

Title: Establishing Normative Standards for Measures of Tinnitus Perception

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MeSH words: ringing-buzzing-tinnitus, auditory perception, standardization

Objectives. Chronic tinnitus is the persistent sensation of hearing a sound that exists only inside the head. Numerous clinical studies have reported positive outcomes of various interventions for tinnitus; however, because there is no consensus on how to measure such outcomes, evidence supporting the effectiveness of these interventions remains inconclusive. Without normative standards for test-retest repeatability of measures of tinnitus perception, it is unknown if quantitative evidence is possible to reflect a reduction in the loudness/intensity of tinnitus as a result of clinical intervention. The proposed study will accomplish the following aims: (1) Determine normative standards for baseline measures of tinnitus perception, including psychoacoustic measures (loudness match—LM, pitch match—PM, minimum masking level—MML), and loudness rating scales; (2) Determine normative standards for repeated measures of tinnitus perception (LM, PM, MML; loudness rating scales); (3) Determine the relationship between automated and manual testing of psychoacoustic measures of tinnitus perception (LM, PM, MML) both for baseline and repeated measures.

Plan. Procedures will be conducted that will result in establishing normative measures of tinnitus perception that can be used as a frame of reference to interpret an individual's responses to the same measures. A sufficient number of subjects will be tested to develop a normative dataset on commonly used tinnitus-related measures. Reference standards for tinnitus patients will be established using parametric and non-parametric methods. This will enable accurate, age-stratified estimates of the normal range of perception outcomes that a tinnitus patient experiences in the absence of effective treatment. Serial monitoring standards will be established using the linear mixed model approach, which includes adjustment for regression to the mean. The end product will be a set of age-specific reference standards for tinnitus patients, as well as a set of shift standards suitable for clinical application among tinnitus patients undergoing treatment geared toward altering the perception of tinnitus.

Methods. To conduct this study, 300 individuals who experience chronic tinnitus will be enrolled. They will be stratified by age decades 20-30, 30-40, 40-50, 50-60, 60-70 and 70+ (50 participants per decade). Each participant will complete psychoacoustic testing (LM, PM, MML) using our automated, self-guided Tinnitus Evaluation System (TES). Participants will also complete the Tinnitus Functional Index (TFI) and scales of tinnitus loudness (numeric rating scale and visual analog scale) during each test session. Testing will be repeated during a period of time that would incorporate most treatments for tinnitus, i.e., 6 months. Testing will be conducted at baseline and at 1, 3, and 6 months. A subset of 60 subjects (10 per age decade) will also complete the same tinnitus psychoacoustic tests conducted manually, which will enable a comparison of results obtained with automated versus manual testing.

Findings to Date. This study has not yet begun.

Relevance to VA's Mission. Tinnitus is the most common of all the service-connected disabilities for military Veterans. By the end of FY 2012, a total of 971,990 Veterans were service connected for tinnitus. Evidence-based intervention for tinnitus requires accurately measuring the perception of tinnitus, which is the focus of this study.