

# Cochlear Implant Rehabilitation

## It's Not Just for Kids!

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*How do you know if you might benefit from rehabilitation?*

*What sort of program should you pursue? What type of professional can help? Is there a role for family members? Are there suggested tools or products that you can utilize at home?*

*This brochure provides a brief introduction to the topic of aural rehabilitation for adults after cochlear implantation.*

(Re)habilitation for children post cochlear implantation is an accepted part of the implant process. Indeed, many cochlear implant clinics feel it is so important that they require parents of young children to sign an agreement laying out family responsibilities for rehabilitation after surgery. A young child with a cochlear implant and her family require a comprehensive habilitation program to help her utilize the auditory signal and to naturally integrate the various components of communication including listening, speech, language, reading and thinking.

While there is variability in how much and what type of rehabilitation adults should pursue after receiving a cochlear implant, it should be assumed that adults, like children, will also derive improved outcomes and more rapid progress with rehabilitation. Although the technology provides much greater access to sound than recipients had before, adults may still need assistance in learning to recognize environmental sounds and comprehend speech.

Adults can also benefit in learning and practicing strategies and skills that can help them bring the process of communication under their control (without being controlling). Additionally, with a growing number of people receiving bilateral implants — generally sequentially — individuals need guidance on how to maximize outcomes with the second cochlear implant while integrating the new sound with their first implant.



Hear now. And always



## Questions to Consider

- Do you understand most speakers easily and completely?
- Are you able to understand a speaker without seeing his/her face? What if the speaker is at some distance?
- Does your comprehension in noise remain largely the same as in quiet?
- Can you follow, and participate in, a group discussion?
- Are you able to use the telephone easily and with full comprehension of most speakers?
- Are you free of anxiety (related to communication) in new environments (i.e., phoning someone you don't know, communicating in an unknown setting)?
- If you have recently received a second (bilateral) cochlear implant, is your speech understanding via the second implant as good as the first?

If the answer to any of these questions is “no,” you should consider some form of rehabilitation.

## What are the principal areas of adult rehabilitation after a cochlear implant?

**Auditory Therapy**, also called auditory rehabilitation, utilizes structured activities that should be carried over into real life to optimize the use of the new signal. It may involve exercises to discriminate between specific sounds (also called phonemes) or to identify single words. Many professionals suggest that individuals generally will need to master discrimination and identification of specific sounds and words in order to be successful at the next level of listening — that involving

comprehension of statements and questions and effective participation in conversations. Often listening is developed based on a hierarchy such as the one proposed by Erber<sup>1</sup> in his “Hierarchy of Auditory Skills” which includes:

Detection → Discrimination → Identification → Comprehension

**Speech therapy** is typically addressed as a component of an auditory therapy program. Because a cochlear implant provides the recipient with access to sounds he may have not have heard before — even when using hearing aids — an individual is better able to self monitor his own speech. A therapist may work with a recipient on articulation of specific sounds, syllables, words, or phrases that he may find difficult to enunciate. Speech therapy may also address voice quality such as pitch or nasality in one’s speech.

After receiving a cochlear implant, most individuals find they are less dependent on **speechreading**.

However, outcomes vary and some recipients may chose to reinforce their speechreading skills post implantation. Speechreading may be addressed for a recipient as part of either auditory or speech therapy. Another option is to pursue assistance from a support group such as the local chapter of Hearing Loss Association of America. For a list of chapters, look on the organization’s website at [www.hearingloss.org](http://www.hearingloss.org).

### Training on repair strategies

may be addressed as part of one’s rehabilitation program and is designed for learning (or re-learning) strategies that improve access to every day conversation like recognizing when communication has failed and having the skills to re-establish it.

**Environmental manipulation** helps the user to be proactive about selecting locations for meetings and social events to ensure the best possible hearing environment. For example, visit a restaurant in advance to know the best seating location and then reserve a specific table. Although one can never completely control the environment, it is helpful to minimize listening challenges in order to maximize access to sound. Learning to effectively use (1) SmartSound™ options in the sound processor and (2) assistive listening devices, in concert with the cochlear implant, are important strategies that should be comfortable for everyone.

For many recipients, regaining use of the telephone is a high priority. **Telephone training** with your cochlear implant audiologist can provide insight on which programs to use with the telephone and on using the telecoil, including what mixing level is right for you. Mixing allows you to choose how much sound you wish to have via the telephone and the external microphone. For example, I prefer being able to hear my own voice when I speak, so I have chosen a mix that allocates 60% of sound via the telecoil and 40% of sound via my external microphone. The second program in my sound processor has another mixing ratio for very noisy environments that places 75% of sound through the telecoil. The 75% mix allows me to talk on the phone in environments that are too noisy for many normally hearing people! Ask your audiologist to let you try different ratios and determine what is best for you.

Some people prefer to “couple acoustically” and use the microphone setting, rather than the telecoil, for the phone. Others find that they prefer a speaker phone. It is important to try out all of the various settings and also

to try different telephones — both landline and mobile — as there are differences in how various phones may work for you. If you have been deafened for some time, you may not have ever used a mobile phone. You may be pleasantly surprised at the options and features now available. My cell phone works great for me with my cochlear implant — both with and without the telecoil. My cell phone is now one of my favorite telephones.

**Music appreciation training** is a relatively new focus in rehabilitation. Since cochlear implants are designed for speech perception, not music, practicing specific techniques can help a recipient improve his enjoyment of music. Some types of music may sound better than others and many adult recipients find that they are most successful when listening to music that they were familiar with prior to losing their hearing. Practice does help with music appreciation — as is the case with all of these strategies. See references below for more tips.

### Do I need to work with an auditory rehabilitation therapist or can I pursue these activities on my own?

Seeing a therapist post implantation is a good idea — just as it is when you utilize the services of a specialized therapist following certain surgical procedures. Some of the therapies noted here may be appropriately addressed within the context of regular clinic visits with your mapping audiologist such as training on use of the sound processor, using assistive listening devices or telephone training. Others, like auditory and speech therapy, should be provided by someone who specializes in this discipline. Typically such individuals have graduate degrees in speech

language pathology or audiology. You may find an appropriate therapist within your cochlear implant center or in a private or group practice outside of a CI clinic. It is most important to find someone you are comfortable working with since that individual should serve both as coach and expert and you need to be able to work with your therapist in both of those capacities.

Elements of rehabilitation can be pursued at home. Some practice tools are listed below. To ensure that you are practicing the right training exercises and also that you are progressing satisfactorily, it is suggested that you work with a trained therapist — at least in the beginning to set you on the right course. Everyone should have goals and activities that are tailored to their specific needs. A trained professional can help you set such goals effectively. Training exercises can be undertaken at home but ideally should be developed with a professional who can suggest materials that will help you reach your full potential with a cochlear implant.

Ask your audiologist to help you find an appropriate professional for rehabilitation. Seek the advice of other recipients who may have utilized a professional for rehabilitation. You might also receive services from an Auditory-Verbal therapist. A list of Certified A-V therapists can be found at [www.agbellacademy.org/locate-therapist.htm](http://www.agbellacademy.org/locate-therapist.htm).

### Is there a role for family members or friends?

Many exercises can be done with a supportive family member or friend. They can make doing the exercises more enjoyable and provide a means of checking on progress as your training partner keeps track of those

sounds or words or activities that are difficult for you. They can help provide feedback on where you need additional work — always doing this in a patient and enthusiastic manner. Family members or friends can also help by alerting you to sounds and helping you identify the sounds. Ideally, this person is a positive, encouraging force in your rehabilitation program, helping to spur on your efforts.

*While not everyone has family members who can be so involved, your rehabilitation partner can also be a friend or fellow recipient. If you are having difficulty finding someone who can help you, contact the Cochlear Awareness Network at [awareness@cochlear.com](mailto:awareness@cochlear.com) and ask if they can identify an appropriate volunteer in your community.*

Speaking from experience, I was fortunate to have my family's backing with my own home practice program over 15 years ago. I spent 20 minutes every evening practicing listening on the telephone with my mother who never failed to encourage my efforts with comments like "Oh, you're doing so much better than last week! You identified four words this time — you never did that before!" My son, only eight years old at the time, delighted in the opportunity to read passages of his favorite books to me (with his lips covered of course) while I learned to listen during the first weeks and months after I received my cochlear implant. I always felt that I owed much of my success to my family's positive approach and unflinching support in aiding me to achieve my goals.

## What is Hear Always and how can I utilize it?

Hear Always is a program for Nucleus® recipients (cochlear implant and Baha®). Your clinic must opt into the program (most have). It allows you to interact with Cochlear professionals via live Web chats or email to receive assistance in troubleshooting the sound processor or gaining information about using the telephone, listening to music, or utilizing assistive listening devices. To speak with a Hear Always representative, call **800 483 3123** or go to the website at **www.cochlearamericas.com/HearAlways**.

## What are some tools that I can use to build skills at home?

All of the tools that we suggest rely on repetition and redundancy to help the cochlear implant recipient learn to recognize speech and other sounds in the environment easily and consistently. Practice makes perfect — just as it does with golf, tennis, skiing, dancing and many more activities. If possible, it is best to utilize the activities suggested at least 5 times a week — every day is even better if you can manage it — over the recommended period of time. Working with a competent rehabilitation professional can help ensure you are practicing correctly and not reinforcing bad habits.

**Interactive computer software** products allow you to build your listening skills in your home and at your own pace. Research has shown that moderate training on targeted phonemes with computer assisted rehabilitation products can improve speech perception by as much as 15-20%.<sup>2,3</sup> Most software packages include a report-back mechanism for sharing of results with the therapist and/or audiologist, which is highly

recommended. Such products provide a practical and enjoyable format for the new CI recipient, someone who wants to improve, or someone who has received a second cochlear implant and wants to focus effort on the newly implanted ear.

## Sound and Beyond



One such product is **Sound and Beyond**, a self directed, interactive software (CD-ROM) program developed by House Ear Institute researcher Qian-Jie Fu specifically for clinical therapy post cochlear implantation. It was designed for adult recipients and allows the user to move at his/her own pace. The product allows the user to determine an appropriate skill level and includes modules for pure tones, vowels, consonants, words, sentences, male/female voice identification, environmental sounds, and music.

Over 10,000 different sounds, words and sentences provide a wide-range of opportunities for building skills. When using Sound and Beyond — or any interactive listening rehabilitation program — it is recommended that the user practice active listening and repeat a sound or word as it is

selected, which reinforces auditory self-monitoring. A detailed user manual comes with the product explaining its use and what each module focuses on. Reports on one's outcomes can be printed out and shared with the recipient's clinical team. Sound and Beyond is also appropriate for children from approximately age 10, if supervised by an adult. Its use with preteens or teens is most appropriate for those who received a cochlear implant later than early childhood or following a second cochlear implant surgery. The product is available from Cochlear Americas although its sale and use is not limited to Nucleus recipients.

If you are working on **telephone training**, try to set aside time each day to practice with a patient friend or relative. You might need to begin with closed set (i.e., a limited number of possible choices) and then move to open set (unlimited number of choices). For example, the recipient might instruct the person with whom she is speaking to say "yes yes" to help distinguish that response from "no." Alphabetical cues can be used if the recipient is stumped (i.e., A as in apple, B as in banana). Practice and confidence-building are especially important when building telephone skills.



<sup>2</sup>Fu QJ, Galvin JJ. Maximizing cochlear implant patients' performance with advanced speech training procedures. Hearing Research [epub ahead of print] 2007 Dec 8.

<sup>3</sup>Sweetow RW ed. Auditory Training. Seminars in Hearing 2007;28(2).

Cochlear™ Americas provides support to encourage recipients to maximize their outcomes on the telephone. Telephone tips can be found on the website at [www.cochlearamericas.com/Support347.asp](http://www.cochlearamericas.com/Support347.asp). The Hear Always program, discussed above, can put a recipient in touch with a Cochlear employee who can review various options with a recipient.

“We’re not training the ears. We are training the brain to interpret what the ears hear.”

Doreen Pollack,  
Auditory-Verbal Pioneer

**Phone with Confidence** is a free rehabilitation tool offered by Cochlear™ Americas to all users who join the Cochlear Community — it can be found at [www.cochlearcommunity.com/services](http://www.cochlearcommunity.com/services). A user can call an 800 number to listen to a recorded list of words and a reading. Text versions of the recordings, which change daily, are provided on the website allowing the user to listen first without, and again with, the text. The user can call back as many times as he wishes. Because the selections change daily, Phone with Confidence can be used multiple times each week to help recipients become comfortable with listening on the telephone and overcome “telephone fright.” The tool was developed by bilateral cochlear implant recipient and Cochlear Americas employee, Scott Rinehart, based on Scott’s own rehabilitation experience and needs.

**Listening to books on tape** (also called audio books) is an accessible and enjoyable rehabilitation option that is recommended by most cochlear implant clinics and private therapists. There are many options for books to use. It is recommended that the recipient begin with speakers that are comfortable to them and that selections be content that the individual enjoys. A person is more likely to stick with rehabilitation if the activity is something she looks forward to. Some recipients begin with children’s books that are familiar to them while others prefer listening to adult books right from the outset. Visit your library or bookstore to find audio book options and make this a daily element of a home rehabilitation program. It is a good idea to begin the process in the public library to try out titles at no cost and determine which options work best for the individual.

Some recipients aggressively pursue a program to improve **appreciation of music** with a cochlear implant. In an article by audiologist and cochlear implant recipient Mark Ross<sup>4</sup>, Dr. Ross emphasizes that music appreciation is subjective for everyone — whether or not they have a hearing loss or listen with a cochlear implant. Hence, one’s enjoyment will necessarily be a function of one’s personal perception. At the same time, there are strategies for improving one’s listening outcomes. Not surprisingly, as with the other areas of rehabilitation described in this brochure, most people do improve with practice. Several sources of information on maximizing music outcomes are available, including materials on the Cochlear Americas website (see references section).

## Robert

a CI at 80

Robert experienced a progressive hearing loss throughout his adult life which he attributes to his World War II service. He wore hearing aids and also made frequent use of assistive technology. When his hearing loss further progressed, he pursued a cochlear implant at age 80. Just as he had done with his hearing aids, he tried to maximize his results by pursuing professional assistance and a personal rehabilitation program. He sought help from an auditory therapist who had been trained as a speech pathologist and worked primarily with children and families although she also had a few adult patients. She coached Robert on his rehabilitation post cochlear implantation and worked with him to develop a home practice plan that included the following elements:

- Robert’s wife read him lists of phonemes (sounds) at regular intervals. He repeated back what he heard and his wife recorded the errors Robert made.
- Robert used interactive computer software (i.e., Sound and Beyond) every day for 30 minutes.
- He enjoyed using books on tape, first with text and later without text. He began with children’s books and after a few weeks progressed to adult texts.
- Music was a special interest of Robert’s. He listened daily, focusing on music that he was familiar with before his hearing changed dramatically.
- Robert worked intensively on his rehabilitation program until his outcomes had reached the point that the activities became easy.

<sup>4</sup>Ross M. Listening to music through a cochlear implant. *Hearing Loss* 29 (3):20-23, 2008.

# Practical Tips

## for Using Books on Tape

### 1. Choose audio selections carefully.

- Begin with readings that are easy and advance to more difficult selections as you master a level. Don't stay at a level that has become comfortable — push ahead.
- If needed, begin with selections for which there is an exact text equivalent to the audio tape so you can follow along (or go back to) the text. Be sure to select unabridged tapes so that the tape and text match exactly.
- Determine if you have a gender preference for speaker. Some people prefer male over female voices, or vice versa.
- Select tapes that have a clear speaker, a relatively slow pace, and little or no background music or noise. Accented speech may be difficult to understand so avoid such speakers initially.

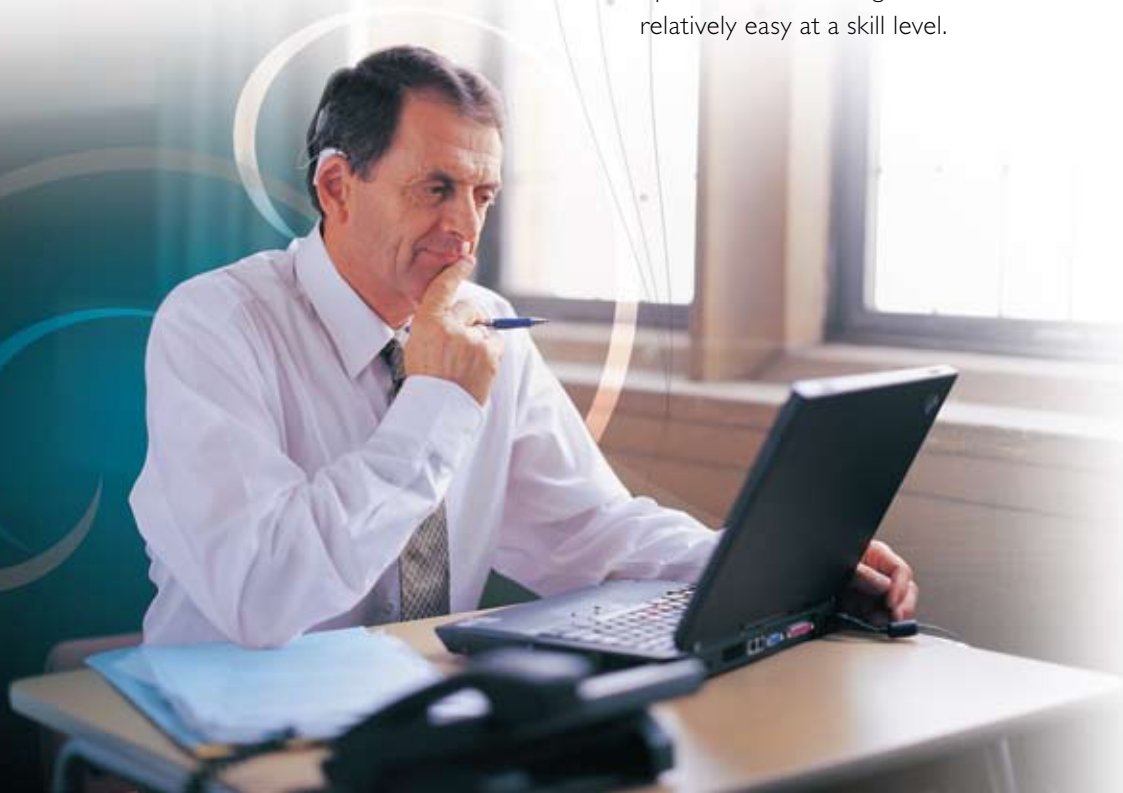
- Begin with children's books that are familiar if adult books are too challenging, and then graduate to more difficult readings with speakers who are talking more rapidly and using more complex language.
- Choose titles that are interesting and enjoyable to you. Consider having family members make recordings. There is nothing like listening to a grandchild's voice to encourage listening practice!

### 2. Repetition and redundancy will contribute to success, as with any rehabilitation tool.

- Set aside time every day (preferably 30 minutes but more is better) for listening to audio books.
- Go back to selections that are difficult and listen to them again.
- Move on to more difficult listening options when listening becomes relatively easy at a skill level.

### 3. Practice active listening.

- Utilize the auditory feedback loop by stopping the tape and repeating phrases or words out loud that are difficult to understand or say.
- An alternative to books on tape is tracking, which involves practice with a partner. Have the partner read a selection while you follow along, looking at the page — not the reader. When the reader stops, pick up and read a bit of the selection rotating between recipient and rehab partner, all the while keeping eyes focused on the page. Be sure to have the rehabilitation partner sit on your cochlear implant side and use regular, not raised, voice volume. This is a particularly good exercise for a new recipient.



# Summary

## Auditory Rehabilitation for Adults with CI(s)

### 1. Establish individualized long-term goals.

These serve as a roadmap for the development of short term goals and can be used in determining over-all progress and when to discontinue therapy. Listed below are examples of long-term therapy goals for an adult CI recipient:

- Gain confidence in listening with the cochlear implant(s).
- Train the brain to process and understand auditory information.
- Monitor speech through listening.
- Understand the theory of speech acoustics and auditory development as it relates to positive and progressive listening experiences.
- Listen with ease to gain information about people, the environment and the world.
- Develop auditory abilities in each implanted ear alone and in conjunction with the integration of the signal to both ears (for bilaterally implanted adults).

### 2. Establish individualized short-term goals.

This encourages the recipient to stay focused on specific steps to reach the expected outcome without feeling overwhelmed. Listed below are examples of short-term therapy goals for an adult CI recipient:

- Improve auditory attention to environmental sounds by taking “listening walks.” Request assistance from family members to alert you to environmental sounds you do not notice or identify.

- Identify through listening common songs or music.

- With the assistance of your family, develop a list of words commonly misheard and misarticulated. Improve speech production for these words by listening to and saying the words correctly (auditory self monitoring of speech).

- Improve auditory self-monitoring and speech production of vowels to increase speech intelligibility.
- Develop a list of past tense verbs that are spelled with “ed” but are articulated with /t/ that you common use.

- Listen to yourself and others read aloud as you track along with the written text.

- Increase auditory memory with repetition of words and sentences to improve auditory recall of information.

- Understand auditory conversations at a normal speed of presentation with familiar and unfamiliar speakers.

- Comprehend auditory information while engaged in another activity.

- Understand speech while listening to the radio.

- Understand speech through the telephone by practicing on the phone with your rehabilitation therapist, family member or friend.

- Understand speech while listening in noisy environments.

- Systematically develop auditory skills by practicing at home using Sound and Beyond, an interactive listening rehabilitation tool for adults. Repeat what you hear to encourage active listening and development of the auditory self-monitoring loop.

- Communicate with your therapist if you encounter any problems or challenges while working with any of the suggested home-carry over activities.

- Maintain daily records of progress and challenges in your home environment and share these notes with your therapist.

### 3. A therapist, family member, or friend can help an adult implant user by giving specific feedback in a positive manner about:

- Missed auditory information such as environmental sounds, comments or questions directed at the user, announcements, and valuable information others may be overhearing.
- Pronunciation of commonly used words that are misarticulated.
- Correct uses of language that the recipient may not have heard prior to receiving the implant(s).
- Common phrases or idiomatic expressions.
- Improvement in previously difficult areas as a reminder of progress.



**Nancy Caleffe-Schenck**, M.Ed. CCC-A, LSLS Cert. AVT® is internationally recognized for her practical approach in guiding parents, teaching children and adults, and training professionals in developing spoken language through listening. She is the Director of Auditory-Verbal Services, Inc., a private practice in Colorado with local and out-of-state programs. Ms. Caleffe-Schenck is a member of cochlear implant teams, a consultant to schools and organizations, and an international lecturer. She is certified as an Audiologist and Auditory-Verbal Therapist.



**Donna Sorkin**, M.A. is Vice President, Consumer Affairs at Cochlear Americas. In that capacity, she leads a range of activities at Cochlear aimed at the broad life needs of adults and children with cochlear implants including rehabilitation and appropriate educational options for children. Donna was executive director of Self Help for Hard of Hearing People from 1993 to 1999 and she served as executive director of the Alexander Graham Bell Association for the Deaf and Hard of Hearing from 1999 to 2001. She is an enthusiastic Nucleus® 22 user and has enjoyed four sound processor upgrades since receiving her CI in 1992.

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Start Listening – For Adults, DVD from Cochlear Americas.

Using the telephone support materials on the Cochlear Americas website.

[www.cochlearamericas.com/Support347.asp](http://www.cochlearamericas.com/Support347.asp)

*For additional products and services on adult rehabilitation including captioned HOPE Online seminars for adult recipients and professionals, please visit the HOPE area of the Cochlear Americas website at*

[www.cochlear.com/HOPE](http://www.cochlear.com/HOPE)

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