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Grand Rounds: Tinnitus

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- David Jedlicka:
  - Financial: David Jedlicka serves as a Staff Audiologist at the Pittsburgh VA and is a part-time instructor in the Au.D. program at the University of Pittsburgh.
  - Non-financial: David Jedlicka has no relevant non-financial relationships to disclose.
- Lori Zitelli:
  - Financial: Lori Zitelli is employed by the University of Pittsburgh Medical Center as a lab-instructor. She received an honorarium for presenting this course.
  - Non-financial: Lori Zitelli volunteers for the American Academy of Audiology.
- Tia Oliverio:
  - Financial: Tia Oliverio is a Clinical Audiologist at the Pittsburgh VA.
  - Non-financial: Tia Oliverio has no relevant non-financial relationships to disclose.

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Learning Outcomes

After this course, participants will be able to:

- Describe different tinnitus treatment methods.
- Identify the benefits of combination devices in the use of tinnitus treatment.
- Describe the utility of tinnitus questionnaires.

Additional Tinnitus Grand Rounds

- Grand Rounds: Tinnitus Evaluation & Management, in partnership with the University of Mississippi Medical Center
- Course #35348

The Purpose of Grand Rounds

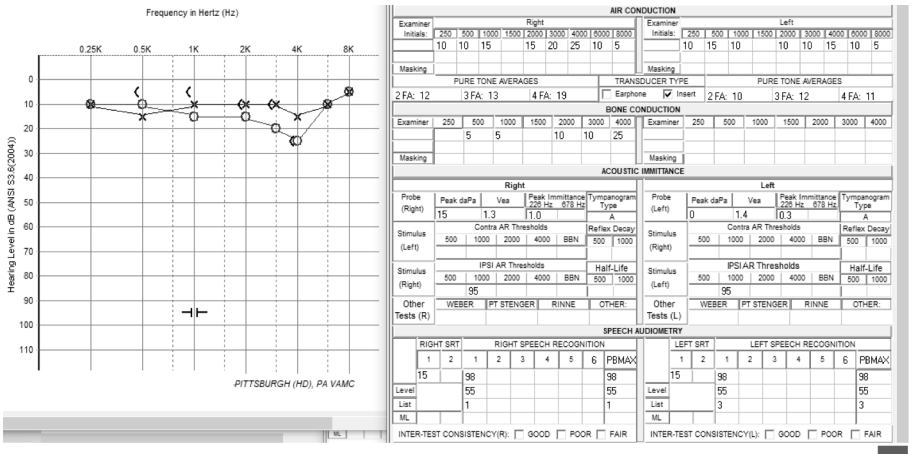
- Designed to increase knowledge and improve patient care
- Allows clinicians to stay up to date in evolving care outside of their core practice
- Can be used for students as clinical education
- May help facilitate discussion of treatment in rare, challenging, or generally non-straight forward cases

Case 1: Mr. NC (non-compliance)

- First presented at the VAPHS in 2011 to file a compensation and pension claim for hearing loss and tinnitus
  - Tinnitus and Hearing Loss are the #1 and #2 ranked service connected disabilities
- 39 years old
- Reported difficulty hearing in noise
- Periodic, non-bothersome, bilateral tinnitus
- No other significant otologic or audiologic complaints

Q1

2011 Audiometric Findings



Compensation and Pension Results

- Claim for hearing loss was denied.
  - Due to audiometric findings and Military Occupational Specialty (MOS) not placing the Veteran at risk of damaging noise exposure
- Claim for tinnitus was denied.
  - Due to MOS it was determined that the infrequent tinnitus was less likely than not due to military service

Returning in 2017

- Patient reports the following complaints:
  - Bilateral hearing loss
  - Bilateral, constant, bothersome, high-pitched tinnitus
  - Difficulty hearing in background noise
  - Periodic aural fullness bilaterally
  - Longstanding lightheadedness
  - Sudden onset vertigo
    - Occurred while laying in bed
    - Lasted until the patient vomited
    - Was treated in the ER with meclizine
      - Takes daily, no further episodes

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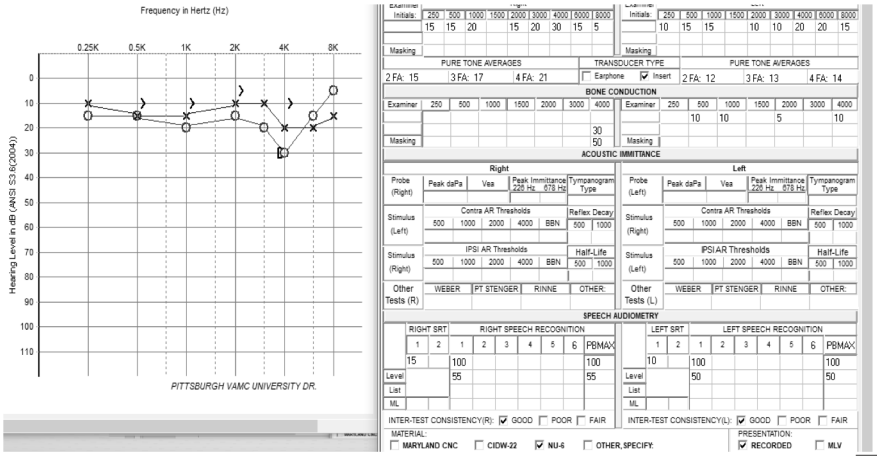
2017 Audiogram



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Next Steps

- Vestibular evaluation with audiology, ENT, and PT
- APD testing
- Hearing aid evaluation
- Tinnitus management strategies

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Vestibular Findings

- Normal MRI
- Normal Dix-Hallpike
- Normal rotational chair test results
- Normal oculomotor test results
- Normal head/body position results
- Normal caloric responses
- Orthostatic Hypotension

APD Test Findings

- SCAN 3A was administered
  - Failed Gap Detection (Patient did not respond to most presentations)
  - Failed Auditory Figure Ground 0 (scored 2/40)
  - Failed Competing Words Free Recall (scored 5/40)
  - Failed all other subtests
  - High rate of no response during all SCAN 3A tests

Tinnitus Evaluation

- Patient reported that tinnitus interrupted his ability to concentrate, understand speech, and sleep.
- THI
  - Score of 94 / 100
  - Functional: 44, Catastrophic 16, Emotional: 34
- Tinnitus Functional Index
  - Patient ranked every subscale problem item as 10/10
  - Answered he is aware and bothered by his tinnitus 100% of the time.

Q10

Hearing Aid Evaluation

- Primary aim: Speech understanding / RE hearing loss
- Secondary aim: tinnitus reduction
  - A sound generator was ordered for the Veteran to use to help improve his sleep
  - Veteran decline Progressive Tinnitus Management
- Amplification alone, amplification + built in sound generator, and tinnitus accessories are all appropriate treatment options.

Q5

Hearing Aid Selection

- Starkey Muse IQ Micro RICs binaurally
- Appropriate for patient's audiometric configuration
- Discreet per patient preference
- Provided "Combination Device" benefits
  - Amplification
  - Sound Generator program option if needed
    - Could be set based on defaults or using patient driven sound generator selection model

Hearing Aid Fitting

- Patient fit 1 month after hearing aid evaluation
- Veteran reported improvement in speech understanding
- Veteran reported immediate reduction in tinnitus perception
- Veteran was able to fully manipulate the devices

Follow Up Visit #1

- Patient returned to the clinic with the aids in his case
- Reported he could not understand in noise
- Reported no improvement with tinnitus
- Did not like how the domes felt in his ears
- Stated he did not take the sound generator out of the box
- Datalogging showed 1 hour of use

Follow Up Visit #1 (cont.)

- Custom earmolds were ordered for the Veteran
  - The devices were reprogrammed due to the physical change
  - Veteran reported improved comfort and retention
- In clinic demonstration of the sound generator was provided
- A tinnitus sound generator program was added (set to manufacturer default)
  - Patient reported immediate benefit when this was activated in the clinic

Follow Up Visit #2

- Patient arrived to the clinic with the hearing aids in his case
- He reported difficulty with occlusion due to the molds
- Felt that the sound generator program in the aids was not beneficial
- Still has not used the speaker sound generator to help improve sleep
- Datalogging still showed 1 hour of use

Follow Up Visit #2 (cont.)

- The earmolds were modified to widen an already large vent
  - Patient reported no issues with occlusion following the earmold modification
- The patient was counseled on the need for full time use of the devices to acclimate to the sounds
- The tinnitus sound generator was reprogrammed by the patient using the Starkey SoundPoint feature.
  - One drawback with this method is that it asks the patient to be more aware of their tinnitus during

Q6

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Starkey SoundPoint Tinnitus

Allows the patient to change the frequency shaping and intensity of the noise generator without any identifiers.

SoundPoint: Start

Navigating SoundPoint

https://starkeypro.com/pdfs/quicktips/SoundPoint_and_SoundPoint_Tinnitus.pdf

Q2

CONTINUED

Follow Up #3

- Patient returned with his hearing aids in the case
- Datalogging showed 1 hour of use
- Returned the aids for credit
- Stated that mental health treatment for tinnitus also did not work
  - Patient did confirm that he was non-compliant with mental health treatment
  - Stated this was due to disagreement with other mental health diagnosis

Comorbidities

- Borderline Personality Disorder
- Major Depressive Disorder
- Anxiety
- Insomnia
- Chronic Pain
- Low Back Pain
- GERD
- Chronic Kidney Disease
- Alcohol Dependence

Interdisciplinary Work

- Psychology was contacted in regards to tinnitus treatment
- Psychology is part of the VA PTM team
- Reported that mental health literature confirms patients with personality disorders are often non-compliant with medication and treatment recommendations (Sansone et al 2015)

Final Appearance

- Patient returned in 2019 for an updated audiometric evaluation
- Reported no change in symptoms
- Was unwilling to try hearing aids, PTM, sound generators, or other treatment options.
- Patient stated he would contact the clinic if he changed his mind.

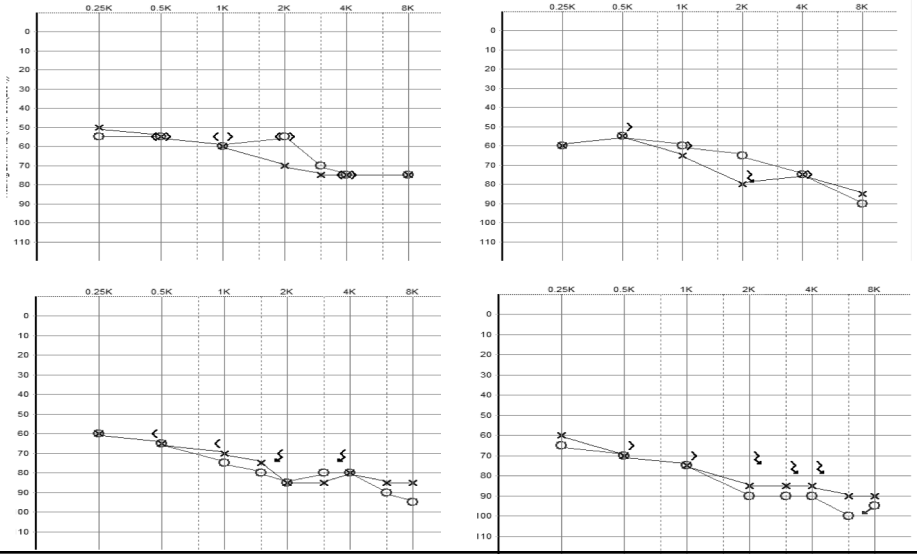
Take Home Messages

- Be aware of the effect of comorbidities
- Help your patient have realistic expectations
- Use an interdisciplinary approach when possible
- Explore all of your options to ensure that the patient has every opportunity for success
- Don't let one unsuccessful example bring you down

Patient 2: Mr. B.

- Started receiving audiology services in 2001 related to hearing loss at age 65
- Only used Phonak BTE hearing aids due to accessory options
  - Primarily used the remote control
- Received hearing aids in 2001, 2005, 2009, 2013, 2017
- Began seeing a therapist for anxiety and paranoia in 2007

Hearing Progression 2005-2019



2009

- During audiometric evaluation in 2009, patient reported significant history of otologic surgery
  - Patient unsure which ear it was or when it occurred
  - Reported having an “implant”
  - No conductive component to his hearing loss
  - No surgical notes indicating any ear related implant
  - Patient reported implant was placed so that people could listen to his conversations.
    - Video otoscopy at audiology and ENT appointments did not convince the patient that no such implant was present

Tinnitus Hacking

- Veteran was concerned that his neighbors could adjust his hearing aids by hacking into his new wireless hearing aids
- He reported he knew they were hacking his hearing aids because the aids were intermittent and he was hearing a high pitched radio signal in his right ear.
- Visual inspection found the right aid was occluded with cerumen.
- The aid was repaired, ENT removed cerumen bilaterally, the aids were working, and no radio signals were present.

Continued Hacking

- Patient returns in 6 months and reports that his hearing aids were hacked again
- Patient believes they are gaining access to his hearing aids through his remote control
- Visual inspection of the aids found occluding cerumen bilaterally
- Aids were cleaned and retubed
- Radio signal was eliminated
- Veteran concerned about future hacking
  - Provided counseling that this was not possible

A Consistent Schedule

- Patient seen quarterly by ENT for cerumen management
- Patient would be seen on the same day by audiology for a hearing aid check / tubing change
- Counseling was required at every appointment to address concerns of hacking the hearing aid and the remote control
- Veteran would call monthly reporting that hackers broke into his hearing aids

2012 – A Steady Decline

- Veteran was contacting law enforcement reporting that people were breaking into his house when he was sleeping or when he was not home
  - Stated people were moving items in his house to cause him distress and annoyance
  - These people were responsible for the hearing aid hacks
- Began suspecting his neighbors of spying on him
- Mr. B's daughter and wife encouraged him to see mental health providers due to the paranoia

Missed Appointment

- Veteran missed an ENT appointment leading to occluding cerumen in his ears and hearing aids.
- This led to increased perception of tinnitus (return of the hackers)
- Audiology was able to fix the hearing aids and remove the cerumen bilaterally
- Veteran lost faith in his devices being "unhackable"

Thinking Outside of the Box

- Veteran was originally using a Phonak remote control to adjust his volume
  - 2009 Phonak Exelia Art aids used the KeyPilot remote
  - 2013 and 2017 Phonak aids used the PilotOne remote
- The Veteran was instructed that when he felt his hearing aids were “hacked” to switch to an older set.
  - Likely that the aids were working and providing tinnitus relief
  - Patient felt that they were not hacked

A Winning Strategy

- Veteran reported that switching to the old set when he heard the radio signal stopped the hackers
- He would send his hearing aids and I would clean the aids and re-sync the serial number to the aids in the Phonak Target software to ensure no one could hack into his aids
- He believed the device serial numbers were the passwords, so devices were swapped out with clinic stock remotes to give him peace of mind if he felt they were compromised

Take Home Messages

- Sometimes no amount of counseling will be effective
- Take the time to address your patients concerns while exploring creative solutions to problems
- Stay within the boundaries of ethical practices and always treat your patients with respect
- Enjoy the journey that you are able to take with all of your patients
  - Mr. B recently passed away and I miss our quarterly visits

Doctor, Heal Thyself!

Presented by Lori Zitelli, AuD
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Meet Mae: 45 y/o woman

This is a 45-year-old female presents the ED by EMS for evaluation after an MVA that occurred just prior to arrival. Patient was going through an intersection and apparently another vehicle was speeding through running the stop sign causing her to T-bone them with her front end. She was restrained. There was airbag deployment. She comes in complaining of left wrist pain. She does have some deformity noted and is currently in a splint. She reports having some tingling in the fingertips. She's not sure exactly how she injured the wrist because it happened so quickly. She denies any head injury or loss of consciousness. She denies any chest pain, shortness breath, abdominal pain or vomiting. She denies any headache or dizziness or blurred vision. She denies any severe neck or back pain but states her neck is just a little sore. She does not take anticoagulant. She is alert and oriented at this time. She was given fentanyl by EMS which has given her some relief. Patient is right-hand dominant.

ED Visit

- Splint for left hand
- Pain medication for neck
- **Follow-up with PCP**

PCP Visit (+1 week)

- Headache & nausea → **Referral to Concussion Clinic**
- New onset of tinnitus (bilateral, L>R)
- Imbalance
- Maybe hearing difficulty?
- **Follow-up with ENT**

ENT Assessment

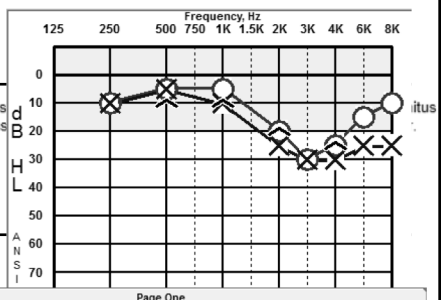
Review of Case Hx

I had the pleasure of seeing your patient [redacted] in cons itus since she was in an MVA [redacted] It's louder on the left. She had a concuss

Left sided tinnitus is constant and loud. Right tinnitus is intermittent.

Otoscopy Unremarkable

Audiogram



Page One

Speech Threshold	Basic / Advanced	RIGHT Result	Unit	Level	Mask	Unit	LEFT Result	Unit	Level	Mask	Unit
PTA	Material / Delivery	10	dB				13	dB			
2 Freq PTA			dB					dB			
SRT-earphones	Spondee - Record	15	dB			dB	15	dB			dB
SAT	Spondee - Record		dB			dB		dB			dB
Speech Recognition-Quiet											
Earphone	NU-6 rec half	100	%	55		dB	100	%	55		dB
Earphone	NU-6 rec half		%			dB		%			dB

ENT Plan

MRI

Given the prominent left-sided tinnitus and slight asymmetry in hearing I ordered an MRI.

↓

PT called to state that she was unable to complete the MRI even after her doses of valium .

↓

She was offered a sedated MRI, but chose to defer at this time.

What now?

There are many treatment options for tinnitus.

The ENT physician referred to audiology for evaluation and discussion of management.

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Assessment of Self-Perceived Tinnitus-Related Handicap

Case History	Validated Questionnaires
	• THI • TFI

CONTINUED

Tinnitus Handicap Inventory

Tinnitus Handicap Inventory	
1F. Because of your tinnitus is it difficult for you to concentrate?	yes
2F. Does the loudness of your tinnitus make it difficult for you to hear people?	sometimes
3E. Does your tinnitus make you angry?	yes
4F. Does your tinnitus make you feel confused?	yes
5C. Because of your tinnitus do you feel desperate?	yes
6E. Do you complain a great deal about your tinnitus?	yes
7F. Because of your tinnitus do you have trouble falling asleep at night?	yes
8C. Do you feel that you cannot escape your tinnitus?	yes
9F. Does your tinnitus interfere with your ability to enjoy social activities (such as going out to dinner, to the movies)?	yes
10E. Because of your tinnitus do you feel frustrated?	yes
11C. Because of your tinnitus do you feel that you have a terrible disease?	yes
12F. Does your tinnitus make it difficult for you to enjoy life?	yes
13F. Does your tinnitus interfere with your job or household responsibilities?	yes
14F. Because of your tinnitus do you find that you are often irritable?	sometimes
15F. Because of your tinnitus is it difficult for you to read?	sometimes
16E. Does your tinnitus make you upset?	yes
17E. Do you feel that your tinnitus problems has placed stress on your relationship with members of your family and friends?	no
18F. Do you find it difficult to focus your attention away from your tinnitus and on other things?	yes
19C. Do you feel that you have no control over your tinnitus?	yes
20F. Because of your tinnitus do you feel tired?	sometimes
21E. Because of your tinnitus do you feel depressed?	yes
22E. Does your tinnitus make you feel anxious?	yes
23C. Do you feel that you can no longer cope with your tinnitus?	yes
24F. Does your tinnitus get worse when you are under stress?	sometimes
25E. Does your tinnitus make you feel insecure?	sometimes

Yes = 4

Sometimes = 2

No = 0

CONTINUED

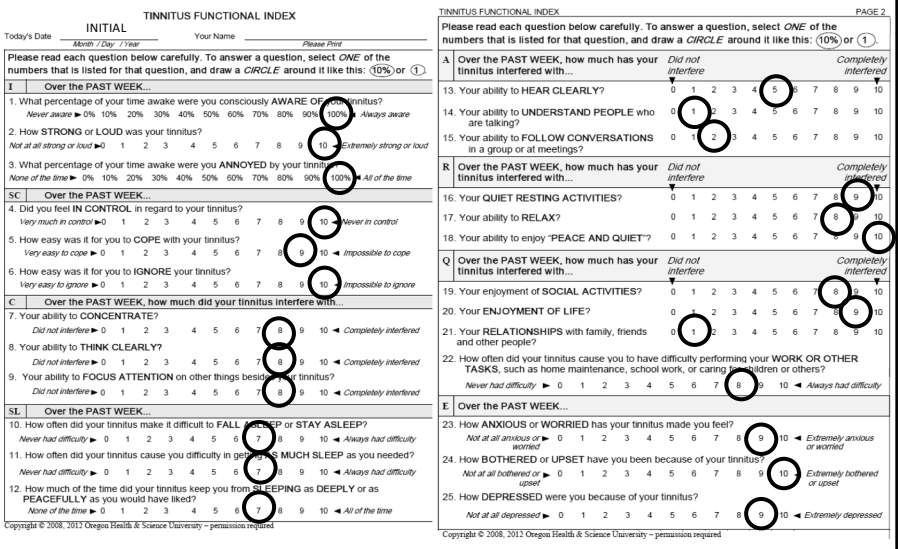
THI Score & Interpretation

Score	Category	Description
0 – 16	Slight	Only heard in quiet environment, very easily masked. No interference with sleep or daily activities.
18 – 36	Mild	Easily masked by environmental sounds and easily forgotten with activities. May occasionally interfere with sleep but not daily activities.
38 – 56	Moderate	May be noticed, even in the presence of background or environmental noise, although daily activities may still be performed.
58 – 76	Severe	Almost always heard; rarely, if ever, masked. Leads to disturbed sleep pattern and can interfere with ability to carry out normal daily activities. Quiet activities affected adversely.
78 - 100	Catastrophic	Always heard, disturbed sleep patterns, difficulty with any activity.

Total score = 84 / 100

Newman, C.W., Sandridge, S.A., & Jacobson, G.P. (1998).
Psychometric Adequacy of the Tinnitus Handicap Inventory (THI) for Evaluating Treatment Outcome.
Journal of American Academy of Audiology, 9(2), 153–160.

Tinnitus Functional Index



TINNITUS FUNCTIONAL INDEX

Today's Date ____ INITIAL ____ Your Name ____
Month / Day / Year — Please Print

Please read each question below carefully. To answer a question, select *ONE* of the numbers that is listed for that question, and draw a *CIRCLE* around it like this: (10%) or (1).

I — Over the PAST WEEK...

1. What percentage of your time awake were you consciously **AWARE** of your tinnitus?
Never aware ► 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% (100%) ◄ *Always aware*
2. How **STRONG** or **LOUD** was your tinnitus?
Not at all strong or loud ►0 1 2 3 4 5 6 7 8 9 (10) ◄ *Extremely strong or loud*
3. What percentage of your time awake were you **ANNOYED** by your tinnitus?
None of the time ► 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% (100%) ◄ *All of the time*

SC — Over the PAST WEEK...

4. Did you feel **IN CONTROL** in regard to your tinnitus?
Very much in control ►0 1 2 3 4 5 6 7 8 9 (10) ◄ *Never in control*
5. How easy was it for you to **COPE** with your tinnitus?
Very easy to cope ► 0 1 2 3 4 5 6 7 8 9 (10) ◄ *Impossible to cope*
6. How easy was it for you to **IGNORE** your tinnitus?
Very easy to ignore ► 0 1 2 3 4 5 6 7 8 9 (10) ◄ *Impossible to ignore*

C — Over the PAST WEEK, how much did your tinnitus interfere with...

7. Your ability to **CONCENTRATE**?
Did not interfere ► 0 1 2 3 4 5 6 7 (8) 9 10 ◄ *Completely interfered*
8. Your ability to **THINK CLEARLY**?
Did not interfere ► 0 1 2 3 4 5 6 7 (8) 9 10 ◄ *Completely interfered*
9. Your ability to **FOCUS ATTENTION** on other things besides your tinnitus?
Did not interfere ► 0 1 2 3 4 5 6 7 (8) 9 10 ◄ *Completely interfered*

SL — Over the PAST WEEK...

10. How often did your tinnitus make it difficult to **FALL ASLEEP** or **STAY ASLEEP**?
Never had difficulty ► 0 1 2 3 4 5 6 (7) 8 9 10 ◄ *Always had difficulty*
11. How often did your tinnitus cause you difficulty in getting **AS MUCH SLEEP** as you needed?
Never had difficulty ► 0 1 2 3 4 5 6 (7) 8 9 10 ◄ *Always had difficulty*
12. How much of the time did your tinnitus keep you from **SLEEPING** as **DEEPLY** or as **PEACEFULLY** as you would have liked?
None of the time ► 0 1 2 3 4 5 6 (7) 8 9 10 ◄ *All of the time*

Please read each question below carefully. To answer a question, select *ONE* of the numbers that is listed for that question, and draw a *CIRCLE* around it like this: (10%) or (1).

A — Over the PAST WEEK, how much has your tinnitus interfered with... *Did not interfere* — *Completely interfered*

13. Your ability to **HEAR CLEARLY**? 0 1 2 3 4 (5) 6 7 8 9 10
14. Your ability to **UNDERSTAND PEOPLE** who are talking? 0 1 (2) 3 4 5 6 7 8 9 10
15. Your ability to **FOLLOW CONVERSATIONS** in a group or at meetings? 0 1 (2) 3 4 5 6 7 8 9 10

R — Over the PAST WEEK, how much has your tinnitus interfered with... *Did not interfere* — *Completely interfered*

16. Your **QUIET RESTING ACTIVITIES**? 0 1 2 3 4 5 6 7 8 (9) 10
17. Your ability to **RELAX**? 0 1 2 3 4 5 6 7 (8) 9 10
18. Your ability to enjoy "**PEACE AND QUIET**"? 0 1 2 3 4 5 6 7 8 9 (10)

Q — Over the PAST WEEK, how much has your tinnitus interfered with... *Did not interfere* — *Completely interfered*

19. Your enjoyment of **SOCIAL ACTIVITIES**? 0 1 2 3 4 5 6 7 (8) 9 10
20. Your **ENJOYMENT OF LIFE**? 0 1 2 3 4 5 6 7 8 (9) 10
21. Your **RELATIONSHIPS** with family, friends and other people? 0 (1) 2 3 4 5 6 7 8 9 10
22. How often did your tinnitus cause you to have difficulty performing your **WORK OR OTHER TASKS**, such as home maintenance, school work, or caring for children or others?
Never had difficulty ► 0 1 2 3 4 5 6 7 (8) 9 10 ◄ *Always had difficulty*

E — Over the PAST WEEK...

23. How **ANXIOUS** or **WORRIED** has your tinnitus made you feel?
Not at all anxious or worried ► 0 1 2 3 4 5 6 7 8 (9) 10 ◄ *Extremely anxious or worried*
24. How **BOTHERED** or **UPSET** have you been because of your tinnitus?
Not at all bothered or upset ► 0 1 2 3 4 5 6 7 8 9 (10) ◄ *Extremely bothered or upset*
25. How **DEPRESSED** were you because of your tinnitus?
Not at all depressed ► 0 1 2 3 4 5 6 7 8 (9) 10 ◄ *Extremely depressed*

Overall TFI Score vs. TFI Subset Scores

- To calculate overall:
  - Sum all valid answers from both pages (max score of 250 if all are 10/10)
  - Divide by # of valid answers (must have at least 19)
  - Multiply by 10

Overall score = 77.2

Score	Interpretation
0 – 17	Tinnitus is not a problem
18 – 31	Tinnitus is a small problem.
32 – 53	Tinnitus is a moderate problem.
54 – 72	Tinnitus is a big problem.
73 – 100	Tinnitus is a very big problem.

Henry JA, Stewart BJ, Abrams HB, Newman CW, Griest S, Martin WH, Myers PJ, Searchfield G. (2014) Tinnitus Functional Index—Development and Clinical Application, *Audiology Today* 26(6):40-48.

Overall TFI Score vs. TFI Subset Scores

- To calculate subscales:
  - Follow same procedure for each of the 8 subscales

Subscale	Mae's Score	Interpretation
Intrusiveness	100	Very big problem
Sense of Control	96.7	Very big problem
Cognitive	80	Very big problem
Sleep	70	Big problem
Auditory	26.7	Small problem
Relaxation	90	Very big problem
Quality of Life	65	Big problem
Emotion	93.3	Very big problem

Case History

Additionally:

I have some trouble with sleep, but sleeping with my TV on really helps me.

I'm a cognitive behavioral therapist.

I've been going to the Concussion Clinic and to vestibular therapy. It's really been helping.

I have had fleeting thoughts of suicide, but I have no plan and no intention to die by suicide.

https://www.audiologyonline.com/audiology-ceus/course/to-hear-what-your-patients-29592

Tinnitus / Hyperacusis / DST Initial Interview Form

Patient Name: Mae DOB: Date: THI:

HISTORY

Symptoms: ◯ Family hx of HL ◯ Otalgia ◯ Aural Fullness (X) Dizziness ◯ Aural Discharge ◯ Hx of noise exposure ◯ Otologic surgery

Current ENT treatment? Y / (N) (Dr.'s Name) Ever had MRI? Y / (N)

TINNITUS

RE / LE / (Both) / Head = L >R Intermittent / (Constant) Onset: Gradual / (Sudden) When? MVA, Dec 2017

Volume Fluctuation? Y / (N) "Bad days?" Y / (N) Frequency?

Description of sound(s): High pitched ringing

Activities prevented / affected: Effect of sound: (None) / Louder / Softer

(X) Concentration (X) Sleep (X) QRA (X) Work How long? Minutes / Hours / Days

◯ Restaurants (X) Sports ◯ Social ◯ Other

% of time when: Aware 80% Annoyed 80% Ear overprotection? Y / (N) % of time:

Severity: 0 1 2 3 4 5 6 7 8 (9) 10 In quiet? Y / (N)

Annoyance: 0 1 2 3 4 5 6 7 8 (9) (10)

Effect on Life: 0 1 2 3 4 5 6 7 8 (9) 10 Any other tinnitus treatments? none

Why is tinnitus a problem for you? Can't escape it

Patient's comments:

SOUND TOLERANCE

Oversensitivity? Y / (N) Physical discomfort? Y / (N) "Bad days?" Y / (N) Frequency?

Description of troublesome sounds:

Activities prevented / affected: Effect of sound: None / Stronger / Weaker

◯ Concerts ◯ Shopping ◯ Movies ◯ Work How long? Minutes / Hours / Days

◯ Restaurants ◯ Driving ◯ Sports ◯ Church

◯ Housekeeping ◯ Childcare ◯ Social ◯ Other

Severity: (0) 1 2 3 4 5 6 7 8 9 10 Ear overprotection? Y / N % of time:

Annoyance: (0) 1 2 3 4 5 6 7 8 9 10 In quiet? Y / N

Effect on Life: (0) 1 2 3 4 5 6 7 8 9 10 Any other DST treatments?

Why is DST a problem for you? It's not

Patient's comments:

HEARING

Hearing problem? Y / (N) Wearing HAs? Y / (N) HA type:

Ever had audiogram? Y / (N) HAs ever recommended? Y / (N)

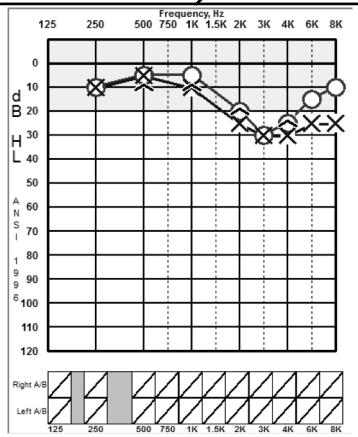
Tinnitus: 0 1 2 3 4 5 6 7 (8) 9 10

Sound Tolerance: (0) 1 2 3 4 5 6 7 8 9 10

Hearing: 0 (1) 2 3 4 5 6 7 8 9 10

Audiologic Assessment

Audiogram → OAEs → LDLs → Tinnitus Evaluation



Page One

Speech Threshold	Basic / Advanced — Material / Delivery	RIGHT Result	Unit	Level	Mask	Unit	LEFT Result	Unit	Level	Mask	Unit
PTA		10	dB				13	dB			
2 Freq PTA			dB					dB			
SRT-earphones	Spondee - Record	15	dB			dB	15	dB			dB
SAT	Spondee - Record		dB			dB		dB			dB
Speech Recognition-Quiet											
Earphone	NU-6 rec half	100	%	55		dB	100	%	55		dB
Earphone	NU-6 rec half		%			dB		%			dB

Audiologic Assessment

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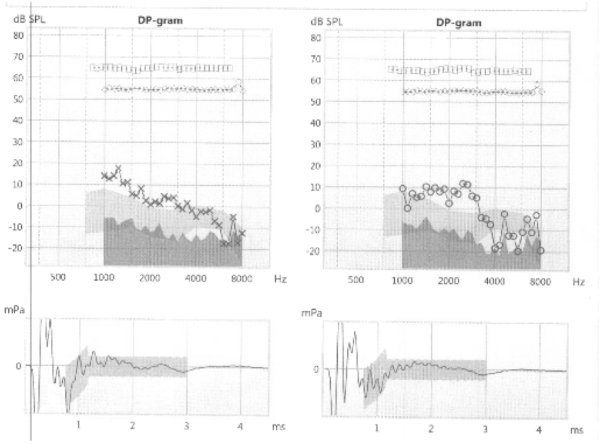
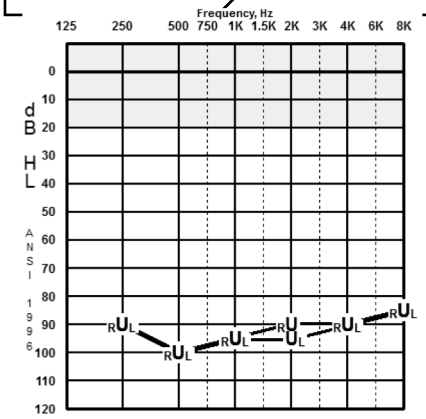


Role of OAEs:
- Counseling!
- Absent/reduced OAEs are objective evidence of peripheral hearing organ damage

Audiologic Assessment

Audiogram → OAEs → LDLs → Tinnitus Evaluation



INSTRUCTIONS FOR LOUDNESS TEST

THE PURPOSE OF THIS TEST IS TO FIND YOUR JUDGMENTS OF THE LOUDNESS OF DIFFERENT SOUNDS.

YOU WILL HEAR SOUNDS THAT INCREASE AND DECREASE IN VOLUME. YOU MUST MAKE A JUDGMENT ABOUT HOW LOUD THE SOUNDS ARE. PRETEND YOU ARE LISTENING TO THE RADIO AT THAT VOLUME. HOW LOUD WOULD IT BE?

AFTER EACH SOUND, TELL ME WHICH OF THESE CATEGORIES BEST DESCRIBES THE LOUDNESS.

KEEP IN MIND THAT AN UNCOMFORTABLY LOUD SOUND IS LOUDER THAN YOU WOULD EVER CHOOSE ON YOUR RADIO NO MATTER WHAT MOOD YOU ARE IN.

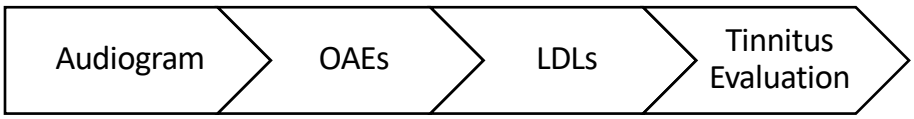
HARL

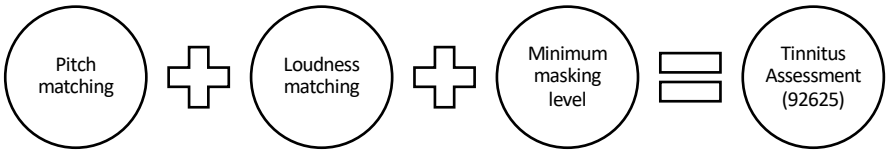
Procedure:
https://harlmemphis.org/wp-content/uploads/2020/05/CONTPAK.pdf

Contour Test Worksheet:
https://harlmemphis.org/wp-content/uploads/2020/05/CONT5.pdf

CONTINUED

Audiologic Assessment





Ear	Frequency
Right	8000 Hz
Left	8000 Hz

Ear	dB HL	dB SL
Right	20	10
Left	35	10

Ear	TWN	MML
Right	0 dB HL	50 dB HL
Left	5 dB HL	68 dB HL
AU	0 dB HL	50 dB HL

CONTINUED

Mae's Treatment Options

Do nothing	"Sound Therapy"
Counseling	Other

Is it possible that people who have tinnitus can do nothing and still improve over time?

- "One technique used to study what happens to symptoms over time among people receiving no treatment is to examine the outcome of participants on a no-intervention or waiting-list control arm of clinical trials…"

CONCLUSION

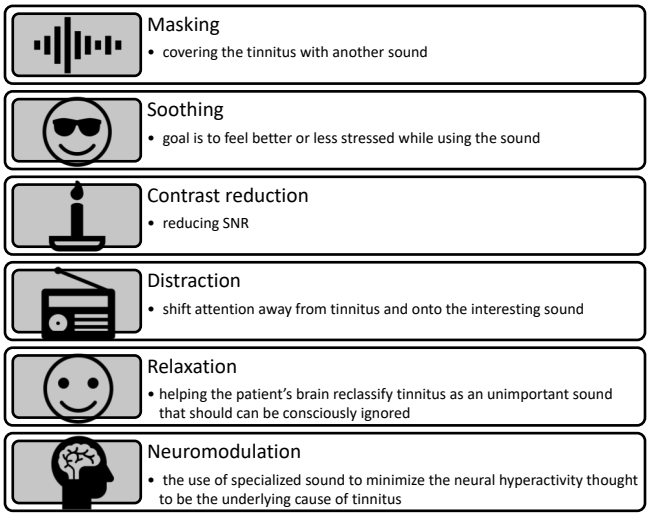
Participants enrolled into clinical trials assessing tinnitus interventions generally demonstrate a small but statistically significant improvement in self-reported global tinnitus severity scores over time, despite receiving no intervention. This finding provides statistical evidence that tinnitus generally improves over time, albeit the effect is highly variable across individuals, and how clinically meaningful the effect is cannot be interpreted at a general level. This evidence can therefore cautiously be used when counseling patients.

Phillips, J. S., McFerran, D. J., Hall, D. A., & Hoare, D. J. (2018). The natural history of subjective tinnitus in adults: A systematic review and meta-analysis of no-intervention periods in controlled trials. *The Laryngoscope*, *128*(1), 217-227.

What exactly does "sound therapy" mean?
Henry et al (2008) describes the following strategies:

This is why HAs often help!

See Henry et al (2008) for descriptions.



What do we mean by "counseling?"

Educational Counseling

- promote their capacity for self-growth and acceptance of tinnitus *symptom*, or their ability to tolerate *the* sound
- Typical components: Goal/outcome of treatment, Basics of auditory system, Basics of brain function/interactions, Habituation, Role of sound therapy

Structured or Behavioral Therapy

- Cognitive Behavioral Therapy
- Mindfulness-based Stress Reduction
- Acceptance & Commitment Therapy
- Progressive Tinnitus Management
- Tinnitus Retraining Therapy

Selected Other Treatments for Tinnitus (Cochrane Reviews)

Treatment	Does sufficient evidence exist?
Zinc	No
Betahistine	No
Anticonvulsants	There is no evidence from studies performed so far to show that anticonvulsants have a large positive effect in the treatment of tinnitus but a small effect (of doubtful clinical significance) has been demonstrated.
Ginko Biloba	No
Acupuncture	Acupuncture points and sessions used in Chinese studies may be more appropriate, whereas these studies have many methodological flaws and risk bias, which prevents us making a definitive conclusion.
Antidepressants	No
Hyperbaric Oxygen Therapy	No

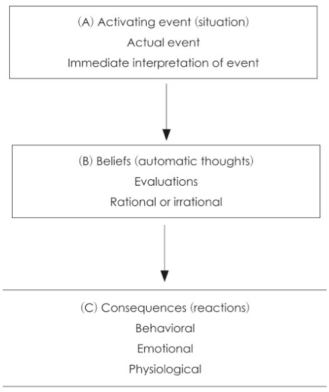
Mae's Appts

Date	Appt	THI / TFI	Notes
1 year after MVA	TRT Eval	84 / 77	
+1 month	Counseling + Device Discussion		Ordered devices
+2 months	Device Delivery	56 / 60	No amplification (just TSG)
+3 months	3 Week Check		
+6 months	3 Month F/U	52 / 62	
+9 months	6 Month F/U	46 / 57	

Cognitive Behavioral Therapy (CBT)

Jun & Park (2013)

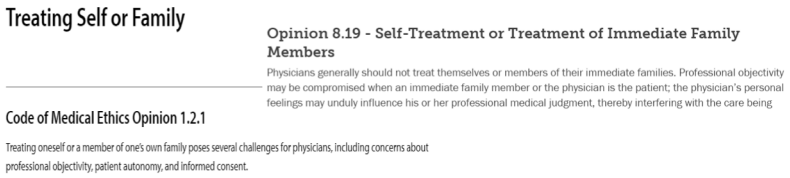
- CBT focuses on negative and unrealistic cognitions (thoughts and beliefs) cause maladaptive behavior.
- By challenging (correcting) these negative cognitions, the patient can have more positive and realistic thoughts.



CBT can be applied to tinnitus treatment. It does not have an effect on improving the acoustic characteristic of tinnitus, but it improves the response to tinnitus. Thus, CBT is a good treatment option for tinnitus.

Q3

There are several opinions available from the AMA website along these lines:



Treating Self or Family

Code of Medical Ethics Opinion 1.2.1

Treating oneself or a member of one's own family poses several challenges for physicians, including concerns about professional objectivity, patient autonomy, and informed consent.

Opinion 8.19 - Self-Treatment or Treatment of Immediate Family Members

Physicians generally should not treat themselves or members of their immediate families. Professional objectivity may be compromised when an immediate family member or the physician is the patient; the physician's personal feelings may unduly influence his or her professional medical judgment, thereby interfering with the care being

- Risks of self-treatment: "In the field of mental health in particular, a physician who treats himself is depriving himself of the benefits of consultation and psychotherapy, which, in some cases, obviates the need for medication."

Q4

Take Homes:

There are many ways to use sound therapy and counseling to benefit the patients who are suffering from tinnitus.

Even those who you might think could manage on their own may need a little extra help.

"Convertible" Hearing Aids for Fluctuating Hearing Loss

Presented by Lori Zitelli, AuD
zitellild@upmc.edu

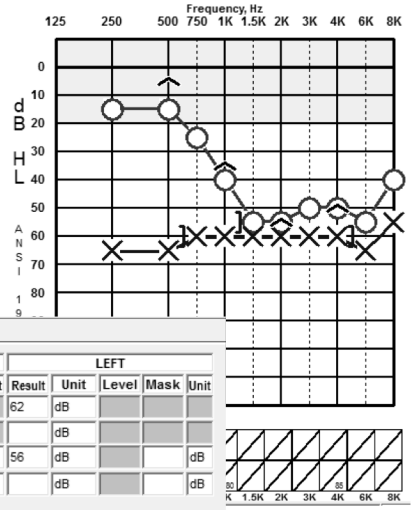
Meet Robert: 52 y/o man

- July Initial ENT eval
  - Self-referred for 2nd opinion of diagnosis of Meniere's Disease
  - Reports:
    - Bilateral hearing loss (L>R) – bothersome
    - Bilateral tinnitus (L>R) – noticeable, but not particularly bothersome
    - Dizziness
  - Exam

EAR, NOSE, MOUTH, AND THROAT

* External pinna & External nose:	normal, no visible lesions or deformities present
* Otoscopy:	normal examination of external auditory canal, tympanic membrane, and middle ear, see micro

Audiogram



Page One

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PTA		37	dB				62	dB			
2 Freq PTA			dB					dB			
SRT-earphones	Spondee - Record	28	dB			dB	56	dB			dB
SAT	Spondee - Record		dB			dB		dB			dB
Speech Recognition-Quiet											
Earphone	NU-6 rec full	84	%	68		dB	48	%	96	76	dB
Earphone	NU-6 rec half		%			dB		%			dB

Assessment & Plan

Diagnosis: asymmetric sensorineural hearing loss & Meniere's Disease

Typical tinnitus = Low pitched, low sensation level, easily masked

Plan:

MRI	Hearing aid evaluation	Balance Specialist	F/u in 6 mos

Unremarkable

Assessment & Plan
My impression is that is suffering from endolymphatic hydrops lateralization uncertain. The patient has a hearing loss on the left consistent with hydrops and a borderline normal balance reduction on the right suggesting possible bilateral disease.

Q8

+7 Mos
HA discussion

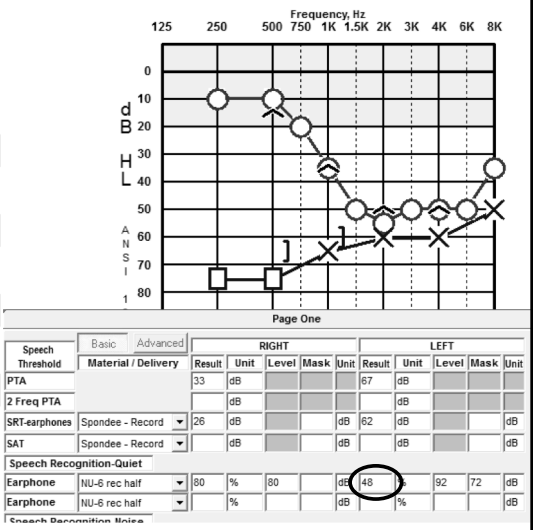
Monaural vs Binaural

Style

Technology level

Meniere's considerations

- Fluctuating HL possible
- Poor WRS likely eventually
- Tinnitus

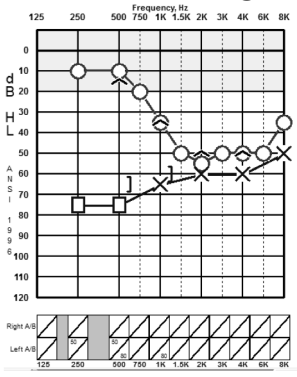


Valente, M., Mispagel, K., Valente, M. L., & Hullar, T. (2006). Problems and solutions for fitting amplification to patients with Meniere's disease. *Journal of the American Academy of Audiology*, *17*(1), 6-15.

Q7

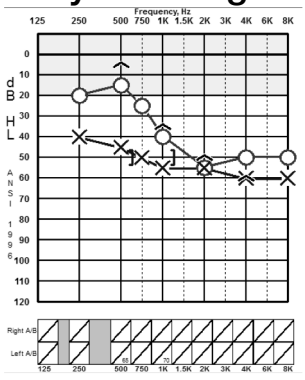
+13 Mos
HA Discussion 2

Previous Audiogram



Right WRS: 80%
Left WRS: 48%

Today's Audiogram



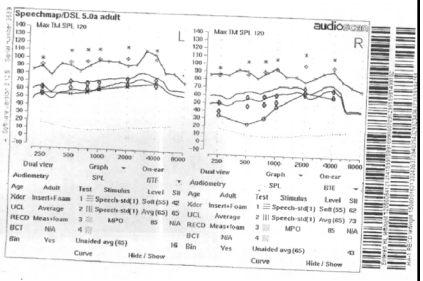
Right WRS: 92%
Left WRS: 60%

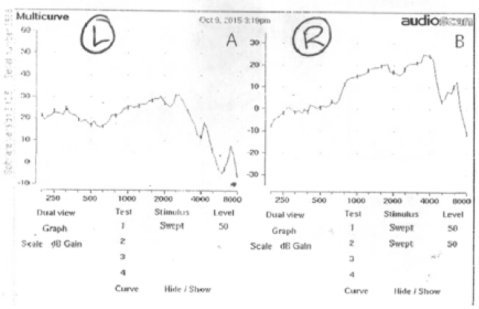
+13 Mos
HA Discussion 2 (cont')

- Option presented: "convertible" hearing aids
  - Program 1 = binaural amplification
  - Program 2 = BiCROS
- Standard technology level RICs
  - Unitron Moxi Dura 600s w/ custom acrylic micromolds

+15 Mos
HA Delivery

- Manual program sequence:
  1) standard



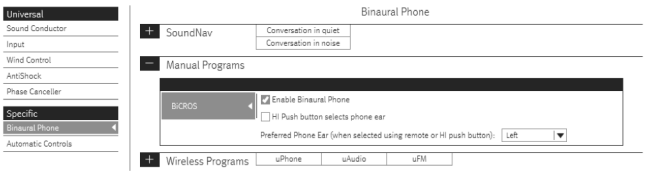


CONTINUED

+15 Mos
HA Delivery

- Manual program sequence:

  2) BiCROS



- https://www.unitron.com/content/dam/unitron-2017/images/GovServ2018/PDFs/PatientSupport/Programming%20Guide-CROS%20BiCROS%20Using%20Wireless%20Streaming_10-17%20(3).pdf

- https://www.phonakpro.com/content/dam/phonakpro/gc_hg/en/resources/evidence/white_paper/documents/technical_paper/Insight_Phonak_CROS_Probe_Mic_Measures.pdf

CONTINUED

3 Week Check & Subsequent F/Us

- Primarily uses Binaural setting, as his hearing has not fluctuated severely (…yet?)
- Reports feeling more “balanced” in binaural setting
- Tinnitus is no longer a problem (barely notices it)

CONTINUED

Take Homes:

- Consider a “convertible” option if hearing loss fluctuates (or at least devices with this option if it may be desired in the future)

Tinnitus and ABR

Can tinnitus be objectively diagnosed?

Tinnitus in the clinic

- Audiologic evaluations
- Patient report/case history
- Tinnitus matching

- These are all behavioral and/or subjective.

Why Objective Measures Matter

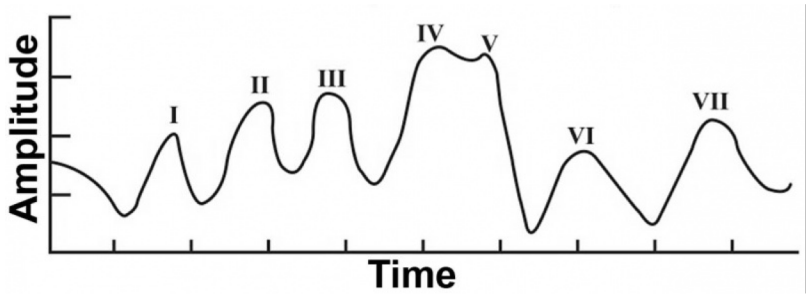
- Verifying patient complaints

- Compensation and pension claims

- Other legal claims

CONTINUED

ABR Review



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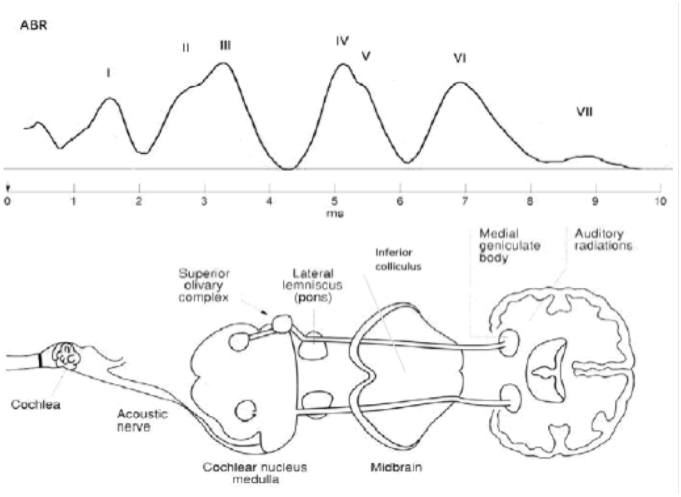
ABR Review



Case History

- 53 y.o. male
- Compensation & Pension Audiologic Evaluation:
  - Right ear: Normal hearing sensitivity through 2000Hz, sloping to a mild SNHL through 8000Hz.
  - Left ear: Normal hearing sensitivity through 1500Hz, sloping to a moderate to severe sensorineural SNHL through 8000Hz.
- Bothersome, bilateral tinnitus ("ringing" and "crickets") since military service.
- 0% Service Connected for Hearing Loss, 10% for tinnitus.

Case History

- Seen for ABR to look further into possible retrocochlear pathology prior to selecting hearing aids.
  - Wave V interaural difference: 0.09ms
  - Wave I-IV difference: 4.1ms
  - ABR WNL
- "My hearing loss was tested. Why wasn't my tinnitus tested?"

Gu et al. (2012) & Milloy et al. (2017)

- Those with tinnitus may show:
  - Reduced wave I amplitude → auditory nerve
  - Enhanced wave V → inferior colliculus
- Subjects matched in age, sex, and pure-tone threshold.

Q9

Guest et al, 2017

- Those with tinnitus may show:
  - NO reduced wave I amplitude
  - ABR measures also did NOT correlate with noise exposure reports
  - Maybe tinnitus is not related to cochlear synaptopathy?

CONTINUED

Take Home Message

- More research is needed to determine if ABR can accurately reflect a person's tinnitus perception.
  - Not used in audiologic evaluation for tinnitus, patient counseling, or legal/compensation claims.
- Could electrophysiology predict if a person will experience tinnitus in the future?

CONTINUED

Group Tinnitus Counseling

Is group tinnitus counseling better than individual tinnitus counseling?

Tinnitus Management Class at VAPHS

- Taught monthly or as needed.
- 3 sessions, each one hour long.
- Use PTM handbook (Given to participants).
- Co-taught by and audiologist and a Cognitive Behavioral Therapist.
- Typically 3-6 participants. Communication partners are encouraged to attend.

Case History

- 67 y.o. male
- Tinnitus for 45 years. Became gradually bothersome 10 years ago.
- History of noise exposure
  - "Gunner" in military
  - Steel mill worker
  - Target shooting and power tools

Case History

- Wears open RIC hearing aids.
- Has a tinnitus program in his hearing aids that he does not like.
- Uses manufacturer's tinnitus app and has found a masker that is satisfactory to him.
- Uses Bluetooth speaker with tinnitus masker sound card at night.
- Tinnitus is still "sometimes bothersome."
- Hesitant to join group class, but eventually completed all 3 sessions.

Thompson et al, 2011

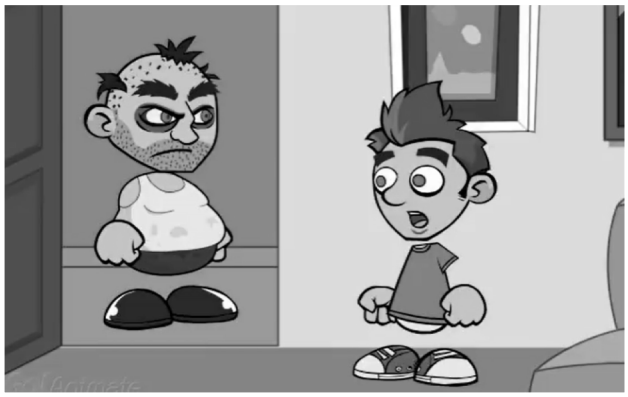
- Group classes facilitate:
  - information exchange
  - social comparison
  - coping
  - "The human dynamics of groups may have an additional therapeutic benefit."

Collins et al, 2009

- Group visits may yield:
  - Lower clinic costs
  - Reduced need for future services
  - Better participant satisfaction and self efficacy
  - Better health status
  - Compliance
  - Quality of life

"The Unwelcome Party Guest"

Acceptance and Commitment Therapy



Take home messages:

- If your practice does not yet offer a group tinnitus class, consider forming one!
  - At the bare bones, no equipment is needed, just a trained provider(s).
- Some patients may be reluctant to join a group. Encourage them to get involved by using past group results or EBP.
- If available, consider involving a mental health professional to speak to the group.

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