

THE EFFECT OF LONGITUDINAL SPLITTING ON THE ENERGY ABSORBED BY A TIBIALIS ANTERIOR ALLOGRAFT: IMPLICATIONS FOR ACL RECONSTRUCTION

Leslie J Bisson, MD and Lindsey Clarke, MD

BACKGROUND: Anterior cruciate ligament (ACL) reconstruction can be performed using a variety of grafts and fixation devices. Certain fixation devices may require more than one soft tissue graft, or conversely, surgeons may wish to perform double bundle ACL reconstruction using a single graft.

PURPOSE: To determine whether longitudinally splitting a soft tissue graft leads to a diminution in the mechanical properties of the graft.

METHODS: Six matched pairs of tibialis anterior tendons were procured from frozen cadavers and stored at -30C. One member of each pair was longitudinally pierced using an eleven blade in the midportion of the tendon and then bluntly split out to each end, creating two longitudinally divided grafts. The other member of the pair remained intact. Each tendon was then frozen into a cryoclamp and loaded to failure on a materials testing machine at a displacement of 1 mm/s until failure. The area under the force versus displacement curve was calculated as an indicator of energy absorbed by the tendon prior to failure. The energy absorbed by the intact tendon was then

compared with the summed energy absorbed by the two specimens obtained by splitting its matched pair using a paired t-test.

RESULTS: Energy absorbed by the intact tendon was 11240 +/- 2590 Nmm, while total energy absorbed by the two longitudinally split tendons was 10920 +/- 2004 Nmm (p=0.65).

CONCLUSION: Longitudinal splitting of a tibialis anterior allograft does not result in a significant loss of mechanical properties. This splitting technique can safely be used to create two grafts if surgeons wish to use a tibialis anterior graft for a double bundle ACL reconstruction.