



Noise: More elusive than realized

Between noisy work environments, loud noise exposures away from work, and an aging population, approximately 30 million Americans have some form of hearing loss. For years, most of the businesses in industry have been aware of the damaging effects of on-the-job noise exposure. Despite the many efforts taken by industry to silence machines, train employees, and provide hearing protection, hearing loss continues to be a problem in the U.S. Recent articles in newspapers and magazines paint a sad story: the baby boomers are suffering hearing loss. Individuals that are too young to be seen wearing a hearing aid are being courted by a new industry; one that sells tiny, disposable hearing aids.

Baby boomers are being exposed to decibel-blasting music, noises from manufacturing, snow mobiles, motor cycles without mufflers, and other forms of noise pollution. To target the boomers with smaller and now disposable hearing aids to make up for the effects of hearing loss, this new concept almost seems to consider hearing loss as trendy. The disposable hearing aid, which does not need battery replacement, is good for 30-40 days and can then be thrown away. The description of this boomer situation is that they are going from "turn it way up" to "say, what?"

How the ear works

Sound is gathered by the outer ear and funneled down the middle ear to the eardrum. Sound waves hitting the eardrum cause it to vibrate. The vibrations are passed on to the inner ear by three small bones: the hammer, anvil and stirrup. The sound waves are then transferred from the stirrup to the fluid within the cochlea, a snail-shaped part, where they are then translated into electronic nerve impulses.

Inside the cochlea, sensory cells called hair cells are within the organ of Corti. When the fluid moves, the membrane at the base of the hair cells moves as well. Different amounts of movement at various positions on the membrane correspond to different frequencies of sound. Those movements make the hair cells bump into a membrane above them and bend, triggering signals that eventually reach the brain through the auditory nerve and are then interpreted as sound. Once the hair cells are destroyed, the individual is left with a significant loss of hearing.

The two most common types of hearing loss are sensori-neural (nerve loss) and conductive. Sensori-neural loss is caused by problems with the inner ear or the auditory nerve. Effected people have trouble understanding the language: they hear speech, but cannot understand the words. Distinguishing between words such as thin and fin is a common problem. Hearing loss continues to occur if background noise is present. Most common causes are prolonged exposure to noise and aging. Damage can also stem from high fever, birth defects, and high doses of certain antibiotics.

Beware the decibels

Noise is unwanted sound and science knows how much noise is needed to cause hearing loss. Noise levels are measured in decibels; the greater the decibels, the more likely there can be noise-induced hearing loss. Note the examples of decibel levels from various daily exposures:

- 20 = watch ticking
- 30 = whispering, a library
- 40 = the rustle of leaves, a refrigerator
- 50 = average home, neighborhood street
- 60 = normal conversation, dishwasher, microwave



- 70 = car, alarm clock, city traffic
- 80 = garbage disposal, noisy restaurant, vacuum cleaner, outboard motor
- 85 = typical factory, electric shaver, screaming child
- 90 = passing motorcycle, lawn mower, convertible ride on an expressway
- 100 = blow-dryer, diesel truck, subway train, helicopter, chain saw
- 110 = car horn, snow blower
- 120 = rock concert, propeller plane
- 130 = jet engine at 100 feet distance, emergency siren
- 140 = shotgun blast

OSHA requires a hearing conservation program where employees are exposed to a time-weighted average of 85 decibels. Some experts argue that damage to ones hearing can come from levels as low as 70 decibels. It should also be noted that the measurement of each 10 decibel rise in noise reflects a tenfold increase in sound. So, 100 decibels is 10 times noisier than 90 decibels.

Prevention of hearing loss

Where possible, eliminate noise from the workplace. In many cases, simple, yet effective measures can be taken to reduce noise levels. Choose the proper hearing protectors and wear them correctly. Avoid loud music or wear hearing protectors. Choose restaurants that do not require you to yell loudly to be heard by the person on the other side of the table. Don't forget to wear hearing protection when using a leaf blower, lawn mower, snow blower, table saw, snowmobile, or skeet shooting. At work, noise should be monitored to first determine what the noise levels are and from this, the noise can be reduced while hearing protection is being worn. Another key factor is to test the hearing of workers. Do not eliminate new employees from this requirement; this group is one that needs monitoring.

Summary

Many fail to realize that excessive noise harms more than the hearing. Noise can be linked to: high blood pressure, increased incidence of heart and circulatory diseases, mental stress, irritability, ulcers, digestive disturbances and faster heart rates. It is up to each individual to protect and preserve one's hearing.

- George Swartz

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