Cranial Cruciate Ligament Disease in Dogs

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Introduction

Cranial cruciate ligament disease (CCLD) is caused by a gradual degeneration of the cranial cruciate ligament (CCL), which results in a partial or complete ligament tear. CCLD is the most commonly diagnosed disorder of the canine stifle joint[1] and is the orthopedic disease most commonly treated surgically in practice.

Patients can present with a variety of signs; some are easily recognizable and easy to diagnose, while others are less obvious, making diagnosis more challenging.

The CCL serves 4 functions[2]:

- Prevention of cranial tibial thrust (CTT)
- Prevention of hyperextension of the stifle
- Prevention of excessive internal rotation of the stifle
- Proprioception

Tear or rupture of the ligament allows excessive movement in the stifle, causing lameness and pain. (See **Table 1**, page 38.)

▲ **FIGURE 1** Proper hand positioning and technique for assessing cranial tibial thrust

CCLD occurs in dogs of all sizes at different ages. (See **Table 2**, page 38.) Dogs that are female, obese, or older are at higher risk for CCLD.[3,4] A genetic link has been documented in the Newfoundland breed that may also be present in other breeds.[5]

See videos of Cranial Drawer & Cranial Tibial Thrust testing at **brief.vet/ccld-dogs**

TABLE 1
Cranial Cruciate Ligament Signs

Typical History	Clinical Signs
3-legged gait	Sloppy sit
Limping	Stifle effusion
Slow to rise (when bilateral)	Pain on stifle palpation and manipulation (hyperextension)
Trouble climbing stairs	Hind-limb lameness

TABLE 2
Breeds Commonly Affected by CCLD

Breeds	Age Typically Affected	Signs
LARGE[4,16,17]		
Labrador retriever Newfoundland Rottweiler	2-6 years	Weight-bearing to non-weight-bearing lameness; pain on stifle hyperextension, palpable joint effusion, and stifle thickening
SMALL[4,16,17]		
Bichon frise West Highland white terrier Yorkshire terrier	<8 years	Can be associated with medial patellar luxation
OTHER[16,17]		
Boxer Mastiff Pit bull terrier	<2 years	Disease is often bilateral

Diagnosis

Physical examination should include gait observation and careful orthopedic examination, including stifle palpation and manipulation.

Simple presentations of CCLD include high-grade lameness (ie, toe-touching lameness to non-weight-bearing lameness) with obvious cranial drawer (CD) and CTT.[6] Evaluation of CD signs and CTT, which are diagnostic tests for CCLD, should be performed during examination. (See **Figure 1**, page 37, & **Cranial Drawer & Cranial Tibial Thrust Tests**.)

If ligament degeneration has been present for several months or longer, thickening of the medial aspect of the stifle joint, known as medial buttress, is likely present. This fibrous tissue forms to help stabilize the joint[4] and can be palpated during orthopedic examination. All patients with CCLD will have pain on hyperextension of the stifle; in fact, this is likely the earliest finding on examination after the patient becomes lame.[6]

Approximately half of patients with CCLD will also have a torn medial meniscus. During stifle range of motion, a meniscal click may be heard, and these patients are typically painful on hyperflexion of the stifle joint.[6-10]

Chronic partial tears are more difficult to diagnose, as many patients with partial tears have negative or mild CD signs and CTT because of periarticular fibrosis. These patients often have a history of chronic, lower-grade lameness. Some degree of medial buttress may be palpable on examination, and hyperextension will elicit pain.[5]

Radiographs should be obtained in patients with suspected CCLD to aid in diagnosis, rule out other diseases, and plan for surgery. Sedation can aid in proper positioning. On radiographs, stifle joint effusion and osteophytosis of the patella, femur, and/or tibia can be seen.

Treatment

Surgical treatment of CCLD results in faster healing time and the most favorable return to function.[11,12] Many procedures have been developed to treat CCLD, including extracapsular lateral suture stabilization (ELSS) and osteotomy-based techniques such as tibial plateau leveling osteotomy (TPLO) and tibial tuberosity advancement (TTA). Board-certified surgeons currently perform TPLO and TTA more often than ELSS in both large- and small-breed dogs because osteotomy procedures are perceived to result in a more rapid return to full function.[13] More recently, the literature has supported the superiority of TPLO over ELSS, with dogs returning to more normal function with TPLO as compared with ELSS.[13-15] Currently, there is insufficient data comparing all available surgical techniques simultaneously to come to a strong scientific conclusion; hence, anecdotal clinical experience continues to play a major role in surgical technique selection.

Most patients that receive appropriate postoperative care return to normal function within 3 to 6 months. Strict exercise restriction for 6 to 8 weeks is required following all surgeries to ensure proper healing without implant system failure. An E-collar is recommended while the incision is healing because stifle surgeries have a higher than average postoperative infection rate and patients tend to lick and chew their incisions.

TAKE ACTION

1. Create a client information handout explaining the details of CCLD to ensure clients with pets experiencing this common condition receive a consistent message.
2. Evaluate all patients with hind-limb lameness for CCLD, and perform a complete orthopedic examination, including cranial drawer and cranial tibial thrust tests.
3. Take time to impress on clients the importance of CCLD postoperative care to achieve an optimal outcome for the patient.

Conclusion

It is imperative that clients whose dogs have CCLD understand the following:

- Surgery is required to achieve the most optimal outcome.
- Postoperative care rules must be followed to minimize complications and help ensure a successful outcome.
- Full recovery takes months.
- Even with surgery, varying degrees of arthritis will still be present.

CCLD is commonly diagnosed in a variety of breeds and can be successfully treated surgically, but client understanding and compliance is paramount to success.

Cranial Drawer & Cranial Tibial Thrust Tests

CRANIAL DRAWER TEST

- Place one hand on the distal femur with the thumb on the caudal aspect of the condyle and the index and middle fingers on the patella.
- Place the thumb of the other hand on the fibular head and the index and middle fingers on the tibial tuberosity.
- Slide the tibia cranial to the femur; if the tibia slides cranially, the CD is positive.

CRANIAL TIBIAL THRUST TEST

- Place one hand on the distal femur.
- Firmly flex the hock (talocrural joint) with the other hand, while maintaining a static angle of the stifle.
- With positive CTT, the tibia translates cranially (ie, thrusts) relative to the femur during flexion of the tarsus; with complete CCL tears, a CCLD diagnosis is straightforward.

Surgical treatment of CCLD results in faster healing time and the most favorable return to function.

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FUN FACT: When not practicing, Dr. Maritato enjoys traveling the world with his wife. They have 3 cats.