THE EFFECT OF TOTAL KNEE REPLACEMENT ON THE EXTENSOR RETINACULUM

KM Ghosh; AM Marican; F Iranpour; D Boohan; and AA Amis
Division of Biomechanics. Department of Mechanical Engineering, Imperial College, London

Objective: The aim of the study was to test the hypothesis that insertion of a total knee replacement (TKR) may affect range of motion as a consequence of excessive stretching of the retinaculum.

Methods: 8 fresh frozen cadaver knees were placed on a customised testing rig. The femur was rigidly fixed allowing the tibia to move freely through an arc of flexion. The quadriceps were loaded to 175N in their physiologic lines of action using a cable, pulley and weight system. The iliotibial tract was loaded with 30N. Tibiofemoral flexion and extension was measured using an optical tracking system. Monofilament sutures were passed along the fibres of the medial patello-femoral ligament (MPFL) and the deep transverse band in the lateral retinaculum with the anterior ends attached to the patella. The posterior suture ends were attached to 'Linear Variable Displacement Transducers'. Thus small changes in ligament length were recorded by the transducers. Ligament length changes were recorded every 10 from 0o to 90o during an extension cycle. A transpatellar approach was used when performing the TKR to preserve the medial and lateral retinacula. Testing was conducted on an intact knee and following insertion of osseous retaining TKR (Genesis II). Statistical analysis was performed using a two way ANOVA test.

Results: The MPFL had a mean behaviour close to isometric, while the lateral retinaculum slackened by a mean of 6mm as the knee extended from 0 degrees (Fig 1). After knee replacement there was no statistically significant difference seen in ligament length change patterns in the MPFL, however the lateral retinaculum showed significant slackening from 10 to 90o.

Conclusion: The data does not support the hypothesis that insertion of a TKR causes abnormal stretching of the retinaculae. This result relates specifically to the TKR design tested.

Correspondence should be addressed to Mr T Wilton, c/o BCA, BASK at the Royal College of Surgeons, 35-43 Lincoln’s Inn Fields, London WC2AIPE, England.