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HearUSA
America's Most Trusted Name in Hearing Care.

Preventing Medical Errors in Audiology

Cindy Beyer, AuD
Suzanne Younker, AuD

HearUSA
America's Most Trusted Name in Hearing Care.

- Malpractice and Audiology Overview
- Administrative and Documentation Errors
- Clinical Errors in Hearing Aid Dispensing
- Diagnostic Audiology Errors
- Summary and Closing

AGENDA

Why Errors Course?

- Risks and liability associated with delivery of care increase: Audiology is not immune
- Cost of providing and receiving healthcare continues to rise
- Complex diagnoses and treatment as hearing healthcare evolves
- Hundreds of millions of dollars spent to resolve cases of medical liability
- Regulatory responsibility- licensing
- Ethical responsibility to minimize risk of error in delivering hearing care

7

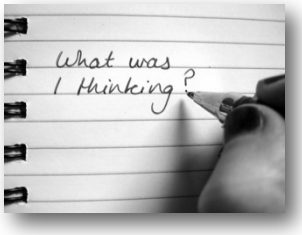
Course Objectives

1) Identify the highest probable origins of adverse audiology outcomes
2) Discuss steps that will minimize errors in audiology practice
3) Discuss the rationale and benefits of a risk management program

8

It Happens!

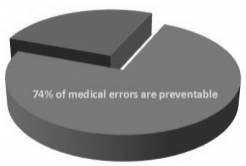
- Odds are if you practice long enough
- See enough patients
- See a diversity of patients
- You will encounter an adverse and unexpected outcome



9

Medical Errors

- Up up to 100,000 die annually
  - More than AIDS, MVA, breast cancer
  - 2.4 million prescriptions filled incorrectly
  - 7000 people die from medication errors
- Cost the nation $17- 29B annually
- Third leading cause of death



http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20%20report%20brief.pdf

10

Do No Harm…

- Best interest of Patient
- Protects clinician from potential liability issues
- Follow established clinical guidelines to assist us in delivering conscientious and appropriate care.
- Scope of practice and best practices documents are available from the American Academy of Audiology www.audiology.org and American Speech and Hearing Association www.asha.org

Standard of Care establishes uniformity across individuals in an organization & sets expectations for acceptable performance

11

Audiology and Liability

- Malpractice can be either a *deliberate* or a *negligent* act committed by a health care provider
- Injury may encompass a broad spectrum of incidences from actual physical injury to the unintentional mismanagement of a patient's hearing loss.
- Result is injury or other adverse outcome to the patient

12

Polling Question #1

- How many of you have encountered an adverse event in the course of performing audiology procedures? (Examples would be: abrasions to the ear canal during impressions or cerumen removal, an embedded impression that couldn't be removed without pain to the patient, PE tubes that were extracted through an impression)

13

Types of Errors

- Diagnostic
  - Error or delay in diagnosis
  - Failure to employ indicated tests
  - Use of outmoded tests or therapy
  - Failure to act on results of monitoring or testing
- Treatment
  - Error in the performance of an operation, procedure, or test
  - Error in administering the treatment
  - Avoidable delay in treatment or in responding to an abnormal test
- Preventive
  - Failure to provide prophylactic treatment
  - Inadequate monitoring or follow-up of treatment
- Other
  - Failure of communication
  - Equipment failure

14

Audiology Specific Areas

- Infection Control
- History and Documentation
- Cerumen Removal
- Evaluation and Testing
- Earmold Impressions
- Circuit Selection of Programming Errors
- Verification Errors
- Electrophysiology Errors – ABR
- Electrophysiology Errors – ENG/VNG

"An ounce of prevention is worth a pound of cure."
Benjamin Franklin
(1706-1790)

15

Infection Control

- Provider's responsibility to ensure patient safety and to provide an environment that controls transmission of disease from clinician to patient; patient to patient; patient to clinician
- Elderly patients present with compromised immune systems placing them at particular risk; newborns and infants
- Direct contact occurs between clinician and patient
- Between patient and equipment/tools …that in turn come in contact with other patients.

Polling Question #2

16

Infection Control: Common Errors

- Not washing hands between patients
- Handling unclean hearing aids
- Failure to disinfect patient contact areas
- Infrequent changing of ultrasonic solution
- Failing to clean and disinfect tools
- Reusing foam earphone inserts, tympanometry tips, and real ear measurement (REM) tubing without proper disinfecting
- Not washing hands after handling used tools and equipment
- Improper storage of clean and dirty tympanometry tips

17

Medical Records

- Good record keeping helps us stay focused and develop logical plans for patient care; information available when reviewing the file.
- Ask questions: most appropriate direction of care - hearing aids, HAT, cochlear implant, and/or med/surgical intervention.
- Patient files are legal documents and subject to subpoena, audit, and other types of regulatory review.
- Our name and license number is attached to the patient's record, and judgments and opinions are rendered according to the extent and quality of supporting documentation.

18

Details…..

- Keep records of exact hearing aid make, model, circuitry, features and experiences
- Appropriate recommendations for improvement should incorporate past experience as well as current and future expectations.
- If medical clearance is so indicated by the results, make reasonable effort to obtain it.
- Ultimately, patients have both the right and the responsibility to make decisions about their health care.

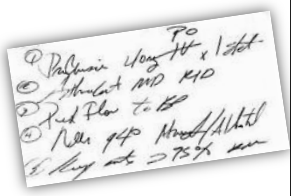
19

AMA Guidelines for Records

- Reason for the encounter;
- Relevant history;
- Physical examination findings;
- Prior diagnostic test results;
- Assessment, clinical impression, or diagnosis;
- Rationale for ordering medically necessary tests or services;
- Patient's progress, response to changes in the treatment, and revision in diagnosis as necessary;
- Care Plan; and
- Date and legible identity of the provider (signature, initials, electronic signature), authentication.

20

Common Deficiencies….



- Illegible notes;
- Incomplete notes, encounter forms, flow sheets;
- Missing or illegible signature;
- Alterations or changes made to the original medical record;
- Use of non standard medical abbreviations;
- Biased or non-professional remarks;
- Disorganized or misfiled patient records;
- Repetitive, non-individualized notes - especially with electronic medical records; and
- Misuse of rubber stamped or electronic signatures.

21

Documentation Errors:

- Failure to document all patient visits
- Failure to initial/sign and date all patient visits
- Failure to include subjective and objective data at each visit
- Failure to document actions and follow up
- Failure to evaluate and document previous hearing aid experiences
- Insufficient amplification history and documentation of needs and expectations

22

Documentation – Common Clinical Errors:

- Neglecting to print/save programming and real ear for future reference
- Missing physician scripts and signed clearance forms as indicated
- Failure to ensure hearing aid make, model and style match billing invoice; required language
- Documentation fails to follow patient care adequately
- Failure to effectively address unresolved problems

23

Civil Cases

- Small claims court
- Documentation is EVERYTHING
- Patient acknowledgements are critical
- Data is important….
- HUGE inconvenience factor
- ALWAYS some concession to the patient

24

Licensure Actions

- Patient submits formal complaint to licensing board
- Investigation by Medical/Quality Assurance
- Alleges some violation of the state statute
- Documentation is EVERYTHING
- Patient confirmation is IMPORTANT

25

Cerumen Removal

- Possibility of clinical error with subsequent malpractice litigation.
- Over 200,000 ears are cleaned of cerumen each week in the United States
- Cerumen management has become a prerequisite to comprehensive patient care within hearing care practices unless prohibited by a state's licensing laws.

26

Cerumen Removal Contraindications

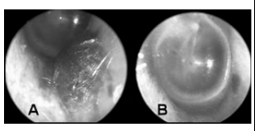
- Effusion in the ear canal or other active ear disease
- Hematoma in the ear canal
- Surgical modification of the canal wall
- Unidentifiable foreign objects
- Diabetic patient
- Pending legal proceedings
- Suppressed immune systems
- Bleeding disorders
- Required constraint for removal

27

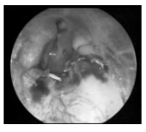
Cerumen Removal - Common Errors:

- Ignoring contraindications
- Unsigned cerumen consent form
- Neglecting to clean and disinfect cerumen tools
- Canal abrasions
- Improper storage of tools

Sizeable AD subdermal hematoma 24 hours and one month after cerumen removal



A post-cerumenectomy with a small hematoma and contusion with bleeding (multiple exostoses)



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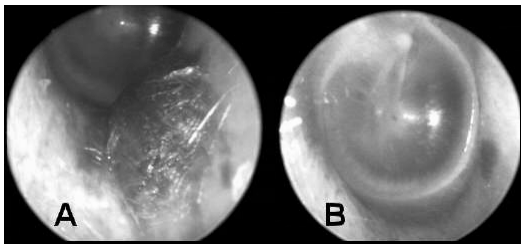
Sizeable AD subdermal hematoma 24 hours and one month after cerumen removal



A post-cerumenectomy with a small hematoma and contusion with

bleeding (multiple exostoses)

29

Common Errors in Audiometry

- Incomplete or poor case history
- Improper supervision of students
- Choosing the wrong test or omitting a test due to time constraints
- Over or under masking
- Misinterpretation/ under interpreting results
- Not making a referral when it is appropriate to do so
- When testing children or difficult to test patients, not keeping them on task and getting invalid results

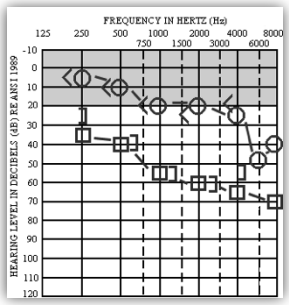
30

Common Testing Errors, Cont.

- Improper placement of headphones (reversal) or bone oscillator.
- Poor or unclear test instructions to patient
- False positive air bone gaps related to insert receiver positioning
- Speech recognition testing at levels too low to reach maximum performance
- Failure to perform annual calibration on test equipment
- Failure to perform daily/weekly listening checks

31

Audiogram Errors



- Reversal of earphones
- Patient confusion over testing procedures = false-positive or false-negative results.
- Double check results and make sure that everything "adds up" and that obvious discrepancies are corrected.

32

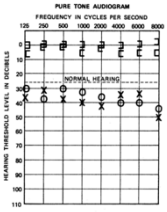
Hearing Aid Assessment

- Hearing aid dispensing is regulated through state licensing or registration
- Testing must include as a minimum, (except where concomitant handicaps or mental or chronological age preclude) speech audiometrics -including word recognition measures, air-conduction threshold assessment, and a measure of middle ear involvement.

33

Masking

- Inaccurate tests due to improper masking can lead to inappropriate recommendations, improper referrals, and inadequate hearing aid fittings.

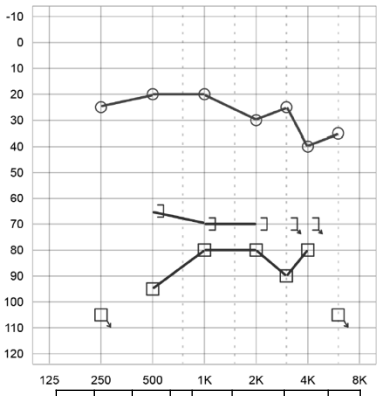


- Dispensers by law must refer patients with potential medical problems for audiologic assessment when indicated.

34

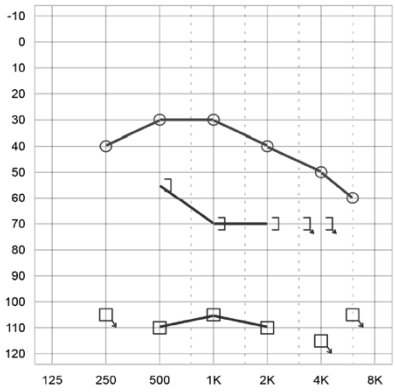
Under Masking @ 30dB-EM

2006



AC		**55**	**55**		**55**	**55**	**55**	
BC			60		60	60	60	

2010

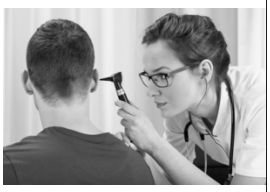


AC		**55**	**55**		**55**	**70**	**70**	
BC			55		55	70	70	

35

Medical Referral

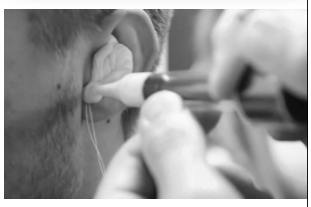
- Coordination of care with patient's physician ensures appropriate treatment
- Refer to established practice guidelines to avoid over or under referring of medical care.
- Under referring patients may deny patients the opportunity for the most effective and appropriate resolution to the hearing condition.
- Over referral of patients for medical care is costly and inconvenient.



36

Earmold Impressions

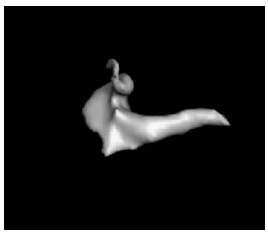
- Invasive procedure that can lead to complications, and quite probably the riskiest procedure that we perform
- In our experience the vast majority of adverse events are related to the taking of ear impressions.
- Requires a conscientious approach to inspecting the ear canal and confirming otoblock placement to avoid errors



37

A routine procedure…

- Potential for damage to outer, middle and inner ear structures exists … potential increases when taking deep canal impressions.
- Complications include- canal abrasions, trauma/lesions to the tympanic membrane and middle ear ossicles; accidental removal of pressure equalization tube; perilymph fistula with resultant fluctuating, progressive, or long-standing sensorineural hearing loss; or concussive inner ear trauma accompanied by temporary or permanent threshold shifts.

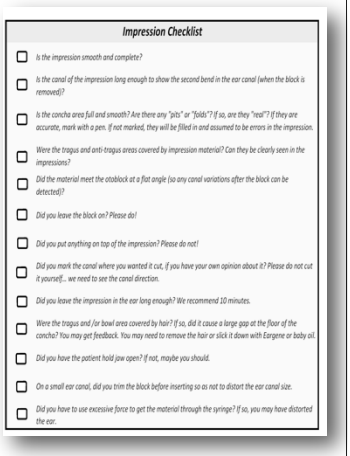


Polling Question #3

38

Precautions

- Appropriate bracing should be employed to avoid potential injury of the canal wall or the tympanic membrane.
- Careful examination of the ear canal pre and post otoblock placement to ensure that the material will not travel past the block.
- Especially important when working with young children, patients who may be frightened by the impression process, or patients with complicating disorders that preclude normal neuromuscular control… may lead to unexpected movement.

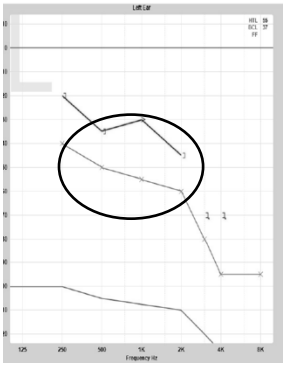

Impression Checklist

- ☐ Is the impression smooth and complete?
- ☐ Is the canal of the impression long enough to show the second bend in the ear canal (when the block is removed)?
- ☐ Is the concha area full and smooth? Are there any "pits" or "folds"? If so, are they "real"? If they are accurate, mark with a pen. If not marked, they will be filled in and assumed to be errors in the impression.
- ☐ Were the tragus and anti-tragus areas covered by impression material? Can they be clearly seen in the impressions?
- ☐ Did the material meet the otoblock at a flat angle (so any canal variations after the block can be detected)?
- ☐ Did you leave the block on? Please do!
- ☐ Did you put anything on top of the impression? Please do not!
- ☐ Did you mark the canal where you wanted it cut, if you have your own opinion about it? Please do not cut it yourself… we need to see the canal direction.
- ☐ Did you leave the impression in the ear long enough? We recommend 10 minutes.
- ☐ Were the tragus and /or bowl area covered by hair? If so, did it cause a large gap at the floor of the concha? You may get feedback. You may need to remove the hair or slick it down with Eargene or baby oil.
- ☐ Did you have the patient hold jaw open? If not, maybe you should.
- ☐ On a small ear canal, did you trim the block before inserting so as not to distort the ear canal size.
- ☐ Did you have to use excessive force to get the material through the syringe? If so, you may have distorted the ear.

39

Case #1 Left Ear

- Impression material scraped from TM under general anesthesia
- Numbness in tongue, sense of taste distorted
- Subsequent tests and doctor visits indicate further hearing loss and additional health issues (dizziness, headaches, etc)
- $100,000 claim settlement



40

Case #2 - Blow By

- Audiologist, GP, ENT could not remove in office
- Impression removed under sedation. - obliterated the TM, surrounded ossicles, entered Eustachian tube. Pt. demonstrated significant decrease in AC thresholds- now severe/profound mixed
- Subsequent dizziness and cardiac problems (for which she was hospitalized)
- Pt underwent surgery to repair TM, one ossicle removed and replaced- cleaned ET in unsuccessful attempt to restore hearing.
- Outcome- Settlement of $560,000.
  - Audiologist: reported to HIPDB for malpractice history
  - HearUSA had to demonstrate preventive action plan

41

Case #3 – Dislodged PE tube

- 21 month old child
- "I did not see the gap between the cotton block/canal – allowed material to blow by the block. The reason I believe the blow-by was so serious is because it was a toddler and the canal is so small that there is little margin for error. I have been doing impressions for 25 years. I should have been even more careful… I just didn't see the gap…"

42

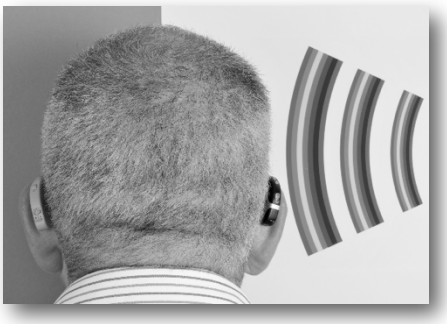
Technology and Programming Errors

- With new technology features comes added complexity of multiple memories and continuously evolving options and algorithms.
- Implementation of programmable amplification will not automatically result in an improved patient outcome. It is incumbent upon us to employ the skills and techniques that will result in the patient realizing the benefits.

43

Common mistake…

- If at "first fit" you don't succeed, try - try again.
- First fit, then multiple visits to "tweak", "adjust" and "modify"



44

Circuit Selection - Programming Errors

- Inappropriate compression strategy
- Not ordering appropriate options
- Not activating or programming additional memories
- Not incorporating past history into programming logic
- Over-reliance on first fit - Not entering UCL/LDL data for 2 frequencies so that first fit will calculate accurate output levels
- Not entering bone conduction scores when an air bone gap is present.

45

Fitting Complication

- Patient fit with CIC hearing aids
- Perforation LE longstanding
- Diabetic
- Subsequent fungus infection resulting in 24 doctor visits

46

Tip:

If pursuing a risky fit, take care to implement and document precautionary measures.

47

Verification and Validation

- Objective
- Subjective
- Together – meet a clinical standard for delivery of care
- Minimum professional standard

48

Verification Failures

Polling Question #4

- Lack of objective data to verify the fitting throws into question the validity, efficacy and legitimacy of the hearing aid fitting process
- Abdicates the responsibility for guiding the patient's course of care to the patient;
  - How does that sound?
  - Let me know if you have any problems?
- Unacceptable in the practice of healthcare not to measure pre and post conditions

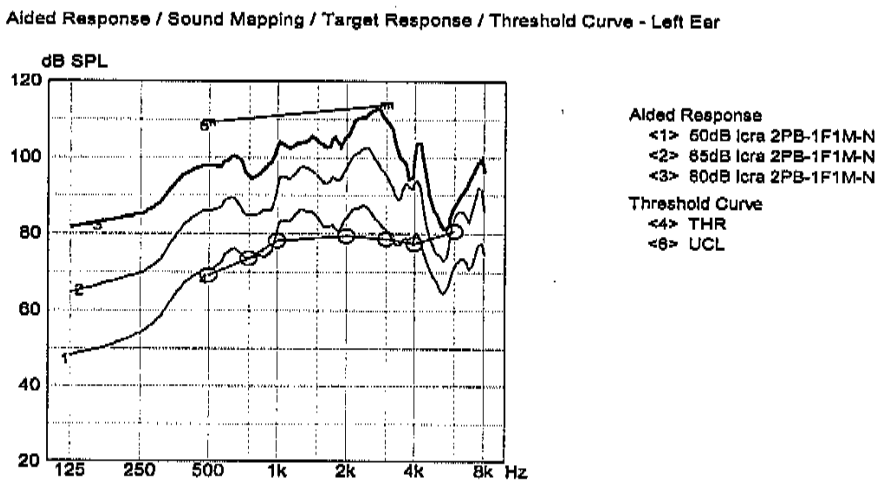
49

Verification Practices

- Multi-memories, directional microphones
- Provide adequate audibility, maximize speech intelligibility and maintain a zone of comfort within the patient's dynamic range
- Output curves - give us good information about the patient's ability to hear soft, medium and loud inputs.
- Preserve dynamic range in order to preserve the elements of speech. Align the curves to preserve speech intelligibility, without compromising the louder speech sounds.

50

Satisfactory REM Output Responses



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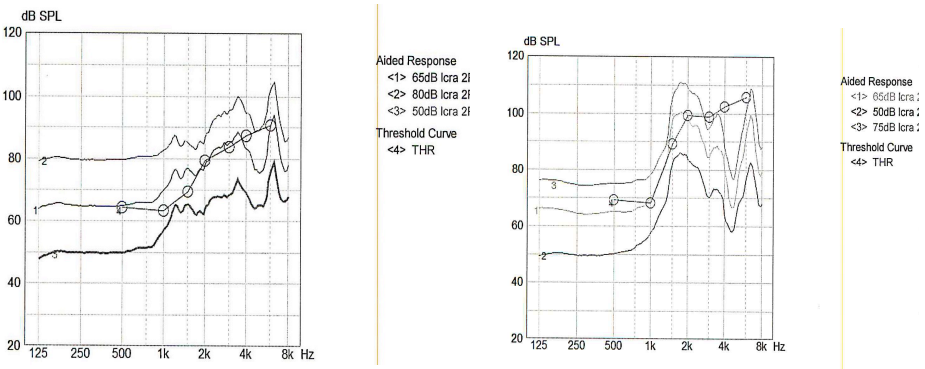
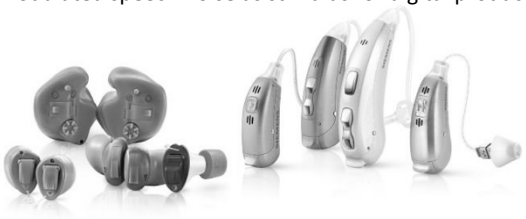
Unsatisfactory REM Output Responses



52

Verification: Common Clinical Errors

- Failure to verify settings
- Failure to verify multiple programs
- Failure to interpret output appropriately
- Failure to include bone conduction in real ear targets when a conductive component exists
- Not using modulated speech noise as stimulus for digital products



53

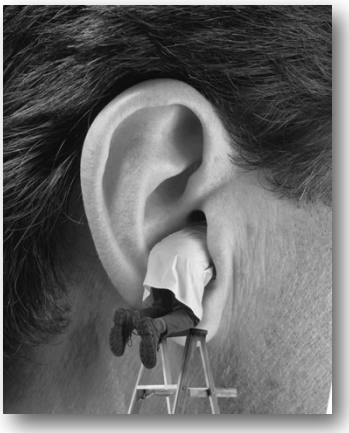
Validation

Polling Question #5

- Failure to employ standardized measures for patient feedback
- Failure to incorporate the feedback into management of care
  - Adjustments
  - Counseling
- Failure to aggregate the data to identify performance improvement opportunities

54

Oops????



55

Dr. Suzanne Younker, Audiology Services Manager

Pediatrics, ENG/VNG, and ABR

56

Iatrogenesis

Inadvertent and preventable induction of disease or complications by the medical treatment or procedure of a member of the medical community.

- Antibiotic resistance in bacteria
- Blood tests can induce anemia
- Counseling about tinnitus can cause symptom of adverse tinnitus
- Acoustic reflex testing on narrow dynamic range patients can cause tinnitus or hearing loss

57

Pediatric - UNHS

- Aimed at the early detection of and intervention for children with congenital hearing loss
- Critics have reasonably argued that current UNHS practices produce an unacceptably high rate of false-positive from 2.5% to 8%
- Assuming that all 4 million infants born each year in the United States received UNHS, a 3% false-positive rate would cause 120,000 families of newborns to leave the hospital questioning the hearing ability of their infant and needing to return for follow-up.

58

Pediatric - UNHS

How Good Are Hearing and Vision Screening Tests in Children?

- A resident was seeing children in his continuity clinic. He had noticed that several of his patients had failed newborn hearing screenings at birth, but were normal when repeated a couple weeks later.
- He asked how good the testing was. His attending said she didn't know the exact numbers but that universal screening had been occurring for several years.

PediatricEducation.org Blog, November 14, 2011

59

Harmful Consequences

In the vast majority of UNHS programs, follow-up testing does not occur until a number of weeks after the initial screen.

- Disease labeling
- Emotional distress
- Squander time and dollars
- Questions validity of test

60

Pro-Active Solution

- Re-screen within 2 days of original screen

TABLE 1. Results of UNHS at WHOG From November 1, 1999 to May 31, 2000 for Non-NICU Newborns

Category	*n*	% of Previous	% of Total Screened
Normal newborns (non-NICU)	3144	—	—
Total screened	3142	99.9	—
Failed stage 1a screen*	131	4.17	4.17
Received stage 1b screen†	125	95.4	4.00
Failed stage 1b screen	33	26.4	1.05
Received stage 2 screen‡	33	100	1.05
Failed stage 2	8	24	0.25

* Stage 1a screen—initial hearing screen.
† Stage 1b screen—repeat hearing screen before hospital discharge of newborn.
‡ Stage 2 screen—outpatient screen by trained audiologist (this does not include the 6 infants who missed stage 1b screening).

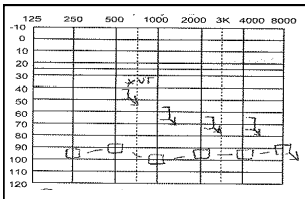
Minimizing False-Positives in Universal Newborn Hearing Screening, PEDIATRICS Vol. 107 No. 3 March 2001

Pediatric Behavioral Testing School Age

Ages 3- 5 years old:

- Pure-tone testing under earphones at 1000, 2000, and 4000 Hz at 20 dB HL using conditioned play audiometry.
- Challenge is that not all children in this age group can complete the task
- Use of Screening OAE: There has been little research on the use of DPOAE in the preschool population. More current studies support the use in addition to pure tone screening.
- Pass Criteria Discrepancy =
  - ASHA, 1997: Must respond to <u>at least two out of three</u> pure-tone presentations at all frequencies in both ears If a child fails the screening, they must then be referred for a full audiological evaluation. Also, incorporate use of tympanometric measures. Children whose test results include a flat tympanogram should be referred for medical evaluation.
  - AAA 1997: Failure to respond at <u>any one frequency</u> in either ear constitutes failing the screening, and the child should then be referred for a full audiological evaluation.

Preschool Hearing Screenings: A Comparison of Distortion Product Oatoacoustic Emissions and Pure Tone Protocols, Journal of Educational Audiology vol. 19, 2013



Inaccurate Documentation

Visit date:8/9/2016

6 y.o. male who is here with his mother for follow-up due to left mixed hearing

Assessment & Plan:
6 year old with left mixed hearing loss.
Discussed option for CROS or BAHA.

Office Visit 11/9/2016

Primary diagnosis: Sensorineural hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side

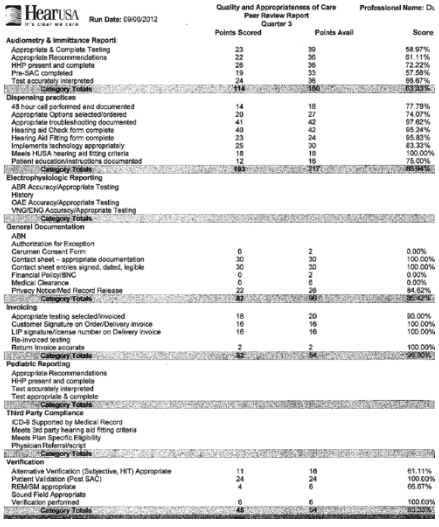
grandmother. **Audiological history is significant for profound sensorineural hearing loss in the left ear with normal hearing in the right ear.**

Last audiological evaluation was completed on 04/19/2016 with Dr. [ ].

LEFT: **Poor (no measurable)** word understanding when speech than average conversational speech **(0% at 105 dB masked).**
Speech testing was completed using the PBK word lists via CD.

63

Peer Review Report



HearUSA Run Date: 09/09/2012

Quality and Appropriateness of Care
Peer Review Report
Quarter 3

Professional Name: Dr.

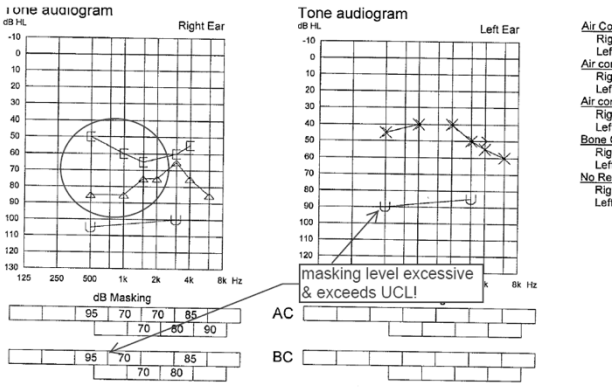
	Points Scored	Points Avail	Score
Audiometry & Immittance Report			
Appropriate & Complete Testing	23	39	58.97%
Appropriate Recommendations	22	36	61.11%
HHP present and complete	26	36	72.22%
Pre-SAC completed	19	33	57.58%
Test accurately interpreted	24	36	66.67%
Category Totals	114	180	63.33%
Dispensing practices			
48 hour call performed and documented	14	18	77.78%
Appropriate Options selected/ordered	20	27	74.07%
Appropriate troubleshooting documented	41	42	97.62%
Hearing aid Check form complete	40	42	95.24%
Hearing Aid Fitting form complete	23	24	95.83%
Implements technology appropriately	25	30	83.33%
Meets HIUSA hearing aid fitting criteria	18	18	100.00%
Patient education/instructions documented	12	16	75.00%
Category Totals	193	217	88.94%
Electrophysiologic Reporting			
ABR Accuracy/Appropriate Testing			
History			
OAE Accuracy/Appropriate Testing			
VNG/ENG Accuracy/Appropriate Testing			
Category Totals			
General Documentation			
ABN			
Authorization for Exception			
Cerumen Consent Form	0	2	0.00%
Contact sheet – appropriate documentation	30	30	100.00%
Contact sheet entries signed, dated, legible	30	30	100.00%
Financial Policy/BNC	0	2	0.00%
Medical Clearance	0	6	0.00%
Privacy Notice/Med Record Release	22	26	84.62%
Category Totals	82	96	85.42%
Invoicing			
Appropriate testing selected/invoiced	18	20	90.00%
Customer Signature on Order/Delivery Invoice	16	16	100.00%
LIP signature/license number on Delivery Invoice	16	16	100.00%
Re-invoiced testing			
Return Invoice accurate	2	2	100.00%
Category Totals	52	54	96.30%
Pediatric Reporting			
Appropriate Recommendations			
HHP present and complete			
Test accurately interpreted			
Test appropriate & complete			
Category Totals			
Third Party Compliance			
ICD-9 Supported by Medical Record			
Meets 3rd party hearing aid fitting criteria			
Meets Plan Specific Eligibility			
Physician Referral/script			
Category Totals			
Verification			
Alternative Verification (Subjective, HIT) Appropriate	11	18	61.11%
Patient Validation (Post SAC)	24	24	100.00%
REM/SM appropriate	4	6	66.67%
Sound Field Appropriate			
Verification performed	6	6	100.00%
Category Totals	45	54	83.33%

64

Medical Report Reviews

REMARKS: Pt has a Hx of Otosclerosis in the right ear.

Right Ear	Left Ear
•Canal clear of excessive cerumen. Using Insert Earphones: •Severe sensorineural loss. •Speech reception validates pure tone response •Word recognition ability poor	•Canal clear of excessive cerumen. Using Insert Earphones: •Moderate sensorineural loss. •Speech reception poorer than pure tone average •Word recognition ability good



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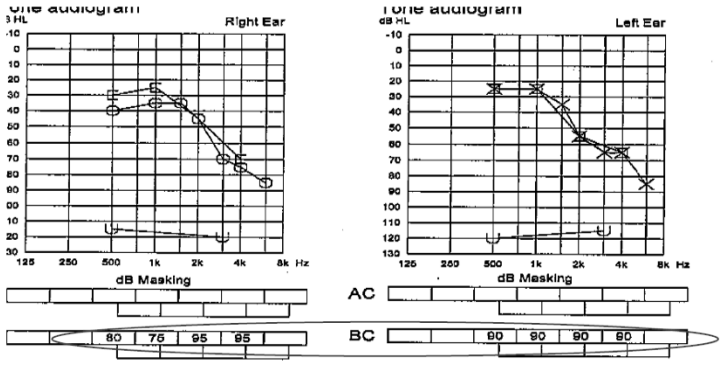
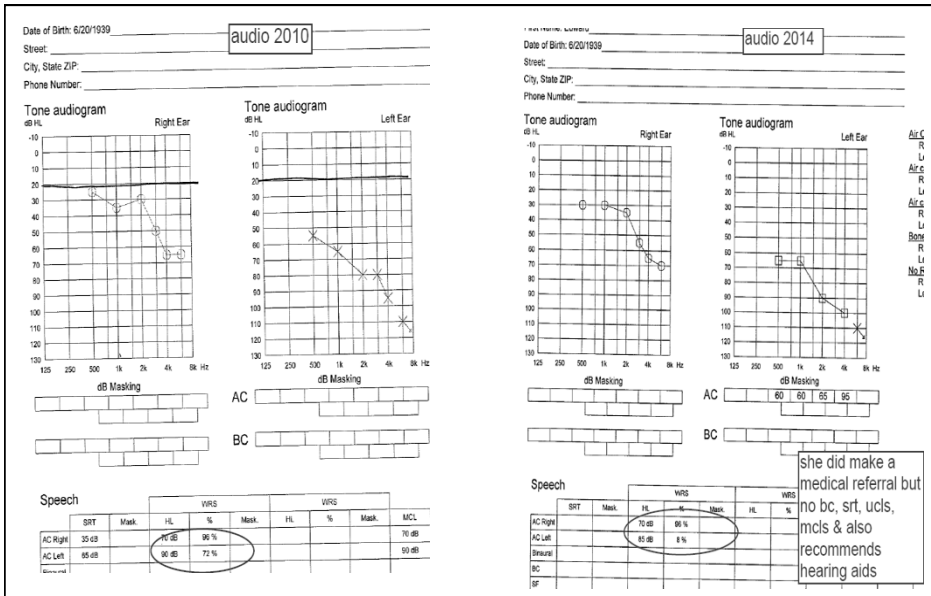


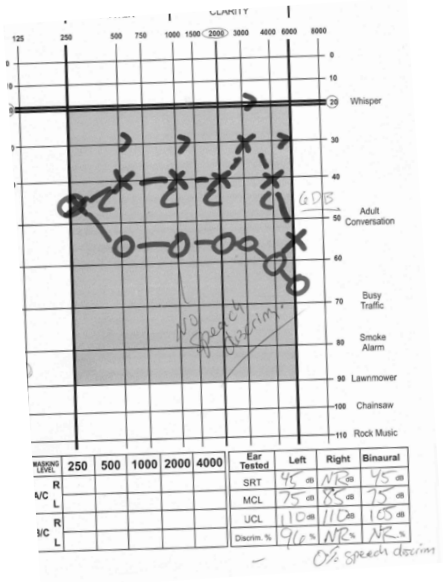
Right Ear	Left Ear
•Canal clear of excessive cerumen. Using Headphones: •Moderate high frequency mixed loss. •Speech reception validates pure tone response •Word recognition ability excellent	•Canal clear of excessive cerumen. Using Headphones: •Moderate high frequency sensorineural loss. •Speech reception validates pure tone response •Word recognition ability good

66



67

Recommended HA for Left Ear



68

Vestibular Reminders/Cautions

- General Precautionary Reminders:
  - Pre-test instructions to limit/omit food, medications, caffeine, etc.
  - Assess patient medications that may affect responses
  - Obtain a thorough medical history
  - (table from McCasling, ENG/VNG, Singular Publishing 2013)

Table 4–7. Types of Dizziness and Related Medical Conditions

Medical Condition	Type of Dizziness
Cardiovascular	Syncope (orthostatic hypotension)
Migraine	Motion intolerance/ vertigo
Multiple sclerosis	Ataxia, lightheadedness, vertigo
Autoimmune disease	Ataxia, oscillopsia, lightheadedness
Chronic subjective dizziness	Rocking sensation, lightheadedness
Viral infections (nervous system)	Ataxia/vertigo
Stroke	Vertigo, short-duration unsteadiness

69

Vestibular Reminders/Cautions

- <u>Patient "Behavioral" Errors</u>
  - Anxiety
  - Neck/back injuries
  - Visual impairments
  - Unable to be tasked adequately due to cognitive issues or hearing loss
  - Physical stature
  - Osteoporosis "hump"

70

Vestibular Reminders/Cautions

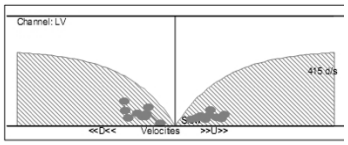
- A note about normal results for a symptomatic patient…

Chronic Subjective Dizziness

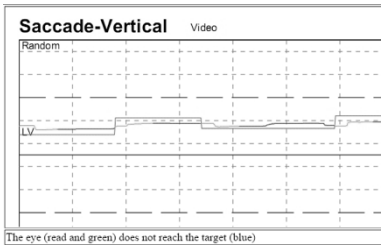
"The clinician seeing dizzy patients inevitably encounters patients who complain not of vertigo, but of a constant dizziness or "rocking"…they have normal results on quantitative assessments…could be suggestive of an anxiety disorder…" (D. McCaslin; "ENG/VNG", Plural Publishing, 2013)

71

Common Errors in VNG/ENG Testing



Saccade velocities are very slow (this is a technical error)



The eye (read and green) does not reach the target (blue)

1. **Failure to perform physical examination of eye movements.** Failure to recognize disconjugate eye movements will result in faulty measurement of eye movements throughout the test.
2. **Faulty Calibrations**. Poor measurements will cause the amplitude of the eye movement to be inaccurate.

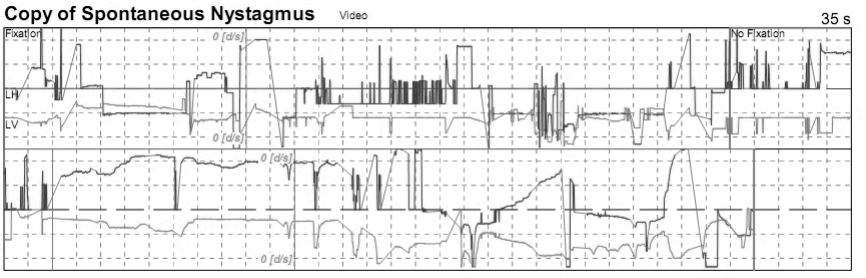
72

Common Errors in VNG/ENG Testing

3. Failure to maintain a steady level of alertness. In particular, during position and caloric tests; failure will result in the nystagmus appearing and disappearing intermittently. In some cases, the nystagmus may be missed completely. If the loss of alertness occurs during the strongest part of the caloric response, the peak nystagmus velocity for that irrigation will be miscalculated.

4. Failure to elicit physiologically-valid caloric responses. The main assumption in the caloric test is that all four irrigations provide equally strong stimulation to the labyrinth. Factors that can be controlled by the examiner are temperature, volume, and duration of irrigation. Also, make sure that there is no cerumen blocking the TM. Some factors, such as the ear anatomy, body temperature, or perforations, are not controllable. Even the most sophisticated algorithms occasionally fail to correctly identify the peak responses. If the system allows manual inspection and cleaning of tracings, the examiner should do so for all caloric irrigations.

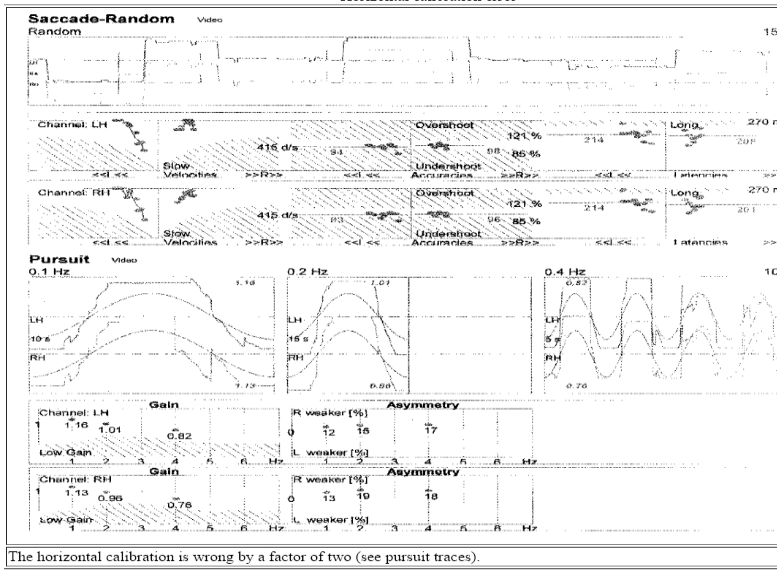
Perspective from a Neurologist; not very favorable to audiologists interpreting results…☹



Terrible VNG tracking produces an uninterpretable recording.

- No data - -many ENG labs omit the traces. This often means that they have something to hide -- often noise. If you can
- Noisy signal -- this is mainly a problem with ENG rather than VNG (see above).
- Tracking problems - when the camera is not "straight on", tracking can be lost, producing an equally awful recording.
- Drugged patient -- patients who come in on vestibular sedatives will produce decreased responses on testing.
- Lack of appreciation that patient has a paralyzed eye or a false eye (really !)

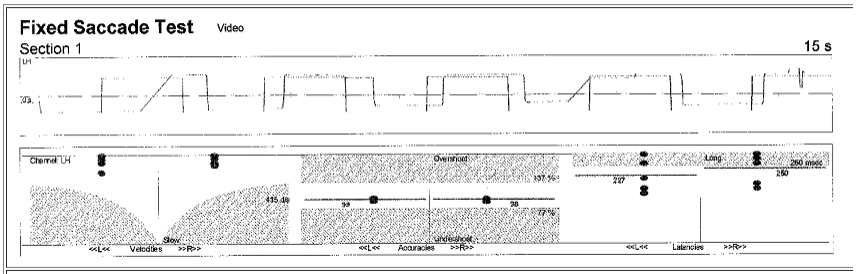
Horizontal calibration error



The horizontal calibration is wrong by a factor of two (see pursuit traces).

75

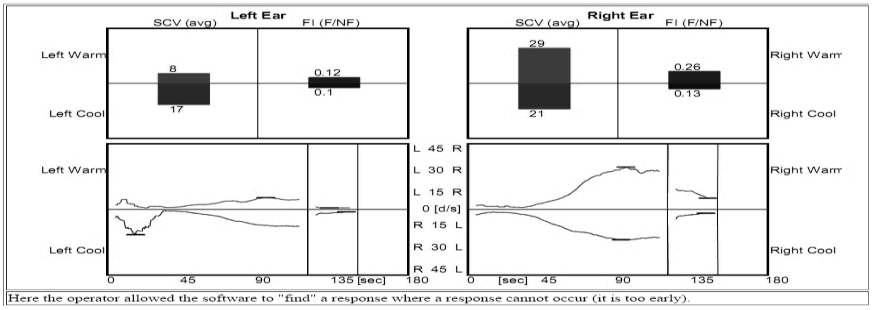
Saccadic test errors



Calibration error results in eyes that go "too fast". Eye drops off of computer "strip" chart.

Blind patient
Patient with a paralyzed eye, using monocular recording.
Poor calibration
Overly predictable protocol by equipment
Blink artifact rejects saccadic nystagmus
Misinterpretation of saccadic flutter as square wave jerks.
Head movement during testing

76



Here the operator allowed the software to "find" a response where a response cannot occur (it is too early).

Caloric test errors

Caloric testing is usually the most important procedure. Because of the discomfort factor, it is the place where technicians often "cut corners" -- they reduce the # of irrigations, they use air rather than water, etc.

Wrong temperature: Usually either warm or cold is wrong, resulting in an ENG that has much better responses for one or the other. Sometimes strange explanations are offered for this pattern, ignoring the obvious one (equipment is bad).

Wrong stimulus (i.e. air rather than water): Air is just not as good a stimulus as water, and it results in many "bilateral weakness" ENG's.

Too short irrigation

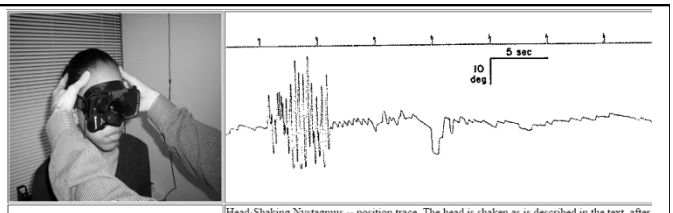
Too short interval between irrigations - One should wait 10 minutes between irrigations (ideally).

Lack of distraction: People can suppress their responses making the test worthless.

Lack of ice calorics: If there is no clear response, one has to do ice.

Too few irrigations: More irrigations means more accuracy. Two irrigations is too few.

77



Method of inducing HSN (also see text)

Head-Shaking Nystagmus -- position trace. The head is shaken as is described in the text, after which a nystagmus ensues, typically for about 15 seconds, with a peak velocity of about 15 deg/sec. (Wei et al, 1989)

Bizarre interpretations

Some interpreters of ENG's offer bizarre interpretations. For example, below med report summary - suggesting that bilateral caloric loss is a "central" finding.

Understandably, some interpreters of ENG's (e.g. audiologists or ENT's) are unfamiliar with neurological illnesses, and miss dangerous conditions.

Lack of correlation between caloric testing, HSN, vibration and rotational testing (i.e not understanding that everything has to be consistent).

Summary: Auditory Evoked Potential yielded normal inter-wave latencies. Ecog testing yielded no evidence of Hydrops. Active head rotation yielded significant abnormalities of the Vestibular-Ocular Reflex. Halpike testing yielded left beating nystagmus in the head hanging left position. Positional Nystagmus testing yielded left beating nystagmus in the body left position. Spontaneous and Gaze testing was normal. Oculomotor testing was positive for Central involvement. Caloric testing yielded absent responses bilaterally consistent with central involvement.

These findings are consistent with reduced vestibular responses of the VOR, Left beating Benign Positional Paroxysmal Vertigo, and Central Vertigo. The patient is a candidate for Vestibular Rehab Therapy focused on the Vestibular Ocular Reflex, BPPV and Central Vertigo.

Dizziness-and-balance.com Blog, March 27, 2016 78

Medical Report Reviews

1) The focus of the VNG report is to identify if a patient's balance symptom(s) is from a vestibular peripheral lesion or a vestibular central lesion. The findings of mild CNS involvement on random test results does not indicate a central vestibular pathology; probably indicates another type of CNS involvement related to age - especially when patient is >/=70 years old.

2) In an effort to communicate the status of the vestibular system in the most concise and effective way, pick ONE result to capitalize on if there is sufficient evidence in the results to support this. Avoid "the kitchen sink" reporting. It is not imperative to report minor/slight abnormalities - especially with CNS. If a patient truly has a Central Vestibular Pathology such as MS, brainstem carcinoma, etc., the test results will indicate CNS response in all outcomes of the test procedures. Random citing's of atypical "CNS" responses are not enough for this diagnosis. Thus, the use of "Soft sign for CNS involvement." can be used if felt relevant to patient's ultimate status and future care needs.

79

Medical Report Reviews

- VNGs Interpretations: “Do not report as Normal Peripheral in Summary if calorics were not completed. Just leave blank. Since the caloric test is the #1 identifier of a peripheral involvement, we cannot make the determination that it is normal if it was not completed appropriately. I am assuming that you are not invoicing the calorics when you are unable to complete them.”

80

Question

Polling Question #6

- Vestibular compensation is most effective when?
  - A. Patients are taking vestibular suppressants
  - B. Patients continue to move in the position that makes them dizzy
  - C. Patients wear glasses

81

ABR Reminders/Cautions

- General Reminders
  - Electrodes
    - Prepare skin adequately for low impedance
  - Make test parameters optimal–rate, gain, stimulus, filters, sweeps, runs, etc.
  - Ambient noise is quiet and calm
    - Fluorescent lighting in test room (adjoining rooms)
  - Patient state is quiet and calm
    - Patient's cell phone off and removed from body
    - Pacemakers create ongoing EEG

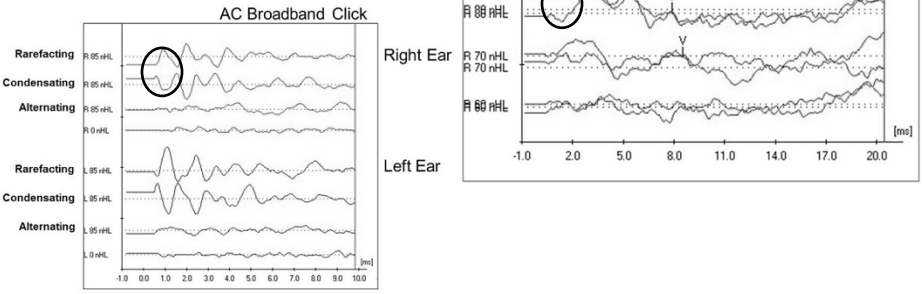
82

ABR Reminders/Cautions

- General Error Possibilities
  - Failing to assess middle ear status prior to evaluation
  - Switch of insert earphones
  - Wave selection – inconsistent marking
  - Not masking with asymmetrical loss
  - Not addressing impact of HL ≥ 4KHz
  - Not addressing impact of conductive loss
  - Pediatrics: Failing to change polarity to assess for CM during L-I Function

83

Pediatric ABR L-I Function



With a normal ABR, we would expect to see a cochlear microphonic prior to wave I. We know the cochlear microphonic is generated within the cochlea, and it will also respond to a change in stimulus polarity. We anticipate the pre-neural cochlear microphonic to invert from rarefaction to condensation click in any patient, but the rest of the waveform should remain intact. If the entire waveform inverted, it indicates that this response is coming from the cochlea and does not reflect any kind of neural response. Given this finding, we now have to recognize that we cannot get any information about the integrity of the auditory pathway. Furthermore, it eliminates our need pursue any decrease in intensity to see what we might find, because we are not getting a response from the auditory system beyond the cochlea.

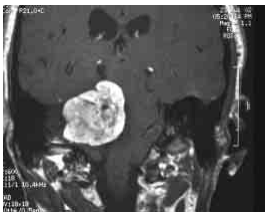
84

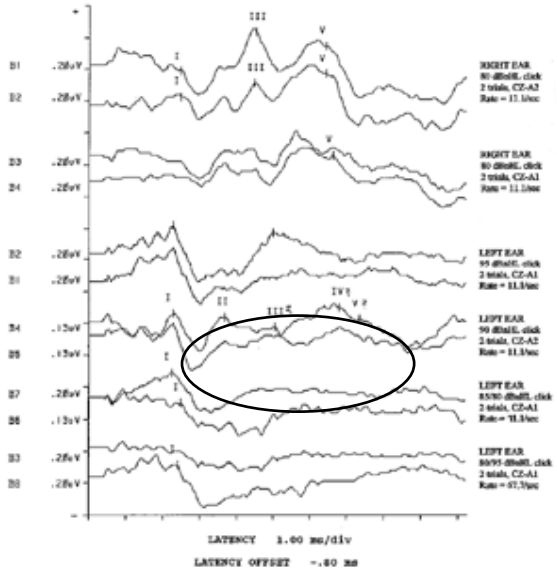
Its OK to say "I Don't Know"

- ABR waveforms can be categorized as clear, absent, or inconclusive responses.
- Many clinicians only use these first two descriptors to categorize ABR waveforms, but the third option is very important.
- Sometimes, there is activity that might be a response, but the waveforms do not have repeatable peaks that are significantly greater in amplitude than the averaged EEG activity.

Sound Advice for ABR Analysis: No Squinting or Guessing, Hearing Journal, June 2014, Vol 67, Issue 6

85





Dizziness-and-balance.com Blog April 30, 2016

86

Medical Report Reviews

- ABR Interpretation (10-4): “On the ABR, the reasons for the absent waveforms is due to middle ear pathology that has clearly increased in severity since 9-4. Please do not ask for further radiologic studies. I would also not use "equivocal" since it is most likely due to middle ear pathology. Ask for Med Consult for middle ear status which is preventing an accurate ABR test. Retest when medically cleared.”

87

Medical Report Reviews

- “Adult Hearing Test Interpretation (10-4): On the Hearing Test report: both ears seem to be "canalograms" instead of tympanograms; both ear canal volumes being below 1.0 is inaccurate and unreliable for an adult male. Even the ones from 9-5 ENT indicate a ECV of 2.0 for LE. Additionally, you remarked that the hearing loss is consistent with the results from 9-5-14, however, the LE has decreased 10-20dB since then…”

…This is important to say on report as it is relevant to ABR results. It makes sense that the tymp tracing from 9-5 is rounded and the acoustic reflexes are absent at low freqs and present at high freqs. That ear had fluid at that time, but, not full. Even though you did not get accurate tymps, I believe the LE has more fluid now and that impacted the ABR.”

88

Booth Hazards!

- 68 yo female patient hit her right toe while entering the booth.
- Patient did not mention pain or any complaints at the time; no physical trauma observed on toe.
- Appointment continued.
- However, 3-days later,….

Watch Your Step!

89

Watch Your Head!

- Enthusiastically sat in chair
- Knocked off accessories; hit patient in the head
- Claimed pain and suffering
- Lawsuit against hospital and provider

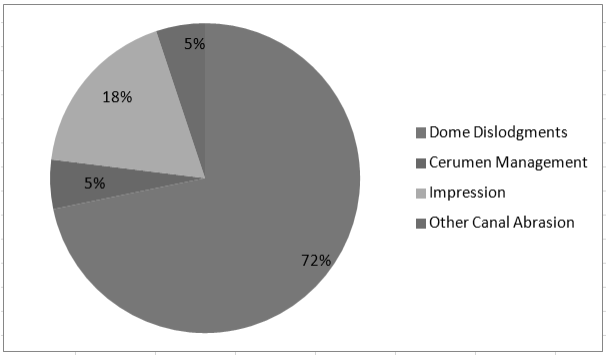
90

In Summary:

- Wrong treatment
- Wrong *site* treatment (L/R side errors)
- Poor record keeping and documentation
- Age extremes (very young, very old patients)
- Improper technique
- Misdiagnosis
- Inexperience
- Fatigue or distraction
- Inadequate or inaccurate labeling (including translation)

91

2016
Patient Care Related Incident Distribution



92

When Clinical Errors Occur

- Potential errors and mishaps are possible during administration of a variety of hearing care services.
- Most of these are avoidable by the conscientious clinician and quickly corrected when they occur.
- Responsibility of clinicians to provide the most efficacious services to patients within a clean and safe environment.
- When error does occur:

93

Fully document the circumstances and details of the event.

- If indicated at time of incident or follow up, call the patient's physician- explain situation and ask if the physician would see the patient, or if there is an ENT that should be contacted.
- Consider a 3rd party to do the follow up inquiry.
- Document appointment date and time.
- Demonstrate compassion, concern, and verbalize "blameless apology".
- Do a root cause analysis and implement corrective action, as indicated.

94

Root Cause Analysis


Description of Patient's Physical Assessment:
Description of current Quality Practice Guideline/Care Planning Process:
Appropriate Staffing Levels for caseload:
Description of LIP Staff Orientation and Training:
Description of Competency Assessment/Credentialing:
Description of Staff Supervision:
Description of Staff Communication:
Description of Availability of Information:
Is Technological Support Adequate?
Description of Equipment Maintenance/Management process:
Is Physical Environment appropriate for Patient Care?
What human/other factors are most directly associated with this event?
Recommendations for redesign or development of new systems/processes:

- **Root cause analysis** (**RCA**) is a class of problem solving methods aimed at identifying the root causes of problems or events. The practice of RCA is predicated on the belief that problems are best solved by attempting to correct or eliminate root causes, as opposed to merely addressing the immediately obvious symptoms.

95

- Do not file details in the patient file. File separately under an incident file.
- Clinician or designee follows-up with patient and/or physician following the medical consultation. The clinician's supervisor should be kept apprised of all developments.
- Take care to communicate and follow the patient through the incident. By conveying a sense of care and concern, we are best able to control the outcome and minimize further adversity.

96

Communicate with resources:

- Risk Management
- Insurance Carrier
  - 30 days!
- In house legal department

97

Improving Patient Safety

- Find out why it happened
- Strategize about new methodologies
- Foster a culture where people are interested in quality of care and discuss near misses, risks, problems
- Patient education is an important part of this process
- Quality oversight is necessary
- Staff training is paramount

98

Closing remarks…

- Routine visits and procedures are not always routine
- Take good care, use a disciplined process to ensure minimal risk to the patient and the provider
- Handle adverse incidents with concern and professionalism
- Manage the incident to the best probable end
- Train and re-train; foster a culture of excellence

99

Resources for good practice

- State licensing laws
- Code of ethics
- Patient Bill of Rights
- Policies and procedures of your institution
- Maintain professional credentials in audiology,
  - State license with required continuing education
  - Board certification with required continuation education
  - Specialty certification

100

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Dizziness-and-balance.com Blog April 30, 2016