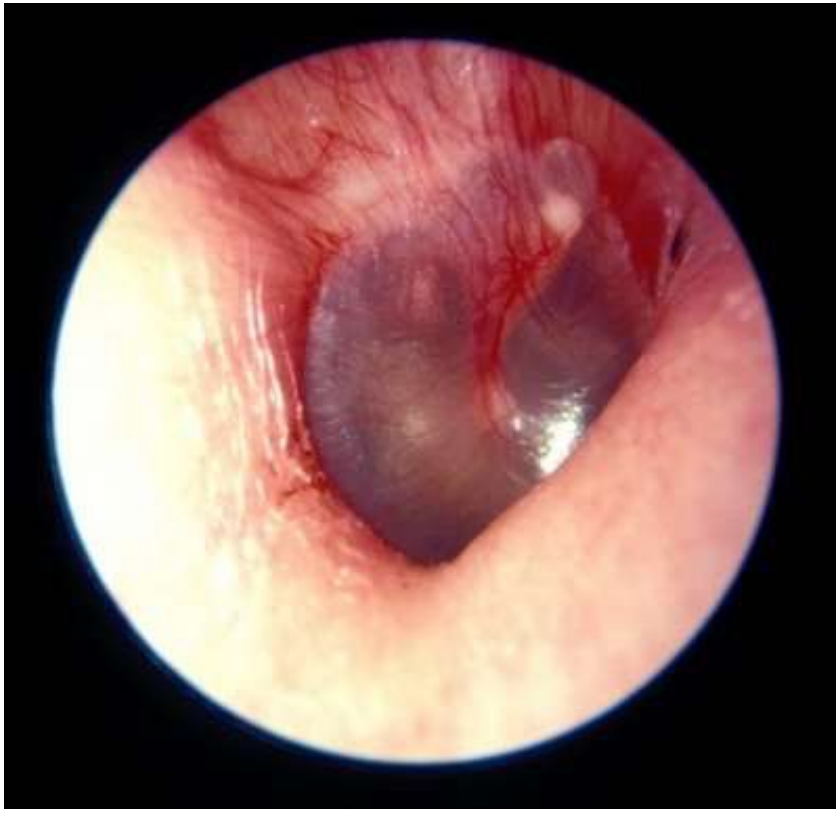
Palpating the mastoid



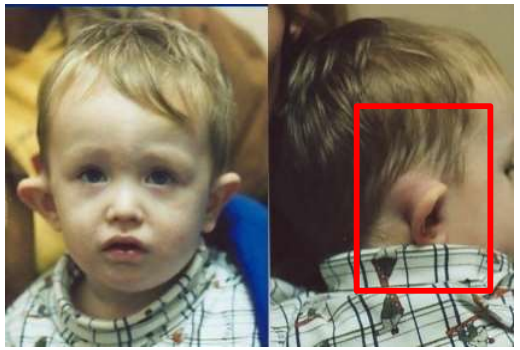
- Light reflex
- Orientation of manubrium
- Bottom and top of the canal
- Post-auricular region
- Pinna
- Around the ear
- Depth perception

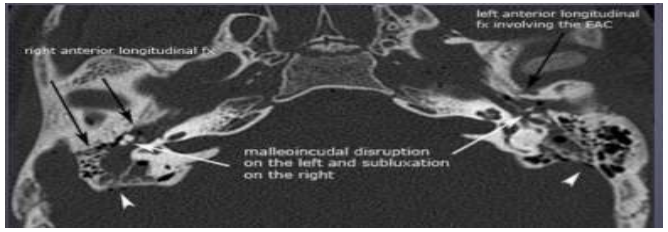
What's the Diagnosis?

- Vasodilatation Reflex:
  - When the canal or tympanic membrane is stimulated.
  - During crying, coughing or irrigation.



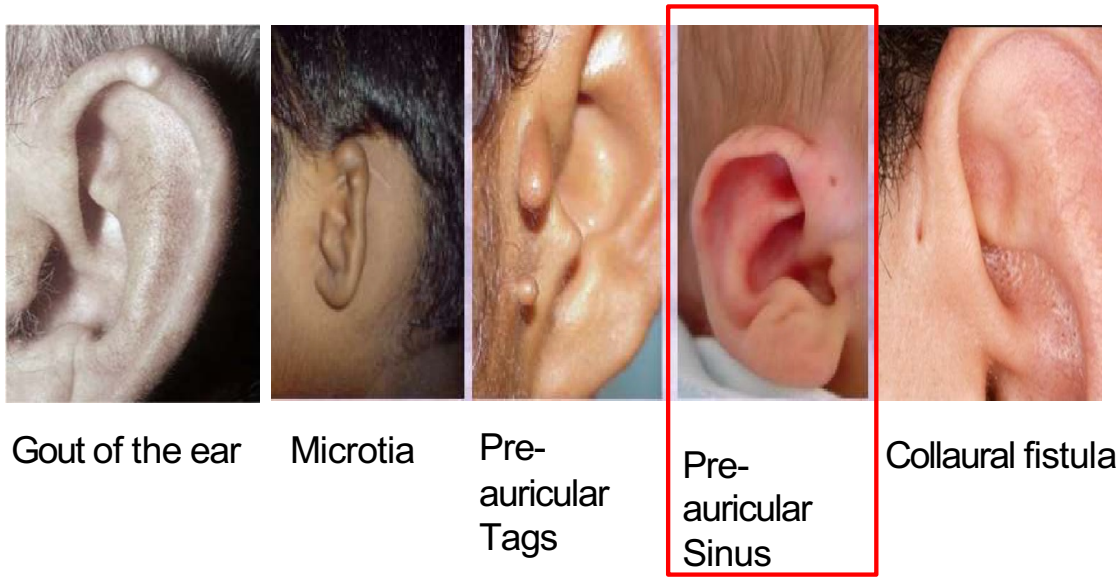
Post Auricular Region





Auricular Region-Congenital Conditions

- Pre-auricular sinus
- Ear tags
- Congenital swellings
- Collaural fistula
- Congenital anomalies
- Atresia
- Congenital tumours



Gout of the ear | Microtia | Pre-auricular Tags | Pre-auricular Sinus | Collaural fistula

Image resource: Type 'disorders of pinna' in google images

Chondro-dermatitis Nodulitis

- Causes:
  - Pressure on the skin of the ear, usually from sleeping mainly on one side.
  - Damage from cold and the sun, and
  - a poor blood supply to the ear.
  - No obvious reason.
- Treatment:
  - Corticosteroid: may be applied as a cream or injected into the nodule to try and reduce pain and redness.
  - Liquid nitrogen: The lesion can be frozen off with it
  - Surgery: may be removed by cutting it out, having first numbed the skin with a local anaesthetic injection.

Contd..Melanoma and Non-Melanoma Cancers

Melanoma-Fast growing skin cancer

Non-Melanoma type: Slow growing Basal Cell carcinomas

Non-Melanoma type: Slow growing Squamous Cell carcinomas

https://secure3.convio.net/ccssk/site/SPageServer/?pagename=SUN_non_melanoma_signs

Brain morphology in **children** with nevoid **basal cell carcinoma** syndrome.

Shiohama T, Fujii K, Miyashita T, Mizuochi H, Uchikawa H, Shimojo N. Am J Med Genet A. 2017 Apr;173(4):946-952. doi: 10.1002/ajmg.a.38115. PMID: 28328116

Basal cell carcinoma in **children**: report of 3 cases

LeSueur BW, Silvis NG, Hansen RC. Arch Dermatol. 2000 Mar;136(3):370-2. doi: 10.1001/archderm.136.3.370. PMID: 10724199

Hypertrichosis

NCBI Resources How To

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed

Advanced

Abstract

Arch Otolaryngol Head Neck Surg. 1988 Aug;114(8):918-9.

Severe hypertrichosis of the external ear canal during minoxidil therapy.

Toriumi DM[1], Konior RJ, Berktold RE.

Author information

Abstract

Minoxidil is a potent peripheral vasodilator used to treat patients with severe hypertension that is unresponsive to other medications. Hypertrichosis of the forehead, face, neck, shoulders, upper part of the arms, and legs is a frequent side effect that occurs in the majority of patients that use this drug. This phenomenon appears to be due to increased blood flow to hair follicles, with resultant excessive hair growth. We describe a patient with severe hypertrichosis of the external ear canal resulting in chronic otitis externa and hearing loss.

Localised changes of hair are important in the diagnosis of some dermatological diseases (viz. elementary lesions). **Ear hypertrichosis may a feature associated with tumoral lesions**

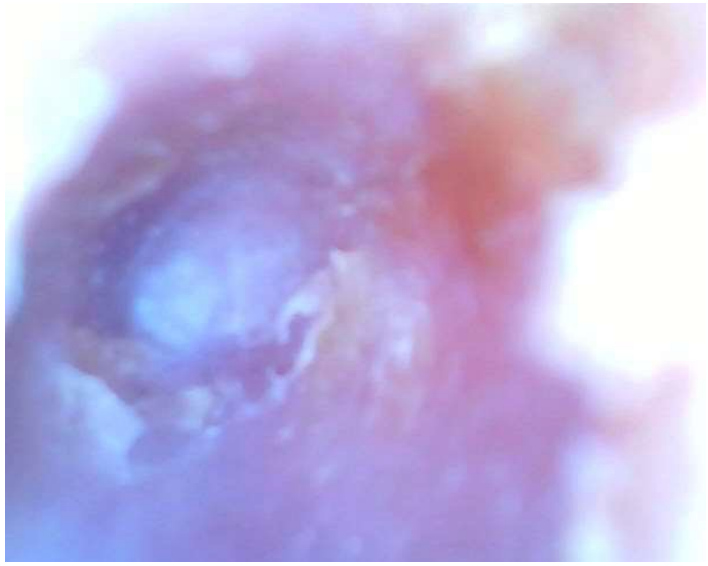
Ear Canal: The only skin lined cavity in the body

- Hair: in cartilaginous part
  - Bottom of hair are ceruminous glands, only found in the ear canal in the body
- Isthmus: Bend of the ear canal beyond which it is bony
  - Injury/infection of Isthmus can cause cartilaginous stops- false fundus
- Anterior recess: bony anterior canal wall (hides part of TM's antero-inferior quadrant.
  - The anterior recess can sometimes be very deep, and this prevents you from seeing pathology there.

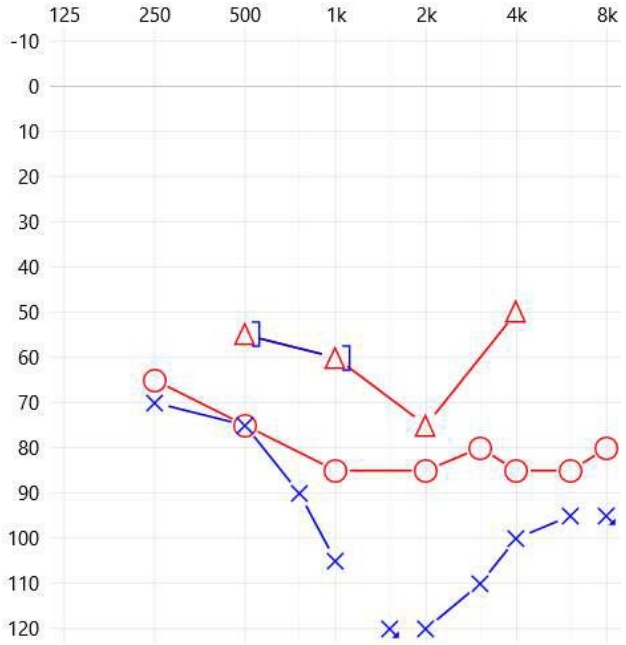
https://www.enteducationswansea.org/copy-of-ent-cambodia-blind-3

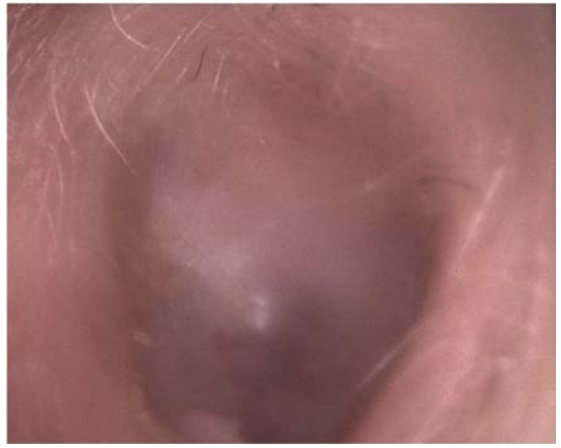
False Fundus

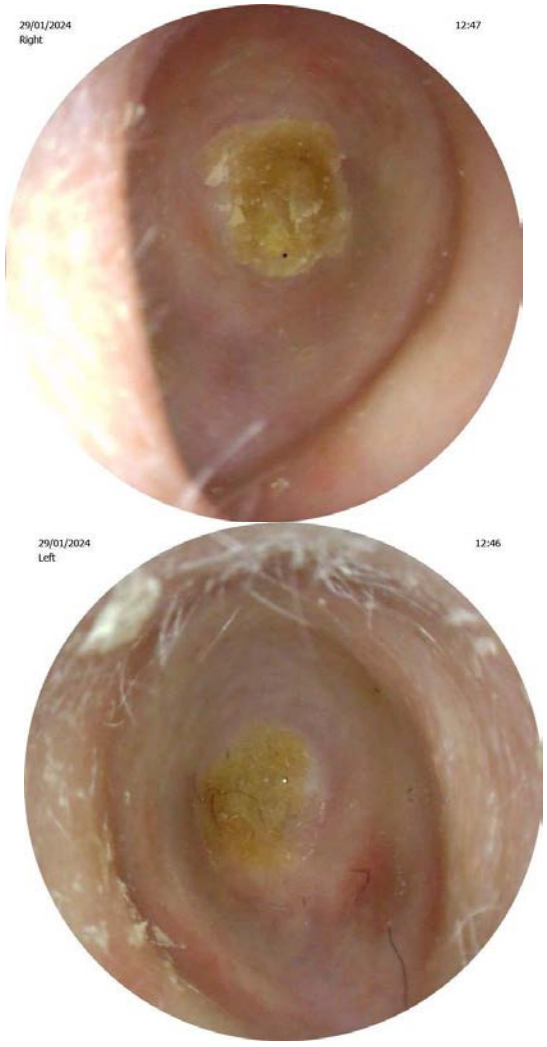
What's this?



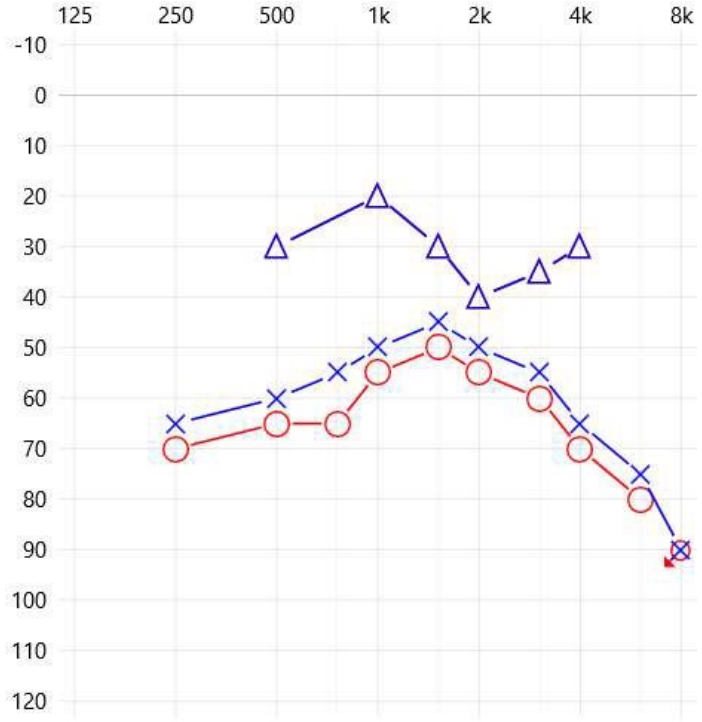
False Fundus: 74-yar-old female

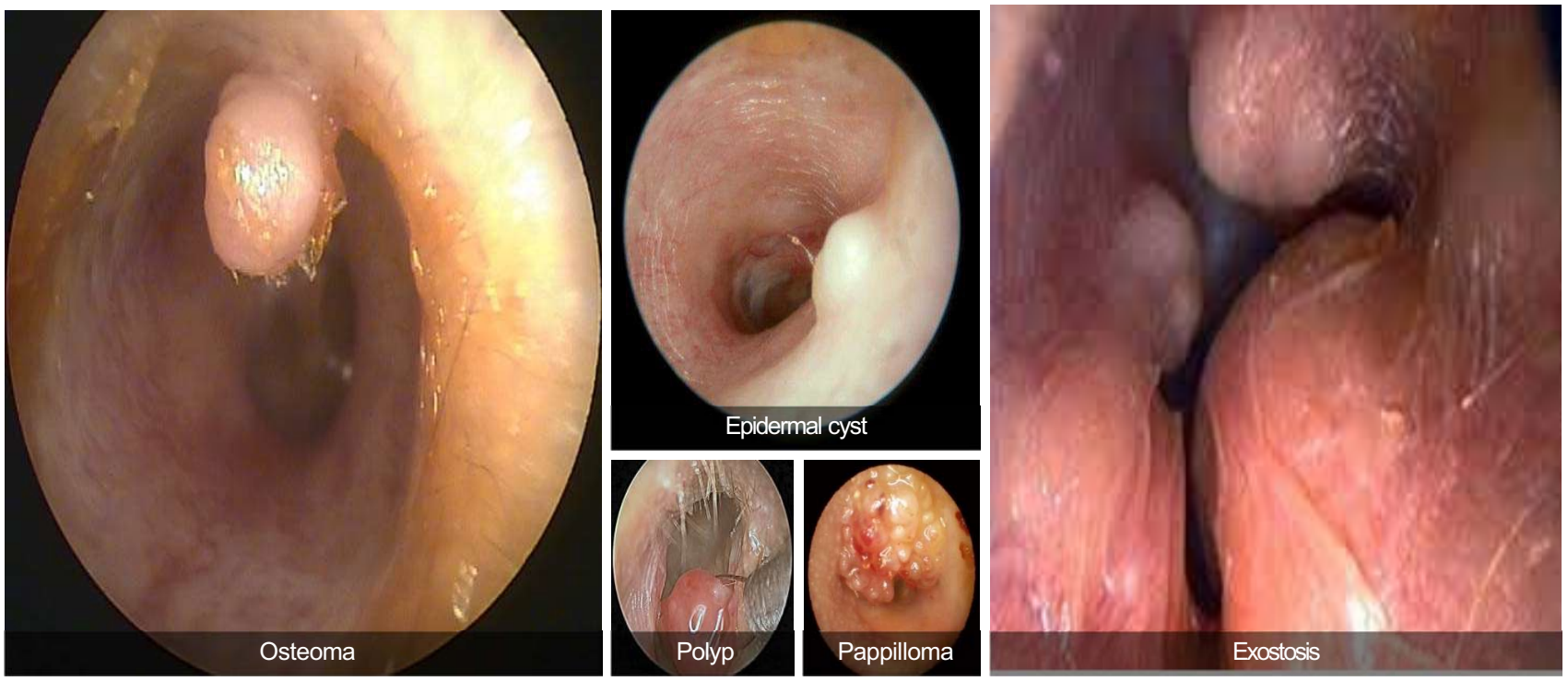






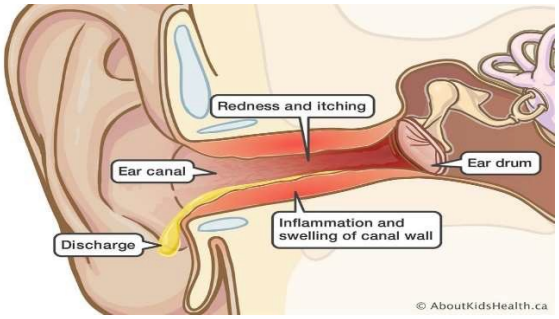
False fundus: 65-year-old female





Growths in the Ear Canal

Otitis Externa



- Furunculosis- Streptococcal infection of skin of EAC
- *May be associated with untreated middle ear infection*

Wet otitis/ swimmer's ear

No need to swab discharge unless there is no change after three lots of treatment

Treatment

Analgesia, anti-inflammatories, drops (antibiotic, anti-fungal, steroids), creams/ointments (wick, drops, spray), ?oral i/v antibiotics, anti-virals

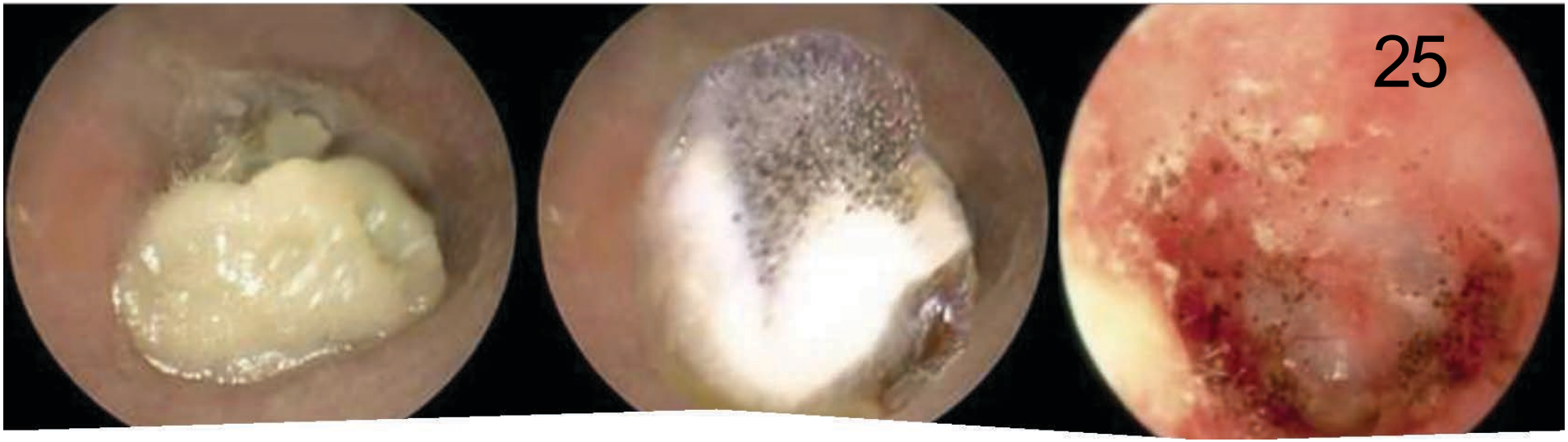
Self help advice from NHS UK

https://www.nhsinform.scot/illnesses-and-conditions/ears-nose-and-throat/otitis-externa/

- avoid getting your affected ear wet – wearing a shower cap while showering and bathing if you aren't washing your hair can help
- avoid swimming until the condition has fully cleared
- remove any discharge by gently swabbing your outer ear with cotton wool – do not stick cotton wool or a cotton bud inside your ear
- remove anything from your affected ear that may cause an allergic reaction, such as hearing aids, ear plugs and earrings
- use pain relief such as paracetamol or ibuprofen to relieve ear pain – these aren't suitable for everyone, so make sure you check the information leaflet that comes with the medication first and if you're still unsure, check with your GP, practice nurse or pharmacist
- if your condition is caused by a boil in your ear, placing a warm flannel or cloth over the affected ear can help it heal faster

Chronic otitis externa

https://www.entbristol.co.uk/gp-education



Otomycosis with fungal spore: itchy, irritable ear, slight discomfort

- About 9% of all ear infections
- Repeated antibiotics can cause it
- Dried Trimovate is black in colour & can imitate fungal infection
- Dried shaving foam can also give false appearance of fungus

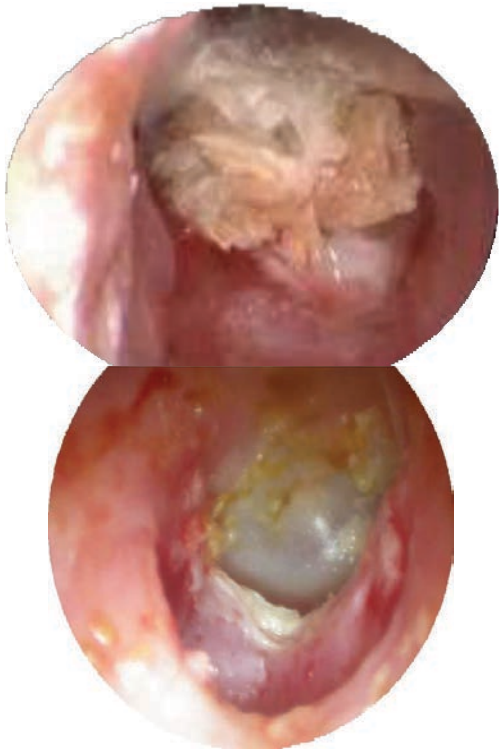
- Rx
  - Topical antifungal: Canestan HC wick-48 hours. Another wick in 7 days
  - 3 treatments of painting the earcanal wall with Canestan for
  - 3 weeks as fungal spores can live for 3 weeks (fill in the cream in the ear for dementia patients)

- Necrotising/Malignant Otitis

- Extreme pain, which worsens when lying down or turning in the bed

Keratosis Obturans

- Pathogenesis: obscure
- Has been associated with eczema, seborrhoeic dermatitis, or furunculosis.
- **Can occur with sinusitis or bronchiectasis (77% of juvenile and 20% of adult cases), which facilitates reflex sympathetic stimulation of the cerumen glands and consequent formation of an epidermal plug**
- May infect the bone (osteotitis), which may settle with Gentamycin



Features:

Typically manifests in a younger population (<40 yo) and presents with

- acute conductive loss
- severe otalgia because of accumulation of keratin in the ear,
- widened ear canal, and
- thickened tympanic membrane

Trauma of External Ear Canal

- Staphylococcus A lives on skin so, the lacerations can cause Steph A infection
- Be conscious if the patient is on anticoagulants

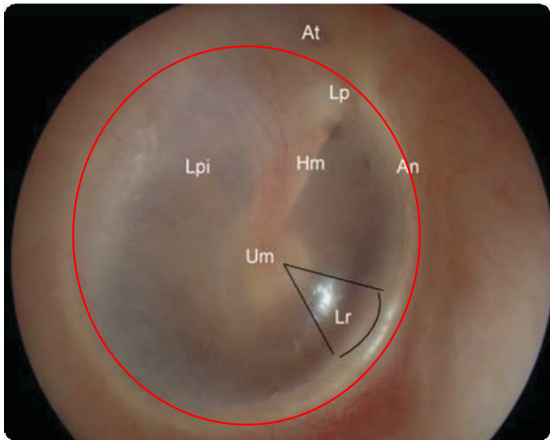
- If no wax, press the affected area with cotton wool on Jobson's Horne
- Can use some antiseptic cream like Betnovate

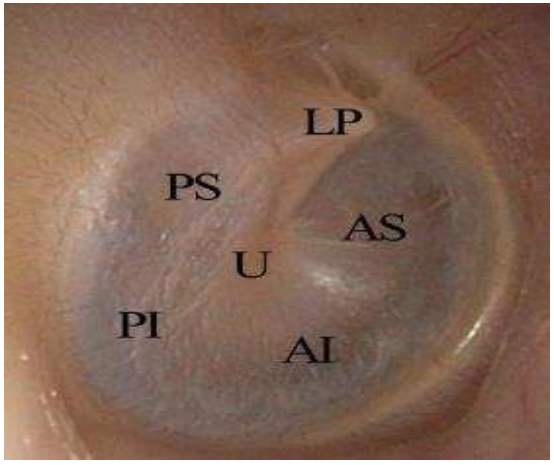
- If wax present, may need prescription for something like Otomize spray

Ear Drum

Which of the attain adult size at birth?

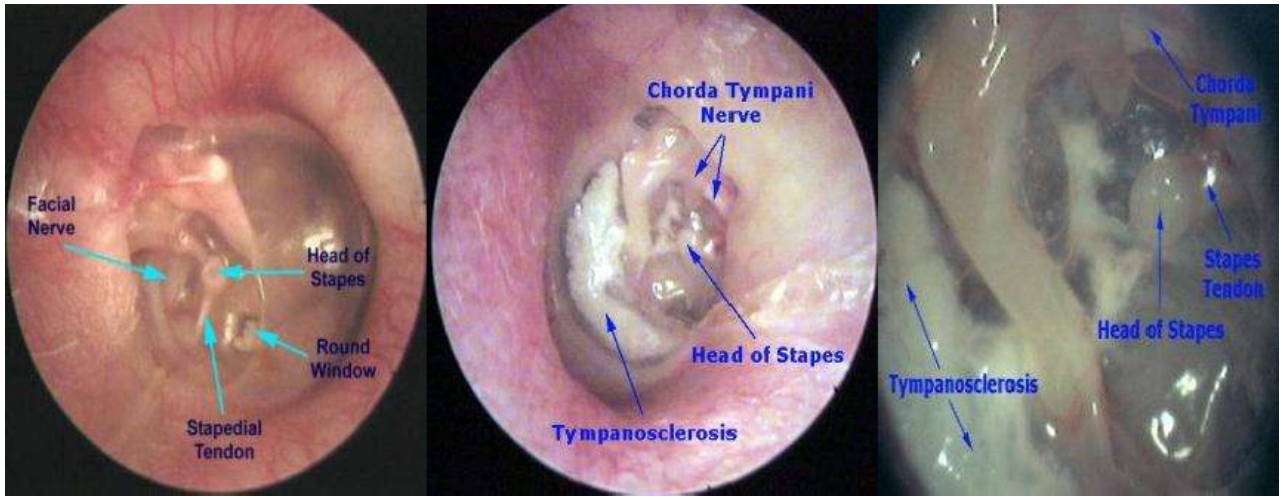
1. Spleen
2. Patella
3. Liver
4. Middle ear ossicles





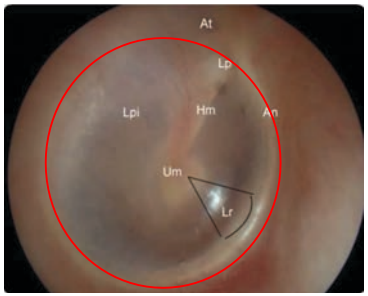
- Light reflex
- Intact ear drum H=10mm, W=8mm
  - Slanted- at around 45^{o}
  - Concave
  - Opaque/Pearly grey
- Handle of malleus orientation
- Lat process of incus may be visible
- Annulus

Retracted Ear Drums



http://www.entusa.com/eardrum_and_middle_ear.htm

Safe and Unsafe Perforations



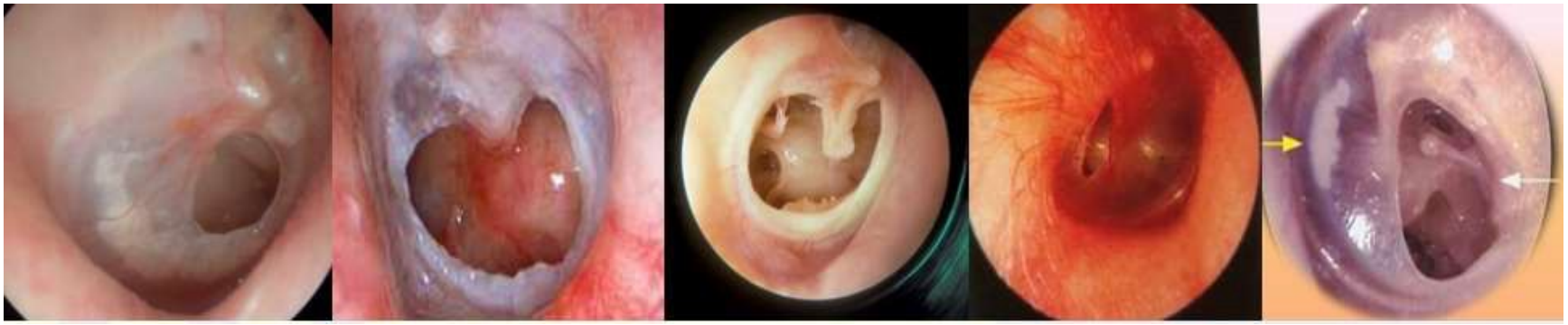
Safe perforations do not include the fibrous edge of the tympanic membrane

- Main risk is that they can allow infection in the ear (pseudomonas in water)
- Take about six weeks to heal- healing occurs to the epithelial and mucoid layers and not the middle fibrous layer, making a week spot
- Perforation with an edge is old
- Can become unsafe in time so, needs to be monitored

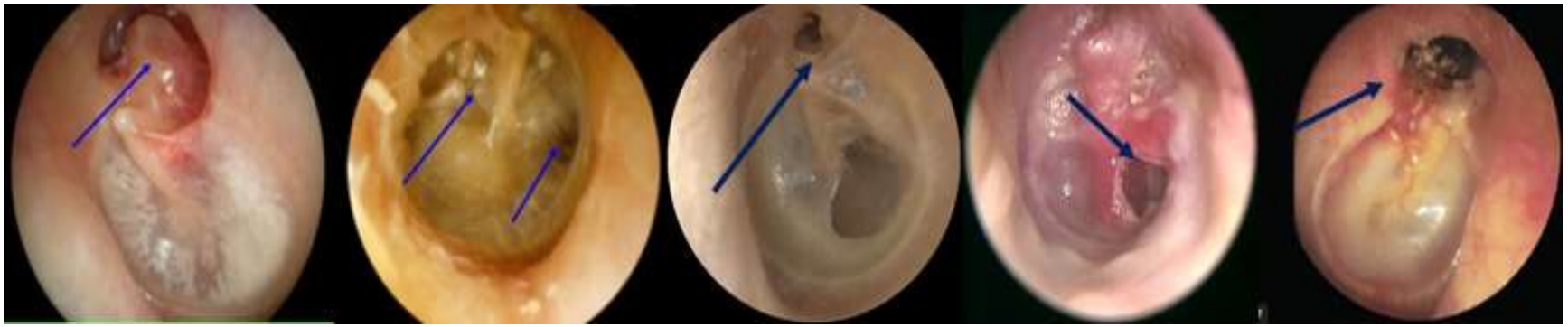
Unsafe perforations are in attic and/or involve the edge (fibrous)

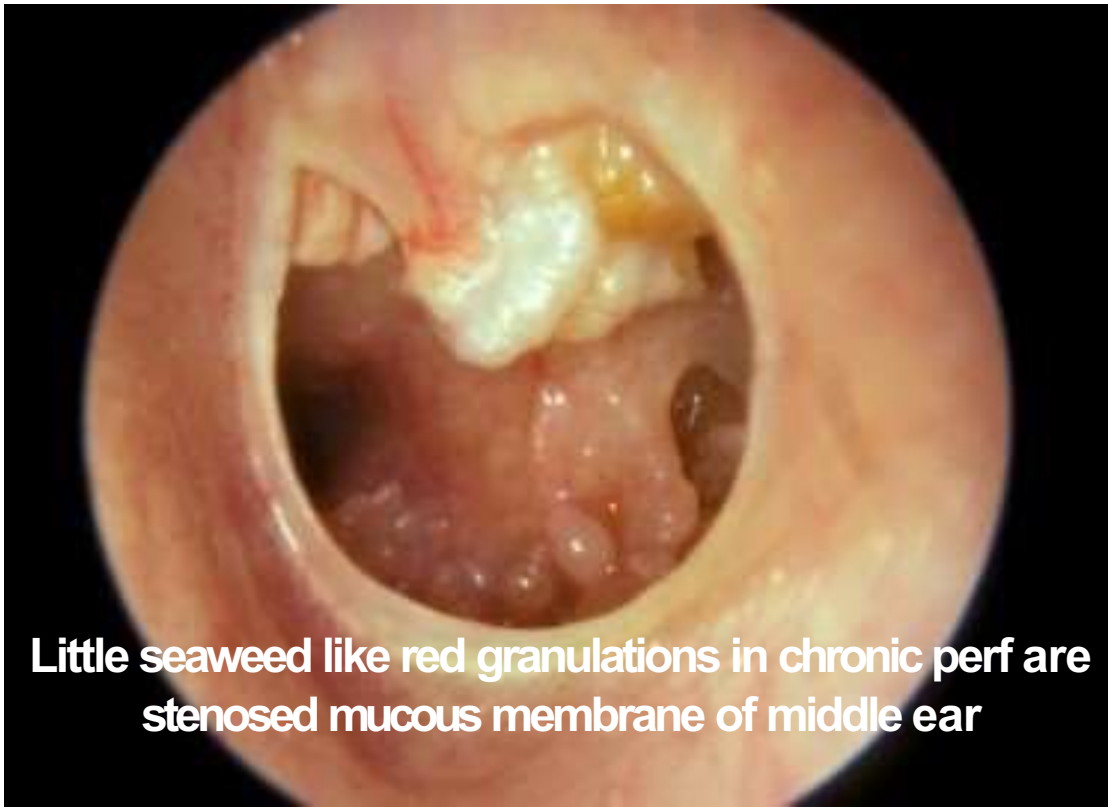
- They may reflect the retraction of tympanic membrane (a part of it sucked inwards) and may gradually enlarge
- When retraction becomes extensive, keratinous debris builds up and may become infected. This is essentially how the acquired cholesteotoma develops.

Safe



Unsafe




Little seaweed like red granulations in chronic perf are
stenosed mucous membrane of middle ear

Otitis Media

Acute Otitis Media

S: Earache, Fever, Discharge, if 'bat ear', mastoid tenderness or oedema, REFER

Rx: Analgesia, decongestant, bed rest, ?antibiotics?

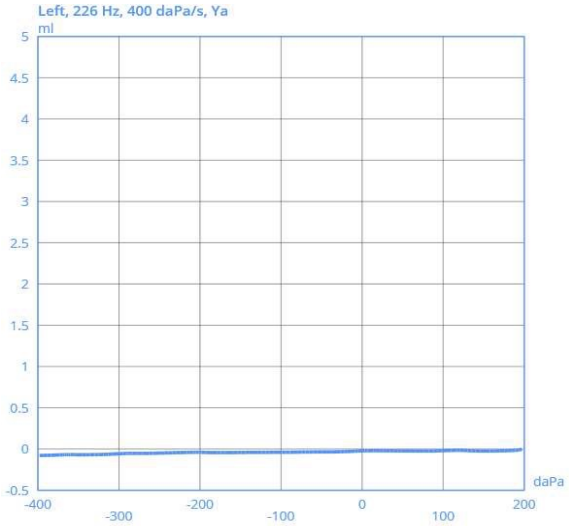
Acute suppurative otitis media

Chronic suppurative otitis media (smelly discharge, safe/unsafe perf)

Serous otitis media or otitis media of effusion

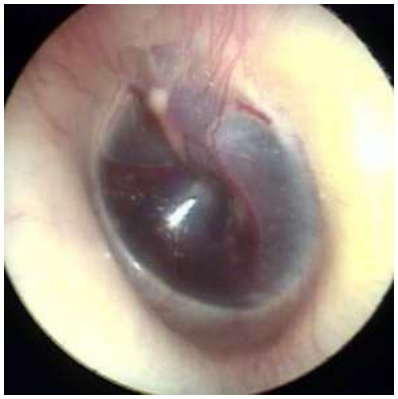
70-year-old man with history of intermittently blocked sensation in left ear

- -Middle ear fluid goes on for a couple of months, resolves, then starts again.
- -Ventilation tube placed in his ear, followed by continuous drainage. The tube was removed due to a possible allergic reaction.
- -Imaging studies of temporal bone were inconclusive.
- -Rest of his head and neck exams, including a nasopharyngeal exam, came out normal.



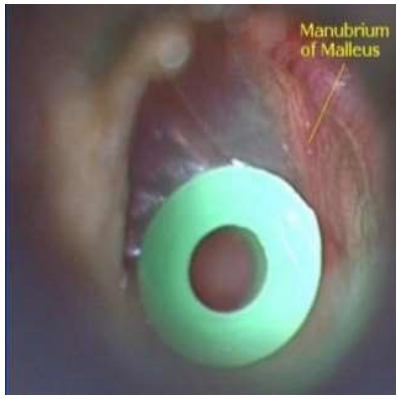
Djalilian, Hamid R. The Hearing Journal: January 2019 Volume 72 - Issue 1 - p 36,38,41

Trauma



Barotrauma due to blasts, loud noise, trauma etc:

Hemotympanium-Blood in the Middle Ear

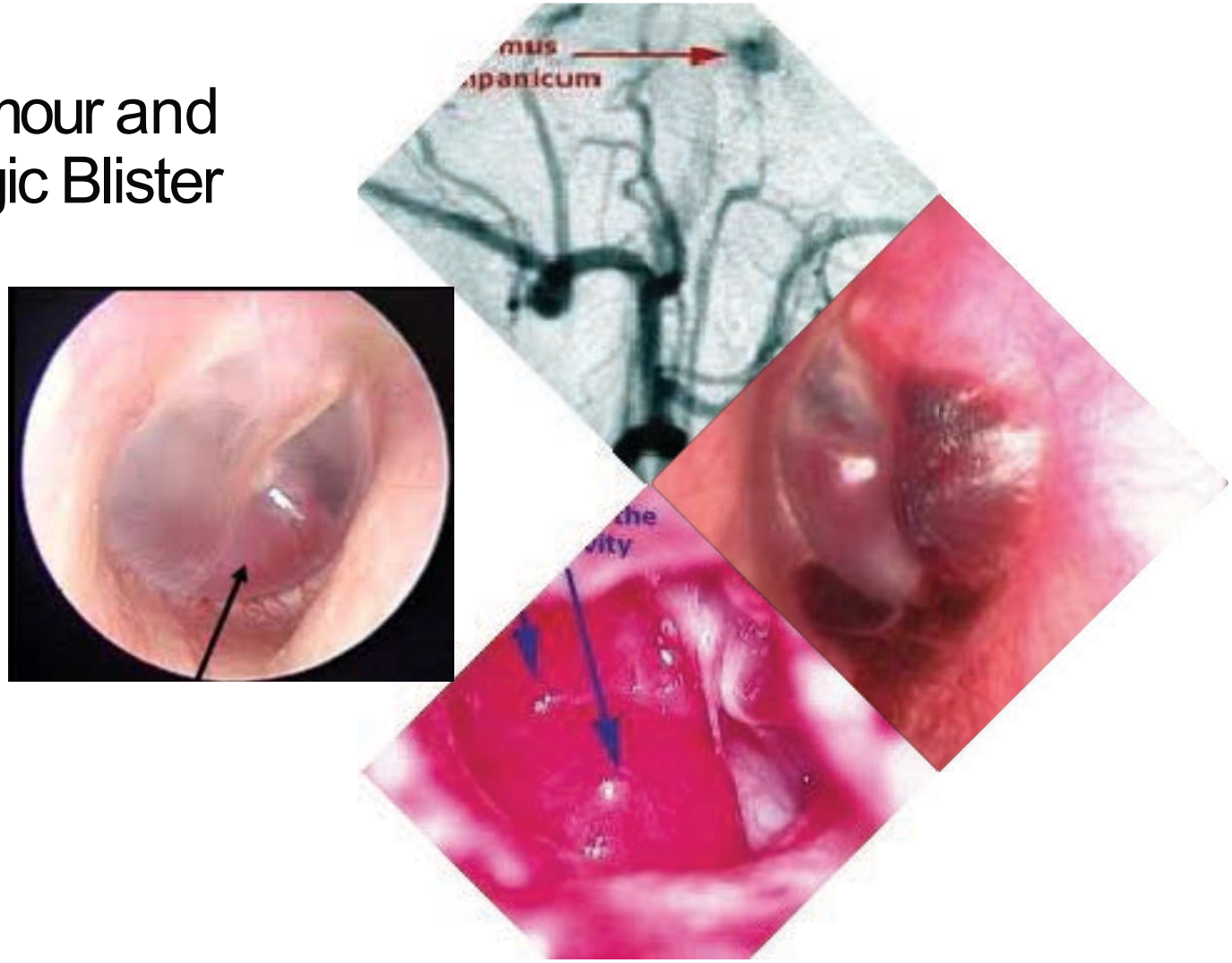


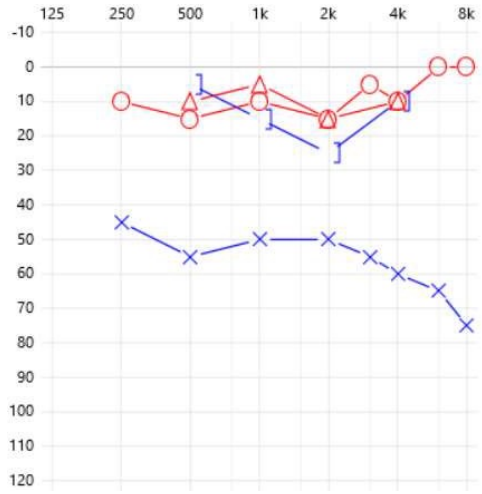
Barotrauma due to repeated valsalva manoeuvre, topical nasal decongestant-grommet may be needed

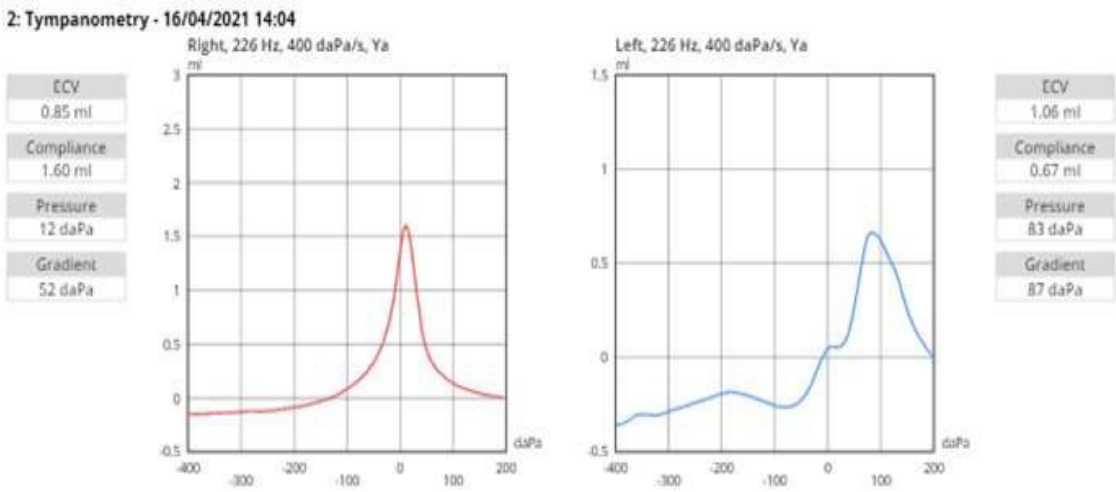
Traumatic perforation due to barotrauma

Iatrogenic trauma

Glomus Tumour and Haemorrhagic Blister





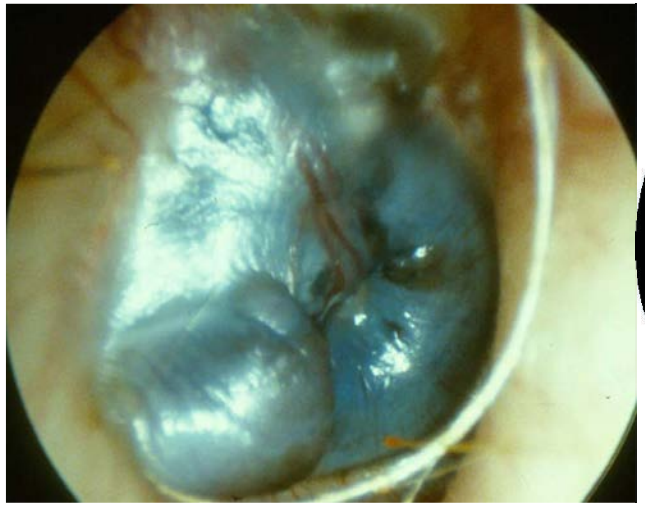


11 yo- Outer Ear Infection, Acute Inflammation of TM- No earache

What Should Worry You?

- Discharge
- Pain

Squamous cell carcinoma at the base of ear canal



Middle ear malignant tumour

Cholesterol Granuloma

CAUSES OF OTALGIA

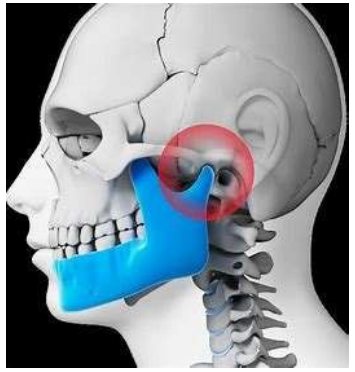
Lesions of the external auditory canal
Furuncle
External otitis (eczematoid or swimmer's ear)
Impacted cerumen or foreign body
Traumatic effects (perforation from a slap on the ear)
Herpes zoster
Otomycosis
Skin tumors, benign and malignant
Granuloma of the ear
Malignant otitis externa (in diabetes)
Bell's palsy
Bullous myringitis involving the canal
Exostoses of the canal with obstruction
Cholesteatoma and keratosis of the external canal
Local manifestations of generalized skin disorders (psoriasis, lupus, leukemia, mycosis fungoides)
Postradiation effects and postsurgical effects
Parotid or soft tissue disorders extending into the ear canal
Lesions of the middle ear
Acute otitis media
Otitis media with effusion (serous)
Acute exacerbation of chronic otitis media with or without drum perforation
Cholesteatoma
Polyps arising from tympanum
Acute mastoiditis
Glomus jugulare tumor or other tumors
Previous ventilation tube implant
Spasm of middle ear muscles

CAUSES OF OTORRHEA

The most common causes:
Liquid low-viscosity cerumen
Otitis externa (swimmer's car)
Eczematoid dermatitis
Other common causes:
Psoriasis
Neurodermatitis
Basal cell carcinoma
Purulent Otorrhea from middle ear disease
Foreign body (children)
Furunculois of ear canal
Previous mastoid or middle ear surgery
Candida (yeast otitis externa)
Uncommon causes:
Herpes zoster oticus
Myringitis bullosa
Malignant otitis externa (pseudomonas infections in diabetes)
Otomycosis (true fungus, not Candida)
Radiation therapy to the cranial area
Squamous cell carcinoma
Old temporal bone trauma or surgery with CSF Otorrhea
Impacted keratosis of ear canal
Rare causes:
Benign and other malignant tumors of canal
Middle ear tumors
Perichondritis
Tuberculosis or other granulomatous disease

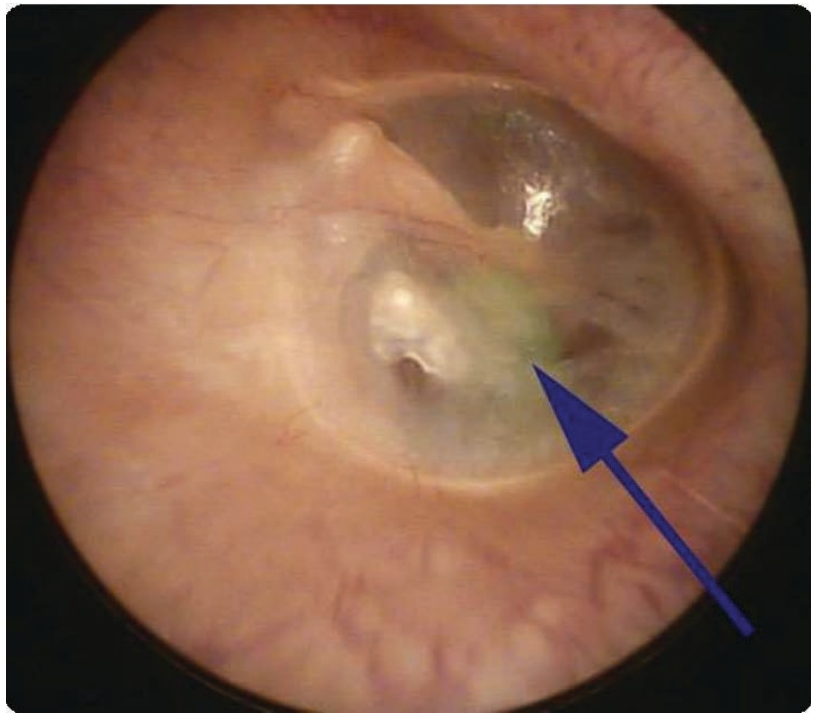
Otalgia

- Primary: ear abnormality source of pain
- Secondary: external abnormality: TMJ, pharyngitis, dental disease, cervical spondylosis, laryngeal cancer, neuralgia
    - **Referred pain pathway corresponds to the nerve supply to the external auditory canal and the middle ear i.e. the trigeminal (V), glossopharyngeal (IX), and vagus (X)**
- 50% otalgia is secondary otalgia, 50% of which comes from dental causes
- Patients who are older than 50, smoke, and drink alcohol or have diabetes are at risk of ear pain that requires further assessment e.g. imaging or ENT assessment (ESR, MRI, fibreoptic nasoendoscopy: risk of tumour
- Squamous cell carcinoma may present as Otitis externa- can be present in the ears discharging intermittently- pain, lymph node swellings etc.
- Inner ear is supplied with VIII nerve, which doesn't have pain fibres so, inner ear pathologies do not cause pain

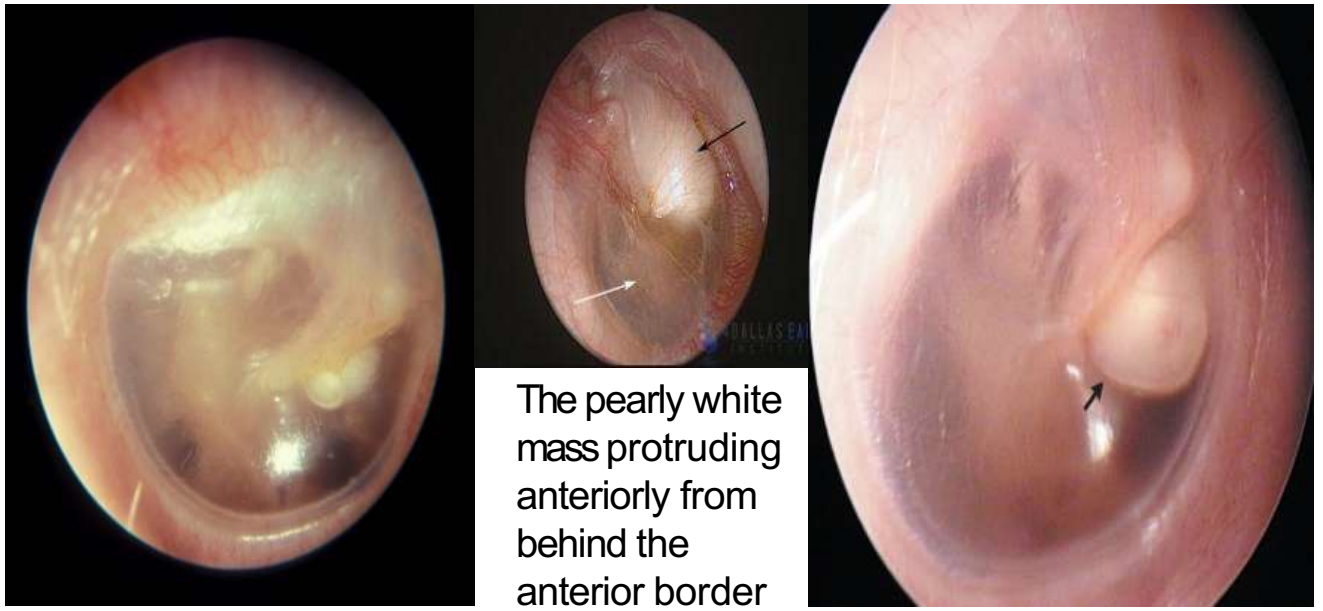


NB: Herpes Infections: vesicles comes about a week after the otalgia starts

What's this?

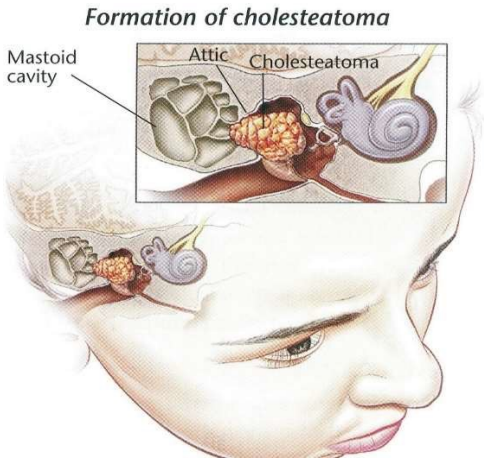


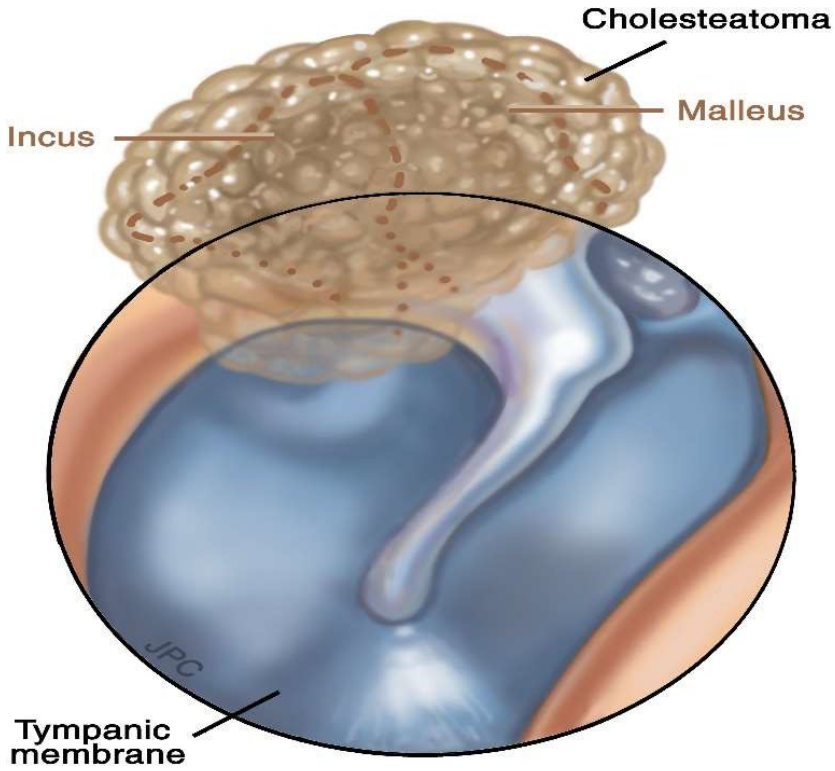
Congenital Cholesteotoma

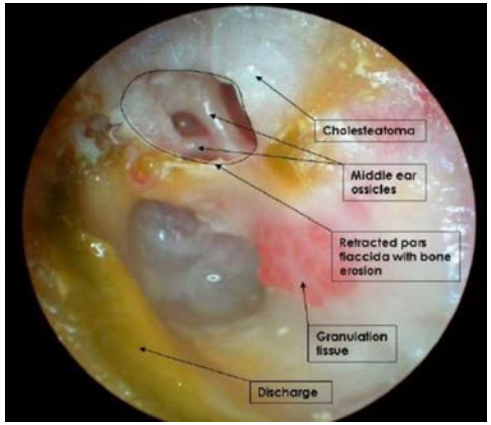


The pearly white mass protruding anteriorly from behind the anterior border of the malleus

Acquired Cholesteotoma

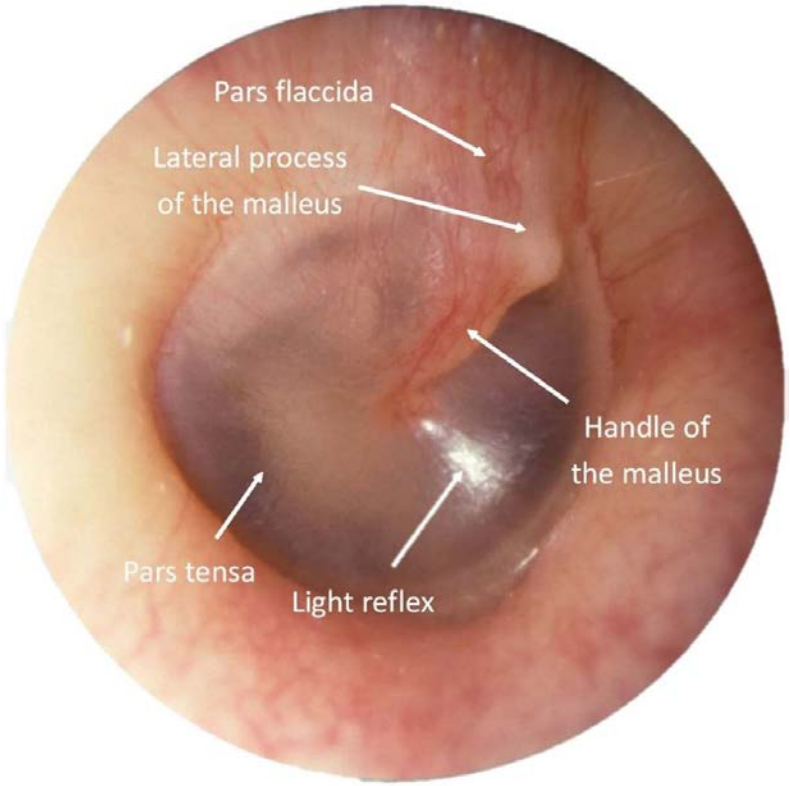

Formation of cholesteatoma
Mastoid cavity
Attic
Cholesteatoma


Cholesteatoma
Malleus
Incus
JPC
Tympanic membrane


Cholesteatoma
Middle ear ossicles
Retracted pars flaccida with bone erosion
Granulation tissue
Discharge

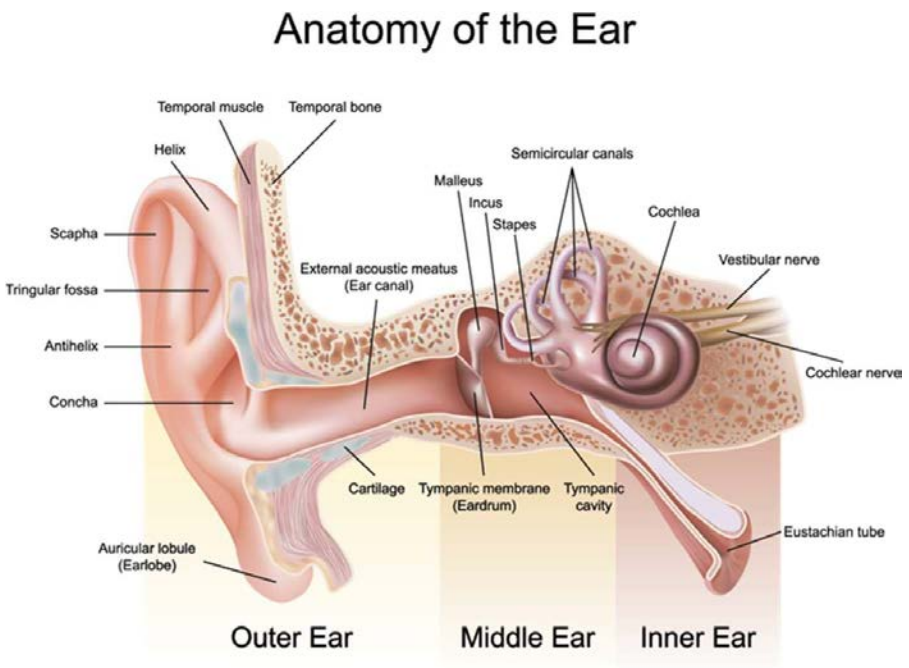
Summary

- External
  - Pinna (shape colour, position, tenderness, haematoma)
  - Mastoid
- Internal
  - The canal (skin spores, foreign body, discharge, debrae, wax)
  - TM(Look ant, post, superior/attic and inferior of malleus
    - colour- opaque, white, red, patches & translucency
  - Retraction (landmarks behind it more visible
  - Perf (safe/ unsafe)
  - Discharge (mucopurulent)
- Behind the eardrum
  - Fluid behind the drum (meniscus, colour, bubbles)
  - Any red bits (glomus tumour, granulations or blood, white- cholesteatoma



Ear Wax

- Ear wax consists of
- -secretions of the ceruminous and
- -sebaceous glands
- The purpose of wax:
- -Repels water
- -Traps dust, debrae and germs
- -Odour discourages insects
- -Antibiotic, antibacterial, antifungal



Earwax

- Earwax is hydrophilic- swells up with water during irrigation
- If the wax is pulled inside the ear so there is no wax at the entrance, the brain compensates by making more wax at the entrance
- Diet (fatty diets), sweating (exercise etc) can facilitate more wax
- People with learning difficulty seem to have more wax- they usually don't have back molars so, lack of TMJ movement may affect the epithelial migration
- Itching: due to increased glandular activity when ear canal is probed: ear calm (2% acetic acid) can treat irritable ears.

Wax Can Indicate Habitat Pollution!

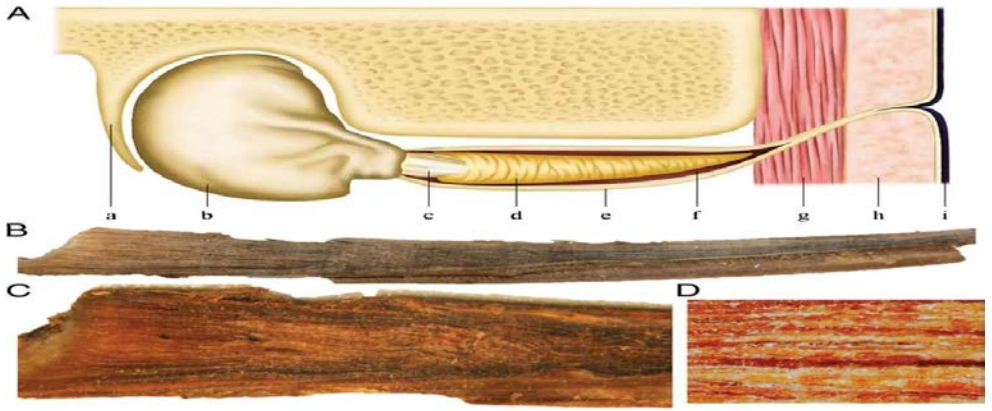
Using the earplug from a single blue whale, Trumble et al, 2013 have been able to demonstrate that:

(i) lipophilic compounds accumulate in cerumen;

(ii) contaminants and hormones that accumulate in the cerumen lamina are chronologically archived;

(iii) trace analysis techniques can be used to measure contaminants and hormones in individual lamina; and

(iv) by combining chemical concentrations from individual lamina, we can reconstruct lifetime profiles for an individual whale (i.e., birth to death).



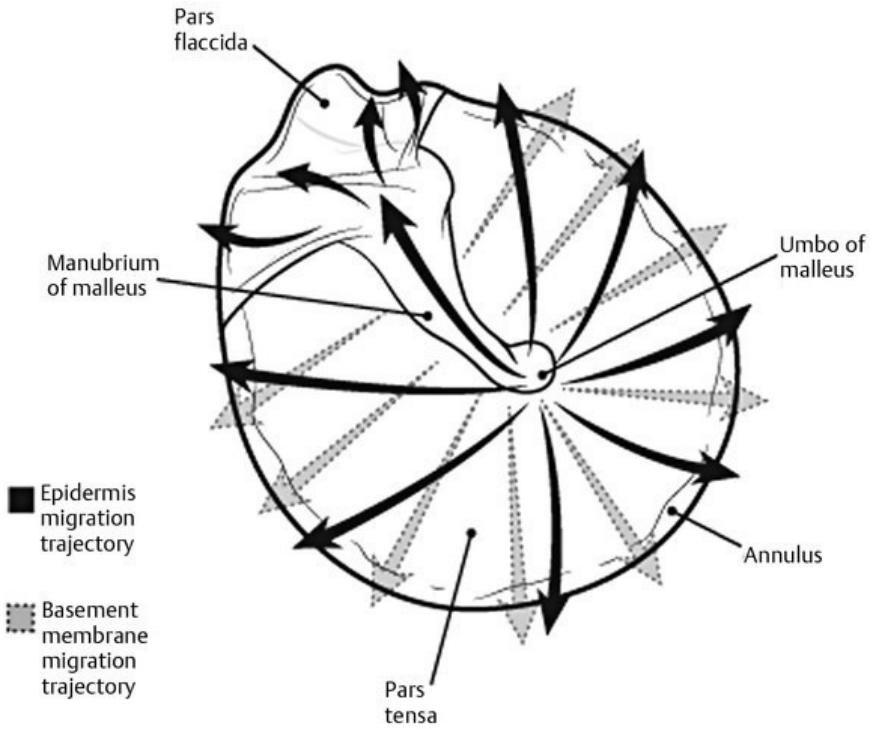
Blue whale earplug reveals lifetime contaminant exposure and hormone profiles

Stephen J. Trumble, Eleanor M. Robinson, Michelle Berman-Kowalewski, Charles W. Potter, and Sascha Usenko

PNAS October 15, 2013 110 (42) 16922-16926; https://doi.org/10.1073/pnas.1311418110

Epithelial Migration

The migration pattern exactly at the umbo is directly up the handle of the malleus before fanning out radially.



After two months

Otol Neurotol. 2011 Apr;32(3):504-7. doi: 10.1097/MAO.0b013e31820d97e2.

Epithelial migration on the external ear canal wall in normal and pathologic ears.

Revadi G[1], Prepageran N, Raman R, Sharizal TA.

Author information

Abstract

HYPOTHESIS: Epithelial migration on the external auditory canal (EAC) wall is abnormal in ears with keratosis obturans (KO).

BACKGROUND: Earlier studies of epithelial migration have focused on the tympanic membrane with scattered information available for epithelial migration on canal walls. This study was undertaken to observe the epithelial migration on the EAC wall in normal ears and in ears with KO.

METHODS: Twenty-five subjects with normal ears and 4 with KO were recruited for the study. Colored ink dots were placed around the tympanic annulus at the 12, 3, 6, and 9 o'clock positions. Migration patterns and the rate of travel of these ink dots were examined and photographed until the ink dots reached the bony cartilaginous junction.

RESULTS: Fifteen healthy subjects and 1 with bilateral KO completed the study. The ink dots migrated laterally, with a rate of migration in normal ears between 42 and 205 μm/d. The mean rates for each quadrant, measured clockwise from the 12 o'clock position, were 104.93, 89.80, 72.67, and 109.93 μm/d, respectively. The pathologic ears exhibited a rate between 88 and 140 μm/d, and at approximately 4 to 12 weeks after ink application, areas of abnormal desquamation were apparent at the inferior quadrant, leading to a halt in the migration of the ink dot once it reached these sites.

CONCLUSION: Epithelial migration occurred in an almost linear pattern in all quadrants, but the speed of migration was relatively slower in the anterior and inferior quadrants of a normal EAC. In the single KO patient, there were areas of normal migration and areas of abnormal keratin resurfacing at the inferior quadrant, which interfered with the migration of ink dots.

Otol Neurotol. 2015 Feb;36(2):318-22. doi: 10.1097/MAO.0000000000000378.

Study of epithelial migration in the tympanic membrane and bony external auditory canal wall in patients with irradiated nasopharyngeal carcinoma.

Santhi K[1], Pre12ageran N, TanqJE, Raman R

® Author information

Abstract

OBJECTIVE: The objectives of this study were to determine the presence of epithelial migration in patients with postirradiated nasopharyngeal carcinoma (NPC) and to compare the rate of epithelial migration in the tympanic membrane (TM) and the bony external auditory canal (EAC) of postirradiated NPC ears with normal ears by means of the ink dot method.

STUDY DESIGN: Prospective, nonrandomized case-control study involving patients with NPC and control subjects with healthy ears seen in an otorhinolaryngology outpatient clinic.

SETTING: Otorhinolaryngology Outpatient Clinic, University Malaya Medical Centre, Kuala Lumpur.

PATIENTS: Patients with NPC who have completed radiotherapy and patients with normal ear presenting with other complaints.

INTERVENTION: Patients who fulfilled the inclusion and exclusion criteria were chosen for this study. All the selected patients' ears were visualized under a microscope and were cleaned, and ink dots were applied at the umbo and annulus. They were followed up on a 2- to 3-weekly basis until the ink dots reached the specified landmarks. The distance and pattern of migration were recorded and calculated. The mean radiation dose received by both the right and left TM and EAC was mapped and calculated.

MAIN OUTCOME MEASURES: Rate and pattern of epithelial migration in the NPC group compared with that in the control group.

RESULTS: The mean radiation dose to both the TM and EAC did not show a significant difference ($p > 0.05$). The entire TM study group showed epithelial migration from the umbo toward the annulus and EAC, except in 1 ear. The mean rate of epithelial migration on the TM of the study group was 51.35 μmid compared with that on the control group, which was 64.68 μmid, and this difference was statistically significant ($p < 0.05$). Of the ears in the control group, 42.5% showed a migration pattern toward the posterior-superior direction, whereas 45% of the ears in the study group showed a migration pattern toward the posterior-inferior direction. In the EAC of the study group, the mean epithelial migration was noted to be accelerated compared to that of the control group (144.75 and 94.33 μmid, respectively; $p < 0.05$). The mean rate of migration between the TM and the EAC was also different. Both the study and control groups showed a significant difference in

Top 5 reasons why Not to use cotton buds

1. Cotton buds can cause the wax to be pushed further inside, even when you are careful. This makes the ear more waxy, not less

2. Cotton buds can cause blunt trauma in the ear, which can cause infection and pain.

3. Cotton buds might help remove a protective layer of protein from the ear canal, making the skin more sensitive to wind etc as you grow older

4. Cotton buds may help introducing germs into the ear as they have surface bacteria and other harmful germs, which get introduced in the ear

5. Cotton is a good absorber of water and oil. It removes the natural moisture from the ear canal, making it dry, itchy and even more waxy.

The safety and effectiveness of different methods of earwax removal: a systematic review and economic evaluation

Health Technology Assessment 2010; Vol. 14: No. 28

http://eprints.soton.ac.uk/153113/1/mon1428.pdf

AJ Clegg, E Loveman, E Gospodarevskaya, P Harris, A Bird, J Bryant, DA Scott, P Davidson, P Little and R Coppin

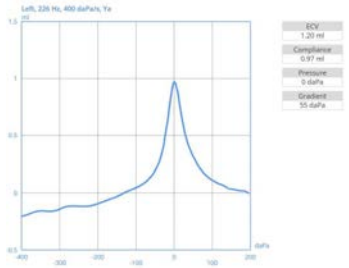
June 2010
10.3310/hta14280

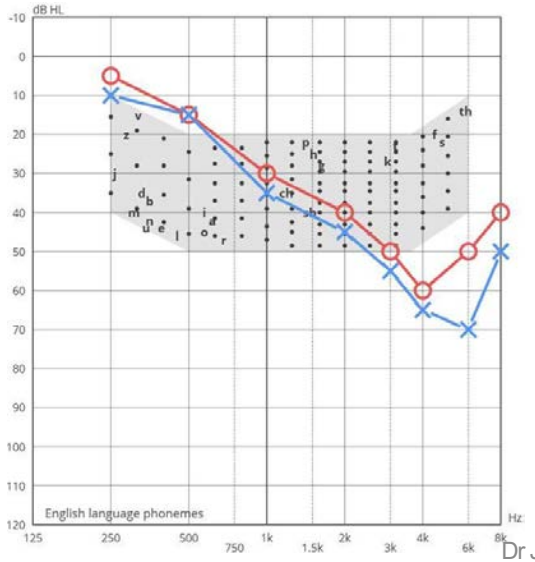
Health Technology Assessment
NIHR HTA programme
www.hta.ac.uk

HTA

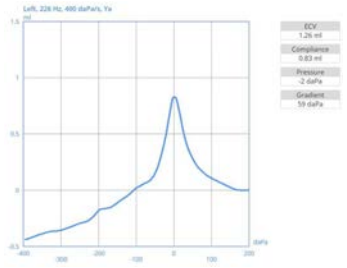
Hearing Loss Caused by Olive Oil

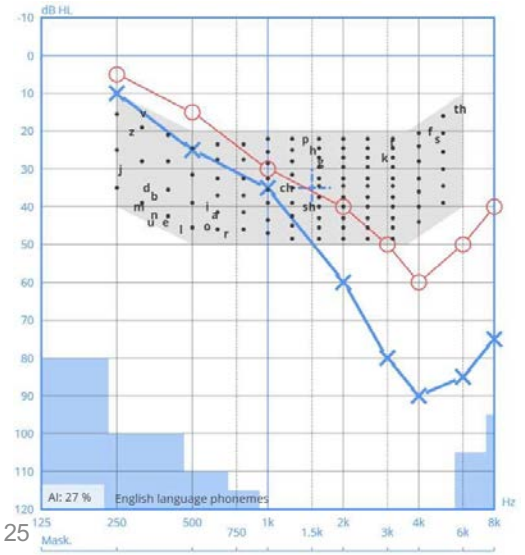
After



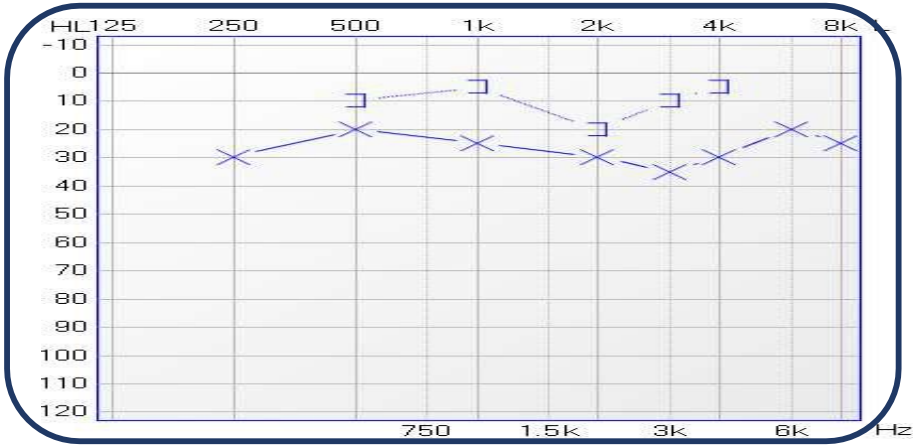


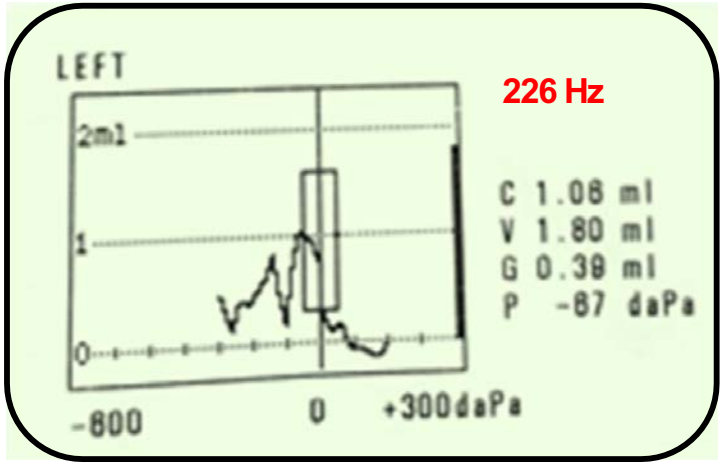
Before





26 yo with earwax: Tympanogram on 226 Hz

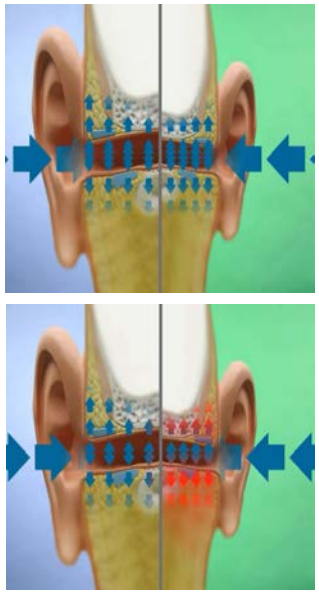


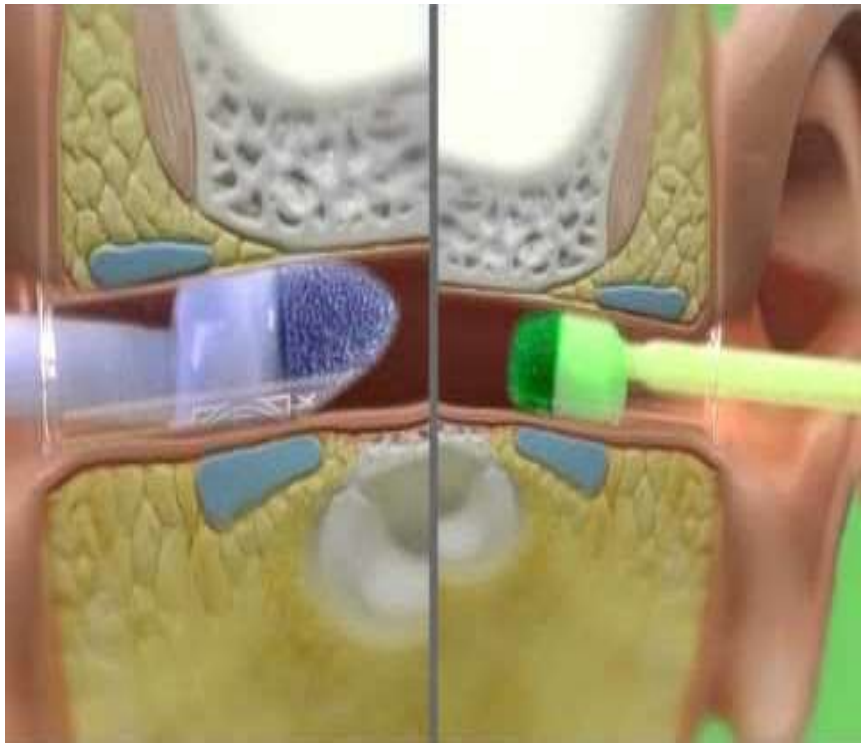


- Bifid tympanograms are abnormal in anybody above few months of age with 226 Hz.
- Tall and narrow double peak like this, indicates loading of the eardrum/ossicular chain with abnormal tissue (Roeser et al, 2000).

Detax video: https://www.youtube.com/watch?v=pH78DDnFKWc

Impression: Earcanal of an Adult and a Child





Advanced Ear Examination for Clinical Decision Making

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