

**HOW TO TREAT A RUPTURED ACL:****Choosing between the TTA procedure, the extracapsular stabilization procedure, and conservative management****Synopsis**

A cranial cruciate deficient stifle will experience laxity on exam (cranial drawer sign) and with weight bearing (cranial tibial thrust). The **tibial tuberosity advancement** (TTA) *dynamically* stabilizes the stifle by moving the patellar ligament “arm” of the angle between tibial plateau and patellar ligament (this is the procedure I utilize). The **tibial plateau leveling osteotomy** (TPLO) and other tibial plateau altering osteotomies (CBLO, triple cut, etc.) dynamically stabilize the stifle by moving the plateau “arm” of that angle. Biomechanical testing has suggested that adjusting this angle to 90 degrees will result in a neutral stifle during weight bearing with no cranial tibial thrust laxity (an *exam finding of cranial drawer still remains*.)

An **extracapsular stabilization** involves implanting a heavy gauge “pseudo-ligament” on the outside of the joint, to approximate the missing ligament function, as a *passive* and *dynamic* stabilizer. Over months, if the implant remains stable, fibrosis will align along that implant to take-over stabilization of the joint.

**Conservative management** of a lax stifle with an incompetent ACL is geared toward quieting the acute inflammation of stifle injury and allowing time to pass while inherent stability is approximated with capsular thickening.

Meniscal injury in dogs happens after the cruciate is injured and the stifle is unstable, not before. It can occur before or after stabilization of the stifle. A typical history is an initial lameness that gets somewhat better with time (the cruciate injury), followed by a sudden, more dramatic lameness that does not resolve with time (the meniscal injury). *The first lameness we describe to owners as “not trusting their leg to bear full weight; not especially painful”, and the second lameness as “a rock in their shoe; painful to step down”.* Surgery to stabilize the stifle must (and does in my hands) involve a thorough investigation of the menisci, removal of any portions that are damaged (usually the caudal pole of the medial meniscus). Additionally, we may release a normal meniscus with the goal of having it slide caudally and remain out of harms way postoperatively (as with everything “cruciate”, this meniscal treatment has data supporting and refuting benefits.)

Up to 40-50% of patients will have cruciate disease or an acutely ruptured cranial cruciate in both limbs in their lifetime. This is NOT likely due to stressing the normal leg while limping on the bad leg. It is more likely related to the underlying reason they develop this condition in the first place...which remains highly debated. The current prevailing pathogenesis is biomechanical stressors based on anatomy. That said, there are many patients (classic is the middle aged female dog-- beagles, boxers, others) who develop radiographic and clinical changes consistent with DJD in advance of an incompetent ligament. These are the “partial tears” we talk about (we call them “cruciate disease”) but can’t get drawer, and the radiographs look chronic. A chronic degenerative process is likely at work ,and the environment leads to ligament damage.

Veterinary data remains quite grey about treatment. Decades of retrospective and prospective clinical, *in vivo* and *ex vivo* studies have filled the veterinary literature. Our recommendations are a digest of that data and our clinical observations for 20 years. As with everything medical, we make decisions using data about populations. How an individual patient outcome unfolds is unique and somewhere on a bell curve. Owners generally think in black and white, so communicating the uncertainty and statistical nature of medical data is always a challenge.

All dogs with a ruptured cranial cruciate will develop DJD/arthritis in their lifetime. This manifests as stiffness

when rising, limping after vigorous activity. **Optimal outcome** for any treatment/management of a cruciate injury is the delayed development of DJD and the comfortable use of the leg for activities typical to the pet's lifestyle.

	<b>TTA</b>	<b>Extracapsular stabilization suture</b>	<b>Conservative management</b>
<b>Patient (normal) BW</b>	>30#	Any; ideal <30#	Any; ideal <20#
<b>Post treat lameness</b>	8-12wks	8-12wks	8-12wks
<b>Activity restriction</b>	8wks	8wks	8wks
<b>Less than optimal outcome</b>	5-10%	15-20% (ideal BW) 25-30% (overwt/obese)	25-30% (ideal BW) 50-75% (overwt/obese)
<b>Worst case scenario complication</b>	Implant/bone breakage/infection; major reoperation	Implant break/infection; minor reoperation	Poor leg use; excessively stiff knee
<b>Cost</b>	1600	800-1000	None

We recommend all patients with evidence of cruciate injury be treated for DJD—lean body condition (will help dramatically), high dose fish oil (1g/10-15#), chondroprotectants (might do something), and as-needed NSAIDs (meloxicam is my go-to medication given the ease of managing a low dose/good day : higher dose/bad day routine). Stifle injections with steroids and/or HA are likely beneficial in some patients; the challenge is that to do the procedure, the dog cannot move. 60 seconds of sedation/anesthesia is all that is needed, but it carries an extra risk and cost.

Proper owner expectations are important to a successful experience and patient outcomes. Please discuss this information with your clients while assisting them with decision-making for a **ruptured cranial cruciate ligament**.

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