

Ultrasound of the medial aspect of the thigh and the back



Diagnostic Mindset



Giliola Spattini
DVM, PhD, DECVDI

Kim, Australian Kelpie, MI, 3 years

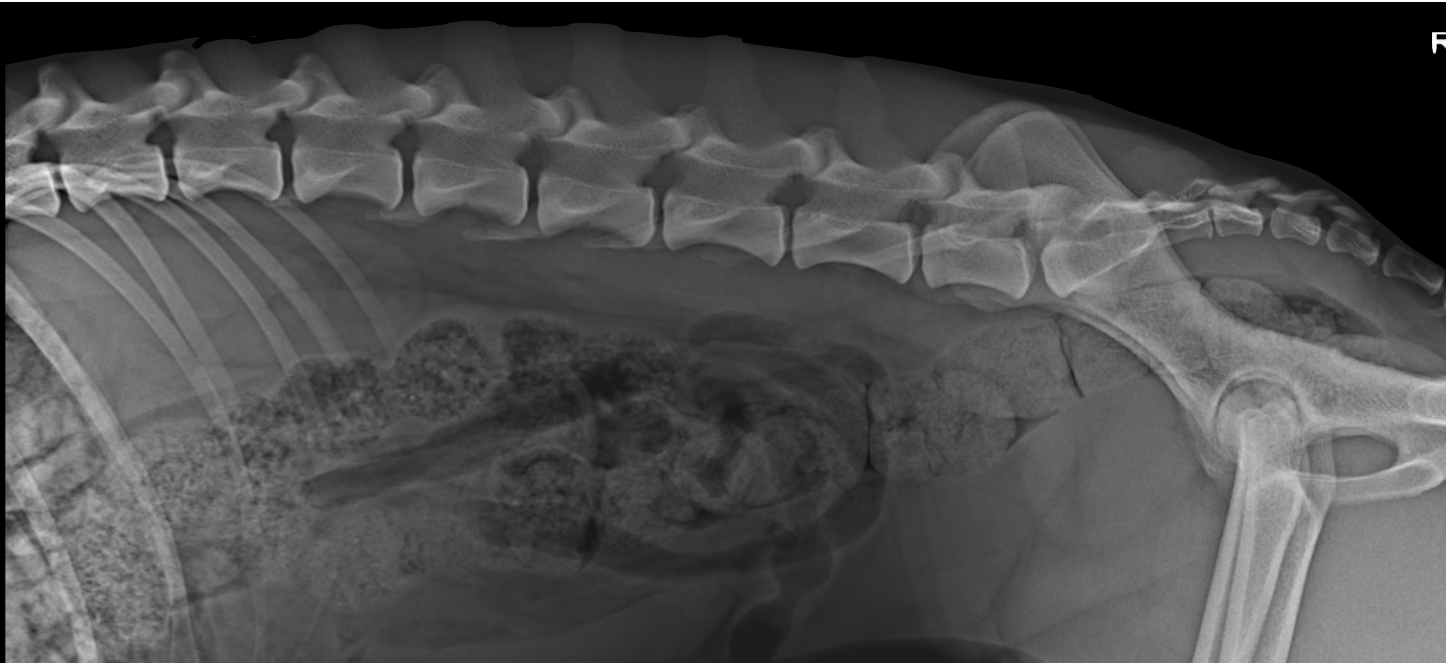
- Failing jumps during agility trial
- Slower than usual
- No evident lameness or discomfort after training



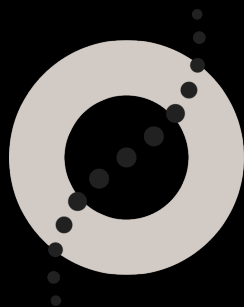
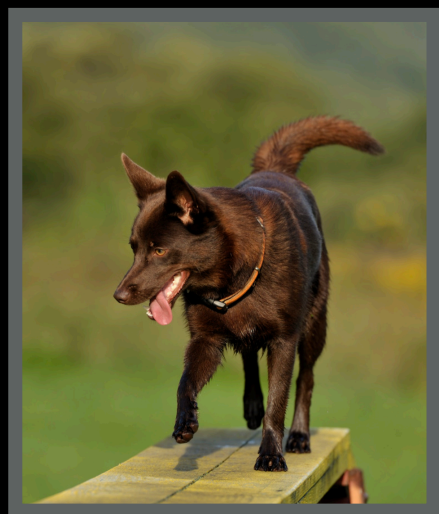
Kim, Australian Kelpie, MI, 3 years

- The following day 3rd degree of lameness in the right hindlimb
- Pain on extension and extra rotation of the hip
- No neurological signs

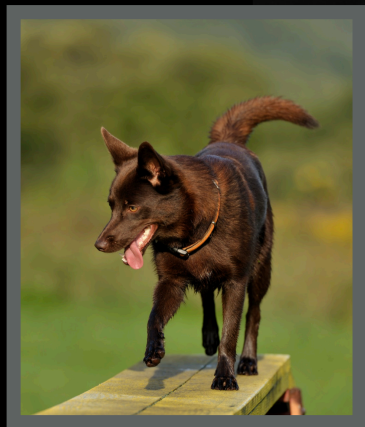




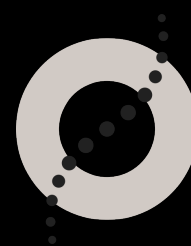
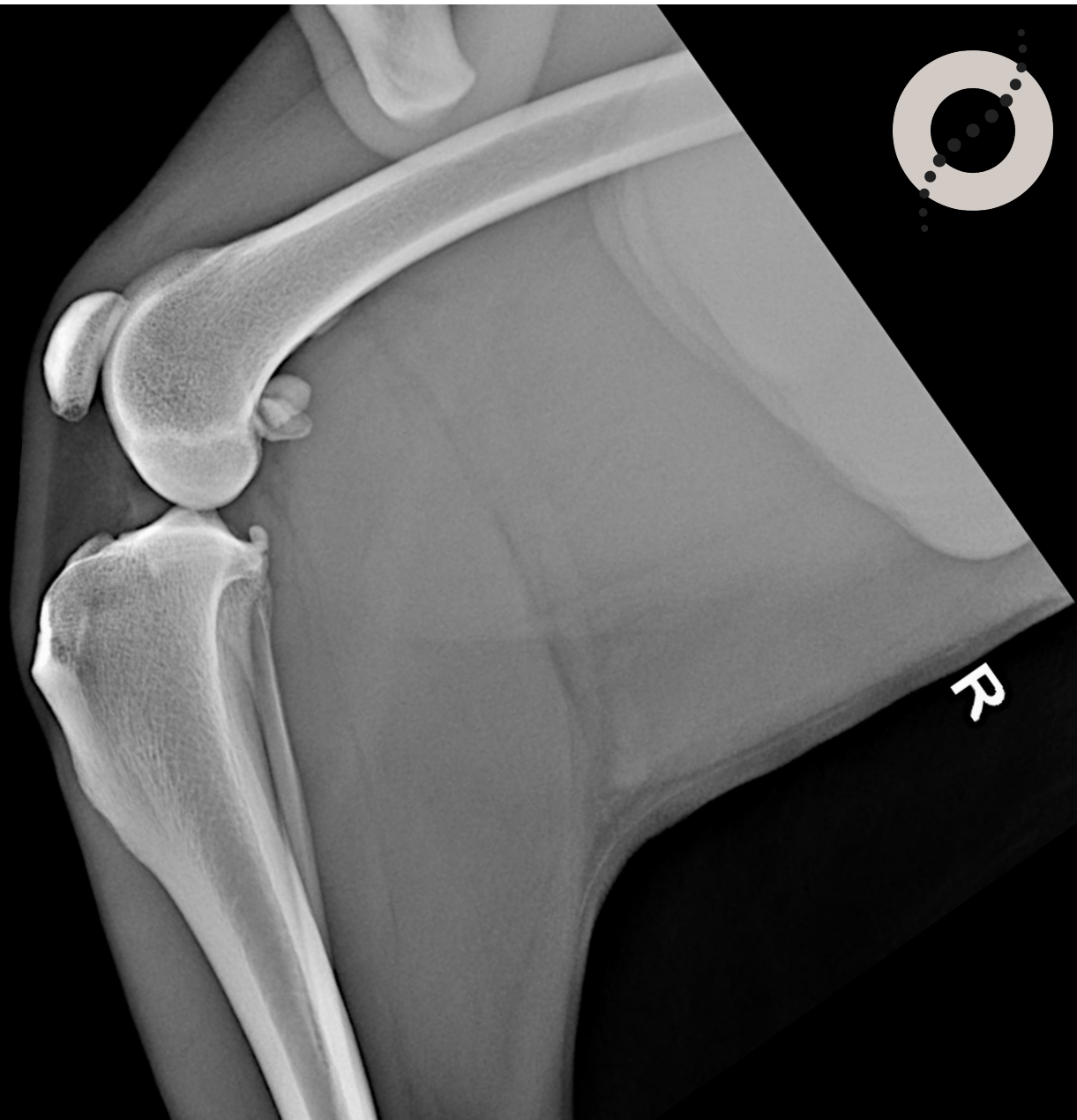
R

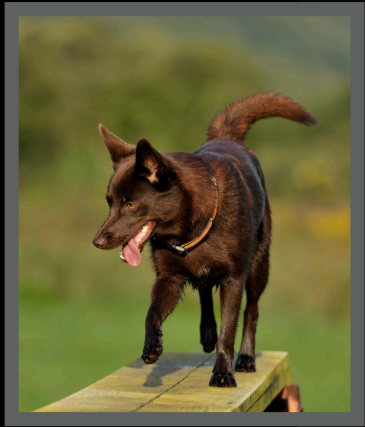


Kim, MI, 3 years



Kim, MI, 3 years

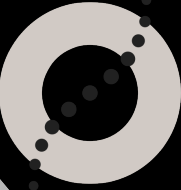




Kim, MI, 3 years



Relatively
unremarkable
radiographs

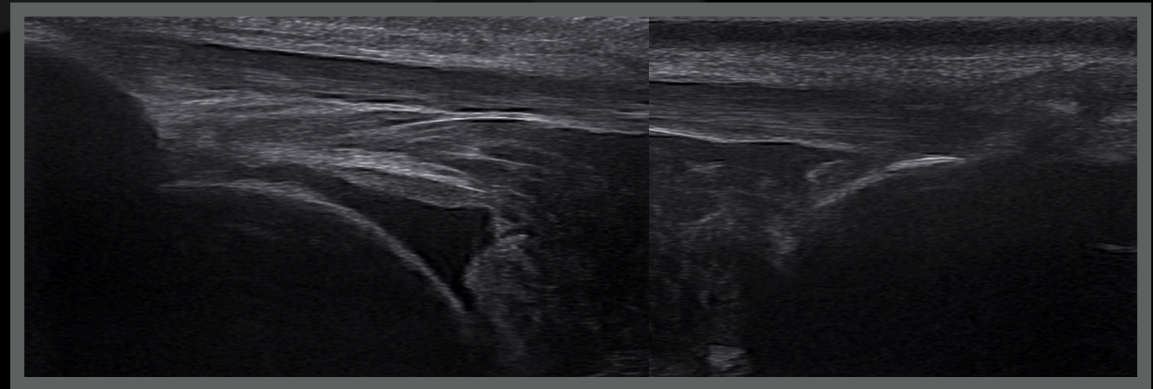
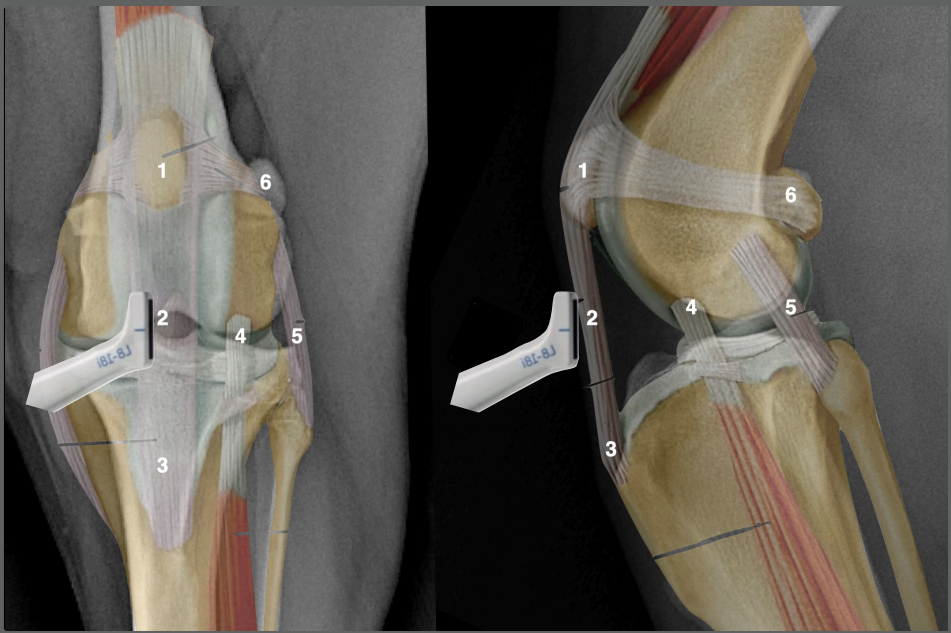


Kim, MI, 3 years

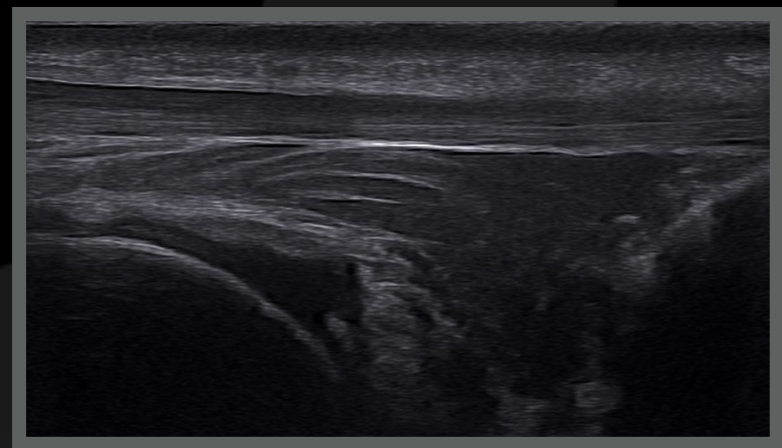
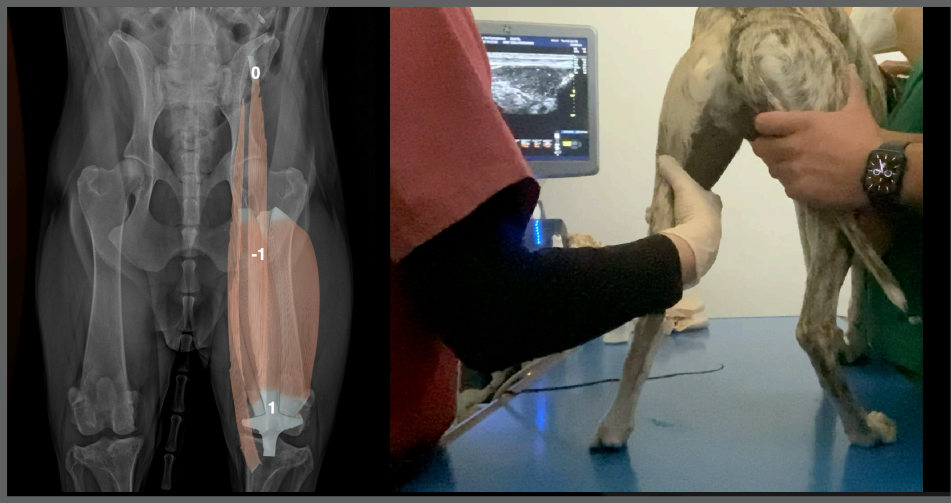
Left stifle

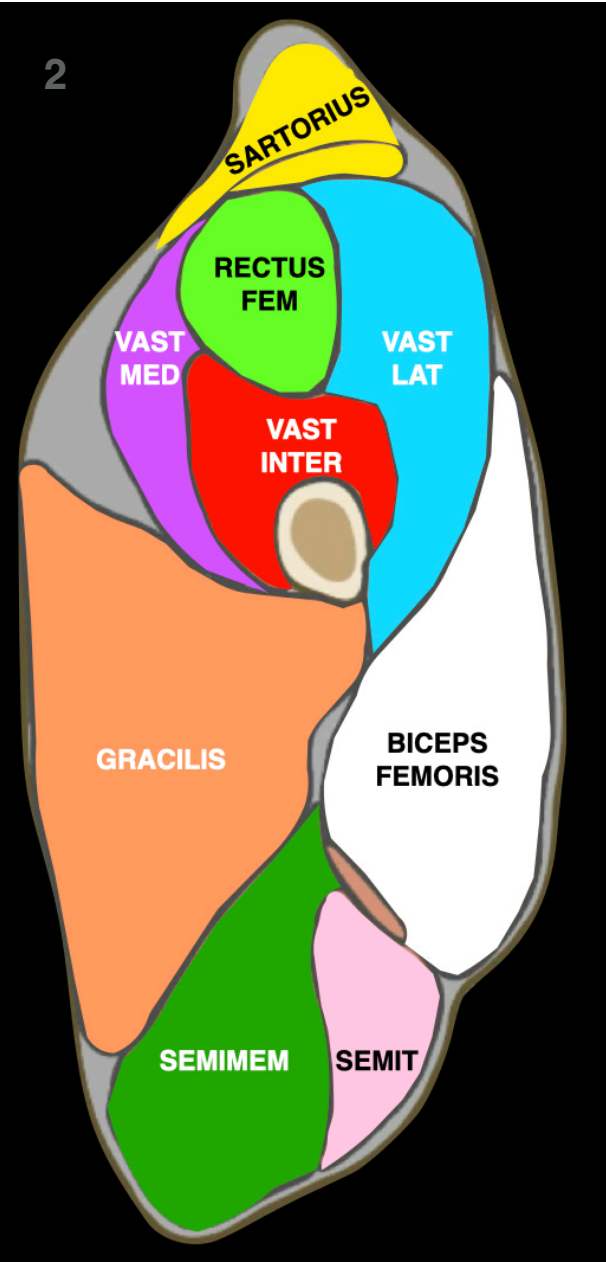
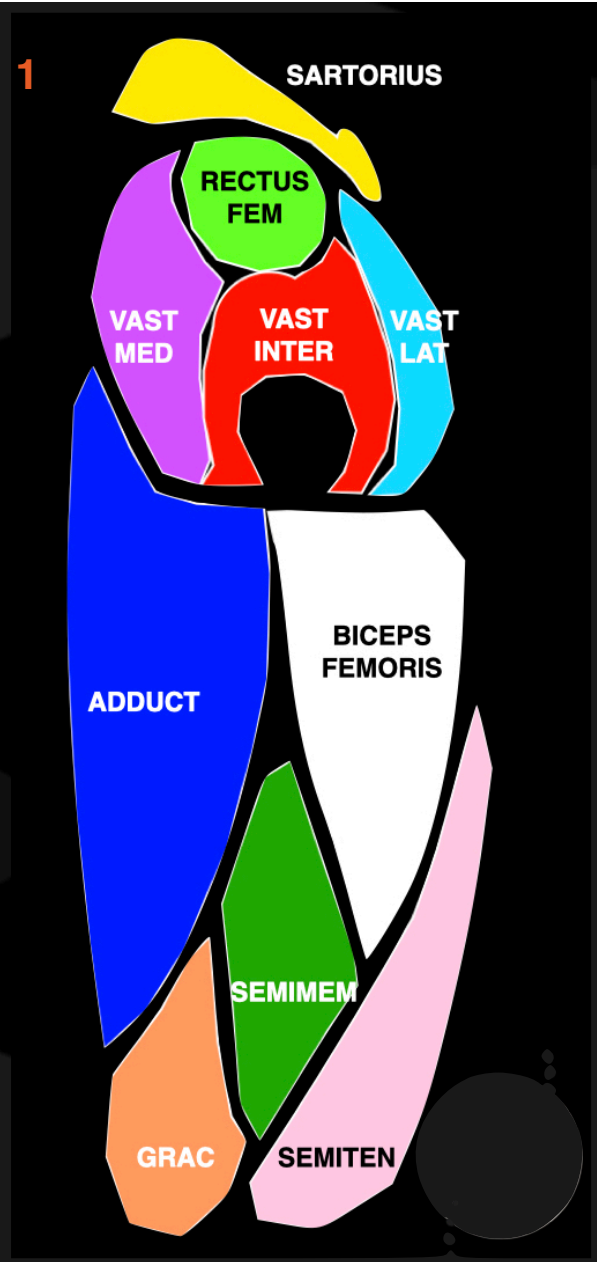
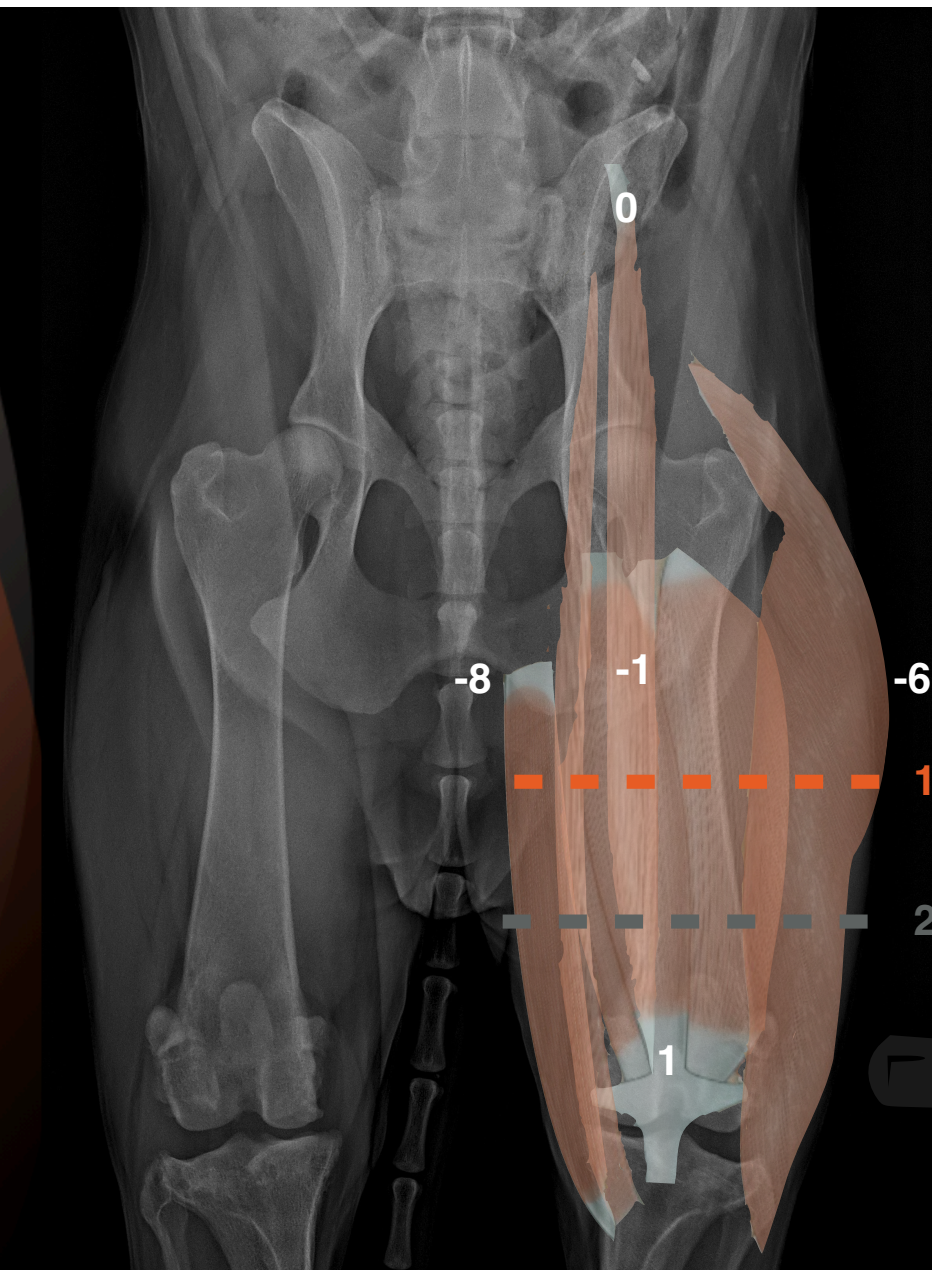
Cranial face longitudinal scan

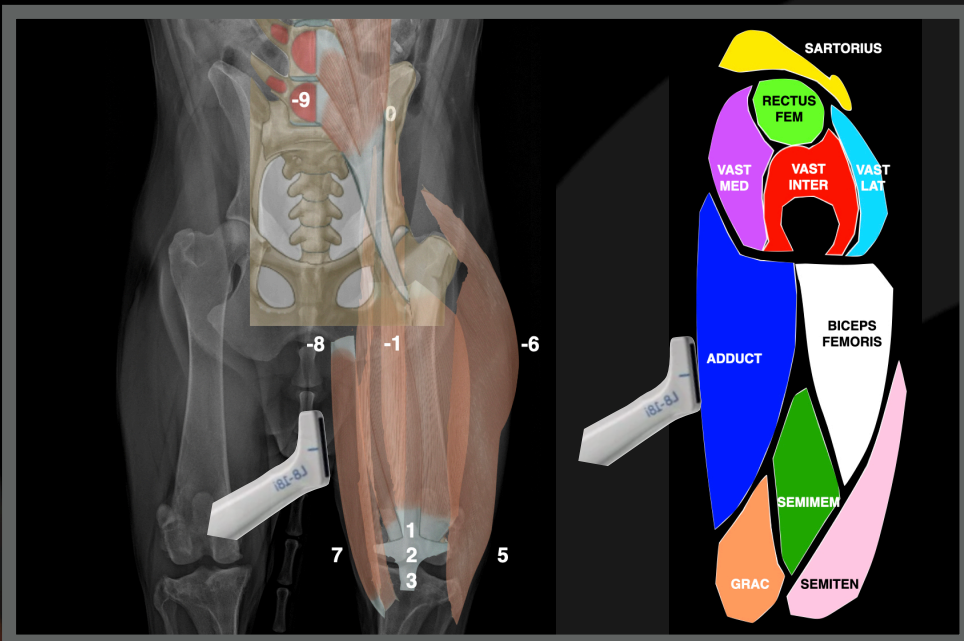
1-2-3



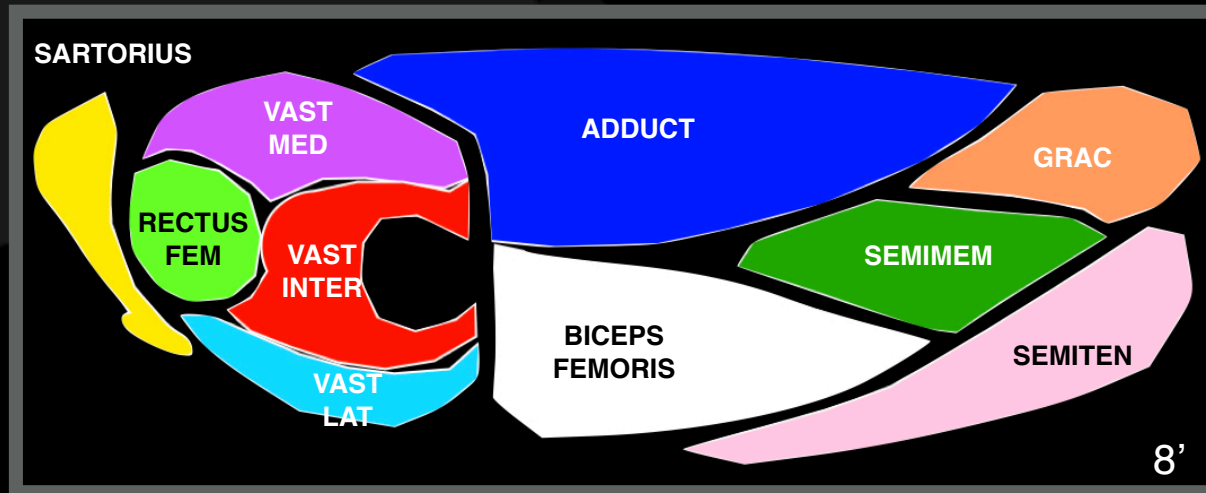
Right stifle



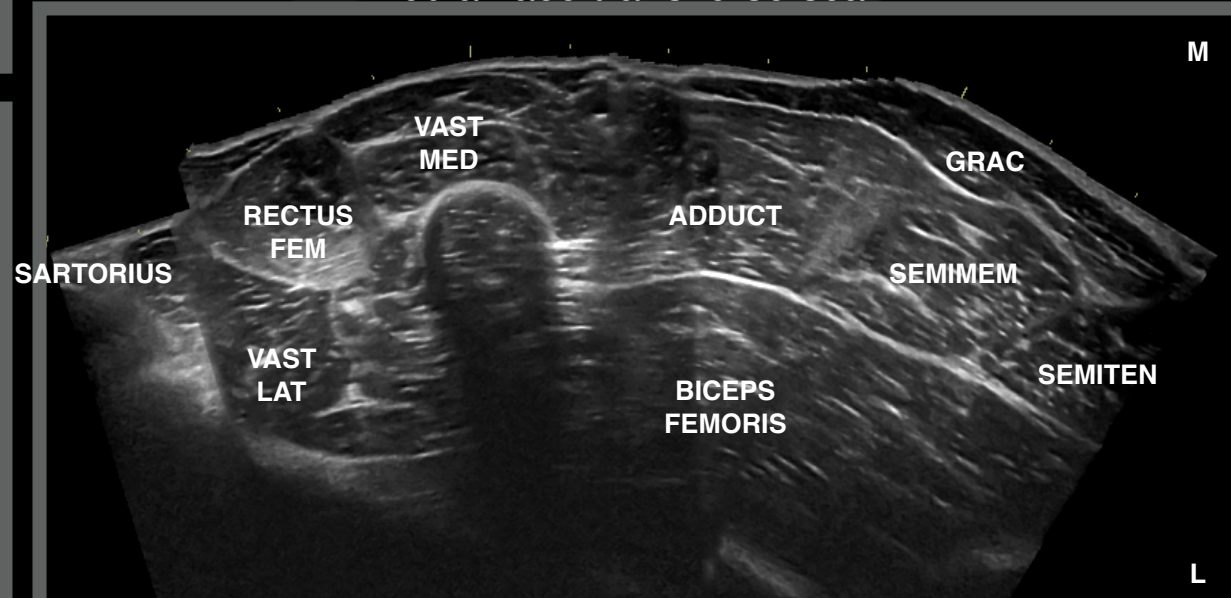




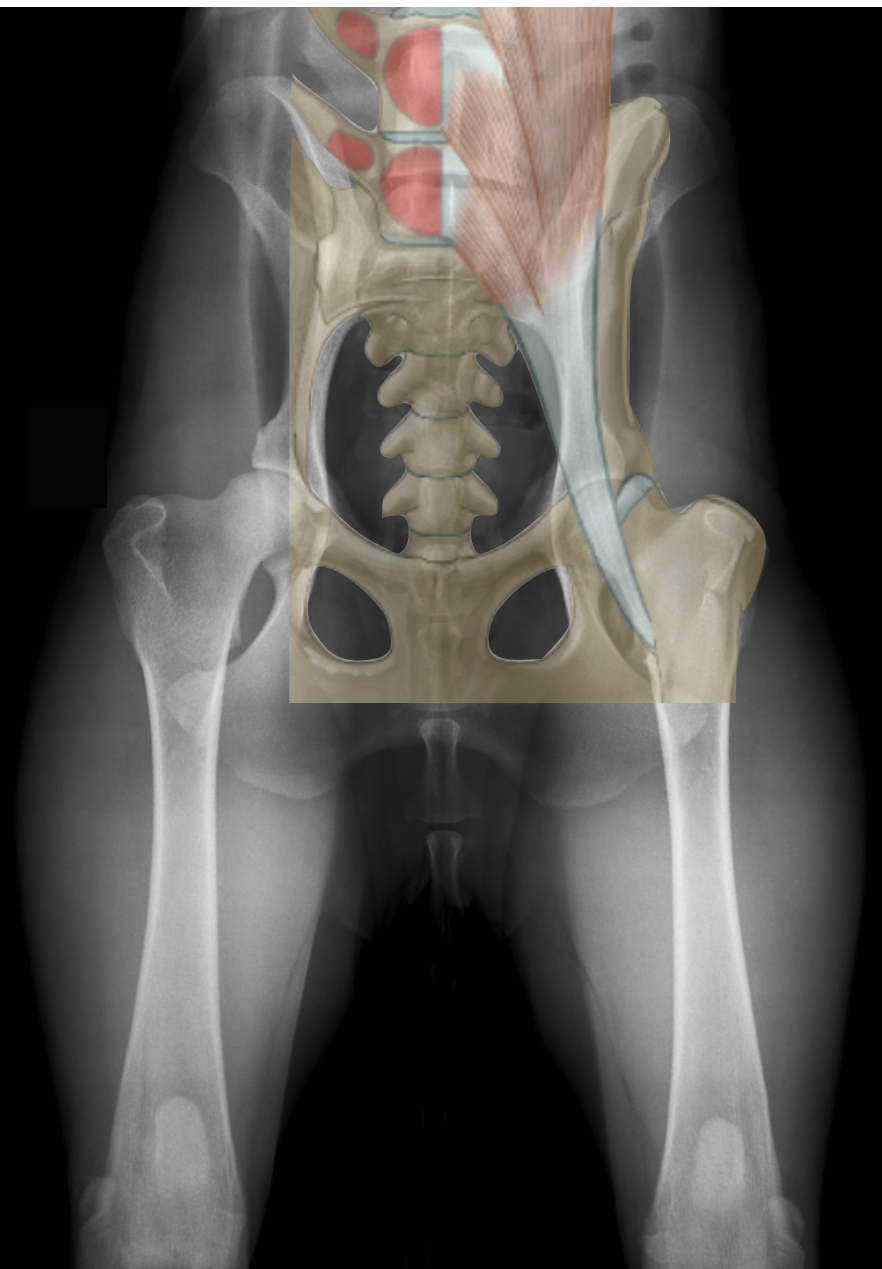
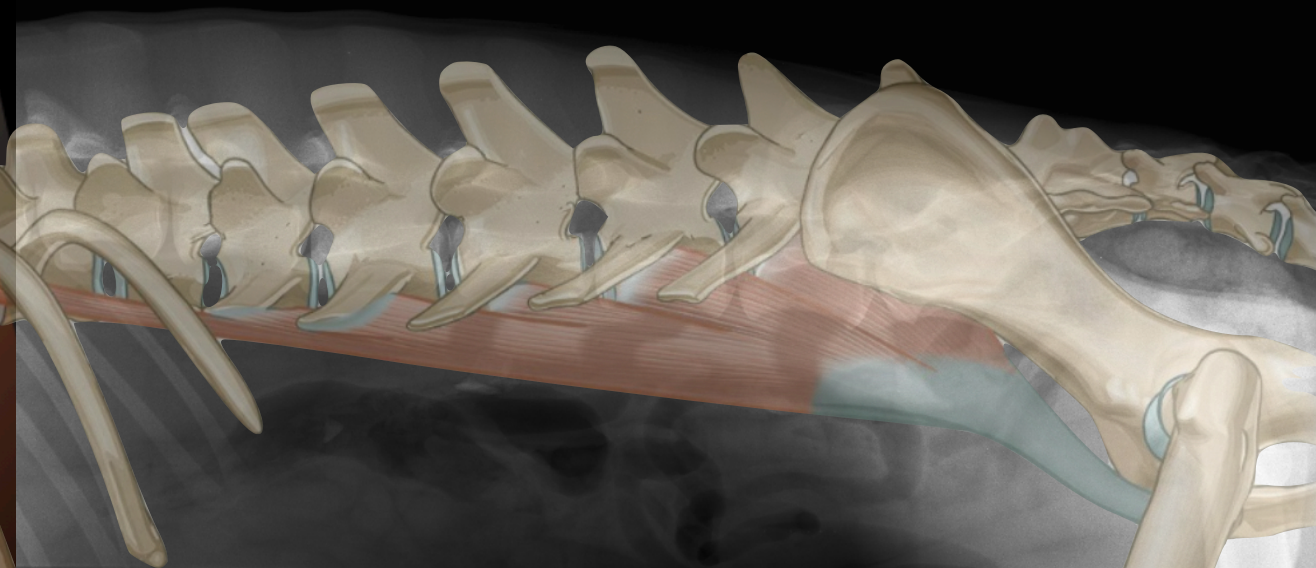
Kim, MI, 3 years



Medial face transverse scan



Ultrasonographic technique for iliopsoas muscle and tendon



Veterinary Anaesthesia and Analgesia, 2015

doi:10.1111/vaa.12240

RESEARCH PAPER

Anatomical and ultrasonographic study of the femoral nerve within the iliopsoas muscle in beagle dogs and cats

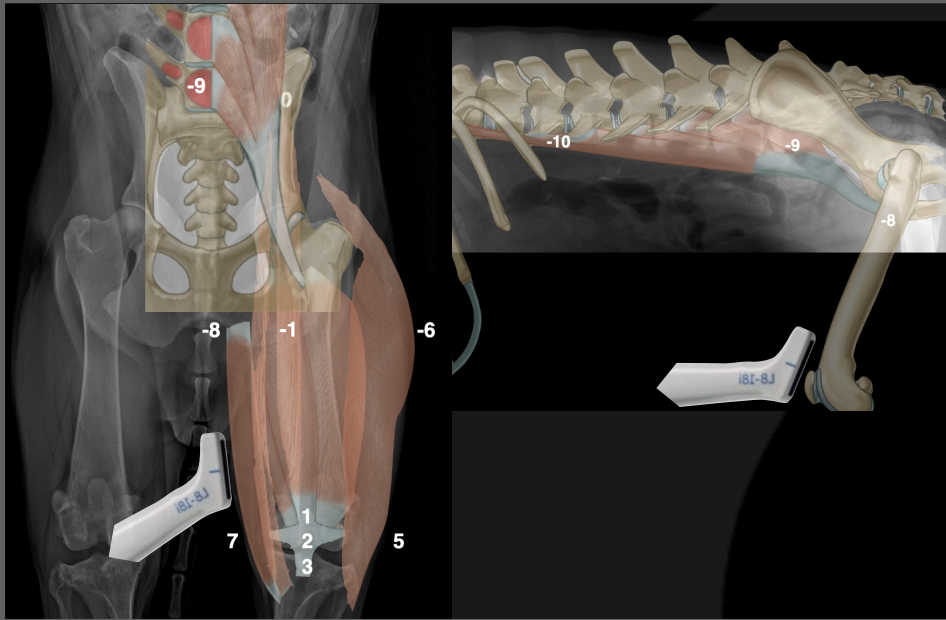
Giovanni Mogenicato^{*,†}, Catherine Layssol-Lamour[‡], Stephan Mahler[§], Maxime Charrouin^{*},
Guillaume Boyer[¶], Patrick Verwaerde[¶] & Géraldine Jourdan[¶]

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Normal anatomy ileopsoas insertion

Medial face transverse scan

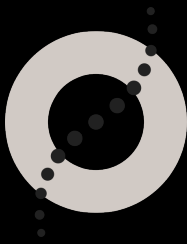
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Kim, Ml, 3 years

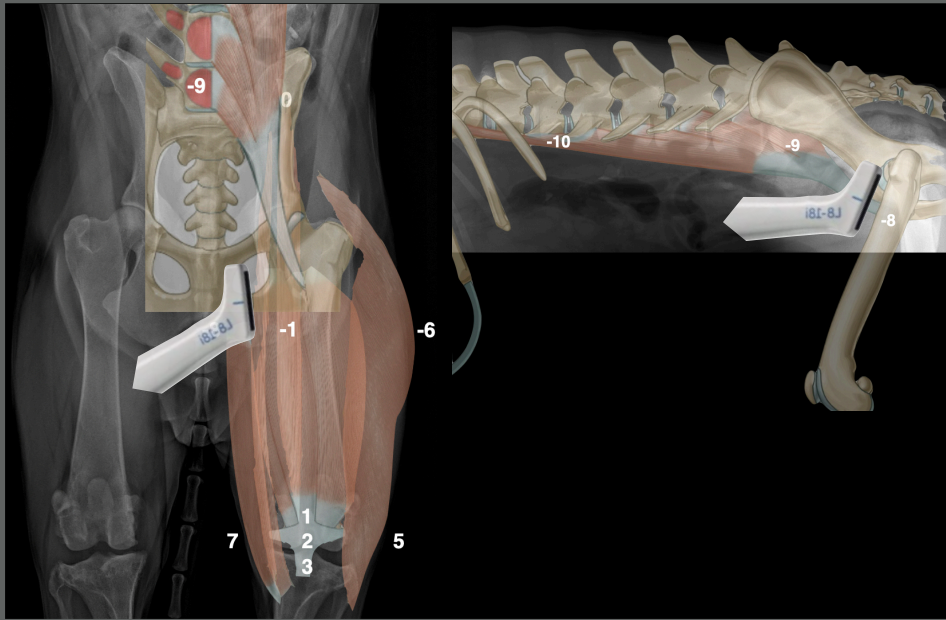
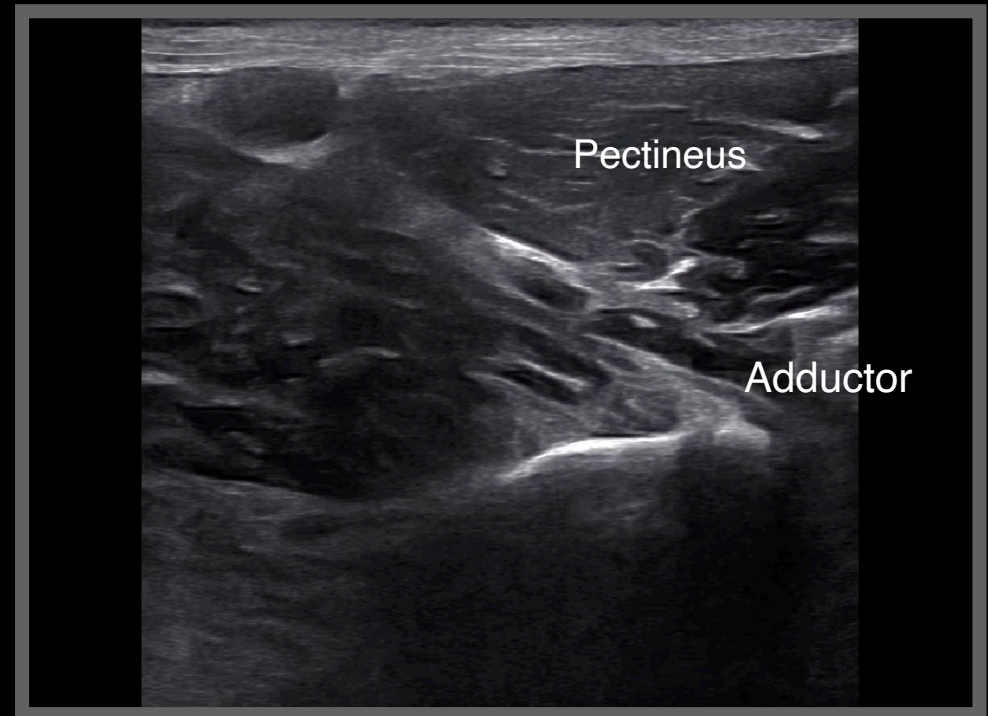
Left thigh

Sound limb



Medial face transverse scan

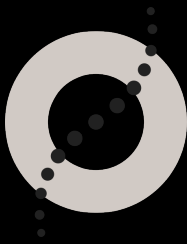
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Kim, MI, 3 years

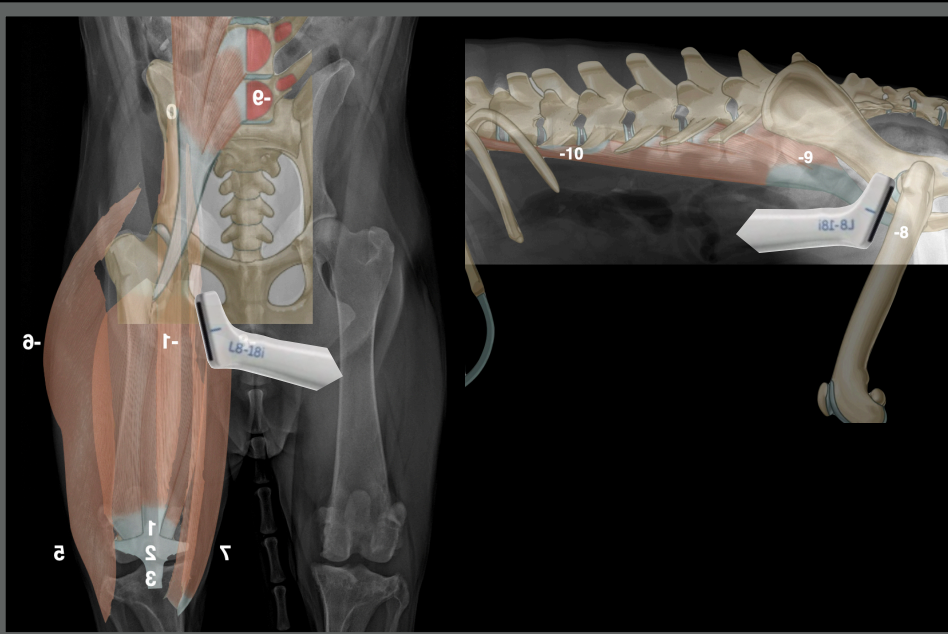
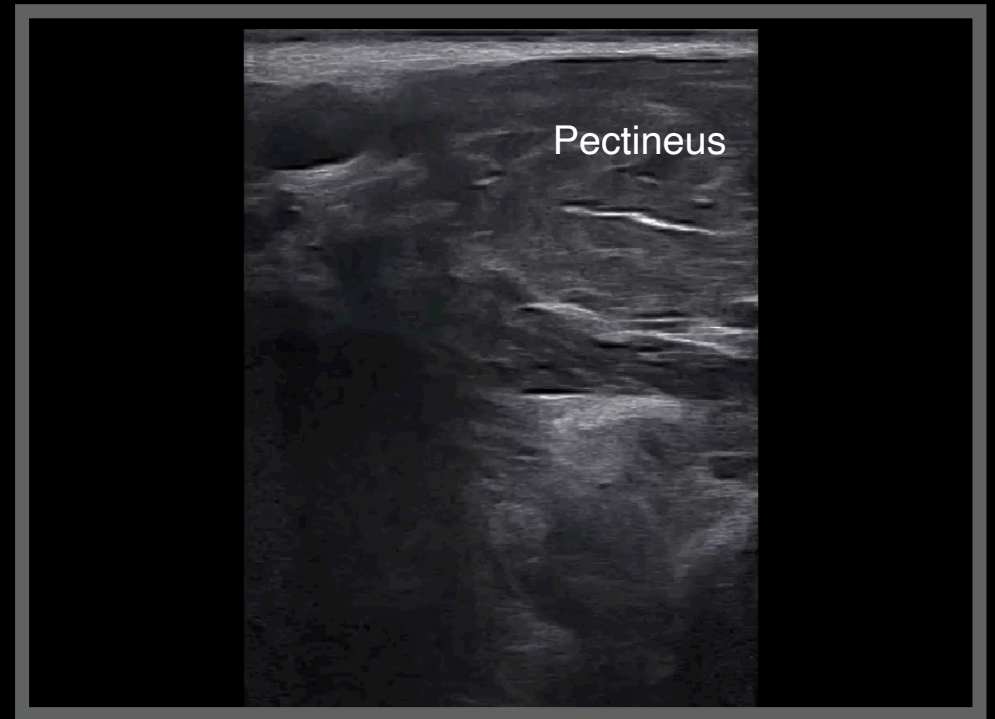
Right thigh

Affected limb

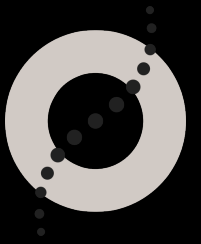


Medial face transverse scan

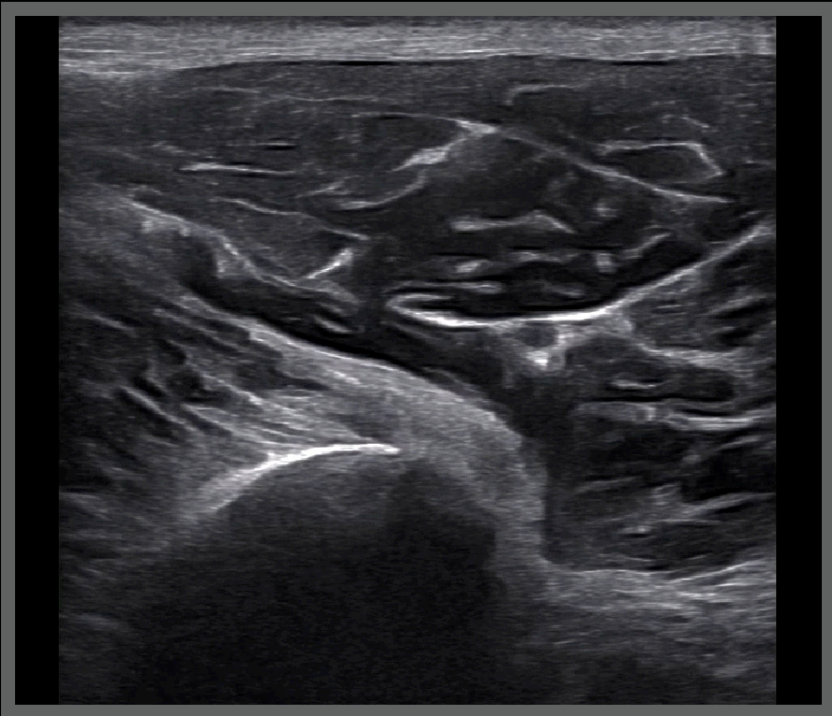
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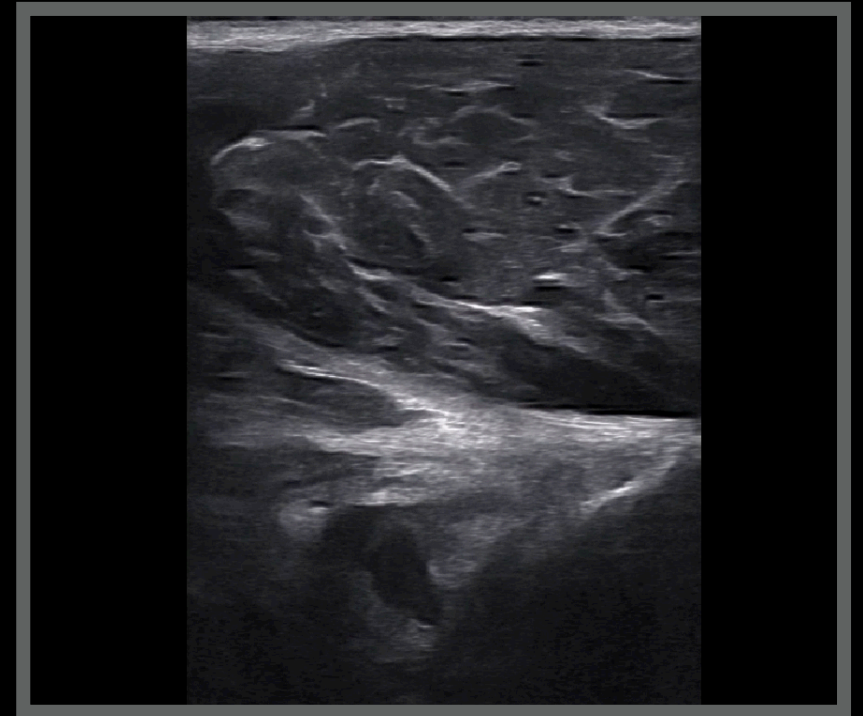
Kim, MI, 3 years



Left thigh



Right thigh



Kim, Australian Kelpie, MI, 3 years

Ultrasonographic diagnoses:

- Partial rupture of the right iliopsoas teno-junction

Conclusions

Physiotherapy and change in training



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1

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RESULTS BY YEAR



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☐ Books and Documents

☐ Clinical Trial

☐ Meta-Analysis

☐ Randomized Controlled Trial



Management of Injuries in Agility Dogs.

1

Pechette Markley A.

Cite

Vet Clin North Am Small Anim Pract. 2023 Jul;53(4):829-844. doi: 10.1016/j.cvsm.2023.02.012.

Epub 2023 Mar 22.

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PMID: 36964029

[Review.](#)

Shoulder injuries and other soft tissue injuries including **iliopsoas** muscle strains are commonly seen. The Border Collie seems to be at higher risk of developing agility-related injuries. ...



Iliopsoas muscle injury in dogs.

2

Cabon Q, Bolliger C.

Cite

Compend Contin Educ Vet. 2013 May;35(5):E2.

PMID: 23677782

Share

The **iliopsoas** muscle is formed by the psoas major and iliacus muscles. Due to its length and diameter, the **iliopsoas** muscle is an important flexor and stabilizer of the hip joint and the vertebral column. ...



Internet Survey Evaluation of Iliopsoas Injury in Dogs Participating in Agility Competitions.

3

Fry LM, Kieves NR, Shoben AB, Rychel JK, Pechette Markley A.

Cite

Front Vet Sci. 2022 Jul 8;9:930450. doi: 10.3389/fvets.2022.930450. eCollection 2022.

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PMID: 35873675

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RESULTS: Of the 4,197 **dogs** in the sample, 327 (7.8%) reported **iliopsoas** injury. The final model identified six risk factors for **iliopsoas** injury. A higher risk of **iliopsoas** injury was observed for the Border Collie breed, **dogs** with handlers who ...

Iliopsoas strain demographics, concurrent injuries, and grade determined by musculoskeletal ultrasound in 72 agility dogs

Danny Sack, Debra Canapp, Sherman Canapp, Stephanie Majeski, Jeff Curry, Angela Sutton, Robert Cullen

Abstract

The objective of this study was to describe patient demographics associated with iliopsoas strains, frequency of common concurrent injuries, and associated strain grades based on musculoskeletal ultrasound.

The medical records of 72 client-owned agility dogs that had an iliopsoas musculoskeletal ultrasound (MSK-US) between 2009 and 2015 were retrospectively reviewed. Analyses included patient signalment, physical examination, and diagnostic findings.

Twenty-four breeds of canine athletes from 1.5 to 10 y old (median: 5 y, SD: 2.2 y) were included in the study. Of the 72 records reviewed, border collies were the most common breed (27.8%, 20/72) reported. Isolated iliopsoas strains occurred in 26.4% (19/72) of cases. Concurrent pathology was noted in 73.6% (53/72) of cases. Cranial cruciate ligament (CCL) instability was the most common concurrent pathology, representing 27.8% (20/72) of all cases, with hip (8.3%, 6/72), lumbosacral (23.6%, 17/72), other non-CCL hind limb (6.9%, 5/72), and forelimb (6.9%, 5/72) pathologies making up the remainder of cases with concurrent pathology. In patients with a concurrent hind limb injury, 96.7% (30/31) of dogs had their most severe iliopsoas strain grade on the same limb.

MSK-US revealed Grade I strains in 54.2%, Grade II strains in 22.2%, Grade III strains in 5.2%, and chronic changes in 18.1% of cases. There were no statistically significant associations between iliopsoas strain grade and age, body weight, sex, breed, concurrent pathology, anatomic location of concurrent pathology, or sidedness of concurrent pathology.

Iliopsoas strains are one of the most common agility dog injuries; however, patient demographics, prevalence of concurrent injury and correlation with MSK-US findings have not been previously reported. To the authors' knowledge, this is the first retrospective analysis reporting iliopsoas strain demographics, concurrent injury frequency and correlation with MSK-US evaluation in agility dogs. Although 26.4% of iliopsoas strains occurred as isolated injuries, 73.6% had concurrent injuries, with CCL instability present most commonly, occurring in 27.8% of cases.

Dogs should be thoroughly evaluated for concurrent injuries when presenting with an iliopsoas strain.

Table I. Musculotendinous grading scheme for dogs.

Grade	Description
I	"Mild strain," < 5% muscle involvement, focal edema/hemorrhage
II	"Moderate strain," > 5% muscle involvement, mild fiber tearing, increased edema/hemorrhage
III	"Severe strain," significant fascial tearing, marked to complete muscle fiber disruption, marked edema/hemorrhage
Chronic	Hyperechoic fiber pattern, hyperechoic changes and/or debris within bursa, > 5% muscle involvement, mild fiber tearing

Internet Survey Evaluation of Iliopsoas Injury in Dogs Participating in Agility Competitions

Frontiers in Veterinary Science | www.frontiersin.org

1

July 2022 | Volume 9 | Article 930450

Lindsey M. Fry¹, Nina R. Kieves², Abigail B. Shoben³, Jessica K. Rychel¹ and Arielle Pechette Markley^{4*}

¹ Red Sage Integrative Veterinary Partners Rehabilitation Clinic, Fort Collins, CO, United States, ² Department of Veterinary Clinical Sciences, College of Veterinary Medicine, The Ohio State University, Columbus, OH, United States, ³ College of Public Health, Division of Biostatistics, The Ohio State University, Columbus, OH, United States, ⁴ Veterinary Medical Center, The Ohio State University, Columbus, OH, United States

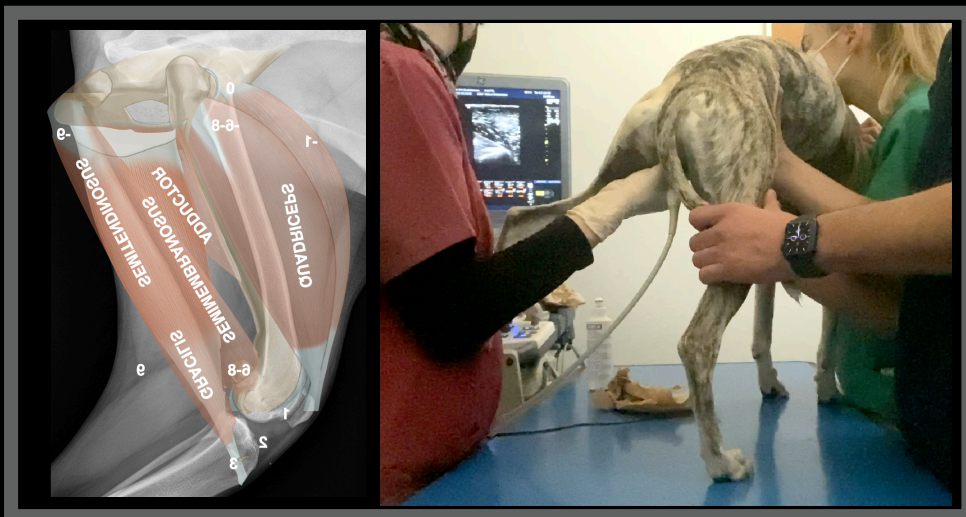
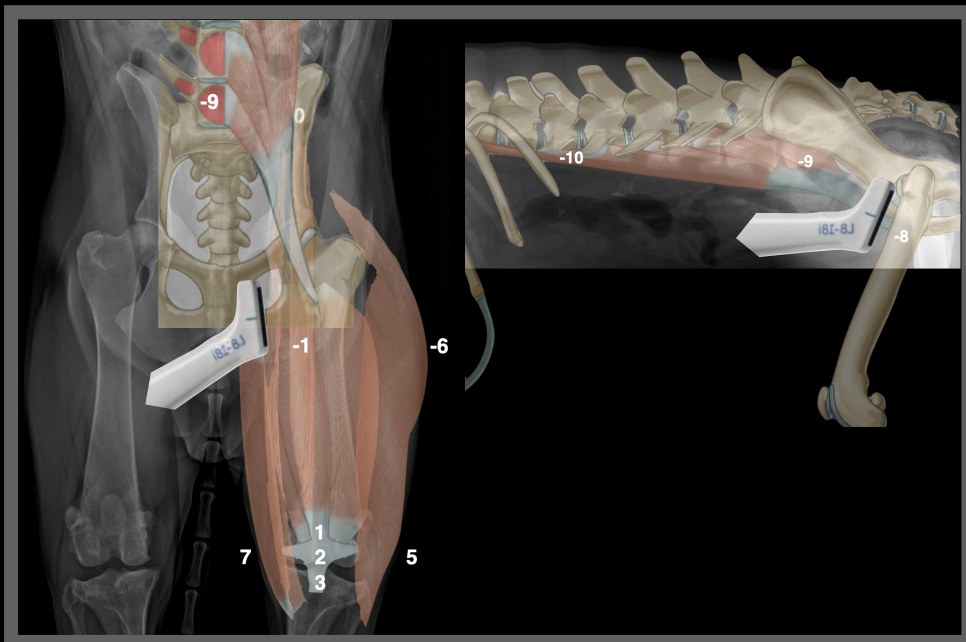
Results: Of the 4,197 dogs in the sample, 327 (7.8%) reported iliopsoas injury. The final model identified six risk factors for iliopsoas injury. A higher risk of iliopsoas injury was observed for the Border Collie breed, dogs with handlers who are veterinary assistants, dogs competing on dirt, dogs competing on artificial turf 6+ times a year, and dogs that trained with the 2 × 2 method for weave poles. Dogs that were not acquired with agility in mind were observed to have a decreased risk of injury. Factors like number of competition days and jump height were not significantly associated with risk of iliopsoas injury. Owners sought veterinary care for 88% of dogs with iliopsoas injury, including specialty care for 63%. Treatment most often included rest, home rehabilitation, formal rehabilitation, and/or oral medications. Most dogs (80%) were able to return to sport within 6 months, while 20% were out for longer than 6 months, or retired.

Kim, Australian Kelpie, MI, 3 years

Four months later

- Back to work
- Performing at the same level than before the injury



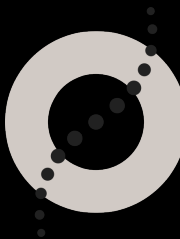


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Kim, MI, 3 years

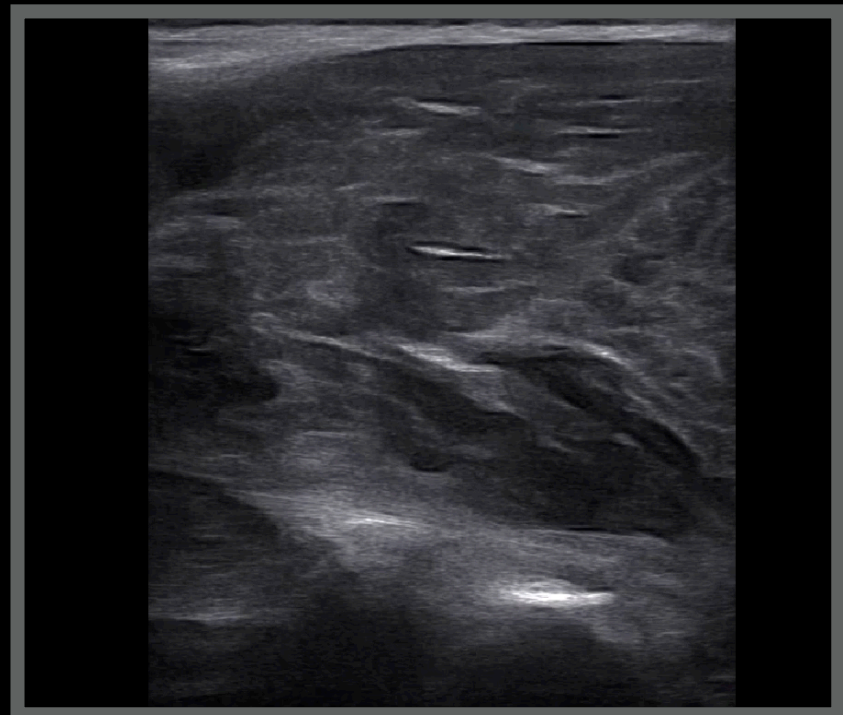
Left thigh

Sound limb



Medial face transverse scan

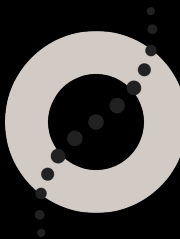
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Kim, MI, 3 years

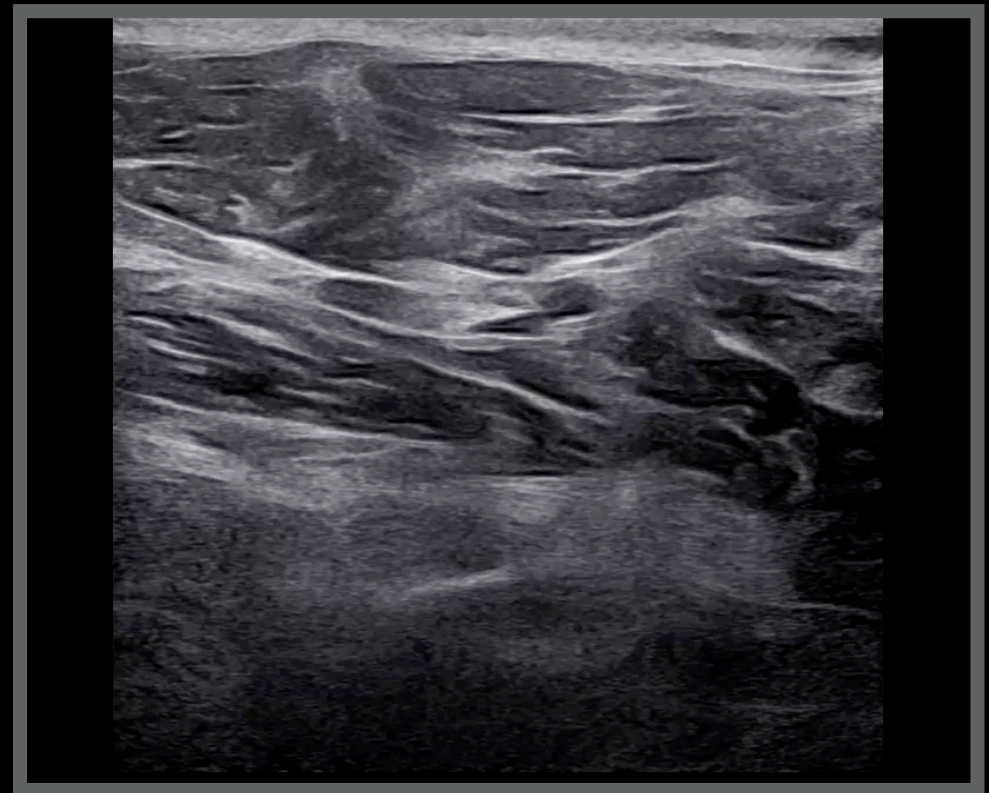
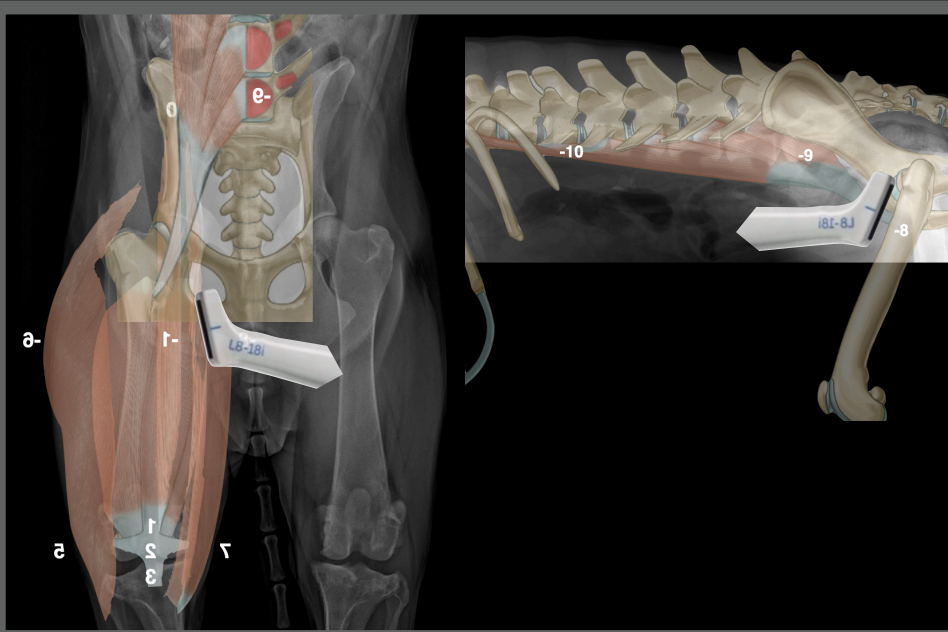
Right thigh

Affected limb



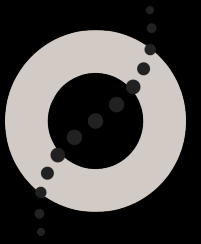
Medial face transverse scan

-8

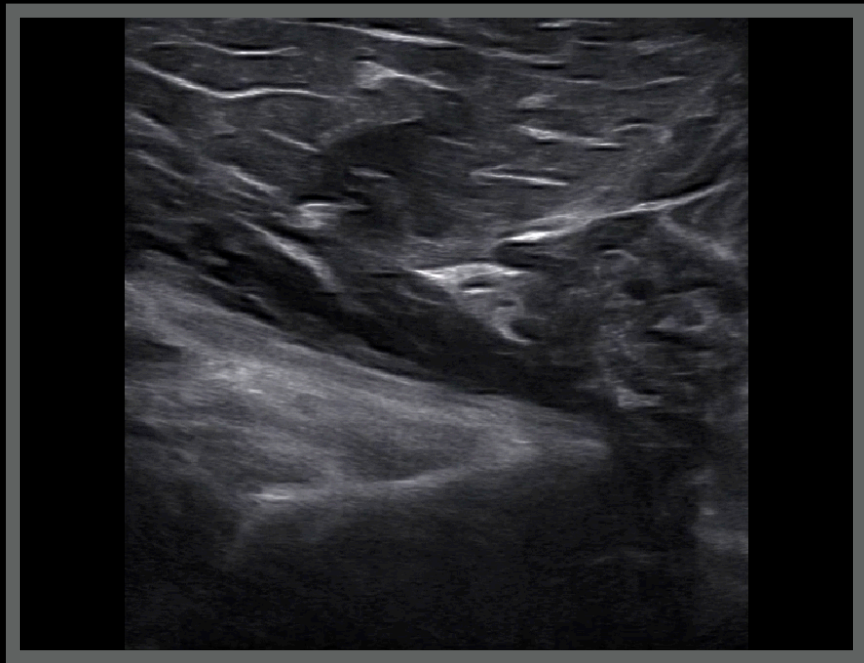


Kim, MI, 3 years

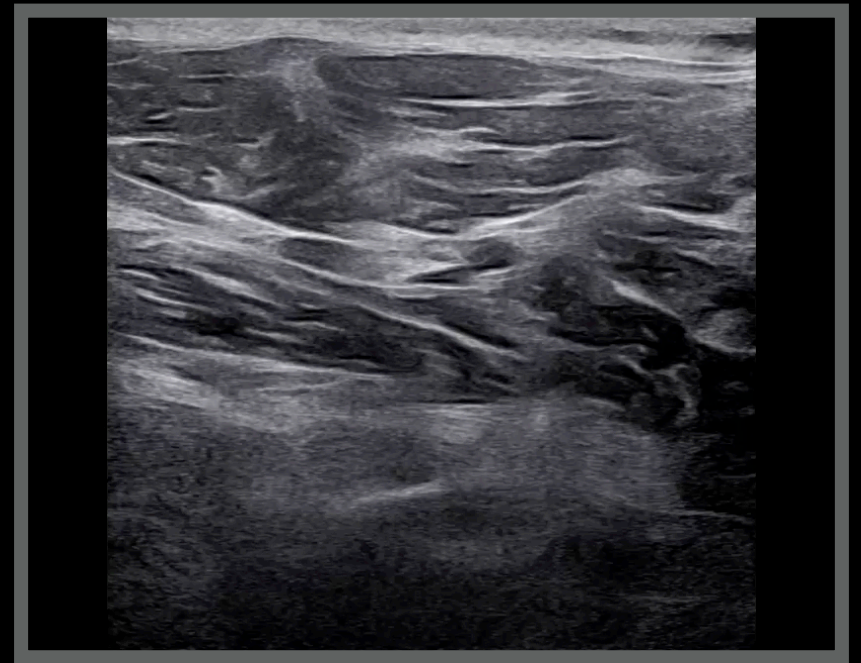
Four months later



Left thigh

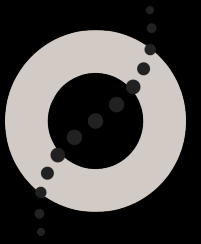


Right thigh

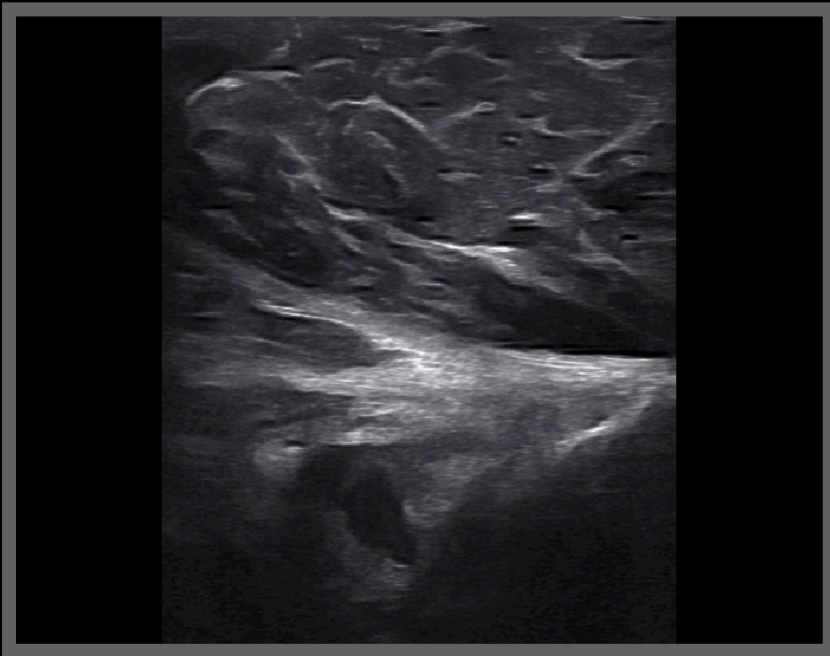


Kim, MI, 3 years

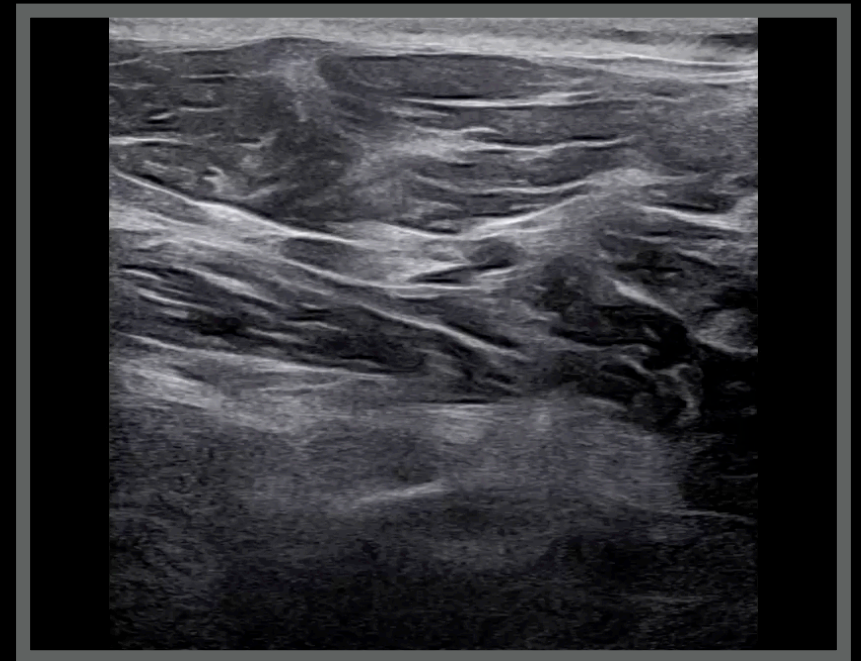
Acute VS Chronic lesions



Right thigh Time 0

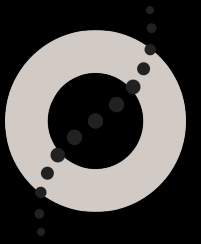


Right thigh Four months later

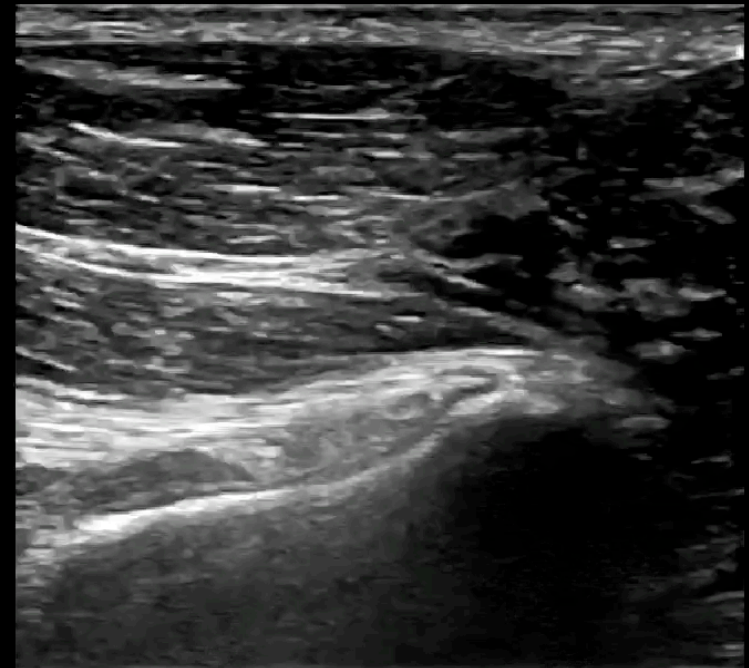


Iliopsoas tendon injuries personal grading

WNL

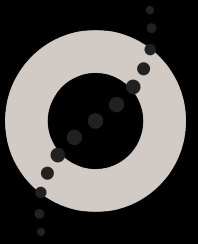


1. Fine fibrillar pattern
2. Well-defined from the surrounding tissues
3. Well-defined bony surface
4. No hyperechoic surrounding tissues
 - No mineralisation

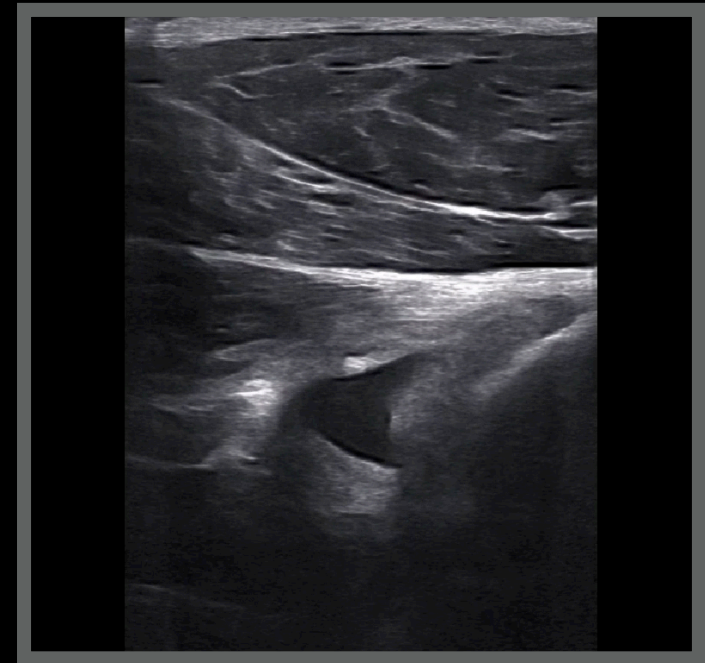


Iliopsoas tendon injuries personal grading

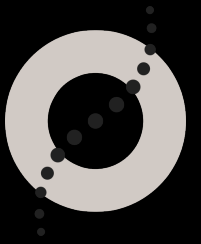
Acute injury



1. Focal loss of the fibrillar pattern
2. Effusion
3. Scattering artifact
4. Reduced distinction with the surrounding tissues

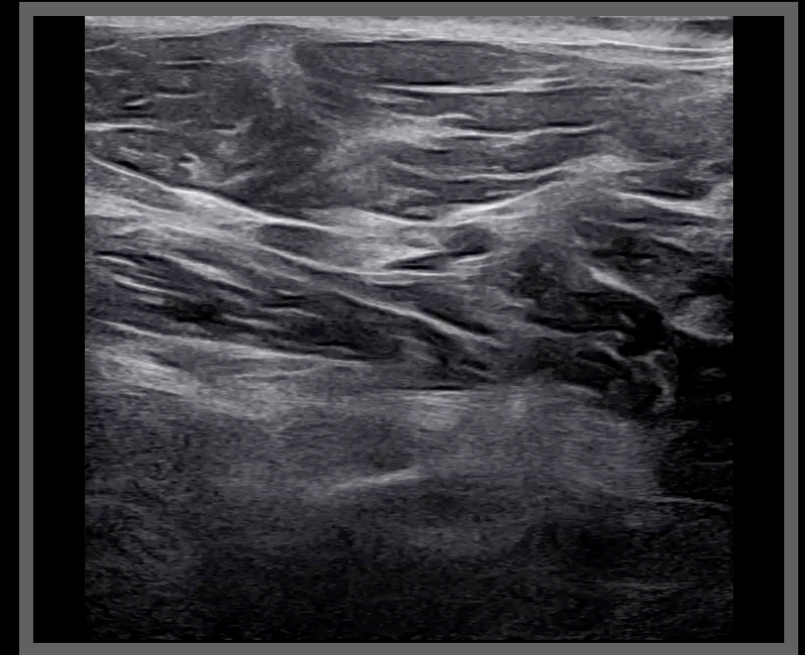


Iliopsoas tendon injuries personal grading



Chronic injuries

1. Less fine and defined fibrillar pattern
2. Markedly reduced distinction with the surrounding tissues
3. No scattering artifact, no effusion
4. +/- Mineralisation

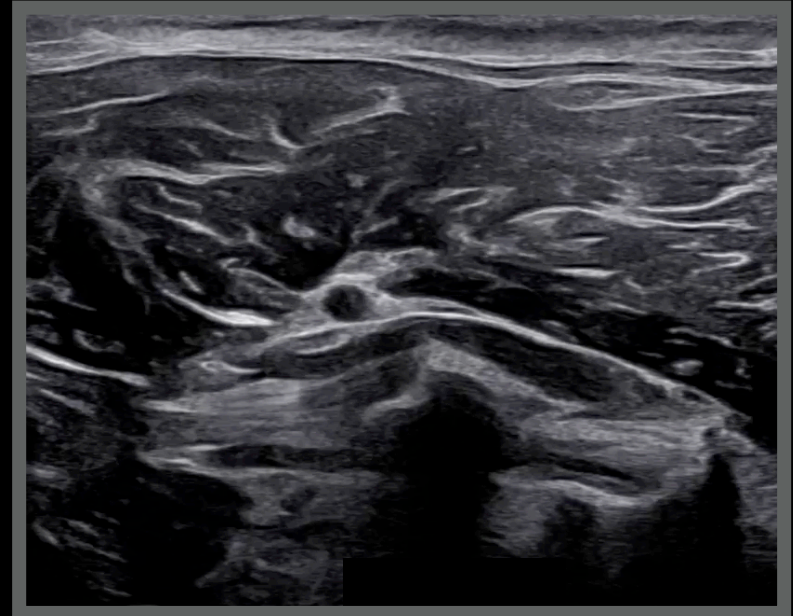
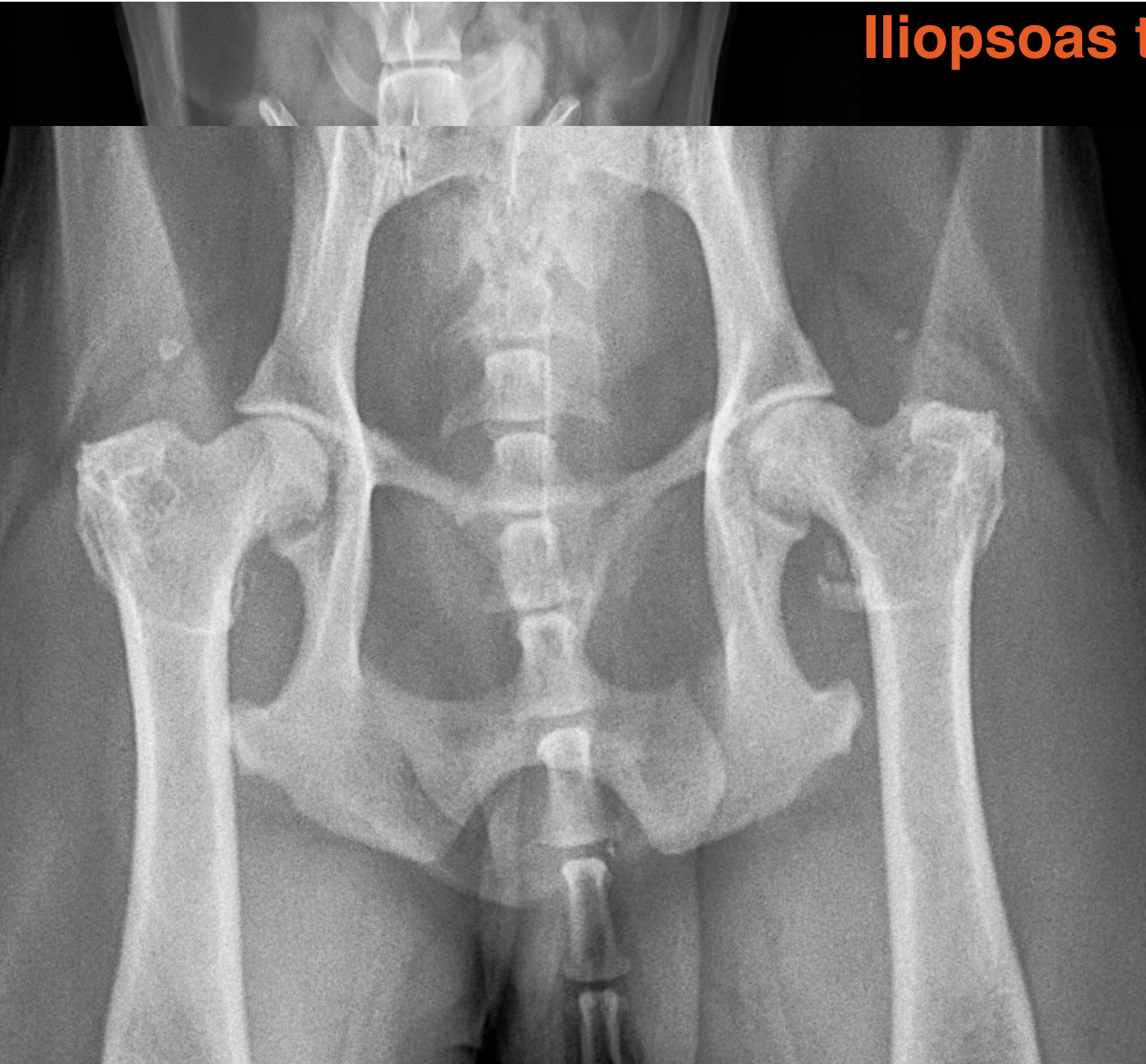
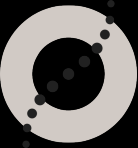


Iliopsoas tendon injuries personal grading

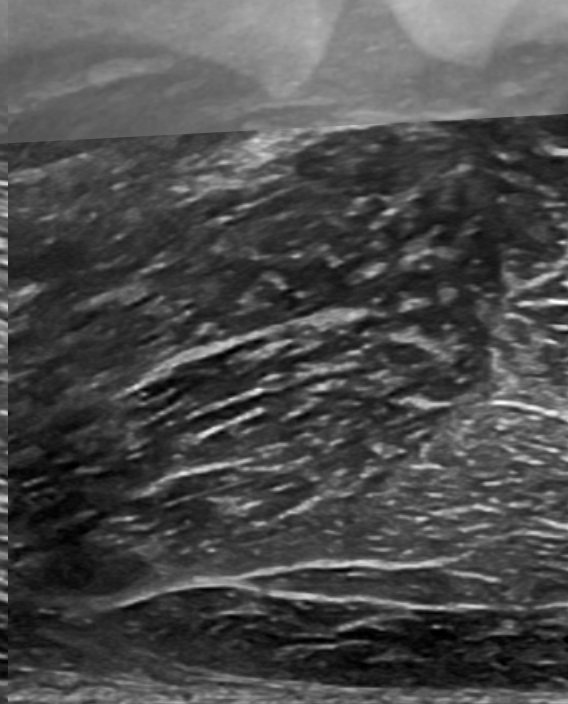
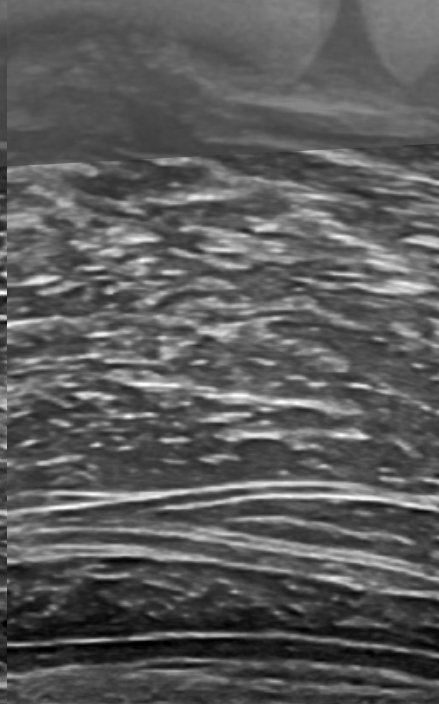
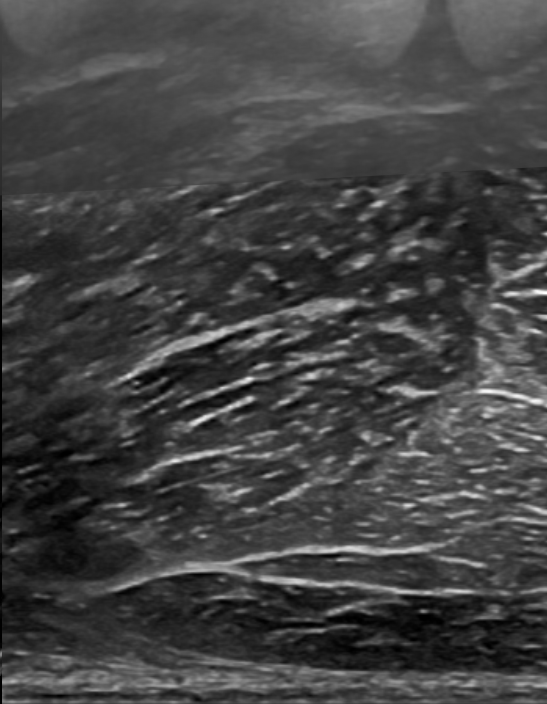
Chronic injuries

Omuk, MI, 4 years

Shortening gait, pain hip extension and internal rotation



Iliopsoas muscle



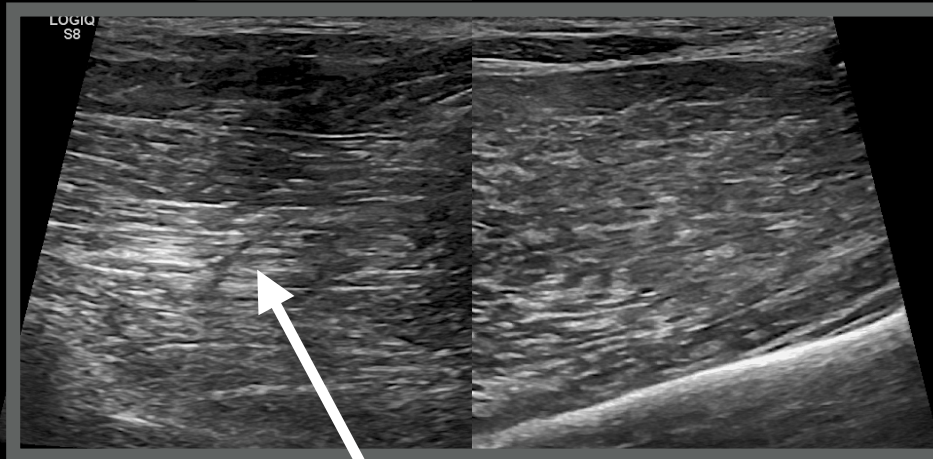


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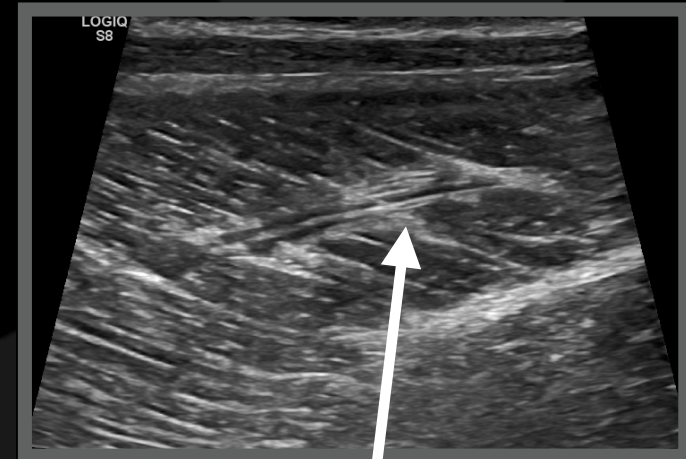
Terminology and classification of muscle injuries in sport: The Munich consensus statement

Hans-Wilhelm Mueller-Wohlfahrt,¹ Lutz Haensel,¹ Kai Mithoefer,² Jan Ekstrand,³ Bryan English,⁴ Steven McNally,⁵ John Orchard,^{6,7} C Niek van Dijk,⁸ Gino M Kerkhoffs,⁹ Patrick Schamasch,¹⁰ Dieter Blottner,¹¹ Leif Swaerd,¹² Edwin Goedhart,¹³ Peter Ueblicher¹

Mueller-Wohlfahrt H-W, et al. *Br J Sports Med* 2013;**47**:342–350. doi:10.1136/bjsports-2012-091448

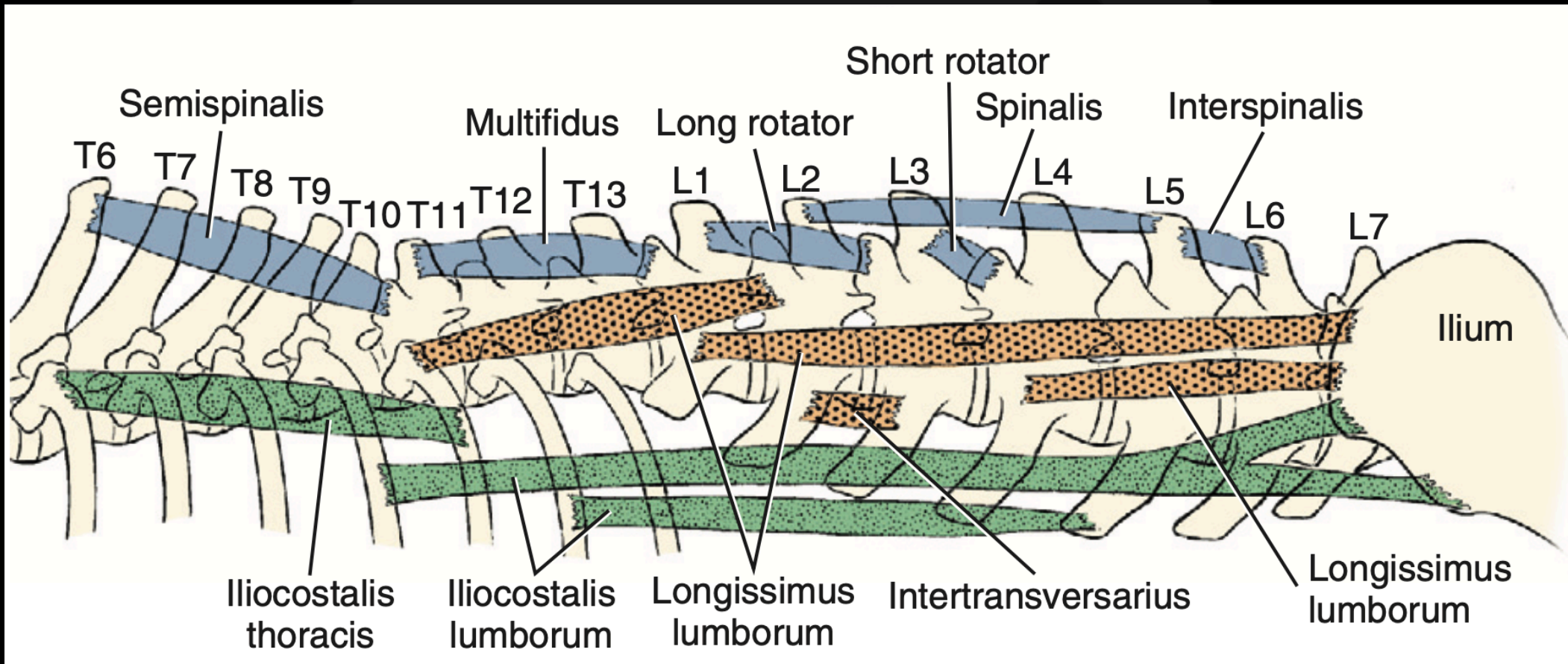


First degree muscle rupture

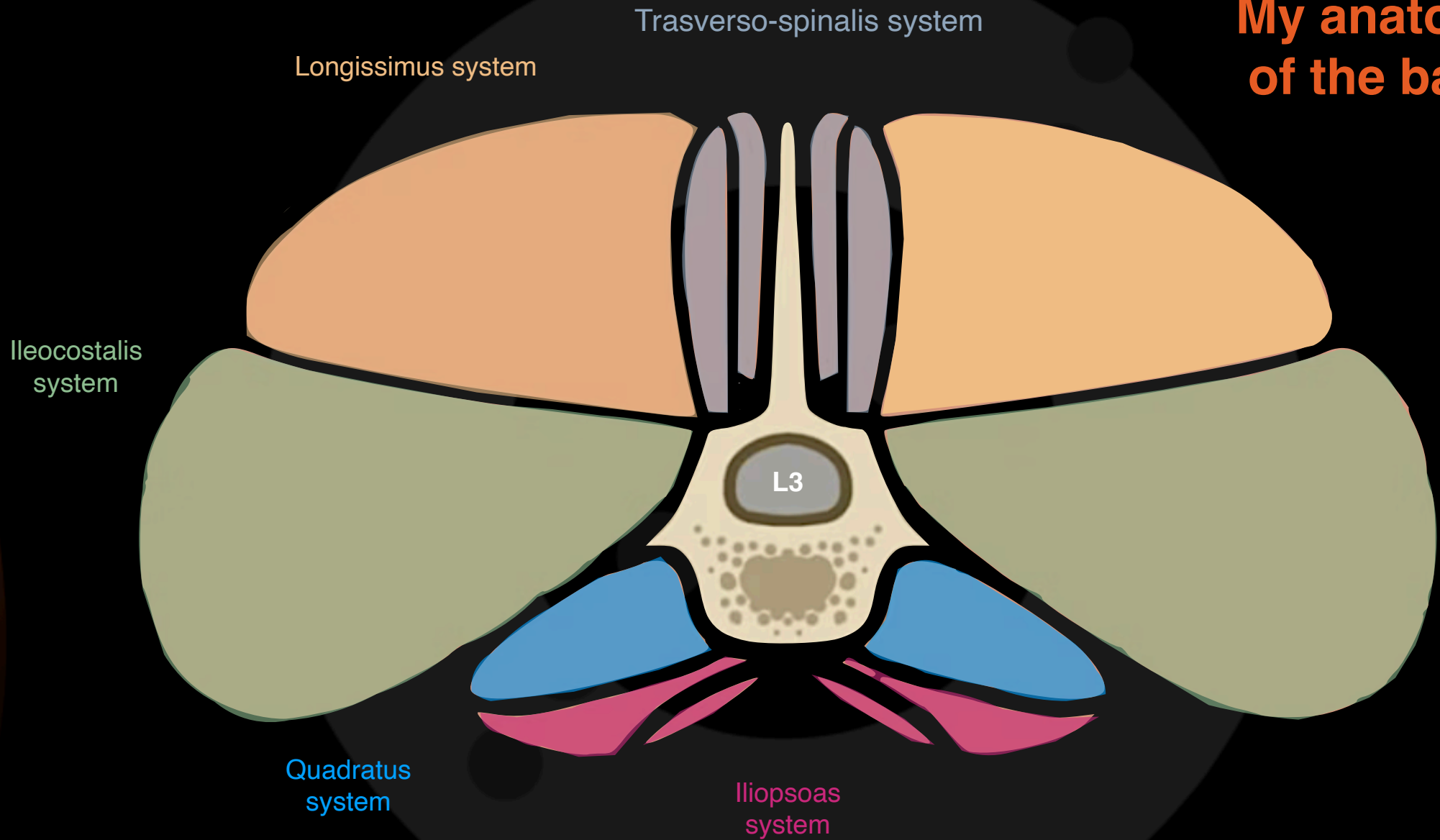


Second degree muscle rupture

Anatomy of the muscle of the back

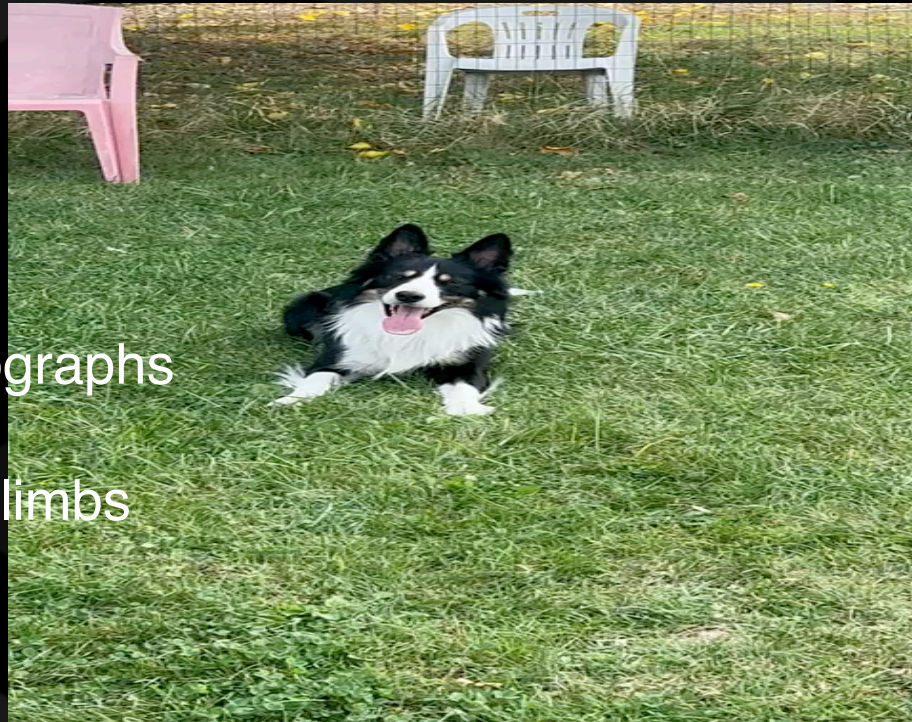


My anatomy of the back



Hiro, Border Collie, MI, 5 years

- Dog trainer
- Not “straight”
- Unremarkable radiographs
- Unremarkable hind limbs
ultrasound



Hiro, immediately before fascial treatment





A comparative multi-site and whole-body assessment of fascia in the horse and dog: a detailed histological investigation

Waqas Ahmed,¹  Marta Kulikowska,² Trine Ahlmann,³ Lise C. Berg,¹ Adrian P. Harrison¹ and Vibeke Sødring Elbrønd¹

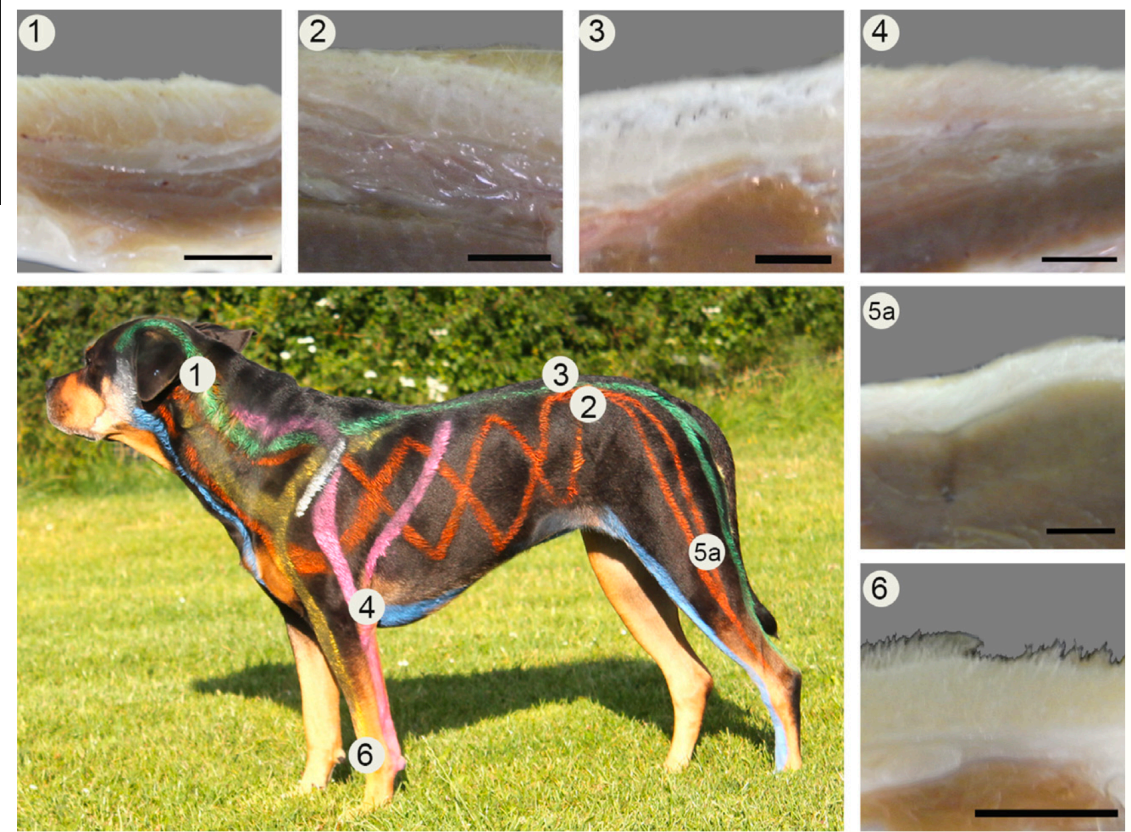
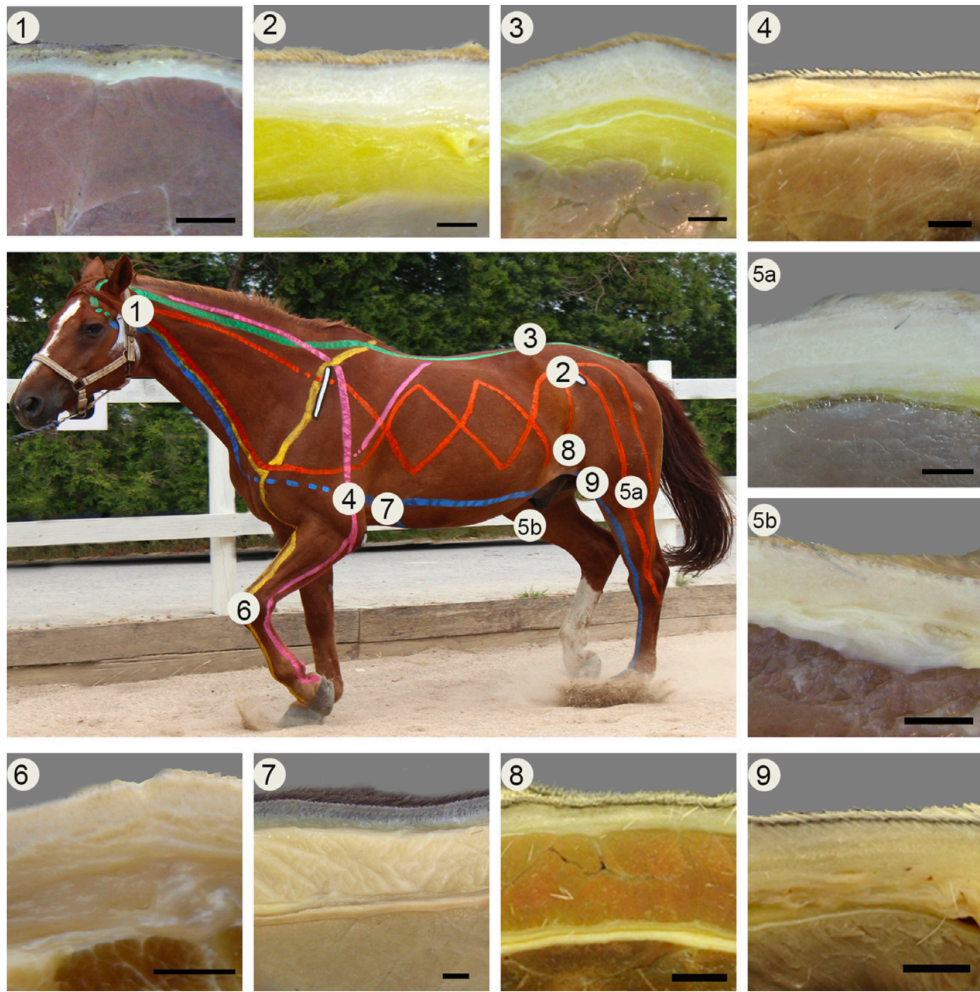
¹Department of Veterinary and Animal Sciences, Faculty of Health and Medical Science, University of Copenhagen, Copenhagen, Denmark

²Equi - Physiq, Tikøb, Denmark

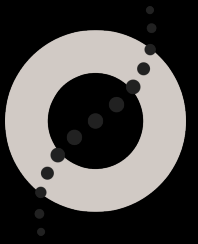
³Move in Harmony, Birkerød, Denmark

Abstract

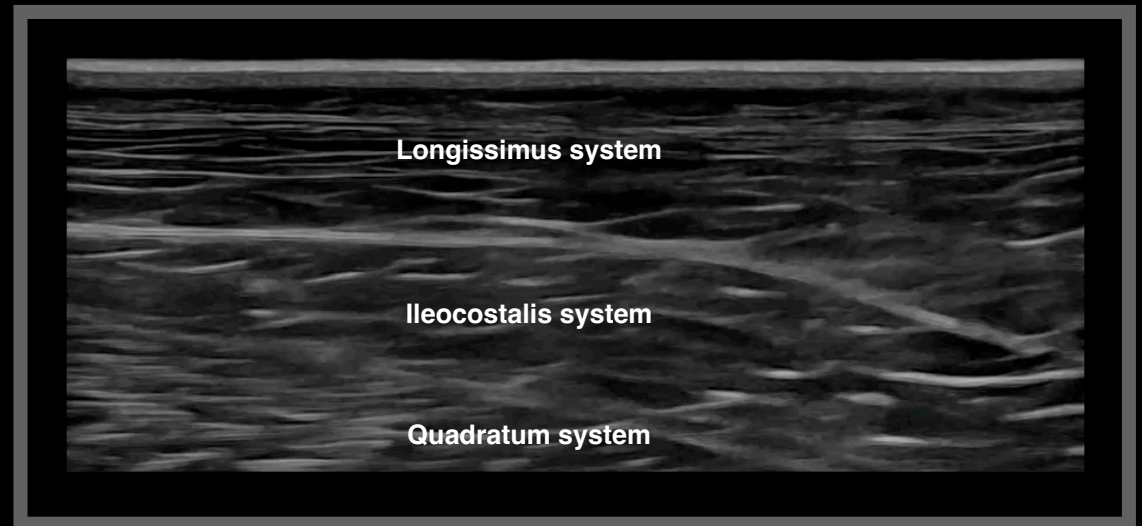
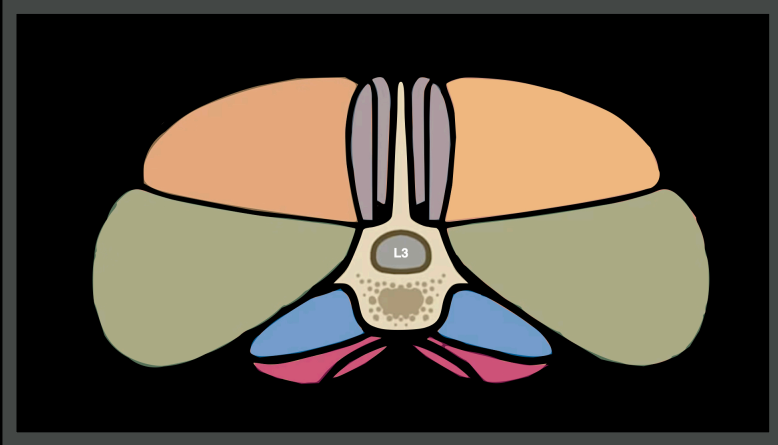
Fascia in the veterinary sciences is drawing attention, such that physiotherapists and animal practitioners are now applying techniques based on the concept of fascia studies in humans. A comprehensive study of fascia is therefore needed in animals to understand the arrangement of the fascial layers in an unguligrade horse and a digitigrade dog. This study has examined the difference between the horse and the dog fascia at specific regions, in terms of histology, and has compared it with the human model. Histological examinations show that in general the fascia tissue of the horse exhibits a tight and dense composition, while in the dog it is looser and has non-dense structure. Indeed, equine fascia appears to be different from both canine fascia and the human fascia model, whilst canine fascia is very comparable to the human model. Although regional variations were observed, the superficial fascia (*fascia superficialis*) in the horse was found to be trilaminar in the trunk, yet multilayered in the dog. Moreover, crimping of collagen fibers was more visible in the horse than the dog. Blood vessels and nerves were present in the loose areolar tissue of the superficial and the profound compartment of hypodermis. The deep fascia (*fascia profunda*) in the horse was thick and tightly attached to the underlying muscle, while in the dog the deep fascia was thin and loosely attached to underlying structures. Superficial and deep fascia fused in the extremities. In conclusion, gross dissection and histology have revealed species variations that are related to the absence or presence of the superficial adipose tissue, the *retinacula cutis superficialis*, the localization and amount of elastic fibers, as well as the ability to slide and glide between the different layers. Further research is now needed to understand in more detail whether these differences have an influence on the biomechanics, movements and proprioception of these animals.



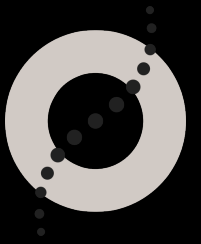
Hiro, MI, 5 years



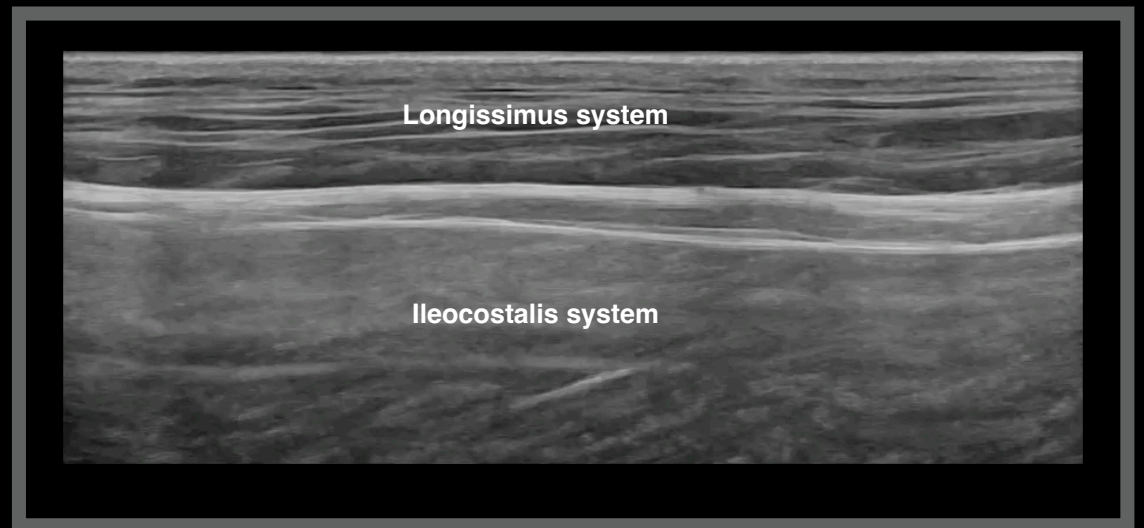
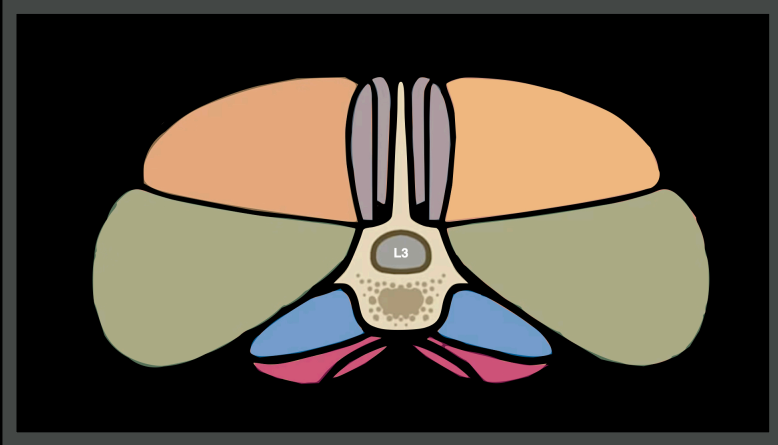
Right lateral face lumbar spine L3-5



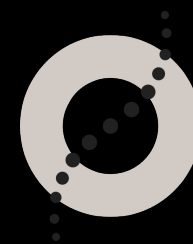
Hiro, MI, 5 years



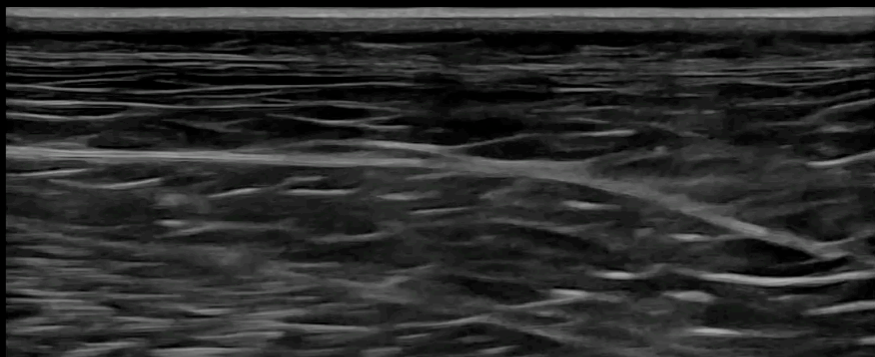
Left lateral face lumbar spine L3-5



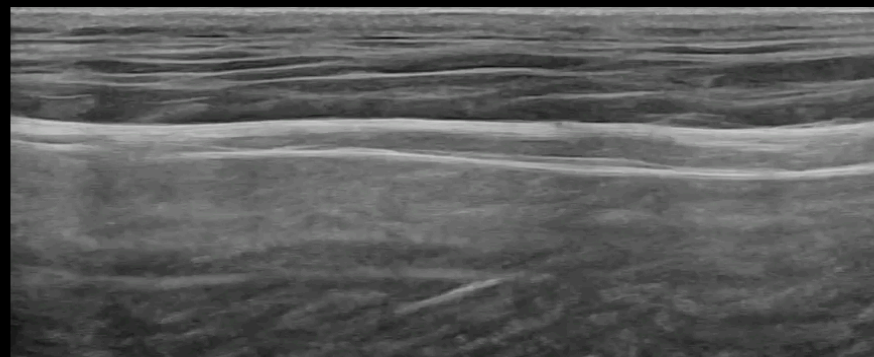
Hiro, Border Collie, MI, 5 years



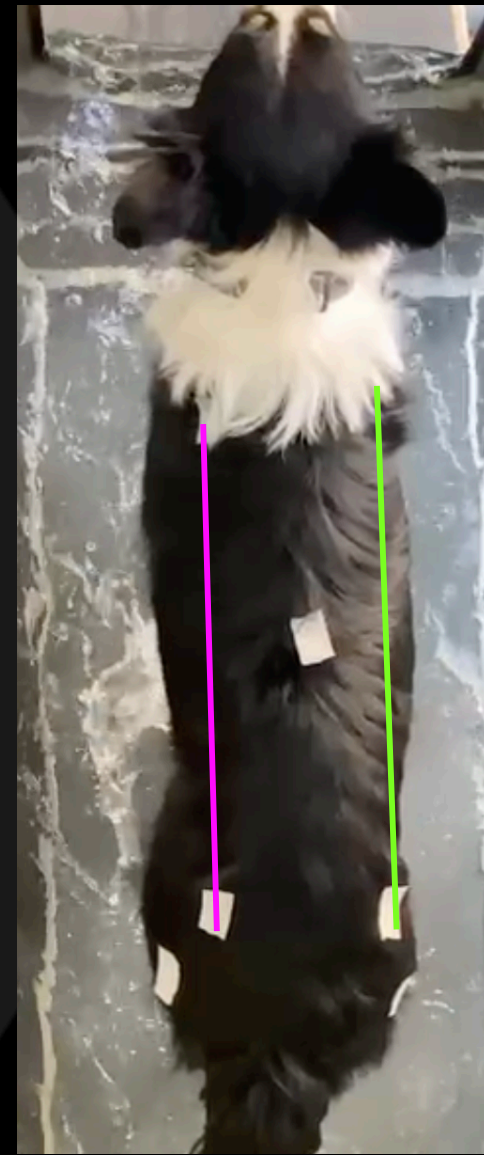
Right



Left



Hiro, immediately after fascial treatment





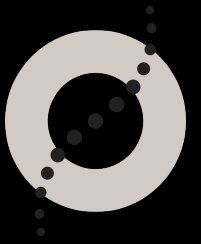
Hiro, Border Collie, MI, 5 years

Three weeks later

- Doing better
- Asymmetric in the morning,
better during the day

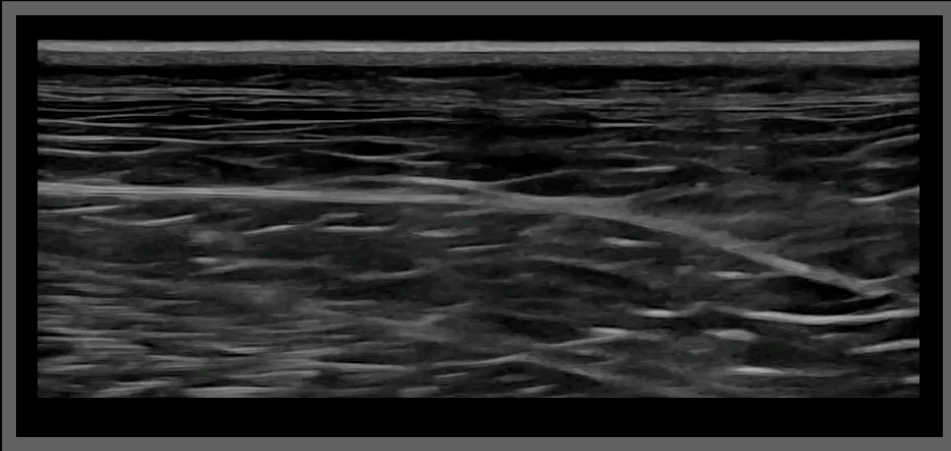


Hiro, Border Collie, MI, 5 years

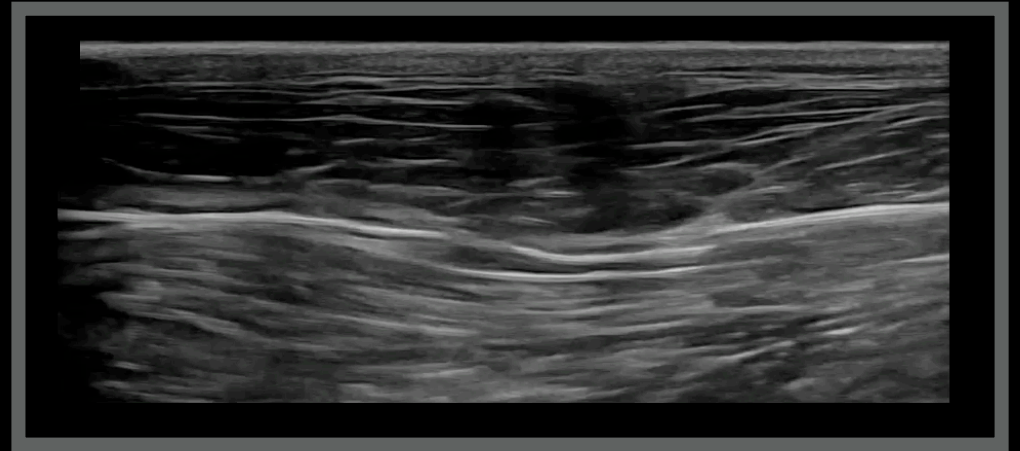


Three weeks later

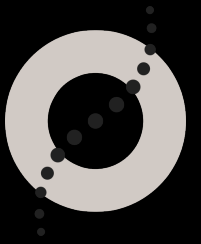
Right



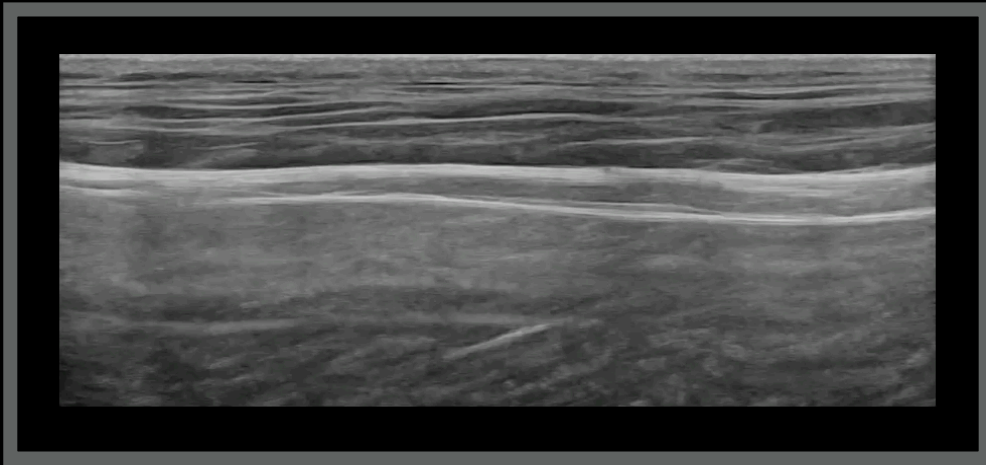
Left



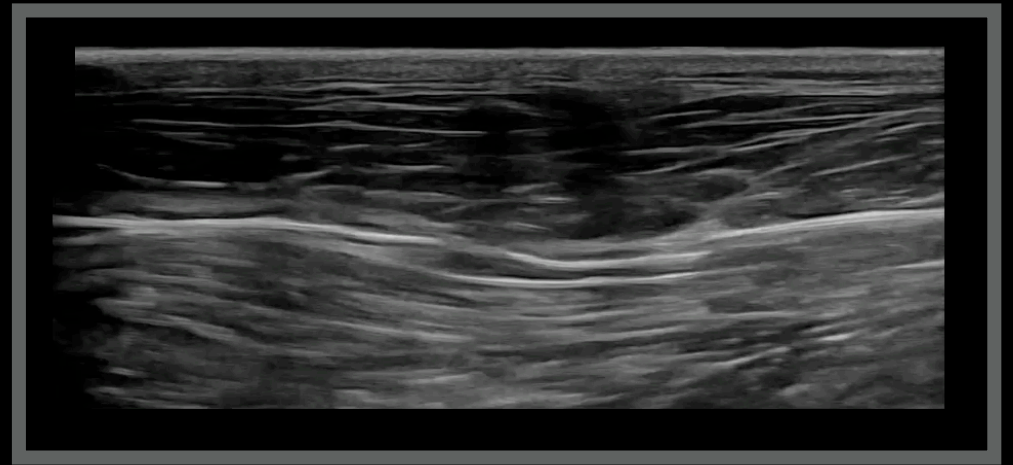
Hiro, Border Collie, MI, 5 years



Left Time 0



Left Three weeks later



Thank you



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