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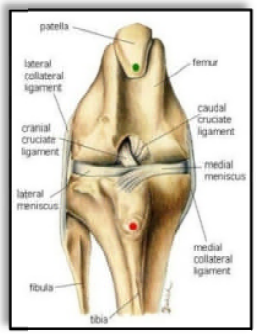
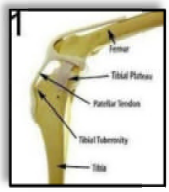
TIBIAL TUBEROSITY ADVANCEMENT (TTA)
FOR CRANIAL CRUCIATE LIGAMENT (CCL) STABILIZATION

INTRODUCTION:



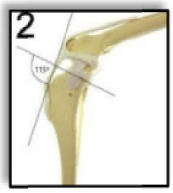
One of the most common stifle (knee) injuries is rupture of the Cranial Cruciate Ligament (CCL), also commonly referred to as the Anterior Cruciate Ligament (ACL), although this term refers to human anatomy. The CCL functions to stop sliding between the femur and tibia as weight or load is applied to the stifle during motion. This sliding motion is called tibial thrust. The CCL can suffer a complete tear or a partial tear. Partial tears eventually lead to complete rupture of the ligament resulting in front to back instability of the stifle called drawer motion. This condition leads to damage to the medial meniscus of the stifle. The meniscus functions as a cushion between the femur and tibia and is responsible for weight distribution. Meniscal damage is very painful and animals will often times be non-weight bearing on the limb. An untreated ruptured CCL usually becomes very arthritic and painful from instability and results in an atrophied, arthritic and poorly used leg. This may result in CCL rupture of the contralateral or opposite CCL due to a significant shift of body weight. This injury can occur at any age and in any breed, but most frequently occurs in middle aged, overweight large breed dogs. Over 600,000 dogs in the United States have CCL stabilization surgery every year. Success rate of the TTA is >90% for normal return to function of the affected limb. The TTA was developed by Drs. Slobodan Tepic and Pierre Montavon in 2002 at the University of Zurich in Switzerland. The TTA was released for clinical study in 2004 worldwide with over 30,000 procedures performed in the initial study.

NORMAL STIFLE JOINT LATERAL (SIDE) VIEW



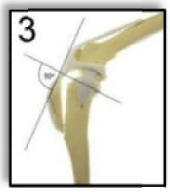
The diagram to the left illustrates anatomical structures that play an important part in the correction of a ruptured CCL using the TTA. The normal joint viewed from the side shows the upper femur bone and the lower tibia bone. The tibial plateau is the flat plane of the tibia that supports the femur. The patellar tendon is located at the front the stifle and is the structure that must advanced to offset the abnormal drawer motion force that is created with rupture of the CCL. Biomechanical and force analysis studies document that the titial plateau needs to be 90 degrees to the patellar tendon for neutralization of drawer motion to occur.

TYPICAL STIFLE ANGLE



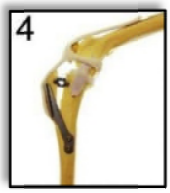
In the typical stifle joint the angle formed between the tibial lateau (horizontal line) and the patellar tendon (vertical line) is approximately 115 degrees when the leg is in a normal standing position. Each animal has a different tibial angle that can be measured using radiographs (x-rays). Essentially the femur sits on the “slope” (horizontal line) of the tibia. The placement of weight on the stifle is termed “loading” of the stifle. With loading the femur slides down the tibial slope and is stopped by the CCL which is under constant tension as long as the stifle is under load. With a ruptured CCL the stifle becomes unstable and sliding of the femur occurs unchecked crushing the medial meniscus causing tearing and pain.

CORRECTED ANGLE FOR CCL/ACL STABILIZATION WITH THE TTA



This diagram shows the bony cut or osteotomy that will need to be performed in order to advance the patellar ligament. The osteotomy is performed in the non-weight bearing portion of the femur called the tibial tuberosity. The osteotomy in this region is not subjected to loading forces and is less like to cause complications such as fractures, poor healing, plate breakage, etc. As discussed above the tibial tuberosity will be advanced forward to correct the tibial angle to 90 degrees neutralizing drawer motion and the need for the CCL. The patellar tendon will now perform the function of the CCL neutralizing its need and transferring loading forces into the tibia.

TTA SURGICAL CORRECTION



This diagram shows the stifle once it has been stabilized with the appropriate sized implants. The implants are measured and sized specifically for the patient’s bone using radiographic studies prior to the surgery. The implants include a plate and a wedge called a cage. The plate and cage are secured to the bone using a fork and screws. These implants are lightweight, medical grade titanium and are designed to be permanently implanted. The osteotomy site will be packed with a bone graft and healing will take 4 – 8 weeks. Post-operative care requires radiographs to determine bony healing at 4 weeks and 8 weeks. The patient must be confined during this time to prevent damage to the stifle and the implants. Once fully healed animals can return to normal function.