

Non-Surgical Management of Serous Otitis Media in Pediatric Population

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Learner Outcomes

- 1- Recognize audiological pattern of conductive hearing loss due to otitis media
- 2- Explain why a fluctuating conductive loss may cause a problem in an educational setting
- 3- Discover an alternative way of providing management options for serous otitis media



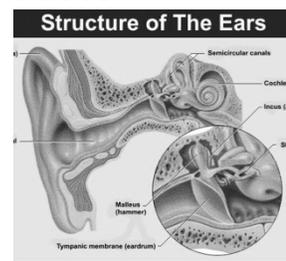
Hearing Tests for Children

- Hearing tests are important since there is an established link between hearing impairments, auditory processing, speech or language delay, learning difficulties and other associated developmental disabilities
- Even slight to mild hearing loss will impact the child and must be ruled out before considering auditory processing weaknesses



Hearing Includes

- Outer Ear and Ear Canal
- Middle Ear (eardrum and ossicular chain)
- Inner Ear (cochlear) and Central Auditory Nervous System
- Conductive Hearing Loss
- Sensorineural hearing loss
- Mixed Hearing loss



Recognizing Conductive Loss

- Normal BC thresholds
- Abnormal AC thresholds
 - An air-bone gap is present at .5, 1, 2, and 4 kHz
- WRS should be nearly normal, as there is no damage to the cochlea/nerve

This patient has a mild CHL

Image from telemedicine.orbis.org

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Recognizing Conductive Loss

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Eustachian Tube Dysfunction (ETD)

- The Eustachian tube is a small canal that connects the middle ear to the back of the nose and upper throat. Its purpose is to equalize the air pressure on the middle ear with the outside environment
- ETD occurs when the tube fails to open during swallowing or yawning, which results in a difference between the air pressure inside and outside the middle ear. It causes discomfort in the ear, hearing problems and may result in fluid accumulation behind the eardrum
- Children have a higher chance of developing ETD

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What is Otitis Media with Effusion

- Otitis media with effusion (**OME**) is a collection of non-infected fluid in the middle ear space. It is also called serous or secretory otitis media (SOM). This fluid may accumulate in the middle ear as a result of a cold, sore throat or upper respiratory infection.
- OME in children can be difficult to diagnose in comparison to an ear infection; because it often has no obvious symptoms and the child usually does not appear to be ill
- Fluctuation in the hearing loss

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Slight to mild loss (16-25dB)

Possible impact on Understanding of Language and Speech

Child may have difficulty hearing faint or distant speech

- at 16dB student can miss up to 10% of speech signal when teacher is at a distance greater than 3 feet
- A 20dB or greater hearing loss in the better ear can result in absent, inconsistent or distorted parts of speech especially word endings (s, ed) and emphasized sounds
- Percent of speech signal missed will be greater whenever there is background noise in the classroom
- Young children have a tendency to watch and copy the movements of other students rather than attending to auditorily fragmented teacher directions



Slight to mild loss (16-25dB)

Possible Social Impact

- May be unaware of subtle conversational cues which could cause a child to be viewed as inappropriate or awkward
- May miss portion of fast-paced peer interactions that could have an impact on socialization and self concept
- Behavior may be confused for immaturity or inattention
- May be more fatigued due to extra effort needed for understanding speech



Mild loss (26-40dB)

Possible impact on Understanding of Language and Speech

- Child can "hear" but misses fragments of speech leading to misunderstanding
- Degree of difficulty in school will depend on noise level in the classroom, distance from teacher and configuration of loss
- At 30dB can miss 25-40% of the speech signal
- At 40dB may miss 50% of classroom discussions especially if speaker is not in line of vision
- Will miss unemphasized words and consonants
- Often experience difficulty learning early reading skills such as letter/sound associations



Mild loss (26-40dB)

Possible Social Impact

- Barriers begin to build with negative impact on self-esteem as child is accused of "hearing when he/she wants to, "daydreaming" or "not paying attention"
- May believe he/she is less capable due to difficulties understanding in class
- Child begins to lose ability for selective listening and has increased difficulties suppressing background noise causing the learning environment to be more stressful
- Child is more fatigued due to effort needed to listen



Similarities Between Mild Hearing Loss and ADD

Mild Hearing Loss	Attention Deficit Disorder
Inappropriate responses	Blurting out answers before questions are completed
Difficulty following directions	Difficulty following through on instructions and organizing tasks
Difficulty sustaining attention during oral presentations	Difficulty in listening to others without being distracted or interrupting
Impulsive	Acts on the spur of the moment
Frequently asks for repetition	Focuses only with frequent reinforcement or is under very strict control
Poor self-concept	Isolated and low self esteem
Doesn't seem to listen	"Can't sit still and listen"



Otitis Media

- Ear infection or otitis media (OM) is the most frequent medical diagnosis for children. OM is an inflammation in the middle ear that usually causes fluctuating hearing loss averaging 21-40dB.
- The National Center for Health Care Statistics estimates 70 cases in every 100 children under 5 years old.
- It ranks second to the common cold in preschool children. Many children with a loss due to OM will pass a school screening test. It is not diagnosed 50% of the time.
- Almost all children have one episode by age six
- 63% have a recurrence
- 96% have OM in the first year of life
- 85% have OM in the first six months
- An estimated 5 million days are missed every year due to otitis media. When a child has OM, the fluid that arises takes an average of 40 days to be absorbed or drain. If a child has chronic OM (4-5 episodes over a 6-12 month period), he/she could experience a possible 200 days of reduced hearing in a year. 30% of students with learning disabilities have histories of chronic middle ear problems.



Antibiotic Considerations

Risk of Antibiotics

- Gastrointestinal upset
- Allergic reactions
- Accelerated Antibacterial resistance

Ventilation Tubes

- 667,000 children under the age of 15 receive tubes every year
- \$2200 per person is the estimated cost (1.5 billion annual)
- Concerns that it is an overuse type of treatment
- Anesthesia is required for children

Wait and See

- American Academy of Family Physicians; American Academy of Otolaryngology-Head and Neck Surgery; American Academy of Pediatrics Subcommittee on Otitis Media with Effusion Clinical Practice Guidelines, published in *Pediatrics* in 2004
- These guidelines recommend watchful waiting without surgical procedures, with 3- to 6- month reassessments of symptoms, hearing, and the development of tympanic membrane pathologic abnormalities for normal, asymptomatic children with hearing thresholds of less than 40 dB.

Surgery Considerations

- Problem of recurrent middle-ear effusion even following middle ear PE surgery
- Surgery does not address the underlying cause/etiology of otitis media with effusion
- There is a higher chance of poorer hearing thresholds in the long run
- Anesthesia concerns

Anesthesia Considerations

- Cognition and Anesthesia
 - Growing concerns that general anesthesia may cause neurotoxic changes in the developing brain that lead to adverse neurodevelopmental outcomes later in life
 - Children exposed to anesthesia scored significantly lower in listening comprehension
 - The Academy has coordinated a response to a recent Food and Drug Administration (FDA) warning that cautions health care practitioners about the possibility of developmental problems associated with repeated or prolonged use of anesthetics in children younger than 3 years of age. The agency is requiring warning labels on all anesthetic agents and sedatives, including propofol, midazolam and all volatile anesthetic agents.

Politzer Maneuver



Politzer Bag

Physician asks the patient to swallow as he/she would squeeze the bag
 Idea is that general pressure would open the Eustachian tube and aerate the middle ear

Problem:

Amount of pressure that is put into the ear, since there is no control over air pressure flow

Coordination between inserting the air pressure and swallowing is difficult to achieve with children

Ear Popper

- Non-invasive device
- Delivers a constant controlled stream of air pressure
- Plug one nostril and hold the device to the other nostril, push the button to start airflow, and swallow while the device is running
 - For children, can have them drinking through a straw



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Does EarPopper device improve hearing

- Study took about 3 years
- 94 children, ages 4-11 with hearing loss due to OM
- Use of ear popper 2 times a day
- 74% resolved within 7 weeks
- Another 10% after an additional 3-4 weeks

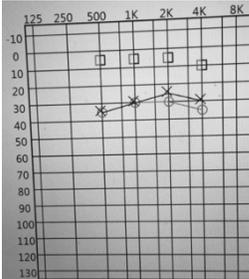
Independent Studies

- Japan
- Nigeria
- Clinical Otolaryngology 2015



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Our Clinic Experience



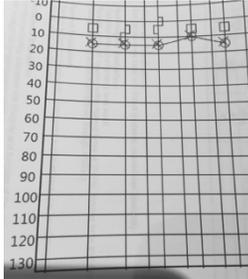
Ages 4-11

- First follow up in 1 week
- Second follow up in 2 weeks
- Third follow up in 2 weeks
- Fourth follow up in 2 weeks
- Fifth follow up in 3 weeks

- Patients come in with the device (a pre and post Tympanogram is done)

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Our Clinic Experience

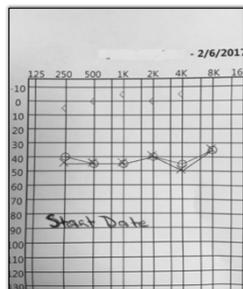


- Over a span of 3 months
- Many patients do not return but parents will comment that pediatrician has done immittance and there is no fluid

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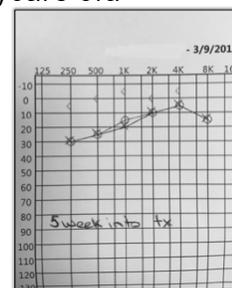
DM, girl 6 years old

Start Date



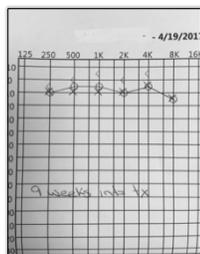
DM, girl 6 years old

5 week visit post start date



DM, girl 6 years old

Last visit -9 weeks post start date



References