

# Master Class

By Richard Best

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## ***Make Your Ears Last A Lifetime***

FIRST OFF, YOU MUST UNDERSTAND that our ears were never designed to withstand the sound levels that we encounter in today's world. As well, the ear and brain work against us by moderating loud sounds so they don't seem quite as loud. So it's easy to sit in a loud environment and not be completely aware of the true sound level because the ears, in effect, turn down the volume. But the sound energy is still reaching the ears. Dr. John Chong of the Musicians Clinic at McMaster/Chedoke Hospital says that he has *never met a musician who did not have hearing damage*, regardless of music style.

Drummers are particularly susceptible to noise damage. A snare drum puts out 100 to 120 decibels and more, and other parts of the drum kit can be just as loud. Hearing damage begins at just 90 decibels.

### **What can happen**

The hearing mechanism consists of the ear canal; the tympanic membrane, otherwise known as the ear drum; the ossicles -- a linkage of tiny bones that transfers vibration from the ear drum to the inner ear, reducing its amplitude in the process; and, finally, the cochlea or inner ear.

Ear drums and the little bones can often be repaired, but they are rarely affected by loud playing. It's the cochlea we're worried about. The cochlea resembles a tiny snail, and is home to thousands of microscopic neural receptors called 'cilia'. (Hold your hand up and spread your fingers. This is what a cluster of cilia looks like, and there are many, many such clusters in the cochlea.) When we encounter a sound, it hits the ear drum, gets transferred to the cochlea via the ossicles, and 'excites' the cilia. The brain then interprets this as sound. It's a marvellous system but, as stated above, it's just not built for abuse.

Loud noises can shock and traumatize the cilia. This can cause discomfort, pain and possibly ringing. With a bit of rest, the ear will usually recover. Problems arise, however, when the cilia don't get a chance to recover or if the sound is so loud that it causes immediate damage. A sufficient amount of trauma can kill the cilia. Autopsy photos of the cochlea of test subjects show a barren wasteland where row upon row of healthy cilia used to be. Once they're destroyed, the cilia are gone -- and so is your hearing in that range. The more cilia that are destroyed, the more profound the problem.

### **Hearing loss**

The ears age along with the rest of our bodies, and we gradually lose cilia in the process. Age-related hearing loss is usually noticed when voices get hard to hear. This type of hearing loss typically occurs at the extremes -- at the lowest and highest frequencies. It's the loss of high frequencies that affects our ability to hear speech. We can no longer hear sibilance and that's what helps us to recognize and differentiate different sounds and hear the shimmer of cymbals.

Hearing loss can also be caused by certain diseases. As with all hearing loss, if the disease has killed off cilia, then the loss is permanent. Regardless of what you might suspect is the cause, at the first sign of a hearing issue, go see your family doctor ASAP.

Loud noises can quickly bring on hearing loss. An extremely loud noise, such as an explosion, can cause immediate, total, permanent hearing loss. For the factory worker or musician, the concern is long and repeated exposure to high levels of noise. It's possible to chart how much noise the ear can handle and for how long, but in general an 8-hour factory shift or 4-hour gig is too long to go without some form of hearing protection.

## **Tinnitus**

Hearing damage is often accompanied by ringing or a wide assortment of other noises in the ear. Tinnitus (TIN-i-tus or tin-NYE-tus) can have other causes as well, including illness, certain drugs or a blow to the head. (You might occasionally experience a short episode of tinnitus lasting just a few seconds. This is mainly caused by minor fluctuations in the flow of blood in vessels that are extremely close to the inner ear and is normal.)

Tinnitus can be permanent, and the main treatment is to either use masking devices or train yourself to ignore the noise through Tinnitus Retraining Therapy (TRT). You might also want to avoid noisy situations if they aggravate the condition.

## **Hyperacusis**

Hyperacusis is a combination of the words hyper, meaning over stimulated, and acuity, meaning to sharpen. It is a condition of hypersensitivity, whether to noise or any sort of sensory stimulation. It can be caused by a variety of medical conditions including anxiety, fear or depression, and is not often seen accompanying hearing loss. But don't rule it out.

## **Recruitment**

The technical explanation for recruitment is rather complicated, but the bottom line is that when a certain area of the cochlea is stimulated and doesn't have enough healthy cilia to process the sound, it will "recruit" other cilia. The result is an overload that typically causes discomfort or pain. In severe cases, it can be debilitating, with the housebound victim suffering from never-ending ear pain and headaches. Cochlear damage due to noise is often accompanied by at least some recruitment. Recruitment also creeps in as we get older.

## ***What to do***

### **Protection**

Always protect your ears in a loud environment. Musicians who play loud music or who play for more than a few hours a day should wear protective ear plugs or headphones all the time. Do not be lured into buying inexpensive earplugs at the local lumber store. These are for casual use and cannot protect a working musician. You need a 'rated' filter that will decrease sound levels in what's called a flat profile. That is, your ear plugs should reduce all frequencies, not just the higher ones as is typical of foam earplugs. Consult an audiologist for a recommendation and fitting. And don't be put off by the cost of proper hearing protection. Ear moulds and inserts cost less than a few months worth of lattes.

### **Moderation**

Easy does it: Play less loud. When practicing, turn it down or off. Drummers can use practice pads, damping pads, headphones, and electronic drums to bring the volume within reason. And don't play endlessly. Take a break and give your ears a break. More than an hour or two of noise a day is risky.

### **Testing**

Find a good audiologist and get your hearing tested annually. If you're a working musician, your ears are more valuable to you than your instrument. If you're not a working musician, your ears are more valuable than ... well, try wearing heavy duty earplugs for an entire day to see what life could be like.