

# Discrepancies in Plantar Pressure Distribution between Affected and Unaffected Sides in Patients with Plantar Fasciitis

Min Gyu Kyung<sup>1</sup>, Dong Yeon Lee<sup>1,2</sup>

<sup>1</sup>Seoul National University Hospital, Seoul, Republic of Korea, <sup>2</sup>Seoul National University College of Medicine, Seoul, Republic of Korea  
Email of Presenting Author: mgkyung@naver.com

**Disclosures:** Min Gyu Kyung (N), Dong Yeon Lee (N)

**INTRODUCTION:** Plantar fasciitis is one of the most common causes of chronic heel pain. Typically, conservative treatment involves stretching exercises and the use of orthosis such as heel cups. To prescribe the appropriate orthosis, a fundamental understanding of plantar pressure distribution is essential. This study aimed to evaluate the plantar pressure distribution of patients with unilateral plantar fasciitis by comparing it with contralateral unaffected sides.

**METHODS:** Prior to performing the study, the study protocol was approved by our Institutional Review Board (IRB). Considering the retrospective nature of the study, the requirement for informed consent was waived by the IRB. We prospectively recruited 20 participants who were diagnosed with unilateral plantar fasciitis and had been complaining of heel pain for at least 6 months. The emed@ pedobarographic system was used to measure the plantar pressure distribution of both feet during gait. We measured the pedobarographic parameters, such as contact area, maximum force, peak pressure, force time integrals, and pressure time integrals. The analysis was performed using a 4-mask configuration (hindfoot, midfoot, forefoot, and toes). In addition, we measured radiographic parameters that could potentially affect plantar pressure in simple foot and ankle radiographs. A Wilcoxon signed-rank statistical test was used to compare the values between the affected and unaffected sides.

**RESULTS SECTION:** Both sides showed no significant difference in radiographic parameters. The affected side showed significantly higher contact area ( $28.9 \pm 10.3$  vs.  $26.3 \pm 8.2$ ,  $p=0.007$ ), maximum force ( $27.3 \pm 12.9$  vs.  $24.4 \pm 11.9$ ,  $p=0.048$ ), and force time integrals ( $0.55 \pm 0.26$  vs.  $0.49 \pm 0.24$ ,  $p=0.044$ ) in the midfoot. However, the unaffected side demonstrated significantly higher maximum force ( $67.5 \pm 11.4$  vs.  $60.1 \pm 8.4$ ,  $p=0.030$ ) and force time integrals ( $1.35 \pm 0.23$  vs.  $1.20 \pm 0.17$ ,  $p=0.038$ ) in the hindfoot (Fig. 1).

**DISCUSSION:** The increase in the contact area and maximum force in the midfoot on the side with plantar fasciitis can be interpreted as a result of weight transfer from the hindfoot to the midfoot due to heel pain. It can be suggested that Achilles tendon and plantar fascia stretching exercise is necessary to prevent weight transfer from the original hindfoot to the midfoot or forefoot. However, the limitations of our study include the relatively small number of participants and, although we compared the pedobarographic data of affected sides to the unaffected sides, we did not have a control group of healthy individuals.

**SIGNIFICANCE/CLINICAL RELEVANCE:** The findings of this study could be helpful in prescribing appropriate orthosis for patients with plantar fasciitis effectively.

Fig. 1. Plantar pressure distribution of the affected and unaffected sides.

