/CN/Chapter 11

/CT/Audiologist-Delivered Cognitive Behavioral Therapy for Tinnitus

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/H1/Introduction

Experiencing conditions resulting in chronic symptoms can affect most aspects of day-to-day living and result in poorer health-related quality of life. Daily struggles with chronic conditions can be demoralizing, worrying, isolating, and frustrating (Andersson & Westin, 2008). One such chronic condition is tinnitus, characterized by individuals hearing sounds with no known external source. One of the biggest risk factors for developing tinnitus is hearing loss, although numerous other conditions can also lead to tinnitus. Although many people with tinnitus do not find it bothersome, others find it extremely problematic (Brüggemann et al., 2016; Davis & Rafaie, 2000). Those with severe tinnitus report many associated difficulties, including insomnia, concentration problems, and indirect psychosocial effects such as feelings of hopelessness, irritability, frustration, anxiety, and depression (Salazar et al. 2019; Trevis et al. 2018). Living with chronic tinnitus as well as the associated psychosocial comorbidities can be an insurmountable challenge. For this reason, individuals with severe tinnitus need appropriate clinical strategies to help manage the comorbidities, including anxiety and depression, to aid coping with tinnitus. This chapter provides an overview of an evidence-based intervention for bothersome tinnitus, namely cognitive behavioral therapy, and how it can be delivered by audiologists.

/H1/Background

Tinnitus management options can be broadly classified as (a) approaches targeting the tinnitus percept (e.g., medical management, sound therapy, and the use of hearing devices), (b) approaches targeting the reactions to tinnitus (e.g., psychological approaches such as mindfulness-based stress reduction [MBSR]; acceptance and commitment therapy [ACT]; and cognitive behavioral therapy [CBT]), and (c) combined approaches that target both the percept and reactions to tinnitus (e.g., tinnitus retraining therapy [TRT]) (Beukes et al., 2021). In addition, various alternative therapies such as acupuncture, ginkgo biloba, and vitamin supplements have been used in the management of tinnitus with limited effectiveness (see Chapters 14 and 15 for additional details). Despite the range of interventions, few are evidence-based. CBT is a psychological intervention approach supported by scientific evidence for management of tinnitus and other chronic conditions (Carpenter et al., 2018). Due to this strong evidence base, CBT is the preferred management option for tinnitus and recommended in most practice guidelines (e.g., the American Academy of Otolaryngology—Head and Neck Surgery [AAO-HNS] guidelines) over other approaches such as the use of medications (Fuller et al., 2017; Tunkel et al., 2014).

The evolution of CBT can be traced back to the developments in psychology as early as 1913, as seen by the work of behaviorist John B. Watson (Watson, 1957). CBT, as practiced today, originated from cognitive therapy, which was developed by Aaron Beck in the 1960s (Beck, 1976, 1995). Prior to this discovery, the emphasis in psychology was on behavioral therapy, focused on eliminating unwanted behaviors. Although this approach was successful, Beck (1976), identified thinking disorders at the core of problems such as depression and anxiety. Distorted cognitions, negative thoughts and beliefs, and biased interpretations of

particular experiences played a critical part in maintaining behaviors associated with depression and negative self-views. These observations resulted in the development of cognitive therapy, aimed at identifying unhelpful thoughts and beliefs and proposing alternatives. Later, behavioral and cognitive principles were combined, resulting in the origin of CBT to address both unwanted behaviors and unhelpful thought patterns (Beck, 1995). CBT has been successfully used to manage various disorders including anxiety, depression, insomnia, and post-traumatic stress disorder (e.g., Luo et al., 2020; Natsky et al., 2020).

/H2/CBT Scope, Principles, and Components

CBT is based on the basic principle that what we think, how we feel, and how we behave are all closely connected, and each of these factors has a decisive influence on well-being, as shown in Figure 11–1. Due to this interconnectedness, addressing either unhelpful thoughts, emotions, reactions, or behaviors can lead to improvements associated with a disorder (Chawathey & Ford, 2016). CBT helps change how people think (cognitive) and what they do (behavior). *Cognitive techniques* identify distressing beliefs, dysfunctional assumptions, cognitive distortions, and exaggerated or negative automatic thoughts. These thoughts are challenged using cognitive restructuring and replaced with more realistic, balanced, and accurate thoughts. *Behavioral techniques* identify unhelpful behaviors, such as withdrawing, giving up hobbies, or experiencing high tension due to problems or medical conditions. Behaviorism is based on the principle that behavior is learned and that behavior can be unlearned or learned anew. Behavioral modification is suggested to re-enable participation, help reduce tension, and decrease isolation. Behavioral activation applies the following steps, using the acronym ACTION: Assess mood and behavior; Choose alternative behaviors; Try out alternatives; Integrate these changes into life; Observe the

results; Now evaluate (Addis et al., 2001). Examples of behavioral modification include keeping a sleep diary, scheduling pleasant events, and activity monitoring.

[Insert Figure 11–1 here]

Together with cognitive restructuring and behavior modification, there are other key components of CBT, such as exposure therapy. This involves graded exposure to feared situations to habituate to the situation and diminish the fear. The use of mental imagery is also incorporated using all five senses, as well as environmental adaptation to minimize problems pertaining to specific disorders.

Although CBT is structured, it can be tailored for different disorders (e.g., anxiety, insomnia) and each individual. CBT is problem oriented and helps therapists find practical ways to reduce difficulties and comorbidities related to the presenting disorder and change behaviors. Thus, CBT focuses on current problems rather than on issues from the past. Goal setting is incorporated to monitor progress, and the therapist and patient collaborate to work toward achieving these goals. Therapy is closely monitored and evaluated to assess the effectiveness of specific strategies, often implemented in the form of homework assignments. A record of positive information is also kept in view of disconfirming negative thoughts. A CBT program can vary in length, between five and 20 sessions. For tinnitus, these sessions generally run for 6 to 10 weeks (Andersson, 2002) to provide enough time for individuals to gain insights or perspectives and learn new skills. Each session may address specific topics such as stress management, cognitive restructuring, and relaxation (Andersson, 2002).

/H2/CBT Research Evidence

Numerous systematic reviews and meta-analyses suggest that CBT is an effective management option for many psychological conditions such as anxiety, depression, and insomnia; for chronic pain and physical health conditions; and for various other conditions such as substance use disorder, anger, and aggression (Cuijpers et al., 2013; Hind et al., 2014; Hofmann et al., 2012; Michail et al., 2017; Trauer et al., 2015). Specific CBT management strategies vary significantly for different disorders, as there are characteristic themes of dysfunctional behavior patterns and cognitive distortions associated with each disorder.

Due to the relationship between tinnitus and psychological distress, CBT has been applied to target the distress caused by tinnitus (Andersson, 2002). Unhelpful thoughts and emotional reactions about tinnitus are addressed through behavior modifications. Various controlled trials, longitudinal studies, and systematic reviews confirm that CBT is the management approach with the broadest evidence base for tinnitus (for a review see Beukes et al., 2019; Fuller et al., 2020; Hesser et al., 2011).

/H2/CBT Delivery Mechanisms

CBT delivery methods can be broadly categorized as follows (British Association for Behavioral and Cognitive Psychotherapies, n.d.):

- **Formulation-driven CBT:** Licensed CBT therapists offer individual or group CBT for a range of people and problem areas. These professionals formulate and adapt management strategies uniquely for each individual. This method is appropriate when individuals require more intensive input (directive counseling) from trained experts.

- **CBT approaches specific to a problem area:** This method includes customized CBT interventions developed for specific problem areas (e.g., specific CBT intervention for those with depression). This form of intervention does not require professionals to formulate and adapt the management strategies uniquely for each individual, but rather within the limits of a previously evaluated management manual. CBT delivery using this method can be done more easily by someone who has domain-specific training (e.g., audiologists trained to provide management of tinnitus) with additional training on CBT.
- **Assisted self-help:** This method can include computerized CBT or other self-help materials presented to a support group or individuals by health care professionals (see Chapter 9 for additional details).
- **Self-help:** CBT delivery is through bibliotherapy or web applications, but without any support from a health care professional. Self-help CBT is thus fundamentally different from the traditional form of psychotherapy. Moreover, no CBT skills or training are required by the individual reading the self-help materials.

CBT has been successfully delivered face-to-face (Fuller et al., 2020), in group sessions (Kaldo et al., 2008), and online (Beukes et al., 2019). Different CBT delivery methods require different skills both from the therapist and the patient. For example, assisted self-help or self-help is appropriate for those who are highly motivated and have good health literacy. On the other hand, patients who may struggle with aspects of self-help may need more guidance or more regular one-to-one or group session.

/H1/Recent Advances

Although CBT has the most evidence of effectiveness for tinnitus management (Fuller et al., 2020), it is often not provided in clinical practice. For instance, a large-scale epidemiological study (n = 75,764) in the U.S. showed that medication, which had the least evidence, was discussed most frequently (i.e., 46%), while CBT with the most scientific evidence was discussed least frequently (i.e., 0.2%) with tinnitus patients (Bhatt et al., 2016). A possible reason for this finding may be the lack of accessible CBT intervention routes for tinnitus. Due to the evidence base for CBT, there has been a growing professional interest to increase access to CBT. Creative approaches have thus emerged. One such approach is the development of an internet-based CBT intervention (ICBT) (Beukes et al., 2016; Beukes et al., 2020; Manchaiah et al., 2020). The efficacy of ICBT has been shown in nine randomized control trials. Specifically, studies show a moderate effect size for both tinnitus distress and insomnia, and improvements in anxiety, depression, and quality-of-life metrics (Beukes et al., 2019).

In summary, CBT as a tinnitus management option is supported by research evidence but is often not available to those with tinnitus. This is partly attributed to a lack of experts able to provide CBT for tinnitus, which has hampered the availability of CBT for individuals with tinnitus.

/H2/Audiologist-Guided CBT for Tinnitus: Evidence

Originally, CBT was delivered only by licensed CBT therapists. Although only a licensed CBT therapist can offer formulation-driven CBT, other health care professionals can potentially offer CBT using assisted self-help approaches. When providing guided online interventions, the level of qualification and experience of the eHealth therapist has not affected treatment efficacy

(Baumeister et al., 2014). For instance, outcomes have been comparable when CBT was provided by a psychologist versus a technical assistant for depression (Titov et al., 2010), social phobia (Titov et al., 2009), and anxiety (Robinson et al., 2010). Likewise, no significant difference in outcomes was found when comparing guidance by a clinical psychologist versus a student psychologist for social anxiety (Andersson et al., 2012), or between psychologists with and without specialized training for anxiety (Johnston et al., 2011).

The assessment and management of tinnitus are generally conducted by otolaryngologists and audiologists. Otolaryngologists provide medical examinations to assess and treat possible conditions associated with developing tinnitus (e.g., vestibular schwannoma or middle ear disorders). Audiologist—who are often the point of contact for tinnitus care—manage tinnitus by fitting hearing aids, providing sound enrichment, and offering informational counseling to address tinnitus. As audiologists are already frontline service providers for tinnitus patients, incorporating audiologist-delivered CBT is a natural progression of tinnitus management. This novel approach is beginning to gain momentum within the audiology community, as seen by studies undertaken in the U.K. (Aazh & Moore 2018a; Beukes, Baguley, et al., 2018; Taylor et al., 2020) (see Table 11–1). For example, Aazh and Moore (2018a) recently reported an uncontrolled trial in the United Kingdom in which audiologists delivered face-to-face CBT to 68 patients with bothersome tinnitus and hyperacusis. Four audiologists underwent a tinnitus training course provided by the authors before providing six weekly sessions. Participants who completed all visits with the audiologists showed significant improvements in tinnitus annoyance, loudness and distress, hyperacusis, and quality-of-life effects. In a similar approach, a psychologically informed manualized intervention for tinnitus was designed for audiologists (Taylor et al., 2020). This manual included sections such as patient education, relaxation, and

promoting sleep. Audiologists were trained to provide the intervention. In a feasibility study of only nine participants, they found the content helpful, although audiologists felt that more training and supervision was required (Taylor et al., 2020).

Studies have recently been initiated to evaluate the role of an audiologist in providing internet-based intervention for tinnitus. This approach was evaluated in a three-phase clinical trial including a pilot study, a randomized controlled efficacy trial, and an effectiveness trial on 229 participants (Beukes et al., 2017; Beukes, Baguley, et al., 2018; Beukes, Andersson, et al., 2018). A trained audiologist provided weekly feedback and on-demand support during the intervention. In the efficacy trial with 146 participants, a medium effect was found for reducing tinnitus severity compared to a delayed management control group (Beukes, Baguley et al., 2018). Improvements were found in tinnitus distress, insomnia, anxiety, and depression, and were maintained 1 year after undertaking ICBT (Beukes, Allen, et al., 2018). In the randomized, multicenter, noninferiority effectiveness trial of 92 adults, internet-based CBT for tinnitus led to outcomes similar to those of individualized face-to-face clinical care for tinnitus (Beukes, Andersson, et al., 2018).

A further study by Taylor et al. (2020) evaluated whether audiologists can apply a psychologically informed manual during tinnitus management. Although outcomes were positive, recruitment was difficult and intervention uptake was low (only nine patients were retained for the trial). Likewise, audiologist provision of CBT in a clinical setting indicated low compliance, with only 17% of those offered the face-to-face clinical intervention completing the full course (Aazh & Moore, 2018b). In a process evaluation, Beukes, Manchaiah, Baguley, et al. (2018) identified that intervention uptake was low and that more efforts were needed to promote these interventions. Participants undertaking these interventions reported finding them effective

and finding the audiology-support helpful (Aazh et al., 2019; Beukes, Manchaiah, Davies, et al., 2018). These studies provide some indication that audiologist-delivered CBT may be viable, as summarized in Table 11–1.

[Insert Table 11–1 here]

/H2/Audiologist-Guided CBT for Tinnitus: Resources

The provision of CBT for tinnitus is a new skill that audiologists can develop. Beukes et al. (2021) wrote a textbook to guide clinicians with this process. The book contains detailed information regarding CBT including ways of delivering CBT and how to monitor progress. Also included are intervention materials for patients that consist of different strategies described in 22 separate chapters. These components include a relaxation program; specific CBT techniques such as the use of positive imagery, shifting focus, and exposure techniques; and tips for dealing with everyday tinnitus problems such as sleep and concentration difficulties (Table 11–2).

[Insert Table 11–2 here]

Prior to embarking on CBT for bothersome tinnitus, an in-depth assessment of the presenting symptoms and auditory profile of the individual with tinnitus is required, as outlined in Figure 11–2. The first step is undertaking a thorough case history to assess whether other referrals are required. A full audiological assessment is also needed to establish hearing ability. Assessing the severity of tinnitus and its functional impact is important. Although various

approaches exist, standardized questionnaires using a test battery approach that focuses on different domains, such as tinnitus severity, anxiety, depression, insomnia, and quality of life, is recommended. To identify whether the intervention has had a positive effect, the initial assessments should be repeated for pre–post comparison. If problems remain, the reasons for slow progress should be explored. There may be various reasons for the lack of progress; e.g., patients still seeking a diagnosis or cure or some difficulty preventing them from following the intervention advice. Once identified, these barriers should be appropriately addressed. Table 11–3 provides the result of an individual after they undertook an audiologist-guided internet-based intervention to provide an example of the range of outcomes that can be expected from such an intervention. It can be seen that, for this individual, the tinnitus severity reduced by 53 points to a range in which intervention was no longer required. The tinnitus scores reduced even further at the 1-year follow-up. Likewise, improvements were found for anxiety, depression, insomnia, and hyperacusis, all reducing to a range where they were no longer problematic.

[Insert Figure 11–2 here]

[Insert Table 11–3 here]

/H1/Future Directions

Audiologists play an important role in the rehabilitation process of patients with bothersome tinnitus. There is a potential to expand this skill set to include audiologist-delivered CBT. At present, this concept is in its infancy, and further training and guidance are required to help audiologists. This training should be included in graduate audiology programs by placing more

emphasis on counseling to increase student confidence. CBT courses tailored for audiologists should be made available.

Audiologists can also guide patients using available manuals. The psychological manual by Taylor et al. (2020) is one example. Another resource is the book *CBT for Tinnitus* (Beukes et al., 2021) containing materials for both audiologists and individuals with tinnitus.

Further work is indicated to improve uptake, engagement, and outcomes using audiologist-guided CBT or psychological interventions. One option may be using a blended approach combining other aspects of tinnitus care such as the use of various sound therapy approaches with elements of CBT. Improving access to CBT is also required. Exploring further ways of increasing accessibility to CBT should be sought. Implementation of evidence-based approaches (such as the use of ICBT) and ensuring that third-party reimbursements are in place can assist in provision of CBT.

/H1/Clinical Implications

As tinnitus is one of the most frequently occurring hearing-related symptoms and may result in severe distress, patients should be offered evidence-based interventions. These interventions should improve not only the tinnitus severity, but also the associated difficulties such as insomnia, anxiety, and hyperacusis. Tinnitus management is often offered by audiological professionals, who seldom offer psychological-based approaches. Including such strategies, such as the use of CBT, for tinnitus management has several advantages. CBT is based on principles from both behavioral and cognitive psychology and helps alter unhelpful thoughts about tinnitus through behavior modifications. CBT is problem focused and action oriented to address the broader difficulties experienced by patients such as sound sensitivity, hearing disability, and

insomnia. Emerging research findings and clinical tools for audiologist-assisted CBT approaches should be considered, as they offer several advantages such as:

- **Research evidence:** CBT has been researched over several years in controlled trials and longitudinal studies. It has a broad evidence base, consistently supporting CBT as a tinnitus management approach (Beukes et al., 2019; Fuller et al., 2020; Hesser et al., 2011).
- **Reducing tinnitus severity:** Results of extensive studies highlight the effectiveness of CBT in decreasing tinnitus distress and annoyance.
- **Decreasing difficulties associated with tinnitus:** CBT has been shown to decrease problems often associated with tinnitus such as anxiety, depression, insomnia, and hyperacusis. It also improves quality of life and daily life functioning.
- **Promoting self-management:** CBT is delivered using homework assignments to help individuals play an active role in their tinnitus management. It is also designed for relapse prevention, in that strategies for mitigating worsening tinnitus are planned beforehand.
- **Short-term management for long-term effects:** CBT programs generally run for less than 2 months (4 to 8 weeks), but the outcomes consistently remain stable for up to 1 year post-intervention (Beukes et al., 2018c).
- **CBT can be offered in different formats:** Research has indicated that CBT delivered in various formats can be helpful, including in groups, online interventions, and face-to-face sessions. CBT provided via both structured intervention and assisted self-help has been beneficial.

- **CBT offers various strategies:** CBT programs are holistic and provide various elements including relaxation, stress-reduction strategies, shifting focus, thought analysis, cognitive restructuring, and dealing with the effects of insomnia and sound sensitivity.

/H1/Key Messages

- CBT has the most evidence of effectiveness for tinnitus management but is infrequently available or accessible to individuals with tinnitus.
- Ways of increasing accessibility to CBT for tinnitus should be sought for those with distressing tinnitus. One way to increase accessibility is by providing assisted self-help options where clinical visits are not feasible.
- Initial results have indicated the effectiveness of audiologist-delivered CBT, irrespective of the format of delivery; i.e. face-to-face or internet-based assisted self-help (e.g., Beukes, Baguley, et al., 2018; Beukes, Andersson, et al., 2018; Kaldo et al., 2008, Aazh & Moore, 2018a. Due to this potential, further training should be offered to increase the scope of practice and confidence in providing CBT for tinnitus.

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Figure Legends

Figure 11–1. Illustration of the relationship between thoughts, emotions, and behaviors. From Beukes, E., Andersson, G., Manchaiah, V., & Kaldo, V. (2021). *Cognitive behavioral therapy for tinnituss* (p. 5). Plural Publishing.

Figure 11–2. A flow chart with a step-by-step guide when planning a CBT intervention for individuals with tinnitus. From Beukes, E., Andersson, G., Manchaiah, V., & Kaldo, V. (2021). *Cognitive behavioral therapy for tinnitus* (p. 44). Plural Publishing.

Tables

Table 11–1. Audiologist-Guided CBT/Psychologically Informed Tinnitus Intervention Studies

Reference	Design	Intervention Group	Control Group	Tinnitus Severity Effect Size: Cohens'*d* (95% CI)	Pre-Mean (SD) Internet Intervention	Post-Mean (SD) Internet Intervention	Pre-Mean (SD) Control	Post-Mean (SD) Control	Mean Age Internet Group (SD)	Gender Internet Group	Post-Intervention Attrition	Improvements in Secondary Outcomes
Beukes et al. (2017)	Pilot study	*n* = 37	None	Within group 1.18	Tinnitus Functional Index: 56.15 (18.35)	37.35 (19.49)	N/A	N/A	Average age range: 50–59 years	49% M 51% F	22%	Insomnia
Aazh & Moore (2018a)	Uncontrolled trial	Face-to-face CBT *n* = 68	None	Within group 1.13	Tinnitus Handicap Inventory 59.7 (19.5)	35.6 (20)	N/A	N/A	52.5 (13)	43% M 57% F	32%	Hyperacusis, tinnitus loudness and annoyance, effect on life, insomnia
Beukes, Baguley, et al. (2018)	2-arm efficacy RCT	Internet-based CBT *n* = 73	Delayed treatment group *n* = 73	Between group: 0.69 (0.35 to 1.02)	Tinnitus Functional Index: 59.79 (17.95)	38.67 (24.26)	59.18 (19.96)	53.72 (19.38)	56.8 (12.2)	59% M 41% F	15% ICBT 1% control	Insomnia, depression, hyperacusis, cognitive failures, life satisfaction
Beukes, Andersson, et al. (2018)	2-arm effectiveness RCT	Internet-based CBT *n* = 46	Individualized face-to-face tinnitus therapy *n* = 46	Between group: 0.30 (-0.11 to 0.72)	Tinnitus Functional Index: 55.01 (21.58)	27.88 (20.84)	56.57 (20.61)	34.88 (24.91)	50.7 (12.2)	63% M 37% F	4% ICBT 4% control	Insomnia improved more than the inferiority margin for the internet-based CBT group
Beukes, Allan, et al. (2018)	Single group longitudinal follow-up	Internet-based CBT *n* = 104	None	Within group: 0.69 (0.28–0.61)	Tinnitus Functional Index: 59.49 (18.40)	36.79 (24.84)	N/A	N/A	58.3 (12.5)	56% M 44% F	20% didn't respond to the invitation	Insomnia, anxiety, depression, hearing disability,

												hyperacusis, and life satisfaction
Taylor et al. (2020)	Feasibility study	Face-to-face psychologically informed intervention *n* = 19	Treatment as usual: Individualized face-to-face tinnitus therapy	Unable to calculate due to the small sample size	Tinnitus Functional Index: 67.08 (23.64)	26.53 (32.03)	N/A	N/A	53 (16.09)	67% M 33% F	53%	Tinnitus conditions, working alliance inventory

Acronyms: CBT = cognitive behavioral therapy; ICBT = Internet-based cognitive behavioral therapy; M = Male, F = Female, n = number

Table 11–2. Tackling Tinnitus: CBT Program for Tinnitus

Component	**Chapters**
Overview	• Program outline • Tinnitus overview
Relaxation guide	• Deep relaxation • Deep breathing • Entire body relaxation • Frequent relaxation • Quick relaxation • Relaxation routine
CBT techniques	• Positive imagery • Views of tinnitus • Shifting focus • Thought patterns • Challenging thoughts • Being mindful • Listening to tinnitus
Dealing with effects of tinnitus	• Sound enrichment • Sleep guidelines • Improving focus • Increasing sound tolerance • Listening tips
Maintaining results	• Outcome measurement • Future directions

Adapted from Beukes et al. (2021). *Cognitive behavioral therapy for tinnitus.* Plural Publishing.

Table 11–3. Clinical Outcomes From One Individual With Tinnitus After They Undertook an Audiologist-Guided Internet-Based Intervention for Tinnitus

Domain	**Outcome Measures**	**Range of Scores**	**Pre-Intervention Score**	**Post-Intervention Score**	**1-Year Follow-Up**
Tinnitus	Tinnitus Functional Index (TFI)	0–100, > 25 = significant tinnitus	65	12	5
Anxiety	Generalized Anxiety Disorder Questionnaire (GAD-7)	0–21, > 5 = mild anxiety	15	5	4
Depression	Patient Health Questionnaire (PHQ-9)	0–28, > 5 = mild depression	12	3	0
Insomnia	Insomnia Severity Index (ISI)	0–28, > 8 = subthreshold insomnia	18	2	0
Sound Sensitivity	Hyperacusis Questionnaire (HQ)	0–42, > 28 = strong hypersensitivity	28	14	11