

Title: Effects of 12 different heel rocker designs, configured with different rocker radii, apex positions and apex angles, on plantar pressure

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Background

Rocker shoes are used to offload high-risk areas of the foot to prevent foot ulcers in diabetic patients with loss of protective sensation. These high-risk areas are the hallux, metatarsal heads (MTH) and heel region [1]. Forefoot rocker shoes can reduce the peak plantar pressure of the hallux and MTH regions, however pressure in the heel is often elevated by this type of footwear, [2,3,4]. No studies have analyzed the effect of different heel rocker designs on the heel plantar pressure.

Method

Shoes with 12 different heel rocker configurations were designed with different heel rocker radii, apex positions and apex angles (Figure 1). The relative peak plantar pressure (RPP) of each configuration in 7 heel masks (Figure 1) was studied in 10 healthy participants.

Results

There is a significant main effect of the rocker radius on the RPP for the different heel masks. A larger radius (LR), compared to a smaller (SR), causes significantly lower RPP in mask 1, 2 and 3 whereas the same radius causes a significant increase in RPP in mask 5 and 7. Moreover, a significant interaction effect between rocker radius and apex position for mask 1 and 3 was found. A LR, compared to a smaller, with a proximal apex position causes a significantly lower RPP in mask 1 and 3. The same is seen in mask 1 with the mid apex position.

Discussion

The radius of the heel rocker affects heel pressure distribution. A steep curve (=SR) resulted in an increased RPP in the proximal heel compared to a LR, probably due to a shortened rear curve rolling time. Patients with high risk areas in the proximal heel region benefit more from a rocker shoe with larger heel radii whereas smaller heel radii are beneficial for patients with high risk areas in the distal heel region.