TELEAUDIOLOGY 101

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Audiologyonline
Teleaudiology 101

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Disclosure and Learner Objectives

- Disclosure
  - I am employed by Otometrics/Audiology Systems.
- Learner Objectives
  - Participants will be able to discuss ways to implement teleaudiology into their practice.
  - Participants will be able to describe the types of evaluations that can be performed with teleaudiology.
  - Participants will be able to describe the technology needed to initiate a teleaudiology program.

What is Telehealth/Teleaudiology?

The use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.

Health Resources and Services Administration Federal Office of Rural Health Policy. Available from: http://www.hrsa.gov/ruralhealth/telehealth/

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Goals of Telehealth

- Improve access to care in rural and highly rural areas or areas difficult not easily accessible.
- Improve access to specialty care
- Reduce patient's time spent in travel and time off work
- Reduce travel expenses
  VA: reduce travel pay to Veterans

http://www.cchpca.org/

Center for Connected Health Policy
-Nonprofit, nonpartisan organization
-Promotes better systems of care
-Promotes access to quality care
-Monitors policies for all 50 states

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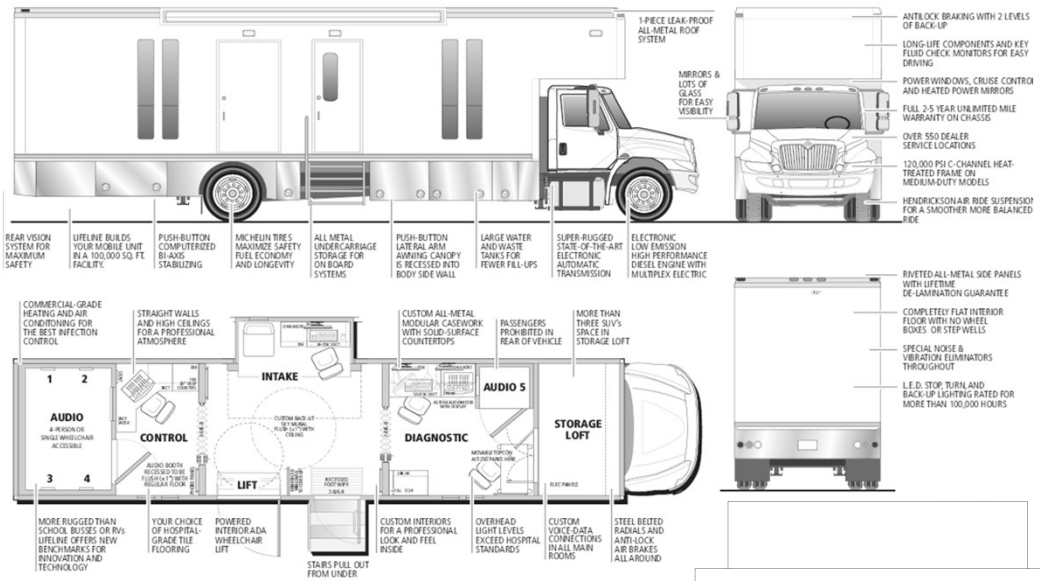
Current Practices in Telehealth

- **Store and Forward**
  - Images, scans taken and sent to provider for review. Radiology, dermatology
- **Remote Monitoring (Asynchronous)**
  - Self-monitoring, self-testing of chronic diseases for later review. Diabetes mellitus, cardiovascular disease. Data logging in hearing aids
- **Mobile Health**
  - Mobile clinic in a truck
- **Live interaction (Synchronous)**
  - Real time, face to face interaction with patient and care-giver.

Clinic in a Box (Truck)



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Hear Here Alabama!
Speech & Hearing Clinic of the University of Alabama

JoAnne Payne
Marcia Hay-McCutcheon

http://hearherealabama.as.ua.edu/

Rural Hearing Health Study

Health Fairs

Mobile Clinic

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This is the larger of the two booths.

- Video Otoscopy
- Astera Audiometer
- Otoflex Tympanometer
- Aurical PMM
- Aurical HIT Box

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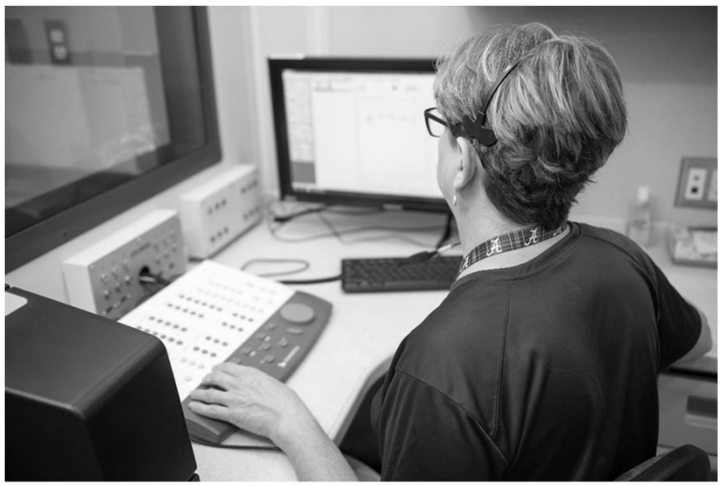
Delivery of services is essentially the same as in a brick and mortor clinic.



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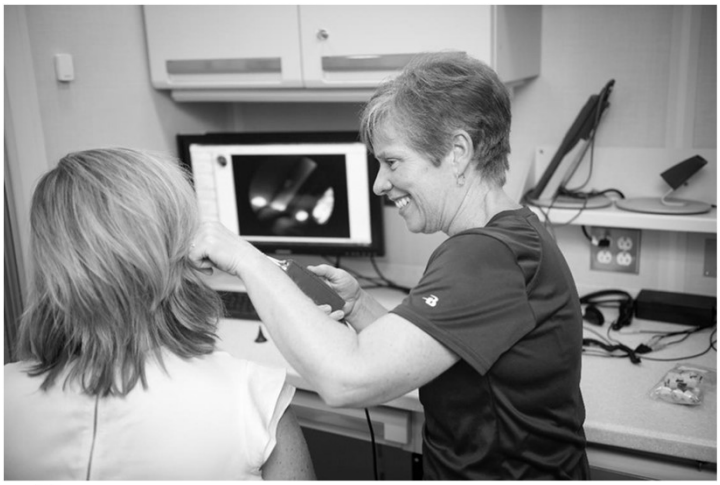
Two audiology suites



Aurical Video Otoscope
Otoflex Tympanometer
Aurical Audiometer
Hearing aid lab

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Smaller booth

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Speech and Hearing Clinic of the University of Alabama

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Live Interaction is becoming more readily available.

App
- Blue Cross/Blue Shield
  - $40.00 additional cost
  - Seen from the privacy of my own home
  - I do not have to sit in Urgent Care.

Iaudiometer- iPad audiometer
Melmedtronics

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Live Interaction (Sychronous)
"Clinic on a cart"
Aurical Audiometer, Aurical Video Otoscope, Aurical PMM and HIT Box, Otoflex tympanometer

Audiology Telepractice Project
University of Texas at Austin and The University of Texas Health Science Center at San Antonio.

Improve Healthcare of at-risk populations

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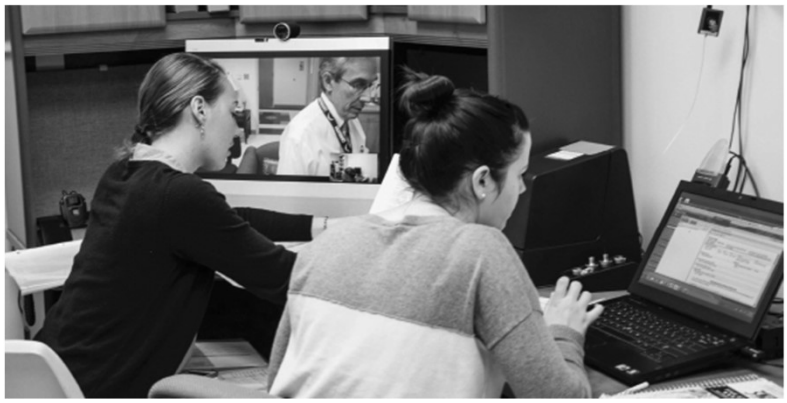
Audiology Telepractice Project
University of Texas



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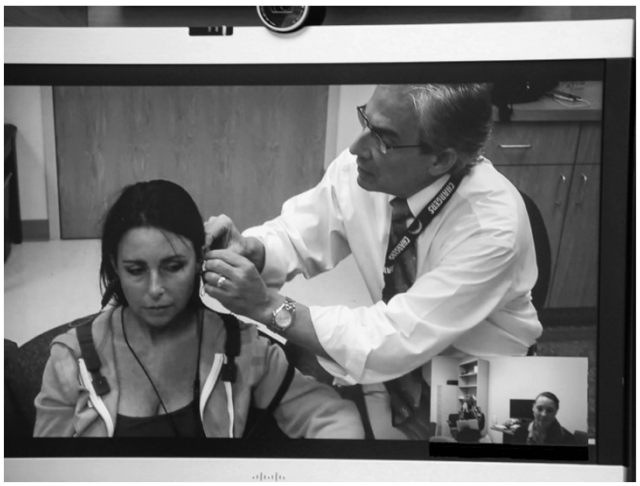
Audiology Telepractice Project
University of Texas



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Live Interaction (Sychronous) "Clinic on a cart"

- Aurical Audiometer,
- Aurical Video Otoscope,
- Aurical PMM
- HIT Box,
- Otoflex tympanometer

The reason this works is because the audiometer is at the patient site with a computer. The audiologist is able to take control of the computer at the patient site and test the patient. All off the test equipment is controlled through Otosuite on the computer.

Considerations for Live Interaction

- Need reliable and fast internet service on both sides.
- Technology needs
- Space Needs
- Support Personal
- Training for Support Personal
- Licensure
  - If you are crossing state lines, be licensed in both states!
- Reimbursement
  - "Medicare regulations do not include audiologists or speech pathologists as eligible providers for telemedicine." - American Academy of Audiology Website.

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Technology:
Determining your needs:

Eyes
- Need to see the Patient, Video
  - At minimum of one video camera
  - Ideally two cameras

Hands
- Need to be able to take control of the PC screen and software

Voice
Ears
- Ability to connect your voice to the remote audiometer and transmit the patient's voice back to you.

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Video
-Eyes

- Options
  - Inexpensive webcam
  - High-end, wide angle, 1080p with Far End Control
- What are your needs?
  - Do you need the ability to move the camera?
  - Do you need ultra hi-resolution video?

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Controlling the PC/Audiometer: -Hands

1. Remote Desktop Application
   - Several vendors of remote desktop. i.e. Log Me In 123, WebX
   - Allows access of the PC
   - No audio.
2. Teleconferencing
   - Outlook/Skype for Business
   - Offers Audio
   - Requires the assistant at far, remote site to assist in connecting the call and allow permission to remotely control the PC/Audiometer

Mouth and Ears – This is the toughie

- The Audiometer's signal routing is an issue… Live Voice, integrated speech material, stimulus monitoring, talkback, and talk over….
- A high end Video Codec system
  - Cisco
  - Polycom
- With a Codec system, testing remotely becomes very similar to how you operate in clinic.

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Do you need the ability to communicate to your patient via Monitored Live Voice (MLV)?

- If not, then your start up costs will be considerably lower.

With or without a Codec you can perform speech testing via recorded speech materials

- The Astera and Aurical Audiometers which utilize Otosuite software, have recorded speech.

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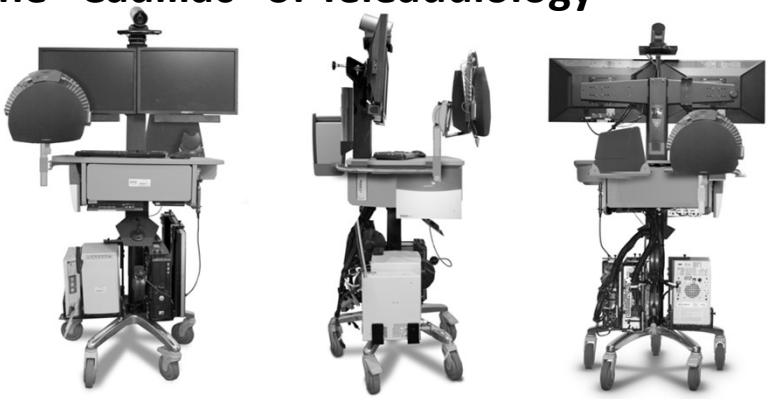
VA Does Telehealth really well!

Telehealth Cart
The "Cadillac" of Teleaudiology



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VA Future Model: Better Access & Care

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TeleAudiology

Fitting and Diagnostics

- Collaboration
  - Audiology and Speech Pathology National Program Office
  - Office of Telehealth Services.
- Implemented remote programming of hearing aids.
- Worked with Otometrics for the development of integrated sound level meter capabilities to monitor ambient noise levels in real time during testing.
- Ongoing data collection (PT air and bone, speech, and immittance) to determine effectiveness of microphone and accuracy of audiometric test results.

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Tele-Health & Tele-Audiology @ the VA

- A VAMC or Hospital-based audiologist logs into a video tele-health cart (using MS Communicator), located at a CBOC or Regional Clinic tied to that VAMC.
- A trained **Tele-health Certified Technician** (TCT) located at the CBOC and interfacing with both patient (hands on) and audiologist (via a/v connection) responsible for facilitating testing, placing headsets, etc.

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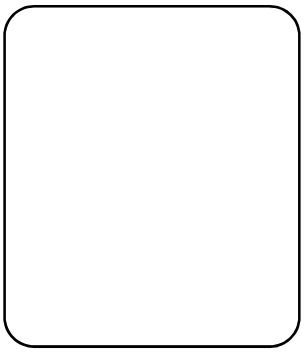
What's on the Cart?

Otometrics equipment on the tele-health cart, located @ the CBOC:

- MADSEN ASTERA w/high frequency
- MADSEN OTOFlex
- AURICAL PMM w/HiPro2
- AURICAL HIT chamber
- Noah link (as a backup device)
- Codec
- Some have the Otocam Video Otoscope
- Peltor Headphones
- Ambient Noise Assessor (ANA)



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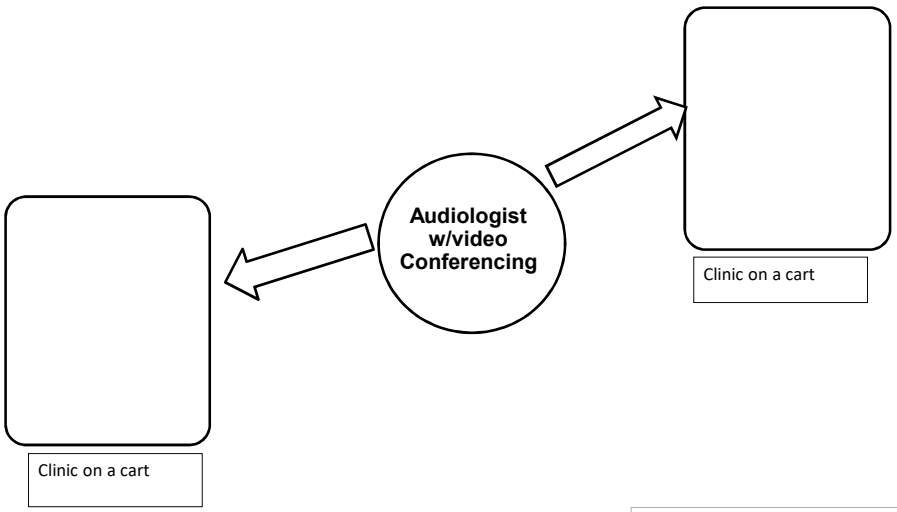
Typical TeleAudiology Setup



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Fitting Training

- Technician is trained on Otoscopy
- Technician is trained in hearing instrument placement, cleaning, receiver replacement, HIT Box, etc.
- Technician is trained on connecting the hearing instruments to manufacturer software

- Consider the training materials you will need.

Diagnostic Training

- The Technicians are trained to the usual diagnostic workflow.
- Use of video otoscopy
- Connecting to the Audiometer
- Proper placement of inserts earphones
- Proper placement of Peltor Headphones (with TDH inside)
- Proper placement of High Frequency Headphones
- Proper placement of Bone Conductor.

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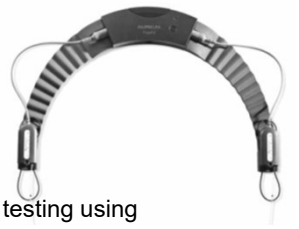
ANA – Ambient Noise Assessor Functional Overview



The Ambient Noise Assessor:

- Monitors background noise at the Far location during testing using microphones located in the AURICAL collar.
- OTOsuite provides a visible display of the Far location room noise at the Near - Audiology workstation.
  - **The Audiologist can *see* the noise levels at the Far location.**
- Compares measured noise level with acceptable limits as defined by ANSI. This is displayed by a frequency-specific line graph, and is specific to transducer type and stimulus level.
- Provides color indicators for validity of results, both on screen and via reports.
- Stores the status of background noise for each tone threshold and speech SDT, SRT and WRS.

Background & Rationale

- This tool is beneficial when testing in a CBOC location, outside of a sound enclosure when ambient noise levels may exceed acceptable levels.
- Standards which describe the procedures and equipment for ensuring that rooms are appropriate for audiometry testing do not take into account the presence of the patient and the fact that the noise may change during the test procedure, something which is rather common in teleaudiology settings.
- Thus, the standards assume a **static** environment. For this reason, the Ambient Noise Assessor applies an approach which is appropriate for **dynamic** environments and allows users to carry out valid diagnostics in otherwise uncertain environments.

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Background & Rationale

- Diagnostic Testing requires acceptable ambient noise levels.
  - This is traditionally attainable in a sound enclosure or booth.
- ANA is beneficial when testing in a Far or remote location, outside of a sound enclosure when ambient noise levels may exceed acceptable levels.
- ANSI Standards describe the procedures and equipment for ensuring that rooms are appropriate for audiometry testing.
- ANSI Standards assume a **static**, unchanging environment
- ANA assumes a **dynamic** environment. It takes into account the presence of the patient and a changing noise landscape during test procedures.
- Allows for valid diagnostic testing in a potentially changing environment.

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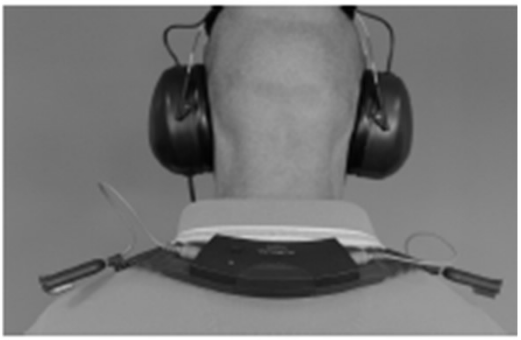
Patient position

- Patient is wearing headphones for testing.
- Patient is wearing FreeFit for monitoring the ambient noise



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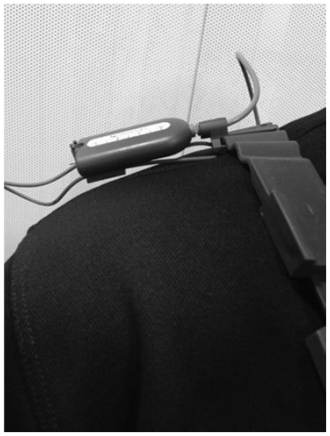
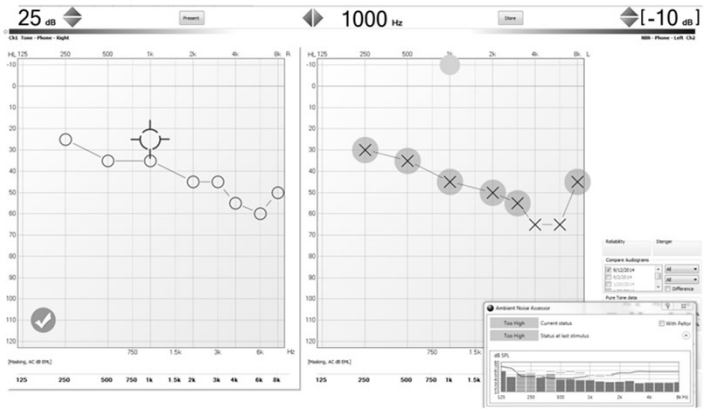
The Reference Mics now monitor the ambient noise



ANA Display in OTOsuite



- Tone audiometry with the floating ANA window in the lower right corner shows the status of background noise. In tone audiometry, noise status is automatically saved, **every time** a threshold is stored. In Speech Audiometry, due to additional sounds from the testing itself, i.e. the Veteran's vocal response, the clinician selects the appropriate noise status based on information in the floating window
- Audiogram for the right ear has all valid thresholds marked with a green checkmark.
- Audiogram for the left ear has thresholds with levels exceeded.

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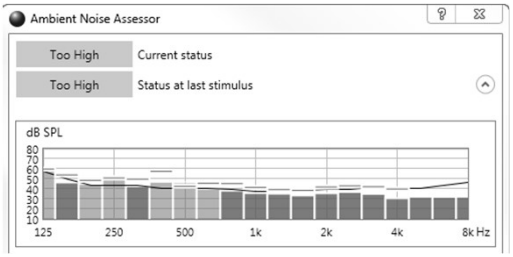
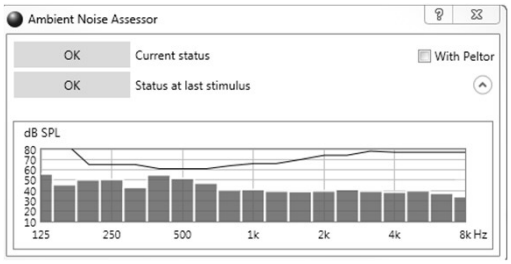
ANA display Tone– Enlarged View





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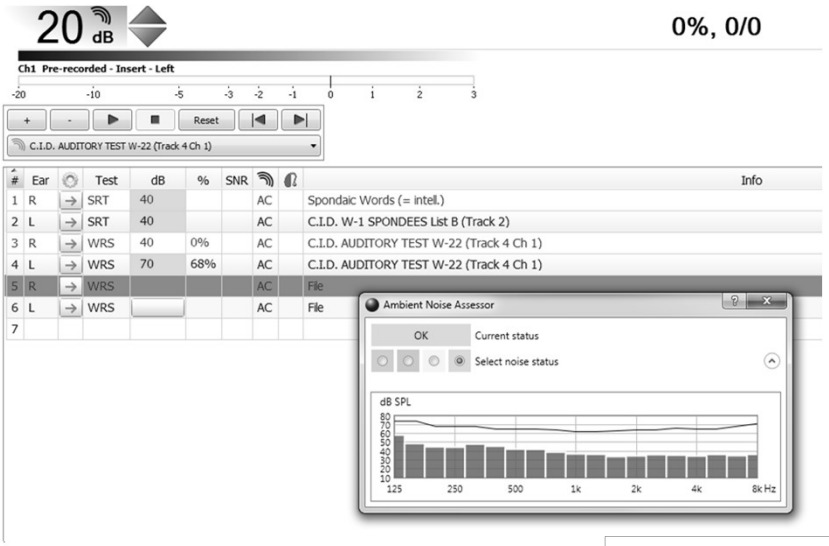
ANA Display Otosuite-Speech



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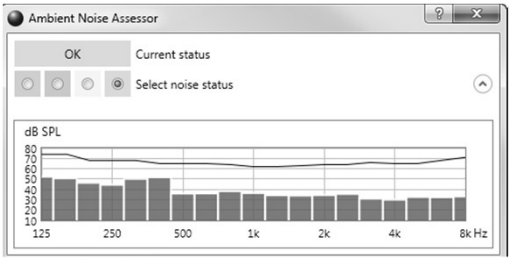
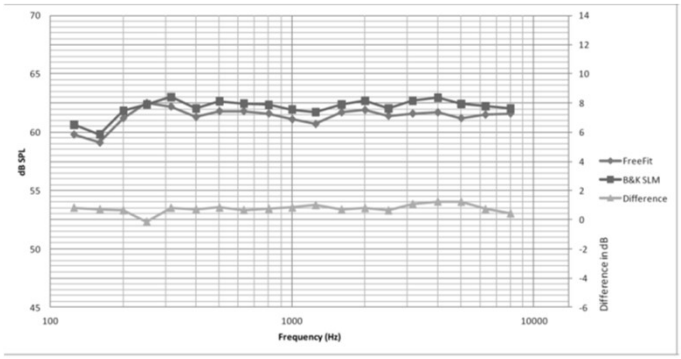
ANA Display-Speech Enlarged View



Comparison between FreeFit and Bruel & Kjaer SLM



- The precision of the FreeFit is within +/- 1 dB for frequencies below 2kHz and +/- 1.5 dB for frequencies above 2 kHz, which corresponds to a type 1 SLM.
- Since FreeFit uses both microphones, the larger of these 2 readings is applied.

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The “clinic on a cart” with testing performed in a booth.

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The “clinic on a cart” with testing performed in a booth.

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Support Personal

- Who are you going to use? Audiology technician?
- Support need training
- Materials and videos.
- Hand outs, laminates

A few resources…

- Teleaudiology and Enhancing Hearing Care: Merging Face-to Face with Face Time. By Mona Dworsack-Dodge, AuD. The Hearing Review, August 2013.
- Current Practices in Tele-audiology. American Academy of Audiology, Chad Gladden, AuD.
- Presentation by Chad Gladden, AuD, 2013, The Current Status of VA Audiology

- University of Alabama's Mobile Clinic
  - http://hearherealabama.as.ua.edu/

- GlobalMed
  - https://www.globalmed.com/
  - SalesTeam@Globalmed.com

- Center for Connected Health Policy
  - http://www.cchpca.org

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Questions????

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