

DANALOGIC i-FIT

INTELLIGENT FITTING

Tinnitus Handbook

This handbook is designed to help educate and provide information to those suffering from tinnitus. It will provide you with valuable information to help you better understand your tinnitus, and what can be done to assist you in finding some relief. We strongly recommend that if you have any questions, you should contact a hearing healthcare professional who is qualified and experienced in tinnitus management.

1. WHAT IS TINNITUS?

Tinnitus is a phenomenon that approximately 10% of the population reports experiencing with regularity. It is most commonly referred to as 'ringing in the ears.' There are many different types of tinnitus. Tinnitus can vary in the way it sounds, its severity, as well as its annoyance. Individuals have reported intermittent episodes that are not very bothersome, to a constant tinnitus that can negatively influence one's daily life. Tinnitus can be described in many different forms; for example, a ringing or chirping, as well as clicking sounds. It can occur a few times a month or many times in one day; it can occur for a few moments or hours; it can even be constant without relief while sleeping. For some individuals, tinnitus has a pulsating or repetitive pattern.

Tinnitus is actually heard by most people at some point in their lives, even those with normal hearing. It can be a by product of loud noise exposure, such as after a rock concert or a night out at the symphony. It can also happen spontaneously without any reason, and then disappear as oddly as it began. Many individuals believe this is just a function of the normal hearing system.

It is when tinnitus starts to negatively affect one's life, or becomes bothersome to a person that further consultation may be necessary.

2. WHAT CAUSES TINNITUS?

There are many theories on the generation of tinnitus and site of origin. No one theory has been definitively proven, but some have been more studied than others. The intention of this handbook is not to review all the theories/models, but we will discuss one of the more generally accepted models of the origin of tinnitus.

In addition to these theories, there can also be psychological influences that play a role in the perception of tinnitus. It is important to consider both of these aspects when trying to find relief from your tinnitus.

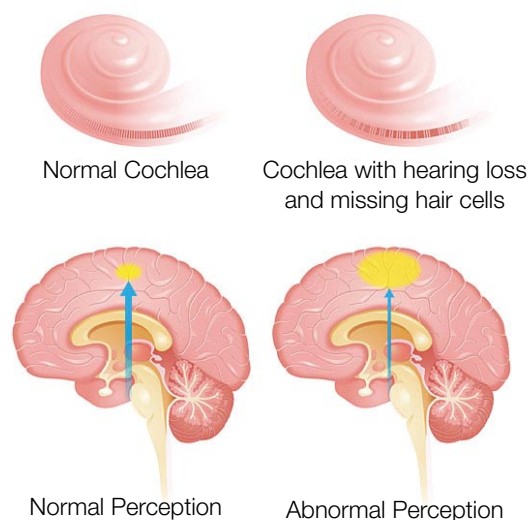
A well-accepted theory on tinnitus generation is that of spontaneous activity in the hearing system. This activity can even take place in the absence of sound being heard. Some experts believe that damage to hair cells in the inner ear can cause tinnitus. The inner ear consists of two types of hair cells: Outer hair cells (OHCs) and inner hair cells (IHCs). It is the hair cells that pick up sounds and send them as signals to the brain, where they are processed into meaning. IHC, rather than OHC are primarily responsible for sending what we hear to the brain, although OHCs do play a role in this process. Because of their location OHC are more exposed, and they are often damaged before IHCs.

When the hair cells are damaged, they are unable to carry out their normal functions. Once they are damaged it becomes more difficult for them to control sound input to the brain, even when there is no actual sound to be heard (i.e. silence of very quiet situations). This abnormal behavior can cause spontaneous sound signals to be amplified, or made louder within the hearing system, perhaps sounds we don't really need or want to hear. The sound being amplified can result in a perceived 'ringing' sensation, known as tinnitus, which is indicated in Figure 1.

A person experiencing tinnitus may, or may not, pay attention to it. In the case where it is ignored the tinnitus takes low priority and is often 'blended' into the background and not much attention is given to it. In the case where it is put as a high priority, the tinnitus can become a

Figure 1:

Damage to the hair cells in the inner ear can result in tinnitus, or a perceived 'ringing' in the brain.



focal point. If this high priority of the tinnitus continues for an extended period of time, the brain will learn to easily detect it, even when other background sounds are present.

Continual tinnitus can cause anxiety and stress in many people who experience it. Once this connection is established a cycle can begin that

includes other parts of the body, including the limbic system (emotion/ associations) and autonomic nervous system (physical/bodily reactions), this is referred to many as *The Vicious Cycle or Circle*.

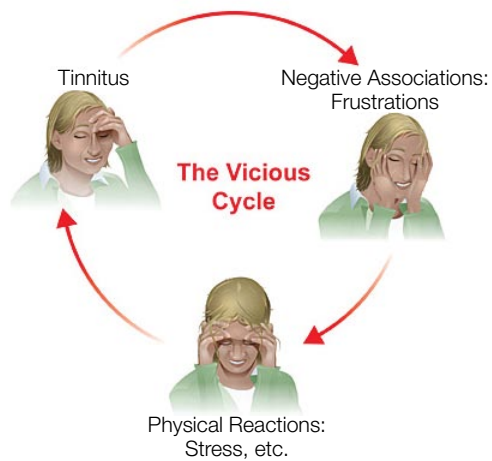


Figure 2:
The Vicious Cycle

3. IS TINNITUS REAL, AND DOES IT MEAN THERE IS SOMETHING WRONG WITH ME?

Tinnitus is very real, as it is a ‘sound’ that is heard by the person experiencing it, regardless if someone else can hear it.

As tinnitus can be a sign of certain medical complications, it should never be dismissed or underestimated. You should see your hearing healthcare professional immediately should you have persistent tinnitus, or if your tinnitus is accompanied with any dizziness and/or balance problems.

Most cases of tinnitus are harmless and simply a by product of the hearing system. If you experience tinnitus of any sort and would like more information regarding your tinnitus, it is recommended to see a hearing health care professional who is trained and experienced in treating tinnitus patients.

4. CAN MY TINNITUS BE CURED?

In certain instances, where the origin of tinnitus is known, for example, dietary habits and side effects of medication, proper management can help reduce and, at times, eliminate the tinnitus.

For most tinnitus patients there is no known cure, but there are many treatment options available to help you understand your tinnitus better and provide relief.

There are many advertisements that include ginko biloba, vitamins, herbs, etc. claiming to provide tinnitus relief. It is important to note that there are no proven benefits to these claims, and before trying any of them you should consult a hearing healthcare professional who is trained and experienced in treating tinnitus patients.

A trained and experienced hearing healthcare professional can discuss what treatment options are available. Because tinnitus can be very unique from person to person, it is important to find a treatment plan that is individualized for your needs and works best for you.

5. WHO SHOULD I TALK TO REGARDING MY TINNITUS, AND WHAT CAN THEY DO FOR ME?

It is strongly recommended that you start with a hearing healthcare professional who is trained and experienced in treating tinnitus patients. These professionals have in-depth training on different treatment options and will thoroughly discuss your tinnitus problems with you.

Often times they will start with a thorough consultation. The consultation is to help them better understand the history of your tinnitus, which can include discussions regarding the onset, traumatic events that may have induced the tinnitus, how bothersome your tinnitus is, characteristics of the tinnitus and how the tinnitus is affecting you. It is important that you discuss as much as possible, as this will assist them regarding what direction is best suited to help treat your tinnitus. In addition to a consultation, many tinnitus experts will have you fill out a questionnaire, perhaps prior to your consultation visit, to more clearly understand how your tinnitus is affecting you.

There are some hearing tests that may be administered to provide more information regarding how your tinnitus may sound. For example, what the pitch of your tinnitus is and how loud you perceive your tinnitus. These results can add valuable data during the treatment process, and also help monitor the status of your tinnitus over time.

In addition to hearing healthcare professionals, many other professionals can be quite useful regarding tinnitus treatment. Specialists, such as Ear Nose and Throat doctors (ENTs), Otolaryngologists or Otologists can be important to rule out any medical complications that can be causing tinnitus. Family doctors, or General Practitioners (GPs) can assist in providing information regarding medications and a general medical history that may be useful in understanding your tinnitus better.

A Psychologist may be involved in the treatment plan as well, depending on the severity and needs of a person. They often help in more severe cases, where the tinnitus is unbearable and intolerable. They can help provide the counselling and intervention that may be necessary beyond the scope of a hearing healthcare professional.

As some studies have shown that high doses of sodium or caffeine can increase the loudness level of one's tinnitus, it is suggested that reducing the intake levels may be one way of helping to control tinnitus. In these instances, a Dietician may be helpful.

Lastly, for relaxation purposes, some tinnitus experts have even referred to massage therapists to help one relax and ease their minds.

At times, there is a network of professionals who work together when treating a tinnitus patient. A network of professionals can be very useful, as each discipline offers unique expertise and knowledge that can ultimately benefit someone trying to achieve relief from their tinnitus.

6. WHAT TREATMENT OPTIONS ARE AVAILABLE?

There are a number of treatment options available, all with their own procedures and explanations as to why they can be beneficial to someone suffering from tinnitus. It is not our intention to offer a preferred method, as different treatment plans may be more suitable for particular cases of tinnitus. It is, however, important to consider your needs and expectations when selecting the appropriate type of treatment plan.

One of the more well-known treatment plans is *Sound Therapy*, where the use of a tinnitus sound generating (TSG) device is often the focal



Figure 3:

Everyday forms of sound generators to help relieve tinnitus.

point, but more specifically, *Sound Therapy* is simply the introduction of sound in regard to tinnitus treatment. In addition to a TSG device, other sound generators, such as sound pillows, radios, TV, etc. can be used to help relieve the negative effects of tinnitus.

Figure 4:

There is less priority and focus on a candle at a busy dinner table, where it blends into the background, than on a table in isolation, where it stands out and is more difficult to ignore.



With *Sound Therapy*, the TSG device helps reduce the perceived strength of the tinnitus signal by introducing background noise that partially covers it. The goal is to make it harder for the brain to detect the tinnitus signal. Ultimately, over time, less importance and priority is placed on the tinnitus and relief is achieved.

Another well-known treatment plan is *Tinnitus Retraining Therapy (TRT)*. In *TRT* emphasis is placed on education, and how the brain is involved in the perception of tinnitus, as previously discussed. This can help you to better understand where tinnitus comes from, as well as understand the reactions produced by other mechanisms in the body in response to the tinnitus. The goal of *TRT* is to again, with knowledge and understanding, for you to have more control over your emotions and reactions to the tinnitus - ultimately, placing less importance and priority on the tinnitus, which will help you cope with the tinnitus more efficiently. *Sound Therapy* is an important part of *TRT*, providing a combined solution to tinnitus treatment.

In addition to *Sound Therapy* and *TRT* there are also psychological models of treatment, such as behavioral treatment, existential treatment and many more. It is outside the scope of this handbook to discuss the variety of psychological models that are available, but many times a psychological approach can be used in conjunction with other types of treatment, should it be useful and appropriate for your needs.

As with any treatment plan, it should be understood that it takes time. Some immediate relief may be achieved, but ultimately the goal is to become more comfortable with the tinnitus, realize it is not life-threatening and most importantly that one has control of the reactions to it.

7. WHAT IS A TINNITUS SOUND GENERATOR (TSG)?

A tinnitus sound generator is a hearing instrument-like device that delivers sound at the ear level to help ‘cover up’ the perceived tinnitus. TSG products come in a variety of shapes and sizes, including instruments that sit over the ear, called behind-the-ear (BTE), as well as custom-made options that are designed to fit the uniqueness of your ear. As the hearing instrument (HI) technology has improved over the years, consequently, so has the TSG technology made available today.

In addition, some newer technology, such as Danalogic i-FIT 71 TS, allows you to modify the noise generated by the instrument, to provide more individualized, comfortable settings for your particular needs. Some specialised TSG products available today, such as Danalogic i-FIT 71 TS, are even able to modulate the noise, creating a more soothing ‘ocean wave’ sound (think of the tide rolling in and out), that can be more relaxing than the traditional noise generated by previous versions of TSG products. Specific TSG products even have some automatic features, which helps bring less attention to the tinnitus by reducing the interaction you have with the instrument, making it easier for you to get on with your daily activities without having to ‘fiddle’ with the device. An example of one of these automatic features, is the unique Environmental Steering option in Danalogic i-FIT 71 TS. This feature automatically increases the volume of the TSG when you are in quiet, where the tinnitus is more easily recognized, but lowers the volume when speech is present, or in noisier situations, where the tinnitus is harder to separate from the background.

Should you have a hearing loss that also needs to be treated, in addition to the tinnitus, there are advanced options called combination devices. Danalogic i-FIT 71 TS is the latest combination device technology available. Combination devices offer you the unique flexibility of having tinnitus sound generator (TSG) and hearing instrument capabilities all in the same device. This provides the flexibility and convenience you and the hearing healthcare professional may be looking for, since you don’t need separate devices to treat two individual issues. Talk to your hearing healthcare professional about what options may be most appropriate for you.

It is important to remember that TSG and combination devices are not cures. They are simply tools to be used, in conjunction with an individualized treatment plan and proper counselling. TSG and combination TSG/hearing instruments can be very effective when used appropriately, and with the right treatment plan.



Figure 5:

Danalogic i-FIT 71 TS

The newest tinnitus and hearing instrument combination technology.

Note: image larger than actual size

8. WILL I ALWAYS HAVE TO USE THE TSG?

As mentioned before, tinnitus rehabilitation takes time. Remember, tinnitus itself does not cause harm, but rather it is the reactions to the tinnitus that can affect one's life. Learning to cope with your tinnitus is a process, and should be delicately handled and treated over a period of time.

Some people report immediate relief using a TSG or combination device, where the device helps take the 'edge' off the tinnitus. The goal of TSG and combination devices is to decrease the perceived strength of the tinnitus signal by partially 'covering up' the tinnitus with the noise generated by the device. Over time it is expected that habituation to (getting used to) the tinnitus will occur, and in turn one can learn to comfortably live with their tinnitus.

Studies have shown that for some TSG and combination devices, it can take 3-6 months for complete habituation to take place and maximum benefit to be perceived, whereas others report 9-12 months. Some treatment models and experts suggest rehabilitation to last as much as 2 years. Again, it is very important to understand what works best for you and to work with the recommended suggestions of the hearing healthcare professional while using a particular TSG or combination device.

9. IS THERE ANYTHING I CAN DO TO HELP REDUCE MY TINNITUS?

For most individuals there are no quick fixes to tinnitus, but there are some changes one suffering from tinnitus can incorporate into their lifestyle to better manage their tinnitus. Here are some recommended tips that may be helpful:

1. **Good dietary and lifestyle habits (exercise):** Restricting, not eliminating intakes of sodium and caffeine may help reduce the perceived strength of the tinnitus signal. In addition, the overall benefits of moderate exercise can aid in stress reduction, general health, sleep patterns, etc.
2. **Keep busy:** By occupying your time with a variety of enjoyable activities and engaging in tasks that require attention, less time may be spent focusing on the tinnitus.
3. **Avoid complete silence:** By adding some light background noise (e.g. music, TV) the strength of the tinnitus signal will be reduced

against the introduced background noise. This can also be useful during quiet times when trying to fall asleep.

4. **Wear hearing protection only when needed:** Inappropriate use of hearing protection can increase sensitivity of the hearing system, making one more aware of their tinnitus. Hearing protection should only be used when exposed to hazardous levels of noise that could damage hearing and potentially make the tinnitus worse. Hazardous levels of noise can damage and even destroy the hair cells in the inner ear. Greater damage to hair cells could intensify the tinnitus.

10. WHAT DEFINES SUCCESSFUL TINNITUS TREATMENT IF THERE IS NO CURE?

Success can be defined as many things. As there is no known cure for tinnitus, expectations of completely eliminating the tinnitus are most likely unrealistic. Therefore, goals should be set by you and the hearing healthcare professional that are realistic and achievable.

To some, being able to provide any relief to their tinnitus can be considered success. Being able to perform daily activities without the stress and annoyance of the tinnitus on a constant basis would be a great relief. Overall, most treatment plans agree that 'habituating' to the tinnitus should be the ultimate goal. By 'habituating', it is meant that one will learn to accept and cope with their tinnitus, giving it less importance and lower priority, allowing more freedom to focus on more important matters in one's life.

As discussed previously, there are questionnaires that can help quantitatively measure the progress of the tinnitus treatment. Typically, these questionnaires will be given when you first visit the hearing healthcare professional, providing baseline data to your initial reactions to the tinnitus, and these tests can be given throughout treatment to measure the progress of the treatment plan.

The most important things to remember, is first to find a hearing healthcare professional who is trained and experienced in treating tinnitus patients. Second, together you can discuss what your treatment options are and collectively decide what the best plan of action is for your particular needs. Last, but not least, always remain positive.

Severe tinnitus is extremely difficult to live with, but there are solutions and professionals out there who can help you. Together you can get closer to finding tinnitus relief.

INFORMATIONAL REFERENCES:

Websites:

British Tinnitus Association:

www.tinnitus.org.uk

American Tinnitus Association:

www.ata.org

United States National Library of Medicine:

National Institutes of Health:

www.nlm.nih.gov/medlineplus/tinnitus.html

Worldwide Headquarters

GN ReSound A/S
Lautrupbjerg 7
DK-2750 Ballerup, Denmark
Tel.: +45 45 75 11 11
Fax: +45 45 75 11 19
www.resound.com

United Kingdom

GN ReSound Ltd.
1 Landscape Close
Weston Business Park
Weston-on-the-Green
Oxon OX25 3SX
Tel.: +44 1869 352 800
Fax: +44 1869 343 466
www.danalogic-ifit.com

5749.07.2009

DANALOGIC