
Abstract: We studied how initial graft size and initial graft laxity affected the biomechanics of anterior cruciate ligament (ACL) reconstruction at six months. Sixteen goats had bilateral reconstructions staged eight weeks apart. Autografts 4 and 7 mm wide were taken from the central patellar tendon (PT). Lax grafts were created by adding 4 mm slack to the graft before fixing. We reconstructed each joint using a combination of width and laxity treatments. Both factors were changed for the contralateral joint and all combinations appeared with equal frequency. At six months we measured the joint extension limit, anterior-posterior (AP) translation, and osteoarthritic changes. The grafts were then tested to failure to determine their mechanical properties. After six months the difference in initial treatments had disappeared: there was no difference in graft cross-section due to the different initial widths and there was no difference in joint AP translation due to the initial graft laxity. We did observe that wide grafts were associated with a block to extension, decreased joint AP translation, and increased articular cartilage damage and osteophyte formation. While AP translation was reduced, it was correlated with decreased extension, possibly indicating an increase in scar tissue formation rather than a more functional graft. Neither graft width nor graft laxity produced differences in any graft mechanical properties. This suggests that the use of larger grafts to prevent increased AP translation has undesirable complications. Ultimately, we conclude that neither of these surgical treatments strongly affects the biomechanical result of caprine ACL reconstruction.