Infant Hearing Screening: Equipment

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SPECIAL INSTRUMENTS

Selecting, troubleshooting, and maintaining your EHDI equipment

EHDI Equipment: OAE vs ABR

- OAE – Otoacoustic Emissions
  - Pros
    - Less Expensive ($4,000+)
    - Quick (6-10 seconds)
    - Cheap Disposables ($.30 - $1.05/baby)
  - Cons
    - Higher False-Positive Rate
    - Might Miss Retrocochlear Hearing Loss

EHDI Equipment: OAE vs ABR

- ABR – Auditory Brainstem Response (AABR = Automated ABR)
  - Pros
    - Lower False-Positive/Refer Rate
    - Test NICU Babies
    - Identify Retrocochlear Hearing Loss
  - Cons
    - More Expensive Equipment ($12,000-$25,000)
    - Longer Test Time (1-5 minutes)
    - More Expensive Disposables ($5 - $15/baby)

OAE vs ABR

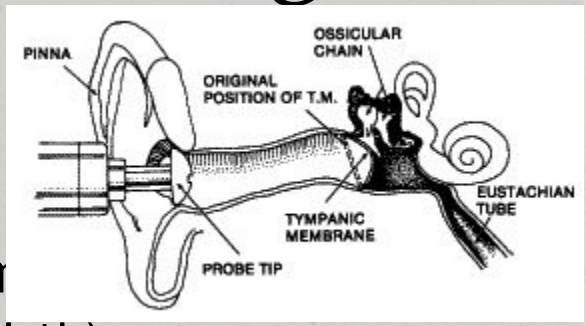
- Main considerations:
  - Birth Rate
  - NICU or Normal Newborn
  - Budget

EHDI Equipment: Other Considerations

- Data Storage or Transfer
  - Printer?
  - Transfer to OZ-esp

- Beraphone
  - Low disposable cost
  - Less after-test “cleanup”

Testing Troubleshooting: OAE



- OAE's are a test of Sound
  - Need clear path to eardrum
    - No Vernix (24 hours after birth)
    - Deep and directed at TM
  - Need to seal out room noise
  - Need a quiet patient (easier said than done)
  - Need a clean and functional probe
    - Most OAE probes will have a filter of some type that requires changing
    - The probe will be the first thing to break

OAE Probe

Testing Troubleshooting: ABR

- ABR is a test of Electricity (EEG)
  - Need a still patient
  - Need an electrically quiet environment
  - Patient needs to be able to hear the sound stimulus
  - Need good impedance (electrical connection) with the skin
    - Skin cleaning is THE key to a good ABR test
    - ABR leads are the first thing that will break

ABR Electrodes

Equipment Upkeep

- Cleaning
  - Use your regular cleaning wipes (Sani-Cloth)
  - Careful not to unplug connections
  - Liquid will kill OAE probes
- Annual Calibration
  - Ensures proper sound levels from OAE probe or ABR speakers
  - Ensures lead wires are functional on ABR
- Preventative Maintenance
  - Changing probe tips
  - Ensuring plugs are fully connected
  - Spare probe tips and/or lead wires
  - System “checker”

Equipment Questions

- Any Questions?

- Contact information

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Tips and Tricks For A Successful Hearing Screen

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Agenda

When and Where to Screen

Preparing Baby for Testing

Completing the Screen

Troubleshooting

Follow up

2-stage Testing In Well-baby Nursery

- Well babies are tested first using OAEs. Infants who do not pass 2 OAE screenings are then tested using an ABR screen
- NICU babies should be screened with ABR only
- Both ears must pass during one test session ("Switched ears")
- Want two high quality attempts. Over screening will increase chances of a false negative

When To Test

- Test when baby is 24 hours old (no sooner than >12 hours).
- Old enough for a successful screening, but also leave time for repeat testing
- Baby is calm, after feeding
- Baby has had a bath. If possible, wait a couple hours after to allow time for ears to dry

Where To Test

- Testing in bassinet often works best
- OAE testing can be done while baby is nursing if necessary, however, sucking may cause too much noise
- For ABR screenings try to have bassinet away from other electrical equipment to avoid electrical interference.

Preparing to Screen

- Start with equipment check
- Discuss the testing you will be doing with parents
- Ask about high risk factors
- Inform families that for the hearing screen to be successful it must be quiet in the room (whisper, turn off fans/TVs)
- Place a sign on the door to reduce interruptions

Preparing Baby

Swaddle

- Swaddle to help baby relax

Examine

- Examine the ear for debris and to help with choosing tip size

Massage

- Massage to help loosen or break up vernix or wax

Getting Started

- OAEs

Choosing a probe tip-correct probe size is key!

Snug fit, slightly larger than canal

Want it snug, but not too large that you are unable to get deep enough into canal

Deep and snug probe fit will help keep out environmental noise.

Try different sizes!

Try not to hold tip in the ear as it can cause extra noise

OAE tips:

1

Rotate the probe tip slightly as you are placing it in canal to help get a good seal

2

Insert tip and let baby calm instead of waiting for them to calm first

3

Rotate baby slightly to the side to let gravity help

4

If baby is upset, try using a pacifier or gloved finger. Remove if sucking is causing too much noise

Troubleshooting

"UNABLE TO CALIBRATE"

- Check probe fit-tip may not be fitting snug
- Make sure probe is securely plugged into box

"LOW OUTPUT"

- Check probe fit-sound may be leaking out if too small
- Check probe tip for wax/debris
- Also check plastic probe tip on machine
- Make sure probe is securely plugged into box

• Getting Started-ABR

- Swaddling is key to stop arms from becoming entangled with cords
- Use prep the skin (NuPrep, gauze with water, electrode gel)
- Try not to touch surface of electrode-may reduce stickiness
- Connect electrode to cord before placing on baby's head

- USE HAT TO KEEP SENSORS/EARPHONES IN PLACE

- USING LIGHT PRESSURE, GENTLY ROLL EARPHONES FRONT TO BACK WITH A ROLLING MOTION

- MAKE SURE HEADPHONES ARE ON TIGHT OR SOUND MAY LEAK OUT

Myogenic Noise:

- ABR is highly affected by muscle movement and contraction
- Twitching, movement will interfere with the test
- Swaddling baby can help
- Babies in REM sleep can be noisy (twitching, small noises) Try to gently rub forehead to try and slightly rouse them out of the deep sleep
- Pacifier may be used to calm but may interfere with testing.
- Do not hold electrodes down by hand; Will reduce impedance but can increase muscle tension

Electrical Noise:

MAKE SURE IMPEDANCE IS LOW/BALANCED

MOVE AWAY FROM OTHER ELECTRICAL EQUIPMENT

IF POSSIBLE, MOVE BABY TO ANOTHER LOCATION

WIRES UNTANGLED AND FACING THE SAME WAY

TURN OFF OTHER MONITORS/EQUIPMENT (WITH NURSING APPROVAL)

If baby wakes up and is active or upset pause the test

- TESTING AN ACTIVE BABY CAN RESULT IN LONGER TEST TIMES AND HIGHER REFER RATES

Discussing Test Results

Don't minimize the results if baby doesn't pass

Don't say baby "almost passed"

Keep it clear and concise

Explain next steps for follow up

Screening does not diagnose hearing loss but will let us know if further testing is needed

REPORTING RISK FACTORS

- Have access to the risk factors for delayed onset hearing loss.
- Review medical chart, but also talk to parents.
- Recording these into the EHDI database will help to ensure the child receives the appropriate follow up in the future

Follow up

Schedule

- Try to schedule follow up testing before baby discharges

Details

- Provide families with written information of time/date/phone number

Timeline

- Rescreen within 2 weeks (CMV testing is needed)

Thank you!

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