

# Four Leg News

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*Hi there!*

I am writing to you from my treadmill! Yes... I bought a fancy plank of melamine, wrapped it with that non-slip stuff that you put under rugs... and here I am using my computer! I feel brilliant!

I want you to feel brilliant too! To help with that, this newsletter is packed with more literature reviews on cruciate deficiency, and more specifically, the Tibial Tubercle Advancement surgery. Please enjoy the reviews and my take on clinical relevance to rehab practice!

This particular newsletter is extra special... because it was created by my new virtual assistant, Joanne Leicester, and me! Joanne is also a vet tech and a rehab practitioner. I feel pretty lucky to have found her! Now, as usual, I want you to print out the newsletter, use the information to help with your own marketing, leave it lying around... whatever helps not only YOU to learn, but also those around you / your referral sources!

*If you think dogs can't count, try putting three dog biscuits in your pocket and then giving Fido only two of them. Phil Pastoret*

And in 2014, I hope to see plenty of you at my different teaching events. Calgary for my Advanced Spine course in January, The APTA Combined Sections Meetings in Las Vegas in February, the STAAR Conference in New Jersey in April, and I'm looking at Switzerland, Germany, & Sweden in May! The rest of the year is not set in stone yet, but I am contemplating having a booth at the IAVRPT conference in Oregon in August (but I've not heard much about it yet), and I'm working with someone to get me to California in October. We'll see what else happens to shake out!! As well, if I don't see you live and in person, I want you to feel free to drop me a line by e-mail if you have any questions!

Thank you everyone for making 2013 joyful for me and I am grateful to be with you for 2014. May you all experience health, happiness & prosperity in the upcoming year!

Cheers,  
Laurie

## Did You Know

...

When asked to subjectively assess the lameness of their dogs/patients who were participating in an osteoarthritis study, a caregiver placebo effect was seen in both owner (57% of the time) and veterinarian assessments (40-45% of the time) when compared to objective measurement using force plate analysis.

### Relevance to Rehab

And if you don't have access to a force plate, then be sure to look into the more economical Stance Analyzer, along with simple thigh circumference measurements. A qualitative functional assessment tool would be useful for canine rehab.

[Conzemius MG, Evans RB. Caregiver placebo effect for dogs with lameness from osteoarthritis. J Am Vet Med Assoc. 2012 Nov 15;241\(10\):1314-9](#)



## TTA - Surgical and postoperative complications

**Wolf RE, Scavelli TD, Hoelzler MG, Fulcher RP, Bastian RP. Surgical and postoperative complications associated with tibial tuberosity advancement for cranial cruciate ligament rupture in dogs: 458 cases (2007–2009). *J Am Vet Med Assoc.* 2012 Jun 15;240(12):1481-7.**

### Objective

This retrospective study examined intra and post-operative complications in dogs undergoing tibial tuberosity advancement (TTA) surgery for cranial cruciate ligament (CCL) rupture.

### Method

Records of all dogs who presented for TTA surgery for a ruptured cruciate ligament between September 2007 and September 2009 at Garden State Veterinary Specialists were reviewed. 501 stifle joints (458 dogs) met inclusion criteria. Diagnosis was confirmed on the basis of physical examination, radiographic, and mini arthrotomy findings.

Complications were defined as any intra or post-operative problem or any radiographical abnormality. Complications were divided into intraoperative, acute (up to 14 days post-surgery) and chronic and were further classified as major or minor. Major complications included fracture, implant failure, any complication requiring a second surgery or unexplained lameness. Minor complications included anything not classified as major, for example infection or inflammation.

### Results

Complications were reported in 95 (19%) cases. Of these, 57 (60%) were major, 37 (54.4%) requiring a second surgery. Of the 38 (40%) with minor complications 33 (86.8%) involved infection/inflammation of the incision. Intraoperative complications occurred in 2 dogs, with 7 joints having both a major and a minor complication. Medial meniscal tears were the most common complication that required further surgery. Thirty six joints had intact, untreated menisci at the time of TTA. Of these 10 returned for reassessment due to lameness and all were found to have subsequent medial meniscal tears.

### Conclusion

The study complication rate of 19% was found to be comparable to other osteotomy techniques for CCL stabilization, and lower than other reported TTA studies. The authors attribute this to their experience and number of cases treated.

Body weight was found to be the only factor associated with overall complication rate. Body condition score was not available for assessment. TTA was not found to protect joints with partial CCL tears and did not prevent meniscal damage from occurring at a later time. All dogs with a partial CCL tear and intact meniscus at the time of TTA surgery went on to develop a complete CCL rupture and meniscal tear when subsequently reassessed.

### Relevance to Rehab

Be aware of potential complications and take action to address any that occur. Even though relationship between BCS and TTA complications have not been studied, encourage owners to aim for the ideal body condition for their dog. Perhaps larger dogs need rehab programs specifically designed to help improve strengthening and help with joint stability even more so than smaller dogs.



*In 16<sup>th</sup> century England small dogs known as Turnspits were bred to walk on the equivalent of giant hamster wheels. The wheel, in the kitchen of the house turned a roast on a spit, making sure the meat was cooked evenly. The breed is now extinct but thought to be related to the Glen of Imaal Terrier, itself a breed in danger of extinction.*



## Clinical Audit

**Proot JL, Corr SA. Clinical audit for the tibial tuberosity advancement procedure. Vet Comp Orthop Traumatol. 2013;26(4):280-4**

### Objective

This retrospective study utilized the cumulative summation (CUSUM) technique to objectively measure the learning curve for a tibial tuberosity advancement (TTA) procedure and to assess the quality of procedures performed.

### Method

Records of all dogs that had a TTA performed by one surgeon at Calder Vets Ltd in the UK were reviewed. 122 records (167 stifles) contained sufficient data to be included in the study. A standard TTA technique was used, and a mini-arthrotomy performed prior to the procedure to examine the menisci. Intact menisci were left in place. The CCL was removed in all dogs with a partial tear. Data on failures (major complications requiring revision surgery) were entered and analyzed using spreadsheet software.

### Results

There were 29 complications, 15 (9%) major (those requiring further surgery within 12 months of the original procedure) and 14 minor (any other problem), 24 complications occurring in the first 67 procedures. The most common major complication was meniscal damage. Most complications occurred at the start of the learning curve, the time taken for failures to fall below the acceptable failure rate for the procedure taking 22 cases.

### Conclusion

The CUSUM tool is a mathematical technique, used in this study to quantify if a TTA procedure was performed within predefined quality boundaries. Acceptable and non-acceptable failure rates were set (15% and 25% respectively) and operators measured against them to look at performance (initial and ongoing), and highlight if further training was required. As surgical expertise increased the acceptable and unacceptable failure rates were lowered 10% and 20%). While it is a useful tool to objectively monitor quality and performance on an ongoing basis, CUSUM is limited in that it only considers one variable and produces a binary output.

### Relevance to Rehab

While all professionals need to practice on real patients in order to gain experience and expertise, if it were me, I would want to ask my dog's surgeon how many of the suggested surgical technique they have done before deciding to proceed with surgery utilizing a new procedure. As a rehab professional, I would also be aware that a surgeon learning a new technique may have a higher than acceptable complication rate, and be ready to watch for signs of such and refer back to the surgeon as soon as possible if problems arise.

*Did you ever notice when you blow in a dog's face he gets mad at you? But when you take him in a car he sticks his head out the window. ~Steve Bluestone*

## Osteosarcoma and Titanium Implants



**Dunn AL, Buffa EA, Hanshaw DM, Farrell M. Osteosarcoma at the site of titanium orthopaedic implants in a dog. Aust Vet J. 2012 Jan-Feb;90(1-2):39-43**

### **Objective**

A discussion of a possible causal relationship between the use of titanium implants and neoplasia. This single case study involved an 8 year old Alaskan Malamute, 20 months post TTA surgery who presented with acute weight-bearing lameness in the same limb. There had been no intra operative or short term complications and the dog had been back to normal activity. Radiographs showed the TTA site was healed and there was no implant failure. There was osteolysis around the proximal tibia raising the suspicion of neoplasia. Thoracic radiographs were normal.

A mid femoral amputation was performed, however the dog was euthanized after a CT scan found osteolysis and a compressive spinal cord lesion at the level of C3. Necropsy was not performed. The implants were found to be intact and stable, with microscopic analysis showing a destructive neoplasm.

Assigning causality in this case is not straightforward as there have been few studies looking at neoplasia around surgical implants.

Additionally a variety of factors (e.g. inflammation, infection, implant material, the presence of any foreign material) may influence the development of tumors.

This case was seen to meet the human definition for assigning a causal relationship (it was in the direct vicinity of the implant, the time between implant and tumor development was around 2 years, and there was no other potential contributing factors). However, given the lack of other reported cases in the veterinary literature, that the implant was not damaged or corroded, and the lack of intra or post-operative complications, the authors concluded that in this case the development of osteosarcoma at the implant site was likely coincidental .

### **Relevance to Rehab**

While cases of implant related osteosarcoma are rare, as rehab practitioners we should be beware of the possibility that changes in limb usage, especially in the longer term in dogs with any implant should be investigated.

### *Did you know ...*

Two studies, one from the University of California in 1990, the other featured in the Science magazine Alaska Science Forum demonstrated that dog's saliva has healing properties and can kill E.coli ad Streptococcus canis.

*Dogs feel very strongly that they should always go with you in the car, in case the need should arise for them to bark violently at nothing right in your ear. ~Dave Barry*

## Patellar Ligament Desmopathy

**Kühn K, Ohlerth S, Makara M, Hässig M, Guerrero TG. Radiographic and ultrasonographic evaluation of the patellar ligament following tibial tuberosity advancement. Vet Radiol Ultrasound. 2011 Jul-Aug; 52(4): 466-71.**

### **Objective**

To evaluate the effects of tibial tuberosity advancement (TTA) surgery on the patellar ligament using radiography and ultrasonography.

### **Method**

Twenty dogs (21 stifles) undergoing TTA for cranial cruciate ligament (CCL) injury at Zurich University between August 2008 and August 2009 were included in this study. A diagnosis of cruciate rupture was based on exam findings of positive drawer, pain on stifle extension, plus radiographic changes. Stifles were evaluated using ultrasound and radiographs for ligament

thickening pre-operatively, at 6 weeks and finally 16 weeks post TTA surgery. Ligament appearance was scored subjectively on a 0-3 scale, based on thickness, shape, echogenicity, and the structure of the fibers (0=normal, 3=ligament thickening with distinct core lesions, disruption of surrounding fibers and hyperechogenicity/edema). A score of 1, 2, or 3 was classed as desmopathy. Arthrotomy was performed in 18 of the 21 stifles.

### **Results/Discussion**

Preoperatively 17 patellar ligaments were normal on ultrasound with 18 stifles developing patellar desmopathy post-surgery. At 6 weeks, 15 out of 17 stifles evaluated showed desmopathy. By 16 weeks there was improvement in 5 stifles and remained unchanged in 7 others. The three dogs that did not have arthrotomy had fewer signs of desmopathy.

### **Conclusion**

Patellar desmopathy following TTA surgery is common. This study was not looking at its causes, however the authors postulate that it may be influenced by the degree of advancement of the tibial tuberosity or surgical trauma. Advancement of the tibial tuberosity changes the angle of insertion and direction of pull of the patellar ligament, which may result in a new areas of contact with bone, resulting in changes to the ligament. In this study, dogs with larger cages were found to have greater thickening of the patellar ligament. Three dogs did not have an arthrotomy and had lower desmopathy scores. The authors hypothesize that the arthrotomy incision (parapatellar) and the retraction of the ligament needed to visualize the meniscus prior to the TTA surgery, may damage the patellar ligament. This study did not follow up further than 16 weeks so long term outcome could not to be assessed.

### **Relevance to Rehab**

This is an interesting study in that patellar desmopathy seems to be an almost unavoidable complication associated with the TTA surgery. So, not only should rehab practitioners be expecting it, but also treatment should be pro-actively directed to the patellar tendon. Modalities such as laser or ultrasound could be utilized, and as per tendon research, eccentric exercises should be employed likely starting at the 4 or 5-week stage. It is likely that 'free activity' (as evidenced by the greater thickening of the patellar tendons of the dogs housed in larger cages) could be the root of the issue. However strict confinement / immobilization is likely to yield other untoward complications and delay return to function because of greater atrophy. So a balance of relative rest and targeted exercise is likely advisable.

## HUMANS

### Athroscopic Meniscectomy Vs. Sham Surgery

Raine Sihvonen, M.D., Mika Paavola, M.D., Ph.D., Antti Malmivaara, M.D., Ph.D., Ari Itä, M.D., Ph.D., Antti Joukainen, M.D., Ph.D., Heikki Nurmi, M.D., Juha Kalske, M.D., and Teppo L.N. Järvinen, M.D., Ph.D., for the Finnish Degenerative Meniscal Lesion Study (FIDELITY) Group. **Arthroscopic Partial Meniscectomy versus Sham Surgery for a Degenerative Meniscal Tear.** *N Engl J Med* 2013;369:2515-24.

#### Objective

This trial assessed the effectiveness of arthroscopic partial meniscectomy in patients with degenerative meniscal tears who did not have knee osteoarthritis, assessing if meniscectomy provides a better patient outcome than medical management.

#### Method

The trial was multicenter, randomized, double-blind and sham-controlled, running between December 2007 and January 2013. 146 patients with knee pain not resulting from osteoarthritis or trauma and which had not responded to medical management were enrolled. All patients had a diagnostic arthroscopy to confirm a meniscal tear and then were assigned randomly to undergo either a partial meniscectomy or sham surgery. Patients undergoing sham surgery had a simulated partial meniscectomy including manipulation of the knee and remaining in the OR the length of time an arthroscopy would take. A standardized post surgery protocol was employed for all patients.

#### Results

Knee pain following exercise, the Lysholm knee score, the Western Ontario Meniscal Evaluation Tool (WOMET - a meniscus-specific quality-of-life tool), and 15D, a general health quality of life tool, were used to measure outcome. Adverse events were defined as “untoward medical occurrences that may or may not have had a causal relationship with the treatment administered” and were assessed as serious if hospitalization was required, if they were life threatening or resulted in death.

The trial found that while there was improvement in all outcome measures between the baseline measurement and reassessment after 12 months, there was no significant difference between the two groups during this same time frame.

There was also no difference in the rate of adverse events or need for further surgery between the two groups.

#### Discussion

This trial showed that in patients with a meniscal tear without osteoarthritis arthroscopic partial meniscectomy proved no more beneficial than sham surgery.

These findings correlate with several other studies where arthroscopic knee surgery found no significant benefits over physical therapy and medical management.

The authors postulate, based on an increasing body of evidence, that non traumatic meniscal tears may be early signs of osteoarthritis and not separate problems, their results arguing against the use of partial meniscectomy in these patients

#### *My thoughts on clinical relevance*

1) I think there is a general under-utilization of physiotherapy in human medicine and/or it should always be used FIRST to seek improvement (before surgery). (The same holds true in veterinary medicine... only in veterinary medicine, there is a SEVERE reliance on surgery to fix problems that could be fixed / improved / alleviated by rehabilitation).

2) One would have to speculate on the placebo effect in a human study. It would be fascinating to see such a study done on dogs - where the placebo effect would be limited to the owner and vet surgeon... however, with use of a force plate or something else, we could eliminate such bias.

Continued ...



## ...Meniscectomy contd

3) I have seen a number of dogs with a meniscal click (subsequent to a CCL surgical repair OR conservative management) who appear to weight bear just fine in stance and ambulation. Do they have a higher pain tolerance, or does the meniscal derangement not cause a weight-bearing pain? Could part of the effect be specific to proper pain management? If the dog (or human) does not develop central sensitization (or 'wind-up' phenomenon), then does the meniscal issue remain no greater of an effect than the joint degeneration itself?

This paper should really make us think twice about what we do as 'standard of care' in many cases!

*Pop trivia ...*

At the end of the Beatles song "A Day in the Life", Paul McCartney added a recording of an ultrasonic whistle for the enjoyment of his dog.

## The Societal &amp; Economic Impact of ACL Tears

**Mather RC 3<sup>rd</sup>, Koenig L, Kocher MS, Dall TM, Gallo P, Scott DJ, Bach BR Jr, Spindler KP; MOON Knee Group. Societal and economic impact of anterior cruciate ligament tears. J Bone Joint Surg Am. 2013 Oct 2:95(19):1751-9**

**Overview**

This study evaluated how cost effective ACL reconstruction surgery is when compared to patients choosing rehabilitation without surgery, both over the short term (6 years) and lifetime

**Method**

Information was gathered from the Multicenter Orthopaedic Outcomes Network (MOON) database (988 patients), KANON study (121 patients), and from a literature review. Analysis was performed using the Markov decision model. The effectiveness of treatment was documented as quality adjusted life years (QALYs) and cost in US dollars.

**Discussion and Conclusions**

Reconstructive ACL surgery cost less (\$4503 less) and was more effective (QALY gain of 0.18) than when compared to rehabilitation alone. In the longer term, the cost savings of ACL reconstruction increased to \$50,417 with a QALY gain of 0.72 compared to rehabilitation. Two conclusions were drawn. Firstly, the study found indirect costs such as lost work time, and productivity resulting from instability in the knee were significant. Secondly ACL surgery resulted in greater QALY improvement and lower cost than rehabilitation alone, and restricting access to reconstructive surgery may harm the patient and increase cost to society.

Osteoarthritis developing as a sequela to an ACL injury is a significant economic and societal cost. The authors suggest that in order to reduce costs research should target prevention of cruciate ligament injuries and addressing injury early in order to minimize the development of osteoarthritis.

**Relevance to Rehab**

While I have presented on the topic of conservative care for canine cruciate deficiency, and based most of that presentation on human research in which successful non-surgical rehabilitation was highlighted, I would never advise someone that conservative results were superior to surgical results.

## Rehab after ACL Reconstruction

**Grant JA. Updating Recommendations for Rehabilitation after ACL Reconstruction: a Review. Clin J Sport Med. 2013 Nov;23(6):501-2**

### **Objective**

To review literature on current rehabilitation techniques employed following (anterior cruciate ligament) ACL surgery.

### **Method**

Twenty-nine studies (peer reviewed randomized controlled trials or prospective studies), published between January 2006 and December 2010, were evaluated. Data collected included the number of patients per study, the repair technique used, outcomes, plus any study bias.

### **Discussion**

Treatment options evaluated included bracing, accelerated strengthening, rehabilitation by the patient at home, neuromuscular strengthening, the role of Vitamins C and E, and patient education.

Several studies found that whether the knee was braced or not did not affect outcome, and that a brace did not help with pain or laxity. Another found that rehabilitation by the patient at home was as effective as professional rehabilitation in the long term.

Those studies looking at accelerated rehabilitation with quadriceps and hamstring strengthening starting 2-weeks post-surgery, did find that doing so increases and accelerates gains in strength. Short-term benefits of neuromuscular strengthening over traditional rehabilitation were found in other studies, and high pre surgical levels of vitamin C also correlating with better strength. While providing patients with pre-surgical education in the form of videos did not affect performance, they did provide positive psychological benefit.

### **Conclusion**

The author concluded that aside from bracing, all methods evaluated may positively influence patient recovery following ACL surgery. He did comment on study quality, noting they were generally of poorer quality, with small size, limited long term follow up, and lack of use of validated tools.

### **Relevance to Rehab**

This study is interesting, and I think backs current trends in veterinary medicine to not brace stifles postoperatively. It would be interesting to find a review study of bracing for non-operative cruciate deficiency (in either human or canine). I would love to see studies in the future that look at professional rehab programs for dogs to look at complication rates, contralateral stifle joint injuries, and functional measures.





## Testimonials

Hi Laurie

*I don't comment often on your blog and website and tools etc, but I have found it to be great stuff. I know what it takes to write a blog and I appreciate your energy and what you are doing for our profession.*

*Hope this is a successful venture for you and I love the dermatome chart--already laminated on my wall--clients love to look at especially because I do acupuncture.*

..

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*I have 4 new post surgery IVDD cases that have presented in the last 2 weeks. And I did the Sports Medicine lectures to get certified with CRI and have never actually done the neuro module. But that's ok, cause Laurie Edge-Hughes will step up and save me by posting 4 lectures on neuro rehab and a lecture on traction for me to watch over the weekend. And I can watch!*

*So now I can head back to work this afternoon feeling more confident!!*

*I LOVE your website.*

*Cheers,*

*JF*



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