Determining Important Dosage Parameters to Improve Gait Speed and Distance Using Mechanical Gait Support for Persons with Stroke: A Meta-Analysis

Diana Veneri* and Janell Tartaglia
University of Hartford, West Hartford, Connecticut

*Address all correspondence to: Diana Veneri, University of Hartford, 200 Bloomfield Avenue Dana 410, West Hartford, CT 06117; veneri@hartford.edu.

ABSTRACT: Introduction: Mechanical gait support for adults with stroke includes body weight–supported treadmill training, Lokomat, and mechanical gait trainers. Studies vary with regard to purpose, training protocols, and outcome measures. The primary purpose of this study was to evaluate this literature; a secondary purpose was to examine dosage parameters and draw any available conclusions. Methods: Inclusion and exclusion criteria were established, and reviewers were trained. Search terms were identified and databases were searched. A deliberate, evaluative process reduced the initial list of 13,094 citations to 27 randomized control trials. Studies were assessed using a data extraction form, the PEDro scale, and the Sackett Level of Evidence. Effect sizes were calculated for the outcome measures of gait speed and distance. Results: Most studies reported significant improvement in outcome measures, regardless of the intervention. Studies comparing conventional physical therapy with mechanical gait support had mixed results, with some claiming conventional physical therapy being more effective and vice versa. Conclusions: Studies with higher training frequencies and coninterventions yielded better outcomes. Study durations and total training time do not appear as influential. Continued focus on dosage parameters is warranted.

KEY WORDS: body weight–supported treadmill training, Lokomat, mechanical gait trainers, stroke, adults

I. INTRODUCTION

Approximately 795,000 Americans experience stroke each year, causing 137,000 deaths. An estimated two-thirds of survivors live with some level of disability.1 Restoration of gait ability is an important goal, as it directly impacts quality of life. Several physical therapy (PT) interventions are used to improve gait including neurodevelopment technique, functional electrical stimulation, orthoses, exercise, treadmill training with and without body weight support (BWS), mechanical gait trainers, biofeedback, proprioceptive neuromuscular facilitation, manual therapy, and BWS during overground training (OGT).4 A projected $73.7 billion was spent in 2010 for stroke-related medical costs and disability.5 According to the US Centers for Medicare and Medical Services, the average length of stay in hospitals for persons with stroke declined from 10.3 days in 1990 to 5.4 days in 2007.6 This decreased length of stay coupled with rising healthcare costs has