Workplace hearing loss

While the majority of hearing loss in North American adults is age related, 5% to 10% is caused by occupational noise exposure.[1] Acoustic trauma and noise-induced hearing loss (NIHL) account for the majority of work-related hearing impairment.

As part of hearing conservation programs, BC employers are required to provide eight components, including annual hearing screenings for noise-exposed workers. Still, WorkSafeBC currently has about 30 000 active occupational (NIHL) claims, with another 3000 or so new claims added each year. Annual health care costs associated with these claims are more than $20 million, with $2 million for hearing aid batteries alone. Given the financial implications and significant social consequences, it is important to remember that most NIHL is preventable.

Acoustic trauma

Acoustic trauma refers to mechanical injury to the ear following exposure to sudden intense sound. The critical sound pressure level (SPL) needed to cause acoustic trauma is approximately 140 dB SPL.[2-4] Conductive hearing loss rarely results from noise, but a severe blast can rupture the eardrum, dislocate the middle ear ossicles, or both.[5]

Acoustic trauma usually results in temporary hearing loss and tinnitus, with full recovery in days or weeks. However, very intense exposures can produce permanent sensorineural hearing impairment.[6,7] Progressive hearing loss is not expected with this type of injury, and any permanent hearing impairment should stabilize within 6 to 12 months of the incident.[5,8,9]

Traumatic hearing loss may be asymmetrical, with greatest hearing loss in the ear closest to the noise source.[2,5,6,10]

NIHL

Exposure to noise of moderate intensity—85 to 130+ dBA—over many years can result in NIHL,[11] which is caused by metabolic and/or structural damage to the inner ear. Since the inner ear is affected, the loss is always sensorineural, rather than conductive.

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NIHL presents as a gradual, symmetrical decline in hearing, even where the noise source is consistently on one side. The decline is symmetrical because of reverberation and head movement, and because very little energy is lost as sound travels from one side of the head to the other.[10,12]

Earliest deterioration is typically in the 3000 to 6000 Hz range.[4,5,13] However, a 4000 Hz audiometric notch can also be caused by non-occupational conditions, and has been demonstrated in individuals who have never been exposed to noise.[4,13]

Hazardous noise contributes to hearing loss most rapidly in the first few years of exposure.[14,15] However, NIHL does not progress once the noise exposure has ceased.[14,16] In patients who show signs of NIHL, further loss can be prevented with appropriate hearing protection or noise control measures.

Recommendations

If occupational hearing loss is suspected, please submit a Form 8 to WorkSafeBC and then proceed as you would with any other patient. That may include referral to an audiologist or hearing instrument practitioner for further follow-up. Since non-occupational pathologies, such as vestibular schwannoma, otosclerosis, and sudden senorineural hearing loss can also be present in noise-exposed individuals, otologic referrals for red flag conditions (e.g., asymmetry > 30 dB, unilateral tinnitus, sudden hearing change) would be appropriate regardless of noise exposure history. These tests may or may not be covered by WorkSafeBC.

For more information

For more information about acoustic trauma or NIHL, or WorkSafeBC's hearing loss diagnostic or treatment services, please contact a medical advisor in your nearest WorkSafeBC office. For worker handouts and other information related to hearing protection and hearing conservation programs, please visit www2.worksafebc.com/Topics/HearingLossPrevention/Home.asp.

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This article is the opinion of WorkSafeBC and has not been peer reviewed by the BCMJ *Editorial Board.*

References

Available online at bcmj.org.