

Guidelines for Pediatric Myringotomy and Tympanostomy Tube Insertion

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Disclosures

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Objectives

- Review the pathophysiology and risk factors associated with Otitis Media
- Understand the rationale and indications for Myringotomy and Tube Insertion Surgery
- Review the literature and evidence in support of the current guidelines
- Gain an understanding of how to manage patients with Ventilating Tubes

Background

- Recurrent Acute Otitis Media (AOM) is one of the most common early childhood infections in Canada affecting 20% to 40% of children
- Otitis Media with Middle Ear Effusion (MEE) occurs when longstanding fluid in the middle ear becomes thickened and glue like
- Clinical manifestations include: otalgia, hearing loss, sleep disturbance, tinnitus and imbalance

Modifiable Risk Factors for Otitis Media

- Encourage breast feeding for 6 months
- Avoid passive smoke exposure
- Eliminate pacifiers in older children
- Avoid multi child day care
- Get a dog

Respiratory Tract Illnesses during the first year of life: Effect of Dog and Cat Contacts

Bergroth et al, Pediatrics, 2012; 130;211

- Finnish Study - Birth Cohort born between 2002-2005; n=397
- Weekly diary and questionnaire at the end of year 1
- Children who had dogs at home were healthier and had less frequent episodes of otitis media and tended to need fewer courses of antibiotics
- Dog contacts may have a protective effect on respiratory tract infections during the first year of life

70-75% of Otitis Media is genetic

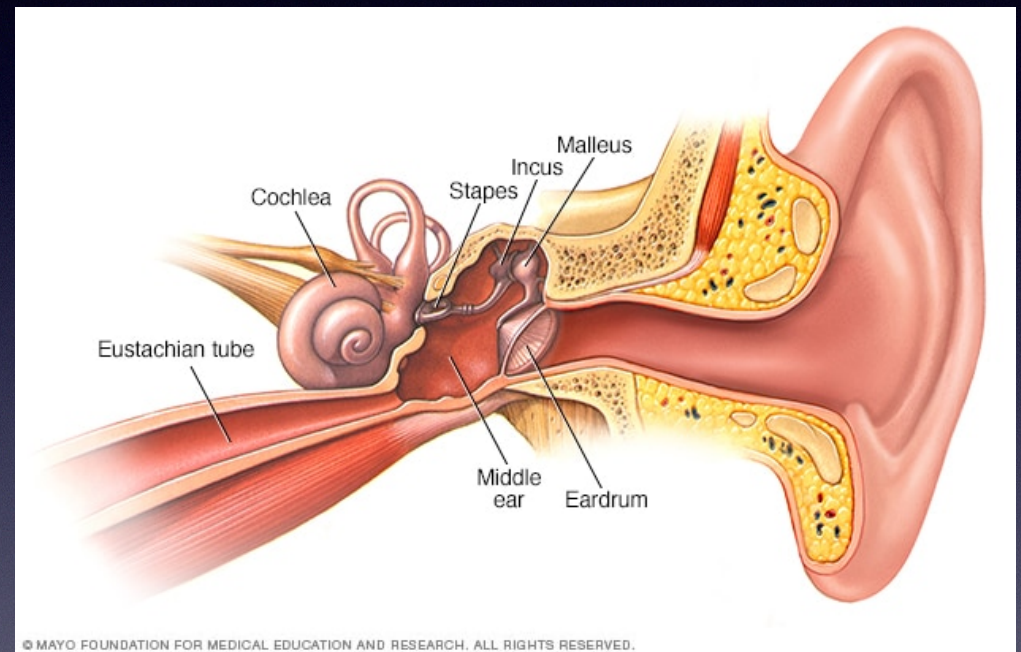


“A child's eustachian tube is too short, too floppy, too horizontal, and doesn't work.”

-Charles D Bluestone, MD

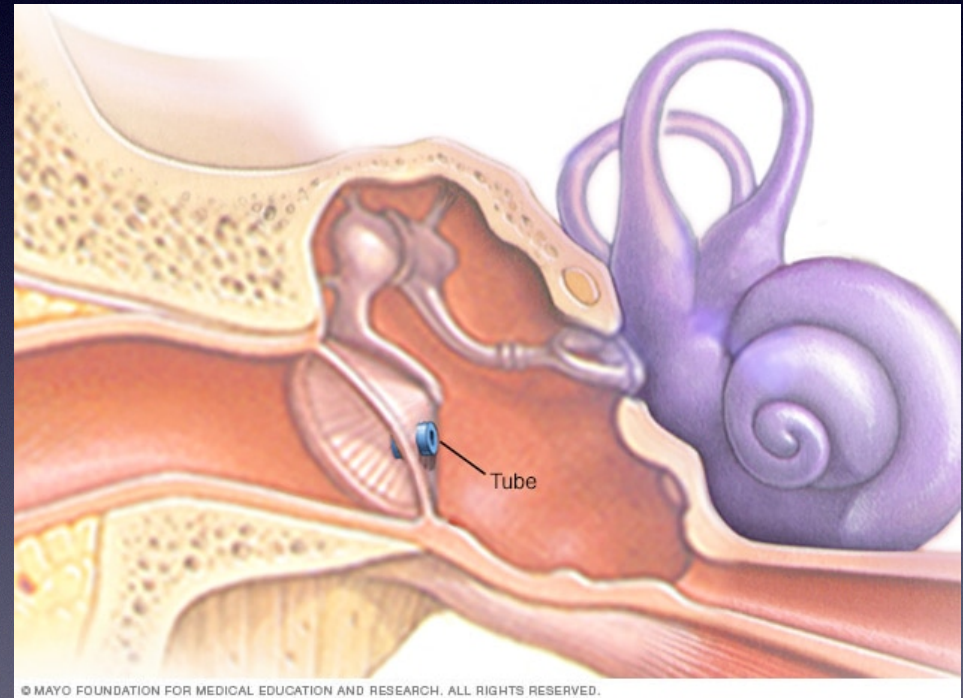
Eustachian Tube Dysfunction (ETD)

- The eustachian tube (ET) connects the middle ear cavity to the nasopharynx
- The function of the ET is to aerate the middle ear and facilitate secretion drainage from the middle ear
- Normally a closed structure - opens in response to movement of the mandible and pharynx
- Conditions that prevent the ET from opening results in dysfunction



Myringotomy and Tympanostomy Tube Insertion

- Myringotomy = surgical procedure of making an incision in the tympanic membrane
- Tympanostomy Tube Insertion = placement of tube into the incision to drain fluid and ventilate the middle ear
- Improves hearing, reduces the risk of recurrent acute otitis media and recurrent effusions
- Most common reason for a child to receive general anaesthesia and undergo ambulatory surgery in North America



Office Insertion of Tympanostomy Tubes without Anaesthesia in Young Children

Rosenfeld et al, Otolaryngology HNS 2016, Dec 153(6)

- Approximately 300 children - Offered to parents as an alternative to GA to parents of children age 6 mo to 5 yrs; 90% < 2 yrs
- No serious or significant complications
- No difference in parent perception of recovery, satisfaction, post-procedure nightmares, or bad memories
- No difference in tube patency or duration
- All children (and parents) tolerated the procedure well
- 2019 AAO-HNS - “Although insertion of tympanostomy tubes in children is generally accomplished in the operating room under general anaesthesia, insertion in the clinic in appropriately selected patients using shared decision making between clinicians and families can be appropriate”
- “Protective Stabilization” term used by the American Academy of Pediatric Dentistry since 1990



Indications for Tympanostomy Tubes for Recurrent AOM with and without Middle Ear Effusion (MEE)

AAO-HNSF Guidelines 2013

- Recurrent AOM without MEE - clinicians should not perform tympanostomy tube insertion in children with recurrent AOM who do not have middle ear effusion at the time of assessment for tube candidacy (reassess the child if AOM episodes continue)
- Recurrent AOM with MEE - Clinicians should offer bilateral tympanostomy tube insertion in children with recurrent AOM who have unilateral or bilateral MEE at the time of assessment for tube candidacy

Watchful waiting for children with Recurrent AOM without effusion

Lavere et al, Int Journal Pediatric Otorhinolaryngology, 2019

- Chart review of 123 children aged 6 m - 12 y with recurrent AOM without MEE
- Followed every 4 months with watchful waiting
- 66% success rate in avoiding tympanostomy tubes
- 34% failure rate requiring tube insertion
- Conclude that AAO-HNS recommendation is appropriate

Indications for Tympanostomy Tubes for Otitis Media with Effusion (OME)

AAO-HNSF Guidelines 2013

- Clinicians should offer tube insertion to children with bilateral OME for 3 months or longer and documented hearing difficulties
- Clinicians may perform tube insertion with unilateral or bilateral OME for 3 months or longer and symptoms likely attributable to OME that include (but are not limited to), balance (vestibular) problems, poor school performance, behavioural problems, ear discomfort, or reduced quality of life
- Clinicians may perform tympanostomy tube insertion in “at risk” children with unilateral or bilateral OME that is unlikely to resolve quickly as reflected by a type B (flat) tympanogram or persistence of effusion for 3 months or longer

“At Risk” Children with OME

- Permanent Hearing Loss (independent of OME)
- Speech or language delay (suspected or diagnosed)
- Autism spectrum disorder
- Craniofacial disorders
- Visual Impairment
- Cleft Palate
- Developmental Delay

Water Precautions with Tubes

AAO-HNSF Guidelines 2013

- Routine prophylactic water precautions should NOT be encouraged for children with tympanostomy tubes

Water precautions with Tubes

- Subtil et al, Effect of Water Precautions on Otorrhea Incidence after Pediatric Tympanostomy Tube: Randomized control trial evidence. *Otolaryngology HNS*, 2019, 161(3): 514-521 - RCT; n=244 aged 2-10 yrs; The incidence of otorrhea was not different with or without prescription of ear protection during water exposure among children with tympanostomy tubes
- Steele et al, Prevention and Treatment of Tympanostomy Tube Otorrhea: A Meta-analysis: *Paediatrics* 2017;139(6) - Review of 25 articles, No compelling evidence of a need for water precautions exists
- Tsang and James, Water precautions for prevention of infections in children with ventilation tubes (grommets). *Pediatric Child Health* 2018 Aug; 23(5): 319-321. Cochrane review of 2 RCT's n=413 met inclusion criteria for the review. Some evidence to suggest ear plugs reduces the rate of otorrhoea in children with ventilation tubes, but the absolute reduction in the number of episodes of otorrhoea appears to be very small and is unlikely to be clinically significant. Based on the data available, an average child would have to wear ear plugs for 2.8 years to prevent one episode of otorrhoea.

Caveats to Water Precautions Guidelines

- Lake swimming
- History of otalgia / otorrhea with water entry into ear canal
- Diving more than 6 feet underwater
- Avoid dunking head in bathtub

Tri-dimensional model for Ventilation tube permeability

Ungar OJ et al, Eur Arch Otorhinolaryngol, 2018 Nov; 275(11):2627-2632

- Used 3-D printed models of External Auditory Canals (EAC) and Middle Ears to assess permeability of ventilating tubes (VT) to various liquid
- Different types of liquids including water, soapy water and dexamethasone through ventilating tubes
- Most solutions required a volume at least as high as the volume of the EAC to provide enough pressure to pass through the VT
- Soapy water had the highest penetrance and required the least volume to pass through the VT

Role of Adenoidectomy

AAO-HNSF Guidelines 2013

- In a child under 4 yrs of age, adenoidectomy should not be performed unless a distinct indication exists (nasal obstruction, chronic adenoiditis)
- In a child 4 yrs of age or older, clinicians should recommend tympanostomy tubes, adenoidectomy or both when surgery is indicated for OME

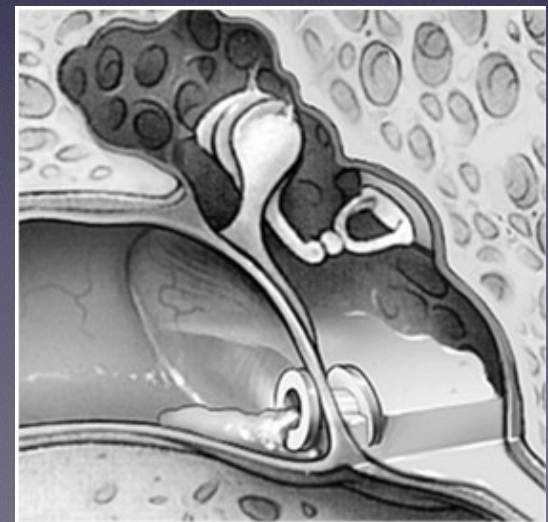
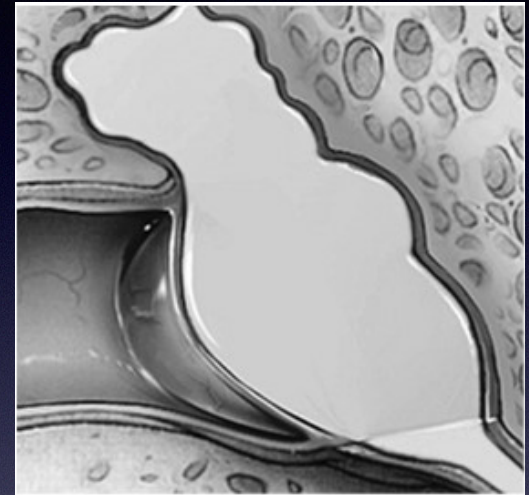
Adenoidectomy with or without grommets for children with Otitis Media

Boonacker CW et al, Health Technol Assess, 2014

- Review of 503 articles including 10 trials
- Primary outcome was failure at 12 months
- Small beneficial effect found in children < 2 yrs of age with recurrent AOM
- Adenoidectomy is most beneficial in children with persistent OME aged \geq 4 yrs (50 days less effusion, 19% lower failure rate)

Treatment of Otorrhea Post Tube Insertion

- Steele et al, Prevention and Treatment of Tympanostomy Tube Otorrhea: A Meta-analysis: Paediatrics 2017;139(6) - Review of 25 articles, Available evidence supports topical treatment of acute, uncomplicated tube otorrhea in preference to watchful waiting or oral antibiotics
- Van Dongen TM et al, A trial of treatment for acute otorrhea in children with tympanostomy tubes. NEJM 2014, Feb 20; 370 (8); 723-33 - Multicenter RCT 230 children - At 2 weeks, Antibiotic/Steroid ear drops (5%); Oral antibiotics (44%) and watchful waiting (55%)



Treatment of delayed Acute Otorrhea Post Tube Insertion

AAO-HNSF Guidelines 2013

- Clinicians SHOULD prescribe topical antibiotic eardrops only, without oral antibiotics, for children with uncomplicated acute tympanostomy tube otorrhea

Clinicians Roles for Myringotomy and Tube for Otitis Media

- Educate families to mitigate modifiable risk factors
- Utilize current guidelines when discussing management options of AOM and OME to patients and families
- Discuss potential risks and benefits associated with all treatment options
- Support a shared decision making process

Questions?