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A Quick Test For Cochlear Dead Regions in Those With a Unilateral Sensori-Neural Hearing Loss and Also to Check if Your Loudspeakers Are Working Well

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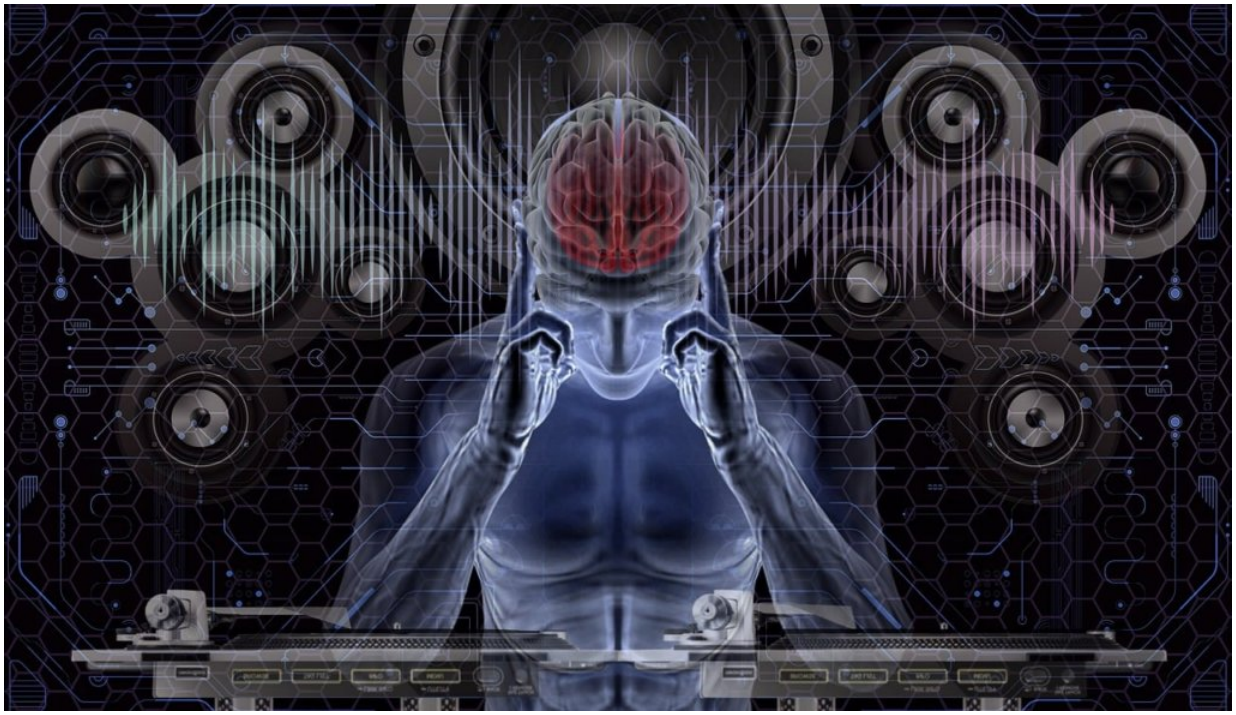

Several “hearing tests” can now be performed in the quiet of one’s own home. These are predominantly threshold-based tests and are typically limited by the environmental condition of the test room or by the asymmetry of unmatched earphones or loudspeakers commonly used by the public.

The following is a quick one-minute test that can be performed anywhere and can be used to not only check the similarity among consumer-level earphones (or, equivalently, the output speakers of a personal computer), but also to check whether there are any cochlear dead regions in hard of hearing patients with a significant sensori-neural asymmetry. This one-minute test can be performed at home or in the audiologist’s office and can provide valuable clinical information. If performed at home, the hard-of-hearing patient can bring these results to the audiologist and save some clinical time. It can also be used to inform the person at home who may have just experienced a sudden unilateral hearing loss whether they should wait until Monday to have the presence of wax checked in their ear, or whether they should immediately seek out an otolaryngologist on any emergency basis with concerns that the sudden hearing loss may be sensori-neural in origin.

One of the hallmarks of significant sensori-neural hearing loss (typically greater than a moderate level) is the possibility of cochlear dead regions. First delineated by Hallowell Davis and his colleagues over 70 years ago (Davis et al., 1950), and more recently by Brian Moore and his colleagues over 25 years ago (Moore, 1996; Moore et al., 2000), unilateral cochlear dead regions exhibit puretones that are heard as “flat” relative to that heard in the better/normal hearing ear. This is the basis for a 30-second test of the presence or absence of cochlear dead (Chasin, 2019) that can be used as a more efficient method than the Threshold Equalizing Noise (TEN) test (Moore et al., 2000). Cochlear dead regions would happen in significant sensori-neural hearing loss but never for those with “mere” conductive pathologies such as wax occlusion.

Here Is How The Test Works

This audio file contains a series of puretones ranging from below the range of computer laptops and Smartphones (e.g., 63 Hz), in octave steps up to 8000 Hz with the first puretone being in the left channel and the second being in the right channel. For a perfectly functioning set of laptop speakers, the two puretones should be identical in pitch and sound level. The same can be said about a perfectly functioning set of earphones. If one side sounds louder than the other but still in pitch, then this is evidence of a unilateral conductive asymmetry that may be related to wax occlusion. (It can also indicate a problem with your laptop speakers or earphones). But if one side sounds quieter AND flatter than the other, this is evidence of a possible unilateral sensori-neural hearing loss in the ear the puretone is heard as flatter. In this latter case, an immediate emergency otologic consultation for possible steroid treatments would be required.

For those people with a known hearing loss, perhaps with some sensori-neural asymmetry, performing this test at home before an assessment with their audiologist would provide important diagnostic and hearing aid programming information. For speech, the hearing aid programming would use some form of a frequency lowering algorithm to avoid the cochlear dead region, and for music, a high-frequency decrease of the amplitude of the music would be in order (see for example, Chasin, 2016; 2020).

Acknowledgement and Information

The audio file is courtesy of Shaun Chasin (www.Chasin.ca). This audio file is available free of charge (in both .mp3 and .wav formats) on my website at www.MusiciansClinics.com in the “Demos” section.

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