Immediate effects of static stretching versus myofascial release in iliotibial band tightness in long distance runners—a randomised clinical trial

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ABSTRACT

Background: Iliotibial band is the lateral distal thickening of the tensor fascia lata and superficial fibres of gluteus maximus extending to the lateral portion of the thigh. This band plays an important role in providing the stability to the knee joint during physical activity like walking and running in coordination with other thigh muscles. In long distance runners, repetitive flexion and extension of the knee cause friction of ITB and can inflame the bursa which may lead to decreased range of motion as a protective mechanism and ITB will be prone for tightness.

Objectives: To compare the immediate effects of static stretching and myofascial release on iliotibial band tightness in long distance runners.

Method: Sixty long distance runners with the age group of 18-30 years were recruited for this study and were randomly allocated into 2 groups - Group A received static stretching and Group B received myofascial release for iliotibial tightness. In both the groups, pre and post intervention hip adduction range of motion was calculated using the universal goniometer. Obers test was used to assess the tightness of the iliotibial band.

Results: The results showed that static stretching and myofascial release both increased iliotibial band flexibility above baseline measures significantly. When both the groups were compared, there was no significant difference found between two groups stating that static stretching and myofascial release are effective in improving hip adduction range of motion. The results showed significant improvement in hip adduction range of motion in both the groups.

Conclusion: This study proved that static stretching and myofascial release both are effective in reducing iliotibial band tightness.

Key Words: Iliotibial band tightness, static stretching, myofascial release, long distance runners.

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INTRODUCTION

Iliotibial band is the lateral thickening of the tensor fascia lata and superficial fibres of gluteus maximus extending to the lateral portion of the thigh. The iliotibial band originates from anterior superior iliac spine with the common origin of tensor fascia lata and gluteus maximus and extends inferiorly till hip and knee. The iliotibial band inserts below the lateral portion of the knee on the lateral portion of the knee on the lateral tibial condyle i.e. Gerdy’s tubercle. The iliotibial band plays an important role in providing the stability to the knee joint during physical activity like walking and running in coordination with other thigh muscles.

Iliotibial band tightness has been found to be a common issue affecting runners or individuals with high activity levels. The function of the iliotibial band is to stabilize the knee and abduct the hip. Knee flexion at or slightly below 30 degrees exerts tension on iliotibial band and pulls it over lateral femoral condyle and full extension returns the ITB to its initial position. Repetitive flexion and extension of the knee cause friction of the ITB and can inflame bursa which may lead to decreased range of motion as a protective mechanism and ITB will be prone for tightness. In long distance runners, if running is continued with the tight iliotibial band, friction will increase and will cause the band to inflame and swell which may lead to iliotibial band Friction syndrome and lateral tracking of the patella along with patellar compression. This will in turn lead to abnormal biomechanics while running as during the stance phase of running the stance extremity goes into adduction and if the ITB is tight, there will be limited adduction leading to abnormal biomechanics. Also, it is suggested in many studies that if there is inflexibility of any muscle or tissue in runners will decrease the running economy. Fredriccson suggested that in runners, ITB friction syndrome occurs due to excessive ITB tightness and myofascial restrictions which in turn is a result of the compensation to the weakness and inhibition of the lateral gluteal muscles. Samuel Sakia proposed in his literature review that various intrinsic factors like tight ITB or weak or inhibited gluteus minimus and maximus muscles and extrinsic factors like improper training habits which include improper shoe type and rapid increase in the speed of running over a short period of time lead to ITB Friction syndrome. To avoid all this complications, it is essential to maintain the flexibility of the iliotibial band. Various techniques have been developed, reported and applied by the physical therapists to increase the iliotibial band flexibility in long distance runners. Many studies have proved that static stretching is effective in decreasing the iliotibial band tightness. It is also seen that myofascial release is effective in the treatment of iliotibial band tightness. So, the purpose of the present study is to find the change in the hip adduction range of motion by comparing the effects of static stretching and myofascial release in iliotibial band tightness.

PROCEDURE

After obtaining the approval from the Ethical committee of Institutional Review Board, subjects were recruited in the study after fulfilling inclusion criteria of long distance runners between age of 18-30 years and those with Obers test positive. Subjects were excluded if the long distance runners had lateral knee pain and if they had any history of lower limb injury. The purpose of the study was explained and a written informed consent was obtained from all participants who were willing to participate in the study. Subjects were randomly allocated into 2 groups-Group A and Group B. Group A were given static stretching of 3 sets for 30 seconds each to iliotibial band and group B were given myofascial release on iliotibial band for 6 minutes. In both the groups, pre and post intervention hip adduction range of motion was measured using universal goniometer. All the assessment and intervention was done by a single investigator.

Obers test

Obers test was done by the therapist to assess the tightness of the iliotibial band. The subject was
asked to be in a side lying position with lower leg flexed at hip and knee for stability. Therapist then passively abducted and extended the subjects upper leg with knee extended. Therapist then suddenly leaves the upper leg and if the leg remains abducted and if does not fall on the table, the test was considered to be positive for Iliotibial band tightness (Figure 1).

**Static stretching of Iliotibial band**

Active static stretching was given to the ilioibial band of long distance runners. The subject was asked to take the affected leg into extension and adduction across the other leg in the standing position. The subject was asked to exhale while slowly flexing the trunk in the direction lateral to the opposite side and along with this the subject was asked to clasp the hands overhead and the arm on the side of the leg being stretched was stretched in the same direction. When the subject felt the good stretched, he/she was asked to hold that position of stretch for 30 seconds and after that was asked to come out of the stretch slowly. The subject was asked to perform this protocol for 3 times (Figure 2).
Myofascial release of iliotibial band

Manual myofascial release was given to iliotibial band of the long distance runners by having the subject to lie in the side lying position on the unaffected side. The upper leg to be tested was rested on the table with hip and knee flexion. Then the therapist applied a few kilograms of force weight along the iliotibial band course proximally to distally. The therapist repeated this for 6 minutes\(^{14}\) (Figure 3).

Hip adduction range of motion

Hip adduction range of motion was measured by the therapist by placing the subject in supine position with both knees extended and the hip being tested in 0 degrees of flexion, extension and rotation. The contralateral extremity was abducted to provide sufficient space for the testing extremity to complete the full range of motion in adduction. The goniometer was aligned at 90 degrees with its fulcrum over the ASIS of the extremity being measured. Its stable arm was aligned with an imaginary horizontal line extending from one ASIS to another and the movable arm over the anterior midline of the femur using midline of the patella for the reference. The therapist used one hand to hold the goniometer body over the subjects ASIS of the testing extremity and placed the other hand at the knee and moved the extremity into adduction by maintaining it in neutral flexion and rotation and measured the hip adduction range of motion\(^{15}\) (Figure 4).
STATISTICAL ANALYSIS

Data was computed and analyzed using SPSS (Statistical Package for Social Science) software version 16. t-test was used to compare between the two experimental groups.

RESULTS

Demographic data: Both the groups consisted of 30 subjects each, group A consisted of 14 females and 16 males while group B consisted of 17 females and 13 males. There was no difference between the gender distributions in both the groups (Table 1). The mean age of all the subjects in group A was 22.8±2.02 years and 23±1.42 years in group B. There was no difference between the age of both the groups (p=0.608) (Table 2). Pre and post intervention between group comparison was done using unpaired t-test. The results showed significant improvement in hip

<table>
<thead>
<tr>
<th>TABLE 1. Gender distribution.</th>
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<tr>
<td></td>
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<tr>
<td>GROUP A</td>
</tr>
<tr>
<td>GROUP B</td>
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Χ²=0.267; p=0.606
adduction range of motion. In group A, hip adduction range of motion values improved from 17.2±2.77 pre intervention to 23.1±2.33 post intervention and in Group B, it improved from 17.9±2.97 pre intervention to 22.9±2.94 post intervention (Table 3; Graph 1). Pre and post intervention within group comparison was done using paired t test. In group A, pre-pos intervention difference is 5.9±1.39 and in Group B, pre-post intervention difference is 5±1.41. The result showed no significant difference in both the groups when pre and post intervention within group comparison was done (Table 4).

### TABLE 2. Age distribution.

<table>
<thead>
<tr>
<th>AGE (Mean ± SD)</th>
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<tbody>
<tr>
<td>GROUP A</td>
<td>22.8±2.02</td>
</tr>
<tr>
<td>GROUP B</td>
<td>23±1.42</td>
</tr>
<tr>
<td>( t_{58} = 0.516; \ p=0.608 )</td>
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</tbody>
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### TABLE 3. Pre and post intervention between group comparison.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE INTERVENTION</th>
<th>POST INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.2±2.77</td>
<td>23.1±2.33</td>
</tr>
<tr>
<td>B</td>
<td>17.9±2.97</td>
<td>22.9±2.94</td>
</tr>
<tr>
<td>( t )</td>
<td>0.943</td>
<td>0.194</td>
</tr>
<tr>
<td>( p )</td>
<td>0.350</td>
<td>0.847</td>
</tr>
</tbody>
</table>

### GRAPH 1. Pre and post intervention between group comparison.

![Graph showing pre and post intervention between group comparison.](image)

### TABLE 4. Pre and post within group comparison using paired t-test

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE-POST DIFFERENCE</th>
<th>( t ) value</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.9±1.39</td>
<td>23.11</td>
<td>0.001</td>
</tr>
<tr>
<td>B</td>
<td>5±1.41</td>
<td>21.646</td>
<td>0.001</td>
</tr>
</tbody>
</table>
DISCUSSION

The purpose of the present study was to compare the immediate effects of static stretching and myofascial release on iliotibial band tightness in long distance runners. The results of the study show that both static stretching and myofascial release of the tight iliotibial band produced a significant difference in improving hip adduction range of motion. When both these protocols were compared with each other, no significant differences were found suggesting that both static stretching and myofascial release of tight iliotibial band acutely improve iliotibial band flexibility and improve hip adduction range of motion.

The effect of static stretching primarily focuses on the tension of the muscle and improves the flexibility of the muscle thus improving the range of motion of that particular joint. Thus static stretching helps in systematic elongation of the musculotendinous units of the iliotibial band to create persistent length of the band and decrease the passive tension of the tight iliotibial band thus increasing the flexibility of the iliotibial band.\(^\text{16}\) Also during static stretching, sustained musculotendinous unit elongation occurs due to stress relaxation.\(^\text{17}\) Static stretches slowly lengthen the muscle when it is held for 15 - 30 seconds. A study conducted by Bandy in 1994 on tight hamstring muscles concluded that static stretching holding for 30 seconds is effective for enhancing the flexibility of the hamstring muscles.\(^\text{18}\)

The effects of myofascial release focuses on resolving the structural dysfunction and restoring the function and mobility. Iliotibial band tightness cause excessive friction of iliotibial band over the lateral femoral condyle which leads to myofascial restrictions in the form of trigger points or fascial adhesions. These myofascial restriction results in decreased shock absorption, reduced peripheral vascular blood supply and decreased or loss of motion of that involved area.\(^\text{19}\) Myofascial release resolves myofascial trigger points and releases the myofascial adhesions of the tight iliotibial band. This technique improves blood circulation of the tight iliotibial band and the underlying fascia increasing the tissue temperature causing an increase in elasticity and stretch of the tight iliotibial band, thus releasing the adhesion and improving the flexibility and hip adduction range of range.\(^\text{20}\) A study was conducted in 2005 to examine the immediate effects of Active myofascial Release Technique on hamstring flexibility using sit and reach test as an outcome measure. The study included 20 male participants aged 21-30 years with no previous hamstring injury. The participants were then asked to perform a sit-and-reach test. The measurements of sit and reach test were recorded prior and following active myofascial release over participant’s dorsal sacral ligament and hamstrings. The results of this study suggested that a single session of Active Myofascial Release Technique increase hamstring flexibility in asymptomatic male participants.\(^\text{21}\) A clinical study was done to analyze the difference between Myofascial Release and Static Stretching on increasing the Flexibility of the Hamstrings. The participants having 15 degree deficit in hamstring flexibility were included in the study. Both the groups of static stretching and myofascial release group underwent the treatment for 4 weeks which included 4 sessions per week. The author concluded that both the Static Stretching group and the Myofascial Release group showed significant increase in the flexibility of the athlete’s Range of Motion but found no difference between these two groups. Thus the study found that the two methods are both effective in increasing Range of Motion.\(^\text{22}\)

So, the present study concludes that static stretching and myofascial release both are effective in reducing iliotibial band tightness.

The limitation of the present study was that only one session of intervention of static stretching and myofascial release was given for improving the iliotibial band flexibility and immediate effects were seen. So, the future scope of the study suggests that long term effects should be seen after multiple sessions of the intervention on improving the iliotibial band flexibility.
ACKNOWLEDGMENTS
None

REFERENCES