



Do I Need Ear Plugs?

Hearing Protection for Young Musicians

What do the following famous artists all have in common?

- Pete Townshend
- Roger Daltrey
- Neil Young
- Barbra Streisand
- Eric Clapton
- John Densmore
- Anthony Kiedis
- Ozzy Osbourne

Answer? According to AARP ([see https://www.aarp.org/health/conditions-treatments/info-2018/musicians-hearing-loss.html](https://www.aarp.org/health/conditions-treatments/info-2018/musicians-hearing-loss.html)), all of the above celebrities have serious hearing loss, audio difficulties, or been diagnosed with “tinnitus” or “buzzing in the ears.”

Music students, teachers, musicians, or family members who go to music performances: **Have you ever noticed humming in your ears?** Did you recently attend a rock concert or had a indoor rehearsal of your school's marching band? This could mean you were recently exposed to excessive levels of loud sound (musical or noise) which may eventually lead to future, long-term, and permanent damage to your hearing!

This article is a comprehensive look at “hearing conservation” for all practitioners of the Performing Arts... “food for thought” to review and reflect on your own “safe habits” of sound consumption!

First, I would like to reprint a portion of an “ear-opening” flier thankfully shared by an expert in the field: Dr. Catherine Palmer of the UPMC Musicians' Hearing Center (Pittsburgh, Pennsylvania).

We would not consider allowing our youth to play football without a helmet, work in chemistry lab or shop class without eye protectors. Yet every day, we allow our children to participate in school-sponsored instrumental music activities without hearing protection.

Loud sounds are the number one cause of permanent hearing loss and this type of hearing loss is 100 percent preventable. The result of noise exposure is ringing in the ears (tinnitus) and permanent hearing loss. By the time people realize that they have permanent hearing loss, they have significant damage to the inner ear. Hearing loss impacts individuals across life activities – social, school, work, and home. School age children are the fastest growing population of noise-exposed individuals suffering permanent hearing loss.

Background

Day in and day out, music students (e.g., band and orchestra members) and their instructors are being exposed to potentially damaging levels of noise during practices and performances. Hearing loss is a function of exposure time, the average noise level, and peak level of very loud sounds. The chart below illustrates the levels of sound produced by the various instruments played in schools. Alone or together, musicians often are exceeding safe limits of noise during practice and performance.

Musical Levels

| | |
|---|------------------|
| Normal piano practice | 60-70 dB |
| Chamber Music in Small Auditorium | 75-85 dB |
| Regular, Sustained Exposure May Cause Permanent Damage | >90 dB |
| Piano Fortissimo | 92-95 dB |
| Violin | 84-103 dB |
| Cello | 82-92 dB |
| Oboe | 90-94 dB |
| Flute | 85-111 dB |
| Piccolo | 95-112 dB |
| Clarinet | 92-103 dB |
| French Horn | 90-106 dB |
| Trombone | 85-114 dB |
| Band (average) | 97 dB |
| Timpani and Bass Drum Rolls | 106 dB |
| Orchestra Peaks | 120-137 dB |
| Band at a Sporting Event (e.g., when the band plays at the football game) | 100-120 dB |



Statistics from Marshall Chastain, Centre for Human Performance & Health, Ontario, Canada

I recommend perusing the entire website of the UPMC Musicians' Hearing Center (<https://www.upmc.com/services/ear-nose-throat/services/hearing-and-balance/audiology/musicians-hearing>) and view Dr. Palmer's video on noise-induced hearing loss.

After a few additional online searches, I found numerous quotes from supportive research, articles, and links.

Surveys of universities reveal that more than 60% of band members suffer from tinnitus, or ringing in their ears, and more than 50% suffer from Noise-induced hearing loss. According to the World Health Organization, loss of hearing has escalated over the past 20 years and shows no sign of slowing down.

Band members have an increased risk for hearing loss as they have spent a majority of their young lives playing loud instruments near each other and during this time they have been exposed to horribly dangerous and irresponsible decibel levels without being warned about the lifelong pain and discomfort that they may potentially face due to playing in the band. Most musical instruments used in marching bands produce sound levels ranging from 92 – 126 dB as shown below will if unregulated or protected against cause irreparable hearing loss and may have already caused you tinnitus (Ringing in the ears). — [Big Ear \(#9\)](#)



As I understand it, the problem is two-fold: exceeding the safe decibel-levels of sound and the length of time you are exposed to these dangerous dosages without protection.

According to NIOSH, any level higher than 85 decibels (dB) for a cumulative period of 8 hours is damaging to the hearing mechanism and requires hearing protection. As the decibel level increases, the safe duration decreases. This means that a jazz band playing at 100 dB is safe for about 15 minutes before hearing damage ensues. — [BandDirectorsTalkShop \(#10\)](#)

Professional musicians may be at significant risk, according to many research studies, including one documented by the University of Toronto and the National Ballet Orchestra of Canada.

For the study published this month in the [January 2011] journal Noise and Health, a team from the University of Toronto's sensory communications group attached microphones to the musicians' shoulders — as close to their ears as possible — with a wire connecting them to a bulky box at their waist that recorded the "dose" of noise. To avoid under-estimating the risk, they chose performances of Sergei Prokofiev's Romeo and Juliet, the loudest ballet the company performs, then extrapolated the results across the full season of shows and rehearsals.

Some of the National Ballet musicians were exposed to levels as high as 94 decibels, equivalent to the sound of an electric drill. Interestingly, the flute and piccolo players absorbed the loudest noise, followed by brass instruments, and the double bass. The violins had the quietest experience, according to the study. — [National Post \(#7\)](#)

For young musicians, I have recommended the specially discounted Etymotic's ER-20 ear plugs, which seem to offer a practical way to help protect hearing during rehearsals and performances. The company that makes them offers an article about their "adopt a band" program (<https://www.etymotic.com/hearforalifetime/adopt-a-band>) and an adjustable "slide rule" tool (pictured at the right from <http://www.etymotic.com/media/sliderule/index.html>) to help predict measurements of dangerous levels and time exposures to loud sounds.

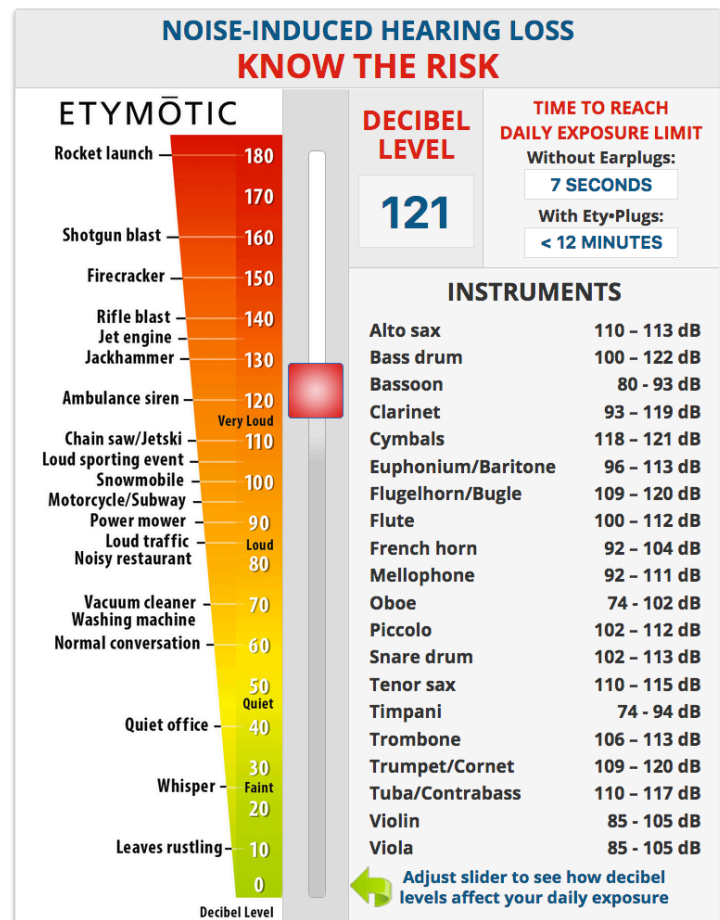
There seems to be some debate about sound distortion with the use of these ear plugs. The cheap yellow foam plugs may cause alteration of the music's intensity and timbre. Personally, I have noticed few problems with the ER-20s, although you may "hear" of conflicting viewpoints on hearing/comfort/distortion issues in the media.

This is the chasm between audiologists and musicians. We [Etymotic] think we've found the answer and the technology, and the musicians are telling us, no, not yet. This outlines the importance of collaboration between audiologists, hearing health care providers, and musicians to find what works.

— [Ascent Hearing \(#11\)](#)

The bottom line, if you want to protect your hearing, you will have to use them regularly.

Also from the University of South Carolina Marching Band and [Big Ear \(#11\)](#), here are a few tips on conserving your hearing in a band rehearsal. Starting right now, you can "monitor and adjust" any excessively high sound exposure and dangers to your health!



1. *If you feel any sensation in your ears, speak up. Your section leaders and band directors are across-the-board caring people with a healthy appreciation for music and those who make it, so don't ever feel like you are being bothersome if you talk to them about pain in your ears.*
2. *Notice the times of your rehearsal when the music peaks and prepare yourself by having a cheap pair of foam earplugs to stick in for that overwhelmingly loud duration.*
3. *Distance yourself from an unruly player. If there is a member of your band who is known to let off an extra loud trumpet, piccolo, alto sax, or drum solo after you finish a song, try to distance yourself from the blast zone and be aware of your surroundings.*
4. *Hand-in-hand with tip number 3, talk to that person about their habit and politely ask them to be mindful of their fellow musicians around them.*
5. *If you are taking any medication, talk to your doctor or school nurse about the specific medication's interaction with decibel levels as there are hundreds of medications that can damage your inner ear hair cells and cause you permanent hearing damage.*
6. *In the same light, if you hear the word ototoxic followed by the name of a medication you are taking, speak to your doctor and band director immediately.*
7. *If you hear for any reason at all ringing in your ears, address the sensation immediately with your section leader or band director.*



The mission of South Hills Junior Orchestra, which rehearses and performs at the Upper St. Clair High School in Pittsburgh, PA, is to support and nurture local school band and orchestra programs, to develop knowledge, understanding, performance skills, and an appreciation of music, to increase an individual member's self-esteem and self-motivation, and to continue to advance a life-long study of music. Members of the Orchestra learn, grow, and achieve positions of leadership to serve their fellow members. All Fox's Fireside blog-posts are free and available to share with other music students, parents, directors, and supporters of the arts.

The final authority on noise-induced hearing loss comes from the United States Department of Health and Human Services, National Institutes of Health, a good online resource posted here: <https://www.nidcd.nih.gov/health/noise-induced-hearing-loss>.

For our South Hills Junior Orchestra players, we are selling the ETY-20 ear plugs (discounted by UPMC for only \$6/pair). Last year (2018-2019), I made sure my piccolo players had a set, and will strongly encourage the purchase of these by all of my brass and percussion instrumentalists, especially those who participate in their marching band programs.

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Paul K. Fox, Director, South Hills Junior Orchestra

www.shjo.org