**Abstract**

In the present study, we suggest a new automated method to acquire an objective frequency-specific audiogram by comparing the amplitude of Wave V with that of SN10. To increase signal to noise ratio in the automated ABR, the following three complementary controls called "triple artifact-rejection method" were adopted: (1) filtering periodic artifacts by real-time FFT monitoring, (2) randomization of ISI (inter-stimulus interval) to exclude periodic artifact influxed from the spontaneous potential, i.e., EEG, and (3) filtering fast component artifacts. To shorten test time without any deterioration of accuracy, "automated quasi Bekesy method" was adopted in the automated ABR. Hearing thresholds obtained from PTA (pure tone audiometry) were compared with those of the present automated ABR at 0.5, 1, 2, 4 KHz. The automated ABR predicted well the behavioral thresholds. Most importantly, there was a big time saving in the automated ABR proposed by the present study. That is, it took only 6~8 minutes which were only one-tenth of the testing time required for the conventional tone-pip ABR audiometry.

**Background Information**

In the conventional tone-pip ABR audiometry, as each frequency-specific threshold should be estimated separately, it takes about 1.5~2 hours to test hearing thresholds. In addition, because clinician’s determination of a subject's hearing threshold depends on visual discrimination of wave V peak of which amplitude decreases more and more when stimulus intensity gets closer to hearing threshold, it is difficult to avoid intervention of clinician's subjective judgment.

It is the most serious problem of the conventional tone-pip ABR audiometry that very long time is required for the hearing test. It takes long time to set manually the test stimulus presented separately according to frequency and intensity. In addition, each test stimulus should be presented more than 1,500 times to obtain a significant signal-to-noise ratio. Most of all, because the more stimulus intensity gets closer to hearing threshold, the more amplitude of wave V decreases, it takes long time for a user to determine the presence or absence of wave V peak.

In order to solve above-mentioned problems of the conventional method, the present study provides a method for automation of tone-pip (or tone-burst) ABR audiometry, which can exclude both manual operation and user's subjective judgment. In addition, the present study provides a method for automation and time shortening.

**Configuration Chart of a Device for Performing Automated ABR Test**

**Results**

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According to the present study, clinicians can shorten testing time by automatically performing tone-pip (or tone-burst) ABR test without both manual operation and clinician's subjective judgment. Further, in spite of minimization of the averaging number, reliable hearing test data with excellent signal-to-noise ratio is obtained by applying a decision method of objective hearing thresholds based on the gap between wave V and SN10.