

CRUCIATE INJURIES IN DOGS

Cranial cruciate ruptures are some of the most common musculoskeletal issues in dogs and can occur in any breed or age. The cruciate ligaments are responsible for stabilizing the knee and preventing rotation or hyperextension of the joint. Injuries affecting the cruciate can occur suddenly during intense activity or play, or can result from progressive degeneration from repetitive strain.

Signs of rupture can include limping and avoidance of bearing weight on the affected limb when standing. The severity is usually related to the extent of the injury (a partial or complete tear) and may worsen after activity. Inflammation and pain in the joint may occur as well. Approximately 20-40% of dogs will injure the other knee as the pet adjusts their posture and gait to compensate.

Surgery is the only way to correct the primary injury. There are several different procedures which work to stabilize the joint. In some cases, conservative management is an option.

NON-SURGICAL MANAGEMENT

Generally, cruciate injuries have the best outcome when treated surgically; more function is restored to the knee and degenerative changes like arthritis are reduced. However there are instances where surgery isn't an option, either because the pet isn't a candidate for anesthesia or due to financial concerns. Conservative management with rehabilitation therapies can help ensure as much mobility and comfort as possible.

Hydrotherapy is often a cornerstone of care for a ruptured cruciate. Through a combination of buoyancy and resistance, this therapy can increase muscle mass and improve range of motion without putting undue stress on the knee. While the tear itself won't mend, the goal is to strengthen the surrounding connective tissue to compensate and stabilize the joint. Therapeutic ultrasound treatments can reduce inflammation and scar tissue formation around the injury. Massage therapy is beneficial in speeding recovery and resolving muscle tension both locally and throughout the body. A custom-made medical brace may be recommended as part of a therapy program as well.

The best candidates for conservative management are: dogs under 30 pounds; those with mild to moderate degree of injury; and those with low activity lifestyles.

DIAGNOSING A TEAR

- Physical exam findings
 - Abnormal movement of the tibia relative to the femur
 - Thickening of the joint capsule
 - Swelling and discomfort when the knee is manipulated
- Diagnostic imaging
 - X-ray will not show the ligament itself but can evaluate for arthritis or other changes in the joint
 - MRI can assess the degree of tear



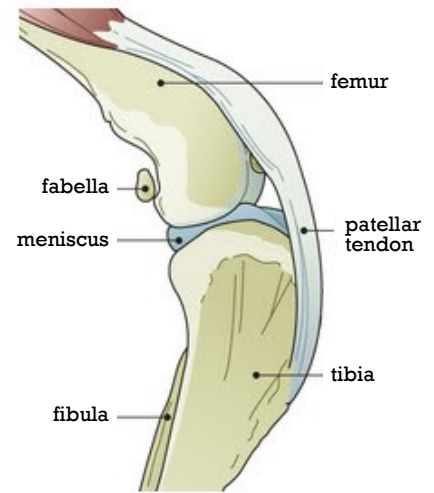
A hydrotherapy appointment in progress

SURGICAL OPTIONS FOR CRUCIATE RUPTURE

EXTERNAL CAPSULAR REPAIRS

This surgery works to stabilize the limb without altering the interior of the knee joint. This method of repair is the oldest surgical correction. A strong type of suture is used to essentially tether the tibia to the femur. This secures the joint from above and below to reduce instability in the knee. A newer version of this surgery is called the Tightrope technique, where two 'tunnels' are drilled into bone and a specialized suture is threaded through. This allows for an improved range of motion when compared to the original method.

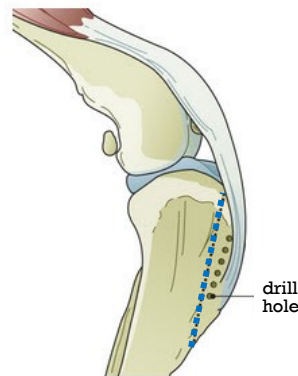
External capsular repairs can be performed by primary care veterinarians and often cost less than specialty surgeries. However there is a high failure rate in dogs over 30 pounds and post-operatively, the site is more prone to the development of arthritis.



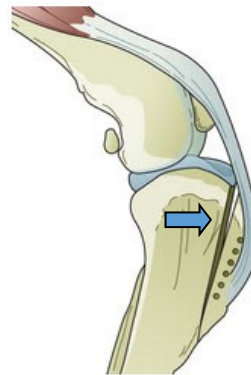
ANATOMY OF THE KNEE

ADVANCED SURGICAL REPAIRS

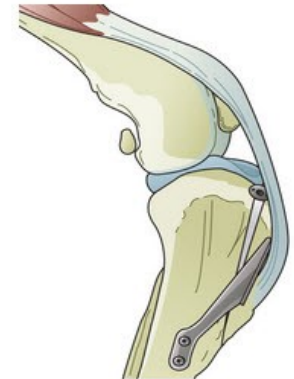
TIBIAL TUBEROSITY ADVANCEMENT (TTA)



A cut is made through the front of the tibia

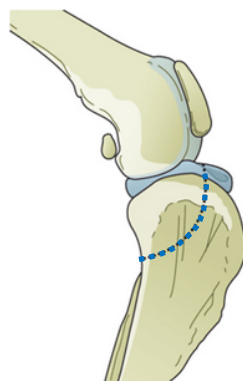


The front of the tibia is advanced to make room for a spacer

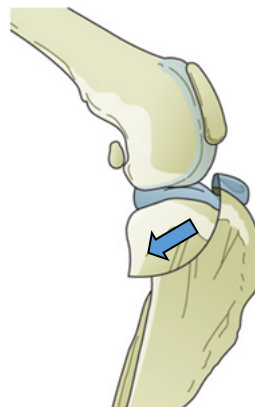


A spacer is put in place and a special bone plate secures the bone in the new position

TIBIAL PLATEAU LEVELING OSTEOTOMY (TPO)



A semicircular cut is made through the tibia



The bone is rotated to achieve a level plateau



The rotated segment is secured by a special orthopedic plate

The Tibial Tuberosity Advancement (TTA) and Tibial Plateau Leveling Osteotomy (TPLO) are advanced procedures to treat cruciate injuries. These are performed at specialty veterinary clinics by board-certified surgeons. Some hospitals offer the procedures arthroscopically to achieve minimal invasion. The TTA and TPLO work to modify the biomechanics of the knee, either by altering the angle of the joint or changing the functional relationship between the femur and tibia. This reduces how much the tibia shifts during strides and makes the cruciate ligament unnecessary.

So which procedure is better for your dog? The cost, recovery time and outcome are largely the same so it's often a matter of which surgery is preferred by the doctor. The success rates of the TTA and TPLO when paired with 2-4 months of rehabilitation are above 85%, with many dogs achieving a return to full activity.

POST-OPERATIVE REHAB



Therapeutic ultrasound treatment of a hip

Post-surgical physical therapy has long been a standard of care in human medicine, compared to the veterinary approach of forced rest. Confinement and activity restriction are vital parts of recovery, but rehabilitation exercises will greatly improve the outcome.

Benefits include:

- Pain relief
- Decreased inflammation and swelling
- Improved balance and proprioception
- Mobilization of tissue
- Improved limb and joint biomechanics
- Weight loss
- Improved cardiovascular and respiratory fitness

A rehabilitation consultation will help determine what combination of therapies would be most beneficial for the pet. Typically, a hydrotherapy regimen is recommended on a weekly to bi-weekly basis for a series of ten sessions. Upon completing that block, the doctor evaluates the dog's progress to assess the response to treatment. Joint care supplements, non-steroid anti-inflammatory medications and herbs that support tendon and ligament health may be suggested on a maintenance basis depending on the pet's age, overall orthopedic health and activity level.

Peer-reviewed articles citing benefits of rehabilitation:

- Johnson JM, Johnson AL, Pijanowski GJ, et al. Rehabilitation of dogs with surgically treated cranial cruciate ligament-deficient stifles by use of electrical stimulation of muscles. *Am J Vet Res* 1997;58:1473-1478
- Taylor RA. Postsurgical physical therapy: the missing link. *Compend Contin Educ Pract Vet* 1992;14:1583-1594
- Simkin PA, Huang A, Benedict RS. Effects of exercise on blood flow to canine articular tissues. *J Orhtop Res* 1990;8:297-303
- Millis DL, Levine D. The role of exercise and physical modalities in the treatment of osteoarthritis. *Vet Clin North Am Small Anim Pract* 1997;27:913-930