

A study to find out the Effectiveness of Post isometric Relaxation and Prone hip Extension after psoas major Stretching to Improve the Psoas major Flexibility in Obese Patients – A Comparative Analysis

Murali Sankar K.S.I.^{1*}, Balu. S.², Dhivyadharshini³, Sathish Kumar C.⁴ and Sam Thamburaj A.⁴

¹ Director, School of Physiotherapy, AVMC Campus, Puducherry,

Vinayaka Mission's Research Foundation (Deemed to be University), Salem (Tamil Nadu), India.

² Professor, School of Physiotherapy, AVMC Campus, Puducherry,

Vinayaka Mission's Research Foundation (Deemed to be University), Salem (Tamil Nadu), India.

³ PG Student, School of Physiotherapy, Vinayaka Mission's Research Foundation (Deemed to be University), Salem (Tamil Nadu), India.

⁴ Professor, Vinayaka Mission's College of Physiotherapy,

Vinayaka Mission's Research Foundation (Deemed to be University), Salem (Tamil Nadu), India.

(Corresponding author: Muralisankar K. S. I. *)

(Received: 06 March 2023; Revised: 10 April 2023; Accepted: 12 May 2023; Published: 20 May 2023)

(Published by Research Trend)

ABSTRACT: Psoas major, the biggest muscle in the lower lumbar spine, stabilises the hip and spine. The front of the hip hurts from psoas major tightness. Finding a balance between providing enough time for the interventions to have an effect and ensuring practicality for obese patients was a challenge. Lower back discomfort is strongly linked to it. Obese individuals' failure to reach complete hip extension range might be used to assess it. This research examines psoas major flexibility in obese patients after an exercise programme. In obese patients, prone hip extension exercise following psoas major stretching improved hip extension. Two groups of 24 15–24-year-olds were studied. Group A did post-isometric relaxation, whereas Group B did psoas major stretch and prone hip extension. Universal Goniometry measured hip extension range of motion pre- and post-treatment in psoas major flexibility. Obese individuals with enhanced psoas major flexibility improved in post isometric relaxation and prone hip extension following stretching. Compared to post isometric relaxation, psoas major stretching with prone hip extension enhances extension ROM and decreases stiffness in obese individuals. Both methods worked in the investigation. In participants with psoas major tightness, psoas major stretch and prone hip extension enhance flexibility. Pre-post therapies demonstrate quick improvement.

Keywords: Prone hip extension, psoas major stretch, post isometric relaxation.

INTRODUCTION

The psoas muscle differs from the iliacus because it has an different structure and characteristics. The psoas muscle has a combination of both the psoas major and psoas minor, in this study mainly focus on psoas major. Psoas major is the only muscle which connects the upper and lower half of the body. The primary action of the psoas major is to flex the hips in order to lift the thighs towards the torso of the body, which allows the movement like running, walking and stair climbing. Psoas major is an important stability muscle of the lumbar spine and hip, it also plays a vital role for flexibility and movement of the back, pelvis, legs and hip. Psoas major along with the core muscle it helps to stabilize the spine. If the person having low back, hip, groin pain there is a possible cause for psoas major dysfunction. The tight or shortened psoas can result in excessive curvature of the lower back and also it reduces the length of stride during walking or running, since the hip cannot extend as much as it needs, and it

affects the activities of daily living. During the stride, the free leg returns in flexion under the pelvis. From its passage the centre of gravity acts under the vertical line, the thigh is raised while at the same time the leg segments remain oscillates forward (Yoshio 2002). Psoas major is often studied in the context of lumbar stress pathologies (Blomberg *et al.*, 2011), but it acts as an double action on the spine and pelvis. Moreover, this muscle allows the thigh to rise in walking and running in stride patterns. When the femur is at fixed position the psoas major bends the spine and pelvis forward, but eventually the spine and pelvis having a fixed position, the psoas major is a hip flexor (Ilizaliturri *et al.*, 2009). Many authors described the psoas major muscles as the main flexors of the hip in the stride pattern (Seif *et al.*, 2004).

The Post-isometric relaxation and Myofascial release therapy on 60 patients with non-specific neck pain showed significant improvements in VAS, NDI, Cervical Extension, left side rotation ranges, and QoL. Post-isometric relaxation improved CROM scores,

suggesting it can benefit patients with neck pain (Khan *et al.*, 2022). Myofascial rollers and post-isometric relaxation techniques relieved pain and postural deviation correction (Susan *et al.*, 2022).

Only exercise and stretching relax the muscles, but they do not retrain them into healthy tone and coordination. The direct approach is to retrain muscle and movement memory by training that actively uses muscles to normalise their tone and improve coordination. Post-isometric relaxation is a technique designed to relax muscles without initiating the stretch reflex. It reduces muscle spasm and increases range of motion. The principle is relaxation of muscle following its isometric contraction, facilitation, and inhibition of muscle that accompany breathing. The most important method in hip joint rehabilitation is psoas major stretching. Psoas major dysfunction can cause faulty hip movement during prone hip extension. There is an insufficient hip extension angle during prone hip extension due to anterior pulling on the lesser trochanter. The psoas major stretching techniques with prone hip extension angle and post-isometric relaxation for 8 weeks in obese patients were investigated to compare their effectiveness on hip extension angle. Thus, the purpose of this study is to examine the effectiveness of prone hip extension after psoas major stretching among obese patients.

The effectiveness of Therapeutic exercise in the treatment of assessing psoas major flexibility in obese patient has not been investigated, although it has been shown effective in reducing the incidence of psoas major tightness and improve hip extension angle. The effectiveness of post isometric relaxation exercise can produce an initial hip extension, so there is an need to prove the effectiveness in application of prone hip extension exercise after psoas major stretching significantly improve the flexibility of psoas major in obese patients.

The purpose of the study is to find out the effectiveness of post isometric relaxation exercise versus prone hip extension after psoas major stretching in obese patient by assessing psoas major flexibility. Based on review of literature, it is expected that there will be significant effect in psoas major flexibility in obese patient with post isometric relaxation and prone hip extension after psoas major stretching.

MATERIAL AND METHODS

The study focuses on obese patients with positive modified Thomas test results. It uses a comparative experimental design with 24 patients in two groups: Group A (12 post isometric relaxation) and Group B (12 post prone hip extension after psoas major stretching). The study will take 8 weeks, with post isometric relaxation and prone hip extension exercises. The study is conducted at the School of Physiotherapy at Aarupadai Vedu Medical College and Hospital in Puducherry.

Selection criteria include gender, age group (15-24), positive modified Thomas test, and obese patients.

Exclusion criteria include fracture, spinal deformity, arthritis, inguinal hernia, inflamed thigh ligament, sciatica, and peripheral nerve injury.

A study group of 24 obese patients with positive Thomas tests was selected from the School of Physiotherapy at Aarupadai Vedu Medical College and Hospital. Eligible subjects were divided into two groups: Group A-7 (Post Isometric Relaxation) and Group B-6 (Prone Hip Extension after Psoas Major stretching). Patients were instructed about the study's purpose and requested to attend all treatment sessions. Initial assessments included quantitative outcomes of extension range of motion before and after the program schedule.

1. Modified Thomas test: Assess the patient at supine lying and the buttocks placed at the end of the couch, ask the patient to hold the opposite leg at flexed knee. The full hip flexion results in flat lumbar spine and full pelvis rotation. If the tested leg is raised above to the ground level indicates short psoas major results in positive modified Thomas test

2. Goniometer Alignment: Position of the fulcrum-lateral to the hip joint. (Greater trochanter of the femur-reference pain).

Immovable arm - lateral midline of the pelvis.

Movable arm - lateral midline of the femur (reference point taken as a lateral condyle of tibia).

3. Technique: (3 sessions / week)

Group A - Patient placed in a supine position with buttocks as close to the end of the couch as possible, flexion of both hip and leg in the non-tested leg. Extend the knee of the opposite thigh upto the barrier. After that ask the patient to flex the hip against minimal resistance (isometric) and to breath in for 7 seconds. After the isometric relaxation ask the patient to relax and "exhale" slowly. Wait for 5 seconds as long as relaxation takes place. The procedure is repeated for 5 times / set, with 1-minute (60 seconds) rest between each set. Perform this method in each session consist of 4 sets and 3 session in a week.

4. Prone Hip Extension after Psoas Major Stretching:

Group B - Patient placed in a prone position, with feet placed in a wider position and knee flexed at 90 degree in a tested leg. Arms were placed comfortably, extend the patients hip with 90 degree knee flexion maintain the range of motion for 30 sec in an extended hip in one hand while stabilize the pelvis in another hand The procedure is repeated for 5 times / set, with 1 minute (60 seconds) rest between each sets. Perform this method in each session consist of 4 sets and 3 session in a week.

RESULTS & DISCUSSION

The following table presents the pre-test and post-test mean differences, as well as the paired t-values, for obese individuals with iliopsoas tightness who were classified into group A or group B. The next table presents the pre-test and post-test scores of obese patients who had iliopsoas tightness and the mean

difference as well as the unpaired t value between those two sets of data for groups A and B.

In Table 1: The calculated paired 't' value is 4.10 and 3.84. Since the calculated 't' value is more than 't' table value (>2.15), the above value shows that there is a significant difference in obese patients having tightness in psoas major following prone hip extension exercise along psoas major stretch.

In Table 2: The calculated unpaired 't' value is 2.73 at 0.005 level. Since the calculated 't' value is more than 't' table value (>2.15), the above value shows that there is a significant difference in obese patients having tightness in psoas major following prone hip extension exercise along psoas major stretch.

Table 1: Table displays mean difference and paired 't' value between pre-test and post-test scores of obese patients with iliopsoas tightness in Group A & B.

Group A & B	Mean	Paired 't' value	'p' value	Interference
Post isometric relaxation exercise	right = 2.24 Left = 1.95	Right = 2.95 Left = 2.15	< 0.005	Significant
Prone hip extension after psoas major stretch	Right = 3.53 Left = 3.46	Right = 4.10 Left = 3.84	< 0.005	

Note: 0.005 is the level of significant

Table 2: Table displays mean difference and unpaired 't' value between pre-test and post-test scores of obese patients with iliopsoas tightness in Group A & B.

Group A & B	Mean	Unpaired 't' value	'p' value	Interference
Post isometric relaxation exercise	Right = 2.24 Left = 1.95	2.18	< 0.005	Significant
Prone hip extension after psoas major stretch	Right = 3.53 Left = 3.46	2.73	< 0.005	

Note: 0.005 is the level of significant

CONCLUSION

In conclusion, this research focused on assessing psoas major flexibility in obese patients after an exercise program aimed at improving hip extension. The psoas major muscle, being the largest muscle in the lower lumbar spine, plays a crucial role in stabilizing the hip and spine. Tightness in the psoas major can lead to pain in the front of the hip and lower back discomfort. Based on the study healthcare professionals working with obese patients, particularly those experiencing psoas major tightness and related hip and lower back discomfort, can consider incorporating psoas major stretching and prone hip extension exercises into their treatment plans.

FUTURE SCOPE

The researchers and clinicians can further enhance our understanding of psoas major flexibility and develop more comprehensive and effective interventions for improving hip and lumbar spine function in obese individuals. This knowledge can be translated into evidence-based treatment protocols and contribute to better patient outcomes and quality of life.

Acknowledgement. The authors are thankful to Vinayaka Mission's Research Foundation (DU) for the facilities and support provided.

Conflict of interest. None

REFERENCES

Agrawal, S. (2016). Comparison between post isometric relaxation and reciprocal inhibition manuevers on

hamstring flexibility in young healthy adults: randomized clinical trial. *International Journal of Medical Research and Health Sciences*, 5(1), 33.

Blomberg, J. R., Zellner, B. S. and Keene, J. S. (2011). Cross-sectional analysis of iliopsoas muscle-tendon units at the sites of arthroscopic tenotomies: an anatomic study. *The American journal of sports medicine* 39 Suppl., 58S–63S.

Clapis, P. A., Davis, S. M. and Davis, R. O. (2008). Reliability of inclinometer and goniometric measurements of hip extension flexibility using the modified Thomas test. *Physiotherapy theory and practice*, 24(2), 135–141.

Edelstein J. (2009). Rehabilitating psoas tendonitis: a case report. *HSS journal: the musculoskeletal journal of Hospital for Special Surgery*, 5(1), 78–82.

Ilizaliturri, V. M., Jr, Chaidez, C., Villegas, P., Briseño, A. and Camacho-Galindo, J. (2009). Prospective randomized study of 2 different techniques for endoscopic iliopsoas tendon release in the treatment of internal snapping hip syndrome. *Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association*, 25(2), 159–163.

Khan, Z. K., Ahmed, S. I., Baig, A. A. M., and Farooqui, W. A. (2022). Effect of post-isometric relaxation versus myofascial release therapy on pain, functional disability, rom and qol in the management of non-specific neck pain: a randomized controlled trial. *BMC musculoskeletal disorders*, 23(1), 567.

Lewit, K. and Simons, D. G. (1984). Myofascial pain: relief by post-isometric relaxation. *Archives of physical medicine and rehabilitation*, 65(8), 452–456.

- Malai, S., Pichaiyongwongdee, S. and Sakulsriprasert, P. (2015). Immediate Effect of Hold-Relax Stretching of Iliopsoas Muscle on Transversus Abdominis Muscle Activation in Chronic Non-Specific Low Back Pain with Lumbar Hyperlordosis. *Journal of the Medical Association of Thailand Chotmaihet thangphaet.*, 98 Suppl., 5, S6–S11.
- Seif, H. E., Alenazi, A. M., Hassan, S., Kachanathu, S. J. and Hafez, A. T. (2015). The Effect of Stretching Hamstring, Gastrocnemius, Iliopsoas and Back Muscles on Pain and Functional Activities in Patients with Chronic Low Back Pain: A Randomized Clinical Trial. *Open Journal of Therapy and Rehabilitation*, 3(04), 139–145.
- Sasun, A. R., Jawade, S., Chitale, N. (2022). Measuring the Efficacy of Myofascial Rollers and Post-isometric Relaxation Technique in Relieving Pain Intensity and Postural Deviation Using Plumb Line Assessment for the Treatment of Upper Cross Syndrome in Dental Undergraduate (UG) Students. *Cureus*, 14(10), e29831.
- Yoshio, M., Murakami, G., Sato, T., Sato, S. and Noriyasu, S. (2002). The function of the psoas major muscle: passive kinetics and morphological studies using donated cadavers. *Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association*, 7(2), 199–207.

How to cite this article: Murali Sankar K.S.I., Balu. S., Dhivyadharshini, Sathish Kumar C. and Sam Thamburaj A. (2023). A study to find out the Effectiveness of Post isometric Relaxation and Prone hip Extension after psoas major Stretching to Improve the Psoas major Flexibility in Obese Patients – A Comparative Analysis. *Biological Forum – An International Journal*, 15(5): 1411-1414.