

# Cranial Cruciate Ligament Injury

## ABOUT THE DIAGNOSIS

**CAUSE:** In dogs and cats, as in humans, ligaments are tough connective tissue structures that normally stabilize joints and are indispensable to the proper function of joints. Whereas tendons connect muscles to bones, ligaments connect bone to bone. The cranial cruciate ligament is one of the ligaments that provides essential support to the knee, which in animals is referred to as the stifle joint. The cranial cruciate ligament is located in the hind leg, between the upper or thigh bone (femur) and the parallel middle hind leg bones, the tibia (shin bone) and fibula. The cranial cruciate ligament in dogs and cats is the same ligament as the anterior cruciate ligament (ACL) in humans.

The cranial cruciate ligament can rupture suddenly as the result of certain traumatic movements, or gradually as the result of degeneration. Causes of degeneration include aging, immune-mediated disease, and, most commonly, certain leg conformations in which the shape of the stifle joint in certain individuals puts lifelong, undue stress on the cranial cruciate ligament. The ligament can degenerate slowly over time, becoming weaker and culminating in a sudden, complete rupture. When this ligament ruptures, either partially or completely, dynamics of the knee joint are altered, and the joint becomes painful and unstable. The most common result is immediate limping (also called lameness or “favoring the leg”) which, if uncorrected, leads prematurely to arthritis, degeneration of cartilage in the joint, chronic pain, and difficulty using the leg.

Although any dog can suffer a ruptured cranial cruciate ligament, it is diagnosed most commonly in larger dogs (over 20 pounds), and occasionally occurs in cats.

**SYMPTOMS:** Cranial cruciate ligament rupture (partial or complete) is the most common cause of hindlimb lameness (limping) in medium- and large-breed dogs. A sudden or intermittent lameness in the hindlimb is the chief symptom. Intermittent lameness may typically appear worse after extended walks or running. Some dogs hold the affected leg up and off the ground when standing, but this symptom is commonly observed in many orthopedic conditions, not just in cruciate ligament injury.

**DIAGNOSIS:** A ruptured cranial cruciate ligament produces symptoms that are nonspecific. That is, limping from a ruptured cranial cruciate ligament can appear identical to limping from a totally different problem, such as a muscle/tendon sprain, injuries to other ligaments, arthritis, and bone disorders such as panosteitis, hypertrophic osteodystrophy, or even certain bone tumors. Since the symptom of limping does not differentiate between these disorders, several tests can be performed to pinpoint the cause of the limping and confirm or eliminate the possibility of cranial cruciate ligament rupture. Your veterinarian will take a complete medical history and may ask you about the duration and appearance of symptoms, any medications you have given, and so on. He/she will observe your dog’s or cat’s gait (pattern of walking). Then by moving the joint through various motions and with careful palpation (feeling with the fingers), your veterinarian can help narrow the list of possible causes of limping and determine whether cranial cruciate ligament injury is likely. The cranial drawer test is an important and simple manipulation that can be very helpful in diagnosing a complete cranial cruciate rupture. For this test, your dog or cat may be sedated or anesthetized to totally relax the muscles around

the stifle joint. The test is positive if the bones can be moved a certain way, indicating ligament discontinuity. The range of motion is determined and compared with the opposite knee. While deep sedation or anesthesia is underway, x-rays often are taken of the stifle joints in each hind leg, since this helps assess the possibility of other disorders that might mimic cranial cruciate rupture, and if indeed cranial cruciate rupture is present, the x-rays are useful for identifying any secondary damage such as arthritis.

## LIVING WITH THE DIAGNOSIS

Dogs and cats with cranial cruciate rupture may have waxing and waning lameness (“good days and bad days” of limping) until the ligament is surgically repaired. Failure to repair the ligament surgically is detrimental in the long term because the unstable joint becomes chronically inflamed, prompting scarring within the joint, and ultimately, potentially severe arthritis is the result.

If medication is part of your pet’s treatment, it must be given exactly as directed. It is also important to stop giving medication when directed. When taking antiinflammatories, the dog or cat may feel very little or no pain, and therefore, it is important to prevent vigorous exertion as much as possible because it might injure the knee even more severely.

Surgery provides the best long-term function of the affected knee. Degenerative joint disease (arthritis) can eventually develop or continue to progress in the joint even with surgery, but the rate and severity of this irreversible complication is much lower once surgery is performed.

In 40%-60% of dogs or cats with cranial cruciate ligament rupture, the ligament in the opposite knee will eventually rupture, and therefore, vigilance for the onset of limping in the opposite hindlimb is important.

## TREATMENT

Surgery is the only definitive treatment for any dog or cat with a ruptured cranial cruciate ligament. Patients that undergo surgery to stabilize the joint have optimal long-term function.

Dogs weighing under approximately 20 pounds, and cats, are sometimes treated in a more conservative fashion, such as strict rest for up to 6 weeks and antiinflammatory medication for a short period and no surgery. This simpler approach may provide resolution of lameness and relief of symptoms in these smaller pets. The joint is not as stable as it would be if surgery had been performed, and degenerative joint disease (arthritis) usually develops. To compensate, more stress is placed on the other hindlimb, which may lead to a ruptured ligament in that knee, but the risk may be worth considering in smaller patients because the likelihood of such problems is lower than it is in large dogs.

There are several surgical techniques that can be used for stabilizing the knee. Your veterinarian may prefer one or may refer you to a veterinary surgical specialist ([www.acvs.org](http://www.acvs.org)).

Post-operative care. Appropriate postsurgical care and physical rehabilitation are extremely important. After surgery, your dog or cat must not be allowed to jump on and off furniture or go up and down steps after surgery until your veterinarian gives permission. This typically implies 2 to 3 months of exercise restriction and motion restriction of this kind. Without exercise restriction, the surgical repair may break down, requiring another surgery and raising the likelihood of more complications. A soft bandage with or without a splint is placed on the leg at the end of surgery and may remain

on the leg for up to 2 weeks, depending on the surgical technique. This bandage must be kept clean and dry. A plastic bag can be wrapped around the leg each time your pet goes outside to keep the bandage clean and dry and can then be removed indoors. Initially, short leash walks on flat surfaces with good traction are encouraged, to allow tissue healing and convalescence. The length of walking time is gradually increased (usually weekly), and different, more challenging terrains are encouraged until the dog or cat is able to climb stairs. In most cases, normal activities are resumed postoperatively by 12 weeks after the surgery.

Therapy may also include range-of-motion exercises, whirlpool treatments, and swimming. Your veterinarian can discuss these options with you and establish a physical rehabilitation program during the post-operative period.

### DOs

- Inform your veterinarian if your cat or dog has ever been diagnosed with a medical condition and is taking medication. These may influence how a cranial cruciate ligament rupture can be best treated.
- Give medication exactly as directed by your veterinarian, and if you are concerned about possible negative effects, discuss them with your veterinarian immediately rather than simply discontinuing the treatment.
- Keep bandages and incisions (stitches and surgery line) clean and dry, even if this means using an Elizabethan (cone) collar to prevent licking.
- Prevent all jumping, climbing, and running for the full 3-month period after cruciate ligament surgery, and then reintroduce activity gradually. This is **critically important**, even when, as most dogs do, your dog gives you the impression of being fully recovered before the 3-month period is up. Active and cheerful dogs often have no idea that their tissues are still healing and can do severe, even irreversible damage to the knee if not prevented from being active during the 3-month convalescence period.

### DON'Ts

- Do not delay visiting your veterinarian if you notice lameness (limping) involving any of your dog's or cat's limbs, even if it is only intermittent. Early diagnosis and treatment can limit any permanent damage and therefore improve the outcome (prognosis).

### WHEN TO CALL YOUR VETERINARIAN

- If you cannot keep a scheduled appointment.
- If you are unable to give medication as directed.

- If you are unable to follow the physical therapy regimen after surgery.
- If your dog or cat is not improving after surgery and pain and lameness increase.
- If you notice liquid discharge, worsening redness or swelling, or a foul odor coming from a surgical incision site or bandage or if stitches are chewed out.

### SIGNS TO WATCH FOR

- General signs of illness: lethargy, weakness, decreased appetite, other behavior changes. These rarely occur from cranial cruciate ligament rupture alone, but could be signs of intolerance to medication (if you are giving any) or signs of other unrelated medical problems that need to be identified and managed at the same time as the cranial cruciate ligament rupture.
- Signs of a ruptured cranial cruciate ligament: sudden or intermittent lameness of a rear limb, onset of lameness after exercise. This could be the first sign in an otherwise healthy pet, or the sign of a recurrent problem if cranial cruciate ligament has occurred previously.

### ROUTINE FOLLOW-UP

- Follow-up visits are required after surgery to remove bandages and sutures/staples and to monitor progress. The schedule depends on the type of surgery performed and the physical therapy program.

*Other information that may be useful postoperatively: "How-To" Client Education Sheets:*

- How to Perform Range of Motion Exercises
- How to Provide General Postoperative Care at Home
- How to Monitor a Surgical Incision during Healing

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