

## Is TTA better than lateral suture in small dogs with cruciate disease?

A Knowledge Summary by

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### PICO question

In dogs weighing under 15 kg with unilateral cranial cruciate ligament disease, does tibial tuberosity advancement lead to better long-term functional outcomes than lateral fabellar suture?

### Clinical bottom line

### Category of research question

Treatment

### The number and type of study designs reviewed

There were no papers that answered the PICO question

### Strength of evidence

Zero

### Outcomes reported

Between TTA and LFS none of the techniques was shown to provide better long-term functional outcomes than the other in dogs weighing less than 15 kg

### Conclusion

Given the absence of evidence answering the PICO question, choice and recommendation of procedure between TTA and LFS in dogs weighing under 15 kg should be guided by what the surgeon deems to be in the best interest of the patient

### [How to apply this evidence in practice](#)

The application of evidence into practice should take into account multiple factors, not limited to: individual clinical expertise, patient's circumstances and owners' values, country, location or clinic where you work, the individual case in front of you, the availability of therapies and resources.

Knowledge Summaries are a resource to help reinforce or inform decision making. They do not override the responsibility or judgement of the practitioner to do what is best for the animal in their care.

## Clinical Scenario

You are presented with a 10 kg Fox Terrier with a complete rupture of the cranial cruciate ligament of the left stifle. The right stifle is unaffected. The veterinarians in your practice are experienced in performing the lateral fabellar suture (LFS) technique to manage cranial cruciate ligament disease in small dogs, typically with good outcomes. You have recently attended a tibial tuberosity advancement (TTA) wetlab and were advised this technique is suitable for all sizes of dogs. In an endeavour to advise the client appropriately, you search for evidence comparing the long-term outcomes of these two procedures in dogs weighing under 15 kg.

## The evidence

There is no evidence comparing functional outcomes of TTA and LFS for unilateral cranial cruciate ligament disease in dogs weighing less than 15 kg. In view of this absence of evidence, it is recommended that practitioners use their personal experiences and preferences to advise clients and decide on which of the procedures to perform in small dogs.

## Summary of the evidence

There was no evidence that addressed the PICO question from the literature search.

## Appraisal, application and reflection

There was no evidence that addressed the PICO question. In combination, two prospective clinical trial studies by Krotscheck et al. (2013) and Krotschek et al. (2016) objectively compared the long-term functional outcomes of tibial plateau levelling osteotomy (TPLO), TTA and extracapsular reconstruction (ECR) by LFS. In the 2013 study, data for normal dogs, ECR and TPLO groups were reported. Data for the control group and TTA group in the 2016 study were reported and compared to data for the control group, TPLO group and ECR (LFS) group reported in the 2013 study. Both studies were identical in design. In the 2016 study, owners with dogs suffering from naturally occurring cranial cruciate ligament disease were offered three surgical interventions, that is, TPLO, ECR (LFS), and TTA. Owners that opted for TTA were given the option to participate in the study. Inclusion criteria were a body mass greater than 15 kg, diagnosis of unilateral cranial cruciate ligament disease and absence of any other orthopaedic abnormalities. Standard TTA was performed on all dogs in the study (n=14) with standardised perioperative care. Force plate gait analysis was performed on normal control dogs and study dogs preoperatively and at 2 weeks, 8 weeks, 6 months and 12 months postoperatively. At 12 months postoperatively, the TTA group had a better functional outcome at the walk than the ECR (LFS) group and was indistinguishable from the control group. At 12 months postoperatively, the functional outcomes of the TTA and the ECR (LFS) groups were indistinguishable at the trot but inferior to the control group. The TTA group had more postoperative complications than the ECR (LFS) group. At 12 months postoperatively, the TPLO group had functional outcomes indistinguishable from the control group at both the walk and the trot, suggesting superior long-term functional outcomes of the TPLO group to both the TTA and ECR (LFS) groups. However, long-term functional outcomes of the TPLO group are irrelevant to the PICO. Although the results of the two studies suggest better long-term functional outcomes in the TTA group compared to the ECR (LFS) group, both studies excluded dogs weighing less than 15 kg, and thus the results may not be applicable to this PICO.

A study by Di Donna et al. (2015) compared objective, validated long-term functional outcomes of TTA and LFS using force plate analysis. Dogs in both groups had good to excellent outcomes but kinematic results indicated superior surgical outcome with the TTA group at 6 month follow-up. However, the conference abstract available lacked important detail on inclusion criteria and statistical inference in its methodology and did not specify whether the study population included dogs weighing below 15 kg, making it difficult to determine its evidentiary value to this PICO. It has been previously recommended that dogs weighing less than 15 kg do not require surgery. This was based on a 1984 study by Vasseur where 85.7% of dogs weighing under 15 kg were considered clinically normal after an average follow-up period of 36.6 months following conservative non-

surgical management, compared to 19.3% of dogs weighing over 15 kg after an average follow-up period of 49.1 months. However, it has since been demonstrated that conservatively managed dogs develop more severe osteoarthritis in the long-term than surgically managed dogs. In view of this, surgery in one form or another is recommended (Innes, 2012; Hamilton, 2016; and Mölsa et al. 2014). The literature does not specify whether this has been demonstrated in dogs weighing under 15 kg so the relevance of this observation regarding small dogs cannot be determined. In order to address the PICO question, the ideal study would be a blinded, randomised, controlled clinical trial (Bergh et al., 2014) addressing the specific weight class, with objective assessment of long-term functional outcomes of TTA and LFS. Mölsa et al. compared long-term surgical outcomes in dogs following surgery for cruciate ligament disease in a 2014 retrospective study. They used force plate analysis, orthopaedic and radiographic examination, and physiotherapeutic examination as objective, validated methods to measure and compare long-term functional outcomes in dogs that had undergone intracapsular, extracapsular and osteotomy techniques. The dogs that had undergone osteotomy techniques had less radiographic osteoarthritis than the dogs that had undergone intracapsular and extracapsular techniques. The low number of dogs treated with the extracapsular technique did not allow for comparison of ground reaction forces with the osteotomy and intracapsular techniques. There were no other significant differences. The limitations of the study are that it excluded dogs weighing less than 17 kg, largely focused on comparing surgically treated limbs to contralateral, healthy limbs, and compared broad surgical technique classifications namely intracapsular, extracapsular and osteotomy techniques rather than specific surgical techniques such as TTA and LFS. The study is, therefore, irrelevant to the PICO question as it excluded dogs weighing under 17 kg and the singular contributions of TTA and LFS to the findings cannot be determined. A 2013 study by Mölsa et al. compared long-term surgical outcome and chronic pain in dogs that underwent intracapsular, extracapsular and osteotomy techniques for cranial cruciate ligament disease. The Helsinki Chronic Pain Index (HCPI) was used to evaluate chronic pain following surgery for cranial cruciate ligament disease. There were no significant differences in chronic pain indices between the different techniques. The study was carried out on a heterogenous population of dogs and does not indicate whether dogs weighing under 15 kg were included. The HCPI questionnaire used, although validated, remains subjective. This study also compared broad surgical technique classification rather than specific surgical techniques such as TTA and LFS. Progressive osteoarthritis which always develops secondary to cranial cruciate ligament disease regardless of surgical technique used to manage the condition may be responsible for chronic pain (Muir, 2018). The use of chronic pain to evaluate long-term surgical outcome is therefore limited as chronic pain may have other sources unrelated to surgery. The relevance of this study to the PICO given these limitations is therefore not possible to determine. Based on the absence of evidence, the choice of procedure between LFS and TTA should be guided by what the surgeon deems to be in the patient's best interests.

There is currently zero evidence to base choice between performing TTA or LFS in dogs weighing under 15 kg. However, surgeons should be guided by the patient's best interests in choosing between which of the two to perform in dogs weighing under 15 kg.

## Methodology Section

Search Strategy	
Databases searched and dates covered:	CAB Abstracts on the OVID interface 1973 to Week 21 2019 PubMed accessed via the NCBI Website 1910 to May 2019
Search terms:	<p>CAB Abstracts:</p> <ol style="list-style-type: none"> <li>1. dog or dogs or canine or canines or bitch or bitches or exp dogs/ or exp canis/ oe exp bitches/</li> <li>2. cranial and cruciate</li> <li>3. tibial tuberosity advancement or TTA</li> <li>4. lateral or fabellar or fabellotibial or tibiofabellar or extracapsular or extra-capsular or LFS or de Angelis or 'modified retinacular imbrication' or MRIT</li> <li>5. 1 and 2 and 3 and 4</li> </ol> <p>PubMed:</p> <ol style="list-style-type: none"> <li>1. dog or dogs or canine or canines or bitch or bitches</li> <li>2. cranial and cruciate</li> <li>3. tibial tuberosity advancement or TTA</li> <li>4. lateral OR fabellar OR fabellotibial OR tibiofabellar OR extracapsular OR extra-capsular OR LFS OR de Angelis OR 'modified retinacular imbrication' OR MRIT</li> <li>5. 1 and 2 and 3 and 4</li> </ol>
Dates searches performed:	04/06/2019

Exclusion / Inclusion Criteria	
Exclusion:	<ul style="list-style-type: none"> <li>• Only one technique included</li> <li>• Wrong techniques</li> <li>• Book chapters</li> <li>• Expert opinions</li> <li>• Reviews</li> <li>• Articles not available in English</li> <li>• Irrelevant to the PICO question</li> </ul>
Inclusion:	<ul style="list-style-type: none"> <li>• Prospective and retrospective studies</li> <li>• Compare outcomes for both TTA and LFS techniques in dogs weighing less than 15 kg</li> <li>• Objective assessment of long term outcomes</li> <li>• At least 6 months postoperative follow-up period</li> </ul>

Search Outcome						
Database	Number of results	Excluded – Article not in English	Excluded – Reviews	Excluded – Expert opinions	Excluded – Not relevant to PICO question	Total relevant papers
CAB Abs	30	3	2	2	23	0
Medline	20	0	1	1	18	0
Total relevant papers when duplicates removed						0

## CONFLICT OF INTEREST

The author declares no conflicts of interest.

The literature search was developed by Clare Boulton.

This Knowledge Summary, albeit with some changes, was originally submitted as an assignment in the EBVM course of the MVetSci programme offered by the University of Edinburgh.

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