

How to Recognize Improper Saddle-Fit as a Potential Cause of Equine Lameness

1. Introduction:

Improper saddle-fit and rider imbalance are significant causes of physical and behavioral equine performance problems. Traditional veterinary medicine often fails to identify these inciting causes, but instead focuses on addressing the pain and specific anatomic lesions secondary to ill-fitting saddles. Muscular back pain and over-riding spinous processes (“kissing spine”), hock or stifle arthritis, and tendon and ligament desmitis or tears are frequent sequelae to ill-fitting saddles due to direct trauma of the back and changes in the horse’s carriage and load distribution that impact the limbs. These secondary problems can be emotionally and financially draining for the client, potentially life-threatening for the horse, and the problems may return if the offending equipment is not replaced. Veterinary education is specifically lacking in the area of saddle-fitting, perhaps because of a reliance on trainers, saddle-fitters, and owners/riders to be familiar with the importance of correctly fitting equipment; however, the ability to relate correct fit to function, and an understanding of the influence of incorrect fit on equine body condition and lameness is imperative for veterinarians to provide the best preventative veterinary medicine and successful case management.

2. Materials and Methods:

Assessing the Equine Patient

Conformation: Equine conformation is largely governed by genetics, but body condition is typically influenced by nutrition and husbandry, training and riding, and by the equipment utilized. Up to 80% of horses are bigger through the left shoulder muscles¹. This asymmetry is also reflected in the hooves, where the low-heel is typically on the side of the larger shoulder, and the high-heel on the smaller shoulder². Most horses with left larger shoulders have a mane that falls to the right; vice versa for right shoulder big. This difference is clinically important because the majority of saddles are created on even, symmetrical trees. Saddles will shift and twist related to the horse’s uneven conformation, creating pressure soreness and potentially deeper pathology.



Fig.1. 4-yr-old Oldenburg gelding with large right shoulder.



Fig. 2. 8-yr-old wild mustang with left large shoulder.



Fig. 3. Saddle dust-pattern showing a saddle falling from left to right in a left shoulder-big mare.



Fig.4. 10-yr-old AQHA gelding with atrophy of the rhomboids and trapezius muscles, and with a visible gall sore behind the left shoulder. A pinching saddle caused these changes.

The equine patient is typically palpated through the topline for pain and reactivity. The paraspinal muscles as well as each individual vertebra should be assessed to differentiate between soft-tissue and vertebral pain³. But shoulder asymmetry plays an important role in saddle-fit, and is not often noted as part of a physical evaluation. Carefully standing behind the patient and sighting up the dorsal midline will give the practitioner a gross view of the shoulder muscles and any inherent imbalances. From the lateral view, the patient should be assessed for being downhill, level, or uphill through the ribcage, which may influence the saddle's levelness on the back. A downhill build may also indicate that a horse is not carrying itself correctly engaged, or may be a normal finding in a young growing horse in training. Evaluation of the horse's topline for any atrophy, or a lack of proper muscle development, will tip-off the practitioner to problems with equipment or improper

riding. A dip in front of the withers and behind the shoulder, usually correlates to rhomboid and trapezius muscle atrophy; a saddle that pinches behind the shoulders and prevents correct topline lift and muscle development will cause this appearance. The length of the horse's saddle-bearing area (behind the shoulder to the last rib) should be determined, and any pain or marks outside this margin should be noted. Outward flaws such as gall sores and scars, "hunters-bumps", raised or rotated vertebrae, a prominent high-spine, or an atrophied topline should all be noted. These lesions provide clues to ill-fitting equipment.



Fig. 5. 10-yr-old. Quarter Horse with a large gall sore over the right shoulder. Patient was presented for chronic RF lameness, which resolved with a correctly fitted saddle.



Fig. 6. Paso Fino Stallion with significant high-spine and topline atrophy secondary to an ill-fitting saddle. Note the hollows under where the rear panels would sit, behind the ribs and over the kidneys.



Fig. 7. 9-yr-old Kentucky Gaited Horse presented for extreme low back pain. The saddle extended beyond the last rib to the croup and gouged the loin – the pattern is visible on the horse's topline. The patient is also extremely downhill through the ribcage.

An incorrect use of the horse's "circle of muscles" is readily viewed in its outward appearance as a bulging underside of the neck, a hollow and dropped back (banana-shape), trailing hind limbs, a sharp and tight loin and croup, and a bulge at C2-3. This outward appearance should guide the practitioner towards a saddle-fitting evaluation as part of a whole horse exam.



Fig. 8. A dressage horse with a hollow, dropped back, bulging neck, and disconnected hind-end. A pinching saddle high on the withers, or creating too much pressure at the rear of the saddle, will affect the horse's engagement and subsequently lead to lameness and injury.

Performance:

Most horses are presented for lameness evaluations with a history of a head-nodding lameness, or other signs of diminished performance. A short and choppy stride, reluctance to go up or down hills, tripping under saddle (Fig. 9.) and problems with canter leads are also typical findings in saddle-fit cases. When a horse presents generally sound on evaluation and a primary lameness is ruled out, but there is a history of resistance to aids or moving forward, resistance to bending, hollow-back, being out behind, or head-tossing under saddle, equipment and rider balance should immediately be suspected.

Hind-end issues are a common presentation to the equine practitioner. Frequently, obscure rear leg lameness or stiffness originates in the back. The hind-legs cannot come beneath the body, and tend to trail, causing excessive stress and strain on the joints⁴.



Fig. 9. Patient with a history of tripping under saddle. Horse was sound in-hand. The horse's original saddle was too narrow behind the shoulders, preventing a normal range of motion. The tripping resolved with a correctly fitted saddle.



Fig. 10. Pony mare pinning her ears and biting at the air in reaction to the saddle being placed on her back.

Behavioral changes:

Some equine patients may be presented due to behavioral changes. These horses may react to the owner entering or exiting the tack room, may turn or bite when saddled or girthed (Fig. 10), pin their ears, buck, bolt, or rear, and present with general anxiety. Head-tossing and moving impatiently in the cross-ties are signs seen frequently in saddle-fit cases. Gastric ulcers may form in these patients from the stress of being ridden while in pain, and may add to the behavioral problems seen.

Evaluation of the Saddle

Most saddle-fitting is presented in a bulleted list of "9-points", but there is a significant lack of relating the horse's underlying anatomy to why the saddle should fit this way. The saddle should be checked grossly for flaws such as a broken tree, twisted construction, lumpy or hard flocking, or sharp points. The girth should be checked for elastic at both ends (Tracy Turner).



Saddle pads should have a contoured or "wither-relief" shape to alleviate pressure over the spinous processes.

Fig. 11. Saddle is too narrow at the front, which causes the saddle to tip backwards, creating excessive pressure at the loins. These patients will often present for stifle or hock pain from traveling "out behind" and stressing the hindlimbs.

The owner should place the saddle in their desired position - many riders and grooms place the saddle too far forward to accommodate for fitting problems such as billets that are too far back. This positioning creates pressure on the shoulders and tips the saddle rearwards into the loins, which riders may then correct with a riser pad, further digging the tree points into the shoulders⁵. Note the horse's reaction to the saddle being placed on its back. Evaluate the saddle for balance - the saddle should sit level on the horse's back without tipping forwards or backwards (Fig. 11). The billets (English) or rigging (Western) should align the girth or cinch in the proper place behind the horse's elbow where the abdomen levels into the pectorals. The saddle tree points must sit behind the shoulders so as not to gouge the scapular cartilage. The saddle should then be evaluated to see if it clears the horse's withers, allows space between the top of the panel and the shoulders, does not extend past the last rib, and provides



Fig. 12. Saddle at left is sitting too low (too wide) over the horse's withers, and is restricting movement of the horse's shoulder blade. Saddle at right shows adequate clearance over the withers, and is opened away from the scapula to eliminate pressure at the trapezius and nerves, and to allow a full range of motion.

adequate channel width to stay clear of the vertebral processes and spinal ligaments. Saddles that pinch at the shoulders will trigger nerve reflexes that cause a hollowing of the back, and raising of the head and neck. The extension tension created in the topline is counter to the desired engagement, and creates resistance and lameness.

Thermography: Thermal imaging is one successful method of objectifying the saddle-fitting process; computerized saddle-pads and pressure mapping are also in use in the industry. Thermography has been shown to be one of the best methods of identifying back problems in the horse. Abnormal pressure and/or friction will create a "hot spot" that the thermal imaging camera can detect with at least 10 times more sensitivity to temperature than the human hand.⁶ Infrared thermography shows heat that may be directly correlated with increased circulation. Saddles will create friction and pressure, and therefore heat, which will be shown in the thermal images. This objective evidence can be useful for both the veterinarian and the rider in determining how saddle-fit may be playing a role in the horse's performance.

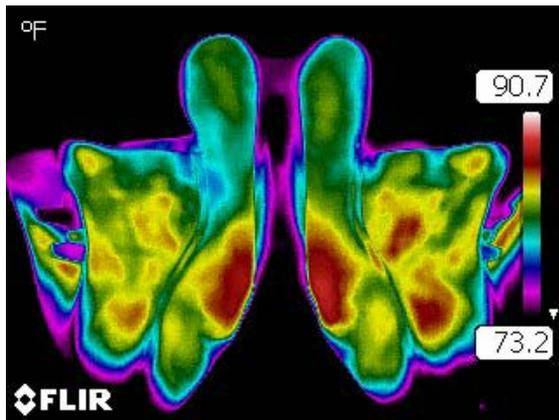


Fig. 12. A thermal image of the underside of a saddle showing increased pressure at the front of the panels from a saddle too narrow for the horse's shoulders, and with uneven contact through the horizontal panels, also bridging.

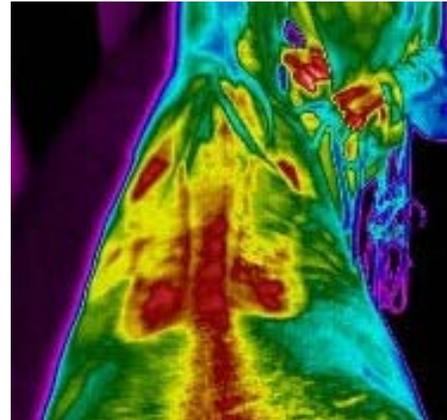


Fig. 13. A thermal image of a horse's back showing a distinct "bridging" pattern, with focal pressure points behind the shoulders and at the loins. This will cause significant back pain and lameness.



Fig. 14. A saddle that bridges on the horse's back will have space or daylight beneath the horizontal panel.

3. Results and Discussion

A pain response to palpation of the topline will certainly lead some practitioners to conclude that saddle-fit may be a problem, but often they are unsure how to proceed. In too many cases, horses are subjected to intra-articular injections due to undiagnosed hind-end problems or general stiffness that are secondary to saddle-

fitting issues. The unsoundness may return quickly after a series of injections, or may never resolve as the underlying issue has not been addressed. Unnecessary injections, especially those done without objective evidence of disease, increase the risk of infection, may be costly to the owner, and depending on the agents used, may cause damage to the joints.

In my practice I see a majority of cases that fit this profile: they have been evaluated for conformational and behavioral changes, have deteriorating performance, have had a multitude of intra-articular or miscellaneous back injections, or have been stall-rested on Bute, and the presenting problems never resolve, worsen, or return as soon as the patient is back under

saddle. In almost every case, saddle-fit has not been evaluated, or even mentioned to the client, as a potential cause of lameness and diminished performance. Typical presentations involve a report of general stiffness, resistance to the rider and aids, traveling hollow, and a gradually worsening attitude or refusal to perform. Fortunately, most patients have a successful return to work once the underlying pain and inflammation has been treated and subsided (typically with rest, acupuncture or equine bodywork, ground work and stretching, and anti-inflammatories where needed), the owner and/or trainer has been educated about the underlying cause, and the tack has been correctly fitted. In those cases that do not respond to a change in equipment and targeted treatment for back pain, the practitioner has reason to suggest further diagnostic imaging such as nuclear scintigraphy or radiographs and ultrasound to assess deeper pathology. In some cases, when the back feels better, patients may demonstrate new soreness in areas previously compensating. Resolving back pain and ensuring correctly fitting tack will not typically eliminate the need for joint support when painful degenerative changes are already present, but ensuring the health of the back and facilitating correct carriage often extends the time between treatments, reduces the dose or amount of a supplement needed, and drastically improves the patient's quality of life. Poor saddle-fit is a missing-link to lameness for a majority of practitioners, and should become a more mainstream differential.

As the horse has become both a significant status symbol and a family member, and distanced itself from historical roles of transportation and fighting wars, the equine industry has seen significant changes in tack and equipment that are now designed to accommodate the rider's checkbook or the latest trend. The significance of the relationship between poor fit and poor performance has been lost in the sponsorship deals and mass production of saddles, but the equine veterinarian armed with an understanding of anatomy and basic biomechanics should re-establish the link between poor fit and lameness. The veterinarian's role must encompass an evaluation of the whole horse, including its husbandry and equipment. By combining a gross evaluation of the patient for asymmetries, blemishes, and back pain, with a history of behavioral and performance changes, and a reasonable evaluation of the saddle, the veterinarian can play an active role in improving the equine patient's quality of life and overall client satisfaction.

References and Footnotes

¹ Harman, J. *The Horse's Pain Free Back and Saddle-Fit Book*. North Pomphret: Trafalgar Square, 2004;124.

² Ridgeway, K. *Low Heel/High Heel Syndrome, Unrecognized Problems and Considerations*, published online, Equine Therapeutic Options.

³ Allen K. Johns S, Hyman S. et al. *How to Diagnose and Treat Back Pain in the Horse* in Proceedings, Am Assoc Equine Pract 2010; 56:384-388.

⁴ Harman, J. *Ibid.*

⁵ Robson, J. *Recognizing the Horse in Pain...and What You Can Do About It*. Charleston: Createspace, 2009;87.

⁶ West C., Turner T. *Evaluating Saddle Fit*, The Horse.com, February 2005, Article # 5393.