

# Musculoskeletal Diagnostic



## Ultrasound

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**D** iagnostic ultrasound of the musculoskeletal system has been a significant component of sports medicine and orthopedics in human and equine medicine for decades. With the inception of more advanced, high-resolution probes that provide clear and accurate images, small animal diagnostic musculoskeletal ultrasound is a more common and welcomed tool in the world of sports medicine, soft-tissue injury, and rehabilitation. Diagnostic ultrasound is available at a relatively reasonable cost and often does not require anesthesia, making it an attractive alternative to other advanced diagnostics for soft-tissue injury, including MRI. The relatively lower cost also allows for more frequent and affordable recheck evaluations.



Using ultrasound to locate correct area for stem cell injection.



Ultrasound image of LongSupra to ensure accuracy during stem cell injection.

Common orthopedic applications of musculoskeletal ultrasound include scanning for tendon, ligament, and muscle injuries, analysis of joints and use as a guide in joint injections, identifying miscellaneous soft-tissue problems associated with sports-related injuries and ultrasound guided injections, including regenerative medicine (stem cell therapy and platelet rich plasma).

While often associated with soft-tissue injuries, diagnostic ultrasound is also valuable for assessing joint disease. Joint effusion, thickening of the joint capsule and cartilage defects, can be identified sonographically. It is also possible to detect bone destruction and inflammation around the bone. More commonly, tendon and ligament instabilities are recognized with the aid of a dynamic sonographic analysis. Partial or complete muscle or tendon tears can be identified and differentiated. The healing process can be monitored and rehabilitation exercises and activity can be adjusted accordingly. Instead of guessing and estimating tissue integrity, ultrasound gives a noninvasive look at the healing process and allows the therapist to adjust the patient's rehab program more appropriately for the pet's stage of healing.

Additionally, most common tendon and ligament injuries in the shoulder, flexor carpi ulnaris, iliopsoas, stifle or the Achilles, such as disruption of the tendons, lesions within the tendon, older injuries with scar tissue or calcification, or tendonitis, can often be appreciated by ultrasound. Regenerative medicine, such as stem cell therapy or platelet rich plasma, can be introduced via ultrasound guided injection into the precise areas of need. It then can be

followed for the appropriate healing indications such as reduction in swelling or thickening of tendons and ligaments, increased normal tissue regeneration, and eventually resolution of the primary injury. In addition, prognosis and healing advancement can be reported and followed by subsequent ultrasound scans. This data can ultimately help determine what percentage the patient has of successfully returning to function and sport.

In many of the older initial ultrasound studies, lower resolution ultrasound probes provided fuzzy, inaccurate images. Currently, higher resolution transducers between 10-20 MHz linear probes are the most popular. These are the same scanning probes used on our elite human athletes to pinpoint and diagnose their injuries to determine a proper treatment and rehabilitation plan.

Simple scanning principles your practitioner should hold include familiarity with the local anatomy, using the opposite limb as comparison for any questionable tissue changes or peculiarities, and obtaining radiographs to use in addition to ultrasound to aid in a final diagnosis.

In general, diagnostic ultrasound is a quick, non-invasive way to diagnose soft-tissue injuries. The medium allows certain structures to be visualized in dynamic form during movement, which may aid practitioners in their complete evaluation and determining a definitive diagnosis. However, it is not without its disadvantages. Very few small animal practitioners in the country are trained to effectively employ and interpret musculoskeletal diagnostic ultrasound.

A veterinarian without the proper training could misdiagnose an injury on ultrasound, which would ultimately affect your pet's overall diagnosis and possible surgical outcome. This emphasizes the importance of finding a veterinary practitioner who is experienced in the art of musculoskeletal ultrasound, well-versed in orthopedics and sports medicine, and preferably board certified in either radiology or the American College of Veterinary Sports Medicine and Rehabilitation.

Diagnostic ultrasound ultimately helps to determine the correct course of treatment and avoids the frequent misconception of "rest and NSAIDS" commonly prescribed to fix the problem. Unfortunately, this method of generalized treatment to soft-tissue injuries only ends up delaying the correct course of treatment and ultimately getting your companion back to running and playing.

All in all, the advent of accurate, high-quality diagnostic musculoskeletal ultrasound in small animal medicine is a state-of-the-art diagnostic advancement essential for a holistic, top-notch approach to providing our animal companions the best health care available. 🐾

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