ABSTRACT

BACKGROUND AND PURPOSE: The efficacy of task-specific gait training for people with spinal cord injury (SCI) is premised on evidence that the provision of gait-related afferent feedback is key for the recovery of stepping movements. Recent findings have shown that sensory feedback from flexor muscle afferents can facilitate flexor muscle activity during the swing phase of walking. This case report was undertaken to determine the feasibility of using robot-applied forces to resist leg movements during body-weight-supported treadmill training (BWSTT) and to measure its effect on gait and other health-related outcomes.

CASE DESCRIPTION: The patient described in this case report was a 43-year-old man with a T11 incomplete chronic SCI. He underwent 36 sessions of BWSTT using a robotic gait orthosis to provide forces that resist hip and knee flexion.

OUTCOMES: Tolerance to the training program was monitored using the Borg CR10 scale and heart rate and blood pressure changes during each training session. Outcome measures (ie, 10-Meter Walk Test, Six-Minute Walk Test, modified Emory Functional Ambulation Profile [mEFAP], Activities-specific Balance Confidence Scale, and Canadian Occupational Performance Measure) were completed and kinematic parameters of gait, lower-extremity muscle strength (force-generating capacity), lower-limb girth, and tolerance to orthostatic stress were measured before and after the training program.

DISCUSSION: The patient could tolerate the training. Overground walking speed, endurance, and performance on all subtasks of the mEFAP improved and were accompanied by increased lower-limb joint flexion and toe clearance during gait. The patient's ambulatory self-confidence and self-perceived performance in walking also improved. These findings suggest that this new approach to BWSTT is a feasible and potentially effective therapy for improving skilled overground walking performance.

Free full text.