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## Regional plantar foot pressure distributions on high-heeled shoes-shank curve effects

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Abstract

Reference

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**Abstract** Forefoot pain is common in high-heeled shoe wearers due to the high pressure caused by the center of body mass moving forward and the increased arch height with heel elevation. Sufficient arch support could reduce the high pressure over forefoot. However, too much arch support could lead to abnormal foot alignment and pain over midfoot. Little information is reported on the relationship among plantar arch height, shank curve design and plantar pressure. This study aimed at quantifying the plantar arch height changes at different heel heights and investigating the effect of shank curve on plantar pressure distribution. The plantar arch height increased to  $(7.6 \pm 1.3)$  mm at heel height of 75 mm. The Chinese standard suggests the depth of last should be 8.5 mm for heel height of 75 mm. When a shank curve with higher depth of last (11 mm) was used, the peak pressure over forefoot further decreased in midstance phase, which might ease the forefoot problems, while the peak pressure over midfoot increased but not exceeded the discomfort pressure thresholds. To achieve a more ideal pressure distribution in high-heeled shoes, a higher than expected depth of last would be suggested that would not cause discomfort over midfoot.

**Keywords:** High-heeled shoes Shank curve Plantar arch height Plantar pressure Foot biomechanics

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