

Effect of Virtual Reality Assisted Gait Training on Functional Mobility in Individuals with Incomplete Spinal Cord Injury: A Randomised Controlled Trial

BJ SHANTHOSH¹, MEENA GUPTA², NEELAM MEHRA³

ABSTRACT

Introduction: Incomplete Spinal Cord Injury (SCI) commonly causes impairments in gait, balance, postural control, and functional mobility, reducing independence and quality of life. Conventional gait rehabilitation remains important in neurorehabilitation; however, limited patient engagement and insufficient task-specific training intensity may affect recovery outcomes. Virtual Reality (VR)-assisted gait training combines repetitive task-oriented practice with real-time multisensory feedback to enhance neuroplasticity and motor relearning.

Aim: To evaluate the effectiveness of VR-assisted gait training on functional mobility in individuals with incomplete SCI.

Materials and Methods: A prospective randomised controlled trial was conducted among 30 participants with incomplete SCI (ASIA Impairment Scale grades C and D), aged 18-60 years, selected from 48 screened individuals. Participants were randomly allocated to either a VR-assisted gait training group (n=15) or a conventional gait training group (n=15). Both groups received supervised interventions for 6 weeks, 4 sessions per week, with

each session lasting 45-60 minutes. Outcome measures included the Functional Ambulation Category (FAC), Berg Balance Scale (BBS), Activities-specific Balance Confidence (ABC) Scale, Two-Minute Walk Test (2MWT), and Barthel Index. Statistical analysis was performed using paired and independent sample t-tests with significance set at $p < 0.05$.

Results: Both groups demonstrated significant post-intervention improvements in all outcome measures ($p < 0.05$). The VR-assisted gait training group showed significantly greater improvements in ABC Scale, 2MWT, and Barthel Index scores compared with the conventional group ($p < 0.05$). No significant between-group differences were observed in FAC or BBS scores.

Conclusion: VR-assisted gait training is an effective neuro-rehabilitation approach for improving functional mobility in individuals with incomplete SCI and may provide additional benefits in walking endurance, balance confidence, and functional independence compared with conventional gait training.

Keywords: Functional mobility, Gait training, Incomplete spinal cord injury, Neurorehabilitation, Virtual reality rehabilitation.

PARTICULARS OF CONTRIBUTORS:

1. MPT Student, Department of Physiotherapy, Amity University, Noida, Uttar Pradesh, India.
2. Associate Professor, Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Noida, Uttar Pradesh, India.
3. Physiotherapist, Walk N Run Advance Neuro and Paediatric Rehabilitation Centre, Noida, Uttar Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Meena Gupta,
Associate Professor, Department of Physiotherapy, Amity Institute of Health Allied Sciences, Amity University, Sector-125, Noida-201313, Uttar Pradesh, India.
Email: mgupta9@amity.edu