

The Effect of Foam Roller with Exercise Vs Conventional Therapy in Iliotibial Band Extensibility and Hip Abduction Strength - A Comparative Study

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Abstract:- Many musculoskeletal patients, members of the active population, runners, and cyclists have clinical iliotibial band tightness, which predisposes them to ITB-related diseases such as ITB friction syndrome and Patellofemoral pain syndrome. Most treatment programmes call for stretching to improve ITB flexibility. A therapeutic technique for relaxing soft tissue from areas of abnormally tight fascia is myofascial release using a foam roller. For subjects with ITB, it has been suggested that strengthening their hip abductors will help with their symptoms.¹² Only a few research have been done to assess the efficacy of foam rolling with exercise vs. traditional therapy in ITB extensibility abduction strength. The current study's aim is to compare the effects of stretching with exercises, and myofascial release with exercises, on hip abduction strength and ITB extensibility. Pre- and post-intervention comparative designs for an experimental study by random allocation, 30 participants were split into Group A (Foam roller with exercise) and Group B (conventional therapy). Visual analogue scale (VAS) is used to quantify pain, universal goniometer to measure hip abduction range, and lower extremity function scale to measure muscle strength to evaluate the statistical difference between the groups were employed as outcome measures. In contrast to Group B (conventional therapy), Group A (Foam roller with exercise) shows a substantial improvement based on post test mean values.

Keywords:- Lower Extremity Function Scale, Visual Analog Scale, Goniometer, Flexibility, Strength, ITB Tightness, Hip Abduction Strength, Foam Roller, Stretching, Exercises.

I. INTRODUCTION

The iliotibial band is a structure in the lateral thigh that is formed of fascial connective tissue that is longitudinally aligned and has significant connections to the ilium, femur, patella, and tibia. It begins proximally through the tensor fascia lata anteriorly, the gluteal aponeurotic fascia in the middle, and the gluteus maximus muscle fibres in the back. It then joins the TFL, travels distally, crossing the greater trochanter, attaches to the linea aspera of femur, and ends

across five insertions at the lateral knee. The linea aspera of the distal femur, the lateral femoral epicondyle's superior surface, 3. Gerdy's tubercle, 4. the patella, and 5. the lateral tibial condyle.¹

IlioTibialBand tightness is present in many musculoskeletal patients, active population, runners, cyclist, predisposing them to ITB related pathologies such as ITB friction syndrome, Patellofemoral pain syndrome. The ITB lies anterior to lateral femoral condyle when knee is in full extension, however, when flexed to 30 degrees, the gluteus maximus pulls the ITB posteriorly to lie on top of femoral condyle. As this mechanism repeats during running, cycling friction between the lateral femoral condyle and ITB insertion, resulting in an inflammatory response, causing pain decrease in function, decrease extensibility of the ITB.²

The ITB stabilizes the knee and abducts the hip.³

In order to be more accurate, the ITB controls and slows down the tensor fascia lata's adduction of the thigh. Additionally, the ITB may serve as a knee's anterolateral stabiliser.⁴

When doing Ober's test to determine ITB tightness, the patient frequently has trouble adducting the affected leg. According to Gose and Schweizer, the patient performs the Ober's test while lying on their side with the affected side up, with the hip and knee bent at a 90-degree angle. The examiner then stabilises the pelvis, abducts and extends the leg until the ITB is over and behind the greater trochanter, and then they release the leg.⁶

Frank Starling's law states that the length of a muscle fibre and the force it produces during contraction are related. The distance between sarcomeres and the tension of the muscle fibre have a predictable connection. There is a perfect distance between sarcomeres where the tension in the muscle fibre is highest and the force of contraction is greatest. The tension and power of contraction will diminish if sarcomeres are too close together or too far apart in comparison to their ideal length. As a result, abduction ROM and strength are reduced.⁸

Stretching is found to provide very good effects on ITB tightness.

A therapeutic method for releasing soft tissue from areas of abnormally tight fascia is myofascial release technique. Foam rolling, a technique where participants utilise their own body mass to generate compressive rolling pressures along targeted musculature while adhering to the direction of a particular muscle being mobilised, has become a popular method of self-myofascial release.¹⁰

The Golgi Tendon Organs, which are sensory receptors found in musculotendinous junctions between muscles and their tendons, are stimulated by this method. These sensors are responsive to both the rate and change in tension. Muscle relaxation is supported when GTOs are stimulated above a particular threshold because this suppresses the activity of the muscle spindle, a receptor that monitors changes in fibre length, and lowers muscular tension. Pain is reduced, the proper relationship between muscle length and tension is restored, and function is improved by reducing soft tissue tension.¹¹

Strengthening of hip abductors has been advised for symptom improvement in individuals with ITB tightness.¹²

So, the main objective of this study is to compare the effectiveness of stretching with exercises and myofascial release with exercises in ITB extensibility and hip Abduction strength.

II. METHODOLOGY AND MATERIALS REQUIRED

- **Study Design:** Experimental research with a pre- and post-intervention design for comparison.
- **Study setting:** Physiotherapy outpatient department of MNR hospital, Sanga Reddy

- **Ethical clearance:** Ethical clearance is obtained from ethical committee of MNR at Sanga Reddy.
- **Study Duration:** One year duration from the date of approval.
- **Intervention period:** 6 weeks (4-5 sessions per week).
- **Treatment Duration:** 60 minutes.
- **Size of the sample -** 30 subjects.

- **Method used for sampling-** Randomized control trial.
- **2 groups:**
- **Group A:** Foam roller with exercise.
- **Group B:** Conventional physiotherapy.
- **Outcome measures:** Visual analog scale, universal goniometer, lower extremity function scale

➤ INCLUSION CRITERIA:

- Sub-acute and chronic ITB syndrome and ITB tightness.
- Any participant between the ages of 15 and 40 is welcome.
- Patients ready to participate in a 6-week fitness course for treatment.
- Having access to a phone (for support afterward).
- Participants able to speak English, Hindi and Telugu.
- Subjects with positive Ober's test.

➤ EXCLUSION CRITERIA:

- Patients who have undergone lower limb manual therapy in past week.
- Neurological disorders.
- Unstable angina, uncontrolled cardiac dysarrhythmias, severe aortic stenosis, acute systemic infection, medicolegal issue, pregnancy.
- History of previous knee trauma, other knee abnormalities.
- Lower extremity operated on within the last 12 months.
- Developmental delay.
- Any skin disease around leg.

- **MATERIALS USED:** Treatment couch and Foam roller.

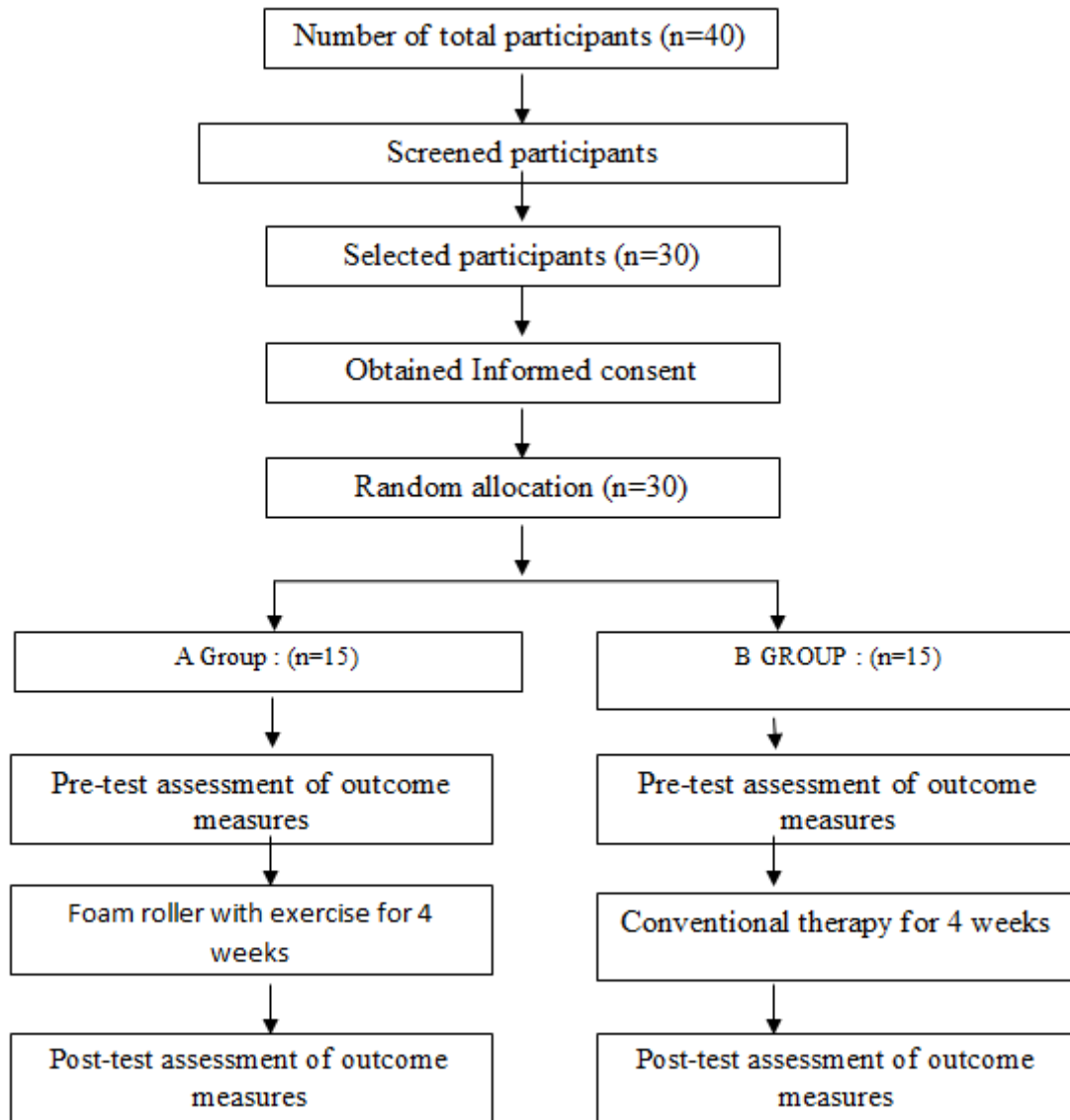


Fig 1 Procedure

➤ **GROUP-A (Foam roller with exercise):**

Treatment strategy includes myofascial release of ITB by foam roller and strengthening hip abductors. The included subjects were allocated to use the foam roller for static and dynamic myofascial release.¹⁵

In static self-myofascial release, the subject is placed in a side-lying position and the tensor fascia lata is treated to static pressure with a foam roller for 90 seconds on the region between the iliac crest and the femur greater trochanter. Additionally, the ITB is impacted above the lateral epicondyle of the femur. Once the pressure on one side had subsided for ten seconds, the other component of the intervention was carried out. Tensor fascia lata was dynamically compressed for 90 seconds utilising a foam roller on the area between the iliac crest and the greater trochanter of the femur during dynamic self-myofascial release. ITB was also used between the lateral epicondyle and greater trochanter of the femur. Once the pressure on one side had subsided for ten seconds, the other part of the intervention was started.¹⁵

For strengthening, conventional exercises (10 repetitions 2 sets) are used advancing from side lying to standing position.¹⁶ Exercises include

- **HIP EXTERNAL ROTATION CLAMSHELLS:** Instructed to move your affected knee upwards, outwards in side lying position with knee bent at 45-degree angle.
- **SIDE LYING HIP ABDUCTION.**
- **HIP INTERNAL ROTATION CLAMSHELLS:** Instructed to move your affected knee upwards, inwards in side lying position with knee bend at 45degree angle.
- **SUPINE BRIDGE:** Instructed in supine lying, lift your hips off the mat and pause for 1second.
- **HIP HIKE:** Standing on the side of a step, without bending your knees, keep your legs straight and slowly lower one leg off the side of the step.

● **GROUP-B (Conventional physiotherapy):**

Rest is advised as the first step in helping ITB syndrome patients get better from pain. Stretching the ITB is part of the treatment plan (Hold for 10 seconds). Repeat this five times, then strengthen the hip abductors to fully recover.¹⁶

➤ **Stretching include**

- **TRUNK SIDE BEND ITB STRETCH**-While standing, extend the affected leg and adduct it across the other leg. The individual was instructed to slowly exhale while flexing their trunk in the opposite way, clasp their hands above their heads, and stretch their arm in the same direction as the leg they were stretching.
- **TRUNK SIDE BEND WITH REACH ITB STRETCH**-n a standing position, extend the affected leg and adduct it across the other leg. The individual was instructed to exhale while bending diagonally downward and stretching out with clasped hands
- **ITB STRETCH**- Sit with your legs out in front of you. Knee bent, foot flat on the ground, involved leg crossed over the other leg. Until you feel a stretch, turn your body to look over your shoulder on the affected side.
- **ITB HIP ABDUCTOR STRETCH**- Supine with knees bent. Lift unaffected leg over the affected knee, holing the unaffected ankle around effected knee. Then use unaffected leg to pull the effected leg down to the unaffected side.

For strengthening, conventional exercises are used advancing from side lying to standing position.¹⁶ Exercises include same as in Group A. Hip hike, side lying hip abduction, hip external rotation clamshells, hip internal rotation clamshells and supine bridge.

III. STATISTICAL ANALYSIS:

The current study's entire statistical analysis was conducted using SPSS version 16.0. Using descriptive analysis, the individuals' overall characteristics were reported as mean and standard deviation. Paired t-tests were used to compare group members within the group before and after the intervention. The Mann-Whitney U test, Wilcoxon signed-ranks test, and independent T-test were employed to compare the group differences. For all tests, the statistical significance level was set at 0.05 or less.

IV. RESULTS

Table 1: Comparison on pre and post-test Means for pain on Visual analog scale.

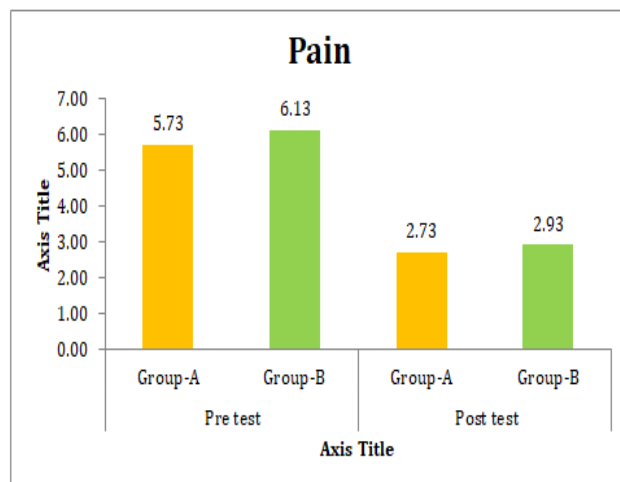
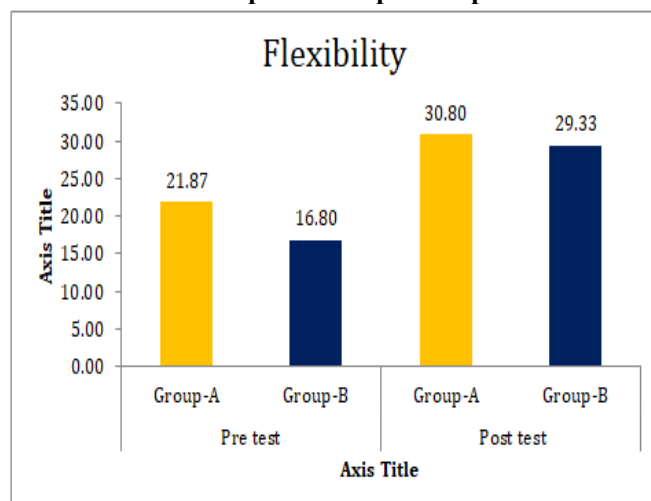
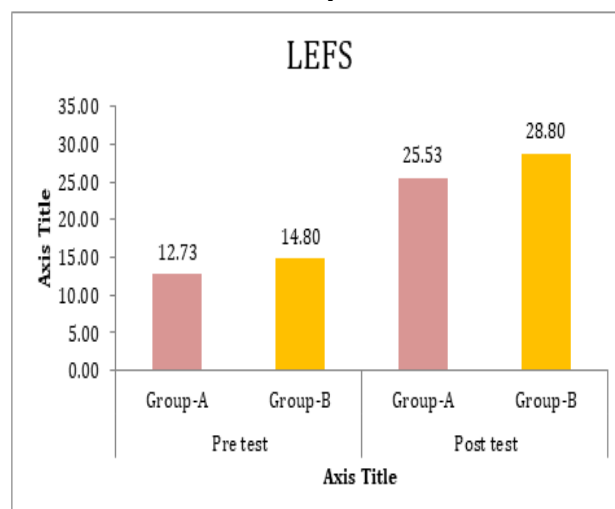


Table 2: Comparison on pre and post-test



t Means for flexibility on goniometer.

Table 3: Comparison on pre and post-test Means for strength on lower extremity function scale.



Data analysis revealed that Groups A and B are both effective. Comparatively Group-A, Foam roller with exercise showed significant improvement than the Conventional physiotherapy.

V. DISCUSSION

ITB tension can lead to patellofemoral maltracking (distal patella slips laterally during flexion), which is a critical component of knee mechanics. Tibial external rotation starts early in flexion and peaks between 60 and 75 degrees. The Q angle may also rise with greater tibial external rotation.

This study objective is to compare effectiveness of foam roller with exercise vs conventional physiotherapy in ITB extensibility and hip Abduction strength. Both the groups demonstrated statistically significant with group involvement in pain scores, functional abilities, ROM. Foam roller with exercise was observed to be more advantageous compared to conventional physiotherapy. Visual analog scale, lower extremity function scale, Goniometer showed better results in Group-A. The outcome of present study is significant decrease in pain, and significant increase in ROM and lower extremity function in Group-A, Foam roller with exercise for 6 weeks, in comparison with Group-B, Conventional physiotherapy.

Myofascial release's strong effects centre on addressing structural dysfunction and regaining function and mobility. ITB tension results in increased ITB friction across the lateral femoral condyle, which creates trigger points or fascial adhesions, which are myofascial limitations. Reduced peripheral vascular blood supply, lower shock absorption, and diminished or lost motion of the affected area are all effects of these myofascial restrictions. Myofascial release eliminates myofascial trigger points and releases the tight ITB's myofascial adhesions. This method enhances blood flow and the underlying fascia, which increases tissue warmth and causes a rise in elasticity and stretch in the ITB, removing adhesions and enhancing flexibility and range of motion. ITB tightness in long distance runners was the subject of a 2014 study by A. Muragodi to compare the immediate benefits of static stretching and myofascial release. 60 long-distance runners between the ages of 18 and 30 were included in this study. This study shown that both myofascial release and static stretching are efficient in easing ITB tension. Additionally, a 2019 study by Ho Kim examined the immediate impact of static and dynamic myofascial release foam rolling and self-stretching on adults with shortened ITB in order to examine the influence on pressure pain threshold and flexibility of the tensor fascia latae and ITB. The study included 50 participants and the results of this study demonstrated that foam roller self-myofascial release helped to reduce ITB pain and increase flexibility when compared to other intervention groups (p .05).^{3,15}

The result of the present study was similar to that of previous studies in literature. Foam roller with exercise and conventional physiotherapy both interventions are effective in treating ITB extensibility and hip Abduction strength. Foam roller with exercise flashed better results than Conventional physiotherapy.

So, the present study concludes that foam roller with exercise showed better results than conventional physiotherapy in iliotibial band flexibility and abduction strength of hip. According to the study results, Alternate hypothesis is proved and null hypothesis is not justified.

VI. CONCLUSION

This study concludes that, when analysed before and after the treatment within the groups, i.e., foam roller with exercise and conventional therapy has shown statistically significant effects on improving pain, flexibility, strength in subjects with ITB tightness.

Among both the treatments, foam roller with exercises group is found to be more effective with greater percentage of improvement than conventional therapy.

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