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Music: A Non-invasive Biological Therapy or Just a Soothing Melody?

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Music has healed the human soul since antiquity. It has been a part of every culture and tradition in form of entertainment, healing prayers, rituals and many other forms.

The medicinal use of music too dates back to ancient times and the historical records of various cultures give numerous accounts of it being used as a mode of treatment for its healing abilities [1,2].

The use of music as a medicine in modern times started with the Second World War when for the first time it was used in the medical settings to hasten the recovery of the wounded soldiers [3,4].

Development of music psychology in modern times as a science can be traced back to the last decade of nineteenth century when laboratories were established to study music psychology especially in Germany and USA [2].

The research into music and healing has delved into the questions of how it heals. Does it heal physiologically by the sound and rhythm structuring the behaviour and influencing the mind and the body or by the vibrations it produces that cause the healing to take place at a sub cellular level? [5].

Research has shown that music enhances the ability of the two hemispheres to work in unison rather than in opposition by activating biochemical and electrical memory material across the corpus callosum [4,6].

Neural activity caused by music listening goes well beyond the auditory cortex to a wide-spread network of frontal, temporal, parietal and subcortical areas related to attention, semantic and music-syntactic processing, memory and motor functions, as well as to the limbic and paralimbic regions related to emotions as elucidated by recent brain imaging studies [7,8].

Music has been found to affect the neuroendocrine system as well, studies have shown that endogenous opioids are released from pituitary on exposure to music thereby relieving pain and modulating mood state and memory [3,6,9].

A recent study conducted to study the effect of music on constitutionally expressed opiates and cytokines found that with regard to mu opiate receptor expression, mononuclear cells showed a statistically significant increase in subjects in the music group compared to the control group. Plasma morphine 6 glucuronide levels increased while plasma morphine levels decreased implying morphine's conversion to morphine 6 glucuronide. IL-6 (Interleukon-6) levels were significantly decreased whereas there were no changes in IL-1b, IL-10 and cortisol values [10].

Phenylethylamine secretion from the limbic system has been shown to be induced by music. Phenylethylamine is a neuroamine also found in chocolate and that is supposed to play a role along with dopamine and norepinephrine in feeling of love and mood elevation [4,9].

There are also reports of decrease in levels of adrenal corticosteroids as well as Corticotrophin-releasing hormone (CRH) and adrenocorticotrophic hormone (ACTH) which are secreted during stress on exposure to music [4,7]. Studies have also shown statistically significant reduction in the serum levels of cortisol and ACTH in patients exposed to music listening thereby explaining the stress reducing function of music as both these hormones are found to increase in stressful conditions [9,11,12]. It has also been noticed in another study that music exposure significantly enhanced Brain Derived Neurotrophic factor (BDNF) levels in the hypothalamus but Nerve Growth Factor (NGF) levels found to be decreased in mice exposed to slow rhythmic music for 21 days. The results which show music's differential effect on neurotrophin production in hypothalamus in mice indicate that modulation of neurotrophins may be the reason behind some of the physiological actions of music [13].

Potential medical applications of music as a healing modality have been indicated and researched in a variety of disorders and settings. A recent randomized controlled trial studied the potential use of patient directed music therapy as an intervention for intensive care patients on mechanical ventilatory support and showed that it can result in reduction of sedative use as compared to usual care and noise cancellation headphones although reduction of anxiety showed mixed results and was not better as compared to noise cancellation headphones [14]. A review of eleven studies done on the role of music therapy in hospice and palliative care concluded that pain, physical comfort, fatigue and energy, anxiety and relaxation, time and duration of treatment, mood, spirituality and quality of life are the variables positively affected by music therapy intervention and stressed for further research [15]. Another study pointed music as a valuable adjuvant therapy for pain reduction and symptom management based on music's ability to decrease pain perception by distraction, change in mood, increased control, use of prior skills, and relaxation [16]. A recent review on the role of music based interventions on motor or non motor symptoms of Parkinson's disease has put forth music as a starting point in rehabilitation of Parkinson's patients indicating the need for more methodologically sound studies for the development of adequate, and increasingly specific and effective music therapy approaches [17].

Another promising application of music therapy is in the realm of mental health disorders. There have been encouraging but mixed results in studies done to improve language, communication, agitation, anxiety, depression, cognition and overall functioning and to reduce caregiver burden through applications of music in dementia patients, indicating further need of research in this area [18-21].

A good amount of research has been done indicating benefits of music therapy in the treatment of depression [22], however more number of music therapy sessions have been suggested for treating the disorder irrespective of underlying cause [23]. A recent pilot study reported music therapy as an effective intervention for reducing anxiety and depression in generalized anxiety disorder patients [24].

In recent decades numerous studies have been done on role of music therapy in schizophrenia and most of them have reported positive results not only in symptoms like auditory hallucinations and other positive and negative symptoms but also in social interaction, quality of life and overall social functioning [25-28]. Music therapy has also been shown to reduce the mean drug dosage requirement in patients with schizophrenia, however the findings need to be replicated [29]. In children affected with Autism spectrum disorders the findings are mixed with some studies reporting benefit while others indicating limited evidence to generalize the findings, thus indicating the need for better and bigger studies to arrive at a conclusion [30,31].

In conclusion the research done so far has been partly successful in exploring and elucidating some of the mysteries associated with music being a healing modality. The understanding is growing and so the potential areas for application of music as a therapy are increasing but a lot still remain to be known. As of now music sounds promising not just only as a soothing melody but as an adjuvant noninvasive cost effective therapeutic modality. The research done so far generates enough confidence to warrant further better designed large scale scientific studies to replicate and validate the findings.

References

1. Horden P (2011) Music as Medicine. The History of Music Therapy since Antiquity. Ashgate, Aldershot.
2. Wigram T, Pedersen IN, Bonde LO (2002) A Comprehensive Guide to Music Therapy: Theory, Clinical Practice, Research and Training. Jessica Kingsley Publishers, London and Philadelphia.
3. Cook J (1986) Music as an intervention in the oncology setting. *Cancer Nursing* 9: 23-28.
4. Chiu P, Kumar A (2003) Music Therapy: Loud Noise or Soothing Notes? *Int Pediatrics* 18: 204-208.
5. Steckler MA (1998) The effects of music on healing *Care Manag J* 17: 42-48.
6. Updike P (1990) Music Therapy Results for ICU Patients. *Dimens Crit Care Nurs* 9: 39-45.
7. Koelsch S, Kasper E (2004) Music, language and meaning: brain signatures of semantic processing. *Nat Neurosci* 7: 302-307.
8. Popescu M, Otsuka A (2004) Dynamics of brain activity in motor and frontal cortical areas during music listening: a magnetoencephalographic study. *Neuroimage* 21: 1622-1638.
9. Kaminski J, Hall W (1996) The Effect of Soothing Music on Neonatal Behavioral States in the Hospital Newborn Nursery. *Neonatal Netw* 15: 45-54.
10. Stefano GB, Zhu W (2004) Music alters constitutively expressed opiate and cytokine processes in listeners. *Med Sci Monit* 10: 18-27.
11. McKinney C, Antoni M (1997) Effects of Guided Imagery and Music (GIM) Therapy on Mood and Cortisol in Healthy Adults. *Health Psychol* 16: 390-400.
12. Bartlett D, Kaufman D, Smeltekop R (1993) The Effects of Music Listening and Perceived Sensory Experiences on the Immune System as Measured by Interleukin-1 and Cortisol. *J Music Ther* 30: 194-209.
13. Angelucci F, Ricci E (2007) Music exposure differentially alters the levels of brain-derived neurotrophic factor and nerve growth factor in the mouse hypothalamus. *Neurosci Lett* 429: 152-155.
14. Chlan LL, Weinert CR (2013) Effects of patient-directed music intervention on anxiety and sedative exposure in critically ill patients receiving mechanical ventilatory support: a randomized clinical trial. *JAMA* 309: 2335-2344.
15. Hilliard RE (2005) Music Therapy in Hospice and Palliative Care: a Review of the Empirical Data. *Evid Based Complement Alternat Med* 2: 173-178.
16. Levreault M, Lucanne (1993) Music therapy in pain and symptom management. *J Palliative Care* 9: 42-48.
17. Raglio A (2015) Music Therapy Interventions in Parkinson's Disease: The State-of-the-Art *Front Neurol* 6: 185.
18. Svansdottir HB, Snaedal J (2006) Music therapy in moderate and severe dementia of Alzheimer's type: a case-control study. *Int Psychogeriatr* 18: 613-622.
19. Brotons M, Koger SM (2003) The Impact of Music Therapy on Language Functioning in Dementia. *J Music Ther* 37: 183-195.
20. Berger G, Bernhardt T (2004) No effects of a combination of caregivers support group and memory training/music therapy in dementia patients from a memory clinic population. *Int. J. Geriatr Psychiatry* 19: 223-231.
21. Vink AC, Birks JS (2004) Music therapy for people with dementia. *Cochrane Database Syst Rev* 3: CD003477.
22. Maratos AS, Gold C (2008) Music therapy for depression. *Cochrane Database Syst Rev* 1: CD004517.
23. Gold C, Solli HP (2009) Dose-response relationship in music therapy for people with serious mental disorders: Systematic review and meta-analysis. *Clin Psychol Rev* 29: 193-207.
24. Gutierrez EOF, Camarena VAT (2015) Music therapy in generalized anxiety disorder. *Arts Psychother* 44: 19-24
25. Hustig HH, Tran DB (1990) The effect of headphone music on persistent auditory hallucinations. *Behav Psychother* 18: 273-81.
26. Gold C (2007) Music therapy improves symptoms in adults hospitalised with schizophrenia. *Evid Based Ment Health* 10: 77.
27. Hayashi N, Tanabe Y (2002) Effects of group musical therapy on inpatients with chronic psychoses: A controlled study. *Psychiatry Clin Neurosci* 56: 187-93.
28. Pavlicevic M, Trevarthen C, Duncan J (1994) Improvisational music therapy and the rehabilitation of persons suffering from chronic schizophrenia. *J Music Ther* 31: 88-104.
29. Jin Z (1994) Effect of an open-door policy combined with a structured activity programme on the residual symptoms of schizophrenic in-patients. A six-month randomised controlled trial in Yanbian, Jilin. *Br J Psychiatry Suppl* 24: 52-7.

30. Whipple J (2004) Music in intervention for children and adolescents with autism: A meta-analysis. *J Music Ther* 41: 90-106
31. Simpson K, Keen D (2011) Music interventions for children with autism: Narrative review of the literature. *J Autism Dev Disord* 41: 1507-14.