National Deaf Children's Society

How radio aids can help

For families

www.ndcs.org.uk


Our vision is a world without barriers for every deaf child.

Contents

We use the term 'deaf' to refer to all types of hearing loss from mild to profound. This includes deafness in one ear or temporary hearing loss such as glue ear.

We use the term 'parent' to refer to all parents and carers of children.

1 Introduction

Radio aids can benefit many deaf children by helping them to hear more clearly. This guide explains what the different types of radio aid systems are, and how they can help at home, in education or at work.

This guide also looks at how to care for radio aids and classroom soundfield systems – creating good listening conditions and acoustics for learning in the classroom.

Most of the equipment can also be used with other hearing technology such as bone conduction hearing devices, active middle ear implants, and auditory brainstem implants.

Joe's story

"Joe has had two cochlear implants since he was seven years old. Until recently he has relied on lip-reading and a portable soundfield system in the classroom, but by the end of school term Joe gets very tired as he has to work extra hard to understand the teachers.

"We decided to try a new digital radio aid system from the National Deaf Children's Society's Technology Test Drive loan service. When the system arrived it was very simple to set up and worked 'straight from the box'. In fact as soon as it was connected I was speaking to Joe and he could hear me immediately. At the end of the first day, Joe couldn't believe how clear the system was and the distance it covered. He went onto the football field with one of his friends at lunchtime to check the distance and almost managed the full length of the pitch before it cut off. The radio aid is interference free, even in areas with other electrical equipment, and in classrooms with high background noise the speaker's voice is still very clear. Both the transmitter and receiver are easy for Joe and his teachers to use.

"Joe has told us: 'The teachers' voices are very clear most of the time, even when my friends are talking in class. Lip-reading is much easier as there is no delay between the lip movements and hearing the teacher's voice'.

"One comment made by Joe's tutor was: 'Considering we are reaching the end of term Joe appears to be more relaxed in class and less tired for this time of year'."

- Michael, grandad of Joe (13)

Dylan's story

"Dylan has had a radio aid for two years now. He uses it at school with receivers attached to the bottom of his aids and it allows him to hear his teacher much louder than the background noise in the classroom. Since he got them his focus in lessons has improved enormously – previously he would be distracted very easily.

"When he is doing group work in class his teacher takes the transmitter and places it in the middle of the table. This helps Dylan to hear the other children and take part in group activities."

- David, father of Dylan (8)

2 What is a radio aid?

"The radio aid has made a huge difference to him. Everything has changed – his attitude and his behaviour."

A radio aid works with your child's hearing aid or implant to make it easier for them to concentrate on the sounds or voices they want to hear.

A radio aid system is made up of a transmitter and a receiver. The transmitter picks up sounds and sends them wirelessly to the receiver so your child can hear them clearly over background noise. They are used widely in education to help deaf children hear teachers and other pupils better. Most wearers of digital hearing aids and implants can hear quiet speech in ideal listening situations. However, most speech isn't heard in ideal listening situations so there will be times when your child may struggle to hear.

When and where radio aids can help

- When there's background noise.
- If sounds are bouncing off hard surfaces around the room (also known as reverberation) leading to distortion of sound or echo.
- When there's distance between the person speaking and the deaf child.

Radio aids can help overcome these problems. Find out more about other situations when radio aids might be useful on page 24.

You can find out more about creating good listening environments online: www.ndcs.org.uk/acoustics.

3 Who can a radio aid help?

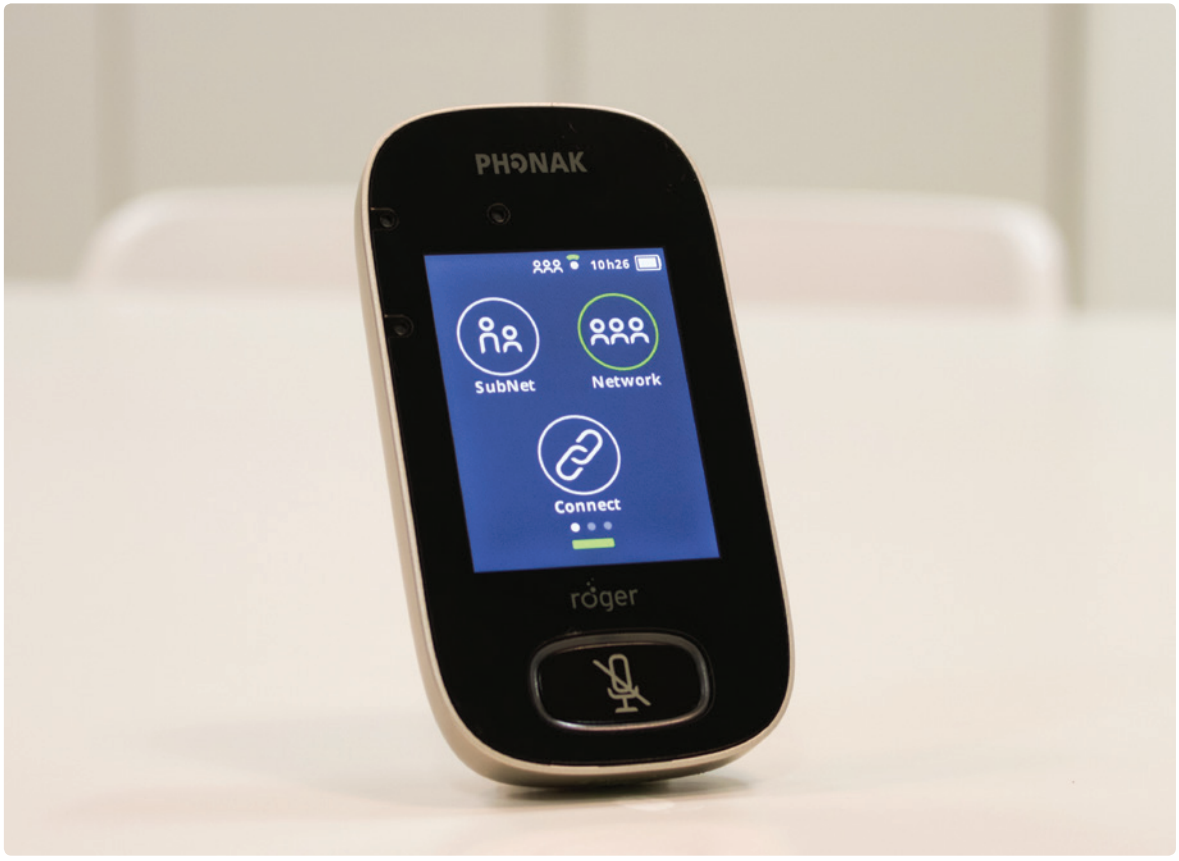
"Classrooms are loud and busy places. Using a radio aid helped my daughter feel involved."

Radio aids are usually used with hearing devices. They are useful for children who have:

- hearing aids
- cochlear implants
- bone conduction hearing devices
- other implantable devices.

A radio aid can also be useful for children who don't use hearing aids or implants, for example:

- Children with a mild hearing loss or unilateral hearing loss (one-sided deafness).
- Children who have difficulty concentrating, particularly in noisy settings, such as children with an auditory processing disorder (APD) or attention deficit hyperactivity disorder (ADHD).

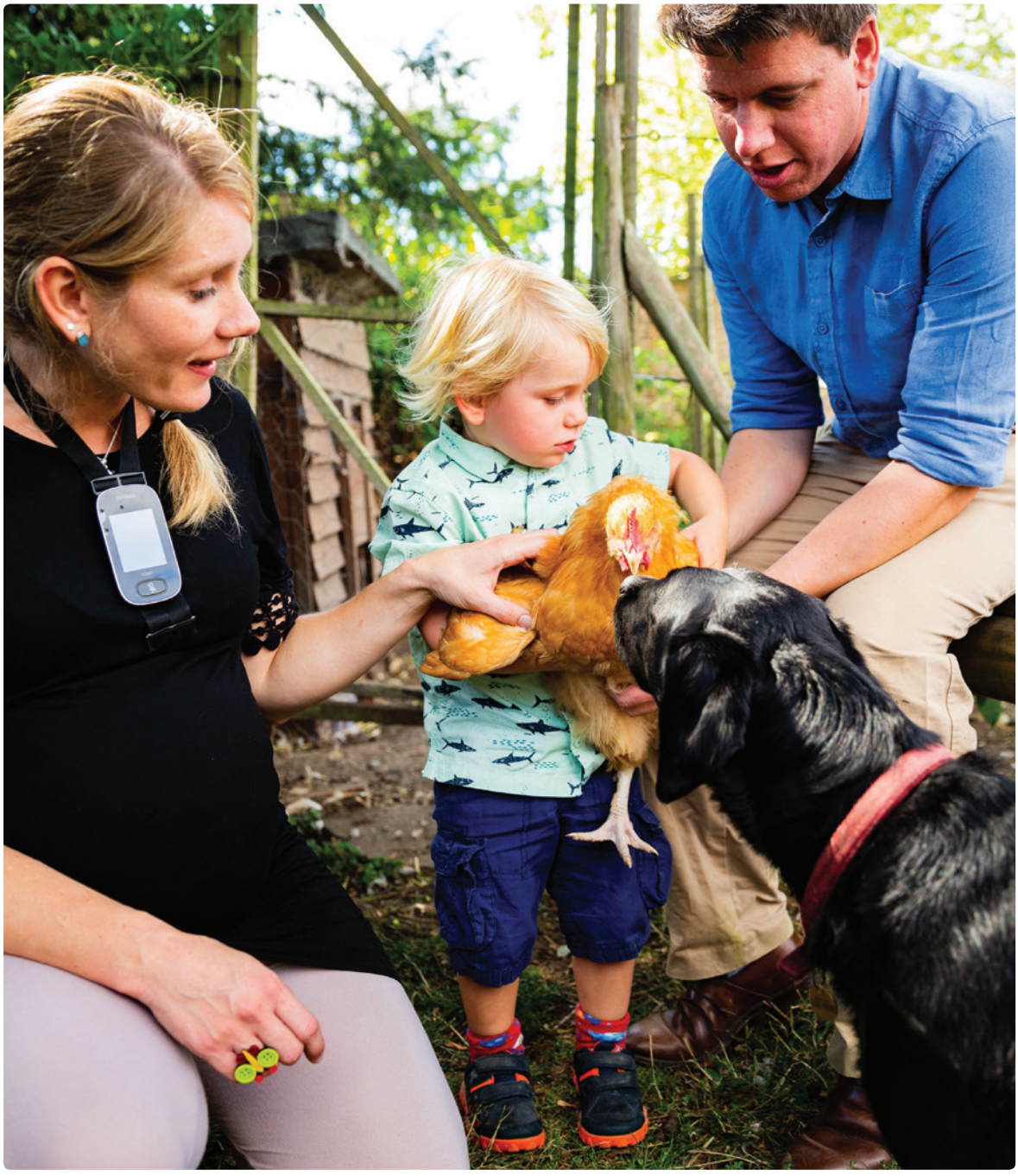


A Phonak Roger Touchscreen Mic transmitter

Your audiologist or Teacher of the Deaf should give you information on how to use a radio aid. They should be able to explain how to make sure small parts are safe and secure and advise on suitable tamper-proofing options.

Go to page 18 for more information on using radio aids if your child doesn't have hearing aids or implants.

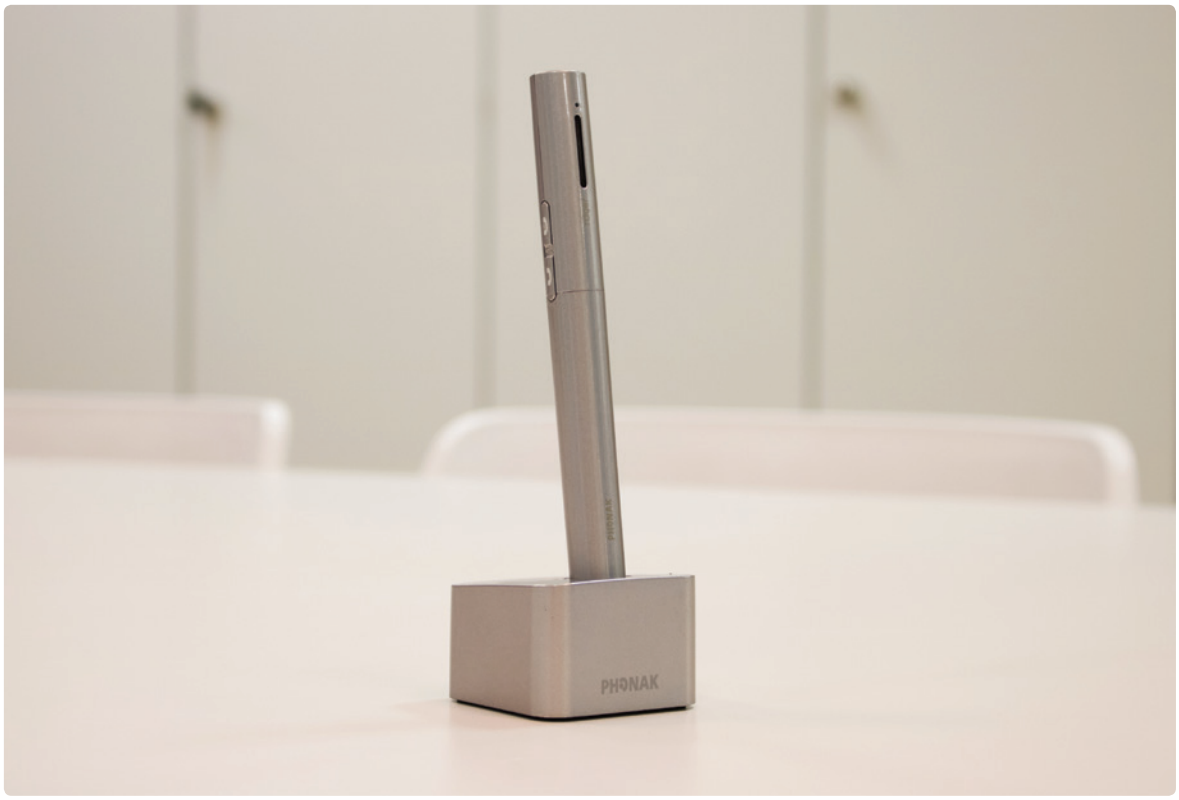
For more information on unilateral hearing loss and auditory processing disorder: www.ndcs.org.uk/unilateral and www.ndcs.org.uk/apd.



4 The parts of a radio aid

"He doesn't mind going up to the teacher to hand over the transmitter because he knows he needs it in the class with all the children making noise."

A radio aid system is made up of a transmitter and a receiver. There are two different types of radio aid transmitters and receivers: digital and FM. The two systems are not compatible with each other.



A Phonak Roger Touchscreen Mic transmitter

Transmitter

This takes the sound the child needs to hear, converts it into a radio signal and sends it to the receiver.

Most radio aid transmitters can be worn by the speaker (usually a teacher or parent) around their neck using a lanyard or tie-clip. However, many transmitters can also be passed around a group, put on a table pointing towards the speaker or used like a conference microphone (see page 10).

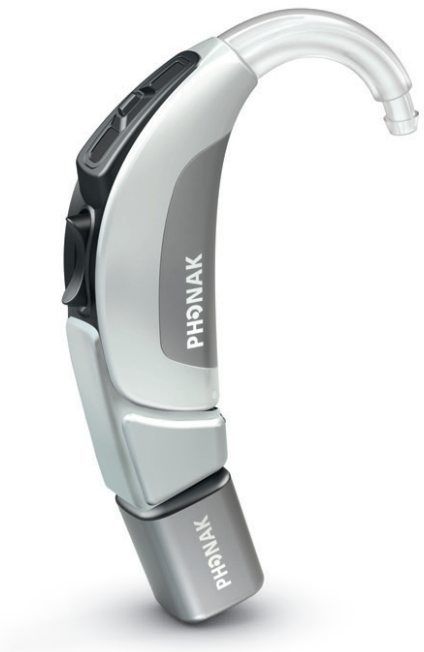
Most transmitters will automatically limit the volume of the radio aid when there's a very loud sound close to the transmitter.

Receivers

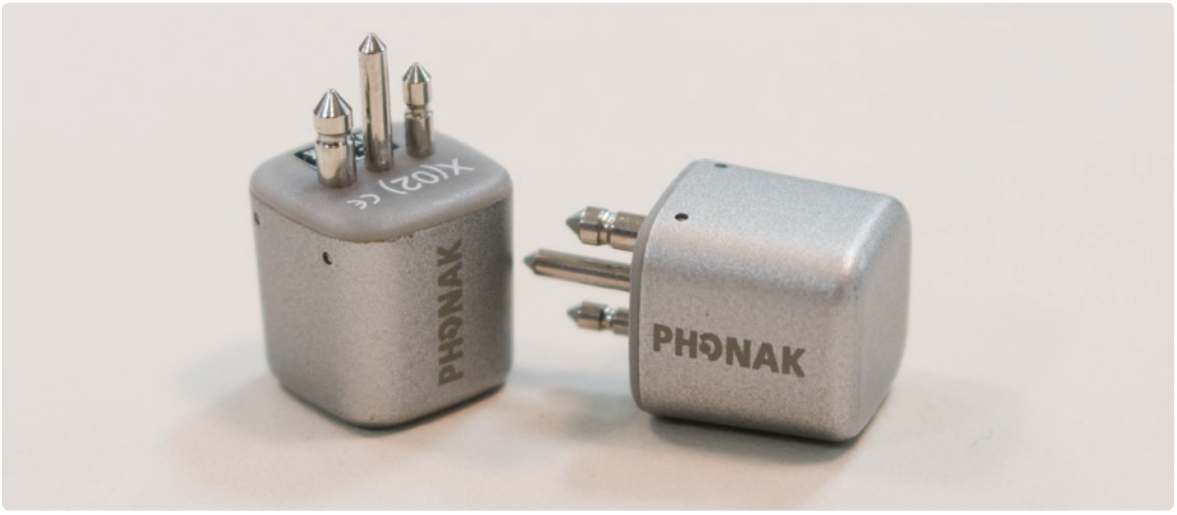
The child wears the receiver (if they have one hearing aid or implant) or receivers (if they have two hearing aids or implants) depending on the devices they use. The receiver picks up the signal from the transmitter and changes it into a sound that the child can hear. Most receivers have a volume control, which will be set by your child's Teacher of the Deaf or educational audiologist using specialist software. Some body-worn receivers may have a lockable volume control, although older children can adjust these themselves.

There are five types of receivers:

1. Ear-level receiver units that attach to hearing devices, often via a direct input shoe (see page 11).
2. Integrated receivers which are built into the hearing aid or cochlear implant (see page 15).
3. Neckloop receivers which require the T programme (see page 13) to be set on the child's hearing aids or implants.
4. Body-worn receivers which are usually worn by the child in a chest harness or bumbag around the waist. Some body-worn receivers aren't wireless and may not be a suitable option for younger children.
5. Ear-level receivers that let children who don't have hearing aids or cochlear implants still benefit from using a radio aid.



A hearing aid with an ear-level reciever connected by a direct input shoe.



A Phonak Roger X receiver

Microphone

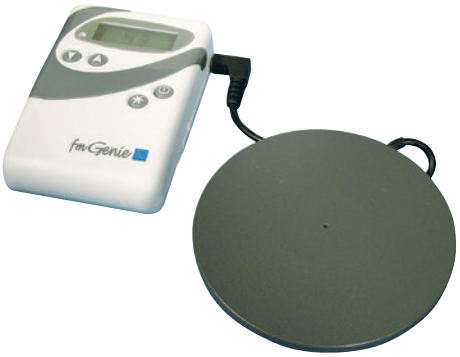
Radio aids can have different types of microphone, built in and external:

Built-in microphones: all modern transmitters have a built-in microphone. Most have different settings, such as omnidirectional, which pick up sounds equally from all directions, or directional, which picks up the sound from one direction.

Often the microphones automatically search for the best setting, for example if the transmitter is worn on a strap around the teacher's neck it will switch to the direction setting to just pick up the teacher's voice. If the transmitter is placed on a table in a group discussion it will switch to omnidirectional and your child can hear what the others are saying.

Tie-clip and neck-strap microphones: some radio aids can be used with a microphone on a lead. The microphone can be clipped to piece of clothing (tie-clip microphone) or worn on a cord around the neck (sometimes called a lavalier microphone). It should be worn 15cm to 20cm from the mouth.

Head-worn microphones: these can be an effective option, as the microphone stays close to the mouth of the person speaking even when they move their head.



A conference microphone attached to an FM transmitter

Conference microphones: these are hand-held, portable microphones and conference microphones which can be useful in school when children are spending time working in small groups.

Hand-held microphones: these may be used in a classroom and linked to radio aids and soundfield systems (see page 27). These are useful for group work and discussions as they can be passed around.

Did you know?

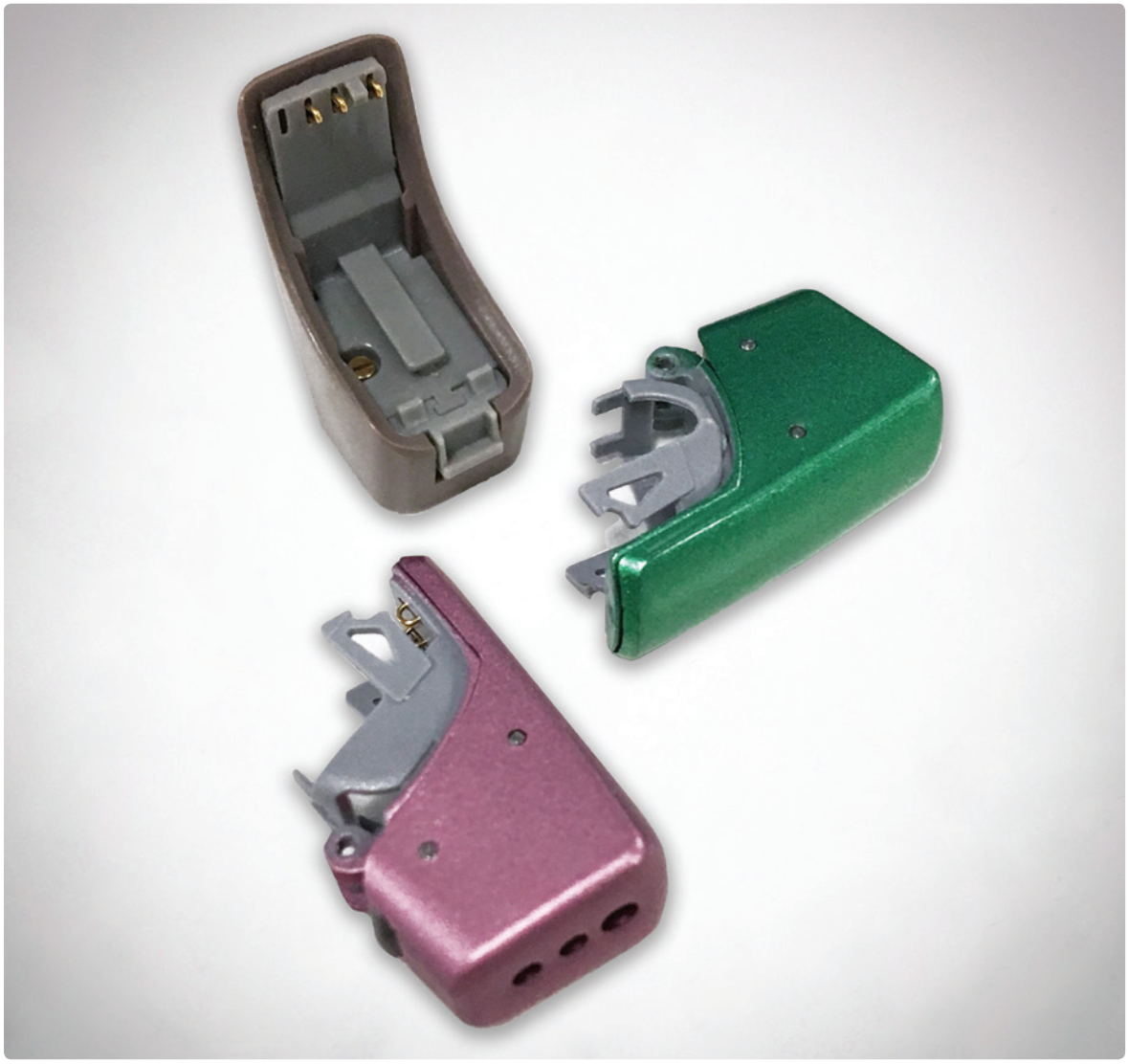
A rechargeable battery can be recharged between 500 and 800 times which saves money and helps the environment. However, charging times will take longer as the battery gets older.

5 Using a radio aid with hearing aids

There are three main ways to use radio aid receivers with your child's hearing aids: direct input, neckloop or integrated receiver.

Direct input: ear level receivers and direct input leads

Many receivers can be used with a direct input shoe. This can be attached to the bottom of the hearing aid and an ear-level receiver can be plugged into it. Pin connectors on the radio aid receiver fit into three small holes on the bottom surface of the shoe. This can be an ear-level receiver or a direct input lead connected to a body-worn receiver. The electrical signal from a radio aid is then fed wirelessly into the hearing aid, giving a consistent and high quality sound.



Direct input shoes

Getting direct input shoes

Each hearing aid will need a specific kind of shoe and it's best to talk to the professional working with your child to find out which product is most suitable. Shoes are usually provided by your child's audiologist or Teacher of the Deaf.

If you are going buy a shoe yourself you should be aware of the following features:

- Shoes produced by a manufacturer may fit different hearing aids from their range.
- Different hearing aid models sometimes have similar sounding names, so make sure that the product you choose will work with your child's hearing aids.
- If you are using a shoe then your child's hearing aid is no longer tamper-proof (see page 15). If you are using an integrated receiver then it should be possible to secure the battery compartment so that it is tamper-proof and young children can't access it.

Programming radio aids

Often your audiologist will need to activate a listening programme so your child can use their hearing aid with a shoe and an ear-level receiver or with the direct input leads on a body-worn radio aid. An ear-level receiver will plug into the shoe attached to the hearing aid. This is compact, and many children prefer it because there are no wires so the system is more discreet.

If your child has a body-worn receiver this will connect to the hearing aid shoe using a direct audio input lead. If your child uses one hearing aid, there will be a single direct audio lead (monaural). If your child wears two aids, there will be two leads (binaural) in a 'Y' shape, connecting to both hearing aids. The wearer may need to choose the direct audio input programme once it's activated, or the hearing aid may default to the radio aid setting when the shoe is fitted. You can switch between programmes by pressing a button on your hearing aid/sound processor, or by using an app. Speak to your audiologist for guidance on how to switch between programmes if you are unsure.

The default programme is particularly important for children who can't manage their own aids, as it makes sure that they're listening on the most appropriate programme. You can set up the direct audio input programme to listen using the radio aid only (FM only) or to listen using the hearing aid microphone as well as the radio aid (M+FM). M+FM is often used to help young children to hear other children in the classroom and hear the teacher's voice clearly.

Neckloop receiver

A neckloop is a wire that your child can wear around their neck. It can be used as an alternative to direct audio input and a radio aid receiver.

The child's hearing aid is switched to the T programme (also called the T setting, telecoil or just T) or M+T programme (part hearing aid's microphone, part T setting) so they can hear sounds from the radio aid via the neckloop. The T programme picks up changes in magnetic fields from loop systems or neckloops, and converts these into sounds in the hearing aid or implant.

In most cases, the T programme won't automatically be set on your child's hearing aid or implant. You should ask the audiologist to set it up if your child wants to use a radio aid neckloop or any other loop system.

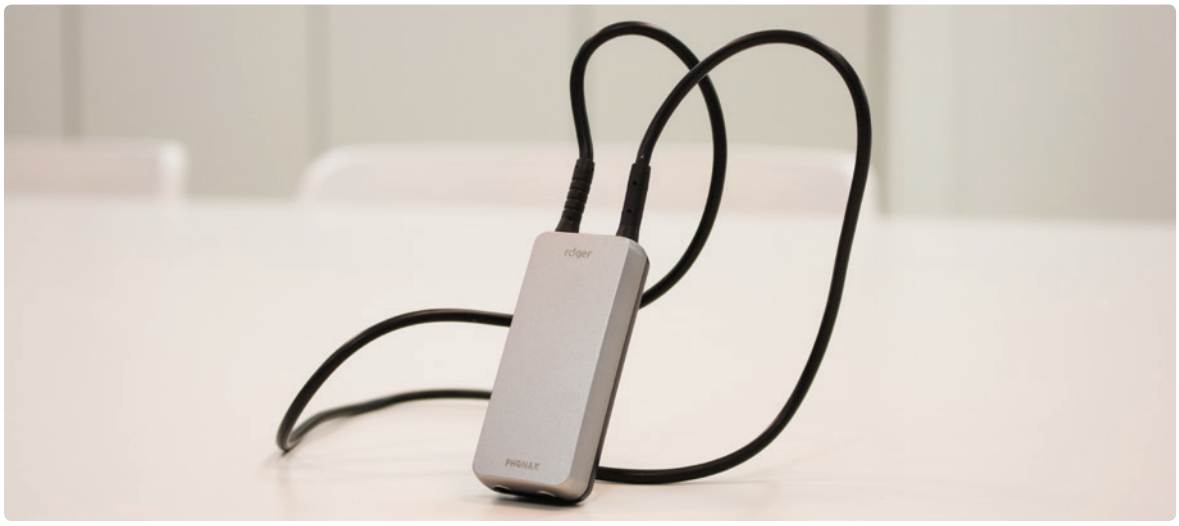
The T programme may be set up to listen using just the telecoil (T only) or to listen using the hearing aid microphone and the telecoil (M+T). M+T is often used when the wearer wants to hear sounds around them as well as from the loop system.

If your child's hearing aid only has the T programme, the hearing aid microphone will be switched off. This means that your child won't be able to hear their own voice or nearby sounds just the sound picked up by the radio aid.

The quality of the sounds a child can hear when using a neckloop receiver with a radio aid can be affected by the following:

- The position of the neckloop – the signal may become weaker or stronger if the position of the neckloop changes as your child moves. It also depends on the position of the hearing aid in relation to the neckloop.
- Electromagnetic interference – this is caused by unwanted magnetic fields that are produced by nearby electrical equipment such as fluorescent lights, pylons or computers. This can mean that your child picks up uncomfortable buzzing noises through their hearing aids.

Neckloop receivers are easy to set up and use. They are popular with children who like to wear the neckloop under their clothing and with children whose hearing aids don't have the direct audio input option, for example in-the-ear hearing aids.



A neckloop receiver

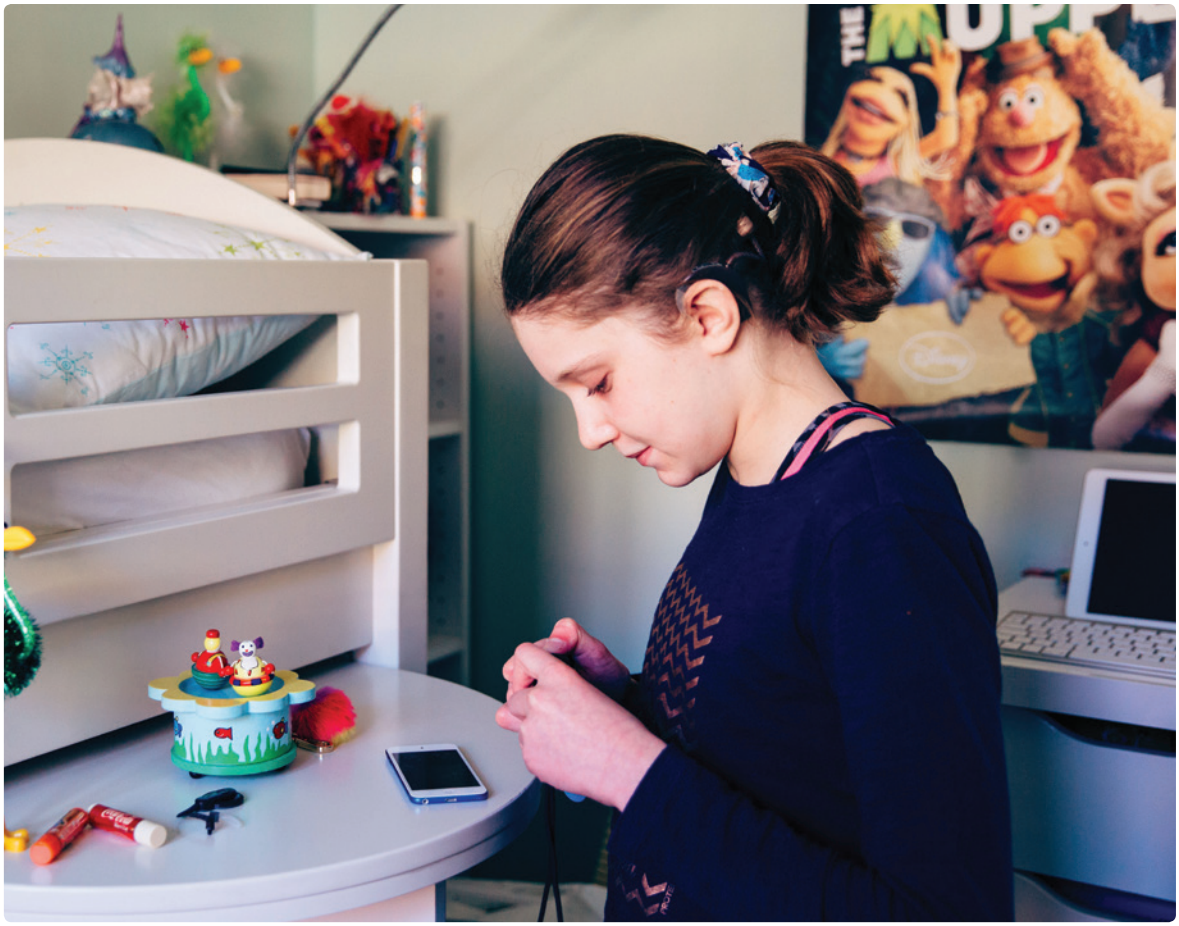
Younger children using a neckloop

Neckloops aren't always suitable for younger children for safety reasons and also because they might not be able to tell you about problems with sound quality or interference. If your child is using a neckloop, check it frequently to make sure it's working properly.

Some younger children don't have the T programme activated on their hearing aid in case it confuses them. Your child's Teacher of the Deaf will be able to advise on whether a neckloop would be suitable.

If you're thinking about a neckloop for your child it's important that someone carries out a listening check using a loop listener or through your child's hearing aid when switched to the T programme. A loop listener allows someone to hear the sound coming from a loop system, as if they are wearing hearing aids on the Tsetting. That can be used to check loop systems are working correctly. Checks should be carried out in all of the rooms where the radio aid will be used.

"Now she can hear everything, even when the teacher turns around or she sits at the back of the class. She has gone up a level in every class."



Integrated receivers

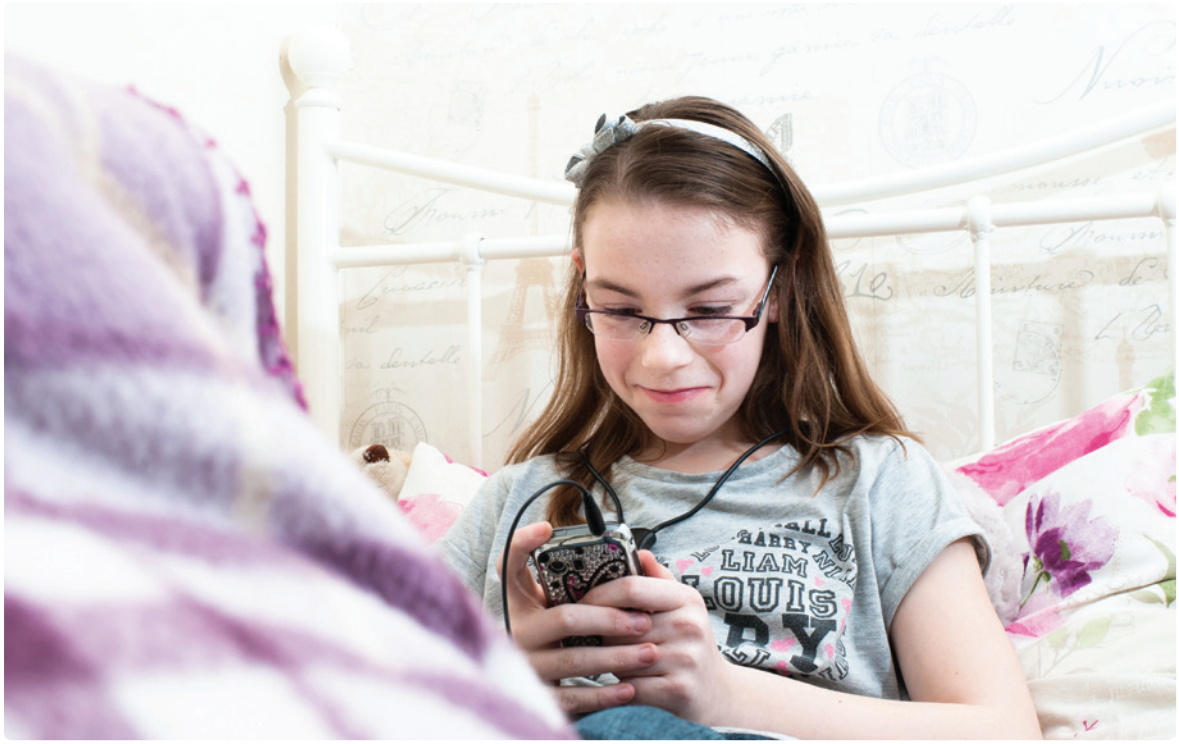
Radio aid manufacturers now offer integrated receivers as an alternative to using an audio shoe and a receiver. An integrated receiver does not mean that it is internal to the hearing aid. Instead, it is a combined battery drawer and FM receiver that is fitted as a single unit to the hearing device. Essentially, it means there is less risk to a child removing and/or losing parts.

The integrated receivers can be colour-matched to the hearing aid and usually come with water resistant properties.

Integrated receivers are available with tamper proofing options that allow the integrated receiver to lock securely to the hearing device, and reduce any risk posed by small parts. Integrated receivers will make hearing aids and sound processors slightly heavier, but they can be taken on and off when required.

No pre-school deaf child should ever be left unsupervised while wearing their hearing aids, whether at home or in nursery. When integrated receivers and/or tamper proofing options are not available for a child under 3 years who requires a radio aid, parents must be given clear information on the risks and benefits of using the technology, and steps they need to take to ensure their child is able to use the technology safely.

Parents should be able to make an informed choice on whether or not to use radio aids based on the information received and fully understanding the supervision needs required.



6 Using a radio aid with cochlear implants and bone conduction hearing aids and implants

Using radio aids with cochlear implants is widely recommended.

Like most hearing aids, cochlear implants usually have direct audio input which means the electrical signal from the radio aid is fed straight into the implant processor. The radio aid can be connected to the cochlear implant processor by using an integrated receiver, ear- level receiver, neckloop receiver, or a direct input lead.

If your child's cochlear implant has a T programme, they could use a radio aid with a neckloop receiver which doesn't require any extra accessories.

Ear-level receivers either attach to a socket in the base of the processor or to a three pin connection on the rear of the processor. Your child's auditory implant centre, audiologist or Teacher of the Deaf will recommend the appropriate type of receiver as this depends on the processor model. Some children prefer to use ear-level receivers as they're more discreet and there aren't any wires to get in the way.

Some processors will need to be set up with the radio aid at the implant centre. Others can be set up at school by a suitably trained professional such as your child's Teacher of the Deaf or a trained member of support staff. Your implant centre or Teacher of the Deaf will be able to advise you.

Cochlear implants and radio aids can't be checked or tested in the same way as hearing aids. You or your child's teacher can check the radio aid by following the guidelines on page 33. For most cochlear implants, earphones are available that allow a parent or teacher to listen to the sound received from the radio aid. However, this only allows you to hear the sound from the radio aid before it's processed, so you can't check that the complete system is working properly.

Ask your child regularly how well they think the radio aid system is working. If your child can't tell you about any problems, you or a teacher will need to look out for any changes in the way your child behaves or responds that may suggest there is a problem.

"When we got it she said: 'Mummy do you always talk that loud?' I knew that she would tell me if it worked or not and she said from day one it works. It's brilliant."

For more information about using a radio aid with your child's cochlear implant, contact your implant team or our Helpline on 0808 800 8880.

Using radio aids with bone conduction hearing aids and implants

If your child uses a bone conduction hearing aid or implant they will likely benefit from using a radio aid.

Bone conduction hearing aids can be used with radio aid receivers, though sometimes in a slightly different way than conventional hearing aids. Your child's audiologist should set up the combined hearing aid and radio aid system for you. Your child's audiologist or Teacher of the Deaf will be able to provide information about the right receivers for your child's implant.

See www.ndcs.org.uk/boneconduction for more information on bone conduction hearing devices.

7 Using a radio aid without hearing aids or implants

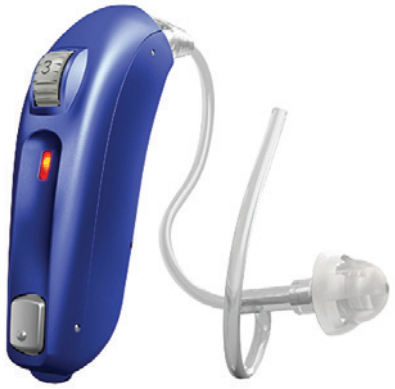
If your child doesn't wear a hearing aid or implant or they are unable to then they may still benefit from a radio aid if they have mild, moderate or unilateral hearing loss.

It can also be beneficial for children with auditory processing disorder (APD), attention deficit hyperactivity disorder (ADHD) and other specific learning disabilities or those who struggle to concentrate.

Behind-the-ear receivers

Personal radio receivers consist of an all-in-one receiver and earphone and work in the same way as an ear-level radio aid receiver. These products are designed to be used by people with a mild to moderate hearing loss only so they don't produce a high volume output that could cause hearing damage.

They are worn just like a conventional hearing aid. The device receives the radio signals from the radio aid transmitter and converts them into sound. It's easy to check that this device is working correctly because it produces an audio output, but like all other devices, it should be set up for your child by an audiology professional.



A conference microphone attached to an FM transmitter

"My son cannot wear a regular hearing aid, so it was suggested he tried [a personal radio aid receiver]. He loves it, he feels like a spy in James Bond."

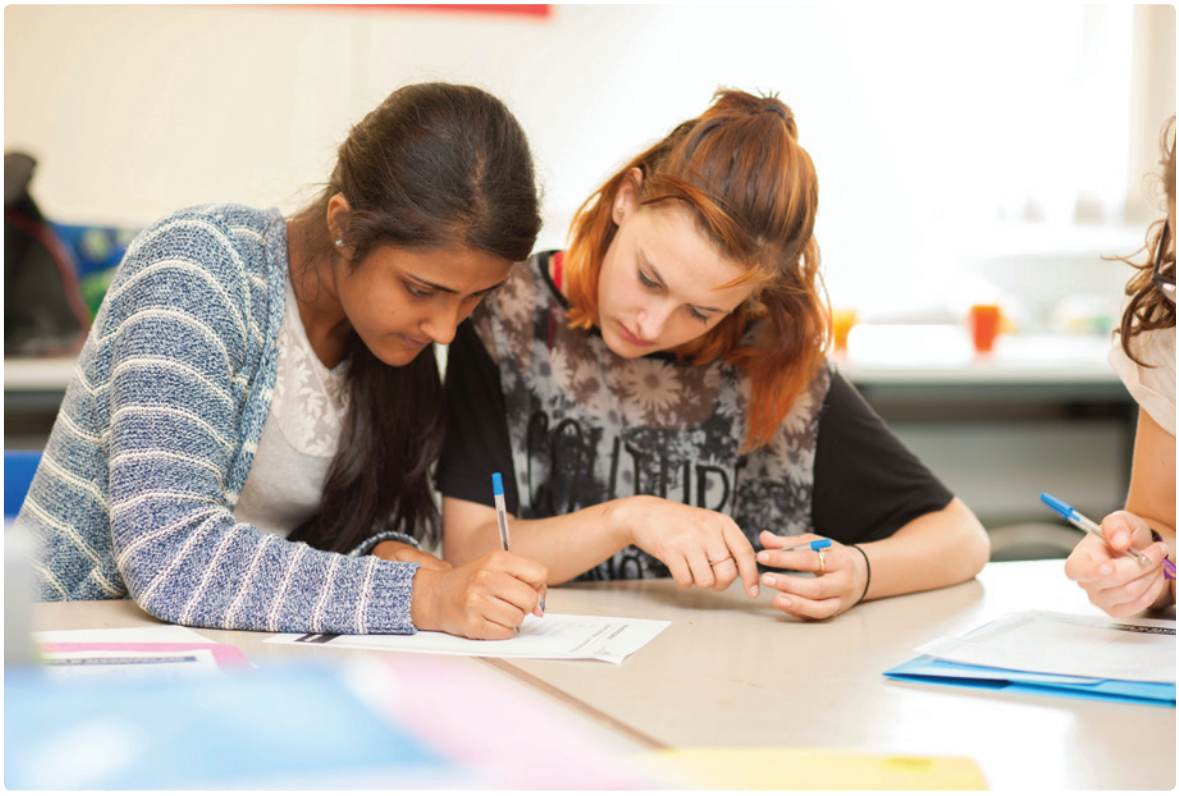
Headphones

Headphones can be connected to some body-worn or neckloop radio aid receivers. Before your child uses a radio aid in this way, their audiologist or Teacher of the Deaf should make sure the sound levels are right for your child. If your child is young, you might want to lock or limit the volume control so that they can't alter the sound level once it's been set.

A wide range of headphones are available and can be used by children with any level of hearing loss provided the volume is not too high, as this might damage their hearing. The manufacturer of your radio aid may supply their own headphones or recommend others. The headphones should be lightweight so that they are comfortable to wear for a reasonable period of time.

Portable soundfield systems

A portable soundfield system is a radio aid receiver with an amplifier and a loudspeaker attached. This is all contained in a portable case, which makes it easy for your child to take it from class to class and put on their desk. For more information about soundfield systems see page 27.



Did you know?

Headphones can be plugged into body-worn radio aid and neckloop receivers.This is great if a child is unable to, or doesn't want to, wear their hearing aids.

8 Special features of radio aids

Mute controls

Mute controls are useful when a teacher is switching from speaking to the class to speaking to individuals or small groups. If the teacher is saying something that your child doesn't need to hear then the teacher can mute their microphone temporarily by pressing a button.

In a busy classroom, it can be difficult for a teacher to remember to use the mute button, but it's important they do otherwise your child may feel overwhelmed by hearing more information than they need to.

Connecting to other sound sources

Most radio aid transmitters have an auxiliary input socket. This means the transmitter can be connected to devices including a TV, computers, media devices, electronic keyboards or equipment in a school language laboratory. This can be a very useful feature both in classrooms and at home. Radio aid manufacturers produce a wide range of leads with commonly used connectors.

"When we plugged it [radio aid] into the TV his face lit up as he was able to hear the television properly for the first time and not have it turned up full blast."

Multi-talker networks

Multi-talker networks allow multiple microphones to be wirelessly linked to a single transmitter. This is particularly useful if there is more than one teacher or teaching assistant in the classroom. It can also be used with a pass-around microphone during classroom discussions.

External microphone input

Most radio aid transmitters have an external microphone input socket. This allows you to connect an external microphone, such as a conference microphone to help during group activities or other situations. A wide range of microphones are available (see page 10).

Bluetooth

Most of the latest radio aid transmitters are fitted with Bluetooth technology.

This makes it easy for your child to use the transmitter with a Bluetooth-enabled mobile phone to make voice calls. Some could also be used to listen to music from a Bluetooth-enabled phone, laptop or tablet.

Control locks

Once a radio aid is set up for a young child to use, the controls shouldn't be adjusted. Many radio aids have locks on the volume control and other controls.

9 Radio aid technologies

There are two radio aid technologies available: digital and FM. They have different ways of sending and receiving sound.

Digital radio aid systems

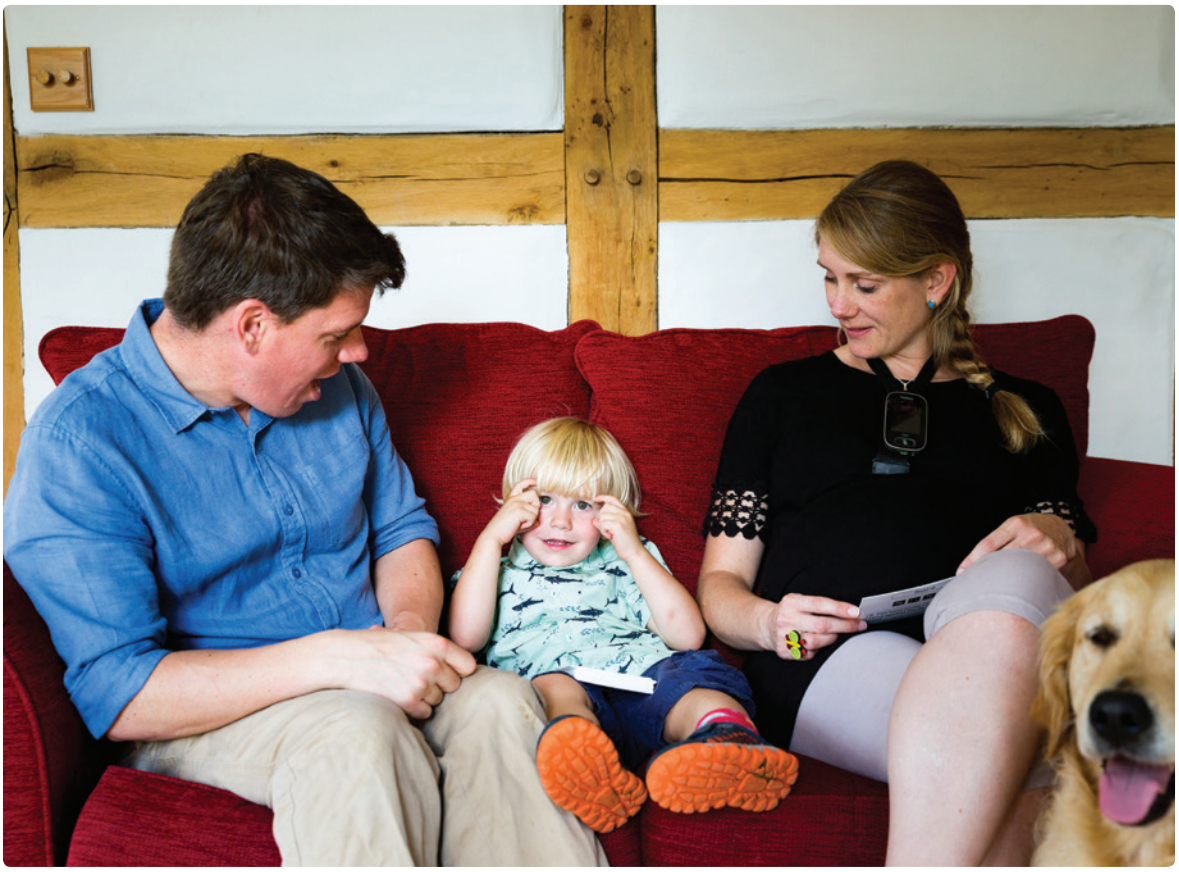
Digital radio aids transmit high frequency digital signals instead of analogue FM signals.

They are easier to set up than analogue FM and frequency management is far simpler. In a school environment it's easier for teachers to cope with lots of children in different rooms wanting to use radio aids.

Another benefit is that they minimise the chances of interference with other radio aids or external sources such as radio stations. Digital systems have been designed to give clearer sound compared to FM radio aid systems, especially in noisy environments. They automatically adjust sound settings according to the input from the microphone and background noises.

Digital radio aid systems use the same digital technologies as the most up to date soundfield systems. This makes it easier to combine using them with soundfield systems and other sound sources such as music players, video, computers or interactive whiteboards.

"Now there are no barriers to his concentration. He's calmer and the other children are happier to interact with him."

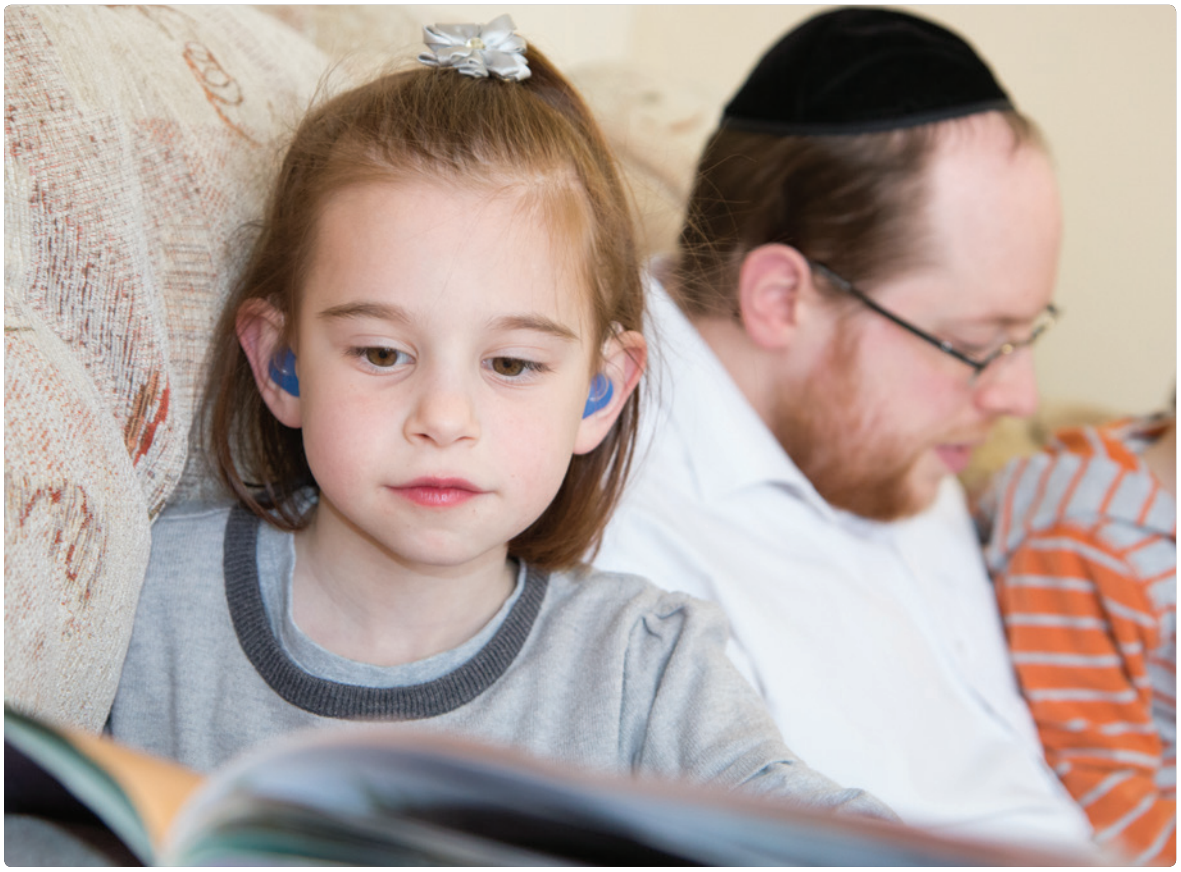


FM radio aid systems

Some systems use FM radio frequencies to transmit signals from the transmitter to the receivers.The transmitter and receivers must be on the same frequency for them to work. You can change this frequency on most radio aids, just like tuning a radio in to another station. There's no limit to the number of receivers that can pick up the signal from a radio aid transmitter in one classroom as long as they are all on the same frequency. When children in different classes want to use radio aids they will need to have them set on different frequencies to avoid hearing the wrong information or getting interference.

FM radio aids have been known to receive unwanted signals, such as a local radio station or taxi company. This doesn't happen very often, but if it does you can try changing the radio aid to another frequency. If this doesn't solve the problem, contact your Teacher of the Deaf or local hearing impaired or sensory support service. If the problem continues, you should ask for advice from the manufacturer.

All FM radio aids use the same group of frequencies, so one manufacturer's transmitter should work with another's receivers and vice versa. However there are differences in the way that radio aid systems work. If you have a transmitter and receiver that aren't the same make and technology you may lose some of the functionality of the systems and you may not be able to use some of the features. Any mixed system should be fully tested by a Teacher of the Deaf or other professional by using a hearing aid test box (also known as a hearing aid analyser) before your child uses it.



10 Using a radio aid at home and during out of school activities

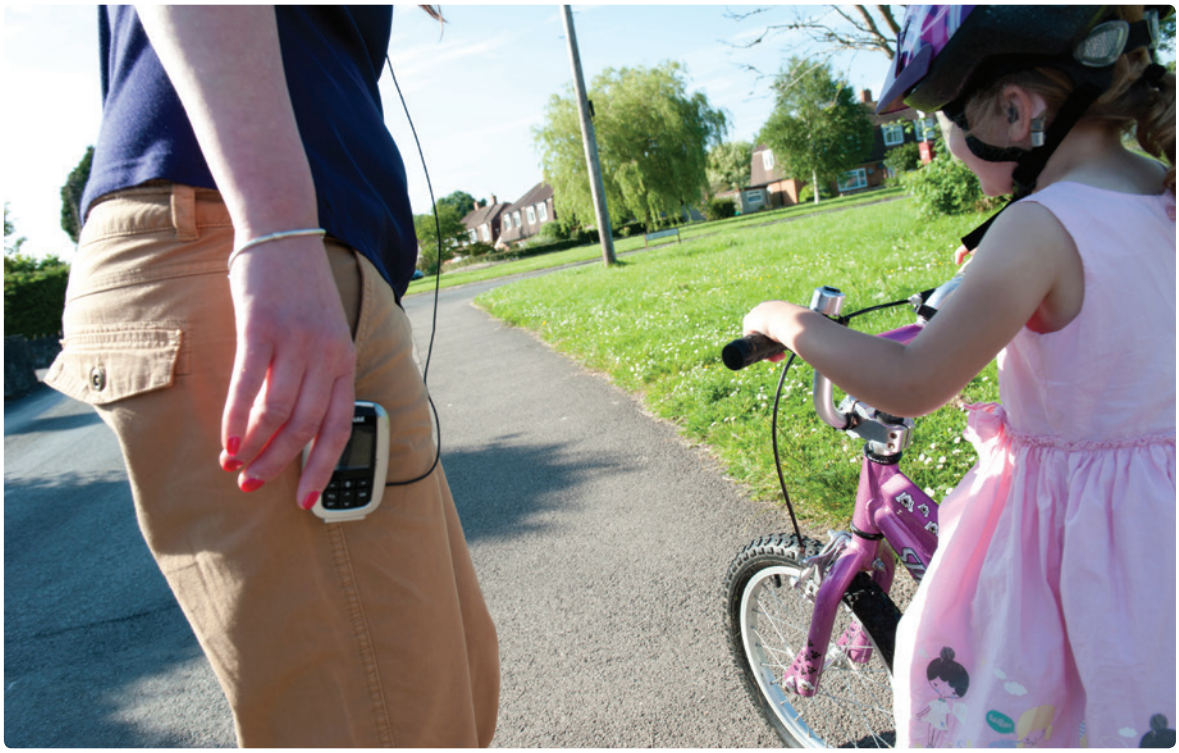
With babies and pre-school children

The first few years of a child's life are a time of rapid and important development. During this time the foundations for communication are laid and for all children, language and interaction with their parents is critical to success in this area.

Hearing is essential for learning spoken language and the earlier a child can hear speech, the better their opportunity to learn to listen and talk. However the crucial early development of speech and language usually happens in everyday situations where the hearing conditions can be difficult. This might be when children are playing outside, in the car or pushchair or even during day-to-day activities around the house.

As babies start to sit, crawl and walk, they become more independent from their parents, maybe playing a little further away in a room or moving from a car seat or pushchair which faces the parent, to one which faces away; this increases the listening distance and the parent's voice is no longer the dominant sound.

Babies and young children under the age of four spend almost a quarter of their day in noisy environments. For a young child who has a hearing loss, understanding speech in noise or at a distance is challenging and this has the potential to impact the development of their spoken language. Using a radio aid is one way to help overcome this by transmitting the speaker's voice directly to receivers on the child's hearing technology to improve the Signal-to-Noise Ratio (SNR).



When using radio aids with deaf babies and young children it is important to make sure that they are properly configured and tested regularly to ensure they are working correctly, as they won't be old enough to let an adult know if something is wrong. find out more about looking after and checking a radio aid system is available on page 30.

When a hearing aid is set on the radio aid programme, its microphone will be switched off and your baby will only hear sounds coming from the radio aid transmitter. Switching off the microphone should reduce feedback, particularly in situations when whistling is an issue, such as when your baby is:

- lying in a cot
- being breast/bottle-fed
- cradled in your arms
- sitting in a car seat, pram or pushchair.

However, turning off the hearing aid microphone will mean that babies and young children can't hear themselves speaking or making sounds (vocalisations), something that is important for their speech development. Also, young children won't be able to experience different listening environments where they can develop important listening skills, such as singling out one speaker in a group, understanding speech in background noise, and working out which direction and how far away a sound is (localising).

Exposure to the incidental listening that comes from their environment is important to deaf children's development, for example, overhearing others' conversation and learning from it. Therefore they need to move on from using the FM programme as soon as possible to an FM+M programme which allows the hearing aid's microphone to work at the same time. This will mean that your child can hear other children and sounds as well as the primary speaker (such as a nursery teacher) through a radio aid at a clear and consistent level.

Other situations where radio aids can be useful for deaf pre-schoolers include:

- nursery or pre-school environments
- story time/reading
- shopping
- in the park
- in a pushchair
- in the back seat of the car
- in a bike child seat
- learning to ride a bike.

"The first day...the nursery teacher was wearing it [radio aid], my daughter was in the other room washing her hands and the teacher was singing a song. My daughter came back in to the room singing the same song."

Using a radio aid with school-age children

A radio aid can be useful at home and when out and about for school-age children.

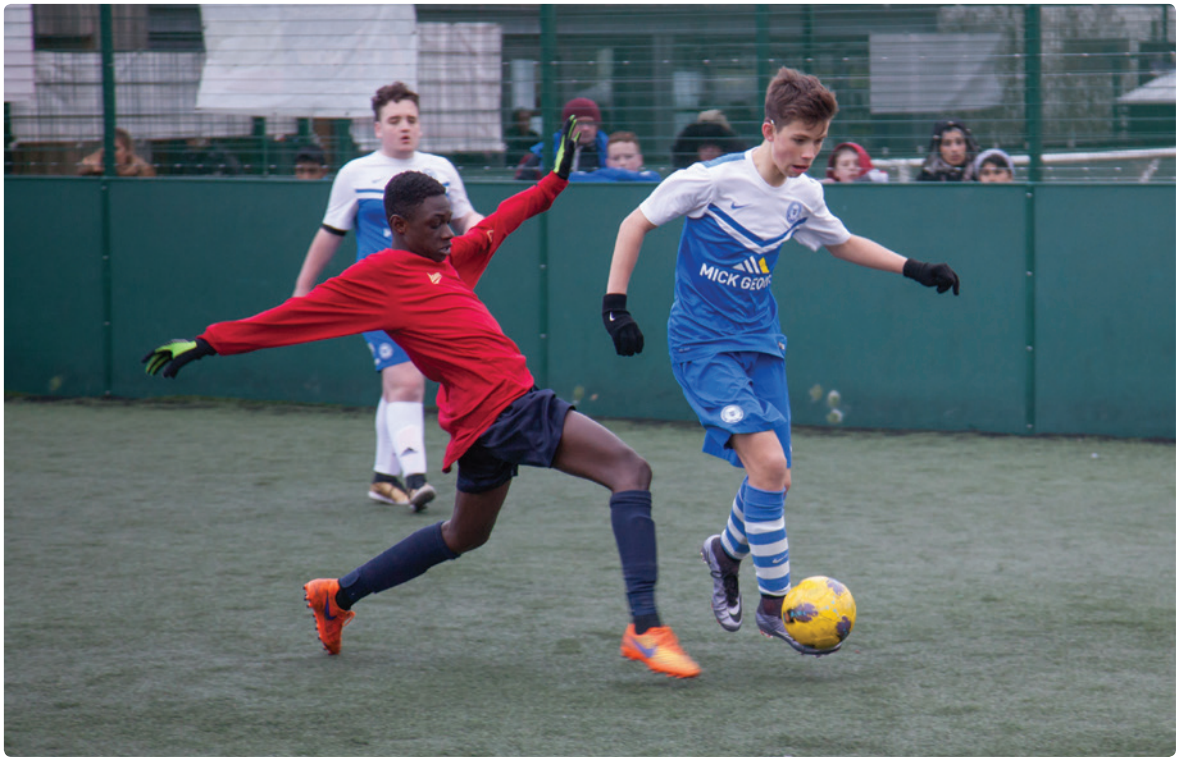
Here are a few examples of when your child might find their radio aid helpful:

- To cut out background noise during a car, bus or train journey where listening conditions can be difficult.
- In busy, noisy places - for example, at the shops or in the park.
- Helping your child to take part in activities and clubs, even if the surroundings are noisy. It may be the first time that people leading these sessions have used a radio aid. It's important to give the people leading these clear instructions on how it works and when it'll be useful. Most radio aids are quite resilient.
- A radio aid can be connected directly to a TV, computer or games console which will then send the sound directly to their hearing aids or implants.

Even though it's clear that a radio aid can be helpful at home or for out of school activities, some education services in the UK don't provide radio aids to be used at home or allow children to take their radio aid out of school.

If you want to use a radio aid at home talk to your child's Teacher of the Deaf or educational audiologist. If your local education service won't let you use the school radio aid at home you should ask them to put their reasons in writing so you have them for reference. You can also contact our Helpline on **0808 800 8880** for support.

"We gave it [radio aid transmitter] to the tour guide at the British Museum and my daughter's whole face lit up because she heard all of the information and felt a real part of the tour. She loved it and felt included."



11 Classroom soundfield systems and acoustics

A soundfield system is an amplification system that provides an even spread of sound around a room. Classroom soundfield systems are not the same as radio aids, although they are designed for similar purposes. Soundfield systems are designed to improve listening conditions for all children in the classroom.

How do soundfield systems work?

Soundfield systems are not the same as a PA system; it just makes the teacher's voice louder and clearer, just loud enough to be heard above unwanted background noises. The aim is to produce a clear and consistent level of sound throughout the classroom rather than just increasing the volume. A soundfield system that is set up correctly should be discreet and the teacher shouldn't notice a big difference when they're speaking.

A soundfield system includes a microphone worn by the teacher. This is linked to an amplifier by a wireless transmitter and allows the teacher to move around the room. Loudspeakers are fitted around the classroom, often on the walls or in the ceiling.

Soundfield systems can be separated into two different types:

- permanent fixed systems
- portable systems.

Permanent fixed systems

Permanent fixed systems are often found in school halls. Speakers are fitted around the room and are linked to a control centre, which can transmit sound from various devices – for example a microphone worn by a person speaking, a music system, computer or a whiteboard.

These systems are sometimes fitted in classrooms, but to benefit a deaf child they'd need to be fitted in every classroom that the child uses and this could be expensive.

There are many companies that sell and install soundfield systems. Your child's school should make sure that they use a company which has specific knowledge of the needs of deaf children. It may also be worth suggesting that they contact another school which has already been fitted with one of their systems or a Teacher of the Deaf to ask for their feedback on the service and quality of product.

Portable systems

These are more flexible than fixed systems as they can be moved around to wherever they are most needed. They're also cheaper than fixed systems and easier to set up, but you do need to take extra care to use them correctly. Another advantage is that they are easier to replace as technologies change, as you won't need to repair damaged walls or ceilings.

Some companies may offer trials of their soundfield systems, giving your child's school an opportunity to try out different systems before deciding which is the most suitable.

Who can it benefit?

A good soundfield system should enable all pupils in a classroom to hear equally well, wherever they are seated. Most children who wear a hearing aid or implant will still need to use a personal radio aid.

The group most likely to benefit from soundfield systems are children with mild hearing loss, who might not get any extra support at school otherwise. There are a large number of children with mild hearing loss, including those who have temporary hearing loss, for example from glue ear.

A soundfield system could also benefit a child who has recently had a cochlear implant fitted and isn't ready to use a radio aid yet.

The system is also very useful for teachers. As well as helping them to avoid straining their voice, research has suggested that soundfield systems can improve discipline and concentration for all children.

Can radio aids be used in classroom with soundfield systems?

There can be a number of advantages for a deaf child when a personal radio system is combined with a soundfield system. These systems must be regularly and sensitively checked to make sure that volume levels are appropriate and that there is no feedback when a microphone comes into close contact with a speaker. This should include asking the deaf child's opinion. Children who use radio aids can continue to use them in a classroom with a soundfield system. However, both devices must be set up correctly to work alongside each other.

"At home he hasn't been as tired or frustrated since having the radio aid system. We use it for out of school classes in skiing and cycling – it has made a tremendous difference as he no longer needs one-to-one skiing tuition and he can now ride ahead of us when on his bike.."

Download our Quality Standards for the Use of Personal Radio Aids from our website for more information.

Will soundfield systems solve all the problems of poor acoustics (sound quality) in a classroom?

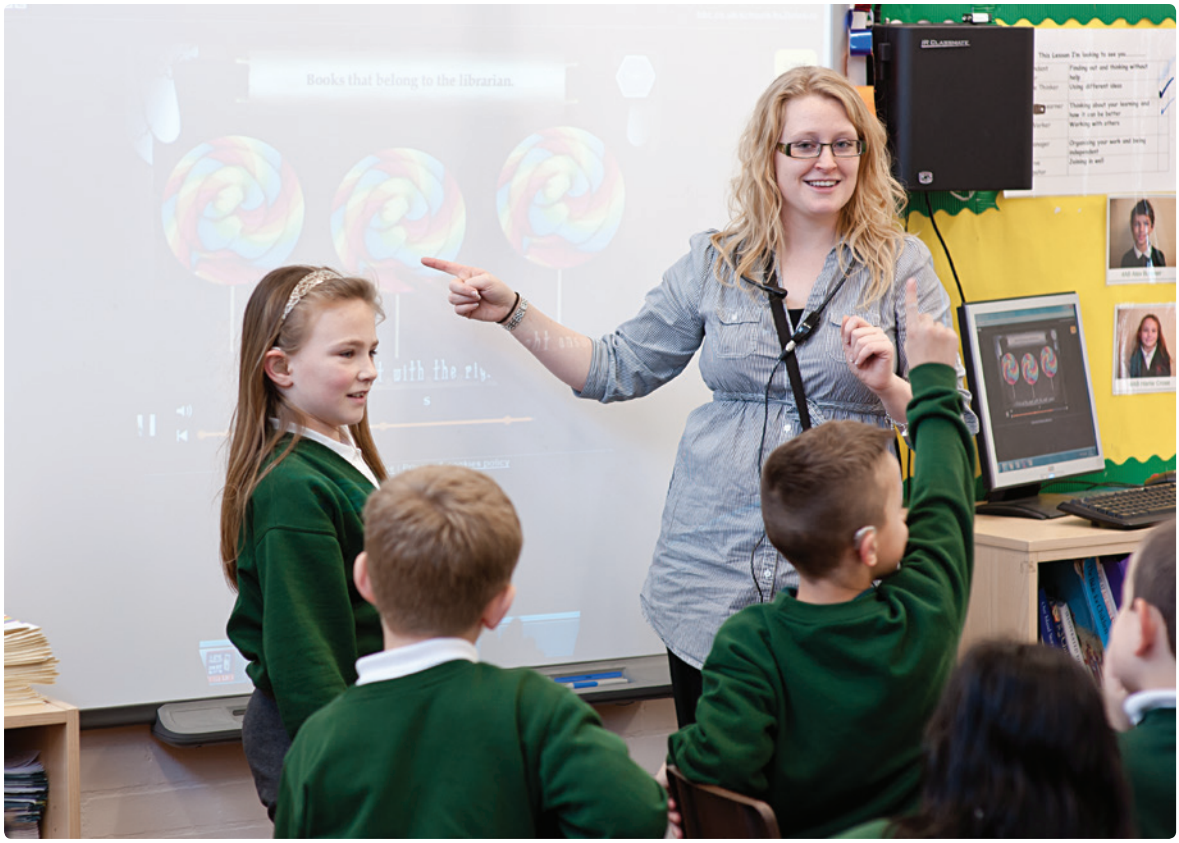
If it's practical to improve the quality of sound in a classroom (for example, by lowering ceilings, changing wall coverings and adding carpeting) this should be the first step. Fitting a soundfield system in a room with very poor acoustics could make listening conditions more difficult, rather than improving them.

Detailed standards and guidelines on sound quality in schools are given in the Department for Education publication Building Bulletin 93: Acoustic design of schools. This is available at **www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards**.

Creating good listening conditions for learning in education

Our online information about creating good listening conditions will help schools or any other education setting to identify where deaf pupils might face difficulties with listening, for example, in the classroom, and how these environments can be improved. Often these improvements will benefit all pupils in the school and can be made at a modest cost. Other improvements may require specialist assessment and are therefore more expensive.

You can find more information on creating good listening conditions in education settings on our website at www.ndcs.org.uk/acoustics.



12 Looking after a radio aid system

Used with care, radio aids should last for several years. Any problems are most likely to be caused by accessories, such as leads and microphones as these take most of the wear and tear.

You or a trained professional should carry out simple listening tests at agreed regular times to make sure the radio aid is working well. How often you check the radio aid will depend on your child's age and communication level as some children will be better than others at letting you know if there are any issues. Full tests in a test box (also known as a hearing aid analyser) should be carried out by a trained person regularly and whenever there is any change to your child's hearing aids, implant or radio aid equipment.

The checks you need to do on the radio aid will depend on the model. We've provided some very general guidelines below, but for specific information about your child's particular radio aid, talk to their Teacher of the Deaf or educational audiologist.

Children should also be encouraged to self-advocate and tell a parent, carer or teacher if their radio aid isn't working properly, or if the person using it is using it incorrectly.

You'll also find useful information on the manufacturers' websites.

"Using the stetoset to listen to my son's radio aid was really easy. It reassured me that the equipment was working properly."

For more information on how to look after your child's radio aid system, watch our 'Hearing technology for deaf children: radio aids' video at www.bit.ly/2XNLiTw.

Daily checks for radio aids used with hearing aids

Before you start, check that the hearing aid is working normally by following the guidelines in our resource Hearing Aids: Information for families, and then follow the steps below:

1. Check the general condition of the radio aid. Are there any cracks or dents? Are the leads or microphone damaged?
2. If you're using an FM radio aid check that the transmitter and the receiver are on the same frequency. Radio aids from different manufacturers may use a number, letter or colour-coding system. Check that the transmitter and receiver match.
3. If you're using replaceable batteries, check that they're fitted correctly. If possible, you should check the batteries for splits, corrosion, cracks and damaged casings. If the batteries are damaged or show any signs that they're leaking, replace them.

4. Check the battery level indicator to make sure the transmitters are fully charged every day before use.Fit the receiver to your child's hearing aid as you normally would.
5. Connect a stetoclip to the hearing aid. A stetoclip is very similar to a doctor's stethoscope – but instead of having a chest piece at the end, a stetoclip has tubing that allows you to listen to a hearing aid to check how well it's working. It's important that you use a stetoclip with an attenuator because this will reduce the volume so that the sound is at a comfortable level for you to listen to.
6. If you have an adjustable attenuator, begin listening with the volume at its lowest level and gradually increase it.
7. Switch on the transmitter, receiver and hearing aid. Listen through the stetoclip. Gently pull the microphone lead on the transmitter. You shouldn't hear any crackling noises (however, there will be some noise from you handling the transmitter and its microphone). Gently squeeze the cases of the receiver and transmitter and listen for breaks in sound or unusual noises.
8. Turn on a radio, TV, or tablet and place the transmitter microphone next to the loudspeaker. Walk at least 4–5 metres away from the transmitter. This is so you don't confuse the sounds you hear through the radio aid with those that you hear through the hearing aid's microphone. Listen through the stetoclip and make sure you can hear in different parts of the room without a break in transmission or a drop in the sound quality. The sound from the transmitter should be clear and free from crackling. Gently flex and wiggle the connections on the receiver to listen for breaks in sounds or crackling.

If you're using a radio aid with a neckloop, gently pull and wiggle the neckloop and connection leads and listen for breaks in sounds or crackling.

If there are any problems, try replacing the batteries or microphone. If there are still problems, contact the person responsible for maintaining your child's radio aid.

Batteries

Most radio aid transmitters have their own internal rechargeable battery which can't be removed by the user. These will have a mains power charger and the transmitter battery should be fully charged at the start of the school day.

Other radio aid transmitters use standard rechargeable batteries. These can sometimes be replaced by alkaline (non-rechargeable) batteries if charging isn't possible or if the rechargeable battery runs out of power unexpectedly.

Body-worn and neckloop radio aid receivers will have either of the rechargeable battery types mentioned above.

Ear-level and integrated receivers are powered by the hearing device that they're connected to. This means that when the receiver is connected, the hearing device's battery will run down more quickly than usual.

! While checking the radio aids, never listen to any sounds that are at a volume you find uncomfortable.

Daily checks for radio aids used with cochlear implants

If your child has a cochlear implant, you can't listen to the sounds they're hearing. However, you may be able to listen to the sounds being transmitted through the radio aid system before they're processed by the cochlear implant. To do this you'll need to get some special earphones from your child's cochlear implant centre.

Different models of cochlear implant work in different ways. The cochlear implant team will show you how to use the earphones with your child's cochlear implant. Once you have these earphones, you can carry out the checks below daily.

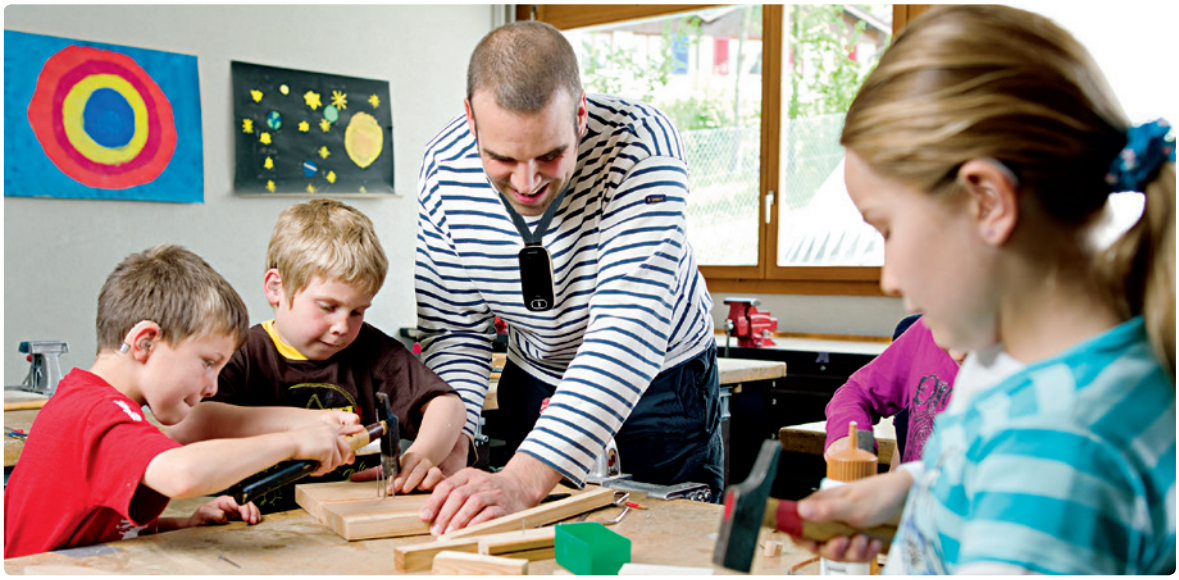
1. Check the general condition. Are there any cracks or dents? Are the leads or microphone damaged?
2. Connect the earphones to the processor and check that the processor is working.
3. Connect the radio aid and switch on the transmitter, receiver and processor in the instructed order.
4. If using an FM radio aid, check that the transmitter and the receiver are both on the same frequency. Radio aids from different manufacturers use either a number, letter or colour-coding system to match the frequencies. It's important to check that the transmitter and receiver match.
5. If you're using replaceable batteries, check that they're fitted correctly. If possible, examine batteries for splits, cracks, corrosion and damaged cases. If the batteries are damaged or show any signs of leaking, replace them.
6. Check the battery level indicator if there is one and make sure that all the components are fully charged before use.
7. Fit the microphone to the transmitter, if these are part of the radio aid system.

8. Listen through the earphones. Gently pull any leads on the transmitter. You shouldn't hear any crackling noises. Be aware that there will be some noise created by you handling the transmitter and its microphone. Gently squeeze the cases of the receiver and transmitter and listen for breaks in sound or unusual noises.
9. Turn on a radio, TV or tablet, and place the transmitter microphone next to the speaker. Walk at least 4–5 metres away from the transmitter. This is so you don't confuse the sounds you hear through the radio aid with those that you hear through the cochlear implant headset microphone. Listen through the earphones and make sure you can hear at a consistent level when in different parts of the room. The sound from the transmitter should be clear and free from crackling. Gently flex and wiggle the connections on the receiver to listen for breaks in sounds or crackling. Be aware of the normal noises caused by handling the cochlear implant.

Tip to share with your child's teachers about using radio aids

When using radio aids, teachers should:

- Switch the transmitter on when talking to the whole class or group in which the deaf pupil is working.
- Remember to switch the transmitter off if the child leaves the room without it otherwise they'll still be able to hear you.
- Wear the microphone about 15cm from the mouth.
- The child can sit anywhere in the classroom, but it can be useful to help them choose an appropriate place without unnecessary disturbances or distractions. Make sure doors are shut and turn off any electrical equipment that isn't being used.
- When using the radio aid, you should speak at the level you would usually use in the classroom.
- If using a soundfield system with the radio aid, make sure both are working and are connected to each other
- Test the range of the system with the child so you can be sure that they can always hear you.
- Switch the radio aid off, or mute the microphone, when having a conversation that the deaf pupil doesn't need to hear. For example, when you are going on a comfort break or when leaving the classroom. The signal can travel some distance and even through walls so the child will still be able to hear you.
- Avoid standing in a loud place, close to any noisy equipment or near an open window, as the microphone might pick up background noise and transmit this to the deaf pupil.
- Don't let the microphone knock against your clothing or jewellery.
- Remember to charge the equipment at the end of the day.
- Remember to take the radio aid transmitter off before going home.



13 Getting a radio aid – know your rights

Most radio aids are provided by the local authority (or the Education Authority in Northern Ireland) to children who need them.

If your child has been identified as having special educational needs (SEN) or additional support needs (in Scotland), the need for a radio aid may be specified in a statement of SEN (Wales and Northern Ireland), Education, Health and Care (EHC) plan (England) or a coordinated support plan (CSP) (Scotland), meaning that the authority has a legal responsibility to provide the equipment, ongoing maintenance and support.

If your child doesn't have a statement, EHC plan or CSP the authority and education setting (which includes early years settings, schools, colleges and universities) still have an obligation to meet your child's needs. Under the Equality Act 2010 (or the Special Educational Needs and Disability (Northern Ireland) Order 2005 in Northern Ireland) the authority and education setting must make 'reasonable adjustments' to make sure what they offer is accessible to disabled pupils. If you live in England, Scotland or Wales, this includes providing auxiliary aids (which include radio aids) and means that all authorities and education settings are required to provide these to disabled pupils where needed, unless they can show that this would be unreasonable.

If you feel your child would benefit from a radio aid then you should speak to their teacher or the person responsible for coordinating the special or additional needs of children in your school (known in England as a special educational needs coordinator) or your child's Teacher of the Deaf.

Despite the benefits of using radio aids in the early years, not all local authorities make these available to parents of deaf children. If you would like to try a radio aid but your local authority has said they won't give your child one, you can contact our Helpline on **0808 800 8880** for information and advice on how you can challenge this.

Insurance

The local authority provision of radio aids to preschool deaf children should be seen as a reasonable adjustment under the Equality Act. Equipment purchased by the local authority remains the local authority's property. It is therefore the local authority's responsibility to repair or replacement broken or lost equipment as required. We do not believe that it would be reasonable or fair to deny a child a radio aid that would benefit them simply on the basis of their parents' insurance arrangements.

You can also download our booklet Know Your Rights: Getting support from your local council from our website. There are different versions available for England, Wales, Scotland and Northern Ireland.

Young people in higher education – Disabled Students' Allowances

Deaf students wanting to use a radio aid in higher education can use the specialist equipment part of the Disabled Students' Allowance to buy the equipment.

Students apply for this funding through different bodies:

- England: Student Finance England **(www.gov.uk/disabled-students-allowances-dsas)**
- Northern Ireland: Education Authority **(www.nidirect.gov.uk/articles/disabled-students-allowances)**
- Scotland: Student Award Agency for Scotland **(www.saas.gov.uk)**
- Wales: Student Finance Wales **(www.studentfinancewales.co.uk).**

Students are assessed for eligibility and this assessment will determine the amount of funding awarded. It's often helpful if they provide a letter from a Teacher of the Deaf in support of an application.

If a student isn't entitled to funding they may still be able to loan a radio aid from their university or college. Some have their own equipment, so they should check with the learning support team at their school, college, or university.

Students can also apply for funding for a radio aid through private trusts if no other source of funding is available.

For more information on Disabled Students' Allowances go to www.ndcs.org.uk/dsa.

Young people in work

A radio aid can be useful at work too, for communicating with colleagues face-to-face and for meetings. Access to Work provides advice and sometimes funding for disabled people to get support and equipment (including radio aids) at work. Not enough employers know about the funding they can get from this scheme, so if your child thinks they might be eligible they should talk to their employer.

Buying privately

You can also buy a radio aid yourself. For a full list of suppliers see page 40.

Most suppliers will sell equipment directly to the public. You won't have to pay VAT on the radio aid if it's bought by or for a deaf person. The supplier will send you a form to fill in so you're not charged VAT.

For more information on Access to Work and how radio aids can be useful in the workplace visit www.ndcs.org.uk/technology and www.ndcs.org.uk/accesstowork.

Deaf children in independent schools

If your local authority doesn't support your child at their independent school it may be possible for the school to buy in their services. Organisations such as the Ewing Foundation offer this type of service on a consultancy basis.

The Ewing Foundation is a charity that has education consultants and specialist audiology technicians in house. The Foundation can help you set up specialist equipment such as radio aids, advise on acoustics and soundfield systems and help your child's teachers to support your deaf child like a Teacher of the Deaf would do.

"At college, I can connect it [the radio aid] up to the computer so I can do music compositions. I had a lot of difficulty concentrating before, but now I can focus. Out and about in town my friends have been using it and it's made a massive difference in communicating with them."

For more information see www.ewing-foundation.org.uk.

14 Further information and support

If you want to know more, go to **www.ndcs.org.uk/technology** where you can find up to date information, product descriptions and user reviews. These pages are regularly updated and are a useful tool for helping you choose a product for your child. Alternatively call our Freephone Helpline on **0808 800 8880.**

We also have a wide range of print and downloadable information resources that you can find and order on our website including:

- How Technology Can Help
- Hearing Aids: Information for families
- Cochlear Implants: A guide for families
- Understanding Your Child's Hearing Tests
- Hearing technology for deaf children: radio aids **(available on our YouTube channel www.ow.ly/sslnU)**
- Technology information videos: **https://bit.ly/2Zbvnuj**
- Quality Standards for the Use of Personal Radio Aids

15 Borrow to buy

You can try out radio aids through our Borrow to Buy scheme. We worked with Phonak to launch the scheme, which offers deaf children, their families and the professionals working with them immediate access to Phonak products.

We have most current radio aid systems in stock and can work with your child's Teacher of the Deaf, or any other professional working with your child, to make sure that you're borrowing the most suitable product.

You can use the equipment wherever you think it might benefit your child: at school, at home or during social activities.

The service is free to all parents and deaf young people who join us as members.

A radio aid can be borrowed for up to 60 days and at the end of the loan period you can choose to buy the product if you think it will benefit your child and your family. If not you can simply return it to us.

"It gave us the chance to see the product in the flesh and test it out in different scenarios. Having a trial meant we could find out how user-friendly the product was and the benefits it could give to our children."

Find out more on our website: www.ndcs.org.uk/borrowtobuy.

16 Radio aid suppliers

National Deaf Children's Society
Phone: **0808 800 8880**
www.ndcs.org.uk/borrowtobuy

Action on Hearing Loss
Phone: **0333 0144525**
www.actiononhearingloss.org.uk

Connevans Ltd
Phone: **0333 0144525**
www.earfoundation.org.uk

Gordon Morris
Phone: **01458 272121**
www.gordonmorris.co.uk

Oticon Ltd
Phone: **01698 283363**
www.oticon.co.uk

PC Werth Ltd
Phone: **020 8772 2700**
www.pcwerth.co.uk

Phonak UK Ltd
Phone: **01925 623600**
www.phonak.co.uk

Some of the radio aid images that appear in this guide were kindly donated by some of the suppliers listed above.

"Whilst using the radio aid from the National Deaf Children's Society he [my son] would come home from school and explain how his day was which he didn't do before."

17 Our information and support

Joining the National Deaf Children's Society gives you access to a wide range of services that can support you at different stages of your journey and your child's development. We want to do all we can to give you the confidence to support your child and make decisions.

The right information, at the right time

We offer free, balanced information about all aspects of childhood deafness, both on our website **www.ndcs.org.uk** and in our publications. Our online content and information booklets can help you make some of the difficult decisions you'll be faced with.

Helping you make informed choices

Every deaf child is different and families should be able to make decisions that are right for them. That's why we give independent support, setting out all the options, so families can make informed choices about how they want to communicate, or which type of hearing technology is best for them. We never promote a particular approach, and we're always clear about the impact it will have on a child's life.

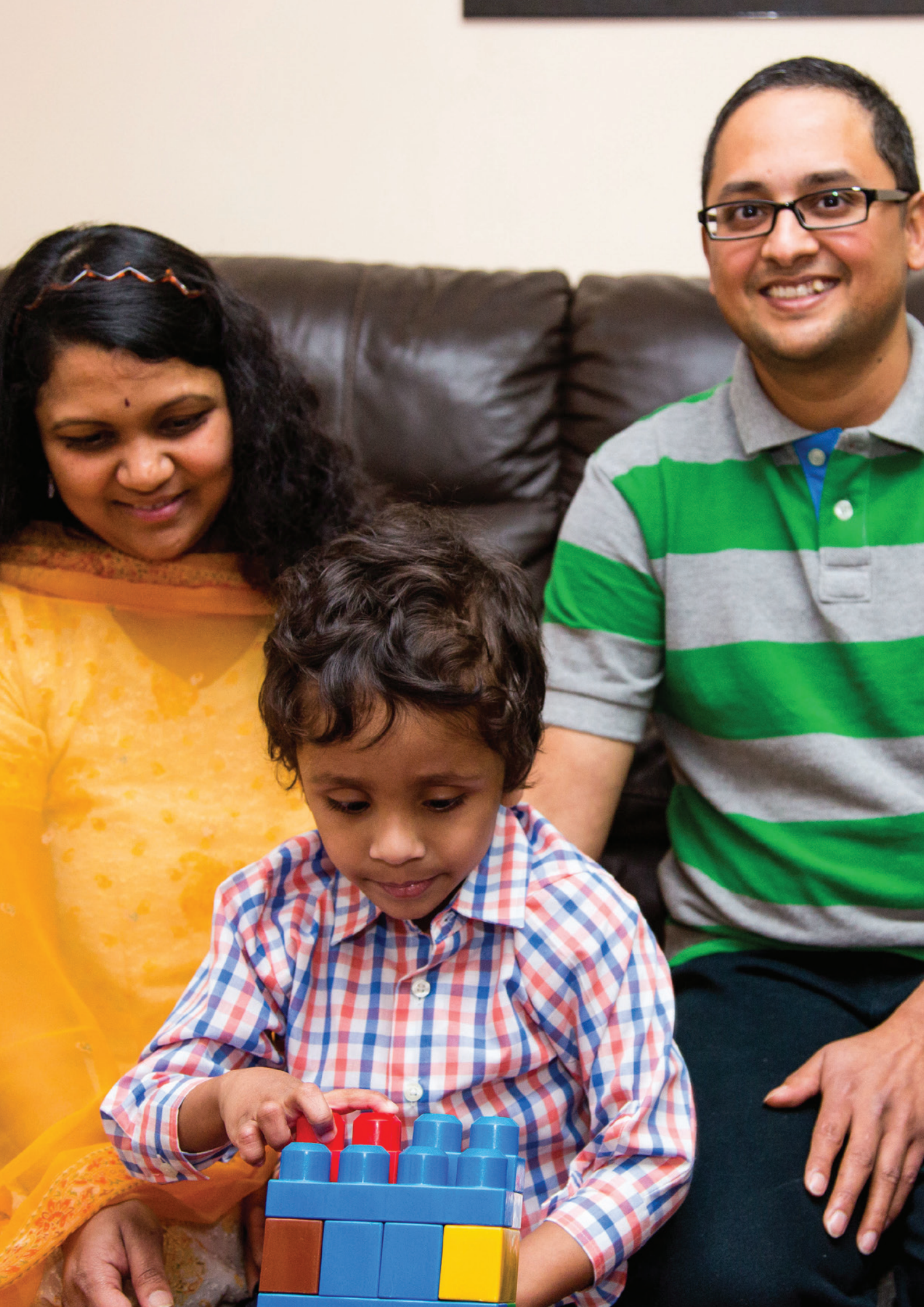
Support when you need it

Any questions? We're here to help.

Freephone Helpline: **0808 800 8880**

helpline@ndcs.org.uk

www.ndcs.org.uk/live-chat



About us

We're here for every deaf child who needs us – no matter what their level or type of deafness or how they communicate.

Visit our website **www.ndcs.org.uk** or contact our Freephone Helpline to find out how we can support your child at every stage of their life. Join us for free and you'll be able to:

- download or order our free information
- come to our events
- be a part of our online community
- borrow equipment through our technology loan service
- read about other families' experiences in our quarterly magazine and email updates
- access support.

National Deaf Children's Society

We are the National Deaf Children's Society, the leading charity for deaf children.

Freephone Helpline:

0808 800 8880 (voice and text)
helpline@ndcs.org.uk

www.ndcs.org.uk

Published by the National Deaf Children's Society

37–45 Paul Street, London EC2A 4LS

Tel: 020 7490 8656 (voice and text) Fax: 020 7251 5020

This publication can be requested in large print or as a text file.

For resource references or to give us your feedback email informationteam@ndcs.org.uk.

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National Deaf Children's Society