

shockwave therapy



Medical Information about animals

Applications of Shock-Wave Therapy in Veterinary Medicine

Background

Shock waves were first employed in the treatment of human beings in the 1980s. Since then units designed to generate extracorporeal shock waves have been used to treat patients with renal calculi. Ten years after the introduction of shock-wave lithotripsy, shock-wave methods were also used for the first time to treat patients with tendinopathies and pseudarthrosis after studies indicated that shock-wave therapy stimulates natural healing processes.

Shock-wave therapy in the modern veterinary practice

The application of electrohydraulic shock waves is the therapeutic modality of choice for a growing number of diseases. The therapy is economical, practically free of adverse reactions and ensures faster recovery. The large focal volume of the shock waves generated by the VersaTron affects both the lesion and the surrounding healthy tissue. Healing is promoted without any injurious thermal effects.

More and more animal owners are asking their veterinarians to use shock waves to treat their animals.



Successful treatment of horses and small animals

Impressive therapeutic results have been achieved by using the VersaTron to treat the following conditions in horses:

- tendinopathies with and without calcification
- insertion desmopathies (e.g. of the suspensory ligament)
- joint disorders (e.g. synovitis or bone spavin)
- exostoses
- stress fractures
- ring bone
- navicular disease
- splint bone fracture
- kissing spines
- back problems



Indications of Shock-Wave Therapy for animals

Ringbone

Clinical picture

Animals suffering from chronic ossifying peri-arthritis, or "ringbone", display non-characteristic and highly variable symptoms of lameness. The onset of the disease is usually insidious; the course is marked by a gradually progressive lameness affecting all kinds of gaits and turns. In some cases the animal exhibits little or no lameness. This occurs, in particular, when the additional bone formation exerts only a minimal effect on the joints. Frequently, lameness is observed only during the supportive phase of the animal's gait when it puts weight on its legs. When ringbone affects the joints, it is always accompanied by inflammation (arthritis) of the affected joint. The animal often takes the weight off the affected leg by putting it forward. At the acute stage of the disease, the affected region becomes noticeably warmer and increases in circumference. At this stage the horse finds any touch painful. At the chronic stage of the disease, the swollen area becomes increasingly thick but is no longer warm. The veterinarian can observe that the horse finds the toe-bending and toe-rotating tests painful; ability to bend the joint is noticeably reduced. Finally, osseous changes seen on x-ray provide clear-cut evidence of ringbone. The joint ossification, if allowed to progress, can ultimately result in total joint stiffness.

Causes

Ringbone can be caused by placing excessive strain on a joint over longer periods of time or by a single trauma. The ossification is always preceded by periosteal inflammation.

Excessive strain on a joint, regardless of whether it is caused by excessive or false training or by a false position of the limbs, causes increased tension to be exerted on the bones by the ligaments, tendons and joint capsules. This in turn promotes the development of periosteal inflammation.

Bone spavin

Clinical picture

The onset of the diseases is heralded by lameness due to pain. As the disease progresses, the lameness becomes increasingly evident. An especially noticeable feature of this "advanced lameness" is that it is more pronounced at the transition from walking to trotting. If the affected horses are kept moving, their gait gradually normalizes; in some cases, the lameness disappears entirely.

At advanced stages of the diseases, so-called exostoses may develop on the affected parts of the joint. These are bony overgrowths caused by abnormal growth of the original bone. In animals with spavin, these exostoses, which are usually not painful, develop on the inner joint surface. The presence of bony overgrowths is not a reliable sign of advanced spavin, however, since it occurs in many healthy horses as well.

Diagnosis

To make a secure diagnosis of bone spavin, the veterinarian has several options. After evaluating the horse while it is standing or moving, he or she can assess the degree of lameness with the bending test or "spavin test". To obtain a more complete picture, the veterinarian can perform additional tests with general anaesthesia or order x-ray studies. On the basis of this diagnostic workup, the veterinarian will be able to give the horse's owner a positive or negative report.

Indications of Shock-Wave Therapy for animals



Podotrochlosis (navicular disease)

Clinical picture

Early signs of podotrochlosis include a flat short gait, usually noticed by the rider shortly after mounting the horse, and sharp pain when turning. At advanced stages of the disease, these symptoms often persist after the horse is back in its box. Examination of the standing horse frequently reveals that it tries to take its weight off the front hoof by putting first the right hoof and then the left hoof forward. A typical feature of navicular disease is the "jumping" of the lameness from the more severely affected limb to the less severely affected limb after the veterinarian has anaesthetized the most severely affected navicular region. However, hoof scintigram provides the most reliable confirmation of the diagnosis.



Causes

To date the factors triggering the development of podotrochlosis have not been fully elucidated. In active animals such as horses, in particular, podotrochlear strain undoubtedly plays an important role. Furthermore, the insertion point of the deep flexor tendon is often the main problem. Other important factors are: an inadequate diet, malpositioning of the extremities (either congenital or due to improper shoeing), false posture and - most importantly - putting excess strain on young horses by entering them in competitive events which can lead to wear and tear on the podotrochlea.

Another question being discussed in professional circles is whether podotrochlosis is inherited or a problem of certain breeds of horses (e.g. quarter horses). The disease may also be sex-related since there is apparently a higher incidence in males than in females.

Indications of Shock-Wave Therapy for animals

Sesamoiditis

Clinical picture

In horses with sesamoiditis, the lameness is especially noticeable when the horse walks on soft ground. In particular, the lameness can be observed when the horse trots faster or has to make sharp turns. Although sesamoiditis commonly affects the front legs, it can also affect the hind legs, especially in dressage horses. The disease can be seen on x-ray at margins and blood vessels which are not clearly demarcated and in porous bone structure. The actual pain occurs at the point of friction between the rough surface of the sesamoid bone and the deep flexor tendon. The sheath of the flexor tendon is located directly in this sensitive area and can become the site of secondary pathology. Under certain circumstances friction points can also develop in the region between the sesamoid bone and the third metacarpal.

Causes

Heredity plays only a minimal role in the pathogenesis of sesamoiditis. In several studies, a positive correlation has been ascertained between navicular disease and sesamoiditis. Optimal conditions during breeding and raising are essential to prevent defects of the sesamoid bones. Toe growth, in particular, should be closely watched in animals suspected of having this disease. Furthermore, there is a disproportionately high incidence of sesamoiditis in overweight horses.

Indications of Shock-Wave Therapy for animals

Tendinopathies

The most common tendinopathy in horses is injury to the superficial flexor tendon. This is the most superficial tendon on the posterior side of the third metacarpal. Directly underneath this tendon is the deep flexor tendon and directly underneath it the suspensory ligament. In animals with severe injuries, structures at deeper locations may also be affected. Tendon damage is usually the result of overuse of the particular tendon, leading to tiny tears in the individual fibres of the tendon tissue. Frequently, the horse does not develop lameness until a substantial portion of these "tendon building blocks" have been damaged. At this stage of the disease, swelling and heating of the affected extremity are observed. Since tendon tissue is only weakly vascularized, damaged tendon may take a long time to heal. Stall rest is essential; in racehorses, this can result in long periods of missed training.

Back problems

Back problems responding to ESWT can be divided into two categories. The first category is reserved for horses suffering from muscular back pain as a result of very intensive training; these problems can be alleviated over the short term with shock-wave therapy. If training is resumed at the same demanding pace, however, this muscular pain will recur after only a few months or even weeks.

The second category consists of back problems attributable to specific diseases, e.g. sacroiliac joint pathology or "kissing spines". In these cases shock-wave treatment can bring about long-term improvement or even healing of the disease.

"Kissing spines" is a condition in which upwardly pointing spinous processes are in contact and rub painfully against each other when the animal moves.

Contraindications and adverse reactions

Indications

Horses :

- Diseases of the suspensory ligament (including pathology affecting the origins and insertion point)
- Tendinopathies (acute and chronic)
- Periostitis (tibia and splint bone)
- Sesamoiditis
- Arthritis (spavin and ringbone)
- Podotrochlosis (navicular disease)
- Diseases of the sacroiliac joint and muscular back pain

Dogs:

- Arthritis: hip dysplasia, elbow dysplasia and chronic arthritis of other joints
- Tendinopathies: calcific tendinitis of the biceps tendon
- Fractures: pseudarthrosis, prophylactic treatment of fractures at risk of developing into pseudarthrosis
- Reduction of scar tissue in burn wounds

Contraindications

The contraindications cited in the literature include:

- treatment of the head (brain)
- treatment of the heart and lungs
- large blood vessels and nerves in the shock-wave field
- tumours (e.g. sarcoids in horses) in the shock-wave field
- septic processes
- coagulation disorders
- gestation

It is the responsibility of the veterinarian supervising the therapy to recognize contraindications and other situations in which the use of ESWT is not advisable.

Very little is known about the effects of shock-wave treatment on young animals or animals with pacemakers. When juvenile animals are treated with shock waves, care should be taken that the epiphysial disks are not positioned in the shock-wave field.

Adverse reactions

Pain may occur during or after treatment with ESWT; however, this pain usually subsides within 48 hours. In individual cases, skin reddening and petechia have been observed in the area around the coupling site. Haematomas occur rarely.

Treatment parameters for the VersaTron

Dogs

Between 200 and 500 shots should be administered, depending on the size of the animal. Whereas acute and subacute processes are treated with low-energy shock waves, high-energy shock waves should be employed to treat chronic disease.

Horses:

Indication	Energy level	Number of shock waves
Fractures	E9	800 - 3000
Acute tendinopathies	E9	1000-2000
Chronic Tendinopathies	E9	1000-2000
ring bone	E9	1500-2000

Preparation:

The horse's hide should be clipped and cleaned at the intended coupling site. Ultrasound gel should be applied to the site; care should be taken to avoid air bubbles.

To prepare the hoof of a horse with navicular disease, the iron horseshoe should be removed the day before treatment and a small cut made in the hoof. The cuneon should also be cut back slightly. The hoof should be hydrated overnight to guarantee optimal coupling of the therapy head. This can be tested by attempting to visualize the podotrochlea with an ultrasound unit. If this attempt is successful, it will be possible to achieve shock-wave coupling without a loss of energy.

Mild sedation is recommended for all animals.