

REHABILITATION OF TENDON AND LIGAMENT INJURIES

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The first step to healing a soft tissue (tendon or ligament) injury is an accurate and complete diagnosis. Unless there is obvious pain heat and swelling of the affected structure, this should include a lameness evaluation with flexion tests and nerve blocks as indicated. Once the suspect area is identified, a thorough ultrasound exam will include short and long axis views with cross-sectional area measurements of the affected tendon or ligament and any discrete lesions seen. Permanent images should be kept in the form of hard copy prints and/or digitized records.

The goal of treatment and rehabilitation is healing of the tendon or ligament to the extent that normal athletic activity can be resumed without re-injury. A large study of equine athletes several years ago showed that 90 days of stall rest followed by 9-12 months of pasture turnout resulted in only 22-26% of horses returning to work for one year without re-injury. Likely reasons for the low success rate of pasture turnout include a relatively short duration of pain and inflammation compared with the long healing time for tendon and ligament. This means that the horse feels good after a few weeks and plays until the weakened structure sustains a re-injury and the cycle of inflammation and pain begins again. Also, normal tendon and ligament are close to their breaking strength when the horse is at full gallop, therefore injured soft tissue can sustain more fiber tearing at lower speeds. In fact, horses which have had

months or years of pasture turnout for a soft tissue injury rarely have healed tendons or ligaments prior to returning to work, rather ultrasound evaluation reveals partial healing with chronic thickening and a fiber pattern that lacks the appearance of sufficient strength to withstand work.

Controlled exercise, which is well accepted for bone fractures, is essential for optimum healing of tendons and ligaments. It is useful to think of a soft tissue injury as being comparable to a fracture that can't be casted or plated for stabilization. Rather, we rely on corrective shoeing, medical therapy and controlled exercise over a several month period, to regain normal tendon and ligament structure and strength. Ultrasound examinations at regular intervals allow us to tailor the amount of exercise to each horse's particular stage of healing so that the risk of re-injury doesn't increase from adding work too quickly or so that unnecessary training or competing time is not lost due to resting for too long.

Overall prognosis for return to work without re-injury after successful completion of a controlled exercise rehabilitation program is good, meaning 85% or better. The most common reasons for failure to achieve 95% healing (normal soft tissue strength) on the final ultrasound examination are:

- 1) Owner/horse non-compliance with a controlled exercise program.
- 2) Failure to recognize and treat other injuries or syndromes that are contributing to the soft tissue injury. For example, a horse with (even slightly) sore hocks will not heal a front leg suspensory ligament injury well even if the rehab. program is being followed due to constant low grade overloading of the injured ligament.

Based on ultrasonographic findings and clinical experience with more than 22,000 cases of tendon and ligament injury, the following rehabilitation protocols have been developed.

At the initial examination, grade of lameness and clinical signs of pain on palpation, heat and swelling are noted. The affected tendon's (ligament) ultrasonographic changes in size (cross-sectional area; CSA) echogenicity and fiber pattern are recorded at the most proximal site of damage, at the most severely damaged site, and at the most distal site of damage. If a discrete core lesion is found, the CSA and echogenicity of the lesion are also recorded at the same sites. An initial period of stall confinement and hand walking is then initiated (**Table 1**)

At the first recheck examination, progress toward healing is regarded as good if: lameness, pain on palpation, heat and swelling are absent, and any core lesion has filled in with collagen to the extent that it is faintly visualized or not visualized ultrasonographically, the CSA of the tendon has decreased, and the fiber pattern has improved one level. Progress is regarded as fair if clinical signs are absent, and ultrasonographically any lesions are faintly visible, CSA is the same or slightly increased, and fiber pattern has improved one level. Progress is regarded as poor if any clinical signs are still present, and ultrasonographically any lesion is clearly visible (Type III or IV), and fiber pattern has not improved. Amount of exercise and duration of protocol before re-examination are based on the degree of improvement. (**Table 2**)

At the second recheck examination, progress toward healing is regarded as good if clinical signs are absent and ultrasonographically, any lesions are no longer visualized, CSA is stable, and fiber pattern is good. Depending on length of rest before return to mid-level work, some tendons will have responded to exercise by a small increase in CSA; progress is still regarded as good if the increase is 10-12 % or less and other parameters are good. Progress is regarded as fair if clinical signs are absent, and ultrasonographically any lesions are faintly visible, CSA has increased 12-15% and fiber pattern is fair to good. Progress is regarded as poor if any clinical signs are present, and ultrasonographically any lesion is Type II or less echogenic, CSA has

increased more than 15%, and fiber pattern is less than fair. Amount of exercise and duration of protocol are based on the degree of improvement. (**Table 3**)

At the third re-examination, progress is regarded as good if clinical signs are absent, and ultrasonographically no lesions are visible, CSA is stable and within normal range and fiber pattern is good. Progress is regarded as fair if clinical signs are absent and ultrasonographically, no lesions are visible, CSA is stable although enlarged and fiber pattern is fair to good. Progress is regarded as poor if any clinical signs are present and/or ultrasonographically a lesion is visible, CSA has increased and fiber pattern is fair or less. Amount of exercise is based on the examination results. (**Table 4**).

Discussion

Successful cases usually require 8-9 months of rest and rehabilitation to return to previous full work load. Advancing too quickly often results in worsening of the lesion; while advancing too slowly results in a loss of productive athletic use of the horse. The basic purpose of controlled exercise rehabilitation is to initially encourage resolution of inflammation and maintenance of tendon gliding function through rest and walking. Gradually increasing work load provides stimulation to the tendon to continue the healing process, bearing in mind that the tendon is relatively weak after injury and gains strength over several months. It is important that the increase in exercise be graduated, so that fatigue or overload injury to the healing tendon does not occur. Owners or trainers should be advised that there is an increased risk of injury to the affected tendon or ligament during healing and that an ultrasonographic examination should be performed if at any time during the rehabilitation program clinical signs recur. Please note that none of the rehabilitation protocols include free pasture turnout or uncontrolled exercise before the horse is ready for full work. Although controlled exercise requires time, effort and money, coupled with accurate interpretation of regular clinical and ultrasonographic examinations, it provides the best opportunity for successful resolution of tendon injury.

Table 1. Exercise protocol following the first examination (0 to 60 days)
Horse is confined to a stall and equivalent size paddock (12' x 24'')

Injury	0-30 days	30-60 days
mild	Hand walk 15 minutes twice daily	Hand walk 40 minutes daily
moderate	Hand walk 10 minutes twice daily	Hand walk 30 minutes daily
severe	Hand walk 5 minutes twice daily	Hand walk 20 minutes daily

Table 2. Exercise protocol following the second examination (60 to 120 days)
Horse is confined to a stall and equivalent size paddock

Progress	60-90 days	90-120 days
good	Ride at walk 20-40 minutes daily	Ride at walk 40-60 minutes daily
fair	“	“
poor	Hand walk 60 minutes per day	Ride at walk 20-30 minutes daily

Table 3. Exercise protocol following the third examination (120 to 180 days)
Horse is confined to a stall and equivalent size paddock

Progress	120-150- days	150-180 days
good	Add 5 minutes trot every two weeks	Add trotting 5 minutes every 2 weeks
fair	Ride at a walk 60 minutes daily	“
poor	Re-evaluate case & discuss further	treatment options

Table 4. Exercise protocol following the fourth examination (180-240 days)

Progress	180-210 days	210-240 days
good	Add canter 5 minutes every 2 weeks	Add canter 5 minutes every 2 weeks
fair	Add trotting 5 minutes every 2 weeks	“
poor	Re-evaluate case & discuss further	treatment options

Table 5. Exercise protocol following the fifth examination (240-300 days)

Progress	240-270 days	270-300 days
good	Begin work at racing speed; jumping	Return to competition
fair	Add canter 5 minutes every 2 weeks	Full flat work; no racing speed work or jumping
poor	Re-evaluate case & discuss further treatment options	Re-evaluate case & discuss further treatment options