Is Your Horse Hurting?

Veterinarians and owners can use a variety of methods to detect pain in horses. Learning to read a horse's facial expressions and postures at rest or under saddle can help you become more sensitive to problems that arise.

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Somewhat unique among other species in the animal kingdom, horses can make facial and eye expressions that convey volumes if you understand what you are seeing. | Photo: iStock

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As you unlatch the paddock gate, expecting your horse to come running for breakfast, you notice him standing in the back of his run-in, head and neck lowered, with his right front leg extended ever so slightly. He raises his head at your entry but remains where he stands. Although hardly dramatic, this is not his usual behavior. If your horse had words, he'd shout, "Look!" He is, in fact, speaking loudly through his posture and facial expressions, conveying he's in pain from an injury incurred overnight.

Horses can be demonstrative in how they communicate with humans—they nuzzle for affection, and they display certain body postures when resisting or acquiescing to an interaction or event. Somewhat unique among other species in the animal kingdom, they can make facial and eye expressions that convey volumes if you understand what you are seeing. In this article we'll explore how you can use these expressions and body language to pick up on painful conditions your horse might be

experiencing.

Behavioral Signs of Pain

During a visit to the doctor's office, you might have seen a wall chart with multiple faces, exhibiting big smiles, deep frowns, tears, and everything between. Physicians use this Visual Analogue Scale (VAS) of 1 to 10 to score pain in people who can verbally communicate what they are feeling. Because we can't rely on horses to tell us what they're feeling, we use other observations to determine if a horse is in pain and, if so, how much.

Historically, the main implement in our equine pain detection toolbox has been behavior. A horse that acts out might do so for no reason or a reason unrelated to pain, such as social factors. Or his behavior might indicate true discomfort. Indicators that all is not right can include:

- Reduced weight-bearing on a painful limb;
- Flank-watching, pawing, rolling;
- Restlessness;
- Depression;
- Decreased activity;
- Diminishing interest in surroundings;
- Retiring to the back of the stall or paddock;
- Standing with head lowered;
- Decreased appetite;
- Decreased socialization;
- Self-mutilation, such as chewing on a painful leg;
- Change in attitude and/or performance;
- Rearing when ridden;
- Hypersensitivity of the flanks; and
- Aggression.

Physiologic Signs of Pain

Other pain indicators include an elevated heart rate and increases in blood cortisol (the stress hormone) and/or β-endorphins (a natural pain suppressor). Elevated oxytocin (a social bonding and reproduction hormone) levels can also indicate reduced well-being.

Lea Lansade, PhD, and her colleagues at the French Horse and Riding Institute and the National Institute for Agricultural Research, in Tours, France, have been studying oxytocin in horses.

"A low level of basal (the minimal level that achieves a physiologic effect) oxytocin could be a marker of better well-being, in a social context," she says. "For instance, higher basal levels of oxytocin in plasma were observed in prairie voles subjected to chronic social isolation, in lambs reared without a mother, and in humans with greater relational distress. It is also known that oxytocin affects levels of anxiety and stress, and during periods of distress oxytocin levels increase. This could also be the case in horses, but further research is required to confirm this result and understand the underlying mechanisms."

Future studies on eye blink rate might also yield more information, because blink rate is associated with levels of dopamine, a neurotransmitter that tends to elevate with pain.

Testing for Pain

Owners and veterinarians can test horses for pain using a variety of methods. One is gauging a horse's response to analgesics (painkillers) such as non-steroidal anti-inflammatory (NSAID) or opioid-type medications. They can also palpate or manipulate limb structures to see if the horse withdraws from the touch due to discomfort. A device called a pressure algometer allows them to detect areas of back pain by amplifying pressure over a suspected injury until the horse reacts.

However, all these methods are time-consuming and don't always correlate with pain, because a variety of other stimuli might elicit similar behavioral changes or elevated heart rates.

Horse Grimace Scale Facial Action

Horse Grimace Scale

Researchers are now using a different

Units

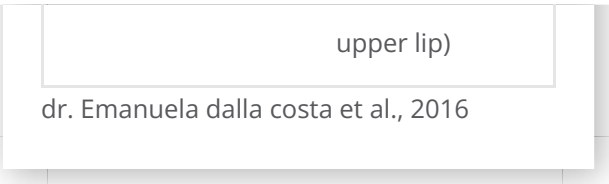
Facial Action Unit	Description
Stiffly backward ears	The ears are held stiffly and turned backward; movements are limited also in presence of environmental stimuli
Orbital tightening	The eyelid is half-closed or closed, the orbit is contracted, eyes are not focused on the environment
Tension above the eye area	Increased muscle tension in the area above the eyes, the underlying bone structure becomes clearly visible
Prominent strained chewing muscles	Increased tension of the chewing muscles, that becomes prominent and clearly recognizable
Mouth strained and pronounced chin	Strained mouth, the corner of the lips is shortened, the lower lip is tense, the chin is contract and becomes more pronounced (crescent-shaped)
Strained nostrils and flattening of the profile	The nostrils are dilated and strained, the profile changes, and you can see two bulges (one at the nostrils and

set of markers to assess equine pain and discomfort. A horse's ears and eyes are extremely expressive, as are his highly mobile lips and nostrils. Researchers have identified a number of facial expressions that correlate well with a horse's pain level based on a system called the horse grimace scale (HGS). Emanuela Dalla Costa, DVM, PhD, Dipl. ECAWM, and colleagues from the Universita degli Studi di Milano Department of Veterinary Medicine, in Milan, Italy, developed the HGS.

"This method exploits the natural human instinct of focusing on head and face when assessing pain, not only in other humans but also in animal species," Dalla Costa says. "A relatively short training session using a manual with pictures and detailed descriptions of facial action units (FAUs) helps horse owners learn and apply grimace scales to achieve reliable pain evaluation of their animals."

She adds that while the grimace scale is seemingly easy to apply, some FAUs are more difficult to assess than others, so owners and veterinarians should undergo training before using the scale to evaluate a horse.

"The use of the horse grimace scale for scoring pain has distinct advantages over that of manual behavior analysis, which is complex due to the



dr. Emanuela dalla costa et al., 2016

potentially greater number of behaviors that need to be scored," says Dalla Costa. "Behavior-based assessments are more time--consuming to conduct—the horse needs to be observed for a longer time, particularly in conditions inducing only mild pain. Furthermore, some behavioral pain assessments that include palpation of the painful area can be dangerous for both veterinarian and horse.

"In contrast, changes in equine facial expressions are detectable without having to approach the subject," she says. "Grimace assessment is used quite easily during routine daily work around the horses."

Dalla Costa says most observers easily recognize FAUs of expression such as:

- Asymmetrical and lowered ears, or ears held stiffly backward;
- Contraction and tension of muscles above the eye area, with orbital tightening;
- Withdrawn and unfocused stare;
- Strained or flared nostrils;
- Muzzle tension and/or pursed lips with pronounced (crescent-shaped) chin; and
- Tension of the facial and chewing muscles.

Lansade evaluated these markers in a study during which handlers groomed horses in a standard manner, continuing even when horses reacted negatively to certain actions. She compared this to gentle grooming, in which the handler stopped if the horse demonstrated discomfort and continued if the horse clearly showed enjoyment.

"Horses that feel uncomfortable during grooming were more frequently observed with their neck in a high position, eyes wide open or showing the whites, tightened lips with the corner of the mouth raised jerkily, and asymmetrical ears," she says.

In contrast, a "happy" horse is relaxed in the neck, the eyes are half-closed, the upper lip is often extended, immobile, or twitching, and the ears point backward together.

"Pain and discomfort during grooming induce distinct emotional states, which are expressed through different facial expressions," Lansade says. "Horses benefit from

complex face muscles that allow expression of a wide range of facial movements, depending on the emotional state felt."

Ridden Horse Pain Ethogram

Behavioral signs of pain can be subtle, such as ear-pinning, keeping the eyes slightly closed, and keeping his head in front of the vertical. | Photo: Courtesy Dr. Sue Dyson

At the Animal Health Trust's Center for Equine Studies, in Newmarket, U.K., former head of Clinical Orthopaedics Sue Dyson, MA, Vet MB, PhD, DEO, Dipl. ECVSMR, FRCVS, and her team developed a list of observable behaviors for horses under saddle, taking the horse grimace scale a step further to include facial, body, and gait behaviors and expressions.

"Not all horses experiencing musculoskeletal pain show changes in facial expression," says Dyson. "Different horses react to pain differently, so the ridden-horse ethogram (descriptive list of behaviors) is potentially more sensitive than the facial expression ethogram that we developed specifically for ridden horses. However, we have shown that we can differentiate many lame and nonlame horses by changes in facial expression."

The ridden-horse ethogram catalogues facial expressions involving the ears, eyes, nose, muzzle, mouth, and head position while ridden. It further includes body markers of head posture, tail position, and head and tail movement. Gait markers include speed and regularity of rhythm, responsiveness, bucking, rearing, and sudden stops.

The following 24 behavioral markers are ones Dyson identified in her studies as occurring more commonly in lame than nonlame horses. She says horses displaying eight or more of these behaviors within a five-minute period of working "on the bit" are likely experiencing some level of musculoskeletal pain:

- Repeated raising or lowering of head position;
- Head tilted or tilting repeatedly;

- Head in front of vertical (>30°) for at least 10 seconds;
- Head behind the vertical (>10°) for at least 10 seconds;
- Head position changes regularly, tossed or twisted from side to side, corrected constantly;
- Ears rotated back behind vertical or flat (both or one only) for at least five seconds or they repeatedly lie flat;
- Eyelids closed or half-closed for two to five seconds
- Sclera (white of the eye) exposed;
- Intense stare for five seconds;
- Mouth opening or shutting repeatedly with separation of teeth, for at least 10 seconds;
- Tongue exposed, protruding or hanging out, and/or moving in and out;
- Bit pulled through the mouth on one side;
- Tail clamped tightly or held to one side;
- Large tail-swishing movements—repeatedly up and down, side to side, circular, and/or during transitions;
- A rushed gait (frequency of trot steps greater than 40/15 seconds), irregular trot or canter rhythm, or repeated changes of speed in trot or canter;
- Gait too slow (frequency of trot steps less than 35/15 seconds) or a passagelike trot (the horse holds each step for a second in the air);
- Hind limbs not following the forelimbs' tracks but deviating left or right, or traveling on three tracks in the trot or canter (when the rider is attempting to ride straight or on the bend of a circle);
- Repeated leg changes at the canter, such as striking off on the wrong leg, changing a leg in front and/or behind, or becoming disunited;
- Spontaneous gait changes (e.g., breaks from canter to trot or trot to canter)
- Stumbling, tripping, or toe-dragging repeatedly;
- Sudden change of direction against the rider's direction or while spooking
- Reluctance to move forward (must be kicked or given verbal encouragement) or stopping spontaneously;

- Rearing; and
- Bucking or kicking out.

"It is important to recognize that some lame horses score below 8, such as stoic horses or those with low-grade lameness, and that some horses behave normally in easy work, but only show signs of pain when performing more biomechanically demanding movements," Dyson says. "Different horses display different behaviors, so the 24-behavior ethogram cannot be simplified. Some horses may appear comfortable in trot and score fewer than eight but are very uncomfortable in canter with scores greater than eight."

She says most nonlame horses score only two behaviors, with the most common ones being opening of the mouth and holding the front of the head behind the vertical. The most common score for lame horses is nine, but some show up to 16 behaviors.

"We know that these behaviors are a reflection of pain because when pain-causing lameness is removed by nerve blocks (anesthetic), there is a substantial reduction in the behavior score," Dyson says.

Although nontrained assessors can differentiate between lame and nonlame horses using the ridden horse ethogram alone, assessor training improves the application's accuracy, says Dyson.

From her experience, she says, "The following are also important observations that I have observed reduce or disappear when pain-causing lameness is removed":

- Teeth-grinding;
- Constantly chomping on the bit;
- Sweating disproportionate to the work done and the environmental temperature;
- Increased respiratory rate disproportionate to the work done and the environmental temperature;
- Increased respiratory noises during work the horse finds more difficult;
- Grunting;
- Increased blink rate; and

- Abnormal behavior when being tacked up or mounted.

Obel Laminitis Scale

Veterinarians can score laminitis pain subjectively when horses are walking or trotting in a straight line. They call this scale the Obel Grading System:

- Grade 1, weight shifts from one foot to the other; no lameness at walk; shortened stride at trot.
- Grade 2, moves willingly at walk and trot but stride is noticeably shortened and lame; willing to lift a foot off the ground with no difficulty.
- Grade 3, lameness is obvious at walk and trot; reluctant to move; and resists attempts to lift a foot.
- Grade 4, marked reluctance or refusal to move; difficulty bearing weight at rest, so it is nearly impossible to lift a foot.

Researchers have found that the HGS correlates well with the Obel laminitis scale and, therefore, veterinarians can assess laminitic horses' pain without forcing them to walk or trot.

Composite Measure Pain Scale

A composite measure pain scale combines multiple simple scales, each of which describes specific behaviors and/or physiological parameters. Composite pain scales differ depending on the horse's condition. For example, horses undergoing colic surgery are evaluated for eight behaviors and one physical parameter, such as leg lifting for lameness. For orthopedic procedures the scale measures weight-bearing ability and behaviors such as tooth-grinding, lip-curling, pawing, and sweating.

The equine pain scale is a composite pain detection method that evaluates behavioral parameters such as gross pain behavior, activity level, position in the stall, posture and demeanor, weight-bearing, head position, head movement, attention toward the painful area, interactive behavior, expressions of pain, and appetite.

Veterinarians can use these pain scales in addition to measuring facial expressions and attitude.

“Behavior-based assessments of pain are appropriate when applied by trained veterinarians in order to assess the location and the intensity of pain,” Dalla Costa notes.

Take-Home Message

Learning to read a horse’s facial expressions and postures at rest or under saddle can help you become more sensitive to problems that arise. Horses speak volumes through their bodies and behaviors … we just need to recognize what they’re saying. Noticing an issue early allows you to seek prompt veterinary attention and appropriate therapeutic measures to mitigate a horse’s discomfort and prevent secondary problems from developing.

“Appropriate treatment is also likely to enhance performance and promote the development of a ‘happy athlete,’” says Dyson. “We have a duty of care for the horses we ride and a moral obligation to improve equine welfare by limiting pain and suffering.”