Foot position affects weight-bearing ankle dorsiflexion measures in individuals with plantar fasciitis.

McClinton, Shane¹; Tilton, Jeremy²; Wettstein, Matt²; Chumanov, Elizabeth³; Vardaxis, Vassilios¹,²; Heiderscheit, Bryan³
¹Physical Therapy, Des Moines University, Des Moines, IA. ²College of Podiatric Medicine and Surgery, Des Moines University, Des Moines, IA. ³Orthopedics and Rehabilitation, University of Wisconsin-Madison, Madison, WI.

Background and Aims:
Plantar fasciitis is a painful condition of the bottom of the foot that is commonly provoked with weight bearing (WB) and associated with restricted ankle dorsiflexion (DF). In WB, foot structure and bi-articular tissues can influence ankle DF. The purpose of this study was to assess WB DF characteristics of individuals with and without plantar fasciitis and the influence of variable foot and knee positions.

Methods:
Fifteen healthy and 15 individuals with plantar fasciitis participated. WB ankle DF was measured relative to a slant board (inclined 25° from horizontal) using 3-dimensional (3-D) motion analysis (Figure 1) in six lower extremity postures with varied knee (flexed and extended) and foot positions (self-selected; 0° toe out; and 0° toe out with supported subtalar neutral (SSN)). Statistical analysis was conducted using a 3-factor mixed ANOVA design (p≤0.05) and Tukeys HSD test.

Results:
WB DF angles were similar between individuals with and without plantar fasciitis. WB DF measures conducted in knee flexion versus knee extension did not have a significant influence on DF angle (Figure 2). The involved limb of individuals with plantar fasciitis demonstrated reduced DF angles with the foot in 0° toe out with SSN compared to the self-selected (p<0.01) and 0° toe out (p<0.01) positions (Figure 3). The 0° toe out with SSN position in the plantar fasciitis group resulted in DF angles consistent with that of the control group. DF angles were similar between foot positions for the control group.

Conclusions:
While no significant differences in WB DF angles were observed between individuals with plantar fasciitis and controls, individuals with plantar fasciitis demonstrated inflated DF angles without a SSN position. During WB DF measurement, consideration of a SSN position and toe orientation is important to improve measurement accuracy specific to uncompensated ankle DF. Clinically, WB DF can be measured using an inclinometer (Figure 2) shown to be strongly correlated to 3-D measures and with reliability greater than traditional DF measures.¹

References: