

## An effect of spinal and ankle-foot orthoses on gait of spastic diplegic child: a case report

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### ABSTRACT

**BACKGROUND:** In children with spastic cerebral palsy (CP), among other disorders, the most common motor dysfunction is pathological gait and it is characterized by changes of various parameters. Various therapeutic measures, including orthoses, are used to improve parameters of CP children's gait.

**OBJECTIVE:** The main goal of our study is to investigate individual gait parameters of spastic diplegic CP child under different conditions and to determine the influence and effectiveness of the orthoses used.

**METHODS:** The case of one spastic diplegia child has been analyzed. Both lower extremities and spine were examined under three gait conditions: 1) barefoot, 2) with ankle-foot orthoses (AFOs) and thoracolumbosacral spinal orthosis (TLSO), and 3) with TLSO only. Spatiotemporal gait and kinematic parameters of the pelvic, hip, knee, ankle joints, and spine were obtained using Vicon Plug-in-Gait model. The difference ( $\Delta$ ) between the measured values and normative ranges was calculated to determine the efficiency of the orthoses.

**RESULTS:** Significant differences were found in kinematic and spatiotemporal parameters comparing results between conditions and body sides. The effectiveness of the measures was confirmed by the smallest  $\Delta$  values in the double and single support time with the AFOs/TLSO and in the stride and stance time with TLSO.

**CONCLUSIONS:** Based on the study results the best stability of the spine, ankle plantarflexion, and knee hyperextension is achieved with the AFOs/TLSO; therefore, this measures combination was considered as the most effective. But, not only quantitative parameters should be taken into account, but also the child's willingness and comfort.

**KEYWORDS:** cerebral palsy, spastic diplegia, children's gait, kinematics, ankle-foot orthosis, thoracolumbar spinal orthosis, effectiveness.