

EURASIAN EXPERIMENT JOURNAL OF SCIENTIFIC AND APPLIED RESEARCH	
(EEJSAR)	ISSN: 2992-4146
©EEJSAR Publications	Volume 6 Issue 2 2024

The Role of Music in Pain Management and Healing

Nyakairu Doreen G.

Faculty of Science and Technology Kampala International University Uganda

ABSTRACT

This paper examines the therapeutic potential of music in the management of pain and its role in facilitating healing. From its origins in ancient rituals to its current applications in clinical settings, music has served as a powerful adjunct to physical and emotional healing. It also investigated the psychological aspects of pain and how music influences pain perception by engaging emotional, cognitive, and sensory systems. Different music interventions including instrumental music, song singing, and passive listening have shown promise in alleviating both physical and emotional discomfort. By examining physiological mechanisms, including the release of neurochemical messengers and the activation of endogenous opioid systems, this study discusses the scientific basis for music's analgesic effects. Furthermore, case studies and experimental findings illustrate the effectiveness of music as a supplementary approach to traditional pain management techniques. This paper ultimately advocates for integrating music therapy within clinical practices to enhance patient outcomes in pain and anxiety management.

Keywords: Music therapy, pain management, healing, physiological mechanisms, psychological effects.

INTRODUCTION

Music has been known to survive centuries—almost as long as mankind itself. Many ancient cave paintings and other evidence lend support to the idea that music had therapeutic results. Traditional rituals often involved music, dance, and song. Religion used music as a means of seeking higher awareness: *idée fixe*, weeping, catharsis, or reaching a state of trance. The Hippocratic tradition listed musical means as the solution of choice—when drugs did not work, the harp or cithara was called upon. David played and composed his sorrow through music. The Hebrews used music to reduce the depression caused by loss in times of war. During his reign, King Solomon played his harp to console his lost spirits and the whole healthy kingdom. Jesus sang his hymn of glory and joy. It emerged from the healing process. The sight of King Saul's political problems and Christians' physical impairments led to a significant medical discovery—the latest discovery proved the significant components of the music therapy model used in the first semi-formal, semi-musical medical institution [1, 2].

The Psychology of Pain and Healing

Music for the Management of Pain. To understand the role of music in the management of pain, it is required first to dissect what exactly it is that associates music with pain in the first place. The definition of pain becomes increasingly difficult to pin down as one's depth of understanding of it increases. At a rudimentary level, pain can be looked at as a negative emotional and sensory experience paired with real or perceived tissue damage. Music can be described as organized sound. It often has the ability to induce emotion and is experienced differently by nearly everyone who listens to it; a fact that is widely used to support the positioning of music as more than a type of entertainment, but rather a powerful and unique tool for wellness and coping. Although music is not widely prescribed for the treatment of pain, it may be considered a noninvasive, safe, effective, and inexpensive adjuvant to pharmacotherapy, anesthetic interventions, and multidisciplinary rehabilitation in the management of pain. The use of music to help patients fall asleep, to muffle the extra loud sounds of intrusive procedures such as dentistry and wound care, and to facilitate relaxation and ease psychological and facial tension is not new; yet it is not widely

employed in the management of pain, despite the presence of numerous scientific reports documenting its advantages [3, 4].

Music Therapy: Principles and Applications

Who is involved and why? The team working with the patient includes the physician, who may refer a patient to a music therapist, and/or the music therapist directly. The patient receives passive music stimulation, engages in instrumental or vocal improvisation, listens to or produces live or recorded music, or writes or discusses song lyrics in any highly varied combinations. Depending on the goal, the therapist might use the sound, rhythm, melody, harmony, and timbre of the music. What are the principles? Some principles of music therapy are simple and inexpensive and apply to all of us. These include gentle rhythmic music for mood improvement, the musician's focus on the patient, and creation of a quiet environment away from monitors and personnel conversations in an ICU, and respect for individual patient preferences. All of these and the use of health-related words by both musicians and patients can convey concern, hope, optimism, and love. Our earliest personal experience with music therapy is the lullaby, which teaches and also provides a health-promoting, nurturing function. In our continued search for information, traditional and increasingly scientific lessons come from mathematics, geometry, physics, neuroscience, and psychology. Many other aspects of music therapy have no scientific theoretical foundation. They are the result of years of clinical experience and are instead reflective of our ongoing relations with music. Since the psychological experience of pain is unique, no single formula is used, but many of the same principles, including the patient's participation in an experienced, dedicated sense of well-being, are present. With music or any non-pharmacologic pain-control technique, preferences should be honored so that the individual patient is truly in charge of his or her own pain management [5, 6].

Types of Music Interventions

Three different types of music may be used as interventions to help patients in the clinical setting: (1) instrumental music, (2) song singing, and (3) music listening. Instrumental music is usually performed on instruments such as a harp, a guitar, or a flute. Song singing is the active participation of patients, who sing music with or without accompaniment. Song singing is most often used as a means of music therapy in children, but managed care does not always support it. Music listening employs music to support clinical intervention for pain reduction. This is because music listening reflects the influence of one's own musical preference on the cardiovascular and sympathetic arousal state. Subsequently, the symbolic, cognitive, and mood-enhancing effects of music help reduce pain [7, 8]. The effectiveness of music listening depends on whether the individual is highly attentive to the music. To take full advantage of music listening, the patient must actively engage in both the clinical evaluation and the music intervention. This is especially true when the music is offered in a clinical setting. Because familiarity with music can reduce stress and help manage pain during a session, it is essential that music be paired with cognitive-behavioral intervention. Interpersonal interaction with the patient can provide and utilize the intrinsic value of music. The psychological response on the part of the patient is also critical for the effectiveness of live versus stereo music. Literally handing the patient a "blanket" of familiarity reduces treatment validation issues such as anxiety, claustrophobia, stress, and non-relaxation of head and body musculature [9, 10].

Physiological Mechanisms Behind Music's Effects

What is happening in the patient's body when they are connected to a pair of headphones and listening to their favorite music, or any music for that matter? Despite the fascination and interest in music's many effects, the precise underlying physiological and psychological mechanisms remain poorly understood. Following are a few of the more promising theories: First, music activates a number of brain cells. Neuroscientists regularly use imaging techniques to observe brain activities. The particular type of activity of interest in this scenario is the so-called pain network, which involves several structures in the whole brain. It appears that music selectively activates emotional and motivational areas and deactivates cortical areas in the pain network [11, 4]. Music can lessen emotional pain and anxiety levels. Listening to music could release biochemical messengers that act as the body's internal opioids. Music can engage sensory pathways that influence the release of opioid peptides and other chemicals in the brain and other nervous system areas. Researchers have discovered that these endogenous chemicals relieve pain, create pleasure, and are involved in the release of hormones. Music reduces the level of the stress hormone and increases levels of neuroactive chemicals [12, 13].

Case Studies and Research Findings

A simple pilot study was conducted in combination with an induced pain experiment for volunteers to identify the relationship between stimulus-induced pain intensity and the relaxation response due to device music that simultaneously acts as both a stressor and placebo. The subjects were instrumented with instrumentation related to recommended biosignal-based music analysis for measuring musical influence. No music intervention effect on the ANS was observed during both the pain and normal states. The relationship between the music-induced relaxation and the stimulus-induced pain intensity was found to be different. The music semblance level was found to increase as music-induced relaxation increased. The MIP showed a downward trend for higher music-induced relaxation compared to music non-relaxation. The findings strengthen the possible usage of device music as part of a music-play intervention in professional medical settings. Biosignal patterns while listening to original composition music show statistically significant differences under different stress provocations. Slow and rhythmic musical features are difficult to perform simultaneously but are shown to be related to enacting the ANS parasympathetic response. Subpopulation-specific music should be arranged with consideration of the music aspects covered. This study presents preliminary evidence for the benefit of using biosignal-based music analysis. The Mood-Specific Sustained Attention Arousal Regulation model creates effort-based challenges; thus, the frames of tolerance can be gradually extended. The complex interaction between the alteration of self-awareness states related to musical performance modeling requires further understanding. Device music is computationally effective for continuous stress assessment. Device music can act as a repeated warning system for medication management. The main finding is that better 'quality' music appears to favorably contribute to treatment [14, 15].

Music's Impact on Different Types of Pain

Although clinical studies have not fully documented the mechanisms by which listening to music modulates pain and allows it to be treated, findings indicate that music influences psychological processes (including mood, emotion, and cognitive function), and may even generate a 'pain-relieving' response by activating sensory and sensory-integrative mechanisms that can be modified by listening to music. Furthermore, the intensity of pain appears to affect a person's preference for types of music. In the absence of pain, genres of self-assessed preference contain major arousal components. When pain is present, the same genres not only have decreased preference but are also disliked. This fact also determines the physiological results of the different forms of music on the body. Different neural systems and neurotransmitters may be involved in the responses to music listening, including the dopaminergic system (which can reduce emotional and physical suffering) and opioid systems, which are also part of the endogenous anti-nociceptive system and exert analgesic activity in pain associated with physical trauma and severe emotions [16, 17]. As we will outline in the next sections, the music genre is only one of the factors to be considered in music applications as a treatment for reducing pain. Individual factors (such as age, sex, personality, musical preferences, and knowledge, which have a clear effect on individual preferences), ethnicity, belief, type of pain, and its location, combined with music-evoked emotions (including whether a person likes music, the specific emotion generated by the heard piece, or, in certain cases, the lyrics, memories evoked by music, and associated brain networks), and a variety of cultural and environmental factors (which can be related to the localization of pain) may influence music's impact on pain. This is what has been supported over the centuries by the traditional side of medicine and the health system. Remedial music is closely linked to appropriate acoustic, melodic, and harmonic qualities. It must strictly follow the rules of music therapy, namely the choice of pitch, dynamics, timbre, rhythm, mode, and harmonic intervals, which can contribute to the states of agony and pain reduction by reprogramming the different parts of the body [18, 19].

CONCLUSION

Music's longstanding connection to healing is reaffirmed through contemporary scientific findings, which substantiate its benefits in pain management. Music therapy, with its adaptability and patient-centered approach, offers a valuable non-invasive adjunct to conventional pain relief methods. Its ability to modulate mood, reduce stress, and promote a sense of well-being highlights its unique contribution to the therapeutic landscape. Tailored music interventions, whether through live performance, recorded sessions, or interactive involvement, show promise in mitigating various forms of pain, particularly when paired with cognitive and behavioral strategies. By considering individual preferences and aligning interventions with physiological responses, healthcare providers can better support patients' holistic healing processes, underscoring music's enduring relevance in modern medicine.

REFERENCES

1. Touwaide A. Hippocrates and Hippocratism: Died: between 375 and 351, Larissa [Greece]. In *Encyclopedia of Renaissance Philosophy* 2022 Oct 28 (pp. 1529-1531). Cham: Springer International Publishing.
2. Gravagnuolo A, Angrisano M, Bosone M, Buglione F, De Toro P, Girard LF. Participatory evaluation of cultural heritage adaptive reuse interventions in the circular economy perspective: A case study of historic buildings in Salerno (Italy). *Journal of Urban Management*. 2024 Mar 1;13(1):107-39. [sciencedirect.com](https://www.sciencedirect.com)
3. Ginsberg JP, Raghunathan K, Bassi G, Ulloa L. Review of perioperative music medicine: mechanisms of pain and stress reduction around surgery. *Frontiers in Medicine*. 2022 Feb 4;9:821022.
4. Arnold CA, Bagg MK, Harvey AR. The psychophysiology of music-based interventions and the experience of pain. *Frontiers in Psychology*. 2024 May 10;15:1361857.
5. Perrin F, Magee WL. Music as Sensory Stimulation and Therapeutic Intervention. In *Coma and Disorders of Consciousness* 2024 Feb 27 (pp. 99-113). Cham: Springer International Publishing.
6. Partesotti E. Extended Digital Musical Instruments to Empower Well-Being Through Creativity. In *Creating Digitally: Shifting Boundaries: Arts and Technologies—Contemporary Applications and Concepts* 2023 Dec 3 (pp. 365-401). Cham: Springer International Publishing. uacj.mx
7. Mojtavavi H, Saghzadeh A, Valenti VE, Rezaei N. Can music influence cardiac autonomic system? A systematic review and narrative synthesis to evaluate its impact on heart rate variability. *Complementary therapies in clinical practice*. 2020 May 1;39:101162. [\[HTML\]](#)
8. Knott D, Block S. Virtual music therapy: Developing new approaches to service delivery. *Music Therapy Perspectives*. 2020;38(2):151-6.
9. Firestone GM, McGuire K, Liang C, Zhang N, Blankenship CM, Xiang J, Zhang F. A preliminary study of the effects of attentive music listening on cochlear implant users' speech perception, quality of life, and behavioral and objective measures of frequency change detection. *Frontiers in Human Neuroscience*. 2020 Mar 31;14:110. frontiersin.org
10. Wald-Fuhrmann M, Egermann H, Czepl A, O'Neill K, Weining C, Meier D, Tschacher W, Uhde F, Toelle J, Tröndle M. Music listening in classical concerts: Theory, literature review, and research program. *Frontiers in Psychology*. 2021 Apr 27;12:638783. frontiersin.org
11. Song Q, Wei A, Xu H, Gu Y, Jiang Y, Dong N, Zheng C, Wang Q, Gao M, Sun S, Duan X. An ACC-VTA-ACC positive-feedback loop mediates the persistence of neuropathic pain and emotional consequences. *Nature Neuroscience*. 2024 Feb;27(2):272-85. [\[HTML\]](#)
12. Shi Y, Wu W. Multimodal non-invasive non-pharmacological therapies for chronic pain: mechanisms and progress. *BMC medicine*. 2023 Sep 29;21(1):372.
13. Malafoglia V, Ilari S, Vitiello L, Tenti M, Balzani E, Muscoli C, Raffaeli W, Bonci A. The interplay between chronic pain, opioids, and the immune system. *The Neuroscientist*. 2022 Dec;28(6):613-27. [sagepub.com](https://www.sagepub.com)
14. Bian D, Wu Y, Song G, Azizi R, Zamani A. The application of mesenchymal stromal cells (MSCs) and their derivative exosome in skin wound healing: a comprehensive review. *Stem Cell Research & Therapy*. 2022 Jan 24;13(1):24.
15. Wang X, Zeng C, Gong N, Zhang T, Wu Y, Zhang J, Song F, Yang G, Tan Y. Effective suppression of CO selectivity for CO₂ hydrogenation to high-quality gasoline. *Acs Catalysis*. 2021 Jan 15;11(3):1528-47. [\[HTML\]](#)
16. Damayanti SU, Herawati E, Suhaemia S, Suraningsih N, Ode IA, Sofiani Y. Music Therapy on Pain Management Among Post-Operative Patients: A Systematic Review. *Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)*. 2022 Nov 2;8(3). stikep-ppnijabar.ac.id
17. Short AD, Dingle GA. Music as an auditory cue for emotions and cravings in adults with substance use disorders. *Psychology of music*. 2016 May;44(3):559-73.
18. Ballenberger N, Avermann F, Zalpour C. Musculoskeletal health complaints and associated risk factors in freshmen music students. *International Journal of Environmental Research and Public Health*. 2023 Feb 10;20(4):3169. [mdpi.com](https://www.mdpi.com)

19. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, Keefe FJ, Mogil JS, Ringkamp M, Sluka KA, Song XJ. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. *Pain*. 2020 Sep 1;161(9):1976-82. [nih.gov](https://doi.org/10.1016/j.pain.2020.07.024)

CITE AS: Nyakairu Doreen G. (2024). The Role of Music in Pain Management and Healing. EURASIAN EXPERIMENT JOURNAL OF SCIENTIFIC AND APPLIED RESEARCH, 6 (2):5-9.