

### Performing CCL Repairs

*Courtesy of Veterinary Instrumentation Limited, UK*

**Originally described by DeAngelis and subsequently refined by Flo, Olmstead and many others, some kind of lateral suture is the most common means of stabilising the Cranial Cruciate Ligament (CCL) deficient stifle.**

By placing some kind of prosthesis from the lateral femur to the proximal tibia in the same plane as the CrCL the stifle becomes stable and maintains a full range of movement. Various materials have been tried over the years; braided nylon, monofilament nylon, stainless steel wire and some of the long term absorbable sutures. All typically fail at between 6 or 8 weeks. This failure does not affect the outcome of the procedure, stability coming as it does from peri-articular fibrosis in the long term.

The current material of choice is monofilament nylon leader line. This material is stronger and more resistant to abrasion than normal monofilament nylon. Currently choice of leader line is between different brands rather than appropriately specified materials.

Joining free ends of heavy monofilament nylon is not without difficulty. Knots tend to be bulky, stretch and cause seromas and pain. Joining by stainless steel crimp has been shown to be equally or more secure and leaves a small radio-opaque connection.

#### Surgical Technique

- ✓ The dog is placed in dorsal recumbency which gives good access to both cranial and lateral aspects of the stifle. The leg

- can be flipped one way then the other.
- ✓ Approach the stifle joint via a lateral parapatellar incision.
- ✓ Incise through the aponeurosis of the biceps femoris /tensor fascia lata. Leave sufficient fibrous tissue on the patella to facilitate the re-suture. Do not go through into joint capsule at this stage if possible.
- ✓ Dissect between biceps femoris and joint capsule to identify and expose the lateral fabella.
- ✓ Open the joint capsule, again leaving enough capsule on the patella for closure.
- ✓ Examine the medial meniscus. The medial meniscus is very difficult to fully visualise. Either a Hohman plus Senn retractor or better still a stifle distractor will facilitate this procedure. Damaged parts of the meniscus are removed using either a ligament clamp and meniscectomy knife or a number 11 blade.
- ✓ The joint capsule is closed using absorbable sutures.
- ✓ Expose the lateral fabella. Gelpi self-retaining retractors are useful.
- ✓ Passing the nylon suture behind the fabella appears to be the most difficult part of the procedure. It is worth dissecting out the peri-fabella structures on a cadaver specimen to identify the fibrous structures which will support the lateral suture.
- ✓ The nylon may be passed around the fabella using either dedicated cruciate/fabella needles or appropriate graft passers.
- ✓ The fabella is a relatively mobile structure which can be identified and moved using the tip of the needle. By

walking the needle tip over the caudal edge of the fabella it is possible to locate and penetrate the femorofabellar ligament. If you are unable to pass the needle between femur and fabella it is essential that the needle passes at least through substantial fibrous tissue adjacent to the fabella. If excessive soft tissue is included in the nylon loop, tension will be quickly lost as the nylon 'cheese wires' through.

- ✓ A single strand of monofilament nylon is pulled through. If the nylon is in the correct place it should be possible to virtually lift the dog up from the table without tearing through.
- ✓ Drill hole (2.5 to 3.5mm) in prox tibia close to the insertion of the straight patella ligament with a bone tunnel borer or drill.
- ✓ The top strand of the nylon is passed under distal patella ligament in the lateral to medial direction. The top strand is passed back through the hole in the proximal tibia using straight graft passer or cruciate/fabellar needle.
- ✓ One free end of the nylon is passed through crimp tube. The other free end is fed through the other end of crimp tube.
- ✓ Gently crimp middle of tube so that nylon can be pulled through with some difficulty (about 60% of a full crimp). Until experience has been gained, use incremental squeezes to obtain ideal resistance. Pulling the free ends through will create tension on the loop.
- ✓ Pull nylon suture tight to eliminate anterior draw and check for full range of motion.
- ✓ Squeeze crimp hard in middle and both ends. Cut off the free ends close to the

crimp. The crimp should sit over tibialis cranialis muscle close to tibia.

- ✓ Repair the arthrotomy in layers.
- ✓ **Post-Operative Care**
- ✓ For 7 days strict rest other than toilet walks.
- ✓ For the next 2 months leash exercise gradually increasing mobility of the stifle.
- ✓ Swimming is beneficial to build muscle mass without weight bearing.
- ✓ Final stability of the repair is due to periarticular fibrosis. The nylon will typically fail at 8 to 10 weeks if it is still stabilising the stifle at this time.

### Frequently Asked Questions

#### **Q Is the suture placed inside or outside of the joint capsule?**

A Outside. The joint capsule is typically opened to examine the meniscus. It is, however, easier to separate the joint capsule from the tensor fascia lata before incising the joint capsule. Identify the fabella and then open the joint capsule.

#### **Q How much tension does the suture require?**

A There is almost no research data on this. The tension should be sufficient to eliminate the anterior draw but not enough to create an outward rotation. Excessive tension is as great a technical error as insufficient tension.

#### **Q Why has the suture broken?**

A If the suture is restraining the movement of the tibia under the femur the suture will always break. The timescale is usually 6-8 weeks. Rupture

of the suture at this time does not affect the outcome. If the suture remains unbroken at 12 weeks it is not functional and may be removed without affecting the outcome of the procedure. The suture will break at the point of maximum abrasion. 60% break at the fabella.

**Q I think the suture is infected?**

A If you think there is a problem, initially try antibiotics, preferably after bacteriology and sensitivity. If at 8 weeks the problem is unresolved, remove the suture, take swabs and see what happens. 90% of sutures removed, suspected of infection are, in fact, sterile.

**Q Where does the suture pass?**

A Although the proximal tibia and the fabella are not ideal isometric points, their convenience as suture points dictates that they are used as anchor points. The fabella is relatively mobile and until severe osteoarthritis ensues can be used as an anchor point. It is useful to dissect out the fabella in a cadaver specimen to identify the fibrous structures which will hold a lateral suture. Once passed the nylon should be secure enough to lift the dog from the table. If the suture pulls through then the suture is in the wrong place. Try to avoid including soft tissues within the loop as these will cheese wire through and cause laxity within the loop. The tibial suture should be placed as cranial and as proximal as possible. A common error is to place the hole too far distally which will limit the extension of the stifle.

**Q Where should the crimp sit?**

A It should sit distally over the Cranialis Tibialis muscle. Avoid leaving it pressing on bone.

**Q My nylon broke close to the crimp?**

A Take care not to squeeze too close to the end of the crimp (there should be a 1mm space). If the crimper gets too close to the end of the tube, the edge can increase abrasion and failure.

**Q My nylon has pulled out of the crimp?**

A Insufficient crimp. Using the original crimper you must squeeze as hard as possible to grip the nylon.

### Online Video Demonstration

For a video clip on the Cranial Cruciate Ligament Repair Technique, please visit:

<http://www.vetinst.com/pages.php?pageid=54>