

## **Cranial Cruciate Ligament Disease**

The cranial cruciate ligament (CCL) is the primary ligament that stabilizes the stifle (knee). CCL disease is a chronic process whereby the CCL degenerates and causes pain, instability, and osteoarthritis. Eventually the ligament ruptures, further increasing instability and pain in the joint. Usually, clinical signs of lameness are not readily appreciated until the ligament ruptures. CCL disease most commonly affects middle-aged, large and giant-breed dogs, but it occurs somewhat frequently in smaller dogs and occasionally in cats. The disease usually occurs in one leg, but rupture of the CCL in the other leg is common within 6-12 months following the first ligament tear. Sometimes instability of the stifle results in injury to the medial meniscus. The menisci are two C-shaped cartilages in the knee. The medial meniscus (on the inside of the knee) is torn in about 50% of these cases.

The cause of CCL is greatly debated. The shape of the tibial plateau (the upper end of the tibia, which is the large bone just below the knee), combined with various other factors including genetics, has been implicated.

Although CCL disease is a chronic, progressive condition, in many cases sudden onset of lameness occurs in association with activity. If not immediately treated, the lameness often improves to some degree but does not completely resolve. Signs typical of arthritis (lameness that is worse with rest and improves with mild exercise, stiffness, and muscle wasting) are usually present and worsen with time.

Orthopedic examination reveals varying degrees of stiffness, fluid, pain, and crepitus (crunching sound) in the stifle. The inside edge of the stifle is often thickened as well. Thorough examination of the stifle with the animal under sedation often reveals excessive instability, particularly excessive movement of the tibia with respect to the femur (large thigh bone). X-rays may reveal signs of osteoarthritis (degenerative arthritis) and malalignment of the tibia with the stifle, but they cannot show a ruptured ligament or torn meniscal cartilage. Sometimes the diagnosis is confirmed only at the time of surgery or with arthroscopy (passage of a fiberoptic viewing scope into the stifle).

The best treatment for CCL disease is greatly debated. Medium, large and giant breed dogs recover quicker and regain the best function with surgery. Small dogs and cats are often treated initially with restricted exercise and medical therapy. (See the article on Osteoarthritis: Medical Management.) In these latter animals, surgery is reserved for those that do not respond to medical therapy. Numerous techniques are available for stabilizing the stifle. Keep in mind that the phrase "cruciate repair" is inaccurate, because in CCL disease the ligament is always beyond repair. Surgery is actually designed to improve stability of the joint. Available surgical techniques can be divided into three different types: Intra-articular techniques that

create a new ligament and involve opening the joint, such as patellar tendon or biceps fascia grafting. Extracapsular techniques that stabilize the stifle via surgery outside the joint, such as fibular head transposition and lateral suture placement. Biomechanical techniques that change the angles and forces within the stifle, such as tibial plateau-leveling osteotomy (TPLO) and tibial tuberosity advancement (TTA). Currently, no single technique has been proven to be superior. Biomechanical techniques are often favored for large and giant breeds, whereas extracapsular techniques are often used for smaller dogs and cats (and in some situations for larger dogs). Many of the described techniques can have good results in the hands of a capable veterinary surgeon. If the medial meniscus is damaged, it is removed.

Regardless of which technique is chosen, strict restriction of activity for at least 8-10 weeks after surgery is critical for ultimate success. The incision is observed daily for excessive redness, swelling, pain, or discharge. Physical rehabilitation and/or exercises at home also greatly improve the outcome of surgery.

Most dogs return to normal or near-normal function following surgery, appropriate activity restriction, and rehabilitation. Dogs with a torn meniscus have a slightly worse prognosis, but generally the outcome is still good. Dogs with osteoarthritis may require continued medical therapy if the signs do not completely resolve with surgery.