Electrical Stapedial Reflex Threshold (ESRT): An objective procedure for cochlear implant programming

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Disclosure:
Sandra Velandia, Au.D. is a member of the MED EL audiology advisory board
Agenda:

- Definition of the electrical stapedial reflex threshold (ESRT)
- Pathway of ESRT
- Background
- Procedure in obtaining ESRTs
  - Video
  - Strategies in obtaining ESRTs with children
- Clinical use and application
- Reasons for using ESRTs
- Obstructions for obtaining ESRTs
- Case presentations
- Conclusions
- Questions

Learning Outcomes:

- Participants will be able to describe what ESRT is, and how the ESRT is elicited and recorded.
- Participants will be able to describe the importance of using ESRTs as an objective procedure for programming.
- Participants will be able to describe how to correlate comfort levels and ESRTs.
- Participants will be able to describe patient set-up, for adults and children, in obtaining ESRTs.
Definition of ESRT:

• The electric reflex is an involuntary contraction of the stapedius muscle as a result of a high intensity electrical signal transmitted with the cochlear implant programming software and sent via the patient’s sound processor.

Pathway:
Electrical stapedial reflex threshold (ESRT)

• Reflex elicited from the implanted or non-implanted ear, and measured through immittance equipment, when electrical stimulus is presented through the cochlear implant (CI)

Background:


ESRT Set-up
ESRT Set up

• Video 1 Set Up
Procedures:

• Video 2 Procedures

Procedures:

• Video 3 Procedures
Procedures:

• Video 4 Procedures

ESRT screen:
Atypical reflexes

• Video 5 Atypical reflexes
Clinical Application:

- Video 6 Clinical Application

Reasons for using ESRTs

- High correlation to MCL levels
- Shown to be successful in setting stimulus levels
- An objective measurement to avoid over- and under-stimulation
- Lack of base knowledge/experience in judging loudness
Reasons for using ESRTs

• To account for fine details in pt’s map
• Makes programming easier
• Requires less adjustments for obtaining best sound quality
• Equipment is readily available in most clinics

Reasons for not obtaining ESRTs:

• Time consuming
• Complex set-up
• Difficult with children
• Low success rate with ipsi recordings
• Lack of training
Reasons for absent ESRTs:

- Bilateral middle ear involvement
- Surgical technique
- Bilateral retro-cochlear pathology
- Brainstem lesions
- Facial nerve dysfunction

Case presentation

**History:**
- 47 year old female
- Ototoxicity/progressive HL
- HA use before CI

**CI surgery:** 11/24/2014
- FLEX 28 internal
- Initial stimulation: Dec 2014
- Bimodal user
Right ear unaided

- Word rec: English -32%

Behavioral map
Reflex map

Outcomes

Behavioral map (9/2015)  Reflex map (12/2015)
# Outcomes

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<th>Spanish HINT sentences (quiet) % correct</th>
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## Case #2:

**History:**
- 81 year old male
- Progressive HL
- HA use before the CI; started approx 30 yrs ago
- Military work – noise exposure
- Spear fishing at age 16 and went down approx 40 ft; heavy pressure on ears
- Shortly after these diving trips, noticed HL and in high school, had to sit near teacher to hear well
- CI surgery at 78 yrs of age
- Bimodal user
Case #2: Behavioral map

Case #2: ESRT screen
Case #2: ESRT map

Outcomes

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Case #3: Pediatric

History:
- 6 y/o female
- Followed by UM since Oct 2009
- Dx with congenital HL
- Started HAs at 1 year of age
- Attended speech therapy
- Auditory detection, but no speech
- Auditory neuropathy/dys-synchrony (AN/AD)
- CI surgery on 4/6/2012; Concert internal
- Initial stimulation on 5/8/2012

Initial stimulation: Behavioral map
Conclusions

• ESRTs valuable objective tool in setting MCL levels
• Reasons not to obtain ESRTs are easily overcome if the correct strategies and set-up are used, especially in children
• Questions?
  – Do they change over time? Do we continue to use the reflex line as guidance if they go away
Thank You