

TREATMENT OF TENDINITIS BY USING COLD THERAPY (ICE) IN HORSES.

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ABSTRACT

This study aimed to treat SDF tendonitis in the forelimbs of horses by application of cold therapy (ice) followed by controlled exercise program. The effect of this treatment was healing, disappearance of the pain and functional rehabilitation of the treated horses.

(15) Working horses of varying breeds, sex, age (3-19) years suffering from acute superficial digital flexor tendonitis was used for this study from the beginning of September 2008 to the beginning of September 2010 in Kirkuk, Iraq.

All the cases were followed up clinically. Swelling and thickness in the affected parts were measured during treatment period. Swelling was reduced after the treatment by the ice with significant variation ($P < 0.05$) in the (anterior-posterior and groove's depth) aspects of sub-metacarpal bone area and (anterior-posterior) aspect of mid-metacarpal bone region. A significant variation ($P < 0.01$) was shown in the (lateral-medial) aspect of sub-metacarpal region and in (anterior-posterior and lateral-medial) aspects of the distal part of the 3rd metacarpal bone region. A significant variation $P < 0.001$ revealed in the (depth groove) aspect of the distal part of the 3rd metacarpal bone area. While there was no significant variance was shown in the (lateral-medial and groove's depth) aspects of mid-metacarpal bone area.

Clinical finding appeared that the functional recovery in treated limbs was improved. This study concluded that cold therapy (ice) was easy, non expensive method, aided to recovery of SDF tendinitis and hasn't any side effects.

INTRODUCTION

The superficial digital flexor tendon (SDFT) is the most commonly affected and the incidence of reinjures in this tendon is relatively high (1, 2, 3, 4, 5). Tendinitis of the (SDFT) is also referred to as "bowed tendon", develops following excessive strain on the (SDFT) which causing tearing of the tendon fibers resulting in a warm, painful swelling associated with it (6). Tendinitis is a potentially career limiting injury (7), which is one of the most frustrating athletic injuries involving the lower leg (8). If there is complete laceration or rupture of the (SDFT) there is reduced support for the

fetlock joint (9). Damage to the (SDFT) most commonly occurs in the mid-metacarpal region or tensile region of the tendon (9, 10, 11, 12). Normal strain measured in (SDFT) range from (3-8 %) at the walk, (7-10 %) at the trot and (12-16%) at the gallop, thus it becomes obvious that a horse's tendon is operating at or near maximal capacity whilst at the gallop (13). Tendon structures when injured do not heal as well (14).

Diagnosis of SDF tendinitis is based primarily on history, physical examination [13]. Treatment in lower leg tendinitis with time casing from injury to successful competition suggested as just over a year (15).

The aims of cold therapy (ice) for acute tendinitis are to decrease inflammation and swelling, minimize scar tissue formation, and promote restoration of normal tendon structure and function as soon as possible for 20 to 30 minutes, 3 to 4 times per day (16). Cold therapy is commonly used in treatment of inflammation and soft tissue injuries in the horses, and no matter what the method of application (17). The amount of exercise and duration of protocol before re-examination are based on the severity of tendon damage at initial examination (18). The repair and maturation phases of healing in a tendon last for six month or more [13]. Recovery from such injury is prolonged, and recurrence frequent after affected horses returns to training or racing (19).

MATERIALS AND METHODS

This study involved (15) working horses (6 males and 9 females) of varying weights, breeds, and age (3-17) years, with clinical evidence forelimb superficial digital flexor tendinitis among September 2008 to September 2010. Only a new or a recurrent cases in one forelimb were manipulated even the second had previous injury

A general examination was done optically in the rest and exercise to observe safety of the body conformation, lifting of the weight, any swelling in the legs and through walking and trotting to determine lameness in the injured legs. The affected tendons were examined by palpation. The tendons were palpated with the horse standing on the injured leg and then again with the foot held off the ground. Gentle pressure is applied with the fingers up and down each of main tendons, including the superficial and deep digital flexor tendons.

Before beginning the treatment, all the shoes of horse removed immediately and the hair was clipped from the accessory carpal bone to the ergot of the affected limbs. Cold therapy (ice) in this study was applied for 20-30 minutes, 3-4 times per a day until acute inflammation is no longer presented. The sound forelimb also treated and manipulated.

After the leg has been iced, a firm padded bandage applied by starting from the inside of the horse's leg and moving toward the outside, clockwise. Bandaging continued for up one month and the bandage was loosed every night for a half to one hour. Horses were clinically examined, between the first day and 3 months of the first detection of the injury. The horses were stalled rest for at least one month depending

on the severity of the injury. Treatment combined with several months of controlled exercise (Table 1).

Table 1: Controlled exercise program used in the SDF tendinitis [5].

Day 0 - 45	Walk 15 minutes, twice daily.
Day 45 - 60	Walk 40 minutes, once daily
Day 60 - 90	Walk 30 minutes, twice daily.
Day 90 - 120	Walk 30 minutes, twice daily. Trot 15 minutes, once daily.
Day 120 - 150	Walk 60 minutes, twice daily. Trot 15 minutes, twice daily.

Palpation is the method of tendon assessment in this study. The sound limb also treated and manipulated to prevent any secondary problems resulting from compensation [12].

RESULTS

Clinical results have shown that the acute superficial digital flexor tendons of the forelimbs are the most common, and that the 3rd metacarpal bone area is the most exposable to injury and there were 5 of 15 cases was repeated for the second time (Table 2)

Table(2): Illustrate the results of using ice to treat acute SDFT in horses:

Case No.	Sex m/f*	Age/ year	Affecte d Tendon	Previous injury	Duration of daily application	Duration of treatment and rehabilitation/ month	results
1.	f	5	SDFT	-	(20-30) minutes	6-7	Returned to work
2.	m	17	=	1	=	< 3	failed
3.	f	6	=	-	=	6-7	Returned to work
4.	f	4	=	-	=	6-7	Returned to work
5.	m	19	=	1	=	3	failed
6.	m	5	=	-	=	11-12	Returned to work
7.	f	3	=	-	=	6-7	Returned to work
8.	f	7	=	1	=	11-12	Returned to work
9.	f	15	=	1	=	3	failed
10.	m	7	=	-	=	18	Continued on prolonged rest and controlled rehabilitation exercises.
11.	f	4	=	-	=	11-12	Returned to work
12.	m	11	=	1	=	< 2	failed

13.	m	4	=	1	=	18	Continued on rest and controlled rehabilitation exercises.
14.	f	5	=	-	=	18	Continued on prolonged rest and controlled rehabilitation exercises.
15.	m	13	=	-	=	2	failed

*m= male. f=female. SDFT= Superficial Digital Flexor Tendon

This study showed that healing of SDF tendinitis needed to prolonged treatment over than one year. The clinical results revealed that the swelling was decreased after ice treatment with significant variation ($P < 0.05$) in the (anterior-posterior and groove depth) aspects of sub-metacarpal bone region, and (anterior-posterior) of mid-metacarpal bone region. A significant variation ($P < 0.01$) was shown in the (lateral-medial) aspect of sub-metacarpal region, and (anterior-posterior and lateral-medial) aspects of the distal-part of the 3rd metacarpal bone region. A significant variation $P < 0.001$ revealed in the (depth groove) aspect of the distal-part of the 3rd metacarpal bone region. While there is no significant variance in the (lateral-medial and groove's depth) aspects of the mid-metacarpal bone region was shown (Table 3).

Table (3): Affection of cold therapy (ice) treatment in the areas and locations of injury

No.	Area	location	Number	P value
1	Submetacarpal bone	Anterior-posterior	15	$P < 0.05$
2		Lateral-medial	=	$P < 0.01$
3		Groove's depth	=	$P < 0.05$
4	Middle of 3 rd metacarpal bone	Anterior-posterior	=	$P < 0.05$
5		Lateral-medial	=	Non significant
6		Groove's depth	=	Non significant
7	Distal part of 3 rd metacarpal bone	Anterior-posterior	=	$P < 0.01$
8		Lateral-medial	=	$P < 0.01$
9		Groove's depth	=	$P < 0.001$

Out of (15) cases, (5) (33.4%) were failed and (10) (66.6%) were healed. (3) (20%) which revealed reflex vasodilatation in the first two weeks were cured and continued on prolonged rest and exercises for 18 month, and remain (7) (46.6%) responded to treatment and returned to the work that (4) (26.6%) of them returned to ordinary work after (6-7) months while the remain cured (3) (20%) returned to it after 11-12 months (Table 2).

DISCUSSION

The results showed that the (SDFT) is more at risk to injury, and this is consistent with (1), (Crevier-Denoix N., *et. al.*, 1997) [2], (White N. A., 2001) [3, 4], and the mid-metacarpal bone area is the most vulnerable to injury and this agreement with (9, 10, 11), because it is far from the bloody dispensation sources and has a poor blood supply, relying on the tiny vessels of the paratendon (12), as well as narrowing of the tendon in this region throughout working and this agreement with (20).

5 cases of which responded to treatment were failed in the functional recovery because of bad application of the exercise program and early returning to work through the first weeks, which is the direct predisposing factor for repeating the damage and this confirmly with (12, 19, 20, 21, 22) who considered that the rest is a primary treatment and an important part of it. The study revealed that the important causes of SDF tendinitis is forcing the horses to turn around in a narrow streets and unexpected sudden emissions as well as unorientable of the body with the conformation of the limbs, and this agreement with (20).

The injured (SDFT) do not heal well, because of poor blood supply and the treatment of it was needed more than one year to heal and this confirmed with (14, 15).

Reducing of swelling after treatment by the ice with significant variation ($P < 0.05$) in the (anterior-posterior and groove's depth) of sub-metacarpal bone area and (anterior-posterior) of mid-metacarpal bone region. A significant variation ($P < 0.01$) was shown in (lateral-medial) of sub-metacarpal region and (anterior-posterior and lateral-medial) of the distal part of the 3rd metacarpal bone region. A significant variation ($P < 0.001$) revealed in the (groove's depth) of the distal part of the 3rd metacarpal bone region. While there is no significant variance in the (lateral-medial and groove's depth) aspects of mid-metacarpal bone region was shown. The healing of SDF tendinitis in this study needed more than one year and the injured tendon not heal as well, and this confirmed with (Cissell J. M. 2009 [14] and (Casey M. J. 2003) [15].

This variation of treatment affection in different regions and aspects returned to failure to ensure application the coldness constantly on certain area further than losing of some coldness after application and this agreement with (Louis, 2009)[12]. Naturally that there is a difference in the strength of treatment's effect mainly, because the swelling is not equal in all treated regions and aspects of limbs, then where the swelling is larger reducing was the largest, and because the swelling in nature stationed at the bottom of the limb, so it was the biggest decrease in this region and this confirms what was said (Jones 2001). (3) Cases revealed vasodilatation because of prolonged duration of the daily application of the ice which came to be concurrence with (Louis B., 2009) [12] and (Gibson *et. al.*, 1997)[19]. Bandaging the lower limbs with firm even pressure also helps increase interstitial fluid pressure and

reduces fluid loss from the vessels (Louis 2009) [12], to restrict the amount of swelling.

There is no certain method of application was depended, but the ice for 20-30 minutes was recommended according to (Ramy D. W. 1999) [17] who reported that no matter what the method of application. The good response to the treatment was encouraged the owners to turning the horses back to the work because they thought that the disappearance of clinical signs particularly the lameness denote the functional recovery. This study concluded that cold therapy (ice) is easy very and non expensive method, aided recover, and hasn't side effect.

علاج التهاب الأوتار باستعمال العلاج البارد (الثلج) في الخيل

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الخلاصة

هدفت هذه الدراسة الى علاج التهاب الأوتار القابضة الإصبعية السطحية لقوائم الخيل الأمامية بتطبيق العلاج البارد (الثلج) متبوعا ببرنامج تدريبي مسيطر عليه. ان تأثير هذا العلاج هو الشفاء, واختفاء الألم, والتأهيل الوظيفي للخيل المعالجة. لقد شملت الدراسة 15 رأسا من خيل العمل, من أصول وأجناس مختلفة, وأعمار تراوحت بين (3-17) سنة, كانت تعاني من التهاب الأوتار القابضة الإصبعية السطحية من بداية ايلول 2008 لغاية ايلول 2010 في كركوك-العراق. تمت متابعة جميع الحالات سريريا. تم قياس الورم والتشنج في الأجزاء المصابة خلال فترة العلاج. لقد اختزل الورم بعد العلاج بالثلج بفرق معنوي ($P<0.05$) في المنطقة الأمامية-الخلفية وعمق الأخدود في منطقة تحت الرسغ والمنطقة الأمامية-الخلفية من وسط عظم المشط الثالث. كما ظهر ان هناك فرقا معنويا ($P<0.01$) في المنطقة الوحشية-الأنسية من تحت الرسغ والمنطقة الأمامية-الخلفية والمنطقة الوحشية-الأنسية من الجزء القاصي لعظم المشط الثالث. وظهر الفرق معنويا ($P<0.001$) في منطقة عمق الأخدود من الجزء القاصي لعظم المشط الثالث. بينما لم يكن هناك فرق معنوي في المنطقة الوحشية-الأنسية وعمق الأخدود في منطقة وسط عظم المشط الثالث. لقد اظهرت النتائج السريرية تحسن الشفاء الوظيفي في القوائم المعالجة. استنتجت هذه الدراسة بأن العلاج البارد (الثلج) كان طريقة سهلة, وغير مكلفة, وساعدت على شفاء التهاب الأوتار القابضة الإصبعية السطحية ولم يكن لها اي تأثيرات جانبية.

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