

# Effect of Rhythmic Auditory Stimulation on Hemiplegic Gait Patterns

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**Purpose:** The purpose of our study was to investigate the effect of gait training with rhythmic auditory stimulation (RAS) on both kinematic and temporospatial gait patterns in patients with hemiplegia. **Materials and Methods:** Eighteen hemiplegic patients diagnosed with either cerebral palsy or stroke participated in this study. All participants underwent the 4-week gait training with RAS. The treatment was performed for 30 minutes per each session, three sessions per week. RAS was provided with rhythmic beats using a chord progression on a keyboard. Kinematic and temporospatial data were collected and analyzed using a three-dimensional motion analysis system.

**Results:** Gait training with RAS significantly improved both proximal and distal joint kinematic patterns in hip adduction, knee extension, and ankle plantar extension, enhancing the gait deviation index (GDI) as well as ameliorating temporal asymmetry of the stance and swing phases in patients with hemiplegia. Stroke patients with previous walking experience demonstrated significant kinematic improvement in knee extension in mid-swing and ankle dorsiflexion in terminal stance. Among stroke patients, subacute patients showed a significantly increased GDI score compared with chronic patients. In addition, household ambulators showed a significant effect on reducing anterior tilt of the pelvis with an enhanced GDI score, while community ambulators significantly increased knee extension in mid-swing phase and ankle dorsiflexion in terminal stance phase.

**Conclusion:** Gait training with RAS has beneficial effects on both kinematic and temporospatial patterns in patients with hemiplegia, providing not only clinical implications of locomotor rehabilitation with goal-oriented external feedback using RAS but also differential effects according to ambulatory function.

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**Key Words:** Gait, rhythmic auditory stimulation, hemiplegia