

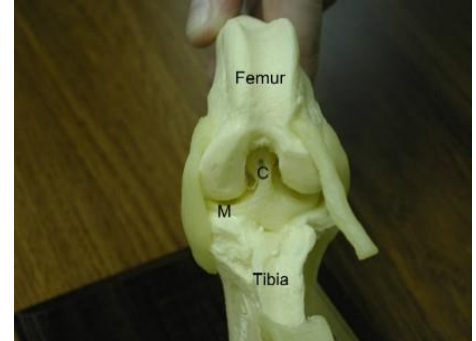
Cranial Cruciate Ligament Disease

Extended Version

Classic case: Overweight rottweiler with pelvic limb lameness that worsens with exercise.
Holds up affected limb when standing.

Presentation:

- Torn cranial cruciate ligament **common in dogs**, uncommon in cats
- **Acute or progressive** onset
- **Large breed dogs**, particularly: Rottweilers, Labrador retrievers, Newfoundlands, Staffordshire terriers.
- Genetic predisposition in Newfoundlands and boxers
- Risk factors: hyperadrenocorticism, autoimmune disease, cutaneous asthenia, overweight
- Clinical signs
 - Variable pelvic limb lameness, unilateral or bilateral
 - Holds up affected limb or non-weightbearing
 - Stifle externally rotated, ncreased flexion when walking
 - Improvement with rest, worsening with exercise
 - **Joint effusion** and thickening of joint capsule – most pronounced over medial aspect of proximal tibia (medial buttress formation)
 - Asymmetry while sitting – affected stifle abducted
 - ± Cranial drawer sign: manual cranial displacement of proximal tibia relative to distal femur
 - ± Cranial tibial thrust: cranial movement of tibial tuberosity as hock is manually flexed and gastrocnemius contracts
 - ± Meniscal click



Anatomy of the canine stifle joint. C = cranial cruciate, M = medial meniscus
Image courtesy, Vet Surgery Central

DDX: Patella luxation, lumbosacral disease, hip dysplasia, iliopsoas strain, bone neoplasia, osteochondrosis, infection (bacterial, rickettsial, or fungal), immune-mediated arthritis, caudal cruciate or collateral ligament injury, long digital extensor tendon avulsion, isolated meniscal injury (almost exclusively in boxers)

Test of choice:

- **Physical exam-Characteristic lameness**
 - **Palpable stifle effusion**
 - ± Cranial drawer sign;
 - ± Cranial tibial thrust (these may require sedation to elicit)
 - Always compare to contralateral limb if questionable findings
- **Radiography** – lateral and craniocaudal stifle
 - Fat pad compression in cranial joint
 - **Effusion in nearly all patients** –Extension, caudal joint capsule
 - DJD in chronic cases (longer than a few weeks)
 - Trochlear ridge
 - Caudal surface of tibial plateau
 - Distal pole of patella
 - Static drawer (cranial displacement of the tibia relative to the femur)
 - Tibial plateau slope angle (for planning surgery) - the angle between a line perpendicular to the long axis of the tibia and a line parallel to the tibial plateau
- **Arthroscopy**
- MRI – probably not necessary in the majority of cases



Arthroscopic image showing partial cranial cruciate ligament tear
Image courtesy, Vet Surgery Central

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Rx of choice:

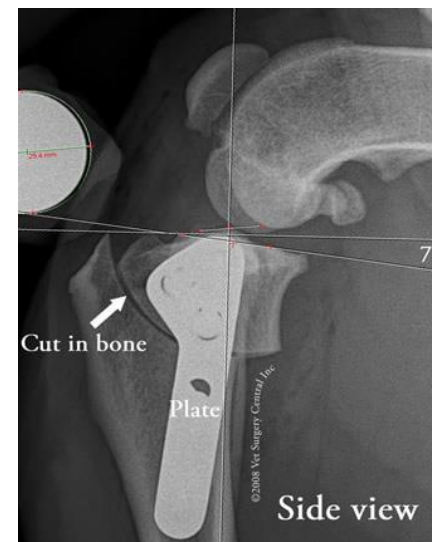
- Medical treatment (with or without surgical stabilization)
 - Physical **rehabilitation**: leash walks, swimming, water treadmill, sit-to-stand exercises
 - **NSAIDs** (Carprofen, Meloxicam, etc)
 - Disease-modifying osteoarthritis agents
 - Polysulfated glycosaminoglycan
 - Pentosan polysulfate
 - Glucosamine, chondroitin sulfate
- **Surgical stabilization**-multiple options, depends on patient, surgeon
 - Intracapsular fascia lata or patellar tendon autogenous graft – limits internal rotation and cranial motion of tibia
 - Over-the-top technique
 - Mimics normal function of cranial cruciate ligament but is invasive and graft may stretch or fail
 - Extracapsular suture stabilization
 - Femoral condyle or fabella to tibia
 - Limits drawer movement and rotation
 - Fibular head transposition
 - Advances insertion of lateral collateral ligament to reduce drawer and internal rotation
 - May be used alone or in combination with other techniques
 - Tibial plateau leveling osteotomy (TPLO)
 - changes tibial plateau angle from 20°-26° to 5°-10° neutralizing cranial tibial thrust.
 - Often preferred in larger, active dogs
 - Tibial tuberosity advancement (TTA)
 - Pull of patellar tendon becomes perpendicular to the tibial plateau during weight bearing
 - Triple tibial osteotomy (TTO) – combination of TPLO and TTA
- ± Complete or partial medial meniscotomy
 - medial meniscus should always be inspected

Prognosis:

- Conservative management only
 - **Dogs and cats under 10 kg: 50% will do well**
 - Dogs over 10 kg: 20% will do well
- Surgical management:
 - **85% all sizes will do well regardless of chronicity before surgery**
 - **Injury of contralateral ligament occurs in 40% of patients.**
 - This **increases to 60% if radiographic changes evident** in uninjured leg.



Normal tibial plateau angle is 20°-26°. Image courtesy, Vet Surgery Central



Post TPLO tibial plateau angle is 5°-10°.

Image courtesy, Vet Surgery Central



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Prevention:

- Avoid obesity

Pearls:

- Cranial cruciate ligament is divided into 2 bands
 - Craniomedial band – taut during all phases of flexion and extension – it is the primary check against drawer motion
 - Caudolateral band – taut only in extension
- Rupture is usually due to degeneration in dogs
- Traumatic rupture
 - Hyperextension and internal rotation of the leg (foot caught in hole or fence)
 - Jumping with excessive cranial tibial thrust
- Stifle instability leads to
 - Synovitis
 - Articular cartilage degeneration
 - Periarticular osteophyte development
 - Capsular fibrosis
 - ± medial meniscal injury
 - ** Progressive arthritis will occur regardless of treatment method
- Bilateral cruciate rupture is often mistaken for neurologic disease

Refs: Côté, Clinical Veterinary Advisor, 2nd ed, pp 261-263; Fossum's Small Animal Surgery, 3rd ed. pp 1254-1276. Merck Manual, 10th ed (online): Joint Trauma in Small Animals

My Notes: