Frank Rothkamm in L.A. photographed by Viko Solorio.

TINNITUS SPECIAL! **FRANK ROTHKAMM** VS. **JÖRG LAND**

"Listen with your body in the zero gravity position."

Moderated by Sven von Thülen

Frank Rothkamm: I had never heard of tinnitus before I got it in 2010. I have subjective tinnitus, which is different from objective tinnitus, where the doctor can actually hear the sound when he does an examination of your ears. Subjective tinnitus, on the other hand, only exists in the listener's brain. The only thing I knew before that was a certain kind of ringing you have in your ears, like when you come home from a club. But that usually didn't last very long. I remember being shocked when I got real tinnitus because suddenly there was this persistent tone in my environment. I first thought that sound was coming from my TV. I had a very old one back then. But when I turned it off the sound was still there. That's when I really freaked out. I went to the doctor, and they did a whole bunch of tests, which I found completely fascinating, to be honest. You're in this bizarre room, and they put little headphones on you and somebody says certain words to you and you have to react. It was extremely interesting but in the end the outcome of all this testing was them saying: "There's nothing wrong with your ears—there's something wrong with your brain. You've got tinnitus. We can't help you. Good luck with it."

Jörg Land: For a very long time you didn't have many treatment options as a patient, mainly psychotherapeutic approaches which have a high entry barrier and a high dropout rate. This wasn't just frustrating for people who suffer from tinnitus but also for the physicians.

FR: My doctor in Los Angeles gave me a guide that included a bunch of crap, because there really is no cure for tinnitus. I had to do something because the sound was unbearable, so I started to do research and experiments. In my research I found no hypothesis or working model or approach to actually heal tinnitus. I came to the conclusion that the only way of dealing with it would be to change how you perceive sound.

JL: The key to understanding and dealing with tinnitus is the brain. Brain science is a comparatively new field of study; any findings are only ten or twenty years old. Scientists still don't really know how the brain functions as a whole, but they're getting closer and closer while acquiring knowledge on how to modulate the brain. I heard about an approach in which physicians treated stroke patients to regain eyesight by stimulating the healthy eye. This approach is similar to what we do in terms of treating tinnitus. Obviously, because brain research is such a new field there are still many people out there who don't believe in what the scientists are doing. The point is: There is no cure for tinnitus *so far*. I agree with you there, Frank. What we at Sonormed are doing with our app Tinnitracks is designed for tonal tinnitus, where you can treat the specific frequency of your tinnitus—that is, the tone itself. We know from medical statistics issued by healthcare insurance companies that the vast majority of people who are diagnosed with tinnitus suffer from tonal tinnitus. This is the group of people to whom Tinnitracks can provide relief. We took published independent research and clinical trials as a basis and translated the findings into a unique technology that can be used for treatment. Key to this approach is to determine the exact frequency of the individual tinnitus tone. To that we tailor the treatment.

FR: How does it work?

JL: It's basically a contrast effect induced by filtering the frequency of your tinnitus from the music or sound you're listening to. This contrast effect is extremely precise and causes nerve cells to reconnect and adapt. The neurological reaction is not only leveraged to treat tinnitus but also stroke patients. Not every single piece of music or sound is suitable for the treatment, though. Audio books for instance—and speech in general—has a very limited frequency range. Also, classical music can be difficult.

FR: I do have my frequency. At the beginning it was at 16,000 Hz and 30 dB. But it started to modulate after a while. That's why I don't talk about hearing a tone, because what I am really hearing is a cluster of tones. They are not all of the same frequency. Looking at it as being only one single frequency is not right, I think. We don't know enough about this disorder and where it's located in the brain. We don't have a medical cure or drug-induced solution so far. The best we have at this point is based on Pawel J. Jastreboff's model, which basically states that you have to get used to your tinnitus because you'll hear this sound for the rest of your life. So you could call that a psychological approach . . .

JL: Sorry for interrupting you Frank, but we *do* have clinical evidence indicating that the cause of tinnitus is a hyperactivity within the auditory cortex. We know from working closely with doctors that in most cases it's the volume of the tone that is changing and not the frequency. But I totally agree, if the frequency is changing in your tinnitus, it is a rare condition, and we currently could not treat that with our solution.

FR: I disagree with you. I don't think there is any scientific proof for a treatment of tinnitus and to those people who say that there is I would call their data flawed. I had my own approach and my own "treatment"—if you want to call it that. I realized after a while of experimenting with sound, all I was doing was actually creating a piece of music. I didn't find the magic bullet or a universal treatment but I found new ways of listening to sound, which then had an effect on my tinnitus and eventually led to the discovery of what I call "psychostochastics" and my release of the *Wiener Process*. This is not offered as a therapeutic approach though, because the effects of psychostochastics are not known. What I made was music.

JL: What did you do exactly?

FR: I started out with the Jastreboff Model, the only one that is, in my eyes, based on somewhat decent science. It's a form of "tinnitus retraining therapy" that first centers on ending the negative view of the sufferer towards the tinnitus and then reducing the actual perception of it. For me, this was achieved through trial and error of creating sounds, exposing myself to them and checking how it affects my tinnitus. What I've created is a form of sound treatment—either for low-volume headphone listening or listened to aloud with any other music or sound environment. It's designed so that listeners will not remember what was heard a few minutes ago and what they hear will be different upon each encounter, which is the stochastic, or "chance" element of the music. After a while I realized that it worked, but not because it changed the tinnitus sound. It was because of how I listened to it. So you might not be able to change the physical cause of tinnitus but you can change how your brain operates when listening. That's the premise of the *Wiener Process*. The Baskaru label released it as a collection of twenty-four CDs and as a twenty-four hour stream—the results of my four years of research. You can tune in any time from any device to the twenty-four hour stream. Obviously, my research is subjective, and the release is a piece of art. Its scientific effects are not known as this point.

JL: Just to clarify things here, Frank: our claim is to reduce the volume of the tinnitus-tone, not to cure it completely. What Tinnitracks is based on is clinical evidence that we can lower the volume of the tinnitus by up to fifty percent. And we are currently working to increase this percentage. It's all based on independent academic research that has been published and verified by the academic community accordingly. To us it is extremely important to be transparent here. That is why we offer on our website a comprehensive list of the studies we based our solution on and thus enable anyone really interested to access the original data. I strongly disagree with your statement that there is no reliable scientific evidence of lowering the volume of tinnitus. We even have some cases where patients say that the sound seems to be gone after using our app. But we cannot reproduce this, so we don't say we can cure it. All this brain research is quite new. And I believe scientists are on the right path. All of the partners we're working closely together with, not only Sennheiser but also the European Commission, share that view. Moreover, all of these organizations closely monitor what we are doing, which has helped a lot in the process to achieve classification as a medical product.

FR: I think one real key word in this conversation is neuroplasticity. I think the brain can, within reason, reroute neurological pathways. I also think that it's probably the key to understanding tinnitus, and in general to understanding music on the level of brain functions—what sound actually does to the brain. That became my main point while dealing with my own tinnitus. What is music? What is sound? I haven't tried Tinnitracks yet since it's not available in the USA at the moment.

JL: We are currently in the process of getting the Food and Drug Administration clearance in the US, which is a lot of work . . .

FR: . . . but I've looked at all the approaches out there so far. And I found them to be unscientific and some even seemed to me like scams. Scams to get people to undergo expensive therapies. But I'm not here to discuss your product. You obviously are and you can vouch for it. I'm not attacking your product.

JL: I do not deny that there are wild theories and promises made out in the market when it comes to tinnitus. However, I cannot stress enough that our solution is based on acknowledged and published research. I think it's a tremendous achievement that you have developed your own way to cope with your individual situation, but the tinnitus you describe is neither the most prevalent form nor the one we target nor the form scientific research available relates to.

FR: That's all fine. There's just a difference in opinion. I am more of a skeptic. I just think we haven't found a cure yet.

JL: We aren't saying that we've found a cure; we have found a treatment to reduce the volume of the tinnitus tone. However, one day a cure might be found and to support that, it's necessary to take different perspectives into account. I think it would be great if you could talk to one of our neurophysiologists, for maybe you have found something in your personal studies that could be of interest to us, too.

FR: Yeah, absolutely. And all my work is open source. I'd love to share all my findings and my research. I have to issue a warning though: The effect of psychostochastics and the *Wiener Process* on humans is not known at this time. As a result, I urge you to use it at your own risk. For some it is extremely powerful if you listen to it on high fidelity headphones in low light with your body in the zero gravity position. For others, I hypothesize, listening to Heino may be just as risky. ~

Tinnitus is a high-pitched ringing in the ears that can range in severity from mildly distracting to totally crippling. If you're reading this magazine, odds are you've experienced it yourself. In terms of a cure, however, no one can quite agree on exactly what tinnitus is, and things can get a little heated when two opposing perspectives go head-to-head, as you'll find in this conversation between sound artist Frank Rothkamm and Jörg Land, co-founder of Hamburg-based audiology company Sonormed. Recently, Land's team developed the tinnitus treatment app Tinnitracks, which took home South by Southwest's coveted Founders Award. That same month, Rothkamm released his own highly personalized tinnitus therapy as a twenty-four-hour-long algorithmic composition. Tinnitus has never been more present, and here are two radically different approaches for dealing with it.

Above: Frank Rothkamm's twenty-four CD box set *Wiener Process* is named after mathematician and philosopher Norbert Wiener, the originator of the concept of cybernetics. For Rothkamm, tinnitus is rooted in perception, not the ear, which is why he sees it as untreatable and independent of individual listening habits.

Above: Tinnitracks. The Founders Award for start-ups that Jörg Land and his Sonormed team took home from South by Southwest was previously won by none other than Twitter in 2007. While Tinnitracks is still awaiting approval from the USFDA, Land is confident that the app can help millions of tinnitus sufferers around the world.

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