

## **Annex for BIAP – Recommendation 12.6**

Unilateral Hearing loss Assessment and Counselling after Newborn Hearing Screening (UNHS)

### **Children under the age of 1 year with a unilateral hearing loss and the fitting of technical devices (e.g. hearing aids)**

The Recommendation 12-6 demonstrates the possible effects of a unilateral hearing loss (UHL) on directional hearing and the speech understanding in adverse hearing situations as well as possible effects on the academic development of a child. Some of the negative effects of a unilateral hearing loss can be partly compensated through the use of technical devices.

There is well proven data that in case a bi-aural fitting is indicated but one ear is neglected, the hearing process of the unattended side will be deprived. But until now there is no sufficient data that with UHL a very early hearing aid fitting (within the first 6 months of life) makes a difference on the future maturation of the auditory pathways.

Taking in account the cost of effort and stress for the family that is connected with any hearing-aid fitting in the first months of life and regarding the diagnostic uncertainties in a number of cases of mild to moderate hearing-losses the BIAP commission suggests as a compromise a start of a hearing aid fitting within the first 12 months of life (instead of a recommended start within the first 6 months with bilateral losses).

In any case the hearing-aid fitting should not start before the diagnosis of a permanent hearing-loss is well confirmed and the limitations of a hearing-aid fitting with UHL are fully discussed with parents. For the decision making the social environment and motivation of the parents should be taken into account as well. Regardless of the use of any therapeutic procedure a control hearing test together with a further counseling of the parents should be performed on a regular basis (see recom. 12-6). In case of a hearing aid fitting the same principals should be respected as with bilateral fittings (see Recom. 06-11). For the evaluation of a hearing aid benefit audiometric test should include a proper masking of the normal hearing ear when tolerated by the child. Also the use of specially designed questionnaires<sup>1</sup> can be recommended.

The hearing-aid fitting should be only finalized, if a sufficient acceptance of the hearing-aid by the child and the parents and a daily wearing of the hearing-aid is confirmed.

Concerning the selection of technical devices a categorization of unilateral hearing losses in the following subgroups is helpful (also see the recommendation):

- Unilateral moderate sensorineural hearing-loss or conductive hearing loss without atresia and normal hearing on the opposite ear
- Unilateral severe and profound deafness and normal hearing on the opposite ear
- Unilateral conductive hearing-loss (e.g. major aplasia, severe ear canal atresia) and normal hearing on the opposite ear

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<sup>1</sup> A proposal for such questionnaires you can find on the webpage of the Klinik für Kommunikationsstörungen in Mainz, Germany: <http://www.klinik.uni-mainz.de/kommunikationsstoerungen/mitarbeiter.html#c43553>

### **1. Unilateral moderate sensorineural hearing-loss or conductive hearing loss without atresia (hearing loss of 30-60dB) and normal hearing on the opposite ear**

- A hearing aid fitting on the hearing impaired ear may be beneficial and may lead/reinstate to a stereophonic as well as a directional hearing. (In case of a unilateral hearing loss of less than 30 dB a benefit of a hearing aid can not be expected and even the loudness difference between the ears may be partly centrally compensated so that a directional hearing is still possible)
- In some cases a hearing aid fitting may still be successful with hearing losses between 60-80dB especially when a recruitment is present or regarding some cases of a high frequency hearing loss.

### **2. Unilateral deafness (hearing loss worse than 60dB, see exceptions above) and normal hearing on the opposite ear**

- the patient will not benefit from a hearing aid fitting on the hearing impaired ear, because it will not be possible to provide enough amplification so that a level of equal loudness can be achieved on both sides.
- in school age a fitting of an FM-system might be useful to improve the signal to noise ratio in difficult listening situations (Recom 06-10 + annex FM)
- a C.R.O.S.-hearing-aid can be useful for some hearing situations, if the user is able to activate or deactivate the system according to his or her actual hearing situation. Especially in a diffuse noisy sound field the noise may be picked up by the C.R.O.S. microphone in a way that it can partially mask the speech information which the hearing impaired person tries to pick up with his/her good ear. Because a C.R.O.S. hearing aid cannot reinstate a true stereophonic hearing, using a C.R.O.S hearing-aid in a diffuse noisy sound field may prevent the benefit, the hearing impaired person might have without the hearing-aid by directing his/her good ear to the sound source. Therefore a tryout of a C.R.O.S. fitting should be restricted to older children (teenagers), who are able to cooperate and use the C.R.O.S technique selectively for special hearing situations (these considerations also apply for a transcranial C.R.O.S.-BAHA).

### **3. Unilateral conductive hearing-loss (e.g. major aplasia, severe ear canal atresia) and normal hearing on the opposite ear**

- A bone conduction hearing aid with the microphone and the bone conductor both on the impaired side may be useful. The bone conductor + the hearing aid can be fixed with a metal bracket, a headband, a special cap or at the age of more than 5-6years a bone anchored hearing aid might be suitable. (If there exists still a small part of the external ear canal one should also try an air conduction hearing aid.)
- Concerning the age at the time of the fitting, one should consider the mechanical difficulties when fitting a bone conduction hearing aid to a very young child, therefore a start of the fitting within (before/at the end of) the first year of life should be feasible and sufficient.

#### **Information about additional technical considerations in later years**

FM-systems also without the use of a hearing aid may improve the signal to noise ratio in noisy hearing situations (i.e. school) (Recom. 06-10).