



Contents lists available at ScienceDirect

Journal of Orthopaedic Science

journal homepage: <http://www.elsevier.com/locate/jos>

Original Article

Effect of selective percutaneous myofascial lengthening and functional physiotherapy on walking in children with cerebral palsy: Three-dimensional gait analysis assessment[☆]

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ARTICLE INFO

Article history:

Received 8 August 2022

Received in revised form

20 September 2022

Accepted 13 March 2023

Available online xxx

Keywords:

Cerebral palsy

Functional physiotherapy

Selective percutaneous myofascial

lengthening

Three-dimensional kinematic gait analysis

ABSTRACT

Background: Walking is the most affected motor function in children with cerebral palsy (CP). Orthopaedic surgery is regularly used to improve ambulation in children with CP. Selective Percutaneous Myofascial Lengthening (SPML) is considered the state-of-the art technique for surgical lengthening of spastic/contracted muscles in CP. The purpose of this study was to investigate the effect of combined SPML surgery and postoperative functional physiotherapy on gait function and characteristics of children with spastic cerebral palsy (CP).

Methods: Twenty-six children with spastic CP, aged 5–7 years, Gross Motor Function Classification System (GMFCS) levels II (n = 6), III (n = 12) and IV (n = 8) participated in a quasi-experimental one-group pretest-posttest study with a 9-month follow-up. The Global Motion Graph Deviation Index (MGDI) (including MGDI sub-indices of each joint in each plane of motion) and spatiotemporal parameters of a three-dimensional kinematic gait analysis were used to assess the gait function and characteristics, respectively.

Results: Nine months following SPML and functional physiotherapy, statistically significant improvements ($p < 0.05$) were noted in the Global MGDI, the MGDI of sagittal plane knee and ankle motion analysis graphs, and the four most common spatiotemporal measures of gait: walking velocity, stride length, step length, and cadence.

Conclusion: Children with spastic CP seem to gain better overall gait function following SPML procedure and functional physiotherapy, by achieving higher walking velocity, longer stride length and step length, and faster cadence. Further studies with control group and longer follow-up three-dimensional gait analyses are warranted to validate these positive results.

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Abbreviations: CP, cerebral palsy; SPML, selective percutaneous myofascial lengthening; MGDI, motion graph deviation index; GMFCS, gross motor function classification system; 3DIGA, three-dimensional instrumented gait analysis; NSDs, normal standard deviations; GMFM, gross motor function measure; R/L, right and left; non-RCT, non-randomised controlled trial; SEMLS, single-event multilevel surgery.

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<https://doi.org/10.1016/j.jos.2023.03.010>

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Please cite this article as: V.C. Skoutelis, A.D. Kanellopoulos, S. Vrettos *et al.*, Effect of selective percutaneous myofascial lengthening and functional physiotherapy on walking in children with cerebral palsy: Three-dimensional gait analysis assessment, Journal of Orthopaedic Science, <https://doi.org/10.1016/j.jos.2023.03.010>