1.3
Invited Paper

The Bone anchored hearing aid (BAHA) and elicited skull vibrations

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Objectives: To measure the skull vibration characteristics of the BAHA in plastic, dried, and for the first time, live human skulls, and to compare different models of the BAHA. Methods: Using a laser Doppler vibrometer, vibration responses with sound input of 70-80 dB SPL were measured on unloaded BAHAs, a dry skull, a plastic skull, and on the abutments of three live BAHA-fitted patients. Responses at different volume settings and distances from the vibrator were also tested. Frequency responses were calculated for displacement, velocity, and acceleration. Loss of vibrations across the snap coupling was measured Results: Unloaded BAHA accelerations were about 30-50 dB higher than live head accelerations. Live head accelerations were similar to dry skulls in frequencies above 500 Hz, but much higher than the plastic skull responses. Live head responses were more damped. The Cordelle II® outperformed the other two processors by about 20 dB. The Classic 300® had better low frequency responses than the Compact®. The volume settings had little effect on vibration output overall. Acceleration peak was at approximately 2.5 kHz for all conditions. The snap coupling was an efficient coupling from the transducer to the skull. Conclusions: The BAHA processors differ in the output acceleration they can achieve with differing loads. The volume control setting has little impact on accelerations produced for most processors. The live head responses are similar to the dry skull above 500 Hz.