

EXTRACAPSULAR CCL REPAIR: HOW TO MAKE YOUR TECHNIQUE PERFECT

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In patients with cranial cruciate ligament disease the decision to perform surgery, and which technique to use, should be made on a case-by-case basis. Some aspects to take into consideration include: client compliance and expectations, patient age, size, anatomy (i.e. tibial slope and presence of concurrent anatomical abnormalities), level of activity and function; cost, individual expertise and available facilities, etc.

In this lecture we are going to review the evidence-based management of CCL disease using the fabellotibial suture (FTS) technique. However, there are other alternative extracapsular repair techniques available for the management of this condition (i.e. TightRope® technique).

Some of the factors to be considered to maximize a good outcome when an extracapsular technique is used for management of CCL disease are:

- **Identification and presurgical planning of concurrent conformational abnormalities** (i.e. medial patella luxation)

- **Exploratory arthrotomy:** Exploratory arthrotomy should always be performed. Removal of the remnants of the CCL is also advised, as they may act as a source of continued inflammation (although not enough evidence). In addition, it improves visualization of intraarticular structures. Concurrent damage to the menisci, particularly to the caudal horn of the medial meniscus, is very common (reported incidence varies from 33 to 77%). Visual examination and probing of the menisci is mandatory, and is best accomplished with the aid of a meniscal probe. Partial meniscectomy may be required if substantial damage is identified. However, it has to be remembered that meniscectomy is not a benign procedure and has profound negative effects in the contact mechanics of the joint and progression of osteoarthritis. Closure of the arthrotomy with an imbricating pattern may be an important source of periarticular fibrosis that ultimately stabilizes the joint.

- **Use of appropriate suture material:** monofilament nylon leader line is still the most commonly used material for this type of repair. Use of multifilament materials is more commonly associated with infection and formation of draining tracts if strict aseptic technique is not followed. However, use of multifilament materials may provide stronger and stiffer stabilization. Different types of nylon are available in the market, with different mechanical properties. Recommendations of the manufacturer should be followed in any case.

- **Method of sterilization:** ethylene oxide is the preferred method of sterilization for nylon, as it preserves the material properties and handling characteristics better than steam sterilization (decreases stiffness of the material).

- **Method of securing the prosthesis:** use of crimps has been proven to significantly reduce elongation and increase load to failure, and has the potential to achieve higher initial tension when compared to the use of knots to secure nylon prosthesis. For multifilament material, use of knots is advised.

- **Location of anchorage points:** in recent years there has been a lot interest in identifying isometric points for placement of extracapsular prostheses. Isometric placement could be defined as the one that is able to maintain the same degree of tension on the prosthesis during the range of motion of the joint. Because of the anatomic and functional

particularities of the stifle joint, truly isometric points do not exist. However, certain pairs of points are more isometric than others. For FTS technique, passing the needle through the fabellofemoral ligament and drilling a tunnel through the proximal tibial crest is advised. The tunnel should be drilled several millimeters caudal and proximal to the tibial attachment of the patellar ligament.

Alternatively, anchors or tunnels can be used in the femoral insertion point. This point is located as caudal as possible on the femoral condyle at the level of the distal pole of the fabella. Femoral tunneling should be paired with tibial anchorage just caudal to the extensor groove near the tibial plateau. Isometry becomes particularly important when using stiffer multifilament materials and anchors.

- **Position of the stifle at the time of securing the prosthesis:** prosthesis should be secured at about 100 degrees of stifle flexion in order to provide enough stabilization and uniform tension throughout full range of motion.

Care should be taken not to over tighten prosthesis, as this has been proven to be more detrimental to the patient than minor instability. Excessive suture tension may predispose to early failure of the suture, decreased range of motion and excessive pressure on the lateral compartment of the joint.

- **Loop configuration:** Current literature supports the use of the interlocking loop configuration or the single strand double loop configuration secured with a single crimp. The interlocking loop configuration is the strongest configuration to date, with a significantly higher mean ultimate load. However, excessive elongation and breakage of the suture material within the loop may be of concern. Alternatively, the use of the single strand double loop configuration provides marginally inferior ultimate load but stiffer construction. Unpublished data suggests that use of a single strand double loop double crimp configuration provides the best load to failure and stiffness profile to date.

- **Postoperative management:** Current advice includes exercise restriction for a minimum of 8 weeks, weight loss in overweight patients and use of intensive physical rehabilitation therapy. Extracapsular prostheses tend to fail 6 - 8 weeks after surgery, by which time periarticular fibrosis should already be providing enough stability to the joint.

Up to date, there is no evidence of better long-term outcome of tibial osteotomies over extracapsular techniques. However, patients treated with extracapsular techniques tend to take longer to regain normal (or near normal) function of the limb. Owners should be warned on progression of osteoarthritis regardless of the surgical technique used.

Despite extensive literature exists on this topic, review of the following review article is strongly advised: Tonks CA, Lewis DD, Pozzi A: **A review of extra-articular prosthetic stabilization of the cranial cruciate ligament-deficient stifle.** Veterinary and comparative orthopaedics and traumatology: VCOT 2011; 24:167-177.