# Cruciate Ligament Rupture in Dogs

## What and where are the cruciate ligaments?

The word cruciate means “to cross over” or “form a cross”. The cruciate ligaments are two bands of fibrous tissue located within each knee (stifle) joint. They join the femur and tibia together (the bones above and below the knee joint), so the knee works as a stable, hinged joint.

One ligament runs from the inside to the outside of the knee joint and the other from the outside to the inside, crossing over each other in the middle. In dogs and cats, the ligaments are called the cranial and caudal cruciate ligaments. In dogs, the most common knee injury is a rupture or tear of the cranial cruciate ligament.

Humans have a similar anatomical structure to the dog's knee, but the ligaments are called the anterior and posterior cruciate ligaments. Anterior cruciate ligament (ACL) rupture is a common knee injury in athletes.

## How does a cranial cruciate injury occur?

The knee joint is a hinge joint. It is relatively unstable because there are no interlocking bones in the joint. Instead, it is held together by several ligaments, including the cruciate ligaments, which allow it to move back and forth like a hinge, but restrict its side-to-side motion.

The two most common causes of cranial cruciate rupture are degeneration and trauma. The most common cause, chronic degeneration, is caused by a slow, progressive weakening of the ligaments. Many factors may contribute to this degeneration, including obesity, abnormal bone or limb shape causing abnormal joint stress, immune-mediated disease, and spaying or neutering.

Initially, the ligament becomes stretched or partially torn and lameness may be only slight and intermittent. With continued use of the joint, the condition gradually gets worse until a complete rupture occurs.

Acute or traumatic cruciate rupture is caused by a twisting injury to the knee joint. This twisting occurs most often when the dog (or athlete) is running and suddenly changes direction, placing most of the body weight on the knee joint, while excessive rotational and shearing forces are placed on the cruciate ligaments. This injury usually affects the anterior or cranial (front) ligament. A cruciate ligament rupture is usually painful and the knee joint becomes unstable, resulting in lameness.

Dogs with other knee problems, such as a luxating patella, may also be predisposed to rupturing their cruciate ligaments. Dogs who rupture one cranial ligament are predisposed to rupturing the cranial cruciate ligament in the other knee.

## How is it diagnosed?

With traumatic cruciate rupture, the usual history is that the dog was running and suddenly stopped or cried out and was then unable to bear weight on the affected leg. Many pets will "toe touch," placing only a small amount of weight on their injured leg.

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During the lameness examination, your veterinarian will try to demonstrate a particular movement, called a cranial or anterior drawer sign. This abnormal forward movement of the lower leg bone (tibia) in front of the thigh bone (femur) indicates laxity or instability in the knee joint. It may be necessary to administer a sedative to relax the dog enough that the veterinarian can perform this test. Other diagnostic tests such as X-rays (radiographs) may also be necessary.

## Is other joint damage common?

Inside the knee joint are pieces of cartilage called menisci. The menisci act as shock absorbers between the femur and tibia. The menisci are often damaged when the cruciate ligaments rupture. They are usually repaired at the same time as the ligament.

## Is an operation always necessary?

All dogs that sustain a cruciate ligament injury will develop osteoarthritis, but surgery can slow its progression. Dogs weighing less than 15 kg (33 lb) may be able to compensate well without surgery, at least initially, especially if their pain is well managed and their exercise is carefully controlled and adjusted based on their ability. This process is often guided by a veterinary rehabilitation specialist.

Dogs over 15 kg (33 lb) usually require surgery to stabilize the knee. Unfortunately, most dogs eventually require surgery to correct this painful injury. Consult your veterinarian to determine the best course of treatment for your dog.

## What does surgery involve?

There are various surgical techniques to stabilize the knee joint following cruciate rupture. The repair techniques fall into two broad categories, the first of which is extracapsular techniques (meaning the repair is **outside** the joint capsule of the knee joint). The surgeon inspects the joint, removing fragments of the ruptured ligament and repairing the menisci if needed, then fashions an artificial ligament (usually placed outside the joint capsule) to stabilize the joint and prevent abnormal motion. See handout "Cranial Cruciate Ligament Repair: Extracapsular Repair" for further information.

The other commonly used surgical techniques are tibial plateau leveling osteotomy (TPLO) and tibial tuberosity advancement (TTA). Both are especially beneficial for larger, more athletic dogs. Your veterinarian will discuss the best treatment option for your pet. See handouts "Cranial Cruciate Ligament Repair: Tibial Plateau Leveling Osteotomy (TPLO)" and "Cranial Cruciate Ligament Repair: Tibial Tuberosity Advancement (TTA)" for further information on these procedures.

## Is postoperative care difficult?

It is important that your dog has limited activity for at least six to eight weeks after surgery. The activity restriction may be less if a TPLO or TTA has been performed. Provided you can carry out your veterinarian's instructions, good function should return to the limb within three months.

Unfortunately, regardless of the technique used to stabilize the joint, arthritis is likely to develop in the joint as your dog ages. Arthritis develops more slowly and to a lesser degree if the dog undergoes surgery. Weight control and nutritional supplements such as glucosamine/chondroitin may help delay the onset of arthritis in your pet (see handout “Glucosamine Chondroitin Combination” for more information on this supplement).

Many dogs receive physical therapy after surgery to speed up recovery and reduce complications. Your veterinarian will discuss your pet's recommended postoperative care with you prior to surgery.

## Is obesity such a problem?

Obesity or excess weight can predispose dogs to cruciate ligament rupture or tear. If your dog is overweight, the postsurgical recovery time will be much longer. Obesity also greatly increases the risk of injury to the other knee, especially during the recuperation period. Weight loss is as important as surgery in ensuring a rapid return to normal function. Weight loss also helps protect your dog against this debilitating injury. Your veterinarian can help to develop an appropriate weight-loss plan for your pet.