Equine Back Injuries

by: Leo Jeffcott, BVetMed, PhD, FRCVS, DVSc, MA, DSc

Equine back problems are common, particularly in performance horses. The conditions involved can be primary or can result from lameness, ill-fitting tack, or even inadequate schooling. It is noteworthy that the most common reason for presentation of a back problem is poor performance rather than pain. Despite the availability of sophisticated clinical aids, definitive diagnosis of a back injury often can be made only by elimination of all other conditions.

Assessment of Back Pain

Quantifying the degree and precise site of pain in animals always has been difficult. This is complicated further because the major clinical sign in many horses with a back problem is impaired performance rather than pain. On the other hand, many horses appear to perform satisfactorily despite some low-grade back pain. To add to this confusion, some horses are naturally sensitive and resent being palpated along the back, which might be wrongly interpreted as a sign of pain.

Sarah Libbey Greenhalgh

The horse's spine is, by design, relatively inflexible. This differs from a number of other species and makes direct comparison among species impossible. Successful diagnosis of equine back problems relies on careful and systematic investigation at rest, during exercise, and after exercise

Cold Back

This term describes hypersensitivity over the back with a transient stiffness and dipping of the spine as the rider mounts. There usually are no other clinical signs, although in severe cases, the horse might buck or rear at first. This initial stiffness wears off within a few minutes and causes no effect on performance. Whether this condition actually is associated with back pain or merely a matter of temperament is not clear.

Many of the difficulties in diagnosing back problems would be solved if some meaningful criteria could be established for assessing and quantifying back pain. The back has a system of nerve endings that are particularly sensitive to tissue dysfunction. They are referred to as "nociceptive receptors" and are represented in the back by arrangements of unmyelinated nerve fibres. In normal circumstances, this receptor system is relatively inactive, but it is stimulated by mechanical or other damaging forces applied to the tissues containing the nerve endings. Primary back pain results, therefore, from trauma or irritation of these nerve endings.

Other important factors when diagnosing back problems in the horse include the wide variation in pain threshold levels and inidividual temperaments.

A thorough knowledge of the functional anatomy of the spine is vital. It is important to remember that the horse keeps its back almost rigid, acting as a bridge between the fore and hind quarters. It then transmits power or impulsion from the hind quarters to increase stride length and performance. The equine spine can be likened to a "string and bow" arrangement, where the "bow" is the rigid vertebral column and the "string" incorporates the muscles and ligaments supporting the spine.

Specific spinal malformations tend to predispose to injury through the inherent weakness of the back or "bow." These conditions place extra strain on the "string," which can lead to recurrent soft tissue injuries. Most horses do not have this type of gross deformity, but conformational defects are common. Horses which are short-backed with restricted flexibility of the spine tend to exhibit more vertebral lesions than longer backed animals, which are more prone to muscular or ligamentous strain.

There also seems to be an association between type of back injury and purpose for which the horse is used. Acute sacroiliac strain is more prevalent in horses jumping at speed, whereas overriding of the dorsal spinous processes ("kissing spines") is most common in show jumpers.

It should be possible to facilitate diagnosis of spinal disorders by carrying out a thorough clinical examination and utilizing modern diagnostic aids.

Another important consideration is the seat of the injury itself. Bone damage tends to be centered around the mid-point of the back, whereas soft tissue injuries are more common in the proximal and distal parts of the thoracolumbar spine.

Importance of Clinical History

The value of obtaining a thorough clinical history cannot be underestimated. Details concerning information on management, tack, and performance are essential. There seems to be a correlation between nervous or temperamental animals and the incidence of back trouble. A consistent feature of long-standing back problems is some alteration in behavior or temperament. This might be gradual in onset, and it could be some time before the change can be fully appreciated.

It is common for owners to blame poor competitive ability on a back condition when it is simply due to problems of schooling or riding. The most consistent feature of back problems is loss of performance, particularly in the ability to jump. Horses with severe back pain might have difficulty in straddling to urinate or defecate, or there might be a reluctance to lie down in the box or roll. There also might be some resentment to putting on a rug or blanket, grooming over the loins and quarters, or having the hind limbs picked up.

Some cases show resentment to weight-bearing, with a tendency to collapse behind when ridden. Saddling up might become a problem, particularly when the girth is tightened. Reluctance to move backward also might be noted.

Signs at exercise could include hind limb lameness, a loss of enthusiasm for work, an inability to stride out at fast paces, some stiffness in hindlimb action, and a loss of suppleness of the back when ridden, although the action when loose in the paddock appears satisfactory. There might be a disinclination to jump or the horse might lose fluidity and timing during jumping and become tense, tending to rush over fences. Head-shaking and an increased tendency to tail swishing are other occasional features of back problems.

Examination at Rest

Clinical signs exhibited by a horse with a back problem are varied, subtle, and inconsistent among individuals. Therefore, a full clinical investigation should incorporate the following:

- Visual inspection.
- Palpation of the thoracolumbar spine.
- Manipulation of the thoracolumbar spine.

Examination at Exercise

In Hand
The animal is walked and trotted in a straight line to detect any obvious gait abnormalities. Many horses with chronic back trouble show restricted hind limb action and a tendency to drag the toes of one or both hind limbs. If there is moderate to severe pain, a wide-straddling hind limb gait usually is seen. However, in horses with a low-grade problem, the action behind will be very close. The horse then is turned tightly in both directions with the intention of making it flex the spine laterally. If back pain is present and there is loss of suppleness, turning often results in rather jerky movements and spasm of the back muscles. On backing, there sometimes is an initial reluctance to move, then the head is raised, the back arched more then usual, and some spasm of the back muscles occurs. Another sign of discomfort is the dragging of the forelimb toes on moving backward.

Lunging Exercise
A session of 10 to 15 minutes lunging provides an opportunity to see any improvement or deterioration in action as the horse warms up. Horses with restricted hindlimb gait often show poor tracking of the hind feet and a tendency to drag the hind toes. Head carriage might be elevated and the animal looks uncomfortable. Poor action usually is best indicated at the trot and some horses with back pain will lunge only at a collected canter. Some difficulty is seen when changing pace, along with an inability to lead on the correct leg. Swishing of the tail is not always indicative of back pain.

Ridden or Driven Exercise
It is useful to see the horse saddled up and to note if there is any pain or resentment to tightening the girth or when mounting.

After the horse has had time to cool down, it should be exercised again to see if there is any change in action. This is particularly useful in horses which are tying-up, as they show increased stiffness of the hock and hindquarters.

Clinical Aids To Diagnosis

Current imaging techniques include the following:

- Radiographic examination.
- Nuclear imaging (scintigraphy).
- Ultrasonographic examination.
- Thermographic examination.

Radiographic Examination
Radiography is particularly valuable if adequate facilities are available. Radiographic findings can be difficult to interpret, and many horses exhibit radiographic abnormalities without suffering from a back complaint.

Nuclear Imaging *(scintigraphy)*
This technique involves intravenous injection of radioactive material and detection of "hot spots" by use of a gamma camera. It is helpful in detecting over-riding spines, vertebrae fractures, osteoarthritis, spondylosis, some sacroiliac problems, and stress fractures. It is particularly valuable in identifying bony lesions at sites not accessible to conventional radiography.

Ultrasonography
This technique utilizes ultrasound transducers and requires a good knowledge of gross anatomy of the region for satisfactory interpretation. It is possible to detect ultrasonographic changes by surface contact in the supraspinous and dorsal sacroiliac ligaments. Transrectal scanning allows investigation of the lumbosacral intervertebral disc, intertransverse articulations between the lumbar transverse processes, and the ventral aspect of the sacroiliac joint.

Thermography
Sophisticated thermography equipment can be used to monitor thermal changes in the back region of horses. However, the temperature increase is related only to the skin and might not reflect deeper muscle or bone injury. This technique might have an important role in establishing sites of excessive heat load after strenuous exercise.

Clinical Pathology
Hematological and biochemical profiles always should be obtained to identify or eliminate other causes of poor performance (i.e., anemia or parasitic disease). The determination of the muscle-derived enzyme concentrations, in association with a standard exercise test, can help diagnose cases of tying-up.

Slap Test
For horses which show signs suggestive of mild hind limb incoordination, the possibility of low-grade cervical cord compression should be considered. Cervical radiography is helpful in some cases, but a more practical method for assessing this is by evaluation of the laryngeal adductory reflex or "slap test."

Local Anesthesia
This technique can be used when crowding or overriding of the summits of the dorsal spinous processes ("kissing spines") is suspected. It involves assessment of the animal's performance before and after injection of local anesthetic into the interspinous spaces of the mid-back or distal back.

Non-Steroidal Anti-inflammatory Drugs (NSAIDs)
A useful and simple test in longer standing cases is to administer a short course (two to three days) of NSAIDs. This often will assist with differentiation of soft tissue and bony injuries. If chronic skeletal bone damage exists, then some temporary improvement in clinical signs usually will occur.

Differential Diagnosis

Table 2 provides a list of conditions that might be confused with genuine back injury. It is common for owners to blame poor competitive ability on a back problem when its cause lies elsewhere. Hind limb lameness probably is the most common differential diagnosis, but it should be remembered that both fore and hind limb lameness can result in secondary back soreness and stiffness.

Specific Conditions

Malalignment or Displacement of Lumbar Dorsal Spinous Processes
This condition is reputed to be a common cause of back trouble in horses that results in chronic poor performance. Horses are said to have one or more vertebrae "put out," and it is claimed that they can be "put back" into their correct position by a manipulative technique that involves application of sharp pressure. From an anatomical point of view, this claim is unacceptable because significant movement of individual vertebrae--either naturally or by manual manipulation--does not occur.

It is more likely that this "malalignment" results from some increased tone or spasm caused by local muscle injury. This situation would lead to abnormal stress on the thoracolumbar spine and thus affect performance.

Deformity of the Vertebral Column
Malformations of the thoracolumbar spine are uncommon and, when they do occur, they usually result in secondary rather than primary back problems. In newborn foals, curvature of the spine is sometimes seen in association with other postural deformities (i.e., limb contractures).

The condition of "roach back" is seen most frequently during the period of active growth after weaning, although the underlying cause does not appear to be in the vertebral column. It might be associated with a progressive straightening of the hind limb conformation during a growth spurt or, perhaps, be secondary to a stifle or hock problem.

All these vertebral deformities predispose to some weakness of the thoracolumbar spine leading to poor performance and soft tissue injuries. Diagnosis can be confirmed by radiography revealing abnormal curvature of the vertebral column.

Muscle Strain
Muscle damage is undoubtedly the most common cause of back injury in the horse. This involves mainly the muscles that extend the back and flex the spine. Their primary role is to control the stiffness of the back. Strain or injury of these muscles occurs most frequently because of a slip, fall, or poorly executed jump. It might be caused through fatigue or inadequate fitness. Clinical signs are an acute onset of poor performance often accompanied by a change of temperament; sometimes with local swelling and heat. The back is kept rigid and there is a restriction in the hind limb gait, often with a wider than normal placement of the hind feet. Stiffness of the hind limbs and back is seen but no clear signs of lameness are evident. There is obvious pain on palpation and a marked reduction in flexibility. In the acute stages, some elevation in the plasma levels of the muscle-derived enzymes will be noted after mild exercise.

Classical signs of tying-up are differentiated easily from muscle strain. However, the atypical, low-grade form of this condition is more difficult to diagnose as it can occur after varying amounts of exercise. It is seen more commonly in animals on a high-protein diet and in highly strung fillies or mares in excellent body condition. Diagnosis usually can be confirmed by marked elevation of muscle-derived enzymes after exercise.

Ligamentous Damage
Another fairly common site of injury, particularly in Thoroughbreds, is the supraspinous ligament that runs down the middle of the back. This structure is subject to strain in the same way as muscles. The clinical signs are similar, but tend to persist for longer and the ultimate prognosis is less favorable. There often is visible thickening of the ligament and pain is easily elicited on palpation. Reduced lateral flexion of the thoracolumbar spine is seen in one or both directions. By taking low-exposure radiographs, one can see the soft tissue thickening and some focal radiodensity in the ligament in long-standing cases. On occasion, detached flakes from the vertebrae are seen.

Diagnosis can be assisted by ultrasonographic examination. In general, the prognosis is guarded, largely because of the likelihood of recurrence. Some animals do recover, but go on to develop signs of a cold back, which is defined as temporary stiffness and a dipped back, without affecting their competitive performance.

Other Soft Tissue Lesions
These include, for example, skin lesions (i.e., wounds or scars) that might cause secondary signs of back pain. Pressure or chaffing from an ill-fitting saddle, particularly in endurance competitions, also can be important.

Fractures of the Thoracolumbar Spine
This condition is diagnosed readily from the history and clinical signs and confirmed by radiography. It is seen most often in young animals (18 months to three years) and there invariably is a history of some traumatic incident, such as rearing up and falling over backward

Clinically, there are local pain, heat, and swelling with stiffness of the back and affected forelimb action. Fracture repair often is slow, but clinical recovery usually is completed within four to six months. A depression on the withers usually remains, with some chronic thickening, but with no permanent effect on performance.

Over-Riding Dorsal Spinous Processes (kissing spines)
It has been known for many years that this condition can cause back problems. However, it is sometimes seen in horses with no signs of poor performance. This makes diagnosis particularly difficult and careful clinical evaluation, as well as radiography, is essential

Horses with the condition usually have a long-standing history of impaired performance, many having already received a number of empirical forms of therapy (i.e., chiropractic manipulation or osteopathy). The condition occurs most often in young Thoroughbreds or crossbreds with short backs which are used principally for jumping and eventing. Onset of signs is often insidious, although a history of trauma from a fall sometimes is reported. There is increasing stiffness of the back, reduced jumping ability, and a disinclination to work. Change of temperament or resentment to grooming or shoeing the hind feet also might be noted. In severe cases, there can be a reluctance to lie down and to roll. Pain usually is mild, and in long-standing cases, it might not be clearly evident on palpation. The horse usually resents "dipping" or hollowing of the back. A degree of muscle wastage appears in severe cases.

Local anesthesia of the interspinous spaces results in marked improvement of performance and elimination of the back pain in some horses, whereas this technique does not appear as effective in horses with ligament or muscle injuries.

The most common site of the condition is the mid-back, where the maximum weight of the rider is exerted and the interspinous spaces are narrowest. This might explain why it is more common in Thoroughbreds, which tend to have narrow interspinous spaces. The underlying cause of the condition appears to involve the conformation of the vertebral column, and the clinical signs are related to the type of work performed. Animals at rest or very light work will not show overt back pain, whereas those used for

jumping, for example, will be prone to back pain if the impinging spines are jarred. Most cases should, therefore, respond to periods of rest, although recurrence of the clinical signs is common.

Fractures of the Lumbar Spine
Such fractures are relatively common in young foals and result in sudden onset of tail-end paralysis. Diagnosis can be confirmed radiographically and the prognosis is grave. This type of injury often results from the horse falling on its tail region. Difficulties in urinating and defecating are common and, in these cases, the prognosis is poor. Fracture of the coccygeal vertebrae might result in kinking of the tail or flaccidity without perineal paralysis.

Hunters' Bumps
The so-called hunters' or jumpers' bumps are bony prominences, often seen on the top of the quarters.

These prominences occur as the result of muscle wastage. There might be a pathological cause for the wastage such as ligamentous strain. However, in many large-framed horses, it might occur as a result of age or after periods of inactivity.

Acute Sacroiliac Damage
Severe injury to the sacroiliac ligament, caused by slipping or twisting, results in moderate to severe hind limb lameness. Pain often is marked and apparently is caused by inflammation resulting from instability of the joint and reflex muscular spasm. This continues until the damaged ligament has healed. The hindquarters might be asymmetric and the diagnosis can be confirmed by nuclear imaging.

Chronic Sacroiliac Damage
Horses with chronic sacroiliac damage usually exhibit signs of poor performance, intermittent lameness, or a back problem (Table 3).

Initially, they might have had a history of severe pain in the pelvic or sacroiliac region associated with marked hindlimb lameness. A fall or similar incident often is reported, although signs are not always recognized for some time afterward. The animal's performance is affected, particularly at slower paces or during dressage. An intermittent, sometimes shifting hindlimb lameness is noted along with stiffness and rigidity of the spine. The condition is more common in large-framed horses with long backs and weak-looking quarters.

Most cases show some degree of asymmetry of the hindquarters due to a malalignment or apparent tilting of the pelvis. The clinical finding of pelvic asymmetry does not necessarily indicate sacroiliac damage, but has been correlated to lowered performance in Standardbred trotters in Sweden.

At exercise, there often is some stiffness in the back with dragging of one or both toes and a tendency to "plait" (the foot of the affected limb swings inward in the forward phase of the stride and is placed almost in front of the opposite hindfoot). Mild hind limb lameness often is seen and is most noticeable at the slow trot. Some cases look uneven from behind, and a slight dropping of the affected quarter sometimes is noted. When ridden, horses show stiffness of the hind limb action with an apparent lack of impulsion from the quarters. In many longstanding cases, jumping is not seriously impaired and continued exercise does not seem to exacerbate the clinical signs. Many of these animals respond temporarily to non-steroidal anti-inflammatory drugs such as phenylbutazone.

It is interesting that the clinical picture, once recognized, is not usually progressive. Treatment is difficult and usually is aimed at building up the muscles of the quarters and back. Improvement in muscular tone and fitness tends to counteract the clinical signs of poor hind limb impulsion. In mild cases, this type of management has been successful. However, the horse must be kept fit. If allowed to rest, it will lose muscle tone and return to the original state.

Therapy and Management of Spinal Problems

The list of treatments for thoracolumbar disorders in horses is extensive. Many of these methods are used in combination, either at the same time or concurrently (i.e, rest, medical treatment, and some form of physiotherapy). Few lines of therapy have been assessed objectively for efficacy, and there is no doubt that some of the methods listed are used as placebos. This lack of precise data results in some therapies becoming "fashionable." A few years ago, the trend was to request surgery for back problems; then swimming became very popular, followed by manipulative therapy. It seems that the trend for the future might be natural medicine (i.e., acupuncture and laser techniques). Many of these types of treatment are performed by non-veterinarians; some are qualified physiotherapists, but a considerable proportion are not.

Rest
Historically, many of the early veterinary practitioners and farriers advocated rest as the most effective remedy for back troubles. For most types of thoracolumbar complaint, this still often proves to be all that is needed. In some animals, the addition of some form of physiotherapy might be beneficial, and in others the periodic use of anti-inflammatory medication is helpful. However, assessment of any therapy for back injuries is difficult because of the tendency for spontaneous recovery to occur.

For horses with muscle and/or ligament damage, rest in a loose box is recommended until the signs of acute pain have subsided. After this, the animal can be turned out in a small paddock or yard for a period ranging from one to 12 months, depending on the site and extent of the injury. Often no other specific therapy is necessary, but return to exercise always should be gradual. The application of heat, by way of an infra-red lamp, sometimes is reported to be of benefit in the acute stages of muscle strain or for other soft tissue injury to the back.

Management
The general management of a horse with a potential back problem is very important. Many horses which are prone to back problems have a temperamental or psychological component to the clinical picture, particularly those with a "cold back." The use of a sheepskin numnah frequently is found to be helpful; another practice is to give the animal a short period of lunging after it has been tacked up and before it is mounted.

A change of stable routine and the type of work often seems to be beneficial. This can involve re-schooling or changing the type of exercise for a period in an attempt to renew enthusiasm for work (i.e., taking the animal hunting or using swimming). Changing the saddle often alleviates low-grade back troubles. Many riders use a far heavier saddle than is necessary.

Once it has been decided to put the horse back into work, a graduated program of exercise always is advisable. This should start with ground work and lunging to build up the back muscles and improve the animal's suppleness. In this regard, the use of a chambon to lower the head and neck during lunging can be helpful. Also, massage or gentle "strapping" of the back muscles after exercise is a useful procedure in horses convalescing from a thoracolumbar disorder.

Medical Treatment
In horses with acute or severe back pain (i.e., fractured spinous processes of the withers), pain-killing medication is indicated for the first few days. This might be followed by non-steroidal anti-inflammatory drugs such as phenylbutazone, flunixin meglamine, naproxin, or meclofenamic acid, which can be given while the horse is really uncomfortable. After that, the animal should be rested and further NSAIDs given only in association with a return to work as prescribed by your veterinarian. In acute cases, a

three- to four-day course of muscle relaxants, such as dantrolene and methocarbamol, might be useful to relieve muscle spasm. Long-term therapy with any of these drugs is contra-indicated.

Local injection of long-acting steroids into the interspinous spaces in cases of kissing spines has been used quite successfully.

Physiotherapy
The application of heat by various means has been used for acute back injuries for many years, although whether it has any real advantage over rest and medication is equivocal. Good results have been reported for various methods of physiotherapy, such as faradic stimulation of muscles, shortwave diathermy, and ultrasonic therapy. Deep massage by cyclotherapy also has been used, particularly in the United States, and more recently, swimming has been advocated. Poorly fitting saddles, while not often being the primary cause of back problems, can exacerbate an underlying condition and will prevent effective recovery, particularly from soft tissue injuries. Replacement of the saddle is important and advice should be sought from an expert saddler. No controlled trials on the benefits of physiotherapy, compared with rest or no treatment at all, have been made. Faradism, cyclotherapy, and swimming appear to be valuable aids to recovery from basic problems once the acute signs and pain have subsided. Recently other techniques such as pulsed high-frequency electromagnetic energy and magnetic field therapy have been used for soft tissue injuries, although it is too early to judge their efficacy.

A gradually increasing program of exercise following a back injury always is advised. Initially, lunging in a sand ring will start to build up the back and quarter muscles and improve spinal flexibility. This can be coupled with a course of physiotherapy.

Manipulative Therapy
This includes chiropractic and osteopathy, which now are performed routinely throughout the world. It is reported to give an immediate but transient relief to horses with back injuries. However, no critical or controlled trials of its efficacy, nor the exact mode of its action, has yet been published. The technique is performed either in the standing animal or under general anesthesia. The aim is to invoke muscle relaxation by pummelling and local pressure to the back or attempting to hyperflex and extend the spine. It is possible that the sharp pressure applied to the affected area creates a reflex contraction in the back muscle of the contralateral side. This would produce transient muscle tension thereby eliminating the previous postural imbalance. Both sides would momentarily have equal muscle tone again and so be able to relax, improving the horse's performance instantly. This is only a tentative theory, and the whole matter needs further investigation before it can be recommended. Manipulation does not address the underlying pathogenesis of the thoracolumbar condition, which might be why recurrence of signs is common after manipulative treatment.

Natural Medicine
Natural or "fringe" medicine is becoming increasingly popular for horses with back problems. Acupuncture has been investigated quite extensively and good responses reported, although correct diagnosis and proper judgement of treatment application are essential for effective acupuncture therapy. More recently, the use of lasers is being introduced to produce the same sort of beneficial analgesic effect.

One other line of treatment, which appears to have no veterinary basis at all, is that referred to as radionics or the so-called "black box." This technique involves sending a hair from the mane of the horse to the operator of the black box. The hair is placed in the box, then it is claimed that an exact diagnosis of the animal's condition can be made and the horse can be treated at the same time. It is hard to envisage how this technique can have any medical or scientific foundation, although there are a number of proponents who claim beneficial results.

Surgery
Surgical resection of part of the summits of the dorsal spinous processes in the thoracolumbar spine was first described for crowding and overriding to relieve pain and thereby eliminate the associated lameness. The technique originally was performed on nine cases with apparently encouraging results. Since then, a number of modifications to this method have been described. However, with the improved understanding of the pathogenesis of the condition, conservative therapy is now being more widely used.

Conclusions

Back problems clearly are an occupational hazard in both racing and performance horses. The conditions that might result often are difficult to diagnose accurately, but it is worth remembering these facts:

- Some horses can perform badly without suffering from a back problem.
- Some horses can perform adequately despite having a back problem.
- Spontaneous recovery from many types of back problem is quite common.

Finally, the simple recourse to a period of rest followed by a graduated program of exercise is all that is required in many cases. This often can be supplemented by various techniques of physiotherapy. Surgery is limited to a few selected cases where the diagnosis is confirmed by radiological examination and local anesthesia of interspinous spaces.