

Use of alternative devices in the sound therapy of tinnitus

Introduction

Today, sound therapy is one of the standard treatments for patients with tinnitus. According to the American Tinnitus Association, sound therapy means using the external acoustic signal to alter the patient's perception of or reaction to tinnitus. For this reason, patients with tinnitus are advised to avoid silence and surround themselves with sounds. They can use for that purpose several devices such as masking devices, sound generators, wide-band noise generators, or hearing aids. Recently, mobile applications have become increasingly popular, in line with the development of e-health solutions. Patients like them because they are, as a rule, easy to access, user-friendly, and free to download. In the literature, we can find a few reports on the effectiveness and safety of sound therapy conducted through mobile applications. The studies reported so far had been conducted on relatively small groups of patients, with short follow-up time, and tools used for assessing the changes had not been very sensitive. Presently, an important research question, both for scientific and clinical reasons, is whether sound therapy through mobile application can contribute to reducing the perceived annoyance on tinnitus.

Aim

The aim of the scientific work comprising the topically coherent series of articles published in scientific journals has been to assess the effects of sound therapy using a mobile application on the perceived annoyance of tinnitus. The study hypothesis was that patients undergoing sound therapy through a mobile application experience the reduction of the perceived annoyance of tinnitus compared to tinnitus patients not using any therapy.

Material and method

The studies included adult patients reporting to the Institute of Physiology and Pathology of Hearing for tinnitus diagnostic procedures. The study was conducted in three stages:

Stage I – a retrospective study with 460 participants;

Stage II – a pilot study with 52 participants in a study group only;

Stage III – the proper study with 130 participants divided between the study group and the control group:

- study group – persons with annoyance tinnitus who expressed willingness in participating in sound therapy conducted through a mobile application,
- control group – persons with annoyance tinnitus who did not want to undergo the sound therapy. In the course of the study, these persons did not participate in any other form of therapy.

Participants in the study group were using a mobile application ReSound Tinnitus Relief™ generating different acoustic signals for 6 months. The assessment of therapy and changes in the perceived annoyance of tinnitus was based on the standardized questionnaires: Tinnitus Handicap Inventory (THI), Tinnitus Functional Index (TFI), and Visual Analogue Scale (VAS).

Results

The research procedure presented in a series of five published articles that comprise a scientific achievement enabled achieving the aim set in this dissertation.

A study conducted in stage I has shown that about 40% of persons with tinnitus use different forms of self-help. They take up these activities independently; the most popular form was enriching the acoustic background with additional sounds.

The pilot study (stage II) showed that regular use of sound therapy for half a year, using the mobile application ReSound Tinnitus Relief™, concurred with the reduction of tinnitus symptoms measured with THI and TFI. The questionnaires' results showed that the largest changes concerned the emotional status and were concurrent with the results obtained in the study with the control group (stage III).

The results obtained in stage III showed that the intensity of tinnitus in the study group was significantly reduced, while in the control group, it was unchanged. The overall intensity of tinnitus in the study group was reduced from the mean score of 54.95 points to 40.45 points. In the control group, the mean score of tinnitus intensity was stable, respectively 52.13 and 50.25 points. Moreover, a clinically significant improvement was observed in 13 patients (30%) after 3 months of using the mobile application and in 17 patients (39%) after 6 months.

Conclusions

Study results show that:

- the most popular form of self-help used by persons with tinnitus is surrounding themselves with sounds. Patients use for that purpose different devices, including mobile applications;
- using the sound therapy through the mobile application for 6 months has a significant effect on reducing the annoyance of tinnitus;
- patients using the sound therapy through a mobile application for 6 months experience the reduction of the perceived annoyance of tinnitus; such changes were not observed in persons not using the sound therapy through the application;
- the largest change of the perceived annoyance of tinnitus was seen in the sphere of emotions in patients using sound therapy through an application;
- persons using sound therapy through the application have observed the reduction of the loudness of tinnitus already after 3 months; such changes were not seen in persons not using the sound therapy.