This paper has been accepted for presentation at 2010 American Academy of Audiology April 14-17, San Diego, CA USA

An Integrated Approach to Tinnitus Diagnosis and Management

Jungang Lin, MicroDSP Hearing & Speech Lab; **Tao Jiang**, MicroDSP Hearing & Speech Lab; **Xiaoyi Fu**, MicroDSP Hearing & Speech Lab; **Xiaoyan Gu**, MicroDSP Hearing & Speech Lab; **Xiaoyan Gu**, MicroDSP Hearing & Speech Lab; **Xiaofang He**, MicroDSP Hearing & Speech Lab; **Qinxiu Zhang**, Chengdu TMC University

Abstract:

Despite extensive research on tinnitus treatment, little progress has been made to improving tinnitus diagnosis. Audiometers with inadequate capabilities still play a major role in tinnitus assessment at most clinics. This paper describes a new approach to combining evaluation and management in one platform. Full tinnitus protocol can be easily conducted with the results digitally downloaded to sound media for individualized treatment. The findings of a clinical study will be discussed.

Summary:

This paper describes a new diagnostic and treatment instrument, TinniTest®, and to report the clinical study on its application. TinniTest® is an all in one digital instrument for tinnitus diagnosis and management. It has incorporated psychoacoustic measures of tinnitus as validation tools for sound therapies. As a specially designed tinnitus diagnostic instrument, it can perform all behavioral tests of tinnitus at greater precision and flexibility. This clinical study was to examine its effectiveness.

Method: 30 patients were included in this study. They all complained of tinnitus but without other medical problems. Complete case histories were taken. The subjects were fully examined with TinniTest® for audiometry. Before and after sound therapies, the patients filled out the tinnitus handicap inventory and judged annoyance from 0 to 6 with the latter being the worst. The findings of the two measures were then compared to determine the effectiveness of the treatment. The study was carried out in two stages: in Stage One, the patients received a full range of psychoacoustic measures of tinnitus, including pitch and loudness matching,

residual inhibition, minimal masking levels and Feldmann masking curves. The findings of tinnitus were compared with that of audiometry in order to analyze any possible associations between. The tinniogram, a group of graphs recording tinnitus evaluation results, was obtained for the determination of appropriateness of sound therapies. In Stage Two, individualized sound therapy sessions were provided to each patient based on the assessment findings obtained in Stage One. For the subjects who scored less than 36 points in the tinnitus handicap inventory, and/or judged “2” or less in the tinnitus annoyance scale, they received counseling primarily in combination of tinnitus sound therapy. The subjects who scored 36 points or greater, and/or judged “3” or greater from the scale, personalized sound signals were digitally created straight from TinniTest® and delivered via TDH earphones. Proper counseling was also provided during the sessions of sound therapy. The subjects who either exhibited Type V of Feldmann masking curves or rebounded effects of residual inhibition received primarily counseling.

Results:

The results of the study indicate that two patients judged annoyance to “0”, a significant tinnitus relief, and the annoyance perception for 27 patients was also significantly reduced after the therapy session. The total reduction of annoyance was 97% except for one patient who showed no improvement. During the study, no side effects were reported.

Discussion: The results were consistent with others for the significant tinnitus relief. The higher rate of improvement in this study was perhaps due to two factors: one is that the utilization of TinniTest® has greatly improved the comprehensiveness and accuracy of tinnitus evaluation. This has resulted in the provision of truly personalized management to the patients. Secondly, in situ digitalization of treatment signals has maximized the comfort of sounds; thus increasing the effectiveness. One interesting observation is that the onscreen comparison of the subjective judgment of annoyance levels before and after therapies has helped the patients better understand the effects of proper management.