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SDFT reinjury: desmotomy versus chemical counterritation

Abstract

The purpose of this study is to compare clinical results in horses with a reinjury of the superficial digital flexor tendon (SDF) treated with desmotomy of the accessory ligament of SDF or with "counterirritation" through a blister ointment. Horses have been divided into two groups: Group 1-horses treated with surgery; Group 2 horses treated with the application of a blister ointment.

The results have shown in Group 1 one horses had a recurrent injury to the SDF after the second competition, instead in Group 2 one horse had a recurrent injury to the SDF after the third competition, one after the first and one after the second. In the present study no statistically significant differences (P=0,058) were detected between the two groups in terms of performance and reinjury incidence for about five competitions.

Keywords: superficial digital flexor tendon, reinjury, counterirritation, desmotomy

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Introduction

Superficial digital flexor (SDF) tendonitis is a potentially career-limiting injury, with a high incidence of reinjury.[1–3]

Most of the published data on SDF tendonitis are related to Thoroughbred flat[1–4] and National Hunt[5,6] racehorses, and Standard bred racehorses.[7] However, this pathology represents a problem in all horse disciplines.[8,9] A wide plethora of treatment approaches have been tried over time, including, but not restricted to, local or systemic application of anti-inflammatory drugs, intratendinous injections with corticosteroids, β-aminopropionitrilefumarate,[9] polysulfated glycosaminoglycans, platelet-rich-plasma,[10,11] autologous conditioned serum[12] or stem cells[13–15] counter irritation, surgery (tendon splitting, proximal check ligament desmotomy), shockwave[16] and high-power laser therapy.[8] Overall, results have been variable at best, explaining the continuous quest for new avenues to the treatment of tendinopathy in horses.

Counterirritation, through the application of topical 'blister ointments' used to be one of the most common methods employed in the treatment of chronic musculoskeletal injuries in horses despite the lack of evidence in the literature.[17] It is now considered an inappropriate treatment but there are still many supporters for its use, especially in Italy. Desmotomy of the accessory ligament of the superficial digital flexor tendon has been proposed as a treatment based on the premise that transaction and subsequent healing increase the check ligament–tendon length and reduce the likelihood of the tendon exceeding the maximum check ligament–tendon unit excursion, reducing the likelihood of reinjury.[18] Both types of treatments are proposed in horses with tendonitis of various degrees but it is not specified if they are subjects whose tendon lesion is a reinjury or not.[19] The purposes of these studies were:

i. To obtain data about the possible clinical value of counterirritation with a 'blister ointment' in superficial digital flexor tendon reinjury.

ii. To compare the reinjury rates in horses treated by check ligament desmotomy or by chemical counterirritation.

Materials and methods

Horses were selected and enrolled in this study on the basis of the following inclusion criteria.

i. Horses must not be destined to the food chain; they must be sport horses in activity and aged between 2 and 15 years, with no distinction of sex or breed, and weighing between 250–650 kg.

ii. Horses were required to show signs of tendonitis attributed to reinjury of SDF in one or both legs. Lesions were graded on a scale of type 1 to 4, according to the method described by Genovese et al.[1]

Horses were excluded from the study on the basis of several criteria.

i. Horses with a first time injury in SDF.

ii. Horses subjected to local or systemic administration of no steroidal anti-inflammatory drugs, glycosaminoglycans, hyaluronic acid, corticosteroids, or other drugs for treatment of the tendonitis.

iii. Horses with type I lesions.

Horses were divided into two groups:

i. Group 1- Ten horses treated with superior check ligament desmotomy. Surgery was performed in all horses using the procedure described by Turner and McIlwraith.[20]

ii. Group 2- Ten horses treated with chemical counterirritation through an ointment composed of: Iodine 6,5%, potassium iodide 5%, sodium borate 1,5%, alcohol 57%, povidone iodine 2%, benzoic acid and oil of eucalyptus. The ointment was applied for five days after shaving the area and until counter stimulation was observed.

At the beginning of the procedure, all horses were subjected to a similar rehabilitation protocol. However, monthly clinical and ultrasound checks were used to guide adjustments to the protocol, as being a population of high-level sport horses in the clinical setting an effort was made to rehabilitate the horses as fast as possible (Table1).

The result was considered positive when the horses managed to carry out at least five competitions in their respective discipline.

Table 1 Rehabilitation protocol, is reported the recommended working rehabilitation plan during the following weeks after treatment

Weeks rehabilitation program	Working plan
1-2	Wolk 20 min. on hard surface
3-6	Wolk 20 min. on hard surface
7-10	Wolk 20 min. on hard surface, trot increase 2 min per week
11-14	Wolk, unrestricted, trot and canter increase 2 min per week
15-18	Wolk unrestricted, trot and canter normal flat work

Statistical analysis

To calculate the probability of getting the observed data, and all data sets with more extreme deviations, under the null hypothesis that the proportions are the same, a Fisher's exact test of independence was used.

Results

Among the ten horses of Group 1, four were female, five geldings and one stallion. The average age of the horses was 4.5 years (SD* 1.7 years). As for their breed, six horses were Thoroughbred, three Italian Saddle horses and one Warm blood horse. One horse had a grade 2 lesion in both legs, six horses had a grade 2 lesion in one leg and three of them a grade 3 lesion in one leg.

Among the ten horses of Group 2, three were female, four geldings and three horses were stallion. The average age of the horses was 4.5 years (SD* 1.7 years). As for their breed, three horses were Thoroughbred, three Italian Saddle horses and four Warm blood horses. One horse had a grade 2 lesion in both legs, one horse had a grade 4 lesion in one leg and eight horses had a grade 2 lesion in one leg. In Group 1 one horses had a recurrent injury to the SDF after the second competition. In Group 2one horse had a recurrent injury to the SDF after the third competition, one after the first and one after the second. No statistically significant differences were observed between the two groups (P=0,058).

Discussion

Tendon injuries are one of the most common musculoskeletal diseases in horses. They are reported in all breeds but are more frequently seen in competing racing horse. Tendinitis results in permanent alteration of the tendon's molecular composition and biomechanical properties. Typical symptoms of tendinitis are heat, pain and swelling in palmar and metacarpal soft tissues region.[21] In general the treatment of tendinitis and tendon injuries has the goal to stop any inflammatory process that might be present and relief pain, restore the physiological functions of the tendon and reduce the risk of reinjury Therefore tendinopathy and especially tendinitis should be treated in early acute state, but anyway they have a very high rate of reinjure. The vast amount of treatments options for primary injuries can be classified into physical, pharmacological and surgical groups,[22] but is still difficult find an effective method to resolve reinjuries. Also the use of mesenchymal cell to resolve tendon injuries is effective for a primary injury but there are no evidence in the literature about their use in the tendon re-injuries. Indeed in literature there are many works concerning acute SDF injuries[12–23] and the methods used fort end on healing.[8] However, there is little on the treatment of reinjury of the SDF and anecdotally one of the most common methods employed in the treatment of chronic musculoskeletal injuries in horses is counterirritation, through the application of topical 'blister ointments'.[22]

The use of superior check ligament desmotomy was based on the hypothesis that injury causes fibrosis within the SDF tendon, resulting in a less elasticity of the tendon with re-tearing predisposition. Desmotomy of the superior check ligament brings the muscle and tendon proximal to the check ligament into use during weight bearing, providing greater elasticity to the SDF muscle-tendon unit. This improved elasticity reduces the risk of the tendon fibrosis area re-tearing.[24] The use of this surgical technique is well documented in literature with a lot of surgical methods. Each surgical technique described in literature presents advantages and disadvantages. The best described seems to be the electrosurgical tenoscopic desmotomy.[25] In this study we used the technique described by Turner & McIlwraith[20] and the authors had no complications in terms of intra and/or post-operative bleeding, incisional complications or swelling.

In the present study three horse of the ten treated with superior check ligament desmotomy have developed proximal suspensory ligament desmitis and one of them had a a reinjury of SDF after the second competition. Instead for the Group 2 one horse had a recurrent injury to the SDF after the first competition, one after the second and one after the third.

Compare the success rate of the superior check ligament desmotomy with counterirritation is difficult because there is a lack of information about the number of horses that successfully resume competition after a reinjury to the SDF tendon treated with rest alone. A limitation of this study is the low number of subjects in both groups and their heterogeneity. Even if no statistically significant differences were observed between horses treated with blister ointment and horses treated with superior check ligament desmotomy is possible, on an empirical level, highlight that there are more reinjuries after the use of topical 'blister ointments'but the risk of desmitis is higher with the desmotomy technique. The rehabilitation program chosen is a well-documented and widely used program in the literature,[8] but with regard to this aspect also the studies on rehabilitation in the SDF reinjury are poorly documented. Sequential ultrasound examinations have been used in order to try to determine the optimum time for a horse to resume sport activity. But the disappearance of a lesion on an ultrasound image, however, may not indicate complete healing of the lesion.[9]

Conclusion

In conclusion, collection of information regarding SDF tendonitis and reinjury should be continued. The purpose of this study is to clarify the effect of the use of "counterirritation" with a blister ointment in chronic tendinitis of the horse (of) and compare it with a well documented surgical technique in the literature. The results have shown that both of them not seem to be an ineffective treatment although the desmotomy seems to be associated with a lower case of re-injuries. It is interesting notify that the only one reinjured horse

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after the desmotomy treatment is affected by proximal suspensory ligament desmitis, suggesting to investigate in the next studies if is possible avoid this secondary complication after surgery. Other clinical studies, with a greater number of cases, a more accurate homogeneity of horse breeds and sportive attitude and the presence of a control group that does not carry out any type of treatment should be done.

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Conflicts of interest

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