
Abstract: This study examined how one- and two-strand posterior cruciate ligament (PCL) reconstructions resist the return of posterior translation during repetitive knee cycling. The femoral attachment of the one-strand graft and the anterior strand of the two-strand (AD2) grafts were located within the anterior one-third of the femoral PCL footprint. The second strand was placed within the middle third of the femoral footprint in one of three locations: middle-distal (MD), middle-middle (MM), or middle-proximal (MP). During repetitive knee cycling from 5 degrees to 120 degrees flexion with a 100 N posterior force, the intact knee had less than 1 mm of residual posterior translation after 2048 flexion-extension cycles. Under similar cyclic conditions, the AD2-MM reconstruction achieved the most cycles before failure; however, this two-strand configuration failed in less than 700 cycles. The other reconstructions, either one strand or two strand, failed in less than 350 cycles. The surface failure location for 19 of 25 graft strands was within the femoral one-third of the strand. We concluded that one- and two-strand reconstructions under moderate loading and a range of motion from 5 degrees to 120 degrees flexion have an unacceptably high cyclic failure rate suggesting modifications of the allowable postoperative knee flexion and loading.