The Evaluation & Treatment of Hearing Loss in Children & Adults

Overview

• Types of hearing loss and common causes of hearing loss
• Dangers of noise exposure
• When to refer to an audiologist and how to find one in your area
• Impact of hearing loss on communication and other aspects of life
• Basic information about hearing aids and treatment options
• What you can do as a member of the patient’s care team

Types of hearing loss

• Sensorineural
• Conductive
• Mixed
Sensorineural hearing loss
- Most common type of hearing loss
- Permanent
- Damage to the inner ear
- Sounds are softer but can also be unclear or distorted
- Typically treated with amplification
- Causes
  - Aging, noise exposure, ototoxic medications, infection, genetics, vascular disease, head trauma

Conductive hearing loss
- Sound traveling to the inner ear is blocked
- Some conductive hearing losses can be medically treated
- Causes
  - Wax impaction, ear infection, tympanic membrane damage, mass in the middle ear, stiffening of middle ear bones

Mixed hearing loss
- A combination of sensorineural and conductive hearing loss
- The patient may benefit from medical intervention and amplification depending on the cause of the hearing loss
Hearing loss affects all ages

- Although hearing problems are commonly associated with the normal aging process, more than half of all hearing-impaired persons are under the age of 65
- One in five Americans >12 years old experiences a hearing loss
- Head trauma, noise exposure, infections, medications, etc.

Sources: American Academy of Audiology; Le et al. (2017)

Causes of hearing loss in children

- Congenital causes
  - Genetic
    - Down syndrome, Usher syndrome, Treacher Collins Syndrome
  - Non Genetic
    - Infections in-utero (CMV, syphilis), severe jaundice, low birth rate
- Acquired causes
  - Head trauma, medications, infections following birth (meningitis)
- Unknown

Sources: CDC, WHO (2017)

Hearing loss statistics (Adults)

- Approximately 37.5 million American adults report some trouble hearing
- Age is the strongest predictor of hearing loss among adults aged 20-69, with the greatest amount of hearing loss in the 60 to 69 group
- About 28.8 million U.S. adults could benefit from hearing aids
- Hearing loss is the third most common chronic physical condition in the US and is twice as prevalent as diabetes or cancer

Hearing loss statistics (Pediatrics)

- Hearing loss is the most common congenital condition at birth
- 3/1000 children in US are born with congenital hearing loss
- More than 90% of deaf children are born to hearing parents
- Babies born at hospitals in Ohio receive a newborn hearing screening at birth
  - Babies who do not pass, are referred for additional testing with an experienced audiologist
- Early identification of hearing loss is crucial for language development

Sources: CDC (2010); NIDCD (2016); Mitchell & Karchmer (2004)

Noise induced hearing loss

- An estimated 40 million Americas have hearing loss and 10 million are believed to be attributed to noise exposure
- A typical conversation occurs at 60 dB (safe)
- Headphones at maximum volume, can reach over 100 dB, loud enough to begin causing permanent damage after just 15 minutes per day
- A gunshot can reach between 140-190 dB causing immediate permanent damage

Sources: Dangerous Decibels

Noise induced hearing loss cont.
Noise induced hearing loss cont.

- Noise is the most common modifiable environmental cause of hearing loss among young and middle-aged adults
- 1 in 4 adults (ages 20-69 years) had audiograms suggestive of noise induced hearing loss
- 1 in 5 adults (ages 20-29 years) had audiograms suggestive of noise induced hearing loss
- 1.1 billion young people (12-35 years) are at risk of hearing loss due to exposure to noise in recreational settings

Sources: Carroll, et al. (2017); WHO (2017)

Who is an audiologist?

- Primary healthcare professionals for the evaluation, diagnosis, treatment, and management of hearing loss and balance disorders
- Education requirement
  - Minimum of a Master’s level degree
  - Current entry level degree is Doctor of Audiology (Au.D)

Audiogram
Audiogram
• X = Left ear
• O = Right ear

How to find an audiologist in Ohio
• Visit The Ohio Academy of Audiology webpage
  • http://ohioacademyofaudiology.com/
  • Click on “Find an Audiologist”
  • Search by zip code

When to refer to an Audiologist (Adults)
• Patient says “what” or “huh”
• Reports that others are mumbling or speaking softly
• Reports “I can hear people talking, but I can’t understand what they’re saying”
• Patient has difficulty with multiple speakers or in background noise
• Patient turns the volume up on the TV/radio
• Reports of ringing, buzzing, humming, sounds in ears
• One ear is better than the other
• Dizziness or balance concerns
• Works in loud environment, history of noise exposure
When to refer to an Audiologist (Pediatrics)

- Does not startle to loud sounds (infancy)
- Does not turn to look for sounds (6 months)
- Does not say single words (1 year)
- Risk factors (ie: low birth weight, prematurity, failed UNHS, NICU admission)
- Speech is delayed or isn’t clear
- Turns volume up on TV/media
- Asks for repetition ("what", "huh")
- Unsure if child is having difficulty hearing or with attention
- In general, delayed milestones, parental concerns, or concerns from teachers/caregivers (failed hearing screening)
- Tugging on ears

Common misconceptions

- Hearing aids are for “old people”
- I can hear, everyone else is mumbling!
- I only have a mild loss…not enough to need a hearing aid
- My child can hear fine, they just like the TV loud or they’re distracted

Consequences of untreated hearing loss

- Feelings of embarrassment
- Reduced self-esteem
- Stress/fatigue
- Withdrawal and isolation
- Negative consequences on relationships, interactions with family/friends
- Anger/frustration
- Anxiety, loss of sense of security
- Diminished psychological well-being and overall quality of life
- Impact on cognitive health
Consequences of untreated hearing loss cont.

• Untreated hearing loss is independently associated with 24% increased risk for cognitive impairment and 30-40% increased rate of cognitive decline

• Increased risk of developing dementia
  • Mild hearing loss = 2x more likely
  • Moderate hearing loss = 3x more likely
  • Severe hearing loss = 5x more likely

• Increased risk of hospitalizations

• Poorer self-rated health

Sources: Reither & Head, 1999; Kuklick & Begun (2000); Lin et al., (2011 & 2013)

Hearing Loss Simulation

• [https://www.youtube.com/watch?v=PbBZjT7nuoA](https://www.youtube.com/watch?v=PbBZjT7nuoA)

Consequences of untreated hearing loss cont.

• In children...
  • Impacts the development of language (impacts reading, social skills, and future employment)
  • Babies start hearing in the womb → importance of early identification
  • Immediate intervention for hearing loss allows early development of language and communication skills
  • Speech, language, and communication development is between birth and 3 years of age
Unfair Hearing Test

- [https://www.youtube.com/watch?v=LVPjb19ur9Y](https://www.youtube.com/watch?v=LVPjb19ur9Y)

Joint Committee on Infant Hearing (JCIH)

- Early Hearing Detection and Intervention (EHDI)
- National 1-3-6 Plan
  - Screen at birth or before 1 month
  - Diagnostic follow-up before 3 months
  - Early intervention before 6 months
    (medical treatment, hearing aids, etc.)
- Ohio Department of Health
  - Find a pediatric audiologist feature

Hearing aids

- Electronic device that uses digital signal processing to amplify, process, and deliver sound to the ear
- Improves audibility of sound
- Attempts to improve the signal to noise ratio to help with understanding in background noise
- Different styles, levels of technology, and capabilities depending on hearing loss and lifestyle (i.e., Behind-The-Ear, Receiver-In-Canal, In-The-Ear, CROS)
Hearing aids in 2018

• Smaller and more discrete options available
• Bluetooth compatibility
  • Stream music, phone calls, television wirelessly to the devices
  • “Find my hearing aids” feature
  • Hearing aids can “geo-tag” to different locations (home, restaurant, work, etc.)
• Rechargeable
  • Charge hearing aids over night instead of replacing batteries

Additional treatment options

• Cochlear Implantation
• BAHA
• Assistive listening devices
• Alerting devices
• Aural rehabilitation programs
• Support groups

What you can do in the office (Adults)

• Gain the patient’s attention prior to initiating conversation
• Face the patient, don’t turn your back while speaking
• Speak at a slower rate
• Include pauses between thoughts to allow the listener to process
• If asked to repeat, rephrase instead of just repeating word for word
• Articulate
• Provide written instructions and notes when possible
What you can do in the office (Pediatrics)

- Ensure the UNHS was completed
  - If passed, are there concerns for hearing, speech/language development, ear infections, etc?
  - If failed/referred, did they follow-up?
- If they didn’t help them schedule!
- Review milestones for speech, language, and communication
- Educate young people about safe listening

Recommendations

- Provide screenings for patients over the age of 50
- Provide a hearing handicap questionnaire (10 simple questions)
- Discuss hearing and balance concerns at annual appointments
- Discuss pediatric developmental milestones
- Refer to audiology if there are questions/concerns
- Patients with Medicare require a physician referral; most other patients can directly seek care from an audiologist
- You are the gatekeeper!

Thank you!