Original Article

Physiotherapy´s protocol to approach the insertional achilles tendinopathy

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ABSTRACT

The Achilles tendinopathy affects to great number of sport people as many elite ones as amateur. Besides, the incidence of this injuries type has increased in an unconscionable way within the last decade caused principally by the impact of amateur sports over the society. It´s common among athletes who play racket sports, athletic, volleyball and football, being one of the most frequently injured tendons in human beings bodies in spite its strength. This aim of this paper is to present a list of several Haglund disease cases that have been treated by conservative treatment, evaluating the results after 10 sessions by VISA-A scale that evaluates pain, function and sports activity in people suffering of Achilles tendinopathy. The study use the clinical´s histories from 5 cases conducted on 5 patients in Spain during 2010 to 2015. The 5 cases were selected from a total of 42 conservative treatment cases done over Achilles tendon. The physiotherapy protocol has been used in all cases consisted in 10 sessions where a combination of several physiotherapy techniques. The patients were evaluated before the first treatment session and after the last one by the VISA-A scale and EVA. After 10 sessions of treatment, the results of the VISA_A show an improvement of 25 % and in case of the EVA scale the pain improvement in 5 points. **Key words:** ACHILLES THENDINOPATHY, PHYSICAL THERAPY'S TREATMENT, ELECTRICAL STIMULATION

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INTRODUCTION

The Achilles tendinopathy affects to great number of sport people as many elite ones as amateur. Besides, the incidence of this injuries type has increased in an unconscionable way within the last decade caused principally by the impact of amateur sports over the society. It´s common among athletes who play racket sports, athletic, volleyball and football, being one of the most frequently injured tendons in human beings bodies in spite its strength. (Roche & Calder, 2013; Larsson & Nilsson-Healander, 2012).

Attending to its location can be classify as central tendon tendinopathy and insertional tendinopathy, those ones know commonly as Haglund disease (Albright et al., 2001) giving a 33% of incidence concerning Achilles tendinopathy.

The Achilles tendinopathy is a no inflammatory degenerative disease (Young & Dyson, 2001; Larsson & Nilsson-Healander, 2012), pain being located, in Haglund disease, in postero-superior calcanean tuberosity.

This injury clinically shows after rest pain and morning stiffness as well as pain during hiking and running physical activity becoming the last one restriction. Concerning its etiopathogenesis has been pointed out the Haglund deformation, the retrocalcanear bursitis, distal tendinopathy or partial tear and tendon calcifications. This kind of injury use to come with deformations such a varus of foot anterior, high inset, the hiperpronation (Irwin, 2010).

The initial treatment is based in resting, the physical activity change, as well as rehabilitation and physical therapy programs (Michael et al., 2008). In cases the conservative treatment fails or when the patient shows Haglund disease signs and he/she is not willing to decrease the activity level, the option is treatment by surgery that will be based in bursa´s section, open calcaneoplasty or by endoscopy, tendons debridement or calcifications resection. But previously, to avoid the surgery and this invasive treatment, it´s necessary to develop a treatment protocol based in conservative physical therapy.

About the conservative treatment, one of the technique that bestow more clinical evidence are the eccentrics exercises Alfredson established by protocol (Alfredson, 2010). Several studies talk about the shock wave efficiency in this type of pathology (Rompe et al., 2007a, 2008b) and many others about the low intensity LASER benefits and eccentrics exercises (Lopez et al., 2015). In addiction Rowe (2012), states that the LASER´s efficiency is higher during reactive period than in a chronic process. Other authors talk about ultrasound therapy efficiency (Eckenrode & Stackhouse, 2015) or electrical stimulation therapy.

This aim of this paper is to present a list of several Haglund disease cases that have been treated by conservative treatment, evaluating the results after 10 sessions by VISA-A scale that evaluates pain, function and sports activity in people suffering of Achilles tendinopathy.

METHODS

The study uses the clinical´s histories from 5 cases conducted on 5 patients in Spain during 2010 to 2015.

The 5 cases were selected from a total of 42 conservative treatment cases done over Achilles tendon. The incidence of insercional Achilles tendinopathy was represented by an 88% of our research material. All patients were evaluated by two specialized in this type of injury traumatologists.

The 5 patients selection was done by the following inclusion criteria:

To be diagnosed as a Haglung disease by both of the traumatologists. All the cases that had been previously surgically treated in Achilles tendon or ankle were excluded, cases that presented contraindications to ultrasound or electrical stimulation and those cases that didn´t practice a regular or constant sport activity before were excluded either.

The physiotherapy protocol has been used in all cases consisted in 10 sessions where a combination of several physiotherapy techniques were used, these are described in Table 1 as well as the justification of each one use.

The patients were evaluated before the first treatment session and after the last one by the VISA-A scale (Robinson et al., 2001) and EVA. In the meta analysis done by Sussmilch-Leitch a 79% of the studies used EVA as an evaluation method and a 37% the VISA-A scale (Sussmilch-Leitch et al., 2012).

With regard to the cases demographic data the medical records of three women and two men in ages among 42.2 ± 14.8 years old were studied.

Cases Reports

Case 1

40 years old woman who is suffering of a pain that is progressively increasing at the posterior calcanean tuberoses. Amateur Marathon runner doing an average of 90 kilometers (km) per week. 6 years records of running sports activity. Presents an initial VISA-A of 68% and an EVA of 7. Interrupts during 3 weeks the regular physical activity replacing it by elliptic machine training.

Case 2

39 years old man with 7 months evolution pain that increases progressively on posterior and medial insertion of Achilles tendon. Amateur Padel player (3 days a week) and cycling (2 days per week). Sports activity records from 12 years ago and 4 years playing Padel. He interrupts during 4 weeks the Padel activity replacing it by one more of cycling per week. Presents a VISA-A 67% and an EVA 8.

Case 3

28 years old woman, professional pole-vaulter, suffering of 2 months evolution postero-medial Achilles tendon insercional pain. 6 years sport activity records 6 days per week. Sports substitute activity of jumps. Initial VISA-A of 69% and an EVA of 8.

Case 4

47 years old man suffering of 5 months evolution posterior Achilles tendon insercional pain, Amateur runner 4 days a week doing an average of 30km per week during 6 years. He stops running during 4 weeks. Have an initial VISA-A of 49% and EVA of 8.

Case 5

57 years old woman suffering of 4 months evolution pain on posterior Achilles tendon insertion. He developed a mixed sport activity including swimming, running, cycling and tennis 7 days a week from the age of 8. He stops the running activity during 2 weeks. The initial VISA-A 82% and EVA 7.

Table 1. Physiotherapy techniques used in treatment and the justification of each one

Therapy	Ultrasound	Eccentrics protocol	Manual therapy	Electrical stimulation
Parametres	**Technique for tendon**	1st Phase: Increase the series and repetitions	To decrease muscle tone technique	Current type: Rectangular simetric square
	Using low intensity (0.1 / 0.045 W/Cm2) 5 Min.	1st Week		
		3 series x 12 two feet repetitions	Massage to remove stiffness on sural triceps	Frequency: Progression (84 – 86 – 88 Hz …..)
	Static technique over the interior or exterior point at the hill. To find periostius pain.	2 series x 8 each foot repetitions	Trigger points techniques even dried puncture.	
		2nd Week		Impulse wideness: Progression (250 – 230 – 210 mseg….)
		3 series x 15 two feet repetitions	**Straight technique over the tendon**	
		4 series x 8 each foot repetitions		Combine exercise: Progression (Static, stretching, Concentric, eccentrics, jumps)
		2nd Phase increased workload	Longitudinal massage: Over most voluminous zone	
		3th week	Insercional treatment.	Intensity: Maximum tolerance by the patient
		3 series x 15 two feet repetitions (5 Kg)		Trains: according to strength protocol.
		4 series x 8 each foot repetitions (5 Kg)		
		4th week		
		4 series x 12 two feet repetitions (7 Kg)		
		4 series x 8 each foot repetitions (7 Kg)		
		5th week		
		4 series x 12 two feet repetitions (10 Kg)		
		4 series x 8 each foot repetitions (10 Kg)		

		6th week 4 series x 12 two feet repetitions (10 Kg) 4 series x 8 each foot repetitions (10 Kg)		
Justification	- Accelerates tendon´s reparation and the change from collagen III to collagen I $p<0.05$ (Jeremias et al., 2011; Kosaka et al., 2011) - improves the collagen I organization and accelerates its synthesis (Wood et al., 2010) - no changes on collagen III	Training with more oscillations in strength in comparison with concentric (Rees et al., 2008) ↓ Tendon Volume, intra-nodular signal, 45% blood flow in the paratendon (Karsten et al., 2005; Fahlström et al., 2003) those are not so effective for insertion. Must be finished in the horizontal one.	Improves the elasticity and the tendon´s tissue increase. (Christebson, 2007)	A tension is needed to change from collagen I to III (Benito et al., 2011a, 2013b)

RESULTS

From those 5 cases we obtained the differences between scale measures VISA-A and EVA before and after 10 sessions of treatment. The time spent in 10 sessions was 5.5 weeks ± 0.5. Each case results as well as the average are represented on Table 2.

Table 2. VISA-A y EVA Results in the 5 cases. VISA-A Pre y EVA Pre = Measured before the beginning of the treatment. VISA-A Post y EVA Post = Measured after 10 sessions. Dif. VISA-A y Dif. EVA = Diferernces between Pre and Post.

	Case 1	Case 2	Case 3	Case 4	Case 5	Average
VISA-A Pre	68%	67%	69%	49%	82%	67%
VISA-A Post	100%	82%	100%	79%	100%	92,2%
Dif. VISA-A	32%	15%	31%	30%	18%	25,2%
EVA Pre	7	8	7	8	7	7,4
EVA Post	2	5	1	4	0	2,4
Dif. EVA	5	3	6	4	7	5

DISCUSSION AND CONCLUSIONS

Evidence supports conservative treatment on haglund disease always the sinthomatology records are not longer than 12 moths evolution. The conservative treatment proposed composed by 4 different techniques (massage + ultrasound + eccentrics protocol and electrical stimulation) agrees with some previous studies.

Eccentrics Protocol

Is possibly the technique with the biggest scientific evidence (Rowe et al., 2012). López (2015) demonstrated how the 12 weeks Alfredson protocol decreased the tendon´s size in the ultrasound image as much as in magnetic nuclear resonance. Fahlström (2003) demonstrated an improvement of 28% in tendinopathy. In the other hand, Lake (2009) reaches to obtain a 30% improvement. Several studies have verified the efficiency of eccentrics exercise versus other technical treatments finding significant improvement with a control group (Rompe et al., 2007) la cryotherapy (Sussmilch- Leitch et al., 2012) concentric exercise (Niesenj-Vertommen et al., 1992). However there´s no deference found over shock waves (Rompe et al., 2007a, 2008b) or ultrasound (Chester et al., 2008) In our cases the improvement is 25,2% in spite to be lower than results obtained (Fahlström et al., 2003; Lake & Ishikawa, 2009) we get 5´5 weeks versus the 12 weeks those authors had registered. Possibly this difference is caused by the inclusion of eccentrics exercises with electrical stimulation, this inclusion has demonstrated to be more efficient (Benito et al., 2011a, 2013b). Besides adding ultrasound therapy and massage increased the injury´s improvement percentage.

Ultrasound Protocol

Parameters used (3 MHz y 0,5 W/Cm^2) agree with Maia studies (2010) who got positive results with a Frequency of 2.5 MHz and a low intensity 0.5W/cm^2 and 2 minutes session. Is true that authors like Warden (Warden et al., 2008) didn´t find pain improvements with low intensities, 0.1 W/cm^{2}during 12 weeks 20 minutes a day, or like Lu (2008) who used the therapy through frequencies like 1.5 MHz, with low intensities 0.3 W/cm^2 along 20 sessions and it allow to observe an endotelelial growth but there were not improvements over the pain. This could be because in spite to have used low intensity the technique hadn´t been completed with eccentrics exercises and manual therapy. The studies that used US low frequency (1 MHz) needed a higher intensity to obtain some improvements over the pain and cellular migration. So, in 2008 Hsu (2008) study demonstrated with higher intensity it gets more cellular migration. Even, Ebenbichler (1999) achieve a pain decrease with ultrasound therapy but he needed 24 sessions lasting 15 minutes each with a 2,5 W/cm^2 intensity. And Falconer (1992) in spite to have used a high frequency, he didn´t obtain differences in comparation with control group with low intensity as 2,5 W/cm^2, It could be caused by the use of high intensity as well as not including any other physiotherapy technique to the ultrasound therapy.

Manual Therapy

There are only a few studies that talk about tissue manipulation´s benefits in this kind of injuries, but Christenson talked about the benefits obtained through this technique. In the 5 cases we recorded this technique allows improving the mobility and stiffness, and also preserves the elasticity obtained by eccentrics exercises. More control groups are necessary to allow us to demonstrate the scientific evidence of this technique.

Electrical Stimulation

This technique´s efficiency as a complement to the strength has been proved (Benito et al. 2011a, 2013b). Bondi (2015) tried this technique with a 27 years old athlete who didn´t respond to eccentrics exercises obtaining an improvement of 32% in VISA-A 1 month treatment after. The parameters used were similar to our cases (150 Hz, Rampa 2 s, 10 s on time, 10 s off time, 400 mseg. 20 min. Max. Intensity tolerance). In this study the eccentrics exercises and electrical stimulation were not done simultaneously.

In conclusion in the 5 cases presented before, it seems to be appropriate and achieve satisfactory results with 25.2 % of improvement in 5.5 weeks according to VISA-A scale and a decrease to 5 according to EVA.

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