An Experimental Study on Maximum Sound Output Capabilities and Preferred Listening Levels Using Different Earphone Types

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ABSTRACT

Objective: The study aims to compare the maximum sound output capabilities of different earphone types/music style combinations. The study also intends to assess the preferred listening levels (PLL) of test subjects using different earphone types with background noise accession. The study also seeks to determine the presence or absence of a threshold shift on headphone/music style combination PLLs that exceed the recommended noise limit.

Methods:
Design: Experimental Study
Setting: Tertiary Government Hospital
Subjects: Thirty (30) hearing healthy volunteers were sampled from hospital staff aged 18-40 years with no known history of ear pathology and/or use of any known ototoxic drugs, with normal otoscopy, audiograms of less than 20dB from 125Hz to 8000Hz and no exposure to loud noise from any source within the previous three days.

The sound pressure levels (SPL) delivered by three (3) types of earphones (earbud type, in-ear type, supra-aural type) were measured at maximum volume setting of a personal media player (iPod, Apple Inc.), while playing different music genres. The test subjects were asked to listen at their preferred listening levels (PLL) using the different types of earphones at increasing background noise accession.

Results: The earbud type averaged the greatest SPL among the earphone types and pop music averaged the greatest SPL among the music styles. Comparison of the maximum output capabilities revealed that there was a significant difference among different brands of earphones of the same type. However, no significant difference were found among songs of similar music style and across different music styles in all earphones except the in-ear type. PLL average was at 90.4dB in a silent environment with increasing intensity as background noise accentuated. Supra-aural earphones registered the least increase in PLL in a loud environment due to its higher background noise-attenuating capabilities.

Conclusion: Having a significant difference among earphone types with regard their maximum output capabilities, it is recommended to check the specifications of the earphone type one intends to use. In using personal media players (PMP), the volume should be set at the lowest comfortable level. While choice of music style remains the discretion of the listener, the choice of music style should be considered for long periods of listening. Because the PLL of test...