

HLAA Meeting
Saturday, February 15, 2020

Larry: As President of this Whatcom HLAA chapter I welcome you here today to benefit from a very informative program on tinnitus which is so commonly experienced with hearing loss.

Who here suffers from tinnitus? Not too many of us. I'm sure you know people that do. One who knows much about it is our speaker, Tracy Denmon. Let's welcome her and get started.

Tracy has a doctorate of audiology degree from University of Arizona. She's a native of Vancouver, BC, so she's been in the area for her life. She spent some time in the desert and then came back to us! Tracy is affiliated with Hearing Northwest, which is an audiology group here in Bellingham. She has presented to our group once in the past that I'm familiar with, though maybe more than that.

I know you will enjoy her presentation. Let's just say she's passionate about tinnitus, which you'll see when you watch her presentation. Tracy also runs a support group for people with tinnitus that she will explain. I think that's incredibly important.

Here is Tracy from Hearing Northwest.

Tracy: I'm a doctor of audiology and I work at Hearing Northwest. We do have a tinnitus support group that meets the third Friday of every month at our office. It's free and open to the public. I can tell you more about that at the conclusion of the presentation.

Some people ask why I specialize in tinnitus. When I was fresh out of school 20 years, I had a Master's Degree in Audiology. Back then, we were trained that if patients said they had tinnitus, they had some sound in their head, and we were supposed to tell them there was nothing that could be done about it, and they needed to live with it. There was nothing that could be done about it back then.

When I was a month into my career, new and green, a young man in his early 20's came into the office without an appointment. He was very stressed. He said he had something that sounded like a fire alarm going on in his head 24/7. It was constant. He didn't think he could make it another day because he was terrified he would never have a moment of silence, not any peace and quiet.

I had to look him in the eye and tell him there was nothing that could be done. I have no idea what happened to that man.

When I went back to school for my doctorate, I jumped at the opportunity to learn more about tinnitus. I'm pleased to report that I no longer have to tell people that they have to

live with tinnitus. I have worked with patients who are thriving and well who have tinnitus. They still have tinnitus, but it's no longer debilitating.

I will discuss some basics about tinnitus today. 50 million people experience tinnitus to one degree or another. Most people that have tinnitus say they have sound in their head, but it doesn't bother them. Of the 50 million people, 16 million have it severe enough that they have sought medical attention.

Out of that 16 million, 2 million people have tinnitus that is debilitating and affects their everyday life, their social and emotional well-being.

Today we will talk about the basics of hearing loss, what tinnitus is and who experiences it, the possible causes, the impacts on everyday life, and what can be done about it.

I need to tell you that this presentation is designed to be informative and not to take the place of professional medical help. If you have tinnitus or other hearing concerns affecting your emotional well-being, such as causing depression or suicidal thoughts, you need to be evaluated by your primary care doctor. This is not meant to take the place of your medical evaluation.

Let's begin by taking a look at the basics of hearing loss. I have a model of the human ear. [Holding.] Many of us know some things about the hearing and auditory system, but we will cover the basics and how the journey from sound gets from the outer ear to the inner ear.

It's the job of the ear to bring the sound from the outer ear canal all the way to the brain. The outer part of the ear is the pinna. The job of the pinna is to collect sound to bring the sound down the ear canal. You know that it does a pretty good job, because if you bring your hand up to your ear, you hear sound better.

I was sitting at my computer the other day and I tried doing that. I could hear a humming sound when I did that; it was the fan from the computer that I couldn't hear without using my hand. The pinna is completely unique. It is almost as unique as the fingerprint.

Years ago when I was working on getting my United States citizenship, I had to have photos taken. The photos had to completely show my left ear. This was a requirement by the United States government, because the ear is that unique!

The outer ear serves quite another purpose! The sound goes down from the outer ear into the ear canal and reaches the middle ear.

Speaker: Do you have hearing loss?

Tracy: My boyfriend in the back is chuckling. I'm starting to get some hearing loss, yes.

Speaker: Do you wear hearing aids?

Tracy: Hearing aids won't benefit me yet, but I sometimes misinterpret some words due to my slight high frequency hearing loss.

The middle ear consists of the ear drum and the ossicular chain, which are the three bones in the body. You may know them as the hammer, stirrup, etc. They are the malleus, incus, and the stapes. The stapes is the smallest bone in the human body. That's a good trivia question.

In the middle ear cavity, there's the stapedius muscle, which is the smallest muscle in the human body. We also have the Eustachian tubes, whose job it is to keep the air pressure from the middle ear equal to the outside. The Eustachian tube needs air flow to balance pressure. You know when you descend on the airplane, you need to pop your ears or chew gum? You're forcing the tubes to open to equalize the pressure.

If the tubes don't work properly, there is no equalization in the ears, so the pressure is off. It's like putting a blanket over a snare drum. The sound can be muffled in the ear.

If you have a problem with the sound getting into the outer or middle ear, we say you have a conductive hearing loss.

We have the cochlea a little farther in. [On screen.] Here is a close-up picture of the cochlea. I want to show you something. This is a life-size cochlea. It's about the size of an M&M (a regular one, not a peanut M&M).

Attached to the cochlea are the semicircular canals. These three canals help to regulate our balance. There is fluid in this entire cavity and even though the semicircular canals, called the vestibular system, share the same fluids as the cochlea, sometimes people have hearing loss and no problems with their balance, some people have problems with their balance but no hearing loss, and some people have both.

I had problems the other day with my semicircular canals. I stumbled to my right when I got out of bed. The world felt like it was spinning. My eyes were darting back and forth and the world was spinning until I got sick. The ENT said I had vertigo, where there are little crystals in the canal wobble a blob of jelly, which sends signals to the brain that you're moving. If the crystals break free, it sends information to the brain that you're moving, even when you're not. The brain is getting a mix up of information.

Inside the cochlea, there are several hundred thousand little hair cell receptors. These receptors are responsible for receiving the sound, converting it to electrical energy, and transmitting the sound along the nerve to your brain. It's a bundle of cells.

[On screen.] This is a very small sample of some of those little hair cells within the cochlea. Remember, there are several hundred thousand of them. On the outside,

there are some outer hair cells, then inner hair cells, which are both responsible for the transmission of sound. They are standing erect and tall. Fluid inside the cochlea triggers these hair cells to send signals to your brain for sound.

[On screen.] This is a healthy cochlea. The one on the right is damaged hair cells, indicating hearing loss. The person on the right probably lost hearing in this ear due to a sudden loud sound, like a gun shot or firecracker.

When we have damaged hair cells, it's impossible for the cochlea to convert the sound information into electricity and send it to the brain.

As you can see, our whole auditory system is intricate. Sound will come from on the outside, be conducted through the middle ear, processed through the cochlea, sent to the brain, and then interpreted. Something can go wrong anywhere along that process, resulting in hearing loss.

[Beeping]

That's tinnitus! Tinnitus can be constant or intermittent. It can be described as rushing, roaring, humming, buzzing, chirping, crickets, power lines, static, etc. There isn't one particular sound for tinnitus and it's usually fairly unique for individuals.

It can be pronounced in different ways. It's usually pronounced at tin-a-tus. Anything ending in -ITUS indicates inflammation, and there's no inflammation with tinnitus. Either pronunciation is correct, though.

Tinnitus is real. Tinnitus is not a disease. Tinnitus is a symptom of something that has malfunctioned in the auditory system. We just talked about the basics of the auditory system. When something malfunctions along that tract, it can cause tinnitus.

Who experiences tinnitus? Men, women, young people, old people, teenagers, people from all walks of life. It is more common in men than women, not because men are more susceptible than women, but men tend to have noisier jobs, working with power tools, etc. compared to women. This is not always the case.

Elderly people are more likely to have tinnitus, not because of a genetic predisposition, but the older we get, the more noise we've been exposed to and thus the more likely we have hearing loss. We will also talk about the health problems that contribute to tinnitus.

What causes tinnitus? The exact cause is unknown right now. We have theories, but we haven't been able to isolate the cause. There are several triggers and possibilities, which we will talk about next. One of the main causes of tinnitus can be noise trauma.

Noise trauma is the repeated exposure to loud sounds, or a single loud sound, such as a gunshot near your ear. Tinnitus is often a first indicator of hearing loss. People who

report sounds in their head might assume they have full hearing, but most often they will have a hearing loss. About 80-90% of everyone who comes into my office with tinnitus has hearing loss.

There are cases when you can have tinnitus without hearing loss, but the majority of my patients also have hearing loss.

Any form or disorder involving the outer, middle, or inner ear can also be associated with tinnitus.

We have talked about how hearing loss can cause tinnitus, but there are other diseases and health problems also associated with tinnitus. Cardiovascular disease, hyper and hypothyroidism, depression, hypertension, and poor diet also are linked to tinnitus. Fibromyalgia and multiple sclerosis are also linked.

I have several patients who have tinnitus without hearing loss and have had head and neck injuries, such as whiplash. Temporomandibular joint dysfunction (TMJ) can also cause a sensation of pain the ear and tinnitus. If your tinnitus is caused by TMJ, resolving the TMJ can resolve the tinnitus.

Neil should do this part of the presentation! There are over 500 prescribed medications that can have an association with tinnitus. And, we have over 500 drugs that we know of right now that can cause tinnitus. There also are many drugs being produced right now that haven't had reports of tinnitus.

If your physician gives you a new medication and you experience tinnitus, what is the likelihood that you'll report that to your doctor? Maybe, maybe not. What's the likelihood that your doctor will report that to the FDA? And what's the likelihood that the FDA will ensure that this drug will be listed as causing tinnitus.

Speaker: Does the tinnitus go away after you stop the drug?

Tracy: In most cases no. Sometimes, though. There are 500 medications that we know of, but there could be more. If you take a high dose of aspirin, tinnitus could result. We will talk about why it doesn't.

Speaker: Do you have a list of those drugs?

Tracy: Not with me.

Neil: You can go on my website, hearinglosshelp.com and you will find a list of the 550 drugs that are associated with tinnitus. I will talk more about this topic next month. You can also find more information on the American Tinnitus website.

Tracy: Thank you.

Speaker: Neil does a great job, so please come back next month.

Tracy: There are other aggravating factors that don't necessarily cause tinnitus, but if you have tinnitus already, it can be aggravated. This includes caffeine, alcohol, high doses of aspirin, stress, noise exposure, salt, etc. So, imagine having a lot of caffeine, being stressed out, listening to loud sounds, having a glass of wine, etc. can make tinnitus worse.

There are people who are prone to anxiety and depression who seem to have worse cases of tinnitus. We don't know what came first. Perhaps the tinnitus causes stress and anxiety, or stress and anxiety causes tinnitus. There seems to be a correlation nonetheless.

Now let's talk about how tinnitus affects people. It affects people differently. Some people will say they have a sound in their head and it doesn't bother them. Others will say a sound is driving them crazy. Still others will find that tinnitus interferes with their ability to sleep.

Tinnitus can also interfere with one's ability to communicate. My personal experience is that it's not that the tinnitus is interfering with the ability to communicate, but rather the hearing loss does. Often people say that the tinnitus is so loud that it interferes with what a person is saying.

Tinnitus can also cause emotional issues, such as frustration, suicidal thoughts, depression, anxiety. It also affects concentration.

In severe cases, tinnitus can actually lead to some serious conditions. There are medications that people will take for depression and anxiety. Some of the medications will help the symptoms of depression and anxiety, but not the symptoms of tinnitus.

As you can see, tinnitus has some pretty major effects on a lot of people. The big question people tend to ask is why some have tinnitus and it doesn't bother them, but it bothers others.

There are three types of reactions people have with tinnitus. There are those who say the sound isn't bothersome. If we measured the volume of their tinnitus, it would be between 6 and 9 decibels. Another group of people say that the sound bothers them and they want it gone. They're not suicidal or depressed. Their tinnitus would measure at 6-9 decibels as well. Others might report having debilitating tinnitus, where they can't associate with their family or other people. They fear the tinnitus is taking over their life, and the tinnitus measures at 6-9 decibels as well.

So how could one person be suicidal over tinnitus but another person isn't bothered?

Speaker: How do you measure tinnitus?

Tracy: It's a perceived measure. I would give them a sound. It's one's subjective opinion. "This sound is at the same volume as my tinnitus." This is the case for the man who had the smoke detector and couldn't hear it.

Zero decibels represents the softest sound an average adult can hear. When we were little, we probably had hearing at 0 decibels. By the time we get to our 60s, we likely don't have 0 decibel hearing.

Tracy: Let's imagine you get to work and construction starts next door. At 8:30am, a jackhammer can be heard from next door. The sound is annoying and bothering you. You decide you have to prepare for your presentation, so you'll get to work on it.

Once in a while, you might look out the window and notice the sound. By day 5, you get used to the sound of the jackhammer. You don't like the sound, but you go along with your day.

By day 10, you don't even hear the sound of the jackhammer and you get a moment of relief. But then the sound starts up again and you just work around it.

Imagine others who have to prepare for their presentation but they can't focus because of the sound from the jackhammer. By the 5th day, they dread getting to work, because they know they can't concentrate. By day 10, there is no jackhammer sound and they feel immense relief. They think they will get through the day but then the noise starts again and they go home sick.

This exact scenario happened at our office. A high rise building for seniors was going in across the street and they were putting in underground parking. Jackhammers were in use. Our building shook and it was really loud. All three of us in the office heard the same sound, but I was so annoyed by it and I couldn't wait for the construction to be done. The jackhammers and the shaking drove me crazy. The other two women in the office weren't even bothered by it.

This shows it's your perception of the sound. For all of us, the tinnitus may be the same, but how we perceive it affects if we are bothered by it or not.

Is there a cure for tinnitus? No. But, there is treatment. There are options. If that same man came into my office and said he had that terrible sound in his head, I would say I couldn't make it go away completely, but that there's treatment I can make it so he doesn't notice it very much, and when he does notice it, it won't bother him. I will tell him there's hope.

You probably have questions. What is the treatment for tinnitus? There are some unproven solutions, and there are "solutions" that do not work. There is no surgery or pill that will make tinnitus go away. We talked about that there are medications that can help with depression and anxiety that end up being exacerbated by tinnitus, but there is no medication that will make the tinnitus go away.

Then there are alternative therapies that people have tried. There is no single alternative therapy that has proved to eliminate tinnitus. There are some anecdotal claims, such as lipoflavinoids, but there is no science to prove it. Some people do get a bit of relief, but nothing has been scientifically proved yet.

Sound therapy is a proved solution and treatment. Sound therapy is something that can be worn at the ear level, such as a hearing aid. Basically, sound therapy is a way of decreasing the person's perception of the sound that's in their head. So, some or all of the sound in a person's head is replaced with something else. If your tinnitus feels loud, sound therapy can make it feel smaller. The tinnitus is still there, but it's not as noticeable.

Another example of using sound therapy is candle. We have a dark room. Pretend all the lights are off and there was a candle. You would really notice it. But, if we moved the candle to a lit room, the candle is still there, but we don't notice it as much. This is a good analogy to use for people who have tinnitus and hearing loss. I explain to them that the candle is like their tinnitus and the hearing loss is like the lights in the room. The better we hear, the less intrusive tinnitus is in our awareness.

If you hear well, this is your scenario. [On screen.] As your hearing decreases, it's going to be more like this. [On screen.] When you have a hearing loss and we correct the hearing loss with hearing aids, it's like turning the lights on in the room. The tinnitus is still there, but the brain doesn't notice it as much because it has something else to focus on.

If someone has tinnitus, we will generally treat the hearing loss first. If hearing aids aren't enough, we might employ sound generators. We can customize sound that plays into the hearing aids that takes the mind off of the tinnitus.

Tinnitus treatment is highly customizable. Some people just need their questions answered, some people need to correct their hearing, some people need sound generators. Some people need to come to the tinnitus support group. Sometimes lifestyle adjustments need to be made, such as reducing stress, salt and caffeine intake, etc. The treatment will differ for everyone. For a lot of people, education and counseling works. It might just take someone to come into the office and learn more about tinnitus. They might even wonder if they could die from tinnitus.

So, what should you do? Who here has tinnitus? The first step is to get information. I would encourage anyone who is looking for information to look at the Internet with caution. The internet has some great answers to tinnitus, but the internet can also be full of inaccurate information. In my last meeting with my tinnitus support group, every single person at the meeting has purchased something like Ring Stop, or Tinnitus SOS, etc. or other things that supposedly guaranteed stopping tinnitus. Don't buy any of that stuff! Don't buy anything that claims to stop tinnitus, because it's not going to work!

If you saw an audiologist for a hearing evaluation, it can take between 1-1.5 hours. However, if you have tinnitus, the evaluation will take longer. Your adjustment and treatment plan will take longer. If you have a cochlear implant, you know it takes longer to get used to the CI than it does to get used to a hearing aid. Getting used to tinnitus will not happen overnight. It usually takes 3-9 months to feel relief from tinnitus.

Do we have time for questions?

Larry: Yes. I actually have one. It's not necessarily related exactly to tinnitus. I know that Hearing Northwest works with the Lions Club which helps with affordable hearing aids. Can you tell us about that, as well as the Starkey Hearing Foundation?

Tracy: If someone is low income and needs assistance with hearing aids, you can apply with the local Lions Club office to get assistance. There is a \$50 copay. You get 2 hearing aids, usually the receiver and in-the-canal ones, although there may be over-the-ear ones.

Another program is called Hear Now through the Starkey Foundation. You don't need a referral to come to the office. When you do come into the office, you get an application. Your cost is \$125 per device, but you get close to top-of-the-line hearing aids. They do cross systems, behind the ear, etc. You get better hearing aids, but it costs \$250 versus \$50 like with the Lions Club.

Are there more questions? There's so much we could talk about but I had to keep it brief due to time constraints!

Speaker: I am a successful patient with tinnitus. I have had tinnitus since 2001. I remember the instant it started. Like many people, I got used to it. I knew what it was and there wasn't much I could do about it. I just tried to not think about it. Then I found this group. I found out I had hearing loss, so I got hearing aids. To my amazement, I have no tinnitus with my hearing aids. If I take my hearing aids off, I still won't have tinnitus at first. The tinnitus will come back if I don't have my hearing aids in for a while. I get so excited that I don't hear that sound anymore.

Tracy: And you're one of the lucky ones.

Speaker: I have been suffering from tinnitus until recently. I'm so happy.

Larry: There is a question right in front of you.

Speaker: You say the level of tinnitus is 6-9 decibels. If someone has 20 decibel hearing loss, does that mean he could have 27 decibel tinnitus?

Tracy: Yes. It's about perception. It's a 7 decibel sensation level. If you had perfect hearing, you would perceive your tinnitus to be about 7 decibel. If you had a 40 decibel

hearing loss, I would have to turn the sound up to 47 decibels.

Speaker: How much noise does it take to mask the tinnitus?

Tracy: It depends on the person. White or pink noise can help. We need to adjust the frequencies of the sound generators. We don't want to completely cover up the tinnitus. If we did that, there would be relief during the day, but the brain would never adjust. So, we need to train how the brain is wired, so you no longer perceive the tinnitus as a threat. If you perceive the tinnitus as something bad, you will be bothered by it.

First noticing the tinnitus activates the limbic system, which is responsible for feelings and emotions. When you apply a negative emotion to that sound, the autonomic nervous system kicks in, telling the brain to pay attention to the sound, which gets the limbic system involved, and the cycle continues.

We want to unwind that spiral. If we completely mask the tinnitus, we couldn't unwind the cycle. We need to change the thought process. We want to reduce the tinnitus enough to make it easier to live with.

Pam, Program Chair: Thank you so much. That was very informative for everyone here. I am very happy that you could be with us.

[Applause.]

Here is a token of appreciation for you. It's great to see you again.

Tracy: Thank you very much everybody!

End of presentation.