

DORSAL MOBILITY AND FIRST RAY STIFFNESS IN PATIENTS WITH DIABETES MELLITUS. Glasoe WM, Allen MK, Ludewig PM, Saltzman CL; Northern Illinois University, DeKalb, IL and Physiotherapy Associates. R90WMG1@wpo.cso.niu.edu. Funded in part by grant #NIH R01 NR07721-03. Authors of this work have no potential for material gain.

PURPOSE: Limited joint mobility in patients with diabetes has been identified as a risk factor in development of plantar ulcers. This study examines dorsal mobility and passive first ray stiffness in patients having diabetes, and investigates the relationship between first ray mobility and ankle joint dorsiflexion. **SUBJECTS:** Forty individuals were studied; 20 had diabetes mellitus (mean duration of 16 ± 10 years) and 20 were matched controls. **METHODS:** Dorsal first ray mobility was measured using a mechanical device. Force-vs-dorsal mobility displacement values were collected at 10 N increments to a load limit of 55 N. Ankle joint dorsiflexion motion was measured using a goniometer. The presence of a “prayer sign” was assessed in each patient. **ANALYSES:** Stiffness, or the slope of the force/displacement graphs was calculated as the 1st derivative of the force/displacement curves for each subject. Descriptive statistics (mean, standard deviation) were calculated for the control group, the patient group with diabetes, and a subgroup of those with diabetes also having a positive prayer sign. Dependent variables included first ray mobility, first ray stiffness, and ankle joint dorsiflexion. Group comparisons between the controls and patients having diabetes were of primary interest and were completed with independent sample t-tests. **RESULTS:** The group with diabetes had less dorsal first ray mobility (3.4 mm) as compared to controls (4.3 mm). Stiffness was significantly higher ($p < 0.05$) in the group of patients with diabetes as compared to controls at each level of displacement assessed, with even higher stiffness values found in the subgroup having diabetes and a positive prayer sign. Between group differences ($p < 0.05$) were found for ankle joint motion. Dorsiflexion averaged 4° in patients grouped with diabetes and 9° in the control group. Measures of ankle dorsiflexion were not associated with first ray mobility in either group. **CONCLUSIONS:** This study shows patients with diabetes mellitus have greater stiffness with decreased first ray mobility, and less ankle dorsiflexion as compared to controls; faulty mechanics that predispose occurrence of foot ulcers. The presence of a positive prayer sign correlates with foot first ray hypomobility and supranormal stiffness.