

Tendinopathy Changes Ultrasound Transmission in the Patellar Tendon

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BACKGROUND: Transmission-mode ultrasonography was used to investigate patellar tendon loading during squatting in adults with and without tendinopathy. It was hypothesized that axial ultrasonic velocity, a surrogate measure of tendon modulus, would be lower in tendinopathy.

METHODS: Ultrasound velocity was measured in both patellar tendons of adults with unilateral patellar tendinopathy (n=9) and in healthy controls (n=16) during a bilateral squat manoeuvre.

Sagittal knee movement was measured simultaneously with an electrogoniometer. Statistical comparisons between healthy and injured tendons were made using 2-way mixed-design ANOVAs. The study received institutional human ethical committee approval.

RESULTS: The pattern of ultrasound transmission in the patellar tendon was highly reproducible during squatting, with mean within-subject coefficients of variation in peak velocity ranging between 3% and 5%. Axial velocity in both symptomatic and asymptomatic tendons in patellar tendinopathy was approximately 15% higher than in healthy tendons at the commencement ($F_{1,23}=5.2$, $P<.05$) and completion ($F_{1,23}=4.5$, $P<.05$) of the squat. While peak velocity was $\approx 5\%$ higher during both flexion ($F_{1,23}=5.4$, $P<.05$) and extension ($F_{1,23}=5.3$, $P<.05$) phases of the squat, there was no significant between-group difference at the mid-point of the movement. There were no significant differences in the rate and magnitude of knee movement between healthy and symptomatic groups.

CONCLUSIONS: Patellar tendinopathy was associated with a bilateral increase in ultrasound velocity in the patellar tendon at rest and during knee flexion but not at the midpoint of the squat. Although further research is required, these findings suggest enhanced baseline muscle activity in patellar tendinopathy and highlight fresh avenues for its clinical management.