



HANDS-ON TREATMENT

A veterinary nurse who is skilled in manual therapy benefits the patient that is experiencing myofascial pain.



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REHABILITATION

Myofascial Trigger Points in Veterinary Patients

**MEET THE AUTHOR**

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Lis received her bachelor's degree from Ithaca College and earned her license in veterinary technology shortly after joining the Veterinary Medical Center of CNY's team. She developed the physical rehabilitation service at the Veterinary Medical Center of CNY and, in 2010, initiated the center's pain management service. Lis has lectured at professional veterinary conferences nationally and routinely contributes to newspaper articles, journal submissions, and book chapters regarding physical rehabilitation and pain management. She has received special training in Canine Myofascial Trigger Point Therapy through Myopain Seminars and has a special interest in myofascial issues and muscle dysfunction.

The concepts of myofascial trigger points (MTrPs) and myofascial pain syndrome (MPS) were first introduced by Dr. Janet Travell more than 65 years ago.¹ These syndromes have yet to be recognized in mainstream veterinary and human medicine as initial diagnostic criteria; however, understanding them can help in recognizing signs of pain in veterinary patients.

Credentialed veterinary nurses are often able to create a bond with their patients by building trust through the use of appropriate behavioral assessments/low-stress handling skills.² The nursing staff (especially in a rehabilitation setting) have more time in the examination room than the veterinarian and see patients on a recurring basis. This gives veterinary nurses an excellent opportunity to see patients without the influence of the “white coat” effect.

Observation of a patient's movement and preferred postures with an understanding of abnormal movement and compensation patterns provides the first clues for identifying myofascial trigger point zones or regions in companion animals. The history obtained from pet owners is not always conclusive or consistent with the presenting complaint; therefore, by watching a patient's movement patterns, veterinary nurses may be better able to determine and identify underlying MTrPs and MPS.

Appropriate therapy to reduce activation of MTrPs may help veterinary patients regain normal range of motion;

**BOX 1****Observing Patient Motions and Postures for Signs of Pain****Head Position During Movement**

Is it ...

- symmetric when turning to both sides?
- lower than normal?
- tilted slightly to one side?

Sitting

Are the hips and hindlimbs ...

- square?
- lazy (off to the side)?

Standing

Is the patient ...

- shifting additional weight forward to the front limbs?
- keeping the base of support neutral?
- keeping limbs widened or in a stagger stance posture?
- offloading weight from a joint or multiple joints or limbs?
- leaning away from a specific side/region?

maintain appropriate posture, balance, and correct use of limbs (independent ambulation); and experience better, more sound sleep due to increased comfort while in the resting position.

UNDERSTANDING MYOFASCIAL TRIGGER POINTS, MYOFASCIAL PAIN SYNDROME, AND FASCIA

Myofascial Trigger Points

An MTrP is defined as a hyperirritable spot or “knot” located in a taut band of a muscle, capable of producing referred pain and a local twitch response (LTR) with direct palpation or dry needling.³⁻⁵ An LTR is a spinal cord reflex and cannot be controlled; it is thought to be transmitted by central and local pathways.⁶ It is a rapid contraction of the taut band within the muscle belly and is evident when the MTrP is stimulated.⁷

In dogs and cats, the taut band is identified in the muscle belly by palpating perpendicular to the affected muscle fibers. Once the taut band is indicated, the practitioner palpates along the taut band to locate the nodule, or “knot.” An MTrP is a discrete area that feels like an intensely contracted structural unit within the muscle, or sarcomere, while adjacent muscle groups may feel supple. An MTrP is not to be confused with a muscle spasm or contracture (increased neuromuscular tone of the entire muscle due to a nerve-initiated contraction).⁷

MTrPs typically form after muscle injury or repetitive overuse of muscles. It has been proposed that sustained low-level contractions cause a decrease in perfusion, hypoxia, and ischemia and that cellular responses occur due to stimulation of activating chemical substances, which affect neuropeptides. Specific neuropeptides, including calcitonin gene-related peptide and substance P, may facilitate an increased release of regulatory compounds, resulting in excessive acetylcholine (ACh). It is hypothesized that the excessive ACh release, sarcomere shortening, and inappropriate changes in receptor activity lead to development of a taut band and subsequent MTrPs.⁷

Persistent muscle fiber contraction can also be an adaptive response caused by low-level muscle contractions, unaccustomed eccentric contractions (e.g., lowering the weight in a biceps curl), muscle overload from shifting cranially due to hip or stifle pain, or slight postural adjustments.

For example, a dog with a digital amputation may shift weight to other body regions to compensate, which promotes changes in other muscle groups. This



FIGURE 1. Poodle in sphinx position. The examiner will lure the dog forward to watch reaction/fasciculations along the paraspinal muscles and to assess length of stretch before making adjustments or repositioning.

overload forces cellular deregulation of ions causing chronic cellular changes in specific parts of the muscles.

MTrPs can be located within the belly, origin, or insertion of a muscle and are known to cause decreased changes in range of motion, muscle weakness, and postural imbalance as the patient develops gait pattern changes in order to function without pain.

Myofascial Pain Syndrome

MPS is associated with a type of pain within skeletal muscle and its fascia; people describe it as deep, dull, aching pain. It is diffuse and not easy to localize because MPS is a referred type of pain within the musculoskeletal and fascial system. Veterinary patients may display subtle alterations in gait function due to primary muscle fatigue and muscle weakness.⁸ They may also posture with an arched or hunched back, move stiffly in all limbs, prefer a lowered head position, and have an unidentifiable source of pain.

Fascia

The definition of fascia as it relates to MTrPs is difficult as there is no consensus yet among researchers. Fascia supports, penetrates, and is distributed within body systems. It is found in bone and meningeal tissue and covers organs and skeletal muscles, creating many independent layers.⁹ When injured through trauma, inflammation, or stress, it can become tense and firm, altering its ability to perform its physiologic function. An observable example of fascial restriction is as follows: a patient that is stretching forward for a food lure while sitting in a sphinx position shows a ripple or twitch in the back (paraspinal muscles), then retracts back to neutral and shifts forward by rising or crawling instead of stretching further. The stretch induces discomfort, so the patient chooses to move its entire body forward and compensate to avoid pain (**FIGURE 1**).

Discovering Myofascial Trigger Points

During a rehabilitation evaluation, it is common for

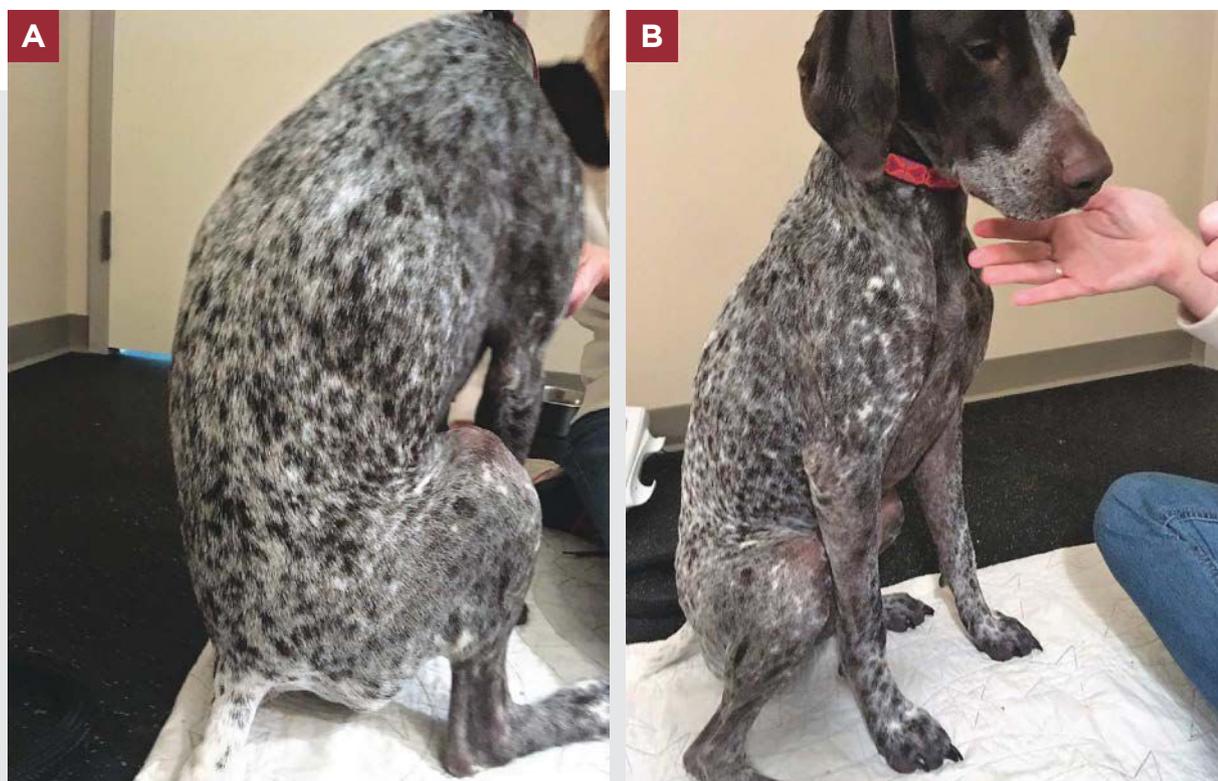


FIGURE 2. Pointer in sit position. **(A)** Note the difficulty this patient has performing a square sit. The stifles are adducted toward the body and tarsal joints are abducted away. Weight is being transferred to the forelimbs. This dog was treated 16 weeks earlier with bone marrow aspirate stem cell concentrate and platelet-rich plasma post-surgery for fragmented medial coronoid process with no other orthopedic abnormalities. **(B)** Poor sit position with roached back; patient is unable to sit with the ischium touching the ground. Clinically, this dog had a tight piriformis muscle, and multiple MTrPs were present along the paraspinal muscles.

**BOX 2****Perpetuating Factors for Myofascial Trigger Points⁸**

- Mechanical stressors
 - Muscle overload
 - Osteoarthritis
 - Repetitive motions
 - Orthopedic disease
 - Soft tissue injury
 - Neuropathy
- Chronic infections/infestations
- Nutritional deficiency or inadequacy (e.g., anemia, inappropriate supplementation)
- Physical and emotional stress (tense/tight muscles/posture)

practitioners to evaluate the patient's posture and movement before physical palpation. When asking for a simple command such as "sit," attention is paid to a few key responses, posture, and behavior in performing the task (**BOX 1** and **FIGURE 2**). When findings are abnormal, such as in compensatory movements during the stand-to-sit posture, an important consideration is the history of the patient back to the earliest time their handler or owner can remember. "Did they always sit off to the side? Did they ever sit with straight posture?" MTrPs create a posture imbalance or shift due to pain and are perpetuated by mechanical stressors, including underlying disease processes (**BOX 2**).



FIGURE 3. Flat palpation technique over the quadratus lumborum. The examiner is palpating by applying finger pressure across the muscle fibers.

Although history and observation are important factors during an evaluation, palpation skill and technique are considered to be the most important tools in identifying MTrPs. Understanding how a "normal" muscle feels and knowing the anatomy of muscles, including their origins, insertions and actions, are critical in discovering and treating the cause of muscle dysfunction.

Hands-on Examination and Palpation Techniques

Due to the lack of objective measurements and diagnostic tools, identifying MTrPs by palpation remains the standard way of confirming their presence so that a diagnosis can be made by a veterinarian. Advances in imaging, such as diagnostic ultrasonography in the hands of a seasoned practitioner or magnetic resonance imaging,¹⁰ are being examined as potential aids in detecting and studying MTrPs, but they are not regularly used clinically. The hands-on assessment approach consists of 3 basic palpation techniques, 2 of which are typically used in veterinary patients.¹¹

During palpation, the patient should be as relaxed as possible to individualize the taut bands; a laterally recumbent position is preferred. Standing patients are much more difficult to relax if muscles are engaging during palpation and activation of sensitive spots.

If palpation techniques are performed in front of an owner or handler, it is important to discuss the possible pain response, or "jump sign," exhibited by the patient when an MTrP is found. Patients may flinch, yelp,



FIGURE 4. Pincer palpation technique over quadriceps muscle group. The examiner is grasping the muscle between the thumb and fingers and rolling the muscle until a taut band(s) is/are detected.

cry out, or try to bite, depending on the location and intensity of pain. This reaction is a normal response to pain induced from palpation and can be assuaged by providing treat rewards to the patient; maintaining soft yet confident praise; or applying petting and massaging through the process to decrease patient anxiety or stress.

Flat Palpation

This technique is best used to identify MTrPs in flat muscles or muscle groups, such as the latissimus dorsi, serratus ventralis, infraspinatus, iliopsoas, and supraspinatus muscles. The examiner applies pressure with the pointer and index finger across the muscle fibers while simultaneously compressing the muscle against the underlying structure, such as a bone or bones, to identify the taut band (**FIGURE 3**).

Pincer Palpation

This technique is best used on specific muscles such as the sartorius, quadriceps, triceps, and gastrocnemius. The examiner grasps the muscle belly between their thumb and finger and rolls the muscle between their fingertips down along the muscle belly until a taut band or bands are detected and a firm nodule within the band is palpated (**FIGURE 4**).

THERAPY

There are invasive and noninvasive therapies for the treatment of MTrPs. Invasive therapy with the use of acupuncture needles or injections is considered the most effective way of decreasing and preventing recurrence in activation of MTrPs. Veterinary technicians and nurses are not permitted to perform needling techniques; therefore, the therapies discussed below are noninvasive techniques that involve manual modalities and laser therapy (**TABLE 1**).

Manual MTrP Release

Human massage therapy often describes relieving muscle “knots” by applying pressure. This is known as ischemic compression. One study has suggested that using this type of technique in myofascial therapy may be effective in reducing symptoms of human patients with chronic shoulder pain.¹² In ischemic compression, the index and middle fingers are held over the MTrP for 30, 60, or 90 seconds with increased pressure after the initial 20 seconds.

To relieve muscle spasms, static stretch can be applied while performing manual MTrP release. A strain and counterstrain theory, previously known as positional release technique (PRT), was developed in 1981. This technique resets the muscle spindle, allowing the spasm

TABLE 1 Noninvasive Therapies for Myofascial Trigger Points

TECHNIQUE	DESCRIPTION
Ischemic compression	Palpate over MTrP and press for 30 seconds, increasing pressure after initial 20 seconds Release pressure for interval of 15-20 seconds, then repeat for 30-90 seconds until reduction of jump sign or local twitch response is noted
Static stretch	Apply stretch to muscle for 15-20 seconds, relax and apply ischemic compression
Positional release technique	Apply ischemic compression over the MTrP and shorten the muscle (opposite of stretch); hold for 90 seconds
Low-level laser therapy	Use directly over MTrP with target energy amount 4 J/cm ² ; can work along muscle band/spasm for relief
Therapeutic ultrasound	Modality used to relieve spasms; not effective as standalone therapy for MTrP release (sample protocol: 5 minutes pulsed 20%, 1 MHz)
Transcutaneous electrical nerve stimulation	Modality has been used in humans for MPS; not effective as standalone therapy for MTrP (sample protocol: 100 Hz, 250 msec stimulation followed by 100 Hz, 50 msec)
Extracorporeal shock wave therapy	Modality used in human MPS and MTrPs (sample protocol: 800-1000 energy level; 0.25 mJ/mm ² , frequency of 4-6 Hz; 1-2 treatments per week for total of 3-7 treatments)



to relax, by moving the joint and muscle away from the motion restriction.¹¹

Low-Level Laser Therapy

Low-level laser therapy (LLLT) uses class IIIa and IIIb lasers, which provide a power output of less than half of a watt (500 mW). The laser applicator can be held directly over the MTrP region at a target energy delivery of 4 J/cm², with the dose range between 1.5 and 5 J/cm².¹¹

A comparison study of dry needling and laser therapy in the masseter muscle found similar outcomes, with a statistical significance of reduction of MTrPs with laser therapy at a dose of 4 J/cm² or dry needling with 2% lidocaine injection over the MTrPs.¹³ Patients were evaluated after a total of 4 sessions at intervals ranging between 48 and 72 hours; however, the number of treatments needed to deactivate MTrPs varies from patient to patient depending on whether the issue is chronic or acute.

Another comparison study concluded that LLLT was more effective than dry needling; however, it stated that more studies with appropriate LLLT use and experienced practitioners are needed to prove greater efficacy. This study mentioned that LLLT may be effective at 2 to 5 treatments per week. It also suggested using more frequent treatments with higher energy for acute cases (e.g., 24 J/cm² 5 times a week) and less frequent treatments with lower energy over more sessions for chronic cases (e.g., 4 J/cm², 2 times a week for 30 sessions).¹⁴

Therapeutic Exercise

Although exercise techniques may not deactivate MTrPs on their own, exercise is helpful in activating appropriate muscles, improving posture, and decreasing compensatory issues that may be perpetuating and precipitating factors of MTrPs. To help condition muscles for postural control, owners can be taught a simple “stack stance” to help their pet stand square and evenly balanced with its head in neutral position without weight shifting for a certain period of time. Gait reeducation is also helpful and can be facilitated by the use of land or underwater treadmills, obstacle courses, and curbs. It is critical during gait reeducation for the patient to demonstrate normal gait patterns such as walking or trotting and not ambling or pacing, which are common compensatory strategies.

Adjunctive Therapy

Other modalities used in veterinary medicine, including therapeutic ultrasound, electrical muscle stimulation, and extracorporeal shock wave therapy (ESWT), may aid in reducing pain and discomfort before release of MTrPs; however, they are not typically used as standalone treatment options. A few studies have demonstrated reduction of MPS with ESWT in humans, but veterinary studies will need to be completed to provide further guidance for practitioners.

CONCLUSION

A veterinary nurse’s goal is to teach clients tools to promote reduction in MTrP activation in their pets, thereby relieving pain and providing better outcomes and successful, long-lasting treatments. More in-depth articles, book chapters, videos, and coursework on MTrPs in companion animals are available for readers who want to learn more about MTrPs and MPS. **TVN**

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