

# Dynamic Pressure Distribution in Patients with Painful Flat Foot : A study Using the Footscan System

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## Introduction

A common clinical presentation of flat foot patients in the outpatient department is loss of dynamic balance during gait. The foot scan system provides objective data on each individual's dynamic balance by dividing the sole into several zones and detecting the pressure distribution during gait. This study provides an objective comparison of the pressure distribution as a dynamic balance value between normal individuals and flat foot patients using the foot scan system.

## Methods

The dynamic pressure distribution of healthy individuals and flat foot patients was measured using the foot scan system. Flat foot patients are defined as patients with calcaneal inclination angles 18 degrees or less on a lateral view x-ray. The Footscan® system with, more than 8,000 pressure sensors on a 1-meter-long plate, calculates and displays the pressure distribution when a patient walks on it, by dividing the sole into three zones; the forefoot, midfoot, and hindfoot. (Figure 1) We collected 90 feet from 45 normal individuals and 36 feet 18 flat foot patients. Here, we compare the average pressure distribution in both feet from the two groups.

## Results

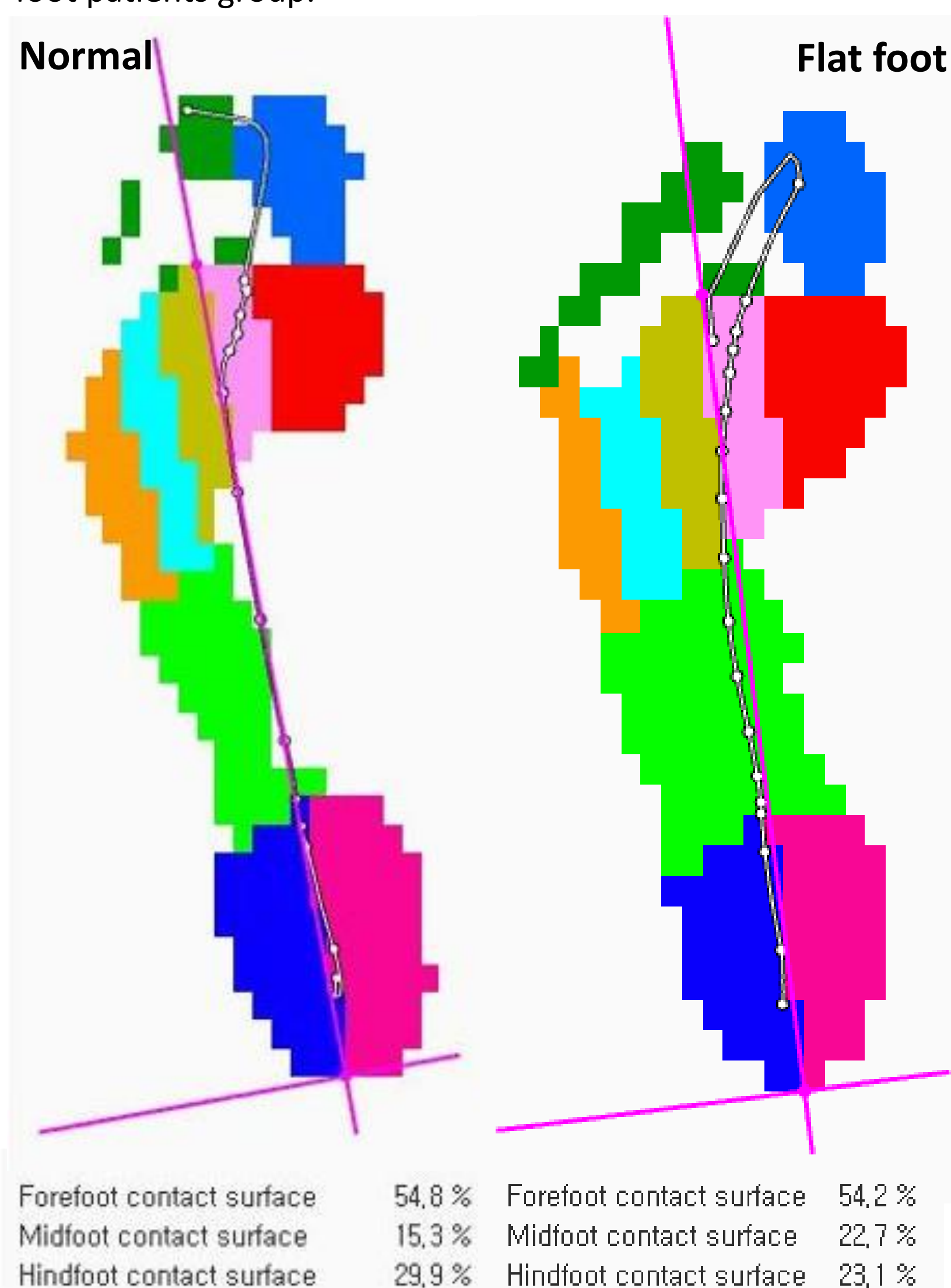
The differences in the characteristics - age, gender, weight, and foot size - of the two groups were not significant. (Table 1) The mean values of the pressure distribution of forefoot, midfoot, and hindfoot were 58.32%, 14.80%, and 26.90%, respectively in the normal individual group, and 54.16%, 21.68%, and 24.16%, respectively in the flat foot patients group. The midfoot pressure distribution mean value of the flat foot patients group was significantly higher than that of the normal individual group, while the forefoot pressure distribution mean value was significantly lower. Significant differences were found between all zones of the foot in both groups. (Table 2)

## Conclusion

The dynamic balance values from the foot scan system showed a significant difference between the group of normal individuals and flat foot patients. Although more data is needed, this study provides a numerical confirmation of dynamic balance abnormalities and presents a probability for clinical use of the foot scan system in flat foot patients.

	Normal group (n=45)	Flat foot group (n=18)
Age	30.4	35.4
Male/Female	18/27	8/10
Weight (kg)	61.9	68.3
Foot size (mm)	248.3	252.8

**Table 1.** Characteristics of normal individual group and flat foot patients group.



**Figure 1.** Pressure distribution of left sole as a dynamic balance values in The Footscan® system.

	Forefoot	Midfoot	Hindfoot
Normal group (n=90)	58.32	14.80	26.90
Flat foot group (n=36)	54.16	21.68	24.16
P value	0.000	0.000	0.000

**Table 2.** It was found that the flat foot patients group had significantly higher midfoot pressure distribution, and lower forefoot and hindfoot pressure distribution than the normal group.