Your Ear Drum: The Most Important Instrument in Your Ensemble

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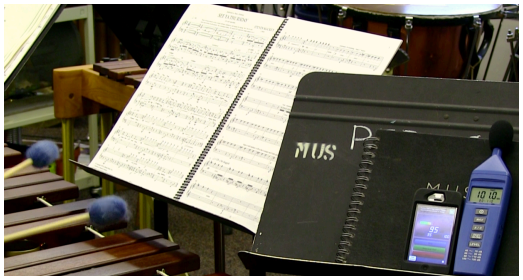
Evaluating any musical performance begins with accurate listening. Using live musicians, video examples, and research data, this clinic will reveal the sound volume levels band and orchestra musicians (and conductors) experience during rehearsal, demonstrate the effects of noise-induced hearing loss, and offer practical and affordable solutions to protect hearing that will also result in more successful musical performances.

85 Decibels – the magic number

Trombonist warming up - *mf* (95 dB)

Violist warming up - *mf* (91 dB)



Marimba practice - *f* (101 dB) *See Ya Thursday* - Mackey

NIOSH (National Institute for Occupational Safety and Health) 2002
Recommended levels of safe continuous sound exposure for unprotected ears.

85 decibels (dB) – 8 hours	103 dB – 8 minutes
88 dB – 4 hours	106 dB – less than 4 minutes
91 dB – 2 hours	109 dB – less than 2 minutes
94 dB – 1 hour	112 dB – about 1 minute
97 dB – 30 minutes	115 dB – about 30 seconds

Your environment as a performer or conductor.
Every instrument in the orchestra or band is capable of producing sound levels that can place the player (or conductor) at risk of surpassing the maximum recommended daily exposure for unprotected ears. *Flutist's right ears and violin player's left ears are continually subjected to decibel levels in the high 80s / low 90s during individual practice.*

This screen shot was taken from a video of the final 20 seconds of Wagner's overture to *Die Meistersinger von Nürnberg*, WWV 96 with decibel meters three feet from the timpani and six feet in front of the brass.

If sound levels are measured with a cell phone app make sure the microphone on the phone is not obstructed. Notice the difference in the two readings – the cell phone is resting on the music stand with the microphone on the bottom.

It isn't only the music.
Aside from rehearsals and practicing when adding other environmental sound levels we encounter throughout the day (Automobile travel, movies, sporting events, in-ear head phones, parties, clubs, concerts, the school cafeteria) musicians can quickly reach a daily sound exposure that is similar to factory workers, who are required to wear hearing protection.

Is permanent hearing loss any less serious than a concussion?
The football or baseball coaches would be suspended if they allowed players on the field without protective gear. For music educators, at the very least, hearing protection is a topic that should be discussed and demonstrated regularly from the first band and orchestra classes each year.

One forward thinking program is Avon High School in Indiana. The music department sells earplugs in a vending machine along with reeds and other instrument supplies. The drum line members are all encouraged to wear hearing protection during rehearsals and performances and those who do report that they can hear the ensemble better because sound distortion is reduced while wearing earplugs.

The filter needs to be as close to your ear drum as possible to be effective.

The plastic sound shields often placed in front of the brass and percussion in orchestras are ineffective unless they are placed 6-8" from the back of the player's head to deflect sound waves around the ear. Even with proper placement reflected sound from the floor, walls, and ceiling reach the ear, and the shield does nothing to protect the musician from the sound they are producing on their own instrument.

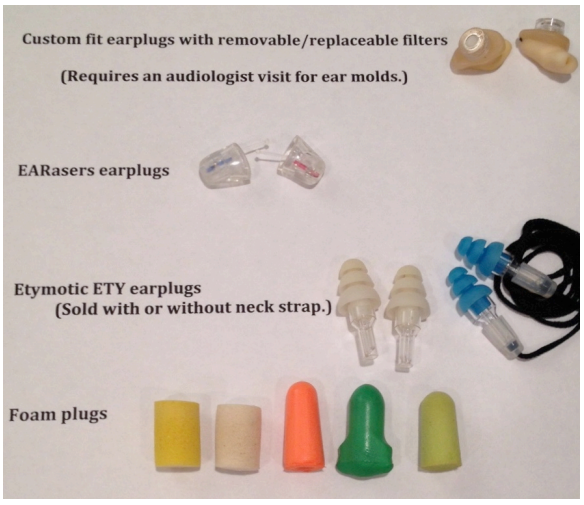
The only guaranteed method for protecting the ear is to use in-ear hearing protection.

Snare drum test with sound shield. Without sound shield.

In-ear filters

The least expensive way to protect the ear is with foam earplugs that are available at most drug stores. While these block out all frequencies effectively, most musicians dislike wearing them while playing. From observations of professional orchestra musicians, string players do not seem to mind using foam plugs but wind and brass players do not like the occlusion (stuffed head feeling) or the difficulty of assessing intonation with the foam plugs. Foam earplugs are a great option for anyone to have in their pocket for non-musical noisy situations.

Several companies have developed earplugs specifically designed for musicians that reduce certain frequencies and offer filter options to reduce noise. These are a good solution for rehearsals and concerts, or other environments where dangerous sound levels regularly are encountered.



The unprotected ear is the most vulnerable to noise-induced hearing loss.

Most musicians want the sound quality to be as close as possible when comparing protected vs. unprotected hearing.

CONCLUSIONS AND SOLUTIONS

1. Shouldn't we be insisting that every student musician have a pair of musician's earplugs in their case as an essential tool like rosin, a swab, extra reeds, valve oil, or a drum key?

2. Isn't hearing health worth the small financial investment, especially if it will help a person become a better musician?

3. Combine singing with playing to work on intonation, phrasing, and reduce sound levels.

4. Rhythm work can be enhanced by including clapping, buzzing, and vocalizing.

5. Record, listen, and evaluate rather than play all the time.

6. Pep Band in the stands = Ear Plugs in the ears.

7. Age-induced hearing loss is something we can't control, however noise-induced hearing loss is easily preventable.

8. The most important thing we can do for this and future generations of students, is to educate them early in the use of earplugs as a tool for better musicianship.

Additional links and articles

How Loud is That? – Rhythm! Scene (April 2014) - A free PAS eMagazine.
http://pasdigitaledition.s3-website-us-east-1.amazonaws.com/onlinemags/rhythmsceneapr14/#?page=8
pas.org

EARasers: www.earasers.net
Etymotic Research: www.etymotic.com
Westone: www.westone.com
Sensaphonics: www.sensaphonics.com
Carolina Hearing Doctors: carolinahearingdoctors.com
Article about hearing perception: www.hearingreview.com
Additional information here: williamjamespercussion.com

Percussive Notes – Vol. 51, No. 4 July 2013 pg. 36-39
Percussive Notes – Vol. 51, No. 2 March 2013 pg. 42-45

John R. Beck has been a faculty member at the University of North Carolina School of the Arts since 1998, and is a performer with the Winston-Salem and Greensboro Symphony Orchestras, Brass Band of Battle Creek, and the Philidor Percussion Group. He is a former member and tour soloist of the United States Marine Band and is a Past President of the Percussive Arts Society. His interest in hearing protection began when his father was forced to wear hearing aids to prolong his career as an orchestral timpanist and percussion teacher. Beck presents clinics endorsing Yamaha Percussion, Zildjian Cymbals, and Innovative Sticks and Mallets.