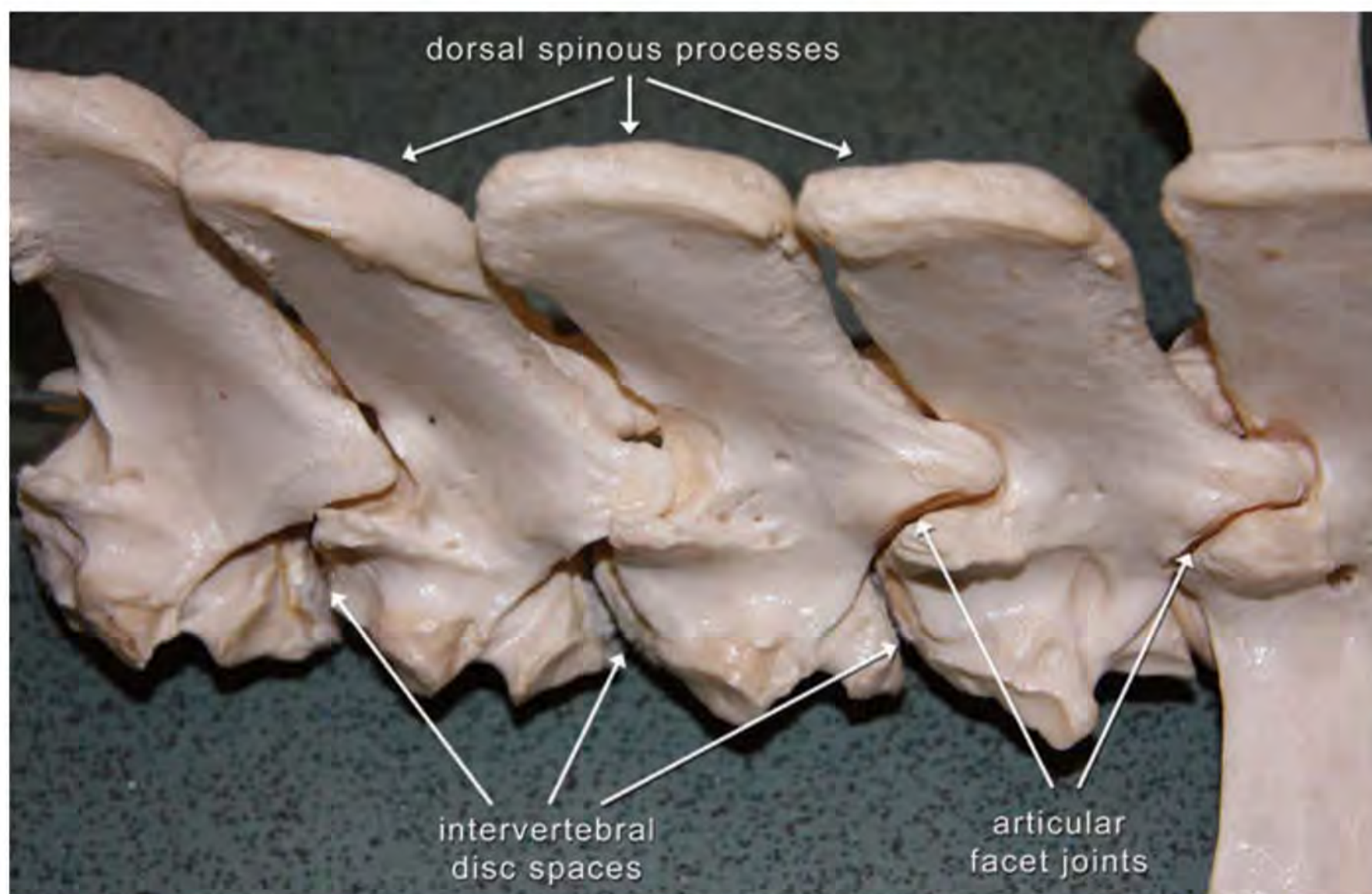


## VET FORUM: THE EXPERT VIEW

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# BACK ON TRACK

### Diagnosing and dealing with back pain and dysfunction in the racehorse



**Figure 1:** Photograph of a section of the thoracic spine clearly showing the secure snug fit of the vertebrae

**W**hile back pain is a common complaint in thoroughbred racehorses in training, it remains largely misunderstood by people outside the veterinary profession. As such it has been a soft target for many a charlatan and indeed a whole backyard industry has evolved around the supposed 'putting back in' of backs that are 'out of place'. A good starting point to begin to understand this misleading notion of 'out', is to take a look at the basic anatomy.

#### Anatomy of the thoracolumbar spine

The equine back is made up of 18 thoracic and six lumbar vertebrae connected to the sacrum in the pelvis. The vertebrae are linked dorsally (on top) by synovial joints (fluid filled joints with a fibrous capsule) where they

'click' firmly into each other, and ventrally (underneath) by fibrocartilaginous joints (intervertebral discs) between the vertebral bodies. Numerous ligaments and muscles firmly encase everything together securely.

In fact, the equine back is a surprisingly rigid and robust structure that has evolved to withstand enormous forces during high speed locomotion. The powerhouse epaxial muscle of the back is longissimus – a huge muscle spanning the entire length of the spine and largest in the lumbar region where it lies under the thoracolumbar fascia which is an expanse of white sheet-like tendon that serves as an energy-saving spring in high-speed gallop. Longissimus has fibre alignments in various orientations to accommodate running in different directions, and when acting together (left and right) stabilises and extends

the vertebral column, importantly providing a firm base for the limbs in the swing phase of gait.

#### Biomechanics of speed

Horses increase stride length and therefore speed via long limbs and a relatively rigid spine. It has been proven that at full speed the ground reaction forces experienced by the forelimbs are equivalent to 2.5 times body weight, so in a 500kg racehorse, that equates to well over a tonne of force transmitted to the base of the neck and cranial thoracic spine.

Assuming a 60:40 weight distribution between fore- and hind-limbs, it can be deduced that the hindlimbs experience around 1.67 times body weight, or roughly 800kg, at full speed which is transmitted to

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>> the pelvis and back with every single stride. With the average stride length being six to eight metres, there are roughly 25 strides per furlong and 150 strides in a mile race, which adds up to a monumental amount of repetitive force through the spine.

**Leg pulling**

Bearing these forces in mind, if the back really could be put ‘back in place’ by the average ‘back-man’ giving a leg a shove – given that the World’s Strongest Man, Brian Shaw, has a personal best on the log lift of just 200kg – would not one single stride in gallop (800kg through a hind limb) put it out again, let alone 150 strides in a mile race? The unglamorous truth is that backs don’t go out; what really happens is far less dramatic. And those long lever manipulations of the hindlimb favoured by the back-man sometimes bring about transient relaxation of muscle spasm which is mistaken for a result.

**Causes of back pain**

By far the vast majority of back pain seen in the thoroughbred racehorse is secondary to lameness as the epaxial muscles brace to compensate for an altered gait pattern. Primary causes can be from direct trauma, athletic demands, or underlying bony pathology. Direct trauma includes exercise saddles and other poor fitting tack, bad riders, and falls or collisions. Athletic demands can lead to strain of the epaxial muscles or other soft tissue structures. Vertebral and pelvic stress fractures are athletic repetitive strain injuries which also fit under the category of underlying bony pathology, along with impinging dorsal spinous processes (DSPs), or ‘kissing spines’.

**Soft-tissue injuries**

Direct trauma from racing saddles can lead to the formation of a haematoma or seroma. These are usually swollen and painful initially but tend to settle. Girth galls are the result of having the girth done up too tightly.

**Thoracolumbar vertebral stress injury**

These include articular facet joint disease (the little joints between individual vertebrae) and stress fracture of the vertebral bodies or lamina (the arch of the vertebra forming the roof of the spinal canal). Stress injuries of the spine are common. However, most go undetected, because of mild or ambiguous signs that do not interfere with training.

Stress fractures are often one-sided and involve several sites. Articular facet joint disease is an extremely common finding in racehorses. The identification of pathology of the articular facets does not always equal pain or clinical significance and should be interpreted in the context of a full diagnostic



**Figure 2a:** The clinical appearance of a racehorse with back pain due to overriding dorsal spinous processes (DSPs) in the thoracic spine. Note the marked atrophy (wastage) of the overlying epaxial musculature – a common sequela of chronic pain



**Figure 2b:** Radiograph of the same horse showing lysis (the moth-eaten appearance) of the affected DSPs

work-up. Once enlarged, the joints will continue to appear abnormal on ultrasound imaging long after they have ceased to be painful.

**DSP impingement**

This affects one or multiple sites in the saddle region. Rarely are they clinically active or result in disruption to training, but are occasionally associated with back pain. They are probably resultant from a combination of factors from conformation, to heritability and age. A large proportion of horses in training are thought to have overriding DSPs (60-90%) but do not have reported back pain.

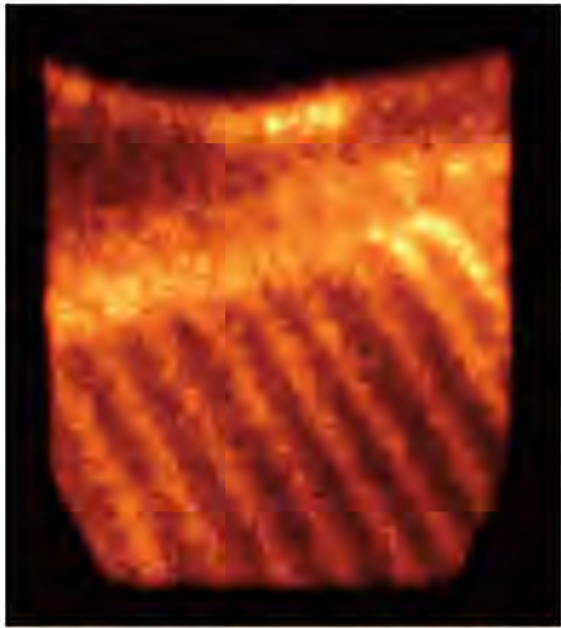
**Presentation**

Equine back pain is often associated with a history of reduced performance. Sometimes

cold-backed behaviour is described, although this can be learned behaviour – fear avoidance from a bad experience in the past.

A drop off in performance often manifests in a reluctance to exercise or try hard in races. The horse might hang, show poor hindlimb impulsion, or refuse to canter or jump off. A poor action may be displayed under tack with high head carriage and/or an uncoupled canter. A classic presentation of back pain in the racehorse is a restricted action in trot – head high, on three tracks, with a pronounced scoliosis, or plaiting, behind.

As a rule of thumb, the back usually does not cause lameness, but lameness will cause compensatory back pain. Only the most intensely painful primary pathology in the spine will cause mild hindlimb lameness on the same side. Where there is marked muscle >>



**Figure 2c: Bone scan of the same horse showing increased radiopharmaceutical uptake in the affected DSPs**

>> guarding of a region around a primary lesion, mild elevations in muscle enzymes (i.e. two to four times baseline levels) are sometimes present and must not be misinterpreted as exertional rhabdomyolysis (tying up). Pelvic stress fractures usually involve a history of lameness but can mimic back pain or rhabdomyolysis, especially if bilateral.

### Assessment

All assessment starts with observation and trot up. It is useful to see horses with suspected back pain turn in a tight circle and rein-back, noting any restriction or reluctance.

### Palpation

Palpation of the back must be undertaken with care to ensure repeatability of findings as response can be highly variable within and between individuals. Left and right sides are compared and care taken to ensure uniformity of pressure whilst watching and feeling for a reaction in the tissues.

### Diagnostic imaging

Nuclear scintigraphy is the gold standard. Radiography and ultrasonography are used as a follow up to scintigraphy to assess lesions of the back.

### Exercise saddles

These can vary greatly dependent on their tree (half or full), age and condition. High pressures capable of causing back pain have been proven in experiments underneath exercise saddles at canter and gallop. They can cause pain to sensitive bony prominences and epaxial muscles. Half-tree exercise saddles channel a lot of force into one small concentrated area – a problem sometimes made worse by the addition of risers or too many numnahs which only make the fit more

of a squeeze. Together with the pilots, these saddles have no doubt caused untold amounts of back pain. Saddles that slip consistently to one side can be the result of asymmetry of the back, crooked riders and/or poor saddle fit, however by far the most common cause is hindlimb lameness.

### Treatment

The vet should be the first point of contact for any discussion about treatment options for back pain. These will vary with the type of racing for which the horse is used, its value, drug clearance times before racing, and the willingness of the trainer/owner to address the primary problem.

Management of stress fractures of the back and pelvis involves a short period of rest (depending on the stability of the fracture) followed by controlled exercise for a few weeks to a few months. Ultrasound is useful to monitor healing of ilial wing fractures. Prognosis is generally good – they settle with rest.

DSP impingement rarely requires significant input but where necessary can be managed with corticosteroid injections around impinging DSPs or the overlying supraspinous ligament. Extracorporeal shockwave therapy is sometimes employed with generally favourable results.

### Physiotherapy

Physiotherapy is widely regarded in the industry as useful for the management of racehorses being trained in the face of minor injuries. It is maintenance work and physiotherapists working in racehorse training yards are typically kept busy treating secondary muscular back pain, stiffness of the neck and back, and muscle strain injuries.

They should liaise closely with the vet, and

are well placed to detect subtle changes in muscle tone and mass, symmetry and reflex movements, because physio cases are mostly selected by the trainer and include horses with poor performance or whom the work rider reports as having a bad back or being 'not right behind'.

### Physiotherapy treatment options

Treatment options available to the physiotherapist comprise manual therapy (joint mobilisations and soft tissue techniques), therapeutic exercise prescription, electrotherapy, advice regarding tack and other equipment, and rehabilitation.

Swimming is recognised as a useful adjunct to rehabilitation, although it needs to be applied cautiously depending on the complaint and the manner in which the individual horse swims. It is possible that stress can be created in areas of the spine as a consequence of the inverted posture adopted by horses in deep water. Equally, walking in deep water, as opposed to hoof level, increases flexion and extension in the thoracolumbar spine – the extension part of which could cause aggravation to a pre-existing back condition.

Physiotherapists cannot perform the miracles sometimes expected of them by trainers, nor can they manipulate vertebrae back into place that have supposedly gone out. They can, however, apply various manual techniques to mobilise the spine or treat soft tissue dysfunction, as well as provide sound advice on therapeutic exercise, or the judicious application of electrotherapeutic modalities. They have the potential to be very useful allies to veterinary surgeons in racing, particularly when it comes to tackling the problem of back pain.

## Chartered Physiotherapists Specialising in Veterinary Physiotherapy

The Association of Chartered Physiotherapists in Animal Therapy (ACPAT) in the UK represents fully qualified human physiotherapists who apply their skills and expertise to animals. They have completed an average of two years' postgraduate training and study to gain category 'A' status with ACPAT, which entitles them to treat animals with veterinary consent. Currently that training is provided by the University of Liverpool and the University of the West of England in the form of a PG Diploma or MSc in Veterinary Physiotherapy.

It is only the titles of physiotherapist (on its own), physical therapist and chartered physiotherapist that are protected by UK law. Much confusion exists as to the credentials of people calling themselves animal, equine or veterinary physiotherapists, because these titles are wide open to anyone who chooses to use them. Hence members of ACPAT, who are all human physiotherapists before they are veterinary physiotherapists, stress the word chartered in their professional titles.

\*\*This section has been amended from the original article\*\*