

## Effect of Weight-bearing Pattern and Calcaneal Taping on Heel Width and Plantar Pressure in Standing

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**ABSTRACT ;BACKGROUND:** Plantar heel pain is caused by micro-damage due to repetitive high stress on the heel pad in sustained weight-bearing activities. It was hypothesized that increased weight-bearing stress to the heel would lead to increased heel width and planter pressure, and that both could be decreased by calcaneal taping. **PURPOSE:** The purpose of this study was to assess the effects of weight-bearing pattern and calcaneal taping on heel width and plantar pressure in standing. **METHOD:** Fifteen healthy subjects with normal feet participated in this study. Inclusion criteria were as follows: (1) no gait disturbance or foot pain; (2) normal ankle joint range of motion; and (3) no foot deformity. Heel width was measured using a digital caliper, and a Pedoscan was used to measure heel plantar pressure in standing. Participants were instructed to stand in three weight-bearing patterns (anterior, middle, and posterior weight-bearing) before and after calcaneal taping. In a standing posture, plantar pressure was recorded for 5 seconds, and heel width was measured using the digital caliper at the thickest point under the posterior margin of the malleoli. Heel width and plantar pressure were measured three times before and three times after calcaneal taping, with the three weight-bearing patterns applied in random order. A 2 (non-taping vs. taping)  $\times$  3 (anterior, middle, posterior weight-bearing) two-way repeated ANOVA with Bonferroni post hoc correction was used to assess differences in heel width and plantar pressure. **RESULTS:** The results revealed a significant main effect of weight-bearing pattern ( $p = 0.001$ ), but not of calcaneal taping ( $p = 0.058$ ). Greater weight-bearing applied to the heel resulted in increased heel width (anterior = 10.9 mm; middle = 10.8 mm; posterior = 13.1 mm) and planter pressure (anterior = 9.9 N/cm<sup>2</sup>; middle = 10.7 N/cm<sup>2</sup>; posterior = 12.6 N/cm<sup>2</sup>). **CONCLUSION:** In standing, a posterior weight-bearing pattern increases heel width due to side-to-side shifting of the plantar heel pad, and this increases the heel plantar pressure. Therefore, to prevent high stress on the heel pad and plantar heel pain, it is important to refrain from posterior weight-bearing when standing during activities of daily living.



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**Biography ; Dr. Jung** is a Professor in the Department of Physical Therapy at Joongbu University. He received his B.S., M.Sc., and PhD in Physical Therapy from Yonsei University, in 1999, 2003, and 2010 respectively. He is interested in movement impairment and analysis, and the prevention and management of work-related musculoskeletal pain syndrome. He specializes in managing people with foot problems caused by excessive stress during weight-bearing activities. More recently, he has been investigating foot disabilities in patients with diabetes mellitus and peripheral neuropathy, especially injuries (ulcers) and heel problems.

[10th World Congress on Physical Medicine and Rehabilitation, February 12-13, 2020 Auckland, Newzealand.](#)

**Abstract Citation :** [Do-young, Jung, Effect of Weight-bearing Pattern and Calcaneal Taping on Heel Width and Plantar Pressure in Standing ,REHABILITATION MEDICINE 2020 ,February 12-13, 2020 Auckland, Newzealand.](#)