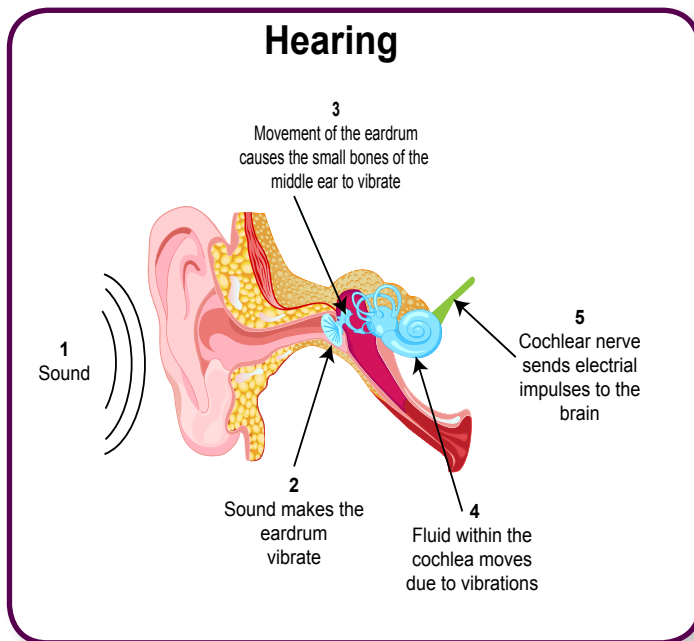


Your Child's Hearing Test Information for Parents and Carers

Visual Reinforcement Audiometry (VRA)

How Does Your Ear Work?



Sound occurs when a moving or vibrating object causes the air around it to move. Sound travels in invisible waves through the air.

When sound waves travel down the ear canal and hit the eardrum, the eardrum vibrates. Three bones in the middle ear link the vibrating eardrum to the cochlea in the inner ear.

The cochlea is filled with liquid that contains thousands of tiny hair cells. Movement of cochlear liquid causes the hair cells to bend and send electrical signals along the cochlear nerve to the brain. For normal hearing to occur, the brain has to receive the signals, then process and interpret them appropriately.

Visual Reinforcement Audiometry (VRA)

Background

Young children need to be able to hear speech sounds so that they can copy them and learn to talk. If a young child has a permanent hearing loss and cannot hear speech sounds in at least one ear, their speech development will not be normal.

The aim of Soundfield VRA testing is to find out if it is likely that a child can hear speech sounds, in at least one ear. Soundfield hearing tests do not test each ear separately because a loudspeaker is used rather than headphones.

Two testers are required for VRA testing. The first tester plays sounds through loudspeaker while the second tester tries to involve the child in play activity. The testers look for changes in the child's behaviour each time that a sound is played.

Conditioning Phase

Initially sounds are presented at a level (about 60dBHL) that is loud enough to attract the attention of a child with normal hearing, without being uncomfortably loud.

Shortly after playing the sound, the first tester switches on a reward box next to the speaker. When

the box is switched on it lights up and a toy animal in the box moves. The second tester points at the toy animal when the sound has been made, as this can help children learn to associate the toy with the sound. After the sound is played a few times most children will link the sound with the toy and will turn to it once the sound comes on, without prompting. The second tester will stop pointing at the toy after the first few sounds have been played, to check whether conditioning has been successful.

The Assessment

Once a child has been conditioned, the hearing assessment can begin.

Testing is usually carried out for four different frequencies/pitches: 500Hz (similar to the “oo” sound in “boo”), 1kHz (similar to the “ah” sound in “bath”), 2kHz (similar to the “sh” sound in “shoe”) and 4kHz (similar to the “ss” sound in “hiss”).

Sounds are played at different intensity/loudness levels. The toy animal is lit up every time the child gives a head-turn towards it, at an expected time following the sound being played.



Sounds are played at irregular intervals, so that it is difficult for the child to anticipate when the sound will play. If they frequently look towards the toy in between sounds being played (“guessing”/“checking behaviour”), the level of play activity is increased in an attempt to reduce/eliminate false responses.

When checking behaviour persists, longer gaps are left in between sounds being presented, as some children’s checking behaviour becomes less frequent when this is done. The test will take longer when a child exhibits checking behaviour, the sounds are played over a longer period to establish a reliable result. A review appointment will be required when the Audiologists feel that a reliable result has not been achieved.

Some children become too involved in the play activity during the test and stop responding when sounds are presented, even though they are hearing them. The tester will try and make the play activity less interesting when this happens and the conditioning phase may be need to be repeated in order to try and complete testing

The Results

When the assessment has been completed the following results are possible:

Satisfactory Result

If your child gave repeatable head-turns at a quiet level of 25dBHL for 500Hz, 1kHz, 2kHz and 4kHz with good reliability, this is considered to be a satisfactory result. When a satisfactory result has been achieved, it is likely your child has sufficient hearing for the sounds of speech to be heard in at least one ear.

Satisfactory Result Not Achieved

- 1) Repeatable head-turns at a quiet level of 25dBHL with good reliability, for one or two frequencies only

4kHz and 1kHz are usually the first two frequencies that are tested. It is quite common for children to lose interest in the toy animal over time. Reliability may be good for one or two frequencies, then poor for other frequencies. When testing for four frequencies has not been completed review will be needed. However, if 1kHz and 4kHz testing was completed, it is still likely that hearing is sufficient for the sounds of speech to be heard in at least one ear. If testing was completed for one frequency only, hearing is considered satisfactory for that frequency, in at least one ear.

2) Head-turns at a quiet level of 25dBHL, but response reliability issues

If the testers felt that there was some uncertainty about response reliability, review will be required even when there were repeatable head-turns at 25dBHL for 500Hz, 1kHz, 2kHz and 4kHz. A significant hearing loss in both ears is unlikely under these circumstances, but review is needed to make sure that your child meets the criteria for a satisfactory result.

3) Head-turns at elevated levels with response reliability issues

When responses are very variable it can be difficult to establish an accurate hearing test result. As previously described, some children become too interested in the play activity or lose interest in the reward part of the way through the assessment. Other children may be too interested in the play activity for some parts of the test and exhibit frequent checking behaviour at other times.

To achieve an accurate assessment your child has to stay in a particular part of the room. Children do not always want to remain in one spot during the test and can become distressed or noisy when their movement is restricted. When a child is noisy they won't be able to hear quiet test sounds.

Some children that have a complex background such as a global developmental delay, autistic spectrum disorder may have variable responses and may not respond at a satisfactory level, even when their hearing is normal. Further testing will be required under the above circumstances. The Audiologists will discuss this with you.

4) Repeatable Head-turns at elevated levels with good reliability

A hearing loss is likely that may be temporary or permanent in nature.

The Audiologists should be able to give you an estimate of the degree of hearing loss that your child has in the better ear. We will refer your child to an Ear, Nose and Throat (ENT) Consultant if they are not under the care of ENT already.

If you have any further questions about your appointment please contact us on 01 878 4577

To arrange any further appointments, please contact our secretaries on 01 8784533

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The information contained in this leaflet is correct at time of print