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SENSORY TECHNOLOGIES:
PREPARING FOR THE ATP EXAM

Michelle L. Lange, OTR/L, ABDA, ATP/SMS

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Learning Objectives

After this course:

1. The participant will be able to list 3 assistive technologies commonly used by people who are hard of hearing.
2. The participant will be able to list 3 assistive technologies commonly used by people who are deaf.
3. The participant will be able to list 3 assistive technologies commonly used by people who have low vision.
4. The participant will be able to list 3 assistive technologies commonly used by people who are blind.

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What we will be covering:

- Hearing
  - Hard of hearing
  - Deafness
- Vision
  - Low vision
  - Blindness
- Deaf/Blind technologies

Baby Cry Sound Signaler

M. Lange 9.2016 6

The ATP Certification

- The Assistive Technology Professional (ATP) certification is offered through the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA)
- This demonstrates a basic level of competence in the practice area of Assistive Technology
  - Over 4000 people hold the ATP certification
- This series of courses will include information to prepare the candidate for this examination

RESNA Rehabilitation Engineering and Assistive Technology Society of North America

The ATP Certification

- The candidate must fulfill specific pre-requisites before taking the examination
- For Occupational Therapy Practitioners with a Bachelor's or Master's degree, 1000 hours of work experience is required over 6 years.
- For further information:
  - http://www.resna.org/get-certified/exam-eligibility-requirements

Context

- Many clients using Assistive Technologies have multiple impairments: motor, cognitive, and/or sensory
- The Assistive Technology Professional must address all of these needs in provided interventions
- Clients who solely have a sensory impairment are typically seen by professionals who are highly trained in this area
  - Important to identify these resources and refer

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Hearing

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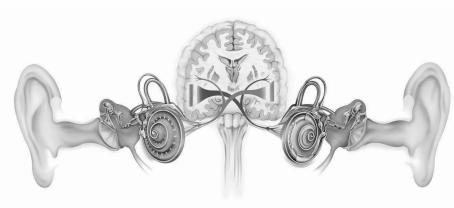
Hearing

- Hearing Impaired
  - Describes any degree of hearing loss
  - Offensive to many deaf and hard of hearing individuals
- Hard of Hearing
  - Mild to moderate hearing loss
- Deaf
  - Very little or no functional hearing



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Types of Hearing Loss

- Conductive
  - Sound is not conducted efficiently through the outer ear canal to the eardrum and ossicles of the middle ear
  - Reduction of sound level or ability to hear faint sounds
  - This can often be corrected medically or surgically
- Sensorineural
  - Damage to the inner ear (cochlea) or to the nerves from the inner ear to the brain
  - Most common type of permanent hearing loss
  - Reduces the ability to hear faint sounds
  - Even loud speech may sound unclear or muffled
- Mixed

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Goals of Hearing Technologies

- Communication
- Information access

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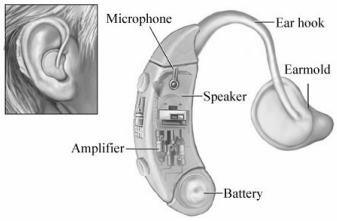
Hearing Aids

- Hearing aids
- Fits in or on the ear
- Amplifies sound
- Electroacoustic system that transforms environmental sound to make it more intelligible or comfortable
  - Sound processing
- Audiologist



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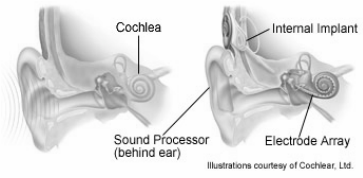
Cochlear Implants

- Cochlear Implants
- Small electronic device consisting of surgically implanted internal components with an externally worn speech processor
  - Microphone
  - Speech processor
  - Transmitter and receiver/stimulator
  - Electrodes



- Does not provide normal hearing
- Used by persons with significant hearing loss who cannot recognize speech with hearing aids

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Hearing Technologies

- These technologies may be used with or without hearing aids or a cochlear implant
- Some of used by people who are hard or hearing, deaf, or either
  - Alerting Devices
  - Telecommunication Devices
  - Assistive Listening Devices
  - Captioning

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Alerting Devices

- These devices use a loud tone, flashing lights or vibration to alert people to environmental sounds
- Device may respond to one specific signal, such as a doorbell
- Devices may respond to a variety of signals, such as the doorbell, telephone or a baby's cry
- Signals may be transmitted to receivers through a home, activating a light to flash or a device to vibrate

Wireless Doorbell and Telephone Signaler

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Alerting Devices

- Baby cry signaler
  - Adjustable sensitivity
- Doorbell signaler
  - Works with or without an existing doorbell system
- Carbon Monoxide detector
- Smoke alarm signaler
  - Often built-strobe lights

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Alerting Devices

- Telephone signaler
  - One type plugs into the telephone line and electrical outlet
  - One type attaches to the side of a telephone to detect the sound of the ringer
- Wake-up alarm signaler
  - Portable alarm clocks with built-in strobe lights
  - Alarm clocks with built-in outlet to plug in lamp or vibrating alert
- Weather alert
  - Gives notice of upcoming storms or dangerous weather conditions
  - Can be used in conjunction with optional alerting accessories

Combination Alarm Clock with Super Shaker

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Telecommunication Devices

- These devices provide an augmentative or alternative means of telephone communication
- Amplified ringers
  - Various types of ringers attached to the telephone line
- Amplified telephone (listening)
  - Telephone with built in amplifier (25-55 decibels)
  - Often includes loud ringer
- Portable phone amplifier (listening)
  - Fits over an existing phone headset
  - Adjustable volume control

Amplified Corded Telephone

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Telecommunication Devices

- TTY or TDD
  - Keyboard with a visual display screen that allows communication over telephone lines by typing and reading
  - Portable and wireless versions
  - Computers can function as TTYs with software and additional equipment
- Video Phone
  - Telephone with video screen
  - Allows communication via sign language
  - Video Relay Service (VRS) can be used to interpret the sign language to the “listener”

TTY

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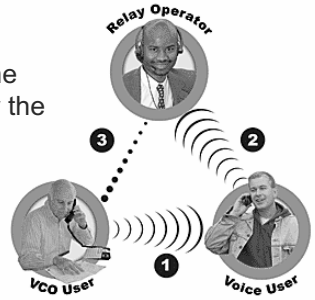
Telecommunication Devices

- For people unable to hear over the phone, but who want to use their voice to communicate:
- Voice Carry Over (VCO) telephone
  - Relay service required
  - Hard of hearing person uses voice, but reads the response of the other person (which is typed by the relay service)
  - Portable version which can be attached to cell phones, pay phones, or cordless phones
- CapTel
  - Relay service required
  - Hard of hearing person uses voice, but reads the response of the other person (which is typed by the relay service)



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Assistive Listening Devices (ALDs)

- These devices are a personal listening device which receives signals from the person speaking, amplifying the sound
- Can be used with an existing hearing aid, but limits background noise
- Audio Induction Loop
  - Microphone, amplifier, and wire (which encircles the seating area)
  - Hearing aid is turned to the "T" (telecoil) switch
  - Person must sit within or need the "loop" of wire
- Neck loop
  - A telecoil neckloop is worn around the neck and transmits information to the hearing aid telecoil through a magnetic field
  - Plugs into a headphone jack of the receiver

Self-contained portable loop

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Assistive Listening Devices (ALDs)

- FM System
  - Wireless system transmits sounds via radio waves
  - Speaker wears transmitter and microphone
  - Listener wears a portable receiver
  - Think “tour group”

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Assistive Listening Devices (ALDs)

- Infrared System
  - Wireless system transmits sound via invisible IR light
  - Receiver has to be in direct line of sight of the transmitter
  - Must be used indoors
  - Often used for home television listening
- Personal Amplified System
  - Portable
  - Can be used indoors or outdoors
  - Used for one-on-one conversations or TV listening

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Captioning

- Closed captioning
  - Captions on TV programs and DVDs
  - Closed caption decoder chip build into TV
  - DVDs often used SDH (Subtitles for the Deaf & Hard of Hearing)
- Activating closed captioning
  - Activation and options vary by TV model
- Open captioning
  - Captions are a permanent part of the picture, rather than an option
  - No decoder required

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Captioning

- Real time captioning
  - Captions are simultaneously prepared and transmitted at the time of the presentation
  - Trained real-time captioners using a stenotype machine

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Emerging Technologies

- Many hearing aids and cochlear implants are equipped to enable digital audio streaming from Bluetooth devices
  - Cell phones
  - TVs
  - Computers

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Emerging Technologies

- Smartphones
  - Vibration alerts
    - Incoming calls
    - Alarms
  - Apps
    - TapTap, Braci, MyEardroid, OtoSense, etc.
      - Vibrates and screen flashes to alert user to nearby sounds
    - RogerVoice, Pedius
      - Subtitling phone app, translates conversation into text
    - Vox Sciences
      - Transcribes voice mails into text
  - Texting

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Vision

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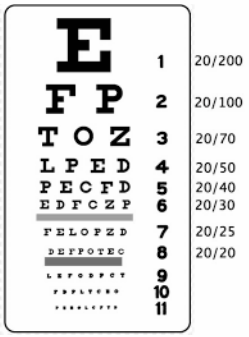
Vision

- Visual impairment means that eyesight cannot be corrected to a normal level
- Functional limitation of the eye or the vision system
  - Acuity
  - Visual field
  - Photophobia (light sensitivity)
  - Diplopia (double vision)
  - Visual distortion
  - Visual perceptual difficulties



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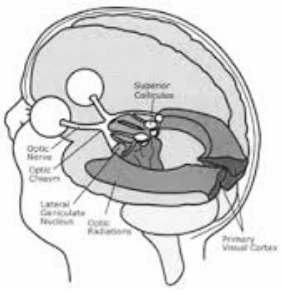
Vision

- Cortical Visual Impairment (CVI)
- Not an acuity problem
- Cortical problem – how the brain processes the information
- Vision may fluctuate
- Vision may improve over time in children



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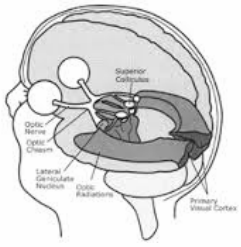
Vision

- Cortical Visual Impairment (CVI)
- Clients often see better out of the sides of the eyes
- Clients tend to glance at an object and may not be able to sustain visual contact
- Clients may move and hold their head in unusual orientations to see optimally



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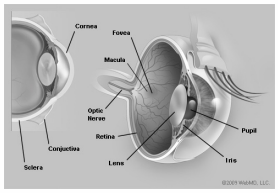
Vision

- Low Vision
  - Visual acuity between 20/70 and 20/400 with correction, or
  - Visual field of 20 degrees or less
- Blindness
  - Visual acuity worse than 20/400 with correction, or
  - Visual field of 10 degrees or less
  - Legal blindness (US)
    - 20/200 or worse with correction or visual field of 20 degrees or less
- *CDC and WHO



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Goals of Vision Technologies

- Information
- Navigation

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Vision Assessment

- Doctor of Optometry
- Ophthalmologist
- Specialist in low vision rehabilitation

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Brightness

- Low Vision – improve brightness
  - Improve lighting
  - Reduce glare
  - Increase contrast

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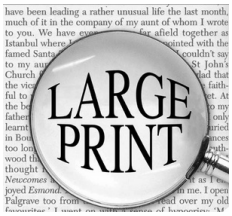
Size

- Low Vision – increase size
  - Move closer
  - Enlarge
    - Large print
    - Phones, clocks, remotes, calendars, keyboards, playing cards, checks, etc. ⟹
  - Magnify



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Size

- Low Vision - Magnify
  - Many powers and types
  - Hand-held
    - Price tags, menus
  - Stands and Video Magnifiers (CCTVs or closed circuit TVs)
    - Reading text

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Organization

- Low Vision - Organize
  - Less background information
    - i.e. cluttered drawer
    - Familiar environment
  - Labels
    - High contrast
    - Enlarged text

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Alerting Technologies

- Low Vision or Blind - Alerting Indicators
  - Liquid level indicators
  - Talking clocks
  - Mail chime – indicates mail is in mailbox

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Reading Technologies

- Kindle, other e-readers and tablets are portable and less costly that CCTV
- Adjust font size
- Adjust contrast
  - White text on black background reduces glare
- Text-to-Speech
- Magnification
  - Not as high a level as CCTVs

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Low Vision: Smartphones and Tablets

- Accessibility features
- Flashlight
- Take a photo and enlarge it to see small print
- Siri
- Magnification Apps
  - iRead
  - iLoupe
  - Magnify

- EyeNote App
  - Scans and identifies the denomination of US paper money

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Audio Technologies

- Low Vision or Blind: Audio information
  - Reading
    - Electronic books
    - E-book readers
    - Audio books
  - Devices with auditory feedback
    - Talking watches
    - Clocks
    - Calculators
    - Glucometers
    - Tape measures

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Reading Technologies

- Reading for the Blind
  - Braille
  - Optical Character Recognition (OCR)
  - Screen Readers

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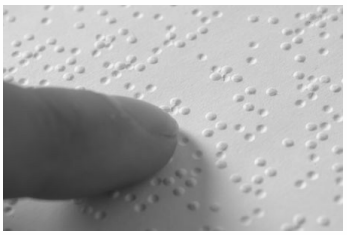
Tactile Technologies

- Tactile - Blind
  - Tactile cues
  - Braille
    - Text
    - Keyboards
    - Braille labels



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Writing Technologies

- Writing for the Blind
  - Keyboard
  - Braille notetakers

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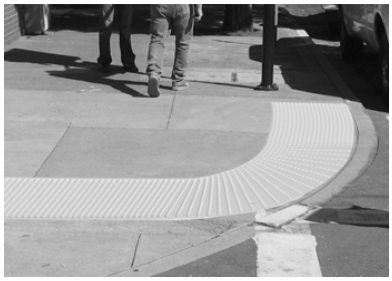
Navigation Technologies

- Navigation tools for the Blind for Orientation and Mobility
  - Canes
  - Guide dogs
  - Tactile warning surfaces



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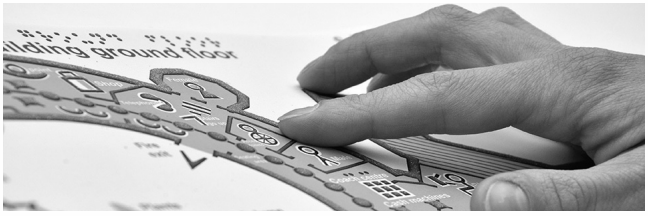
NavigationTechnologies

- Navigation tools for the Blind for Orientation and Mobility
  - Electronic Travel Aids
  - Accessible signage
  - GPS and camera based Apps are emerging
  - Wayfinding



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Deaf Blind Technologies

- This is a highly specialized area
- If vision and hearing are not present, the main strategy is tactile
  - Braille

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Conclusion

- Many of the clients we work with have multiple disabilities which may include sensory limitations
- Clients who solely have sensory limitations are typically seen by a clinician who is trained in this highly specialized area
- It is important that we are generally aware of intervention considerations and technologies

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References

1. van Rheede, J. J., Wilson, I., Qian, R. I., Golodetz, S., Downes, S. M., MacLaren, R. E., ... & Hicks, S. L. (2014). Mobility performance in low vision: Capturing the dynamics of target finding and obstacle avoidance across different tasks. *Investigative Ophthalmology & Visual Science*,*55*(13), 4127-4127.
2. Pawluk, D. T., Adams, R. J., & Kitada, R. (2015). Designing Haptic Assistive Technology for Individuals Who Are Blind or Visually Impaired. *IEEE transactions on haptics*, *8*(3), 258-278.
3. Collins, J., Goyne, T. R., & McCabe, P. C. (2013). Deafness and Hard of Hearing in Childhood: Identification and Intervention through Modern Listening Technologies and Other Accommodations. *Communique*, *41*(6).
4. Kenney, M. J., Jain, N. R., Meeks, L. M., Laird-Metke, E., Hori, J., & McGough, J. D. (2015). Learning in the Digital Age: Assistive Technology and Electronic Access. *The Guide to Assisting Students With Disabilities: Equal Access in Health Science and Professional Education*, 119.
5. Hatakeyama, T., Watanabe, T., Takahashi, K., & Fukuda, A. (2014). Development of Communication Assistive Technology for Persons with Deaf-Blindness and Physical Limitation. *Studies in health technology and informatics*, *217*, 974-979.

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Resources - Hearing

- Assistive Equipment and Technology, Minnesota Department of Human Services
  - http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&RevisionSelectionMethod=LatestReleased&dDocName=id_003399
- Hearing Loss Association of America
  - http://www.hearingloss.org/content/hearing-assistive-technology
- National Federation of the Blind
  - https://nfb.org/fact-sheet-blindness-and-low-vision
- National Center on Deaf-Blindness
  - https://nationaldb.org/

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Resources - Vision

- American Academy of Ophthalmology
- http://www.aao.org/eye-health/diseases/low-vision-aids-rehabilitation

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Thank you!

Contact Information:

- Michelle Lange
- MichelleLange@msn.com
- www.atilange.com