Behavioral Intervention in Tinnitus Management

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Tinnitus is the presence of ringing or buzzing in the ears or head. Between 10% and 15% of Americans have some degree of tinnitus. There is no cure for tinnitus, which is a symptom of other problems, not a disease itself. Progressive tinnitus management, an intervention developed over the last 22 years, is described. CBT for tinnitus is a component of the intervention program.

"Doc, you've got to help me. This sound is driving me nuts. I can't sleep, my work is suffering, and my wife doesn't believe me. My primary care physician has no answers. If I don't get some relief soon, I'm not going to be able to handle it." This is just an example of the distress and frustration some people describe regarding having tinnitus.

The presence of tinnitus (i.e., ringing or buzzing in the head or ears) is determined by self-report, and its loudness is measured through subjective ratings, such as a 1–10 scale. Because tinnitus loudness cannot be quantified, it is unknown if it correlates with emotional distress, functional consequences, or other domains associated with bothersome tinnitus. These domains are assessed using outcome questionnaires that focus on reactions to tinnitus, including sleep disturbance, concentration difficulties, and emotional distress. The most widely used of these scales is the Tinnitus Handicap Inventory (THI; Newman, Jacobson & Spitzer, 1996), but the newly developed Tinnitus Functional Index (TFI) is gaining popularity due to its ease of use and responsiveness to change (Henry et al., 2016).

Given the lack of a standard diagnostic criteria for tinnitus, prevalence rates range considerably, between 5.1% and 48.7% (McCormack, Edmondson-Jones, Somerset, & Hall, 2016). Longitudinal research suggests a 10-year cumulative incidence of tinnitus of 12.7% (Nondahl et al., 2010). Tinnitus is reported to increase with age, be slightly more common in men, and occur more frequently in occupations involving loud sound. Hearing loss and tinnitus have always been problematic for military personnel, who are commonly exposed to high levels of noise, and hearing conservation programs intended to increase use of ear-level noise protection and decrease noise exposures have afforded limited protection (Yankaskas, 2013). It is not surprising that tinnitus and hearing loss have been the two most common service-connected disabilities for veterans for over a decade (US Department of Veterans Affairs, 2017).

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Tinnitus is a symptom of other problems, not a disease itself. There is no cure for tinnitus (i.e., there is no proven method to permanently eliminate, or even reduce, tinnitus). The onset of tinnitus is associated with many factors, including age, sound trauma, head injury, and neurologic disease (Hoffman & Reed, 2004). The underlying cause of its onset and sustainability is currently unknown (Henry, Roberts, Caspary, Theodoroff, & Salvi, 2014). No medication is labeled for use in treating tinnitus. Tinnitus is a risk factor for developing mental health symptoms and disorders including depression, anxiety, insomnia, and posttraumatic stress disorder (Fagelson, 2007; Folmer, Griest & Martin, 2001; Shargorodsky, Curhan & Farwell, 2010). For persons experiencing mental health conditions associated with tinnitus distress, medications can be helpful in mitigating those conditions (Robinson, 2007).

Intervention for tinnitus is limited to reducing a person's reactions to tinnitus (and its interference in his or her life). The goal

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of intervention is to enable the individual to live a normal life, despite the unwanted sound perception. Interventions include various means of utilizing sound therapeutically, and counseling that focuses on teaching basic information and coping skills. Audiologists and mental health providers work together to offer tinnitus interventions based on patients' needs (Fuller et al., 2017). Diverting attention through sound enrichment (adding comfortable sound and avoiding silence) and activities improves adjustment to tinnitus. Particular attention to the problems of sleep disturbance and stress further enhances adjustment.

The American Academy of Otolaryngology – Head and Neck Surgery Foundation (AAO-HNSF) recently published the Clinical Practice Guidelines (CPG) for management of tinnitus (Tunkel et al., 2014). A comprehensive review of the peer-reviewed literature, including the available Cochrane reviews, was done in the development of the CPG in order to identify appropriate Randomized Clinical Trials (RCTs) to inform evidence-based recommendations (Martinez-Devesa, Perera, Theodoulou, & Waddell, 2010). Cognitive behavioral therapy (CBT) was the only intervention for tinnitus recommended in the CPG.

Progressive Tinnitus Management

Over the past 22 years, our tinnitus research has led to the development and refinement of a protocol called Progressive Tinnitus Management (PTM). It involves five stepped-care levels of management, and patients progress only to the level that is needed to meet their needs (Henry, Thielman, et al., 2017b). This protocol offers guidance to clinicians working with patients reporting tinnitus.

Level 1 is the referral level. This pertains to any clinician who encounters patients complaining of tinnitus. Depending on the urgency of patients' symptoms, they may be referred to audiology, mental health, otolaryngology, or emergency care. The "default" referral would be to Audiology.

Level 2 is the audiological evaluation level. Every patient reporting tinnitus should have a hearing evaluation and brief tinnitus assessment. If the patient verbally states he/she is experiencing emotional distress, such as frustration or sadness, or functional difficulties because of their tinnitus, such as avoiding socialization or difficulty working, they are referred to the next level.

Level 3 is a tinnitus-specific skills education level. It is offered to patients who require intervention because of tinnitus distress or behavioral dysfunction due to tinnitus. Ideally offered in a group setting, patients are taught skills they need to self-manage their tinnitus-related problems—possibly for a lifetime. The group setting enables patients to receive peer support and share their experiences with others, and enables providers to efficiently provide care. These sessions are done by an interdisciplinary team, with different portions taught by audiologists and mental health providers. Audiologists explain different forms of sound therapy, such as using a problem-solving method for determining preferred categories of sound and describing available medical and non-medical devices for receiving sound. Mental health providers deliver CBT, which includes psychoeducation regarding psychiatric comorbidities with tinnitus (such as depressive symptoms), skill development for stress reduction and distraction, and cognitive restructuring. The majority of patients who receive Level 3 intervention have their needs met to the degree that they do not desire further services.

Level 4 represents an individualized interdisciplinary evaluation. This level of services is offered to the relatively few patients who request further services beyond learning self-care skills. Patients are encouraged to utilize the skills learned during Level 3 for approximately six weeks, and to return for Level 4 if they continue to experience tinnitus distress. An in-depth evaluation is done to identify barriers to enacting the Level 3 skills and to problem solve for tinnitus coping strategies.

Level 5 represents an individualized support intervention. If intervention is still needed and desired, patients are offered one-on-one services by an audiologist and/or a mental health provider. The audiologist typically reviews and assists in implementing sound therapy skills in greater detail. The mental health provider typically individualizes CBT to address barriers to implementation, and tailors it to individuals' specific needs. For example, CBT for sleep disturbance may be provided at this level for patients whose sleep is negatively affected by tinnitus.

Intervention for hearing loss, often comorbid with tinnitus, is fairly straightforward: Individuals experiencing hearing difficulties have their hearing evaluated by an audiologist and/or ear, nose, and throat doctor who determines if hearing aids would improve their hearing ability. When hearing aids are warranted, they generally function well to improve hearing to a significant degree (dos Santos et al., 2014; Henry, Frederick, Sell, Griest, & Abrams, 2015; Henry, McMillan, et al., 2017).

Basic CBT for tinnitus, offered within the PTM protocol, increases coping skills and includes management of stress and distractions, and cognitive restructuring (Henry, Thielman, et al., 2017b). Two problem-solving worksheets placed back-to-back on a single sheet integrate Level 3 skills from both disciplines by having patients identify their most bothersome tinnitus situation. Several blank copies of these worksheets are in the workbook, and the patient chooses one specific bothersome tinnitus situation from a list (e.g. trouble initiating sleep) to address on each worksheet. On one side, the Changing Thoughts and Feelings worksheet lists the three primary CBT skills (relaxation, adding pleasant activities, and changing thoughts) and the patient chooses a plan to implement the skills and then tracks responses to the skills between sessions. On the other side, the Sound Plan worksheet lists the three types of sound (background, soothing, and interesting) and the patient chooses what type of sound and device will be tried to address the specific problem. These worksheets seamlessly tie together the sound therapy and CBT interventions. Patients are encouraged to use trial and error to discover the skills they use rather than viewing the program as one size fits all. Through trial and error, patients record strategies effective for their unique situations and preferences.

Although evidence indicates CBT-for-tinnitus protocols help patients cope with tinnitus, other behavioral interventions have promise. Investigations into the use of Acceptance and Commitment Therapy (ACT) for tinnitus have also been gaining ground.

Psychoeducation regarding the effects of tinnitus on functioning are routinely provided as these problems present during session. For example, the potential impact of tinnitus on socialization, frequency of depressive and anxious symptoms often comorbid with tinnitus, and tips for improving sleep hygiene are discussed. CBT-for-tinnitus is a derivative of CBT-for-pain, so it includes a "whole health" perspective, and, as such, overall well-being is emphasized (Cima, Andersson, Schmidt, & Henry, 2014). Some CBT-for-tinnitus providers also include a module on hearing strategies, even though hearing loss and tinnitus are conceptually separate problems. Desensitization (exposure) techniques may also be helpful for tinnitus, though they are not routinely offered as part of the basic CBT-for-tinnitus protocol in PTM.

Stress management takes many forms and its emphasis for tinnitus distress is behavioral (Mazurek, Szczepek, & Hebert, 2015). Most patients with tinnitus will say they notice their tinnitus when trying to rest or relax, but when occupied with other activities, they hardly notice their tinnitus. Others report that their tinnitus seems louder and more intrusive during stressful situations (Shargorodsky, Curhan, & Farwell, 2010). Reductions in nervousness, sleeplessness, and irritability assist in coping with tinnitus (Cima et al., 2014). Patients learn how to apply a specific relaxation exercise to a bothersome tinnitus situation, such as falling asleep at night. Although diaphragmatic deep breathing and guided imagery are taught during PTM, patients learn that any relaxation exercise of their choosing may be helpful.

Behavioral activation, a hallmark of CBT for depression, assists in improving mood, distraction, and self-confidence (Cima et al., 2014). Patients learn to recognize their activities as mandatory versus optional and add activities as needed to reduce distress. By observing current activity frequency and then gradually adding pleasant activities, patients achieve realistic and observable goals. Some patients add activities to indirectly address their bothersome tinnitus situation such as difficulty falling asleep at night. For example, a patient may observe that cardiovascular exercise during the day improves sleep quality at night and would create exercise goals addressing their sleep and, indirectly, their tinnitus.

Cognitive restructuring occurs both indirectly and directly in CBT. Indirectly, offering basic information on sound and sound perception greatly assists in reducing patients' catastrophic thoughts about tinnitus (Cima et al., 2014). Until learning otherwise, some patients worry their tinnitus indicates a prelude to total hearing loss or psychiatric illness. Simple information about their prognosis offers potential relief. Some patients fear their behaviors are somehow worsening their tinnitus and will avoid activities, such as potentially noisy or stressful events. Cognitive restructuring occurs directly by offering an 8-step process to identify thoughts about their tinnitus that lead to adverse emotional responses. They then discover new thoughts that lead to more positive emotional responses and work to implement those into their daily bothersome tinnitus situations. For example, the thought, "Silence is critical to my need to relax" may be identified as an all-or-nothing thought leading to frustration and irritability (Beck, 2011). When this thought is challenged, a patient may realize that, in reality, complete silence is unusual even without tinnitus since humans typically hear cars driving by or a refrigerator running, but we have learned to ignore these sounds. Patients brainstorm other potential thoughts, such as "My tinnitus is there, but I can ignore it when I'm busy or turn on a fan" and imagine new emotional reactions.

Research on PTM

Cumulative evidence for CBT within the PTM protocol consists of: 1) a pilot study for developing a CBT for tinnitus protocol; 2) clinical implementation at Audiology clinics—PTM is being utilized in one form or another by over 100 clinics (Myers et al., 2014); 3) a proof-of-concept study evaluating telephone-based PTM (Henry et al., 2012); and 4) two RCTs of PTM that were recently completed (Henry, Thielman, et al., 2017a; Henry, Thielman, et al., 2017b).

The first RCT was a clinical effectiveness study of PTM that was conducted in two VA audiology clinics: one in Memphis, Tennessee, and one in West Haven, Connecticut (Henry, Thielman, et al., 2017b). There were 300 veterans in this study. Patients who came to the clinics signed up for the study if they felt that the PTM Level 3 intervention might be helpful for them. Half were enrolled to attend the Level 3 Skills Education classes and half were put on a six-month wait list. The PTM group showed significantly greater benefit than the wait list group.
The second RCT was motivated by the fact that so many patients have experienced a traumatic brain injury (TBI) and that, of these, many have bothersome tinnitus (Henry et al., in review; Lew, Jerger, Guillory, & Henry, 2007). The PTM Level 3 Skills Education counseling was administered to participants over the telephone by both an audiologist and a psychologist. Participants were located all over the United States; each had bothersome tinnitus, and some of them had experienced one or more TBIs. They were randomized to either receive the telephone counseling for six months or to be put on a six-month wait list. The Tele-PTM group showed significant improvement while the wait list group did not. These results were particularly strong (Henry et al., in review).

Both recent RCTs have validated the effectiveness of interdisciplinary tinnitus management services. PTM is a protocol for intervention delivery and should be considered for the practice of evidence-based tinnitus management. PTM is remarkably consistent with the AAO-HNSF CPG, and provides a structured and defined framework for implementing both assessment and intervention services for patients who report tinnitus. The VA Central Office has endorsed PTM as an effective intervention for tinnitus and has recommended its use at VAMCs (Edmonds, Ribbe, Thielman, & Henry, 2017).

Other Explorations and The Future

Although evidence indicates CBT-for-tinnitus protocols help patients cope with tinnitus, other behavioral interventions have promise. Investigations into the use of Acceptance and Commitment Therapy (ACT) for tinnitus have also been gaining ground as an evidenced-based psychotherapy for tinnitus (Hesser, Bankestad, & Andersson, 2015). The fundamental idea of ACT includes directly moving towards a problem and increasing cognitive flexibility for coping with it rather than attempting to avoid it—as a form of distraction in CBT could be viewed (Hesser, Westin, & Andersson, 2014). Coping skills training and mindfulness-based stress reduction (MBSR) have also shown promise for helping individuals with bothersome tinnitus (Martz & Henry, 2016).

Interdisciplinary approaches to tinnitus management such as PTM are efficient and effective for managing reactions to tinnitus. Combined efforts led by audiology as supported by other health disciplines, such as mental health, provide coping skills emphasizing distraction, behavioral activation, stress reduction and cognitive shift to enable improved quality of life. Individual preferences based on self-determined goals and values should be carefully considered when selecting behavioral interventions (Heapy et al., 2017).

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