

EQUINE DIGITAL FLEXORS TENDINITIS AND TENDINOSIS

Conventional vs Regenerative therapy

Bros Pont, Maria

Introduction

Flexor tendinopathy is a highly prevalent condition in most athletic horses and is problematic because it heals very slowly and repaired tissue hasn't got the same characteristics of elasticity and strength than the original tissue.

Conventional treatments result in a inferior functionally tissue repair with an a large heal phase, resulting in a relatively high rate of recurrence.

There is growing evidence that the regenerative potential substrates are superior to conventional treatments. There is some evidence in human athletes that manual therapy and physical therapy via eccentric exercises may augment the quality of tendon repair.

Platelet-Rich Plasma (PRP)

The PRP is defined as a plasma with an increase of 2 or more platelet baseline concentrations above the reference levels or $>400 \times 10^3$ platelets/ μ l.

The suggested use for tendon injury is to use 2 to 3 times higher concentration than baseline and a minimum concentration of leukocytes.

The PRP reduces the expression of collagen type III and induces an increased expression of collagen I.

In **fig.1** it is observed that horses treated with PRP, unlike controls, from the most serious categories (Cat VI) injuries evolve to less serious categories or even healthy (Cat II).

When applying two or more doses evolution was faster. In serious lesion categories that received several intralesional doses the improvement was similar to less serious lesions stressing, the fact that intralesional injection has superior results.

Physiology

Collagen and elastin form the fibrous component, which give tensile strength to the tendon. The disposition in tiny fascicles covered by elastic fascia and the spiral configuration of collagen macromolecules give this tissue a special characteristic called crimp. With maturation, increases in age or general cyclic fatigue the crimp pattern disappears in certain tendinous areas. Almost 95% of the collagen is type I. However, collagen type III prevail after lesions. This type of collagen is immature and needs to organize and crosslink with other molecules in order to become type I.

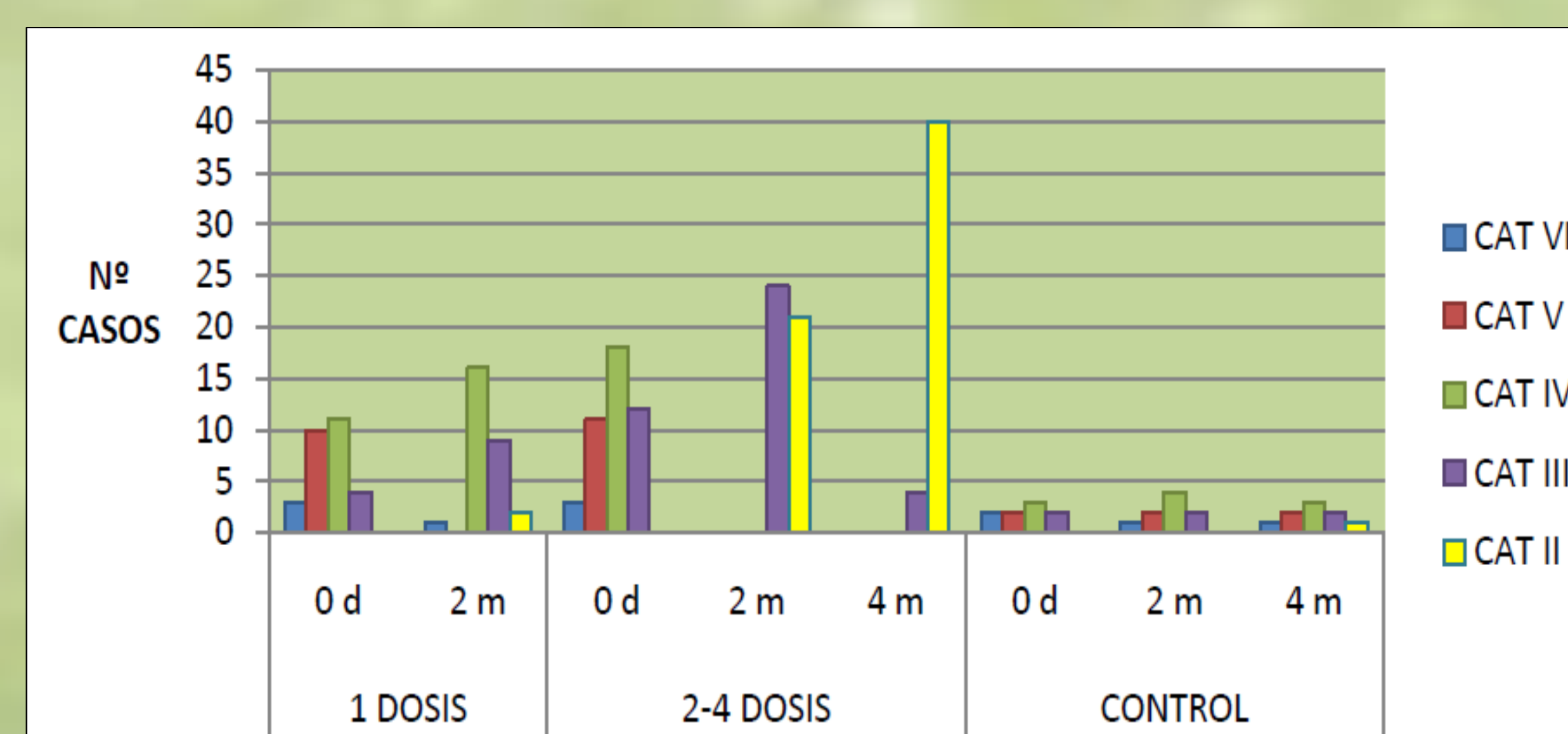


Fig.1: Reproduced from Abellanet, 2009.

Physiotherapy – Eccentric Exercise

Eccentric exercise is a type of training based on the completion of muscle contractions where insertions, proximal and distal, separate and ultimately obtain an improvement in the strength and endurance of a muscle when it contracts, while extended its fibers. (**Fig. 2**)

Rehabilitation should start the day after the injury with progressive mobilizations. Is necessary to follow some general guidelines with a gradual increase of the eccentric load.

Eccentric exercise loads represent a promising treatment for patients with various types of chronic tendinopathies and although its exact mechanism of action is not entirely clear, some authors reported that this type of exercise returns the physiologic alignment of the fiber and reduces adhesion formation in acute tendinopathies.

In human results there is a better short term recovery of Achilles tendinopathy patients.

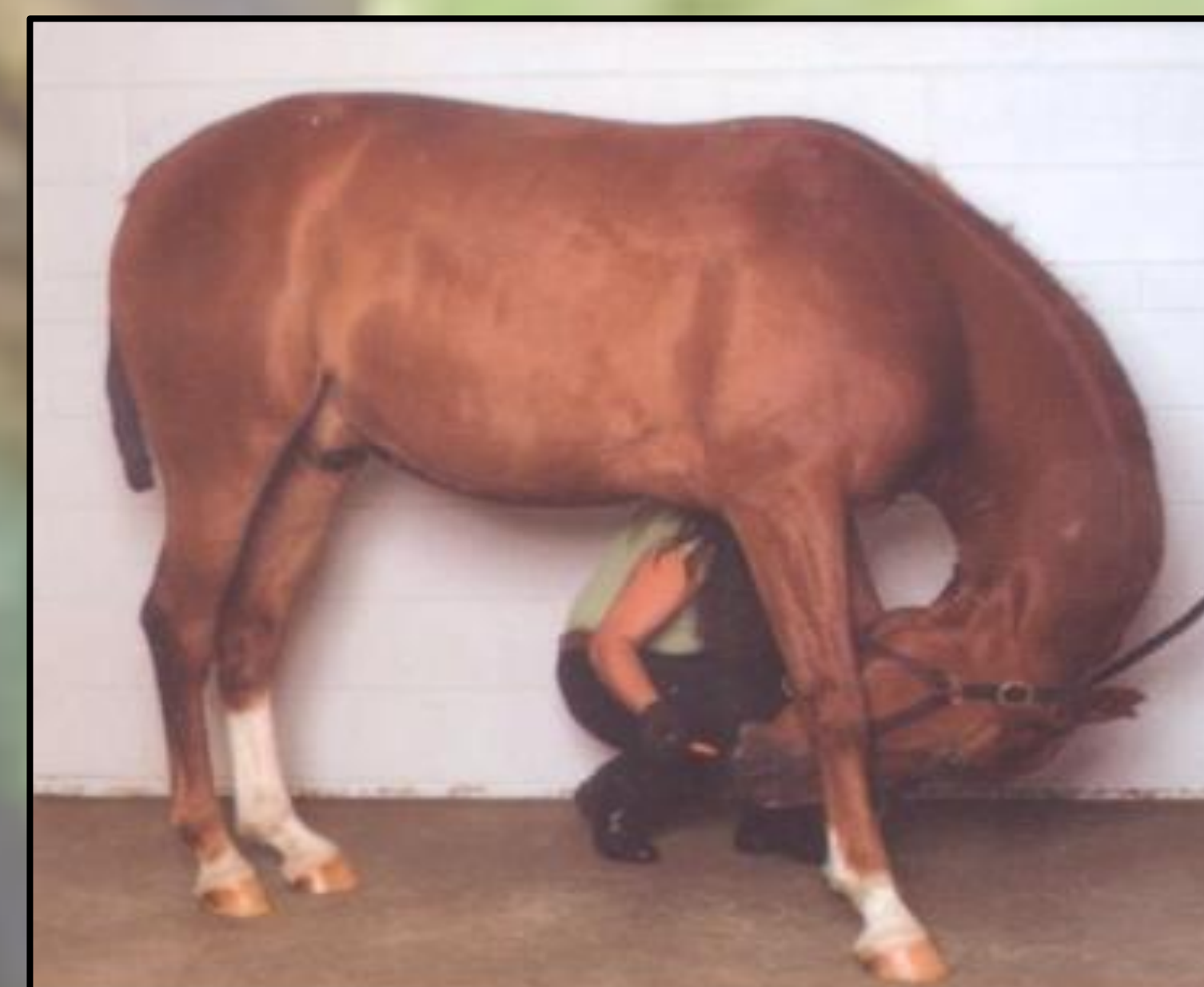
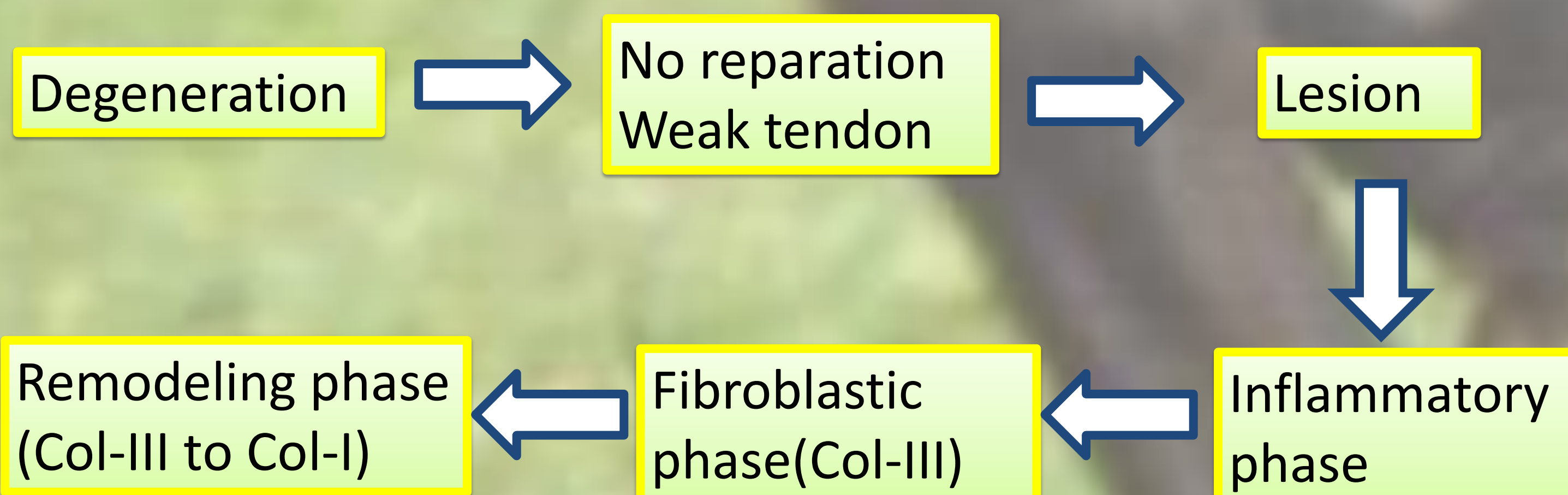


Fig 2. In this exercise called rounding the tendons of the forelegs are doing the eccentric exercise, ie proximal and distal insertions of the tendons limbs are separating. Reproduced from *Activate your horse's core*.

Pathogenesis and Physiologic Recovery



Conventional Treatment

The aim of this treatment is based on controlling inflammation and prevent further tendon damage both directly, by reducing inflammation of the tendon fibers and the influence of inflammatory mediators by giving adequate support to the tendon, or indirectly through rest followed by a gradual exercise increase.

The current heal therapies are divided into three groups depending on whether the injury is acute, subacute or chronic.

-> **Acute:** Rest, ice and AINEs (Flunixin meglumine and Phenylbutazone).

To reduce more injury and inflammation.

-> **Sub-acute:** Alternating cold with warm temperatures and manual therapy. Start a progressive mobilization.

To begin the formation and deposition of collagen.

-> **Chronic:** Continuation with the progressive mobilization.

To obtain a functional tendon.

Conclusions

The basis of care will be control of local inflammatory signs, early mobilization passive and active and a gradually increasing exercise load. Adding regenerative therapies such as intralesional PRP therapy in several doses at 2-3 time supraphysiologic levels and novel and increasing eccentric exercise loads will result in better tendon quality, due to better fiber alignment and collagen remodeling and thus increase athletic expectations.