



Hyperacusis and other forms of reduced sound tolerance

David M Baguley, Audiological Scientist, Addenbrooke's Hospital, Cambridge
Don McFerran FRCS, Consultant Otolaryngologist, Essex County Hospital, Colchester
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Hyperacusis is a symptom that can be a minor nuisance to some but a life altering experience to others. As will be seen in this leaflet, there are problems with definitions, but the term is generally applied to people who experience the sounds of everyday life as intrusively loud, uncomfortable, and sometimes painful. Sometimes this symptom is triggered by specific medical conditions, so we recommend that anyone with hyperacusis should seek a specialist medical opinion. In other people, a negative life event appears to be associated with the onset. However, in many people no clear reason can be identified. Some people with hyperacusis withdraw from social and professional activities and become isolated: this can further exacerbate the problem as they become fearful and anxious. Therapy for hyperacusis involves the exclusion of treatable medical conditions, counselling, and often the use of sound therapy.

Sound tolerance

The human auditory system has an extraordinary range: we are able to hear tiny sounds such as the gentle rustling of leaves, and yet, we are still able to tolerate extremely loud sounds such as music in a disco. There is a level of sound that will generate physical pain in anyone. This occurs at a level of approximately 120 dB. However, we generally reach a point where we feel that sound is too loud long before we reach the threshold of pain. This point of maximum comfortable loudness varies from person to person and also varies according to the person's mood and the context of the sound. A radio may generate pleasant background sound one day but seem unpleasantly loud and intrusive on another day. This reduced tolerance is especially likely to happen if we are tired or stressed. As well as having a maximum comfortable sound level, most people note that there are certain particular sounds that they find unpleasant, whatever the intensity of that sound. Chalk scratching down a blackboard is a common example of this. Such observations are examples of the normal variation in sound tolerance. However, there are some people who have alterations in their sound tolerance that can impact on their ability to live a normal life.

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Types of altered sound tolerance

The vocabulary around hypersensitivity of hearing is confusing. The word *hyperacusis* is often used to refer to all types of altered sound tolerance. However, it is more correct to apply hyperacusis to mean a general oversensitivity of hearing where even quite modest environmental sounds appear loud, intrusive and sometimes painful to an affected individual. An organisation called The Hyperacusis Network (details below) has applied the phrase *collapsed sound tolerance* to this situation. Where the sensitivity is specific to a particular sound, then the term *phonophobia* can be applied. A new word, *misophonia*, which means dislike of sound, has been coined to describe the aversion that some people with hyperacusis experience. *Recruitment* is a specific form of reduced sound tolerance in people who have a hearing loss. When people speak to someone who has recruitment, the person may say "Speak up a bit, I can't hear what you're saying." The speaker will then raise their voice slightly, only to be told "Don't shout! I'm not deaf". In recruitment, the auditory system goes from too little to too much very quickly.

What are the symptoms of hyperacusis?

The term hyperacusis is generally applied to people who experience the sounds of everyday life as intrusively loud, uncomfortable, and sometimes as painful. Sounds make it difficult for them to concentrate and they may report tension or even anger. Some people with hyperacusis become so afraid of sounds that they withdraw from normal daily activities and unfortunately this self imposed isolation can further exacerbate the condition.

Who gets hyperacusis?

There is very little reliable information about the numbers of people with troublesome hyperacusis. An internet study from Sweden has suggested that the figure may be as high as 9% of adults, but most professionals working in the field feel that this is too high. A more conservative estimate suggests that about 2% of the adult population have some degree of hyperacusis. The number of people who are severely affected is a small proportion of this total. If there is a dearth of information about hyperacusis in adults, there is even less information available regarding children. An association between hypersensitive hearing and Autism Spectrum Disorders (ASD) has been noted, but much more work is needed in this area before any real conclusions can be reached.

Is there a link with tinnitus?

Quite a few people who have tinnitus also have hyperacusis and looking at the figures the other way round, most people with significant hyperacusis also have tinnitus. However, this linkage is not absolute and it is quite possible to have either condition without the other.

What causes hyperacusis?

There are a few medical conditions that have hyperacusis as a symptom and for this reason it is important that people with hyperacusis should seek medical advice. Exposure to sudden loud noise can sometimes trigger the symptom. In some other people, a negative life event appears to be associated with the onset, but for many people no clear reason can be identified. Medical conditions that are on occasion associated with altered sound tolerance include migraine, post head injury syndrome, Lyme disease and Bell's palsy. The

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symptom can also arise after certain types of ear surgery. Although some people with hyperacusis have a hearing loss this is not inevitable and it is possible to have the symptom with ears that have completely normal hearing.

There are several theories about the mechanisms that underlie hyperacusis. What they share in common is that hyperacusis is usually associated with increased gain (or sensitivity) in the central auditory system (the hearing pathways in the brain), and that gain can be influenced by issues of anxiety or depression. Whilst none of the theories is entirely satisfactory they do represent an emergent understanding of the mechanisms of hyperacusis, which may well point the way to effective treatments.

Investigation of hyperacusis

Because significant hyperacusis is an unusual condition, most general practitioners have little knowledge regarding the symptom. Investigation therefore necessitates referral to an ENT Surgeon or Audiological Physician in a hospital. This doctor will then take a detailed history, considering the onset of the symptom, and any associated illness or other circumstance. The progression of the patient since that onset will be explored, as will any hearing loss, noise exposure or tinnitus. A careful examination of the ears, or otoscopy, will be performed and the doctor will arrange for a normal hearing test, or audiogram to be undertaken. In some centres a loudness discomfort test is performed. This is not an essential test and many people with hyperacusis are apprehensive about undergoing such an investigation. Anyone who is worried about this test should discuss it with the audiologist performing the test and the doctor who requested the test. There are questionnaires relating to hyperacusis and allied symptoms that may be used, both to try and quantify the problem and to monitor therapy.

Treatment of hyperacusis

If a specific medical condition is identified, there may be a specific form of treatment. However, for the vast majority this is not the case and once other conditions been excluded, referral can be made for therapy for hyperacusis. This is usually delivered within an NHS Audiology Service, and by the same Audiological personnel that undertake therapy for patients with tinnitus. Whilst access to services does vary, as does the expertise of professionals, it should be possible for patients to be referred to a unit that offers therapy for hyperacusis. The nature of hyperacusis and the patients' individual experiences will be explained: some therapists are happy to call this counselling, whereas others prefer an informal discussion or dialogue with their patient. Because many people with hyperacusis have cut themselves off from sound, most therapists feel that it is important to slowly and gently reintroduce sound into the person's life so that they can start to resume the activities they have been avoiding. Sound therapy can be administered either via ear level devices which resemble small hearing aids or bedside sound generators: the most commonly used sound is a wide band sound similar to a radio tuned 'off station'. A formal and structured version of these techniques has been called Retraining Therapy. An alternative approach is the use of Cognitive Behavioural Therapy (CBT). Availability of CBT for hyperacusis is limited by the number of appropriately trained Psychologists, but there are moves afoot to empower Audiologists to utilise such techniques. Each approach has its enthusiastic proponents, but all agree that these techniques are the present treatment of choice for hyperacusis. The

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duration and outcome of therapy vary with individual patients, but one normally expects therapy to last months rather than weeks, and to significantly improve quality of life.

Ear protection

One common feature of people with altered sound tolerance is that they try and avoid loud sounds. Although this may seem like a common sense precaution it can turn out to be counter productive and can even exacerbate the condition. As people avoid sound their environment becomes quieter and the auditory system becomes confused by this lack of sound input. The auditory system therefore becomes more sensitive in a misguided attempt to find the missing sound. This increased sensitivity can make the hyperacusis even worse. It is sensible to use ear protection measures when doing something really noisy such as using DIY tools. However, it is inappropriate to use ear plugs or ear muffs when doing something that is not really noisy such as emptying a dishwasher or driving a car. Someone who has become used to wearing ear protection at inappropriate times should consult their therapist about measures for weaning them off this practice. For advice on appropriate ear protection measures, see the BTA leaflet, *Save Your Ears*.

Research Issues

Hyperacusis is beginning to attract substantial scientific interest. Topics under investigation involve changes in the brain associated with hyperacusis, optimal sound therapy, and the association between hyperacusis and ASD. Whilst much work remains to be done, it is encouraging that hyperacusis is being taken seriously by the scientific community.

Further information

The Hyperacusis Network (www.hyperacusis.net) is an invaluable resource, with much useful and up to date information, lively forums and the opportunity to purchase sound therapy CDs for hyperacusis.

Whilst aimed at a professional audience, the book *Hyperacusis: diagnosis, mechanisms and therapies* (Baguley and Andersson, 2007, Plural Publishers) is accessible to people with hyperacusis and their families and summarises present scientific and clinical information.

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Helpline: 0800 018 0527
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