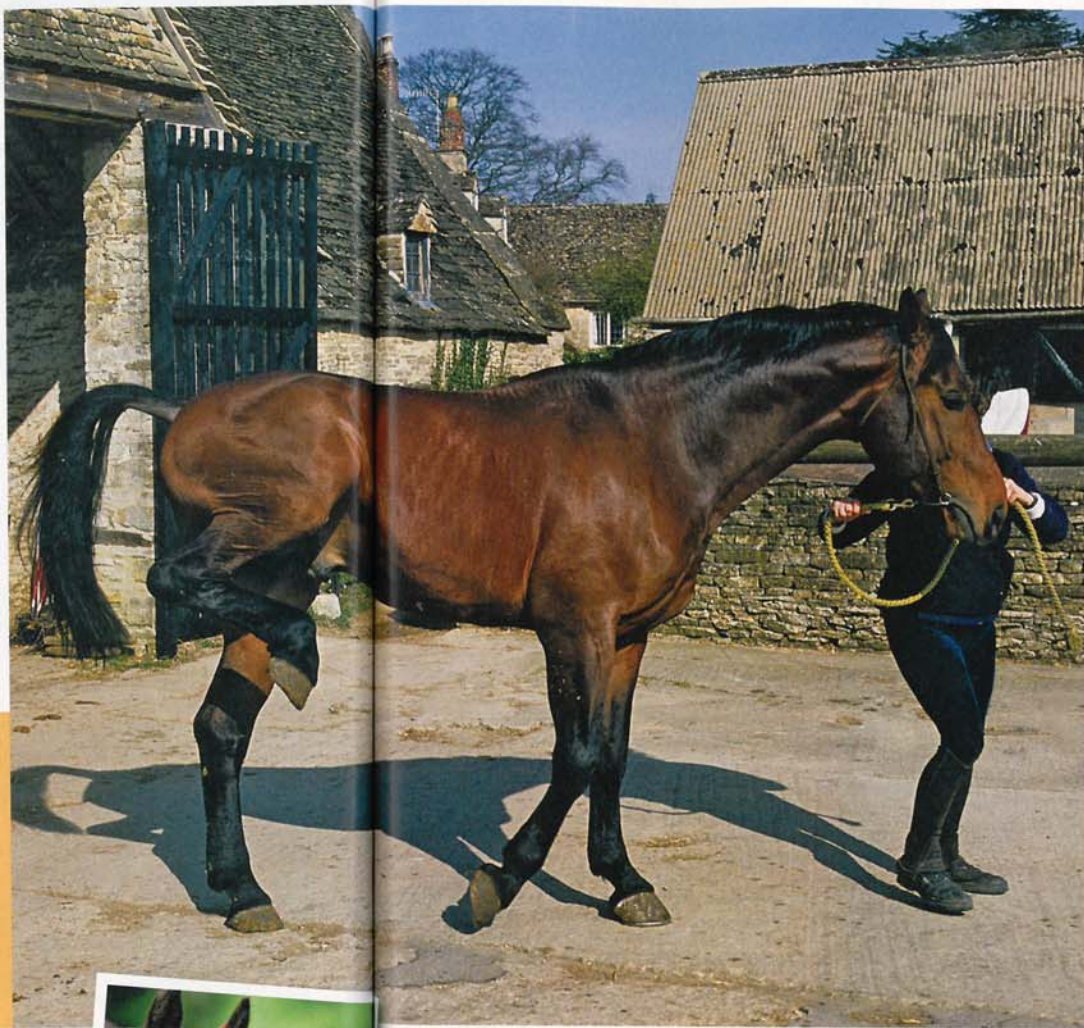


Shake a leg!

Shivering is a disorder that usually affects horses' hindlimbs, but what does the future hold for a shiverer? Vet Graham Hunter from Ardene House Veterinary Practice, a member of XL Equine, has the low-down on this mysterious condition

Shivers (also known as shivering) is a fairly uncommon, progressive, chronic nervous or neuromuscular movement disorder seen in horses. It is most commonly seen in draft breeds (particularly the Clydesdale in the UK), but is also regularly identified in warmbloods. It is noted, but is less commonly seen in lighter breeds, such as Thoroughbreds, Quarter Horses, Arabs and Morgans.

Shivers is characterised by excessive flexion and outward rotation of primarily the hindlimbs. This is most noticeable when a leg is lifted or the horse is walked backwards (see main image, right). Tall, male horses appear to have a slight predisposition, with the onset of clinical signs being seen at a young age – generally between two and four years old.



There is some evidence that shivers is inherited

Mystery cause

The true cause of shivers is not known. Although it is considered to be caused by an underlying neuropathy or nerve problem, in some cases it has been thought to be a result of a muscular problem, infection or trauma. Thorough neurological and post-mortem examinations have been performed, looking at nerve pathways from the brain stem, all the way down the spinal cord to the associated muscles and joints. These examinations have consistently failed to find any conclusive lesions to explain the clinical signs.

It has been suggested that shivers could be due to an underlying muscle disease called equine polysaccharide storage myopathy (PSSM). PSSM and shivers are both common in draft breeds and

often occur together in the same horse. But muscle biopsies taken in cases of shivers have unfortunately failed to prove a convincing association or link between the two conditions.

Systemic or respiratory infections, such as equine influenza or strangles, have been thought to cause damage to the nervous system, resulting in shivers. But this, as with all previous theories, has not been proven. Suggestions that osteoarthritic lesions of the lumbar vertebral column may cause shivers sound very logical, with lesions of the

lumbosacral vertebra causing either mild spinal cord lesions or damage to the nerve roots. This, in turn, could cause muscle spasms in the affected hindlimbs. Again, though, no evidence has been obtained to determine a connection between this and the clinical signs of shivers.

There is also some evidence that shivers is inherited or has at least a hereditary predisposition. There is, however, no specific genetic pattern that has been identified and, therefore, no genetic tests are available. Shivers has been classified as a hereditary disease under the UK Government Horse Breeding Act of 1918. As a result of this predisposition, many people would discourage breeding from stallions with shivers.

Our expert



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MRCVS graduated from The Royal (Dick) Vet College in Edinburgh. He is the senior equine veterinary surgeon at Ardene House Veterinary Practice, a member of XL Equine. Although interested in all aspects of equine medicine and surgery, Graham's focus and passion over recent years has been lameness and surgical cases.

Early signs of shivers

It is frequently the farrier who detects the presence of early-stage shivers. The horse may be reluctant to lift up a leg, appear to be unable to hold up the affected leg, or be reluctant to stand on three legs for any length of time. Any of these will result in your farrier having difficulty in trimming and shoeing the affected limb.

Horses with shivers may appear worried when having a leg picked up or may hesitate before snapping it up quickly. If you notice any of these signs or are worried, ask your vet to perform a full physical and neurological examination on your horse to see whether there is any evidence of shivers.



Diagnosing the condition

There is no easy blood test that can be performed to confirm shivers. Instead, it is generally diagnosed by the recognition of the characteristics by farriers and owners, clinical signs and the ruling out of all other diseases that the horse's symptoms could suggest. This is sometimes not as easy as it may sound.

Early signs of shivers can resemble stringhalt (which causes a similar action), intermittent upward fixation of the patella (locking patella), leg mites (chorioptic mange) or even the rare and more recently recognised 'stiff horse syndrome'.

Painful conditions involving the bottom part of the hindleg, such as a foot abscess, can sometimes result in a horse showing an abnormal limb flexion that can mimic shivers. To complicate matters further, sometimes a concurrent, painful hindlimb lameness can worsen the abnormal limb flexion seen in a true case of shivers.

The condition may present with a wide variety

of clinical signs that vary with the severity of the disease. In mild cases, the signs may only be seen occasionally.

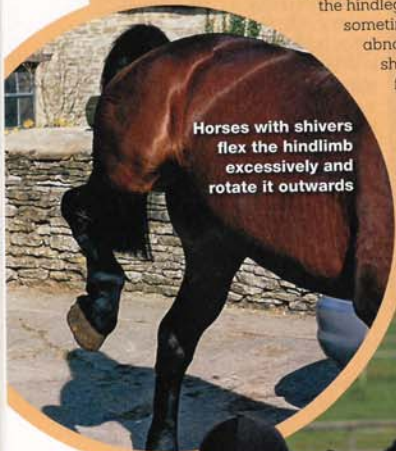
Occasionally, if a diagnosis is not clear, your vet may undertake some tests that are primarily targeted at ruling out other conditions. Blood samples or muscle biopsies may be taken to check for muscle problems. If the horse has been imported from the USA, a Western Blot test may be done to rule out equine protozoal myeloencephalitis (EPM). This disease can present with a great variety of different neurological signs, some of which are similar to shivers.

Shivers in action

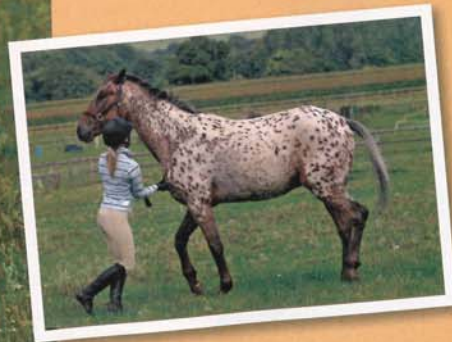
When a leg is lifted or the horse is backed up, the horse will demonstrate excessive flexion of leg, with the limb lifted high, and often rotated and held out from the body for a few seconds before being placed hard back on the ground. The thigh muscles may also be seen to tremble. The tail head may lift up and quiver and sometimes the horse may stretch his neck forward. The muscles of the face can be affected, too, with a characteristic flickering of the eyelids, ears and lips. In stallions, the testicles may be seen to shiver. In some severe cases, the hindleg is held out behind the horse in rigid extension, and horses can also occasionally be seen to stand on their hind toes with the heels elevated a little off the ground.

These unusual signs are seen occasionally at rest but generally at walk. No significant clinical signs are seen at the trot or canter until the condition is more advanced, and weakness and a loss of power become noticeable. These signs are most obvious when the horse is backed up or turned in a tight circle, at the first stride after standing or the last stride after walking. In severe cases, horses are very reluctant or unable to move backwards at all. Shivers tends to worsen in cold weather, when the horse is stressed, anxious or excited, and when he is not in work or where there is a lack of exercise for any reason.

Horses with shivers flex the hindlimb excessively and rotate it outwards



You can check for signs of shivers by turning the horse in a tight circle or backing him up (see right)



A gradual progression

The prognosis for horses with shivers is poor, because although some cases will remain static, the majority will progressively worsen over time. As this happens, we see wastage of the thigh muscles and eventually more generally over the whole hindquarters. The hindquarters become very weak and stiff, and advanced cases are seen to stand with a very wide-based stance behind.

Although horses are often still willing, the loss of power and weakness eventually results in the horse being unable to perform any work, so the long-term prognosis for athletic function is grave. Eventually, the discomfort and incapacitation associated with the muscle cramping can become so severe that euthanasia is the only option available.

Shivers will affect a horse's ability to pass a five-stage pre-purchase veterinary examination

Available treatments

It can be difficult to advise on the best treatment options as there are no reliable treatments for shivers. Many different medical treatments have been tried, including dietary vitamin E supplementation (1,000 international units per day). Vitamin E is often prescribed because of its neuroprotective properties.

Non-steroidal anti-inflammatory drugs, such as phenylbutazone (bute), may be used in cases where there are suspected traumatic or inflammatory causes, and in some cases, muscle

relaxants have been tried to help relieve the muscle cramps and spasms. A variety of anti-convulsants and antipsychotic drugs have also been tried, because they potentially have effects on muscle contraction and nerve function. However, no consistent improvement has been seen with any of these treatments.

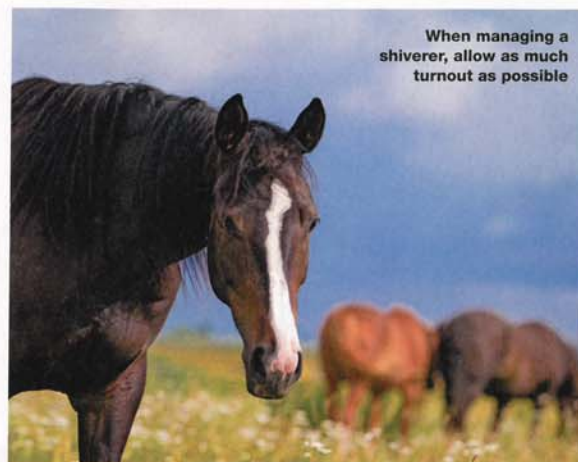
Dietary management using a long-term, high-fat, low-carbohydrate diet has been suggested.

It can be used in shivers cases related to confirmed PSSM and cases with no identifiable muscle pathology. It is possible that this diet decreases the anxiety of the horse as well as decreasing the muscle cramping seen in shivers cases. However, this diet change can take up to six months for a response to be noted. Shivers cases are frequently overweight and their calorie intake should be reduced to manage this situation before starting on a high-fat diet.

Despite these options, there are currently no successfully proven surgical or long-term medical treatments available.



A high-fat, low-carbohydrate diet could be beneficial



When managing a shiverer, allow as much turnout as possible

Managing a shiverer

There is no doubt that factors such as reduced turnout, excessive or limited exercise, illness, stress or excitement can precipitate the worsening of the clinical signs of shivers. It is, therefore, logical to minimise these triggers. Regular, controlled exercise with maximum daily turnout and the removal of any stress or excitement triggers would be a logical management approach to prevent severe shivering episodes. Occasionally, clinical signs of shivers have been reported to improve after long periods of rest, but the signs unfortunately almost invariably return when the horse's work is resumed.

Pre-purchase considerations

Shivers will affect a horse's ability to pass a five-stage pre-purchase veterinary examination. The decisions can be difficult in performance horses, and dressage horses in particular, because we know that the disease is most noticeable at walk, is generally slowly progressive and is very likely to eventually result in loss of power and weakness. However, the rate of this progression is completely unpredictable.

The pre-purchase examination will record any abnormalities and signs of ill-health, and their significance will be noted and discussed with you, based on the use the horse is intended for. Mild shivers in a beautifully-behaved schoolmaster may be perfectly acceptable for a child's general riding pony, but be completely unsuitable in a Prix St Georges dressage horse.

Current thinking

There is very little new information on this unusual movement disorder. New theories, such as one that relates shivers to recurrent laryngeal neuropathy (RLN, also known as roaring, where respiratory noise is heard during fast work), are constantly being explored. Horses suffering from RLN also tend to be tall, predominantly male, and of draft, warmblood or Thoroughbred breeding. It's been questioned whether there is a common pathology that affects the long nerves in these horses, but as with all other proposed ideas, no evidence has been found to back up such a theory.

At present, researchers at the University of Minnesota are performing research into shivers in conjunction with Ontario Veterinary College. The focus of this research is dedicated to trying to establish the cause of the disease, if the condition is inherited, and if dietary therapy could be effective.

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