

Optimize Your Experience with the Audiologist: Listening and Making Music with Hearing Loss

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Disclaimer:

In this presentation I will show brand names of hearing aids and hearing aid manufacturers. I have no financial or non-financial interests in these companies, and do not promote these particular brands over other brands. These examples are for teaching purposes only. The opinions I'm expressing today are my own, and do not reflect those of Lantos Technologies, Inc.

Topics

- Ok, you have hearing loss and use hearing aids to help you hear people talking better. But do you need to use hearing aids when making music?
- If you use hearing aids when making music, how can we make them NOT sound God awful? (Resources)
- Choosing an audiologist
- How to not terrify the audiologist
- How to get the most out of your time with them

Getting audiologists on the same page as you, the musician

Fantastic primer on hearing aids for musicians with hearing loss:

http://www.hearingreview.com/2016/06/music-sound -quality-hearing-aids-interview-brian-moore-richard-einhorn/

Optimizing Your Experience

- There are cultural differences between many audiologists and many musicians! (e.g., audiology clinics are VERY quiet)
- Is it possible to bring your instrument to the appointment? (There are many reasons this may help – from programming to getting a good custom earmold)
- 3. Is the appointment length appropriate?
- 4. Try not to intimate or otherwise scare the audiologist!

Optimizing Your Experience

- 5. Come in with your priorities clear, communicate those priorities in advance.
- 6. Understand that both audiologists and the devices have limitations (this doesn't mean they aren't valuable)
- 7. Focus on whether or not the device settings make you feel confident (not AS much on the quality... which will NOT be terribly satisfying/might be quite disappointing)
- 8. Keep a sense of humor!

The "Dynamic" Ear Canal

Video play of ear canal moving with opening and closing of mouth

If you have a custom fit earmold/earpiece, this needs to be considered, particularly if you play a wind instrument

Earmold Impression Technique

- Open vs. Closed Jaw?
- EMI as musician plays instrument





Choosing an audiologist

- 1. Referral from a fellow musician
- 2. Does this person strike you as approaching challenging problems with a sense of curiosity and "stick-with-it-ness"?
- 3. The finances, bundling and unbundling, willingness to invest the necessary time
- 4. Necessary equipment to test and verify your hearing and your devices

Considerations for hearing aidsMusic \neq Speech

The settings that help to make speech intelligible are amazing at improving intelligibility... and amazing at making music sound awful!

- 1. Maximum input (and dynamic range)
- 2. Crest Factor (Peak RMS)
- 3. Spectral structure
- 4. Time domain envelope
- 5. "Intent"



Hearing Aid Selection

- Peak input limiting: 94 dB SPL vs. 104-112 dB SPL
- Ability to turn off processing (non-linear signal processing, noise reduction, feedback management, frequency compression)
- Omni-directional microphones (not directional)
- "Fake it" into thinking single channel?
- Option of patient to perform **self-tuning**

Examples of differences in hearing aid programs



Hearing Loss does NOT (necessarily) mean loss of loudness - audio example

Examples of differences in hearing aid programs

| I HERE SILE | | | | | | | | |
|---|-------------------------------------|---|------------------|-------------------|--------------------|--------------------------------|---|-----------------------|
| File Edit View Instrument Fitting H | Help | | | | | | | |
| Patient Information | Start Pre-Fit | Fit Summary | | | | | ta) i | New Updates Available |
| Test Run | Right Ear 🔴 🕙 | LS962-DRW LP RIE | Airlink | • | Connect | LS962-DRW LP RIE | | 🕒 🔴 Left Ear |
| Birthdate: 3/16/1964 Age: 52 | Display Options | | | | | | | |
| Experience: First Time User | Gain View Output View | Gain Curves : 📝 50 📝 80 🏾 Target Curves : 🛙 | 7 50 🔽 80 G | ain Targets (%) : | 100 - | Vent Corrections : 📝 | | |
| ▲ Tools | ₩ dB | | | | dB | | | Vi |
| | 80 | | | | 80 | | | N |
| Gain Adjustment | 70 | | | | /0 | | | |
| Advanced Features | 50 | | | | 50 | | | |
| Physical Properties | 40 | | | \bigcirc | 40 | | | |
| 🧟 Aventa Cuide | 30 | | | | 30 | | | |
| Data Logging | 20 | 0-0-0-0-0-0- | | | 20 | | 0-0-0-0-0-0- | |
| - Data Logging | 10 | _8_0_0_0-0-0-0-0- | -0 | | 10 | | _0_0_0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0- | |
| Hi Environmental Optimizer | 125 250 | 500 1K 2K 4K | 8K Hz | | 125 | 250 500 | 1К 2К 4К | 8K Hz |
| Tinnitus Sound Generator | | | | | | | | |
| IO Acceptance Manager | P1:All-Around p2:Restaurant P | 3:Telecoil Phone + Mic P4:Music PhoneNow: | None Streamers:1 | V / Micro Mic / | Multi Mic Pho | ne Clip: Phone Clip / Smart De | vice | |
| Seeps and Volume Control | Nepage Programs Create Compari | son Recalculate Autorelate Copy Paste | | | | | М | lanage Program Names |
| | Features | | | Right si | ide | | Left side | |
| Manage Accessories | Directionality: | | | В | Binaural Direction | nality II 🔹 | Binaural Directionality II | - |
| Wireless Accessories | Directional Mix: | | | V | /ery Low | | Very Low | - |
| Bluetooth Smart Devices | Time Constants: | SURROUN | | S | oyllabic | • | Syllabic | • |
| | DFS Ultra II: | by ReSour | d | | Л | 0n @ 0ff | OT OT | |
| | Expansion: | S by Rebound | | | Off | | Off | • |
| | Sound Shaper: | | | | Off | • | Off | • |
| | NoiseTracker II: | | | P | er Environment. | | Per Environment | • |
| | WindGuard: | | | C | Off | | Off | • |
| Select Sound T | | | | | | | | |
| 00:00/00:00 | | | | | | | | |
| | Calibrate DES | | | | | | | Save |
| | | | | | | | | Jave |

Examples of differences in hearing aid programs



Examples of differences in hearing aid programs – is there an app for that?



Examples of differences in hearing aid programs – is there an app for that?





Example: 55 year-old "professional music fan"

- Huge music fan (esp live music)
- Progressive SNHL of known genetic origin
- Fitted with electronic earplugs 3 years prior
- Fitting with IIC hearing aids to help at work, and maybe for music listening; known peak input limit was ~107 dB SPL

55 year-old "professional music fan"



Example fan: Program 1 "Normal"



Example fan: Program 2 "Music"



Example fan: Self-tuning option



55 year-old "professional music fan"

- "Loves" his music program!
- Initial fitting not totally satisfactory with all other programs
- At 1st follow-up, "tweaked" P1 to reduce frequency compression, changed out another speech-in-noise program for comfort-in-noise
- At 2nd follow-up visit, reported extreme satisfaction with speech intelligibility (in quiet and noise) and with music listening!

Resources

• You are welcome to review and share these with your audiologist, if helpful. Please credit this presentation as the source, so that correct AND incorrect suggestions are blamed on the right person!

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Considerations for hearing aids

Music \neq Speech

3. Spectral structure



Considerations for hearing aids

Music \neq Speech

3. Spectral structure
<u>Fundamental frequency:</u> voice = 82 – 1046 Hz
<u>Fundamental frequency:</u>
piano = 27.5 – 4186 Hz; violin = 196 – 2637 Hz

Violin playing A440 <u>http://www.nagyvaryviolins.com/</u>



Considerations for hearing aids

Music \neq Speech

4. Time domain envelope

Rise-time of signal: violin bow vs. piano key strike vs. drums As opposed to voice-onset time, formant transitions

- compression attack time and release time:

Slow-attack/slow-release (live music: 0.5 sec – 10 sec) vs. fast-attack/slow-release... fast-attack/fast-release (syllabic compression: ~10msec to 200 msec)

5. "Intent"

Communication of emotion, not content

Considerations for hearing aids Music ≠ Speech

4. Time domain change: rate of frequency change



/chapter_3_consonants_new.htm

Considerations for hearing aidsMusic \neq Speech

4. Time domain change: rate of frequency change Time (sec)

