

Tinnitus and Cochlear Implants

David Baguley PhD, Consultant Clinical Scientist,
Cambridge University Hospital Trust

What is tinnitus? It is the subjective perception of sound or sounds that are not present in the external environment.

Many cochlear implant users have tinnitus and for most it largely disappears when the device is switched on. A few people have trouble sleeping at night and some even wear their implant at night.

In the general population about a third of all people say that they have had tinnitus at some time but only one in twenty say that it is really annoying. Between 2% and 4% go to hospital with tinnitus. Most people with tinnitus hear more than one sound and left sided tinnitus for some unknown reason is more common than right sided tinnitus.

Tinnitus is also related to hyperacusis or decreased sound tolerance. About 2% of people in this country have that. People with tinnitus can become agitated and struggle with their concentration, have sleeping problems and, as a result, to become anxious and depressed or as the Scandinavians say suffer from 'emotional exhaustion'.

Although most people say that the cochlea is the organ of hearing it is actually the auditory centre in the brain itself which is of crucial importance in recognising sound. Awareness of music happens when it goes to the conscious part of the brain. Normally in the hearing system there is a little bit of system noise but the system is so sensitive, so dynamic that it is normally filtered out at the level of the brainstem (where the spinal cord becomes the brain proper). If these filters fail the person becomes aware of that background sound. When they become anxious, fearful and dismayed about this tinnitus sound there is a problem.



David Baguley

How can an Audiologist help them? They may be helped by becoming habituated to the sound just as people living in a village near a motorway learn to ignore the traffic noise. Some people may be helped and become less fearful when they understand what is happening and learn to ignore it.

There are many different ideas as to what tinnitus actually is. Some tinnitus is generated at the level of the cochlea when the delicate hair cells have been damaged by age or by noise causing a tinnitus signal to go from the ear to the brain. In other people the signal is in the brain itself.

There are three main theories at the moment about what tinnitus actually is. Some people say it is an increase in spontaneous activity often associated with deafness. Others say it is when the hearing system picks up the tinnitus signal and that then becomes organised and synchronised so that it is perceivable and loud. Other people talk about networks in the hearing brain, or several different layers of connection which are not connected randomly but in networks.