

Unlocking

the locking device

Posture, hoof angle, muscle synergy and back function can all influence the horse's ability to smoothly lock and unlock its stifle.

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EQUITANA PRESENTER

Ian will be a presenter at Equitana Sydney 7-10th Nov 2013



The stifle of the horse is a very complex joint similar to the human knee joint and involves four bones, 14 ligaments and two cartilages (or menisci). The patella is equivalent to the human patella or knee cap, which has only one patella ligament joining the quadriceps muscles of the thigh to the tibia or shin bone: whereas the horse has three, a middle, an inside and an outside ligament.

The inside ligament gives the horse the ability to lock the patella, in order for it to sleep while standing or to lock its 'weight bearing leg' as it rests the other hind leg.

The important structures involved with the patella's ability to lock are the inside ridge that lies beside the groove for the patella to run in at the end of the thigh bone, the patella and the medial or inside patella ligament.

The inside or medial patella ligament has a fibro-cartilagenous join to the patella, which is designed to lock over the ridge on the inside of the thigh bone. When locked in place it becomes part of a cunning bit of bioengineering known as the reciprocal apparatus of the hindleg. The reciprocal apparatus is made up of balancing 'ropes' that, when activated, turn the hindleg into a semi rigid structure which allows the horse to stand with a minimum of muscular effort, enabling it to 'sleep on its feet'.

The role of the patella and inside ligament in the reciprocal apparatus is to lock in an upward position thereby securing the leg. The problem of stifle lock occurs when locking and unlocking isn't happening smoothly.

Stifle lock, or upward fixation of the patella (UFP), is a common condition of horses, usually seen as a partial catching of the patella and less frequently as a complete lock. Complete lock tends to come and go. Complete stifle lock involves the whole affected hindleg being locked out straight like a rigid pole, usually only for a few strides but in severe cases it may lock completely and require surgery to free it up. The more common partial catching of the patella causes a subtle or mild upset in the stride of a horse.

A number of factors affect the smoothness of the disengagement of the patella from its locked position. Firstly there is muscle synergy. When a horse moves from a regular locked stance to walking the patella needs to be first lifted out of its locked position and then allowed to slip downward as the leg is flexed up and the horse moves away. The hip flexors, and especially the quadriceps and tensor fasciae latae, are the main lifters and need to act in synergy with the other thigh muscles, especially the biceps femoris which pulls on the outside ligament of the stifle. If this synergy fails, partial or complete lock usually occurs.

The angle of the stifle has been shown to have a considerable effect on the occurrence of stifle lock. The more upright the stifle, the more prone horses are to stifle lock, which is perhaps an area where inheritance contributes to the occurrence. Stifle angle is not only a product of the inherited make up of the horse but is actually much more a product of posture. If a horse is weak in the back as a result of being poorly conditioned then it will tend to let its hindlegs trail behind the body and in doing so increase the stifle angles. Similarly, back soreness can produce the same changes in posture.

In addition to the effects on posture, back soreness or dysfunction can cause an imbalance in the tone of the leg muscles controlling the release of the patella. The spine of the mid loin controls the quadriceps and the sacro-iliac area controls the hamstrings. If there are problems in either or both areas then the chance of loss of muscle synergy - with respect to unlocking the patella - are considerable.

The angle of the stifle is also affected by the length and angle of the hind hooves. Longer toe and lower angle increase the stifle angle and thus increase the tendency for stifle lock.

Another contributing factor to stifle lock is laxity of the stifle ligaments. It is believed that when the inside patella ligament is repeatedly stretched, by being momentarily caught over the ridge of the thigh bone, it becomes elongated and lax - thus needing more muscle pull to get it off the ridge, and thus more chance of the synergy not being there at that fraction of a second it's needed - the end result is a cycle of more catching and more damage.

SYMPTOMS OF STIFLE LOCK

Complete stifle lock causes a dramatic change in hindleg action. The locked leg is fixed in a relatively straight form and in action looks much like a person with a peg leg. Only the fetlock is able to knuckle over and the horse has to lift the hind quarter of the affected side to move ahead. The medial or inside patella ligament is caught like a band over the ridge in the thigh bone. Often the horse will manage to free up the patella but at times they will require the patella to be pushed up and to the inside to free up the leg. In extreme cases the inside of the patella ligament has to be severed to allow the leg to unlock (rare).

Much more commonly the stifle only partially locks, causing a slight interruption to the flow of the stride. This is very often

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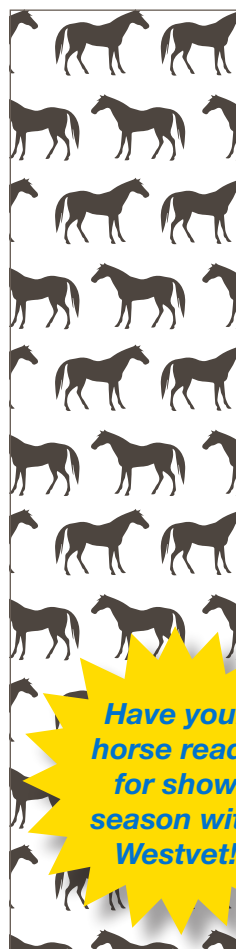


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Unlocking the Locking Device cont...

associated with a clicking noise as the patella releases, a noise many horse owners hear and think comes from the hip joint (sound travels very well through bone). The interruption of the flow of the stride most noticeably produces a jerky type back motion, most obvious when the horse is walking down a slope. The jerky motion can also be noted at the stifle, with a quiver of the stifle apparent as the patella is released. If present, the clicking noise is also heard just as the patella is released from a caught position, whereas the hindleg may lift in an exaggerated way giving the impression of a mild form of stringhalt or other hindleg gait abnormalities. Sometimes this jerk is considerable and may be associated with a 'collapse' of the hindlegs. Affected horses may be tender around the stifle, especially on the inside of the stifle and around the attachment of the inside ligament to the patella.

TREATMENT OF STIFLE LOCK

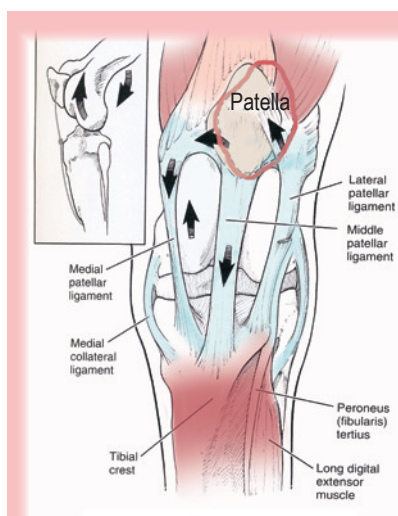
Correcting the affected horse's posture is one of the cornerstones of treatment. Improving the horse's core strength with exercise - including trotting over poles, working up gentle and later steeper slopes, working diagonally across slopes - is one of the first steps. Spinal therapy, and especially veterinary chiropractic, acupuncture and prolotherapy (regenerative injection therapy) is very important to return lumbar and sacroiliac area spinal function to normal. Birth trauma involving the wither and pelvis is a major driver of poor posture and has to be

addressed if posture is to reach its best form. Saddle fitting must be optimised, as well as other causes of poor posture, including attention to teeth, anxiety and rider induced postural problems. Hoof shape must be improved to shorten the toe length and raise the angle of the hind hooves.

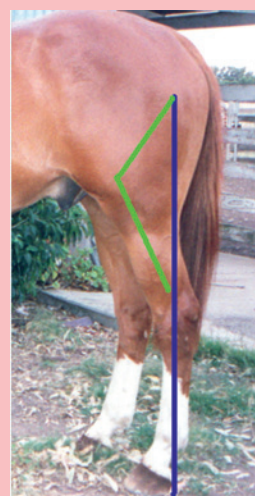
The use of oestrogen injections to induce ligament relaxation is advocated by some veterinarians but is poorly supported by anecdotal evidence. Any positive effects are more likely to come from relaxing the strained pelvic ligaments involved in the sacroiliac joint dysfunction, than relaxing stifle ligaments. In fact, the next most important factor to improving posture is tightening the lax stifle ligaments.

Stifle ligament laxity is most commonly addressed by veterinarians through the injection of counter-irritants around the inside and middle stifle ligaments. Iodine in oil and ethanolamine are the most commonly used counter-irritants. An alternate technique is to use a large bore needle or small scalpel blade to make small incisions in the inside and middle patella ligaments so as to cause them to thicken and shorten. Both of these techniques are usually quite effective for those horses that have not responded well enough to just correcting the horse's posture.

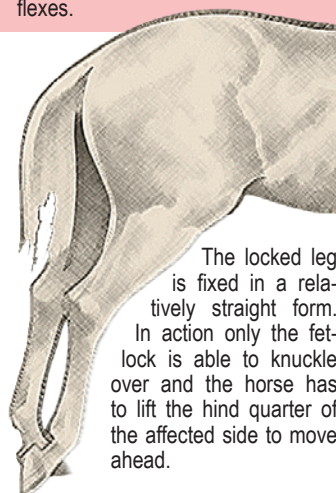
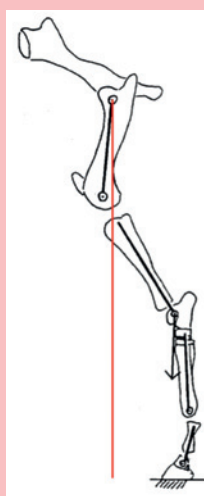
After working to correct the postural issues, a variant of the above technique can be used for the more troubled horses, or to refine the movement of horses that still have a subtle jerkiness to their back movement. Under surgical conditions a smaller needle can be used to mildly irritate and shorten the ligaments and a



Above: Normal patella unlocking action with the patella first being lifted up to 'unhook' the medial patella ligament then being allowed to slide down the patella groove as the stifle flexes.

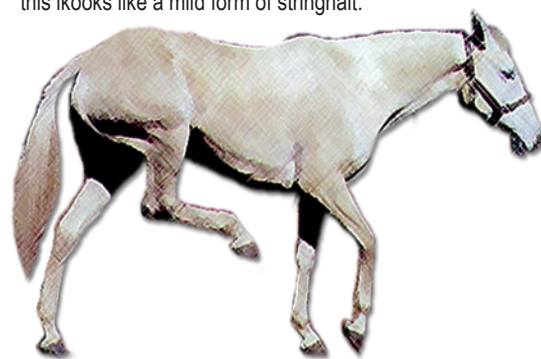


Centre: Normal hindleg position - directly under the hip joint. Right: Hind leg trailing behind the body as often occurs with poor core strength and a dropped belly. Stifle angle is more open and is considered to predispose the horse to stifle lock.



The locked leg is fixed in a relatively straight form. In action only the fetlock is able to knuckle over and the horse has to lift the hind quarter of the affected side to move ahead.

Below: An exaggerated view of a horse's leg snatching up as the patella unlocks from a caught position. Sometimes this looks like a mild form of stringhalt.



dextrose prolotherapy solution injected around the areas of the ligaments that are most prone to strain - that of the attachments to the patella and to the tibia or shin bone. The positive response rate is very high and potential complications very low.

Thirty years ago the standard treatment for horses with stifle lock was to sever the inside patella ligament, the one that allows the horse to stand with minimal muscular effort. It certainly stops the patella locking, as the ligament is no longer able to catch on the ridge of the thigh bone. Also it was used as a cure all for the condition so none of the causes of the condition were addressed. A little like cutting the wire to the warning light when it lights up on the dash of a car because the engine was overheating, rather than putting water in the radiator. Since then, this technique has been put into disrepute because of a much greater awareness of the complications which may occur with the technique. Complications include intractable lameness, infection, fragmentation of the apex of the patella and middle patella ligament strain. Nowadays, with other less invasive techniques being shown to be quite effective, the only time this approach is recommended to be used is in cases where all else fails, or a horse is locked so badly it cannot be freed up any other way. Today, to reduce complications from this procedure, horses are usually box rested for six weeks or more.

Stifle lock is far more than just a full locking of the hindleg and has much more to its treatment than just severing a vital ligament.