Foot Pressure Wearing Revised High Heeled Shoes: pilot study

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Abstract. Purpose of this study was to investigate the Changed of Foot Pressure during Standing Wearing Revised High Heeled Shoes. Five healthy young female participated. Foot pressure was obtained under 3 conditions: barefoot, revised high heeled shoes, and traditional high heeled shoes. Foot pressure was measured using the Matscan system among the 3 conditions (barefoot, revised high heeled shoes, traditional high heeled shoes). Centre of pressure and foot pressure ratio were significant difference. Left-Right displacement was only significant difference between barefoot and traditional high heeled shoes. Our findings support the premise that wearing revised high heeled shoes was seems to provide normalized physiologically standing posture more than traditional high heeled shoes.

Keywords: Revised high heeled shoes, Foot pressure, Standing.

1 Introduction

High heeled shoes (HHS) disturb the natural function and position of the ankle joint by forcing the foot into plantar flexion and peak pressure and shear stress shifted from the lateral to the medial forefoot [2]. The resulting data show that the effects of HHS are not localized to the foot, but instead there is a chain reaction of effects that travels up the lower limb at least as far as the spine [3].

Revised HHS were developed to address these shortcomings of traditional HHS. It anticipates to have normalized physiologically standing posture and walking pattern more than traditional HHS by tunnel technology of excellent shock absorption and rearward decline of wedge angel. Therefore, the purpose of this study was to investigate the effects of revised HHS on foot pressure during standing in young female.
2 Methods

Five young women (19 ~ 23 years; 163.5 ± 4.1 cm; 55.1 ± 4.2 kg) in one of three conditions: (1) without footwear, (2) in shoes with 7 cm traditional HHS, and (3) in shoes with 7 cm revised HHS. All measurements were performed during standing on a Matscan system with natural posture. And revised HHS with tunnel technology of excellent shock absorption and rearward decline of wedge angle (Fig. 1).

During the standing for 30 s, centre of pressure (COP) measurements were recorded using the Matscan system. COP was calculated the distance from the heel end and displacement was calculated the distance from the COP. The measured variables were the COP, anterior-posterior (A-P) displacement, right-left (R-L) displacement, left rearfoot pressure, left forefoot pressure, right rearfoot pressure and right forefoot pressure.

The data were analysed using the Statistical Package for the Social Sciences version 21.0 (SPSS Inc., Chicago, IL). Kruskal-Wallis one way ANOVA by ranks measures were performed to assess differences in each of the variables. The level of statistical significance was set at 0.05.

Fig. 1. High heeled shoes design (a) traditional high heeled shoes, and (b) revised high heeled shoes.

3 Results

COP was 5.21 cm on the barefoot, 10.27 cm revised HHS and 12.42 cm on the traditional HHS, there were significant difference between 3 conditions.

L-R displacement was 0.84 cm on barefoot and 1.42 cm on the traditional HHS, there were only significant difference between 2 conditions.

Left rearfoot was 70.43% on the barefoot, 29.48% on revised HHS and 24.02% on the traditional HHS, there were significant difference between 3 conditions. Left forefoot was 29.57% on the barefoot, 70.52% on revised HHS and 75.98% on the traditional HHS, there were significant difference between 3 conditions. Right rearfoot was 69.15% on the barefoot, 28.11% on revised HHS and 22.97% on the traditional HHS, there were significant difference between 3 conditions.
forefoot was 30.85% on the barefoot, 71.89% on revised HHS and 77.03% on the traditional HHS, there were significant difference between 3 conditions.

4 Discussions

In HHS there is an anterior, medial shift of forces within the foot; forefoot forces increase. [4]. Therefore, the purpose of this study was to investigate the effects of revised HHS on foot pressure during standing in young female. The distribution of foot pressure moved from the rearfoot to the forefoot as the heel height increased. Our study showed significant difference between 3 conditions on foot pressure, and revised HHS was lower changed more than Traditional HHS. Actually, revised HHS was seems to provided normalized physiologically standing posture and static balance more than general HHS by tunnel technology of excellent shock absorption and rearward decline of wedge angel. The COP is the point on a body at which the total sum of the pressure acts, causing a force with no moment about that point [5]. Our study showed significant difference between 3 conditions on COP change, and revised HHS was lower changed more than Traditional HHS. This is a result of revised HHS, seem to minimize and restore the displacement of the COP there are temporary responses in appropriate muscle synergies, producing effective motor actions such as anterior tilt of the pelvis, posterior displacement of the trunk and increased lumbar lordosis which tend to rebalance the body in the standing posture [3]. Therefore, our findings support the premise that wearing revised HHS was seems to provided normalized physiologically standing posture more than traditional HHS.

Reference