THE EFFECT OF A DARCO POST-OPERATIVE SHOE ON POSTURE, BALANCE, FOREFOOT PRESSURES AND MUSCLE ACTIVITY

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Abstract

Introduction Shoes with a rocker sole are commonly prescribed following forefoot surgery to redistribute pressure towards the heel. By shifting the body weight backwards, does the rocker shoe adversely effect balance and so disturb normal muscle activity? This study investigated the effects of the Darco post-operative shoe, and the impact of a contralateral shoe raise, on forefoot pressure, posture and balance.

Materials and Methods Fourteen healthy volunteers were investigated (age 36 ±10.8 yrs 11 females) either wearing (1) left Darco shoe and right standard shoe with/without a 5cm temporary shoe raise (Algeos Ltd) (2) two standard shoes. Postural sway was measured while standing with eyes open/closed and on/off a foam block. Dynamic balance was measured while stepping forwards/backwards and walking. Measurements of foot pressure (TECSKAN Inc USA), 3D body motion (Codamotion, UK) and surface electromyography of lower limb muscles were taken. Results were analysed using a repeated measures ANOVA.

Results The rocker shoe was associated with a 84% (±14) decrease in mean peak medial forefoot pressure a posterior shift of 0.9 cm (±1) in the centre of pressure (COP) and a 223% (±127) increase in tibialis anterior activity (P<0.05). Postural sway and whole body motion while stepping did not change. The shoe raise decreased peak loading in the Darco shoe and resulted in a smaller shift in the COP.

Discussion and Conclusions The increase in tibialis anterior activity helps maintain balance by compensating for the posterior shift in the centre of pressure. In people with weakness in the anterior muscles a rocker shoe may adversely affect balance. A contralateral shoe raise reduces the posterior shift in the COP but, due to a decrease in total loading through the whole foot, forefoot offloading is similar. A contralateral shoe raise may therefore aid balance while maintaining forefoot offloading.

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