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Gerontology 2010; 56:351-358

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Introduction
Introduction 1/2

- A shift in population demographics
- Presbycusis (age-related hearing loss)
  - Age related
  - 70-80% of over 75 year-old people
  - Bilateral, symmetric hearing loss
  - Problem in understanding speech (high frequency)
  - Etiology
- Noise-induced hearing loss (NIHL)
Introduction 2/2

- Hearing loss in people over 60
  - Quality of life
    - Depression
  - A leading cause of years lived with disability (YLDs)

- Hearing loss in people over 60 - Treatable
  - Hearing aids (HA)
  - Cochlea implant (CI)
  - Electric acoustic stimulation (EAS)
Methods

Reviewed 431 articles

- 419 from Pubmed
- 5 general internet research
- 7 from reference mining
Review of hearing technology
- Hearing Aids

- Effective in treating presbycusis
- The type and severity of hearing loss
- Variety of shapes and sizes
  - Behind the ear
  - In the canal
  - Completely in the canal
Review of hearing technology
- Hearing Aids
Review of hearing technology
- Hearing Aids

● Analog HAs
  - Sound waves
  - Microphone
  - Electric Signal
  - Amplifier
  - Receiver
  - Tympanic membrane

● Digital HAs
  - Additional features-programmms
  - Acoustic feedback
  - Background noise
  - Multidirectional microphone
  - Transpose frequencies
Outcomes with HAs

- Benefit in social-emotional, communication, depression
  - after 12 months use
  - 192 elderly hearing-impaired veterans
- Average decibel gain: 16.3 dB, S.D=2.4dB
- QoL: improved
- The acceptance of the device
  - Cosmetically: OLD
Hearing assisted technology-FM system

- Frequency modulator
- Useful in churches
- Study
  - 36/36 continued to use it after the study
  - 30/36 continued to use it for one year
Active middle ear implants (AMEI)

- Cosmetic reason
- Not severe enough for CI

- Better than HA in patients with
  - Collapsed canal
  - Difficulty cleaning ear mold

- Weak points
Cochlear implants (CI)

- **Severe HL (> 70dB)**
- **Electrical stimulation to the auditory nerve**
  - Bypass ear canal
  - Middle ear
  - Hair cells in the cochlea
- **Improved in life quality**
- **Strong and weak points**
Electric Acoustic Stimulation (EAS)

- An HA and a CI together in one ear
- **HA**: amplified the lower frequency
- **CI**: electrical stimulation of high frequency area of the cochlea
Conclusion

- Improved QoL in the elderly
  - **HA**: effective in mild-moderate HL
  - **CI**: improved QoL in severe presbycusis
  - **AMEI**
  - **EAS**: patients with sufficient residual low frequency hearing

- Hearing screening

- Prevention of NIHL in the young
Thank you for your Attention!