

# HISTORICAL PERSPECTIVE AND CLINICAL INDICATIONS

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In human medicine, back pain is probably the most common reason for sickness or absence from work. It undoubtedly causes the patient, diagnostician, and therapist considerable difficulties with its management. The problem may not be so prevalent in the horse, but it is certainly as controversial. Much of this controversy results from a general lack of basic knowledge on the functional anatomy of the equine thoracolumbar spine and the dearth of specific pathological information or scientific studies on pathogenesis. There are many different means of therapy available for bad backs in horses today, and such a choice usually means that efficacy is far from complete or satisfactory. I believe that many horses can suffer back pain during exercise or competition and that spontaneous recovery is relatively common. In other words, many cases of back pain recover in spite of various types of therapy and not because of them.

This whole problem is exacerbated because definitive diagnosis of many back problems is notoriously difficult and always requires a thorough systematic examination.<sup>2-8</sup> Despite attention to detail and the application of sophisticated clinical aids, definitive diagnosis is often made by elimination of all other conditions. The purpose of this article is to provide an overview of back problems in horses and to give some insight into the problems that are explained in greater detail in the ensuing articles of this issue.

## HISTORICAL PERSPECTIVE

Back problems in horses are certainly not new to the veterinary and farriery literature. In 1876, Lupton<sup>10</sup> remarked that back injuries "are among the most common and least understood of equine affections." This statement is largely true today, judging from the limited amount of information available on the etiology and pathogenesis of conditions affecting the horse's back. The only

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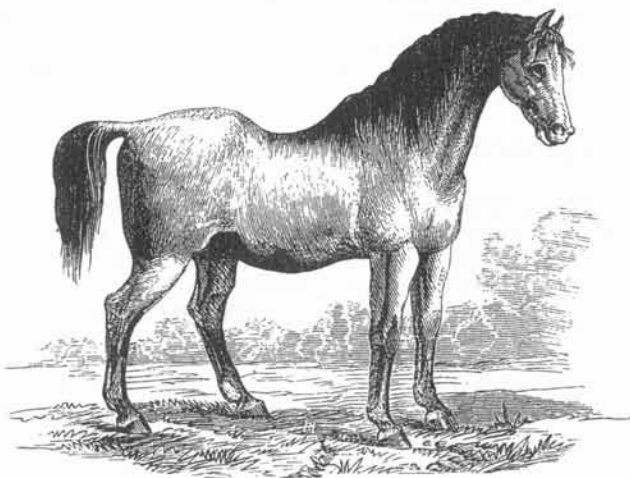
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published report on incidence from general practice<sup>1</sup> recorded a 0.9% incidence of back injuries in a series of 6588 horses presented with musculoskeletal damage. No breakdown of these cases into specific diagnoses was made, but a later review of 443 cases did categorize cases as far as was possible.<sup>7</sup>

Few firm facts, detailed descriptions, or pathological studies occur among the lengthy accounts of back disorders in the old farriery and veterinary textbooks. Diagnosis was based on clinical observation, and opinions were many and varied. These early writers were often excellent horsemen and were particularly knowledgeable on aspects of conformation. In relation to the incidence of spinal damage, Youatt<sup>17</sup> believed that the short-backed horse showed less tendency to back problems and could be expected to carry more weight. It also possessed greater endurance but did not have much potential for speed. The long-backed horse was built for speed but was much more prone to weakness when ridden. In well-conformed animals, he thought there should be a gentle ventral curve immediately behind the withers, followed by a straight line to the lumbar region. An increase in this curvature (lordosis, saddlebacked, sway-backed) would increase the tendency to weakness and strain (Fig. 1). Dorsal curvature (roach back), however, was considered to be a more severe defect, which seriously impaired usefulness and performance (Fig. 2).

One condition to which reference was almost invariably made was that of "strain of the back," also called "strained back-sinew," "sway'd back," or "strain of the loins."<sup>3, 4, 10, 13, 15-17</sup> This was apparently common in heavy draft horses and was usually caused by injury or overexertion. It reputedly involved "strain of the back muscles, injury to the spinal marrow and even discolouration of the pelvis."<sup>16</sup> In severe cases, there was marked lameness with back pain, and the animal was said to be "chinked." Fractures of the spine were referred to by some of these authors<sup>4, 12</sup> but did not seem to have been particularly common. A general stiffness of the back was attributed to ankylosis of the bones of the back, which was thought to be common in old and hard-worked horses.<sup>17</sup>



**Figure 1.** A hollow-backed horse. (From Lupton: Mayhew's Illustrated Horse Management. 1876.)



**Figure 2.** A roach-backed horse. (From Lupton: *Mayhew's Illustrated Horse Management*. 1876.)

Youatt<sup>17</sup> referred to this condition as "broken-backed" or "chinked in the chine," which was presumably what we now refer to as osteoarthritis.

A problem Lupton<sup>10</sup> referred to as "rick" or "chink" of the back was particularly common in draft and harness horses. One fairly dramatic clinical sign observed in some of these cases was that of so-called "kidney-dropping" (Fig. 3). The animal would suddenly squat on its haunches when coming to a halt. No obvious loss of skin sensation in the hind legs occurred. The animal would soon get up again on its own and be apparently sound until the signs recurred. The method of examination in horses with a rick or chinked back was by downwards palpation of the thoracic and lumbar dorsal spinous processes in order to locate an area of pain in the lower back region (Fig. 4). It was suggested that in addition to the vertebral damage, there was injury to the spinal cord. Consequently, clinical signs were prone to recur, and this condition carried a poor prognosis. Ricked back was not always diagnosed with such dramatic symptoms, and in some horses, clinical signs were confined to stiffness of the spine with an associated poor or difficult temperament.

Lupton<sup>10</sup> described a condition often encountered in riding horses, where there was considerable pain noted on mounting. This was followed by a tendency to violent kicking and rearing. He ascribed the damage to subluxation of the vertebrae of the back together with ligamentous strain. This was probably what we refer to now as a "cold back." Another reported cause of back trouble was that associated with damage to and aggravation of skin lesions (e.g., sitfasts, warbles) due to poorly fitting tack. Saddle galls were apparently considerably more frequent in ladies' horses,<sup>11</sup> presumably because of the custom of riding sidesaddle in those days.

The involvement of temperament or simply bad habits mimicking the clini-



**Figure 3.** A kidney dropper—creatures that are viciously disposed are generally aged and are devoted either to heavy draught or to harness purposes. (From Lupton: Mayhew's Illustrated Horse Management. 1876.)



**Figure 4.** A test for rick of the back. (From Lupton: Mayhew's Illustrated Horse Management. 1876.)

cal signs of back problems in some horses has been alluded to in some of the older texts, although no definite ideas on their pathogenesis or control were ever put forward.

## LIMITING FACTORS IN EVALUATION OF BACK PROBLEMS

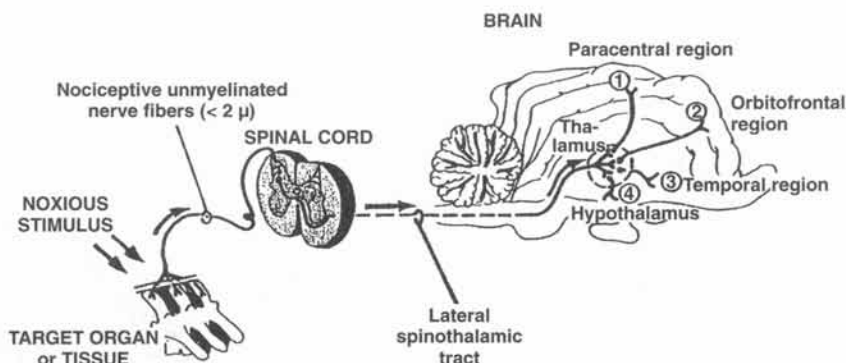
### Inability to Define Back Pain

Quantifying the degree of pain in animals and establishing the precise site of pain has always been difficult, and horses with back pain are no exception. The situation is further complicated, as the major clinical sign recognized in many horses with a back problem is impaired performance and not thoracolumbar pain. On the other hand, there must be many horses that apparently perform satisfactorily in spite of some low-grade back pain. To add to this confusion, some animals appear to be naturally sensitive or "thin-skinned" and resent being palpated along the back. The evasive response produced can be wrongly interpreted by both owners and clinicians as a sign of pain resulting from an underlying spinal lesion.

Another difficulty in the assessment of back pain involves the condition known as "cold back" in which there is apparent hypersensitivity over the back with a transient stiffness and dipping of the spine as the rider gets into the saddle. There are usually no other demonstrable clinical signs, although in severe cases, the animal may buck and rear when first ridden. In some instances, instead of dipping, the spine is roached and the back muscles are kept rigid, but the initial stiffness on being saddled or mounted wears off within a few minutes, and no effect on performance is noted thereafter. Whether this condition is actually painful, associated with some previous back pain, or merely a matter of temperament is not clear.

Many of the difficulties in clinical diagnosis of back problems would be solved if some meaningful criteria for the assessment of pain and an objective system of quantifying it could be established. In human medicine, back pain is considered to be as much a problem of pain as a problem of the back. The origin of primary back pain is irritation of the dorsal nerve roots and the branches of the spinal nerves. Like most tissues of the body, the back is equipped with a specific system of nerve endings that are particularly sensitive to tissue dysfunction (Fig. 5). They are referred to as "nociceptive receptors" and are represented in the back by plexiform and freely ending arrangements of unmyelinated nerve fibers. These are distributed throughout the skin and subcutaneous tissues, adipose tissues, fasciae and ligaments, periosteum, dura mater, adventitia of blood vessels, and fibrous capsules of interneural articulations and sacroiliac joints. In normal circumstances, this receptor system is relatively inactive, but it is activated when mechanical or other damaging forces are applied to the tissues containing the unmyelinated nerve endings. Primary back pain therefore results from trauma or from the irritation of these nociceptive receptor nerve endings. Various other pain syndromes are recognized in man, including secondary, referred, and psychosomatic backache, but their importance in the horse is unproven as yet.

Another important factor to be considered is the marked variation in response to pain. Even in man, a meaningful measurement of "pain threshold" is unrealistic, as patients can vary in the intensity of their experience of pain from day to day and even at different times during the day. The involvement of temperament as a contributory factor in the horse is believed to be important. It



**Figure 5.** Pain pathways associated with the thoracolumbar spine.

is suggested that the lowered performance is sometimes due to the animal attempting to "save its back" even though the clinical signs of pain have abated for some time. Some credence to this idea has been given by the induction of back pain in trotting horses. Pain was induced by multiple injections of concentrated lactic acid into the left longissimus dorsi muscle. The effect was local pain, stiffness, and a noticeable reduction in performance capacity as analyzed by high-speed cinematography of the horse trotting on a treadmill.<sup>9</sup>

### Lack of Specific Clinical Signs

It is worth remembering that the most common reason for presentation of a back problem is poor performance rather than overt back pain. It is therefore not surprising that the clinical signs involved are numerous, varied, and often not specifically related to a site in the thoracolumbar spine.

For these reasons, each potential back case should be viewed as a diagnostic challenge and should receive a holistic approach to both diagnosis and treatment. A definitive diagnosis is more often made by elimination of differential diagnoses rather than by identification of specific clinical signs.

### Difficulties of Palpating the Anatomical Structures Involved

Many of the lesions associated with back problems involve structures along the thoracolumbar spine that are difficult, if not impossible, to palpate effectively (e.g., vertebral bodies, articular and transverse processes). It is really only possible to palpate the extreme tips of the dorsal spinous processes, although this varies to some extent with body condition and the presence or absence of atrophy of the longissimus dorsi muscles. Locating the site of pain in the back muscles is often difficult, as the palpation procedure sets off spasms or contractions of the longissimus muscles. The thoracic and lumbar portions of this muscle run the length of the back from its origin on the caudal cervical spine to the insertion on the wing of ilium and sacral spines.

## Differences of Opinion

A serious stumbling block to progress in diagnosis and treatment of equine back problems is the wide range of opinions that exist. This is true not only within the veterinary profession but between veterinarians and physical therapists, horse owners, and trainers. The lack of authenticated reports and specific studies in this field make it impossible to set standards for definitive diagnosis and therefore clear guidelines for treatment.

Opinions also vary as to whether horses genuinely suffer from back problems at all or whether the signs exhibited are referable to damage elsewhere in the skeleton. In my experience, genuine back problems do occur but in a variety of forms. First, there are those horses with identifiable lesions in the thoracolumbar spine (i.e., primary back problems). A second important category is secondary back problems that occur as a result of the pressure or strain exerted from lesions in the appendicular or axial skeleton (i.e., particularly forelimb or hind limb lameness). Finally, there is a category of apparent or alleged back problems which, despite popular opinion, have limited anatomical or pathophysiological evidence to support their occurrence (Table 1). It is this group that forms the basis of much controversy between veterinarians, physical therapists, and horse owners. These difficulties are exacerbated by the fact that many horses suffer low-grade and chronic lesions. The major clinical sign is always a loss or reduction in performance whatever the underlying pathogenesis; other clinical signs may be more difficult to precisely define.

Malalignment or displacement of the caudal thoracic or lumbar dorsal spinal processes is reputed to be a common cause of back trouble in horses. One or more spinous summits are said to become laterally displaced (i.e., "put out"), and these can apparently be replaced by sharp pressure at the appropriate site (i.e., "put back"). From an anatomical point of view, this claim is not acceptable; these structures are not moveable either in life or at postmortem examination. The management of horses by manipulation (chiropractic/osteopathy) is dealt with elsewhere in this issue.

In spite of the tendency for intervertebral discs to degenerate with age in the thoracolumbar spine, they do not appear to cause any clinical signs similar to those seen so commonly in humans and dogs. Nerve "pinching" and peripheral nerve lesions are often claimed to be important causes of back problems, but, to date, there has been no scientific evidence to substantiate this belief.

## Spontaneous Recovery

Many of the problems causing poor performance in horses are of long-standing (i.e., many weeks or months) duration, and there is a tendency for

**Table 1.** CONDITIONS ALLEGED TO CAUSE BACK PROBLEMS IN HORSES FOR WHICH THERE IS CURRENTLY NO DEFINITIVE SCIENTIFIC EVIDENCE

General Category	Specific Problems
Vertebral subluxation	Subluxation of thoracic or lumbar vertebral bodies Malalignment of dorsal spinous processes in thoracic or lumbar region
Disc injuries	Intervertebral disc prolapse and herniation
Peripheral nerve injuries	Pinching of peripheral nerves to epaxial structures of the thoracolumbar spine



these horses to recover spontaneously. In a survey of cases followed up over 2 years, I reported a 65% recovery rate irrespective of the diagnosis and treatment or management regime.<sup>5</sup> The prevalence of spontaneous recovery can thus hamper elucidation of diagnosis and make evaluation of treatment regimes worthless.

## CLINICAL INDICATIONS OF BACK PROBLEMS

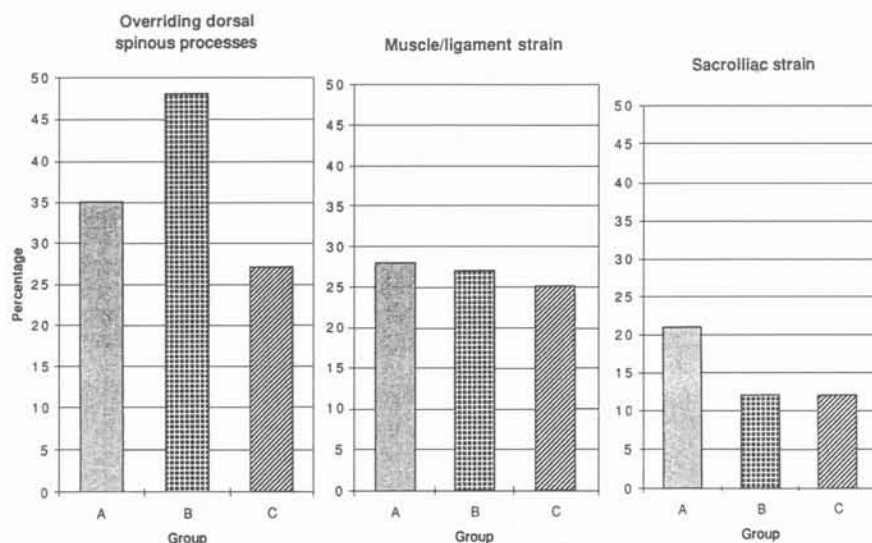
The specific pathogenesis of many back problems is unknown. Nevertheless, a thorough knowledge of functional anatomy of the spine is the basis of pathophysiology. It is important to remember that the horse keeps its back almost rigid to act as a bridge between the forequarters and hindquarters. It then transmits the power or impulsion from the hindquarters to enable increased stride length and performance. The equine spine has been likened to a "string and bow" arrangement, where the *bow* is the rigid vertebral column and the string, comprising all the muscles and ligaments supporting the spine, keeps it under constant tension.<sup>14</sup>

The conformation and type of horse as well as the use to which a horse is put can have an important bearing on the injury involved.<sup>5</sup> For example, specific spinal malformations (e.g., lordosis and scoliosis) tend to predispose to injury through the inherent weakness of the back or bow arrangement of the thoracolumbar spine. These conditions place extra strain on the string or epaxial muscles of the back, which can lead to recurrent soft tissue injuries. The majority of horses do not have this type of gross deformity, but conformational defects are common. Short-backed horses with restricted flexibility of the spine tend to exhibit more vertebral lesions than longer backed horses, which have relatively more suppleness and seem to be more prone to muscular or ligamentous strain. Large-framed animals with comparatively weak-looking hindquarters definitely appear to be more susceptible to sacroiliac problems.

There also seems to be an association between the type of back injury and the sort of work the horse is asked to perform. In a series of cases examined some years ago, I reported that the differences in incidence of specific back problems varied quite noticeably (Fig. 6) according to whether the horses involved jumped at speed (group A), jumped competitively (group B), or were not used for jumping at all (group C).<sup>6</sup> Acute sacroiliac strain or subluxation was more prevalent in horses jumping at speed, whereas overriding of the dorsal spinous processes ("kissing spines") was most common in showjumpers. The incidence of soft tissue damage was much the same in both of these groups, and age was not nearly as important a factor in equine back disorders as it is in humans. Spondylosis deformans appeared more frequently in mares, and overriding of the dorsal spinous processes was most often seen in short-backed Thoroughbred geldings.

Another feature that seems to have a bearing on pathophysiology is the seat of the injury itself. From examination of a large series of cases,<sup>6</sup> we can generalize that bone damage tends to be centered around the midpoint of the back, although soft tissue injuries are more often seen in the proximal and distal parts of the thoracolumbar spine (Fig. 7). This point can be helpful if no special imaging facilities are available to differentiate soft tissue from skeletal damage. For example, a common scenario in practice is acute onset of noticeable discomfort in the animal's back behind the saddle region (i.e., cranial lumbar spine). This would most likely be due to soft tissue damage and could be treated accordingly.

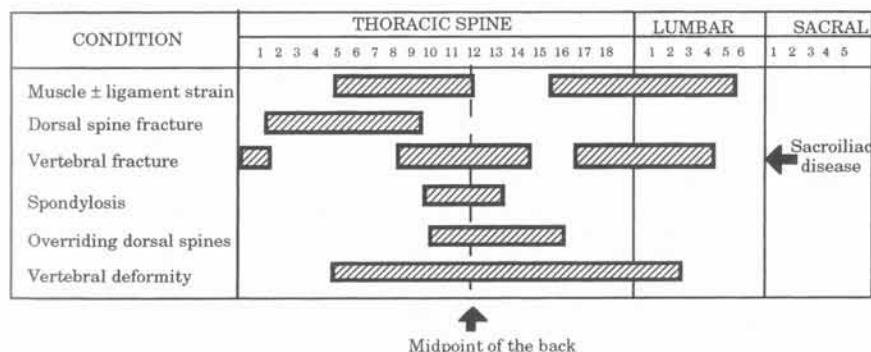




**Figure 6.** The comparative incidence of 3 common back problems according to the type of jumping performed in a series of 443 cases [Group A—jumped at speed ( $n = 157$ ); Group B—competitive jumping ( $n = 180$ ); Group C—non jumping ( $n = 106$ )].

## IMPORTANCE OF CLINICAL HISTORY

The value of obtaining a thorough clinical history cannot be underestimated, as the clinical signs of thoracolumbar disorders are many and varied. Details dating back to the time that the owner first acquired the horse are extremely helpful in deciding whether or not one is dealing with a genuine back problem. In this regard, queries concerning information on management, tack, and performance should be sought. There seems to be a correlation between nervous or temperamental animals and the incidence of back trouble. One consistent feature



**Figure 7.** Commonly diagnosed back problems in horses showing that most bone problems are centered around the midpoint of the spine.

of a long-standing back problem is some alteration in the animal's behavior or temperament. This may be insidious in onset, and it may be some time before the owner fully appreciates that the change has taken place (e.g., a normally good-natured animal becomes sour and rather fractious to handle and work).

It is common for owners to blame poor competitive ability on a condition in the thoracolumbar spine when, in fact, it is simply due to problems of schooling or equitation. It is now well recognized that the most consistent feature of a back problem is a loss of performance, particularly in the horse's ability to jump effectively. Acute soreness in the back muscles is often associated with falling or some other traumatic incident, but a history of obvious pain in the thoracolumbar spine is not always reported, particularly in long-standing cases. Horses with severe back pain may have difficulty in straddling to urinate or defecate, or there may be a reluctance to lie down in the box or to roll. There may also be some resentment to putting on a saddle blanket or to grooming over the loins and hindquarters. In some cases, an objection to having the hind limbs picked up is reported or the farrier may remark on the difficulty of shoeing the animal.

A history of resentment to any weight on the horse's back is sometimes reported with a tendency on the part of the horse to collapse behind when ridden. Saddling up may become a problem, particularly when the girth is actually tightened. The animal may buck when first mounted, although this is usually due to temperament rather than to back pain. A reluctance on the part of the horse to move backwards or to rein back when being ridden may also be noted by the owner.

The signs at exercise may be reported as unilateral or bilateral hind limb lameness, a loss of enthusiasm for work, or an inability to stride out at fast paces. The owner often mentions some stiffness in the hind limb action and a loss of suppleness of the back when the horse is ridden, although the horse's action when loose in the paddock appears to be satisfactory. There may well be a disinclination to jump, particularly the combination-type fences. Jumping with a fixed hollow back is frequently encountered. The horse may lose its fluidity and timing during jumping and become tense, tending to rush over the fences. Signs of head shaking and an increased tendency to tail swishing are other features occasionally encountered in horses with back problems.

## DIAGNOSIS OF BACK PROBLEMS

It should be clear from the discussion in this article that much still has to be learned about back problems in horses and the need to differentiate them into primary, secondary, and apparent categories. Despite the difficulties of establishing a definitive diagnosis, there is a long list of conditions that should be considered for all three categories of back problems in horses (Table 2). The reader should not be too discouraged, because this issue provides a comprehensive and up-to-date review of the anatomical aspects, means of diagnosis, and features of pathogenesis as well as suggestions for lines of therapy and management. When all the information is taken into account, it should be possible for veterinarians to establish clearer guidelines for diagnosis and more objective and less empirical recommendations for therapy. It is therefore encouraging to be able to end this introductory article on a positive note.

**Table 2.** CONDITIONS THAT NEED TO BE CONSIDERED WHEN A HORSE IS REFERRED AS HAVING A POTENTIAL BACK PROBLEM

Type of Back Problem	General Category	Specific Lesion/Problem
Primary back problem	Soft tissue injury	Longissimus muscle injury
		Supraspinous ligament damage
		Dorsal sacroiliac ligament damage
		Exertional rhabdomyolysis (tying-up)
	Vertebral damage	Nonspecific soft tissue injury
		Conformational abnormality
		Vertebral fracture
		Overriding dorsal spinous processes
		Osteoarthritis
		Spondylosis
		Acute sacroiliac injury
		Chronic sacroiliac disease
	Inflammatory and degenerative	Discospondylitis
	Miscellaneous	Neoplasia of spine (primary or secondary)
		Abnormal saddle pressure
Secondary back problem		No abnormalities detected
		Hind limb lameness (spavin)
		Forelimb lameness
		Neck problem
		Pelvic fracture
		Neurological problem (mild ataxia)
Alleged or apparent back problems		Neoplasia of spine (primary or secondary)
		Temperamental problem
		Lack of ability
		Lack of fitness
		Malalignment of lumbar vertebrae
		Vertebral disc injury/herniation
		Pinched nerves
		Tack problems

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