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Effect of Iliopsoas Muscle Release on Running Speed in Recreational Runners

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Abstract

Background and Objective: Running has steadily gained worldwide popularity and is the primary mode of exercise for many. This, increase in activities have further observed a steady increase in the incidences of injuries. Recreational function and activities like running results in hip pain, limitation of motion or both. Iliopsoas, being the primary and the strongest hip flexor plays an important role in maintaining integrity and strength of hip joint. Iliopsoas muscle tightness occur as a result of overuse or strain in recreational runners. The primary aim of this study was to find the effect of iliopsoas release on running speed in recreational runners.

Materials and methodology: 40 recreational runners were included in the study. Static release and Dynamic release was given to the patients. A pre-test Assessment of Visual Analogue Scale (VAS) on rest, and on activity, Manual Muscle Testing (MMT), Range Of Motion (ROM) and Straight Line Sprint Test (SPT) was taken.

Result: Pain is significantly reduced during both, rest and VAS exercise. The mobility of the hip joint has significantly increased based on the ROM. There is a significant improvement on muscle strength evaluated by MMT.

Conclusion: There is significant increase in running speed of recreational runners, along with significant decrease in pain.

Keywords: iliopsoas muscle, recreational runners, running speed, muscle release

Introduction

Running is one of the most popular and accessible sport activities enjoyed by people worldwide.[12] It has become increasingly popular in the past 50 years. Running is an excellent form of exercise for people seeking to achieve physical fitness and healthy lifestyle as it is linked with longevity and reduction of risk factors for cardiovascular diseases.[10] Running is a form of both anaerobic exercise and aerobic exercise. It is a complex, coordinated process which involves the entire body.[10]

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Despite the health benefits, running related musculoskeletal injuries are very common. The incidence and prevalence of injuries among runners ranges between 3.2% and 84.9% respectively.[1] It has also been reported that 36% of the runners suffer from musculoskeletal injuries.[14]

In recreational runners, running related injuries are most commonly seen in the lower extremity. Some of the most frequently seen diagnosis among recreational runners are patellofemoral pain, iliotibial band syndrome, plantar fasciitis, with proportions in relation to all injuries ranging between 10-17%, 4-8% and 5-8% respectively.[8]

Clinically, one of the most important causes of running is muscle tightness. 92% of injured runners exhibits one or two muscle imbalances that may contribute to running injury.[8] A number of factors have been identified that contribute to flexibility, including gender, age, muscle size, and warm-up. Females are more flexible than males, with the differences in flexibility being accounted for by anatomic factors, such as the difference in pelvic anatomy that can result in females having a larger valgus angulation at the knee.

Compared to non-runners, runners tend to have tighter rectus femoris and iliopsoas muscles. The prevalence of iliopsoas tightness is 33.8% in runners. [2]

Iliopsoas muscle is a primary mover of the hip joint and also helps to stabilize the hip and lower back during activities such as walking, running and rising from a chair. Iliopsoas muscle activity occurs during swing phase for 30-60% of the running cycle. The tightness of iliopsoas muscle leads to reduced velocity while flexion of hip joint.[11] Reduced velocity of hip flexion leads to decreased running speed.

The iliopsoas muscle has the greatest influence on the running speed compared to other muscles. Stretching of tight muscles is a very common on-going physiotherapy practice. There are various types of stretches such as static, dynamic, and ballistic.[3]

In competitive sprinters, active dynamic stretching of the major muscle groups of the lower limb has been shown to be advantageous in terms of decreasing 50 meters sprint time. Dynamic stretching of the lower limbs in professional soccer players has produced faster 10- meter sprint times and greater maximal speed over 20 meters in comparison to no-stretch conditions. Static stretching of the calf and thigh musculature on 20-meter sprint performance and observed significantly slower times among post-stretch trials when compared to no-stretch trials.[7]

The main purpose of this study is to investigate the effects of iliopsoas muscle release on the running speed in recreational runners.

Material and Methodology

- Study Design: Observational Study
- Study Type: Experimental Study
- Study Setting: Krishna College of Physiotherapy, Karad
- Target Population: Recreational Runner
- Sample Size: 40

$$\left(\frac{4pq}{L^2} \right)$$

p= prevalence

q= (1-p)

L= allowance error

- Sampling Method: Convenient Sampling
- Study duration: 3 months
- Inclusion Criteria: Both male and female

  Age limit 18-30

  Recreational runners.

  Anterior hip pain on activity.

  Modified Thomas test positive.

- Exclusion Criteria: Runners who had experience in gymnastics, dance, yoga

  Patients who had history of surgeries.

  Trauma

  Recurrent ankle sprain.

  Hernia

- Outcome measures: Visual Analog Scale

  Range of motion of hip joint

  Modified Thomas test

  Straight line sprint test

Procedure

- This is a study to assess efficacy iliopsoas muscle release on running speed in recreational runners.
- This study was conducted in Krishna Institute of Medical Sciences 'Deemed to be' University, Karad.
- An ethical clearance certificate was obtained by Institutional Ethical Committee of Krishna Institute of Medical Sciences 'Deemed to-be' University, Karad.
- Subjects were selected according to the inclusion exclusion criteria.
- An informed written consent was obtained from the subjects.
- A pre-test Assessment of VAS on rest and on activity, MMT, ROM and SPT was taken.
- Patients were explained regarding the 3 weeks protocol which was divided in 2 phases
- Phase 1 is of 1.5 weeks, where only static release was given.
- In phase 2, static release was progressed to dynamic release.

Static release:

Subject lied in supine position with hip and knee flexed.

Patient was asked to breathe in and out.

While breathing out, therapist applied deep pressure just above the ASIS.

While maintaining the pressure, 10 oscillations were given for 10 minutes with 10 seconds hold in 3 sets

Dynamic release:

Subject lied in supine position and were asked to breathe in and out.

While breathing out, therapist applied deep pressure just above the ASIS.

The subject was asked to simultaneously perform hip flexion, hip extension + internal rotation.

Oscillations were given when the leg was in hip extension + internal rotation. 10 oscillations were given for 10 minutes with 10 seconds hold in 3 sets

Post 3 weeks of protocol a post assessment was taken for VAS on rest and on activity,

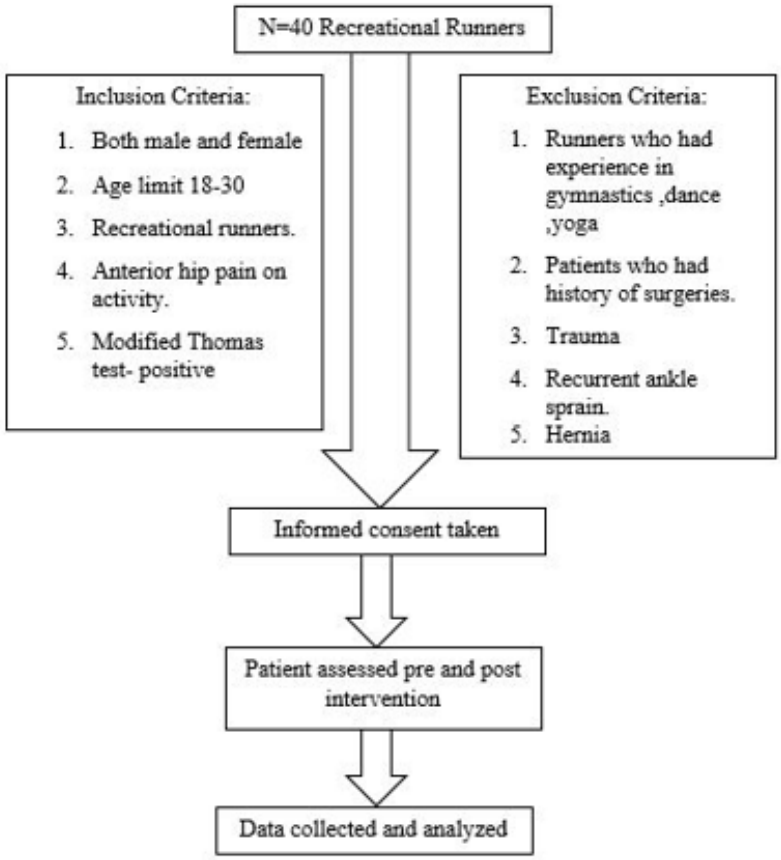
ROM, MMT and SPT.

Data was collected and analyzed statistically

Fig. 1: Static Iliopsoas Release

Fig. 2: Dynamic Iliopsoas Release

Fig. 3: Straight Line Sprit Test

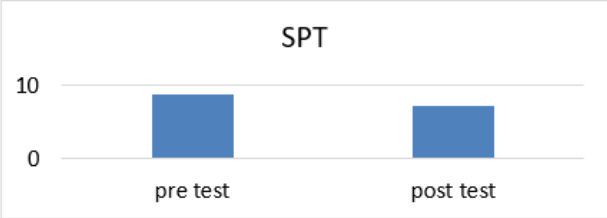


Result

- A total of 40 patients between the age of 18-30 years were included. The mean age of patients was 23.7±3.97 years. Out of 40 patients 14 were females and 26 were males.
- Patients treated with the given exercise program has shown decrease in pain VAS on rest mean score 2.68 to 1. 13. Statistically it shows that there was extremely significant difference (p<0.0001) between pre intervention assessment and post intervention assessment.
- Patients treated with the given exercise program has shown decrease in pain VAS on activity mean score 2.96 to 1.37. Statistically it shows that there was extremely significant difference (p<0.0001) between pre intervention assessment and post intervention assessment.
- Patients treated with the given exercise program has shown increase in hip range of motion with mean score of flexion from 113.1 to 118.9, extension from 8.45 to 13.6, abduction from 38.2 to 39.2 and adduction from 19.6 to 21.2. Statistically it shows that there was extremely significant difference (p<0.0001) between pre intervention assessment and post intervention assessment.
- Patients treated with the given exercise program has shown increase in muscle strength assessed using MMT with mean score of 4.72 TO 4.92. Statistically it shows that there was extremely significant difference (p<0.0001) between pre intervention assessment and post intervention assessment.
- Patients were assessed pre intervention and post intervention with SPT test. Patients treated with the given exercise program has shown increase in running speed with mean score 8.79 to 7.30. Statistically it shows that there was extremely significant difference (p<0.0001) between pre intervention assessment and post intervention assessment.

Table 1: Mean, Standard Deviation and *P* Value for SPT Pre And Post Intervention

Outcome cmeasure	Pre test	Post test		interpretation
	Mean ± SD	Mean ± SD	p- value	Extremely significant
SPT	8.79±0.53	7.30 ± 0.46	< 0.0001	



Graph 1: Result for Straight Line Sprint Test (Pre and Post)

Discussion

The result of this study demonstrated that iliopsoas release is effective on increasing the running speed in recreational runners. The authors of a study measured the effects of stretching on a dynamic event immediately after stretching (0-60 seconds), whereas other studies investigated the effects of stretching on performance approximately 3-10 minutes following the performance of stretching.[5]

A study carried out by Winchester et al reported a 3% decrease in sprint performance for track and field athletes after participating in a static stretching protocol, which was conducted after a 30 minute dynamic warm-up.[4]

Prior studies reported an increase in 50-m sprint time (decrease in sprint performance) in a group of competitive track and field athletes after passive static stretching, despite being combined with active dynamic stretching. Conversely, they observed a decrease in 50-m sprint time (improvement in performance) after warm-ups involving static dynamic stretches combined with active dynamic stretches or with the active dynamic stretches alone. [6]

Little and Williams reported that a static-stretch protocol produced significantly faster runs than did the no-stretch protocol for the 20 m sprint.6 However, in their study, subjects performed further warm-up activity after the stretching, which may have affected the immediate adverse effects of static stretching that have been previously reported. Vetter reported no changes on a 30-m sprint after static stretching.[9]

A study showed significantly faster post 40-yard sprint times when compared to pre 40-yard sprint times only after the NS condition. One limitation of this study was the use of a small group of untrained, recreational, non-competitive runners instead of trained runners. Consequently, it becomes important not to generalize the findings to competitive runners. Yet, the results of this study may be more relevant for trained runners than recreational runners due, in part, to stringent training regimens, warm-up routines, and stretching protocols as well as potential differences in parameters such as height, weight, and BMI.[13] Future research can be carried out with increased number of sample size and also increased time duration for treatment protocol.

Conclusion

In this present study, there is significant increase in running speed of recreational runners, along with significant decrease in pain, improved strength and mobility of lower limb muscles. The structured exercise program designed, have been effective for other types of runners and different age group.

Future studies can include more exercises and can build a step-by-step protocol.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Wang SS, Whitney SL, Burdett RG, Janosky JE. Lower extremity muscular flexibility in long distance runners. Journal of Orthopaedic & Sports Physical Therapy. (1993) Feb;17(2):102-7.
2. Harvey D. Assessment of the flexibility of elite athletes using the modified Thomas test. British Journal of Sports Medicine. (1998) Mar 1;32(1):68-70.
3. Ferguson LW, Gerwin R, editors. Clinical mastery in the treatment of myofascial pain. Lippincott Williams & Wilkins; (2005).

4. Little T, Williams AG. Effects of differential stretching protocols during warm-ups on high speed motor capacities in professional soccer players. Journal of strength and conditioning research. (2006);20(1):203-7.
5. Winchester JB, Nelson AG, Landin D, Young MA, Schexnayder IC. Static stretching impairs sprint performance in collegiate track and field athletes. The Journal of Strength & Conditioning Research. (2008) Jan 1;22(1):13-9.
6. Sayers AL, Farley RS, Fuller DK, Jubenville CB, Caputo JL. The effect of static stretching on phases of sprint performance in elite soccer players. The Journal of Strength & Conditioning Research. (2008) Sep 1;22(5):1416-21.
7. Sim AY, Dawson BT, Guelfi KJ, Wallman KE, Young WB. Effects of static stretching in warm-up on repeated sprint performance. The Journal of Strength & Conditioning Research. (2009) Oct 1;23(7):2155-62.
8. Christensen SD, Perry C, Resnik R. The acute effects of various types of stretching (static, dynamic, ballistic, and no-stretch) of the iliopsoas on 40 yard sprint times in non-athletes (Doctoral dissertation, University of Nevada, Las Vegas).
9. Kurihara T, Saiki T, Kageta T, Isaka T. Contribution of iliopsoas and quadratus lumborum muscle size on long distance runners. InXXIV Congress of the International Society of Biomechanics, XV Brazilian Congress of Biomechanics. p (2013) (pp. 1-2).
10. Schache AG, Dorn TW, Williams GP, Brown NA, Pandy MG. Lower-limb muscular strategies for increasing running speed. journal of orthopaedic & sports physical therapy. (2014) Oct;44(10):813-24.
11. Pradip B, Sudhir B, Nidhi B. Prevalence of tightness in hip muscles in middle aged Indian men engaging in prolonged desk jobs: A descriptive study. Int. J. Phys. Educ. Sports Health. (2018);5(2):15-21.
12. Alam F, Raza S, Moiz JA, Bhati P, Anwer S, Alghadir A. Effects of selective strengthening of tibialis posterior and stretching of iliopsoas on navicular drop, dynamic balance, and lower limb muscle activity in pronated feet: A randomized clinical trial. The Physician and Sportsmedicine. (2019) Jul 3;47(3):301-11.
13. Sulowska-Daszyk I, Skiba A. The Influence of Self-Myofascial Release on Muscle Flexibility in Long-Distance Runners. International Journal of Environmental Research and Public Health. (2022) Jan 1;19(1):457.