

Cranial Cruciate Ligament Disease

Basics

OVERVIEW

- The “stifle” is the knee joint of the dog; it is the joint between the large upper thigh bone (the femur) and the two lower leg bones (tibia and fibula)
- A “ligament” is a band of connective or fibrous tissue that connects two bones or cartilage at a joint; the “cranial cruciate ligament” is the ligament that connects the inner, back part of the femur with the tibia—it helps to stabilize the stifle joint
- “Cranial cruciate ligament disease” is the sudden (acute) or progressive failure of the cranial cruciate ligament, which results in partial to complete instability of the stifle joint
- “Cranial cruciate rupture” is the tearing of the cranial cruciate ligament; it is the most common cause of rear-leg lameness in dogs and a major cause of degenerative joint disease (progressive and permanent deterioration of joint cartilage) in the stifle joint; rupture may be partial or complete



GENETICS

- Unknown
- May be important in increasing the likelihood of active stifle restraint deficiencies and/or conformation abnormalities

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats—uncommon

Breed Predispositions

- All susceptible, especially large to giant breeds
- Rottweilers and Labrador retrievers—increased incidence when less than 4 years of age
- West Highland white terrier, overrepresented small breed

Mean Age and Range

- Dogs, incidence increases when greater than 5 years of age
- Large-breed dogs—earlier at 1–2 years of age

Predominant Sex

- Spayed female

SIGNS/OBSERVED CHANGES IN THE PET

- Related to the degree of rupture (partial versus complete), the mode of rupture (sudden [acute] versus long-term [chronic]), the presence of other injury to the stifle (meniscus cartilage cushion), and the severity of inflammation and degenerative joint disease
- May occur in both hind limbs
- History of athletic or traumatic events—generally precede sudden (acute) injuries
- Normal activity resulting in sudden (acute) lameness—suggests degenerative rupture; “degeneration” is the slow decline or loss of function or structure of a tissue
- Subtle to marked intermittent lameness (for weeks to months)—consistent with partial tears that are progressing to complete rupture
- Sudden (acute) cranial cruciate rupture results in non-weight-bearing lameness, fluid buildup in the joint (known as “joint effusion”), swelling on the inside of the stifle joint (medial buttress), and the affected leg held in partial flexion while standing
- “Cranial drawer test”—specific manipulation evaluating the status of the cranial cruciate ligament; diagnostic for cranial cruciate rupture, a tibial compression test is used to support the diagnosis, a click or pop is indicative of meniscus injury 63% of the time
- Decrease in muscle mass (known as “muscle atrophy”) in the rear leg—especially the quadriceps muscle group
- Nervous or painful dogs or those with chronic or partial tears may be challenging to diagnose on physical exam, sedation or anesthesia may be needed to allow the tissues to relax

CAUSES

- Trauma
- Repetitive microinjury to the cranial cruciate ligament
- Excess stifle loading
- Progressive degeneration

RISK FACTORS

- Obesity
- Kneecap (known as the “patella”) dislocation (known as a “patellar luxation”)
- Poor conformation
- Abnormalities of the bones making up the stifle

Treatment

HEALTH CARE

- Stabilization surgery recommended for all dogs
- Following surgery—ice packing and physical therapy (such as range-of-motion exercises, massage, and muscle electrical stimulation); important for improving mobility and strength
- Conservative (non-surgical) management uses anti-inflammatory/pain medicine and rest, physical rehabilitation, weight loss –this program produces normal function > 1 year in 66% of dogs

ACTIVITY

- Restricted—with conservative medical treatment and immediately after surgical stabilization; duration of activity restriction depends on method of treatment and progress of pet

DIET

- Weight control—important for decreasing stress on the stifle joint
- Joint health diets rich in omega-3 fatty acids and joint protectants may support overall joint health

SURGERY

- Stabilization surgery—recommended for all dogs; speeds rate of recovery; reduces degenerative joint changes; enhances function, full return to athletic function is possible, but needs early intervention and proper rehabilitation to provide full benefit
- Various surgical techniques are available to treat cranial cruciate rupture, none have been shown to be

consistently superior to any other, partial meniscus removal may be done concurrent to the ligament repair when it is damaged, it improves comfort but loss of part of it can reduce meniscus function (shock absorber), and contribute to arthritis

Extra-Articular Methods

- Variety of techniques that use a heavy-gauge implant to tether the tibia to the femur and restore stability
- Implant material—placed in the approximate plane of the cranial cruciate ligament attachments to the bones (femur and tibia)

Intra-Articular Methods

- Designed to replace the cranial cruciate ligament anatomically
- Uses various materials to “act” as the ligament, including autografts (patella ligament, fascia), allografts (bone-tendon-bone), and synthetic materials

Osteotomy Methods

Cranial Tibial Closing Wedge Osteotomy

- Level by removing a wedge-shaped piece of bone, held in place by a special bone plate and screws

Tibial Plateau Leveling Osteotomy (TPLO)

- Surgical cutting (known as a “rotational osteotomy”) of the tibia
- Held in place with a special plate and screws

Tibial Tuberosity Advancement (TTA)

- Surgical procedure in which part of the tibia is cut (procedure known as a “tibial crest osteotomy”), crest is held in an advanced position with a cage and plate, bone graft fills the defect
- Active control of cranial tibial displacement is improved which helps stabilize the stifle

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Nonsteroidal anti-inflammatory drugs (NSAIDs)—minimize pain; decrease inflammation; examples include meloxicam, carprofen
- Medications intended to slow the progression of arthritic changes and protect joint cartilage (known as “chondroprotective drugs”), such as polysulfated glycosaminoglycans, glucosamine, and chondroitin sulfate—may help limit cartilage damage and degeneration; may help alleviate pain and inflammation
- Pain relievers (known as “analgesics”)

Follow-Up Care

PATIENT MONITORING

- Depends on method of treatment
- Most surgical techniques require 2–4 months of rehabilitation

PREVENTIONS AND AVOIDANCE

- Avoid breeding pets with conformational abnormalities

POSSIBLE COMPLICATIONS

- Second surgery may be required in 6% to 22% of cases, because of subsequent damage to the meniscus (a crescent-shaped cartilage located between the femur and tibia in the stifle)
- Approximately 37–48% of dogs with cranial cruciate ligament rupture involving one leg will rupture the ligament in the opposite leg at a later date, requiring a second surgery

EXPECTED COURSE AND PROGNOSIS

- Regardless of surgical technique, the success rate generally is better than 85%

Key Points

- Regardless of the method of treatment, some degenerative joint disease (progressive and permanent deterioration of joint cartilage) is common

- Approximately 37–48% of dogs with cranial cruciate ligament rupture involving one leg will rupture the ligament in the opposite leg at a later date
- Return to full athletic function is possible but requires considerable rehabilitation

Blackwell's Five-Minute Veterinary Consult: Canine and Feline, Sixth Edition, Larry P. Tilley and Francis W.K. Smith, Jr. © 2015 John Wiley & Sons, Inc.