

# Hither & Thither

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## The Eyes Have It

*By Gary W. Helmer*

Our sense of sight is probably our most critical faculty and without full use of it our lives can be dramatically altered. Yet, every year over 500,000 eye injuries occur in the United States. What's worse, it is estimated that nearly 90% of these injuries could be avoided by simply wearing appropriate eye protection. Not wearing suitable eye protection is the single biggest contributor to eye injuries in the workplace, at home, and on our playing fields.

Eye injuries are particularly prevalent in sports and among children under the age of 16 participating in sports. In 1996, there were more than 100,000 sports-related eye injuries reported to doctors or hospital emergency rooms. The costs of these visits exceeded \$175 million.

The most common injuries to the eye are abrasions, contusions, detached retinas, corneal lacerations, hemorrhages, and a complete loss of the eye. Most injuries occur when the ball or puck comes in contact with the eye or eye socket but can also be caused by other players. The riskiest sport for eye-related injury is baseball followed by racquet ball, then ice hockey, tennis, football, basketball, and golf.

Many high-risk sports such as hockey, lacrosse, racquet ball, soccer, baseball, basketball, and football have some form of eye/face protection designed for those who participate. However, there are sports such as wrestling and full-contact martial arts that do not have specific eye protective gear and yet, a high risk of injury exists. The most immediate problem is getting people to properly wear the protection that is provided.

Young and old alike are afflicted and accidental eye impairment shows no particular affinity toward race or gender. We all share equally in the chance of being hurt if we do not take adequate precautions. Some basic tips include:

- Follow and obey established safety precautions.
- Be alert for eye hazards - know that injuries can occur at anytime and anyplace.
- Wear effective eye protection that is appropriately designed for the task or activity at hand.

- Ensure that protective eyewear is clean and serviceable.
- Replace faulty or broken eye protection immediately.
- Do not forget that everyday eyewear and contact lenses offer no protection against eye hazards. Only eyewear designed specifically to afford defense against hazards will suffice.
- Buy safe toys for kids avoiding those with shafts, spikes, rods, and sharp or protruding edges. Ensure toys are age appropriate as well.
- Teach children to never run while carrying sharp objects such as pencils or scissors.
- Safety gates, furniture edge and corner protectors, and drawer and cabinet locks are a must in homes with small children.
- Wear specifically designed occupational eye protection on the job.
- Wear sunglasses that block 99% - 100% of the ultraviolet A and B rays when outdoors. This is especially critical when there is a high potential for glare such as at beaches and in snow-covered areas.
- Exercise caution when using household chemicals – many can cause serious eye damage.
- Never mow the lawn or use a grass/weed trimming device without proper safety goggles.

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- Utilize the appropriate sports eye-guard, safety goggles, helmet, or face mask/shield designed for the particular sporting activity.
- Know basic eye injury first-aid and plan for emergencies.
- Seek medical attention immediately in the event of an eye injury.
- Do not attempt to remove objects protruding into the eye except during a life-and-death situation.
- Get regular and comprehensive eye exams – uncorrected vision also causes accidents.

When fitted and used properly, eye protection can reduce injuries significantly. Protection cannot work if you don't use it. Think eye safety! *gwh/03*

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## Checklist: Steps Computer Users Can Take to Maintain Healthy Eyes

For workers who spend most of the day in front of a computer screen, several key factors can cause eyes to work harder than necessary. Here are some basic tips courtesy of 3M for minimizing eye strain and maintaining your vision.

- Get regular eye exams, and wear corrective lenses if necessary. (Be sure to tell your eye specialist that you use a computer at work.)

- Add an AOA-approved anti-glare computer filter to your monitor.
- Blink frequently to help keep eyes moist, particularly if you wear contact lenses.
- Occasionally cup your hands over closed eyes for 30 seconds to 60 seconds and take deep, slow breaths to relax.
- Adjust your monitor distance. Position your monitor at least 18 inches from your eyes.
- Adjust monitor angle to reduce reflective glare. Straight up and down is best. Use document holders that attach to the sides of the monitor, and angle them accordingly.
- Adjust your monitor height. A good guideline is to arrange the monitor so that when sitting relaxed, you can look over the top of the monitor.
- Use polarizing task lights to light your tasks, not your computer monitor.
- If feasible, install lower-watt overhead light bulbs or polarizing light filters to reduce room lighting levels.
- Relocate your computer monitor from in front of windows and bright light sources.
- Use drapes, shades and blinds.
- Clean the screen. Staring through dust, dirt and fingerprints on your

computer screen makes the image more difficult to see.

These tips originally appeared in *Occupational Health & Safety News*, one of several print newsletters offered by Stevens Publishing.

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## Noise-Induced Hearing Loss

Reprinted from:  
[www.nidcd.nih.gov](http://www.nidcd.nih.gov)

Every day we experience sound in our environment such as the television, radio, washing machine, automobiles, buses, and trucks. But when an individual is exposed to harmful sounds--sounds that are too loud or loud sounds over a long time--sensitive structures of the inner ear can be damaged, causing noise-induced hearing loss (NIHL).

### How do we hear?

Hearing is a series of events in which the ear converts sound waves into electrical signals that are sent to the brain and interpreted as sound. The ear has three main parts: the outer, middle, and inner ear. Sound waves enter through the outer ear and reach the middle ear where they cause the eardrum to vibrate.

The vibrations are transmitted through three tiny bones in the middle ear, called the ossicles. These three bones are named the malleus, incus, and stapes (and are also known as the hammer, anvil, and stirrup). The eardrum and ossicles amplify the vibrations and carry them to the inner ear. The stirrup transmits

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the amplified vibrations through the oval window and into the fluid that fills the inner ear. The vibrations move through fluid in the snail-shaped hearing part of the inner ear (cochlea) that contains the hair cells. The fluid in the cochlea moves the top portion of the hair cells, called the hair bundle, which initiates the changes that lead to the production of nerve impulses. These nerve impulses are carried to the brain, where they are interpreted as sound. Different sounds move the hair bundles in different ways, thus allowing the brain to distinguish one sound from another, such as vowels from consonants.

## What sounds cause NIHL?

NIHL can be caused by a one-time exposure to loud sound as well as by repeated exposure to sounds at various loudness levels over an extended period of time. The loudness of sound is measured in units called decibels. For example, normal conversation is approximately 60 decibels, the humming of a refrigerator is 40 decibels, and city traffic noise can be 80 decibels. Examples of sources of loud noises that cause NIHL are motorcycles, firecrackers, and firearms, all emitting sounds from 120 to 140 decibels. Sounds of less than 80 decibels, even after long exposure, are unlikely to cause hearing loss.

Exposure to harmful sounds causes damage to the sensitive hair cells of the inner ear as well as the hearing nerve. These structures can be injured by two kinds of noise: loud impulse noise, such as an explosion, or loud continuous noise, such as that generated in a woodworking shop.

## What are the effects of NIHL?

Impulse sound can result in immediate hearing loss that may be permanent. The structures of the inner ear may be severely damaged. This kind of hearing loss may be accompanied by tinnitus, a ringing, buzzing, or roaring in the ears or head, which may subside over time. Hearing loss and tinnitus may be experienced in one or both ears, and tinnitus may continue constantly or occasionally throughout a lifetime.

Continuous exposure to loud noise also can damage the structure of the hair cells, resulting in hearing loss and tinnitus. Exposure to impulse and continuous noise may cause only a temporary hearing loss. If the hearing recovers, the temporary hearing loss is called a temporary threshold shift. The temporary threshold shift largely disappears 16 to 48 hours after exposure to loud noise.

Both forms of NIHL can be prevented by the regular use of hearing protectors such as earplugs or earmuffs.

## What are the symptoms of NIHL?

The symptoms of NIHL increase gradually over a period of continuous exposure. Sounds may become distorted or muffled, and it may be difficult for the person to understand speech. The individual may not be aware of the loss, but it can be detected with a hearing test.

## Who is affected by NIHL?

More than 30 million Americans are exposed to hazardous sound levels on a regular basis. Individuals of all ages, including

children, adolescents, young adults, and older people, can develop NIHL. Exposure occurs in the workplace, in recreational settings, and at home. Noisy recreational activities include target shooting and hunting, snowmobiling, riding go-carts, woodworking and other noisy hobbies, and playing with power horns, cap guns, and model airplanes. Harmful noises at home include vacuum cleaners, garbage disposals, gas-powered lawn mowers, leaf blowers, and shop tools. And it makes no difference where a person lives--both urban and rural settings offer their own brands of noisy devices on a daily basis. Of the 28 million Americans who have some degree of hearing loss, about one-third can attribute their hearing loss, at least in part, to noise.

## Can NIHL be prevented?

NIHL is preventable. All individuals should understand the hazards of noise and how to practice good health in everyday life.

- Know which noises can cause damage (those above 90 decibels).
- Properly wear earplugs or other hearing protective devices when involved in a loud activity.
- Be alert to hazardous noise in the environment.
- Protect children who are too young to protect themselves.
- Make family, friends, and colleagues aware of the hazards of noise.

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- Have a medical examination by an otolaryngologist, a physician who specializes in diseases of the ears, nose, throat, head, and neck, and a hearing test by an audiologist, a health professional trained to identify and measure hearing loss and to rehabilitate persons with hearing impairments.

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## Choose Hearing Protection That Workers Will Wear

Reprinted from:  
[www.oshonline.com](http://www.oshonline.com)

Hearing protection must be capable of reducing the noise at the ear to a safe level. However, it must also be reasonably comfortable to be accepted by the worker. This means that it must be compatible with whatever else the worker is wearing or doing. The following guidance can be used when selecting a device that will be accepted by the wearer.

1. First, make sure that the required level of protection is established by having a competent person measure the noise levels and determine what level of attenuation the ear protectors should provide.
2. Review the available types of hearing protection. Generally, this will involve choosing between earplugs, earmuffs and semi-aural inserts. At this stage an assessment of their compatibility with the task and environment will need to be made.

3. Do not select high-efficiency ear protection unless it is really needed. It is a mistake to assume that the highest level of protection must be the best. Devices with a high level of noise attenuation may be heavy, bulky and generally more uncomfortable to wear than more basic types.

4. The choice of hearing protection is best done in consultation with the workers who are going to wear the devices. An informal session, away from the shop floor, often works best. Discuss the pros and cons of using each type of device. Involve the workers and let them try out a selection of devices so that they can choose something they are comfortable with. This might mean supplying a wide range of different devices, but this is better if the workers actually use them when they should.

5. Earmuffs can be unpleasant to wear when the work areas are hot or if a lot of manual work is involved. If the workers are required to crawl or work in narrow and confined spaces, earmuffs are probably going to be too bulky for this application, so earplugs might be a better choice.

6. If the worker needs to wear a hard hat, consider using hat-mounted earmuffs. There are many hard hat and earmuff combinations available, but some are difficult to use and do not fit well. Look for a hard hat that has been specially designed to accept earmuffs.

7. If the work area is very dirty and the workers' hands get badly soiled, earplugs may not be a suitable choice. This is

because conventional earplugs need to be rolled up and placed into the ear canal using the fingers. It is natural for people to be resistant to introducing dirty earplugs into the ear. In these cases earmuffs would probably be the best choice.

8. There are modern alternatives that bridge the gap between traditional earplugs and earmuffs. There is a range of mushroom-shaped earplugs, which do not need to be compressed and have a small plastic stub handle that enables them to be handled with dirty fingers.

9. Semi-aural ear inserts, i.e. earplugs on flexible plastic neckbands, are also a good choice as they can be easily removed and replaced in dirty environments. They are also far less bulky than earmuffs.

10. Earmuffs and earplugs are often forgotten by workers who are always on the move, e.g. factory maintenance workers, or people working from vehicles such as field service engineers or site construction workers. It is probably best in these cases to opt for semi-aural ear inserts. These can be worn around the neck when not in use. These devices are light and unobtrusive and once placed around the neck are less likely to be laid down and forgotten.

11. The semi-aural ear inserts are a good choice for supervisors and managers who frequently need to move from quiet to noisy areas and back again.

12. Try to choose brightly colored earplugs and semi-aural ear inserts as these tend to be

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more readily accepted by younger workers.

13. Custom-molded earplugs may be an option to consider. They can be more comfortable to wear because the plugs are pre-molded according to the exact shape of the wearer's ear canal. The disadvantage is that they are more expensive than standard earplugs so the initial purchase costs can be high.

14. Timely replacement of lost or damaged custom-molded plugs may also be an issue to consider. However, it is understood that the companies supplying these products include maintenance contracts to cover these problems. These devices are unlikely to be suitable replacements for conventional ear protection in situations where there is a high turnover of staff because the replacement costs would be too high.

15. Where workers need to hear each other talking in noisy work areas, earmuffs or earplugs which have been designed to make the speech frequencies more audible should be selected.

16. For more reliable communication, it would be better to obtain earmuffs that incorporate radio communication equipment. These devices are particularly good for safety-critical applications, e.g. airport ground crew and for training workers in the use of noisy and dangerous machinery.

17. It is important to ensure that whatever device is selected, it will provide the necessary degree of protection. This is always going to be the most important consideration, so it

must be properly checked out by a competent person.

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## Look to These Links

Lab Safety Supply  
[www.labsafety.com](http://www.labsafety.com)

National Safety Council Buyer's Guide  
[www.nsc.org/buyersguide](http://www.nsc.org/buyersguide)

Occupational Health and Safety Magazine  
[www.ohsonline.com](http://www.ohsonline.com)

OSHA Computer Workstations  
[www.osha.gov/SLTC/computerworkstation/index.html](http://www.osha.gov/SLTC/computerworkstation/index.html)

Lost Time Due to Work-Related Injuries  
[www.dmdc.osd.mil/twi/owa/lpdr\\_main](http://www.dmdc.osd.mil/twi/owa/lpdr_main)

Prevent Blindness America  
[www.preventblindness.org/safety/](http://www.preventblindness.org/safety/)

A Kid's Eye Safety Guide  
[www.optima-hyper.com/eyetests/kidsquiz/KIDSAFE.htm](http://www.optima-hyper.com/eyetests/kidsquiz/KIDSAFE.htm)

All About Eye Safety and Safety Eye Glasses  
[www.eyesafety.4ursafety.com/](http://www.eyesafety.4ursafety.com/)

National Institute of Deafness and Other Communication Disorders  
[www.nidcd.nih.gov/health/hearing/noise.asp](http://www.nidcd.nih.gov/health/hearing/noise.asp)

HealthLink – Medical College of Wisconsin  
<http://healthlink.mcw.edu/article/965928293.html>

NIOSH – Noise and Hearing Loss Prevention

[www.cdc.gov/niosh/noise/noisepeg.html](http://www.cdc.gov/niosh/noise/noisepeg.html)

OSHA – Noise and Hearing Conservation  
[www.osha-slc.gov/SLTC/noisehearingconservation/](http://www.osha-slc.gov/SLTC/noisehearingconservation/)

American Speech-Language-Hearing Association (ASHA) – Hearing Protection  
[www.asha.org/hearing/disorders/hearing\\_protect.cfm](http://www.asha.org/hearing/disorders/hearing_protect.cfm)

The Effects of Hearing Protection on the Localization of Sound  
<http://www.afrlhorizons.com/Briefs/Jun02/HE0201.html>

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**Your comments and suggestions are always welcome!**

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### **A Parting Thought**

**“Always do right. This will gratify some people and astonish the rest.”**  
– Mark Twain

**Thanks!**