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May 2015

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# Hindlimb Gait Abnormalities

## locking patella & stringhalt

By Dr Sarah Van Dyk  
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and Reproduction Centre

TOP RIGHT: Figure 1: Anatomy of the hindlimb. Image courtesy of WestVETS Animal Hospital and Reproduction Centre.

BELOW: Figure 2: Anatomy of the hindlimb. Image courtesy of WestVETS Animal Hospital and Reproduction Centre.

**T**he condition known as a locking patella or locking stifle is not uncommon in the horse world. You may have heard horse owners talk about their horse that has stifles that 'catch' or 'lock', or you may have experienced this condition firsthand in your own horse.

### Mechanism and anatomy

The anatomically correct term for this condition is upward fixation of the patella (UFP). To understand the principle behind this condition, knowledge of the anatomy is important.

The stifle is the most complex and largest joint in the horse. It is a critical part of the passive stay apparatus of the horse. The passive stay apparatus prevents collapse of the hindlimb with minimal muscular effort through a combination of anatomical components that prevent flexion of the stifle and hock, and prevent overextension of the fetlock and pastern; consequently allowing the hindlimb to act as a weight-bearing pillar.

It allows horses to relax standing for extended periods of time resting one hindlimb. This is achieved by 'locking' the patella or knee cap (Highlighted in green, refer to Fig. 1 and Fig. 2) in position by hooking the medial patellar ligament (Highlighted in blue, refer to Fig. 1 and Fig. 2) and the parapatellar fibrocartilage (Highlighted in red, refer to Fig. 1 and Fig. 2) over the medial trochlear ridge of the femur (Highlighted in yellow, refer to Fig. 1 and Fig. 2), preventing collapse of the supporting hindlimb.

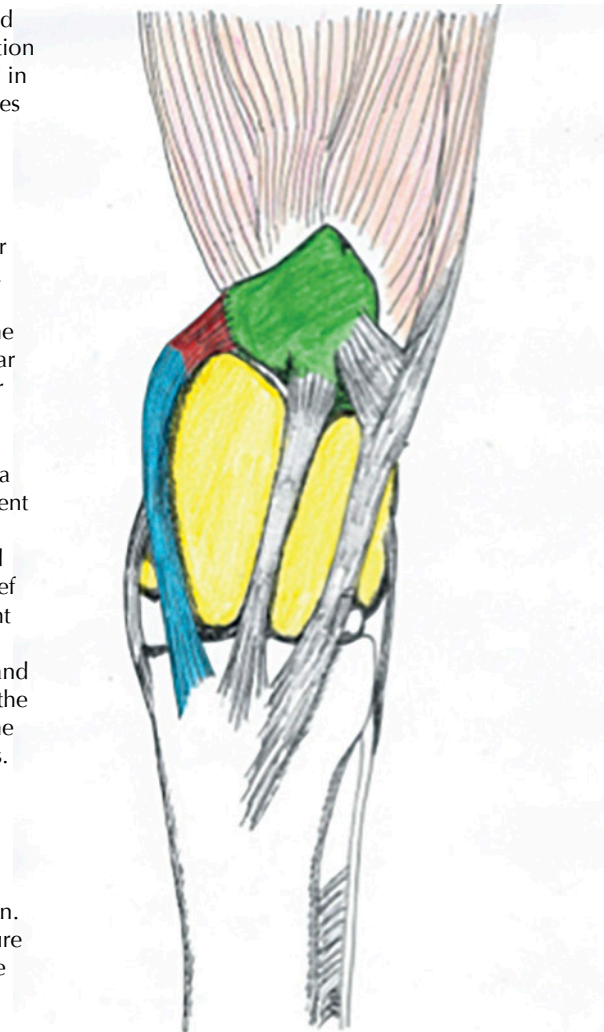
Normally, the patella can be disengaged from this position smoothly by contraction of the quadriceps muscles (Highlighted in pink, refer to Fig. 2) as the horse changes position or moves off.

UFP is a characteristic hindlimb gait abnormality that occurs when the patella catches or locks in position over the medial trochlear ridge of the femur. This occurs when contraction of the quadriceps muscle fails to disengage the medial patella ligament and parapatellar fibrocartilage from the medial trochlear ridge.

The severity of fixation can range from a delayed release of the patella to persistent locking. Delayed release of the patella is clinically apparent as an exaggerated flexion of the hock and stifle after a brief period of the patella catching. Persistent fixation presents as the stifle and hock locked in extension, while the fetlock and foot are in flexion. This may appear as the horse dragging its hindlimb. Backing the horse may exacerbate the clinical signs.

### Diagnosis

Diagnosis of UFP is generally made on clinical history and clinical examination. Radiographs may be performed to ensure there are no other problems in the stifle before treatment is recommended.

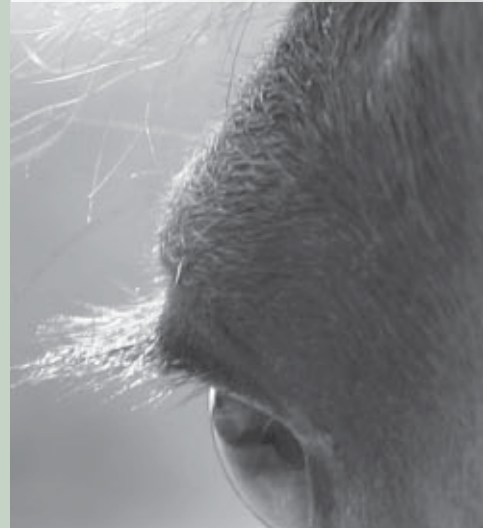




“Delayed release of the patella is clinically apparent as an exaggerated flexion of the hock and stifle after a brief period of the patella catching. Persistent fixation presents as the stifle and hock locked in extension, while the fetlock and foot are in flexion. This may appear as the horse dragging its hindlimb. Backing the horse may exacerbate the clinical signs.



You worry  
about their  
**health** & well-being



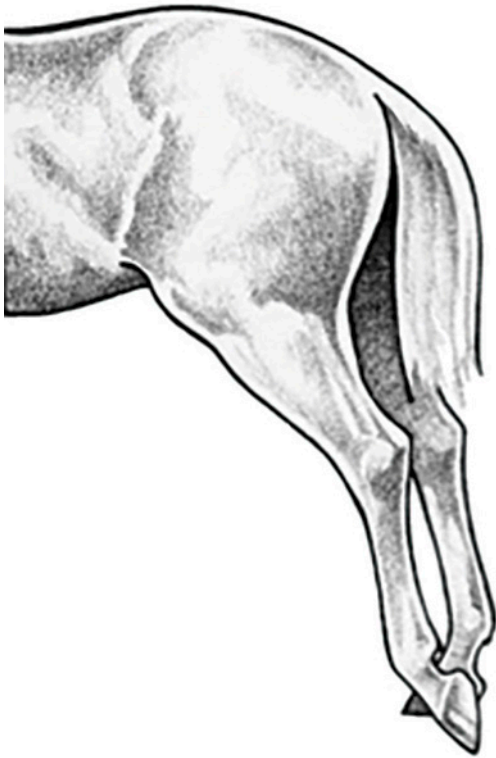
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**Figure 3: Upward fixation of the patella.**  
Courtesy of WestVETS Animal Hospital and Reproduction Centre.

## Treatment

In many cases, UFP occurs in young horses at the beginning of their training, and is related to a lack in condition and muscle tone, and a straight hindlimb conformation. In these cases, training should be aimed at increasing muscle tone in the hindquarters, particularly the quadriceps muscles.

Exercises such as trotting poles and trotting hill work in deep, sandy or loamy soils can help. Circle work (particularly at a canter) should be avoided and stall confinement can perpetuate the problem. It is better to have these horses turned out in a paddock.

It may also occur in older horses that have had trauma to the stifle or have been stabled or inactive for a period of time. It is more commonly seen in ponies. If conditioning and development of quadriceps tone with training doesn't resolve the condition, there are medical and surgical treatment options available.

The medical option involves injecting counterirritants into the medial patellar ligament to cause inflammation and thickening of the ligament, limiting fixation of the ligament over the medial trochlear ridge of the femur. This treatment is most effective for cases of mild or intermittent fixation, and results are not reliably consistent.

The traditional surgical treatment option is a medial patellar ligament desmotomy. The purpose of this surgery is to cut the medial patellar ligament so it cannot catch or lock over the medial trochlear ridge of the femur.

Complications reported from this technique include fragmentation of the distal patella and osteoarthritis of the femoropatellar joint. Consequently, this is no longer considered the surgical treatment of choice and is a last resort in riding horses.

Another surgical treatment option is medial patellar ligament splitting, which has been reported as the preferable surgical technique to treat UFP. This technique provides excellent success rates without the potential complications of a medial patellar ligament desmotomy.

The purpose of this surgery is to cause scarring and thickening of the medial patellar ligament which, in turn, prevents the ligament from catching or locking over the medial trochlear ridge of the femur. The surgery is performed under general anaesthetic, is quick and horses can return to work after only a very brief recovery period.

## Stringhalt

Another hindlimb gait abnormality which can be confused with mild forms of upward fixation of the patella is stringhalt. The mechanism for this condition is very different to UFP.

## Clinical signs

Stringhalt is characterised by involuntary exaggerated upward flexion towards the ventral abdomen of one or both hindlimbs occurring every walk stride. There can be wide variation in the severity of the signs. The clinical signs lessen at a trot and may disappear at a canter. In mild cases, difficulty backing may be the only sign.

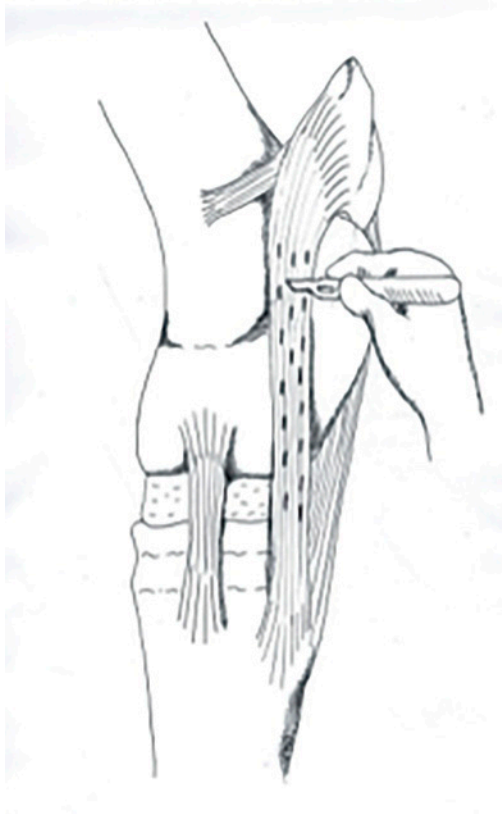
## Cause

There are two described forms of stringhalt. The conventional form of the disease is usually seen sporadically and involves a single hindlimb. It has been attributed to trauma to the stifle, hock and cannon bone, foot pain, spinal cord disease and tendon adhesions. The true cause is unknown, however, is suggested to be caused by an underlying neuropathy.

In Australia and New Zealand, the outbreak form of the disease is usually bilateral and occurs in horses on pasture containing dandelions known as flatweed (*Hypochoeris radica*). The toxic principle behind this condition is unknown. The clinical signs are caused by a peripheral neuropathy (dysfunction of one or more peripheral nerves) and neurogenic muscle atrophy (atrophy of the muscle due to the dysfunction of the nerves that connect to it) of the long digital extensor, lateral digital extensor and gastrocnemius muscles.

## Diagnosis

Diagnosis is based on history and clinical signs. It tends to occur suddenly and may vary in severity. Clinical signs are often worse after rest, during cold weather or with anxiety.



**Figure 4: Medial patellar ligament splitting.**  
Courtesy of WestVETS Animal Hospital and Reproduction Centre.

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### Treatment

For conventional stringhalt (unilateral form), spontaneous recovery rarely occurs. Therefore, treatment of choice usually involves surgery. Surgery involves cutting and removing part of the lateral digital extensor muscle and tendon. Improvement following surgery for the conventional form of stringhalt is variable, and may occur immediately or take several months.

Horses with the outbreak (Australian and New Zealand) form of stringhalt often recover spontaneously. Removing the horse from pasture containing dandelions is usually curative, but recovery can take months to years, and may not be complete in some horses. Surgery as described previously for conventional stringhalt has shown improvement in these horses.



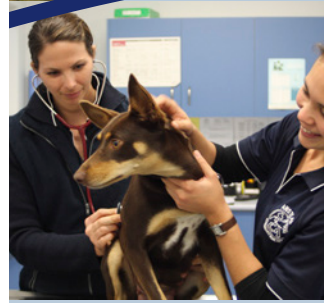
**ABOUT THE AUTHOR:** *Sarah Van Dyk, BVSc (Hons) - Mixed Animal Veterinarian. Sarah worked at WestVETS as an afterhours nurse in her last year of studies at UQ. Upon graduation in 2009, Sarah worked in Armidale, New South Wales in mixed practice for some time before re-joining the team at WestVETS as a mixed animal veterinarian. Her special interests are small animal surgery, farm animal medicine and surgery, and equine medicine and reproduction. She also enjoys being attending veterinarian at endurance rides and other equestrian events. In her spare time, she enjoys snowsports, art, horse riding and long distance running.*



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