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- Restart your computer/device

Still having issues?

- Call 800-753-2160 (M-F, 8 AM-8 PM ET)
- Email customerservice@AudiologyOnline.com
Best Practices for Music Industry Patients: Recommendations and “Real World” Care
Heather Malyuk, AuD

Time Ordered Agenda

- Introduction 0-5
- Evidence on musicians/literature review 5-15
- Education and case history 30-45
- Best case scenario recommendations 15-30
- Adapting to real world scenarios 45-55
- Summary 55-60
Learning Outcomes

After this course, participants will be able to:
1. Create a comprehensive case history for a music industry patient.
2. Outline a framework for best practices in a clinical setting.
3. Outline a framework for best practices in an on-site setting.

Introduction
-Life in the Music Industry
Introduction

- Featured lecturer, published author, interviewed for music industry publications
- Former clinical Director of Sensaphonics Hearing Conservation in Chicago (musicians’ clinic)
- Researcher
- **Wellness Committee member for the College Music Society**
- On the American Academy of Audiology committee for best practices in working with musicians
- **On the executive council for National Hearing Conservation Association**
- Former planning committee for the Audio Engineering Society’s conference on Music Induced Hearing Disorders

Literature Review

- The purpose of hearing conservation for musicians:
  - Prevention of Music-Induced Hearing Loss
    - Can be variable in configuration and degree
  - Prevention of Music Induced Hearing Disorders
    - Tinnitus
    - Hyperacusis
    - Distortion/Dysacusis
    - Diplacusis
Risk of MIHL

- 109 orchestral musicians + 110 music students (219)
- Screened for other causes of NIHL (questionnaires)
- Audiometric data & OAEs collected
- Over 50% had a music-induced injury
- The older musicians had more injury at 3 kHz-6 kHz
- Predominantly left ear injuries for strings

(Emmerich, et al, 2008)

Risk of MIHL

- Chicago Symphony Orchestra
- Violinists had more injury at 3 kHz-6 kHz in left ear than in right ear
  - Sound levels 6-8 dB higher in left ear
  - Head shadow effect/distance

(Royster, et al, 1991)
Risk of MIHL

- 44 pop/rock/jazz participants
- Positive correlation between exposure to amplified music and 3 kHz-6 kHz thresholds

- Review of 41 papers:
  - 38.6% of professional musicians have MIHL
  - Some limitations mentioned
  (Di Stadio, et al, 2018)

Risk of MIHL

- Study done on over 2,200 professional working musicians
- Results
  - Fourfold higher adjusted risk for NIHL
  - 57% higher adjusted risk for tinnitus

(Schink, et al, 2014)
## Risk of MIHL

<table>
<thead>
<tr>
<th>Role</th>
<th>N</th>
<th>Median Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Engineers</td>
<td>205</td>
<td>32</td>
</tr>
<tr>
<td>DJs</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>Jobbers</td>
<td>296</td>
<td>31</td>
</tr>
<tr>
<td>Live Performers</td>
<td>524</td>
<td>31</td>
</tr>
<tr>
<td>Music Educators</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Studio Workers</td>
<td>233</td>
<td>31</td>
</tr>
<tr>
<td>Control Group</td>
<td>165</td>
<td>30</td>
</tr>
</tbody>
</table>

(Malyuk, et al, 2017)

## Risk of MIHL

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage With Audiometric Notch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Engineer</td>
<td>41%</td>
</tr>
<tr>
<td>DJ</td>
<td>37.5%</td>
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<tr>
<td>Jobbing</td>
<td>47%</td>
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<tr>
<td>Live Performance</td>
<td>44.4%</td>
</tr>
<tr>
<td>Music Teacher</td>
<td>59.2%</td>
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<tr>
<td>Studio</td>
<td>42.9%</td>
</tr>
<tr>
<td>Control Group</td>
<td>35%</td>
</tr>
</tbody>
</table>

(Malyuk, et al, 2017)
Risk of MIHL

Presence of Noise Notch by Role

Stars indicate significant differences compared to non musicians (p<.05)

(Malyuk, et al, 2017)

Risk in EHF (217 participants)

Average Threshold for Right Ear 9000-18000 Hz

Average Threshold for Left Ear 9000-18000 Hz

The bilateral notch group is depicted in red, while the control in black
Risk in EHF (217 participants)

LOESS fit (solid) and 95% confidence intervals (dashed) for the right and left ear EHF 9 kHz-18 kHz (dBSPL). Red depicts the bilateral notch group, while black depicts the control group.

Risk of MIHD

- 30%-74% in general

- Orchestral study:
  - 79% had hyperacusis
  - 7% had diplacusis
  - 51% had tinnitus
  - 24% had distortion
  (Jansen, et al, 2009)
Risk of MIHD

- Can we be sure?
- Musicians fear admitting issues with hearing when directly asked, especially in classical world

(Jansen, et al, 2009)

Education

- Most important part!
- Without proper education, gear purchases will always come before actual care (for lack of knowledge)

- Any HCP that overlooks this phase of the program will find other phases failing

(Suter & Franks (CDC), 1990)
Survey of audiologists

- 87.1% of audiologists felt confident working with musicians
- 80.7% felt they lacked/needed knowledge and additional training
- 35% actually did some kind of hearing test with a musician
- 26% educated on exposure and hearing conservation practices
- 3% tested additional frequencies

Disclaimer "When considering the results of this study the potential for response bias should be taken into account. The sample of audiologists who completed the survey included a high proportion of musically experienced audiologists."

Heather Malyuk: I've seen practices all over the board with clinical protocol for musicians. It's certainly something we don't learn in school or, currently, have much guidance on from our academy. Just for the sake of me getting to know what other AuDs do in their clinic, do you include a hearing test with the impressions?

Heather Malyuk: I only test hearing if the patient asks or if they have concerns. Otherwise we just schedule quick 30 minute appointments to take impressions.

Continued

Continued

Dan: Usually the musician already knows what company they're going to use. They just want you to take the impressions. Most of these patients will come with the instructions on specifics for the impressions.

Dan: I have a lot of friends that are professional musicians that use 1084 monitors. We also get a fair amount of locals coming in for impressions to send to them. We don't actually sell them, they buy from 84 Audio - they just do impressions here. Which frankly takes a lot of pressure off of me knowing how they work 🤗 I'm sorry! https://www.84audio.com/...

Dan: I would advise the patient to look online and then you just do the impressions. Some companies want different things, cotton vs foam blocks, open mouth vs natural facial expressions while performing, etc. I've worked with Westone, but my musician friends prefer the sound quality of JH Audio or Sensaphonics. Most of the impressions I do any more are for JH Audio.
Education

- Anatomy/physiology
  - For musicians, learning about the “instrument”
- Causes of hearing loss
  - For musicians, causes of injury and disorders
- Understanding decibels and exposure
- Proper selection and insertion of protection
  - For musicians, achieving proper fit and make, ear training
- How to read a hearing evaluation results and motivation for annual hearing testing (not regulated)
- Other sources of sound exposure, other types of gigs (use of IEMs, etc) and how to protect in those varying environments

Education

- Earplug attenuation level based on exposure level and length
- Safe use of IEMs
  - Binaural summation
  - Encouragement to consciously reduce volume (Federman & Ricketts, 2008)
Case History

- All IN ADDITION to general case history
- What is their motivation to see you?
  - Typically for ear impressions
- When was their last hearing test?
- Were they exposed within 16 hours of the visit?

Case History

- Ask about:
  - Genre
  - Instruments
  - Number of years playing
  - Length of typical exposure
  - Do they feel they are too loud/not loud/just right
Case History

- Location of sound exposure:

Case History

- Are they already using earplugs or IEMS?
  - Use of these
  - What kind
  - Number of drivers

- Have they ever taken a SLM or do they know how loud they are running the IEMs?
Case History

- Do they have any MIHD or notice any hearing loss?
- Any loud hobbies or other loud jobs?
  - Is hearing protection used/required?

Best case scenario

- In the clinic
- Onsite
In the clinic

- 1 person
- Prep beforehand
  - When scheduling, ask which instrument, tell patient to bring instrument (mouthpiece), etc.
- Ample case history and education
  - 20-30 minutes
- Earwax removal if needed and within scope
- Diagnostics
- Counseling
- Selection of devices
- Ear impressions
- Fitting appointment

Diagnostics

- At minimum .25 kHz-8 kHz (include 3 kHz and 6 kHz)
- EHFs
- Speech in Noise
- Immittance (use your judgement)
- OAEs
- Electrophysiology
EHFs

- Can be a more sensitive test for injury
  (Mehrparvar et al, 2014)
- Can show statistically significant differences between musicians and control groups
  (Kazkayasi et al, 2006; Malyuk, 2018)

Are EHFs used in music?

- One example:
  - Recording taken in sound treated chamber with a 20-20,000 Hz response mic
  - Violinist played expressing different timbres/attitudes
  - Spectral analysis shown without character and with
  - Differences exist in Hzs above 8,000 Hz!

(Yokoyama, et al, 2016)
OAEs & Electrophysiology

- Counseling tool
- Tracking discrete changes over time

Counseling

- “Your hearing is within the normal range” (even when injury is present)
  - “You don’t have diagnosable hearing loss, but I am seeing signs of mild injury”
- “Your hearing looks normal for your age”
  - “There is a reason for your hearing loss, let’s figure out what it is to keep you stable and working”
- “It looks fine for a musician”
  - “I know these results are tough, but we can work with this, there’s hope”
Selection of devices

- Choosing attenuation level for hearing protection
  - Not according to instrument but safety scales
- IEMs
  - Informed opinions are ok
  - Heavy counseling on usage

If you can….Sound Level Measurements on site
Ear impressions

- According to company, if necessary
- Full helix, long canal, movement of jaw (mimicking movements while wearing earplugs or in ears)
  - Past the second bend
  - High viscosity material
  (Lerner, 2015)

Fitting appointment

- Fitting of devices:
  - Insertion
  - Removal
  - Cleaning
  - Reminder of proper usage
  - Verification
    - Seal test for IEMs
    - In-situ probe mic measures
    - REAT measurement
Onsite

- Maybe some prep ahead
- Ample time (at least 20 minutes)
- Quiet space
- Full attention of the artist or crew member

Education/Case history

- Likely not a paper form
- Start chit chatting!
Diagnostics

- Portable audiometer/OAEs/Portable electrophysiology
- Where can this be done?
  - Dressing room
  - Bathroom
  - Tour bus
  - Backstage, if quiet
  - Another room in the venue
  - Anywhere that’s quiet!

Counseling

- Take time to talk about test results and recommendations
Ear impressions

- Same technique as before

Fitting appointment

- Likely can’t happen
- Can be done with creativity
Real-world, worse case scenario

- “Can you come take molds?”

On-site

- Be an advocate and explain that you do appointment
- If they say no, “sneak attack”
On-site

- Take all gear with you in the car
- If possible, turn it into a “best case scenario”

Can you take levels for counseling?
On-site

- If you have to adapt...
  - EDUCATE, EDUCATE, EDUCATE

Impressions only? Never.
While taking impressions

- Ask when last hearing test was
- Talk about prevention of MIHD
- Ask about use of IEMs
  - What kind are they getting?
  - Have they used them before?
  - Do they know they aren’t safety devices?

Summary

- Music audiology is a specialized branch of hearing conservation
- Education/case history is key
Summary

- For best case, clinical scenarios, the appointment should not lack anything
- For best case, on-site scenarios, the appointment should lack very little
- For worst case, on-site appointments, educate and advocate

References

References


Questions