ESRT protocol in Custom Sound® Pro 7.0

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When clinically appropriate, electrically evoked stapedius reflex thresholds (ESRT) may be utilized as an objective measure for cochlear implant programming. Research supports using postoperative ESRTs for MAP verification.[1–6] Cochlear recommends combining ESRT with behavioral loudness scaling to determine upper stimulation levels.

Absence of ESRT response does not indicate a device issue or inability to hear.

Get started

1

Perform a standard tympanogram bilaterally

- ☐ Ensure normal middle ear function in the recording ear
- ☐ Ensure the probe tip achieves a consistent seal preferably without being held by clinician

2

Optimize recording parameters for reflex decay mode

- ☐ Set immittance bridge to reflex decay mode
- ☐ Set probe tone to 678 Hz for adults and 1000 Hz for children.[7] A 226 Hz may be considered if equipment does not accommodate a higher probe tone
- ☐ Maximize recording window to 15+ seconds
- ☐ Stimulus should be set to contralateral or external stimulus

3

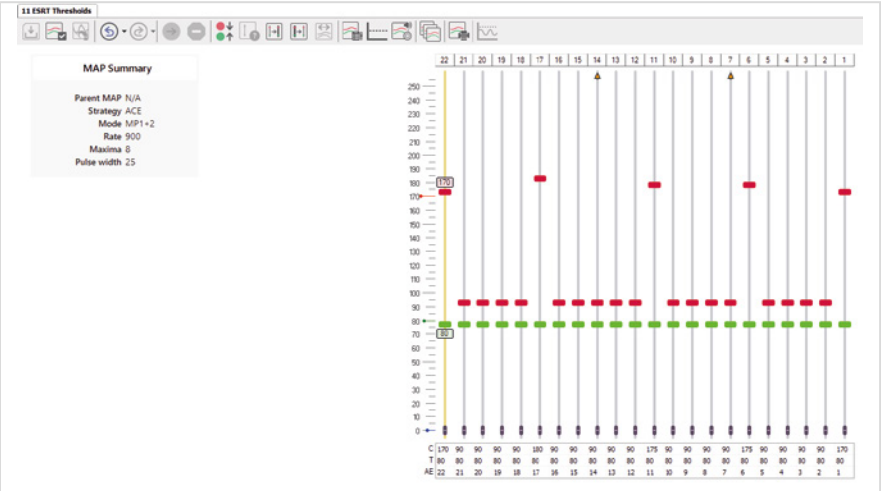
Select ear for immittance probe

- ☐ ESRTs are a bilateral response, and ear selection may be ipsilateral or contralateral, as determined by tympanometry
- ☐ Initial recording is typically attempted with probe in contralateral ear

4

ESRT measurement setup in Custom Sound Pro 7.0

- ☐ Connect patient's sound processor to Custom Sound® Pro 7.0 to record responses
- ☐ Utilize the Set Levels screen to allow for single channel stimulation off air
- ☐ Identify three electrodes to measure starting with at least one basal, mid, and apical channel to provide profile estimation
- ☐ Select parameters for recording (stimulation mode, pulse width, and stimulation rate)
  - ☐ Consider recipient's mapping parameters for closest correlation to upper stimulation levels
- ☐ Ensure sound is enabled to aid observation of time-locked responses



5

Record ESRT thresholds

Utilize Hughson-Westlake method for threshold detection

- ☐ Present stimulation (2–3 beeps) in ascending steps
- ☐ Initial step size of 10 Current Level until response obtained
- ☐ Reduce step size to 5 Current Level to threshold seek
- ☐ Responses may be observed as a positive or negative time-locked deflection
- ☐ If stimulation elicits a response, document threshold and proceed to the next electrode

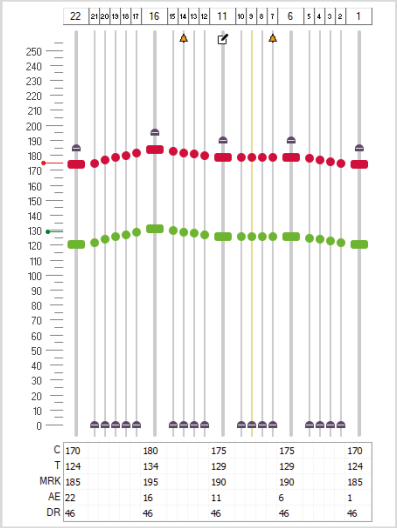
Additional considerations

- ☐ Increase pulse width
- ☐ Change probe tone frequency (226 Hz, 678 Hz, 1000 Hz)
- ☐ The probe tip must maintain a hermetic seal without clinician support. Change probe tip or utilize Otoferm as needed.
- ☐ In case of a hyper-compliant tympanogram and excessive artifact:
  - ☐ Increase probe tone frequency
  - ☐ Adding positive pressure manually (up to +50 daPa) may help stabilize the tympanic membrane for recording

6

Displaying thresholds in Custom Sound® Pro 7.0

- ☐ Manually enter ESRT thresholds by adding values in the objective marker section found in the data grid on the Set Levels screen



7

Globally adjust C-levels

- ☐ Maintain profile and adjust C-levels to a level that is perceived as “loud” for the recipient
- ☐ Beware of upper stimulation levels exceeding ESRT or upper stimulation levels that are unusually low
- ☐ An appropriate dynamic range for 40 to 60 Current Level should be maintained

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3. Jerger, J., Fifer, R., Jenkins, H., & Mecklenberg, D. (1986). Stapedius reflex to electrical stimulation in a patient with a cochlear implant. Annals of Otology, Rhinology, & Laryngology, 95, 151–157.
4. Messersmith, J., Entwisle, L., & Stout, A. (2002). Electrically evoked stapedial reflex threshold: A procedure. Perspectives of the ASHA Special Interest Groups, 9(3), 4-11.
5. Pitt, C., Munoz, K., Schwartz, S., & Kunz, J. (2020). The long-term stability of the electrical stapedial reflex threshold. Otology & Neurotology, 42, 188-196.
6. Wolfe, J., & Kasulis, H. (2008). Relationships among objective measures and speech perception in adult users of the Hi Resolution Bionic Ear. Cochlear Implants International, 9(2), 70–81.
7. Wolfe J, Gilbert M, Schafer E, Litvak LM, Spahr AJ, Saoji A, Finley C. (2017) Optimizations for the electrically-evoked stapedial reflex threshold measurement in cochlear implant recipients. Ear Hear, 38(2), 255-261.

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