

Supraspinatus Tendinopathy Puts Dogs on the Sidelines

By Susan Chaney

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A limping dog is always a concern. After all, our canine companions need their legs for every aspect of their lives – from eating to exercising to eliminating. Most of the time, a slight limp seems to clear up within a day or so. And our dogs go on as before.

Other limps are much more serious. One such front limb lameness should not be ignored. Although supraspinatus tendinopathy is most commonly seen in dogs that hunt, compete in agility or are in other ways canine athletes, it can happen in any dog that repeatedly pushes its shoulder joint too far or too hard, says Wendy Baltzer, D.V.M., Ph.D., diplomate of the [American College of Veterinary Sports Medicine and Rehabilitation](#) and associate professor at the [Oregon State University College of Veterinary Medicine](#). “They’re all very active dogs,” she says. One dog she treated does competitive dancing with its owner. Even a dog that hikes or plays ball a lot can end up with the condition. However, she estimates that more than 70 percent of the dogs treated at Oregon State are athletes or have been at one time.



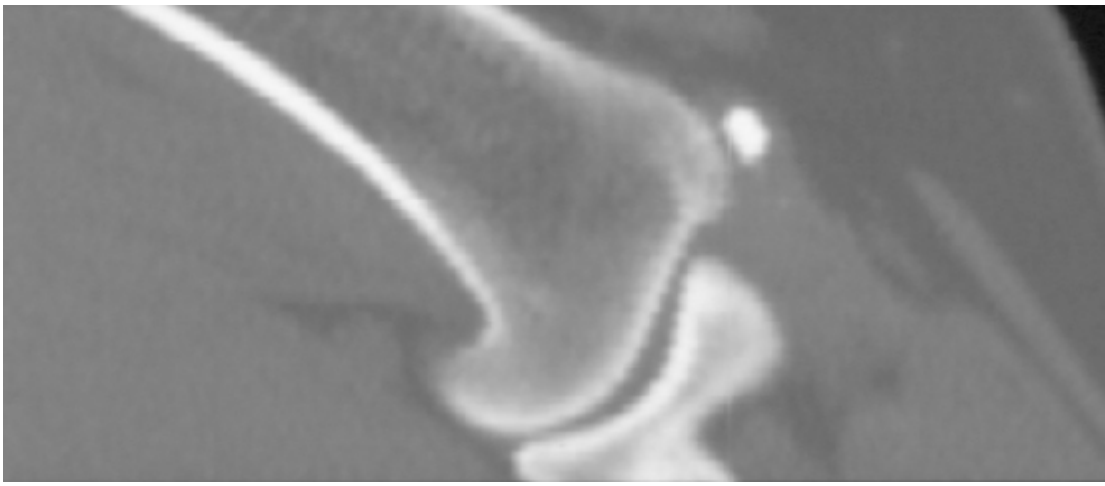
Supraspinatus tendinopathy, which causes forelimb lameness, is typically seen in athletic dogs that weigh at least 45 pounds. Photo courtesy Wendy Baltzer, D.V.M., Ph.D.

The supraspinatus (pronounced *soo-pruh-spi-NA'-tus*) muscle allows the shoulder joint to extend – for example when a dog leaps across a ditch in a field. The muscle runs along the scapula toward the humerus, the bigger bone at the top of the front leg. The supraspinatus tendon connects that muscle to the front of the humerus. Many other muscles, tendons and ligaments are involved in allowing a dog’s shoulder its full range of motion.

“The supraspinatus tendon is a stabilizer of the joint,” Baltzer says. “Dogs don’t have a clavicle, or collarbone,” she explains, “so their stability is not as pronounced as in humans,” despite the fact that dogs actually use the joint in the process of supporting their body weight and propelling themselves forward.

“Nobody knows for sure what the origin of the injury is,” says Baltzer, whose professional and research interests include ligament and tendon injury in small animals, oxidative stress in companion animals and canine sports medicine, among others. “Most people think it’s repetitive strain,” she says, and that high intensity, high impact activities can predispose dogs to the injury.

She adds that some people in the field trial world believe it might be essentially a “jamming” of the joint from a dog taking an extra-long leap that tears the tendon. That might be true, she says, in cases of acute trauma, when a dog very suddenly is seriously lame in a forelimb. Nonetheless, “No one has specifically determined the cause.”



The white spot in the upper right of this CT scan is the mineralization buildup around a tear in the supraspinatus tendon. Photo courtesy Wendy Baltzer, D.V.M., Ph.D.

Getting to 'It's ST'

It often is months or years after the initial injury that a dog finally gets Baltzer's care. If the tear in the tendon is small, "It usually resolves with rest," she says. "Then it gets worse again." Many dogs "react stoically," she says, and it's kind of a "dull, chronic pain." That's why many dogs aren't diagnosed immediately. They seem to be getting better, so owners think they're doing OK.

In addition, "it's really hard to identify this," Baltzer says. "So what we're trying to do is educate people about this problem. Dogs that do a lot of jumping exercises are the dogs that are at risk."

Often dogs end up being treated for arthritis. Even if a veterinarian does X-rays, they won't show the tear unless it's already mineralized with calcium. It could be "many, many months before you'd see the mineralization."

However, an MRI and an ultrasound together can identify a tear – if the technician or specialist doing the ultrasound knows how to do it on a tendon. "You have to be taught to do it, and it's kind of hard to do. You have to have the right ultrasound to do it," Baltzer says.

"Getting to a diagnosis is really hard."



In this X-ray, the mineralization of a tear is at the upper left of the image. Photo courtesy Wendy Baltzer, D.V.M., Ph.D.

One reason tendon tears are tough to heal is a generally poor blood supply in the area of the shoulder, Baltzer says. A year after such an injury, most dogs are only back to about 60 percent of their normal shoulder strength. "It's very difficult to rest them," she says, and to keep the

shoulder “completely” non-weight-bearing. “Even walking is weight-bearing,” she points out. If, after the injury, a dog could truly not put any weight on its shoulder for two months, it likely would recover fully, she says. But that never happens.

Baltzer calls supraspinatus tendinopathy “insidious” and “progressive.”

However, people whose livelihood is made training dogs for canine sports sometimes recognize that a little lameness is not a particular dog’s typical short-term lameness. “They bring them in earlier, and the lesions [the spots where the tendon tears are] are smaller.

“Think of the tendon as a rope with a lot of little strands,” Baltzer says. “It has some elasticity, but also functions to protect the muscle from tearing. The first strands of tendon that tear are almost always in the center of the rope,” unlike how an actual rope frays. The space created by the tear fills with blood. “If the tendon is allowed to heal [on its own], new tendon and scar tissue will fill that space. After a very long time – many, many months – it will become mineralized with calcium.”

Over time, the dog will develop multiple lesions up and down the tendon. “The longer it’s been going on, the bigger the lesions,” she says. “In chronic cases, they’ll have a big chunk of what looks like bone there, but it’s mineralized tendon.”

In addition, very little inflammation occurs, so nonsteroidal anti-inflammatory drugs are no help. The tendon does not retain its normal elasticity, Baltzer says. And if that knob of mineralization gets big enough, it starts to rub on the bicep tendon. “A lot of dogs have tendon disease in both [the supraspinatus and biceps tendons]. Then it all starts to fall apart from there.”

Treatment Options

However, if a supraspinatus tear is identified before that mineralization occurs, injections of protein-rich plasma may help heal it.

Baltzer’s been studying the use of platelet-rich plasma – extracted from the dog’s own blood – to treat ST for the last year. To create platelet-rich plasma, the dog’s blood is placed in a special centrifuge that separates platelet cells, which carry blood-clotting factors and growth factors. The plasma will have five to eight times as many platelets as regular blood.

It’s then injected into the site of the tear – using an ultrasound to watch the needle go in and the plasma enter the lesion – where the cells stimulate the growth of new blood vessels, tendon cells and collagen fibers. “I don’t believe you can get it in the exact right spot unless you’re looking at it,” Baltzer says. The injection is done on an out-patient basis and without general anesthesia. The procedure is FDA-approved for use in people with rotator cuff injuries.

Her research thus far has not definitively identified a reliably effective protocol, and she’s currently applying for grant money to study the use of three injections, each done two weeks apart.

However, she says that “even if it doesn’t help the patient, I don’t feel I’ve hurt them.”

For dogs that are not part of her trials, Baltzer – and other practitioners – do have options for treating ST. A dog that’s not too far along in the disease process might be treated with a laser, which helps build new fibers and scar tissue in the tendon, encouraging resolution of the blood-filled cavity. [Extracorporeal shock wave therapy](#), which is now being used to treat canine osteoarthritis, can also stimulate healing of torn tendons. Therapeutic ultrasound works in two ways with mineralized lesions: the non-heat-related effects “change the electrolyte balance across the cell membrane, stimulating healing and scar tissue,” Baltzer explains, while the heat of the ultrasound increases blood flow to the tissue, as well as increasing the elasticity of the collagen in the tendon.” With these treatments, some of the mineralization will be broken down and dispersed, but it’s not likely that all of it will disappear. These treatments are being used in dogs based on studies done in rats, mice and people, Baltzer says.

Baltzer and her colleagues will use one or more of the available treatments, depending on the stage of the disease and the dog’s response.

Surgery is also an option. The veterinary surgeon removes the mineralized piece of tendon, leaving the rest intact. During this procedure, the biceps tendon is checked out and any mineralization removed. Some surgeons may opt to try to reattach the tendon to the bone, “but the prognosis is poor,” Baltzer says. Most dogs that have had surgery for ST, “do not return to full activity.”

“I go to surgery as a last resort,” she says. “I try to do everything I can to get that tendon to heal without cutting into it.” Even if the surgery is successful, about 20 percent will re-mineralize.

Regardless of the type of treatment, the dog will need eight weeks of very limited activity afterward. The supraspinatus tendon then needs stimulation to fully recover, Baltzer says. “If not, they heal weakly and poorly.” If there’s too much stimulation, though, more tearing will occur. Controlled, limited stimulation, such as swimming and underwater treadmill therapy, works best.

About 40 to 50 dogs are diagnosed with ST at Oregon State each year. That’s about 40 percent of the dogs with diagnosed forelimb lameness. Most of them weigh more than 45 pounds.

If you have an active dog, who does a lot of jumping – whether it’s agility jumps, fallen logs in the woods or streams and creeks – you can do several things to help prevent ST, Baltzer says. First, warm up your dog with five minutes of walking or trotting before any heavy exercise, even an off-leash run. “Warm-up is really important because it raises the temperature of the tissue, making the tendon more elastic,” she says. If you jog or run with your dog, don’t run on cement or asphalt; find a place where you can run on dirt or grass. Also, do balancing exercises with your dog, using a [therapy ball](#) or [wobble board](#). This helps build what’s known as “core strength.” “You need that upper core strength to stabilize the shoulder,” she says. “Sixty percent of the dogs’ body weight is carried by the front limbs. So the upper core is more important” than the abdominal core most of us associate with our own core strength.

Considering the long-term damage supraspinatus tendinopathy causes, taking steps to prevent it will be well worth the time and effort.

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