

Surgical Repair of Anterior Cruciate Ligament Tears

Injuries to the anterior cruciate ligament(acl) in small animals is without question the most common orthopedic condition we encounter as veterinary surgeons.

For as long as I have been a veterinary surgeon, the best way to surgically repair these injuries has been controversial. It has been the subject of the most heated, biased and pompous debates at every surgical conference I have attended. Recommendations for surgical repair are based on opinion, clinical experience, ego, and financial considerations. As of yet there is no science that actually proves that one technique is superior to any other - that goes for extracapsular repairs, TPLO, TTA, and the myriad of other techniques that have been proposed over the years.

All of the early repairs of acl injuries were described as either extracapsular or intra-articular procedures. The first published report of an intra-articular repair was in 1952 by Paatsama. The first report of an extracapsular repair was by Childers in 1966.

The extracapsular repairs were all various modifications of the similar techniques named after the surgeons that proposed them. There was DeAngelis, Flo, Dickinson, Gambardella and a host of others. They were basically the same extracapsular procedure still in use today with variations in the number of sutures, type of sutures, and the position of the sutures placed. All of these techniques rely on the formation of organized fibrous tissue to form around the suture material and it is this fibrous tissue that ultimately stabilizes the joint and not the implant itself. For the most part, these procedures all worked well especially in the smaller patients.

Fibular head transposition was another type of extracapsular repair that is no longer used. More recently the TightRope procedure was developed which is another variation of a standard extracapsular repair using a braided multifilament material. Because this material is highly susceptible to harboring bacteria and eliciting profound inflammatory responses I am not a fan of this procedure.

There was some disappointment with the results in the larger and more active patients who received extracapsular repairs. To address this problem various types of complicated intra-articular procedures were developed. The Paatsama, Over-The-Top, Under and Over, and others were all variations of intra-articular procedures that involved running a strip of the patient's own tissue – either fascia lata or a portion of the patellar ligament – through the joint and then anchoring the graft to the bone with screws or staples. These were tedious procedures and required rigid immobilization of the stifle in these large dogs for up to 8 weeks post operatively. The failure and morbidity rates were unacceptably high.

In the early 1980's the TPLO was developed. This was a radical new way to treat torn acl's and had us all rethinking stifle dynamics and a new concept called tibial thrust. It seemed to be highly effective especially in the larger, more active patients. About 10 years ago the TTA was developed as a TPLO alternative to help avoid some of the complications associated with TPLO. The development of TTA further refined our understanding of the stifle joint. TTA does seem to be less traumatic and invasive than TPLO but long term results of both are probably equal. Again, no study has ever shown any one procedure superior to another.

So the question is – which surgical procedure do we recommend for which patients?

My recommendations are based on my involvement with the management of over 10,000 cases of acl injuries in my career and also my personal bias and observations.

Patient weighing less than 30#

There are some practices that offer TPLO or TTA for all of their patients – even cats and the smallest of dogs. While I cannot claim that this is the wrong thing to do, I am not convinced of the need for these procedures in the smaller patients. They clearly do as well with the extracapsular procedures as they do with the more involved and costly osteotomy procedures.

For the vast majority of these patients I believe the standard extracapsular repair is very acceptable. It is cost effective, minimally invasive, and complications are manageable. The most common complication is infection associated with the implant or reaction to it. If this occurs the implant can simply be removed after 10 weeks with minimal risk of destabilizing the joint and it generally resolves the problem. I would estimate this occurs around 7% of the time.

Patients weighing 30# - 50#

This is sort of the gray zone for me – meaning you could probably get away with either an extracapsular or TTA. Decisions for this group are influenced by the age, body condition, and activity level of the patient as well as the owners expectations and finances. I would likely recommend a TTA for a very athletic and lean 35# patient. Conversely I might suggest an extracapsular repair for an overweight, sedentary 50# patient. Many of the above mentioned factors come into play for this group and there is no clear cut right and wrong here.

Patient weighing over 50#

TTA is my procedure of choice for this group especially as we get into the larger, heavier patients. I prefer TTA over TPLO as these patients rapidly begin to bear weight after surgery, and have a lower complication rate, a less painful convalescence, and high owner satisfaction. This is not to say that it would be wrong to offer an extracapsular repair for an 80 or even 100# patient where there are financial constraints. It would not however be my first choice. I do believe the complication and failure rates of extracapsular repairs increase with the size of the patient, but the success rate is still acceptable enough to consider this as a second option if TTA could not be considered due to cost and as long as the owner fully understands the increased risk for failure and complications.

How do we manage patients with bilateral acl tears?

Unfortunately this is not an uncommon situation and the question always arises as to whether to stage the surgeries or to repair both at the same time. I will admit that my personal bias is against repairing both at the same time. Regardless of whether I'm considering TTA's or extracapsular repairs, I believe that the complication and failure rates climb drastically when both limbs are operated on at the same time. I also think recovery is really tough for these bilaterally operated patients.

In most cases we see that one of the tears is chronic and the other more acute. I tend to repair the more acute one first as the patient is usually weight bearing on the more chronic injury. In other words, first fix the one that the patient is bearing the least amount of weight on then wait 6-10 weeks to repair the other leg.

I will consider bilateral repairs at the same time in patients that acutely blow out the acl's in both rear limbs. These patients can barely use their rear limbs at all and are mostly walking on their front legs. Post op management and nursing care can be much more difficult for the owner when both limbs are repaired at the same time especially as the patient's weight increases.

There is also a moderate cost savings to the owner if both injuries are repaired at the same time. And sometimes that cost differential will be the difference between the owner being able to repair both stifles or not. Repairing bilateral tears simultaneously also cuts the total recovery time in half. This however, is less significant to me during decision making than the increased risk for postoperative problems.

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