

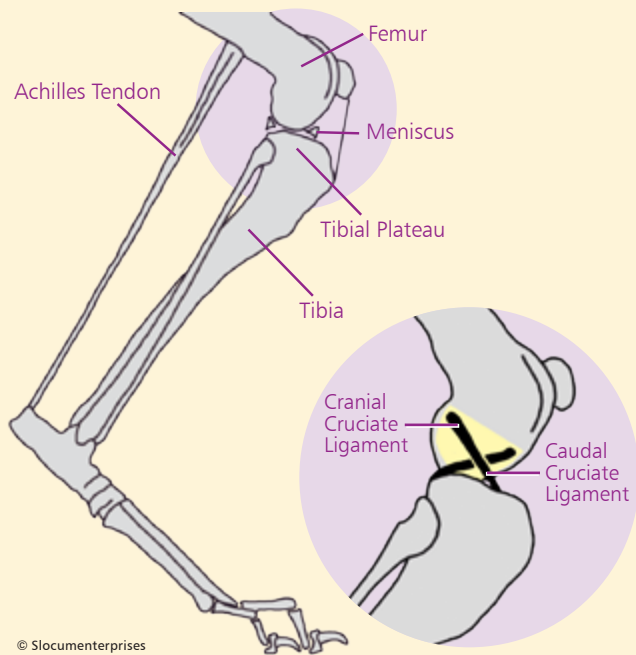
Cranial Cruciate Ligament (CCL) Injury and Surgical Repair

Rupture of the Cranial Cruciate Ligament (CCL) is a common, disabling injury in dogs. This ligament is partly responsible for stabilizing the stifle (knee) joint. Partial or complete tearing of this ligament is not only painful, but causes instability in the joint with consequent development of arthritis. The rupture itself, the discomfort it causes, and the progressive joint disease all contribute to lameness of the affected leg. These injuries occur in both young and old animals of either gender. Certain breeds, such as Labrador Retrievers, Staffordshire terriers and Rottweilers, may have hereditary predispositions to CCL problems.

There are many established techniques to repair a CCL injury, all of which report very high success rates of approximately 90% (good to excellent function).

Anatomy and Function of the Cranial Cruciate Ligament

The CCL is one of two “critical” ligaments in the knee, considered critical because it is one of the structures providing primary stability of the knee—in this case front-to-back stability. When this ligament is torn, this front-to-back stability is compromised resulting in a “drawer sign” in which the tibia and femur move against each other similar to a drawer being opened and closed.



Continual instability, in absence of a healthy ligament constraining abnormal movement of the joint, leads to progressive osteoarthritis. This instability can also lead to other cartilage injury within the joint, commonly a tear in the medial meniscus (a structure which separates and cushions the bones within the stifle).

Surgical Repair of CCL Injury

During surgical treatment for CCL injury the knee joint must be explored to confirm that the CCL is torn, examine the cartilage surfaces, and to examine and treat the meniscus if it is damaged. This now can be done minimally invasively using a small arthroscope. Knee Arthroscopy significantly lowers the morbidity associated with joint exploration, provides a more accurate assessment of the internal knee structures, and in many cases can provide a more comfortable and quicker return to use of the limb. See images A and B.

Regardless of the technique(s) used, the goal of surgery remains to prevent patellar instability, to create a more functional joint, to minimize further arthritic deterioration, and to restore comfort and function to the patient.

Current procedures repair cruciate injuries by one of two approaches:

1. Replacement of the passive restraint to the knee: these surgical techniques replace an injured ligament with an artificial structure providing similar function.
2. Alterations of the mechanics of the knee joint: these approaches strive to obtain a functional stability to the joint.

Regardless of technique choice, the joint may be explored to assess damaged structures that may contribute to swelling and pain.

Passive Repairs

Repairs outside of the stifle joint (“extra-articular”) include the Lateral Suture and the Fibular Head Transposition. However, as successful as these surgeries can be, anecdotal evidence strongly suggests that more rapid and enduring returns to normal function are achieved by the functional repairs described below.

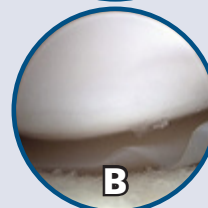


Image A: Arthroscopic view of a torn cranial cruciate ligament.

Image B: Image of a healthy/non-damaged medial meniscus in a dog.

Functional Repairs

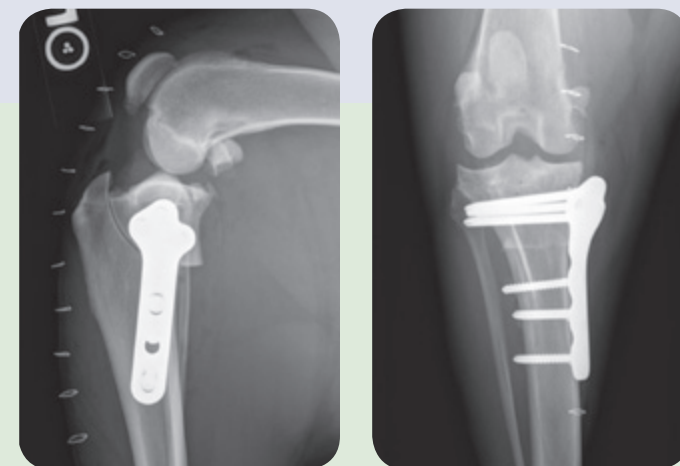
Two common methods to obtain functional repairs involve performing an osteotomy (a precise surgical cut in the bone).

Tibial Plateau Leveling Osteotomy (TPLO)

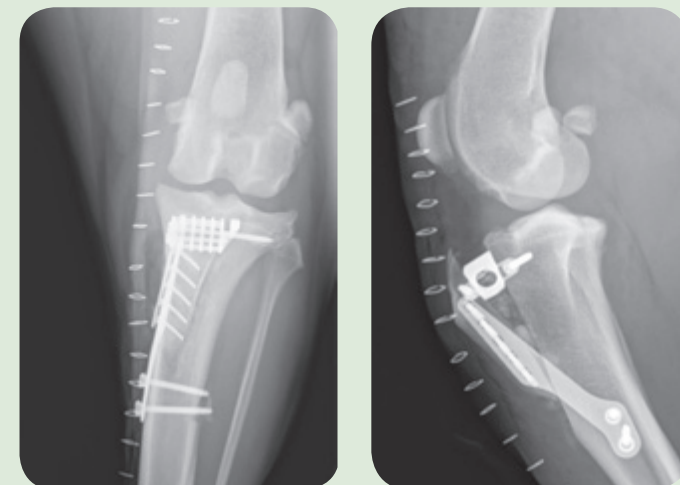
This technique strives to alter the naturally-occurring downward slope (angle) of the tibial plateau. Because of this slope, the femur, which rests upon the tibial plateau, has a tendency to push the tibia forward; normally the CCL acts to restrain this thrust but cannot adequately stabilize the stifle joint when injured or torn. In this surgery, a cut is made in the tibia, the slope rotated so it is flatter, and the new position of the bone secured in place with a bone plate and screws.

Tibial Tuberosity Advancement (TTA)

This is a newer procedure similar in concept to the TPLO. Instead of altering the slope of the tibial plateau, however,



Postoperative views of TPLO procedure



Postoperative views of TTA procedure

the TTA alters the point of insertion of the patellar tendon. Only part of the bone (the tibial tuberosity) is cut, "advanced" by means of a titanium cage, and secured with a plate and screws. This advancement acts to "tighten-up" the joint, alleviating the instability.

Post-Operative Care

Regardless of the specific type of procedure performed, surgical recoveries are very similar. Strict exercise restriction is mandatory for the first 6 weeks after surgery followed by controlled exercise for another 4 weeks. Stringent exercise restriction involves:

- Access to confined areas only (crate, kitchens, bathroom);
- Restricting free access to stairs;
- Eliminating playing, running and especially jumping during the initial recovery period; and
- Leash walking only, with a chaperone, for bathroom breaks.

At 2 weeks post-surgery we will recommend starting physical therapy and rehabilitation to aid and speed the remainder of the recovery process while providing a controlled and safe environment for doing this.

Functional surgical techniques (TPLO and TTA) require only that the osteotomy (surgically-created fracture) heals, rather than waiting for the return of scar tissue strength in the static (passive) techniques.

Substantial anecdotal evidence suggests that TPLO and TTA procedures return a patient to weight-bearing status in about half the time as other methods. Further, data also suggests the degree of future arthritis development is diminished with functional repairs. Arthritis should be expected to develop over time with every procedure. Most dogs function reasonably well despite these changes with or without medical therapy on an ongoing or intermittent basis.

Finally, there is a fairly high incidence of dogs that have sustained a CCL rupture on one knee, developing the same injury on the other leg within 1-2 years. Reported frequencies of second injuries range from 30-60%.

Please let us know if Veterinary Surgical Centers of the Delta can answer any additional questions about your pet and CCL repair options.



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Injury of the Cranial Cruciate Ligament in the Dog



Come. Sit. Stay.
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