TACSM Abstract

Regaining Strength and Range of Motion in a Young Adult Male with Spastic Quadriplegic Cerebral Palsy Through Locomotor Training

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ABSTRACT

Cerebral palsy (CP) is a condition that is attributed to some degree of brain damage that interferes with the ability of muscles to function normally. There is minimal understanding about the effects of physiotherapy on individuals with CP because there has been a lack of research on CP focused therapeutic designs due to the hands-on, single-subject nature of this research. However, improvements in the ability to independently walk short distances using an assistive walker have been documented as a result of locomotor training in children with CP. **PURPOSE:** To design and trial a harness-assisted treadmill apparatus (HATA) to enhance flexibility, strength and comfortability while engaging in locomotor movement for an individual with Spastic Quadriplegic Cerebral Palsy (SQCP). **METHODS:** The study followed a six-week intervention design with the participant, a 25-year-old male with SQCP, engaging in 2 days a week of treadmill locomotor training with flexibility exercises and 2 days a week with strength and flexibility training. Strength and flexibility exercises were provided by the participants Physical Therapist. Intensity (speed and RPE) and duration (mins/session) increases were determined by the participant. Muscular strength measurements for plantar flexor, dorsiflexor, inverter and evertor muscles along with goniometry measurements for the hip, knee, and ankle joints were assessed at baseline (week 0) and upon completion of the treadmill training program (week 6). **RESULTS:** A significant difference between pre and post measurements were found in both the (R)foot strength ($t(3)$, $p=0.031$), 55% improvement and (L)foot strength ($t(3)$, $p=0.019$), 95% improvement. There was a 20% improvement in the range of motion of the joints on the right side of the body and a 30% increase in range of motion of the joints on the left side of the body. **CONCLUSION:** The combination of locomotor, strength and flexibility training not only increased the participants strength and flexibility, but enhanced their level of ability and comfortability when engaging in locomotion. The cost-efficient HATA design, along with its versatility (to be anchored and moved) could potentially help in creating more cost-efficient therapeutic opportunities for individuals with Cerebral Palsy. It is also important to note the positive social impact this interaction has had on both the participant and researcher's self-efficacy and quality of life.