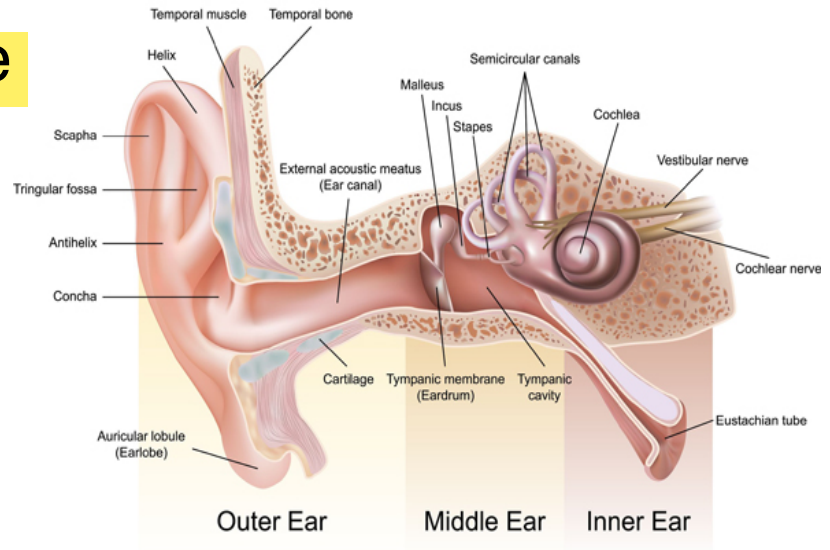


Acute Otitis Media

JUH

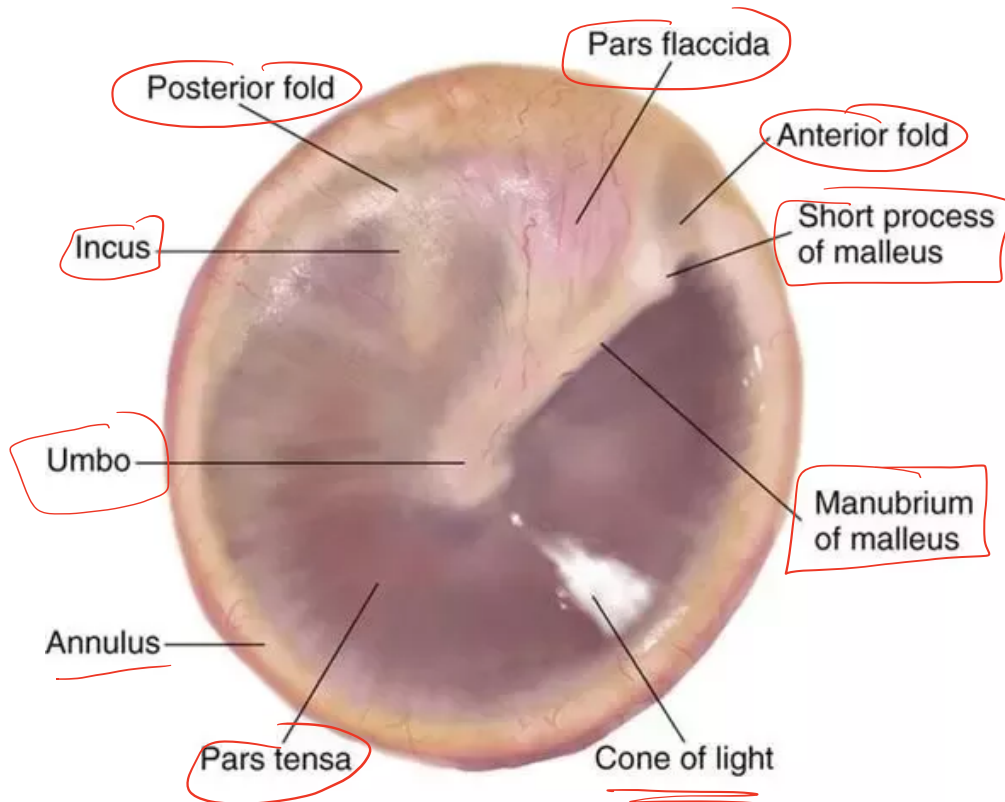
Definition

- The first 3 weeks of a process in which the **middle ear** shows the signs and symptoms of **acute inflammation**
- Peaks between the ages of 3 and 7.



- Neonates: Irritability or feeding difficulties
- Older children: consistent presence of fever and otalgia, or ear tugging
- Older children and adults: **Hearing loss becomes a constant feature of AOM** and otitis media with effusion (OME); **ear stuffiness** is noted before the detection of middle ear fluid

Normal Tympanic Membrane



TYMPANIC MEMBRANE

Otitis Media Stages
Tympanic Membrane View with
Otoscope

Stage One (Hyperemia)

- In the mucosa of the middle ear including TM
- The earliest pathological change
- Sense of fullness and mild conductive hearing loss

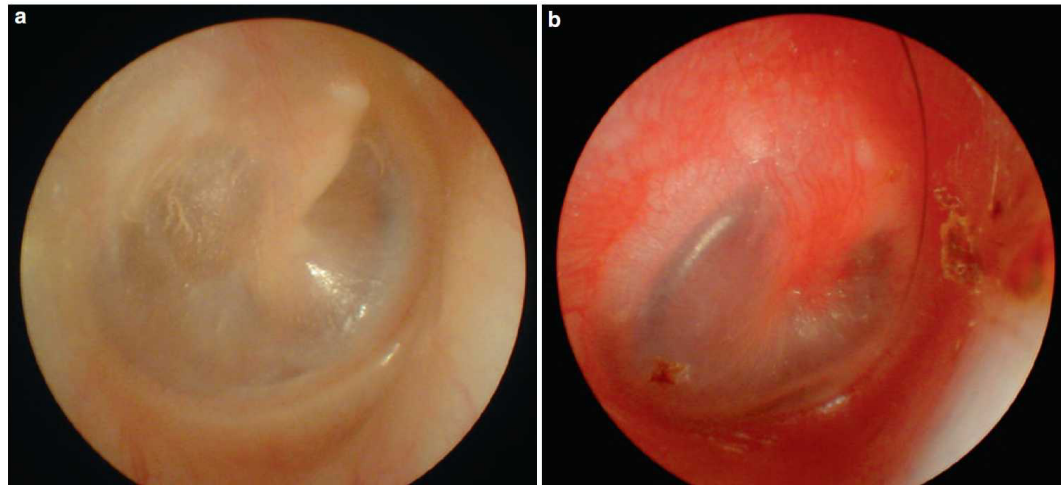


Fig. 1.6.1 (a) Normal tympanic membrane. The short process of the malleus and malleus handle is seen. The tympanic membrane is transparent, sometimes allowing the long process of the incus and

promontorium to be seen. Note the light reflex in the anteroinferior quadrant of the membrane. **(b)** Eustachian tube dysfunction. Note the vascularization along the manubrium mallei

Stage Two (Exudate)

- **Cart wheel appearance**; of fibrin, wbc's and rbc's from capillaries
- **Cuboidal tympanic epithelium** becomes mucus secreting; containing goblet cells
- Tympanic membrane becomes **thick and bulging** with no landmarks
- **Otalgia** with marked fever and **conductive hearing loss**
- **No cone of light**



Stage Three (Suppuration)

- TM perforates inferiorly with mucopurulent fluid discharge
- Pain and fever subside but hearing loss persists



Stage Four (Resolution)

- Majority of cases resolve but some with go into coalesce
- Pain, fever, and mastoid tenderness; All less profound than second stage
- If left can lead to extradural or subperiosteal abscess

Clinical Course

- OM is a **self limiting disease**
- Healing with resolution of tissues toward normal even without treatment
- Most common cause is ***S. Pneumonia***
- Clinical course is shortened and terminated earlier by adequate antibiotic treatment

Diagnosis

- History and physical exam
- Head & neck exam



Diagnosis

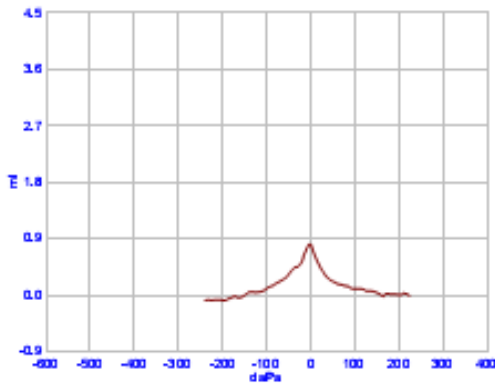
- Pneumatic otoscopy is the standard of care in the diagnosis of acute and chronic otitis media.



Tympanogram

- Type B curve

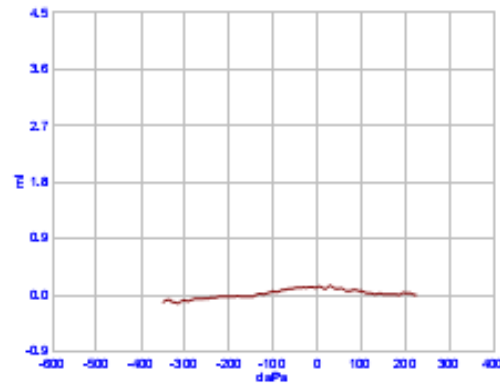
Tymp: Sweep Right



Tymp: Sweep Right Numeric

ECV: 1.33 ml
MEP: -5 daPa
SC: 0.77 ml
Grad: 0.70
TW: 66 daPa
Speed: 400 daPa/sec
Direction: Negative

Tymp: Sweep Left



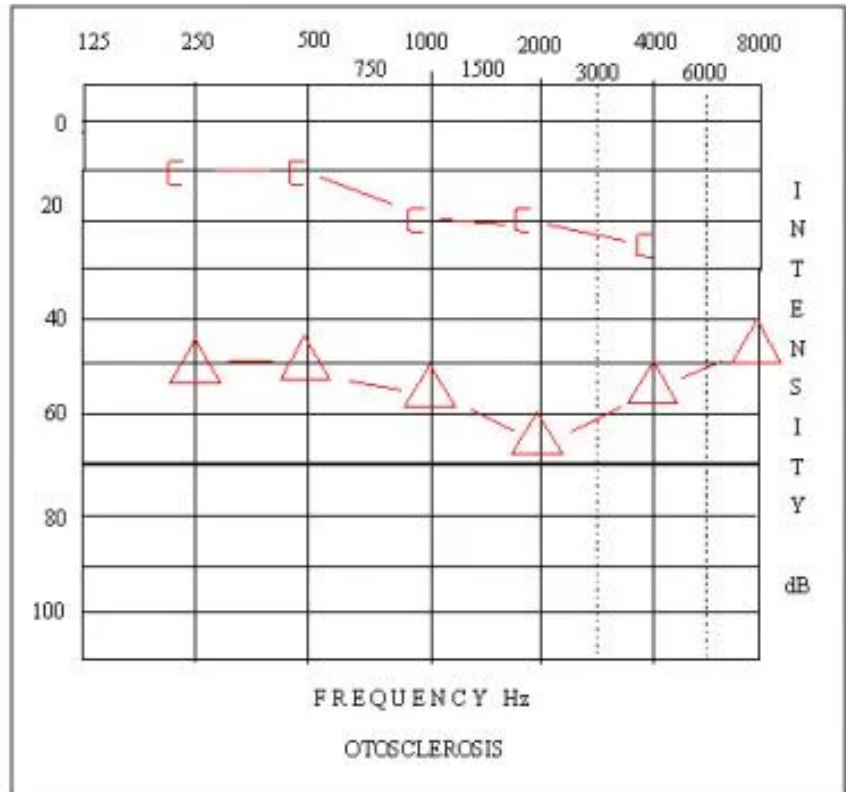
Tymp: Sweep Left Numeric

ECV: 1.40 ml
MEP: 30 daPa
SC: 0.13 ml
Grad: 0.40
TW: 126 daPa
Speed: 400 daPa/sec
Direction: Negative

Diagnosis

- Audiogram??

- Air-bone gap of 15-20dB



Treatment - AOM

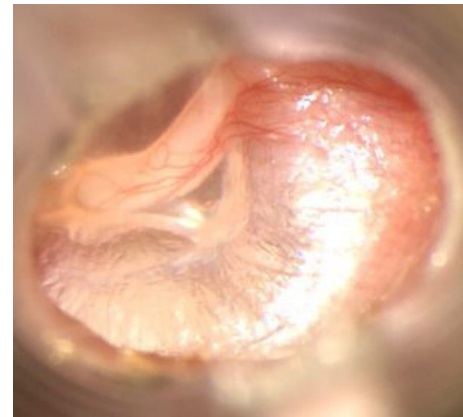
- Best time to treat is **before the beginning of the 3rd stage**
- Antibiotics - consider drug resistance patterns
amoxicillin
- All antibiotics must be given for **7-10 days.**
- In the coalescence stage patient usually needs **IV antibiotics for 24 hours** followed by **cortical mastoidectomy** .

Antibiotics

- In children under the age of 5;
 - *H. Influenza*
 - **Augmentin (Amoxicillin and clavulanic acid)**
- In adults and children above the age of 5;
- *Streptococcus* (Esp. *S. Pneumonia*)
 - **Ampicillin / Amoxicillin/ Erythromycin**

Late Outcomes

- 1) Tympanic membrane perforation
- 2) Tympanosclerosis
- 3) Middle ear effusion
- 4) Adhesion between tympanic membrane, ossicles and medial wall



OTITIS MEDIA WITH EFFUSION

secretory otitis media

glue ear

- It's defined as the presence of fluid (non purulent) in the middle ear.
- Fluid [?] mucoid | serious
- It's the leading cause of hearing loss in childhood.

OTITIS MEDIA WITH EFFUSION (Secretory/nonsuppurative)

- “Glue ear”: describing the thick and glue like fluid in the middle ear.
- persistence of fluid (for weeks to months) within the middle ear resulting in conductive deafness.
- the most common cause of hearing loss in children in the developed world and has peaks in incidence 2-5 years of age
- occurs after an episode of AOM, and children with OME are far more likely to suffer from recurrent AOM.
- may be responsible for developmental and educational impairment, and if untreated may result in permanent middle-ear changes

PREDISPOSING FACTORS

- Family History
- Bottle feeding
- Day care
- Adenoidal hypertrophy
- Exposure to tobacco smoke
- Low socioeconomic status
- Cleft palate (chronic OME)

PATHOGENESIS

- Incompletely understood.
- Normally: middle ear mucosa constantly secretes mucus, which is removed by mucociliary transport into the nasopharynx via the Eustachian tube.
- OME: caused by anything that leads to
 - overproduction of mucus
 - impaired clearance of mucus
 - both

OME due to AOM

- Can be caused by both viral and bacterial infection.
- Infection may lead to inflammatory edema of the mucosa, which may obstruct the Eustachian tube.
- Temporary paralysis of cilia by bacterial exotoxins further impedes the clearance of an effusion.

- Not all patients with OME have a history of infection
- Other factors can lead to OME, the most important one being Eustachian tube dysfunction.

Functions of the ET include:

- 1) Protection of the middle ear from nasopharyngeal secretions.
- 2) Clearance of secretions of the middle ear

THE EUSTACHIAN TUBE

- Is normally blocked and opens temporarily with swallowing
- Air in the middle ear space is absorbed resulting in sub-atmospheric pressure when the ET is closed. When the tube opens temporarily with each swallow, atmospheric air is drawn into the middle ear to equalize the pressure.
- The result of any tubal obstruction is a decrease in the intratympanic pressure due to oxygen consumption from the middle ear.
- Because the walls of the middle ear cant collapse, the negative pressure is maintained and transduction of fluids from the vasculature of the middle ear may result in OME.

OTHER CAUSES

- **Recurrent URTI** (sinusitis/tonsillitis/rhinitis) culture from OME shows mainly pneumococcus/H.influenza.
- **Nasopharyngeal obstruction:**
- In adults the MCC of unilateral middle ear effusion is nasopharyngeal CA (carcinoma or lymphoma)
- **Allergy** ; allergic edema of the ET is the principal cause of obstruction
- **Barotrauma** (diving)
- During descent the outside pressure and the pressure in the nasopharynx is higher than middle ear pressure causing locking of the ET.

CLINICAL FINDINGS

- Can be symptomatic or Asymptomatic
- The most common symptom of OME is **hearing loss.**
- In younger children, the only symptom may be **delayed speech development** or behavioral problems
- Another common symptom is a “**blocked**” feeling in the ear.
- Ear ache is uncommon
- the Mother may notice that her **child tends to do traction to his auricle**

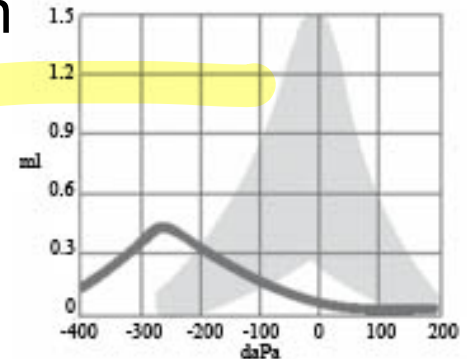
- Yellow discoloration
- Dull TM
- H- Handle of Malleus





AUTOLOGICAL EXAMINATION

- **Conductive hearing loss** with a maximum OF **10-30 db**.
- **Tympanogram:**
- Usually shows **flat type B curve** with absent stapedial reflex.
- In cases of **ET dysfunction** with n accumulated yet, **tympanogram**
c **curve.**



Otitis media with effusion



Air bubbles can be seen in the anterior quadrants of the tympanic membrane



Secretory otitis media.
The effusion is
visible through two
thinned areas of the
tympanic membrane
lying anterior and
posterior to the handle
of the malleus

Management

90% resolve spontaneously without any medical intervention .

Initial management should identify the underlying cause , in adults nasopharyngeal tumors should be excluded .

Otitis media with effusion



Risk factors modifications
and conservative management



Medical treatment



Surgical treatment

90% resolve spontaneously

if fluid persisted beyond 3 months
+hearing is impaired

The following modifications may help:

- Avoiding secondhand smoke
- Breastfeeding whenever possible
- Avoiding feeding, either by breast or bottle, while completely supine
- Avoiding exposure to a large number of children, particularly in daycare centers
- Avoiding exposure to children who are known to be affected
- Avoiding known allergens
- Chewing gum

When to refer to an ENT specialist ?



- An otolaryngologist should be consulted whenever the primary care physician (PCP) is concerned about persistent conductive hearing loss in children, especially those with signs of language development delay or if the disease is recurrent

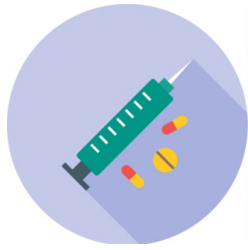
Medical treatment

- Pharmacologic management of otitis media with effusion (OME) includes administration of antimicrobial agents, steroids, antihistamines and decongestants, and mucolytics. However, their use is not recommended with concerns regarding side effects and cost, as well as a lack of evidence for long-term therapeutic effectiveness.



1. Antimicrobial agents

- short-term benefit.
- When the otitis media with effusion becomes chronic (3 mo), the effectiveness of antimicrobials diminishes.



2. steroids

- In 3 placebo-controlled randomized clinical trials, oral steroids alone did not improve otitis media with effusion clearance within 2 weeks of treatment. When oral steroids are combined with antibiotics, the rate of clearance of middle ear effusion does not improve compared with the rate with antibiotics alone.



3. Antihistamines and decongestants

- There is no difference in the clearance rates of the effusion between use of an antihistamine/decongestant or placebo.
- However, nasal obstruction, rhinorrhea, and sinusitis often accompany otitis media, and antihistamines and decongestants may be considered for the relief of these associated symptoms.



SURGERY

Indications for Surgical Intervention

Surgery has become the most widely accepted therapeutic intervention for **persistent otitis media with effusion (OME)**, and it is clearly effective. The interventions include **myringotomy with or without tube insertion**, **adenoidectomy**, or both.



Indications for Surgical Intervention

- surgical intervention was supported if fluid persisted **beyond 3 months**, but observation is an option if hearing is not impaired, therefore, continuous hearing assessment is a must.
- For patients with hearing loss and otitis media with effusion, **a loss of 40 dB or greater is an absolute indication for pressure equalization tube insertion.** A **loss in the range of 21-40 dB is a relative indication with a very low threshold for placement.**

Myringotomy

- is a surgical procedure in which a tiny incision is created in the eardrum (tympanic membrane) to relieve pressure caused by excessive buildup of fluid, or to drain pus from the middle ear.
- Myringotomy and aspiration is useful to treat patients with moderate to severe hearing loss as they recover normal middle ear function.

Myringotomy with PET (Grommet tube) insertion

- When myringotomy is performed alone without the placement of pressure equalization tubes, this procedure is worse in long-term follow-up in children but when its performed with placement of pressure equalization tubes, there is improvement in hearing, duration of middle ear effusion (MEE), time to recurrence, and less need for repeated procedures.

Myringotomy & Tympanostomy Tube

Myringotomy



Tympanostomy Tube



Types of Tubes



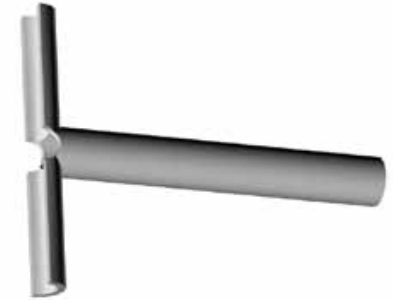
Shepard Grommet



Soileau Tytan®
Titanium Ventilation Tubes



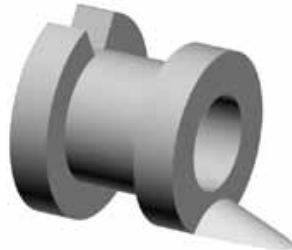
Spoon Bobbins



Goode T-Tubes®



Armstrong Beveled
Grommets, Modified



Paparella-Type Vent Tubes



A



Triune Tubes

All tubes are designed to permit ventilation of the middle ear and mastoid system.

Typically, the tubes self-extrude 9-12 months after placement.

Complications

- Persistent otorrhea (most common)
- Tympanosclerosis
- Persistent perforation

These complications is also known to increase with the placement of tympanostomy tubes (T-tubes) that are designed to stay in the tympanic membrane longer than the typical grommet tube.

Long-Term Monitoring

- No standard of care for the follow-up of patients with otitis media with effusion (OME) has been established.
- Some caregivers follow up with the patient 3 weeks after the placement of the tubes and then every 6 months thereafter, until the tubes extrude or are removed.
- Patients are instructed that if more than 2 episodes of otorrhea occur before the 6-month follow-up is scheduled, they should see their otolaryngologist (ENT) instead of or in addition to their primary care physician (PCP).