

**Does plantar tissue thickness vary with age and gender in people with diabetes?**

S.G.Mengoulis; A.P.Garrow; F.Abouaesha; C.H.M.vanSchie; A.J.M.Boulton

University of Manchester, Manchester, UK

251 Hellenic Air Force Hospital, Athens, Greece

Previous studies have suggested that plantar tissue thickness is reduced in people with diabetes and that this could be important in the pathogenesis of foot ulcers. The influence that age and other demographic factors have in this process, however, is unknown. In this study we measured the plantar tissue thickness in 151 patients with diabetes [(Type 2: 82.2%; mean age 60.8 years (sd 9.8); BMI 29.2 (sd 4.7)] who were at increased risk of, but had no previous history of foot ulceration, [VPT 35.5 (sd 9.8); median Neuropathy Disability Score of 7; Range (2-10)] and 63 age and gender-matched normal controls. Weight bearing measurements between the plantar surface of each of the metatarsal heads and the skin surface were taken using the Planscan, a standardized platform with a 5 MHz ultrasound probe embedded into the base unit. In the control subjects, the average plantar tissue thickness below each of the metatarsal phalangeal (MTP) joints was MTP1: 11.6 mm (sd 2.0), MTP2: 9.4 mm (sd 1.5), MTP3: 8.4 mm (sd 1.4), MPT4: 7.9 mm (sd 1.3) MTP5: 6.8 mm (sd 1.2). In diabetes, the protective padding below each of the metatarsal heads was significantly reduced by ~1.5 mm ( $p < 0.001$ ) in men; and by ~1 mm ( $p < 0.01$ ) in women, but only at MTP5. A significant reduction was observed at the lesser metatarsal heads between men aged <45 years and men >65 years; MTP3 ( $p = 0.02$ ); MTP4 ( $p = 0.02$ ) & MTP5 ( $p = 0.007$ ) but in women, soft tissue thickness did not vary with age in either the disease or the control groups ( $p > 0.20$ ). A positive association was seen between plantar tissue thickness and BMI, but again, only in men. Neuropathy, minor trauma and foot deformities are recognized as important risk factors in the development of foot ulcers in diabetes. Our findings suggest there is a reduction in protective plantar padding in men with diabetes, a process that may accelerate with age. This might contribute to the preponderance of foot ulcers seen in men.