

Evidence based automated tools for the objective measurement of tinnitus and their application

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Most cases of tinnitus are caused by changes in central auditory structures consequent on hearing impairment expressed in the audiogram or more sensitive measures. Compensation for these impairments requires knowledge of how the impairments are expressed, tools for their assessment, and, in our approach, interface of the tools with therapeutic devices that aim to normalize impaired hearing function in affected individuals. Baseline population data are required to make individual measurements informative. We are adapting computer-based, subject-driven psychoacoustic tools that were designed initially to shed light on the mechanism of tinnitus (Roberts et al., *JARO* 2008 9:417-435), for use in tinnitus assessment in the clinic. A new module is assessing changes in central gain by measuring perceived loudness as a function of physical sound intensity. Measurements of peripheral and central auditory function for individual patients are used by an adaptive hearing aid algorithm to restore a more normal pattern of auditory nerve activity and loudness growth for individuals experiencing tinnitus with or without audiometric hearing loss.