

Reducing ligament strains following osteotomy in the canine stifle

Advisors: M van der Meulen (ME/BME) and U Krotschek (Clinical Sciences, CVM)

-

Background: Rupture of the cranial cruciate ligament (CCL) is the most common cause of hindlimb lameness and stifle osteoarthritis in dogs. The disease is often treated with a surgical procedure known as the tibial plateau-leveling osteotomy (TPLO). Despite surgical intervention significant osteoarthritis (OA) progresses in 100% of patients. Dogs with early partial CCL ruptures at the time of TPLO surgery have minimal OA progression and stable CCLs long-term. Replacing a ruptured CCL with an intra-articular graft, as done in humans, consistently fails in the early post-operative phase. Therefore this project will examine whether performing a TPLO at the same time as an intra-articular graft decreases the load on the graft itself, resulting in outcomes similar to early partial CCL tears. To address this question, cadaver canine hindlimbs will be tested while measuring the strains on the ligament under the different procedures.

-

Objectives: Our goals are 1) to measure CCL strain at decreasing TPAs during stifle loading on a materials testing system, 2) to determine the minimum amount of CCL strain achievable within the confines of a TPLO, and 3) to determine the tibial plateau angle at which cranial tibial thrust is eliminated in the cruciate deficient stifle.

Design issues will include:

1. Designing a custom rotational jig to rotate the proximal tibia relative to the distal tibia by a known amount
2. Developing fixtures that allow cranial translation of the tibial relative to the femur under loading in the materials testing system

Contact: Marjolein van der Meulen, mcv3@cornell.edu