

Acoustic Trauma-injury of an Ear

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Description

Acoustic trauma is an injury that damages the sense organ (inner ear), it mainly happens when exposed to high-decibel noise and it can occur when ear exposure to a single, very loud noise or from exposure to noises at significant decibels over a very long time. It further leads to progressive permanent hearing disorder. The eardrum will protect the middle ear and inner ear and also passes the signals to the brain. If the eardrum is ruptured or if any other injuries to the inner ear (labyrinth) or head can cause acoustic trauma. This kind of damage to the ear's hearing mechanisms as a result of exposure to high-decibel sound effects the vibrations because the eardrum transmits signals to the brain, resulting in hyperacusis or hearing disorder [1,2]. Sound moving into the inner ear can cause a threshold shift, which can trigger hearing disorder. The most common symptom of acoustic trauma is tinnitus or a ringing in the ears. People who are suffering from an acoustic injury will have difficulty hearing high-frequency sounds. One of the most delicate parts of the ear is tiny hairs that are surrounded near the middle ear. There are about 15 thousand of these kinds of structures and they are playing a fundamental part in the hearing process. Whenever the sound waves enter the ear canal, these hair cells bend to respond to the levels of sound they encounter, passing the waves further down into the ear [3]. Hair cell's function is to vibrate when sound waves hit it to send sounds further into the ear for processing. As many people know, loud noise can tear or pierce the eardrum and so you don't hear properly for a while.

While the ear exposure to high decibel sounds, the sensitive hair cells can lose their connections to the nerve cells which are responsible for hearing, and ear structures will be directly injured by loud noise. Sudden sounds which are above 130 decibels, a trusted source will injure the ear's microphone. Acoustic damage can injure the eardrum along with the small muscles in the ear, especially the tensor tympani muscle [4]. In most cases, when people exposure to long-term high volume sound, they first begin to have difficulty in hearing high-frequency sounds which further leads to permanent hearing disorder. One of the most important symptoms that can trigger the onset of acoustic trauma is known as Tinnitus. It is an injury that causes buzzing and ringing sounds in the ear. When a person is in a calm and silent environment without any sound pollution, this tinnitus will be often aware of mild to the moderate symptom [5]. This acoustic trauma is a higher risk for the person who works at loud industrial equipment operators for a long period, frequently added music concerts at high-decibel music, who live or work where other high-decibel sounds continue for a long period, encounter extremely loud sounds without proper equipment, such as earplugs.

Types of acoustic trauma

There are two main types of acoustic trauma, which are changed by the intensity of the sound that led to hearing disorder and the length of exposure to it:

Acute acoustic trauma: It is caused due to short exposure to an intense blast of sound. This type of trauma is sustained at a music concert, spending more hours at a nightclub, listening to train or airplane sounds for a long time, explosions or gunshots near the ear. Injury sustained by the ears in these kinds of situations can be reversed and tends to resolve spontaneously a few hours after the noise is experienced.

Chronic acoustic trauma: It is caused by prolonged exposure to harmful hearing loss, with less intense and noise levels. Chronic acoustic trauma leads to gradual damage to the ear and progressive hearing disorder over years of exposure to the noise and can be the result of working with loud machinery, such as in the case of factory workers or people who use headphones to listen to music or for any other phone conversation for a long time at high-level volume.

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Conflict of Interest

There are no conflicts of interest by author.

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