

Title: Porcine Xenografts for Orthopaedic Applications

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More than 350,000 cruciate ligaments are reconstructed in the U.S each year, 70% of which use the patient's own patellar tendon. The autogenous harvest is associated with anterior knee pain, weakness, scar formation, and patella tendon complications. Substitute tissues include the hamstrings and allografts with varying degrees of success and complications.

Efforts to replace the cruciate ligament with synthetic materials have failed and are no longer in use in the U.S. Early efforts to replace the cruciate ligament with bovine xenograft tissue were successful for some of the patients who received the tissue. Other bovine graft patients suffered complications from synovitis, graft loosening, failure of fixation, and abrasion. Much of the synovitis was attributed to the high levels of glutaraldehyde in which the product was packaged.

It is our belief that the ideal tissue replacement would be a de-antigenated porcine patellar tendon due to similar biological, anatomical and biomechanical properties to human tissue. We have identified the key antigens that cause rejection and have developed a processing technique of de-antigenation within the imposed constraints that the end product exhibit similar biomechanical characteristics as native tissue.

This talk will present the results of our work identifying the antigens in a porcine bone-patellar tendon-bone device, describing the enzymatic removal technique, testing the implants in animal immunologic models, and comparing the resulting initial biomechanical properties of the device to human allografts. Additional work will be presented reviewing development of porcine graft tissues in the areas of bone, meniscal and articular cartilage grafts.