



MUSCLE ENERGY TECHNIQUE VS YOGASANA ON ILIOPSOAS TIGHTNESS TO IMPROVE FLEXIBILITY AND LUMBAR RANGE OF MOTION IN YOUNG ADULTS: A COMPARATIVE STUDY

Physiotherapy

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ABSTRACT

Purpose of study: Iliopsoas is a muscle of lower extremity prone to tightness with prevalence of 83.8% in young and middle-aged adults leading to lower back pain. **Objective:** To compare the effect of Muscle Energy Technique versus Yogasana on Iliopsoas tightness to improve flexibility and lumbar range of motion in Young adults. **Methodology:** 30 subjects with Iliopsoas tightness within age group 18-35 fulfilling the selection criteria were selected and assigned into Group A (n=15) that received Muscle Energy Technique and Group B (n=15) received Yoga technique "Anjanyesana", both the groups underwent the intervention for 2 weeks, 3 sessions per week. Pre and Post treatment Modified Thomas Test, Lumbar range of motion for flexion, Lumbar side flexion and Lumbar side rotation were used as outcome measures. **Results:** Group A showed a statistical significant difference with mean of 6.3 ± 2.7 , while Group B showed difference with mean of 10.0 ± 4.64 on Modified Thomas test with $p=0.021$ post 2 weeks of intervention. There was statistically significant improvement in lumbar side flexion with $p=0.02$, with mean and SD of 3.3 ± 1.952 for group A and 1.3 ± 0.457 for group B. However, based on the mean values, other outcome measures showed better improvement in Group A as compared to group B. **Conclusion:** Both MET and Yogasana were effective in improving flexibility of Iliopsoas and lumbar range of motion. While MET proved to show immediate effects in decreasing hip flexion tightness, Yogasana was more effective following 2 week intervention.

KEYWORDS

Muscle Energy technique, modified thomas test, Iliopsoas tightness, Anjanyesana

INTRODUCTION

Flexibility is the ability to move a single joint or series of joints smoothly and easily through an unrestricted, pain-free range of motion. Muscle tightness is the adaptive shortening of the contractile and non-contractile elements of the muscle, thus leading to shortening of connective tissue and fascia, causing decreased mobility of the joint.¹ Muscles in the lower extremity which are prone to tightness are Iliopsoas, Rectus femoris, the Hamstrings, Hip adductors, Tensor fascia lata, Tibialis posterior and gastro soleus.² Iliopsoas muscle very uncommonly gets stretched in activities of daily living, resulting in tightness. Also a study conducted by Pradip B. et al in 2018, showed a prevalence of Iliopsoas tightness as 83.8% in middle aged desktop workers and concluded that a majority of desk job professionals with a longer work history could develop tightness in Iliopsoas and hamstring muscles making them prone to low back Pain in some point of life.³ Iliopsoas is a postural muscle and has been observed to have a lot of tendency to shorten.⁴ A short Iliopsoas pulls the spine into hyper lordosis and an anteriorly tilted pelvis which puts stress on all the spinal muscles leading to low back pain.⁵ Shortened Iliopsoas muscle acts to limit the available range of hip extension.⁵ A shortening of this muscle group also limits lateral flexion on the contralateral side and ipsilateral rotation of the lumbar spine.⁴

Flexibility can be improved through a wide variety of techniques like Stretching, PNF technique, Myofascial release technique, Muscle energy techniques and various Yoga asanas as well. However, the most effective management remains an area of debate. The use of Muscle Energy technique, specifically the Post Isometric Relaxation (PIR) is found to be the most effective technique for increasing Range of Motion, decreasing pain and functional disability as compared to static Stretching.⁶

Another useful technique for increasing the flexibility of the muscles are Yogasana. It has been proven worldwide to have many health benefits. Anjaneyasana is Yogic pose that improves and maintains flexibility of Hip flexors. It is an asana that stretches the anterior muscles of the thigh, the rectus femoris and mainly the iliopsoas. It also improves balance, endurance and core awareness.⁷

Yoga increases strength, flexibility and the ability to relax, it also helps to improve the circulation in the body. Yoga asanas aim to develop balance and flexibility.⁸

Since there are limited studies and literatures done on Iliopsoas Muscle in the previous years, the need is to improve the flexibility of Iliopsoas muscle. Hence the need of study was to compare Muscle Energy Technique and Yogasana to improve Iliopsoas flexibility and Lumbar range of motion to prevent further complications.

MATERIALS AND METHODOLOGY

The Study was commenced after ethical clearance from the Institutional Sub-ethical Committee of Dr. D. Y. Patil college of Physiotherapy, Pune, India. After getting the approval, the eligibility of the subjects were considered through thorough history taking and Physical examination by Principal investigator. Participating subjects were explained about the study and were asked to sign on the written consent form. 48 young adult participants of age 18-35 were screened and 30 subjects were included according to the selection criteria. Subjects with positive modified thomas test, decreased lumbar range of motion of flexion, side flexion, side rotation were included in the study. Subjects with musculoskeletal soft tissue injuries to the lower extremity, recent fractures of spine and lower extremities within 3 months were excluded. The study was commenced from August 2018 to January 2019.

Subjects were then randomly allocated in two groups by chit method. Group A (n=15) received Post Isometric Relaxation technique for 3 repetitions and Group B (n=15) received a Yoga technique "ANJANYESANA" with a hold of 20 seconds/session for 3 repetitions. Both groups received 3 sessions of intervention per week on alternate days for 2 weeks. All subjects were evaluated for Iliopsoas muscle tightness using Modified Thomas test, Lumbar flexion range of motion by Modified-Modified Schober's test, Lumbar side flexion using finger to floor method and lumbar side rotation by universal goniometer. All these outcome measures were evaluated for pre-treatment, immediate post-treatment and after 2 weeks.

Intervention protocol for Group A

The subject was taken in supine position, at the very end of the table, non- treated leg fully flexed at the hip and knee and held in that position by the subject. The leg on the affected side was allowed to hang freely. The therapist stood sideways on to the patient, at the foot of the table, with both the hands holding the thigh of extended leg. The subject was asked to flex at the hip to the point of resistance felt by the therapist. The subject then using his 15-20% of strength was asked to flex at the hip against minimal resistance (isometrically) and to breathe in for 10 seconds. He was then instructed to 'let go' (relax) and exhale slowly. The procedure was repeated for two more times.⁹

Intervention protocol for Group B

Before starting the yogasana, subjects were given a warm-up session, then proceeded with Anjaneyasana. From downward facing dog, the subject was asked to exhale and step the right foot forward between the hands, aligning the right knee over the heel. Lowering the left knee to the floor, keeping the right knee fixed, the subject was instructed to slide the left back until a comfortable stretch is felt in left front thigh.

Subject was asked to inhale and lift the torso upright, also sweep the arms out to the sides and up, lift the chest from the firmness of the shoulder blades. The subject was then asked to take the head back and look up, hold on for a minute, exhale the torso back to the right thigh, hands to the floor, and turn the back under toes. With another exhale, the procedure was repeated the same for the left leg. Rest period was given for 10 seconds. After asana, the subject was asked to maintain 'shavasana', pose for 3 minutes⁷.

DATA ANALYSIS AND INTERPRETATION

All data in the study was analysed using IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY, Released 2011. SPSS for Windows, Version 16.0. Chicago, SPSS Inc. Data was tested for normality and Shapiro Wilk test was not met. Therefore, Non-parametric test was used in order to examine the difference between groups using Mann-Whitney test and compare the difference of pre and post training within the groups using Friedman test. The statistical significance was set at 0.05.

Table 1 Intra group Comparison between Pre and Post Mean Scores for Outcome Measures in group A and Group B

Outcome measures	Group A	Mean ±SD	p value	Group B	Mean ±SD	p value
Modified Thomas Test	Pre	11.2 ± 3.8	<0.05	Pre	13.7 ± 6.68	<0.05
	Imm.Post	3.1 ± 1.8		Imm.Post	6.7 ± 4.20	
	Post 2 Weeks	4.9 ± 2.5		Post 2 Weeks	3.7 ± 2.52	
Modified Modified Schober's Test	Pre	5.7 ± 0.8	<0.05	Pre	5.7 ± 0.8	<0.05
	Imm.Post	6.9 ± 0.7		Imm.Post	6.6 ± 0.8	
	Post 2 Weeks	7 ± 0.7		Post 2 Weeks	6.7 ± 0.8	
Lumbar Side flexion	Pre	15.3 ± 2.82	<0.05	Pre	15.7 ± 2.0	<0.05
	Imm.Post	11.8 ± 2.59		Imm.Post	13.8 ± 2.0	
	Post 2 Weeks	11.9 ± 2.12		Post 2 Weeks	12.4 ± 2.3	
Lumbar Rotation	Pre	43.1 ± 1.9	<0.05	Pre	43.5 ± 1.88	<0.05
	Imm.Post	43.7 ± 1.2		Imm.Post	44 ± 1.19	
	Post 2 Weeks	43.9 ± 1.2		Post 2 Weeks	44.3 ± 0.89	

Table 2 Comparison of Pre and Post Immediate treatment mean difference of various outcome measures

Outcome Measures	Group	Mean ±SD	p value	t value
Modified Thomas Test	A	8.1 ± 3.24	0.29	1.05
	B	7.0 ± 4.17		
Modified modified Schober's Test	A	1.1 ± 0.516	0.391	0.85
	B	0.9 ± 0.258		
Lumbar Side Flexion	A	3.3 ± 1.952	0.02*	3.44
	B	1.3 ± 0.457		
Lumbar Rotation	A	0.7 ± 0.723	0.429	0.791
	B	0.5 ± 0.743		

*Significant

Table 3 Comparison Of Pre And Post 2 Weeks Mean Difference Of Various Outcome Measures

Outcome Measures	Group	Mean ±SD	p value	t value
Modified Thomas Test	A	6.3 ± 2.76	0.021*	2.30
	B	10.0 ± 4.64		
Modified Modified Schober's Test	A	1.3 ± 0.45	0.357	0.921
	B	1.1 ± 0.258		
Lumbar Side Flexion	A	3.2 ± 1.656	0.455	0.747
	B	2.7 ± 1.047		
Lumbar Rotation	A	0.9 ± 0.915	0.77	0.291
	B	0.8 ± 1.082		

*Significant

RESULTS

Table 1 shows the Intra group Comparison between Pre and Post Mean Scores for Outcome Measures in group A and Group B. This table shows that there was a statistically significant difference ($p \leq 0.05$) in all outcome measures post 2 weeks of treatment.

Table 2 shows the Comparison of Pre and Post Immediate treatment mean difference of various outcome measures. This table shows statistical significant improvement in Lumbar side flexion Range of Motion with $p=0.02$, with mean and standard deviation of 3.3 ± 1.952

for group A and 1.3 ± 0.457 for Group B, thus proving Muscle Energy Technique was more effective in improving immediate Lumbar side flexion range of Motion. However, based on the mean values, all other outcome measures showed better improvement in Group A as compared to group B.

Table 3 shows the Comparison of pre and post 2 weeks mean difference of various outcome measures. This table shows the statistical significant improvement in Hip flexion Range of Motion as measured by Modified Thomas test with $p=0.021$, with mean and standard deviation of 6.3 ± 2.76 for group A and 10.0 ± 4.64 for Group B, thus proving thus proving Yogasana was more effective in improving Hip flexion range of Motion post 2 weeks of treatment.

DISCUSSION

The purpose of this study was to compare the effectiveness of Muscle Energy Technique and Yogasana in Subjects with Iliopsoas Tightness to improve flexibility and lumbar range of motion. In the current study, there was significant decrease in hip flexion tightness according to Modified Thomas Test immediately post treatment in group A as compared to Group B.

The effects of MET for decrease in hip flexion tightness immediately after one intervention can be explained on the basis of physiological mechanisms behind the changes in muscle extensibility- reflex relaxation, viscoelastic changes as well as change in stretch tolerance. Reflex muscle relaxation followed by immediate contraction that been proposed to occur by activation of the Golgi tendon organs and their inhibitory influence on α - motor neuron pool¹⁰.

Yogasana uses asanas (statics stretch postures) which improves muscular strength and flexibility. Hatha Yoga combines asanas along with pranayamas which further benefit for monitored stretching and improving balance in long times¹¹. This can be said the reason for improvement in hip flexion post two weeks following Yogasana as an intervention.

M Jay Polsgrove et.al in year 2016, conducted a similar study of impact of 10 weeks of yoga practice on flexibility and balance of college athletes, and found out significant gain in flexibility and balance in the individuals¹¹.

The study also measured Lumbar flexion using the Modified-Modified Schober's Test, where in, Muscle energy technique was found to be more effective than Yogasana for both immediate and after 2 weeks of treatment. The Iliopsoas also limits lumbar rotation to the ipsilateral side of the muscle tightened. This study also showed that Muscle energy technique was more effective in improving lumbar rotation. The reason for both can be due to the effect of Muscle energy technique on both soft tissue and articular component of the somatic dysfunction. The control of muscle tone includes afferent information coming from mechanoreceptors of the articulations, periarticular structures, from the muscle spindle and golgi tendon organs, the information being then processed at spinal cord level causing contraction and relaxation of the muscle. The mechanism follows stretching of the series of elastic components of sarcomeres, increasing Range of Motion⁷.

With prolonged and regular intervention of Yogasana practice, there is increase in blood flow to the muscles bringing oxygen and essential nutrients to the active tissues. Yogasana involves stretching, which results in lengthening of the muscle fibres and their re-alignment and also help to maintain stability and balance. This is the reason Yogasana proved to be effective post two week after the intervention as Yogasana requires prolonged stretching and strengthening¹¹.

CONCLUSION

The study concluded that both MET and Yogasana are effective to improve flexibility of iliopsoas and lumbar range of motion. While MET proved to show immediate effects in decreasing hip flexion tightness, Yogasana was more effective following 2 week intervention.

LIMITATION

The study included only healthy young individuals for the intervention.

FUTURE SCOPE

Study can be performed with larger number of population while duration of the treatment protocol could be extended for a longer

period of time. The study can be done in different populations and different occupations to find out specific effect of both the techniques.

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CONFLICT OF INTEREST: There are no conflicts of interest

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