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INVESTIGATION OF THE ANTERIOR LATERAL LIGAMENT

Matthew Jenkins

Mentor: Spencer Lake

Currently there is a hot debate on the existence of the anterolateral ligament (ALL). Some studies argue the ALL exists in every human knee, while others argue the ALL does not exist. The ALL originates at the lateral epicondyle of the femur, and inserts at the anterolateral aspect of the proximal tibia. Proponents of the ALL believe it to play a crucial role in post anterior cruciate ligament (ACL) reconstruction knee stability. The goal of this study was to determine if the ALL is a true ligamentous tissue or just a thickening of the anterior lateral capsule (ALC). To test for the existence of the ALL, we harvested 13 ALC, lateral collateral ligament (LCL), and ALL tissue samples from human cadavers with ages ranging from 35-48 (4 M, 9 F). These samples were tested through stress-strain mechanical tests using the quasi-linear viscoelastic (QLV) model and a quantitative polarization imaging technique. In doing this real-time collagen alignment analysis we hoped to compare the ALL to the ALC and LCL tissues, paying particular attention to the parameters of average angle of polarization (AoP) and standard deviation degree of linear polarization (DoLP). Results show that the ALL is not a ligamentous tissue. The ALL demonstrated significantly lower toe and linear region moduli in addition to lower levels of collagen alignment (i.e., lower degree of linear polarization (DoLP) values and more distributed angle of polarization (AoP) values) compared to the LCL. In some cases the ALC tissue was significantly stronger and more aligned than the ALL. These results suggest against the existence of the ALL as an important structural ligamentous tissue.