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BONE CONDUCTION AMPLIFICATION

Effectiveness of Bone Conduction Hearing Aids in young children with congenital aural Atresia and Microtia

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Abstract

Microtia is a congenital deformity affecting the outer ear. Microtia is usually accompanied by atresia, a condition in which the external auditory ear canal is absent or closed. The sooner a hearing defect is detected, the sooner therapy and rehabilitation can begin, opening the door to proper development and regular functioning. The selection and fitting of hearing aids for very young patients is a complex process that requires the cooperation of specialists in various areas. Effectiveness of conventional hearing aids is limited in some cases, thats why children who have severe outer or middle ear malformations are potential candidates for bone conduction hearing aids.

The main objective of this study was to assess the effectiveness of bone conduction hearing aids in children under 2 years of age who had microtia and atresia. The results were based on audiometric tests and a questionnaire.

Objectifs

This prospective study involved 42 children under 2 years old with congenital microtia and atresia who were divided into 2 groups: 21 with unilateral defect and 21 with bilateral defect.

Méthodes et Matériels

All children were provided with bone conduction hearing aids on a softband. Air and bone auditory thresholds were assessed by auditory brainstem responses (ABRs). The LittlEARS questionnaire was used to evaluate auditory development at baseline and after 6 months of hearing aids use. Behavioral observation audiometry (BOA) was used to assess auditory thresholds and compare aided and unaided hearing.

	Children with UHL	Children with BHL	t-test, p-value
AC Right ear	69–90; 72.31±10.13 (13 ears)	50–90; 72.86±9.56	t= 0.16; p=0.874
AC Left ear	60–80; 67.50± 8.86 (8 ears)	30–100; 72.86±15.21	t=0.93; p=0.360
BC Right ear	10–40; 20.00±9.13 (13 ears)	10–40; 20.48±10.24	t=0.14; p=0.892
BC Left ear	10–20; 17.50±4.63 (8 ears)	10–50; 20.48±12.03	t=0.68; p=0.506

Table 1. Results of ABR testing for air (AC) and bone (BC) conduction.

Résultats

After 6 months of hearing aid use, the total score of the LittlEARS questionnaire in children with unilateral defect was 24±5.60, while children with bilateral defect achieved a result of 26.29±6.17. Hearing thresholds in both groups with bone conduction hearing aids improved significantly and approached the normal level.

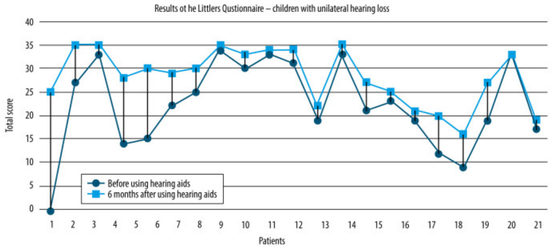

Figure 1. Comparison of LittlEARS questionnaire results before (dark blue) and after (light blue) use of hearing aids for children with unilateral hearing loss.

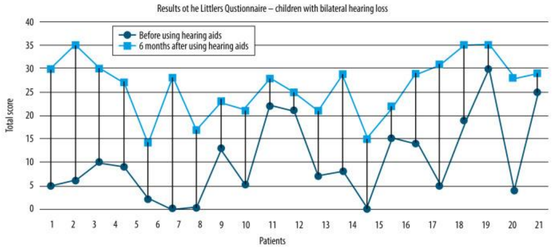

Figure 2. Comparison of LittlEARS questionnaire results before (dark blue) and after (light blue) use of hearing aids for children with bilateral hearing loss.

Conclusion

Our results confirm that bone conduction hearing aids provide an effective method of auditory rehabilitation for children with conductive and mixed hearing loss caused by microtia and atresia. Using bone conduction hearing aids in such children is crucial for proper hearing, speech, and language development.

Références

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