

To see a video of Wendy and Charlie in action, go to <https://youtu.be/0IvGho9GzD8>

it is the back of a jump or something like that. Also, I will come up with a plan and think, 'that will be fun,' and then when I watch I see why nobody else is doing that!" She works hard at staying in the moment and maintaining connection. "I have a tendency to just run, because it is fun and easy, but now I am trying to run with more purpose, and it is paying off."

Reading *The Mindful Athlete* by George Mumford started Wendy thinking about how her mental game might help to improve her overall performance. She credits the book with helping her to focus better, which, in turn, has made her more confident. "We have been so successful over the last two years. I know that I can go out there and hold my own." The dogs that challenge her and Charlie in competition only make it more fun for her.

Walking to the Line

Charlie comes out of the crate happy and ready to run. He loves going to trials, says Wendy, because he is a very social dog. "He goes around and likes to meet everyone." She will put him over the practice jump before the first run, if it is convenient, and take him out between runs for a walk or to play Frisbee, "the only game he enjoys."



Goals

Wendy neither keeps records of her training nor does she write down her goals. "I live very much in the day for agility." When she began to enjoy more and more success with Charlie, she also started to look for more from her own performance. "When I first got into Masters with Charlie, I thought we were out of our depth. But when I found we could really do it, I set my goals higher. Now I want to place, so I am looking for more speed from him. I expect him to be able to read a line, to reach the finish line ahead of me." At the same time, providing Charlie with the necessary information even earlier is crucial. "He will not second guess me and I get refusals when he is not given the information in time."

Keeping Fit

Having played sports all her life, Wendy is a naturally strong athlete. She played lots of field hockey, and was involved in competitive tennis for 65 years before she quit the team two years ago. "Now I have a partner who always thinks I am perfect!" She and Charlie walk in the woods every day for forty minutes to an hour and a half. That, she says, keeps them both fit enough for competition.

Wendy's daughter is an animal chiropractor and has cared for Charlie throughout his life. "That keeps him very balanced." She also believes his raw diet helps him to stay fit and healthy.

The Future

Wendy is pretty neurotic about Charlie, she says, and just wants him to stay healthy and with her for as long as possible. "I have some years ahead of me and plan to run for as long as I can keep going." She also figures she has one more agility dog in her. Don't tell Charlie, but he is about to get a baby sister. "I am a little nervous. I had five kids, though, and they managed to survive each other, so hopefully I can handle this! 🐾"

Sally Silverman is a freelance writer whose life has gone to the dogs. She and her husband share their hearts and their home with three Australian Shepherds. An avid agility competitor, Sally is working on MACH3 with Bounce, who also has a PDCH, as well as many canine freestyle and herding titles. Java is now in AKC and USDAA Masters and earned her PDP freestyle title. Sally is an active member of Y2K9s Dog Sports Club outside of Philadelphia, where she trains and teaches a variety of classes.

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Return to Agility after Iliopsoas Strain

By Robert Cullen, DVM and Debra Canapp, DVM, CCRT, CVA Diplomate, American College of Veterinary Sports Medicine and Rehabilitation. Photos courtesy of VOSM.

Daisy, a 3-year-old spayed female Border Collie, began training for a career in agility. Over the course of a year, she demonstrated signs of intermittent lameness in her left hind limb during walks. While she wasn't exhibiting signs of lameness during her training sessions, she would intermittently hold up her leg while on walks and playing fetch. She was initially treated with mild exercise restriction and administration of carprofen and Dasuquin with no significant improvement. She was referred to a veterinary surgeon, where radiographs showed signs of mild left stifle (knee) joint effusion (fluid accumulation within the joint). An exploratory surgery of the left knee was performed to evaluate for the cruciate ligaments and menisci, but these were found to be intact and normal.

As the problem failed to improve, Daisy was brought to the Veterinary Orthopedic & Sports Medicine Group (VOSM) in Annapolis Junction, Maryland. During her initial orthopedic examination, no significant lameness was appreciated at a stand, walk, or trot. However, discomfort was elicited with extension and internal rotation of the left hip. In addition, discomfort was noted on palpation in the region of the left iliopsoas muscle. No such resistance to extension or discomfort was found on the right side. A diagnostic musculoskeletal ultrasound was recommended to further evaluate Daisy's iliopsoas.

Iliopsoas Injuries

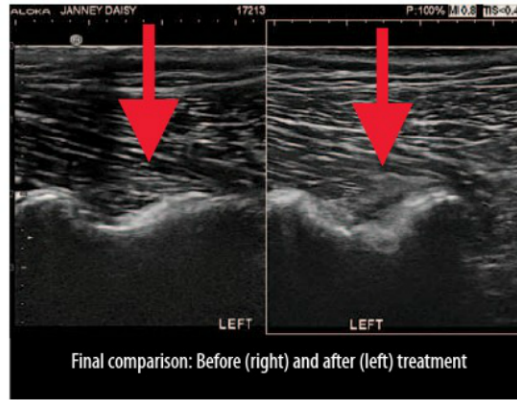
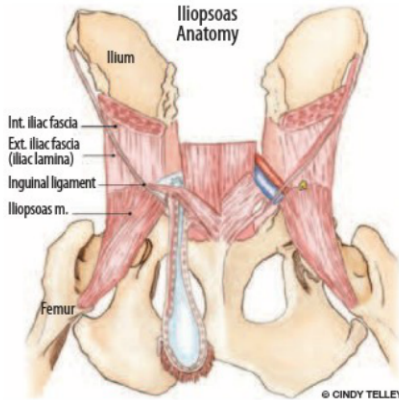
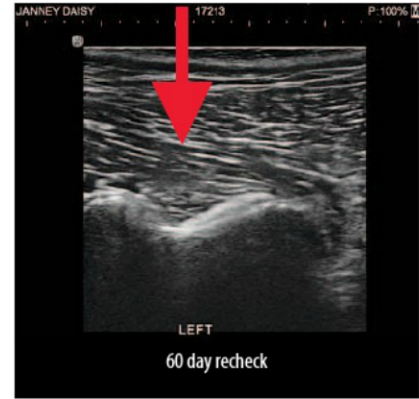
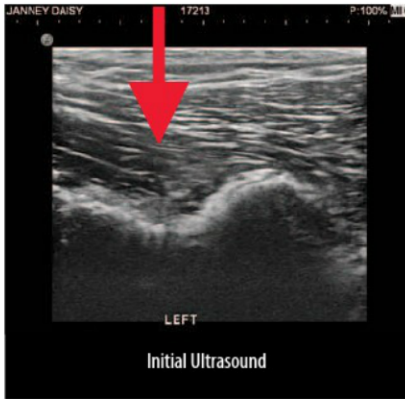
The iliopsoas muscle group is composed of two muscles. The psoas major starts at the lumbar vertebrae, coursing backwards under the pelvis to join with the iliacus muscle, and both join on the inside of the femur, at a spot on the bone called the lesser trochanter. The iliopsoas muscle acts as a hip stabilizer, and works in concert with other muscle groups to draw the femur forward (hip flexion). By extending the hip back and rotating inwards, this puts tension on the iliopsoas muscle unit. The combined muscle tendon junction that joins at the lesser trochanter is the spot where Daisy was uncomfortable upon palpation and manipulation.

Muscle strains, in both canine and human athletes, occur as a result of excessive force across the muscle unit, typically occurring at the tendon or myotendinous junction (where the muscle belly becomes the tendon). A muscle that is already activated during stretch (eccentric contraction) and which then endures a further force is prone to injury and strains. This often happens while the animal is engaged in rigorous activity, and is commonly noted during aggressive agility training. Thirty-two percent of agility dogs engaged in competition are diagnosed with some degree of orthopedic injury. Of these, 53% percent are the result of a muscle or tendon injury. Another study found that 32% percent of muscle injuries in dogs involved the iliopsoas muscle group.

While the majority of iliopsoas strains are primary and the result of an injury during training, it should also be recognized that the iliopsoas muscles are often engaged more frequently when there is an underlying cause of lameness in the limb, such as cruciate disease, hip osteoarthritis, or lumbosacral disease. Such a secondary or compensatory strain may be difficult to resolve and the muscle is prone to recurrent injury unless the underlying issue is treated.

Diagnosis and Types of Injuries

Classically, CT (computed tomography) and MRI (magnetic resonance imaging) have both been described for assessing iliopsoas strains. However, the majority of these scans return with no lesion identified. In addition, these diagnostic scans are both expensive and require general anesthesia or sedation. Musculoskeletal ultrasound of the iliopsoas muscle group has multiple advantages over such advanced imaging modalities. It can be performed with only light sedation, is typically less expensive, and can be readily utilized in future assessments to assess how pathologies are responding to treatments. Ultrasound can be used to characterize iliopsoas strains for how acute (recent) or chronic (long term) the pathology is.



Initial diagnostic musculoskeletal ultrasound showed a grade 2 left iliopsoas insertionopathy with moderate fiber disruption and inflammation noted at the points of insertion. Following regenerative medicine treatment, additional diagnostic ultrasounds were repeated at 30 days, 60 days, and 90 days following treatment to monitor healing. After 90 days, the left iliopsoas insertionopathy was resolved with good fiber pattern, minor residual scar tissue, and minor scant inflammation.

Given the recurrent nature of Daisy's discomfort, a diagnostic musculoskeletal ultrasound was performed. Ultrasound found signs of an acute strain at the insertion site of the left iliopsoas, as well as a mild, acute strain of the right iliopsoas insertion. In addition, bright chronic changes were noted in the tendons and muscle fibers on both sides, which is consistent with her prolonged history. A finding of both acute and chronic changes is not uncommon, as chronic lesions can often be exacerbated into bouts of acute injury by repetitive use. Given the severity of the injury and the high expectation for full return to function, regenerative medicine therapies were recommended.

Treatment with Regenerative Medicine

Stem cell therapies involve the collection and manipulation of multipotent cells (cells capable of generating multiple cell lines in different environments) and injection at the site of tissue injury to stimulate renewed healing and tissue remodeling. This not only allows for improved healing of recently injured tissue, but also the replacement of stiff and weak fibrous tissue with new muscle and tendon fibers that more closely resemble normal tissue. These injections are accompanied by platelet-rich plasma (PRP) which is a solution of growth factors harvested from the patient's own blood to further encourage healing. Stem cells for Daisy were obtained from a bone marrow aspiration from the upper femur (thigh bone) which was then processed within the hospital and injected at the site of injury.

Following stem cell injections, activity was limited but an active regimen of rehabilitation sessions was initiated involving passive range of motion (PROM) exercises, manual therapy, stretching, massage, and Class IIIB laser therapy. At home, Daisy underwent progressively more vigorous home exercises initially starting with core isometric strengthening and escalating to concentric and eccentric regimens along with controlled active exercise over the course of twelve weeks.

After injections, recheck examinations and ultrasound evaluations were performed at VOSM. In under a month, improvements in the acute strains were evident, with bet-

ter fiber continuity and less inflammation. By two months, the bright chronic changes were diminishing, being replaced with healthier and more viable muscle tissues. At this time, Daisy's rehabilitation exercises were increased with introduction of underwater treadmill therapy to start increasing muscle mass and strength. At the final recheck three months later, ultrasound showed both right and left acute tendon strains to have resolved with good fiber pattern and no inflammation. Only a minor amount of residual scar tissue remained on the left tendon as a marker of the previous injury. On physical examination, no discomfort could be elicited with extension of the hips or with palpation of the iliopsoas muscle units. Daisy continued to improve with her exercises and protocols, and she is currently fully engaged in agility training with no signs of discomfort and lameness.

Return to Agility Competition

Evaluating iliopsoas strains in agility strains allows for the unique opportunity to gauge return to function, as opposed to such injuries in non-athletic compan-

VOSM Return to Agility Grading Scale	
Grade	Post-Therapy
Grade 1	Owner chose not to return dog to agility for unrelated reasons
Grade 2	Dog was physically unable to return to agility
Grade 3	Dog returned to agility but performed at a worse level than before starting therapy
Grade 4	Dog returned to agility and performed at a similar level than before starting therapy
Grade 5	Dog returned to agility and performed at a better level than before starting therapy

ion animals. Performance in human and equine athletes can be evaluated based on various parameters of function and measurement, and a similar evaluation for return to performance has been developed by VOSM based on retrospective analysis of pre-injury and post-injury competition. Such an analysis has been performed in a previous studies conducted for cranial cruciate ligament and medial shoulder injuries. VOSM is currently conducting a similar study for dogs assessed with iliopsoas injury to determine if these animals are able to perform to competition, and do so at a similar level to their pre-injury status.

Those clients surveyed were caring for agility animals that were assessed with iliopsoas strain based on ultrasound evaluation and treated with rehabilitation and/or regenerative medicine therapies. These athletes were those with lameness that persisted despite initial exercise restriction and conservative management and who sought further diagnostics and treatments. As such, these cases were typically more severe than the typical presentation for iliopsoas strain. Seventy-two such cases treated at VOSM since 2009 were identified and surveys submitted via email. The survey inquired into normal daily function and activity, time to return to competition, pre- and post-operative jump height, average yards per second, and average number of dropped bars per run.

From the surveys collected to date, 100% of owners who responded to the survey stated that their dog was able to return to normal function and comfort, and 53% did so within the first month following treatment for the injury. Eighty percent of responses indicate that their athletes had returned to agility competition. Reasons for not returning to agility included the presence of an additional orthopedic issue and fear of recurrent injury. With use of the previously established VOSM Return to Agility Grading Scale (Table 1) with surveys collected to date, we found that greater than 80% dogs that returned to agility were performing at the same level or better than they had prior to injury (VOSM Grade 4 and 5). In addition, it should be noted that all dogs performing at a decreased level were found to have sustained a separate orthopedic injury.

Summary

Iliopsoas muscle strains should be considered in cases of nebulous hind limb lameness or performance-related issues when there is no other obvious cause for lameness on physical examination




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and radiographs. Ruling out such pathologies as cranial cruciate disease, lumbosacral discomfort, or hip osteoarthritis, is important before embarking on a treatment schedule of rehabilitation. Regenerative medicine (stem cell therapy and PRP) can be an effective treatment modality, especially for discomfort that persists despite standard rehabilitation.

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Robert Cullen, DVM currently practices orthopedic surgery and sports medicine at Veterinary Orthopedic & Sports Medicine Group in Annapolis Junction, Maryland, where he is completing a specialized internship in surgery and sports medicine. Dr. Cullen attended the Virginia-Maryland Regional College of Veterinary Medicine, and then completed a rotating internship and a surgery internship before coming to VOSM. Dr. Cullen is currently engaged in research of iliopsoas strains and the use of regenerative medicine in sporting dogs, and has special interests in fracture management and wound care. You can read more about Dr. Cullen at www.vosm.com.

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