

# Otitis Media

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(But Really Draining Ears More Generally)

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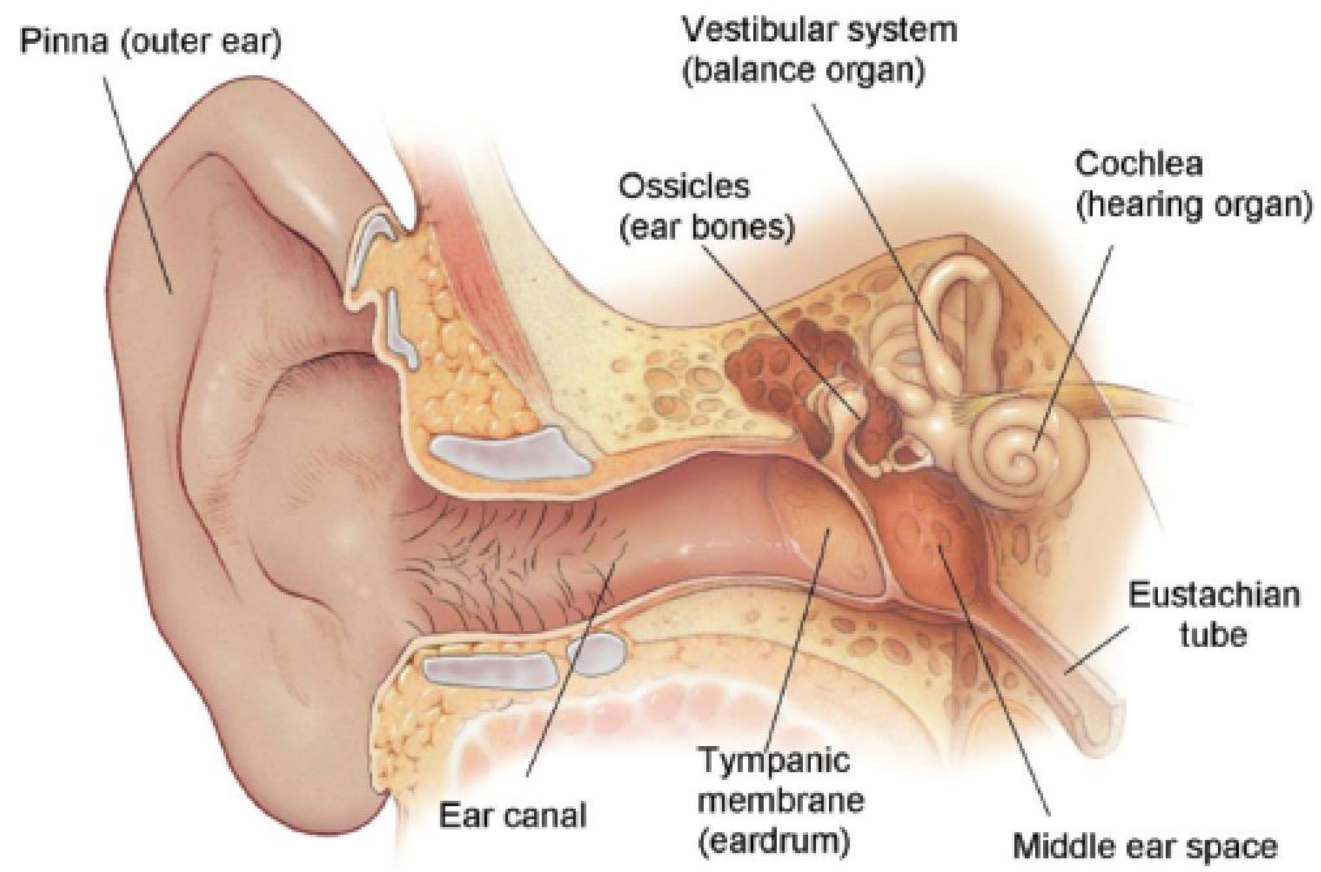
(And Also Some Public Health-y Stuff It's Good To Know)

# Overview

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- Guidelines
  - Tympanostomy Tubes in Children
  - Otitis Media with Effusion
  - Acute Otitis Externa
- Draining Ears
- Otitis Media and Hearing Loss
  - Public Health Implications
  - Strategies

# Anatomy



# CPG – Otitis Media with Effusion

- 2016 update of 2004 guidelines
- Definitions
  - OME – Middle ear fluid **without** inflammation
  - Chronic OME – Lasting > 3 months
- Causes
  - Upper respiratory infection
  - Eustachian tube dysfunction
  - After AOM



# CPG - Otitis Media with Effusion

- Hearing loss
- Balance problems
- Structural changes of TM
- Recurrent AOM
- Ear discomfort



# CPG - Otitis Media with Effusion

- Hearing loss
- Balance problems
- Structural changes of TM
- Recurrent AOM
- Ear discomfort
- Behavioral problems
- Poor school performance
- Reduced QOL



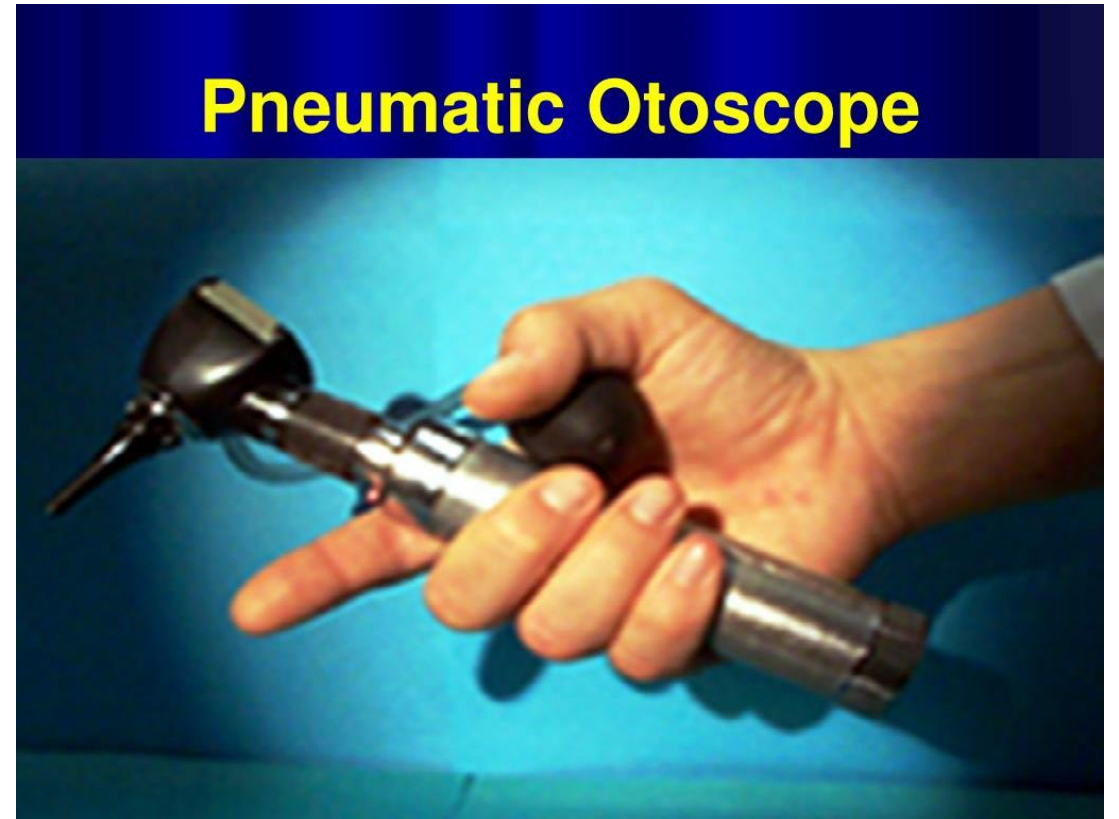


# CPG – Otitis Media with Effusion

- Statement 1a

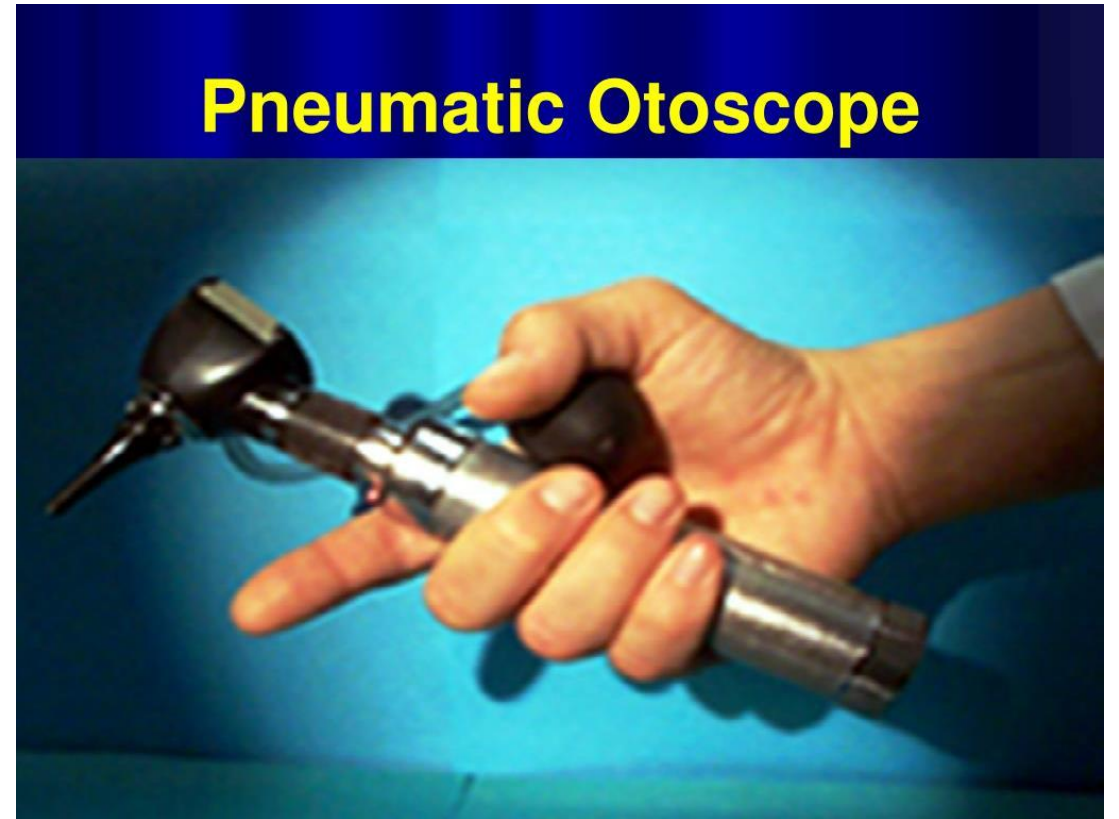
# CPG – Otitis Media with Effusion

- Statement 1a



# CPG – Otitis Media with Effusion

- Statement 1a
- And it's also statement 1b



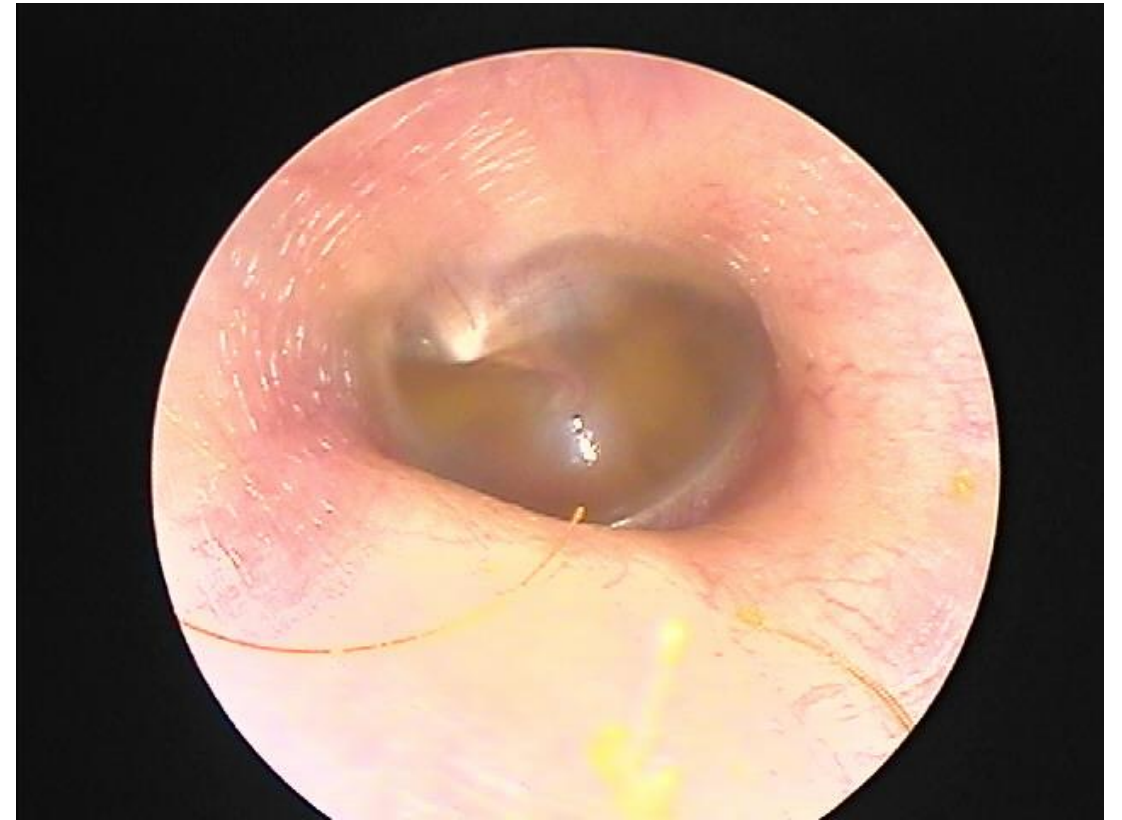
# CPG – Otitis Media with Effusion

- Statement 1a
- And it's also statement 1b
- ...
- If diagnosis is uncertain, tympanometry is OK

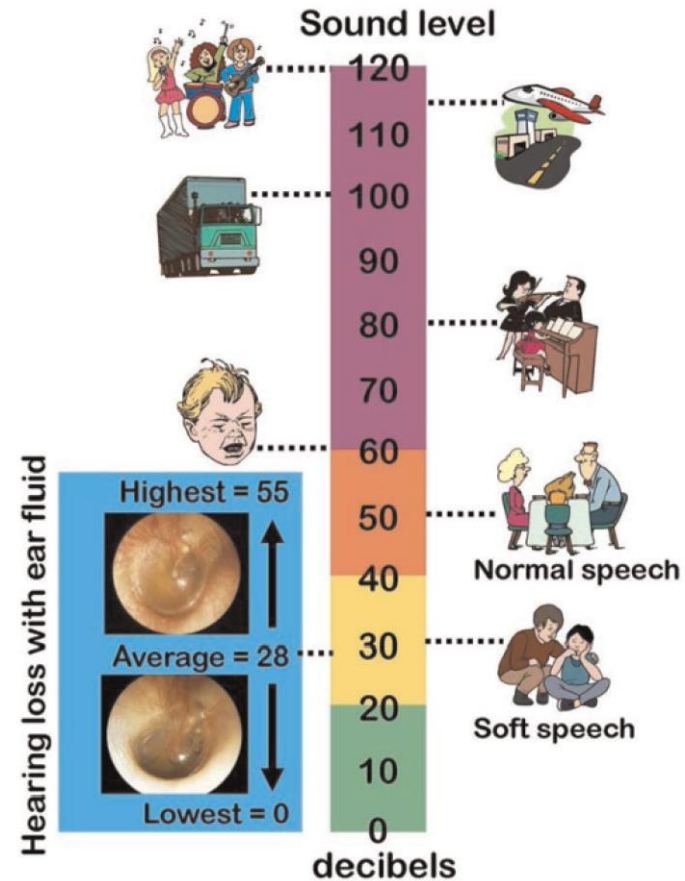


# CPG – Otitis Media with Effusion

- What's new
  - Recommendation against intranasal steroids
  - No adenoidectomy if < 4 years old
- What's old
  - Recommendations against
    - Systemic steroids
    - Decongestants
    - Antihistamines
    - Antibiotics
  - Surgery (after 3 mo WW)
    - Ear tubes or monitoring



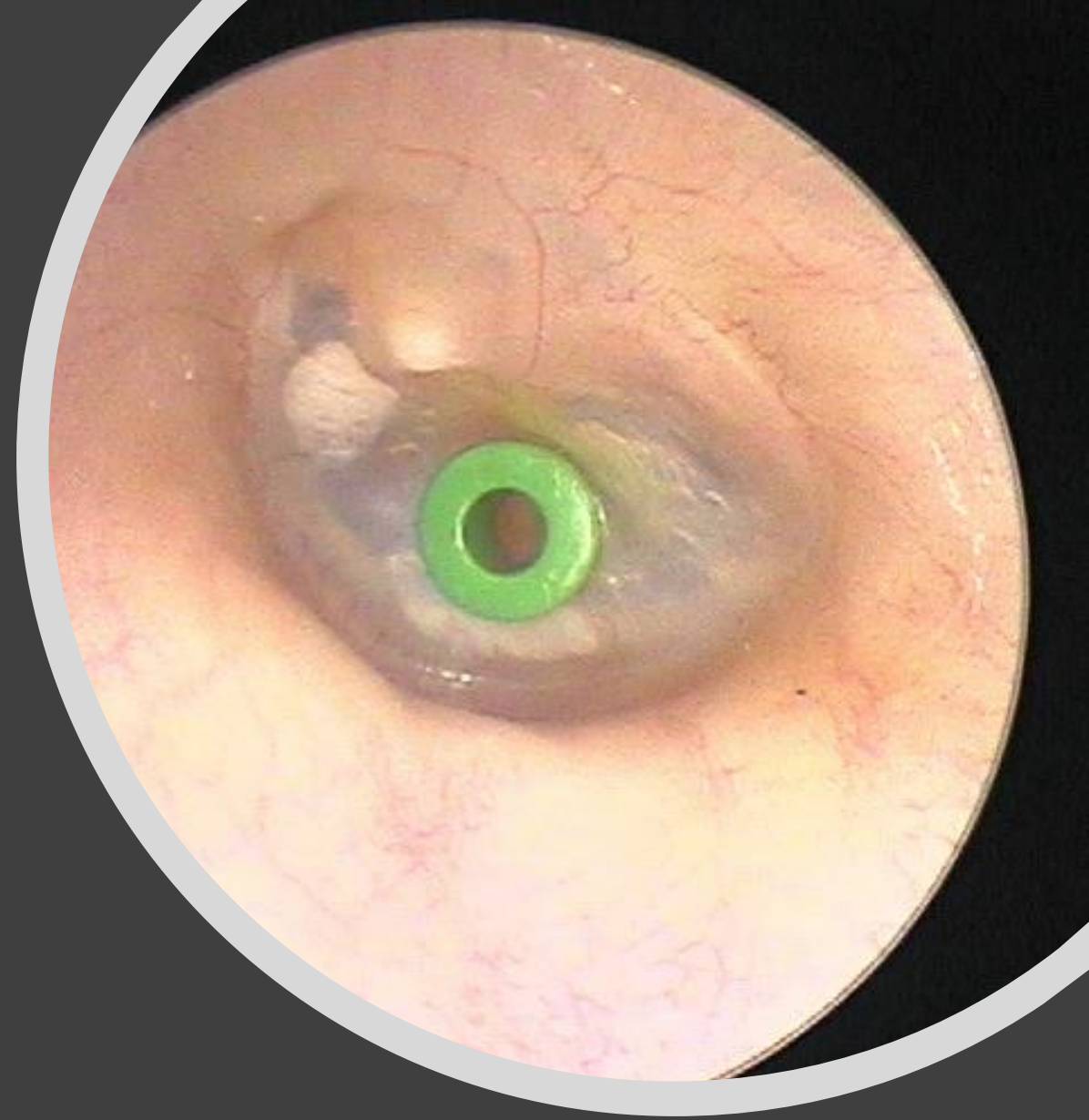
# CPG – Otitis Media with Effusion





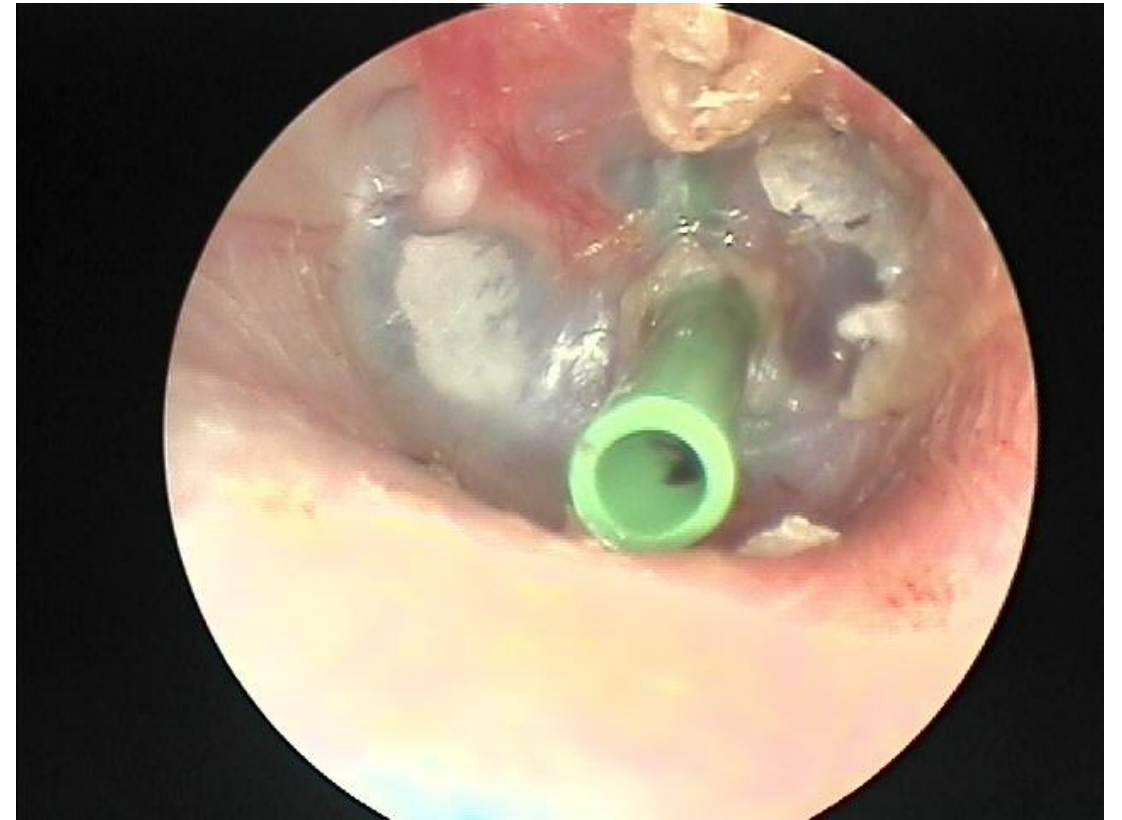
# CPG – Tympanostomy Tubes in Children

- 2013 guidelines
  - Indications
  - Risks
  - Life with ear tubes



# CPG – Tympanostomy Tubes in Children

- Indications
  - Chronic OME (>3 months) with
    - Hearing loss
    - Other sequelae
  - Recurrent acute otitis media
    - 3 episodes in 6 months
    - 4 in 1 year including 1 in past 6 months
  - Caveats for at risk children





# CPG – Tympanostomy Tubes in Children

- Benefits
  - Improved QOL in OME
  - Hearing improvement in OME
  - Possible reduction of AOM episodes
  - Possible improved speech
  - Reduced need for systemic antibiotics



# CPG – Tympanostomy Tubes in Children

- Risks
  - Tympanostomy tube otorrhea 26%
  - Blockage of the tube 7%
  - Granulation tissue 4%
  - Early tube extrusion 4%
  - Persistent perforation 1% to 6%
  - Intrusion 0.5%
  - General anesthesia (1 in 10k - 45k)

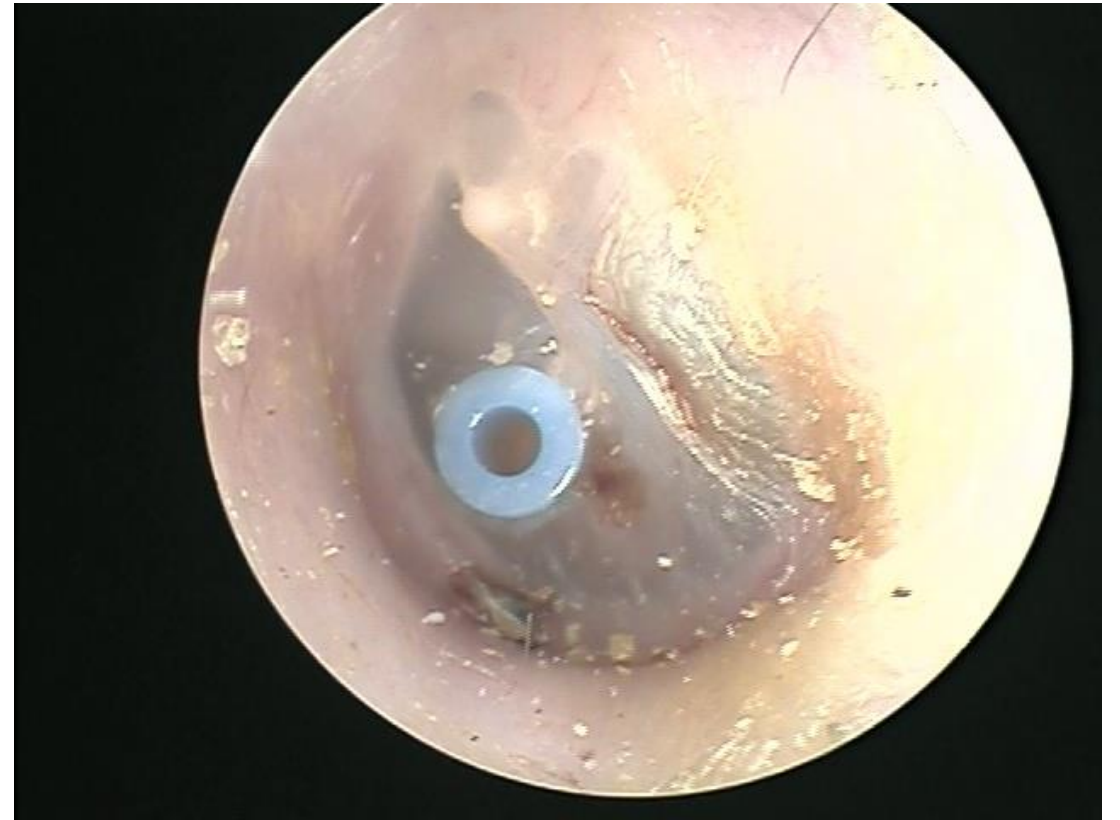


# CPG – Tympanostomy Tubes in Children

- Risks

- Tympanostomy tube otorrhea 26%
- Blockage of the tube 7%
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- Persistent perforation 1% to 6%\*\*
- Intrusion 0.5%
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\*\*Maybe >10% risk of persistent perforation in at least one ear!!!



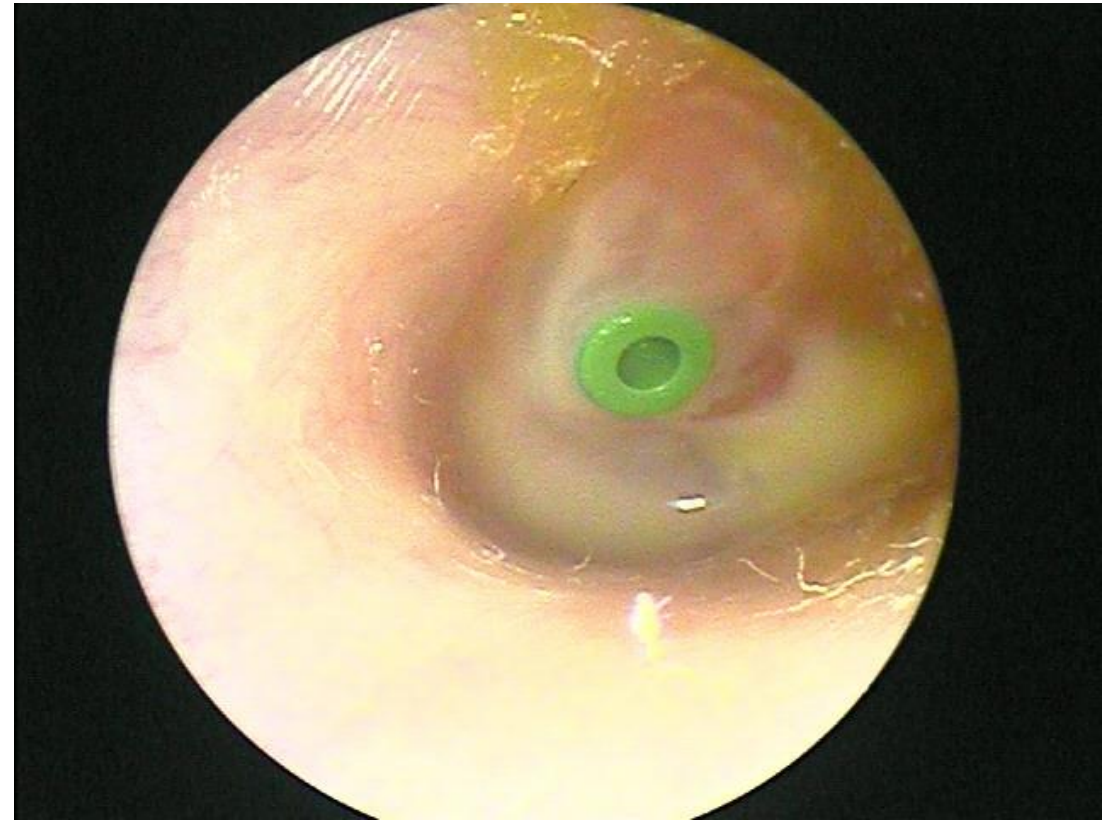
# CPG – Tympanostomy Tubes in Children

- Life with ear tubes
  - Swim!
  - No ear plugs!
  - Ear drops for uncomplicated TTO



# Managing Tympanostomy Tube Otorrhea

- Clean the ear
  - "Tissue spear"
- Ear drops
  - Which ear drop???





# Ear Drop Dilemmas

- Ototoxic
  - Aminoglycosides
    - Cortisporin (Neomycin)
    - Pred-G (Gentamicin)
- Perforation risk
  - Fluoroquinolones
    - Ofloxacin
    - Ciprofloxacin
  - Adding a steroid increases the risk



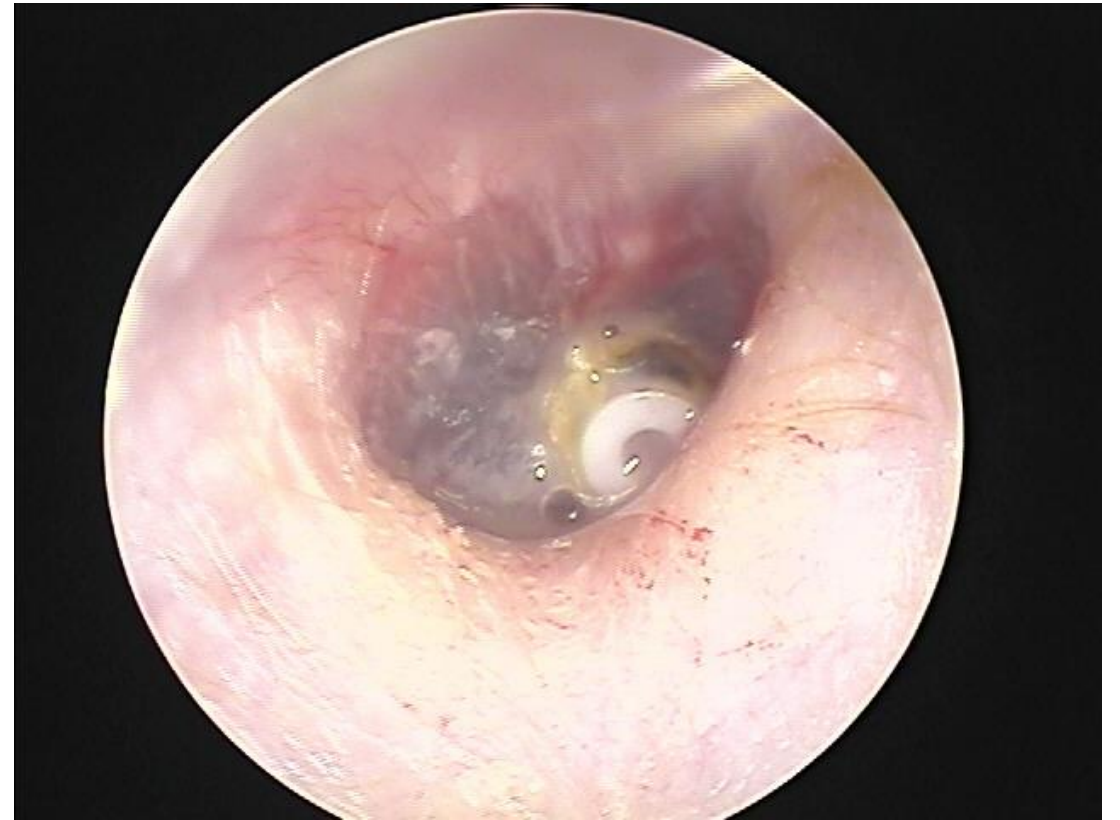
# Ear Drop Dilemmas

- For middle ear applications, only ofloxacin and ciprofloxacin drops are FDA approved



# Managing Tympanostomy Tube Otorrhea

- When to add a systemic antibiotic?
  - Complicated infection
  - Evidence of infection of the surrounding soft tissues
  - Treatment failure
    - Inability to get ear dry enough
    - Compliance problems





# Managing Tympanostomy Tube Otorrhea

- When to culture the ear
  - Almost never
  - Treatment failures
  - Anticipate unusual findings
- Problems with ear culture?
  - Contamination
  - Isolating non-pathogenic bacteria



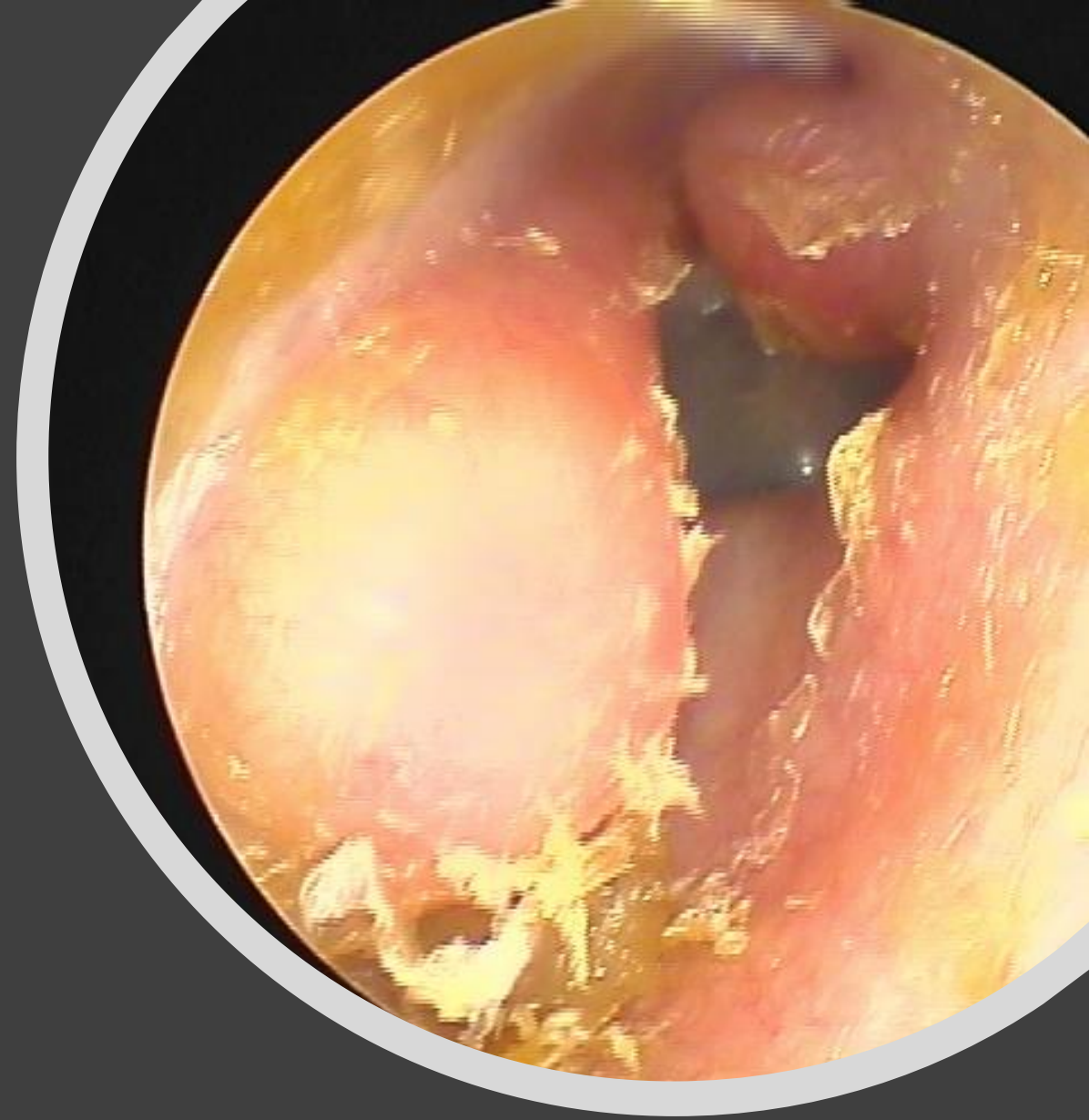
# Managing Tympanostomy Tube Otorrhea

- What about MRSA???
- Paper showed ciprofloxacin-resistant MRSA was susceptible to Ciprodex in vitro (2018)
- Concentration of Ciprofloxacin in Ciprodex is nearly 1000x the MIC breakpoint of cipro-resistant Staph aureus
- Only caveat – the drop's access to the middle ear



# CPG – Acute Otitis Externa

- 2014 Update of 2006 guideline
- Diffuse inflammation of the external auditory canal
  - May include pinna
  - May include tympanic membrane
- Emphases
  - Diagnosis
  - Topical treatment





# CPG – Acute Otitis Externa

- Diagnosis
  - Rapid onset (<48 hours)
  - Symptoms
    - Ootalgia, itching, fullness
    - With or without hearing loss or jaw pain
  - Signs
    - Tenderness of pinna, tragus or both
    - Ear canal erythema, edema or both
    - Otorrhea, lymphadenitis, TM erythema, cellulitis of pinna or skin



# CPG – Acute Otitis Externa

- Diagnosis
  - Distinguish from AOM
    - TM mobility
    - Motion tenderness of pinna and tragus
  - Identify risk factors – disruption of EAC epithelium
    - Water exposure
    - Dermatoses
    - Trauma or external devices
    - Obstruction by cerumen, cyst, foreign body



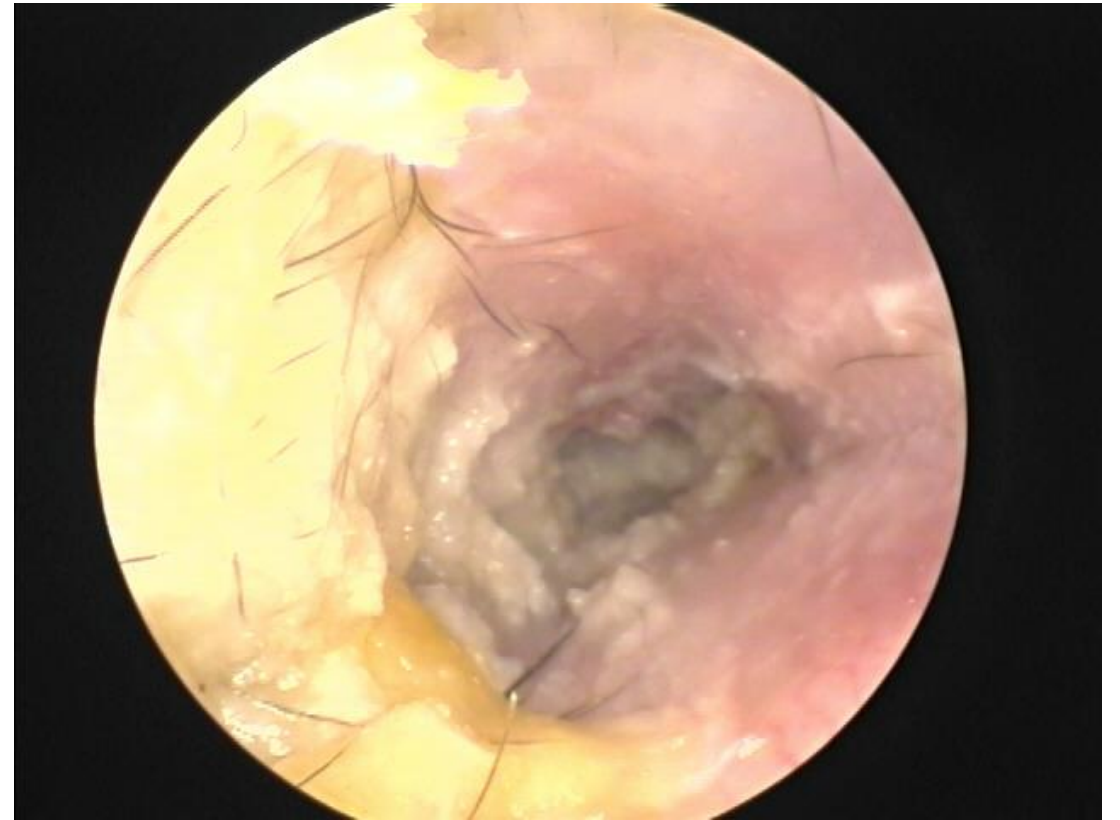
# CPG – Acute Otitis Externa

- Assess modifying factors
  - Non-intact tympanic membrane
  - Diabetes
  - Immune compromise
  - Prior radiation therapy



# CPG – Acute Otitis Externa

- Pain Management
  - NSAIDs, Acetaminophen
  - Limited opioids may be appropriate
  - Topical anesthetic drops?
  - Steroid-containing ear drops





# CPG – Acute Otitis Externa

- Avoid systemic therapy
  - Exceptions
    - Disease extension
    - Host factors
      - Immune compromise
      - Middle ear disease
- Use topical therapy
  - Antibiotics
  - Steroids
  - Acidifying agents





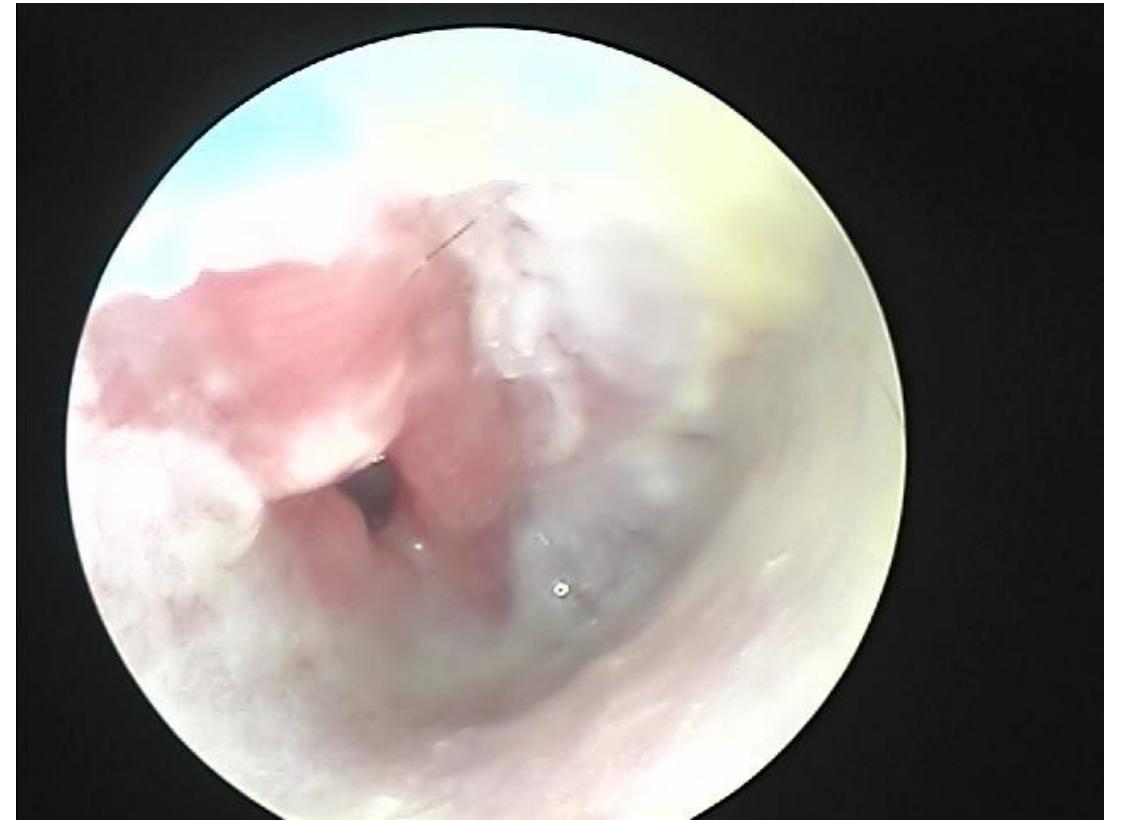
# CPG – Acute Otitis Externa

- Home Remedies
  - Rubbing alcohol (isopropyl)
  - 5% acetic acid mixed with either
    - Water
    - Rubbing alcohol
  - Tea tree oil (*Pseudomonas* resistance)
  - NO ear candles!



# CPG – Acute Otitis Externa

- Drug delivery
  - Cleaning ear canal
  - Fill ear canal
  - 3 to 5 minutes
  - Tragal pumping
  - Otowick
- Non-intact tympanic membrane
  - Do not use ototoxic drops
  - Avoid alcohol, acid, aminoglycosides

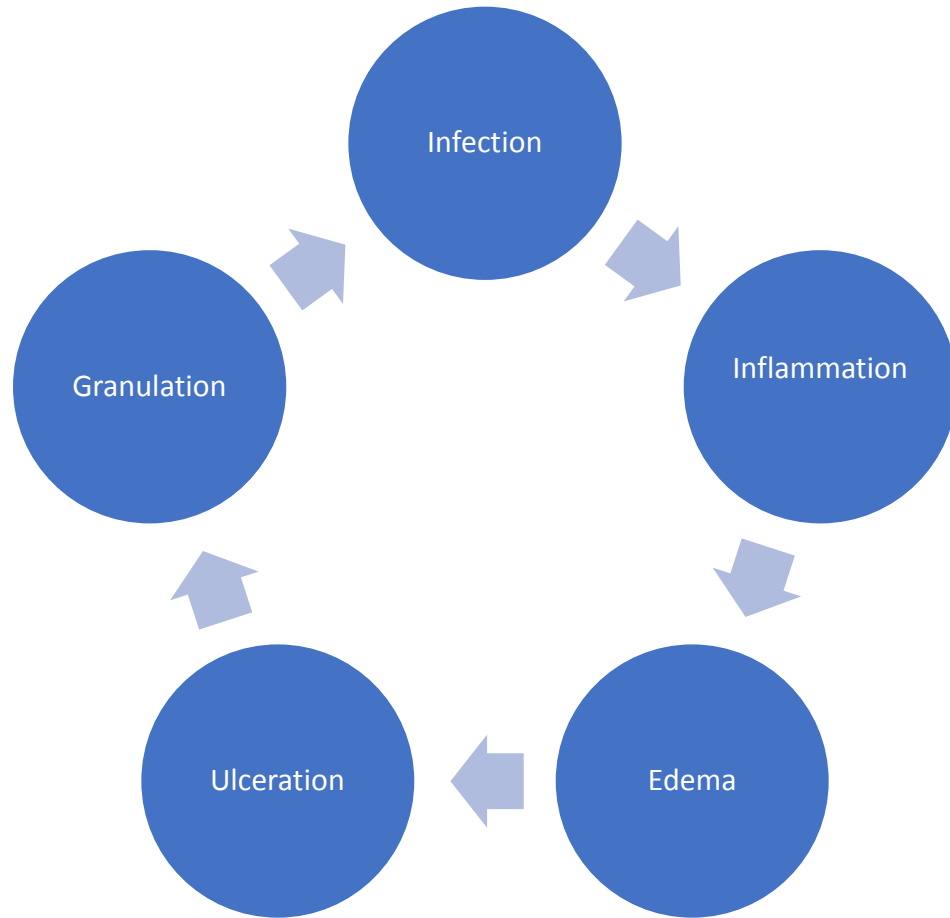


# Chronic Suppurative Otitis Media

- Perforation
- Persistent drainage
- Lasts longer than 6 or 12 weeks



# Chronic Suppurative Otitis Media



# Chronic Suppurative Otitis Media

- Microbiology
  - *Pseudomonas aeruginosa* 48-98%
  - *Staphylococcus aureus* 15-30%
  - *Klebsiella pneumoniae* 10-21%
  - *Proteus* species 10-15%
  - Other gram negative
  - Anaerobes 25-50%
  - Fungus up to 25%





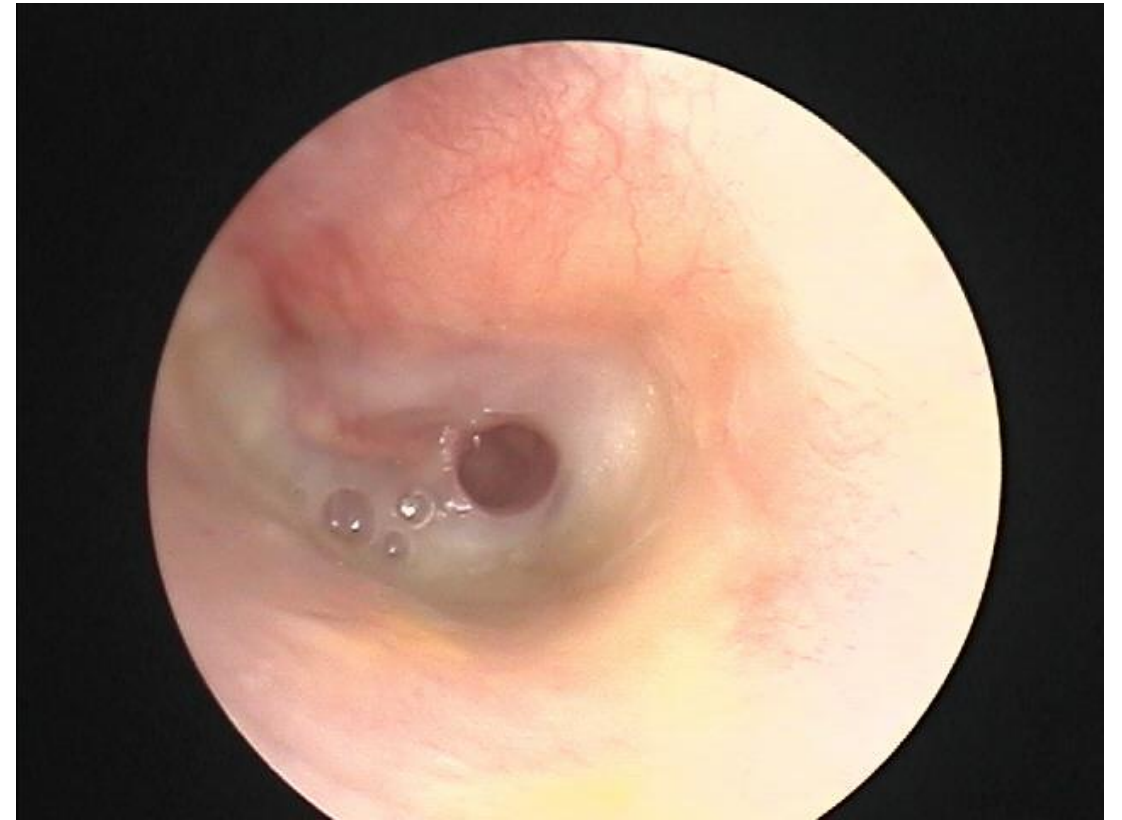
# Chronic Suppurative Otitis Media

- Risk factors
  - Multiple episodes of AOM
  - Living in crowded conditions
  - Day care facility attendance
  - Large family
  - Maybe...
    - 2<sup>nd</sup> hand smoke exposure
    - Low parental education
    - Low SES
    - Non-breastfeeding



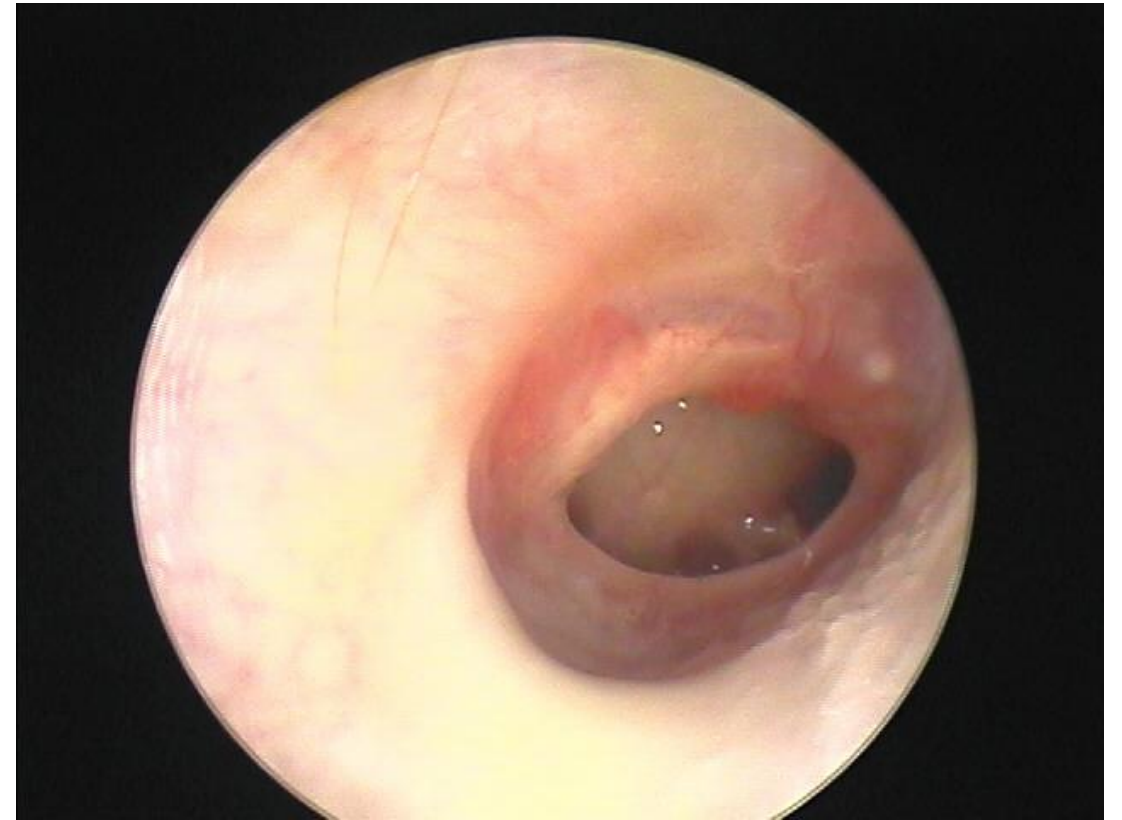
# Chronic Suppurative Otitis Media

- Populations at risk
  - Australian Aboriginal
  - Eskimo
  - Other Native American
  - Some Pacific Islanders
  - Canadian First Nations
  - Greenlandic Inuit



# Chronic Suppurative Otitis Media

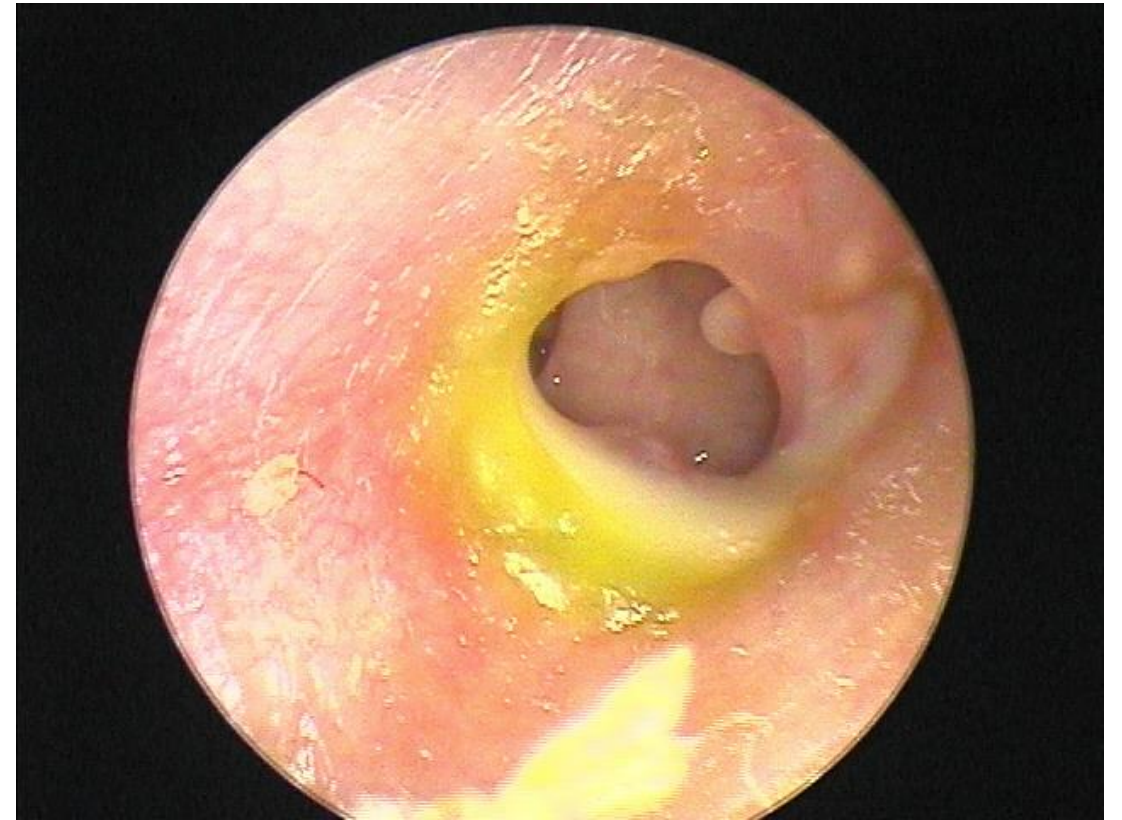
- Complications
  - Intratemporal
    - Petrositis, labyrinthitis, facial nerve paralysis, lateral sinus thrombophlebitis
  - Intracranial
    - Meningitis, abscess,
  - Hearing loss
    - Greenland study: 91% with permanent hearing loss >15 dB
    - Hearing loss worse in middle age than in early adulthood





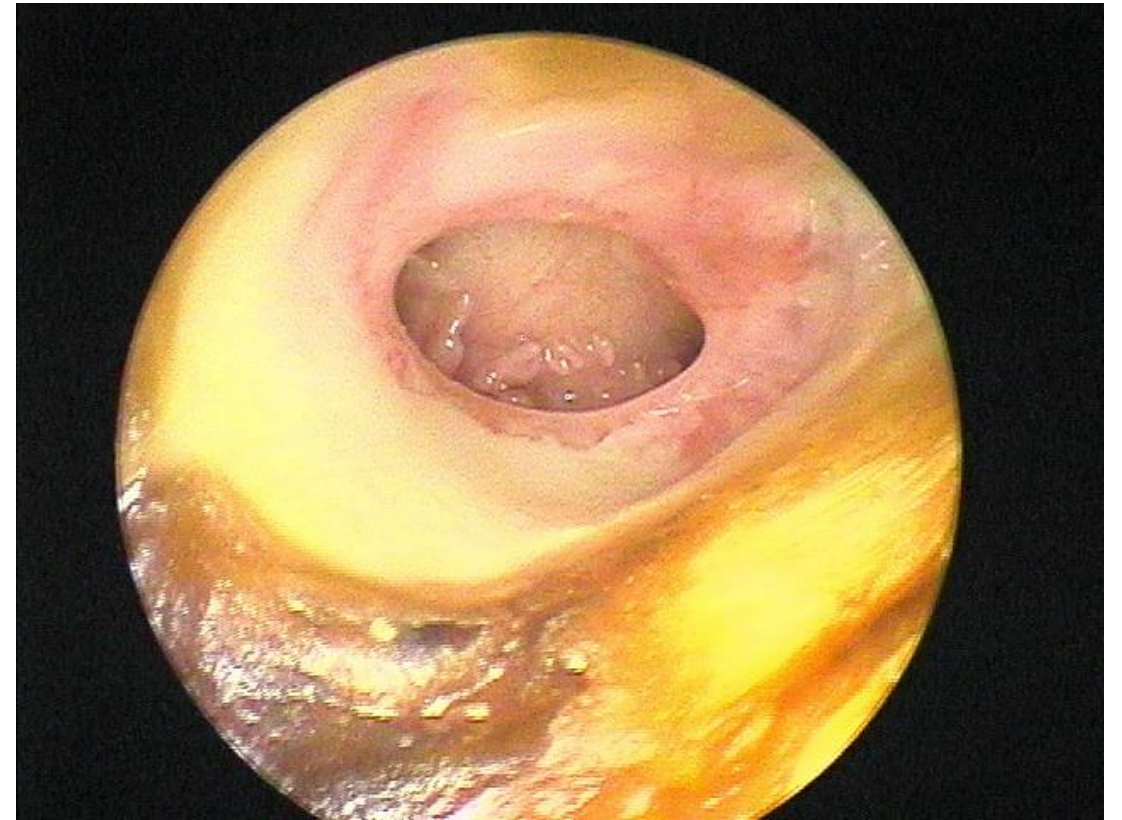
# Chronic Suppurative Otitis Media

- Imaging
  - CT scan
    - For suspected complications
    - For suspected cholesteatoma
    - Pre-op
  - MRI
    - For suspected intratemporal or intracranial complications



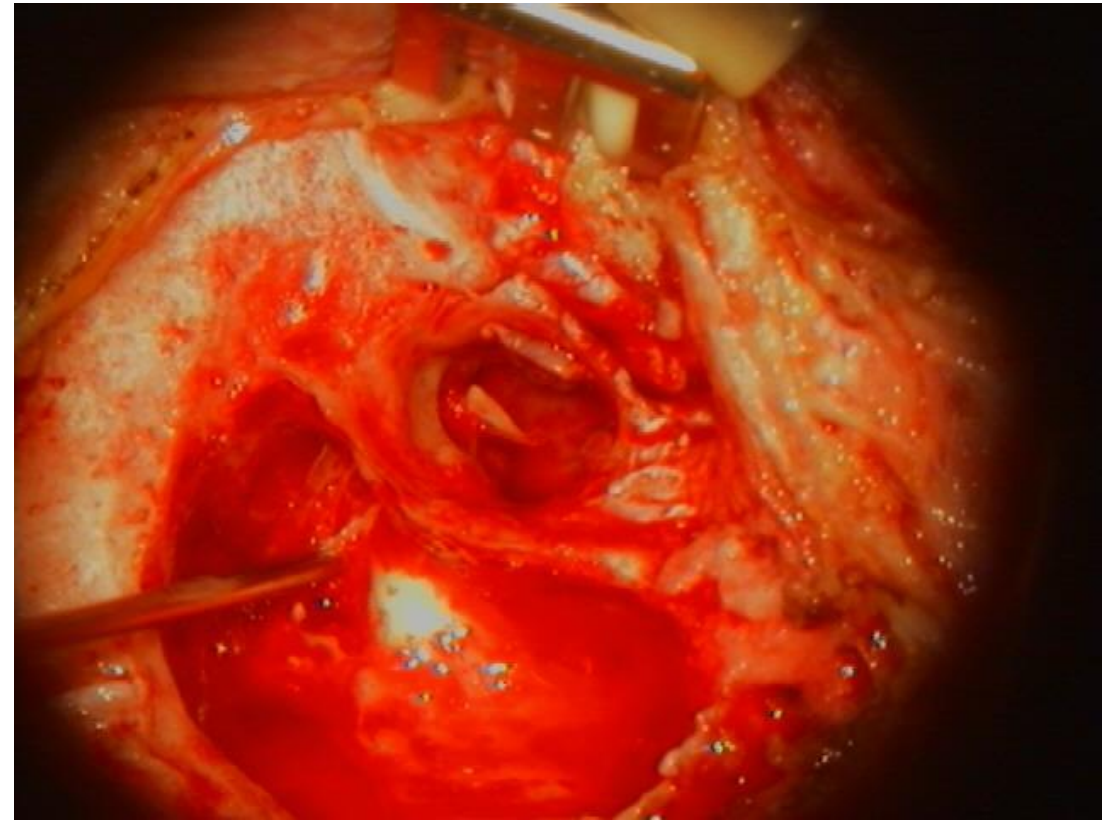
# Chronic Suppurative Otitis Media

- Treatment
  - Aural toilet is critical
  - Topical therapies first
    - Fluoroquinolones
    - Steroids if granulation tissue
  - Systemic treatment
    - Failure of topical treatment
    - Complicated cases
    - Continue topicals
    - Culture before starting systemic tx



# Chronic Suppurative Otitis Media

- Surgical intervention
  - Chronic perforations
  - Chronic refractory otorrhea
  - Cholesteatoma
- Goals of surgery
  - Clear disease first
  - Reconstruct hearing if possible (frequently staged)



# Public Health Issues

- Consequences of hearing loss
  - Emotional and behavioral difficulties
  - Family functioning (child and parent)
  - Behavioral issues at school
  - Delinquency and aggression
  - Vulnerability
  - Alcohol and drug use
  - Family violence
  - Employment impacts

