

# Otitis Media: An Osteopathic Perspective

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# Otitis Media - Definitions

- Inflammation of the middle ear
- Acute Otitis Media
- Otitis Media with Effusion
- Chronic Suppurative Otitis Media

# Otitis Media – Epidemiology

- Most common reason for antibiotic prescriptions in children
- 25% of infant visits to practitioners, up to 40% of visits by kindergarten age
- 30 million office visits; 23 million prescriptions (809 Rx per 1000 visits)
- Direct cost: \$2 Billion

# Epidemiology (cont.)

- Highest incidence: 6 – 24 mos.
  - Declines until 5-6 yrs. (school age)
- Tympanostomy tubes 2<sup>nd</sup> most common surgical procedure in kids (after circumcision)
- Mean # of antibiotic days was 41 in first year of life in one study
- Antibiotic resistance increasingly an issue

# Otitis Media – Risk Factors

- Sex
  - Males have higher incidence
- Age
  - Peak between 6-18 mos.; unlikely if no dx by 3 yo
- Daycare
- Pacifier
- Smoking
- Siblings
- Breast feeding <3 months
- Ethnicity
- Bottle use
- Congenital malformations
- Other: environment, allergies, genetics, immune status, etc.

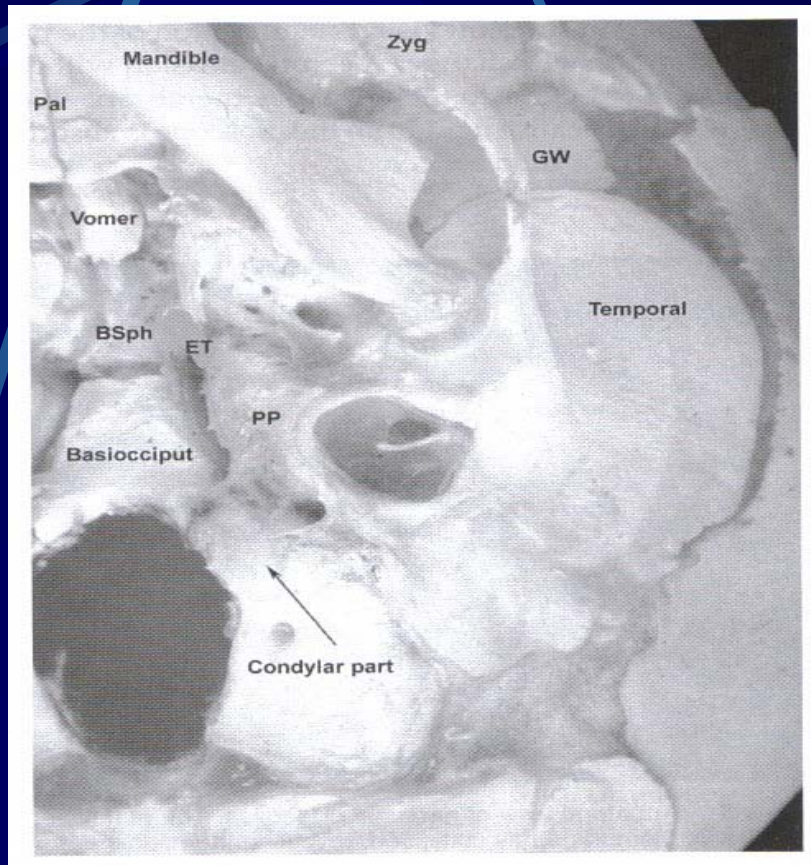
# Function of the Eustachian Tube

- Equalization of pressures between atmosphere and middle ear
- Prevention of reflux/aspiration of nasopharyngeal secretions/flora
- Drainage of middle ear secretions

# Functional Anatomy

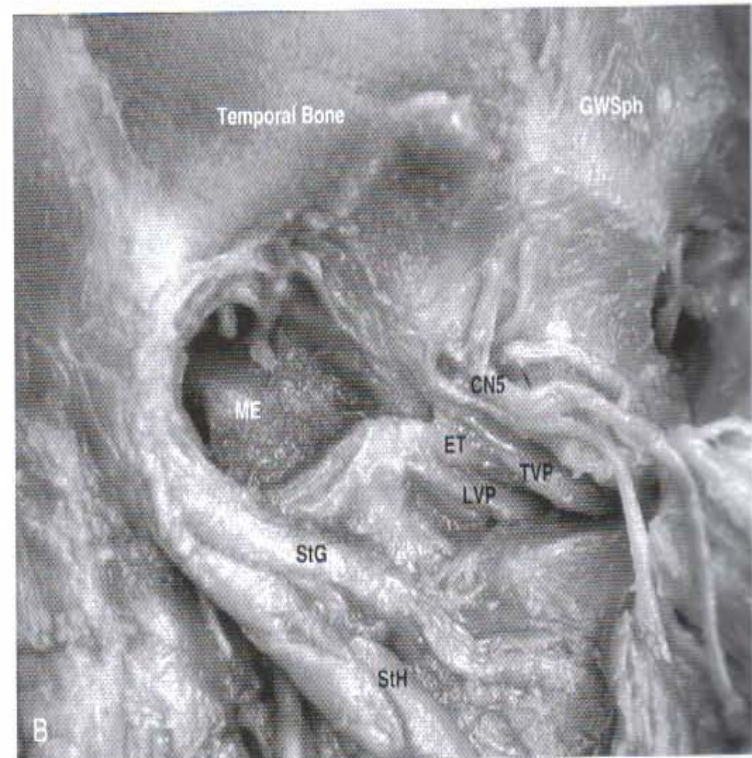
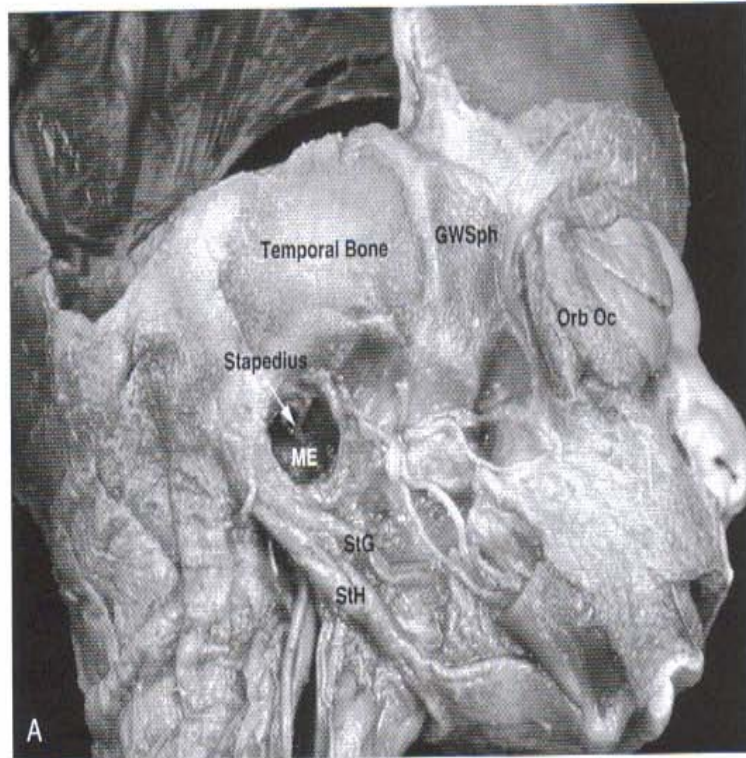
- Respiratory mucosa lining nasopharynx also lines eustachian tube and middle ear
- Infection/inflammatory response in nasopharynx also affects E.T. and M.E.

# Functional Anatomy

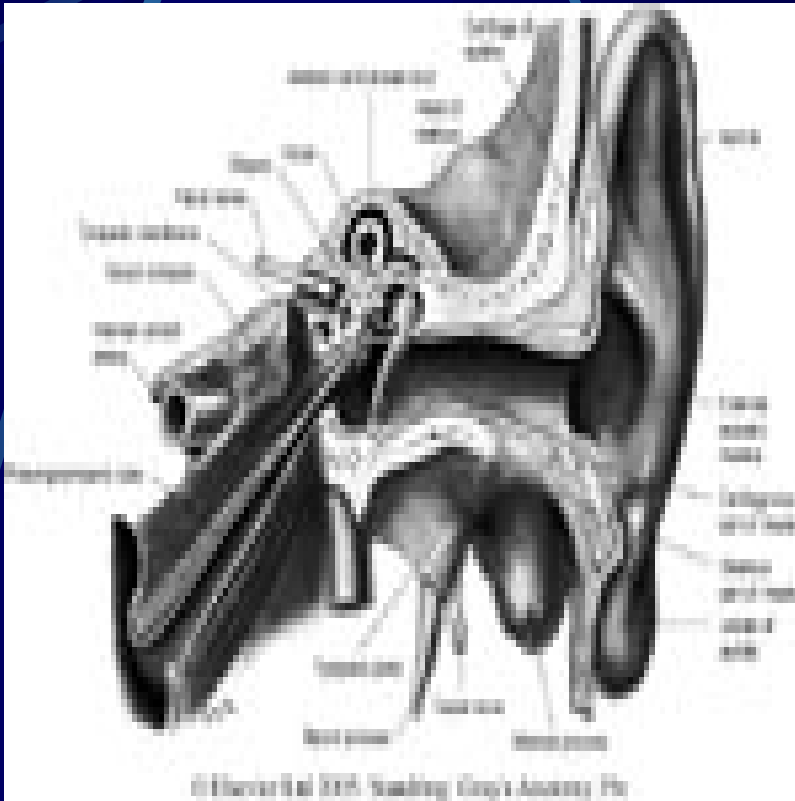


- Path of eustachian tube
  - Exits middle ear, crosses petrous part of temporal bone and sphenoid articulation
  - Temporal bone in three parts, joined by cartilage
    - Squamous, petrous, tympanic ring
  - Tube narrowest as it crosses cartilaginous parts

# Functional Anatomy



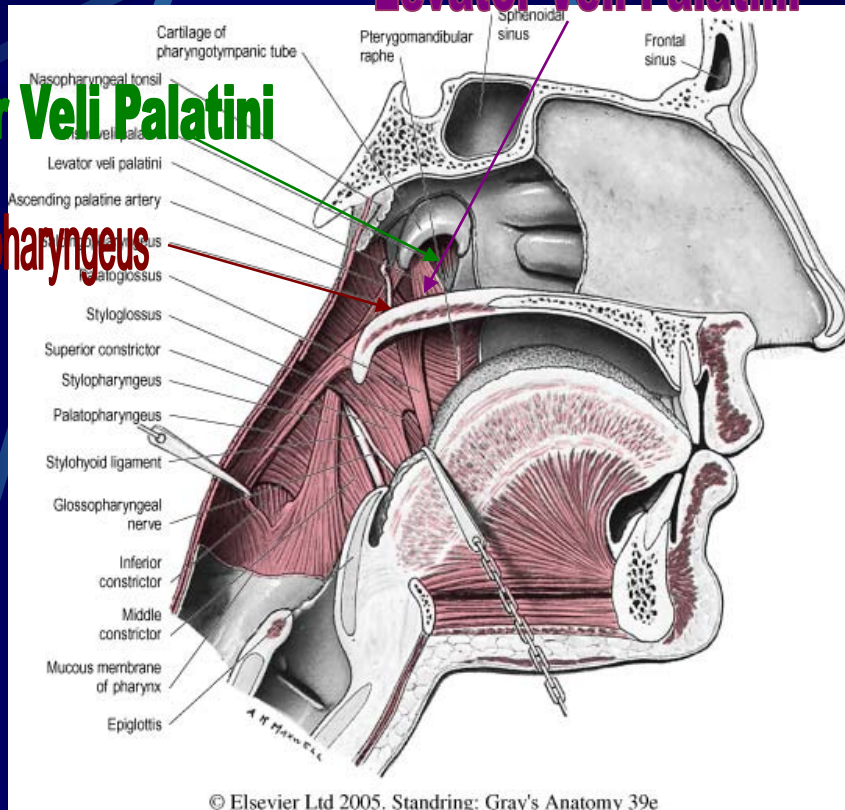
# Functional Anatomy



- Orientation of eustachian tube in adult (nearly horizontal in children)
- Note narrowing of tube
- Re-expands as it passes through pharyngeal musculature

# Functional Anatomy

## Levator Veli Palatini



## Muscles Related to Eustachian Tube

- Salpingopharyngeus
- Tensor veli Palatini
- Levator veli Palatini
- Medial pterygoid

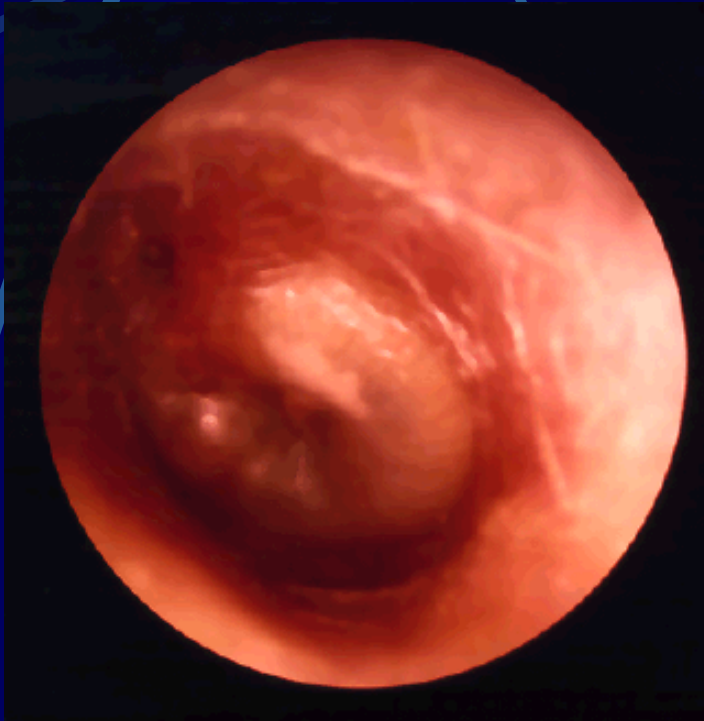
# Etiology of OM

- Often preceded by URI (Viral) or allergy
  - Nasopharyngeal/E.T. inflammation
- Eustachian Tube Dysfunction
  - Horizontal orientation
  - Greater difficulty maintaining normal pressures/opening
  - Pressure in E.T./middle ear slightly negative in children
  - E.T. more pliable(vs. adults)

# Etiology of OM

- Eustachian Tube Dysfunction, cont.
  - Above factors
    - Impede drainage from middle ear
      - Leading to congestion/obstruction
    - Create negative pressure in middle ear
      - Retention of secretions in middle ear
    - May promote reflux of nasopharyngeal secretions
  - Other contributing factors: adenoidal hypertrophy, congenital malformation, tumor, etc.
  - Microbial growth – pain, fever, erythema, loss of mobility, etc.

# Dx of Otitis Media



**Acute otitis media** Tympanic membrane in acute otitis media is erythematous and bulging. Purulent fluid can be seen behind the membrane. Courtesy of Glenn Isaacson, MD.

- Acute

- Acute onset of sx
- Otagia
- +/- Fever
- +/- TM Erythema
- Bulging TM
- Limited mobility of TM
- Air-fluid level
- Otorrhea
- Draining TM with hx of tympanostomy tubes
- Tympanocentesis w/pathogenic organism
- Respiratory

# Acute OM – Treatment

- Antibiotic Therapy Vs. Watchful Waiting
  - Amoxicillin, Omnicef, Rocephin
- Watchful waiting becoming standard of care in selected groups
  - >6 mos, uncomplicated, without systemic signs
  - Most cases spontaneously resolve
  - SNAP guideline

# Dx of OM with Effusion

- Most children will develop a sterile effusion following episode of AOM
- Chronic
  - Absence of acute symptoms
  - Preceded by AOM
  - Presence of effusion for > 3 months
  - Loss of mobility of TM



# Natural History of OM with Effusion

- Two-thirds of children with AOM develop OM w/effusion
- Spontaneous resolution within 90 days in 80% to 90% of cases

# Sequelae of Chronic OM with Effusion

- OM w/Effusion greater than 3 months can lead to:
  - Hearing loss
  - Language delay
  - Behavioral problems
  - Poor academic performance

# Conventional Treatment of Chronic OM/Effusion

- Observation w/follow up recommended at 6, 9 and 12 weeks
  - Include pneumatic otoscopy/tympanometry
  - Antibiotic trial may be helpful
- Surgical intervention
  - Persists >4 months w/bilateral conductive hearing loss >20 dB
  - Tympanostomy tube placement
    - +/- adenoidectomy

# Osteopathic Approach to Otitis Media

- Normalize/improve structural deficits to allow appropriate function of body's immune system
  - Correct somatic dysfunction of appropriate structures
    - Often result of birth trauma
  - Open eustachian tube to allow drainage
  - Encourage sinus drainage
  - Improve lymphatic flow
  - Reduce dependence on antibiotics
  - Decrease need for invasive procedures
  - Prevent sequelae of chronic otitis media w/effusion

# Osteopathic Research

- *Archives of Pediatrics and Adolescent Medicine, 2003*
  - Mills, et al. The Use of Osteopathic Manipulative Treatment as Adjuvant Therapy in Children with Acute Recurrent Otitis Media
    - 57 patients (25 intervention, 32 control) between 6 months and 6 years of age
    - Pediatrician and osteopathic physician both blinded
    - Variety of treatments used to treat body and head and neck
    - Intervention group: fewer episodes of AOM, fewer surgeries (1 vs. 8), more normal tympanograms

# Osteopathic Research

- Steele, et al. Pilot Study
  - Developed 7 minute treatment protocol for 3<sup>rd</sup> year medical students
  - Small study, case-controlled
  - Trend toward improvement in tympanograms in treatment group at two weeks

# Dr. Heatherington

- Direct manipulation of eustachian tube in posterior nasopharynx
- Takes 10-20 seconds
- Extremely uncomfortable – gag reflex

# Fulford's Approach

- Birth Trauma
- Insufficient lymphatic drainage secondary to restrictions in sacrum, pelvis and rib cage
- Treat the whole patient
  - Balance/release the sacrum/pelvis
  - Correct rib cage restrictions
  - Address head and neck
  - Ensure good breath

# Rib Raising



- Hands grasp ribs medially and laterally
- Thumbs put pressure on the rib angles, augmenting the breathing

# Galbreath Mandibular Technique



- Seated or supine
- Affected ear away from practitioner
- Superior hand steadies the head
- Inferior gently grips the mandible
- Apply gentle downward and transverse pressure across the face
- 3-5 second cycle for 30-60 seconds
- Can be taught to parents to do at home

# Ear Pull Technique



- Patient supine
- Seated behind the patient
- Apply equal ear pull bilaterally with a gentle force until symmetry or bilateral lessening of restriction is felt
- Not suggested in a moving infant or toddler

# Sinus Effleurage



- Patient supine
- Gently bring the thumbs across the frontal and maxillary sinuses
- Perform over two to five minutes, from medial to lateral ending up towards a point near the ear lobes in the neck region
- Then use the thumb to milk the lymphatic fluid down the anterior aspect of the SCM along the anterior cervical lymphatic chain towards the heart.
- Can be repeated and taught to the parent as needed.

# Temporal Bone Technique



- Thenar eminences on mastoid portions, thumbs along mastoid processes
- Fingers interlaced under occiput
- Rotate petrous portions externally and draw them posteriorly. Hold
- Maintains external rotation of the petrous portions
  - Opens eustachian tube

Thank You.

