Suggestions for a Hearing Protector Fitting Practicum

Elliott H. Berger, MS
Senior Scientist, EAR/Aearo Technologies

Quite often the business end of a hearing conservation program is the correct and consistent use of hearing protection. This requires proper training and motivation of employees. The importance of this cannot be overstated, in light of the numerous studies indicating that a very high percentage of hearing protection wearers, who are enrolled in hearing conservation programs achieve poor noise reduction performance in the workplace. However, fitting hearing protection devices (HPDs) doesn’t require sophisticated technical wizardry or an advanced education. Although there is new technology to measure in-field performance, (Berger, 2007) its use is not widespread. The common-sense techniques described here can provide an adequate indication of the quality of the hearing protector fit. Teaching the fitting of hearing protectors may seem mundane, and it can be. However, it calls for commitment, experience, and sufficient time with each individual - and that’s what we hope will be demonstrated and instilled in all Occupational Hearing Conservationists (OHCs) and Course Directors (CDs).

Certified OHCs need to be knowledgeable about the types and selection of HPDs and skilled in teaching the proper fitting techniques and monitoring HPD use in the workplace. In the 20-hr. OHC course, one hour is devoted to hearing protector “theory,” items related to attenuation, ergonomics, and company policies etc. An additional hour is comprised of the hearing protector fitting practicum, including ear inspection. Although some hearing conservationists have objected to spending that much time teaching HPD fitting, I find that at least 2/3 of people who are nominally “experienced” hearing-protection users walk away with a valuable take home, and at least ¼ of them could not correctly insert a foam earplug prior to the training. Even if your students grasp only one or two gems, or experience a single “ah-ha” moment, the session will be well worth it. It is important that everyone involved in hearing conservation, regardless of how often he/she is involved in teaching others to fit HPDs, be as knowledgeable as possible with the one tool that in nearly all instances can prevent noise-induced hearing loss, namely a well-fitted earplug or earmuff.

Students should be taught the use of 1) roll-down foam earplugs, 2) premolded earplugs, 3) semi-insert devices (canal caps), and 4) earmuffs. These cover the major categories of hearing protection (with the exception of custom earmolds that are not practical to work with in this setting. The amount of time focused on foam earplugs is due to the popularity and effectiveness of those devices and my observation over many years that much can be learned about ears and plugs by using them.

Preparation

It is best for this class to be taught with all participants standing. It promotes interaction and makes it easier for all to work with their ears and those of their classmates. Each group of no more than 8 students should be situated around a small table with the supplies they need. Cocktail rounds are ideal because of their height and small diameter. It is also helpful, if in the room, you have a slide screen and projector available to project information that you would like to share during the fitting seminar. One suggested set of slides on using foam earplugs is available at www.e-a-r.com/hearingconservation.

Recommended references on teaching how to fit hearing protectors are listed at the end of the article. The brochure, Tips and Tools for Fitting E-A-R Foam Earplugs (Aearo Company, 2001), is an excellent resource for fitting foam earplugs and also provides information on how to use the E-A-R Roll Model as a training aid.

A list of suggested supplies is located on page 9. A more extensive article is available on the CAOHC website under the Teaching Tools section http://www.caohc.org/publications/teachingtools.php

Suggested Outline For A Practicum

1) Otoscopic inspection for hearing protector fitting

Choose an easy eardrum for all to view. Stress importance of looking around at the entrance to canal, on the way to examining the actual canal itself. Use earlight (if available) but discuss alternative use of otoscope. Illustrate pinna pull, direction of canal, and direction to insert plug. Everyone looks in neighbor’s canal with earlight. Follow by everyone using the otoscope. Stress bracing fingers against cheek with otoscope held like pencil so that canal of student is protected.

2) Demonstrate use of foam earplugs in slide presentation format

It is helpful to first demonstrate correct use with a set of PowerPoint slides such as the one cited above.

3) Rolling and inserting foam plugs

Roll Model practice – all students roll plugs and practice inserting into Roll Model for proper depth and no wrinkles (see Tips and Tools for Fitting Foam Earplugs) Instructor fits off-hand ear of each student and asks them to fit the other. Students should also practice fitting each other. Stress importance of pinna pull direction. It is helpful to continuously move direction of pinna pull during insertion until plug slides easily in place.
there may be a tendency to blame the workplace for all of his hearing loss, when in fact, there could be multiple causes including recreational and environmental noise exposure. Quantifying HPD performance and documenting it regularly, should give the hearing conservation program manager and professional supervisor another tool to use when trying to determine whether a given hearing loss is work-related. Rather than relying on anecdotes and assumptions, they can look at the PAR achieved by the worker involved, and compare that to the worker’s noise exposure. With a PAR appropriate for the noise exposure, there can be greater assurance that the worker received adequate protection from occupational noise exposure, and that other causes for hearing loss should be considered.

Individual fit testing of hearing protectors is an idea whose time has come. Fit testing can improve understanding of HPD performance, and by doing so, help prevent hearing loss.


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4) Checking and demonstrating the fit
With finger, feel position of back end of earplug relative to the tragus as this is a rough guide to insertion depth. Use tweezers to remove plugs so they do not become distorted and then “read” the plugs for depth of insertion, and for wrinkles or creases. Optional (requires presentation of a constant broad band noise): Tightly cup hands over ears to listen for differences in the perceived sound (see EARLog 19).

5) Comments re deep fitting and advantages of a better fit with foam earplugs
Deep fitting is rarely a problem with foam earplugs, even of the cylindrical variety. Mention the solutions that include: rolling the plug into a golf tee shape for a natural stop, using plugs with attached cords, or buying some of the longer foam earplugs or flared foam earplugs that are on the market today. Advantages of deeper fits of foam plugs are generally better comfort, more noise reduction, and less occlusion effect (OE).

6) Fitting a premolded earplug
Once again, stress pinna pull and helping determine proper direction of pull for each individual ear. Warn re need for slow withdrawal with premolded earplugs so as not to create suction and hurt the ear. As above, fit earplug in off-hand ear of each student and have her/him match in other ear. Demo TUG test and PUMP test (see EARLog 19 for description). Optional: while in noise have students break seal and listen to difference in noise reduction Optional: while in noise perform cupped-hands over plugs “earmuff test” as noted above.

7) Listening to and use of the occlusion effect (OE)
Review meaning of, and listen to the OE. See EARLog 19 for discussion of this effect and how it varies for depth of insertion of foam earplugs. Listen to OE by creating it with thumb over ear while saying “boom beat.” Fit one ear with premolded plug and listen to OE which will be dominant in the occluded ear. Fit other ear and now again listen to OE to perceive how it is centered in the head. OE works for earmuffs too by lifting one cup at a time, and also for foam earplugs, though with foam plugs (unlike premolded plugs), usually less OE is better because that indicates a deeper fit.

8) Use of the Eargage
Demonstrate use for approximate sizing for those inexperienced in fitting HPDs. Fit for minor suction and until tab is at floor of concha.

9) Fitting earmuffs
Easier to fit than earplugs, but still requires attention and sizing. Demonstrate: cup centered around pinna cushion sealing against skull, not against hair or over pinna/lobe proper positioning of headband directly over top of head band extension for uniform cushion compression uniform pressure around ear removal of obstructions OE test can work with earmuffs too.

References

Suggested Reading
Suggested Supplies for a Hearing Protector Fitting Practicum

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>EXAMPLE and NOTES</th>
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<tbody>
<tr>
<td><strong>HPDs</strong></td>
<td></td>
<td></td>
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<tr>
<td>Foam earplugs</td>
<td>4 pr./person</td>
<td></td>
</tr>
<tr>
<td>Premolded earplug</td>
<td>1 pr./person (if single sized)</td>
<td>Suitable size selection if multi-sized</td>
</tr>
<tr>
<td>Semi-insert (canal cap)</td>
<td>2 pr./group</td>
<td></td>
</tr>
<tr>
<td>Earmuffs</td>
<td>2 pr./group</td>
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<tr>
<td><strong>OPTIONAL TRAINING AIDS</strong></td>
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<tr>
<td>Roll Models</td>
<td>at least 1 per 2 students</td>
<td>available from Aearo Company*</td>
</tr>
<tr>
<td>Eargages</td>
<td>at least 1 per 2 students</td>
<td>available from Aearo Company*</td>
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<tr>
<td><strong>EQUIPMENT</strong></td>
<td></td>
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<tr>
<td>Otoscopes</td>
<td>at least 2 per group</td>
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<tr>
<td>Earlights</td>
<td>1 per person (optional)</td>
<td>penlight with a clear plastic probe on the tip</td>
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<td>Tweezers (blunt)</td>
<td>3 pair</td>
<td>optional to allow listening to HPDs</td>
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<tr>
<td>Sound system</td>
<td>2 speakers for high-level noise</td>
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<tr>
<td><strong>SUPPLIES</strong></td>
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<tr>
<td>Specula</td>
<td>1 bag (40/bag)</td>
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<tr>
<td>Cotton Balls</td>
<td>1 bag</td>
<td></td>
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<tr>
<td>Alcohol</td>
<td>1 bottle</td>
<td></td>
</tr>
<tr>
<td>Batteries</td>
<td>extras for the otoscopes or earlites</td>
<td></td>
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Note: * Products are suggestions made by the author and are not endorsed or required by CAOHC.

Hearing Conservation Standards and Regulations

According to a May 2008 report by the International Safety Equipment Association (ISEA), the U.S. House of Representatives plans to move forward with a recommendation to OSHA that, with its FY09 funding, the Agency should focus on hearing protection regulations. The recommendation is in the form of “report language,” which is not binding, but federal agencies heed it closely. The hearing protection “report language” addresses hearing protection for construction and general industry. The report language would state:

- The Committee notes that OSHA is responsible for regulation of occupational exposure to hazardous noise, but nearly thirty years after the issuance of a hearing standard for general industry, OSHA has failed to issue a similar rule to protect workers in the construction industry. Though a hearing conservation standard has been on OSHA’s regulatory agenda for years, it has been downgraded to an item for long-term action.

- The Committee urges OSHA to put this rulemaking back on the active regulatory agenda and move forward to issue a regulation.

- In addition, when the Environmental Protection Agency (EPA) publishes its final rule on hearing protectors, for which EPA’s Office of Air and Radiation has jurisdiction, the Committee expects OSHA shall develop a plan, with timelines for expected action, to update regulations for occupational exposure to hazardous noise based on the new EPA rule, current science, and best practices.

ISEA reports that, while the appropriations process is moving forward, there is no specific date for next action on the Labor-HHS-Education Appropriations bill, which contains funding for OSHA. If you’d like to help support these recommendations please contact ISEA Public Affairs Director Dan Glucksman for more information and suggestions for contacting members of Congress. He can be reached at 703-525-1695 ext 19 or by email dglucksman@safetyequipment.org.