



Occupational Health
Clinics for Ontario
Workers Inc.

Centres de santé
des travailleurs (ses)
de l'Ontario Inc.

Sudbury Clinic
1300 Paris St.,
Suite 4
Sudbury, Ontario P3E 3A3
Tel: (705) 523-2330
Fax: (705) 523-2606
1-800-461-7120
E-mail: sudbury@ohcow.on.ca
Website: www.ohcow.on.ca

The Effects of Vibration on Occupational Hearing Loss

Occupational hearing loss can be defined as partial or complete hearing loss in one or both ears arising in, or during the course of, and as the result of one's employment. Whether occupational hearing loss is referred to as a disability, disorder, or impairment, it is one of the most common chronic health conditions affecting all age groups, ethnicities, and genders (Zenz et al., 1994). There are many factors such as noise, vibration, and solvents present in workplaces that contribute to hearing loss. Often, when two or more of the factors are present within a workplace, the level of hearing loss can be even greater. When examining the causes of hearing loss in workplaces, the effects of vibration on hearing loss may be overlooked.

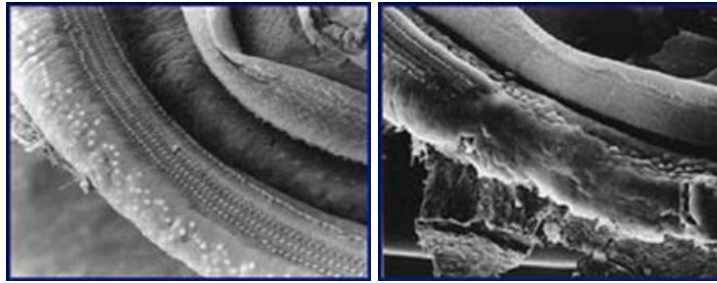
There are two types of vibration experienced by workers: segmental and whole body. Segmental vibration is transmitted through the hands and arms of a worker from a tool or work piece. The level of hand-arm vibration is determined by measuring the acceleration of the tool or object grasped by the worker. Whole body vibration is transmitted to the body when workers sit or stand on a vibrating surface or machine. The vibration then enters the feet, buttocks, or back. There are various sources of whole body vibration such as standing on a vibrating surface or driving.



What Are Signs That You Have Hearing Loss?

- You can't hear when the TV or radio is on at normal volume.
- Words become garbled and fuzzy when someone speaks in a crowded room.
- You laugh when others laugh, but really you don't know why they are laughing.
- You get confused and feel left out of conversations.
- You have trouble understanding young children as their words sound garbled.

Many vibratory hand tools and equipment expose workers to high levels of vibration as well as high levels of noise. Current literature shows that vibration alone does not cause hearing loss; however, the combined effects of noise and vibration are greater than the effects of noise alone. Vibration and noise together result in greater amounts of hearing loss than each factor separately. The combined effects of noise and vibration are a result of an increased narrowing of the blood vessels that occur in the cochlea. In 1981, Pyykko and colleagues discovered a link between workers who suffer from vibration induced white hands and hearing loss. Workers who are affected by vibration induced white hands have a greater hearing loss on average of 10 decibels (measurement of sound level) compared to an individual without the disorder (Pyykko et al., 1981).



Normal Hair Cells
(Hearing Professionals)

Damaged Hair Cells

If Vibration Is A Concern In Your Workplace, here are some tips:

1. Reduce the transmission of vibration to the worker by engineering the tools, equipment, or workplace more effectively. For example:
 - Improve vehicle suspensions
 - Alter the position of the seat within the vehicle
 - Mount equipment on springs or compression pads
 - Maintain equipment and tools properly (e.g. balance and replace worn parts)
 - Properly engineer tools and seating (or purchase this equipment)
 - Purchase anti-vibration equipment
 - Design tools to keep hands warm (e.g. heated handles, relocate air vents)
 - In standing operations, provide an anti-fatigue mat
2. Decrease the amount of vibration that workers are exposed to by:
 - Measuring the vibration exposure
 - Based on results determine the need for:
 1. Increasing rest/recovery time between exposures
 2. Reducing the speed of travel
 3. Alternating working tasks where vibration is present and those where it is negligible
 4. Having a policy on removal/reduction of vibration from the workplace
3. Eliminate awkward postures:
 - Modify the seat and control positions to reduce the incidence of forward or sideways leaning of the upper body and provide back rest support
 - Use tools with an ergonomic design to reduce grip force
4. Educate workers on vibration and hearing loss and what can be done in the workplace to decrease vibration exposure.

What Type Of Ear Protection Should Be Used?

To prevent noise from reaching your eardrums, you can use ear muffs, ear plugs (form-able type and plastic types) and ear canal caps. Ear protection is given a noise reduction number rate (NRR) which is shown as a number. The noise reduction rating is determined in a laboratory and does not reflect actual use in the workplace. The numbers should be reduced by about 25% for muffs, 50% for form-able plugs and 75% for ordinary plugs. For example, a formable plug rated at an NRR of 29 dB may reduce noise by about 15 dB.

Facts about Hearing Protection



- Ear muffs last longer, are not easily lost, and are dependable over a longer time. They may, however, be uncomfortable in hot weather, not compatible with eye/safety glasses, some face shields, and respirators. Ear muffs are bulky, heavy and may be difficult to carry if not attached to a hard hat.
- Earplugs are good for low frequency sounds. They are compatible with hot environments, easy to store and compatible with glasses, hard hats etc. Ear plugs are easily lost, contaminated and may cause ear canal irritation. They may also not be fitted properly or may be improperly used.



Using ear plugs and muffs together is the best protection.

OHCOW may be of assistance to you by:

- Providing facts on occupational hearing loss – contact us to receive a free copy of our Occupational Hearing Loss fact sheet
- Investigating the factors affecting hearing loss in your workplace by monitoring noise levels and providing recommendations to decrease levels
- Educating staff at your workplace on hearing loss at work
- Conducting hearing screenings to determine if workers have occupational hearing loss
- Refer workers to a specialist

Written By:
Mallorie Leduc
4th Year Kinesiology Student – Laurentian University

References

Hearing Professionals: Nelson Marlborough.
<<http://www.hearingprofessionals.co.nz/faq.htm>>

Occupational Health Clinics for Ontario Workers. (2007). Occupational Hearing Loss Fact Sheet.

Pyykko, I., Starck, J., Farkkila, M., Hoikkala, M., Korhonen, O., Nurminen, M. (1981). Hand-arm vibration in the aetiology of hearing loss in lumberjacks. *British Journal of Industrial Medicine*. 38: 281-289.

Zenz, C., Dickerson, O. B., & Horvath, P. (1994). Occupational Medicine. (3rd ed.) St. Louis, M.I.: Mosby.