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## **Cranial Cruciate Ligament Rupture**

Cranial cruciate ligament rupture (CCL) is the tearing of an important ligament in the stifle joint (knee), resulting in partial or complete joint instability, pain, and lameness. Torn ligaments retract, do not heal, and thus cannot be repaired if any length of time is allowed to pass. If the injury is not treated, damage to connective tissues and degenerative joint disease often results.

### **Anatomy**

The femur (large bone of the thigh) and the tibia and fibula (two smaller bones in the shin) meet to form the stifle joint. Articular cartilage attaches to and covers the ends of bones, protecting and cushioning them. Ligaments, tendons, and muscles hold the bones in place, stabilize the joint, and enable movement. A joint capsule, filled with nourishing and lubricating synovial fluid, surrounds the entire joint.

Four major ligaments (dense bands of fiber) support and stabilize the stifle joint by connecting the femur to the tibia and the joint capsule to the bones. The medial and lateral collateral ligaments are located outside the joint and the caudal and cranial cruciate ligaments are located inside the joint.

The cranial cruciate ligament (CCL) attaches to the femur, runs across the stifle joint, and attaches to the tibia. The CCL holds the tibia in place and prevents internal rotation and hyperextension.

The meniscus (fibrocartilage located between the femur and tibia) absorbs impact and provides a gliding surface between the femur and tibial plateau. The patella (kneecap) protects the tendon of insertion of the cranial thigh muscles.

### **Incidence and Prevalence**

Cranial cruciate ligament (CCL) rupture occurs in both dogs and cats. It is more often seen in older dogs.

CCL is one of the most common orthopedic injuries in dogs and is the most common cause of degenerative joint disease in the stifle joint. Overweight and poorly conditioned dogs have a higher incidence. CCL rupture occurs in dogs of all sizes, but is most prevalent in large and giant breeds including:

- Boxers

- Collie breeds
- Mastiffs
- Shepherds
- Retrievers
- Rottweiler
- Saint Bernard

Chronic onset (degeneration and rupture usually from aging) occurs in 80% of cases and occurs in dogs 5 to 7 years old. Acute onset (tear caused by injury) is most common in dogs under 4 years old. Young dogs of large breeds are more susceptible to rupture than young dogs of small breeds.

### **Causes**

Acute rupture of the cranial cruciate ligament (CCL) is caused by sudden, severe twisting of the ligament. The injury usually occurs when the animal steps in a hole while running or turns with its paw remaining planted. The twisting motion causes the ligament to hyperextend or rotates excessively and partially or completely ruptures. The meniscus is often damaged as well.

Chronic rupture occurs after the ligament has degenerated with age. The fibers weaken and partially tear, the joints become unstable, and degenerative joint disease develops. A partially torn CCL eventually tears completely.

### **Risk Factors**

Risk Factors include the following:

- Age
- Arthritis
- Injury to stifle or joint
- Large or giant breed
- Overweight
- Poor musculature near the joint
- Structural abnormalities (e.g., bow-legged, luxating patella)

*Updated/Revised 12/2012*