Effects of Music Therapy after Autologous Stem Cell Transplantation

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Abstract

The notion that music can influence your thoughts, feelings, and behaviors probably does not come as much of a surprise. If you've ever felt pumped up while listening to your favorite fast-paced rock anthem or been moved to tears by a tender live performance, then you easily understand the power of music to impact moods and even inspire action. Music therapy may be a viable nonpharmacological method of pain management for patients undergoing ASCT.
In fact post-transplantation of stem cell transplantation involves pain and nausea, and its treatment can be physically and psychologically challenged, with many side effects that can be painful, uncomfortable, and sometimes difficult, which takes us to the use of challenging alternative methods to see if there would be helpful positive effects on the treatment.

Keywords: Music therapy, Cellular therapy, Psychology, Stem Cell Transplantation, Molecular Biology, Clinical Pyschology

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Introduction

1.1. What is Music Treatment (Music Therapy)?

Music Therapy is a clinical use of music to achieve individual goals such as reducing stress, improving their mood and expression. This is an evidence-based treatment created in the health community. Music therapy experience may include listening, singing, playing or making music. Music skills or talents are not required to be aware of the company.

Music therapy may help you in psychological, emotional, physical, spiritual, cognitive and social. A short list of benefits includes the following:

- Reduce blood pressure
- Improved memory
- Manage pain
- Reduce muscle tension
- Develop healthy coping skills to manage your thoughts and feelings

Music therapy was first used by the US war sector in 1945. This helped military service members help to improve their military hospitals with career treatment, education, recreation and physical reconstruction. [3]

1.2. Who can do Music Therapy?

- People with mental health disorders
- Drugs consumer
- People with physical illnesses include; Patients with diabetes, chronic pain, cancer, heart disease, recently surgical, migraine, rehab
- Afflicted with Alzheimer's disease
- People with Autism Spectrum Disorder (ASD) and MS [5]

1.3. Autologous stem cell transplantation (ASCT) and music therapy

Autologous stem cell transplantation (ASCT) is a standard treatment for patients with multiple myelomas and lymphoma. However, this treatment can be physically and psychologically challenged, with many side effects that can be painful, uncomfortable, and sometimes difficult. Most patients treated with ASCT have high dose chemotherapy. Most patients also experience pain from oral mucositis and esophagitis or inflammation of the esophagus. Extreme mucositis can cause oral ulcers, dysphagia and epigastric pain, so the use of drug and anti-inflammatory drugs that are associated with many side effects should be replaced by another useful method [1] in the experimentation of music

therapy in the recipient ASCT with myeloma and lymphoma, no significant difference was observed in the amount of pain measured by visual analog scale or in the POM scale. However, patients receiving music therapy significantly use fewer drugs than those who did not receive music therapy. [2]

1.4. Musical physical and psychological effects

The structure of brain physiology shows different reaction to music. Considering the type of music, blood pressure and heart rate, and the positive effects of music on the body are that it relieves muscle tension and motor skills and increases the amount of endorphins and reduces stress hormones. Also, the type of sound helps to calm, for example, one of the benefits of music, increasing learning and memory, and has positive effects on children with learning disabilities. Therapeutic music helps to increase, by studying students; it became clear that they could do mathematical issues when listening to the classical song; music played a significant role on human affection and even children's sleep. [4]

Studies clearly demonstrate that instrumental music without lyrics, Chinese and Western music can evoke changes in emotion and stimulate the brain structures involved with motivation, reward, and emotion. There is evidence that music can provoke changes in individual emotions, hormone arousal, emotional motor expression, and action movements. In particular, music is observed to stimulate increase in blood–oxygen level dependent (BOLD) signals in the amygdala, and the hippocampus. The ventral tegmental area (VTA), involved in dopamine production and release within the reward system, is also significantly activated by both unfamiliar musical pieces and the participant's favorite music. However, favorite versus neutral music listening contrasts showed a greater activation in healthy participants than depressed patients [6]. [Figure 1] illustrates a summary of brain areas stimulated by music.

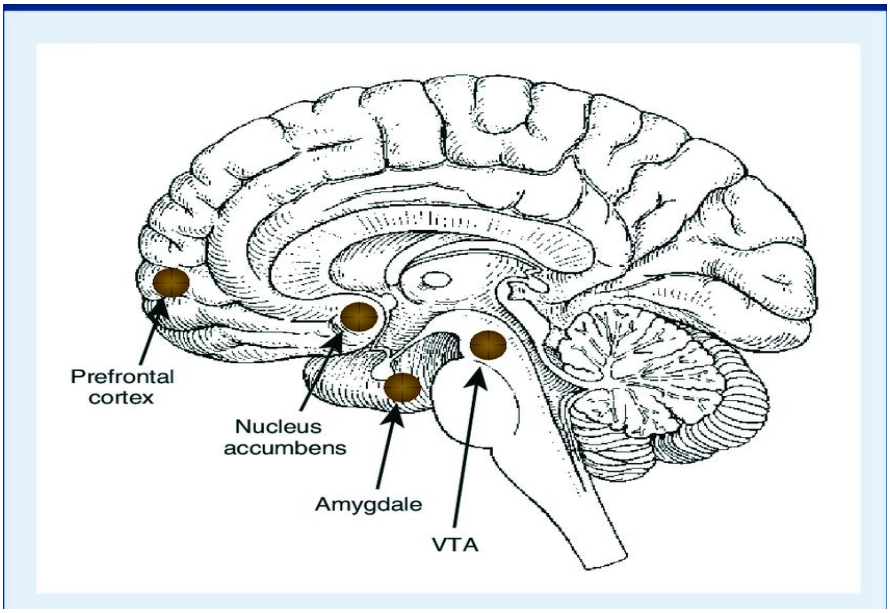


Figure 1

Music stimulates the mesocorticolimbic system. Specifically, it activates the nucleus accumbens, ventral tegmental area, hippocampus, amygdalae, and prefrontal cortex. Adapted from: Desai, R. (2019). Drug addiction. https://drrajivdesaimd.com/wp-content/uploads/2019/06/brain-and-drug-2.jpg accessed on 13 November 2021 [7].

Predictable music leads to positive responses, such as reward, appraisal, and pleasantness, thus it may support the relaxation response, while dissonant and unexpected harmonies with frequent chord changes activate the amygdala and defeat the purpose of emotion regulation. Possible instrumental arrangements include piano, cello, flute and marimba. In addition, the use of instrumental music over nature sounds can effectively induce relaxation. The effects of music on neurobiology are summarized in [Figure 2].

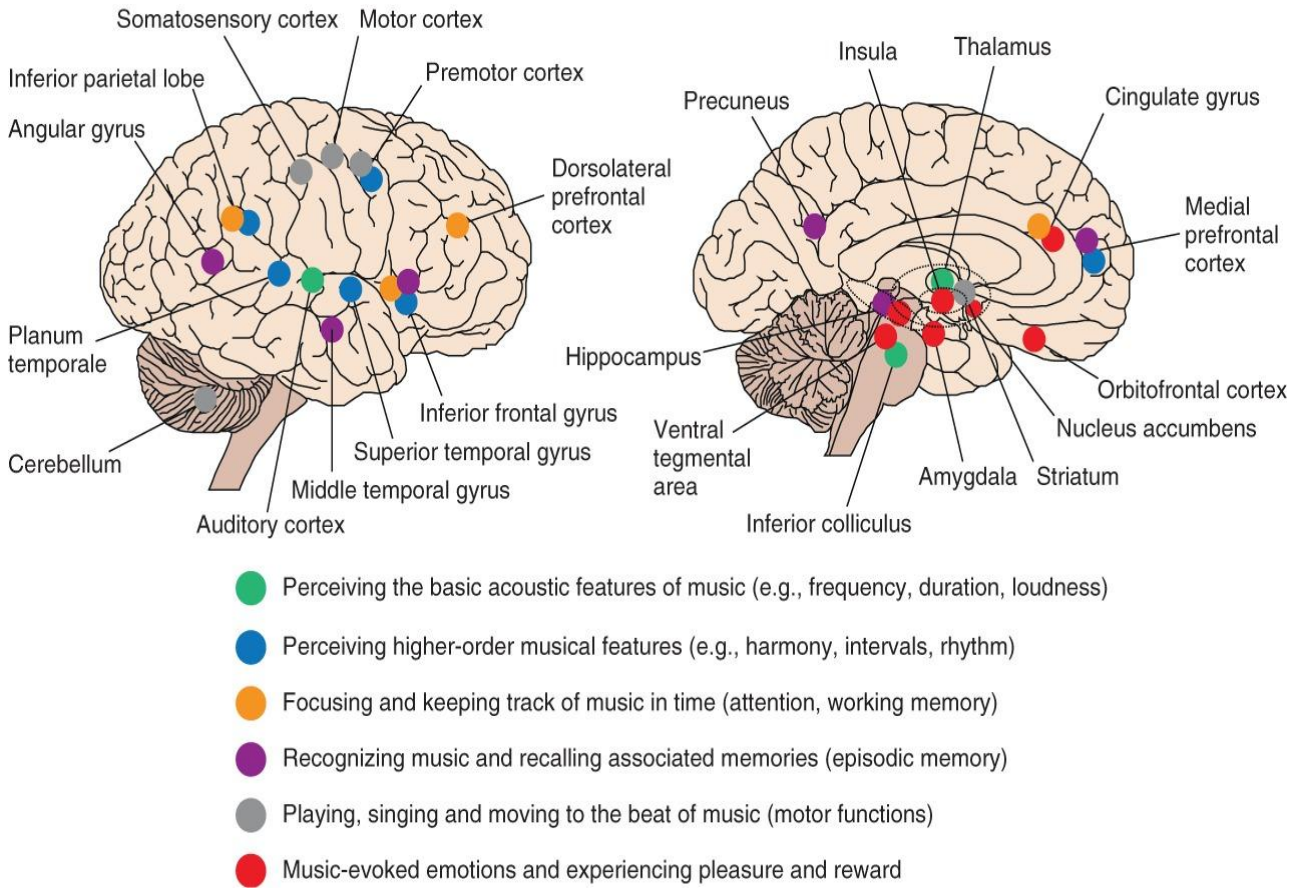


Figure 2

Main effects of music processing in amygdala, hippocampus, and prefrontal cortex. Adapted from: Särkämö, T., Tervaniemi, M. and Huotilainen, M. (2013), Music perception and cognition: development, neural basis, and rehabilitative use of music. WIREs Cogn Sci, 4: 441-451. https://doi.org/10.1002/wcs.1237 [8].

1.5 Important Factors on ASCT Treatment

The factor age is associated with mood disturbance, although the middle age patients may experience the greatest distress compared to the oldest and youngest patient groups in some measures. Also non-Hispanic white patients tend to report less severe symptoms and better results following ASCT compared to patients of ethnic minorities and that African American patients may experience less mood disturbances following ASCT compared to Hispanic participants. Lastly, individuals receiving transplant cells derived from umbilical cord/placenta may experience poorer results and greater symptoms than those whose grafts are derived from bone marrow or peripheral blood. Though this association has not been previously reported, many studies have excluded patients receiving cells derived from umbilical cord/placenta, likely due to their relatively small numbers. [9]

Conclusion

The experiments indicate that the use of music recorded in relieving symptoms as nausea and anxiety has been proven in patients undergoing chemotherapy, but there is a shortage of information about the effects of music therapy in patients with ASCT and need Visual research. There are several possible reasons for why the music therapy did not result in greater improvements in acute mood compared to unstructured music listening. It is possible that patients without clinical mood disorders derive greater benefit from listening to consistently relaxing or energizing music, rather than listening to playlists transitioning from one music type to another. Secondly, with more frequent use, a long-term effect of music listening on patients may have been found. Also Short presentations of as little as four

minutes (the maximum length of most music tracks) of binaural beats may not be sufficient to alter patient's physiological vigilance, thereby making it impossible to fully “transition” from one mood state to another. Finally, the time at which the patient was listening may be another reason for the lack of long-term effect. [9]

Disclosure Statements

Negin SK declares that there is no relevant or material financial interests that relate to the research described in this paper.

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