Equine Manual Therapies in Sport Horse Practice

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Equine Manual Therapies in Sport Horse Practice

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KEYWORDS

• Manual therapy • Proprioception • Neuromuscular control • Massage therapy
• Stretching exercises • Joint mobilization • Chiropractic care • Osteopathy

KEY POINTS

- Manual therapies can provide detailed diagnostic and therapeutic approaches to assess and manage neuromuscular coordination and strength in sport horses.
- Active stretching involves using the patient's own movements to induce a stretch; whereas, passive stretches are applied to relaxed muscles or connective tissues.
- Soft tissue or joint mobilization is indicated to help limit the effects of joint immobilization and to restore proprioceptive mechanisms.
- Equine chiropractic research has shown positive effects for pain relief, improving flexibility, reducing muscle hypertonicity, and restoring spinal motion symmetry.

INTRODUCTION

Manual therapies involve the application of the hands to the body, with a diagnostic or therapeutic intent. In horses, a diverse array of manual techniques, such as touch therapies, massage, joint mobilization, and manipulation (ie, chiropractic), have been applied with a primary therapeutic intent (eg, reduce pain or stiffness).[1–3] However, all of these therapies also have important diagnostic value in assessing musculoskeletal pain and dysfunction that is not possible with other more traditional physical examination approaches or imaging modalities. In sport horse practice, the primary issues that limit performance are chronic repetitive use injuries associated with long active athletic careers of pushing physical and psychological limits of horse and rider. Chronic, poorly localized pain and stiffness combined with slower reflexes or altered muscle timing contribute to poor performance issues and increase the risk of acute injury and inflammation. Manual therapies can provide detailed soft tissue, osseous, and articular evaluation techniques and unique methods to assess neuromuscular

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coordination and strength in sport horses that are not possible with routine lameness evaluation or neurologic tests.

Touch therapies and massage techniques focus on myofascial tone and the role of connective tissue (ie, fascia) in supporting optimal muscle, joint, ligament, and tendon function. Joint mobilization techniques involve assessing the quantity (eg, range of motion) and quality (ease of movement) in static and dynamic settings. Joint mobilization is used to provide subjective assessments of joint stability, passive and active joint movements patterns, and type of palpable resistance created as a joint is brought toward its end range of motion (ie, end-feel), which all provide critical insights into the biomechanical and neurologic features of an articulation. The ability to localize pain or stiffness to a specific vertebral level or defined spinal motion pattern (eg, restricted right lateral bending at C3-C4) provides a level of specificity that is required to diagnose subtle performance issues and to address vague or poorly localized sources of pain or upper limb lameness. The objectives of soft tissue and joint mobilization are typically to reduce pain, restore tissue compliance, and improve overall tissue mobility and joint range or motion.[4] Manipulation is more often used to address localized pain and joint stiffness, with less focus on the surrounding soft tissues.[5] Manual therapy techniques can also provide an adjunct to therapeutic exercises and rehabilitation of neuromotor control, where applied forces are used to induce passive stretching, weight-shifting, and activation of spinal reflexes, which help to increase flexibility, stimulate proprioception, and strengthen core musculature.[6]

IDENTIFICATION OF REHABILITATION ISSUES

Any medical, surgical, or rehabilitation plan is only as good as the diagnosis on which it is based. Veterinarians typically are good at establishing or defining diagnoses based on a known pathology or on anatomic localization (ie, pathoanatomic diagnosis). At times, they may even slide into the misguided approach of "treating the diagnostic image" without giving full consideration to determining the clinical relevance of the diagnostic imaging findings relative to the presenting or continued clinical signs of the patient. At the other end of the diagnostic-treatment spectrum are those owners and practitioners that are solely focused on the function of the horse (ie, is the horse able to do its job) despite the accumulation of known musculoskeletal injuries and chronic, multilimb lameness over a long active athletic career. Striving to find a balance between applying structural and functional approaches is ideal for managing the athletic demands and injuries in sport horses.

From the functional perspective, general rehabilitation issues to be addressed in equine athletes include, in progressing order, (1) pain management, (2) proprioceptive deficits, (3) stiffness, (4) weakness or fatigue, and (5) neuromuscular control. Pain management is always the first step in rehabilitation because it is not possible or ethical to ask a patient to exercise or do stretching when they are in pain. The body's normal protective mechanisms do not allow one to fully contract a muscle attached to an acutely stained tendon or to freely move a joint with acute synovitis. Nociceptive input by itself induces many other neurologic reflexes (eg, withdrawal reflex, crossed-extensor reflex) that function acutely to protect the body from further injury. However, chronic nociceptive input leads to peripheral and central sensitization (ie, wind-up) that has widespread neurologic and musculoskeletal effects that make clear distinctions between pain or lameness, altered proprioception or body awareness (ie, somatoesthesia), and altered gait patterns difficult to interpret.

As horses move into the proprioceptive and flexibility phases of rehabilitation, more focus is placed on how the horse is perceiving its environment through its sensory

system and able to navigate through that environment with its motor system. This integration is often referred to as neuromuscular or neuromotor control and relies heavily on afferent signaling from proprioceptors, which include muscle spindle fibers in muscles, Golgi tendon organs, and many other soft tissue mechanoreceptors located in joint capsules and fascial planes. The motor component includes active and passive structures. The active structures that are addressed with rehabilitation include all motor pathways from the motor cortex in the cerebrum for control of movement, the cerebellum for balance and coordination, down to the timing and strength of muscle contractions. Passive structures include the joint capsules, ligaments, and the superficial and deep fascial layers that cover and envelop muscles and neurovascular bundles. All of the sensory and motor components and active and passive structures must function optimally for the horse to be able to progress in a defined rehabilitation or training program to build endurance and strength required for sport-specific demands.

PAIN MANAGEMENT

The goal of most rehabilitation programs is the early initiation of movement to begin the process of restoring normal joint motion, strength, and coordination. Acute pain and inflammation are typically managed with nonsteroidal anti-inflammatory drugs; cold therapies (ie, ice); restricted exercise; and compression wraps, if indicated, to protect local tissues and to limit excessive joint movement. Once the initial acute inflammatory phased has begun to subside in 3 to 5 days, then gentle, slow passive soft tissue or joint mobilization is indicated to help limit the effects of joint immobilization and to restore proprioceptive mechanisms.[7,8] Joint mobilization is usually applied in a graded manner, with each grade increasing the range of joint movement. Grades 1 to 2 joint mobilization involve inducing small degrees of joint motion around the neutral joint axis (ie, resting joint position) and then beginning to move the joint up to 50% of normal joint range of motion for a specified articulation. If passive joint motion is too painful, then applying light pressure and inducing motion of the overlying skin and subcutaneous tissues may help to improve lymphatic flow and increase mechanoreceptor stimulation in an effort to inhibit nociceptive signaling via local and spinal cord mechanisms.[9] Manual lymph drainage has been described for use in the management of lymphedema in horses; however, no controlled studies exist evaluating its effectiveness.[10] The reparative process of tissue healing includes collagen synthesis and fibrous tissue proliferation. Significant fascial restrictions or adhesions can limit injury recovery if proper mechanical stimulation and restoration of fascial glide of superficial and deep tissues is not achieved. Skin rolling techniques and deep tissue massage provide increased level of mechanical stimulation of connective tissues, which may be required in patients with extensive fibrosis or soft tissue adhesions.[2] Prolonged joint immobilization or forced stall rest are often counterproductive to maintaining musculoskeletal health.

Chronic pain often induces sensitization or wind-up, which produces generalized pain that is poorly localized and is often disassociated from the initial inciting injury. In humans, massage therapy, joint mobilization, and manipulation are often used to address chronic pain syndromes and compensatory gait mechanisms (ie, antalgic gait). In horses, massage therapy has been shown to be effective for reducing stress-related behavior[11] and lowering mechanical nociceptive thresholds within the thoracolumbar region.[12] The use of acupuncture evaluation techniques to localize reactive loci within superficial soft tissues is useful for assessing overall nociceptive thresholds and diagnosing myofascial pain. Acupressure or ischemic compression techniques are used to treat local muscle pain or hypertonic bands (ie, trigger points).[13] Two randomized, controlled clinical trials using pressure algometry to

assess mechanical nociceptive thresholds in the thoracolumbar region of horses have demonstrated that manual and instrument-assisted spinal manipulation can reduce back pain (or increase mechanical nociceptive thresholds).[12,14]

STIFFNESS

Neck or back stiffness is a common cause of poor performance in sport horses. Stiffness localized to a specific limb articulation is typically caused by joint capsule fibrosis or periarticular adhesions. Stiffness can also be produced by pain and muscle guarding associated with osteoarthritis or dorsal spinous process impingement. Muscle spasms or hypertonicity are common clinical findings in horses with neck or back pain or stiffness.[2] Detailed palpation techniques provided by manual therapy techniques can help to localize the source of stiffness to the various tissue types and possible pathophysiology of the clinical complaint.

All of the individual articulations of the proximal and distal limbs are mobilized to assess the quality and quantity of joint motion. As isolated joints are moved through full flexion and extension and accessory motions of internal and external rotation or translation, the ease of joint movement and any restrictions or painful responses are noted. A full description of the techniques for joint mobilization are beyond the scope of this article, but a simple example of assessing internal and external rotation of the coffin joint demonstrates asymmetries in the end range of motion. Gentle rotation of the hoof internally and externally helps to determine the quality and quantity of passive axial rotation of the coffin joint as the pastern region is stabilized proximally (**Fig. 1**).

Active stretching involves using the patient's own movements to induce a stretch, whereas passive stretches are applied to relaxed muscles or connective tissues during passive soft tissue or joint mobilization.[3,15] In horses, active stretches of the neck and trunk are often induced with baited (ie, carrot) stretches with the goal in increasing flexion, extension, or lateral bending of the axial skeleton.[6] Asking horses to produce active stretching of the limbs is often difficult; therefore, passive stretches are most commonly prescribed in horses.[15] In horses, passive stretching exercises of the limbs and axial skeleton have anecdotal effects of increasing stride length and joint range of motion and improving overall comfort.[15] In a noncontrolled study, passive thoracic limb stretching lowered wither height caused by possible relaxation of the fibromuscular thoracic girdle.[16] However, a randomized controlled trial in riding school

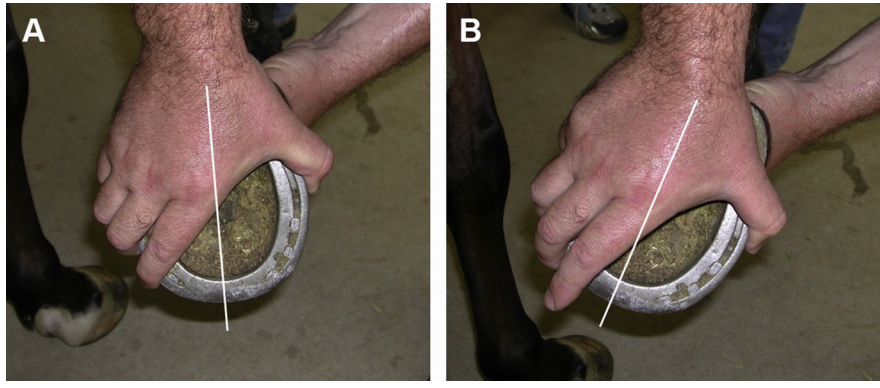

Fig. 1. Joint mobilization of the coffin joint in internal (*A*) and external (*B*) rotation. Note the reduced or asymmetric end range of motion induced during external rotation, compared with internal rotation (*white lines*).

horses evaluating the effect of two different 8-week passive stretching programs reported no significant changes in stride length at the trot but had a detrimental effect of decreasing joint range of motion within the shoulder, stifle, and hock articulations.[17]

The focus of recent equine chiropractic research has been on assessing the clinical effects of spinal mobilization and manipulation on pain relief, improving flexibility, reducing muscle hypertonicity, and restoring spinal motion symmetry. Spinal mobilization has been shown to be effective at increasing spinal flexibility in ridden horses without clinical signs of back pain.[12] Manipulation may preferentially stimulate receptors within deep intervertebral muscles, whereas mobilization techniques most likely affect more superficial axial muscles. Only one study has compared mobilization with manipulation in horses and spinal manipulation induced a 15% increase in displacement and a 20% increase in applied force, compared with mobilization.[18] At most vertebral sites studied, manipulation increased the amplitudes of dorsoventral displacement and applied force, indicative of increased spinal flexibility and increased tolerance to pressure in the thoracolumbar region of the equine vertebral column.

Manually applied forces associated with chiropractic techniques are able to produce substantial segmental spinal motion.[19] Additional studies have assessed the effects of equine chiropractic techniques on increasing passive spinal mobility (ie, flexibility)[12,18] and reducing longissimus muscle tone.[20] The effect of manipulation on asymmetrical spinal movement patterns in horses with documented back pain suggest that chiropractic treatment elicits slight but significant changes in thoracolumbar and pelvic kinematics and that some of these changes are likely to be beneficial.[21,22]

Equine osteopathic evaluation and treatment procedures have been described in textbooks and case reports, but no formal hypothesis-driven research exists.[23,24] A case series of 51 horses with chronic lameness or gait abnormalities that were poorly localized were treated with osteopathic techniques under sedation and had reported positive results in most cases from 6 to 12 months after treatment.[25]

WEAKNESS

Weakness (ie, lack of muscular strength) is a common but poorly recognized or easily localized disorder. The cause of weakness is often neurologic-based but clinically weakness is often attributed to muscular disorders because of the lack of epaxial muscle development, inability to perform advanced training techniques, asymmetrical movement patterns (eg, not bend to the left), or difficulty in clearing a jump. The most common cause of weakness is reflex inhibition caused by soft tissue or orthopedic pain. A lame horse is that is unable or unwilling to place full weight bearing on a limb also has distinct changes in muscle activation (ie, timing and amplitude of contractions). Muscles that have altered timing can include individual muscles that turn on too early or stay active too long or do not turn on at all. Muscles also have changes in the number of motor units activated, which directly correlates to the amplitude or strength of muscle contraction. A horse with a painful back often has accompanying muscle hypertonicity of varying degrees, which alters the resting muscle tone and threshold for muscle activation. A common misconception is that a hypertonic or muscle spasm is a “strong” muscle; however, because of chronic activation it is often a weak muscle with altered on-and-off timing that increases the risk of injury. Chronic pain often induces recruitment of peripheral or proximal limb muscles, which is interpreted clinically as altered gait patterns. Neurogenic atrophy is noted locally within a segmentally innervated myotome and varying degrees of disuse atrophy may be noticed more regionally over the lateral neck or dorsal trunk in horses with chronic neck or back pain.

MOTOR CONTROL

Manual forces are used to induce passive stretching, weight-shifting, or activation of spinal reflexes, which help to increase flexibility, stimulate proprioception, and strengthen core musculature.[6,26] Soft tissue mobilization has the additional effect of stimulating regional or systemic changes in neurologic signaling related to pain processing and motor control. Joint mobilization and manipulation can provide effective management of pain and neuromuscular deficits associated with musculoskeletal injuries, alterations in postural control, and locomotor issues related to antalgic or compensatory gait. In response to chronic pain or stiffness, new movement patterns are developed by the nervous system and adopted to reduce pain or discomfort. Long after the initial injury has healed, adaptive or secondary movement patterns may continue to persist, which predispose adjacent articulations or muscles to injury. Activation of proprioceptors, nociceptors, and components of the muscle spindles provide afferent stimuli that have direct and widespread influences on components of the peripheral and central nervous systems that directly regulate muscle tone and movement patterns. The various forms of manual therapy are thought to affect different aspects of joint function via diverse mechanical and neurologic mechanisms.

The goals of neuromuscular rehabilitation are to (1) identify the individual muscle or muscle groups involved; (2) diagnose the underlying cause of muscular dysfunction (or neurologic or muscular disease); (3) define the rehabilitation issue relevant for that horse on that day (ie, timing or amplitude); (4) develop and implement a focused rehabilitation plan to address the specific needs of the individual patient; and (5) provide objective outcome measures to assess accomplishment of goals and eventual return to optimal function. Manual therapy is a useful diagnostic and therapeutic tool in this process and is often combined with therapeutic exercises to help support rehabilitation process of neuromotor control.

Three-Legged Stance

The ability to stand comfortably on three limbs while one limb is elevated off of the ground is a measure of the musculoskeletal and nervous systems. If a sport horse is not able to stand quietly on one limb for a short period of time, then concerns may be raised about the strength and nociceptive and mechanoreceptive requirements to run at full speed, navigate turns or jumps, or to maintain collected movements for any period of time. The contralateral limb is required to double its weight-bearing load, which increases musculotendinous and ligamentous strain and may precipitate osteoarthritic pain. Because of the increased weight bearing and change in center of mass, the proximal musculature (ie, thoracic sling or pelvic girdle muscles) of the contralateral limb is also activated to maintain balance and stability. Sequential limb elevation is used to assess the ease of limb elevation and the quality of proprioceptive capabilities and neuromuscular strength (ie, core stability) within individual limbs.

Limb Circumduction

Static assessment is done with simple limb elevation and evaluation of the horse's ability to stand comfortably on three limbs for up to 20 to 30 seconds. Dynamic assessment includes the addition of induced distal limb circumduction in small repetitive circles about the size of a dinner plate. The circles are repeated in several locations, which include directly under the elevated forelimb, 12 inches cranial and caudal, and 12 inches lateral to the site of normal foot placement. The circumduction circles are done in either clockwise or counterclockwise directions. The horse is observed for the ability to let their distal limb be moved freely at the four different

locations, which requires activation of different proximal muscle stabilization patterns and the ability to maintain balance on three limbs with mild perturbations in the center of mass. Horses without pain or neuromuscular dysfunction can easily stand while their distal limb is mobilized in these different positions. Horses with perceived weakness, pain, or poor core stability of the proximal limb musculature are not able to stand on three limbs, do not allow limb elevation or circumduction in one or all positions, or place excessive weight into the hands of the evaluator as they resist standing with their limb elevated. Limb circumduction exercises are used diagnostically and therapeutically to improve strength and proprioceptive awareness because of painful or diseased tissues within the limb.

Passive and Active-Assisted Limb Retraction

The quality and quantity of limb protraction and retraction also assesses the functional status of the musculoskeletal and nervous systems. If a sport horse is not able to readily extend its fore and hind limbs without pain or resistance or while maintaining proper balance, then concerns may be raised about flexibility issues and the nociceptive or neuromuscular status. Passive limb range of motion helps to assess the passive supporting structures of the limb and proximal attachments to the trunk, which include joint capsule, ligaments, and fascial components. Active engagement of the limb musculature during assisted limb retraction helps to assess over strength, coordination, and ability to perform these limb movements in a standing or static position and at end-ranges of overall limb motion. If horses are not able or willing to perform this type of limb movements in a low-impact setting, then questions or concerns could be raised about their optimal performance under active or ridden exercise with the high demands placed on the neuromuscular systems during athletic competition.

Active-assisted limb retraction is used diagnostically and therapeutically. While gently guiding a horse's forelimb backward (ie, retraction) to induce a slow and steady stretch, the handler asks for an "active stretch," which occurs when the horse leans into your supporting hands and actively stretches its forelimb backward (Fig. 2). Normally, horses should be able to retract their forelimb so that the forearm (radius and ulna) are moved caudally behind vertical with ease and comfort, which is a measure of forelimb flexibility. With active engagement and the willingness to extend the limb fully into retraction, proprioceptive signaling and motor control are assessed. In horses that do not actively retract their fore or hind limbs, lowering the hoof closer to the ground (ie, 3–6 inches off the ground) and asking for an "active stretch" again may be successful.

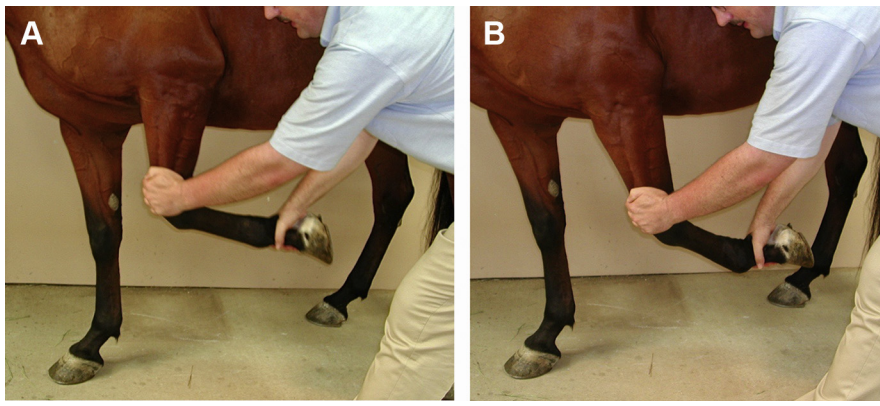

Fig. 2. Passive (*A*) and active-assisted (*B*) thoracic limb retraction stretches.

Passive and active-assisted hind limb retraction provides similar insights into hind limb range or motion and neuromuscular status. Normally, horses should be able to retract their hind limb so that the metatarsus is moved caudally behind vertical with ease and comfort. Active-assisted hind limb retraction asks for active engagement and assesses the ability and willingness to extend the limb fully into retraction (Fig. 3). Treatment involves using this same technique in a series of repetitions to help develop strength and coordination in the limb or direction of impairment.

Passive and Assisted Limb Protraction

Passive limb protraction induces a stretch in the supporting structures located along the caudal aspect of the limb. With the lower forelimb held in a flexed position, the stretch is localized to the upper forelimb and scapulothoracic junction (Fig. 4). As the forelimb is supported in full extension, then a passive stretch of the entire fore or hind limb is produced (Fig. 5). Hind limb flexibility in protraction is assessed by the measured distance between the forward reach of the hind hoof and the ipsilateral front hoof (Fig. 6). Assisted limb protraction seeks an "active stretch," which occurs when the horse leans into your support and actively stretches its forelimb forward into your supporting hands. In horses that do not actively protract their fore or hind limbs, lowering the hoof closer to the ground (ie, 3 inches off the ground) and asking for an "active stretch" again may be successful. Normally, horses should readily bring their hind foot to the level of or past the position of the front foot. This is especially true with assisted hind limb protraction, as the footfall of the hind limb is near the footfall of the forelimb during trotting exercise. In horses that readily produce active engagement at lower levels of foot placement, the hoof is raised slightly in 3-inch increments and repeated until the fore or hind limb is near horizontal position to maximize flexibility and core stability of the proximal limb attachments (Fig. 7).

Sternal Elevation Reflex

Horses with poor saddle fit and pain in the wither region or impinged dorsal spinous processes may benefit from trunk elevation or flexion exercises because of the induced stretching and separation of the soft tissues and bony structures along the

Fig. 3. Active-assisted pelvic limb retraction stretch.

Fig. 4. Passive upper thoracic limb protraction stretch.

dorsal midline. Using spinal reflexes to diagnose and treat core stability issues is an important tool in managing sport horses. A spinal reflex that induces sternal elevation is done by applying upward fingertip pressure or scratching in a craniocaudal direction along the ventral midline of the sternum to induce active elevation of the cranial thoracic region (Fig. 8). As a natural response, most horses also lower their head and neck during active elevation of the withers. Initially, one may need to use strong upward pressure or fingernail pressure to induce elevation of the withers. If the horse does not respond, then the pressure may be applied with the fingernails of both hands or the pressure may be applied more caudally, at the xyphoid or along the midline of the cranial portion of the abdomen. Both the quality and quantity of movement are assessed during the spinal reflex response and the ability to hold or maintain the induced posture. The induced motion should be smooth and easy with the base of the withers elevating about 2 cm in normal horses. The goal is to help to develop core stabilization and movement of the scapulothoracic junction that forms the fibromuscular sling between the thoracic limb and rib cage.

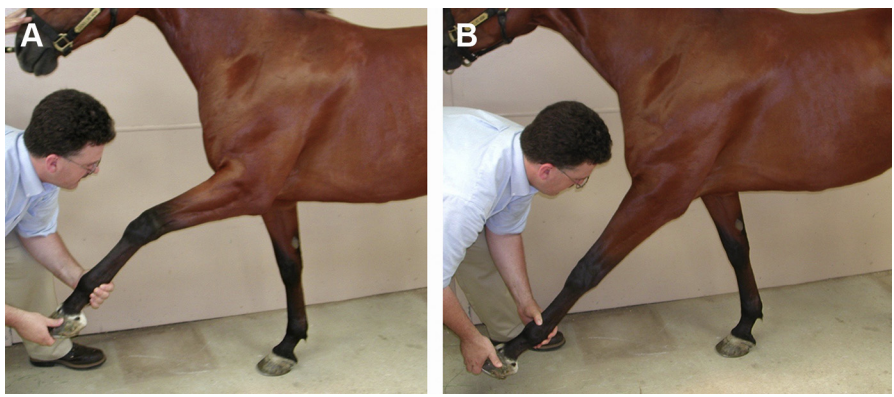

Fig. 5. Passive (*A*) and active-assisted (*B*) whole thoracic limb protraction stretch. The thoracic limb is fully extended and held at the end range of motion to promote elongation of soft tissues and increase neuromuscular activation.

Fig. 6. Passive pelvic limb protraction stretch. The pelvic limb is brought into full extension to assess overall limb range of motion in protraction.

Horses with girth pain may react strongly to the applied pressure and often kick out, step away from the applied pressure, or maintain an elevated head and neck posture. Saddle fit and proper girth positioning, use, and fit should be evaluated in these affected horses. Some horses do not respond to any applied pressure along the ventral sternum. Asking the handler to lower the head below the height of the withers may help to assist or initiate active elevation of the withers. Rapid and repeated stimulation along the ventral midline or off to one side of the ventral midline along the edge of the deep pectoral muscle may also help to initiate the desired reflex.

Pelvic Flexion Reflex

Horses with lordosis, obvious epaxial muscle pain or hypertonicity, or trunk stiffness may benefit from induced pelvic and trunk flexion exercises. Active trunk flexion is

Fig. 7. Passive whole thoracic limb protraction stretch applied at the highest level possible above the ground while still remaining comfortable for this horse.

Fig. 8. Sternal elevation reflex with digital pressure applied along the ventral midline of the sternum while assessing the quality and quantity of elevation of the region caudal to the withers.

required in collective movements and horses with poor hind limb coupling or lack of impulsion may also benefit from this exercise. By applying firm digital pressure bilaterally along the intermuscular groove between the biceps femoris and semitendinosus muscles at a level lateral to the base of the tail, the natural response is induced pelvic (lumbosacral joint) flexion and elevation or induced kyphosis of the entire thoracolumbar region (**Fig. 9**). Moving the digital stimulation ventrally along the muscular groove is often required to identify the site that produces the most effective spinal reflex response. Once the horse produces active elevation of the back and flexion of the pelvis, then hold the finger contact to maintain the abdominal muscle contraction and stretch for up to 20 seconds. Again, the quality and quantity

Fig. 9. Pelvic flexion reflex with digital pressure applied bilaterally along the intermuscular groove between the biceps femoris and semitendinosus muscles. Note the degree of pelvic flexion and trunk elevation (kyphosis) induced in this horse.

of movement are assessed during the induced movement. The induced motion should be smooth and fluent with clear pelvic flexion noted and elevation of the thoracolumbar junction by 2 to 4 cm. The goal is to strengthen and stimulate coordination of the muscles that lift the back and produce flexion of the trunk and pelvis (ie, collection).

Diagnostically, one of several responses occurs because of digital pressure applied over the croup region:

1. Normally, a horse without back or lumbosacral pain and with strong coupling or collection abilities strongly contracts the rectus abdominis muscle and the horse actively flexes the lumbosacral junction (ie, coupling) and elevates or flexes the trunk. Muscles responsible for producing lumbosacral flexion include the rectus abdominis, iliopsoas, and psoas minor muscles. The amount of trunk flexion produced by this exercise should at least produce flattening of the thoracolumbar spine. Optimally, a prolonged, steady kyphotic posture of the caudal thoracic and lumbar spine should be produced to induce maximal stretching of the dorsal epaxial musculature.
2. A horse with poor neuromuscular coupling or obvious back pain, muscle hypertonicity, or stiffness does not respond to any amount of applied pressure. Because this is an unusual aid, many normal horses may not respond initially to the applied pressure until they learn the desired response to the applied stimulus.
3. A horse with notable lumbosacral or gluteal pain may have an exaggerated response and buck or kick out on the hind limbs. It is always best to begin with light digital pressure and gradually increase the digital or fingernail pressure until an avoidance response or active spinal movement is noted.
4. Other horses produce active lumbosacral flexion without any elevation of the trunk or elevation of the trunk but no active flexion of the lumbosacral junction.

Therapeutically, if the horse has a weak, slow, or minimal response to the applied pressure, then repeated application of this exercise is indicated. If, after several repeated attempts, an exaggerated or painful response is consistently noted, then referral for evaluation of underlying back, lumbosacral, or pelvic pain or lameness is indicated.

Axial Tail Traction

The lateral tail pull tests or exercises are often used to assess hind limb weakness and proprioceptive status. Caudal or axial tail traction can also provide diagnostic and therapeutic insights into the horse's capabilities for lumbosacral coupling, canter movements, and pelvic stabilization. Horses with pain in the lumbosacral or sacroiliac regions and horses with poor hindquarter coupling and lack of impulsion benefit from this exercise. This exercise is best done in a quiet open space with horses that one is familiar with and if there are limited distractions in the immediate area. Cautiously move from the side and stand behind the horse while grasping the horse's tail firmly with both hands, about 6 inches below the tail head. Lean back slightly and gently apply slow and gradual caudal or axial traction to the tail. The tail and your line of pull should be parallel to the croup of the individual horse. Pull firmly for 5 seconds and monitor the contraction of both middle gluteal muscles along the top line of the pelvis (**Fig. 10**).

Diagnostically, one of several responses typically occurs during the application of tail traction:

1. Normally in a horse without back or tail pain and good coupling or collection abilities, you see a strong contraction of both croup (gluteal) muscles and the horse actively pull against you.

Fig. 10. Axial tail traction with firm, constant pressure applied caudally to induce a counter-resistive response and activation of bilateral middle gluteal muscles.

2. A horse with poor coupling or who is disunited allows you to pull on their tail but there is no visible gluteal muscle contraction or attempt to lean forward to resist your traction on the tail.
3. A horse with potential lumbosacral or tail pain dances from side-to-side and does not allow you to apply any pressure to the tail. If this response is seen, immediately discontinue the applied traction and reassess the horse's back, pelvic, and tail regions with your veterinarian.
4. Some horses contract only one gluteal muscle or consistently stand on one pelvic limb. If a horse consistently unweights one hind limb or refuses to stand on one limb, then applying traction slightly to the affected or unweighted limb helps the horse to redistribute its weight evenly on both hind limbs and begin equal contraction of both gluteal muscles.

Therapeutically, if the horse has a weak, slow, or minimal response, then slowly release the traction for 2 seconds and apply again for 2 seconds. Rhythmically repeat the applied traction and release procedures for up to 30 to 40 repetitions. When finished with the exercise, slowly release the applied traction on the tail. Do not let go of the horse's tail too fast because some horses resent this and kick out.

SUMMARY

Touch therapies, massage, joint mobilization, and manipulation are all critical components in the management of muscular, articular, and neurologic components of select injuries in performance horses. Musculoskeletal conditions that are chronic or recurring, not readily diagnosed, or are not responding to conventional veterinary care may be indicators that manual therapy evaluation and treatment is needed.

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