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Paper Title: A Single Case Study of the Effect of Bi-Motion Orthotic Ankle Joint on Balance Stability throughout the Gait Cycle in Hemiplegic

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Abstract

Current orthotic treatments in post-stroke are focusing on blocked ankle motion, allowed sagittal motion, stopped plantar flexion, and assisted dorsiflexion, while humans ankle have anatomical movement. Particularly, the subtalar joint which is placed under the ankle joint plays the main role in maintaining balance. This study was done to test the hypothesis of imitation human ankle column movement by allowing both sagittal and coronal movement in a proper range of motion affected on gait balance. Bi-motion orthotic ankle joint was designed on SOLIDWORKS, and fabricated by Al7075. Mechanical verifications were proved before testing with the human subject. Then, one 37-year-old male was recruited. He presented with hemiplegia regarding post-stroke, normal passive range of motion, and mild spasticity. Gait detection was performed in the Gait and Motion laboratory, focused on knee and ankle motion, and center of gravity displacement during gait cycle, then Time up and Go test was done to evaluate stability through performance test. Sinusoidal COG pattern was detected from AFO-BJ with the least Symmetry index between left and right excursion. AFO-BJ also presented the fastest time spent from Time up and Go test but could not achieve MDC in the stroke group.
