

## **The effect of varying the plantarflexion resistance of an ankle-foot orthosis on knee joint kinematics in patients with stroke.**

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#### **Abstract**

Ankle-foot orthoses (AFOs) can improve gait in patients with hemiplegia. However, it is anecdotally known that excessive plantarflexion resistance of an AFO could induce undesired knee flexion at early stance. The aim of this study was to systematically investigate the effect of varying the degrees of plantarflexion resistance of an AFO on knee flexion angles at early stance in five subjects with chronic stroke who demonstrated two clear knee flexion peaks at early stance and swing. Each subject wore an experimental AFO constructed with an oil-damper type ankle joint and was instructed to walk at their self-selected walking speed under five plantarflexion resistance conditions. The sagittal plane ankle and knee joint kinematics and gait speed were analyzed using a 3-D Motion Analysis System. A number of significant differences ( $P < 0.005$ ) in maximum knee flexion angles at early stance amongst different plantarflexion resistance conditions were revealed. The knee flexion angle was 23.80 (3.25) degrees under the free hinge joint condition (condition 1), while that was 26.09 (3.79) degrees under the largest resistance condition (condition 5). It was therefore demonstrated that increasing the plantarflexion resistance of an AFO would induce more knee flexion at early stance phase in patients with stroke.

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