

Achilles Tendon Volume in Type 2 Diabetic Patients with or without Peripheral Neuropathy: MRI Study

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Background and aims: There is evidence that diabetes may increase Achilles tendon (AT) thickness, possibly predisposing to foot ulceration. The aim of the present study was to evaluate AT in type 2 diabetic patients with vs. without peripheral neuropathy using Magnetic Resonance Imaging (MRI). **Patients and methods:** This study included 19 patients (group A, mean age 63.9±7.4 years) with peripheral neuropathy and 19 patients (group B, mean age 63.6±6.1 years) without peripheral neuropathy, as well as 16 healthy age-matched controls (group C, mean age 61.6±8.4 years). Diagnosis of neuropathy was based on clinical examination using the Diabetic Neuropathy Index (DNI). Neuropathy was diagnosed in patients with DNI score higher than 2. Furthermore, moderate neuropathy was defined as DNI score 2.5-4.5 and severe neuropathy as DNI score 5-8. The maximum AT thickness and AT volume were measured in sagittal T₁-weighted MRI images. AT volume was calculated by the sum of the tendon surface area of all contiguous sections multiplied by the slice thickness. **Results:** Diabetic patients had significantly ($p < 0.001$) greater AT volume than controls (9742.0±2034.9 mm³ vs. 7323.8±1918.2 mm³). By contrast, AT thickness did not differ between diabetic patients and controls (7.2±1.0 mm vs. 6.7±1.5 mm, $p = 0.194$). The difference in AT volume was observed both in men ($p = 0.030$) and in women ($p < 0.001$). AT volume was significantly greater in group A vs. C (9503.9±1764.8 mm³ vs. 7323.8±1918.2 mm³, $p = 0.003$) and in group B vs. C (9980.2±2297.3 mm³ vs. 7323.8±1918.2 mm³, $p < 0.001$), but there was no difference between groups A and B ($p = 0.469$). Finally, in group A increased AT volume was significantly ($p = 0.041$) associated with clinical severity of neuropathy. **Conclusion:** Type 2 diabetic patients have increased AT volume as compared to controls. There is no difference in AT volume between patients with and without neuropathy. However, in neuropathic patients increased AT volume is associated with severity of neuropathy.