

## Analysis of Gait and Footprint in Patients with Hallux Valgus

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**Category:** Midfoot/Forefoot

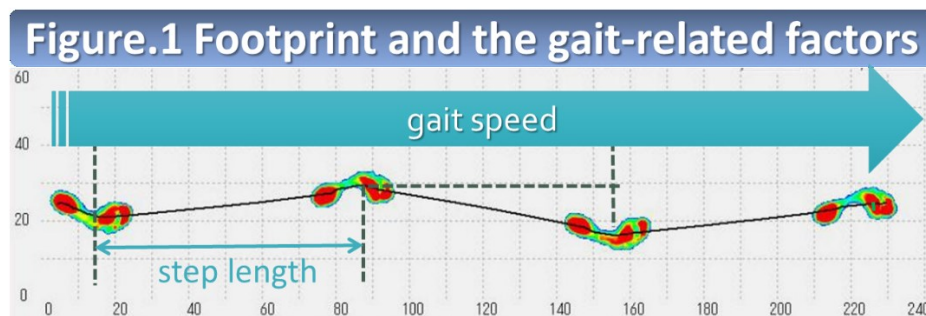
**Keywords:** Hallux valgus, footprint, gait speed, the number of steps

**Introduction/Purpose:** Hallux valgus (HV) is one of the most common forefoot problems. HV is defined as a hallux valgus angle of more than twenty degrees. HV can lead to alterations of the plantar pressure pattern and clinical gait. This study examined the relationship between gait alterations and HV deformities.

**Methods:** We examined 500 residents (161 men and 339 women; >50 years of age) of Miyagawa village in Mie, Japan in 2009, 2011 and 2013. They performed a 6-meter walk test at normal and maximum speed. We examined gait speed, the number of steps, and footprint between patients with normal (HV angle <20; n=350) and HV (HV angle >20; n=150), and between normal-to-mild (HV angle <30; n=436) and moderate-to-severe (HV angle >30; n=64). Their plantar pressure patterns were measured using a gait analyzer (Walk Way MW 1000; Anima, Tokyo, Japan, Figure.1). Statistical analyses were performed using the chi-square test according to sex and use of the hallux ball; the t-test according to age, height, and weight; and logistic regression analysis adjusted for age, sex, and height according to gait speed and the number of steps. P value less than 0.05 was considered significant.

**Results:** With regard to the plantar pressure pattern, the percentage of subjects in the HV group who left a footprint of the hallux ball was significantly lower than that in the normal group. The percentage of subjects in the moderate-to-severe group who left a footprint of the hallux ball was even lower. Analysis of the footprint revealed that the HV group used the hallux ball significantly less during toe-off than the normal group. At both normal and maximum speed, the number of steps and gait speed did not differ significantly between the normal and HV groups. However, when we compared normal-to-mild and moderate-to-severe groups, the number of steps in the moderate-to-severe group was significantly greater than in the normal-to-mild group at maximum walking speed.

**Conclusion:** Analysis of the footprint revealed that the percentage of subjects in the HV group who was able to use the hallux ball during toe-off was significantly less than that in the normal group. The percentage of subjects in the moderate-to-severe group who could use the hallux ball in toe-off was even lower. HV can cause footprint alterations. Moderate-to-severe HV can cause not only footprint alterations but also gait alterations, especially when walking at maximum speed.



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