

***It is essential that medical opinion is always sought to identify or to rule out any treatable pathology. Any programme of tinnitus management including the Tinnitus E-Programme can and should only be contemplated AFTER having sought medical opinion about your tinnitus.***

Tinnitus is a collection of electrical signals that pass between the ear and the brain. These electrical signals are present in every one, but most people's brains do not register them because they have no significance or meaning. The signals are NORMAL where there is normal hearing, a clear MRI scan and there are no symptoms of treatable pathology.

### TRIGGER

It takes a trigger to enable the brain to register these electrical signals. Common triggers may be any of the following:

#### 1. TRAUMA

- Physical trauma e.g. a bang on the head from a fall
- Emotional trauma e.g. bereavement
- Noise trauma e.g. exposure to a sudden very loud noise or loud noise over a long period of time

#### 2. INFECTION

- Viral infections mainly

#### 3. SOME MEDICATIONS

- E.g. the "mycin" group of antibiotics known to be ototoxic (poisonous to the ear)
- Aspirin if taken in very large doses
- Quinine if taken in very large doses

Sometimes, we are aware what has triggered the tinnitus. In many cases, it may not be possible to identify the cause. Whatever the cause has been, the "sound" has now been registered by the auditory brain and it tries to do its job of interpreting what the sound means.

## **THE BRAIN AND TINNITUS**

The brain will only try to do its job of interpreting the meaning the electrical signals it "hears", just as it hears speech and other sounds in your environment. The problem is that the "tinnitus sound" cannot be related to anything in its environment. There are no messages being received from the eyes or other areas to corroborate what the sound is or where it is coming from.

A process then begins where the brain will send out messages to different parts of itself trying to investigate.

One of the areas of the brain involved in this process is the LIMBIC centre of the brain. This centre deals with emotions and feelings.

Because there is nothing very positive that the limbic centre can make of these signals, there is a negative response given from the limbic part of the brain.

For this reason, the brain will treat the "sound" as it would a threat. It will listen intently to that signal, waiting for it to change or for what it will do next.

It is at this stage that the electrical signals have become tinnitus.

### **Tinnitus and the Autonomic Response**

Once the brain has "registered" the noise (tinnitus) and the limbic centre has been triggered, levels of arousal/stress increase, and as they increase so does "attentional-focus". This means that the higher we allow our stress arousal levels to rise, there is simultaneously a reaction in the cochlea itself whereby nerve endings in the cochlea become over-active or "super-sensitive".

Imagine you have spent the afternoon walking in the countryside, and found some woods that you decide to explore. There are lovely flowers in the woods, and it is such a beautiful day that you get quite carried away in your own thoughts. You wander through the woods not thinking of anything but your own thoughts and the lovely peaceful environment of the woods.

You suddenly realise that the sun appears to have gone. You look at your watch and see the time. It's been hours – you'd completely lost track of the time! You'd best make your way out of the woods and go home. But..... you look around you and all you can see are trees. You can't see which way you've come from and have lost all sense of direction. What happens?

Your heart starts to beat faster and you have feelings of panic welling up inside you. Your breathing becomes more noticeable and panicky, you keep "seeing things" from

the corners of your eyes (peripheral vision) and yet when you turn to look, nothing is there. You can hear your own footsteps!

Now, here is what is happening: the limbic centre in the brain has been triggered into an autonomic reaction/response. Levels of arousal increase thus making you notice things that you were previously unaware of – in other words, your attentional focus is increased. You hear your own footsteps as well as any tiny sounds that you wouldn't have noticed before. Does this sound familiar?

It should do, because it's exactly the process that I described above in the paragraph before I began the story about being in the woods!

*Have a look at Diagram 1 – this demonstrates the process diagrammatically.*

## **HOW TINNITUS IS MANAGED**

There are 3 main aspects to the effective management of tinnitus:

1. Knowledge and understanding of tinnitus – what it is and why it behaves in the way that it does
2. Management of Stress – tinnitus is very responsive to stress and tension
3. Prosthetic Management – in the case of a hearing loss, this should be managed by use of an appropriate hearing aid. In some cases, especially where there is no aidable hearing loss, white noise therapy can be prescribed

These 3 aspects of tinnitus management enable you to manage your tinnitus effectively.

Having a really good understanding of the mechanism of tinnitus is essential if you are going to leave the fear and worry behind. Isn't it usually the case that once we understand something, we feel less threatened by it?

This is why it is so important that you grasp the mechanism – because it IS a mechanism, nothing more, nothing less. It's actually the frightening, worrying, and/or angry thoughts that trigger high levels of arousal because they make us feel so bad; make us feel so intensely emotional be that emotion fear, worry, anger, frustration, despair and often in combinations making them very difficult to believe we have any control over them.

“Managing” stress is done through the learning and the regular practice of relaxation. This is why you begin with the breathing exercise in Week 1 – you'll find as you progress through this programme that the breathing underpins all of the relaxation you undertake. It is a very powerful relaxation “tool” on its own, and once you have mastered it, you'll be able to use it at any time that you feel stressed to moreorless immediately bring about feelings of calm.

Updated for The Tinnitus E-Programme © by Debbie Featherstone, 7 July 2009

Prosthetic management is something that cannot be dealt with using this E-Programme. So it's really important for you that you know what your hearing levels are like – have an audiologist or other hearing specialist explain the results of your audiogram to you.

White noise or sound enrichment therapy is something you may benefit from. Some people find that white noise generators help them, though the loudness level of the white noise must ALWAYS be below the loudness level of the tinnitus in order for it to help bring down loud tinnitus. And even then, it will only work in conjunction with the other two aspects of tinnitus management discussed above.

Sound enrichment i.e. using sound in your environment is very helpful because it distracts the brain AWAY from listening to the tinnitus. By combining relaxing music, including the sound of a relaxation recording playing of course, is going to be beneficial.