

**Does Loud Music During Exercise Affect Hearing?**

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**Reply to question posed to *Audiology Online's* "Ask the Expert"**

**Question:** Does loud music during exercise affect hearing? If so, to what degree?

**Answer:** If by “loud music” you mean objectively measured sounds at levels above which prolonged exposure will begin to cause noise-induced hearing loss, the answer is yes. If by “loud” you mean, subjectively perceived as loud by the listener, then all bets are off, since the relationship between perceived loudness and noise risk is quite variable. Although a few studies have suggested that “pleasant” sound is less likely to cause noise-induced hearing loss (NIHL) than noxious sounds, in general, noise hazard is primarily a function of level and duration, influenced of course by the individual’s susceptibility.

The facts are these:

1. Regular exposure for prolonged periods to sound levels above 85 dBA puts a portion of the population at risk for permanent noise-induced hearing loss. The risk is proportional to the duration of the exposure. Like radiation exposure, noise exposure has a dose relationship. The greater the sound level and the longer the exposure, the greater the risk<sup>1</sup>.
2. Estimating hearing risk due to recreational exposures, such as those due to music, is difficult because of their intermittent and irregular nature, but the data make it clear that the cumulative dose per day and over a lifetime, is what is important. In studies I have conducted wherein I measured the 24-hr noise exposures of representative adults, not working in noisy jobs, I found that their noise burden was still in the range of potentially hazardous levels<sup>2</sup>. It appears that “typical” societal noise (transportation, recreational, home hobby, and other incidentals) approaches levels that cause hearing loss for those who are most susceptible. Unfortunately there are no standardized tests to predict in advance those who are at greatest risk.
3. Music exposures add to the noise burden of daily life and can cause hearing loss, especially for the noise-susceptible. Although any single aerobic class is unlikely to cause a hearing loss, attending them on a regular basis is not a hearing-healthy activity if the sound levels are at and above 85 dBA.
4. Although the data are not unequivocal, at least four studies have shown small measurable increases in temporary hearing loss following high-level noise exposures, for conditions in which subjects had been strenuously exercising during the noise versus the exposures they received during resting periods. Thus there appears to be a possibility that exercise accentuates the risk of acquiring temporary, if not permanent hearing loss due to noise.
5. It is difficult to control music levels during exercise classes because of the common perception that louder music is more enjoyable, and therefore causes participants to work harder. However, in a recent study, Wilson and Herbstein<sup>3</sup> found that “low-risk” sound levels (by which they meant 85-dBA) could be used in aerobics classes without reducing loudness comfort, enjoyment or motivation to exercise for the majority of those involved.

Despite the potential noise risk associated with music during exercise classes, efforts to promote hearing conservation within the aerobics industry have been limited and largely unsuccessful. This, in spite of the generous recommendations of the IDEA Association of Health and Fitness Professionals that sound

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<sup>1</sup> For regular weekly occupational exposures of 8 hours/day, hearing risk begins to be detectable in the most susceptible members of the population for sound levels at or above 80 dBA. In terms of a decibel loss in hearing sensitivity, the noise-induced hearing loss ranges from 5 – 10 dB for 85-dBA exposures for the more sensitive audiometric (i.e. hearing) frequencies.

<sup>2</sup> Berger, EH and Kieper, RW (1994). “Representative 24-hour  $L_{eqs}$  arising from a combination of occupational and nonoccupational noise exposures,” J. Acoust. Soc. Am. 95(5), Pt. 2, p. 2890.

<sup>3</sup> “The role of music intensity in aerobics: implications for hearing conservation,” J. Am. Acad. Aud. 14(1), 2003, p. 29-38.

levels should not exceed 90 dBA, and the amplified instructor's voice should not exceed 100 dBA. In fact, to be truly safe, levels even 5-dB lower are advisable.

If you choose to exercise at gyms and spas, you may well be exposed to potentially hazardous noise. Therefore, it is prudent to practice your own personal safe-listening strategies. Subjectively you can estimate when harmful sound levels are present by noting whether you feel the need to shout in order to be heard at arm's length. If you do, the sound is probably 85 dBA or greater. Occasional exposure to sounds at or slightly above this level will be safe for most people, but today there is no way to determine noise susceptible individuals in advance, and it is difficult for individuals to estimate their daily noise burdens to begin to estimate their own risk.

Indicators you can use to personally assess noise hazard are the presence of tinnitus or of a temporary threshold shift in your ears after a noise exposure.

- Tinnitus is like a "sunburn" of the hair cells of your inner ear, indicating that they have been irritated and overworked. If you notice the onset of tinnitus, or increased tinnitus immediately after a noise exposure, this suggests the sound exposure was too much for your ears and that repeated exposures might well lead to permanent hearing loss.
- You have experienced a temporary hearing loss if after a sound exposure, your hearing seems muffled or softer, or your ears feel full. Repeated temporary shifts are likely to become permanent with time.

If you suspect a hearing problem or too much noise exposure in your life, it is a good idea to have a complete hearing evaluation to get a baseline against which to compare future hearing tests. Professionals suggest evaluations every 10 years; more often for those over 50.

I encourage you to be aware of the sounds around you and to practice safe hearing. That includes asking the instructor to turn down the music, moving away from the speakers if possible, or wearing hearing protection. There are a number of earplugs from which to choose today that provide modest amounts of protection (so not too much noise is blocked) and do it in a manner that equally blocks all sounds, regardless of their pitch, for a good listening experience. For examples of such products and additional information visit:

[http://www.aearo.com/html/products/aud\\_sys/earplug.htm](http://www.aearo.com/html/products/aud_sys/earplug.htm)

<http://www.etymotic.com/>

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