One-Year Follow-Up in Children with Conductive Hearing Loss Using ADHEAR

Abstract

Background: The ADHEAR[™] system (MED-EL, Innsbruck, Austria) is a nonsurgical bone conduction device (BCD) to treat conductive hearing loss (CHL) and single-sided deafness. In contrast to the nonsurgical alternatives on headbands or spectacle frames, the audio processor of ADHEAR is placed retroauricularly on an adhesive adapter. The published evidence on the performance of this system is limited to studies with a trial period of 2–8 weeks. **Objective:** This study assesses audiological and subjective outcomes over a period of 12 months, on patients with congenital aural atresia (CAA) using the ADHEAR hearing system. **Method:** Fifteen children (mean age: 9.4 ± 4 years; range: 5-16 years) diagnosed with CAA (7 uni/8 bilateral) were included in this prospective, observational, repeated-measures study. Each subject used ADHEAR for 1 year, and the performance was evaluated after 1, 6, and 12 months. Free-field audiometry and speech discrimination tests were performed, and hearing-, general health- and device-specific questionnaires were used. **Results:** The unaided sound field threshold improved from an average PTA4 of 63.6 \pm 3.4 dB HL to an aided average PTA4 of 29.3 \pm 3.0 dB HL after 1 month of device use. The word recognition score (WRS) improved from an average of $27.9 \pm 15.9\%$ unaided to an aided average WRS of 91.3 \pm 4.4% (p = 0.0003) after 1 month, 92.0 \pm 4.1% (p = 0.0002) after 6 months, and 92.7 \pm 5.3% (p < 0.0001) after 12 months using the ADHEAR system compared to the unaided condition for all 3 time points. The improvements in the speech in noise at 1, 6, and 12

months were as well consistent over time. The average improvement at the signal to noise ratio (SNR) of +5 dB was 58% and 53% at the SNR of +0 dB. No complications were reported, and all patients continued to use the ADHEAR after the study end. The questionnaire results revealed high user satisfaction and an average wearing time of 12 h per day. **Conclusion:** This 12-month trial of the nonsurgical adhesive BCD in CAA patients showed sufficient and reliable audiological and subjective outcomes, long wearing time, and high acceptance. The ADHEAR can be considered a suitable option to treat children with CAA for the given indication, without the drawbacks of nonsurgical devices that use pressure for retention of the audio processor or the costs and possible complications involved with a surgical alternative.

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