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Original Research

Tibiofemoral Joint Positioning for the Valgus Stress Test

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Abstract

Context: Recommendations on the positioning of the tibiofemoral joint during a valgus stress test to optimize isolation of the medial collateral ligament (MCL) from other medial joint structures vary in the literature. If a specific amount of flexion could be identified as optimally isolating the MCL, teaching and using the technique would be more consistent in clinical application.

Objective: To determine the angle of tibiofemoral joint flexion between 0° and 20° that causes a difference in the slope of the force-strain line when measuring the resistance to a valgus force applied to the joint.

Design: Cross-sectional study.

Setting: University research laboratory.

Patients or Other Participants: Twelve healthy volunteers (6 men, 6 women: age = 26.4 ± 5.6 years, height = 170.9 ± 8.4 cm, mass = 75.01 ± 14.6 kg).

Intervention(s): Using an arthrometer, we applied a valgus force, over a range of 60 N, to the tibiofemoral joint in 0°, 5°, 10°, 15°, and 20° of flexion.

Main Outcome Measure(s): Force-strain measurements were obtained for 5 positions of tibiofemoral joint flexion.

Results: As knee flexion angle increased, slope values decreased ($F_{4,44}$ = 17.6, P < .001). The slope at full extension was not different from that at 5° of flexion, but it was different from the slopes at angles greater than 10° of flexion. Similarly, the slope at 5° of flexion was not different from that at 10° of flexion, but it was different from the slopes at 15° and 20° of flexion. Further, the slope at 10° of flexion was not different from that at 15° or 20° of flexion. Finally, the slope at 15° of flexion was not different from that at 20° of flexion.

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Conclusions: When performing the manual valgus stress test, the clinician should fully extend the tibiofemoral joint or flex it to 5° to assess all resisting medial tibiofemoral joint structures and again at 15° to 20° of joint flexion to further assess the MCL.

Keywords: knee, collateral ligaments, joint angle, valgus force

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