

# Getting acute and chronic cases under control

## Treating tendon disorders in horses with laser light

**Tendon damage in horses is a very stressful problem for both the animal and the owner. This is because treatment is usually difficult and lengthy. Unfortunately, a full recovery is not always possible. It is estimated that 10 to 15 % of all lameness in sport and leisure horses is caused by tendon disorders.**

Many vets, veterinary practitioners and horse owners now rely on the power of laser light to treat acute and chronic tendon problems.

The focussed light can promote and accelerate the healing process.

### Show horse Nikita: an out-of-therapy case

Nikita ended her career as a show jumper at the age of 10 and went into the quieter riding school business. By nature, the Württemberg mare was softly tied up and very supple. Tendon problems were actually pre-programmed with her.

When she came into the stable, she was no longer stable in the fetlock joint area. She became increasingly lame and was treated with injections (IRAP, Müller-Wohlfahrt treatment). At the age of 12, she was considered clinically out of therapy and was to be put down. There was only one treatment option left for the warmblood.

“After a thorough examination, I treated Nikita twice a day with the low level laser,” reports veterinary practitioner Julia Beiter from Sinzheim. “I set the frequency and pulsation individually for her problem. After just three irradiations, the mare was walking much better again.” At the follow-up check eight weeks later, the vet was amazed at how well the horse was running. Nikita was 24 years old.

### The risk of injury is high for sport horses

In general, even the smallest tendon damage is often problematic. This is because a horse's legs are a finely tuned but also vulnerable system of bones, joints, muscles, connective tissue, ligaments and



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tendons. The tendons bind muscles and bones and have the important function of transferring energy to the bones during movement. This strong and elastic tissue is what makes smooth and powerful movement possible in the first place.

“The risk of injury is relatively high for sport horses used in show jumping and dressage,” says Susanne Schatz, a former professional rider.

“But leisure horses are not spared either. Deep soils, irregular grazing - and thus ‘temperamental outbursts’ and malpositioned limbs are often the cause of the disease.” In horses, the tendons in the front legs are very often affected because they have to carry more than half of their body weight.

### In general, all tendons can become diseased

“In my clientele, tendon damage due to chronic overload and degenerative processes clearly dominates over acute, traumatic tendon damage,” says Dr Anja Eisenack from Zülpich. “The flexor tendons and pasterns are frequently affected, but extensor tendon problems also occur. In the case of arthrosis in the lower joints, the tendon insertions are also very often affected, so I always focus on these as well.” Veterinary physiotherapist Nadine Tenger from Lingen (Ems) explains: “In my practice, tendon disorders are often all kinds of injuries: Tears and ruptures, inflammation, holes in the tendons. All tendons can be affected, from



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An acute tendon strain is typically accompanied by swelling.

the superficial to the deep flexor tendon. In most cases, the holes or tears in the tendons are caused by overloading and malformation of the horse - more rarely of a traumatic nature (rabbit hole).”

### The difference between tendinitis and tendopathy

In the case of a tendon disease, a basic distinction must be made between tendinitis and tendopathy. In tendinitis, the tendon is inflamed due to an acute injury, for example. Tendopathy is an acute or chronic disease of the tendon that frequently occurs in riding horses, racehorses and quarter horses. The most commonly affected tendons include the superficial flexor tendon, the deep flexor tendon and the fetlock beam.

- The superficial flexor tendon lies directly under the skin behind the cannon bone
- The deep flexor tendon is located behind the superficial flexor tendon and extends down into the hoof
- The pastern has a tendinous structure with a muscular component and begins on the back of the upper cannon bone. It divides into two legs at about mid-height

### There are many causes of tendon problems

The following factors can favour tendon disease:

- Overloading, muscle fatigue and tendon wear and tear
- Lack of exercise
- Feeding errors and obesity
- Frequent rides over uneven ground
- Malpositions of the limb
- unfavourable hoof shape, e.g. flat hooves, long toes
- Frequent uncontrolled movements of the horse
- Injury

### The symptoms of tendon disease

The earlier a tendon disease is recognised and treated correctly, the better the chances of a quicker and complete recovery. However, a disease does not usually come on abruptly, but develops gradually. Therapists therefore recommend checking and palpating the tendons on all four limbs after every ride.

### The following signs indicate tendon problems:

- Swollen, pulsating and/or hot spots on the legs
  - Pressure pain on palpation
  - Slight lameness on level ground
  - Lameness increases on deep soils
- In addition to palpation, the therapist can make an exact diagnosis with an ultrasound examination.

### The natural healing process

After an injury - no matter how slight - there is an inflammatory phase with oedema formation. In the first few weeks, a short-fibre, inelastic scar tissue forms in the tendon, which is very delicate. If it is injured again during this time due to excessive or incorrect strain, these newly formed fibres tear completely and the healing phase starts all over again. Gentleness is therefore the most important measure

After about 12 weeks, new fibres have also formed longitudinally and the tendon tissue is denser and more resilient

“However, the healing time cannot be generalised, as it depends on many factors,” says veterinary practitioner Matthias Spitznagel, who specialises in equine rehabilitation. “It depends on the type of injury and which tendon is affected, the age of the horse, previous illnesses, etc. On average, it takes between 4 and 12 months.”

### The aim of low level laser therapy: to inhibit inflammation and promote tissue regeneration

The main areas of treatment are

- In case of acute injury, cool the area to reduce bleeding and oedema
- Absolute immobilisation in the horse box to prevent further injury to the tendon tissue.
- Fight the inflammation as quickly as possible.
- Minimise the formation of irreversible scar tissue. This is because the healed scar tissue is generally no longer as strong and flexible as the original healthy tendon tissue. “In addition, the less elastic scar tissue puts a strain on the neighbouring tissue structures,” says veterinary practitioner Julia Beiter. “There is therefore also a risk that the next tendon damage will occur in the

surrounding tissue.”

- Restore the normal tendon structure as much as possible.
- Promote optimal tendon function in the long term.

### Aims of low level laser therapy

Low level laser therapy is intended to support the healing process and restore the structure and function of the damaged tendon as far as possible.

“Low level laser therapy, or rather photobiomodulation, is a non-invasive form of therapy that is extremely well tolerated,” says Dr Anja Eisenack, vet. “The laser can even be used on horses that are very sensitive to pain and touch. It is a therapy that attacks several problem areas at the same time so that the inflammation can be brought to a tolerable level. The swelling and lymph congestion are significantly reduced and the formation of ‘good’ repair tissue is supported. The fibrocytes, the cells that form the connective tissue, are stimulated to form higher quality fibres to a certain extent.

These can be loaded again more quickly and the scar tissue, which is often problematic afterwards, is less pronounced. In addition, not only the actual defect is treated, but also the surrounding tissue, so that tension is released and the entire system is supported.”

### Use of laser light in human medicine

High-energy laser light is very powerful and is used in many different ways in medical treatment. The special thing about it is that the energy of the light is very concentrated and can be applied to the tissue without contact.

The light beams are focussed on the cells and lead to a desired positive change in the tissue. The wavelength (colour of the laser light) and the pulse duration are determined depending on the medical application. The radiation can therefore be continuous or pulsed. In surgery, for example, high-energy laser light is used instead of a scalpel to cut through tissue precisely and with minimal haemorrhaging. Dentists use laser light to painlessly remove caries and eliminate germs and bacteria in the oral cavity. Lasers can also be used to treat defective vision and eye diseases such as retinal tears, macular degeneration or cataracts and to improve eyesight. In dermatology, laser light is used to treat vascular changes and vein problems.

### How low level laser therapy works

In low level laser therapy, the energy is considerably lower (max. 100 mW), but still with high power without overheat-

ing the tissue. The depth of penetration into the tissue depends primarily on the wavelength of the light. Focused light of a specific wavelength, such as in the red and infrared range, is used with different frequencies. This stimulates the body's own physiological processes and supports the healing process

The principle behind it: The energy of light supports the biochemical process of adenosine triphosphate (ATP) formation in the mitochondria, the power stations of a cell. This molecule in turn provides the diseased cells with energy to regain strength. This makes it easier to remove damaged tissue and rebuild new tissue more easily.

Regeneration is accelerated. The laser light also stimulates the release of endorphins, which contributes to pain relief.

### The main aims of laser therapy are

- Stimulation of blood circulation
- Relaxation of the surrounding muscles
- decongest diseased tissue
- minimise inflammatory swellings
- positively influence cellular metabolism and tissue regeneration

“Laser therapy is indispensable for all forms of tendon and ligament injuries,” says Matthias Spitznagel. “The advantages are: faster regeneration, better lymph



Photo: © Andrea Bruckmaier

The healing process can be significantly supported with the help of low-level laser therapy



Photo: © MKW-laser.de

The device can be used all over the body, wherever tendons and ligaments run

transport, demonstrably scar-free healing and therefore a better prognosis in terms of resilience.

“Almost all the cases that come to me are those that have not achieved a satisfactory result with bandages and anti-inflammatory substances,” explains Dr Andrea, Countess of Ingenheim, owner of a rehabilitation centre for horses in Baierbach.

“Trauma or alteration of the flexor tendon or the annular ligament leads to constriction of the flexor tendon sheath and the flexor tendon, resulting in local ischaemia and necrosis. The consequences of this are scar tissue formation, inflammation and adhesions of the superficial flexor tendon to the tendon sheath. The filling of the tendon sheath results in an increasing constriction of the flexor tendons, which leads to a considerable reduction in the functional capacity of the tendons.”

### The treatment usually proves to be very effective

The expert explains further: “Laser therapy has an anti-inflammatory effect and promotes blood circulation, which par-

ticularly counteracts ischaemia. This not only improves the supply of oxygen and nutrients to the damaged tissue, but also removes the harmful substances caused by the necrosis. These anti-oedematous processes enable the tendon to glide again, thereby reducing tendon tension. In addition to treating the affected area, I also carry out stem cell stimulation with the laser. This stimulates the stem cell density in the blood and their differentiation potential. This plays a decisive role in all forms of tissue regeneration. Laser therapy promotes both the stem cell yield and their differentiation. Added to this is the pain-relieving effect of the laser. This form of therapy is completely free of side effects, which is not the case with many anti-inflammatory drugs.

In addition, laser therapy does not require any major manipulation, which is often associated with pain. On the contrary, it has a pain-relieving effect and, in my experience, is extremely effective.”

### The treatment is very pleasant for the horse

“Low-level laser therapy has no side effects, is pain-relieving, anti-inflammatory,

strongly promotes healing and has a relaxing effect,” confirms Nadine Schröder, veterinary practitioner in Henstedt-Ulzburg. “The special feature of the laser is its relaxing and non-painful effect on the patient, so that even open wounds or painful injuries such as a tendon injury can be treated very well because the laser is well tolerated by the horse. Added to this are the many different frequencies of low level laser therapy, which I can use to specifically target the tendon and ligament apparatus. This accelerates the healing process enormously, which is very important for this protracted illness, which is emotionally demanding for both owner and horse. So I not only help the horse, but also the owner!”

### How the low laser is used

The treating, laser-competent therapist sets the recommended programme for the tendon disease on the low-level laser device. The Power Twin laser shower is then passed over the affected region. “The advantage of the laser is both the energy that is brought into the cell to activate self-healing and the frequency,” says animal physiotherapist Nadine Tenger.

“Every organ has its own frequencies that remind the cell of its ‘favourite music’, in which it can heal best. The combination of the huge increase in ATP synthesis and the frequency for activating the cells has allowed me to heal every tendon injury in the past. Even cases that occurred years ago could be healed. Further advantages are: The treatment is inexpensive in relation to the clinic, smooth scarring, shortening of the healing phase. The prospects for success are extremely good if you stick to the treatment plan, and you can work under full load after healing.”

### The following therapy lasers can be used for acute and chronic tendon disorders:

#### Surface irradiation

Modern low-level laser systems such as the PowerTwin XP5 and PowerTwin 21 laser showers from MKW Lasersystem can be used to treat large areas of tissue.

The laser devices also work with frequencies according to Paul Nogier, Frank Bahr, Manfred Reininger and Royal Rife. The right pulsation of the laser light can significantly increase the success of laser therapy.

#### Laser acupuncture

The MKW LA-X P500 laser pen can be used to treat trigger points/acupuncture points in a targeted manner.

### Accompanying treatments for low laser therapy

In the case of tendon problems, accompanying treatments such as mobility training or physiotherapy are usually also carried out.

“Each treatment involves different measures,” explains Dr Anja Eisenack. “It’s like having a well-stocked toolbox.

No craftsman would work with just one tool on a construction site, no matter how great this tool may be. Basically, I differentiate between the treatment of an acute and a chronic problem. In addition to a proper diagnosis, this may also include an injection with hyaluronic acid or PRP and inflammation and pain management with medication (my colleagues then take care of this). The use of leeches to eliminate the causes as comprehensively as possible is also conceivable.



Practical, easy to store and transport, the device sits comfortably in the hand

Photo: © MKW-laser.de

The collaboration with ‘my’ farrier is particularly valuable for me here, in order to correct the mechanical causes of hoof misalignments. Various methods of manual therapy, physical medicine and my radial shock wave are regularly used as additional treatment tools. Afterwards, it is important that the owner knows how to avoid future strain and how to move and train their horse biomechanically correctly.

For example, I work closely with a trainer who specialises in rehabilitation.

“I always add laser acupuncture, which I also use to achieve impressive additional improvements in general well-being,” says Dr Andrea, Countess of Ingenheim. “Fascia therapy is also always included in the treatment, as the elasticity of the entire fascial apparatus is restricted by the adhesion of the fascia at the diseased site.”

“I accompany the laser therapy with aqua training, leeches, medication and shoeing techniques,” says Matthias Spitznagel.

### The difference: acute and chronic tendon problems

In general, acute tendon problems are easier to treat than chronic ones, and the chances of complete regeneration are high.

“Even if the transitions are fluid and even a chronically damaged tendon can be damaged again and again, the treatments are definitely different,” says vet Anja Eisenack. “In the case of acute damage, rest, inflammation control and rapid mechanical relief are important. Ideally, the laser would be used twice a day to support healing and reduce the acute inflammatory process. Depending on the severity of the damage, such inflammations can heal without visible consequences and the horse can be fully resilient again.”

The vet goes on to explain: “Chronic events usually result in scarring or remodelling of the connective tissue structure. The inflammation is no longer ‘productive’.

This means that it no longer really serves to repair the damaged tissue, but instead perpetuates a vicious circle of tissue damage, inflammation and pain. The primary aim here is not to end the inflammation quickly with anti-inflammatory drugs, for example, but to convert it back into a productive form and thus achieve tissue healing. Chronic damage takes much longer to treat and changes often remain that are always susceptible. Unfortunately, there is still often the opinion that chronic tendon damage must be taken for granted and that the horse will never be able to bear weight again. This is not true in many cases. The aforemen-

tioned corrections in hoof treatment and accompanying shock wave applications in combination with optimisation of movement patterns can also produce very good results with chronic tendon damage. However, no miracles should be expected and the therapies are sometimes very time-consuming.”

### The earlier the treatment, the better the prognosis

“Acute injuries are always easier to treat, as there is less scarring and adhesions,” confirms Matthias Spitznagel. “Chronic injuries generally last longer and don’t have such a good prognosis.”

“Acute cases are treated daily and the chances of success for complete healing are much better,” adds Dr Andrea, Countess of Ingenheim, MD. “For chronic cases, I treat with the laser once or twice a week, depending on the condition.”

### Restore mobility as quickly as possible

As running animals, horses need sufficient free movement to stay physically and mentally healthy. Tendon problems are therefore very distressing for horses.

“The healing process is often very protracted. The horses are clearly in pain. Due to the long and necessary periods of standing in the box, muscle loss also occurs,” says Susanne Schatz. The aim of laser therapy is to support and accelerate the healing process and to restore the horse’s mobility as well and as quickly as possible.

Even in sport horses with tendon damage, the prognosis is good that the tendon injuries can be cured completely and more quickly with laser therapy. As a result, the horses do not have to take such a long break, lose less muscle and can be trained again sooner. An important aspect for competitions.

“The prognosis depends very much on the type and severity of the damage,” says Dr Anja Eisenack. “The earlier damage is recognised and the earlier it is treated holistically, the better the chances. And the less effort, time and costs are incurred by the owner. However, this also means that the hoof position and/or incorrect posture, incorrect training and negative postural influences must be corrected.

Ideally, the horse’s mineralisation and metabolism should also be optimised. Apart from real accidents, tendon damage is almost always caused by incorrect loading in combination with metabolic deviations. The laser has become an indispensable tool for me. It cannot work miracles on its own, but is always used in combination with comprehensive treatment and counselling. The experts agree: “Laser therapy is well tolerated, painless and pleasant for the animal. In the last few years, I have been able to help 20 horses that were considered to be out of therapy and due to be euthanised to regain their ability to move, and in some cases even to ride again.”

“The prognosis for recovery naturally depends on the severity of the inflammation or injury. However, in my experience, laser therapy has always led to a significant improvement in the patient’s quality of life, even in the case of severe

chronic diseases,” says Dr Andrea, Countess von Ingenheim.

### Even older horses have a good chance

“I have an 18-year-old gelding with a severe inflammation of the pasterns. After the ultrasound examination, the very experienced colleague who was called in said he had little hope, but at 18, retirement was also an option. Well, he’s my own horse and I was able to treat him every day. It also took 18 months, but then the colleague said at a check-up that he would never have thought it possible. The horse is still being ridden today.”

“In general, it depends on the age and what the horse should or must do after healing,” says Sabine Dietrich, veterinary practitioner from Wüstenrot, from her day-to-day practice. “There have also



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been cases that have become lame-free, but the sport and exertion had to be adjusted.”

### The duration of therapy depends on the degree of severity

It takes time for a horse to be able to canter and be ridden again without any problems after a tendon injury. How long this can be varies. “This depends very much on the type and extent of the damage and, of course, on how quickly and consistently the owner initiates and implements therapy,” says Dr Anja Eisenack. “Tendon damage is generally one of the more protracted changes, so even minor damage can take a few weeks to heal. Severe damage or chronic changes can take several months. I’ve also had horses with tendon damage that were considered to be out of therapy and had severe adhesions and traumatic damage to the surrounding tissue, so that euthanasia was advised. The longest accompanying therapy lasted just over a year. However, I was only admitted after several weeks, so the changes were already partially scarred and highly adherent. It is

always advisable to have regular ultrasound examinations of the structures at the same time. Initially, you often have the feeling that the laser brings relief, for example by reducing the smouldering quite impressively, but you can’t really say that the tendon heals faster than with purely conservative therapy. There are studies that show that the healing process accelerates measurably from approx. 10 days after the start of therapy, which also corresponds to my experience. Control ultrasound examinations are often recommended after 3 to 4 months. With laser therapy or combined therapy, in which the laser plays an important role, results that are actually expected after 4 months can often be seen after 0 weeks. This often relativises the cost factor for the owner.

### Feeding and hoof care are also important

“You can’t give a generalised answer to how long the therapy lasts, it’s very individual,” confirms Julia Beiter. “It depends on the type and degree of damage, the age of the animal and the

individual general constitution. But it also depends on many other factors that the owner can influence, such as feeding, husbandry, hoof trimming, etc.”. For me personally, the time factor should not be underestimated. You shouldn’t start training again too soon. It’s better to walk the horse at a controlled pace for longer, incorporate aqua training and just let the horse be a horse from time to time.”

### The experts agree that this form of therapy is well tolerated, pain-free and pleasant for the horse.

“When used correctly and excluding contraindications, laser therapy has no side effects,” says Julia Beiter. “In principle, there are no side effects,” confirms Matthias Spitznagel. “However, it is important to choose the right laser frequency and laser dose. This must be individually adapted to the damage and the horse in each case.”

Vet Dr Anja Eisenack adds: “Photobio-modulation as an accompanying form of therapy normally has no direct side effects.

In particular, there is no risk of heat damage to the tissue, as is the case with higher-energy lasers. The effect is really based on the exact wavelength of the light and the pulses with which this light reaches the tissue. There are, of course, some contraindications that must be taken into account. For example, if there is acute inflammation in the tissue following tendon damage caused by injury, the laser can have negative consequences due to its effect of increasing blood flow. Too much energy can overload the tissue and then have no or a disturbing effect. A laser, as low in side effects as it is, belongs in the hands of trained people who really understand how it works and can judge its use on damaged tissue.”

*Raija Wengler, medical journalist*

### The mechanism of action of low level laser therapy

To inhibit inflammation	For tissue regeneration
improves phagocytosis	increases the rate of mitosis and collagen synthesis, activates fibroblasts, chondrocytes, osteocytes, etc.
Inhibits mast cell degranulation	increases ATP production
activates the immune cells through increased leukocyte mobilisation	Increases granulation and epithelialisation
Improves microcirculation through vasodilation	Promotes peripheral nerve regeneration after injuries
Reduces inflammatory swelling and stimulates lymphatic flow	Reduces or eliminates scar tissue
reduces the synthesis of proinflammatory prostaglandins	