

Evidence for Joudry Sound Therapy

A discussion paper for doctors

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Abstract

This paper contrasts and compares Sound Therapy based on discoveries by Dr Tomatis to music therapy, meditation, and various tinnitus treatments including masking, habituation retraining and intermittent masking with music. Tomatis based, Joudry Sound Therapy, has been found to have a more profound effect on ear function and the brain and nervous system for several reasons. It uses the power of classical music. It rehabilitates the middle muscles by enhancing polyvagal function, it stimulates the brain with concentrated high-frequency input and it reorganizes brain pathways in a beneficial way by training the listener to be right ear dominant. A review of the clinical evidence points to the efficacy of the Joudry method particularly for the treatment of tinnitus.

Premise

Joudry Sound Therapy is an effective treatment for tinnitus because it directly stimulates the ear mechanism in such a way as to improve both the mechanical, muscular function of the middle ear and the sensorineural function of the cochlea. It also activates many brain centers simultaneously, thus promoting the creation of new brain connections and better neural integration between auditory centers as well as integration with other sensory pathways.

Definition and Scope of Joudry Sound Therapy

Joudry Sound Therapy is a treatment system based on the discoveries of the ENT Dr Alfred Tomatis. New treatment protocols and improved algorithms have advanced the therapy to render it more potent in the treatment of tinnitus and other ear-related problems.

Background research

Music Therapy. Extensive evidence exists for the efficacy of music therapy in altering stress, mood states and assisting with a range of health disorders. In particular the music of Mozart has proven beneficial in assisting mood and also stimulating neurological connections and improving intelligence and short-term memory.¹

Tinnitus - is learning to live with it still the best answer?

¹ Argstatter, H., Plinkert, P., Bolay, HV., "Music Therapy for Tinnitus Patients: an interdisciplinary pilot study of the Heidelberg Model." HNO. 2007 May;55(5):375-83.

MyskiaA. "Can Music Therapy for patients with neurological disorders?" Tidsskr Nor Laegeforen. 2004 Dec 16;124(24):3229-30.

Thaut, MH. "The Future of Music Therapy in Medicine." Ann NY Acad Sci. 2005 dec;1060:303-8. Campbell, D. *The Mozart Effect, Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit.* Avon Books, 1997.

Because no suitable drug therapy has been found for tinnitus there is a tendency to accept that the condition is untreatable. However stimulation and retraining methods have been found to deliver relief for the majority and in some cases total recovery.

Masking. Tinnitus masking was discovered in 1977 by Jack Vernon who observed that an external sound is easier to tolerate than an internal sound and went on to develop specialized devices for masking tinnitus.² While helpful to some sufferers, this method was found effective in providing temporary relief only.

Habituation theory. In the 1980s Dr. Pawell Jastreboff and Dr. Jonathan Hazel, developed the theory of habituation which holds that tinnitus only becomes a problem if the limbic system is activated and the patient associates the tinnitus with stress or another negative emotion. Jastreboff developed Tinnitus Retraining Therapy which uses counseling and sound generators to train the patient not to pay attention to the tinnitus.³ This method has gained wide acceptance in the audiology profession. It provides a measure of relief but requires a fair time commitment, and cost, as subjects must attend a course of training to learn the method.

Intermittent masking. In the 1990s a program was developed by Dr. Paul Davis and marketed under the brand name Neuromonics. This program delivers a more tailored form of masking which has proved more palatable as it is delivered via music, giving an intermittent effect at a level tailored for the patient.⁴ However, the cost is prohibitive for many tinnitus sufferers. The efficacy of this method has not been verified by independent research.

Ear rehabilitation. Dr. Tomatis's discoveries provide a unique approach wherein ear function is rehabilitated using classical music processed with particular algorithms to create a stimulating effect for the ear. His work has been largely overlooked in the audiological field due to the fact that the short-term treatment possible in the clinic setting was usually insufficient to produce the needed changes to affect tinnitus. However, the portable program developed by Joudry uses a different protocol which allows for more intensive, long-term treatment, and is now proving to be highly effective in this area.⁵ The improvements made to the Joudry program include:

1. Portability, meaning greater access and ease of long-term listening
2. A more active musically responsive algorithm used in mastering
3. Audio-visual support materials to increase listener motivation and compliance
4. Convenience of use as listening can be done during daily activities or sleep

² Vernon, J. A., *Tinnitus Treatment and Relief*. Allyn and Bacon, Boston, 1998.

³ Jastreboff, P. J. and Hazell, J. W. P. *Tinnitus Retraining Therapy: Implementing the Neurophysiological Model*. Cambridge University Press, 2004.

⁴ Davis, Paul. "Tinnitus rehabilitation device and method." US Patent Issued January 27th 2004. Sinopoli, T., Davis, P. B. and Hanley, P. "Tinnitus: Addressing Neurological, Audiological, and Psychological Aspects with Customized Therapy." Hearing Review August 2007.

⁵ Joudry, R. *Triumph Over Tinnitus*, Sound Therapy International, Gerringong, 2007.

The physiological basis of Sound Therapy

Dr. Tomatis in the 1950s invented a method of Sound Therapy where the frequencies in classical music are altered to provide a physical stimulus for the ear as well as the brain.⁶

Tomatis advanced some radical ideas about the ear and nervous system for which he was acclaimed during his lifetime by the French academies of medicine and science. Several of his theories were tested and confirmed at the Sorbonne University. His premises, established through clinical observation included the following:

Efferent impulses activate the ear

The middle ear mechanism is an active organ which responds via efferent nerve stimulus to incoming sounds. While generally thought of as passive, the middle ear muscles tend to be ignored in seeking remedial solutions for ear problems. Their only recognized role is generally the impedance of loud sound, which could damage the ear. However, Weeks⁷ and Richards⁸ through investigating the role of the cranial nerves and efferent impulses arising within the Superior Olivary Complex in the brain stem, confirmed that there is a voluntary and proactive component to our hearing. In fact it appears that we are continually tuning the middle ear in order to focus on sounds that we deem to warrant our attention.

Sound can improve ossicular performance

The middle ear muscles can be activated by alternating high and low tones, leading to permanent improvement of their functioning. Tomatis made this discovery after many hours of clinical experimentation with his filtering device, the Electronic Ear. Though more interested himself in psychological aspects of hearing, and in treating autism and dyslexia, he laid the foundation for others to exploit his breakthrough for “ear physiotherapy.”

High frequencies reactivate the cilia

Moving through to the cochlea, Tomatis found that presenting the ear with increasing high-frequency sound enhances the capacity of the ear to respond to high-frequencies. He developed a program which progressively increases the high-frequency content of the sound, increasing both tolerance and capacity for frequencies of 8,000Hz and above. Standard medical advice holds that if the cilia are damaged by noise or infection, they have most likely been destroyed and no improvement in hearing can eventuate. This has been called into question by a growing body of evidence that listening to the Joudry Sound

⁶ Tomatis, A.A. *The Conscious Ear*, Station Hill Press, NY 1977.

⁷ Weeks, B. S. ‘The Therapeutic Effect of High Frequency Audition and its Role in Sacred Music,’ in *About the Tomatis Method*, edited by Gilmour, T. M., Madaule, P. and Thompson, B. Toronto: The Listening Centre Press, 1989.

⁸ Richards, G.B., and Richards, P. J. and Joudry, R. “The Therapeutic Effect Of High Band Pass Classical Music And Antioxidant Supplements.” Presented to Australian Audiological Society Conference Brisbane 2004. Cited on http://www.soundtherapyinternational.com/research_and_media_articles.htm#17

Therapy, (an extended version of Tomatis) sometimes results in significant hearing improvement for sufferers of sensorineural hearing loss. This can only be explained by the premise that the hair cells in some instances were not destroyed but only damaged, and that the repeated stimulation by gradually increasing high-frequencies helped to reactivate them.⁹

Better ear function increases appreciation of sound

Tomatis asserted that the ear can be re-trained to receive a greater range of sound by repeated stimulus to “exercise” the middle ear muscles. Listeners to the Joudry method frequently confirm this finding by observing that their appreciation of sound improves, musical and vocal ability improve and they are able to hear birdsong and appreciate music in a new way. Along with this, following a conversation becomes easier, they can hear better in different environments and many report being able to turn down the TV so they can listen without annoying the rest of the family.

The right ear leads language integration

Tomatis discovered that singing, speaking and all language skills are enhanced by ensuring right ear emphasis, which creates a shorter, more direct brain route for processing sound in the left hemisphere. While it is generally accepted that the primary processing center for language is on the left, no one apart from Tomatis has used this knowledge to create a simple, auditory remedial program for laterality confusion and the resulting learning and language problems. Tomatis discovered this phenomenon by accident when working with singers who he found greatly improved their vocal range, control and fluency when monitoring themselves with the right as opposed to the left ear. He found that subjects could be trained to be right ear dominant by consistently supplying louder sound to the right ear.¹⁰

High-frequency bombardment improves brain energy and integration

Perhaps the most groundbreaking of Tomatis’s discoveries was that intensified high-frequency sounds, primarily in the range of 8,000 to 16,000 Hz, consistently supplied, serve to stimulate and enhance brain function. This has implications for a wide range of brain disorders from depression to epilepsy, but also explains the benefit of the method to stress, anxiety and general wellbeing. Tomatis said that the brain needs to receive 3 to 4 billion stimuli per second for at least 4 ½ hours per day in order to function at optimum potential. Various forms of brain stimulation have been looked at for their therapeutic

⁹ Joudry, P. and Joudry, R. *Sound Therapy: Music to Recharge Your Brain*. Sound Therapy International. Sydney, 2000.

¹⁰ Tomatis, A.A. *The Conscious Ear*, Station Hill Press, NY 1977.

impact on dystonia,¹¹ stroke rehabilitation,¹² depression¹³ and chronic pain.¹⁴ By using classical music with augmented high frequencies, Tomatis found a way, via the auditory system, of making brain stimulus more acceptable and universally beneficial to the nervous system.

Supporting evidence for Tomatis's discoveries

Enhanced Brain states. Davidson of Madison University has studied the ability of humans to create and maintain positive emotional states and has integrated Western medical investigation with the teachings of Tibetan Buddhism by engaging in extensive inquiries with the Dalai Lama and other leading Tibetan lamas. Davidson's research shows that certain centers in the left hemisphere of the brain, which are activated by meditation, contribute to more positive emotional states.¹⁵ This corroborates Tomatis's discovery that stimulating the left hemisphere via the right ear emphasis produces beneficial results.

Classical music. Tomatis and Joudry Sound Therapy are delivered through classical music that has been altered to enrich the high frequencies, provide a right ear emphasis and present the ear with constantly alternating sounds of high and low tones in a particular algorithm, using Tomatis's purpose made filtering system, the Electronic Ear. Western classical music is most suitable for this system due to the fact that it uniquely combines complex rhythm, melody and harmony to a greater degree than any other form of music, thereby stimulating numerous parts of the brain at one time. This is believed to enhance brain connectivity by causing connections to be formed by many diverse regions of the brain.¹⁶ Through experimentation Tomatis established that classical music was the most suitable type of music to use for Sound Therapy. The clinic-based Tomatis method was

¹¹ Skogseid, I. M., "Pallidal Deep Brain Stimulation is Effective, and Improves Quality of Life in Primary Segmental and Generalised Dystonia." *Acta Neurologica Scandinavica*. 117 (Sup 188):51-55, May 2008.
Hung, S.W. et al. "Long Term Outcome of Bilateral Pallidal Deep Brain Stimulation for Primary Cervical Dystonia." *Neurology*. 68(6):457-459, February 6, 2007.

¹² Alonso-Alonso, M., Fregni, F. and Pascual-Leone, A. "Brain Stimulation in Poststroke Rehabilitation." *Cerebrovascular Diseases*. 24 (Sup.1):157-166, November 2007.

¹³ George, M.S. et al. "Brain Stimulation for the Treatment of Psychiatric Disorders." *Current Opinion in Psychiatry*. 20 (3):250-254, May 2007.

¹⁴ Kringlebach, M. L., et al. "Deep Brain Stimulation for Chronic Pain Investigated with Magnetoencephalography." *Neuroreport*. 18(3):223-228, February 12, 2007.

¹⁵ Davidson, Richard J. "Anterior electrophysiological asymmetries, emotion, and depression: Conceptual and methodological conundrums," *Laboratory for Affective Neuroscience, University of Wisconsin-Madison, USA*.

Davidson, Richard J., Nitschke, Jack B., Pizzagalli, Diego, Putnam, Katherine, "Depression: Perspectives from Affective Neuroscience" *Annual Review of Psychology*. 2002.

¹⁶ Campbell, D. *The Mozart Effect, Tapping the Power of Music to Heal the Body, Strengthen the Mind, and Unlock the Creative Spirit*. Avon Books, 1997.

used extensively to treat dyslexia, autism and a variety of listening or auditory processing disorders.¹⁷

Tomatis research. A variety of beneficial effects of the Tomatis method have been recorded in research at specialized clinics in South Africa, Canada and Australia. These include benefits for dyslexia, anxiety and depression, language disorders, stuttering, mental retardation, learning difficulties, vocal quality and tinnitus.¹⁸

Ear disorders showing improvement. The Tomatis method was made portable in 1984 by the Joudrys, so longer-term treatment became feasible as cost and convenience were dramatically improved. This led to evidence that on-going Sound Therapy can assist in certain cases with a number of ear-related problems not previously considered treatable. These include various types of hearing loss: sensorineural, acquired hearing loss, industrial deafness, age-related hearing loss and conductive hearing loss for which there is often a muscular component. They also include blocked ear, hyperacusis (sound sensitivity) cocktail party syndrome (difficulty hearing in a noisy room) and tinnitus (ringing in the ears.)

Data has been gathered for these effects through extensive written testimonials, surveys and clinical observations by some 200 allied health practitioners who recommend the method.²⁰ A pilot study at Sydney University showed a significant increase in Heart Rate Variability as a result of Sound Therapy.

Polyvagal Theory and the Middle Ear Muscles

Dr. Stephen Porges' Polyvagal theory has helped to provide a scientific understanding of the ways in which Sound Therapy beneficially impacts our nervous system.

The sound we hear in the environment hits the eardrum and is transduced from the eardrum to the inner ear via ossicles – small bones in the middle ear²². When innervated, the stapedius muscle and the tensor tympani (the former innervated via a branch of the facial nerve and the latter by a branch of the trigeminal nerve), tighten the ossicular chain, dampening the amplitude of the low-frequency components of sound that reach the inner ear²³ Hence, two functions impinge on the activity of these muscles; the attenuation of low-frequency sound and; consequently, extraction of high-frequency sounds, such as those characteristic of the human voice.

The degree of frequency modulation goes through the ear up to the cortex and back down to help regulate those middle ear muscles. In this way certain sounds trigger three processes.

¹⁷ Gilmore, T.M., Maudale, P. & Thompson, B.M. (eds) *About the Tomatis Method*. The Listening Centre Press Toronto, 1989.

¹⁸ Joudry, R, *Sound Therapy Manual for Practitioners*, Sound Therapy International, Sydney 2000.
Jaarsveld, I. P.E. and du Plessis, W.F. *Audio-psycho-phonology at Potchefstroom: A review*. Potchefstroom University of Higher Education, 1988.

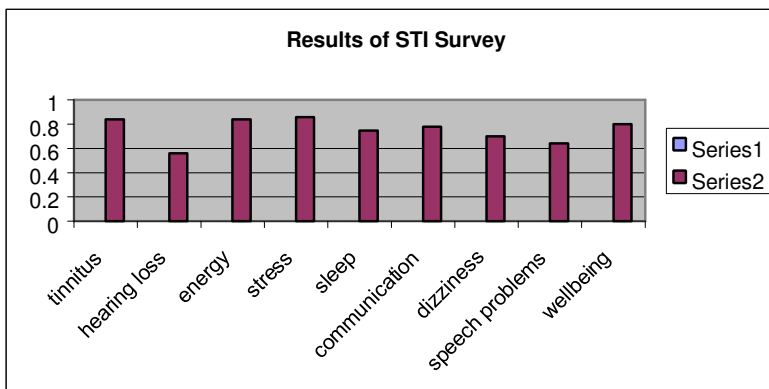
1. Stimulation with high-frequency sounds enhances the ability of the cranial nerves to act on the middle ear muscles, enabling them to block out low-frequencies.
2. This process also reduces stress and enhances communication and emotional adaptability.
3. This also calms thoughts and feelings (behavior and physiology)
4. Improvement in vagal regulation enhances communication and emotional adaptability.

So, in summary, the vagus nerve affects the function of the middle ear muscles, which play a role in dampening low-frequency sound and enabling us to focus on the human voice and enhance our social engagement.¹⁹

Evidence of success with tinnitus

There is extensive clinical evidence for the portable Tomatis (Joudry) method in the form of surveys, case histories and in-depth interviews with clients.

A survey of Sound Therapy listeners found that 90% of tinnitus sufferers benefited from



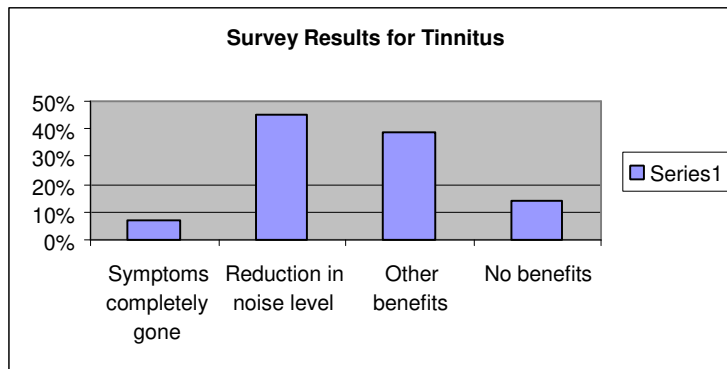
the method in that it reduced stress, anxiety and sleeplessness associated with the tinnitus. 45% experienced a reduction in the noise level and 7% found their symptoms were completely gone. Of hearing loss sufferers, 56% reported improvement.

Improvements were observed through changes on audiograms, decreased volume required on Walkman or TV, being able to hear better in noisy environments, on the phone or when the speaker had their back turned. Such changes made a significant difference to the person's life.^{20 21}

¹⁹ Warhurst, L, Kemp, A, Listen to Your Heart: A Preliminary Investigation on the Impact of Sound Therapy on Heart Rate Variability. Poster presentation, University of Sydney, 2012.

²⁰ Joudry, R. *Triumph Over Tinnitus*, Sound Therapy International, Gerringong, 2007.

²¹ Collins, S. <http://www.soundtherapyperth.com/index.php> and Delafaurie, B. <http://www.therapie-par-leson.com/>



Numerous practitioners from various fields including musicians, psychologists, medical doctors and audiologists have become advocates and as independent practitioners actively promote and recommend the method. ²⁶

Eric Jordan, a UK based audiometrician treated 200 to 300 tinnitus patients over a 2 year period and observed that 90% of patients benefited. ²² Though not a formal study, this nevertheless constitutes objective, clinical observation of patients using the method in their day to day lives by a practitioner interested and experienced in the tinnitus field.

Conclusion

As most of these results have been gathered from qualitative measures of actual clinical applications, including the personal reports from the clients on the impact on their lives, they are more informative than single quantitative measures from controlled research situations. ²⁸ More extensive research is needed to determine more precise statistics for the potential results in each category of hearing disorder. However, the information gathered so far leaves no doubt that Sound Therapy is beneficial to most people suffering from a hearing related complaint and that in many instances it can be quite life changing. The affordability of this method makes it a very favorable and low-risk option for tinnitus sufferers when compared to other treatments available.

²² Joudry, R, *Sound Therapy Manual for Practitioners*, Sound Therapy International, Sydney 2000. ²⁸
 Joudry, R. *Triumph Over Tinnitus*, Sound Therapy International, Gerringong, 2007.

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