VETERINARIAN EXPLAINS

The suspensory ligament

The suspensory ligament is an essential part of the horse. Unfortunately injuries to this ligament occur frequently in our sport horses, in both front and hind legs.

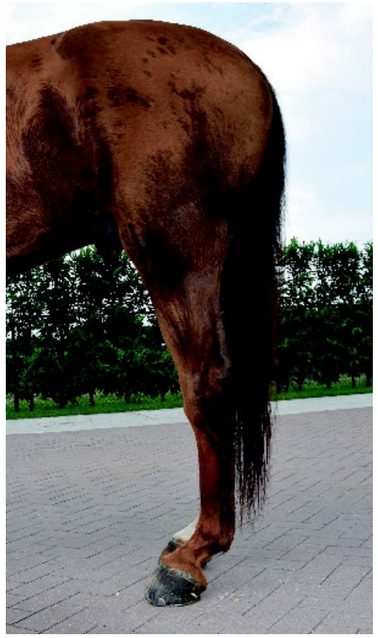
How do they work?
A horse has four suspensory ligaments, one in each leg. They attach at the cannon bone, just below the knee or the hock and run to the sesamoid bones of the fetlock. Together with a couple of other ligaments, the suspensory ligament forms the suspensory apparatus of the fetlock. Cutting the ligament would result in the fetlock dropping to the ground. This means that the ligament is always under tension when the horse is standing. At walk, trot and canter the stresses on these ligaments increase. When jumping the impact on the ground at landing will provide even higher tension on these ligaments. During dressage the repetitive exercises and asymmetric load when the horse is moving sideways provide a challenge for these ligaments.

Microdamage
Injuries of the suspensory ligament rarely occur acutely in jumpers and dressage horses. Most often it is a repetitive strain injury, where the tendon slowly changes due to microdamage and small inflammations (desmitis). These changes can occur subclinically (not visible) or may only lead to minor, short lasting complaints. For example, a horse that is slightly off during a training, but that recovers with a few days of rest. Or a dressage horse that only shows a shortening of the stride at an extended trot. As the suspensory ligament's attachment point in the front legs is hidden between three bones (the cannon bone and the two splint bones) and covered by the check ligament and the deep and superficial digital flexor tendons, a swelling may easily go unnoticed. Often these changes develop in either both front legs or both hind legs, resulting in a shortening of the stride and stiffening of the movements of the horse without a very obvious lameness. As the changes progress, the day will come that the horse does show lameness.

When it progresses
If the injury is situated at the level of the attachment on the cannon bone (the proximal part of the suspensory ligament), this bone may also develop changes. Often the surface of the bone becomes irregular as lysis (bone resorption) and new bone formation occur. Sometimes even an avulsion fragment is present or small fracture lines within the bone. Even the link between the splint bones and the cannon bone can be affected, leading to splints on the inside and/or the outside of the leg. Changes to the middle part (or body) of the suspensory ligament are more easily identified as they will lead to obvious swelling and warmth of the leg. Moving even further down the body divides into two branches which each attach on a sesamoid bone. Injuries of the branches often lead to asymmetric swelling of the leg (either the inside or the outside) just above the fetlock and changes to the sesamoid bone. Chronic injury and inflammation of the ligament will lead to a lot of scar tissue in and around the ligament, decreasing its ability for shock absorption, and elongation of the structure. Ultimately this leads to a typical stance. In the hindlimb, as the fetlock drops, the hock will become more straight.

The location of the suspensory ligament in the horse's front leg.

Diagnosis
During a clinical examination the horse will typically show more lameness on a soft surface compared to a firm surface and the lameness will increase on a circle compared to on a straight line. Often it is most visible when the affected leg is on the outside of the circle. Most often working the horse will worsen the lameness. Flexion tests often lead to an increase in lameness and the ligament is usually painful during deep palpation. When the location of the lameness is not obvious nerve blocks can be performed. At the proximal suspensory a local infiltration of anesthetic fluid often decreases signs of pain. If there are bony changes contributing to the painfulness it may prove difficult to block. The horse needs to be evaluated carefully to observe a decrease in lameness and caution must be taken to prevent the horse from worsening the injury when it no longer feels the pain.



The typical stance of a horse with chronic suspensory desmitis: a straight hock and dropped fetlock.

Imaging
Diagnosis of suspensory disease is often made by clinical, radiographic and ultrasonographic examination. On radiographs an increased density of the bone structure (sclerosis) and/or bone lysis of the cannon bone may be seen at the location where the tendon attaches. Avulsion fragments and mineralization may or may not be seen depending on their location and size. The surface and structure of the sesamoid bones may be altered and formation of a splint may be visible. Ultrasonographic examination is useful to evaluate the size and structure of the ligament. Peritendinous swelling can be imaged. The bone surface and mineralizations can be seen in more detail than on radiographs. As the ligament contains fat and muscle fibers, the evaluation of the structure of the upper part of the ligament (the proximal area) can be challenging. Careful examination of the ligament from different angles in combination with imaging the structures while the leg is picked up and flexed makes ultrasonographic examination very valuable in the hands of an experienced veterinarian.

Orthopedic shoeing
To evaluate the extend of the injury in both tendon and bone, additional evaluation using MRI examination may be required. This will provide more information, helpful to decide on a prognosis and as a basis to establish an individualized rehabilitation plan for the patient. Treatment often includes decreasing the inflammation by administering oral non-steroidal anti-inflammatories and extensive cooling of the leg. In addition, the horse receives orthopedic shoeing. The type of shoe used is based on the findings during the examination and the conformation of the horse. A shoe with a wide toe and narrow branches may be used, but in other cases a shoe which promotes an easy break over or even a shoe with heel support may be favored. The tendon itself may be injected with stem cells, PRP or other substances to promote healing. Chronic cases can also be treated with focused shockwave therapy. Various other treatment options are also used including laser therapy.

The most important tool
The most important tool, though, is time. As tendons and ligaments do not contain a lot of blood and lymphatic vessels, an injury takes a lot of time to heal. Considering the fact that suspensory ligament injuries are often chronic, the activity in the region is often low, slowing down the recovery even more. Of course the type of changes found in the ligament and bone highly influence the duration of the rehabilitation period. A sprain of the ligament with only mild swelling will heal a lot faster than when extensive structural changes of ligament and bone are present. A period of controlled exercise is indicated during which the load on the ligament is slowly increased to stimulate healing without overloading and causing more damage to the structure. Careful, regular ultrasonographic re-evaluations are indicated to monitor the progression of healing of the ligament.

Prognosis
Prognosis of a proximal suspensory ligament injury in the front leg is often favourable. Concerning the hindlimb, the proximal suspensory ligament is covered by a fascia and therefore pressure may increase as the ligament swells, complicating the healing process and decreasing the chances of returning to the previous level of training. Surgical splitting of this layer (fasciotomy) may be considered. Injury of the body or branches of the suspensory ligament often leads to the formation of scar tissue making the ligament susceptible to reinjury as the ligament becomes less stretchable.

Prevention is key
All in all prevention is key. Training the horse on an even, soft but responsive and stable surface helps. Training them on different surfaces will help them develop their coordination. It is also essential to avoid repetitive strain on the ligaments by refraining from repeating the same exercise over and over again. Instead, make the training varied and diverse. Short turns at high speed and jumping often over high fences also increase the risk of a suspensory ligament injury developing. Especially when the horse is tired and therefore may become less well coordinated. Training the horse to have a good level of physical fitness and endurance is important to prevent this. Adequate shoeing will minimize the tension on the tendons and ligaments. Suspensory ligament injuries are common in jumpers and dressage horses. Most of them return to soundness, but regularly they relapse when returning to their previous level of competition. Prevention is key! ■

THE VETERINARIANS

Dr. Brenda Hoogelander

Dr. Elisabeth van Veggel

ABOUT SMDC
Sporthorse Medical Diagnostic Centre (SMDC), based in the Netherlands, is a multidisciplinary centre of excellence where all orthopedic diagnostic and treatment modalities can be utilized in combination with experience, extensive knowledge and individual attention. Dr. Bergman, Dr. van Toor, Dr. Cokelaere, Dr. Hoogelander and Dr. van Veggel dedicate their time to optimize sporthorse performance while considering all factors which might influence it. Their caseload contains horses showing lameness but also includes horses with spine related problems, pre-purchases examinations as well as preventative sporthorse care. www.sporthorsemdc.com