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RESEARCH ARTICLE

EFFECTIVENESS OF KINESIO INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION AND TAPING AMONG SPRINTERS WITH CHRONIC ACHILLES TENDINOPATHY

Bharani V.[1], S. Karthikeyan[2] and Dr. P. Senthilselvam[3]

1. MPT Ortho, School Of Physiotherapy, VISTAS.
2. Research Scholar, School Of Physiotherapy, VISTAS.
3. Head of the Department, School Of Physiotherapy, VISTAS.

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Abstract

Background: Achilles tendinopathy is the most frequently reported injury related to the ankle and foot common in runners and other sports activity. Chronic tendinopathy most often characterized by tendon degeneration and the area can be painful to touch. As a result the tendon goes for spasm and joint stiffness due to the force generated during toe off of the ground during running and it is transmitted by achilles tendon. This may lead to affect the performance in sprinters.

Aim: The aim of this study is to find the effectiveness of Kinesio instrument assisted soft tissue mobilization and taping among sprinters with chronic achilles tendinopathy.

Method: The study included 30 sprinters from Chennai who fulfilled the inclusion criteria. The 20 meter yard test done to check the running performance for each sprinters and the pain was measured using numerical pain rating scale and functional disability was measured using lower extremity functional scale.

Result: The results were analyzed using inferential statistics, t-test using intra-group analysis. The mean and standard deviation for 20-meter yard test 4.00 and 0.65. The mean and standard deviation for numeric pain rating scale will be 3.67 &0.88. The mean and standard deviation of lower extremity functional scale will be 68.53 & 6.11. The t- test for 20-meter, numeric pain rating scale & lower extremity functional scale are 11.79, 10.93 & 21.51. These have the significant at the level of p-valve = 0.000 < 0.05.

Conclusion: The present study concludes that there is a significant effective in Kinesio instrument assisted soft tissue mobilization followed by taping on ankle range of motion, performance level and functional disability with chronic achilles tendinopathy among sprinters.

Introduction:-

Achilles tendinopathy is the strongest and largest tendon in the body that connects the gastrocnemius and soleus muscle to posterior aspect of calcaneus and insertional fibers of Achilles tendon are in continuity with plantar aponeurosis. Tendon comprised of small fibers like proteins called collagen and pain in achilles tendon result of

Corresponding Author:- Bharani V.
Address:- MPT Ortho, School Of Physiotherapy, VISTAS.

damage to the collagen. Achilles tendinopathy is common lower extremity injury in athletes as well as non-athlete. Achilles tendinopathy is musculoskeletal injury common in runners.

Two most common sites of injury in runners include mid portion achilles tendinopathy and insertional achilles tendinopathy. The force generated during "toe off" of the ground while running. The force is transmitted by achilles and the force can be as much as three times of the body weight. Faster the run more strain will be on the achilles tendon. Thus the overuse of achilles tendon leads to weak calf muscle and poor ankle joint range of motion result the tendon damage that occurs achilles tendinopathy in runners.

The achilles tendon pain arise dull stiffness in the tendon and gradually worse with the speed and faster running. If continue to overuse the muscle and the pain will be more sharp and often. Ability of the running speed reduced and eventually impeding the ability even to jog lightly.

Achilles tendinopathy has been measured using numeric pain rating scale which contains 11 item scale and lower extremity functional scale contains 20 questionnaires. The outcome measure used to assess the running capacity is the 20 meter yard test. Thus the present aim of the study is to find the effectiveness of Kinesio instrument assisted soft tissue mobilization and taping among sprinters with chronic achilles tendinopathy in and around Chennai as Quasi experimental study.

Kinesio instrument assisted soft tissue mobilization is a common term that describes the use of an Accel Tool which is ergonomically designed to detect and treat soft tissue pain, injury, and dysfunction. Kinesio instrument assisted soft tissue mobilization is a procedure in which instruments are used to mechanically stimulate soft tissue structures to relive musculoskeletal pain and discomfort and to improve overall mobility and function.

Instruments effectively breakdown the fascial restriction and scar tissue. The ergonomic design of these instruments provides the ability to locate restrictions and allows to treat the 3 affected area with the appropriate amount of pressure. When the stimulus is applied to the injured soft tissue using an instrument causes the stimulation of local inflammatory response. Micro trauma initiates reabsorption of inappropriate fibrosis or excessive scar tissue and facilitates the healing activities resulting in remodeling of affected soft tissue structures and breakdown the scar tissue allowing full functional restoration to occur. Recently, instrument assisted soft tissue mobilization has received much attention. Instrument soft tissue mobilization is a technique that involves using instruments to address musculoskeletal pathology related impairments and help heal soft tissues. When a stimulus is applied to the injured soft tissue using an instrument, the activity and the number of fibroblasts increase, along with fibronectin, through localized inflammation which then facilitates the synthesis and realignment of collagen is one of the proteins that makes up the extracellularmatrix.

Howitt et al, miners &Boergie have reported that IASTM can reduce pain caused due to sports injury and improve soft tissue function and joint range of motion in ordinary people with chronic achilles tendinopathy resulting from persistent running. Howitt et al reported that when applied to a triathlete who had suffered an acute grade 1 strain in the tibialis posterior muscle.

Taping method is a therapeutic tool utilized by the rehabilitation management, pain, soft tissue injury, edema, tissue and joint malalingment. Taping theory is based on the neuro physiological mechanisms and the effect of mechanical stimuli on various systems in the body. It designed to mimic human skin with roughly the same thickness and elastic properties, the 4 tape can be stretched 30 to 40 % longitudinally. It is latex free material with acrylic adhesive and which is heat activated.Jung hoon lee, Won gyuyoo stated that the increase in active ankle range of motion and decrease tenderness and pain from repeated achilles tendinopathy.

Meter yard test

The running test used to estimate an athlete's capacity. The test requires participants to run 20 meters as quick as possible to reach the target. Sprint training includes various running workouts, targeting acceleration, speed development, speed endurance, special endurance and tempo endurance. All these training methods produce qualities which allow athletes to be stronger, more powerful in hopes of ultimately running faster. It is important to perform the fitness test must be done in consistent environment.

Methodology:-

In this study 50 samples were taken for analysis from in and around Chennai. From the 50 samples I took 30 samples that were satisfying the inclusion criteria and informed consent received from each sprinters and the procedure were explained.

The sprinters will be instructed to stand in a normal relaxed posture and instructed to wear proper dress code with tracks and t-shirt and to take off their shoes. The 20 meter yard test was performed on the ground and the instructions are given how to perform and the athletes to answer the questionnaire about NPRS and LEFS and the score were noted.

Test was performed at the same place participants were asked to avoid strenuous exercise 24 hours prior to the test not to consume food, caffeine for 3 hours before the testing session. Instruction given to perform the test as fast as they can and no verbal encouragement was used during performance.

Participants asked to stand on starting line and on hearing the "Ready, Steady, Go" the participant starts to run as fast as they can and to start the stop watch as soon they reach the finishing line, stop watch is manually stopped and the duration is recorded and noted.20 meter yard test performed both per and post-test to check the running capacity of runners and the performance level of theathlete.

Kinesio instrument assisted soft tissue mobilization were started to treat on the calf muscle with the Kinesio instrument assisted soft tissue mobilization principle for about 3-5 minutes and followed by taping over calf muscle to maintain range of motion of ankle joint. Kinesio instrument assisted soft tissue mobilization & taping applied for 2 sessions per week for 4 weeks totally 8 sessions.

Finally to check the performance level of the athlete after the treatment 20 meter yard test is performed as post-test and the duration is noted along with lower extremity functional scale score and numeric pain rating scale score is recorded. The value of this parameter will be sent for statistical analysis.

Fig 1:-

Fig 2:-

Outcome Measures

1. Numerical pain rating scale
2. Lower extremity functional scale
3. 20- Meter yard test

Results:-

The present study included 30 samples for this quasi-experimental study. Here the samples were taken from in and around Chennai. The nominal data used in our study are Numerical pain rating scale, LEFS and 20-Meter yard test. The table shows paired t-test samples for the 30 subjects who have Achilles tendinopathy and its relationship to functional disability and describe the descriptive statistics of 20 M- yard test, NPRS, LEFS pre -test and post-test values of mean and standarddeviation.

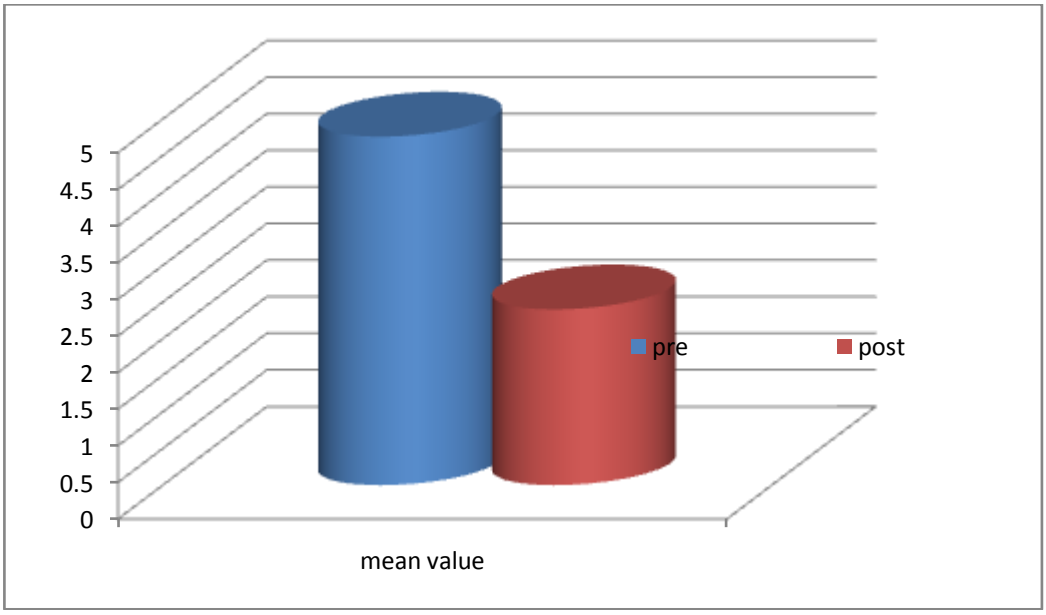
The mean and standard deviation for 20-meter yard test will be 4.00 &0.65. The mean and standard deviation for NPRS will be 3.67 & 0.88. The mean and standard deviation for LEFS will be 68.53 &6.11.

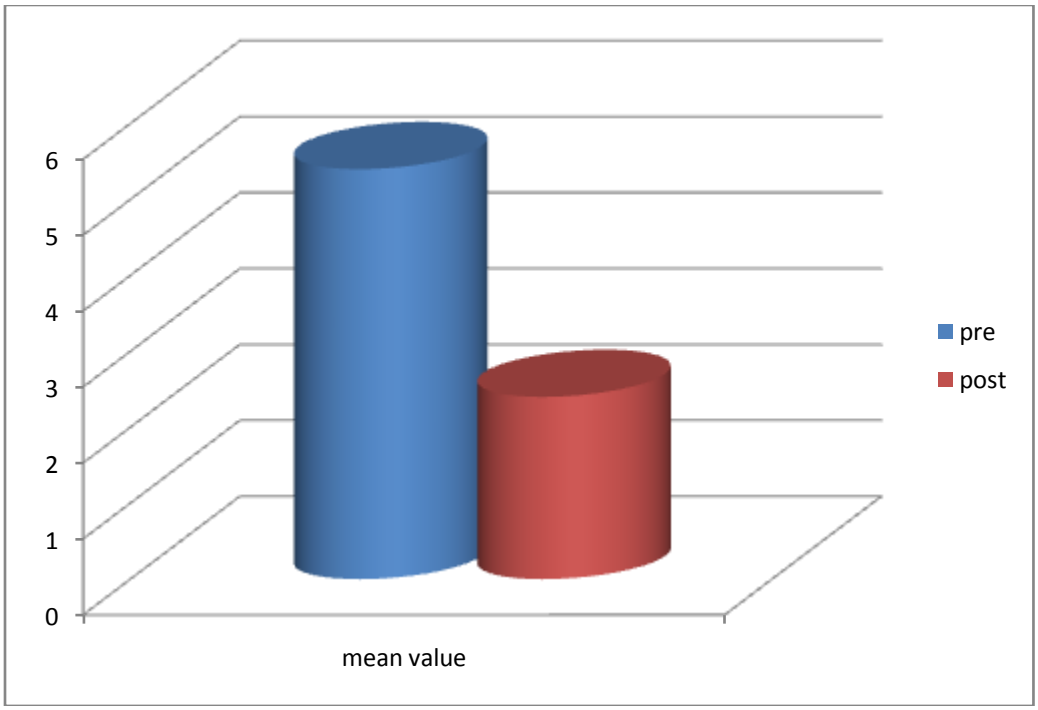
The results of the present study show statistically and clinically significant correlation for the sprinters who have achilles tendinopathy which have a relationship between pain and functional disability. The statistic test ‘t’ for the 20-M yard test is t=11.79. The statistic test ‘t’ for the NPRS is t=10.93. The statistic test ‘t’ for the LEFS t=-21.51. The pain and functional disability have correlation showing the value ‘p’ 0.000 which is significant at the level <0.05.

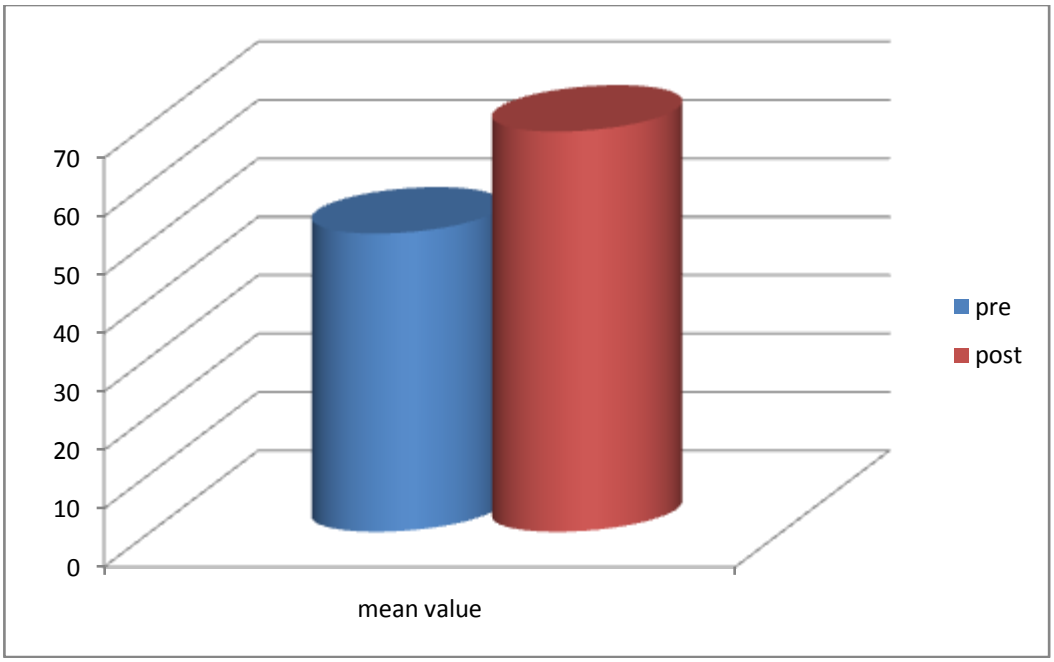
Table:

Parameter	Mean value		Standard deviation		t-test	p-value
	pre	post	pre	post		
20 - meter yard test	4.76	4.00	0.66	0.65	11.79	0.000
Numeric pain rating scale	5.40	3.67	0.93	0.88	10.93	0.000
Lower extremity functional scale	51.07	68.53	6.49	6.11	-21.51	0.000

20 - meter yard testNPRS LEFS







Discussion:-

The present study identified achilles tendinitis is a common injury that affects athletes involved in running and jumping sports. The injury results from repetitive micro trauma caused by eccentric loading which in turn will have an impact on the tendon and peritendinous structures which may leads to achilles tendinopathy. Achilles tendinitis most commonly results from training errors, including excessive running, rapid increase in training intensity, uphill running, sudden changes in running surfaces, training on indoor tracks, and wearing poorly designed running shoes.

During 'toe off' of running the force is transmitted to the achilles tendon. This tremendous force is absorbed through eccentric tendon loading when the rapidly dorsiflexing foot decelerates. Repetitive eccentric loading may leads to tendon degeneration and inflammation which in turns leads to repetitive strain on achilles tendon leads to achilles tendinopathy. As injured tissue heals, granulation tissue develops and frequently forms adhesions between the tendon and Para tendon resulting in recurrent inflammation.

IRIS F. Lagas, TryntsjeFokkema, Jan A.N. Verhaar, Sita M.A BiermaZeinstra, MarienkevanMiddelkoop, Robert Jandevos. Study stated that Incidence of achilles tendinopathy and associated risk factors in recreational runners. The present study aim is to find the effectiveness of kinesio instrument assisted soft tissue mobilization and taping among sprinters with chronic achilles tendinopathy in and around Chennai as Quasi Experimental Study.

Achilles tendinopathy to be the third most common running injury in athletes it is 52% common in elite runners. And in marathon runners have the highest incidence of achilles tendinopathy, with an incidence of 7.4%. Thus the repetitive strain on achilles tendon can result in running performance and pain with reduced range of motion in ankle joint which will affect the functional status of the athletes. This may have an impact on the sprinter's performance and speed.

Jooyoung Kim, Dong Jun Sung, Joohyunghee the previous study stated that instrument assisted soft tissue mobilization was found to improve soft tissue function & joint range of motion in acute or chronic sports injuries while also reducing pain. 2011 Jung hoon lee, Won gyuyoo stated that the increase in active ankle range of motion and decrease tenderness and pain from repeated achilles tendinopathy among amateur badminton player.

Teresa S.M. Yeung, MSc, MSc Jean Wessel, PhD, Paul Stratford MSc, MSc Joymacdermid PhD. Reliability, validity and responsiveness of lower extremity functional scale. There was less previous evidence stated the Kinesio instrument assisted soft tissue mobilization on achilles tendinopathy among the sprinters. And there was less evidence

stated that Kinesio instrument assisted soft tissue mobilization followed taping among sprinters with chronic achilles tendinopathy.

The results of our study and the evidence is sufficient to conclude that there is significant effect of treatment Kinesio instrument assisted soft tissue mobilization & taping is significantly effective in increasing the range of motion, functional ability, speed and performance level while also it reducing the pain.

Thus, the results reject the null hypothesis and accept the alternate hypothesis showing significance between the variables used. Furthermore, research must focus on the large sample size of sprinters with longer duration form different cities and other cities around India.

Conclusion:-

The present study concludes that there is a significant improvement in Kinesio instrumentassisted soft tissue mobilization followed by taping that on ankle range of motion, performance level and functional disability with chronic achilles tendinopathy among sprinters.

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