



Acceptance and Commitment Therapy versus Tinnitus Retraining Therapy in the treatment of tinnitus: A randomised controlled trial

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ABSTRACT

The study compared the effects of Acceptance and Commitment Therapy (ACT) with Tinnitus Retraining Therapy (TRT) on tinnitus impact in a randomised controlled trial. Sixty-four normal hearing subjects with tinnitus were randomised to one of the active treatments or a wait-list control (WLC). The ACT treatment consisted of 10 weekly 60 min sessions. The TRT treatment consisted of one 150 min session, one 30 min follow-up and continued daily use of wearable sound generators for a recommended period of at least 8 h/day for 18 months. Assessments were made at baseline, 10 weeks, 6 months and 18 months. At 10 weeks, results showed a superior effect of ACT in comparison with the WLC regarding tinnitus impact (Cohen's $d = 1.04$), problems with sleep and anxiety. The results were mediated by tinnitus acceptance. A comparison between the active treatments, including all assessment points, revealed significant differences in favour of ACT regarding tinnitus impact (Cohen's $d = 0.75$) and problems with sleep. At 6 months, reliable improvement on the main outcome measure was found for 54.5% in the ACT condition and 20% in the TRT condition. The results suggest that ACT can reduce tinnitus distress and impact in a group of normal hearing tinnitus patients.

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Introduction

Tinnitus is the perception of ringing, buzzing or whistling sounds in the absence of external auditory stimulation. If tinnitus lasts for more than 6 months it is regarded as more or less chronic (Davis & El Refaie, 2000). Tinnitus is a symptom that can have different causes and in many cases the aetiology is unclear. However, in most cases, tinnitus is associated with a hearing loss caused by ageing or excessive noise exposure (Eggermont & Roberts, 2004). Examples of other known causes of tinnitus are otosclerosis, Mènières disease,

infections, spontaneous otoacoustic emissions and temporomandibular disorders (Andersson, Baguley, McKenna, & McFerran, 2005). The overall prevalence of tinnitus in the adult population across studies is about 10–15%, where 1–3% of the population has severe, distressing tinnitus (Andersson et al., 2005). Severe tinnitus can disrupt daily activities and have a negative impact on quality of life. Psychological distress such as depression, anxiety and sleep disturbance is commonly reported among those with severe tinnitus (Andersson, 2002). Since direct treatment of tinnitus, with few rare exceptions, cannot abolish the symptom (Dobie, 1999), several treatments have been developed to target the distress and secondary problems that may accompany tinnitus (Andersson, 2002; Jastreboff & Hazell, 2004). Two of the most influential are Tinnitus Retraining Therapy (TRT) and Cognitive Behaviour Therapy (CBT).

TRT has become widespread and is currently performed in more than 100 clinics in the world (Henry, Zaugg, Myers, & Schechter, 2008). Initial evidence suggests that this can be an effective treatment for tinnitus (Henry et al., 2008). There is however a need for

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controlled trials published in peer-reviewed papers with validated outcome measures to support the efficacy of TRT (Phillips & McFerran, 2010). Systematic reviews and meta-analysis show substantial support for CBT as a treatment for adults with tinnitus annoyance and tinnitus distress (Hesser, Weise, Zetterqvist Westin, & Andersson, 2011; Martinez Devesa, Perera, Theodoulou, & Wadell, 2010). Although CBT is among the most validated treatment approaches used in tinnitus management, only about 30–45% of those receiving the treatment show clinically significant improvement (e.g., Andersson, Porseus, Wiklund, Kaldo, & Larsen, 2005; Kaldo, Cars, Rahnert, Larsen, & Andersson, 2007; Kaldo et al., 2008). Thus, it is of interest to find possible ways of enhancing treatment results. Moreover the processes driving the change in outcome remain unknown.

Emerging evidence suggests the usefulness of incorporating acceptance-based interventions in behaviour therapies for chronic distressing health conditions. There is correlational (e.g., McCracken, 1998) and experimental (e.g., Keogh, Bond, Hammer, & Tilston, 2005; Vowles et al., 2007) data showing that acceptance is related to better functioning and well-being in chronic pain. Outcome studies have shown promising results of Acceptance and Commitment Therapy (ACT) for patients with chronic pain (Vowles & McCracken, 2008; Wicksell, Melin, Lekander, & Olsson, 2009) type-2 diabetes (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007) and epilepsy (Lundgren, Dahl, Melin, & Kies, 2006). In all these trials the outcomes were mediated in part by the suggested processes of the therapy (Gregg et al., 2007; Lundgren, Dahl, & Hayes, 2008; Vowles & McCracken, 2008; Wicksell, Olsson, & Hayes, 2010). However, RCTs of high methodological quality comparing ACT with credible treatments are still scarce (Öst, 2008).

Initial work on tinnitus suggests that there is both correlational (Andersson, Kaldo, Strömberg, & Ström, 2004; Hesser & Andersson, 2009; Westin, Hayes, & Andersson, 2008) and experimental (Hesser, Pereswetoff-Morath, & Andersson, 2009; Westin, Östergren, & Andersson, 2008) support for the notion that acceptance/experiential avoidance is an important factor in the adaption to tinnitus. Thus, there is preliminary evidence to suggest that processes outlined in ACT can be relevant in understanding and managing tinnitus intrusion and distress. Moreover, a small ($n=25$) trial has shown that a mindfulness meditation CBT approach of four sessions led to significant reduction on tinnitus distress (Sadlier, Stephens, & Kennedy, 2007).

The underlying principles in TRT are drawn from a neurophysiological model (Jastreboff & Hazell, 2004), which proposes that tinnitus perception and tinnitus annoyance are both generated by two different processes of non-habituation. The auditory pathways have a high level of random spontaneous activity, which is normally not perceived as sound(s). Tinnitus is perceived when spontaneous neural activity in the auditory periphery, that has previously been filtered away, starts to reach the level of conscious perception at the cortical level. Tinnitus annoyance on the other hand is thought to occur when the signal in the auditory nervous system has been classically conditioned to activate the limbic and autonomic nervous systems, generating a loop which feeds tinnitus perception and results in emotional reactions and stress (Jastreboff & Hazell, 2004; Wilson, 2006).

TRT consists of two main components: (1) directive counselling based on a neurophysiological model of tinnitus, and (2) sound therapy with or without an instrument that provides sound directly to the ear, e.g., hearing aid like device that generates white noise (Jastreboff & Jastreboff, 2006). Both treatment components are thought to play a part in the intended reconditioning of mechanisms in the nervous system, “retraining” the brain to habituate to the tinnitus signal. The counselling component is thought to enable the habituation of the negative emotional reaction evoked by

tinnitus, represented in the limbic and sympathetic systems. The goal of the counselling is therefore to reclassify tinnitus as a neutral, unharmed stimulus. The second component, sound therapy, aims to increase the sound level that reaches the ear in order to increase the level of the background neuronal activity in the spontaneous and evoked auditory pathways. The rationale behind this is that whenever a sound is presented to our nervous system together with a noise background, we perceive the sound as less intense and more difficult to detect. In this way the neuronal activation constituting the tinnitus signal is inhibited before the level of conscious perception is reached, allowing habituation to occur, so that the brain classifies tinnitus as meaningless and unimportant with the result that the patient will be able to ignore the presence of tinnitus. According to the protocol TRT is most often finalised 18 months after the initial visit (Jastreboff & Hazell, 2004). However in different clinical trials most of the treatment effects of TRT were already achieved after 6 months (Caffier, Haupt, Sherer, & Mazurek, 2006; Herraiz, Hernandez, Plaza, & de los Santos, 2005).

While both ACT and TRT are potentially effective treatments, they have not been directly compared. There are a few studies in which CBT and sound stimulation strategies have either been combined (Hiller & Haerkötter, 2005) or compared (Zachriat & Kröner-Herwig, 2004), but it is questionable if these approaches count as TRT (for example, the treatment in Zachriat & Kröner-Herwig, 2004 was delivered in groups which is not in line with the TRT protocol). The aims of the present study were to evaluate the immediate effects of ACT in comparison with a wait list and to compare the long-term effects of ACT with those of TRT across a period of 18 months among participants who experienced distress associated with tinnitus. We also investigated whether changes in acceptance of tinnitus mediated immediate outcome in ACT.

Method

Participants

Participants were recruited from three different audiology departments and via advertisements and articles in newspapers over the course of 17 months. All were registered as regular patients within the public health care system and diagnostic assessments and treatments were provided within that system. For inclusion in the study, participants needed (a) to have tinnitus as their primary problem (b) to be ≥ 18 years old, (c) to have a score of ≥ 30 on the Tinnitus Handicap Inventory (THI; Newman, Jacobson, & Spitzer, 1996), (d) a duration of tinnitus of ≥ 6 months, (e) not to suffer from a severe psychiatric disorder, (f) not to have previously received a psychological or sound-generator treatment for tinnitus (g) not to be in need of immediate medical consultation and (h) have hearing thresholds which would allow for the use of wearable sound generators (i.e., in severe hearing loss the sound stimulation may not be heard or need to be so loud that the person would have problems hearing conversations).

The age of the sample ranged between 20 and 72 years, with a mean of 50.9 years ($SD=12.9$). Slightly less than half of the participants (46.9%) were females. The average duration of tinnitus was 8.3 years ($SD=7.3$) ranging between 9 months and 34 years. Pure tone average thresholds were obtained with a mean result of 12.8 dB hearing level ($SD=7.1$) for the better ear (over the frequencies 0.5, 1, 2, and 4 kHz) results ranging between 1.0 dB and 28.8 dB. Minimal masking levels (the softest sound required to make tinnitus inaudible) were measured using broad band white noise, obtaining results ranging between 14 dB and 85 dB with a mean of 40.7 dB hearing level ($SD=18.2$). Loudness discomfort levels (LDL) for pure tones were measured at 0.25, 0.5, 1, 2, 3 and 4 kHz according to standard clinical procedure in Sweden (Arlinger,

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