



# EAR IRRIGATION

*[Most] Everything you need to  
know to do it safely.*

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4 April 2019 | APNA National Conference  
Adelaide, South Australia

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## Outline

- ☐ Purpose
- ☐ Clinical Governance
- ☐ History and Examination
- ☐ Differential Diagnosis
- ☐ Approaches to Management
- ☐ Procedure
- ☐ Red Flags and When to Refer

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# Why is this Needed?

- Cerumen impaction is common
- Supplements APNA Module
- Not usually a part of our basic training
- Feedback: **Nurse-led clinics**
- Concerns over scope of practice
  - Uncertainty RE: NMBA expectations
  - NOT a replacement for VET 10630NAT
    - ? Appropriate *level* of education

Ear syringing is a **skill** that almost anyone can learn.  
**Knowledge** informing that skill is key to safely, effectively and efficiently performing it.



## Litigation



### Procedural Claims

Up to 19% of general practice procedural claims.  
 (Price, 1997)



### Poor Technique

Of those claims, most were due to poor technique;



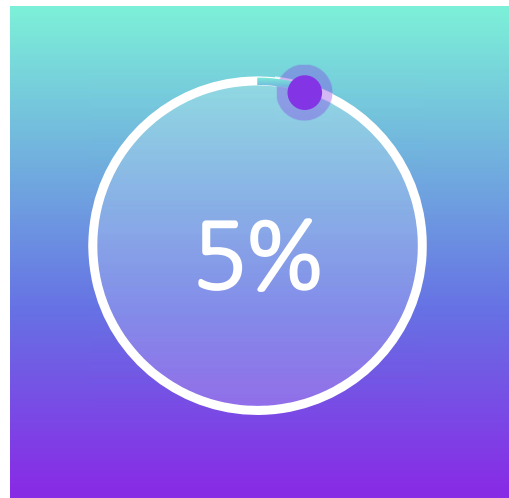
### Faulty Equipment

Was the second most common cause of claims; and



### Excessive Pressure

Was also the second most common cause of claims.  
 (Bird, 2008)



#### Failure to Exam

A small proportion were because no one bothered to look in the ear. (Bird, 2008)

Not a scope of practice thing.  
Simply a **negligence** thing.

## Complications...

- Failure to remove;
- Otitis externa;
- Perforation of eardrum;
- Damage to external auditory canal;
- Pain, vertigo and otitis media. (Bird, 2008)
- "Minor" complications are approximately 1:1000
  - e.g. Perforation, Laceration, Infection, Hearing Loss
- "Major" complications are approximately 1:10,000
  - e.g. Malignant Otitis Externa



## Malignant External Otitis

(Ford & Courteney-Harris, 1990)



Image: Osguthorpe & Nielsen, 2006

- Risk: Diabetics (90%), actively immunocompromised +/- age 60
- Pain+++Temp+++
- Pus draining from ear (Pseudomonas > Staph)
- Necrotic ear canal
- Osteomyelitis of the canal and likely mastoid
- Auricular swelling
- Chondritis: Loss of cartilage structure
- Erysipelas

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## Erysipelas



Image: Menner, 2000

- Superficial form of cellulitis
- Affects upper dermis into the superficial cutaneous lymphatics
- "St Anthony's Fire"

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## So what?

- There are few clinicians out there that cause *harm* because of negligence (5%)
- Most harm: *lack of clinical governance* and *individuals practicing outside their scope of practice* (95%)
  - Poor Technique
  - Faulty Equipment
  - Excessive Pressure
- This presentation is about **clinical governance** and supporting **scope of practice** through education.

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## Scope of Practice

- Knowledge + skills + experiences = ability
- Professional vs.
- Jurisdictional vs.
- Organisational vs.
- Individual

[Your] scope of practice may change over time. If a [nurse] decides to expand or change their scope of practice to meet the needs of their client group, then [you] will need to complete further **postgraduate education** and **skill development** to meet those needs.

(NMBA, 2016)

## Clinical Governance

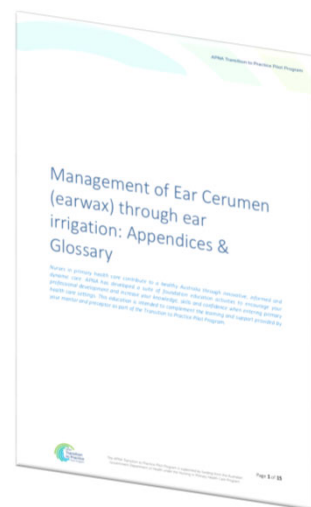
- Describes a **systematic approach to maintaining and improving the quality of patient care** within a clinical care setting, health program or health system. (DOH, 2012)
- Important to discuss:
  - Public protection
  - Evidence-informed practitioners
  - Term has been **relatively absent** from the nursing literature

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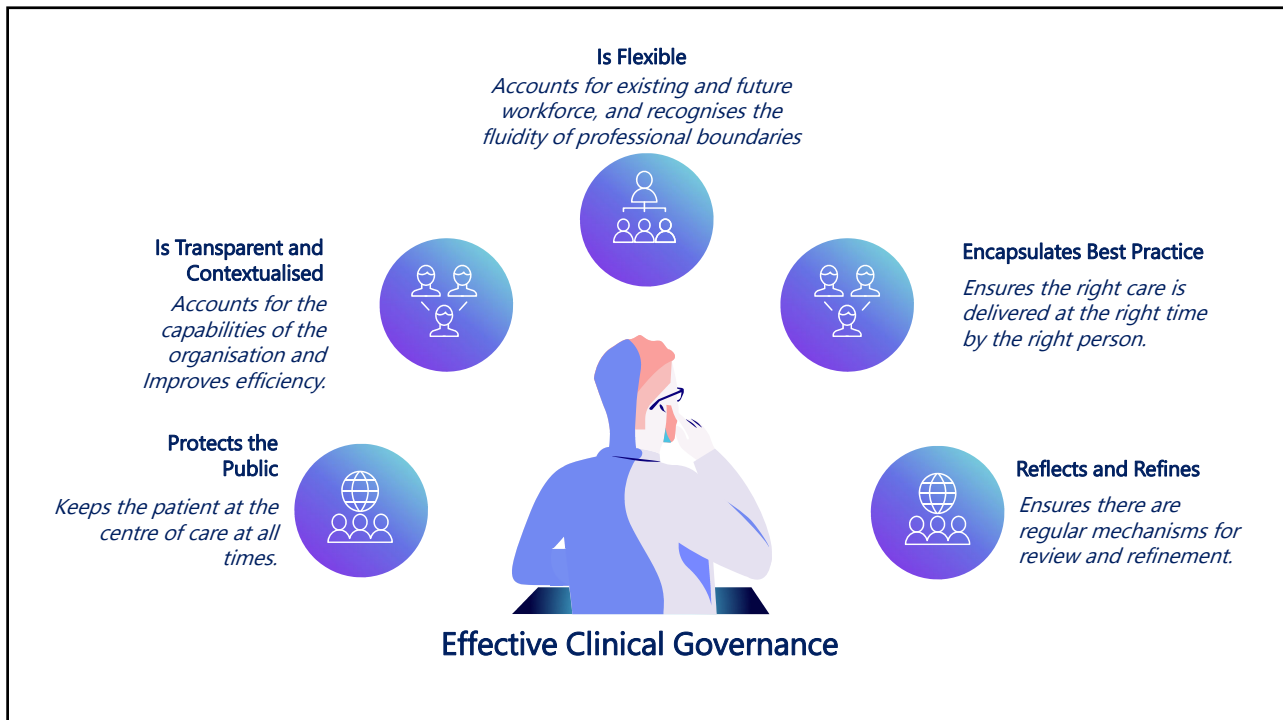
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## Requirement: Policies and Procedures

- Need not be onerous and exhaustive, but encompassing
  - Parameters for practice (e.g. accreditation, populations, etc.)
  - Informed consent and patient checklists
  - Equipment and maintenance
  - Mechanisms for review and quality assurance
  - Risk management
  - **Documentation**
  - **Care escalation**



APNA : Management of Ear Cerumen



## Documentation (Hayter, 2006)

A laptop computer is shown with its screen displaying a row of colorful folders (yellow, orange, red, green, blue, purple) that appear to be floating or emerging from the screen. The laptop is silver and has a black keyboard. The entire illustration is set against a white background.

- Indications for ear irrigation
- Assessment for contraindications or cautions
- Unusual findings
- Irrigation characteristics
- Cerumen quantity and character
- Pre-post observation of ear/TM
- Symptoms reported
- Whether **referral** was required

# Next Up: Developing Your Scope of Practice

*Anatomy and Physiology*

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## Anatomy: Inspection

*Don't be freaked out if you  
notice your neighbor looking  
at your ear.*

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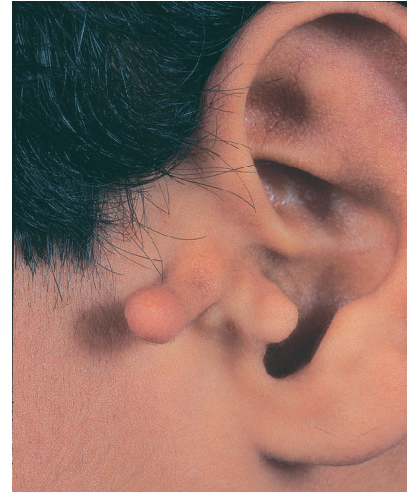
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Image: healthlifemedica.com, 2019

*Darwin's Tubercle*

## Common Variants

*Duplication of lobule**Hillocks (Pre-auricular tubercle)*

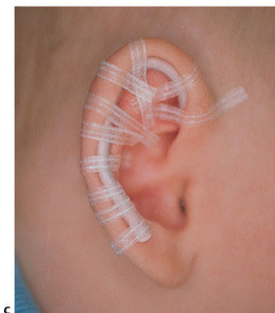
Images: Color Atlas of ENT Diagnosis, 2009

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## Prominent Ears

- Important to note within 6 months of life
- Splinting highly successful, but not after 12 months
- Otherwise, consider correcting before school (4-6 years)



Images: Color Atlas of ENT Diagnosis, 2009

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## Pre-auricular Sinuses



Images: Color Atlas of ENT Diagnosis, 2009

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## Pathology: What is it?

Keloid after ear piercing



Melanoma



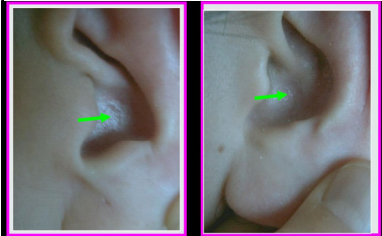
Basal Cell Carcinoma



Images: Sand, Brors, Altmeyer, Mann & Bechara, 2008

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# Pseudoscience vs Real Science *Just for fun...*



Rheumatic Heart Disease



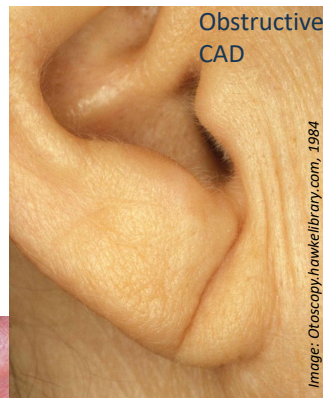
Hemorrhoid

Images: eardrums.us, 2011



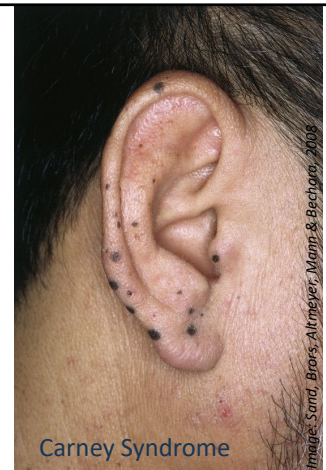
Gouty Tophi

Image: Color Atlas of ENT Diagnosis, 2009



Obstructive CAD

Image: Otoscopy.hawkebury.com, 1984



Carney Syndrome

Image: Sand, Brans, Altmeyer, Mann & Bechara, 2008

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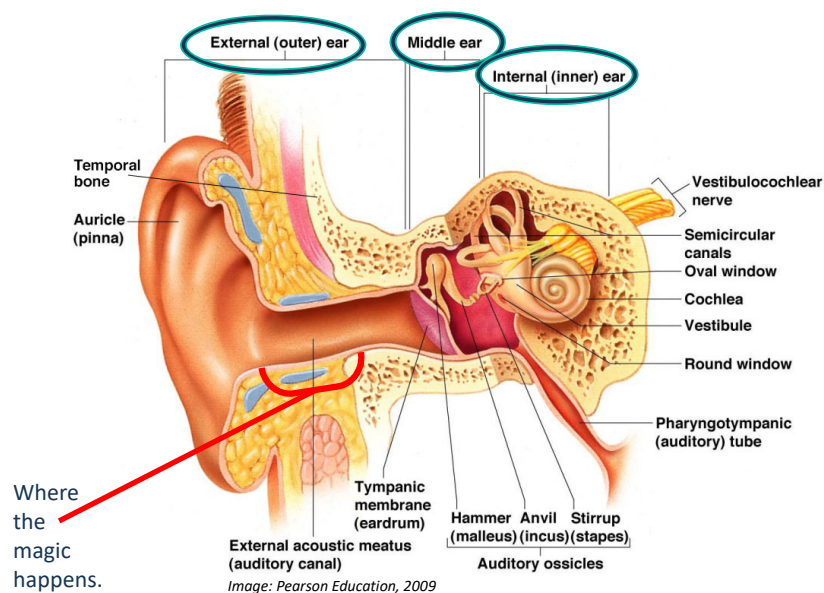
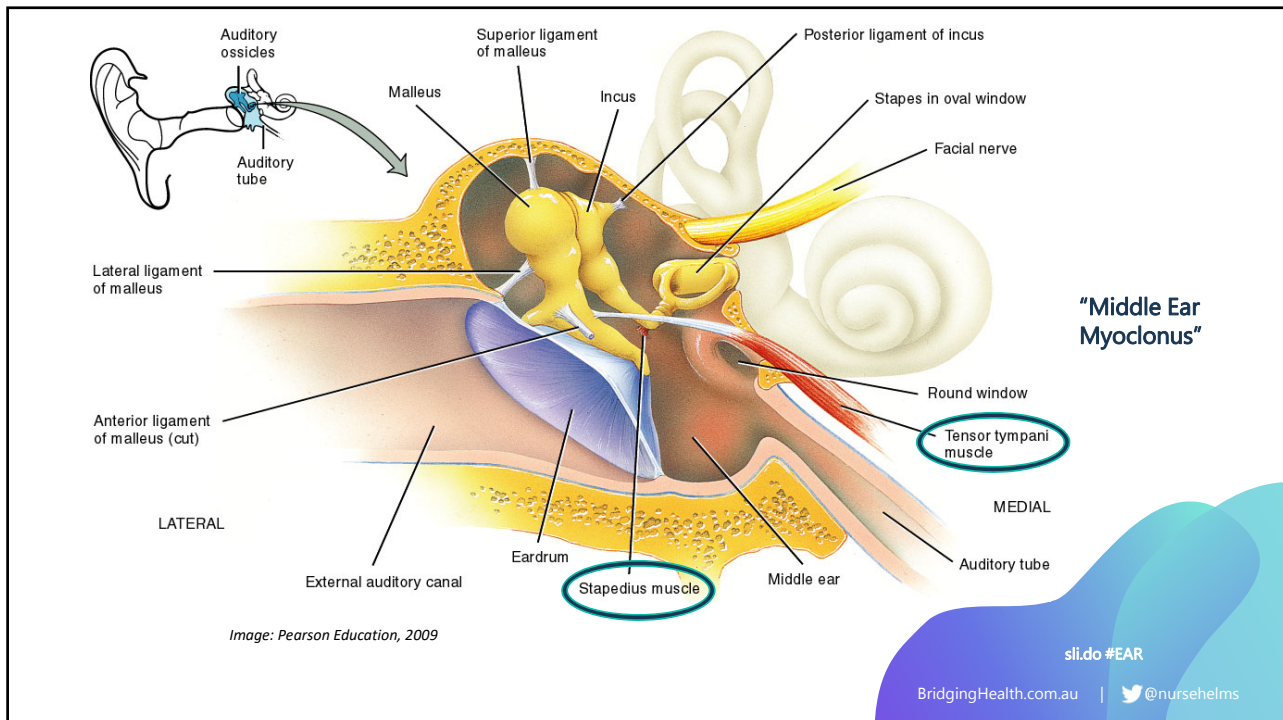


Image: Pearson Education, 2009

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## Epithelial Skin of External Auditory Canal

- Does not **normally** desquamate
- Canal about 2.5-3cm long in the adult
- **Migrates** from centre of TM outwards
- 2mm/month migration aided by **talking and chewing**
- 6-12 weeks to reach the orifice of the canal

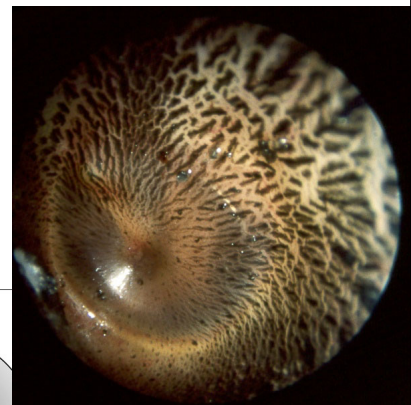


Image: Otoscopy.hawkelibrary.com, 1984

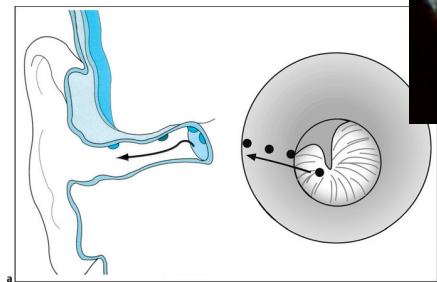


Image: Color Atlas of ENT Diagnosis, 2009

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# Otoscopy Equipment



Image: Heine, 2019



Specula  
Large  
and  
Small

Images: Welch Allyn, 2019



Insufflation  
Tube: OM

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## Otoscopy

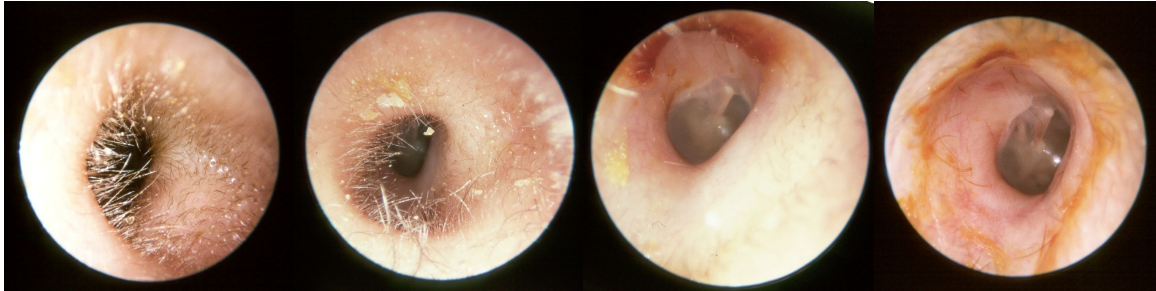


MONASH University

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## Normal Anatomy: Entering the Ear



Just in...

A little closer...

What most of  
us see.

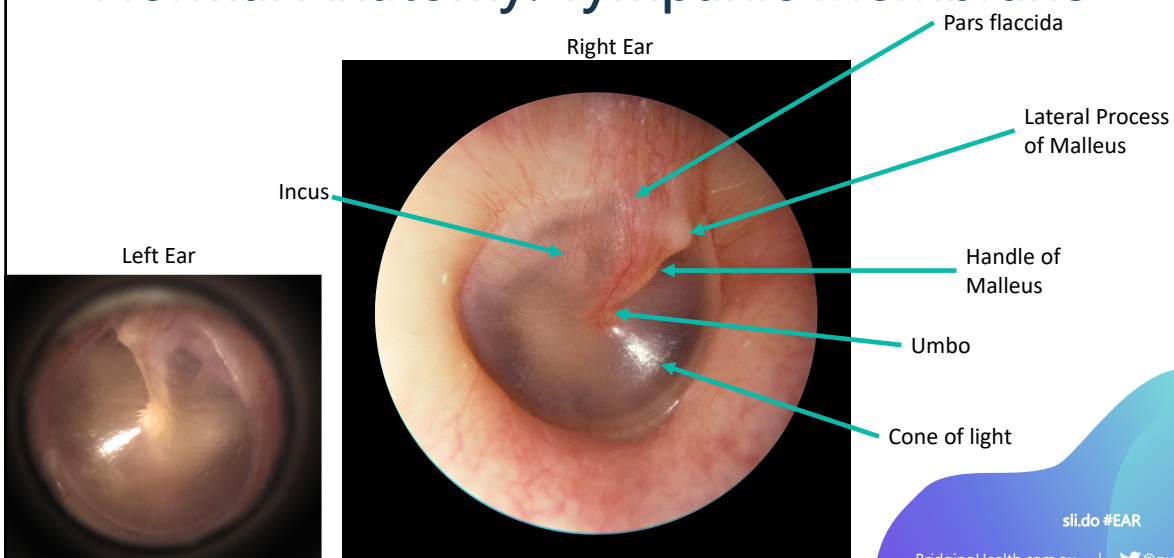
If the patient  
tolerates.

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Images: Otoscopy.hawkelibrary.com, 1984

## Normal Anatomy: Tympanic Membrane



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Images: Geekymedics.com, 2019

## Smallest Bone in the Body: The Stapes



Image: Color Atlas of ENT Diagnosis, 2009

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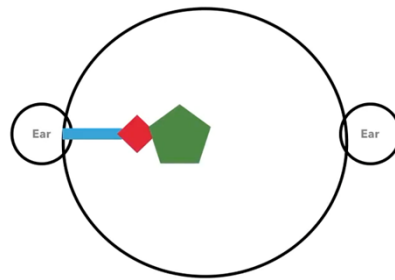
## Next Up: Developing Your Scope of Practice

*Ear Screening*

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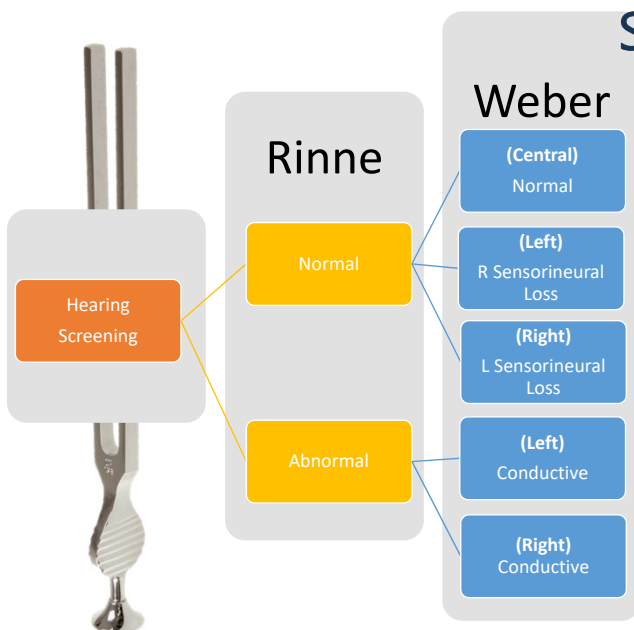
## Hearing Loss: Rinne and Weber



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## Screening for Hearing Loss



- Use a 512Hz fork
- Conductive (Outer or Middle Ear)
  - Cerumen Impaction
  - Otitis Media
  - TM Rupture
  - Ossification
- Sensorineural (Inner Ear)
  - Presbycusis
  - Space occupying lesion
- 1<sup>st</sup> Rinne (Conductive)
  - Normal if **air** louder than **bone**
- 2<sup>nd</sup> Weber (Sensorineural)
  - Abnormal if **lateralises**
- Mixed can exist.

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## Brief Intro to Audiometry

- Pure tone testing of frequencies from 500 to 4000 Hz (**low to high pitch**)
- Normal hearing **intensity**
  - Less than 25-30dB Adult
  - Less than 15-20dB Children
- **Screening** or threshold search 5 years and up
- QUIET ENVIRONMENT
- Start at 1000 Hz (easiest to hear)
  - 1000,2000,3000,4000,8000,1000,500, 250Hz
- Greater than 40 dB stimulates the other ear (masking)
- Recording
  - **Right Circle**
  - **Left X**

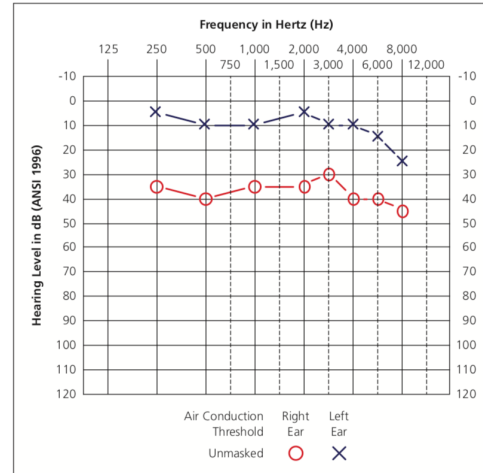


Image: AFP, 2013

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## Screening for Middle Ear Disease

- Extremely useful for Otitis Media with Effusion
- Can be used to establish patency of tubes
- Don't use age <7 months

Basic Pneumatic Otoscopy  
(Advanced/Best)



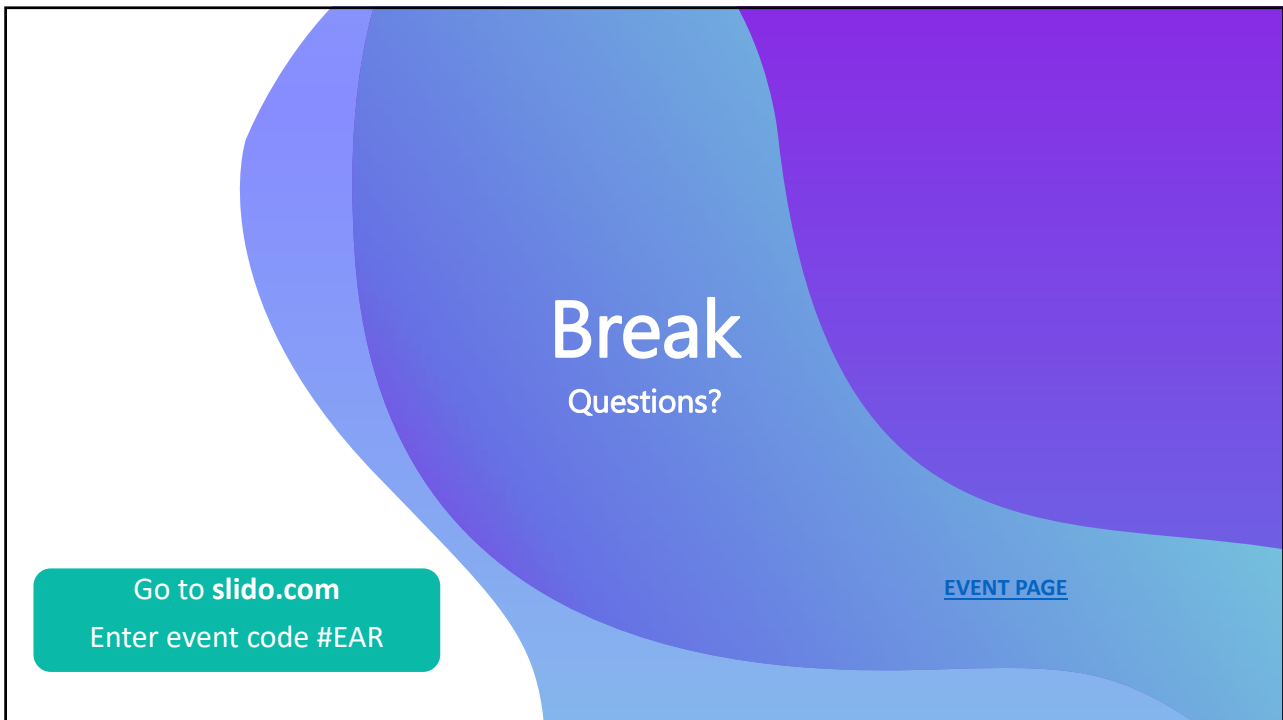
Tympanometry  
(Novice/Adjunctive)

### Information from Tympanometry

1. Type A: Normal (Peaked, Normal Volume)
2. Type B: AOM/OME (Flat, Low Volume)
3. Type B: Patent Passage (Flat, High Volume)
4. Type C: Eustachian Tube Dysfunction (Peaked, Negative)

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A presentation slide with a background of overlapping blue and purple organic shapes. The text 'Break' is in large white font, with 'Questions?' below it in a smaller white font. In the bottom left, a teal rounded rectangle contains the text 'Go to slido.com' and 'Enter event code #EAR'. In the bottom right, the text 'EVENT PAGE' is in blue and underlined.

# Break

Questions?

Go to **slido.com**  
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A presentation slide with a background of overlapping blue and purple organic shapes. The text 'Next Up: Developing Your Scope of Practice' is in large dark blue font. Below it, 'Pathology' is in a smaller, italicized dark blue font. In the bottom left, there is a teal rounded rectangle containing the text 'sli.do #EAR', 'BridgingHealth.com.au', and a Twitter icon followed by '@nursehelms'. The bottom right of the slide is partially obscured by the teal shape.

## Next Up: Developing Your Scope of Practice

*Pathology*

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## The Wonderful World of Earwax

*The **colour** and **smell** of your cerumen is partly determined by your ethnicity.*

(Prokop-Prigge, Thaler, Wysocki & Preti, 2014)

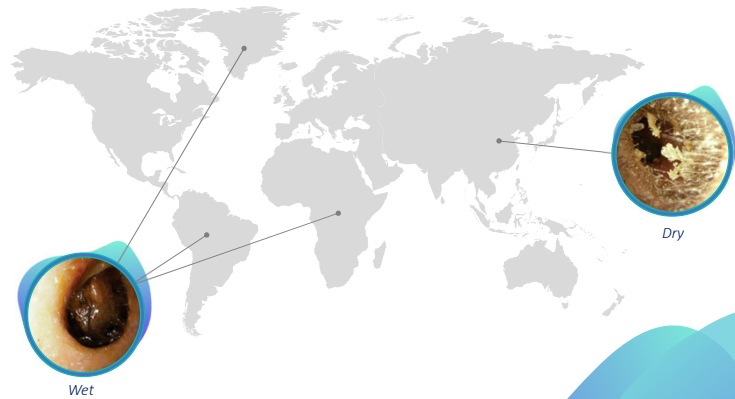
### Apocrine Glands are Responsible

Cerumen and underarm odor produced by East Asians differ markedly from non-Asians.

Becomes darker as it oxidises (Zivic & King, 1993)

Cerumen colour in East Asians is typically **dry and white**, whereas in non-Asians is typically **wet and yellowish-brown**. (Møller & Miller, 2012)

An emerging field of research is looking at how earwax correlates to systemic diseases, such as tumours and metabolic diseases! (Shokry & Filho, 2017)

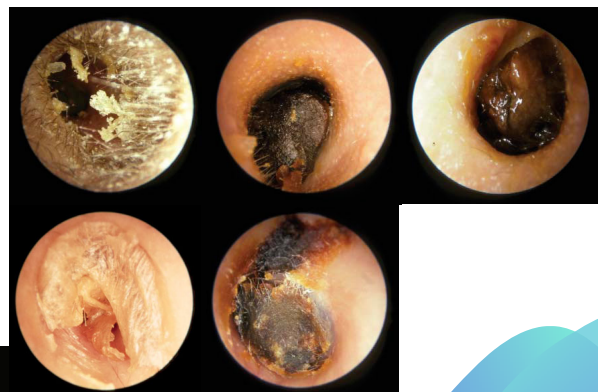


Images: Epocrates.com, 2019

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## Cerumen: It Does a Body Good!-ish

- Protects and moisturises the external canal
- Low pH → Discourages microbial growth
- Traps and slowly removes foreign material
- Glands atrophy with age → Drier and migrates slower



Images: Epocrates.com, 2019

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...Except when it does bad things:



***Keratosis obturans:***

1. NON-migratory epithelium (desquamation)
2. White keratin plug
3. Hard
4. Adherent to wall → hyperaemia
5. PAIN with removal
6. ENT Referral.

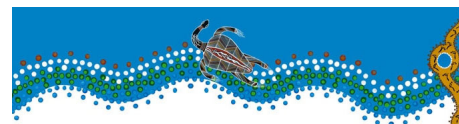
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Image: Otoscopy.hawkeiibrary.com, 1984

## Common Pathology

- Tympanosclerosis
- Exostoses
- Osteomas
- Foreign Bodies
- Otitis Externa
- Otitis Media with Effusion



PRIORITY 1

**PUS FREE FROM BIRTH TO THREE**

Excellent resource for Closing the Gap:  
Deadly Ears QLD

- Acute Otitis Media
- Acute Otitis Media with Perforation
- Chronic Suppurative Otitis Media
- Dry Perforations
- Grommets

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## Tympanosclerosis

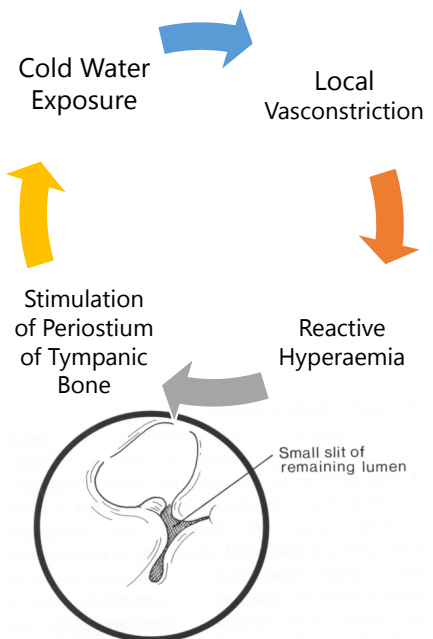
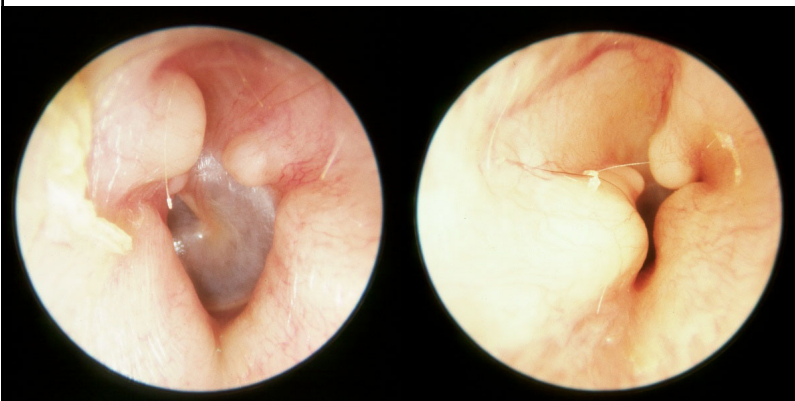


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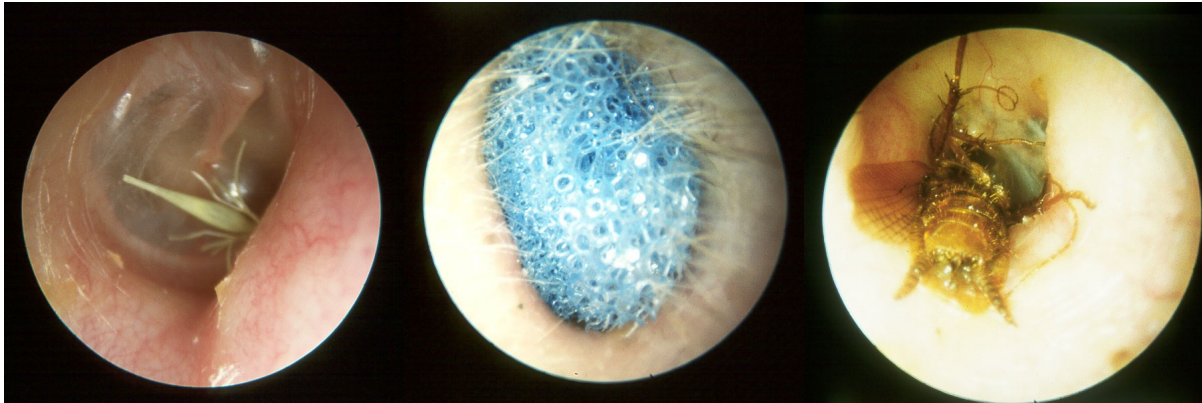
## Exostoses

1. Benign
2. Bilateral
3. Males > Females
4. If grow large enough, can cause \_\_\_\_\_ hearing loss
5. Differ from **osteomas** → solitary, unilateral



Images: Otoscopy.hawkelibrary.com, 1984

## Foreign Bodies: How to Remove?



**Irrigation**

**CAUTION:** Swelling from vegetable/plant material!

**Alligator Forceps**

**Mineral/Olive Oil**

Images: Otoscopy.hawkelibrary.com, 1984

## Otitis Externa

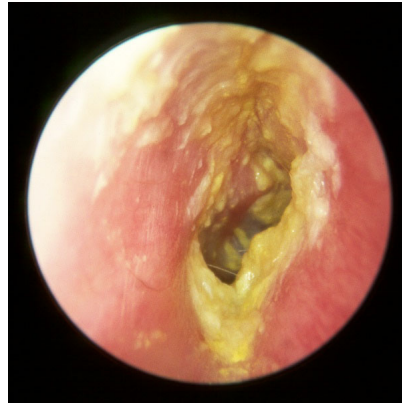


**Diffuse Swelling**

- Pain with manipulation of pinnae, blocked feeling, draining, itching and hearing loss

Images: Otoscopy.hawkelibrary.com, 1984

## Otitis Externa



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Images: Color Atlas of ENT Diagnosis, 2009

## Acute Otitis Media vs OM with Effusion



Acute Otitis Media

Otitis Media with Effusion

Normal  
"Pearly grey"

Images: Medicine.uiowa.edu, 2017

## OM with Effusion vs. AOM +/- Perforation



*Images: Otoloscopy.hawkelibrary.com, 1984*

## AOM with Perforations



Grommet with AOM

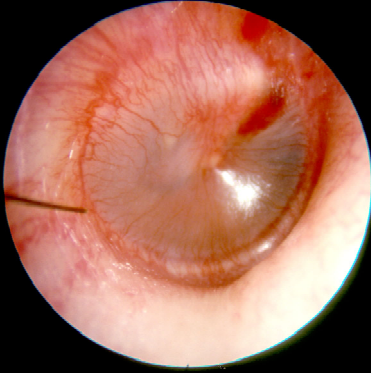
Anterior Marginal  
(Unsafe) Perforation

20% Central Anterior  
Perforation

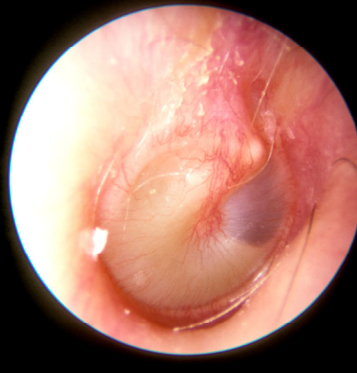
*Images: Otoloscopy.hawkelibrary.com, 1984*



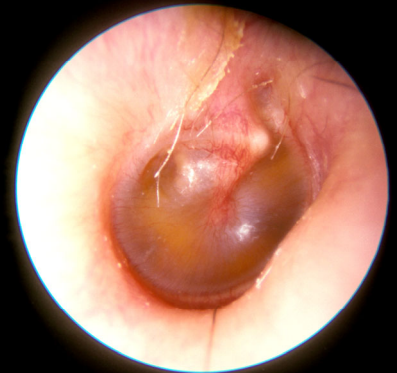
## Stages



Early AOM - Redness

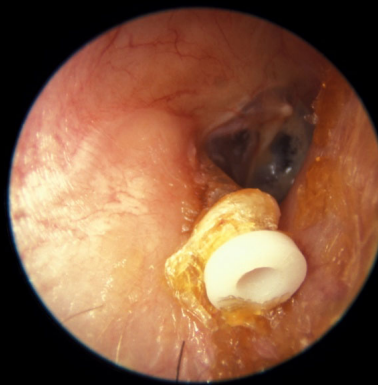
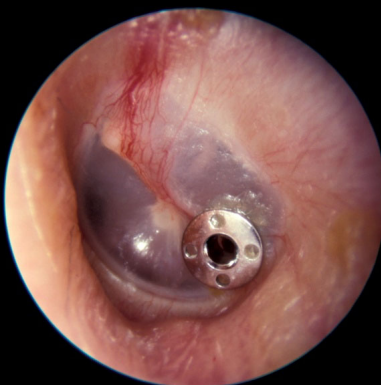


Early AOM – Purulence and Bulging - Pain



Otitis Media with Effusion - Painless

## Grommets

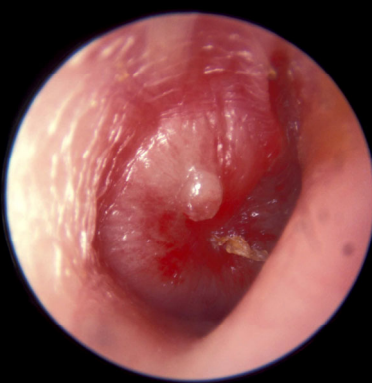


Images: Otoloscopy.hawkelibrary.com, 1984

## Barotrauma



## Which is it?



Herniated TM –  
Prerule State



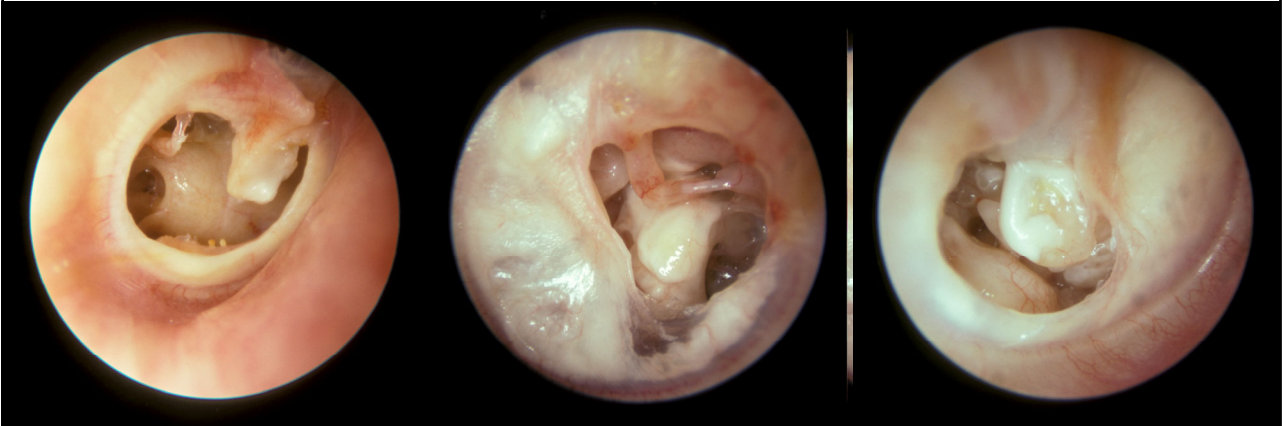
Air/Pus Level AOM



AOM

Images: Otoscopy.hawkelibrary.com, 1984

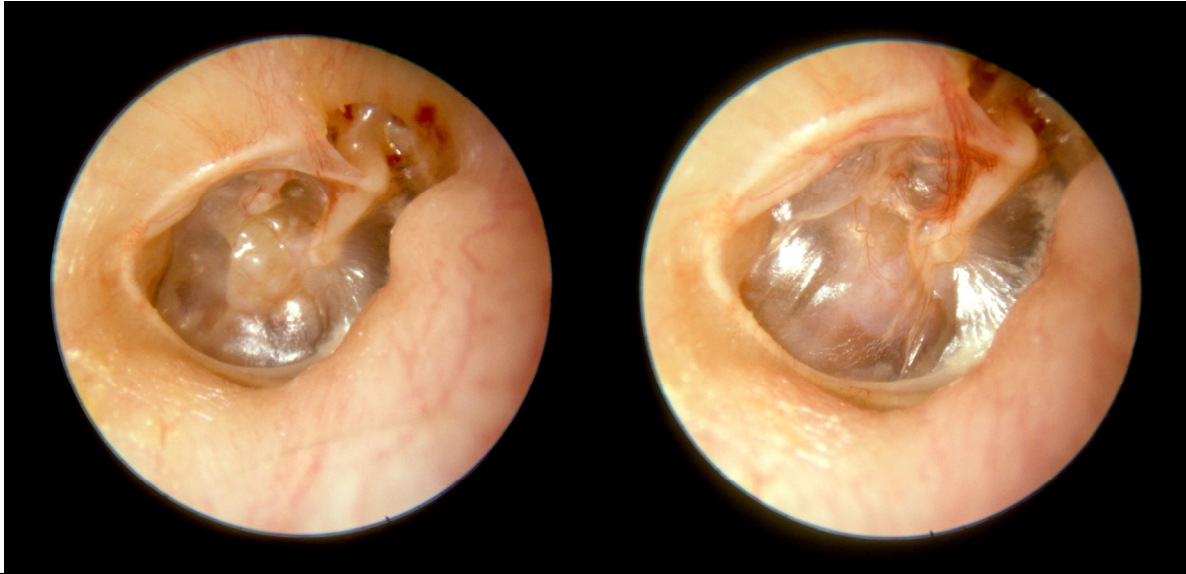
## Dry Perforations



## Retraction Pockets (Atelectasis)



## Atelectasis Before/After Valsalva



## Others

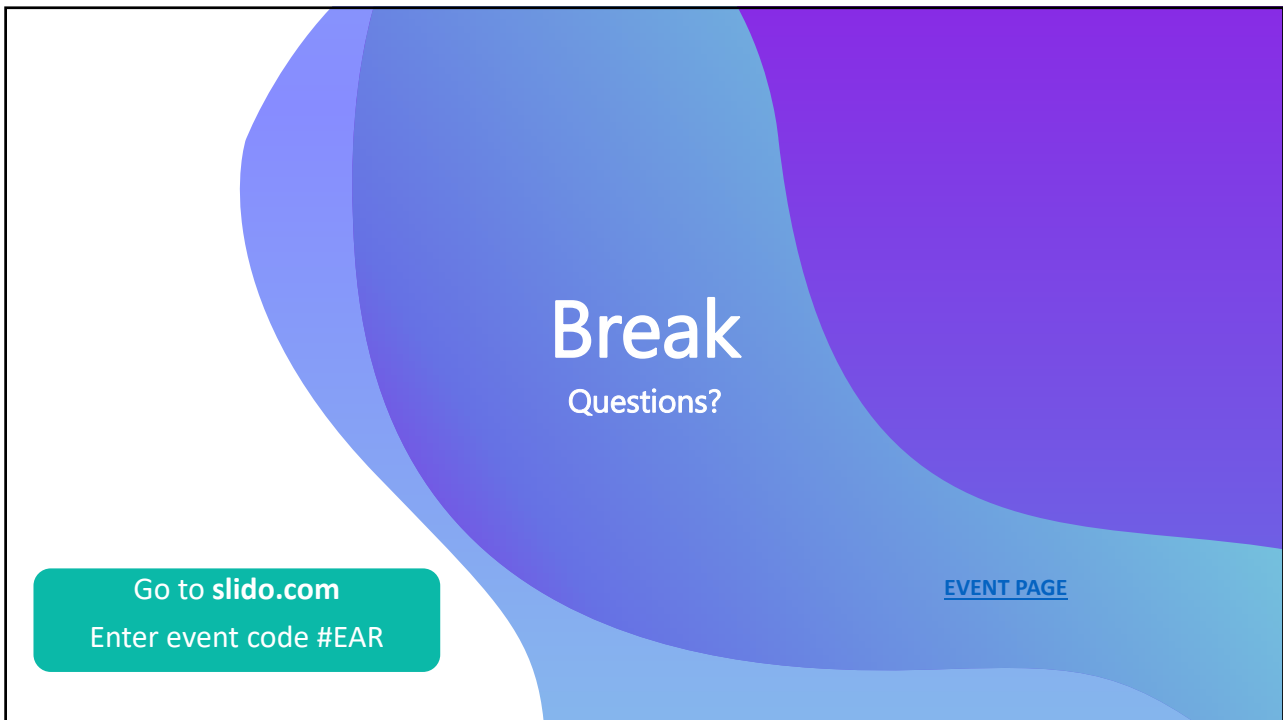


Dried Blood

Keratinisation  
– More  
pronounced  
when wet!

Cholesteatoma  
– Behind TM



A presentation slide with a white background on the left and a blue/purple abstract graphic on the right. The text 'Break Questions?' is centered in the white area. A green button on the left contains the text 'Go to slido.com' and 'Enter event code #EAR'. A blue link 'EVENT PAGE' is on the right.

# Break

Questions?

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A presentation slide with a white background on the left and a blue/purple abstract graphic on the right. The text 'Next Up: Developing Your Scope of Practice' is in the white area, followed by 'Cerumen Removal' in italics. At the bottom left, there is a link to 'slido.com', the website 'BridgingHealth.com.au', and a Twitter handle '@nursehelms'.

## Next Up: Developing Your Scope of Practice

*Cerumen Removal*

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## Risk Factors for Impacted Cerumen

(Roland, Smith, Schwartz, Rosenfeld, Ballachanda...Wetmore, 2008)

- 1:10 children & 1:20 adults
- Hearing aids
- Occupations with high exposure to dust and debris → chicken or egg as ear plugs stimulate cerumen production
- Older persons (65% of those aged >65, 57% NH residents)
- Developmentally delayed/disabled (36%)

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## Reasons for Removal

- Symptoms:
  - Conductive hearing loss
  - Cough
  - Tinnitus
  - Dizziness
  - Fullness
  - Itchiness
  - Mild pain
  - Discharge +/- odor
- Audiology appointment
- Unable to examine

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## Ear Candling

Although it appears to be highly relaxing  
(with a bonfire being lit near your ear)

...

It's **ineffective and potentially harmful.**

(Because there's a fire dripping hot wax into your ear. and it doesn't actually remove anything but the wax from the candle itself.)

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## Removal: Cotton Swabs

WARNING: DO NOT INSERT INTO  
EAR CANAL. IF USED TO CLEAN  
EARS, STROKE SWAB GENTLY  
AROUND THE OUTER SURFACE OF  
THE EAR ONLY.

Expert opinion recommends  
against the use of swabs to  
remove cerumen, although the  
evidence against this is sparse.

(Roland, Smith, Schwartz, Rosenfeld, Ballachanda...Wetmore,  
2008)



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## Cerumenolytics Alone (Aaron, Cooper, Warner & Burton, 2018)

- Cochran Review of 10 studies looking at oil-based (e.g. olive or almond), water-based (e.g. docusate, 3% hydrogen peroxide) saline or plain water, and no treatment
- Risk of doing nothing (1:20) vs risks with drops (1:5)
- Using any cerumenolytic is better than nothing
- Suggestion of **minimum of 5 days'** therapy
- Seem to work better in children

Options from my experience

3% Hydrogen Peroxide 1-2ml/ear

2-3 gtts BD Olive Oil (filtered and unflavoured)

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## Techniques that have been tried over the past 100+ years...

Pay close attention...



NOT recommended unless there is NO other option as risks generally outweigh benefits.



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(Sharp, Wilson, Ross & Barr-Hamilton,

## Ear Syringing Products: Mechanical



Image: MirageHealthGroup.com, 2019



Image: NJ Phillips, 2019

Image: Guardian, 2019

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## Cautions and Contraindications (Bird, 2008; Hayter, 2016;

- Perforation of the ear drum
- Ear Infections within last 6 weeks
- Presence of a grommet
- History of ear surgery (atrophy)
- Uncooperative (children)
- Only hearing ear
- Facial trauma
- Cleft palate (with or w/o surgery)
- Stenosis (trapped H<sub>2</sub>O)
- Exostoses (trapped H<sub>2</sub>O)
- Discharge in last 12 months
- Anticoagulation use
- Diabetes
- Immunocompromise
- Active dizziness or tinnitus

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## Irrigation and Earwax Can Cause:

- **Vertigo** (Semicircular Canals)
- **Nausea and Vomiting** (Semicircular Canals)
- Cranial Nerve V
  - Trigeminal
  - **Tinnitus**
- Cranial Nerve VII
  - Facial
  - **Sensory Changes**
- Cranial Nerve VIII
  - **Acoustic Changes**
- Cranial Nerve IX
  - Glossopharyngeal
  - **Coughing**
- Cranial Nerve X
  - Vagus
  - TM/Posterior Wall
  - **Fainting**

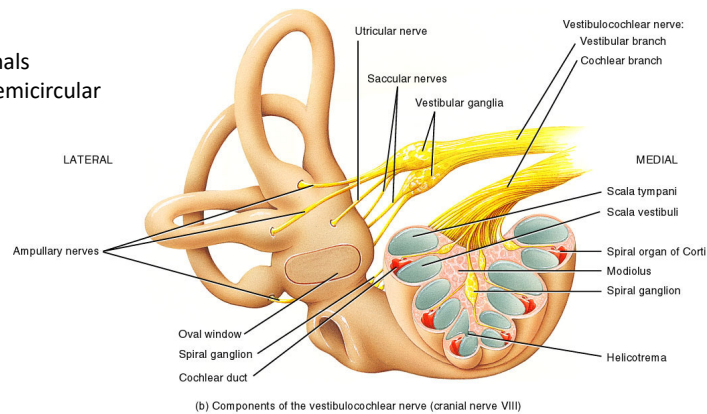


Image: Pearson Education, 2009

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## General Approach

- Ensure clinical governance and agreed clinical training framework
- Explain and gain consent
- Sitting down and comfortable
- Assess with otoscopy and consider:
  - Rinne and Weber
- Ensure water is at body temperature
- **STOP** irrigation if:
  - Pain
  - Dizzy
  - Ringing
  - Bleeding
  - Nausea or vomiting
  - Coughing\*
  - Abnormal discharge or smell
  - Equipment concerns
- **DRY** the canal with wick or cotton swab afterwards
- Reassess
- Educate
- Document


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## 10 Steps to Mitigate Risk

1. Think twice: presence of wax in itself is not a problem.
2. Only attempt syringing if symptomatic.
3. Informed consent (1:1000 have a 'minor' complication)
4. 15 minutes pre-procedure softening\*
5. Use a mechanical device that controls pressure.
6. Use warm (37°C) water - never more than 500ml/ear (Stevenson, 2010)
7. Consider ENT referral for suctioning or sterile saline for diabetics, actively immunocompromised or age >60.
8. Always perform a pre/post examination.
9. Always provide appropriate f/u education and instruction.
10. Use modifiable templates to DOCUMENT EVERYTHING.

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## What if Symptoms of Impaction Don't Resolve?

- Consider alternative diagnoses:
  - Sensorineural hearing loss
  - Otosclerosis
  - Otitis Media
  - Medication ototoxicity
  - Head and neck tumours
  - TMJ syndrome
  - URTIs
  - Eustachian Tube Dysfunction
  - Skin Disorders

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# Any questions?

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## Thank You!

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