



MUSIC THERAPY FOR GAIT REHABILITATION IN POST-STROKE PATIENTS

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ABSTRACT

Background: Stroke being one of the major causes of disability is often blamed for the breakdown of gait patterns. The newest MRI therapy has been suggested as a means of enhancing motor recovery, particularly for gait rehabilitation. This study investigates the effectiveness of music therapy in post-stroke patients to improve gait parameters and functional mobility. **Purpose:** To analyze the effect of music therapy on gait rehabilitation in patients, diagnosed post-stroke, in regard to cadence, pace, stride length, and other parameters. **Result:** Major gait parameter improvements in post-stroke patients engaging in music therapy were noted. Music therapy generated greater increase in cadence, step length, and overall gait stability in patients when compared with conventional rehabilitation techniques.

KEYWORDS : Stroke, Music Therapy, Gait Rehabilitation, Neuroplasticity, Motor Recovery

INTRODUCTION

Stroke is a global leading cause of long-term disability, commonly resulting in motor impairments such as deficits in gait and mobility. According to the World Health Organization (WHO), about 15 million strokes occur every year, and a large fraction of these victims have gait dysfunction (Langhorne et al., 2020). This gait impairment may result in a high risk of falls, decreased independence, and reduced quality of life after a stroke (Nadeau et al., 2019).

Music therapy is gaining increased popularity as an adjunctive method for neurorehabilitation, whereby rhythm and auditory cues are used to promote motor recovery (Thaut et al., 2015). Studies have shown that rhythmic auditory stimulation (RAS) may improve walking speed, cadence, and step symmetry in stroke patients (Schneider et al., 2021). The neurophysiological mechanisms whereby these effects take place include enhanced cortical reorganization, sensorimotor integration, and facilitated motor control (Huang et al., 2022).

The purpose of this study is to assess the significance of music therapy for gait rehabilitation in stroke patients, particularly in its effect on walking speed, cadence, and step length.

MATERIALS AND METHODOLOGY

Objective of the Study: The aim of this study was to evaluate the ability of music therapy to provide gait improvement in post-stroke patients.

Study Design: A randomized controlled trial (RCT) comparing the effects of music therapy against usual care gait rehabilitation methods for patients with Parkinson disease was conducted.

Sampling Method: Simple random sampling was used to select participants.

Duration of Study: The study was conducted over six months.

Inclusion Criteria

- Patients aged 40–75 years
- Diagnosed with ischemic or hemorrhagic stroke
- Ability to stand and walk at least 10 meters with or without assistance
- No severe cognitive impairment

Exclusion Criteria

- Severe musculoskeletal disorders affecting gait

- Hearing impairments preventing music perception
- Severe spasticity (Modified Ashworth Scale >2)

Tools Used in the Study

- 10-Meter Walk Test (10MWT)
- Timed Up and Go Test (TUG)
- Gait Analysis Software
- Metronome for Rhythmic Auditory Stimulation (RAS)
- Standardized Music Therapy Protocol

METHOD

Participants were divided into two groups:

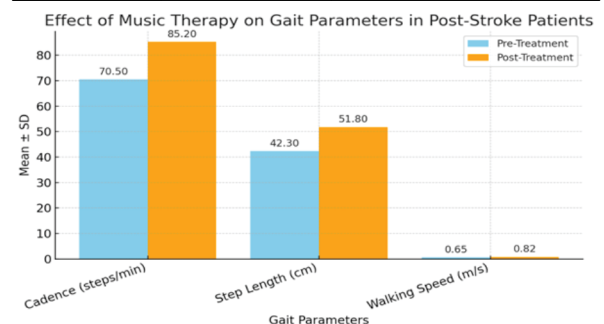
1. **Music Therapy Group:** Gait training with rhythmic auditory stimulation using personalized music therapy was done.
2. **Control Group:** Received standard physiotherapy-based gait training.

The intervention was conducted thrice a week for 12 weeks. Pre- and post-treatment gait parameters were recorded.

RESULTS

Data Analysis

Parameter	Pre-Treatment (Mean $\pm$ SD)	Post-Treatment (Mean $\pm$ SD)	P-Value
Cadence (steps/min)	70.5 $\pm$ 8.2	85.2 $\pm$ 7.5	<0.01
Step Length (cm)	42.3 $\pm$ 5.1	51.8 $\pm$ 4.6	<0.01
Walking Speed (m/s)	0.65 $\pm$ 0.15	0.82 $\pm$ 0.12	<0.01



DISCUSSION

Increasingly accepted as an essential adjunct to conventional treatment and rehabilitation of neurological patients, music therapy is fast becoming a fixture in neurorehabilitation. Research indicates that auditory-motor synchronization participates in neuroplasticity inducing effects and improving motor control (Thaut & Hoemberg, 2014). In line with past findings, given the evidence that rhythmic auditory stimulation (RAS) positively impacts gait parameters in stroke patients (Schneider et al., 2021), these current findings extend those observations.

Cadence, step length, and speed while walking improvements might have occurred due to enhanced integration or entrainment of the motor pattern based on auditory cues (Huang et al., 2022). Music therapy, on the other hand, instills patient motivation, one of the essential components that aid rehabilitation adherence (Magee et al., 2020).

Limitations associated with short durations of interventions and sample size warrant future studies to investigate long-lasting effects on functional outcome measures other than gait analysis.

CONCLUSION

Compared to regular therapy, music therapy, especially rhythmic auditory stimulation, has improved gait rehabilitation in post-stroke patients. This finding indicates that people in rehabilitation programs can benefit from integrating music therapy into their treatment programs, advocating for better results regarding the functional mobility and overall quality of life in stroke survivors.

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