



Treatment options for cranial cruciate ligament injury/disease of the dog knee

The anterior cruciate ligament (ACL) is commonly torn in people. Dogs, like humans, often rupture this ligament that is more properly called the *cranial cruciate ligament* (CrCL) in dogs. Unlike humans, this tear is often the result of subtle, slow degeneration that has been taking place within the ligament rather than the result of trauma to an otherwise healthy ligament. This is why approximately half of the dogs that have a cruciate ligament problem in one knee will, at some future time, develop a similar problem in the other knee. Also, in contrast to humans, the skeletal structure of the dog knee is such that the CrCL is under a tremendous mechanical stress even during relatively sedentary activities. Unfortunately, this also means that ligament replacement techniques, as frequently performed in the human patient, have a unique challenge in the dog!

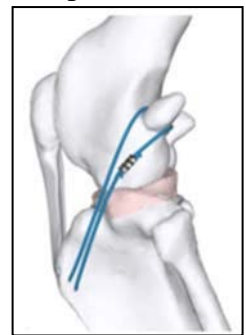
Diagnosing cruciate ligament degeneration/tears is usually very simple with observation of your pet's gait, palpation of your pet's knee and x-rays. At times, however, it is more complicated and may require advanced imaging such as MRI or surgical exploration through a traditional surgical arthrotomy or with the use of a minimally-invasive arthroscope.

Choosing which CrCL surgical treatment is best for your pet

Our philosophy is to offer a variety of surgical treatments for CrCL tear and do our very best to work with you, the pet owner, to tailor our treatment recommendations to the unique needs of your pet and family. Variables that we take into account when making our recommendations include your pet's activity level, size, age and conformation, the degree of knee instability, and each option's affordability in your family budget. Surgical procedures of the knee are among the most commonly performed in our hospital and our faculty surgeons are internationally recognized experts in the field. We currently offer a variety of surgical treatments for CrCL tears:

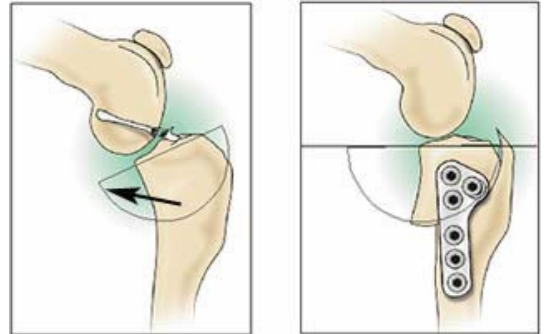
Surgical options

- ***Extra-capsular suture stabilization*** (also called "Ex-Cap suture", "lateral fabellar suture stabilization" and the "fishing line technique") – This is a traditional surgical treatment that has been performed for many years. The concept of this procedure is to replace the function of an incompetent cranial cruciate ligament with a heavy monofilament nylon suture (a specific brand of fishing line is typically used) placed along a similar orientation to the original cruciate ligament, but outside of the joint (the actual ligament is inside the joint). The suture needs to stabilize the tibia ("shin-bone") relative to the femur ("thigh bone"), while allowing normal knee movement, until organized scar tissue can form and assume the stabilizing role. These techniques tend to have a little bit too much "give" for larger breeds and active dogs, but seem to work reasonably well in small breeds and inactive dogs when performed by an experienced surgeon. Postoperative care at home is very critical and involves strict activity restriction for ~ 4 months. Premature and excessive activity risks complete or partial failure of the stabilizing suture that can render the surgery a complete or partial failure. The cost of these procedures varies from amongst veterinary centers depending upon the amount of preoperative screening, degree of anesthetic monitoring, specialized training of the surgeon, the amount of postoperative care, etc. At CSU, the cost of preoperative exam, x-rays, anesthetic management supervised by a board certified anesthesiologist, surgery supervised by a board certified



veterinary surgeon, and 24/7 supervised anesthetic recovery and pain management is approximately \$2300-2500.

- **Tibial Plateau Leveling Osteotomy (TPLO)** – This method was a radical departure from traditional Extra-capsular Suture Stabilization treatment when it was first introduced in the 1990’s. Our surgical team has now performed 1000’s of these procedures and has gained an understanding of the technique’s strengths and weaknesses. TPLO involves making a circular cut in the top of the shin bone (tibial plateau) and rotating the contact surface of this bone until it attains a relatively level orientation that puts it at ~ 90 degrees to the patellar tendon. This orientation of the tibial plateau renders the knee relatively stable, independent of the role of the cranial cruciate ligament. The cut in the bone is stabilized by the use of a bridging bone plate and screws. Once the bone has healed, the bone plate and screws are not needed, but are seldom removed unless there is an associated problem. A recent study demonstrated superiority of this technique over suture stabilization in giant breeds of dogs. We prefer this method to Extracapsular Suture Stabilization in active dogs, young dogs, dogs over ~ 40 pounds and dogs that have a relatively stable knee to start with (suture stabilization doesn’t seem to be able to improve these patients much). The cost of TPLO varies amongst veterinary centers depending upon the amount of preoperative screening, degree of anesthetic monitoring, surgeon training, cost of implants used, amount of postoperative care, etc. At CSU, we use the highest quality implants available. The cost of preoperative



exam, x-rays, anesthetic management supervised by a board certified anesthesiologist, surgery performed/directed by a board certified veterinary surgeon, and 24/7 supervised anesthetic recovery and pain management is approximately \$3600-3800. Postoperative care at home is very critical and involves strict activity restriction for ~ 4 months. Premature and excessive activity risks re-fracture of the bone prior to bone healing.

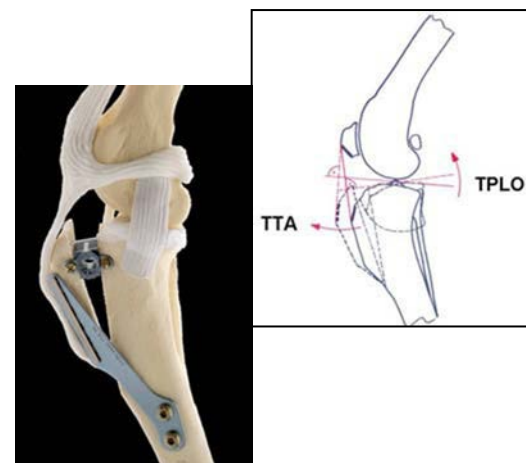
- **Tibial tuberosity advancement (TTA)** – This method makes a linear cut along the front of the tibia (“shin-bone”). The front of the tibia, called the

“tibial tuberosity” is advanced forward until the patellar tendon is oriented approximately 90 degrees to the tibial plateau (notice that this is simply another way to accomplish the same orientation as the TPLO).

This orientation renders the knee relatively stable, independent of the role of the cranial cruciate ligament. The amount of advancement needed to obtain this orientation is determined from x-rays and we have recently completed a study that has helped us to determine how this planning is best performed. The cut in the bone is stabilized with a bridging bone plate and screws. Once the bone has healed, the bone plate and screws are not needed, but are seldom removed unless there is an associated problem.

Like with the TPLO, we prefer this method to Extracapsular Suture Stabilization in active dogs, young dogs, dogs over ~ 40 pounds and dogs that have a

relatively stable knee to start with (suture stabilization doesn’t seem to be able to improve these patients much). In some dogs, we discover during their preoperative planning that their knee structure does not lend them to safe or effective application of this technique. Other times the decision between TPLO and TTA is based upon concurrent problems, surgeon preference, etc. The cost of TTA varies amongst veterinary centers depending upon the amount of preoperative screening, degree of anesthetic monitoring, level of surgeon training, cost of implants used, amount of postoperative care, etc. At CSU, we use the highest quality implants available. The cost of preoperative exam, x-rays, anesthetic management supervised by a



board certified anesthesiologist, surgery performed/directed by a board certified veterinary surgeon, and 24/7 supervised anesthetic recovery and pain management is approximately \$3600-3800. Postoperative care at home is very critical and involves strict activity restriction for ~ 4 months. Premature and excessive activity risks re-fracture of the bone prior to bone healing.

Non-Surgical Options

- ***Activity restriction, weight loss and anti-inflammatories*** – This combination is not a treatment per se because it does not stabilize the knee. This regimen may allow the knee joint inflammation to subside somewhat. While the symptoms of lameness and pain may subside with time, attempts to return to normal activity levels will often be limited by the progression of osteoarthritis. In general, we do not advise this therapy as the ideal form of treatment, but it may be appropriate for individual dogs due to some combination of their very small size, inactive lifestyle, other concurrent injuries or diseases, or financial realities. It is important to point out that, in general, the earlier surgical therapies are performed, the more effective they are; thus a “wait and see” approach to non-surgical management based only on wishful thinking is seldom advised.
- ***Rehabilitation therapy, custom knee bracing, etc*** – There is ample evidence that perioperative rehabilitation therapy by a trained rehabilitation practitioner can advance and hasten the recovery from surgery. There is little/no evidence to suggest that this is a consistent and predictable alternative to surgical management for most dogs, but occasionally the combination of concurrent injuries or diseases, advanced age, patient size and financial limitations lead pet owners to pursue this option. Custom knee bracing is relatively new to canine orthopedics and there is little/no scientific evidence on the topic applied to cruciate ligament injuries. We have worked with OrthoPets (www.orthopets.com) and have found satisfactory accomplishment of the management goals in selected patients.

General approach at CSU – We offer all of the options described above. After examination of the patient, discussion with the owner, and review of pertinent x-rays, we make our best treatment recommendation for the individual patient and owner. In most instances, your primary care veterinarian can guide you with non-surgical treatments. If you or your veterinarian wishes to consider surgical management, please call our appointment desk 970.297.5000 to make an appointment with one of our “small animal orthopedic surgery services”.