

Cruciate Disease in Dogs

Functional Anatomy CCL

- Originates from the caudomedial aspect of the lateral femoral condyle and inserts craniomedially on the tibial plateau, between the cranial poles of the two menisci.
- Consists of a single band which is twisted about its self to give the functional behaviour of two bands. The craniomedial band is taut at all stifle angles. The caudolateral band is only taut in extension.

Diagnosis

- Acute failure: the diagnosis is generally via evaluating cranial-caudal instability. The tibial thrust test (figure 1) is easiest in conscious patients. Cranial drawer best tested in anaesthetised/sedated patients.

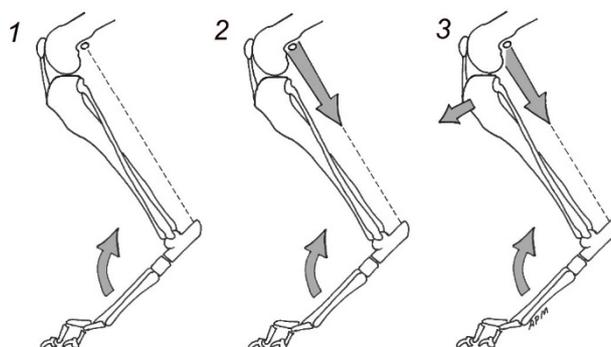


Figure 1. Mechanics of the tibial thrust test in a CCL-deficient stifle

- Cranial drawer: performed in extension and in flexion. If only present in flexion, cranial cruciate ligament (CCL) is only partially torn (due tearing craniomedial band). Occasionally (early disease) the stifle will be stable at all stifle angles. Beware naturally increased laxity in puppies.
- Non-specific clinical findings: stifle effusion, quadriceps atrophy, and medial buttress (firm fibrotic swelling centred over medial collateral), stifle discomfort (especially in full extension with partial tears)
- Radiography: effusion and osteophytes seen, even in acute ruptures. Radiographs of the contralateral stifle are useful to assess for bilateral disease. 60% of dogs with osteophytes in the asymptomatic stifle suffer a ruptured CCL in that stifle at an average of 16 months

Conservative Management

- Satisfactory results in most (but not all) dogs <15kg (but ? quicker recovery with surgery especially in dogs with a steep tibial plateau angle), poor results in larger dogs

Surgical Management

1. Intraarticular Repair

- Over-the-top technique is no longer as popular as it once was. Invariably the patellar tendon/fascia lata graft becomes devascularised leading to ischaemic necrosis and subsequent failure of the graft.
- Limb use does not recover as quickly as with other techniques



2. Extracapsular Repair

- Large gauge monofilament nylon leader line or modern polyethylene-based braided sutures (e.g. TightRope) are the materials of choice
- Using a metal crimp is as strong as a knot and results in less elongation (for leader line)
- Invariably the suture fatigues and breaks, or stretches, at some stage postoperatively but it is anticipated that at this stage periarticular fibrosis should have developed which will ensure continued stifle stability, although this is not always the case and recurrent instability is not infrequent
- Use of a 'mini' medial arthrotomy and isometric suture placement can reduce morbidity and improve joint range of motion. Careful attention to surgical technique will improve outcomes and reduce postoperative morbidity. You must check the menisci!
- Dogs should be expected to start weight-bearing on the affected limb within 1-3 days of surgery.

3. Osteotomies

- TPLO: results in 'functional' stifle stability, by neutralising cranial tibial thrust, although the stifle is not physically stabilised and thus cranial drawer will still be present (but tibial thrust should not be). Aim is to reduce the tibial plateau angle (TPA) to 5°.

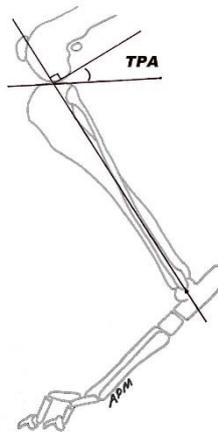


Figure 2. Tibial plateau angle (TPA)

- Generally regarded that TPLO results in a quicker recovery and better outcome for dogs compared to traditional surgical techniques, particularly for large dogs, and there is now evidence to support this
- Partial tears: ligament salvage possible with TPLO
- Original reports of TPLO suggested a relatively high complication rate. Modifications to the technique such as the use of a high osteotomy and the use of locking plates/screws mean that in experienced hands the complication rate is very low
- Tibial tuberosity advancement (TTA): the tibial crest is osteotomised and advanced cranially such that the angle of the patellar tendon to the tibial plateau is altered to 90°. This is proposed to maintain a functionally stable stifle in the absence of an intact CCL. The crest is held in place by placing a spacer between the tuberosity and the proximal tibia
- The original TTA uses a medial 'tension-band' plate
- MMP-style tibial crest advancement procedures are prone to potentially severe complications in our experience and are not recommended.
- Evidence and experience indicate that TPLO provides more reliable stability and more predictable outcomes than TTA
- Triple tibial osteotomy (TTO): employs three osteotomies in the proximal tibia to concurrently create a closing wedge osteotomy and advancement of the tibial crest with the aim of achieving a patellar



tendon–tibial plateau angle of 90°.

- Technique is rather complex but does not require specialist instrumentation (other than an oscillating saw).
- TTO: Preliminary results indicate satisfactory clinical results, although common to the early experiences of all the osteotomy techniques the complication rate can be high

The Meniscus and Cruciate Disease

- An arthrotomy (or arthroscopy) is mandatory for all cruciate surgeries to allow inspection of the menisci
- ‘Mini’ medial arthrotomy allows good visualisation of the menisci and avoids trauma to the lateral parapatellar tissues
- Surgeons treating dogs for cruciate disease must be confident that they can adequately inspect the menisci, recognise injuries to them and treat such injuries appropriately. Around 50% of dogs with cruciate disease have a meniscal tear at the time of surgical treatment.
- Not being able to recognise meniscal tears is perhaps the most common error made by inexperienced surgeons: unresolving lameness can be expected which will only resolve with further surgical intervention.
- Anatomical differences between the lateral and medial menisci predispose the caudal horn of the medial meniscus to trauma –most commonly peripheral circumferential tears. Menisci with such tears can appear grossly normal on visual examination and thus the caudal horn of the medial meniscus should always be probed (a Dandy nerve hook is ideal for this) to see if any part of the caudal horn can be displaced cranially
- Meniscectomy is a negative prognostic factor for long term joint function in dogs with CCL disease

Postoperative Care

Following extracapsular suture stabilisation or TPLO a typical exercise regime would be:

First 10 days: Strict rest in the house, no stairs, no jumping on/off furniture. Active dogs may need to be confined to a single room or kennel. Short walks out to the garden (on a lead) for toilet purposes only.

10 day - 4 weeks: As above, plus five minute lead walks, 2-3 times daily.

4-6 weeks: As above, but lead walks are extended to 10 minutes, 2-3 times daily

6-12 weeks: The length of lead walks is gradually increased, week by week, dictated by the individual dog’s progress. Hydrotherapy is often started at this stage.

From 12 weeks: If the dog is progressing well, short walks off the lead are implemented and gradually increased.

- Should expect to see dogs start to use their limb within a few days of surgery, and there should be a gradual and progressive improvement in limb function such that at 6 weeks they are confidently using the limb with substantial weight-bearing during walking and are actively pushing-off the limb at the end of the stance phase of the gait.
- It can take substantially longer than six weeks for dogs to get back to maximum function.
- If at any stage postoperatively limb function deteriorates, or if limb function remains poor postoperatively, consideration should be given to why this might be (Infection? Meniscal tear?)
- ‘Late’ meniscal tears are expected in 10-15% of dogs that have an undamaged meniscus at the time of extracapsular suture stabilisation and in around 3-5% of dogs after TPLO. These dogs will require further surgical intervention.
- All dogs that don’t progress as well as expected following stifle surgery should have joint taps performed and synovial fluid submitted for cytological examination and culture and sensitivity testing.



Treatment Algorithm for Cruciate Disease

