

A New Method for Assessing Masking and Residual Inhibition of Tinnitus

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Objectives: The main goal of the present research was to investigate, in a relatively large set of tinnitus patients, the tinnitus masking patterns (TMC) in comparison with physical tuning curve (PTC) of tinnitus patients when the target was an external tone mimicking tinnitus characteristics in terms of pitch and loudness.

Background: The TMC provides information about the frequency selectivity of masking around the tinnitus frequency. The PTC provides information about the frequency selectivity of the auditory periphery within the same region. As the pattern of excitation of a tone can be derived from the PTC, the pattern of excitation of the tinnitus can be estimated by the difference between the TMC and the PTC.

Methods: The TMC and PTC results of 32 tinnitus patients were analyzed retrospectively. All patients performed a hearing test, a tinnitus pitch- and loudness- matching task. Conventional PTC was performed but with a tone mimicking tinnitus as the target. Patients were instructed to respond when the masker was just masking the target (3 dB steps). During both procedure, the first narrowband noise used was centered at one octave under the tinnitus frequency and increased by 1/8 octaves step up to one half-octave above the tinnitus frequency.

Results: Most TMC shapes displayed very low levels of frequency selectivity around the tinnitus frequency (69%) although a few patients displayed some level of selectivity (31%). For most patients (72%), tinnitus was more difficult to mask than the mimicking tone. Noise-type tinnitus was significantly more difficult to mask than tonal type tinnitus.

Conclusions: In most cases, the excitation pattern of the tinnitus related signal is wide, extending by at least more than 1 octave around the tinnitus frequency. Still, very narrow tinnitus excitation pattern was found. These results may have important implications for therapies targeting precisely the tinnitus frequency.