Musicians & Hearing
Playing and Enjoying Music Better and For Longer

Vincent Howard
Hearology Co-Founder and Director of Audiology
ABRSM
9th November 2019
Agenda

- Welcome
- Your most wonderful and valuable musical instrument: The Ear
- Music and auditory disorders
- Figures and statistics
- Existing prevention strategies and solutions consideration
- The Musicians’ Hearing Conservation Programme!
- Tips on ear health longevity
You care for your eyes.
You care for your teeth.
You check your blood pressure.
You measure your heart rate.
You track your steps.
You monitor your calories.
What about your ears?
There is more to ears than meets the eye
The cochlea is like a curled up piano
Music/Noise-induced Auditory Disorders
Music or Noise

De-mystifying the concepts…

Although music (generally considered a desirable sound), is clearly not ‘noise’ (usually an undesirable sound), the risk of damage to the auditory system from exposure to music is considered the same as the risk due to exposure to noise.
<table>
<thead>
<tr>
<th>Factors affecting MIAD</th>
<th>Tinnitus</th>
<th>Misophonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislation</td>
<td>Hyperacusis</td>
<td>Somatosounds</td>
</tr>
<tr>
<td>Hearing loss: Noise-induced temporary &amp; permanent threshold shifts</td>
<td>Diplacusis</td>
<td>Phonophobia</td>
</tr>
</tbody>
</table>
Intensity, duration and frequency of high sound exposure (music and exposure to other sounds)

Individual factors that may put you at higher risk of auditory disorders, e.g. genetic predisposition, environmental (chemicals, solvents), medical (ototoxic drugs), health status (cardiovascular issues, diabetes)
Health & Safety
Law in the UK
Applies to all musicians, including self-employed freelancers (Noise at Work Regulations, 2005), came into force for the musical world from 2008.

According to this law, the lower exposure level where action is required is 80dBA of daily noise exposure. The employer is required to assess the risks, control the risks, to make Hearing Protection Devices (HPDs) available for voluntary use and provide employees with information, instruction and training.

At the upper daily exposure level of 85dBA, the employer is required to put more effort into reducing the risk of hearing loss faced by a musician working in such an environment.
If exposures are still above the upper level (85dBA), the employer is required to ensure that employees use personal hearing protection devices effectively.

The noise reaching the ear must not exceed a daily personal noise exposure of 87dBA.

If there are marked variations in daily exposures, weekly personal noise exposure values can be used to ensure compliance with the regulation.
Important information for freelancers and music students

Whilst musical institutions have a duty of care to all their staff and students, the law states that employers are not obliged to ensure that freelance staff and students are taking the necessary precautions to protect their hearing.
Temporary & Permanent Threshold Shifts
Noise-induced Hearing Loss

Causes no pain
No visible trauma
Leaves no visible scars
Is unnoticeable in its earliest stages
Accumulates with each over-exposure
Knock-on effects are enormous

Noise-induced hearing loss is the most common permanent and preventable occupational injury in the world.

World Health Organisation

100% Permanent but 100% Preventable

Sounds above 85dB have the potential to damage hearing. With every 3dB increase, your safe exposure time halves.
Temporary Threshold Shifts

Temporary change in auditory sensitivity with return of the auditory threshold to pre-noise exposure level.

(Rawool, 2012)
Permanent Threshold Shifts

Auditory thresholds remain worse after the noise exposure or do not show any recovery over time.

(Rawool, 2012)
Music-induced Hearing Loss

Figure 1: The progression of noise-induced hearing loss at exposures above the exposure standard.
Inner Ear Hair Cells

Normal

Damaged
Bothersome tinnitus is a negative emotional and auditory experience, associated with or described in terms of actual or potential physical or psychological harm.

(Baguley & Fagelson, 2016)
Hyperacusis

The term hyperacusis is used to describe discomfort or annoyance associated with sound levels that are not considered uncomfortable by most other individuals with normal hearing. Its most common cause appears to be exposure to loud sounds and more specifically exposure to loud music.

(P.J. Jastreboff 2009)
When a tone of a specific frequency is presented to the two ears, the pitch perception of that tone can be very different in the two ears for some individuals and can interfere with music perception.

(P.J. Jastreboff 2009)
Misophonia

This is a strong dislike of sounds which are around you, squealing bike breaks, chalkboard scratching or even someone chewing very loud. Surround sounds are an extreme irritation and can cause anxiety.

(P.J. Jastreboff 2009)
This is the sensitivity to internal body sounds, jaw bones clicking, stomach rumble, heart beat or other quiet body sounds. This causes stress and anxiety and can be difficult to overcome.

(P.J. Jastreboff 2009)
This is an extreme anxiety and fear of environmental sound that are experienced around you on a daily basis, could damage the hearing further or make the symptoms worse and force the individual to excessively use ear plugs to drown our all sounds all of the time.

(P.J. Jastreboff 2009)
Stress & Fatigue
61% of adult musicians aged 27-66 have hearing loss.

In youth musicians aged 18-22, that rate is 22%.

16% of child musicians aged 8-12 have hearing loss.
A summary of key, recent academic findings

The largest study into noise-induced hearing loss was published in 2014. Three million Germans were examined, including 2227 professional musicians. They found that the musicians were four times as likely to report a new NIHL compared to the general population (Schink et al. 2014).

Study of 100 musicians. Amongst the auditory symptoms, 72% reported tinnitus (63% occasional and 9% permanent). Intolerance to loud sounds was next, reported by 67%. (Luders et al. 2016).

Zhao et al. (2010) reviewed five studies reporting that between 37% and 58% of classical musicians experienced MIHL.
Prevention strategies & Solutions

"The ringing in your ears—I think I can help."
Decibels (dB) measure sound pressure.

We can listen to a sound at 85dB for about 8 hours over the course of a day before it becomes dangerous.

With each increase of 3dB you halve the safe exposure time, so 88dB = 4hrs, 91dB = 2hrs etc.

Therefore, for each 3dB reduction, you double your safe exposure time.

If you double the distance from a single sound source, you effectively reduce its sound pressure by 3dB.
Protecting your hearing

Keep noise levels down

Mark up the score so you are prepared for the peaks in sound

Positioning of instruments, risers and screens in ensembles. You are in a unique position to know how loud it is

Quiet breaks in rehearsals to allow ears to recover

Custom hearing protection

Practice on mute – go through the motions without making a sound, or use dampening cloths on drums and pianos

Stay aware of noise due to your lifestyle as well as your music and how that contributes to your daily noise dosage
Custom-fit hearing protection
Using Hearing Protection effectively
Use the right level of attenuation for the situation. Don’t over-protect or under-protect.

With flat-attenuating filters, you will still hear everything you need to hear to keep time and play to the best of your ability.

Insert your hearing protection in good time before playing to allow time for acclimatisation – this is the equivalent for your ears of your eyes adjusting to the dark. This way you won’t notice the volume difference.
Carry your hearing protection with you at all times and use it in other noisy situations as well as when playing music.

Hearing protection is an excellent solution – as long as it is worn and fitted properly.

Build a long-term relationship with your Audiologist. Hearing protection may not be a quick fix for all, although it is for many. Bear in mind it can be adjusted. We want to find the best solution for each individual.
How to Achieve Ear Health Longevity

- MIHL awareness and education for music professionals and students. Acoustic assessments & evaluations.
- Regular Audiological assessments and consultations with Audiologists.
- Custom hearing protection devices (HPDs). Verification of efficacy and education to end users.
- Working alongside musicians to advance technology in this field.
Laurel or Yanni?

What do you hear?
Invest in your hearing instrument and don’t ruin your musical career
References


