

Effect of Orthotics on Postural Stability Over a Six Week Acclimation Period

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Objective: Orthotics have been studied for various conditions and prescribed for many different injury situations. However, little research has been published related to the long term effects of orthotic use. The purpose of this study was to evaluate the effect of orthotics on postural sway over a six-week acclimation period.

Design and setting: Two 1 between factor (group) and 2 within factor (time & orthotic) repeated measures ANOVAs were used to measure differences in postural sway. The group factor had 2 levels (control, effected). The time factor had 4 levels (initial evaluation, 2, 4, and 6 weeks) and the orthotic factor had 2 levels (no-orthotic, orthotic) The .05 probability level was considered significant.

Subjects: Twenty-one subjects volunteered for this study: 11 subjects with a rearfoot varus/valgus of 5 deg or greater measured with a standard goniometer and an observational amount of pronation or supination (age= 24.5 ± 6.5 years, wt= 75.5 ± 4.6 kg, ht= 177.80 ± 37.7 cm) and 10 subjects with a normal rearfoot alignment served as a comparison (age= 22.3 ± 2.2 years, wt= 77.13 ± 3.5 , ht= 169.9 ± 25.9).

Measurements: Subjects were fitted for orthotics in subtalar neutral position and impressions were sent to Foot Management Inc.(Pittsville, MD) for construction. Subjects were fitted for the semi-rigid orthotics, provided an adjustment period, and instructed to wear the orthotics 8-10 hr/day for 6 weeks. Subjects reported for testing on the NeuroCom SMART Balance Master (Neurocom Inc. Clackamas, OR) for four different dates (Initial, 2, 4, and 6 weeks after orthotic intervention). Three-10 sec, unilateral (right/left leg), eyes closed trials were completed for each orthotic condition. On each occasion, subjects were assessed with and without orthotics in a counterbalanced fashion. The same shoes were worn for all testing conditions however, brand of running shoe was not controlled. The average center of gravity sway velocity was measured in deg/sec.

Results: There was a significant main effect for orthotic for both legs. Left leg sway velocity was $1.79 \pm .089$ deg/sec for the orthotic condition and $1.92 \pm .079$ deg/sec for the no-orthotic condition. Right leg sway velocity was $1.74 \pm .074$ deg/sec for the orthotic condition and $1.86 \pm .073$ deg/sec for the no-orthotic condition.

Conclusions: In conclusion, the application of orthotics decreased sway velocity and as such, improved postural stability regardless of group when visual feedback was removed. In addition, there were no significant differences between weeks suggesting that the orthotics had similar effects over time.

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