

THE H.E.A.R.[®] SURVIVAL GUIDE FOR

MUSIC HEARING Health



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H.E.A.R.[®]
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By **Kathy Peck**: Musician, composer, hearing health expert,
and Executive Director and co-founder of H.E.A.R.

Hearing, hearing loss, and minimizing risk

We sometimes take this amazing gift of hearing for granted

We hear melody because our ears are able to discriminate complex combinations of sound, and then convey these patterns to our brain which assembles this web of tonal relationships into music.

Yet, we sometimes take this amazing gift of hearing for granted. As a fellow musician, I unknowingly did just that, unaware of the huge consequences I would suffer. My all-girl rock band, The Contractions, opened for Duran Duran at Oakland Coliseum during their MTV video-shoot concert tour in the '80s. For that particular show, I felt our rock trio needed to have more power, so I borrowed a friend's giant bass cabinet stack, prepared to pump out a wall of sound at the concert. Little did I know that was the day my whole world would turn upside-down and my hearing damage would become permanent. It was this experience that led me to become a co-founder of the H.E.A.R.® (Hearing Education and Awareness for Rockers) non-profit public benefit organization.

The ear is not designed for repeated exposure to extremely high sound levels. Its defense mechanism is limited. A middle ear reflex action (a contraction of ear muscles that stiffens the system, reducing energy transmission) can protect against sudden increases in sound, but too slowly to protect against bursts of sounds like gunshots, loud drum hits, or walls of sound intensity that assault our ears and hit us in the chest.

A sound wave travels through the air at around 1,100 feet per second. It vibrates at different rates, which is the frequency of a wave. We hear higher frequency of a wave as higher pitch. When there are fewer fluctuations in a period of time, the pitch is lower. Sound Pressure Level (SPL) is a measurement of the air pressure of a wave's amplitude and how it affects the speed of sound. It determines the volume of sound and is measured in decibels. Sound waves with greater amplitudes move our eardrums more, and we register this sensation as higher volume. No matter what the sound frequency, high or low, it is the sound intensity or loudness combined with the repetition of exposure that can harm the ears.

Think of your ears as if they were tiny organic batteries with a charge. The more exposure of the ears to loud noise or music, the more the ears will lose their charge. So if you are over your maximum daily dose of loud sounds, your ears begin to lose their charge. This is why people hear less clearly and/or have ringing in their ears after being exposed to music at a loud concert or to other loud noises. Even worse, people who suffer with tinnitus (ringing in the ears) may hear just one specific tone that will set off the ringing in their ears. For some, even when things are completely quiet and there is no sound in their environment at all, ears may start to ring.

Exposure to continuous loud sounds can sometimes cause a temporary hearing loss (temporary threshold shift), and the ears may recover in a day or so. However, repeated exposure to harmful sounds eventually diminishes the ability of the sensory hair cells in our inner ear to transmit sound by flattening or disfiguring them, fusing

them together, or breaking them off entirely. Sounds louder than 80 decibels are considered potentially hazardous. OSHA guidelines are 90 dB for factories. Audiologists and ear doctors would like to see that changed to 85 dB for eight hours of noise exposure for unprotected ears. Unlike noise exposure from factories or machinery, loud music exposure is not regulated and there are no required guidelines.

According to a 2002 research study survey on musicians and hearing loss conducted by H.E.A.R. with Smith-Kettlewell Institute researchers, it was estimated that 86% of musicians and concert goers surveyed over a 10-year period reported ringing in the ears after going to hear loud music.

Findings of a [European study](#) of over seven million health records from 2004 to 2008 showed that working musicians topped the charts for hearing loss.

The good news is that hearing loss is preventable. The risk of damaging your hearing depends on a number of factors including:

- 1) the intensity of the sounds and/or the loudness of the music or noise
- 2) how close you are to the loud sound source
- 3) how long you are exposed to loud music or noise
- 4) other noisy activity exposure that day, including how loudly you listen to your music
- 5) previous hearing damage
- 6) your health condition at the time (alcohol and dehydration make things worse)
- 7) family history of hearing loss
- 8) drugs that may be ototoxic (toxic to the ears)

Are you at risk?

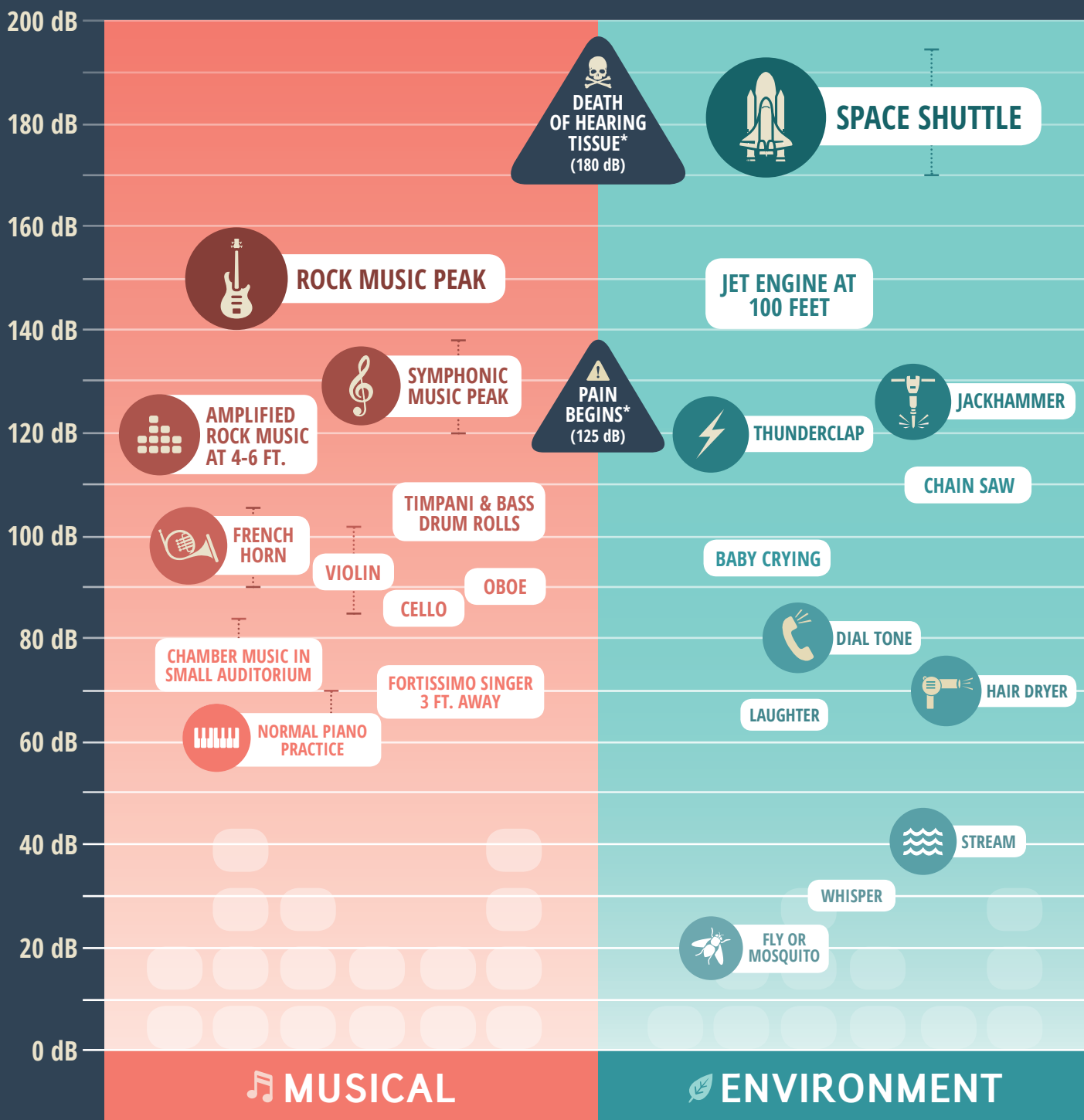
The incidence of hearing loss in classical musicians has been estimated at 4-43%. In rock musicians, this figure is 13-30%. High frequency sounds of 2-4,00 Hz are the most damaging. For reference, the highest octave of the piccolo registers 2,048-4,096 Hz.

Regular sustained exposure may cause permanent damage at 90-95 dB. Physical pain can begin at 125 dB. Everyday environmental noise, including conversation, telephone dial tones, city traffic, subway trains, and power tools ranges from 60-125 dB. Musical noise, including the volume of individual instruments, ranges from 60-150 dB. Jet engines at 100 feet register 140-150 dB.

The following chart shows the maximum allowable exposure time at certain decibels before there is a risk for hearing damage to unprotected ears:

(See next page)

ENVIRONMENTAL & MUSICAL dB LEVELS



*Effect occurs with regular sustained exposure

Statistics for the Decibel (Loudness) Comparison Chart were taken from a study by Marshall Chasin, M.Sc., Aud(C), FAAA, Centre for Human Performance & Health, Ontario, Canada. http://www.hearnet.com/at_risk/risk_trivia.shtml

What can you do to minimize the potential for hearing loss and prevent further damage?

It is important to not overexpose your ears. This can be done by:

- 1) turning down the volume of your stereo, TV and MP3 music device
- 2) monitoring sound levels at your rehearsals and performances
- 3) limiting your exposure time to loud noises
- 4) taking a 5 to 15 minute break from the sound source
- 5) wearing earplugs!

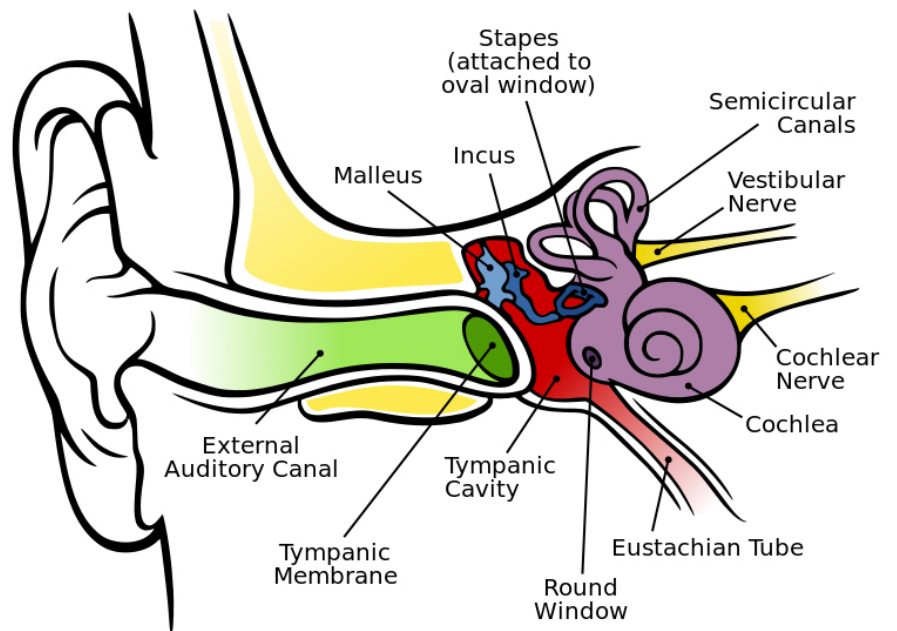
As sunglasses are for protection of the eyes, hearing protection in loud, noisy environments is just as important for the ears. Every working musician, music industry professional, and music listener should consider using hearing protection.

How we hear

As sound waves travel through the ear, they are converted into electrochemical messages that are sent along more than 30,000 nerve connections to the brain. The brain then interprets these messages as words and other sounds.

The ear

The ear has three main parts: the outer ear (including the external auditory canal), middle ear, and inner ear. The outer ear, the part you can see, opens into the ear canal. The eardrum (tympanic membrane) separates the ear canal from the middle ear. The middle ear contains three small bones which help amplify and transfer sound to the inner ear. These three bones, or ossicles, are called the malleus, the incus, and the stapes (also referred to as the hammer, the anvil, and the stirrup). The inner ear contains the cochlea, which changes sound into neurological signals and the auditory (hearing) nerve, which takes sound to the brain.



Any source of sound sends vibrations or sound waves into the air. These funnel through the ear opening, down the external ear canal, and strike your eardrum, causing it to vibrate. The vibrations are passed to the three small bones of the middle ear, which transmit them to the cochlea. The cochlea contains tubes filled with fluid. Inside one of the tubes, tiny hair cells (cilia) pick up the vibrations and convert them into nerve impulses. These impulses are delivered to the brain via the hearing nerve. The brain interprets the impulses as sound.

Tinnitus: causes, treatment, and prevention

It shocked the music world the day Pete Townshend of The Who announced he had hearing loss and tinnitus in *Rolling Stone* magazine in July 1989. H.E.A.R. board members attended The Who's reunion concert in August 1989 at Oakland Coliseum to meet Pete and receive a generous founding donation for our cause. Pete's demeanor was regal, as one of the world's greatest rock guitarists, a rock rebel legend, and now a fellow musician afflicted with hearing damage. Hearing damage and tinnitus – hidden epidemics at that time – were finally coming into the open.

What is tinnitus?

Tinnitus is typically characterized as a sizzling, ringing in the ears. It can also include buzzing, whistling, hissing, roaring, clicking, and surprisingly, even musical tones. Tinnitus can be constant or intermittent, it can be pulsating or it can be a constant drone. Chronic tinnitus can cause people to have difficulty concentrating and sleeping and interfere with work and personal relationships. Tinnitus may even cause psychological distress.

Tinnitus can remain at tolerable background noise levels or become loud enough to interfere with normal activities. Anatomically, tinnitus is a symptom of something wrong in your auditory system. The auditory nerve becomes shocked, often due to hearing damage, and the brain interprets this as noise. This damage can exist in varying degrees. Repeated exposure to loud music or noise can permanently injure the small hair cells in the inner ear called cilia. Damaged cilia transmit constantly, whether actual sounds exist or not. These transmissions are what are heard as tinnitus.

Someone can have hearing loss without having tinnitus, and you can also have tinnitus without having hearing loss. Tinnitus affects an estimated 50 million adults in the U.S. For most, the condition is an annoyance. However, about 12 million people seek medical help for severe tinnitus yearly.

What causes tinnitus?

The most common cause of tinnitus relates to over exposure to noise and music. You might have noticed this after performing, attending a music concert or dance club, listening with ear buds/earphones too loudly, or other noisy activities. The show may be over, but the ringing in your ears goes on. But there are other potential causes of tinnitus. Some are not serious: for example, a plug of wax in your ear might cause temporary symptoms. Earwax, also known as cerumen, is the wax like substance in the ear that traps dust and other particles to prevent them from damaging the inner ear.

Tinnitus can also be a symptom of more serious middle ear problems such as infection, a hole in the eardrum, an accumulation of fluid, or stiffening (otosclerosis) of the middle ear bones. It can be a symptom of a head and neck aneurysm or acoustic neuroma, either of which can be life threatening and often involve a loss of hearing. In rare cases, tinnitus is caused by a blood vessel disorder. This type is called pulsatile tinnitus, and changes along with the heartbeat.

A number of health conditions can cause or worsen tinnitus. Occasionally, the sound of tinnitus may be a clicking noise, which may represent a problem with the jaw or Eustachian tube. Tinnitus may also be a symptom of a wide variety of conditions: allergy (drug, food, or environmental), high or low blood pressure, diabetes, insulin resistance, high cholesterol, hypoglycemia, hypothyroidism, vertigo, and sinus infection.

Auditory conditions including hyperacusis (extreme sensitivity to all sounds), recruitment (perception of loud sounds much louder than normal, often accompanied by pain), and presbycusis (natural aging process of the ears) may contribute to tinnitus. Additionally, osteoporosis, sciatic nerve pain, multiple sclerosis, fibromyalgia, anxiety disorders, anemia, HIV immune deficiency disorder, Alzheimer's disease, and injuries to the head or neck have been identified as potential causes of tinnitus.

Medications

A wide range of medications can be toxic to the ears, including prescription and over-the-counter medications, controlled substances, and, to a lesser degree, certain vitamins and supplements. Medications such as aspirin and ibuprofen can cause tinnitus if overused. If you take aspirin or other drugs and your ears ring, talk with your doctor.

Review all of your medicinal products with your health care provider. Do not stop taking any medications without first talking to your health provider. Generally, higher doses of medications worsen tinnitus; the unwanted noise often disappears when you stop using certain drugs.

Stress

Research shows that acute stress can literally divert blood flow from the inner ear's cochlea and deafen you! Adrenaline causes the ear to become sensitive to nervous impulses that would normally not be perceived. If adrenaline levels drop, sensory perceptions will become less acute, and tinnitus symptoms will ease.

Treatment

When symptoms are intense, do something relaxing, and draw your focus elsewhere. Distraction is an effective technique to combat tinnitus. Become aware of physical and emotional sensations in your body by learning yoga, meditation, tai chi, etc. Become aware of your adrenaline levels and learn to lower them. This will improve your overall health, and possibly your tinnitus. Bring in as much inner peace, comfort, and physical relaxation as possible into your life.

Reduce or eliminate your exposure to high decibel levels to prevent hearing damage, and wear hearing protection. Just by taking a short break (15 minutes) and keeping volumes at lower levels, you can help reduce tinnitus risk. If you have to turn up the volume to hear the bass with your ear-buds/earphones, it could be a sign that something might not be right. Look for ear-buds/earphones with truer sound to avoid potential hearing damage.

Prevention

Get some earplugs: foam, rubber, moldable wax, or custom-made silicon earplugs. As we'll discuss later in the guide, a variety of hearing protection options exist. Refer to hearnet.com for more detailed information.

Do not overuse your earplugs by wearing them constantly. Ear protection in noisy situations is necessary, but constant use of earplugs does not allow the ears to normalize sounds in quieter environments. For anyone with decreased sound tolerance, it makes you even more sensitive to sound. For someone with tinnitus, it further sensitizes

the auditory system and makes you more aware of the symptoms. However, when it's loud, be proud you remembered your earplugs.

Healthy life style choices and natural therapies

Chronic tinnitus can be part of a degenerative process characterized by chronic inflammation. Inflammation is the body's natural response to tissue damage and a process your body uses to heal itself. Eat more natural healthy foods. Follow an anti-inflammatory diet that consists of mainly fresh fruits and leafy green vegetables, non-starchy vegetables, healthy fat sources, lean protein (grass fed/free range meats, cold-water fish like salmon), legumes, nuts, and seeds.

Stopping caffeine intake (coffee, black and green teas, sodas, energy drinks, chocolate, some medications) for four days, drinking more water, and lowering stress levels may significantly reduce symptoms of tinnitus. Certain vitamins and minerals can help reduce tinnitus symptoms, as well.

Rest and exercise are key elements to restoring your body's health. Become aware of and describe your sensations. What does the noise sound like? Is the sound throbbing or rhythmic? Is it in one or both ears? What other symptoms do you have? Find out the triggers for your tinnitus.

Various additional treatment therapies that have proven helpful in coping with tinnitus include: counseling, behavioral modeling, cognitive therapy, hearing aids, TRT (Tinnitus Retraining Therapy), acupuncture, naturopathy, homeopathy, chiropractic craniofacial exam, dental TMJ exam, biofeedback, hypnosis, sound therapy, and support groups.

Tinnitus isn't normally accompanied by chronic ear pain. If your ears hurt, see your doctor immediately.

Otolaryngology or ENT (ear, nose, and throat specialist) is the branch of medicine and surgery that specializes in the diagnosis and treatment of disorders of the head and neck, and should be used in an attempt to identify the cause of chronic conditions. The following medical tests may be done by an ENT/otolaryngologist: ear examination, head CT scan, head MRI scan, blood vessel studies (angiography), and X-rays of the head.

Audiologists diagnose and treat a patient's hearing and balance problems using advanced technology and procedures. Audiologists can administer an audiometric test and help provide custom ear molds, masking devices, hearing aids, Tinnitus Retraining Therapy, and other counseling therapies. When experiencing hearing difficulties, it's important to not delay in seeking help.

Hearing loss and deafness

People with total deafness can hear no sounds at all. Others have partial deafness, which means they may have trouble hearing certain sounds. Some people slowly start to lose their ability to hear, and the problem gets worse as time passes. Hearing loss may be temporary, such as when ear wax builds up. If the wax is removed properly by a health professional, hearing returns. But some forms of total or partial hearing loss are permanent.

Types of hearing loss

Conductive hearing loss. Conductive hearing loss occurs when sound waves are not transferred (conducted) completely from the outer and middle ear to the inner ear. A conductive loss refers to a decrease in sound caused by a

problem in the outer or middle ear. Such a loss indicates normal inner ear activity. Possible causes of a conductive loss may be: wax in the ear canal, a perforation in the eardrum, or fluid in the middle ear. This type of loss is usually treatable with either medical or surgical intervention.

Sensorineural. Sensorineural hearing loss occurs when there is a problem with some part of the inner ear or with the nerves that send messages from the inner ear to the brain. This type of hearing loss is more common than conductive hearing loss and more difficult to treat. The most common cause can be hearing damage from loud noises and music. Some estimates say that about 90 percent of hearing loss results from sensorineural problems, and a mixed form that combines conductive and sensorineural hearing loss.

Mixed hearing loss refers to a conductive loss and a sensorineural loss occurring at the same time. While the conductive component may be treated, the sensorineural component is permanent.

Damaged eardrums. A tear or hole in the eardrum can cause the eardrum to lose some or all of its ability to vibrate properly. Such damage may occur if a cotton swab or other object is placed too far inside the ear, if an explosion or gunshot or other extremely loud impact sound occurs too close to the ear, or as a result of an ear infection, head injury, or sudden or extreme change in air pressure.

Abnormal bone growth. The ossicles are the tiny bones in the middle ear that work together in a very small space to conduct sound from the ear drum to the inner ear. If they grow too much or too little, or are damaged, they cannot do their jobs properly. This problem may be present from birth or it may occur as children grow.

Meniere's disease. Meniere's disease affects more than three million people in the United States, many of them between the ages of 30 and 60. It can cause sensorineural hearing loss, vertigo and dizziness, and tinnitus.

Hyperacusis. Hyperacusis is characterized by an over-sensitivity to certain frequency and volume ranges of sound (a collapsed tolerance to usual environmental sound). A person with severe hyperacusis has difficulty tolerating everyday sounds.

Recruitment. Recruitment causes your perception of sound to be exaggerated. Even though there is only a small increase in the noise levels, sound may seem much louder and it can distort and cause discomfort.

Hearing aids

The most common device used to amplify sound is the hearing aid. Hearing aids come in various forms that fit in or behind the ear and can help make sounds louder and clearer. They cannot completely restore lost hearing, but they can make it easier for many people to hear sounds. Audiologists are trained specialists who help select, fit, and monitor the use of hearing aids for both children and adults.

Cochlear implants

A cochlear implant is a complex device that replaces the work of the delicate hair cells (cilia) of the inner ear. A receiver worn behind the ear captures sound waves and transmits them to a receiver that is surgically placed inside the skull. This receiver then stimulates the nerves that the brain uses to interpret sounds. An ENT doctor can perform this type of surgery. The surgery can be expensive, and it does not work for everyone, but for some it can be an effective way to partially restore hearing.

How can musicians protect their hearing?

Musicians Earplugs are the quality earpiece of choice for performing musicians and other music professionals like sound engineers and crew – and for music fans, as well. The Musician Earplug is a custom fit canal-style earplug that is virtually unnoticeable. The flat attenuation characteristics allow the wearer to hear accurately but at a safer volume. They can be ordered with a choice of either ER -9, -15, or -25 dB filters.

Ready-fit earplugs for music are a non-custom, easy way to protect the ears without sacrificing sound quality. The soft flanges enable maximum comfort, while the firm stem allows fast, easy insertion.

Foam earplugs block maximum noise but do not allow you to hear the high-end sounds or a clear flat frequency response that is needed for music performance.

In ear monitors (IEM) that are custom or universal fit are available for musicians, DJs, touring artists, sound engineers and stage crew for live performances and studio recordings. Audiophiles and music listeners use of IEMS or headphones for quality sound while listening to their music. Drummers also rely on IEMS/headphones to hear their click tracks.

Plexiglas screens are also used by artists on stage to help to deflect some of the high decibel levels that could damage hearing.

Development and availability of high-quality music earplugs and custom in-ear monitors

In the early 1980s, there were no real solutions for musicians' hearing on-stage. With the support of The Who's Pete Townshend, H.E.A.R. was instrumental in conducting the first public information campaigns on music hearing conservation through North American and worldwide media with MTV, PBS, BBC, *TIME* magazine, *Rolling Stone*, and many others.

The Steve Miller Band and The Grateful Dead broke new ground when they co-headlined the first in-ear-monitor national stadium tour using

EARPLUGS



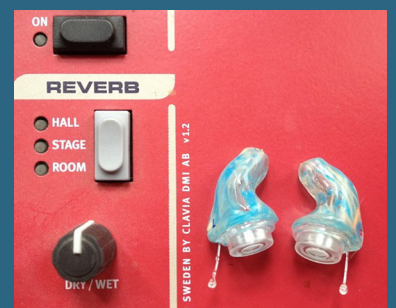
THE MUSICIAN EARPLUG



READY-FIT



FOAM



IN-EAR MONITORS (IEM)



Future Sonics' ear monitors. There were no floor monitors or speakers on stage – just performers and their musical instruments. Clean stages significantly cut down on overall stage sound levels, and artists and sound crews were no longer at risk of being blasted by loud wedge monitors and auxiliary amplification on stage – they were now in control of their own stage volume and mix.

Today, sales of custom-fitted in-ear monitors (CIEM) have grown exponentially, benefiting touring musicians; club and dance bands; DJs; sound, monitor and FOH engineers; musical theatre orchestras; symphony and opera orchestras; houses of worship bands; audiophiles; and the general public. The pro sound market for CIEMs is reported to be 30 percent of audiology clientele and growing fast.

There are many excellent pro companies supplying in-ear systems with drivers that appeal to nearly anyone's taste or budget. "Universal-fit" IEMs supplied with a variety of ear tip styles and sizes are often a good way for musicians to "test the waters" using in-ear devices, but to best achieve isolation and eliminate sound leakage, custom fitted systems are the way to go.

The customized approach

Once you've found a driver to your liking, the next step is having a custom-fitted ear mold made. Different CIEM products may have different technical requirements in terms of the type of "dam" used to make the impression or how much outer ear coverage is needed, so check with them before moving on to the ear impressions phase. The process then requires going to a hearing specialist who is experienced in making custom in-ear music products. The importance of making an accurate ear impression is an essential factor in the formula for making the best possible CIEM earpiece.

Crafting ear impressions is like making a three-dimensional sculpture of the inside of your ears. Precise measurements and the knowledge of the interior dimensions of your ear is key. Hearing professionals such as audiologists have the tools and know-how to take accurate impressions. Handcrafted custom impressions that uniquely fit your ears are not something off the shelf. Something that you purchase in a kit and attempt to do by yourself could be a very dangerous experience for your ears if you are untrained. That said, there are some do-it-yourself impression kits on the market — of varying quality and efficiency — and these can provide a solution for someone who absolutely cannot access a trained impressionist or audiologist. However, given the affordability and availability of having professional impressions done (some companies even do them free toward purchase during industry tradeshows such as NAMM and InfoComm), the convenience and economic considerations of getting pro impressions makes a lot of sense.



Creating the ear molds

Once your impressions are made, these are sent to the lab to be cast. The acrylic solution is poured and begins to harden in an investment cast made from your impressions. The ear mold canal insides are hollowed out by hand, which tunes it to about a 3 dB resonance of the natural ear canal. The CIEM driver and monitor cable socket are also set up and inserted, and other fine adjustments and cosmetic designs are made during the lab process.

An overall fit that is too loose results in a compromised seal, and sound bleeds through the gaps and may reduce the sound quality of the monitor. In order to have more of a full bass response, you need to have a tight seal. Fit and comfort directly correlate to how good your monitors will sound. The better the fit, the better the feel and sound. In-ear monitors need to block -26 dB of ambient noise and fit snugly.

Finding the right ear impressionist saves you time and problems down the line. Impressions for in-ear monitors are different than impressions for hearing aids. Hearing aids are much smaller than in-ear monitors, and their impression process doesn't need to capture a full-shelled earpiece with a completely in-the-canal (CIC) ear mold, which is all-important for best results for CIEMs.

It's crucial that you feel confident and comfortable with your choice of an ear impressionist. Call around. Find an audiologist who is music savvy and has made impressions for in-ear monitors before.

Six steps toward making a great impression

1. Set up an appointment with your local audiologist/ ear impressionist.
2. Start with clean ears with no wax or debris present. If needed, have a doctor clean your ears beforehand.
3. A small ear dam made of cotton or soft foam is placed just past the second bend of your ear canal to protect your eardrum and serve as a backstop for the impression material.
4. A bite-block will be provided to allow an open mouth impression to be taken. It helps to keep your jaw open in a relaxed position, producing a more comfortable, natural-fitting custom in-ear monitor.
5. A two-part epoxy designed for medical use is mixed and put into a specially designed syringe. Some ear impressionists use an ear gun syringe that holds a two-part mixture. The impression mixture is semi-viscous and it looks like Silly Putty. It's then injected into your ear, a feeling much like putting your toes in mud. The impression material goes right up to the ear dam and fills up the in-ear canal completely. Kathy Peck at H.E.A.R. prefers to mix impression material by hand and use a small syringe that is easy for her to control. Mixing by hand is like molding clay in your hands, it warms the impression material before it goes in the ear canal giving the ears a more comfortable experience.

Some ear impressionists then pat everything down. In making impressions, it is a matter of technique choice, but Peck does not recommend patting the mixture down after it is in the ear canal as it can move and change the impression shape.

6. Silicon Impression material usually harden in about one minute, but sometimes impression material can take up to five minutes to harden. After the ear molds harden and set up, they are taken out of the ear. This is where uniformity and balance is checked at the first bend and the second bend of the ear canal; the detail of the full helix, crus of the helix, tragus, and anti-tragus; and also check the ear canal tip for length comfort and over all tight fit. A good ear impressionist will know if it is not the proper fit and will make a new impression over in order to check and compare if need be. If it's not right, it should be made over.

In Ear Monitor (IEM) and Custom In Ear Monitors (CIEM) tips

1. Use your IEMs for everything – with your MP3 player, computer, in the studio, etc. – and get used to taking them in/out until it becomes second nature. If there is any discomfort at all, contact your hearing health professional or IEM provider.
2. You want to be sure what you are hearing is accurate and reflects what you will be doing on stage. The idea is not to hear so well that you sing off the mic. You must be able to work the mic properly and dynamically and be able to be close without an issue and a bit off the mic when you push. The house mixer (and fans) will not be happy if you hear too well and sing too far off the mic.
3. It is not proper to have the sound seem like it is directly in your ears or head. It is very important to add a little reverb so it sounds like you are singing in the room naturally and out to the audience. This will also allow you to keep the volume in your ears at a lower level and in balance with the rest of the band. It will also help you to perform for longer periods of time without vocal and hearing fatigue.
4. Always start with vocal sound first when sound checking on the stage. The mix should be built around a comfortable vocal level.
5. Never just pull or tug your In Ear Monitors out by the cord. Twist your IEMs out properly to avoid damaging them.

About H.E.A.R.[®]

H.E.A.R. (Hearing Education and Awareness for Rockers) is a nonprofit organization 501(c)(3) established 1988 (San Francisco, CA) with the support of founding donor Pete Townshend of the Who, The Les Paul Foundation, The Bill Graham Foundation, The Tec Foundation, and many others. H.E.A.R. is dedicated to the prevention of hearing loss and tinnitus among musicians, other music professionals, and all music fans (especially teens) through education and grassroots advocacy.

H.E.A.R. provides on-site seminars and training/education outreach programs to public schools and colleges, music and sound arts institutes, music conservatories, music camps, music events, and workplaces. H.E.A.R. also offers custom ear impressions, earplugs, music hearing services, referrals, testing in San Francisco Bay Area and nationally via its H.E.A.R. Partner network of hearing health professionals (Hearnet.com), and has conducted grassroots H.E.A.R.ing conservation campaigns worldwide.



PETE TOWNSHEND WITH KATHY PECK

Current H.E.A.R. programs include:

1.) *Plugs In The Clubs H.E.A.R.® Initiative*, 2.) *H.E.A.R. Listen Smart: Safely Handling the Power of Sound*, which includes film series and workshops for students and educators in partnership with The Les Paul Foundation, The Hearing Aid Music Foundation (HAMF) and The Bill Graham Foundation. 3.) H.E.A.R.'s on-going musicians hearing services and H.E.A.R. Partner HEARNET.COM directory.

Kathy Peck: musician, composer, hearing health advocate, H.E.A.R. co-founder and executive director and Recipient of The National Council on Communications Disorders Leadership Award.

For more than 30 years Kathy Peck has been at the forefront of cutting-edge music, community enrichment, and hearing health advocacy and reform. From her deep involvement in the burgeoning punk movement of the late '70s to spearheading a nationwide call for new and innovative ways to prevent hearing loss, Peck has delivered visionary leadership to generations of music lovers, musicians, and other music professionals.

Started as a grassroots organization more than 25 years ago, H.E.A.R. (Hearing Education and Awareness for Rockers), Inc. is now recognized around the world as the first of its kind to both educate the public of the dangers of excessive noise from loud music, and to provide hearing protection for musicians and music fans. From producing public service announcements and conducting its Listen Smart outreach programs to developing public hearing conservation exhibits and distributing free ear plugs at music events, H.E.A.R. is dedicated to promoting awareness of hearing damage, advocating for hearing health, and providing a bridge between the music and medical communities.

H.E.A.R. online

H.E.A.R. website

www.hearnet.com

Facebook

www.facebook.com/HEARnetOfficial

Twitter

<https://twitter.com/HearnnetOfficial>

Instagram

<http://instagram.com/HearnnetOfficial>

Pinterest

<http://www.pinterest.com/hearnetofficial/>

YouTube

<http://www.youtube.com/user/HearnnetOfficial>

HEARnet Hearing Health Information and Partner Directories

www.hearnet.com/affiliates/affiliate_index.shtml

Through HEARnet.com, and its H.E.A.R.'s Listen Smart film series and workshops, students and educators, musicians, DJs, sound engineers, other music industry personnel, concert goers, and music lovers learn about the value of hearing protection and find additional resources. H.E.A.R. Partners provides directories of audiologists, ear doctors, hearing instrument specialists, speech pathologists, and health organizations. It also includes links to H.E.A.R. sponsors and supporters that include educators, musicians, recording engineers, music producers, DJs, music fans, music and health industry professionals, foundations and private donors.

H.E.A.R.'s Listen Smart film series

www.hearnet.com/features/feature_ListenSmartindex.shtml

H.E.A.R. and the *Can't Hear You Knocking* film and video

www.hearnet.com/features/feature_CHYKindex.shtml

Save Your Ears for Music Campaign, Plugs In The Clubs

H.E.A.R.® Initiative and the San Francisco Ear Plug Ordinance

www.hearnet.com/events/events_entertainmentcomm.shtml

Kathy Peck and David Denny Monima Music

<http://www.monimamusic.com>

The Contractions

<http://www.thecontractions.com>

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Other resources

The American Academy of Audiology

<http://www.audiology.org/Pages/default.aspx>

The American Academy of Otolaryngology
Head and Neck Surgery

<http://www.entnet.org/>

The National Institute on Deafness and Other Communication
Disorders

<http://www.nidcd.nih.gov/Pages/default.aspx>

The American Speech Language and Hearing Association

<http://www.asha.org>

The American Tinnitus Association

<http://www.ata.org>

The Center for the Performing Artist at New York-
Presbyterian/Weill Cornell Medical Center

<http://weill.cornell.edu/centerperformingartist/>

Hear the Music

<http://hearinghealthmatters.org/hearthemusic/>

Custom IEM Suppliers

1964

<http://www.1964ears.com>

ACS

<http://www.acscustom.com>

Aurisonics

<http://www.aurisonics.com/store/>

Earsonics

<http://www.earsonics.com>

Etymotic Research

<http://www.etymotic.com>

Future Sonics

<http://www.futuresonics.com>

JH Audio

<http://www.jhaudio.com>

Sensaphonics

<http://www.sensaphonics.com>

Ultimate Ears

<http://www.ultimateears.com/en-us/>

Westone

<http://www.westone.com>

Direct Sound Headphones

www.extremeheadphones.com

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