ABSTRACT

This study investigated the effects of a novel shoe sole attachment, the Evenup device, designed to reduce the functional limb length discrepancy (LLD) created by wearing a CAM walker. Ten healthy subjects participated in this study. In-shoe plantar pressures, activities of daily living and temporal and spatial footfall parameters were collected in three different conditions: (A) New Balance walking shoes, (B) New Balance walking shoes plus Evenup and CAM walker, and (C) New Balance walking shoe and CAM walker. Gait speed and plantar pressures were significantly lower in the boot conditions. Most of the differences between the twoWalker data were not significant. The results do indicate that the CAM walker plus the Evenup device on the contralateral side more resembles the bilateral sneaker condition than the condition with just the CAM walker.

METHODS

Study Procedures:
Ten healthy, asymptomatic subjects (7 female, 3 male) were evaluated; see Table 1. The study was approved by the Temple University Institutional Review Board and a signed consent form was obtained from all subjects prior to enrollment. A biomechanical exam included measuring the resting coronal stance position, footprint to footfall relationship, and LLD while barefoot. Subjects were tested in three conditions, see figure 2. Subjects walked at a comfortable pace on a treadmill for 3 minutes prior to testing in order to acclimate to each condition. Results were compared with an analysis of variance (ANOVA) at a significance level of 0.05.

Temporal and Spatial Footfall Parameters:
GaitMat™ II (E.Q. Inc., Chalfont, PA) is a system for measuring the spatial and temporal parameters of gait. Activities of daily living:
Subjects rated their level of pain during a timed 50 foot walk at comfortable speed, fast pace, while ascending and descending five steps.

LIMITATIONS OF STUDY

-Only ten subjects were studied: a larger sample size would increase the power of our test.
-Only immediate effects were studied.
-Younger population sample (average age of 25 years) does not demonstrate the advantages this device may have in an older population that has decreased muscle mass and more difficulty adapting to changes in limb length. Further studies could record speed during pressure measurement.

CONCLUSIONS

-Evenup device allows for the subjects speed of gait to more closely resemble that of normal speed. 
-Evenup device may be a viable supplement for patients experiencing limb lengthening sequelae.
-Evenup device may contribute to increased compliance in patients when using a CAM walker post-surgically because of the perceived benefits of comfort and stability.
-It is possible that the Evenup device may cause a reverse LLD if the added height is greater than the CAM walker.
-Additional studies are needed.