SIM 05 05 01 NIHL Prevention
Track C Education and awareness

Guidelines for Trainers Volume 1

Induction talk for employees in noisy occupations

To be presented before or immediately after audiometric testing

Preface

These guidelines for trainers are to assist them in the presentation and facilitation of induction sessions aimed at employees in noisy occupations. The purpose is to increase workers' awareness of noise as a hazard and of the negative impacts it can have on their employment and quality of life, as well as to provide employees with the necessary knowledge and skills to protect themselves against noise-induced hearing loss (NIHL).

It is widely recognised that a personal protection strategy, in this case the use of hearing protection devices (HPDs), is only an interim measure until engineering solutions have reduced noise to safe levels. Given that some individuals may be resistant to the use of hearing protection, education and motivation should be seen as prerequisites to training in the use of HPDs. These trainer guidelines were produced by the CSIR Centre for Mining Innovation on behalf of the Mine Health and Safety Council, as outputs of Project SIM 05 05 01, Track C.

For further information contact:
The Research Group Leader
Human Factors
CSIR: Centre for Mining Innovation
P O Box 91230
Auckland Park 2006
Tel: (011) 358-0000
Fax: (011) 482-3267

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Objectives and notes for trainers/presenters

An essential prerequisite for ensuring the effectiveness of a personal protection strategy is to make people aware of the hazard and its potential consequences, so that they will want to protect themselves from injury.

The objectives of this induction talk are:

(i) to promote a comprehensive understanding of the nature, the cause and the consequences of noise-induced deafness, as well as to motivate workers to take steps towards preventing loss of their own hearing;

(ii) to demonstrate the advantages of using Hearing Protection Devices (HPDs) in noisy places and encourage a positive attitude towards HPDs;

(iii) to demonstrate the proper use and care of HPDs; and

(iv) where the induction talk is to be immediately followed by audiometry, to ensure the correct responses or behaviour expected from employees during audiometric testing.

It should be noted that the present document provides detailed guidelines for induction talks aimed at noise-exposed employees. It may be necessary to change or modify the content and/or manner of presentation to suit a particular situation or group of trainees. The trainer or presenter should encourage group members' participation and allow ample time for questions and discussion.

If the induction talk is to be presented before audiometric testing, it will not be permissible to demonstrate the effectiveness of HPDs in improving speech and signal intelligibility in loud noise (see Section 5). This is to avoid causing possible temporary hearing loss during the demonstration and the subsequent recording of inaccurate hearing thresholds during audiometry. If the demonstration detailed in Section 5 is to be included as part of the induction, trainees should participate only after they have undergone audiometric testing. Alternatively, the induction talk could be presented before audiometry, omitting the HPD demonstration until after the audiometry.

1 Introduction

The suggested "script" for induction talks given in these guidelines is printed in normal font, with the text enclosed by quotation marks ("…"). Prompts or suggested actions for the trainer/presenter are printed in ***bold italics***. Reference is made to four figures, which are appended. To make use of these visual aids, the trainer/presenter should either print them on transparency film for display with an overhead projector, or display the images using a computer and projector.

Friendly greetings to all and introductions

"We are going to look at the use of hearing protection to prevent the damage that can be caused by loud noise. Where there are machines working, there is loud noise that can damage your ears. If your ears are damaged by loud noise you will never be able to hear properly again. Imagine if you could never hear properly again. You would not be able to understand what other members of your team or your friends and family say to you. You would not be able to understand what is said on the radio or television, enjoy music or be able to speak on a telephone. You would not hear the soft sounds of nature, like birds singing. You would have difficulty understanding what your supervisor or other members of your team are saying or hearing warning signals from approaching machinery, which could have a bad effect on your job and on your safety."

Presenter to display overhead slide of "thermometer scale" (Figure A-1 in the Appendix), illustrating the loudness of different sounds

"This picture shows us how loud different sounds are. Where the lines are red, it shows that the noise is loud enough to be dangerous, and that we need to protect our ears."

"Whenever you go where there is loud noise from a drill or loader or any powerful machine, the noise will slowly destroy your hearing if you are not wearing hearing protection devices or HPDs. Only a small amount of damage occurs each day, but the damage is permanent and gets worse each day. There is no pain when your ears are damaged and, as you lose more and more hearing, you may think that you are getting used to the noise. What is really happening is that your ears are being slowly deafened. It does not matter if you are big and strong or small or young or old: loud noise can damage your ears."

"At the end of the shift, if you hear a ringing sound coming from inside your ears or if your ears feel half-deaf, this means that the loud noise damaged your ears slightly during the shift. The next day your ears will feel good again but you may have lost some hearing without knowing it. You may have met someone who has worked on the mine for a long time and does not hear very well. When you speak to someone who does not hear well, you have to speak loudly and

say

things more than once for the person to understand. Some people become impatient and stop speaking to the deaf person. How would you feel if your friends and family stopped speaking to you because they find it too much trouble to shout and repeat everything that they say?"

2 How to recognise dangerous noise

"How can you know when the noise is loud enough to damage your ears?"

"Whenever you are in a place where you must shout before a person standing close to you can hear and understand what you say, the noise is loud enough to damage your ears."

Trainer/presenter to explain that 'standing close' would mean within one metre or approximately an arm's length

"Also, whenever you see this sign,"

Trainer/presenter to display the picture of the symbolic sign for mandatory use of hearing protection (Figure A-2) on the overhead projector

"the noise in that area is dangerous. The sign tells us that we need to wear HPDs to protect our ears from the loud noise."

"If at the end of your shift you hear a ringing, hissing or buzzing sound coming from inside your ears, it means the noise during the shift was too loud and caused a bit of damage to your ears. This picture shows what our ears look like on the inside and this innermost part of the ear is where the damage happens."

Trainer/presenter to display the picture that shows the general anatomy or structure of the ear (Figure A-3), pointing to the inner ear

"This next picture shows the inside parts of two different people's inner ears."

Trainer/presenter to display the picture that shows a magnified view of two inner ears (Figure A-4)

"See how the inner ear in the top picture still has all the little nerve endings or hair cells that send messages to the brain and allow us to hear. But the inner ear at the bottom has lost all the nerve endings where the arrows are pointing."

Trainer/presenter to point out the difference between the normal and noise-damaged inner ears

"The inner ear at the top is still healthy and the person has very good hearing. The inner ear at the bottom has been damaged by loud noise. This person will never be able to hear properly because the little nerve endings or hair cells that have been destroyed cannot grow back again. If this person had used hearing protection the bottom inner ear would look more like the one at the top and the person would still be able to hear properly."

"To make sure that your ears do not get damaged like this one, before you go into any noisy

area you should make sure you have HPDs and that you are wearing them."
"You must make certain that your HPDs are fitted properly."

3 How to protect against dangerous noise and hearing loss

“We must protect our ears from loud noise, just as we protect our heads with hardhats, our feet with strong boots, our knees with knee guards and our hands with gloves. We must protect our ears just as we protect our eyes with safety goggles. How do we protect our ears from being damaged by loud noise? We can protect our ears with earmuffs or earplugs, the two main types of HPDs.”

Trainer/presenter to display various types of HPDs, including earmuffs, earplugs and band-mounted earplugs

“Because earmuffs are too big and very hot to wear underground, most underground workers prefer earplugs. If you work where the noise often stops for a few minutes at a time or if you are going into and out of the noisy area, you may prefer band-mounted earplugs like these, but they do not give as much protection as earplugs or earmuffs”

Trainer/presenter to show audience band-mounted earplugs

“or if it's not too hot, earmuffs like these.”

Trainer/presenter to show earmuffs

“Whichever type of HPDs you use, they should be replaced if you lose them or if they become damaged or worn out. You can get new ones at the change house or crush, from your Health and Safety Representative or from your supervisor.”

Trainer/presenter to provide details of where HPDs are available

4 How to fit earplugs correctly

“These earplugs will not protect your ears from loud noise if you do not fit them properly. We are now going to learn the correct way of fitting earplugs.”

At this point members of the group should be given earplugs

Note to trainer/presenter: Although some people such as surface workers might ultimately be using muffs, for the purpose of this demonstration it will be better to use earplugs. If disposable earplugs made of compressible foam are used at your mine, it will be necessary to point out the importance of rolling the plugs into a thin "sausage shape" before inserting them. If some people will be using band-mounted plugs, they should be shown the correct method of wearing these, including how to get a good, tight fit by first pulling the ear outwards and back to straighten the ear canal while pressing the plug into the ear.

“Please insert one of the earplugs into your **LEFT** ear.”

Pause to allow time for fitting of earplugs

The following statement may or may not be appropriate

"Some of you did fit your earplugs correctly, by first reaching over your head with one hand and pulling the top of your ear outwards and back."

Trainer/presenter to demonstrate while explaining correct method of fitting

"This straightens the ear canal so the earplug can go in far enough to fit tightly when you push the earplug into the ear with your other hand. You should continue to press the earplug in after you let go of your ear. This will lock the earplug in place. This is true for any type of earplug: the ones with cords, the ones without cords and even the ones with a plastic band."

"When you have fitted an earplug properly you can hear the difference. Please insert your right earplug properly and, if you can hear or feel a difference between the two ears, you might need to refit your left earplug."

Pause to allow time for members of the group to insert the second earplug and, if necessary, to refit the first earplug

5 Demonstration of improved speech and signal audibility when wearing HPDs in loud noise

This demonstration can be done with earplugs of any type or with earmuffs.

Trainer/presenter will need to speak more loudly now. Ensure that the noise from this demonstration does not interfere with audiometric testing for other groups of employees.

"How many of you are thinking that you will not be able to hear what others say when they speak to you?"

Pause for members of the group to respond
Trainer/presenter to switch on a noise source, either a machine (e.g. angle grinder (with cutting disk removed), vacuum cleaner, petrol mower) or a tape recording of a machine, but <u>NOT</u> a radio or television. He or she should face the group, holding or positioning the noise source directly in front of him/her while speaking to the group. REMEMBER TO SPEAK UP.

Trainer/presenter to blow a pea-whistle to get the group's attention and demonstrate signal audibility in noise with HPDs.

"How many of you can hear what I am saying to you? Can you understand what I'm saying?"

Trainer/presenter to make a brief statement of fact or announcement, pausing for members of the group to respond BUT LEAVING THE NOISE SOURCE ON

"Now remove your HPDs, both of them."

Pause for noise to make impression

Trainer/presenter to blow a pea-whistle to regain the group's attention and demonstrate reduced signal audibility in noise without HPDs.

"How many of you can hear and understand what I am saying to you now?"

Trainer/presenter to make a second brief statement of fact or announcement and then switch off the noise source.

Trainer/presenter to ask the group what it was that he/she said while they were wearing their earplugs and what he/she said to them after they had removed their earplugs. Trainer/presenter asks the group to explain when they were better able to hear the whistle and the speech sounds: when they were wearing HPDs or when they were not wearing HPDs.

If there is anyone who insists that it was easier to hear better without HPDs, ask if their HPDs were fitted correctly. If so, it may be that the person has already suffered considerable hearing loss. People with bad hearing need earplugs that are especially selected for their type of hearing loss and the noise in their workplace.

Hopefully there will be consensus that it was easier to hear speech and signals in loud noise while wearing HPDs.

"Some people may think that while wearing HPDs they will not be able to hear warning signals or what someone is saying to them. As we just learned, this is not true; when the noise is loud HPDs make it easier to hear the whistle or what someone is saying. The same is true for other signals: This is because HPDs block out most of the machine noise, but only a small part of the sound from speech and signals. Because HPDs make the machine noise much less and the sound from the speech and signals only a bit less, it becomes easier to hear the things that we need to hear, allowing us to work more safely."

6 Getting used to wearing earplugs

"How many of you have found that wearing earplugs is uncomfortable?"

Pause for response

"If you wear your earplugs for short periods at first, you will get used to them, but you should only take them out when there is no loud noise. If after a few days you find that you cannot get used to them or if they are uncomfortable, you can come to us to get another kind. But give yourself a fair chance to get used to your HPDs – it is a bit like getting used to wearing a new pair of shoes: it takes time."

Pause and encourage discussion. Try to get agreement that HPDs are helpful and that one can get used to them. Encourage men who have already had good experiences with HPDs to tell the group about them.

7 Caring for earplugs

"Earplugs need to be cared for and kept clean. Re-usable plugs must be cleaned in warm soapy water and dried after every shift. This is to avoid ear problems like skin irritation or infection, which can be caused by dirty earplugs. Disposable plugs should be discarded after each use and replaced with new ones."

Trainer/presenter to demonstrate the correct way to clean earplugs. It should be emphasised that compressible foam earplugs are meant to be used only once and then discarded, never washed.

"Re-usable earplugs should be kept inside their carrying case when you are not wearing them. They must be replaced if they become old, damaged or lost. To avoid losing them, tie the carrying case to your overall or inside your hardhat. If you think that there is something wrong with your ears you must have your ears examined at the Medical Station or Occupational Health Centre."

"Before travelling in the cage or opening ventilation doors, loosen or remove your earplugs to avoid discomfort and possible damage to your ears."

Trainer/presenter to encourage questions and discussion

8 Earmuffs

Note to trainer/presenter: For groups that will be using earmuffs in their workplace or if members of the group express interest in muffs and it is likely that some members will be using them, muffs should be discussed. The presenter/trainer should explain that muffs and plugs both give similar protection against loud noise.

The demonstration of how HPDs improve the intelligibility of speech and warning signals in loud noise (see Section 5) could be included in this section on earmuffs. If the group has already had the demonstration with earplugs, it should not be necessary to repeat it with earmuffs.

"People who work where it is not too hot or work on surface and go into and out of noise frequently may find earmuffs to be better for them than earplugs."

Trainer/presenter to display earmuffs

"Earmuffs have a plastic shell with a soft cushion,"

Trainer/presenter to point out soft cushion

"to cover each ear and a strong headband to press the cushions tightly around the ears."

Trainer/presenter to draw the group's attention to the flexible headband by spreading the cups apart from each other as he/she dons the earmuffs.

“If you have long hair you should move it out of the way so the earmuffs can seal tightly round your ears. Also, some glasses or safety goggles may prevent the cushions from sealing tightly around the ears and keeping the noise out.”

Trainer/presenter to remove earmuffs

“Men with beards may also find that earmuffs do not seal properly around their ears.”

“If you are going to wear earmuffs and a hardhat together, you will need the kind of earmuffs that have a thin head strap that you put over your head so that you can position the strong plastic headband behind your head before putting on your hardhat.”

Trainer/presenter to show earmuffs with thin plastic head strap and point the strap out to the group

“When fitting these earmuffs you should first put the thin strap over your head and place the cushions around your ears. Then swing the strong headband behind your head before putting on your hardhat.”

Trainer/presenter to demonstrate correct fitting

“Another way to wear earmuffs and a hardhat together is to use a hardhat that has the earmuffs attached to it.”

Trainer/presenter to show group a hardhat with muffs attached

“With this type of hardhat you put it on your head and then swing the muffs down over your ears.”

Trainer/presenter to demonstrate

“Make certain that the hardhat and the muffs are both adjusted to fit properly.”

“Like earplugs, earmuffs must be kept clean, especially the cushions that seal around the ears. A clean, damp cloth or tissue should be used to wipe the cushions at the end of each shift. The headband that presses the earmuffs tightly around your ears should be checked to make sure that it is still strong. The thin head strap that goes over your head before you put on your hardhat should be checked and adjusted so the muffs don't slip down off your ears.”

“If your earmuffs become damaged or lost, you should replace them before going back into the loud noise. If the cushions no longer seal properly and replacement cushions are available, get new ones. If replacement cushions are not available, get new earmuffs.”

9 Introduction to audiometry

This section is intended to introduce the people to audiometric testing and ensure that they respond appropriately during the test procedure.

“We will be testing your ears today and re-testing them at regular intervals to see if they are being damaged. If we find that your ears are being damaged by loud noise or that you do not use your HPDs in noisy areas, we will warn you about the damage your ears are suffering. If you become so deaf that you cannot work safely, you will be declared unfit for your job. The ear test will help us to find out if your ears are being damaged before the damage becomes too great.”

“When we test your ears you have nothing to be afraid of. You will be asked to sit inside a booth that stops noises outside the booth from interfering with the test. A pair of earphones will be placed over your ears and you will be handed a button that you hold in your hand. Soon you will hear whistling or humming sounds coming from the earphones, either in your left ear or your right ear. When you hear a sound you must press the button once.”

“That's all you need to do. Even if the sound is very soft, press the button once and then let it go. Do not press the button if you do not hear any sound. When you press the button do not hold the button down for too long. Press the button quickly and let it go.”

“While you are waiting for your turn to be tested, please sit quietly and do not talk, as this can disturb the people who are being tested.”

“Do any of you have questions or wish to raise any issues around noise and the use of hearing protection devices?”

APPENDIX

VISUAL AIDS FOR TRAINERS

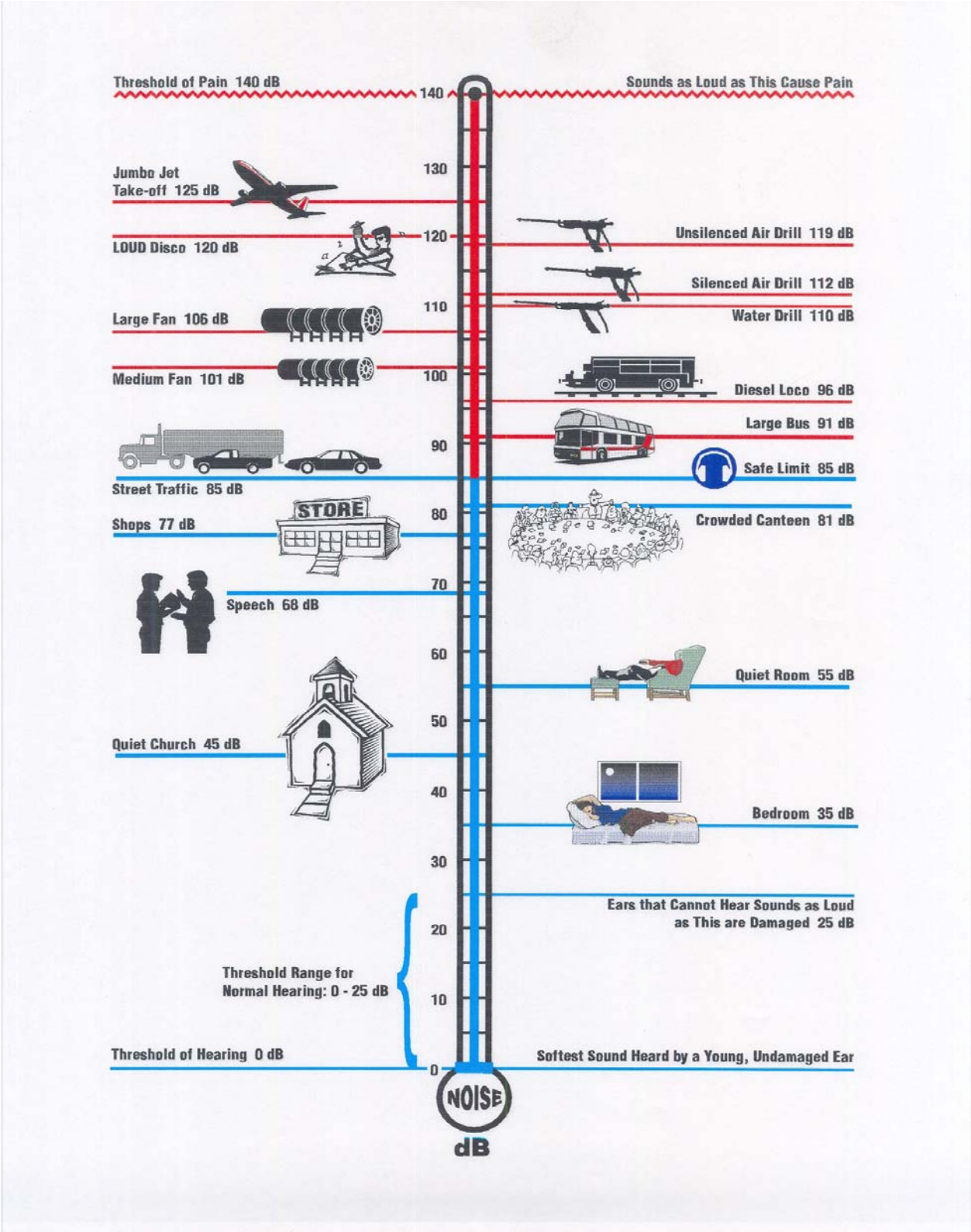

Figure A-1 Levels of loudness for various noise sources and situations

Figure A-2 International symbolic safety sign for mandatory hearing protection

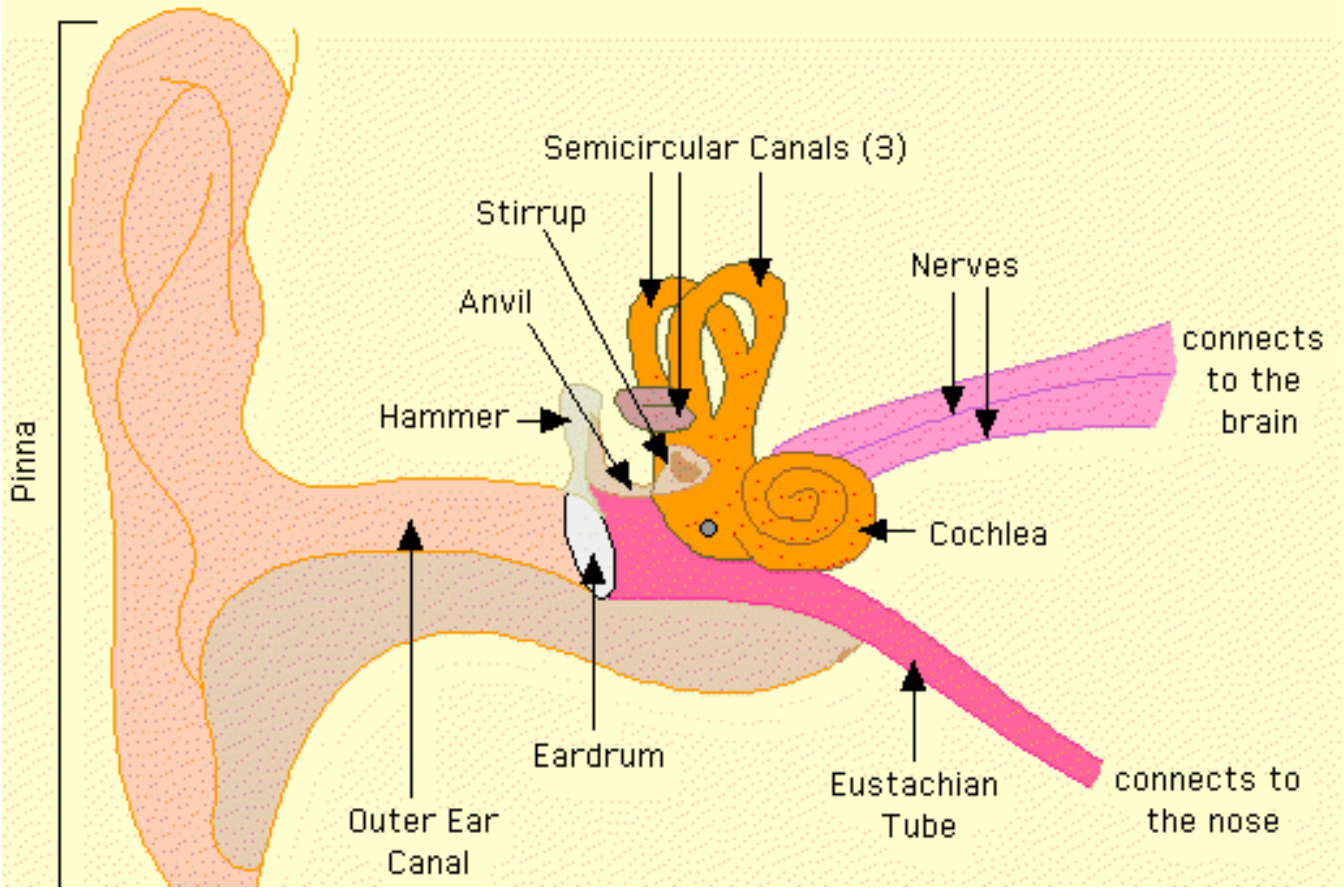

Figure A-3 General anatomy of the human ear

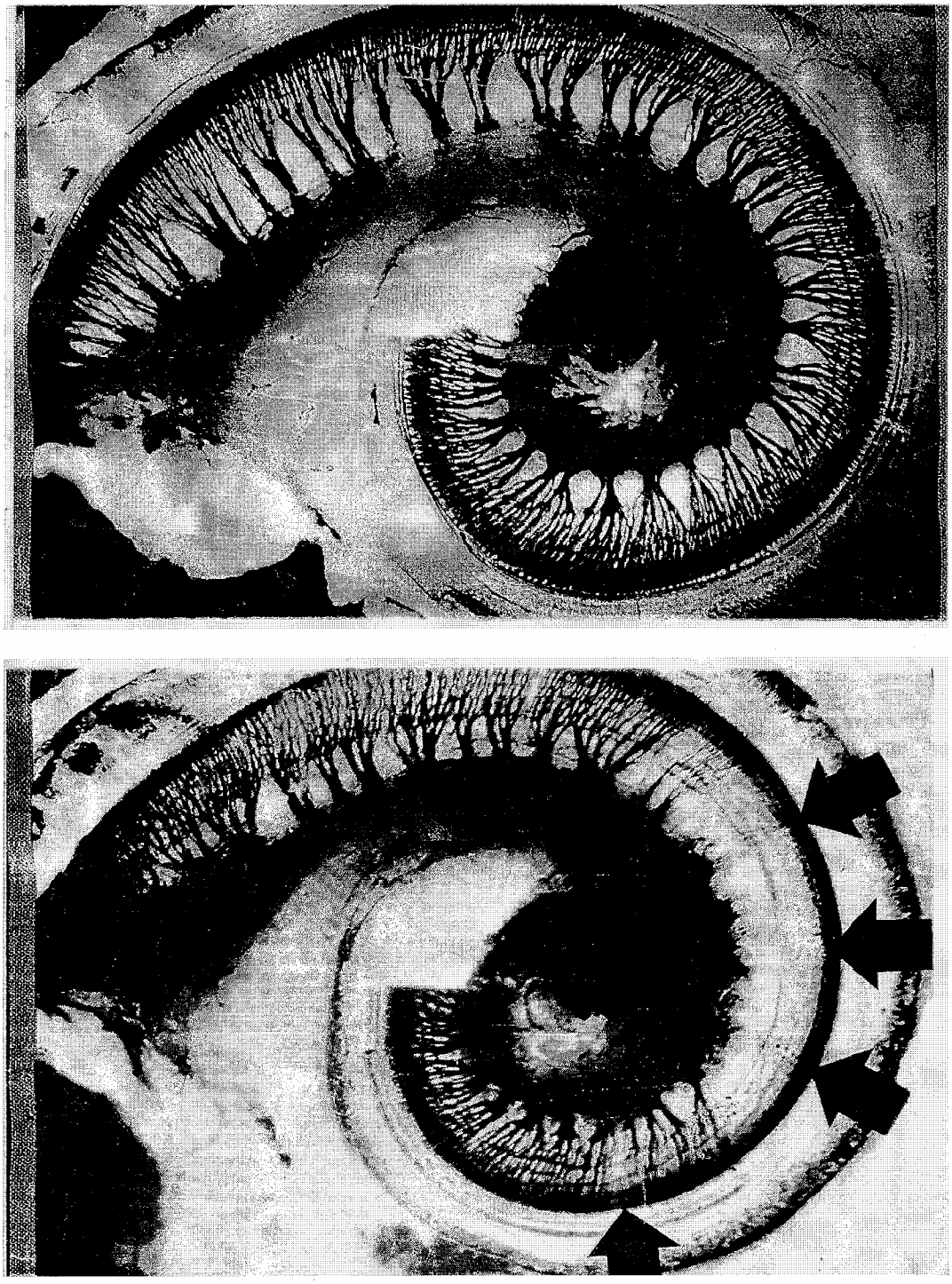

Figure A-4 Comparison of normal (Top) and noise-damaged (Bottom) inner ears

(Arrows in lower picture show where nerve endings have been destroyed by noise.)