Cranial Cruciate Ligament (CCL) Rupture - TPLO & Lateral Suture

What is the cranial cruciate ligament (CCL) and what does it do?

Rupture of the cranial cruciate ligament (CCL) is the most common cause of lameness in dogs. The CCL is equivalent to the ACL in humans, and it performs three main functions to stabilize the stifle (knee). These functions include preventing hyperextension of the knee, preventing excessive internal rotation of the knee, and preventing the tibia (shin bone) from moving forward in relation to the femur (thigh bone) when the animal places weight on its leg. Dogs have two, medial (inside) and lateral (outside), menisci in each of their stifles, which also act to help stabilize and provide shock absorption for the knee.

Why do CCL ruptures happen in dogs?

In people, ACL ruptures are typically due to an injury (ie. football injury or skiing accident), while these acute injuries do occur in dogs, they are rare. More often than not, CCL ruptures in dogs occur due to progressive degeneration of the ligament over time. The underlying cause for this slow degeneration is not completely understood, but there are multiple contributing factors to this disease process including anatomic variations, genetics, conformation, breed, obesity, and poor physical condition. Cranial cruciate ligament rupture is more prevalent in large breed dogs, but many small and medium-breed dogs are also frequently affected. Many CCL ruptures start as a partial rupture, and eventually progress to complete ruptures. Meniscal injury also commonly occurs with complete ruptures of the CCL, though is less likely with partial ruptures due to some degree of stability provided by the remaining intact cruciate ligament fibers.

Since this is a degenerative disease process, approximately 40-60% of dogs that have a CCL rupture on one side will go on to rupture the other side, This typically occurs within 1-2 years of the first side rupturing.

What are treatment options for CCL rupture in dogs?

The vast majority of dogs with CCL rupture require surgical stabilization of the stifle to achieve the best outcome. The top of the tibia (tibial plateau) is angled caudally (backwards) in the dog. This means that every time the dog places weight on their foot, the femur slides off the back of the tibia when the CCL is ruptured. Surgical treatment for CCL ruptures in dogs focuses on providing stability of the stifle without needing the CCL to be intact. The two big categories of stabilization procedures are extracapsular stabilization (ie. lateral suture) and osteotomy procedures (ie. tibial plateau leveling osteotomy or TPLO). There are multiple procedures that fall under these two categories, though this discussion focuses on the lateral suture and TPLO specifically, as these are the procedures that MVS performs.

Extracapsular Stabilization (Lateral Suture)

The lateral suture technique involves wrapping a heavy gauge nylon suture around the stifle to stabilize it long enough for organized scar tissue to form around the joint. The suture has a limited functional lifespan, and will eventually stretch out or break. The objective is that this failure happens after enough scar tissue has formed to ultimately provide long-term stability for the joint. For this reason, lateral sutures are generally only recommended for patients that are less than 20 pounds or in patients that are not very active, as the functional lifespan of the suture tends to be shorter in larger dogs or those that are active.

Tibial Plateau Leveling Osteotomy (TPLO)

The TPLO procedure involves making a biradial (semicircular) cut in the proximal (top) of the tibia, and then rotating the proximal segment down, so that the tibial plateau is more flat or parallel with the ground. This changes the biomechanics of the knee by creating compression across the stifle joint, which provides stability to the stifle when the dog steps down on the leg, thus removing the need for the CCL to be intact. The tibial fragments are then stabilized in their new position using a bone plate and screws. Once the bone has healed in its new position, the implants are no longer needed, but the patient keeps those implants for the rest of their life unless they develop a complication.

What surgery will be recommended for my dog?

The first decision that must be made is whether surgery is the best treatment for your pet. As stated before, surgery is most often recommended to give your pet a stable knee and slow the progression of arthritis, which provides them with the best chance of a good long-term outcome. However, surgery may not be recommended if your pet has other significant comorbidities that preclude surgery or anesthesia, or if you and your veterinarian decide to pursue other avenues of treatment.

The tibial plateau leveling osteotomy (TPLO) has been shown to have the best, and most consistent, outcome of all of the described procedures for cruciate ligament ruptures in dogs. However, every patient is unique, and your veterinarian/surgeon will determine the best treatment option for your pet.

What are the potential risks/complications of CCL surgery?

Just like with any surgical procedure, there are potential complications associated with CCL surgery. However, the risk of developing most surgical complications can be significantly reduced by keeping your pet calm and quiet during the recovery period and by keeping their mouth off of the incision during the first 2 weeks postoperatively. We expect most patients do well following CCL stabilization surgery when postoperative recommendations are followed.

Lateral Suture

Potential complications associated with the lateral suture procedure include anesthesia related complications, intraoperative hemorrhage, implant failure (suture breaking/stretching out prematurely) leading to recurrent instability, implant infection (possibly necessitating removal

once sufficient healing has occurred), postoperative meniscal injury, incisional complications (infection, dehiscence, and/or seroma (fluid accumulation) formation - swelling around the ankle can occur due to gravity pulling the fluid towards the foot), and potential lameness due to osteoarthritis development.

TPLO

Potential complications associated with the TPLO procedure include anesthesia related complications, intraoperative hemorrhage, implant failure, tibial tuberosity fracture, implant infection or sensitivity possibly requiring implant removal, patellar tendinosis (inflammation of the patellar ligament), postoperative meniscal injury, incisional complications (infection, dehiscence, and/or seroma (fluid accumulation) formation - swelling around the ankle can occur due to gravity pulling the fluid towards the foot), and potential lameness due to osteoarthritis development or long-term bone sensitivity.

What does recovery from CCL surgery involve?

Your pet will need to wear an E-collar (cone) for at least the first 2 weeks following surgery to protect the incision and prevent him/her from licking or chewing at the incision.

Most orthopedic surgeries take approximately 8-12 weeks for healing to occur. This means that the implants used for repair/stabilization are responsible for bearing most, if not all, of the weight that is placed on the affected limb until complete healing has occurred. To protect the repair and maximize potential healing, your pet will need to be crate rested during this 8-12 week recovery period. Strict crate rest means no running, jumping, playing with other animals or people, or any uncontrolled off leash activity. In addition, he/she must also be kept off of furniture and stairs during this period. Canine patients may be allowed to go outside to urinate and defecate 3 to 4 times daily, and must always be kept on a leash. When not directly supervised or performing rehabilitation exercises, your pet must be confined to a crate or small room, such as a bathroom or laundry room to prevent him/her from having free access to the house or jumping onto things.

Failure to follow these confinement recommendations could result in surgical site complications and the need for additional surgery at an additional cost.

What is the prognosis following CCL surgery?

Most patients do well following CCL stabilization surgery with 80-90% of patients following lateral suture surgery and 90-95% of patients following TPLO surgery returning to normal or near normal activity level once completely healed. Peak recovery can take up to 4-6 months to be achieved following surgery. In some cases, professional physical therapy is recommended to maximize recovery.