

Comparison of Silicone-Ankle-Foot Orthoses vs Plastic Ankle Foot Orthoses in subjects with Lower Motor Neurone Lesions using the CODA mpx30 gait analysis system.

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Introduction

The objective of this study was to compare the performance of Silicone Ankle Foot Orthoses (SAFOs) with Plastic Ankle Foot Orthoses (AFOs). The SAFO is manufactured completely from silicone and has been claimed to be of benefit to patients with flaccid drop foot. Previous studies have supported the reduction in energy expenditure in patients using these devices although little is understood with regard to how the shortened lever arms and more flexible material of the SAFO compares to that of the AFO.

Method

Six patients were selected with lower motor neurone lesions, previously successfully supplied with AFOs. Each individual was assessed, cast and fitted for a custom made SAFO. The individuals were instructed to wear the SAFO for a minimum period of four weeks. They then returned for gait analysis using the CODA mpx 30 gait analysis system. Analysis of three conditions was then performed, un-braced, with AFO and with SAFO.

Six gait cycles were averaged for the kinematic data, a total of seven kinematic parameters and three kinetic parameters were examined. The significance level was set as $p < 0.01$ (99%)

Results

Significant differences were noted between the un-braced and SAFO condition during maximum plantarflexion in swing and maximum hip flexion in swing. Also significant differences were noted between the AFO vs un-braced condition in ankle angle at

98% of gait cycle, maximum knee O; Barry flexion in stance and maximum plantarflexion in swing. Differences were noted at the $p < 0.01$ in the AFO vs SAFO condition in ankle angle at 98% of gait cycle, maximum hip flexion in swing, maximum knee flexion in stance and maximum plantarflexion in swing.

Maximum knee flexion during swing was found to be significantly less in the SAFO condition than in the AFO condition ($p = 0.015$).

Conclusions

Despite the AFO providing greater control of ankle plantarflexion, the SAFO significantly reduced maximum knee and hip flexion during swing when compared to the AFO condition.

This comparative study has found significant differences in gait characteristics within the patient group selected between two very different designs of AFO.

References:

The use of a silicone boot orthosis on the speed and effort in walking in patients with lower motor neuron lesions. Wright, PA, Morant, S., Watts R., Swain ID., The 10th World Congress of the International Society for Prosthetics & Orthotics, 1st-6th July 2001