Correlation Between Auditory Steady State Response (ASSR) Testing and Conventional Diagnostic Audiometry

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Background

Auditory Steady State Response (ASSR) is an electrophysiological test used to obtain frequency specific information in regard to peripheral auditory sensitivity.

Objectives

The objective of this study was to retrospectively evaluate if there was correlation between ASSR findings and behavioral audiometry (BA) findings. Children with hearing loss that are unable to participate in BA are tested using the ASSR. Subsequent to testing, children with hearing loss are fit with hearing aids based on the ASSR findings. Therefore, good correlation between ASSR and behavioral audiometry are crucial in the child receiving optimal amplification.

Methods

A retrospective look at 376 subject ears. ASSR equipment used was the Natus MASTER II recording system. Protocol measures included air-conducted stimuli for 500, 1000, 2000 and 4000 Hz. Four frequencies collected simultaneously for individual ears. Single frequency search was completed once partial thresholds were obtained with a p-statistic < 0.05 accepted as a present response. Behavioral audiometry protocol included diagnostic audiometer; insert or supra-aural headphones, and threshold determined for air-conducted pure tones at 500, 1000, 2000 and 4000 Hz. Behavioral observation audiometry, visual reinforced audiometry, conditioned play audiometry and standard audiometry were all acceptable test methods.

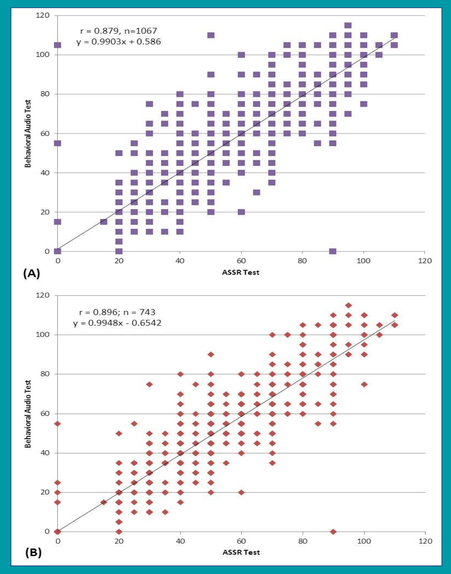

Figure 1. ASSR:BA threshold correlation for all subjects (A), and subjects with good - excellent BA reliability (B) across all frequencies, ages, and degrees of hearing loss.

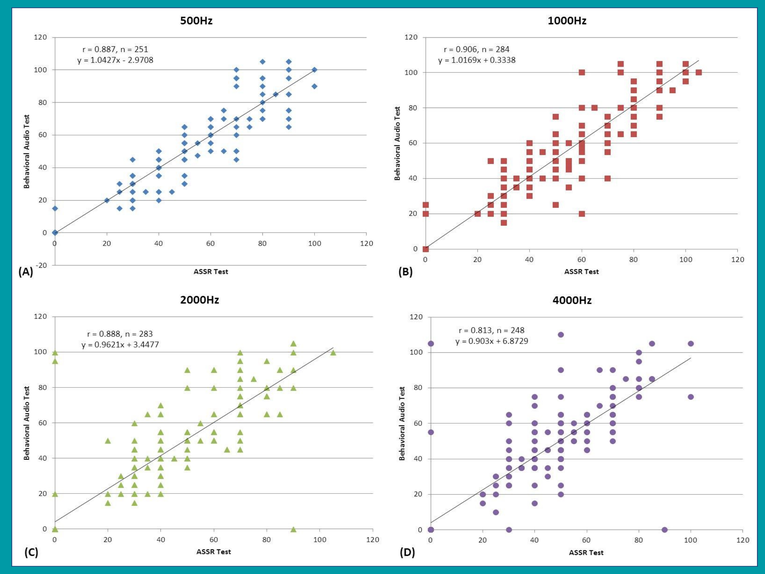

Figure 2. Correlation between ASSR and BA thresholds for all subjects at 500, 1000, 2000, and 4000 Hz.

Results

Results indicated a strong significant positive correlation between the two measures across all frequencies. A stronger positive correlation between the two measures across all frequencies was seen in subjects that had a good to excellent reliability on the BA. Hearing losses ranging from mild to severe showed a correlation of less than 5 dB between the ASSR and BA. Normal and profound hearing losses demonstrated less of a correlation.

Discussion

Results indicate a strong correlation between ASSR and BA thresholds for all frequencies, ages and degrees of hearing loss, suggesting ASSR is a good predictor of behavioral threshold sensitivity.

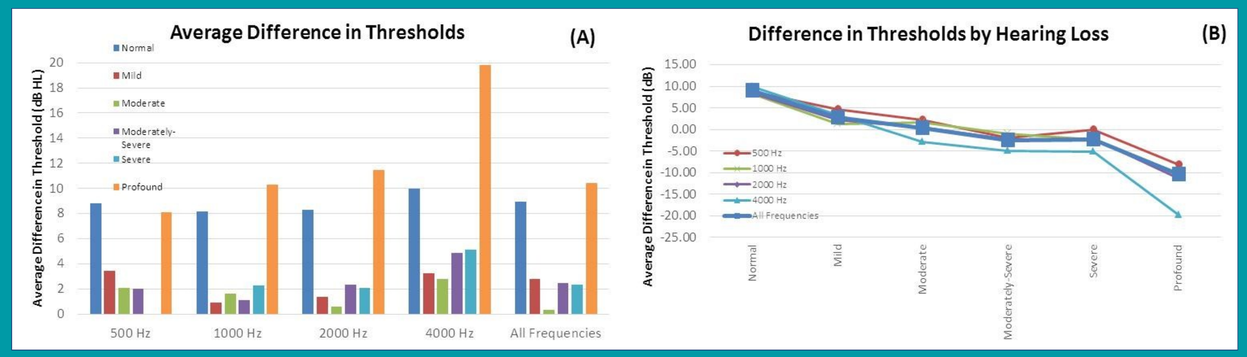

Figure 3. (A) Average difference in ASSR and BA thresholds by frequency (B). BA-ASSR difference per frequency by degree of hearing loss.

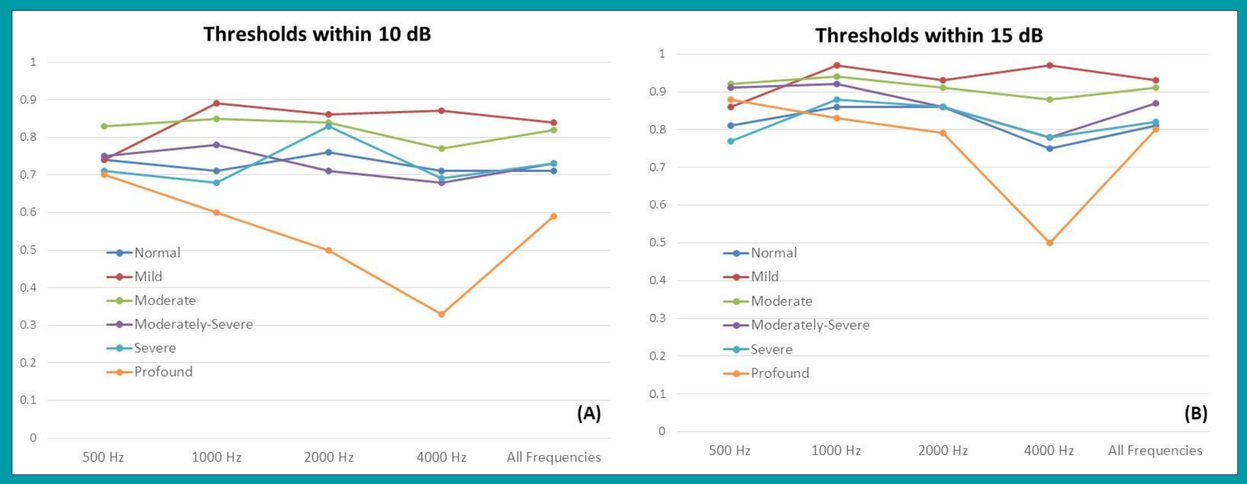

Figure 4. Percentage of subjects with ASSR and BA thresholds within (A) 10 dB and (B) 15 dB of each other.