



Blog & Newsletter 26th June 2016

Evidence to support the use of sound therapy to improve tinnitus

Quick recap from our last blog - *Our internal perception of tinnitus*

People often report that their tinnitus is loud and annoying, but when it is compared to external sounds it is quite quiet. How can that be? Part of this relates to the difference between magnitude and loudness. In real life we don't usually consider sounds just in terms of intensity (what a sound level meter would show as dB) we also take into account other aspects of the sound including pitch, timbre and context. For example I might find a neighbour's hip-hop music really loud at 3 am on a Sunday, but think my classic rock music, while I'm driving in my car, is just right – even though my music may be more dB.

This is because I am in control, I like the sound and it is not 3 am when I want to be sleeping. Actually it's because it is lower in magnitude - a mix of many things not just intensity. So if we are sad or depressed tinnitus can seem louder – because the brain makes it seem that way. If we feel better, relaxed and we can control the context and background sound levels we can change the perceived magnitude of tinnitus.

Introducing Helson's Adaptation Level Theory (ALT)

In our last blog we introduced the concept of applying Helson's ALT to tinnitus. The theory says that stimuli (in this case tinnitus sounds and other sounds we introduce via sound therapy) are not processed in isolation but are always compared to our internal reference point when estimating magnitude and making perception judgements. For persistent tinnitus, a high internal *adaptation level* is established – thus the tinnitus is perceived as being of high magnitude. This occurs when tinnitus is the focus of listening. In a similar manner, stress and negative emotions can increase tinnitus magnitude even if remains the same loudness. *Please use the link below to obtain a full copy of the article published on the connection between Helson's ALT and tinnitus.*

<http://www.tinnitustunes.com/articles/20160210>

In this month's blog – what is the link between applying Adaptation Level Theory (ALT) to tinnitus and the evidence to support the use of sound therapy?

Most of the evidence testing for applying ALT to tinnitus has been completed by Mithila Durai (nee Aruldasan). Mithila undertook her Master of Audiology thesis and PhD research on this Topic at the University of Auckland involving clients attending our Hearing & Tinnitus Clinic. In our next blog Mithila will provide more detail regarding the structure and results of her research and clinical trials. In this blog we will introduce the work she has completed and the outcomes.

Seven studies were undertaken as part of her doctoral thesis work (some of these will soon be appearing in journals):

1) An initial review of the literature identified key personality traits relevant for people with tinnitus. Tinnitus sufferers reported higher levels of stress reaction, lower social closeness, lower self-control and higher alienation.

2) A web-based survey was administered to 154 individuals with tinnitus and a control group of 61 people with similar age, gender and hearing levels, but no tinnitus symptoms. This survey identified these same differences in personality between the two groups. What does this mean? Essentially it means that who we are as individuals has a strong influence on not only how we react to tinnitus, but it seems this might also determine if we process it as a sound at all.

3) A follow up experiment measured tinnitus loudness and annoyance characteristics with exposure to short-term emotional sounds and pictures, there were differences in how much stress and arousal they created.

Unpleasant sounds led to higher tinnitus loudness ratings in males and females and higher distress ratings in males. Visual emotional stimuli did not have an effect on tinnitus characteristics. This finding suggests that how loud we perceive tinnitus is affected by how our auditory system is activated at that time. The difference between males and females also confirms some work we've done looking at tinnitus in the NZ population – with males and females differing in their experience of tinnitus.

4) A review of literature pointed towards auditory memory and predictive brain activity as being important in tinnitus generation.

The linkages between ALT and evidence that sound therapy can help reduce your tinnitus symptoms

5) A short-term adaptation experiment and short trial compared the effect of predictable and unpredictable surf sounds on tinnitus, both surf sounds decreased tinnitus loudness in the adaptation experiment, however, only the unpredictable sound lowered tinnitus distress ratings in the trial, we have surf sounds on the TinnitusTunes website so you can test this yourself via this link to natural (and unpredictable) surf sounds.

http://www.tinnitustunes.com/downloads/20151019_3

6) A brainwave (EEG) study compared people with and without tinnitus using predictable and unpredictable sounds to see if the groups responded differently, they did! Tinnitus seems to change the processing of sound with the tinnitus seemingly competing with “real” sound.

7) A trial compared the impact of broadband noise and nature sounds in terms of improving tinnitus over 8 weeks. Both types of sound reduced tinnitus, with the results quite complex to interpret (more information will be provided in our next blog).

The broad band noise (hissing type sound) reduced tinnitus complaints most, but nature sounds were liked because of their relaxing nature. This is why we think that having a range of sounds to suit different personalities, tinnitus types and reactions to sound is so important. On the Tinnitus Tunes website we have the following types of sound therapy files you can download:

Category / Use	Sub Type	Broad band (e.g. white noise)	Natural style (e.g. river, surf etc.)
Masking	High intensity	3 Sound Files (1.5 hours)	5 sound files (2.5 hours)
Masking	Moderate intensity	4 Sound files (2 hours)	3 sound files (1.5 hours)
Masking	Low intensity	Zero	5 sound files (1.5 hours)
Relaxation	3D	Zero	8 sound files (4 hours)
Relaxation	Binaural beat	Zero	4 sound files (1.5 hours)
Adaptation		5 sound files (4 hours)	2 sound files (45 minutes)
Totals		12 sound files and a total of 7.5 hours	27 sound files and approximately 12 hours duration.

We also have a further 250 plus Brain re(Training) sound files that are designed to train your brain to ignore your tinnitus and let you enjoy surrounding natural sounds.

In a future blog we'll have Mithila describe some of the results in more detail and how they can be used by people with tinnitus and clinicians to better help turn “tinnitus” down!