hearing
Quality Standard



EXECUTIVE SUMMARY

Single-sided Deafness in Adults

Key points[1]

- Single-sided deafness (SSD) impairs speech perception in noise.[1]
- SSD reduces spatial hearing, i.e. sound localization abilities.[1]
- SSD is frequently accompanied by tinnitus.[1]
- SSD decreases quality of life (QoL).[1]
- For the audiological classifications of SSD and asymmetric hearing loss (AHL), see Table 1[2]

Treatment options and their effectiveness

- The contralateral routing of signal (CROS) wirelessly transfers the signal received at the deaf ear to the hearing ear, overcoming the head shadow effect.[3]No binaural hearing can be regained with the CROS.[4]
- Bone conduction devices (BCDs) convert sound energy reaching the deaf ear into skull vibrations, which stimulate the normal-hearing ear. No binaural hearing can be regained with BCDs in individuals with SSD. [5]
- Cochlear implantation is the only strategy that can potentially restore binaural hearing, delivering significant improvements in speech perception, spatial localization, tinnitus control, and overall QoL.[1,6]

Specific selection criteria for cochlear implantation in adults with SSD

- ·Candidacy criteria for cochlear implant (CI) provision are generally the same for those with SSD as for those with bilateral deafness except for the assessment of the functionality of the contralateral ear.[2]
- Adults with postlingual SSD and moderate to profound hearing loss who do not benefit from conventional hearing aids, particularly adults with SSD caused by sudden idiopathic sensorineural hearing loss who seek to restore binaural hearing, improve localization, or reduce tinnitus in the ear with poorer hearing. [2]

Cochlear implant team structure

- The structure for CI teams working with adults with SSD is similar to the structure for those working with other adult CI users.[7]
- Additional personnel are required to address physical and cognitive/mental health needs, particularly to older adults.[2]

Preoperative assessment[2]

- Unless clinically contraindicated, all candidates must have a comprehensive CI assessment to assess the functional hearing abilities of their poorer ear and determine whether these are likely to be significantly improved via CI.
- An important part of the assessment process is the demonstration of the anatomical and functional integrity of the auditory nerve. SSD patients with a dysfunctional auditory nerve are eligible for CROS or BCDs.
- Further testing should include bilateral CROS fitting, testing, and evaluation, preferentially with a follow-up period of at least 3 weeks; BCD soft band fitting, testing, and evaluation, preferentially with a follow-up period of at least 3 weeks; tinnitus disturbance evaluation; sound localization testing; and a QoL assessment via validated questionnaires. See Fig. 1.
- The individual's communication level and psychological status should also be assessed.



Preoperative counselling[2]

- Clear description of pros and cons of a CI to avoid later non-use (binaural hearing is a great benefit, but takes time)
- Clear description of alternative technologies (CROS, BCDs)
- Explanation of implications of no treatment
- Clarification of patient expectations
- Description of postoperative auditory rehabilitation
- Involvement of significant others, particularly in older adults

Anatomy-based fitting (ABF)

- Additional considerations need to be made when combining electric stimulation in one ear with acoustic hearing on the contralateral ear.
- Reprogramming the CI frequency allocation based on CT scans, not on interaural pitch, may improve binaural processing and spatial hearing benefits in CI users with SSD.[8]
- Mismatch in CI users with SSD may be reduced by implantation of a long electrode array that approximates the cochlear place frequency with the default filter frequencies and/or mapping the filter frequencies for individual electrode contacts to match the cochlear place frequencies.[9]
- Individualized electrode array selection using a patient-specific otological planning software is recommended.
- Study outcomes showed that ABF improves speech perception in noise in adult CI users with SSD.[10]



Postoperative rehabilitation & assessment[2]

- Systematic postoperative rehabilitation should begin after initial fitting according to the individual's needs.
- Postoperative rehab should help the CI user acclimatize to the new sensation of sound and the integration of the CI with the contralateral acoustic ear. Extensive rehabilitation and training of the CI ear alone is mandatory.
- Postoperative rehab should also reassure the user and the significant others.
- Detailed explanation of the rehabilitation programme is important.
- Postoperative assessment should involve PTA, speech perception in noise, sound localization, QoL, and tinnitus.

Conclusions [4]

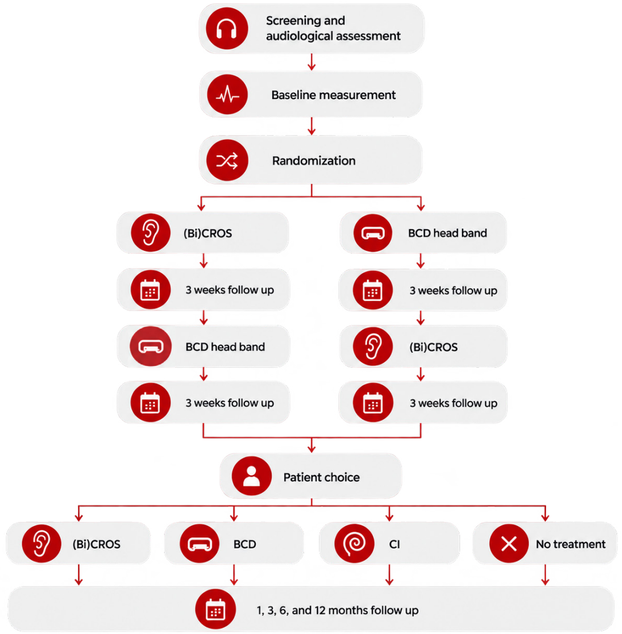
- Cochlear implantation is an effective treatment option in individuals with unilateral sensorineural hearing loss.
- Long-term CI use significantly improves auditory outcomes in individuals with unilateral sensorineural hearing loss and suppresses ipsilateral tinnitus.

Table 1 - Audiological classifications of SSD and AHL

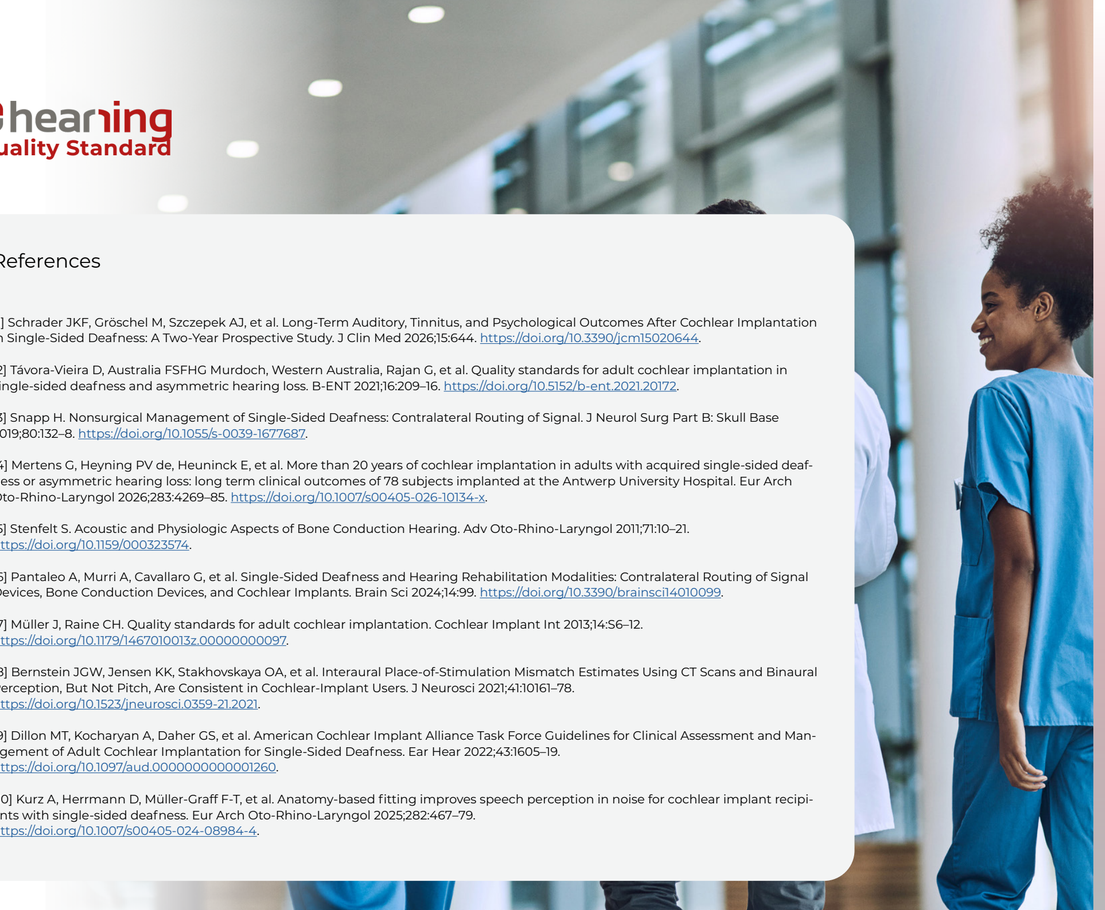
Type	Ear	dB HL
SSD	Poorer ear	PTA ≥70
	Better ear	PTA ≤30
	Interaural threshold gap	≥40
AHL	Poorer ear	PTA ≥70
	Better ear	PTA >30 and ≤55
	Interaural threshold gap	≥15

PTA: Pure-tone average (0.5, 1, 2, and 4 kHz), dB HL: Decibel hearing loss, SSD: Single-sided deafness, AHL: Asymmetric hearing loss

Figure 1 - Recommended clinical assessment, decision, and follow-up tree



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