ARE YOUR EARS RINGING?

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Concerns about gradual hearing loss over time are of particular interest to us at CrossFit because of the tendency to play "ear-splitting" music before, during, and after workouts. I'll admit that this is the way we began way back then, but surely, being more enlightened, it need not be the way we continue, especially since the tender ears of the very young are becoming more and more evident in our gyms as are the more vulnerable ears of the very old. Samual C. Levine M.D., University of Minnesota was asked if continuing to go without earplugs when listening to loud music could lead to deafness. "Absolutely! There's no cure for tinnitus or hearing loss. Your ears are trying to tell you something. That ringing is the scream of your hair cells dying. Each time you do that, more and more damage is done." Dr. Levine is speaking of the tiny hair cells lining the cochlea of your inner ear.

We also need to be aware that some drugs can be toxic to the auditory system and NSAIDs qualify. The hearing loss from use of non-steroidal anti-inflammatory drugs such as Advil (ibuprophen) and Aleve (naproxen) is a rare transient complication. But, if you must take NSAIDs and if, during the treatment period, you have ringing in one ear or both – this is a warning. Stop the drug immediately.

HOW DO WE HEAR?

Sound is produced when the air is disturbed as it would be by the vibrations from the speaker cone in a high fidelity system. The air in front of the speaker cone is alternately compressed and decompressed causing waves of high and low pressure to be radiated away from the speaker cone at the speed of sound. The pressure waves cause the eardrum to vibrate and this energy is transferred through the little bones in the middle ear to the delicate hair cells in the cochlea, a shell-like structure in the inner ear. These minuscule hair cells move with the waves of pressure and transmit impulses to the auditory nerve and on to the hearing center of the brain.

The pressure waves from a very loud noise have been known to actually perforate the eardrum. However, it is important to realize that it doesn't have to hurt in order to harm. When the hair cells in the cochlea are damaged from too much pressure, you'll have some hearing loss and your ears may be "ringing" (tinnitus), hissing, or buzzing even in a quiet environment. These are "desperate" warning signs that hearing loss may result over a long period of time with consistent abuse.

The sources of the sounds that we hear from the energy being transmitted through the air (or water if you're a dolphin) and falling on our eardrums vary over a tremendous range

from a cat walking across a carpeted floor to a jet taking off. Our ears handle all of this range with a fair degree of grace, although not always without some hearing loss. To quantify this wide range, we use a logarithmic scale relating to the energy level at a point at which a person can just perceive sound—the threshold of hearing.

DECIBELS

The sound level of source is measured in dB (decibels). The dB level is the logarithm of the ratio of source energy to this reference level multiplied by ten. Using this system, sound levels range from 0 dB threshold of hearing to 60 dB–normal conversation, 85 dB–heavy city traffic and 115 dB–rock concert. Higher sound levels include a jet aircraft at 100 ft–130 dB and a shotgun–145 dB. In a logarithmic scale, an increase of 10dB means a sound power increase of ten times. An increase of 20dB is one hundred times and increasing sound power by 30 dB translates to one thousand times as much sound power. Thus, a 110 dB rock venue is 50 dB louder than a 60dB normal conversation. This 50 dB difference translates into a whopping 100,000 times more sound energy. That's why they bring the big amps and that's why you need ear plugs.

A-weighted decibels, abbreviated dBA, or dBa, or dB(a), are an expression of the relative loudness of sounds in air as perceived by the human ear, adjusting for the fact that the human ear is less sensitive to low frequencies.

To protect the hearing of workers in the workplace, standards have been established mandating a maximum sound level of 85 dB for an 8 hour exposure. For every 3 dB increase, the exposure time is cut in half. Following these rules, time of exposure at the rock venue should not exceed 2 minutes!

Stealth sources of hearing loss are high sound levels in clubs, iPods, and yard power equipment. Exposure to these 100 dB sources should be limited to 15 minutes. These are 10,000 times as loud as normal conversation.

PROTECT THOSE CUTE LITTLE EARS

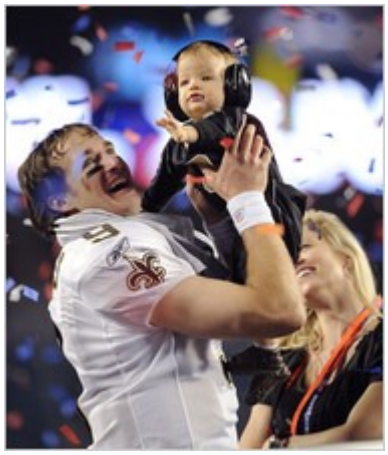

Photo by Mark J. Terrill/Associated Press

Above, Drew Brees, quarterback for the New Orleans Saints holds his one year old son, Baylen, following the 2009 Superbowl victory. Little Baylen is wearing hearing protective earmuffs to shield his sensitive ears from damage – smart people, Mr. and Mrs. Brees!

Is the noise at a football game that loud? Yes. It can reach 100 to 130 decibels especially when the quarterback is calling plays or there has been a touchdown. One hundred decibels for more than 15 minutes of exposure is potentially dangerous to an adult and all the more so to a child whose narrow, short ear canals cause the sound pressure on the eardrum to be greater. That shorter length in particular, increases noise levels in the higher frequencies. Dr. Gary Curhan of Brigham and Women's Hospital in Boston tells us that children with slight hearing loss "will hear all of the vowel sounds clearly, but might miss some of the consonant sounds such as t, k and s." Think what that would do to language development.

Of course, the warning extends not only to sporting events with huge screaming crowds, but also to environments that may slip your mind as being too loud for a child's ears such as some parades, fireworks displays, or high-decibel motorcycles and snowmobiles.

One retrospective study (Segal) described inner ear damage documented in 53 children exposed to noisy toys, in this case toy weapons and firecrackers. There were 49 boys and four girls aged between four and fourteen years. Thirty-nine children were affected unilaterally while fourteen had bilateral hearing loss (total of 67 ears). Most of the hearing loss (>70%) was sensorineural high frequency hearing loss, while only nine out of the 67 injured ears had sensorineural mid frequency hearing loss. Seven children sustained a traumatic ear drum perforation. Dizziness or tinnitus was reported by twenty children, with pathological findings in four of them.

Remember that hearing loss from exposure to loud noise is cumulative and irreversible.

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