

Information for parents and carers

Sound Over-sensitivity or Decreased Sound Tolerance in Children

A decorative graphic at the bottom of the page consisting of three overlapping, wavy bands of blue. The top band is a light blue, the middle is a medium blue, and the bottom is a dark blue.

What is oversensitivity to sounds?

Between 3 and 15 out of 100 children may dislike certain everyday sounds, which most people accept as normal sounds. This is also known as decreased sound tolerance (DST). There are two main types based on the nature of sound:

Hyperacusis: Oversensitivity to any sounds, other than sounds associated with chewing/eating/lip smacking.

Misophonia: Oversensitivity to sounds of chewing/eating/lip smacking, also known as 'Mastication rage'. In addition, sensitivity to other body sounds such as breathing, coughing, sneezing/sniffing, and some repetitive sounds such as tapping may also be present.

Responses to the triggering sounds vary from just moving away from the source, covering the ears with the hands, or displaying few behavioural/emotional responses. Different emotional responses described include anger, annoyance, complaint of loudness, disgust, distress, fear and physical as well as verbal aggression. Fear and being upset are common in hyperacusis; disgust and verbal abuse are more common in misophonia.

The impact of DST can vary from none to significant restriction in daily activities.

Other associated conditions

Other sensory over sensitivities

Over-sensitivity may not be limited to sounds and may also be present in other sensory domains such as touch, smell, taste, food preference, light, and pain sensation.

Different co-morbidities

DST is common in certain neurodevelopmental and mental health conditions such as anxiety, autism spectrum disorder, attention deficit hyperactivity disorder, depression, obsessive compulsive disorder, Williams syndrome, and others. These children may have educational, learning and listening difficulties. Some children with hyperacusis and misophonia can hear occasional noises without any source of sound in the ears (tinnitus). However, DST may be present in some children, especially young children, without any conditions. DST tends to improve as children's understanding gets better.

What causes oversensitivity to sound?

The exact cause of DST is not known. Our brain stores in its memory representations of sounds we encounter, and our response to specific sound depends on its relevance, previous experience and the meaning we attach to the sound.

Automatic 'fight or flight' response is triggered if a sound is considered as potentially dangerous. This generates adverse emotional responses and development of avoidance behaviours, as a protective mechanism. Therefore, it is common to see hyperacusis and misophonia in children who are anxious, stressed, vigilant and who likes routine. Hyperacusis

and misophonia is not directly related to the ear, but related to what the brain interprets the sound as.

Hyperacusis improves as children gradually understand the relevance of the sounds and gets used to them. However, if there are unmet needs from associated co-morbidities hyperacusis persists or worsens, and misophonia may set in later along with other behavioural, educational, and mental health issues. Special attention needs to be given to girls who may internalize problems and may miss out on support, resulting in higher probability of developing misophonia and other mental health issues.

Assessments

To understand your child's problem, the detailed history and examination are important. **Please ensure you complete the history questionnaire sent with the appointment letter in full and bring it to the consultation.** An exact assessment depends on the age and developmental stage of children. In general, the nature of DST is initially discussed (pre-conditioning) to help children to engage in detailed physical and audiological tests, which eventually help management of the condition

Management of the condition

1. Reassurance is the main management strategy. Concepts of “positive affect labelling” and “emotional reappraisal” are helpful. The child needs support to help them understand that the objects and surroundings causing the noises are useful and there is no reason to worry.

Approaches will be different dependant on age and understanding. Children accept these trigger sounds if they feel they have control over it, such as letting them bang a drum, play with noisy toys, turning on a

vacuum cleaner themselves and others. This aspect will be discussed further during the clinic appointment.

2. Activities to promote the brain's adaptation to the sound is helpful. The technique of "counterconditioning" may help in desensitization. After explaining to the child, one of the offending sounds is presented briefly for two to five seconds and repeated every minute over a period of 15-30 minutes every day while the child is engaged in one of his/her most favourite activities, for up to eight weeks. Initially the sound is presented at a quiet level and the loudness gradually increased every week. The rationale is to help the child to relate the offending sound to something positive.
3. Activities such as learning a musical instrument that help different parts of the brain work together in a coordinated manner (sensory motor integration) can help with anxiety, motor coordination, listening and coping with sounds.
4. Children with DST may have additional difficulties with their listening, especially in the presence of background sounds. Encouraging lip reading and getting your child's attention when talking is helpful, both at home and at school. You should discuss different ways of improving the listening environment and reducing background noises with school.

You may consider your child wearing a Bluetooth enabled noise cancelling headphone or ear bud that can be paired with a remote microphone which can pick up voices the child needs to hear clearly.

A mobile phone could be used as a remote microphone (by installing a Bluetooth loudspeaker app).

Please note that use of ear defenders is not advisable unless it is absolutely necessary.

Ear defenders block sounds which in turn increases the gain control system within the brain, which makes the perception of sound even louder when the ear defenders are taken off. They interfere with the brains adaptation and learning process. Ear defenders falsely reassure children leading to dependence and isolation from the world around them. However, there is an in-ear tuning device called 'Calmer', from Flare Audio Ltd, that claims to improve DST and stress without blocking the sounds like ear defenders. We do not have conclusive research evidence about the impact of flare devices in children, but some parents have reported it to be beneficial.

5. Regular relaxation exercises can help with anxiety and stress. You can try different ways to help your child.
- Create a relaxing environment with your child's favourite items, smell and relaxing music or sounds
 - Carry out muscle-relaxing exercises to helps the child to notice the difference between tension and relaxation in their muscles. Stretch the body as tall as possible with arms above the head and on tiptoes and then flop down few times a day. Encourage physical activity and sports
 - Practice breathing exercises by encouraging your child to watch the tummy ballooning out during taking a deep breath in, holding it and then watch the tummy balloon slowly deflating and getting sucked during breathing out. Find a rate that is comfortable for your child

- Ask your child to think of the positive aspect of the offending sounds as he/she exhales

Useful websites include:

- Save the Children (www.savethechildren.org/us/charity-stories/easy-at-home-relaxation-activities-to-help-calm-kids)
 - Relax kids (www.relaxkids.com)
 - Cbeebies (www.bbc.co.uk/cbeebies/joinin/seven-techniques-for-helping-kids-keep-calm)
6. Get support for other problems that may be present along with the decreased sound tolerance such as academic difficulties, inattention and hyperactivity, social communication and language, and sleep difficulties amongst other.

Discuss any relevant issues with your GP, health visitor/school nurse, nursery/schoolteachers, or other local services such as Children and Family Wellbeing service or charities like Child Action Northwest.

Contact details

Should you require further advice or information please contact. Fulwood Paediatric Audiology Clinic, 4 Lytham Road, Preston PR2 8JB.

Telephone: **01772 401310**

Email: Paediatric.Audiology@lthtr.nhs.uk

Sources of further information

www.lancsteachinghospitals.nhs.uk

www.nhs.uk

www.accessable.co.uk
www.patient.co.uk

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Please ask a member of staff if you would like help in understanding this information.

This information can be made available in large print, audio, Braille and in other languages.

Department: Paediatric Audiovestibular Medicine

Division: Women and Children

Production date: August 2024

Review date: August 2027

JR 1206 v1