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Volume 2: Issue 6

Four Leg News

Exponentially expanding brilliance in Canine Rehab!

Time flies!

It's amazing how fast time can fly. When I sit back and do some simple math… it has been 1.5 years since I started the FourLeg.com website! Thank you everyone who believed in me. I have always felt strongly, that canine rehab is not just about 'doing the rehabilitation'… it also help general practice vets do better assessments and give better advice… it improves the overall quality of animal health care… and by helping the pet you are impacting the life of the owner, and therefore having a bigger impact on society in general. Maybe that's a little too philosophical for a newsletter about TPLO's… but that's just me! Keep up the good work my friends!

In this issue…

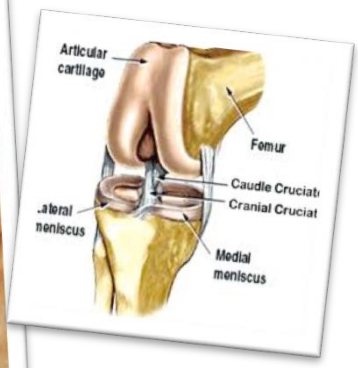
The TPLO Issue

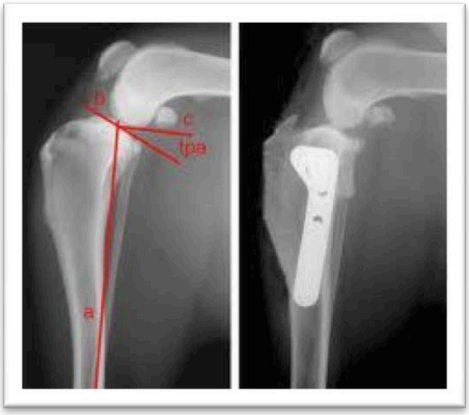
I don't think that vet medicine has the perfect cruciate repair surgery nailed down just yet. And I am not a hard and fast 'lover' of any one surgery over another. I worry about biomechanics… when you alter an angle on just one side, there simply has to be implications elsewhere as the body compensates. However traditional veterinary research is not yet looking at that! (WE can! There's a research study I'd like to see!) So what is available in the literature tends to come out well after surgical techniques have been around for a while. All of the studies I have gathered for you here are recent, relevant, and thought provoking to our practice of canine rehab. I hope you enjoy the information contained within the newsletter… and share it with colleagues, classmates, and friends!

Cheers!

Laurie Edge-Hughes

PS I'd love to hear your thoughts! Feel free to drop me a line!





Meniscus lesions post TPLO

Kim SE, Lewis DD, Pozzi A. Effect of tibial plateau leveling osteotomy on femorotibial subluxation: In vivo analysis during standing. Vet Surg 2012, 41: 465-470.

So there have been numerous cadaveric studies that evaluate the effects of TPLO on joint alignment. This study looked at 15 live dogs following TPLO surgery and radiographed the surgical legs pre-operatively, 1, 3, and 6 months post-operatively.

They found that 5 of the dogs (33%) has persistent cranial tibial subluxation at 2 or more postoperative evaluations. Four of these 5 dogs had undergone hemimeniscectomy (of the medial caudal pole at 1 and 6 months post-operatively). The fifth dog had loss of osteotomy reduction and the tibial plateau angle had increased to 15 degrees at the time of the 1-month evaluation.

What does this mean?

It appears that the integrity of the medial meniscus appears to have a substantial influence on stifle stability after TPLO. The researchers reported that human studies have found the medial meniscus to be a critical stabilizer to anterior translation of the tibia, and that medial meniscecotomy is also associated with rotational laxity. And "If the medial meniscus becomes a primary stabilizer of the stifle as our data imply, an intact meniscus may be subjected to supraphysiologic stresses after TPLO and consequently predisposed to subsequent meniscal injury.

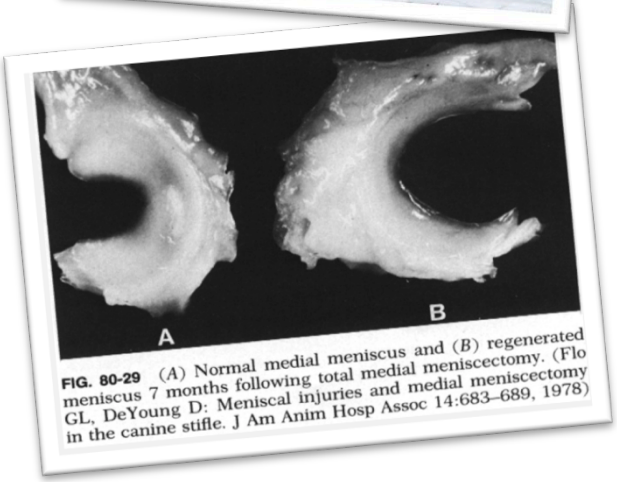
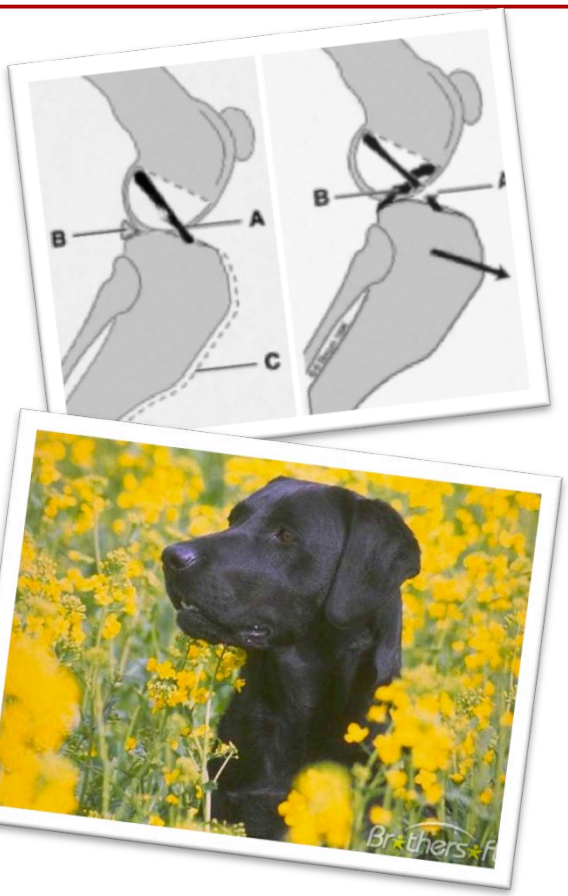


FIG. 80-29 (A) Normal medial meniscus and (B) regenerated meniscus 7 months following total medial meniscectomy. (Flo GL, DeYoung D: Meniscal injuries and medial meniscectomy in the canine stifle. J Am Anim Hosp Assoc 14:683–689, 1978)

Relevance to rehab?

If you assess a dog with a full or partial cruciate tear, it is imperative to educate the owner on proper management… undergo surgery expediently followed with post-operative rehab or proceed with conservative management. But either way, judicious care and management should be taken to avoid meniscal damage to the joint as the limb is building muscle control and strength to help support and stabilize it.

Tibial Translation & TPLO



Johnson K, Lanz O, Elder S et al. The effect of stifle angle on cranial tibial translation following tibial plateau leveling osteotomy: An in vitro experimental analysis. Can Vet J 2011; 52: 961-966.

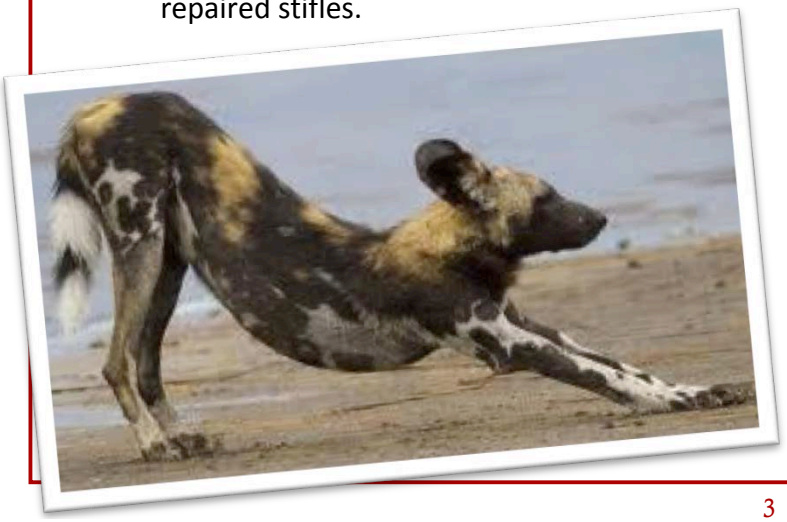
Can TPLO eliminate cranial tibial translation (CTT) throughout a loaded range of motion?

In a normal stifle, the point of contact between the femoral and tibial articular surfaces lies cranial to the functional axis of the tibia. As a result, loading the joint leads to a ventrally directed compressive force and a horizontally directed force (or cranial tibial thrust). An intact cranial cruciate ligament opposes this force. The TPLO was designed to dynamically eliminate cranial tibial thrust & translation during weight bearing.

This study utilized 24 canine cadaveric hind limbs, and tested for tibial translations when the limbs were loaded in various degrees of range of motion, starting at 120 degrees to maximal extension.

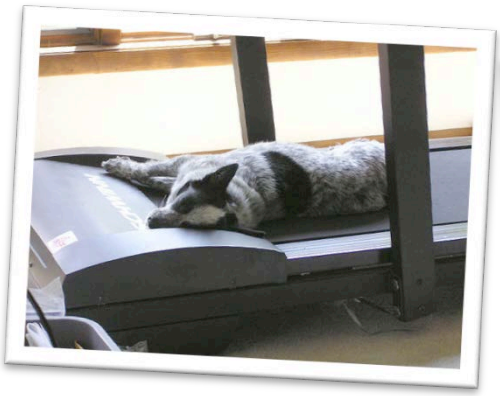
Results?

1. There was no significant difference in relative CTT values between the intact and TPLO repaired stifle from 120 – 130 degrees.
2. There was a significant difference in CTT values at 131 – 145 degrees (i.e. straighter).
3. Despite failure of the TPLO to normalize CTT through the entire ROM, TPLO values were significantly lower than cruciate-deficient stifles.
4. These altered biomechanics may help explain the continued progression of osteoarthritis in TPLO repaired stifles.



Relevance to Rehab?

What can reduce cranial drawer of the tibia? Hamstrings! When do you need them? Apparently when the stifle is straightest – according to this study!



Treadmill and muscle activation in dogs

Laurer SK, Hillman RB, Hosgood GL. Effects of treadmill inclination on electromyographic activity and hind limb kinematics in healthy hounds at a walk. Am J Vet Res 2009, 70 (5): 658 – 64.

Want to know one way to activate hamstrings in dogs?

This study provides insight on one option. Eight healthy hounds were utilized in this study, and were walked on a treadmill at 0.54m/s at inclines of 5%, 0% and -5%. The researchers measured hip and stifle ROM as well as activations of the hamstrings, gluteals, and quadriceps muscle groups via surface electrogoniometric and myographic sensors.

What did they learn?

Well, as one would expect, with the 5% incline, there was an increase in hip joint ROM, and stifle joint extension decreased significantly. And at the 5% incline, there was an increase in hamstring activation at both the beginning and end of stance phase. The gluteals and quadriceps muscle groups were not affected when the treadmill inclination changed.

Relevance to Rehab?

We know that hamstrings are required in cruciate deficient, cruciate repaired (and even osteoarthritic) stifle joints. So… when your post-operative TPLO patient is weight bearing consistently try challenging him / her with incline walking!

Rock star Ozzy Osborne saved his wife Sharon's Pomeranian from a coyote by tackling and wresting the coyote until it released the dog.

The shape of a dog's face suggests how long it will live. Dogs with sharp, pointed faces that look more like wolves typically live longer. Dogs with very flat faces, such as bulldogs, often have shorter lives.

The Mayans and Aztecs symbolized every tenth day with the dog, and those born under this sign were believed to have outstanding leadership skills.

Source: Choron, Harry and Sandra Choron. 2005. *Planet Dog: A Doglopedia*. New York, NY: Houghton Mifflin Co

Cold compress & TPLO

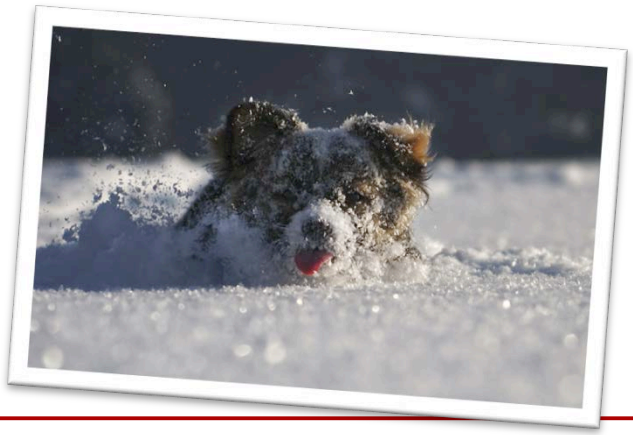
Drygas KA, McClure SR, Goring RL, et al. Effect of cold compression therapy on postoperative pain, swelling, range of motion, and lameness after tibial plateau leveling osteotomy in dogs. J Am Vet Med Assoc 2011; 238(10): 1284-1291.

This study was evaluating the effectiveness of a cold compress system (Game Ready Cold Equine, Cool Systems Inc). They took 34 dogs and divided them into

two groups (treatment & control). The treatment group received the cold compress therapy on the surgically repaired stifle for 4 sessions of 30-minutes each at 6-hour intervals beginning immediately after surgery.

What was discovered?

Use of the cold compression therapy unit (in this scenario) resulted in lower values for the visual analogue scale and Glasgow pain scales and lower pain threshold scores, as well as lower lameness scores, less swelling, and increased ROM 24 hours after surgery. However there were no significant differences between groups at 14 days post-operatively.



Relevance to Rehab?

This would be a worthwhile practice for pain reduction in the first 24 hours. It would be interesting to take this study to the next step to see if a rehab practitioners might be able to work with these dogs a bit sooner from a rehab perspective and whether that might show a difference at the 14 day mark.

Osteoarthritis & TPLO

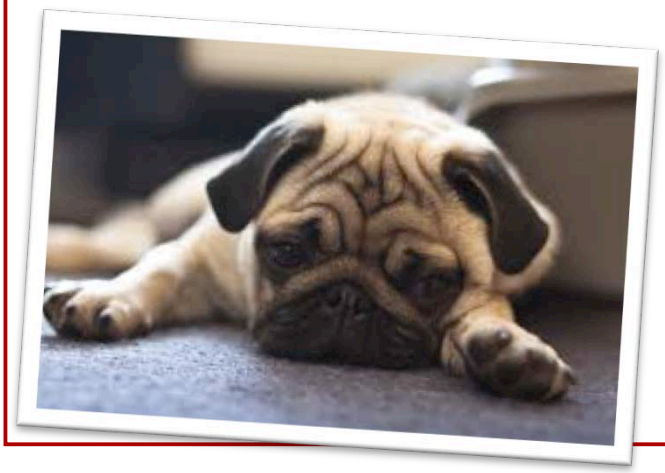
DeLuke AM, Allen DA, Wilson ER et al. Comparison of radiographic osteoarthritis sores in dogs less than 24 months or greater than 24 months following tibial plateau leveling osteotomy. Can Vet J 2012; 53: 1095 – 1099.

What do the stifle x-rays look like in dogs following TPLO surgery at follow up of 1 – 3 years?

Sixty dogs were followed for up to 3 years following TPLO surgery for cruciate deficiency. There was a significant increase in osteoarthritis score from post-operative to follow-up evaluations for all dogs studied. However, the osteoarthritis did not progress in a linear fashion over time.

The authors cited several papers that also disputed the claim that TPLO stops the progression of osteoarthritis; however this was the first study to look at whether or not there was a relationship between osteoarthritis changes and time.

Unfortunately, this study was not able to make conclusions for all patients in this study regarding concurrent meniscal injury or surgery as that information was not always available.



(Note: human studies find a high correlation between meniscectomy and knee osteoarthritis - Neuman et al 2008)

Relevance to Rehab?

Osteoarthritis is coming… regardless. Prepare the owner and make appropriate recommendations (i.e. nutraceuticals, exercises, etc).

Human Studies & their relevance to Canine Rehab

Beynnon BD, Vacek PM, Sturnick DR et al. Geometric profile of the tibial plateau cartilage surface is associated with the risk of non-contact anterior cruciate ligament injury. J Orthop Res 2013, Sep 30 [Epub ahead of print].

Does geometry of the tibial plateau affect the incidence of non-contact ACL injury? (…like it does in dogs??!!??)

This study looked at 78 people who had suffered non-contact ACL tears, and an equal number of controls.

Results?

1. Surface geometry was the same in both knees of the control subjects.
2. There were significant differences in the surface geometry between the injured and normal knees in the ACL-injured subjects… suggesting that the injury changed the cartilage surface profile
3. Comparing the uninjured knee of the ACL-injured subjects and the corresponding knees of their matched controls revealed significant differences in surface geometry! The ACL-injured subjects demonstrated a posterior-inferior directed orientations of the articular surface relative to the long axis of the tibial, while the control subjects were more likely to show a posterior-superior directed orientation.

What the heck?

Yep! That means that some of us have knees like dogs!!!

Thomas AC, Willwock M, Wojtys EM et al. lower extremity muscle strength after anterior cruciate ligament injury and reconstruction. J Athl Train 2013; 48(5): 610 – 620.

The purpose of this study was to determine weakness after ACL injury and after rehabilitation.

15 patients and 15 controls were used. The participants with ACL injury were tested pre-operatively and 6 months post-operatively, whereas the controls were tested only once. Testing looked at hip-flexor, -extensor, -abductor, and –adductor; knee-extensor and-flexor; and ankle plantarflexor and –dorsiflexor strength.

Results:

1. The ACL-injured participants demonstrated greater hip-extensor, and –adductor weakness preoperatively than postoperatively, regardless of limb, and greater post-operative hip-adductor strength than control participants.
2. Knee-extensor and –flexor strength were lower in the injured than in the uninjured limb preoperatively and postoperatively, with greater knee-flexor weakness preoperatively in the injured limb of the ACL-injured participants.
3. The ACL-injured participants had less injured limb knee-extensor and-flexor strength preoperatively BUT NOT post-operatively AS COMPARED to control subjects.
4. Ankle plantarflexor weakness was greater preoperatively than postoperatively in the ACL-injured limb.

Relevance to Rehab?

There's a lot to strengthen… and it's not just isolated to the knee (or stifle as the case may be)! Chose exercises that work on multiple joints and muscle to have the greatest impact for your patients… and please be more specific than just using the underwater treadmill for your rehab exercise regimen!

Liking FourLeg.com?

Laurie - you would be famous if you were on you tube. I have been watching your videos instead of Netflix. You also said on the treadmill video "Honey badger don't care"... of course I didn't know what that meant when I heard you say that in your practice as well...then I saw a t-shirt with that saying on it. Too funny... Have a great week. – P.H.

Tell your colleagues & classmates!

FourLegRehabInc

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Visit **www.fourleg.com**

Drop me a line! Send me your questions!

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