Hearing Loss and Cognitive Effects

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No Disclosures
Learning Objectives

• Describe the most common causes and types of age-related hearing loss, and related medical treatments
• Discuss the effects of age-related hearing loss on cognition and day-to-day functional abilities
• Share ideas on how to minimize the cognitive effects of hearing loss
Hearing Loss and Age

Age Related Hearing Loss

Sensorineural hearing loss
Age Related Hearing Loss

- Cumulative injury leads to hair cell loss
Age Related Hearing Loss

Chance
GET OUT OF JAIL FREE
THIS CARD MAY BE KEPT UNTIL NEEDED OR SOLD
Age Related Hearing Loss

Low pitched sounds

High pitched sounds
Age Related Hearing Loss
Age Related Hearing Loss
Age Related Hearing Loss

Wah wa-wah wa-wah wah wah wah wa-wah wa-wah wah wah wa-wah wa-wah wah wa-wah wa-wah wah wa-wah wa-wah wah wa-wah wa-wah wah ...
Age Related Hearing Loss

**RIGHT EAR**

- **FREQUENCY IN Hertz (Hz):**
  - 125, 250, 500, 1000, 2000, 3000, 4000, 6000, 8000, 12000

- **HEARING LEVEL IN dB (ANSI 1996):**
  - 0, 20, 40, 60, 80, 100, 120

**LEFT EAR**

- **FREQUENCY IN Hertz (Hz):**
  - 125, 250, 500, 1000, 2000, 3000, 4000, 6000, 8000, 12000

- **HEARING LEVEL IN dB (ANSI 1996):**
  - 0, 20, 40, 60, 80, 100, 120

**SPEECH AUDIOMETRY**

- **R:**
  - SRT: 30, SOT: 100, %: 70, H: 50, MASK: NU 6 by difficulty List 2

- **L:**
  - SRT: 30, SOT: 92, %: 7, H: 50, MASK: NU 6 by difficulty List 1

* = Masked
Age Related Hearing Loss

![Graphs showing hearing levels in different frequencies for right and left ears.](image)
Treatment for Age Related Hearing Loss

- Prevention/protection
- Lifestyle modifications
- Hearing aid amplification
- Cochlear implantation
Protection from Noise
How to Eat at a Restaurant
How to Eat at a Restaurant

- Corner table
- High backs (booth)
- Restaurant with carpet, not high ceilings

Speaker:
- Back against wall
- Light on face

Listener:
- Back to room
Which do you like the best?

I don’t know where to find your vest.
Hearing Aids

• For most people with hearing loss
Cochlear Implants

- For hearing loss that is too severe for hearing aids
Can a Tiny Fish Save Your Ears?
Researchers Use the Zebrafish in Efforts to Find Ways to Regenerate Hearing-Essential Cells

Gene Therapy for Human Sensorineural Hearing Loss

The Johns Hopkins Human Inner Ear Gene Therapy Trial: CGF166 Inner Ear Gene Therapy Research Study
Age Related Hearing Loss
Hearing Loss

What else?
What Else?

Hearing Loss

- Loneliness
- Employment
- Cognitive function
- Depression
- Driving Habits
- Falls
- Social Engagement
- Psychological Distress
- Health Care Satisfaction
Hearing Loss and Cognitive Function

- Loneliness
- Employment
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Hearing Loss and Cognitive Function

For Better Brain Health, Preserve Your Hearing

Hearing loss is the largest modifiable risk factor for developing dementia, exceeding that of smoking, high blood pressure, lack of exercise and social isolation.

Hearing loss may cause dementia, study finds

Addressing hearing impairment may help prevent the condition, the researchers said.

Can Hearing Aids Help Prevent Dementia?
Hearing Loss and Cognitive Function

FACT?
OR
FICTION?
Hearing Loss and Cognitive Impairment and Dementia
Dementia Risk

- **Mild Hearing Loss**: 2X
- **Moderate Hearing Loss**: 3X
- **Severe Hearing Loss**: 5X
Hearing Loss and Cognitive Impairment

CAUSE

EFFECT
Hearing Loss and Cognitive Impairment

Hearing Loss → Cognitive Impairment and Dementia
Hearing Loss and Cognitive Impairment

Hearing Loss  Cognitive Impairment and Dementia
Hearing Loss and Cognitive Impairment

Hearing Loss

???

Cognitive Impairment and Dementia
Hearing Loss and Cognitive Impairment

Hearing Loss → Cognitive Impairment and Dementia

???
Hearing Loss and Cognitive Impairment

Hearing Loss

- Reduced Socialization
- Cognitive Load
- Brain Structural Changes

Cognitive Impairment and Dementia
Hearing Loss and Cognitive Impairment

Neurological processes
Microvascular Disease

Hearing Loss

Cognitive Impairment and Dementia
Hearing Loss and Cognitive Impairment

Degree of Cognitive Impairment

Mild Cognitive Impairment

Dementia
Hearing Loss and Cognitive Impairment

Cognitive Domains Impaired

- Neuropsychiatric Symptoms
- Executive Function
- Memory
- Social Interactions
Do Hearing Aids Prevent Cognitive Impairment?
Do Hearing Aids Prevent Cognitive Impairment?

Hearing treatment for reducing cognitive decline: Design and methods of the Aging and Cognitive Health Evaluation in Elders randomized controlled trial

Jennifer A. Deal¹,²,³, Adele M. Goman²,³, Marilyn S. Albert⁴, Michelle L. Arnold⁵, Sheila Burgard⁶, Theresa Chisolm⁷, David Couper⁸, Nancy W. Glynn⁹, Theresa Gmelin¹⁰, Kathleen M. Hayden¹¹, Thomas Mosley¹², James S. Pankow¹³, Nicholas Reed²,³, Victoria A. Sanchez¹⁴, A. Richey Sharrett¹⁵, Sonia D. Thomas¹⁶, Josef Coresh¹⁷,⁸,¹⁸, Frank R. Lin¹,²,³,*, for the ACHIEVE Investigators
Do Hearing Aids Prevent Cognitive Impairment?

Risk

Reward
Summary

- Age related hearing loss is common
- Age related hearing loss is associated with cognitive impairment
- Cognitive impairment *may* be slowed/prevented by treatment of hearing loss
Thank You