

Effect of Elastic Band along with Isometric Strengthening Exercise for Achilles Tendon on Sprint Performance among Football Players

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Abstract: ***Problem statement:** Achilles Tendinitis is one of the commonest injuries that happen to football players. Achilles tendon strength is important to prevent the recurrence of Achilles Tendon injuries in football players. 30 Meter Sprint Test is the type of outcome measure to assess the conditions. **Approach:** The subjects were approached via Sri Venkateshwaraa Medical College Hospital and Research Centre, Ariyur, Pondicherry – 605102. **Purpose:** The study aimed to find the effect of Elastic Band along with Isometric Strengthening Exercises for the Achilles tendon on sprint performance among Football Players. **Result:** The statistical analysis obtained from the unpaired 't' - test shows that the calculated 't' value of the post - test values of Group A and Group B for the 30 Meter Sprint Test is 5.83 ($p < 0.05$). The values obtained from the statistical analysis concluded that there is a significant difference between Group A and Group B with Group A being more effective. **Conclusion:** The study concluded that the Elastic Band along with Isometric Strengthening Exercise shows a more significant improvement in Sprint Performance among Football Players.*

Keywords: Elastic Band Strengthening Exercise, 30 Meter Sprint Test, Isometric Strengthening Exercise

1. Introduction

The Achilles tendon is a tough band of fibrous tissue that connects the calf muscle to the calcaneus. [1] Achilles tendinitis is the inflammation of the Achilles tendon in recreational runners and athletes or any other sport whose training contains a large amount of running and jumping. [3] Achilles tendon rupture is an injury of veteran football players. Among 54.8% (n=17) of injuries occurred in offensive players. Isometric exercises are one of the best ways to reduce tendon pain, speed up recovery, and prevent injury to the tendon from occurring again. Exercising with elastic resistance is simple, easy to perform, dispensable, and can be used for various purposes such as strength training, the training of coordination skills, and exercises to improve range of motion. [4]

2. Materials and Methodology

This is an experimental study that includes 30 patients from the Department of Physiotherapy, Sri Venkateshwaraa medical college Hospital and Research Centre, Ariyur, Pondicherry - 605102. Subjects were divided into two groups (Group A - 15 & Group B - 15). The subjects were included based on the selection criteria. The inclusion criteria of the study were Subjects in the age group of 23 to 36 years, Beginner football players, Male genders included, Subjects who are willing to participate in the study, and exclusion criteria were subjects with any lower limb fracture and dislocation, Elite players, recent ankle injuries, underwent foot surgery within 6 months, not willing to participate in the study. In both groups, the subject's pre - test and post - test values were collected using the 30 Meter Sprint test. The study was conducted for a period of 6 months and during the study time subjects received Group A Elastic Band along with Isometric Strengthening Exercise

and Group B Isometric Strengthening Exercise for a period of 6 weeks.

3. Procedure

30 M Sprint test:

Before giving EBSE and EBSE & ISE, a 30M Sprint Test has been given to the players with time recorded in each session. Instruction has been given to the patient, to inform them about the 30M Sprint test during the treatment period.



Figure 1: Normal Values of 30 Meter Sprint Test

Elastic Band Strengthening Exercise

Seated Calf Raise:

The seated calf raise works the soleus muscle, the muscle that lies under and below the gastrocnemius, the larger calf muscle. Sit on a chair or bench with the ball of your foot on a phone book (or) a small block of wood. Cross the handles and stand on the tubing near the handles so that it can be looped over your knee. Bend at the ankles, lowering your heels towards the floor. Rise up on your toes as high as

possible, pausing at the top for a second before lowering to the fully stretched position again.



Figure 2: Seated Calf Raise

Standing Calf Raise:

The Standing calf raises work gastrocnemius and soleus that run down the back of the lower leg. Stand with the ball of your feet on a block four to five inches high, feet shoulder width apart, tubing under your feet. Slip a broomstick through the handles of the tubing and raise the bar over your head, onto your back, just above your posterior deltoids. One strand of tubing should be on each side of your body. Lower your heels towards the floor as low as possible while keeping the balls of your feet on the block. Lift yourself by rising on your toes as high as possible, pausing at the top for a second before lowering to the fully stretched position. Keep your legs straight but not locked throughout the movement to make sure the movement is coming from the ankle and that you are not lifting yourself with the other leg muscles.



Figure 3: Standing Calf Raise

Seated Calf Press

The Seated calf presses work the soleus muscle which sits underneath the gastrocnemius muscle. Sit in a straight - back chair and straighten the leg so that it is parallel to the floor. Place the handle of the tubing over your foot so that the ball of your foot is against the handle and your toes point toward the ceiling. Hold the tubing tightly in your hands. Straighten your ankle, pressing the tubing handle away from you. Pause for a second and allow your ankle to bend backward as far as possible. Keep your legs straight but not locked throughout the movement to make sure the movement is coming from the ankle and not the other leg muscles.



Figure 4: Seated Calf Press

Protocol (EBSE):

Each exercise was performed 10 times in two series after each series a break of 60s was included. After 6 weeks, to eliminate load adaptation, the number of series was increased from 2 to 3, with a break period of 60s after each series.

Isometric Strengthening Exercise:

There were 3 levels of loads that built on one another. Patients were briefed to do the exercises cautiously and pain - free, going to the next level if they were not feeling pain or exhaustion at maximum load.

Load Level 1, Patients were standing for 45 seconds on the tip of the toes of both legs,



Figure 5: Tip Toes Stand

Load Level 2, They were standing with all their body weight just on one leg. And do it for another leg.



Figure 6: Standing with Load On One Side

Load Level 3, Individuals further increased the load by pushing themselves down while standing on the staircase edge. Patients were advised to choose the amount of

plantarflexion themselves, depending on where they felt the maximum load.



Figure 7: TOE Stand on Staircase Edge

Protocol (ISE):

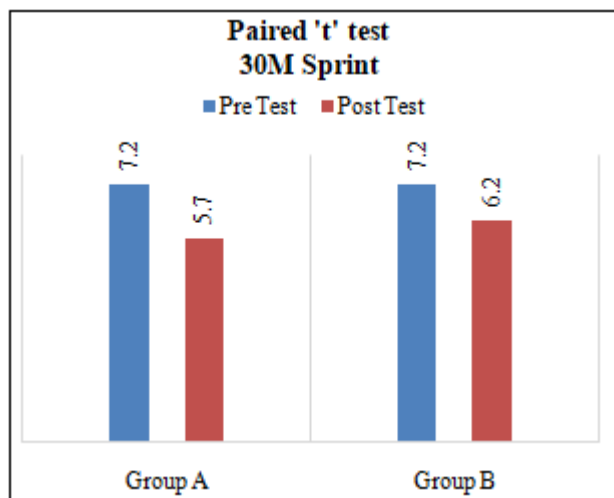
ISE performed once per day, with 5 sets of 45 seconds each for 6 Weeks

Statistical Analysis and Results:

The data obtained were analyzed using both the paired and unpaired t - test and were tabulated. The calculated 't' value obtained from paired 't' - test of group A (within group analysis) of the 30M Sprint test for 14 degrees of freedom and 5% level of significance was 4.76 and group B was 2.34 with the p - value <0.05 (Table 1). In the statistical analysis obtained from the 30M Sprint test, the mean values and SD obtained from Group A and Group B of the 30M Sprint test were 7.193 ± 0.856 & 5.680 ± 0.883, and 7.227 ± 1.057 & 6.273 ± 1.167 respectively. For 28 degrees of freedom and a 5% level of significance, the calculated 't' value obtained from unpaired 't' test of the 30M Sprint test is 5.83 (Table 2).

Table 1: Showing the pre and post - test values of Group A and B (Paired t Test Value)

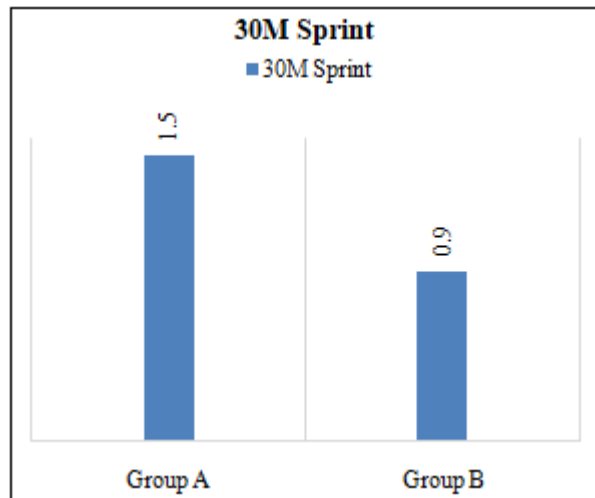
Group	TEST	MEAN	SD	T-value	P-value
Group A	Pre - test	7.193	0.856	4.76595	<0.05
	Post - test	5.680	0.883		
Group B	Pre - test	7.227	1.057	2.3453	<0.05
	Post - test	6.273	1.167		



Graph 1: Within - group analysis of 30 Meter sprint test

Table 2: Showing the pre and post - test values of Group A and B (UnPaired t Test Value)

	Mean	SD	T-value	P-value
GROUP A	1.513	0.297	5.83438	<0.05
GROUP B	0.953	0.223		



Graph 2: Between the group analysis of 30 Meter sprint test

4. Discussion

The present study is the experimental study conducted to find out the “Effectiveness of Elastic band along with Isometric strengthening exercise for Achilles tendon on sprint performance among football players”. This study was selected for the purpose to improve sprint, strengthening the Achilles tendon, and preventing recurrence of Achilles tendon injuries in football players. Overall 30 players in the age group between 20 - 30 years of Male beginner football players were selected on the basis of inclusion criteria and randomly allocated into two groups 15 players in Group A were treated with an Elastic band along with isometric strengthening exercise & 15 players from Group B were treated with isometric strengthening exercise. They were assessed by using the outcome measure such as 30 Meter sprint test. Pre and post - test values obtained from the statistical analysis show significant improvement in 30 Meter sprint test followed by Group B than Group A. **Juan C Colado et, al (2010)** studied the effect of elastic tubing and isotonic resistance exercise for 42 physically fit women randomly assigned into 3 Groups. Where Group 1 performs the theraband exercise station Group (TBG) and Group 2 performs the weight machines/free weights group (MFWG) and Group 3 is the control group. A training program that lasted for 8 weeks, with 2 - 4 sessions per week and 3 - 4 sets of 8 - 15 sub - maximal reps. The result of the study indicated that elastic tubing use is as effective as weight machines and free weight use when trying to obtain increases in strength in young and physically active women [5]. **D Stasinopoulos (2015)** studied the effect of isometric contractions combined with eccentric contractions and stretching exercises on pain and disability in lateral elbow tendinopathy (LET). A patient with unilateral LET for 8 months was included in the present report. The patient followed an exercise program consisting of slow progressive eccentric exercises of wrist extensors, isometric contractions of wrist extensors, and static stretching of the extensor muscles of the wrist five times per week for 4 weeks and the

outcome measures were pain, using a VAS and function, using a VAS and the pain – free grip strength. Evaluated at the end of treatment (week 4) and 1 month (week 8) after the end of treatment. The result of the study indicated that isometric contractions reduce pain in tendon disorder, increasing the strength at the angle of contraction without producing inflammatory signs^[6]. From the above discussion, the benefit of elastic band strengthening exercise along with isometric strengthening exercise for Achilles tendon along with their routine training helps to maintain the biomechanical properties of joints and muscles, also the 6 weeks of training shows a significant difference in improving strength and sprint performance among football players.

5. Conclusion

This study concludes that the Elastic Band along with Isometric Strengthening Exercise **GROUP** - Ashows significant improvement in sprint performance on the Achilles tendon when compared with Isometric strengthening exercise alone **GROUP** - Bafter 6 weeks of intervention on football players. Therefore null hypothesis is rejected.

6. Limitations and Recommendations

The limitation of the study was small samples were selected, the study duration was only 6 weeks, Only football players were included, and Male football players were only included. Recommendationsof the study werefurther study can have more participants, the intervention of the study can be compared with any other interventions, Analysis of the effect on different age groups, Improve study duration more than 6 weeks, In future studies other than football players will include, Both Male and Female will include. Therefore the null hypothesis is rejected.

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