



ADVANCED
BIONICS
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A Sonova brand

My Child's Hearing Adventure

A PARENT'S JOURNAL

Providing Support and Communication



Dear Parent(s),

Your child is beginning a new adventure into the amazing world of sounds, voice, and music!

This Parent Journal is a special place for you to document your child's journey to sound. Use this journal to store important information and records regarding your child. You can take this with you to appointments so that you have easy access to previous test results, observations, notes on your child's recent progress, and results from other professionals.

You also might want to share this folder with important caregivers, therapists, and teachers. This way the journal can provide more opportunities for improved communication between you, your family, and your child's team members.



If lost, please return to:

Name _____

Address _____

Phone _____

Email _____

Learn more about Cochlear Implants

To get more information about hearing loss and restoration with cochlear implants:

Visit AdvancedBionics.com

Join HearingJourney.com





tips & information

In this section, consider placing information on:

- The steps to hearing
- Practical tips to improve your communication with your child
- I hear that
- Literacy strategies

Exploring Communication Options

As a parent of a child with hearing loss choosing a communication option(s) for your child and family can feel overwhelming. Use all resources available to you as you research each option. Speaking with local early intervention professionals, audiologists, educators, and teachers of the deaf will help you learn the specifics about each communication option and help you determine what is best for your child and family. Speaking with other families who have walked this path can also provide valuable wisdom and support. Below is a brief overview of each communication option.

Listening and Spoken Language (LSL)/ Auditory Verbal

Goal: To teach children spoken language through listening

- Children taught this approach will use spoken language and listening to communicate with others.
- Full time and consistent use of appropriately fit amplification is necessary for children to succeed with this approach.
- Parents will communicate with their children through spoken language.
- Parents are coached by professionals and are the primary language teacher.
- Academics are typically taught in a mainstream classroom beginning in the early years.
- An interpreter in the mainstream classroom is not necessary if this approach is successful.
- This is considered an oral approach. Manual communication is not used.
- Guiding Principles:
 - ✓ For children who are deaf and hard of hearing to grow up in a mainstream learning environment, enabling them to become independent, and contributing citizens of society
 - ✓ A developmental approach which follows typical milestones
 - ✓ Promotes early identification of hearing loss and use of appropriate hearing technology
 - ✓ Professionals guide parents on strategies and techniques to teach a child how to listen and talk
 - ✓ Parent-centered approach that encourages the use of naturalistic conversation and the use of spoken language to communicate

For further information about Total Communication, visit:

agbell.org

hearingfirst.org

Auditory-Oral

Goal: To teach children spoken language through listening, speech reading, context, and visual clues

- Children taught this approach will use spoken language, speech reading, and listening to communicate with others.
- Full time and consistent use of appropriately fit amplification is necessary for children to succeed with this approach.
- Parents will communicate with their children through spoken language.
- Parents must carry over instruction from therapy and/or the classroom to maximize their child's success.
- Academics may take place in a self-contained classroom in the early years but children will typically mainstream.
- An interpreter in the mainstream classroom is not necessary if this approach is successful.
- This is considered an oral approach. Manual communication is not used.
- Guiding Principles:
 - ✓ For deaf and hard of hearing children to grow up in a mainstream learning environment, enabling them to become independent, and contributing citizens of society
 - ✓ Children will enter the mainstream after they have time to strengthen their language, social, and cognitive development
 - ✓ Promotes early identification of hearing loss and use of appropriate hearing technology

For further information about Auditory-Oral, visit:

agbell.org

hearingfirst.org

Exploring Communication Options

Cued Speech

Goal: To enable a child to understand spoken language by helping a child distinguish the sounds of speech through a visual cueing system that is used in combination with speaking

- Children who are taught this approach learn a system of eight hand-shaped cues that represent the different sounds of speech to help them understand what is being said. Spoken language or a sign based communication methodology may be used for communicating with others.
- Full time and consistent use of appropriately fit amplification is necessary for children who are learning to express themselves through spoken language.
- Parents will need to learn to use the eight hand shaped cues in four different locations in combination with spoken language to communicate with their children.
- Parents are coached by professionals and become the primary language teacher.
- Academics may be taught in a mainstream classroom with support services or may be taught in a self-contained environment.
- Use of an interpreter will be necessary in the mainstream classroom.
- This method is considered a visual approach to spoken language.
- Guiding Principles:
 - ✓ Literacy is a primary goal of Cued Speech, by providing the appropriate phonemic language base for learning to read
 - ✓ Children with hearing loss who use cued speech will learn language much the same way as a child with normal hearing but through vision rather than audition alone
 - ✓ Cued speech makes spoken language clear by allowing children to distinguish sounds that look the same on the lips
 - ✓ Cued Speech is not considered its own language but a visual signing system that can supplement spoken or sign language
 - ✓ Cued Speech supports the development of lip-reading, auditory discrimination, and speech
 - ✓ A system for children who may not be able to learn entirely through listening alone

For further information about Cued Speech, visit:

cuedspeech.com

Total Communication

Goal: To learn language through all means of communication; formal signs, natural gestures, finger-spelling, body language, listening, speech reading, tactile cues, and speech

- Children who are taught this approach will use signs, gestures, speech reading, and spoken language and listening to communicate with others.
- The use of amplification is necessary to support the development of auditory skills.
- Parents will communicate with their children through the use of signs, gestures, spoken language, and listening.
- Parents will need teaching and support to develop proficient sign language skills.
- Academics may be taught in a mainstream classroom with support services or may be taught in a self-contained environment.
- Use of an interpreter in the mainstream classroom may be necessary based on the student's needs.
- This method uses both manual and oral/auditory components.
- Guiding Principles:
 - ✓ Language development is optimized in whatever way is most effective for the individual child
 - ✓ Communication is developed through a combination of hearing, vision, and tactile cues

For further information about Total Communication, visit:

raisingdeafkids.org/communicating/choices/tc.php or communicating/choices/tc.php

American Sign Language (ASL)

Goal: To learn a complete and complex visual language system that uses hand signs, facial expressions, and postures of the body to communicate

- Children taught this approach will use American Sign Language to communicate with others.
- Amplification is not required for communication.
- Parents will need to learn ASL to communicate with their children.
- Parents will need teaching and support to develop proficient skills in ASL.
- Academics are typically taught in a self-contained classroom that uses ASL, a self-contained classroom that uses a Bilingual-Bicultural (Bi-Bi) approach, or in a mainstream setting.

Exploring Communication Options

- Use of an interpreter will be necessary in the mainstream classroom.
- This method is fully manual with no oral or auditory component.
- Guiding Principles:
 - ✓ Research has shown that when deaf children are exposed to a rich visual language environment (American Sign Language) they are provided the foundation for a first language and school readiness
 - ✓ A complex visual and spatial language
 - ✓ ASL is a language with its own unique rules of grammar and syntax. Each country has its own sign language and regions have dialects, like any spoken language
 - ✓ English is considered a second language

For further information about ASL, visit:

handspeak.com

gallaudet.edu

deafchildren.org

nad.org

Helpful Terminology

Bilingual-Bicultural (Bi-Bi) Education: Education of children who are deaf and hard-of-hearing using a child's first language, American Sign Language, as the primary language of instruction and teaching English as a second language for reading, writing and speaking. Children learn about and become part of Deaf culture and the Deaf community.

Early Intervention: Early intervention is the term used to describe the services and supports that are available to babies and young children with different and possible additional needs and their families.

Expressive Language: The way a child communicates wants, needs, and feelings to others through using words or gestures.

Interpreter for the Deaf: A person who facilitates communication between hearing and deaf or hard-of-hearing persons by translating language from one modality to another, such as between Spoken English and American Sign Language.

Mainstreaming: Integration into the classroom with hearing peers to the maximum extent possible.

Manual Communication: A communication approach that uses hand signs and gestures to convey messages between persons.

Receptive Language: Receptive language refers to how a child understands language.

Self-Contained Classroom: This refers to a classroom, where a special education teacher is responsible for teaching children that have similar 'schooling needs', e.g.: children with hearing loss.

Speechreading: This is a way of understanding speech by looking at and interpreting the movements of the lips, face, and tongue.

Good & Not So Good Sounds

by Dave Sindrey, M.Cl.Sc. LSLC Cert. AVT

Let's think about the soup of sound around us. The TV is on in the other room. Someone just started the dishwasher. The fan was left on in the bathroom. Noise is a soup. Even small sounds can add to it and make it difficult to hear the words spoken in it. Noises that we as adults can easily "tune out" might just rob your child of a language learning chance. As children are developing listening and language skills, they do best in places where the words spoken are louder than the noise around them. Children with hearing loss are even more affected, of course, by the presence of noise and distance away from the speaker. Since everyday noises are easily dismissed by our adult language mastered brains we tend to not appreciate the effect these noises can have on little ears.



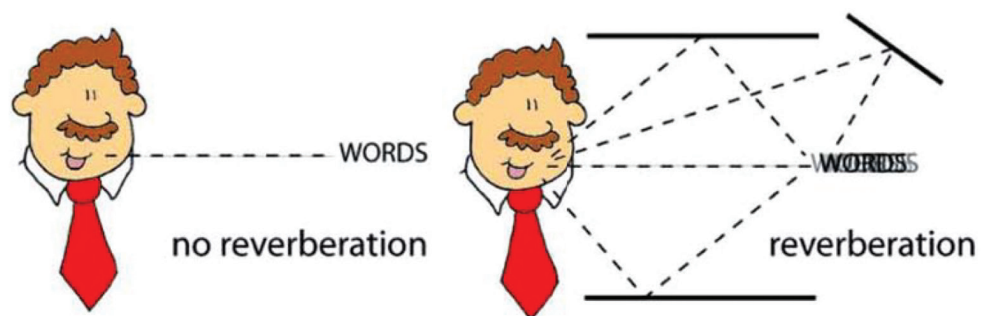
That means that we have to be careful about the amount of sounds in your home. Run the dishwasher at night while little listeners are sleeping. Don't have the TV on all the time — especially when no one is watching! Air conditioners, fish tanks and fans shouldn't be in places where you'll be doing a lot of talking and listening (the kitchen table, bedtime, play areas, etc.). Keep doors to other rooms shut. You might want to line those doors with weather stripping if sound still comes through. Caulking windows may also help quiet your home.

Let's consider one example a child has to learn in the great tapestry of language learning: when we talk about 'a book' we mean one, when we say 'books' we mean more than one. For a child to learn to put the tiny little "s" sound on the end, they have to hear it used meaningfully with different words over and over again, so that he can learn that rule. If noise covers up that tiny "s" sound, so that sometimes they hear it used when we mean "more than one" and sometimes it is gone due to noise (or distance) then what is the rule? It is much harder to learn these language rules when noise makes the rules hard to hear and even inconsistent.

So our advice is: get closer, move in and talk with your child about all they see. By getting closer you naturally help your words win over the noises that compete. It's also important that you talk naturally, don't talk in a loud voice. Talking louder doesn't make what you say more clear (it can do quite the opposite actually!). If your child wears a FM/Roger system, use it. With this system your voice will sound like you are right next to them no matter how far away they get.

Sounds Bounce

Reverberation: when sounds and your words are reflected by hard surfaces (like walls, windows, and floors), it will be more difficult for someone to understand you because the words are mixed together.



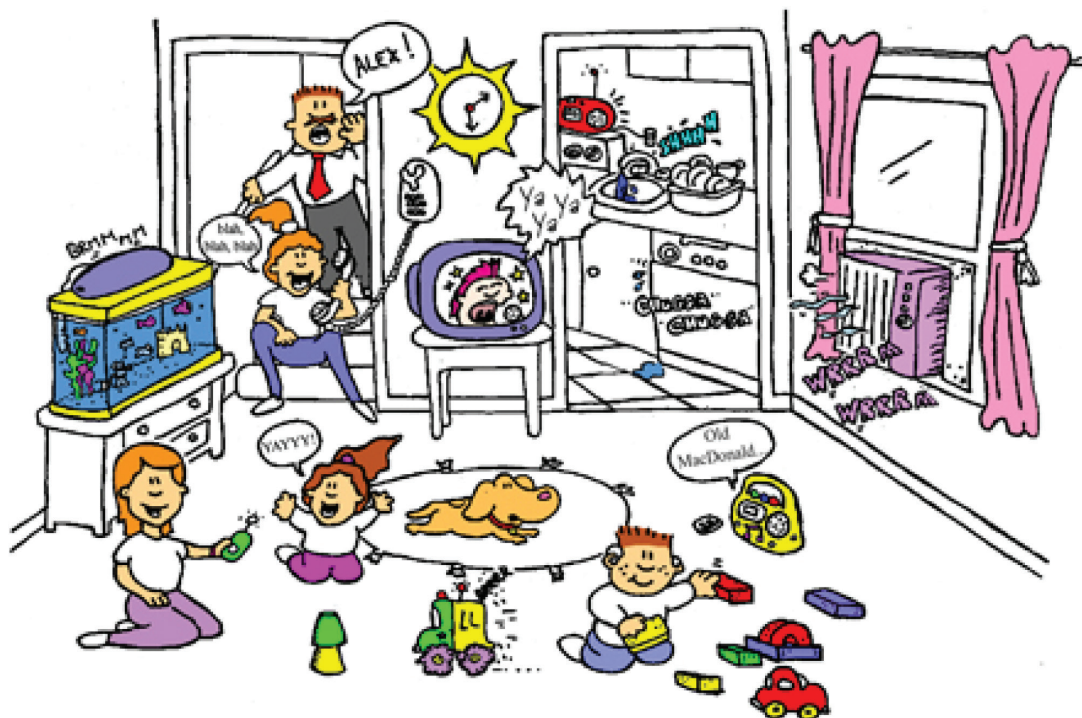
Good & Not So Good Sounds

Sounds bounce (Look at the picture at the bottom on the other side again). Your voice travels out from your mouth in all directions. One path goes straight to your child's ear. Another path travels to a hard flat surface like a window and bounces. One path of this bounce arrives at your child's ear just milliseconds behind the original words. This blurs the sound like nothing else. Think of the echo in a gymnasium. Now think of sound in a carpeted library. The library is better. Help your child make the most of what you tell them. You can do this in part by closing curtains (to cover hard flat windows) and using carpeting when you can, cover tables with table cloths.

When you look ahead to places your child will be where they have to listen in noise, prepare them by pre-teaching. Pre-teaching the things your child will hear and learn about in a story will help them because they will have knowledge of the phrases and words that might be said. If noise, distance, or reverberation (sound bounce) will make it harder for your child to understand what is being said, they will be able to "fill in" what they missed with what they already know.

You can pre-teach the names of children in their preschool by playing at home and pretending you are at school. Use the words, directions and activities that will be said at school. If your child is into sports, pre-teach the game and the concepts by playing miniature version on a table or by playing a mini game in your backyard. Or get a book (even a coloring book can help) of the movie you are going to see. Act it out with action figures. It also might be a good idea to use the FM/Roger system whenever noise or distance is a concern.

In the soup of sound around us, do whatever you can to help to make the meatballs (your words) stand out from the broth (noise). Listening should be fun and easy!





my child's team

In this section, consider placing:

- Business cards or contact information for your team of medical and school professionals that support your child
- Pictures of your child's therapists, audiologists, doctors, and others
(Take time to familiarise your child with these individuals prior to their appointments; it will make the appointment go more smoothly!)



therapy services

In this section, consider placing your child's:

- Speech-language evaluations, goals, and reports
- Occupational therapy evaluations, goals, and reports
- Physical therapy evaluations, goals, and reports
- Vision therapy evaluations, goals, and reports
- Other therapy evaluations, goals, and reports

Early Intervention Reference Card

What is early intervention?

Early intervention is the term used to describe the services and supports that are available to babies and young children with different and possible additional needs and their families. After your child's hearing loss is confirmed, it's recommended to start the intervention as soon as possible, certainly no later than 6 months of age, to make sure your child gets all the support they need during those first critical years.

A number of principles are very important to early intervention. These include the following:

1. Parents should be offered the opportunity to interact with other families who have infants and children with hearing loss or adults with hearing loss.
2. Parents should also be offered access to professional, educational, and consumer organisations and provided with general information on child development, language development, and hearing loss.
3. Foundational characteristics of developing and implementing early intervention programmes include a family-centered approach, culturally responsive practices, collaborative professional-family relationships and strong family involvement, developmentally appropriate practice, interdisciplinary assessment, and community-based provision of services.

Educational intervention services will usually be provided by early intervention or family support services in or near your community.

What are early intervention services?

If an infant or toddler has a disability or a developmental delay in one or more developmental areas, that child will likely be eligible for early intervention services. Those services will be tailored to meet the child's individual needs and may include:

Assistive technology (devices a child might need)	Nursing services
Audiology or hearing services	Nutrition services
Speech and language services	Occupational therapy
Counseling and training for a family	Physical therapy
Medical services	Psychological services

Services may also be provided to address the needs and priorities of the child's family. Family-directed services are meant to help family members understand the (special) needs of their child and how to enhance their development.

Why is early intervention important?

Research has compared children with hearing loss who receive early intervention and hearing devices before 6 months of age versus after 6 months of age. By the time they enter first grade, children identified earlier are 1–2 years ahead of their later-identified peers in language, thinking, and social skills.¹ Therefore, early intervention can lay the foundation for developing fundamental language, social, and thinking skills that provide the framework for later schooling and success in life.

What is a home visit?

A specialist, such as an early intervention or family support professional, will come to your home or another natural environment to work with you, your infant, and your family members. Visits are conducted in the home or other places where your child spends a big part of his or her time because these are the most natural places for your baby.

During the home visit, the early intervention or family support specialist will help you communicate with your child and encourage their development. Your specialist will work closely with you to identify your needs and set priorities for your baby, help you locate resources, and answer your questions.

1. U.S. Department of Health and Human Services (HHS). (1990). Healthy People 2000: National Health Promotion and Disease Prevention Objectives. Washington, DC: Public Health Service.



learning & school

In this section, consider placing information on:

- IFSP/IEP (Reviews)
- Communication with school and/or daycare
- Your child's classes

School Input Form

By Amy McConkey Robbins, MS, CCC-SLP

Dear _____ :
Teacher/Therapist

Your student, _____, will be seen for a cochlear implant follow-up visit on _____.
Child's Name
Date
Your feedback about how this child is doing with their implant(s) is very important to us. Please take a moment to complete this form and email it to me at _____
Email Address

by _____.
One Week Before Visit

1. Does the child wear the CI consistently and without resistance at all times at school/therapy? YES NO
If NO, please describe: _____
2. Based on your knowledge, does the child wear the CI consistently and without resistance at home? YES NO
If NO, please describe: _____
3. What percentage of the time does the child respond to their name when called from behind on the first trial, without prompting? _____ %
4. How much noticeable difference do you see when the child is wearing versus not wearing their cochlear implant(s)?
 No difference Very little difference Some difference Quite a difference Huge difference
5. Are you pleased with the child's progress? YES NO Please comment:

6. How would you characterise the child's current speech skills?
 Completely unintelligible Few intelligible words Partially intelligible
 Mostly intelligible Completely intelligible
7. Please list any noticeable changes in the child's listening or communication skills since their last visit to our centre:

8. How would you compare the child's implant performance to that of other CI children with whom you have worked?

9. How would you characterise the child's current listening skills (check all that apply)
 No consistent detection Detection Simple pattern perception Complex pattern perception
 Closed-set word recognition Beginning open-set word recognition Advanced open-set word recognition
10. Please note any concerns or questions you have about the child's cochlear implant(s) or hearing development:

Early Intervention Communication Log

(Circle one) CI was: working / not working properly today

(Circle one) FM was: working / not working properly today

Please describe any equipment problems:

Ling Sound Test	ah	eeee	oo	sh	sssss	mmm	(silence)
Detected							
Identified							

(Circle all that apply) Child was happy / upset / tired / focused / not focused

Notes regarding today's session:

Ideas and concepts for family to work on at home:

I have read these notes: _____

Parent/Caretaker Initials

Home and School Communication Log

To be completed by the parent/caregiver and sent to school with the child.

PARENT/CARETAKER

Notes from home:

Cochlear implant settings:

Notes from therapists:

Notes regarding upcoming or recent mapping appointments:

Memorable cochlear implant moment:

I have read these notes: _____

Teacher's Initials

Home and School Communication Log

SCHOOL

Please complete this log and send home with the child so that the parent(s)/caregiver(s) can review the events of the child's day and address any concerns you may have before the child arrives at school the next day.

(Circle one) CI was: working / not working properly today.

(Circle one) FM was: working / not working properly today.

Please describe any equipment problems:

Ling Sound Test	ah	eeee	oo	sh	sssss	mmm	(silence)
Detected							
Identified							

Cochlear implant was worn all day except:

No Exceptions Gym Lunch Nap Playground Other

(Circle one) Child was: happy / upset / tired / focused / not focused

Services received today:

Speech Therapy Occupational Therapy Reading Specialist Deaf/HoH teacher Other

Today, your child:

I have read these notes from school: _____

Parent/Caretaker Initials

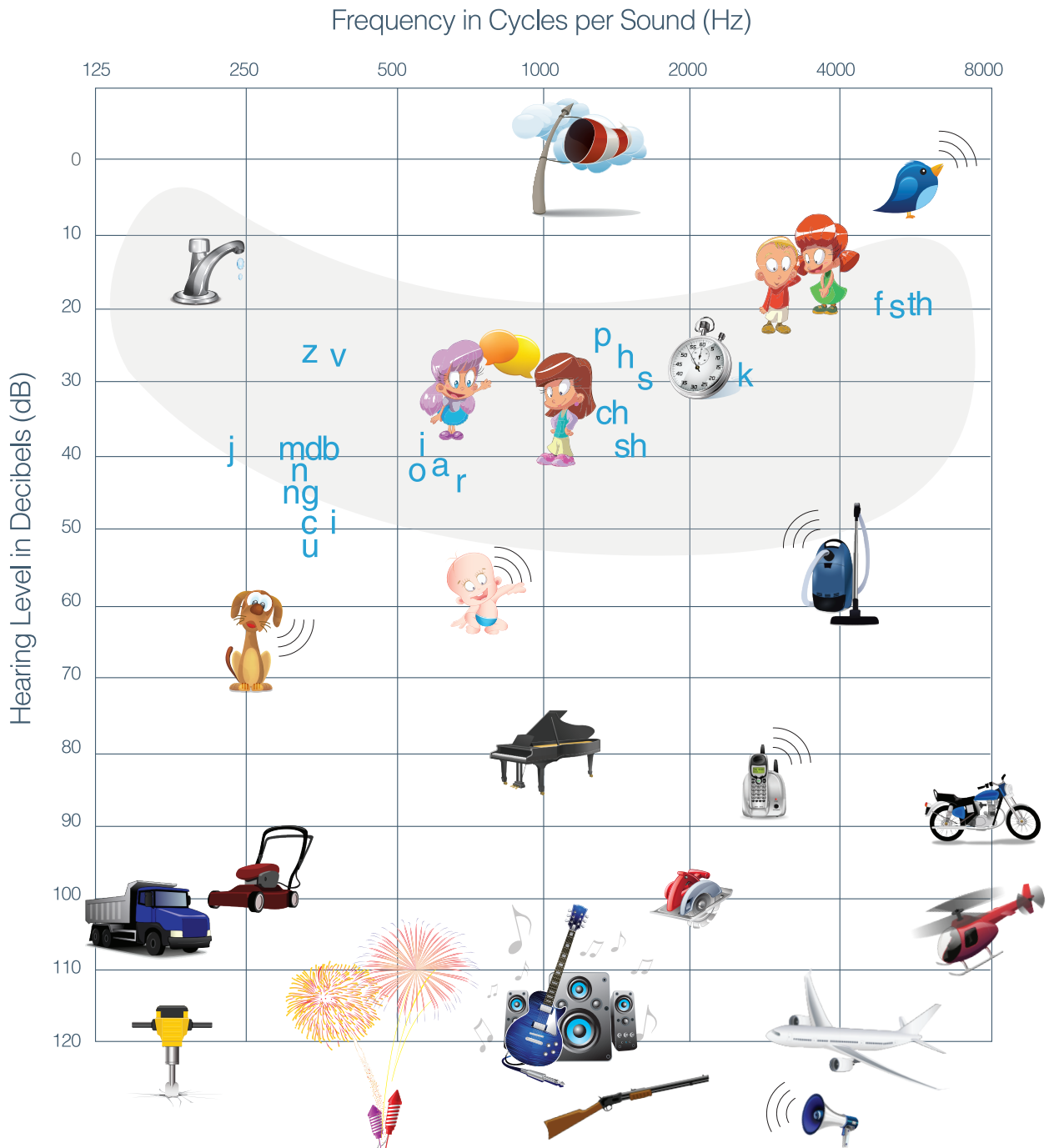


hearing tests

In this section, consider placing your child's:

- Audiograms (hearing test results)
- ABR/ASSR test and/or OAE results
- Speech perception results

Audiogram of Familiar Sounds



Adapted from: American Academy of Audiology, www.audiology.org and Northern, J & Downs, M. (2002). Audiogram of familiar sounds; and Ling, D. & Ling, A (1978). Aural Habilitation.



hearing technology

In this section, consider placing information about your child's:

- Hearing device(s) (e.g., hearing aid(s), cochlear implant(s), Roger)
- Hearing technology user guides
*This will help others understand how your child's hearing technology works
(AB Product Guides are available for download at [AdvancedBionics.com](https://www.advancedbionics.com))*
- Hearing technology programs (i.e., sound processor programs)
- Notes on recent changes to their hearing device

My Child's Ears

On My Child's Right Ear is:

Hearing Aid

AB Cochlear Implant

Other _____



Program	Description
1	
2	
3	
4	
5	
Other Settings	
Serial Number	

Batteries:

Rechargeable

Disposable

Size/Type: _____

Other Technology:

Personal FM System/Roger

Remote Control

Other

Type: _____

Additional processor features and/or important notes about how my child listens:

My Child's Ears

On My Child's Left Ear is:

Hearing Aid

AB Cochlear Implant

Other _____



Program	Description
1	
2	
3	
4	
5	
Other Settings	
Serial Number	

Batteries:

Rechargeable

Disposable

Size/Type: _____

Other Technology:

Personal FM System/Roger

Remote Control

Other

Type: _____

Additional processor features and/or important notes about how my child listens:

The Ling Six Sound Check



The Ling Six Sound Check

What is the Ling Six Sound Check?

Using the 6 Ling sounds ('ah', 'ee', 'oo', 'sh', 's', and 'm') you can check if your child can hear sounds that sound very different (some are louder than others, some sound sharper than others).

This way you know if your child's hearing devices are working properly. Your child should be hearing the sounds first (this is called 'detection'), secondly, they should hear that they sound different (in technical terms we say that they can 'discriminate between the sounds') and finally your child has to recognize or 'identify' them (and you'll know this if they can repeat them correctly).

Detection: recognising the presence or absence of sound.

Discrimination: recognising if two or more sounds are the same or different.

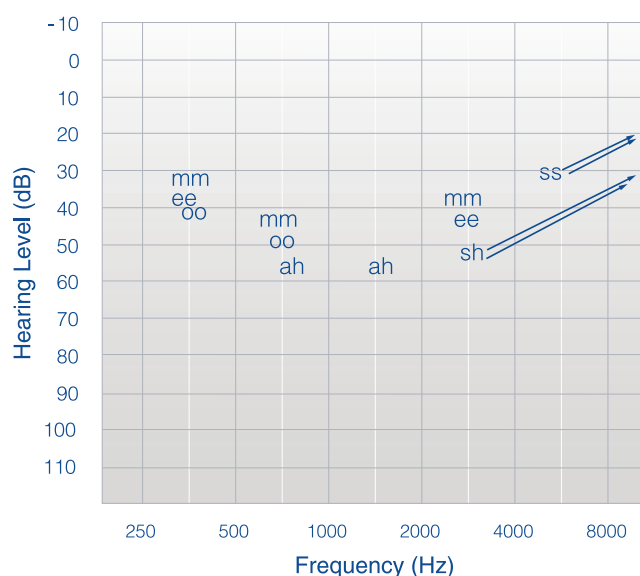
Identification: repeating a sound or pointing to a picture if the sound is heard.

The best way to do this is when your child can't see your face. If your child is still very small, you'll start to teach them these sounds while they look at you of course. However, once they are listening well with their device(s), you want to check if they can hear the sounds, so it's best if your child can't see your face (so they can't 'read' your lips). You can sit next to your child, stand behind them or even just cover your mouth (preferable with a screen, however you can also use your hands).

Then slowly pronounce the different sounds ('ah', 'ee', 'oo', 'sh', 's', and 'm') and ask your child to point to the pictures or repeat the sound if they can.

If your child hears:

- the three sounds 'ah', 'ee', and 'oo' - spoken in a quiet voice at a distance of at least 4 meters, their hearing device(s) work well in the 1000 Hz range.
- the sound 'sh', their hearing device(s) work well in the 2000 Hz range.
- the sound 's' - spoken in a quiet voice at a distance of at least one to two meters, their hearing device(s) work well in the 4000 Hz range.



If you do this test regularly, you'll quickly notice when something is not working well. This is important because you can then take immediate action, and try to troubleshoot and fix the problem (for example: replace the battery or cable) in a timely fashion.

Listening Check Results

Form for recording your child's responses to the Ling Six sounds:

Name: _____ Age: _____ Date: _____

Cochlear Implant (CI): Right Ear Left Ear Both Ears

CI Settings: _____

Circle Your Choice

Technique Used: Detection Discrimination Identification

Response Used: Change in Behavior Pointing Repeating

Presentation Level: Whisper Normal Voice Loud Voice

Distance: 30 cm 2 metres 3.5 metres

Reliability: Good Fair Poor

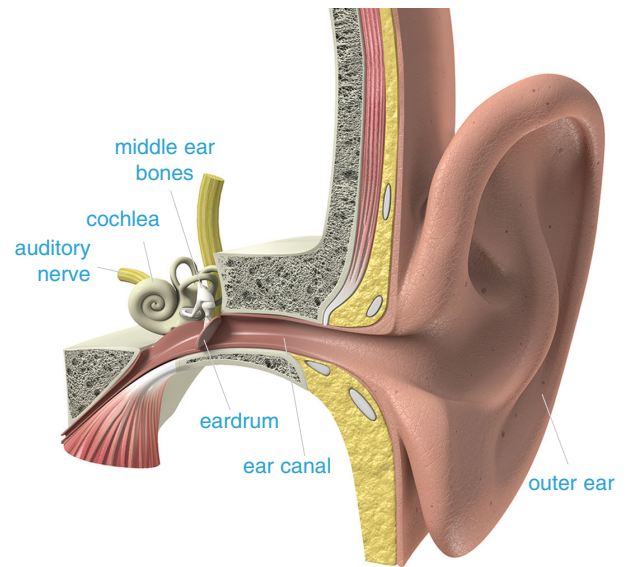
Ling Sound	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
ah							
ee							
oo							
sh							
s							
m							
Silence							

Note: Remember to change the order of the sounds when you say them, and make them long and short so that your child can't guess what you're saying and they really have to pay attention and listen closely!

Becoming Familiar with Cochlear Implants

Understanding Hearing Loss

You have recently been told that your child has a hearing loss. You may feel emotional and overwhelmed as you begin to learn more about your child's diagnosis. There is a lot of new information to learn. This guide is intended to help you understand basic information about hearing and hearing loss, the audiogram, and the treatment options available. Please consult with a pediatric audiologist for any specific questions you have about your child's hearing loss. Additionally, you may find it helpful to connect with other parents who have children with hearing loss. A parent mentor is a wonderful way to get support and guidance. Email hear@advancedbionics.com to learn more.



How the Ear Works

For sound to be heard, the ear needs to convey the message to the brain. The ear consists of four main parts: the outer ear, middle ear, inner ear, and the hearing nerve. Each of these parts plays a key role in transmitting sound to the brain.

1. The outer ear

The outer ear captures sound and then directs the sound down the ear canal to the ear drum. The shape of the outer ear amplifies important sounds and helps to reduce competing noise.

2. The middle ear

Sound traveling down the ear canal reaches the eardrum causing it to vibrate. These vibrations are transmitted to the middle ear bones, the malleus, incus, and stapes causing them to move back and forth and push against the inner ear.

3. The inner ear

The inner ear is a snail shaped organ called 'the cochlea' that contains sensory cells called 'hair cells'. As the middle ear bones vibrate and push against the cochlea, fluid in the cochlea moves causing the hair cells to bend and sway. As they move, they communicate information about the sounds in an 'electrochemical code' to the hearing nerve.

4. The hearing nerve

The hearing nerve is responsible for transmitting the sound information from the ear to the brain. The brain is responsible for interpreting sound.

What Is "Normal" Hearing?

Hearing is considered normal when all parts of the hearing system are working properly and people can hear sound that is very soft to very loud over a wide range of pitches. Audiologists use special terms to describe pitch and loudness. These terms are defined below.

Frequency — describes the pitch of sound. The unit of measurement used to describe frequency is Hertz (Hz). A low pitched sound like thunder has a frequency of about 100Hz. A high pitched sound like a bird singing has a frequency of about 8,000Hz.

Decibels — describes the loudness of sound. The unit of measurement is written on the audiogram as dBHL. A very soft sound like a whisper has a dB level of about 20dBHL. A very loud sound like an airplane taking off has a dB level of about 120dBHL. Using these terms audiologists define normal hearing as the ability to hear sounds as soft as 0dBHL between 125-8000Hz. You may be wondering how an audiologist is able to determine the frequencies and decibel levels your child is able to hear. Audiologists use special tests to gather this information. Let's learn more about them.

Becoming Familiar with Cochlear Implants

How do Audiologists test hearing?

There are several ways an audiologist can test the hearing of children. In fact, your child probably had a screening version of one of the test methods described below before they even left the hospital as a newborn. The first two methods described do not require your child to be an active participant and are commonly used with babies and toddlers. The last method described, the Audiogram, does require your child to participate and is considered the most accurate and specific way to test hearing. Typically pediatric audiologists will use a combination of several tests to understand your child's type and degree of hearing loss.

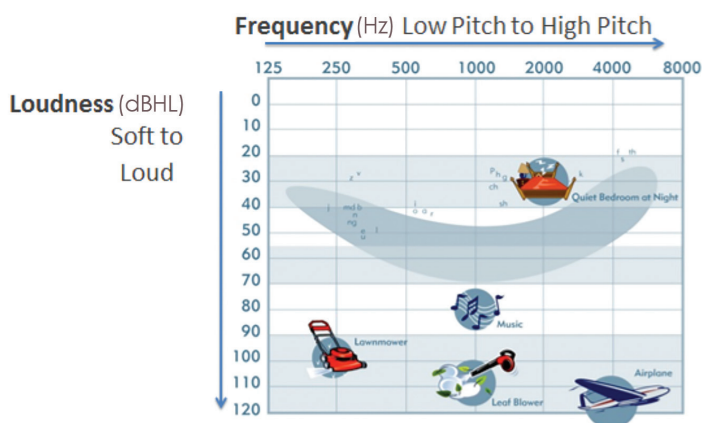
1. Auditory Brainstem Response Test (ABR) and Auditory Steady State Response Test (ASSR) — These tests use a special computer program in combination with electrodes that are placed close to the ears and on the head to measure the brain's response to sound. As sounds are played through headphones or insert earphones, the electrodes measure how the brain responds. The audiologist uses the computer program to assist in determining the degree of hearing loss.

2. Otoacoustic Emissions (OAE's) — This test measures soft sounds, called otoacoustic emissions, given off by the inner ear. The measurement is done by placing a small microphone in the ear canal. Individuals with hearing loss greater than 25-30dBHL do not produce these soft sounds. The OAE test is part of a battery of tests and cannot be used to identify the type and degree of hearing loss on its own.

3. Audiogram — An audiogram is a graph that shows a child's type and degree of hearing loss. The audiologist plots the graph by recording the softest level your child can hear different sounds that vary in loudness and pitch. Testing is done in a sound proof booth. It is important for you to understand the audiogram as it is the way professionals describe your child's hearing loss. Let's use the Audiogram of Familiar Sounds below to learn more about how to read and understand your child's hearing loss.

As mentioned above, an audiogram is a graph that plots a child's type and degree of hearing loss. The horizontal axis of the graph indicates the pitch also known as frequency (Hz). Sounds become higher in pitch as you move from left to right in the direction of the arrow. The vertical axis of the graph indicates loudness, measured in (dBHL). The sounds increase in loudness level as you move down the graph in the direction of the arrow.

This audiogram (see below) is called the Audiogram of Familiar Sounds as it plots common sounds as well as speech sounds according to the pitch and loudness level they most commonly occur. For example, the sound of an airplane occurs at a frequency of about 4,000Hz at about 120dBHL which is extremely loud. Compare this to the "p" sound which occurs at a frequency of about 1,500Hz at about 25dBHL which is very soft. The Audiogram of Familiar Sounds is a great way teach family members and friends about the sounds your child can and cannot hear.



Becoming Familiar with Cochlear Implants

What do the symbols on the audiogram mean?

The audiogram contains several symbols that represent responses to sound in the right ear (O), left ear (X), soundfield (S), and bone conduction (<>). The type of response plotted is determined by the person's age and ability to sit and complete testing. Since most adults and older children can sit wearing headphones and participate in a full length hearing test, the audiologist is able to collect right ear (O), left ear (X) and bone conduction (<) responses during a single evaluation. Audiograms are typically completed in one session and the audiologist will be able to diagnose the type and degree of hearing loss for each ear.

Getting a complete audiogram for babies and very young children, however, is not as simple. Young patients typically have short attention spans and will not tolerate wearing headphones. The goal of testing is to collect as much information as possible about how well a baby or very young child hears before the child tires and can no longer participate. Typically, audiologists will record soundfield (S) responses as they can be collected quickly and without headphones. They give audiologists some information about how well your child hears. Soundfield responses must be interpreted carefully as they may not be the softest level at which your child can hear and must be evaluated in terms of reliability. Additionally, soundfield responses are not ear specific. They indicate your child's ability to hear sound in the test booth in the better hearing ear (if there is a difference in hearing between the two ears). Your child's audiologist will be able to obtain a complete audiogram for your child as he or she becomes more familiar with the testing situation and matures. In the meantime, results from all the different types of hearing tests (ABR/ASSR/OAE/Audiogram) will be used in combination to gain the best understanding of your child's type and degree of hearing loss.

Audiogram Symbols

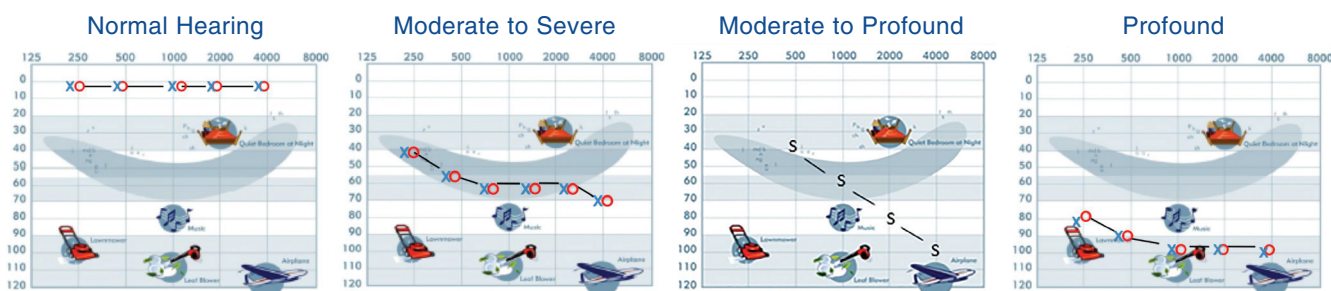
- O** Right ear: softest sound heard through headphones in the right ear
- X** Left ear: softest sound heard through headphones in the left ear
- S** Soundfield: softest sound heard when sound is presented through a speaker to both ears
- <** Right ear bone conduction: softest sound heard when sound is presented directly to the right inner ear system
- >** Left ear bone conduction: softest sound heard when sound is presented directly to the left inner ear system

Degrees of Hearing Loss

Normal	0 – 20 dBHL
Mild	25 – 40 dBHL
Moderate	40 – 70 dBHL
Severe	70 – 90 dBHL
Profound	90dB and higher

What are the different degrees of hearing loss?

Hearing loss is discussed in terms of degrees. See the box to the right as well as example audiograms below to learn more about interpreting different degrees of hearing loss. There are five degrees used to describe hearing. Normal, Mild, Moderate, Severe and Profound.



Becoming Familiar with Cochlear Implants

What are the different types of hearing loss?

There are 3 different types of hearing loss.

1. Conductive

This type of hearing loss is usually caused by a problem in the outer or middle ear. This type of hearing loss can be temporary or permanent. An ear infection that causes temporary hearing loss until treated is an example of a conductive hearing loss. The treatment for conductive hearing loss varies widely depending on the cause but may include options such as taking antibiotics or receiving ear tubes.

2. Sensorineural

This type of hearing loss is due to damage to the inner ear (cochlea and hair cells), and/or the auditory nerve pathway from the inner ear to the brain. This type of hearing loss is almost always permanent and depending on the degree of hearing loss is typically treated by fitting hearing aids or receiving a cochlear implant.

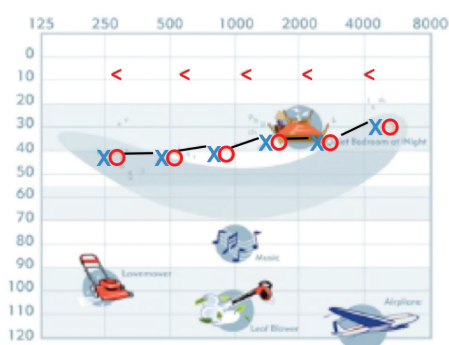
3. Mixed

This type of hearing loss results from a combination of conductive and sensorineural components. The conductive part of the hearing loss can be temporary or permanent. The sensorineural part of the hearing loss is almost always permanent. An ear infection that occurs in a child who already has a sensorineural hearing loss is an example of a mixed hearing loss. This type of hearing loss may be treated with hearing aids, cochlear implants, or other methods, depending on several factors which are beyond the scope of this document.

How is the type of hearing loss noted on the audiogram?

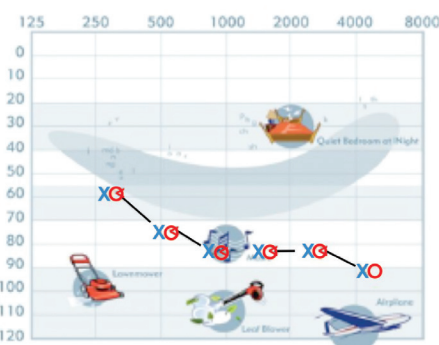
On the audiograms below you see the right ear response (O) and the left ear response (X) symbols. There is an added symbol, < which represents bone conduction. A bone conduction response is obtained when a tone is presented via a special headphone that stimulates the cochlea directly. This response bypasses the outer and middle ear. Bone conduction responses indicate how well the inner ear system can hear.

Follow along with each audiogram as you read the descriptions below to learn how to interpret the different types of hearing loss.



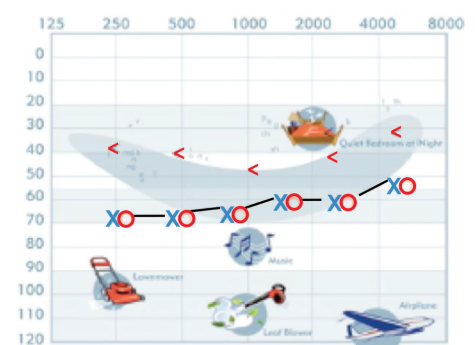
Conductive Hearing Loss

- Bone conduction responses (<) will be in the normal hearing range (0-20dBHL).
- Right ear (O), left ear (X), or soundfield responses (S) denote hearing loss (25dBHL or higher).
- There will be a gap between bone conduction responses (<) and right and/or left ear responses (O and X) or soundfield responses (S).



Sensorineural

- Bone conduction responses (<) indicate hearing loss (25dBHL or higher).
- Right ear (O), left ear (X), or soundfield responses (S) denote hearing loss (25dBHL or higher).
- Bone conduction responses (<) and right and left ear responses (O and X), or soundfield responses (S) responses overlap.



Mixed

- Bone conduction responses (<) indicate hearing loss (25dBHL or higher)
- Right ear (O), left ear (X), or soundfield responses (S) denote hearing loss (25dBHL or higher).
- There will be a gap between bone conduction responses (<) and right and left ear responses (O and X), or soundfield responses (S).

Becoming Familiar with Cochlear Implants

What are the treatment options for hearing loss?

Now that you have a better understanding of hearing loss and how to read the audiogram you may be wondering what can be done to improve your child's ability to hear. There are many different solutions for treating hearing loss. Most children with permanent hearing loss benefit from using hearing aids or cochlear implants. These devices improve hearing sensitivity and help your child to hear the world around them.

What is the difference between a Hearing Aid and a Cochlear Implant?

A hearing aid makes sounds louder and delivers these sounds to the ears as normal. The sounds now pass through both the healthy and damaged parts of the ears before reaching the brain. The loudness and clarity of the sounds depends on the number of normal working hair cells inside the cochlea and how well the hearing nerve and brain are still able to process sound. For many children hearing aids are sufficient to improve hearing. Cochlear implantation is considered for individuals that cannot hear enough with hearing aids.

A cochlear implant works differently than a hearing aid. It delivers electrical signals that represent sounds directly to the auditory system. The electrical signals bypass damaged areas of the auditory system and stimulate the hearing nerve directly. Cochlear implants are usually recommended for ears with severe to profound hearing loss and can significantly improve hearing.

How do I know which treatment option is right for my child?

Make an appointment with a pediatric audiologist and ear doctor to get more information about the best treatment option for your child. Keep in mind that the recommendations may change as these professionals learn more about your child and their specific hearing loss and overall needs.

How can I help my child succeed?

Make sure your child wears their hearing devices during all waking hours every day. Find a mentor or support organization who can answer questions and provide support. View yourself as your child's primary language teacher. Enroll your child in listening and spoken language therapy and commit to attending on a regular basis.

What is listening and spoken language therapy?

A young child who has just received their hearing aids or cochlear implants is suddenly experiencing a world of sound. A baby or toddler will need to learn how to recognize and give meaning to these sounds. Listening and spoken language therapy transforms these meaningless sounds into an understandable language. It is a key factor to maximize success. You can learn more about about listening and spoken language at TheListeningRoom.com.

The Listening Room™

Provides families and professionals with interactive and uniquely designed activities to support the development of speech, language, and listening skills in babies, toddlers, and children.

Visit TheListeningRoom.com to explore and download the many FREE resources available.



medical information

In this section, consider placing information on your child's:

- Medical Reports (Otology/ENT, Ophthalmology, Genetics, etc.)
- CT and/or MRI reports
- Immunisations
- Developmental and growth milestones
- Medications and dosages



notes

In this section, consider placing:

- Communication notes to professionals
- A journal to write down those special moments you don't want to forget
- Keepsakes and mementos that are special to you and your child

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