

Title: Effects of treatment with reciprocal inhibition on gait function in children with cerebral palsy.

Background: Mollii is a full-body garment with 58 integrated electrodes with capability of stimulating 40 muscles in the body. The Mollii suit facilitates reciprocal inhibition of a spastic muscle by stimulation of the antagonist muscle.

Aim: The aim of this preliminary study was to investigate the effect of the Mollii suit on gait function in children with cerebral palsy as a part of a larger study of whole-body function.

Method: 29 children with spastic cerebral palsy GMFCS 1-2 (15 boys; 13 girls; 11.3±3.2 years; 1.41 ± 0.29 m, 37.9 ± 12.7 kg) were included in this six-month prospective study. The Mollii suit was individually adapted to stimulate the antagonists of their affected muscles in both upper- and lower extremities. The children wore the suit one hour daily during activities of daily living for six months. Gait function was evaluated with a 3-D gait analysis before and after the intervention with kinematic, kinetic and temporospatial outcome parameters related to the ankle joint. Either paired samples t-test or Wilcoxon Signed Rank test were used for every parameter obtained from the gait analysis. Effect sizes (Cohen's d or Wilcoxon effect size r) were calculated.

Results: 17 children (10 boys; 7 girls; 10.9±3.2 years, 1.37±0.34 m, 36.5±12.1 kg) completed the intervention. Temporospatial parameters including cadence, stride length, gait velocity and limp index were unchanged after six months of treatment with the Mollii suit. Dorsiflexion in stance phase improved significantly from 11.4±6.5° to 15.7±4.5° (p=0.001, r=0.49). Dorsiflexion in swing phase was significantly improved from -8±10.2° to -4.6±9.5° (p=0.012, r= 0.36).

Conclusion: Improved dorsiflexion in swing phase is a positive change which might improve gait function by decreasing the risk of stumbling. Improved dorsiflexion in stance phase could be a measure of less spasticity in the plantar flexor muscles and hence better shock absorption. This preliminary study shows moderate effect on biomechanical gait parameters, as an effect of this intervention, but further evaluation of the full data set and the reasons for the large drop out should be considered before a concluding assessment of this new intervention method may be obtained.