Hearing aids, cochlear implants, and other assistive technology

SECTION 5
HEARING AIDS, COCHLEAR IMPLANTS, AND OTHER ASSISTIVE TECHNOLOGY
WHAT ARE HEARING AIDS?

Most children diagnosed with a permanent hearing loss are fitted with hearing aids. The term “hearing aid” includes the mould that sits inside the ear, plus the main part that for children, sits behind the ear. Ear mould + hearing aid = the complete hearing aid.

Hearing aids are mini amplifier systems that make sounds louder. They are extremely important in helping children to make the best use of what hearing they have.

Hearing aids can’t permanently fix hearing loss or return hearing to ‘normal’. What they can do is make sound signals strong enough for your child to hear them.

Hearing aids are not like glasses: it’s not just a case of wearing them to ‘hear better’. Hearing aids increase noise levels, but the brain still needs to process these sounds. Children of any age can learn to make sense of the new sounds they hear through their hearing aids if they wear them consistently and get suitable therapy or teaching support.

Your child’s hearing aids will be individually matched to their level of hearing loss. As your child grows, and as technology changes, their hearing aids will need to be adjusted or replaced.

For infants and children who have severe to profound sensorineural hearing loss (see section 4, page 35) and who would get little benefit from hearing aids, a cochlear implant may be suggested.

“Meghan wore hearing aids from an early age. Sometimes she would scream or shout when the aids were on. I taught her to use a one-to-four scale to learn about sound levels. We used 1 for a whisper, 2 for a normal conversation, 3 when excited or angry, or with a strong emotion, and reserved 4 only for emergencies needing urgent help. For example, at the movies or when we travelled on a plane, I taught her to use 1 when the lights were out. She soon learned to control her own voice and adapt to the situation she was in.”

If your child has not seen an adult with hearing aids, they may think they won’t need their hearing aids when they grow up. In most cases, they will always need to wear hearing aids, so you may need to explain this to them.
All hearing aids have the same parts

- **Microphone** – picks up the sound and turns it into an electrical signal
- **Amplifier** – increases the size (amplifies) of the electrical signal
- **Receiver** – converts the amplified electrical signal back into sound

Hearing aids require an ear mould. This is a clear or pale-coloured rubbery shape that sits inside the outer ear. A small tube connects the hearing aid (which sits behind the ear) to the mould. The tube carries sound from the hearing aid into the ear.

The different types of hearing aid

**Behind-the-Ear (BTE) hearing aids**

Young children are usually fitted with behind-the-ear or BTE aids – mainly because they’re easy to use, are of a manageable size and easier to repair. Young ears will be too small for larger types of aids, and small aids may not be able to be connected to assistive devices such as Frequency Modulation systems (FM systems). Other reasons these are most suitable relate to safety and problems with feedback.

For young children, behind-the-ear hearing aids can have a locked volume control to prevent children accidentally turning them up or down. You can also get a tamper-proof battery door so children can’t take the battery out and put it in their mouth.

A typical behind-the-ear hearing aid

![Diagram of a behind-the-ear hearing aid](image)

1. Programme selector button
2. Digital volume control
3. Battery compartment and on/off switch
4. Sound inlet to microphones
5. Sound outlet to earmould via speaker and earhook
Bone conductor hearing aids

These are used when a hearing aid with an ear mould cannot be fitted. They are usually required when a child has a permanent hearing loss. The bone conductor is worn with a band that is usually placed behind the ear or on a soft band or cap. Sound is sent to the inner ear by vibrating the bones of the skull.

Bone anchored hearing aids – BAHAs

These are used for the same reasons as bone conduction aids. They are usually fitted to children who have had, or may soon have, surgery for an implant in the mastoid bone behind the ear. The bone conduction aid will be attached to this implant. These aids can be fitted to a soft headband worn by children who are awaiting implant surgery.

“Louis will start school at the end of the year and that will bring a whole new challenge to his life. We are confident he will be prepared with his BAHA and will be as advantaged as any other child.”

Liz, mother of Louis

Other styles of hearing aid

- ITE – In-the-ear
- ITC – In-the-(ear) canal
- CIC – Completely-in-the-canal
- RITE – Receiver-in-the-ear

These styles are not usually provided to young children because of safety, fitting security, rapid ear growth and feedback problems.
Choosing the best type of hearing aid for your child

Your audiologist will discuss which model is best for your child. This will be based on the child’s needs and factors such as:

- size and shape of the ear
- degree of hearing loss
- the age of your child.

Ear moulds

The ear mould is the piece that sits snugly in the ear and is attached to the main (outer) part of the hearing aid. To get the same individual shape of the inside of your child’s ear a cast or impression is made. Taking an ear impression may feel a little weird, but it doesn’t hurt.

Your child will need to be relaxed, and discouraged from touching their ear during the process. It’s good to have a few items you can use to distract them. Audiologists usually have toys and books on hand if you have not brought your own. Always explain to your child what is happening.

The audiologist will begin by looking at your child’s outer ear and ear canal with a special light (an otoscope or auriscope) to make sure it is clear and healthy.

Then they will gently place a small foam or cotton ‘block’ attached to a cotton string in the ear canal, to stop the ear impression material (like soft putty) from going too deep into the ear.

Next, the impression material is carefully squeezed into the ear. This impression material becomes firm in a few minutes. It is then removed and sent to the manufacturer, who uses it to shape the ear mould. If your child needs two hearing aids, the process is repeated for the second ear.

Within a few days, the manufacturer will send the ear moulds to your audiologist and another appointment is made for your audiologist to fit them.

The ear mould should fit firmly, so that sound being directed from the hearing aid itself doesn’t ‘leak’ or cause a whistling sound, known as ‘feedback’.

Children are constantly growing so a firm fit can quickly become a loose fit. This means there will be an ongoing need to have new ear mould impressions made. In the case of a baby, new ear moulds may need to be taken as often as every one to two months during the first year following the first aid fitting, and as needed during growth spurts.

Trouble-shooting a hearing aid

- Some children and adults near a child may be able to hear feedback (whistling). If your child or others are finding the whistling disturbing, sometimes aural gel applied to the earmould can help.
- Whistling hearing aids may be caused by wax build up, middle ear fluid present, or the mould may be sitting incorrectly in the ear. See the steps for checking a hearing aid on page 48.
- If whistling is caused by cracked tubing or a growth spurt, you will need to get the tubing replaced or new ear moulds made.
- It pays to contact your audiologist as soon as there’s a problem, as ear moulds take time to be made and fitted. The turnaround time for very young children can be under one week.

FAQ: Will my child need one or two hearing aids?

If your child has a hearing loss in both ears, two hearing aids are needed. If your child has a loss in one ear, only one hearing aid may be needed. Being able to hear from both sides is important for localisation, hearing across distance, and hearing in background noise. Limiting hearing aid use to one ear if there is a loss in both ears limits your child’s ability to hear the best that they can. It also deprives the brain of the stimulation it needs to develop properly.
**FAQ: What can I do to stop feedback in my child’s hearing aids?**

The best solution is often a new ear mould. While waiting for the new moulds to come back from the manufacturer you may find that using a lubricant like Auragel will help by filling in the spaces between the mould and the ear. Alternatively, a light smear of KY gel on the mould can help.

If your child has ear infections or skin problems, check with your doctor before using Auragel.

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**Adjusting hearing aids**

Hearing loss can vary in degree and configuration, so it is important that each hearing aid is adjusted to suit the child who needs it.

Audiologists adjust hearing aids using an internationally recognised prescription procedure so that the aid is adjusted to amplify to the correct levels at different frequencies, according to the degree of hearing loss. The procedure recommends how much gain or amplification is needed over different frequencies for soft, medium and loud sounds. This is to make sure that soft speech sounds can be heard and loud sounds are not uncomfortably loud.

In younger children, the audiologist will adjust the hearing aid with the computer to match the hearing loss of the child, and by checking their reactions to sounds. Older children are more able to participate in the fitting process so they can tell the audiologist about the sound quality and loudness.

**Real ear testing**

The amplification of sound is measured with computers and part of this process is called ‘real ear testing’.

This involves putting a tiny silicone probe tube into the child’s ear along with the ear mould, and measuring the levels of sound from the aid in the child’s own ear canal using a miniature microphone attached to the tube.

The levels measured in the ear are checked against the prescription and adjusted if needed.

**How to tell if your child is benefitting from their hearing aids**

The most important part of fitting hearing aids is working out how well your child is actually hearing with the aids. The aim, after all, is to help your child hear speech and other sound so they will develop listening and spoken language skills.

Audiologists and Advisors on Deaf Children (AODC) can assess aided hearing in a variety of ways, using hearing tests and speech perception tests to find out what range of sound your baby can hear and later understand.

**VERY YOUNG CHILDREN**: parents and family members can use checklists to see when the child reaches important hearing and listening milestones.

**TODDLERS AND ECE CHILDREN** who have worn their hearing aids for some time will continue to have their hearing and speech perception assessed (with aids in) and monitored by audiologists and AODCs. This is to make sure they are progressing well toward learning to hear and speak.

When your child starts ECE and primary school, their reaction to the noisy environment, as well as their ability to communicate in this noise and to understand speech over greater distances, is monitored carefully. They may need to use assistive listening devices, such as an FM system (see page 49).
Hearing aids need to be worn regularly

It is important for children to wear their hearing aids regularly. For most children this should be all day, every day except when sleeping which can cause discomfort, or in water.

Audiologists monitor children’s hearing sensitivity on a regular basis and will be looking for any changes.

Children with moderate and greater degrees of hearing loss need to hear many sounds, words and sentences many, many times to develop speech and language skills and an understanding of the world around them.

For children with milder loss, it is sometimes hard to get them to wear their hearing aids as they say they can hear, not realising what they are missing.

If hearing aids are prescribed for milder degrees of hearing loss, the hearing aids have been given to the child to provide them with a clear speech “signal” so they can develop normal speech and language, and hear well in all situations.

Getting used to hearing aids can be difficult for all the family. Parents often expect their child to magically begin responding to sounds and start communicating right from the start. But these devices just provide the pathways, and the child now needs to learn how to use them.

If your child needs encouragement, role-play with a soft toy that wears toy hearing aids. New Zealand hearing aid manufacturers often supply parents with toys, such as ‘Otto the Otter’ or ‘Oliver the Elephant’.

THE WONDER OF HEARING SOUND FOR THE FIRST TIME: LEARNING TO LISTEN

For children with all types of hearing loss, the development of language through speech starts with learning to listen.

Once your baby or child understands there is value in taking notice of what they’re hearing through their hearing aids, they soon learn that different sounds mean different things. Sounds happen when people move their mouths and that means something. Or sounds happen when a telephone rings, and that means something too.

As your child learns that each sound has meaning, they will develop a ‘memory bank’ of sounds which most of us have been building up since we were born. Those who can hear have had a head start. So if your child has just begun to wear hearing aids, there will be a lot of catching up to do. That is why a hearing loss needs to be identified as soon as possible. Now that New Zealand has universal newborn hearing screening, we hope that all babies born with a hearing loss who need hearing aids will be fitted with them when they are only a few months old.

Magic ears

Some parents call hearing aids ‘magic ears’ to help their children accept them. It can be hard to encourage a child to wear their hearing aids when parents themselves are not sure about the benefits they bring. This is especially so if a child shows little or no response to sound in their early tests. It is helpful to understand that a child’s age, personality, and hearing level can all affect the way they react to their hearing aids.

Showing a positive attitude to the hearing aids will influence the way your child sees them.

There are ways to make the introduction of hearing aids easier. Ask your audiologist or AODC to show you and your child how to insert them correctly into your child’s ear. It’s fine to ask them to show you this more than once because correct insertion is very important.

Also check with the audiologist that the ear moulds are comfortable and not likely to cause feedback or whistling. If they do cause feedback, go back to the audiologist and ask to have this sorted out.
PAYING FOR HEARING AIDS

Most children’s hearing aids are fitted through the public hospital system. A small number of private audiology clinics will also fit children’s hearing aids and while there is a charge for the fitting and ongoing care, the cost of the hearing aids themselves is supported by the Ministry of Health, through the Hearing Aid Funding Scheme (criteria apply). The Ministry of Health will fund up to three hearing aids within a six year period for children and young people up to the age of 16 years if the hearing aids are lost or damaged, or if the hearing loss changes.

Funding or subsidies for older children and adults are available under the Hearing Aid Funding Scheme or the Hearing Aid Subsidy Scheme: ask your AODC for more information or go to this website www.health.govt.nz/yourhealth-topics/disability-services/hearing-and-vision-services

Although the Ministry of Health pays for some loss or damage replacement (up to three times in six years), parents are encouraged to arrange their own insurance cover as well. Where parents have this insurance, Ministry of Health may pay the excess on a claim, and the lost or damaged aid is not then counted as one of the three funded in a six year period.

Looking after your child’s hearing aids

Day-to-day operating and checking is the responsibility of the family. Check the hearing aids daily. Morning is often the best time to make sure they are in working order for the day ahead. Once a routine is established it can be very straightforward.

When a child is first fitted with hearing aids they will usually get a maintenance kit. This kit should include:

- a battery tester, to check whether batteries need replacing
- an air puffer, to clear any moisture in the hearing aid tubing
- a stethoclip, so parents can listen to the hearing aid at a level that is comfortable to them
- a wax tool, to clear wax from the opening of the inner tubing of the ear mould.

“A seagull flew off with it! I had placed it on a picnic table as Dylan had been pulling it out with his sticky ‘lunch’ fingers. I was on my own and changing Dylan on the grass, the seagulls were all over the table - and no doubt mistook the hearing aid for food.”

Dylan’s family
Hearing aid batteries and repairs are provided by the Deaf Education Centres; families from Taupo northwards should contact Kelston Deaf Education Centre while van Asch Deaf Education Centre supplies families from Taupo south, including the South Island. Contact your AODC or audiologist for more information.

As children grow older, encourage them to take more responsibility for checking and maintaining their hearing aids. Soon they should be able to learn how to detect and solve problems themselves. However, until they are able to do this parents or caregivers need to do this for them.

**Simple steps to check and maintain hearing aids**

**Step one: do a visual check of the ear mould**

a. Is the hole (sound bore) in the ear mould clear of ear wax? A total blockage will stop the amplified sound passing into the child’s ear canal. Partial blockage may reduce the sound or result in the hearing aid feeding back (whistling). Remove any wax with a wax tool.

b. Is the ear mould clean? Wipe it with a tissue or damp cloth to remove any grime. If a behind-the-ear ear mould is dirty, remove the ear mould from the hearing aid and wash it with warm, soapy water. Take care to remove all water by drying it and also using a puffer.

c. For behind-the-ear hearing aids only: Is the tubing from the ear mould to the hearing aid in good order? If there is a ‘kink’ in it or it is twisted, this will affect the passage of sound through to the ear. If you can’t remove the twist, you may need to replace the tubing.

d. Is the tubing free of any holes or splits? This will make the hearing aid cause feedback, and stop sounds reaching the child’s inner ear. Take the ear mould to an audiologist or AODC.

e. Is the ear mould inserted in the ear properly? The only part of the ear mould that should be sitting out of the ear is the tubing. The rest should lie at the same level as the rim of the ear.

**Step two: do a visual check of the hearing aid**

a. Is the hearing aid free of any damage or cracks? Damaged hearing aids may make the hearing aid work intermittently. It will need repairing.

b. Are the switches all in place? If switches are missing these need to be replaced.

c. Are the batteries clean and the battery compartment free of dampness or rust? Corrosion on the battery or in the battery compartment will look like powder. Throw away the leaking battery and try cleaning the battery contacts carefully with a cotton bud dipped in methylated spirits. If the hearing aid still doesn’t work, get it repaired.

d. For behind-the-ear hearing aids only: are the hearing aids on the correct ear moulds? Check the ear mould is shaped like the letter ‘C’ which matches the curve of the hearing aid – if it isn’t then it may be attached the wrong way around or to the wrong hearing aid.

**Step three: do a listening check**

To perform a listening check you will need to use a stethoclip (or special ear mould tubing supplied in your maintenance kit). Place one end over the opening in the hearing aid mould and the other end in your ear. This will give you the sound which is similar to the sound your child hears through their hearing aid.

When listening through the stethoclip, speak clearly into the microphone of the attached hearing aid using a range of sounds such as: ahh, ee, orr, oo, sh, sss, mmm, and/or count out loud. Take note of the sound quality when the aid is working well. The more times you do this, the better you will become at detecting poor sound quality.

a. Can you hear sound coming out of the hearing aid? Switch the hearing aid off and on a few times, and change the battery if necessary.

b. Is the volume control moving as it should? Note that sometimes your audiologist may have turned off the function of the volume control to prevent accidental changes when your child is wearing the aids.

c. Is the quality of the sound coming from the hearing aid clear? If you hear any static or distortion or crackling sounds the hearing aid needs to be checked by a technician.
Step four: do a speech check

Another way of checking the hearing aid is working well is to carry out a quick speech check. A speech test simply means you make these speech sounds while standing behind the child, and ask them to repeat them.

If the child has an aid with directional microphones, stand beside them when testing. But don’t always use the sounds in the same order, as children can learn which sounds to expect, rather than actually listening for them.

Use the sounds: ahh, ee, oor, oo, sh, sss, mm because they cover the frequency range of speech. Ask the audiologist which of these sounds your child should be able to hear, and at what distance.

Hearing aid tips

• You can check if the battery in a hearing aid is still working, by cupping your hand over the hearing aid at any time when it is switched on. If you hear a whistling noise the battery is still okay.

• Never connect a hearing aid to a stethoclip unless it is turned off as some aids are very powerful and the decibel levels could damage your hearing. Talk with your audiologist or AODC about checking an aid for a severe or profound loss.

• Hearing aids are individually programmed for the hearing in each ear. Some moulds have tiny wording in different colours (such as in blue and red) on the inside of the tubing to help you identify which is left and which is right. Hearing aids also have different serial numbers, so you can also write down the serial number for ‘L’ and ‘R’ when you first get them. Stickers can help your child know which is which, and some parents also use a pen to mark ‘L’ and ‘R’ on the aids to help them.

• Never use your mouth to blow through the hearing aid tubing, as your breath carries moisture and germs which will get into the tubing.

“Last summer we discovered the aids are fairly resilient. Dylan drove his play motorbike into a swimming pool and both ears survived the chilly submersion!”

Dylan’s family

FM SYSTEMS

(or Frequency Modulation Systems)

Personal FM/ Radio aids

While hearing aids and cochlear implants are very helpful, their benefit is often limited because of background noise, listener-speaker distance and reverberation. ECE centres and classrooms can be noisy places. Hearing the teacher is very important. Remember that hearing aids amplify all sounds, not only those that we want to hear. This is where personal FM devices are extremely useful.

How a personal FM system works

The person speaking to the child wears a microphone that is an FM transmitter. The child wears an FM receiver attached to their hearing aid or speech processor. The FM transmitter sends the speaker or teacher’s voice signal via radio transmission to the child’s FM receiver. The signal is then amplified in the hearing aid or speech processor.

The FM radio waves do not pick up other sounds as they are transmitted to the receiver, so the effect of using an FM microphone at a distance from the child is the same as if the talker was speaking close to the child. Some FM systems can be used without connection to hearing aids or speech processors, such as those used by children with auditory processing disorder.

Where to use an FM system

FM systems are particularly useful in ECE centres or schools, when there is a lot of background noise. An FM system can also be used in many other situations, for example, you can use it with young children at home or in the car, older children can use it when connected to the television, or they can worn by a lecturer at tertiary level.

FM systems provide huge benefits if used properly. Make sure your child’s teachers understand how to get the most out of their FM system. Your AODC can help with this – and every time your child has a new teacher, you’ll need to make sure they understand the system too.
Sound field or classroom amplification systems

How they work

The sound field system is made up of a microphone and transmitter worn by the teacher. Instead of a child wearing a personal receiver, one or several loudspeakers are usually located in the classroom. The sound field system delivers the teacher’s voice to an amplifier/receiver via infrared or FM signal carrier, and then via the speakers into the room for all the class to hear. The amplified sound is distributed evenly around the room. The setup is similar to a public address system. An advantage of the sound field system over a personal FM system is that a child does not have to actively co-operate by wearing a personal FM receiver to benefit from the increased sound signal of the teacher’s voice.

Benefits

These systems provide benefit to children wearing personal hearing aids and cochlear implants by providing an improved signal (teacher voice) to classroom noise ratio. However, the benefit may not be as great as that provided with the use of a personal FM system which delivers the teacher’s voice directly to the child’s hearing aid or cochlear implant speech processor. Soundfield systems are often also used for children who have hearing problems but who do not wear a personal hearing aid, such as some children with slight, mild, or unilateral hearing losses, and children with listening or auditory processing disorders.

Funding

Soundfield systems are funded by the Ministry of Education for specific hearing impaired children and students in schools. The Ministry of Education’s Assistive Technology service will consider funding personal FM or sound-field systems for students who are identified as having special learning needs (and therefore receive additional support for learning from their school or Ministry of Education special education services). The allocation of a personal FM system or sound field system must be considered as a part of a support package for a student with hearing loss (including auditory processing disorder) and not as the sole intervention strategy.

The Ministry of Health funds FM systems for ECE children and students in full time tertiary education under the age of 21. There may also be funding available for young people aged 16 years and over who meet the Ministry of Health eligibility criteria but who are not in tertiary education.

Your AODC will be able to assist with funding applications.

For more information see:

www.hearingresearch.org/ross/children_and_hearing_loss/classroom_sound_field_systems.php
www.nfd.org.nz/87/Sound-Fields

(NB: the second website mentions one product range of systems. There are other suitable products available in New Zealand and these can be discussed with your AODC.)
Cochlear implants are medical devices that bypass the part of the ear that is not functioning and stimulate the hearing nerve directly. Unlike hearing aids, which simply amplify sound, cochlear implants (CIs) provide useful hearing sensations by sending electrical signals to the nerve endings in the inner ear, called the cochlea.

Cochlear implants have the same aim as hearing aids—to enable a child to hear as much of the range of speech sounds as possible so they may develop useful listening, speech, and spoken language skills. They may be suggested for children with severe to profound hearing loss who do not get much benefit from hearing aids.

The cochlear implant is surgically implanted in the bone behind the ear and can provide useful hearing sensations by sending electrical signals to the nerve endings in the inner ear, called the cochlea.

There are some major advantages of cochlear implants that families will want to consider.

- Many children understand speech through hearing alone.
- Most children demonstrate an improved ability to communicate verbally, especially when combining lip reading with hearing.
- Many children develop advanced speech skills.
- Children have a greater awareness of everyday sounds in the environment, e.g., people calling, doorbell and telephone ringing, traffic noise.
FAQ: What is the difference between a hearing aid and a cochlear implant?

Hearing aids fit in the ear and make sounds louder so it’s easier to hear.

A cochlear implant (CI) bypasses the damaged inner ear or cochlea and electrically stimulates the auditory nerve directly to produce sounds that the person then needs to learn to recognise. A CI has two parts – one part is surgically implanted in the skull, and a speech processor is worn on the ear like a behind-the-ear hearing aid.

A CI is for someone with severe or profound hearing loss, or sometimes with ANSD (Auditory Neuropathy Spectrum Disorder).

Referral for a cochlear implant

Every child referred for a cochlear implant is carefully assessed by a cochlear implant team. The team will discuss the process with you, advising you and your family of the potential benefits and the likelihood of success. Only those who are suitable are recommended for an implant.

The surgery is a routine procedure performed by an ORL/ENT surgeon. While the surgery may only take one – two hours, it involves an overnight stay in hospital.

The success of the implant will vary. Children will undergo an intensive habilitation program that aims to teach the child to listen and speak with their cochlear implant. The success of this depends, among other things, on the age at implantation, the quality of habilitation services, and the input from the family on the development of the child’s language.

How a cochlear implant works
All CI systems consist of a surgically implanted device, a cable and transmitting coil, and an externally worn speech processor.

- Sound is received by the microphone at the top of the speech processor.
- Sound is analysed and digitised into coded signals by the unique internal microchip.
- The transmitter sends the code across the skin to the internal implant.
- The code is turned into electronic signals and sent into the electrode array.
- The electrode array stimulates the hearing nerve fibres in the cochlea which creates a hearing sensation.

**Cochlear implant services**
The Ministry of Health’s Disability Support Services funds cochlear implants for eligible children. This covers the cost of travel to hospital for surgery, and for a child to attend audiology assessment, switch-on and follow-up appointments at the relevant CI programmes based in either Auckland or Christchurch. Strict travel criteria apply.

**Programming**
The switch on and programming or ‘MAPping’ of the device happens two to three weeks after surgery. Cochlear implant services will be needed for the rest of the child’s life. MAPping or changes to the MAP will need to be made regularly for the first two years, and then yearly. Extra appointments may be needed.

**Habilitation**
Parents and children need to be committed to intensive therapy (habilitation) to help their child adjust to the new sound being provided via a cochlear implant. An auditory (listening) learning programme is the key focus. For some children visual communication such as NZSL and/or speech reading is also used.

The Ministry of Education funds habilitation services through the northern and southern cochlear implant programmes based in Auckland and Christchurch.

**Wearing the cochlear implant**
It is important for the child to wear the external part of the cochlear implant all day every day except when sleeping and in or near water. Eventually the implant will become so much a part of their life that your child will not want to be without it. Most children who have a cochlear implant can remove the external part and then swim freely. If your child has a cochlear implant and you have any concerns about them swimming, talk to your cochlear implant centre.

**Looking after a cochlear implant**
It is important your child hears as well as possible through their cochlear implant at all times. And, like a hearing aid, wearing a cochlear implant that is not working properly can be worse than not wearing one at all.

In New Zealand, maintenance and repairs of a child’s cochlear implant and supply of batteries is provided by your cochlear implant centre. However, day-to-day operating and checking is the family’s responsibility. Once a routine is established it can be very straightforward.

When your child is initially fitted, you will be taught how to use and maintain the implant. As your child grows older and more capable, encourage them to take on more responsibility for checking and maintaining it. Soon they should be able to learn how to detect and solve problems themselves. However, until they are able to do this, they will rely on you.

Cochlear implants should be checked daily. Morning is often the best time. Instructions for troubleshooting each processor will be given by the cochlear implant centre.

**Insurance**
Parents must arrange insurance cover for their child’s device and equipment as issued to them. Replacement of a speech processor wilfully damaged, lost, or stolen is the responsibility of the family. The replacement cost of a speech processor is around $10,000.
OTHER ASSISTIVE TECHNOLOGY

Communication technology is rapidly changing. The following are examples of devices that can assist with hearing in everyday life.

For up-to-date products go to: www.deafquip.co.nz and other suppliers, such as hearing aid companies.
Many kinds of everyday equipment can be adapted to help people with a hearing loss. Here are some examples.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Function</th>
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<tbody>
<tr>
<td>Alarm clocks</td>
<td>Wakes person using a strobe light or through a vibrating unit under the pillow.</td>
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<tr>
<td>Door/phone bell</td>
<td>A buzzer on the door causes a strobe light to flash inside. In some houses this is attached to wiring to indicate whether someone is at the door or the phone is ringing.</td>
</tr>
<tr>
<td>DVD subtitles</td>
<td>Movies usually include a language track with subtitles for deaf and hearing impaired viewers.</td>
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<tr>
<td>Email and instant messaging (eg with skype, facebook)</td>
<td>Allows written messages to be sent electronically.</td>
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<tr>
<td>Hearing aid/cochlear implant – compatible mobile phone</td>
<td>Mobile telephones that do not interfere with hearing aids or cochlear implants.</td>
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<tr>
<td>Cellphone texting</td>
<td>Short written messages.</td>
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<tr>
<td>Modified telephone</td>
<td>Volume control to increase the sound coming through the telephone. Some are able to improve sound quality through using the telecoil or ‘t’ switch on the hearing aid.</td>
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<tr>
<td>Smoke alarms</td>
<td>Same way as a normal smoke alarm but can trigger strobe light or cause a separate pager to vibrate.</td>
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<tr>
<td>Teletext television</td>
<td>Shows subtitles on many television programmes and enables the deaf person to view news and weather.</td>
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<tr>
<td>TTYs (teletypewriters)</td>
<td>Like a small typewriter with a screen or printer to display a message coming from another TTY.</td>
</tr>
<tr>
<td>Television/radio</td>
<td>Several systems are available to improve the TV or radio signal, either by direct connection to the hearing aid or FM system or via a separate headset.</td>
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Funding for assistive equipment
If you are a member of a parents’ group that belongs to the New Zealand Federation for Deaf Children Inc. you may be able to apply for a partial refund on assistive technology you buy for your child.
Funding may be available through the Ministry of Health for essential equipment such as a vibrating or visual alarm clock for a young person.

OTHER SERVICES

NZ Relay Service
TRS stands for Telecommunications Relay Service. NZ Relay Service is the name of the service that enables deaf and hearing impaired people to make telephone calls to normally hearing individuals using an operator who types the conversation so the Deaf person can read the words on their TTY display.
See www.nzrelay.co.nz
COMMUNICATION TIPS WITH AIDS

Communication when a child is using aids (with or without signing) relies on the child receiving a clear sound message or signal whenever possible. Here are some ways to help your child.

1. Make sure your child can see and hear you clearly
   - Show your face. When you’re in the same room, make sure your child can see faces and mouths so they get extra clues to what is being said. When reading aloud, facial expressions help to tell a story, so make sure the book doesn’t cover your face.
   - Lighting. Too much glare or insufficient lighting will make it difficult for a child to see your face and/or hands clearly if you are using NZSL to support listening.
   - Speak clearly but naturally. Exaggerating or shouting can make it more difficult for the child to understand speech. Shouting may overload the hearing aids, as a louder voice just gets distorted.
   - Don’t move about. This makes it difficult to lip read.

2. Reduce background noise when talking with your child
   - Turn down noisy appliances. Decrease the level of background noise such as the television or radio. If it may be heard at the same level as speech, it will be hard for a child to decide which noise they should be listening to.
   - Move where it’s quiet. Move away from noises such as other children or noisy motors such as fans, air conditioners, loud speakers, and traffic.
   - Keep close. Stay less than a metre away. However, use some judgment on this as standing too close to a person may not be helpful in some situations. One metre away from a child is often called optimum distance.
   - Watch surfaces. Be aware large rooms with hard surfaces that don’t have carpet or curtains etc. Sound bounces off hard surfaces, giving a more distorted signal and making it harder for a child to hear sounds clearly. A room like this is described as being reverberant.
   - FM system. Another way to reduce the impact of background noise is use an FM system. Ask the audiologist, AODC or Resource Teacher: Deaf about this.

3. Use simple spoken language
   - Parents naturally speak to babies in a special way. They simplify the way they describe things and often repeat back the sounds the baby has made. This adaptation of normal language is termed “motherese”. For guidance on the natural development process of speech contact a Speech-Language Therapist, AODC or Resource Teacher: Deaf.

4. Check for understanding
   - Check your child has understood what you have said by watching their response or by asking clarifying questions. If they have not understood, try saying the same thing again in a simpler way.