

# Ask the Doctor

*Pamela Pilcher\*, MD, discusses the topic of hyperacusis as it appears to effect both behavior and sleep depending on its severity. The topic will also give behavioral techniques and treatment that might be helpful in some cases.*

## TOPIC: HYPERACUSIS AND ITS EFFECTS ON BEHAVIOR

“**HYPERACUSIS** is **defined** as a collapsed tolerance to normal environmental sounds. Ears also lose most of their dynamic range. **What is dynamic range?** Dynamic range is the ability of the ear to deal with quick shifts in sound loudness.” (Hyperacusis Network)  
[www.hyperacusis.net](http://www.hyperacusis.net)

### Types of Hyperacusis:

- **Hyperacusis in hyptonia (low muscle tone):** Generalized low muscle tone from birth may decrease the force of muscle contraction on ear bones which allow LOUD sounds to be carried into the inner ear instead of being changed into softer sounds. Loudness to softness of sound is controlled by the movement of the ear bones. In general, if the bones are moving rapidly, the sound is heard as LOUD. If the bones are moving slowly, the sound is heard as soft.
- **Hyperacusis from Facial Nerve Paralysis:** “Paralysis of Stapedius muscle causes uninhibited movement of the Stapes.” Moore, Keith L. Clinically Oriented Anatomy. The Williams and Wilkins Co. 1980
- **“Hyperacusis from a cerebral processing problem** specific to how the brain perceives sound.
- **Vestibular hyperacusis from a vestibular disorder** is caused by the brain perceiving certain sounds as motion input as well as auditory input.
- **Recruitment** is a rapid growth of perceived loudness for sounds in the pitch region of a person who has hearing loss.
- **Hypersensitive hearing (of specific frequencies):** Then there are individuals who are sound sensitive at birth but it is only specific to certain frequencies heard at loud levels (typically above 70 decibels). Autistic children are good examples of this type of hypersensitivity. See the following link: <http://www.autism.org.uk/sensory>”  
[www.hyperacusis.net](http://www.hyperacusis.net).
- **“Phonophobia (fear of sound)** is an adverse emotional response to sound and often develops with an individual who has a significant collapsed tolerance to sound. They not only fear the sound of the environment they are experiencing in real time (right now) they worry about the sound that future events of the day or in the near future will produce.”  
[www.hyperacusis.net](http://www.hyperacusis.net)

## **Behavior Modification For Parents With Children With Hyperacusis**

“Inevitably there is likely to be a learned association of fear and anxiety when in situations where uncontrolled sound exposure may occur. In order to break down the learned association of anxiety with noise exposure, a desensitization program may be appropriate, though the physical occurrence of pain with noise exposure should be acknowledged, even though the condition maybe maintained by anxiety. Assume that any noise which is seen to be aversive to the child, is also uncomfortable, and work to break down the fear association. A clinical psychologist will develop a program of behavioral desensitization, but the following suggestions can be used by everyone:

- When the child becomes distressed by exposure to sound, move the child away from the sound source if possible and then comfort and reassure him/her.
- Try to explain the source of the sound to the child.
- The child's fear reaction will often diminish if s/he can exercise some control over the sounds. So encourage the child to clap his own hands, to play with noise makers or to start and stop the vacuum cleaner at home. There is a specific therapy program which is based on the child producing a range of different sounds in a play situation. This may involve tapping a table top in a certain rhythm or shaking rattles but the child is always in control of the sounds.
- Repeated gentle exposure to the noise may help the child to reduce anxiety and desensitize the auditory aspect of the sensitivity. You could tape record one or more of the problem sounds (e.g. laughter, clapping, thunder, sirens, machine noise) and help him to switch the tape recorder to a very low volume. Gradually over a period of days or weeks the volume can be increased. Practice with the sounds under play conditions that the child can control, to help break the association of that sound with fear. This is not the same as unexpected exposure to the same sound, as people with hyperacusis do say that they can often cope better if they are warned that a sound is about occur, but it is helpful.
- Children should not be forced to stay in a situation that is causing them obvious distress (for example during singing in assembly). This may compound their apprehension and make them associate that situation (e.g. the assembly hall) with pain. If fear of a specific situation has become established, it is important to gradually desensitize the child, with time and care.
- Older children may be reassured if they are told they have the teacher's permission to leave the classroom for a few minutes at any point if they are exposed to an aversive noise. In our experience children do not abuse such an arrangement but are greatly” [www.hypercusis.net](http://www.hypercusis.net) “reassured to know that they can leave a room, for a short time, if noise becomes distressing to them.”
- The use of ear plugs, muffs or defenders should be avoided except in extreme or short-term, unavoidable situations (e.g. during a journey). Exposure to normal and tolerable sound is crucial if the ear and brain are to establish normal sensitivity.

## **Auditory Desensitization**

Auditory desensitization aims to reduce the over-sensitivity of the hearing system to the sounds that the child finds uncomfortable. If this is a very specific sound source, e.g. the sound of material being rubbed, it may be easy to design a hierarchy of acceptable noises, through more challenging sounds, and building up to more aversive ones. The important aspect is to keep the signal carefully graded to be acceptable, and under the control of the listener. A tape recording of sounds played by the child at their own comfortable level may be helpful. This approach may be undertaken by the family, without requiring professional support. However if there is a wide range of sound sources and situations a more proactive approach is needed hyperacusis profile and behaviors. Documenting your activity with the child allows outcome measures to be kept (in case further interventions is needed).” [www.hypercusic.net](http://www.hypercusic.net)

## **Hyperacusis Treatment**

“Many patients have seen improvement in sound tolerance through the use of sound generators (special hearing aids) or CD player that emit broad band pink noise. This retraining therapy suggests that the ear will become desensitized to sound by listening to broadband pink noise at barely audible levels for a disciplined period of time each day (usually 2-8 hours a day). This has been proven to help over 90% of hyperacusis patients maximize the tolerances in their ears. The name of this treatment is called Tinnitus (Hyperacusis) Retraining Therapy or TRT. “  
[www.hypercusic.net](http://www.hypercusic.net)

*Dr. Pilcher has added this section on Decibels for your information. Hopefully, you will find it helpful in order to gage sound levels at home when doing activities.*

## **Decibel**

“On the decibel scale, the smallest audible sound (near total silence) is 0 dB. A sound 10 times more powerful is 10 dB. A sound 100 times more powerful than near total silence is 20 dB. A sound 1,000 times more powerful than near total silence is 30 dB. Here are some common sounds and their decibel ratings:

- Near total silence - 0 dB
- A whisper - 15 to 30 dB
- Refrigerator - 40 dB
- Normal conversation - 60 dB
- Dishwasher - 75 dB
- Heavy city traffic or school cafeteria 85 dB
- A lawnmower - 90 dB
- Snowmobile - 100 dB
- Personal stereo (iPod) at maximum level - 105 dB
- A car horn, rock concert, or orchestra - 110 dB
- A rock concert, jet engine or siren - 120 dB

- A gunshot, firecracker or jet taking off - 140 dB
- Firecracker or shot gun firing at close range - 140 to 165 dB

You know from your own experience that distance affects the intensity of sound -- if you are far away, the power is greatly diminished. All of the ratings above are taken while standing near the sound.

Hyperacusis patients often have difficulty with sounds exceeding 60-65 decibels. For this reason, it is often difficult for the hyperacusis patient to tolerate conversation with varying degrees of loudness. In addition to the decibel (loudness) level of sound, hyperacusis patients also have difficulty with sudden shifts in sound (their dynamic range). For more information on this, read the Supplement section of our website.

Any sound above 85 dB can cause hearing loss, and the loss is related both to the power of the sound as well as the length of exposure. You know that you are listening to an 85-dB sound if you have to raise your voice to be heard by somebody else. Eight hours of 90-dB sound can cause damage to your ears; any exposure to 140-dB sound causes immediate damage (and causes actual pain).”

*\*Dr. Pilcher has a nephew with Cri du Chat Syndrome. She is a pre-residency doctor in family practice with an interest in pediatrics. This topic is one of many that Dr. Pilcher will be discussing with the 5p- community. Dr. Pilcher does not have any financial or any other type of relationship with the Hyperacusis Network or its physicians.*

## **Resources**

Moore, Keith L. Clinically Oriented Anatomy. The Williams and Wilkins Co. 1980.

The Hyperacusis Network – [www.hyperacusis.net](http://www.hyperacusis.net)

This information is provided by 5p- Society and is not intended to replace the medical advice of your doctor or health care provider. Please consult your health care provider for advice about a specific medical condition.

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