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Review Article

Sound Therapy: Vibratory Frequencies of Cells in Healthy and Disease States

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Abstract

Sound therapy is a revolutionary approach to medical treatment and prevention, transforming the current treatment landscape. The therapy is based on the notion of resonance. Typically, in homeostasis, electromagnetic fields—surrounding the body and all organs, cells, bones, tissues, and liquids—have a healthy a healthy vibratory frequency. Sound wave treatment induces profound relaxation, which facilitates the healing of emotional anguish and scars. Sound therapy helps a person release fear and sadness, improves the feelings of loneliness and despair, "cleanses" harmful emotions, and provides constructive insights regarding emotional conflicts. It also helps alleviate physical disorders, such as aches and pains, muscle and connective tissue difficulties, mobility issues, postoperative rehabilitation, and tinnitus. Also, it can be used as adjunctive therapy with standard cancer treatments. This review article discusses the importance of sound therapy and the pioneers' use of sound strategies to heal. The review also highlights the frequencies generated by different body organs and how to detect diseases based on changes in these frequencies. Furthermore, tools used to administer healthy frequencies to diseased cells and the future of sound therapy are offered and explained.

Keywords: *Ancient Healing Methods; Frequency; Music Therapy; Musical Medicine; Natural Cancer Treatment; Body Vibration*

Abbreviations

BP: Blood Pressure; COPD: Chronic Obstructive Pulmonary Disease; DIC: Digital Image Correlation; DOMS: Delayed Onset Muscle Soreness; EMF: Electric and Magnetic Field; FE: Finite Element; GIM: Guided Imagery and Music; HIFU: High-Intensity Focused Ultrasound; HR: Heart Rate; LMHFV: Low-Magnitude, High-Frequency Vibration; ICU: Intensive Care Unit; IR: Infrared; min: Minute; NP: Nanoparticle; NTT: Neuromonics Tinnitus Treatment; OI: Osteogenesis Imperfecta; PR: Pulse Rate; RF: Resonance Frequency; RS: Raman Spectroscopy; TFA: Trans Fatty Acid; VS: Vibrational Spectroscopy; WBV: Whole-Body Vibration

Introduction

Background

Sound therapy is an ancient healing technique. It is the therapeutic use of sound frequencies to transition patients to a state of harmony and well-being. Figure 1 (below) illustrates how sound therapy can be administered [1].

Figure 1: *Ways through which sound therapy can be delivered.*

Every physical system in the cosmos vibrates at a unique frequency [1]. The complex human body vibrates in several ways, with each vibrating mode having a particular oscillation frequency. Vibrations are complex, and vary from one second to the next [2]. The sound of the wind, the rustling of leaves, and long undulating grass were all pleasing sensations to early humans [3]. The benefits of sound therapy are listed in Figure 2 (below) [1,4].

Figure 2: *Benefits of sound therapy.*

For nearly a millennium, sound was used in treatment methodologies by ancient Greeks, Native Americans, shamans, and others [5]. The Aboriginal Australians are the first known humans to use sound as a therapy. They employed a "didgeridoo," a wind instrument, to treat broken bones, muscle tears, and several diseases for at least 40,000 years [6]. The use of "*bija*," the mystical "seed syllables" embedded within mantras, is also a well-recognized sound therapy (healing prayers) in the yogic tradition. Specific mantras, chants, and sounds are used in Chinese *qigong* (or *qi gong*) to stimulate various organ systems in the body. Greek physicians applied vibrations emanating from flutes, lyres, and zithers to improve digestion, alleviate mental disturbances, and induce sleep in their patients [3].

In his classic treatise *De Anima*, Aristotle (323–373 BCE) mentions that intense emotions are generated, and the sound purifies the soul of the flute [3]—a practice that was used for healing by the ancient Egyptians as well. In their medical papyrus manuscripts, the Egyptians mention the use of chant-like incantations, musical incantations, and a specific type of instrument that produced "ultrasound" for treating those who were ill [5].

Pythagoras, the noted Greek philosopher and mathematician, also known as the Father of Harmony [7], systematically used sound as a therapeutic tool. He called this treatment "musical medicine". Circa 500 BCE, Pythagoras and his pupils began using melodies to cure psychological problems, such as despair, aggressive conduct, and rage [5].

Shamans worldwide have used the rhythmic thumping of drums to transcend themselves and their patients to a state of altered consciousness capable of inducing mental and physical well-being. The first undeniable evidence of shamanic practices was seen about 30 thousand years ago. Chants and monosyllabic phrases, known as mantras (a common motif in religious and spiritual circles), were used by Vedic thinkers in ancient India to quiet the senses and mind [5]. Likewise, religious chanting, calms worry and transcends the mind, helping people cope with life's adversities. The *Buddha Amitābha* mantra is the most common type of religious chanting, and one of the earliest known religious activities practiced even today [8]. From Jewish Kabbalists to the Sufis and mystics of the Muslim world, music has been a vital mode for gaining spiritual transcendence and treating the mind and soul. Physical recovery, on the contrary, is frequently secondary, almost a consequence, to the primary objective of achieving spiritual enlightenment and a sense of happiness and inner peace [5].

The use of "healing singing bowls" by Tibetans and Himalayans is also a well-known practice. These bowls are made of metal alloys [5,6] and used in religious rites and meditation. Singing bowl therapy incorporates certain aspects of meditation and sound therapy, effective in improving disease symptoms and those of depression. This therapy is also used in hospital treatments [9]. Goldsby., *et al*. (2016) investigated the beneficial effects of sound meditation, primarily singing bowl meditation on stress, illness, and mental well-being in 62 women and men (average age, 50 years). The physical body, including the nerve centers, circulatory systems, and cells that work with specific brain parts, responded well to the emitted vibrations. The researchers concluded that singing bowls relieved stress, anxiety, and despair—while enhancing spiritual well-being [5].

In the late 1700s, Diogel reported on the effect of sound on heart rate (HR), respiration, pulse rate (PR), and blood pressure (BP). He measured the BP and PR of his patients accompanied by the sound emitted by soot-coated drums and a stylus. According to Diogel, sound lowers BP, increases heart function, decreases PR, and, in general, improves the functioning of the peripheral nervous system [3].

Toward the end of the nineteenth century, researchers began to conduct systematic studies regarding sound or music in medicine and healing [3]. In 1896, American physicians discovered that sound or music might increase blood flow and improve mental processes [8]. Eva Augusta Vescelius founded the National Society of Musical Therapeutics in 1903. Isa Maud Ilsen formed the National Association for Music in Hospitals in 1926. Harriet Ayer Seymour established the National Foundation of Music Therapy in 1941 [10]. In the early 1940s, sound and music therapy was used to rehabilitate soldiers returning from World War II [8].

These events led to the development of sound therapy, pioneered by the British osteopath Sir Peter Guy Manners in the 1950s. He created the first equipment capable of producing sound waves for therapeutic purposes. It was assumed that diseased cells would be restored to a healthy state if this equipment were placed directly over the body section that needed therapy (and was configured to match the vibration frequency of healthy cells in that location). Manners created the first computerized method to treat several illnesses by the 1990s [8]. Alfred Tomatis and Guy Berard developed auditory integration therapy to help people with various illnesses, including anxiety, learning impairments, attention deficit disorders, autism, sensory processing aberrations, and motor-skill deficiencies. The Tomatis method helped adults overcome depression, learn foreign languages more quickly, improve communication skills, increase creativity, and enhance work performance. This method uses recordings by Mozart, who tuned his music to 432 Hz, and Gregorian chants that were initially embedded with mystical solfeggio frequencies (528 Hz) [11].

Kemper and Danhauer (2005) published an article—regarding the benefits of sound therapy in hospital settings—in the *Southern Medical Journal.* According to the authors, sound therapy significantly decreases stress and improves mood in medical and surgical patients, and patients in intensive care units (ICUs) [12].

Discussion

The human body produces extremely low frequency electric and magnetic fields (EMFs) and mechanical vibrations known as infrasonic waves. Physiological functions, including the heartbeat, respiration, circulation, and other bodily processes, generate infrasonic waves. Each organ generates a unique resonance frequency (RF) [13,14]. The vibration frequencies of significant bodily functions (organs and systems) range from 3 to 17 Hz. However, according to the International Standard ISO 2631, the sensitive range in the vertical vibration of the human body is 6 to 8 Hz [15]. Figure 3 details the RFs of particular human organs [13,14].

Human Body	• Resonance Frequencies (RF)
Brain	• ~ 10
Head	• 20 - 40
Spinal Column	• 8
Blood circulation	• 0.05 - 0.3
Chest Wall	• 60
Heart	• ~ 1
Abdominal	• 4 - 8
Shoulders	• 4 - 8
Lungs	• 4 - 8
Hands and arms	• 20 - 70
Ocular globe	• 60 - 90
Maxilla	• 100 - 200

Figure 3: *Resonance frequency readings of human organs.*

In humans, the vibrational frequency may be traced to the cellular level. A higher frequency in the body indicates better health, while a frequency below normal indicates sickness and disease development [16]. Low frequency (40 Hz) mechanical energies can affect the

semicircular canals (mostly associated with balance), the otolith system, the chest, abdominal cavity, and entire body. The tympanic membrane is affected by pressure variations between 20 and 2 kHz. Thyroid activity increases when the frequency is higher (about 14 Hz) [17]. Insomnia frequencies are about 300 Hz [18].

Frequency is an exogenous factor, and the extent of deviation of target cells from their particular frequencies helps in diagnosis and treatment [19]. Studies have found that vibrations with frequencies >20 Hz can enhance both delayed onset muscle soreness (DOMS) and physiological recovery after strenuous exercise. Researchers have also discovered that a vibrational frequency >20 Hz (2530 Hz, 26 mm) helps decrease arterial stiffness, accelerate blood movement, and increase both muscle warmth and blood flow [20].

Frequencies in patients with cancer mostly exceed 1000 Hz [18]. The use of amplitude-modulated electromagnetic fields in cancer treatment has revealed that each cell has a unique response to the transmitted frequencies. Patients with breast cancer, hepatocellular carcinoma, prostate cancer, and pancreatic cancer have ascribed frequencies of 1873.477, 2221.323, 6350.323, and 10456.383 Hz, respectively [19].

Mittelstein., *et al*. (2016) investigated the response of cancer cells to a range of ultrasound frequencies (300,000–650,000 Hz). They also studied the effect of different pulse durations (from 2–40 ms) on these cells. They found that 500,000 Hz ultrasound administered for 1 min in 20-ms bursts destroyed all cancer cells without affecting the blood cells. Also, this technique did not adversely affect more than eight out of every ten immune cells [21]. Zimmerman., *et al*. (2013) discovered that intrabuccal application of amplitude-modified 27.12 MHz RF-EMF to tumor-specific frequencies leads to long-term, objective, positive responses in patients with cancer without causing any significant adverse effects. Furthermore, *in vitro* studies have shown that tumor-specific frequencies inhibit tumor cell proliferation alter gene expression, and disrupt the mitotic spindles (Figure 4) [18].

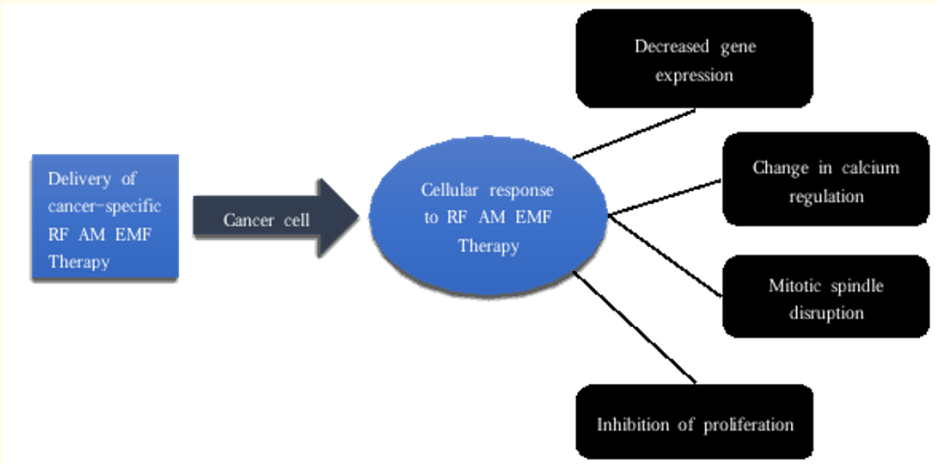

Figure 4: *Cancer-specific treatment and responses.*

Studies have shown that, in the presence of magnetic nanoparticles (NPs), EMF and alternating magnetic field (AMF) trigger apoptosis in cancer cells and tumor tissues. Human cancer cell lines, such as pheochromocytoma-derived (PC12), breast cancer (MDA-MB-231), and colon cancer (MDA-MB-231), have been used to test these treatments *in vitro* (SW-480 and HCT116). Figure 5 details *in vitro, in vivo*, and clinical observations during PMF/AMF-based cancer therapy [22].

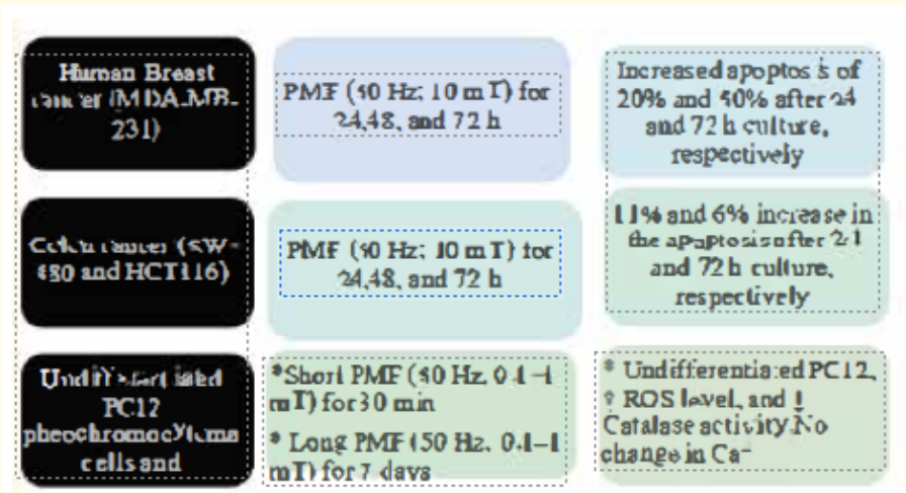

Figure 5: *Summary of PMF-/AMF-based cancer treatment observations.*
Note: Column 1: Cancer Cell Line; Column 2: Treatment; Column 3: Observations

Tools used to identify disease state vibratory frequencies

Vibrational spectroscopy

When paired with multivariate analysis or machine learning approaches, vibrational spectroscopy (VS) may provide objective and rapid evaluation of molecular composition and an accurate disease prognosis. VS, including Raman spectroscopy (RS) and infrared (IR) spectroscopy, is the frequency used in biological and medical sciences [23,24].

Raman spectroscopy

RS is an optical method used to investigate the vibrational activities of chemical interactions. It can detect unknown chemicals in a sample and help distinguish samples based on their chemical compositions. RS does not harm the cells, does not require external dyes, and may be performed with clinically acceptable measurement durations—using fiber-based or traditional optics-based gear—making it an appropriate approach for *in vivo* tissue diagnostics. Several organizations use RS to investigate skin biochemistry. Lieber., *et al*. (2008) used a Raman fiber probe to evaluate lesions from non-melanoma skin malignancies. The researchers found 100% sensitivity and 91% specificity in distinguishing these lesions from normal tissues [23]. Furthermore, Choi., *et al*. (2005) found a 95% separation between normal and basal cell cancer in Raman spectra, obtained from various skin depths [25].

IR spectroscopy

Vibrational spectroscopic relies on the absorption of IR by materials, causing molecular-bond vibrations to resonate. It is a practical approach to visualize morphological, physiological, and variations in biomolecules, cells, and tissues. IR spectroscopy can be used to discover molecular alterations caused by obesity, which will help better understand the molecular basis of the disease and develop specific spectral biomarkers for diagnosis. Furthermore, these spectral indicators may be used to determine the best medications and dosages for therapy [26]. Bortolotto., *et al*. (2005) measured the total trans fatty acid (TFA) content in subcutaneous, visceral, and retroperitoneal fat in morbidly obese and non-obese individuals undergoing bariatric, cosmetic, and abdominal surgery. TFA concentration in all adipose tissues analyzed was more significant in patients from Brazilian countries than in those from Europe and the United States. Furthermore, greater TFA was found in visceral adipose tissue (VAT) than in other abdominal fat reserves. The TFA in visceral fat was more significant than in other fatty regions in severely obese and non-obese individuals [27].

Finite element analysis and digital image correlation

Finite element (FE) analysis is performed on a typical skin model, including the stratum corneum, epidermis, dermis, and subcutaneous layers. On the contrary, digital image correlation (DIC) is a reliable non-invasive approach to assess the mechanical characteristics of the skin. DIC has been used for several *in vivo* measurements. Studies have indicated an association between the DIC and FE data, supporting a non-invasive approach for obtaining skin vibration qualities. This technology can distinguish healthy from unhealthy skin in the future. It is relevant and vital in skin biomechanics because prevention, early diagnosis, and treatment are critical to minimize the incidence, morbidity, and mortality associated with skin cancer [28].

Tools used to apply "healthy state" frequencies to "disease state" cells

Whole-body vibration

Whole-body vibration (WBV) is a non-invasive physical treatment that has recently been added to hospitals' patient rehabilitation training catalog. Vertical vibration causes an upward thrust on the human body, which alternates with gravity to create a short, up-and-down shock that operates on the body's bones, muscles, and nerves. As a result, WBV stimulates the entire body rather than a single muscle group [29]. According to Song., *et al*. (2019), WBV boosts CD4- and CD25-positive lymphocytes in the spleen and promotes T-regulatory cells [30].

Furthermore, Boyle., *et al*. (2010) observed that WBV combined with exercise decreased the risk of thrombosis or infarction greater than simple exercises alone, emphasizing its contribution to preventing and treating cardiovascular diseases [31]. Additionally, Park., *et al*. (2015) and Sa-Caputo., *et al*. (2016) demonstrated the benefits of WBV on pulmonary rehabilitation in patients with chronic obstructive pulmonary disease (COPD), as well as the improvement of local vasodilatation in the microcirculation via endothelial stimulation [32,33].

Rife machines; Rife frequency generators

Rife devices generate low-level electromagnetic frequency waves, also known as RF-EMF. Rife therapy works by determining the frequency of the ailment. A similar frequency impulse is then used to destroy or inhibit aberrant cells. Low-frequency waves affected cancer cells, but not normal cells. However, this research is still in its early stages [34]. *In vitro* studies by Zimmerman., *et al*. (2012) demonstrated that specific electromagnetic frequencies inhibit malignant cells from proliferating—without damaging normal cells [35].

Low-magnitude, high-frequency vibration (LMHFV)

Low-magnitude, high-frequency vibration (LMHFV) is emerging as a possible stimulant for musculoskeletal repair and regeneration, with preliminary data indicating effects on mesenchymal stem cells as the mechanism of action [36]. Holguin., *et al*. (2009) discovered that LMHFV (30 Hz, 10 min per day) reduced inflammation in the intervertebral disks of human volunteers after 90 days of bed rest, in addition to a 46% reduction in the reported occurrence of low back pain [37].

Intervention with LMHFV may benefit patients with osteogenesis imperfecta (OI)—caused by a mutation of the structural protein type 1 collagen—by increasing the bone mass and structure. Vanleene., *et al*. (2013) studied LMHFV interventions on a young OI mouse model. LMHFV (0.3g, 45 Hz) was administered 5 days a week for 5 weeks. Cortical bone thickness and area were increased in the tibia and femur of both OI and wild-type the mice. Moreover, the mice had increased trabecular bone volume. These changes were associated with increases in femoral strength and yield load [38].

Neurologic music therapy

Music therapy helps people relax and de-stress. Often, it is more effective than prescription drugs in reducing stress levels before surgery [39]. Jenny and Jung (2017) investigated the benefits of various forms of therapies in alleviating depressive symptoms in older persons with chronic conditions. A 30-minute music therapy session paired with standard treatment improved depressive symptoms in these patients [40]. Mckinney., *et al*. (2017) reported that a series of guided imagery and music (GIM) sessions helped enhance psycho-physiological health in people with various medical problems [41].

Brainwave entrainment

Brainwave entrainment utilizes binaural beats. It stimulates the brain into a particular condition by using a pulsating sound, urging the brain waves to sync with the frequency of the beat. Brainwave entrainment also aids in inducing increased attention, enhanced mental state, relaxation, and sleep [39]. Jirakittayakorn and Wongsawat (2018) investigated the effects of low frequency (3 Hz) binaural beats on sleep in 24 individuals. According to the findings, the delta range beats cause profound slumber. Furthermore, those who listened to binaural beats slept for more extended periods than those who did not [42].

Tuning fork therapy

Tuning fork therapy uses calibrated metal tuning forks to deliver particular vibrations to various body regions. It can help release stress, increase energy, and promote emotional equilibrium. Tuning fork therapy functions similar to acupuncture, except instead of needles, it uses sound frequencies to stimulate associated points. The therapeutic tuning fork at 128 Hz is applied in treating contractures, muscular pains, and bone pain—among other conditions [39,43].

Dedicated sound therapy devices

- Neuromonics® treatment is a first-generation passive music sound therapy that is habituation-based. It uses music that has been spectrally flattened and adapted to the listener's ears. It is divided into two stages: a noise with modified music, and modified music alone. Several studies have shown that this therapy lowers the unpleasant psychological elements of tinnitus. The effectiveness of neuromonic therapy is comparable to that of ear-level maskers [44]. Vieira., *et al*. (2011) conducted a multicenter cohort trial regarding long-term advantages of tinnitus control with Neuromonics Tinnitus Treatment (NTT). The study included 70 people

who had previously received the treatment. Tinnitus distress was assessed using the Tinnitus Reaction Questionnaire, and patients were asked to report on the percentage of time they were aware of and disturbed by their tinnitus. Patients reported a considerable reduction in their tinnitus distress. The success rate for this cohort of patients was 75.7% at the program's completion—with the majority of patients maintaining the benefits in the long term. NTT delivers consistent and long-term alleviation from tinnitus symptoms [45].

- High-intensity focused ultrasound (HIFU) therapy employs high-frequency sound waves to attack cancer cells. It is only suitable for treating a single tumor or a small portion of a large tumor. HIFU may be applied through heat and mechanical methods to boost blood flow or destroy cancerous tissue. However, because HIFU cannot pass through solid bone or air, it cannot be used to treat larger tumors [46].

- The Tomatis Method stimulates the auditory system, making it more receptive to vocal sounds, enhancing a person's ability to listen to and interpret spoken language. The patient is exposed to sound and music using an auditory training device, known as the Electronic Ear, which is modified to boost the high-frequency range—that Tomatis feels is required for receptive listening. This strategy is beneficial to patients with learning impairments, anxiety, and Asperger's syndrome [47].

- Cymatics and ultrasonics are two further sound healing modalities that music therapists explore. Cymatics purportedly heals the body by using the vibratory properties of specific tones. Cymatic therapy aims to return the entire unit (body) to its natural vibratory rate by replicating healthful frequencies with electronic oscillators, and applying it to the unit (body). Diagnostic methods—such as echocardiograms to investigate the heart, echoencephalography to study the brain, echocardiograms to study assess structures, and sonograms to evaluate organs and internal structures—are widely used. Ultrasonic treatments also identify bone fractures, kidney stones, and gallstones [47].

The future of sound therapy

Sound therapy has demonstrated its potential for treating several diseases, and studies in this area must be continued. It is essential to determine strategies to develop the discipline in theory, research, and practice to move sound therapy ahead in the most effective manner possible. If purposeful actions are undertaken regarding investigations, documentations, and practices, this "sound science" may have widespread applications in the future.

Conclusion

Sound healing is a holistic therapeutic approach, using precise frequencies, vibrations, and musical melodies and refrains to potentially restore the body's energy system, supporting healing and recovery processes. Sound application has been a primary component of healing methods throughout ages and continents. In addition, several studies on sound/music, health care, and technology have been conducted to improve collaboration among the healthcare, medicine, music, and technology fields. Due to the data researched and presented herein, it is posited that applying sound, music, and vibration therapy with standard medical treatment will contribute to humanity's well-being, health, and spiritual growth.

Conflict of Interest Statement

The authors declare that this paper was written without any commercial or financial relationship that could be construed as a potential conflict of interest.

References

1. Heather S. "What is sound healing". *The International Journal of Healing and Caring* 7.3 (2007). https://www.researchgate.net/publication/228550675_WHAT_IS_SOUND_HEALING

2. Jaganathan SK., *et al*. "Natural frequency of cancer cells as a starting point in cancer treatment". *Current Science* (2016): 1828-1832. https://www.jstor.org/stable/24908072

3. Meymandi A. "Music, medicine, healing, and the genome project". *Psychiatry* 6.9 (2009): 43. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2766288/

4. Benefits of Music Therapy (2021). https://www.verywellmind.com/benefits-of-music therapy-89829

5. The history of sound healing (2021). https://soundtherapy.education/history of sound-healing/

6. Goldsby TL., *et al*. "Effects of singing bowl sound meditation on mood, tension, and well-being: an observational study". *Journal of Evidence-Based Complementary and Alternative Medicine* 22.3 (2017): 401-406. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5871151/

7. Music and Mathematics: A Pythagorean Perspective (2021). https://www.unyp.cz/news/music-and-mathematics-pythagorean-perspective

8. Sound Therapy (2021). https://www.encyclopedia.com/medicine/encyclopedias-almanacs-transcripts-and-maps/sound-therapy

9. Stanhope J and Weinstein P. "The human health effects of singing bowls: A systematic review". *Complementary Therapies in Medicine* 51 (2020): 102412. https://www.sciencedirect.com/science/article/abs/pii/S096522991931756X

10. Archives of the American Music Therapy Association (2021). https://www.musictherapy.org/about/history/

11. Origins and research on Sound Healing (2021). https://www.pierrestocker.com/origins-and-research-on-sound-healing/

12. Kemper KJ and Danhauer SC. "Music as therapy". *Southern Medical Journal* 98.3 (2005): 282-288.

13. Scientists research effects of infrasonic vibrations in humans (2021). https://phys.org/news/2016-10-scientists-effects-infrasonic-vibrations-humans.html

14. Duarte ML and De Brito Pereira M. "Vision influence on whole-body human vibration comfort levels". *Shock and Vibration* 13.4-5 (2006): 367-377. https://www.researchgate.net/publication/274471590_Vision_Influence_on_Whole-Body_Human_Vibration_Comfort_Levels

15. Ren W., *et al*. "Study on vibration characteristics and human riding comfort of a special equipment cab". *Journal of Sensors* (2018). https://www.hindawi.com/journals/js/2018/7140610/

16. Frequency boosts (2021). https://medium.com/thrive-global/three-hacks-to-boost-your-frequency-af1a6c3887c2

17. Edwards JH and Reilly GC. "Vibration stimuli and the differentiation of musculoskeletal progenitor cells: review of results in vitro and in vivo". *World Journal of Stem Cells* 7.3 (2015): 568. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4404392/

18. Zimmerman JW., *et al*. "Targeted cancer treatment with radiofrequency electromagnetic fields amplitude-modulated at tumor-specific frequencies". *Chinese Journal of Cancer* 32.11 (2013): 573. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3845545/

19. Jafari M and Hasanzadeh M. "Cell-specific frequency as a new hallmark to early detection of cancer and efficient therapy: Recording of cancer voice as a new horizon". *Biomedicine and Pharmacotherapy* 122 (2020): 109770. https://pubmed.ncbi.nlm.nih.gov/31918289/

20. Cheng CF., *et al*. "Effects of low-frequency vibration on physiological recovery from exhaustive exercise". *The Open Sports Sciences Journal* 10.1 (2017). https://www.researchgate.net/publication/316541909_Effects_of_Low-Frequency_Vibration_on_Physiological_Recovery_from_Exhaustive_Exercise

21. Mittelstein DR., *et al*. "Selective ablation of cancer cells with low-intensity pulsed ultrasound". *Applied Physics Letters* 116.1 (2020): 013701. https://aip.scitation.org/doi/10.1063/1.5128627

22. Sengupta S and Balla VK. "A review on the use of magnetic fields and ultrasound for non-invasive cancer treatment". *Journal of Advanced Research* 14 (2018): 97-111. https://pubmed.ncbi.nlm.nih.gov/30109147/

23. Lieber CA., *et al*. "In Vivo Nonmelanoma Skin Cancer Diagnosis Using Raman Microspectroscopy''. *Lasers in Surgery and Medicine* 40.7 (2008): 461-467. https://pubmed.ncbi.nlm.nih.gov/18727020/

24. Mollaoglu AD., *et al*. "Applications of Infrared Spectroscopy and Microscopy in Diagnosis of Obesity. Infrared Spectroscopy-Principles, Advances, and Applications". *Intech Open* (2018). https://cdn.intechopen.com/pdfs/63997.pdf

25. Choi J., *et al*. "Direct observation of spectral differences between normal and basal cell carcinoma (BCC) tissues using confocal Raman microscopy". *Biopolymers* 77 (2005): 264-272. https://pubmed.ncbi.nlm.nih.gov/15657894/

26. Mollaoglu AD., *et al*. "Applications of Infrared Spectroscopy and Microscopy in Diagnosis of Obesity. Infrared Spectroscopy-Principles, Advances, and Applications". *Intech Open* (2018). https://cdn.intechopen.com/pdfs/63997.pdf

27. Bortolotto JW., *et al*. "Higher content of trans fatty acids in abdominal visceral fat of morbidly obese individuals undergoing bariatric surgery compared to non-obese subjects". *Obesity Surgery* 15.9 (2005): 1265-1270. https://www.researchgate.net/publication/7506926_Higher_Content_of_Trans_Fatty_Acids_in_Abdominal_Visceral_Fat_of_Morbidly_Obese_Individuals_undergoing_Bariatric_Surgery_compared_to_Non-Obese_Subjects

28. Panchal R., *et al*. "Vibration analysis of healthy skin: toward a non-invasive skin diagnosis methodology". *Journal of Biomedical Optics* 24.1 (2019): 015001. https://pubmed.ncbi.nlm.nih.gov/30666853/

29. Merriman H and Jackson K. "The effects of whole-body vibration training in aging adults: a systematic review". *Journal of Geriatric Physical Therapy* 32 (2009): 134-145. https://pubmed.ncbi.nlm.nih.gov/20128338/

30. Song N., *et al*. "Whole Body Vibration Triggers a Change in the Mutual Shaping State of Intestinal Microbiota and Body's Immunity". *Frontiers in Bioengineering and Biotechnology* 7 (2019): 377. https://pubmed.ncbi.nlm.nih.gov/31850333/

31. Boyle LJ and Nagelkirk PR. "The effects of whole-body vibration and exercise on fibrinolysis in men". *The European Journal of Applied Physiology* 110 (2010): 1057-1061. https://pubmed.ncbi.nlm.nih.gov/20686900/

32. Park SY., *et al*. "Effects of whole-body vibration training on body composition, skeletal muscle strength, and cardiovascular health". *Journal of Exercise Rehabilitation* 11 (2015): 289-295. https://pubmed.ncbi.nlm.nih.gov/26730378/

33. Sa-Caputo D., *et al*. "Benefits of whole-body vibration, as a component of the pulmonary rehabilitation, in patients with chronic obstructive pulmonary disease: a narrative review with a suitable approach". *Evidence-Based Complementary and Alternative Medicine* (2016): 2560710. https://pubmed.ncbi.nlm.nih.gov/27190529/

34. Rife Machines and Cancer (2021). https://www.webmd.com/cancer/cancer-rife-machine-evidence

35. Zimmerman JW., *et al*. "Cancer cell proliferation is inhibited by specific modulation frequencies". *British Journal of Cancer* 106.2 (2012): 307-313. https://cancerres.aacrjournals.org/content/72/8_Supplement/916A

36. Edwards JH and Reilly GC. "Vibration stimuli and the differentiation of musculoskeletal progenitor cells: review of results in vitro and in vivo". *World Journal of Stem Cells* 7.3 (2015): 568. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4404392/

37. Holguin N., *et al*. "Short applications of very low-magnitude vibrations attenuate expansion of the intervertebral disc during extended bed rest". *The Spine Journal* 9.6 (2009): 470-477. https://pubmed.ncbi.nlm.nih.gov/19356986/

38. Vanleene M and Shefelbine SJ. "Therapeutic impact of low amplitude high-frequency whole-body vibrations on the osteogenesis imperfecta mouse bone". *Bone* 53 (2013): 507-514. https://pubmed.ncbi.nlm.nih.gov/23352925/

39. The Uses and Benefits of Music Therapy (2021). https://www.healthline.com/health/sound-healing

40. Quach J and Lee JA. "Do music therapies reduce depressive symptoms and improve QOL in older adults with chronic disease?" *Nursing* 47.6 (2017): 58-63. https://pubmed.ncbi.nlm.nih.gov/28538355/

41. McKinney CH and Honig TJ. "Health outcomes of a series of Bonny Method of Guided Imagery and Music sessions: A systematic review". *Journal of Music Therapy* 54.1 (2017): 1-34. https://pubmed.ncbi.nlm.nih.gov/27941132/

42. Jirakittayakorn N and Wongsawat Y. "A novel insight of effects of a 3-Hz binaural beat on sleep stages during sleep". *Frontiers in Human Neuroscience* 12 (2018): 387. https://www.frontiersin.org/articles/10.3389/fnhum.2018.00387/full

43. Masala D and Merolle V. "The tuning fork and the "Soundtherapy". *Senses and Sciences* 4.2 (2017). https://www.researchgate.net/publication/317503571_The_tuning_fork_and_the_Soundtherapy

44. Searchfield GD., *et al*. "A state-of-art review of digital technologies for the next generation of tinnitus therapeutics". *Frontiers in Digital Health* (2021): 3. https://pubmed.ncbi.nlm.nih.gov/34713191/

45. Vieira DT., *et al*. "A multi-centre study on the long-term benefits of tinnitus management using Neuromonics Tinnitus Treatment". *The International Tinnitus Journal* 16.2 (2011): 111-117. https://pubmed.ncbi.nlm.nih.gov/22249869/

46. High-intensity focused ultrasound (HIFU) (2021). https://www.cancerresearchuk.org/about-cancer/cancer-in-general/treatment/other/high-intensity-focused-ultrasound-hifu

47. Crowe BJ and Rio R. "Implications of technology in music therapy practice and research for music therapy education: A review of literature". *Journal of Music Therapy* 41.4 (2004): 282-320. https://pubmed.ncbi.nlm.nih.gov/15762835/Zimmerman JW., *et al*. "Targeted cancer treatment with radiofrequency electromagnetic fields amplitude-modulated at tumor-specific frequencies". *Chinese Journal of Cancer* 32.11 (2013): 573. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3845545/

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