Role of the medial structures in the intact and anterior cruciate ligament-deficient knee. Limits of motion in the human knee


Abstract: We measured motion limits in human cadaveric knees before and after sectioning the anterior cruciate ligament and the medial structures. Sectioning the medial collateral ligament in an anterior cruciate ligament-deficient knee increased the anterior translation limit at 90 degrees of flexion but not at 30 degrees of flexion. The tibia displaced straight anteriorly without exhibiting the coupled internal rotation that occurred in intact and anterior cruciate ligament-deficient knees. A lateral 15 N-m abduction moment produced a coupled external rotation in the medial collateral ligament-deficient knee. This was in marked contrast to intact, anterior cruciate ligament-deficient, or combined medial collateral ligament and anterior cruciate ligament-deficient knees, in which an abduction moment produced a coupled internal rotation. Sectioning only the medial collateral ligament caused a small but significant increase in the abduction rotation limit, whereas larger increases in the abduction rotation limit occurred when the posterior oblique ligament and posterior medial capsule were cut in addition to the medial collateral ligament. Cutting the medial collateral ligament increased the external rotation limit. The increase was independent of whether the anterior cruciate ligament was intact or sectioned. Subsequent cutting of the posterior oblique ligament and posterior medial capsule further increased the external rotation limit.