

## EFFECTIVENESS OF ILIOTIBIAL BAND STRETCHING VERSUS MYOFASCIAL RELEASE TECHNIQUE ON KNEE PAIN, PHYSICAL FUNCTION, AND QUALITY OF MOVEMENT IN PATIENTS WITH LATERAL PATELLAR TRACKING DISORDER

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### Article Info



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### Abstract

**Background:** Lateral Patellar Tracking Disorder (LPTD) is one of the common biomechanical problems of the knee joint. However, there is still a scarcity of evidence regarding the effects of physiotherapy therefore this study aimed to compare the effectiveness of Iliotibial Band (ITB) Stretching versus ITB Myofascial Release Technique (MFRT) on knee pain, physical function and quality of movement in patients with LPTD.

**Methodology:** A two-arm, parallel group design, Randomized Controlled Trial was conducted on patients suffering from LPTD. Patients aged between 25-55 years and radiograph findings with lateral tracking of patella were enrolled. A sample size of 40 participants who met eligibility criteria were assigned into Group A= ITB Stretching (n=20) and Group B=ITB MFRT (n=20) using simple random sampling. Treatment protocol was followed as one session per day for 2 weeks. Data was collected using valid tools i.e., Numeric Pain Rating Scale was used to assess Knee pain, Western Ontario and McMaster Osteoarthritis Index was used to measure physical function and Lateral Step-Down Test for Quality of Movement. Data was analyzed using IBM-SPSS version 23.0. Paired sample t-test was run for within-group analysis and independent sample t-test was used for between-groups analysis. P-value <0.05 were considered as significant at 95% CI.

**Results:** The pre-post analysis of both the groups showed statistically significant reduction in knee pain, improvement in physical function, and quality of movement at p-value <0.01. The mean post-post score of pain, physical function and quality of movement of Group A was 2.2, 25.3 and 1.2 respectively and whereas for Group B was 2.4, 25.3 and 24.1 respectively, showed no statistically significant difference between studied groups at p-value p>0.05.

**Conclusion:** ITB Stretching and MFRT both are effective treatment strategies in reducing knee pain, improving physical function, and quality of movement in patients with LPTD.

**Keywords:** lateral tracking of patella, knee pain, Iliotibial Band tightness, myofascial release, stretching exercises

## Introduction:

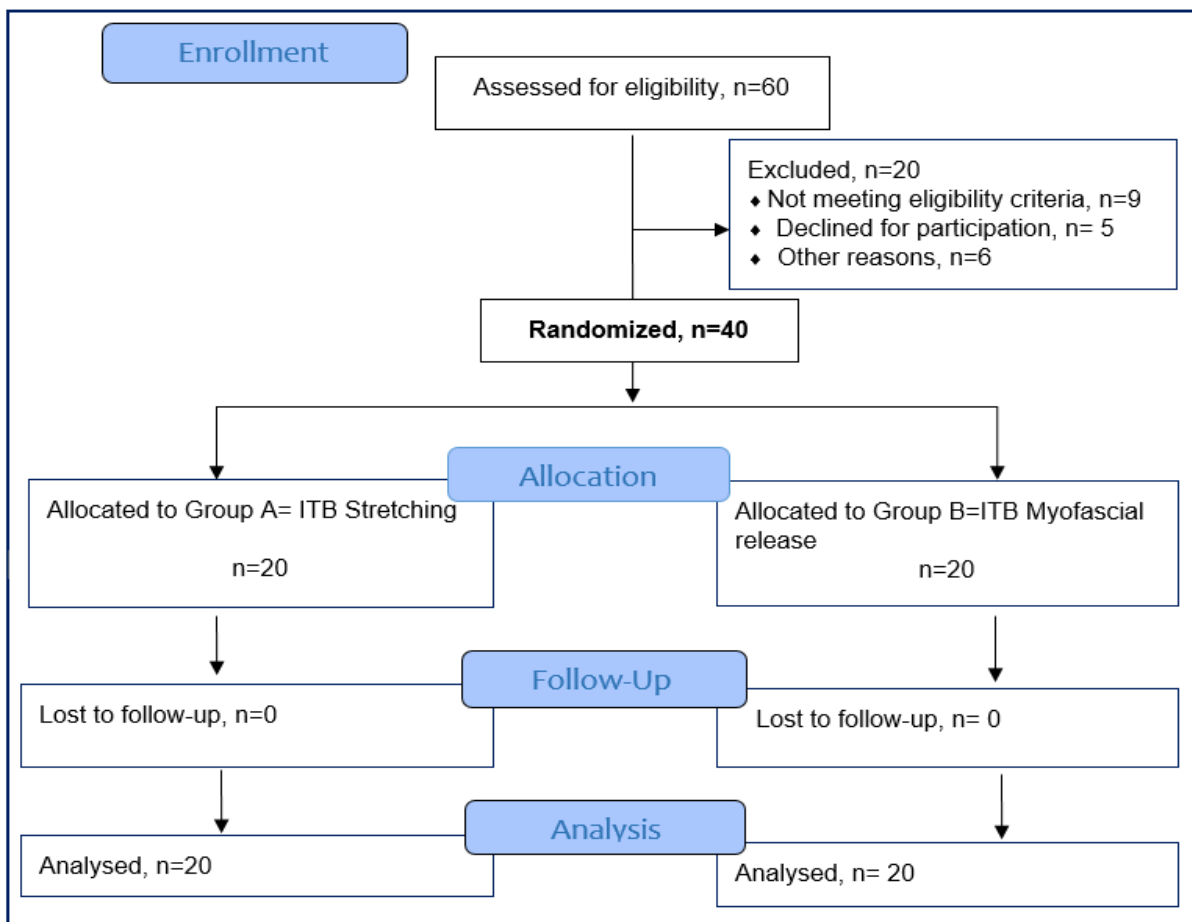
The knee is a complex, structural and weight-bearing joint that develops various musculoskeletal problems [1]. Many factors contribute to the development of knee pain, one of the most common factors is alternations in biomechanics of knee joint which may lead to pain along the lateral aspect of the knee [2, 3]. Lateral Patellar Tracking (LTPD) is a condition in which knee cap (patella) moves laterally while the leg bends or straightens [4]. Lateral tracking of patella usually developed due to muscle imbalance, one aspect around the knee becomes weak and other muscles becomes tight [5]. Although lateral tracking of patella is easily diagnosed clinically however most common techniques to confirm diagnosis is MRI and X-rays imaging techniques [6].

Globally, lateral tracking of knee is most common patellofemoral dysfunction with estimated 22.7% annual prevalence of patellofemoral pain in the general population [7]. According to the literature the incidence of patellofemoral dysfunction in Pakistan is most prevalent in the age between 25-45 years. Patellofemoral pain syndrome (PFPS) is one of the most common knee problems among young active individuals with an incidence of 28.9%. [8]. A study conducted in Lahore Pakistan reported a higher prevalence of PFPS [9]. A recent published article reported that the burden of patellar tracking is going to be increased globally with most prevalence reported in the Asian countries such as China, India and Pakistan [10].

Literature suggested that Iliotibial Band (ITB) tightness is linked with in lateral tracking of patella [11]. Both ITB tightness and lateral tracking of patella have been attributed to cause knee pain [12]. Conservative treatments for lateral patellar tracking include a variety of interventions such as stretching, strengthening exercises, activity modification, cryotherapy, trigger point therapy and other manual therapy techniques [13]. Non-conservative interventions involve surgical correction of the dysfunctional patellae or release of the tightened structures as iliotibial, are indicated only when conservative management fails to administer or the case is too severe [14]. Myofascial Fascial Release Technique (MFRT) or soft tissue mobilization is one such manual therapy technique that may be used to relieve myofascial adhesions and associated pain in knee. Evidence concluded stretching exercises and myofascial release technique as effective for knee related musculoskeletal problems [15, 16]. Another study compared the immediate effects of static stretching and myofascial release on ITB tightness in athletes. The results revealed that static stretching and myofascial release both are effective in reducing iliotibial band tightness and improving hip adduction range of motion [17]. Many studies have evaluated the effects of various physiotherapy interventions on knee joint mechanics and patellar tracking; however, evidence is still scarce in this regard therefore this study aimed to:

- To determine the effectiveness of iliotibial band stretching versus iliotibial band myofascial release technique on knee pain using Numeric Pain Rating Scale in patients with lateral patellar tracking disorder.
- To compare the effectiveness of iliotibial band stretching versus myofascial release technique on knee physical function using Western Ontario and McMaster Osteoarthritis Index in patients with lateral patellar tracking disorder.
- To evaluate the effectiveness of iliotibial band stretching versus myofascial release technique on knee quality of movement using lateral step-down test in patients with lateral patellar tracking disorder.

**Methodology:** A two-arm, parallel group design, Randomized Controlled Trial (RCT) was conducted on patients suffering from LPTD at Physiotherapy Out Patient Department (OPD) of Jinnah Postgraduate Medical Centre (JPMC) Karachi, Pakistan. The trial was completed over the period of six months after the approval of synopsis from Review committee. The sample size of 40 (n=20 for each group) was calculated using G-power software version 3 at 95% Confidence Interval (CI). Diagnosed patients suffering from LPTD, aged between 25-55 years, positive Ober’s test, having trigger points over the ITB and radiograph findings of Lateral Tracking of Patella (LRP) were enrolled in the study. However, subjects suffering from injury of ITB, ligamentous or other injuries of the knee joint, recent or previous femoral/ tibial fracture, skin allergies or diseases, any systemic illness or serious pathology including malignancies/ carcinomas/HIV, mental retardation or major psychiatric disorders were excluded from the study. Those volunteer participants who gave written informed consent and met the eligibility criteria were assigned into Group A= ITB Stretching (n=20) and Group B=ITB MFRT (n=20) using simple random sampling (See figure 1).



Figure#1: CONSORT flow diagram

Group A (n=20), underwent sustained stretching exercises of ITB each with 20 secs hold and 10 repetitions with 10 sec rest between each (See Figure 2). However, Group B (n=20) underwent

manual myofascial release technique along the ITB course from proximal to distal on the effected limb with the subject in side lying position. Total 10 repetitions were given (See figure 3). Participants of both the groups performed strengthening of the quadriceps muscle as a home exercise program. Treatment protocol was followed as one session per day for 2 weeks.



Figure #2: Therapist performing ITB stretching



Figure# 3: Therapist performing ITB MFRT

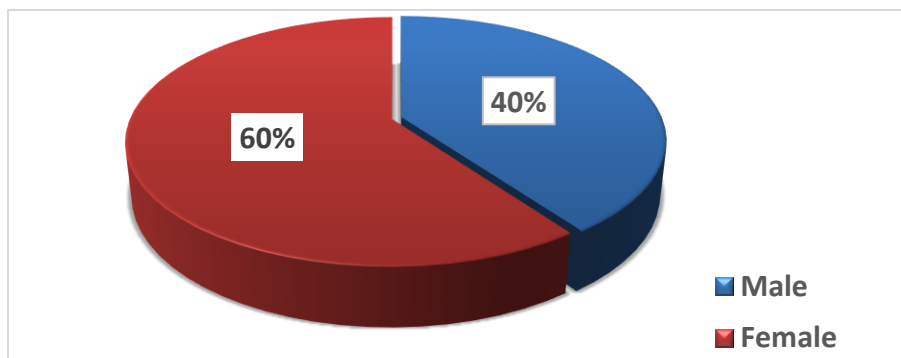
Data was collected using valid and reliable tools i.e., Numeric Pain Rating Scale (NPRS) was used to assess Knee pain, Western Ontario and McMaster Osteoarthritis Index (WOMAC) was used to measure knee physical function and Lateral Step-Down Test for quality of movement [18, 19, 20]. Data was analyzed using IBM-SPSS version 23.0. Descriptive statistics was used to show demographic characteristics. Normality of the data was checked by Shapiro-Wilk test. Paired sample t-test was run to compare the mean within groups and independent sample t-test was used to compared the between group analysis. P-values less than 0.05 were considered statistically significant at 95% CI.

**Results:** In Group A the mean age of the study participants was 46.8 years ( $SD=\pm 11.4$ ) and mean BMI was  $25.1 \text{ kg/m}^2$  ( $SD=\pm 3.7$ ). Whereas in Group B the mean age of samples was 44.1 years ( $SD=\pm 12.5$ ) and mean BMI was  $26.3 \text{ kg/m}^2$  ( $SD=\pm 4.6$ ) (See Table# 1). Most of the study participants i.e., 60% were females (See figure # 4).

Table# 1: Demographic characteristics of study participants (N=40)

		Group A= ITB Stretching (n=20)		Group B=ITB Myofascial (n=20)	
		Frequency	Percentage	Frequency	Percentage
<b>Gender</b>	Male	8	40.0	8	40.0
	Female	12	60.0	12	60.0
<b>Age (Years)</b>	Mean $\pm$ SD	46.8	$\pm 11.4$	44.1	$\pm 12.5$

<b>BMI (kg/m<sup>2</sup>)</b>	Mean ±SD	25.1	±3.7	26.3	±4.6
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Figure# 4: Gender of the study participants (N=40)

The mean knee pain intensity of Group A (ITB Stretching) before treatment was 5.4 (SD=±2.1) and after treatment it was 2.2 (SD=±2.0), P<0.01 showed a significant reduction in knee pain intensity after the treatment. Whereas the mean knee pain intensity of Group B (ITB MFRT) before treatment was 6.3 (SD=±2.1) and after treatment it was 2.4 (SD=±1.7), P<0.01 showed a significant reduction in pain intensity after the treatment. The mean knee function score of Group A before treatment was 41.9 (SD=±19.9) and after treatment it was 25.3 (SD=±20.9), P<0.01 showed a significant improvement in knee function after the treatment. Whereas the mean WOMAC score of Group B before treatment was 45.6 (SD=±23.9) and after treatment it was 24.1 (SD=±20.7), P<0.01 showed a significant pre-post difference. The mean of lateral step down test of Group A before treatment was 2.9 (SD=±1.7) and after treatment it was 1.2 (SD=±1.4), P<0.01 showed a significant improvement in knee quality of movement after the treatment. Whereas the mean lateral step down test score of Group B before treatment was 2.9 (SD=±2.3) and after treatment it was 1.1 (SD=±1.5), P<0.01 showed a significant improvement in quality of movement after the treatment (See table# 2).

Table# 2: Pre-post comparison of knee pain, physical function and quality of movement (N=40)

Groups	Pre-test		Post-test		p-value
	Mean	±SD	Mean	±SD	
<b>Knee Pain</b>					
<b>Group A= ITB Stretching (n=20)</b>	5.4	±2.1	2.2	±2.0	<0.01*
<b>Group B=ITB Myofascial (n=20)</b>	6.3	±2.1	2.4	±1.7	<0.01*
<b>Knee Physical Function</b>					
<b>Group A= ITB Stretching</b>	41.9	±19.9	25.3	±20.9	<0.01*
<b>Group B=ITB Myofascial</b>	45.6	±23.9	24.1	±20.7	<0.01*
<b>Quality of Movement</b>					
<b>Group A= ITB Stretching</b>	2.9	±1.7	1.2	±1.4	<0.01*

<b>Group B=ITB Myofascial</b>	2.9	±2.3	1.1	±1.5	<0.01*
<i>*p&lt;0.05 was considered as statistically significant</i>					

The mean knee pain intensity of Group A= ITB stretching was 2.2 (SD=±2.0) and whereas Group B=ITB MFRT was 2.4 (SD=±1.7) at p-value 0.74 showed there was no significant difference in post knee pain intensity. The mean score of knee physical function of Group A was 25.3 (SD=±20.9) and Group B was 24.1 (SD=±20.7). The p-value 0.86 showed there was no significant difference in post WOMAC scores of two studied groups. The mean Quality of Movement score of Group A was 1.2 (SD=±1.4) and Group B was 1.1 (SD=±1.5). The p-value 0.91 showed there was no significant mean difference in post lateral step-down test of two studied groups (See Table# 3).

Table 3#: Post-post comparison of knee pain, physical function and quality of movement (N=40)

Parameters	GROUPS				P-value
	Group A= ITB Stretching (n=20)		Group B=ITB Myofascial (n=20)		
	MEAN	±SD	MEAN	±SD	
<b>Knee Pain</b>	2.2	±2.0	2.4	±1.7	0.74
<b>Knee Physical Function</b>	25.3	±20.9	24.1	±20.7	0.86
<b>Quality of Movement</b>	1.2	±1.4	1.1	±1.5	0.91
<i>*p&lt;0.05 was considered as statistically significant</i>					

### Discussion:

This RCT compared the effectiveness of ITB stretching versus ITB myofascial release technique on knee pain, function, and quality of movement in patients with LPTD. Results revealed significant improvement in both the groups. However no statistically significant difference was detected between the groups. Hence concluded both the treatments as equally effective.

According to this trial both ITB stretching and ITB MFRT are equally effective in improving quality of movement in patients with LPTD, these findings are in line with the study conducted by Keys PM claiming that myofascial release and static stretching both the treatments are equally effective in improving hamstring range of motion [21]. Hence both the treatments could be used to improve patients knee symptoms and enhance patients' quality of life.

A systematic overview of conservative treatments for ITBS reported that stretching, foam rolling, and other myofascial release methods were associated with improvements in pain and function, though definitive superiority of any single modality remains unclear, echoing the present finding of equivalent clinical outcomes across techniques [22]. Similarly, a 2025 pilot RCT examining MFRT combined with hip strength training found both groups improved over time in pain and function, and although MFR provided earlier pain relief in the short term, **functional gains were comparable** aligning with the current study's lack of between group differences [23].

According to the literature studies on knee osteoarthritis showed that combining MFRT with stretching or other exercises can produce significant improvements in pain and disability compared with conventional therapy alone, these results do not contradict the current RCT's equivalence in outcomes when each modality is applied independently, but rather highlight the additive benefits of multimodal strategies [24]. A recent review also indicated that conservative physiotherapeutic measures, including stretching and manual soft-tissue techniques, contribute meaningfully to reducing pain and enhancing function in lateral knee conditions [25].

As per the knowledge of the authors this study is the first of its type that is conducted in Pakistan using valid and gold standard tools. Some of the limitation associated with this study was the small sample size, and that the data was collected only from the specific geographical location, furthermore follow-up was not carried to identify the long term effect of the treatment.

Future trials are recommended to focus on isolated muscle group strengthening such as hip adductors, quadriceps and hamstring. Also, the effect of various exercises on the biomechanics and functional integrity of patella and knee joint.

**Conclusion:** Iliotibial Band Stretching and Myofascial Release Technique both are significantly effective treatment strategies in reducing knee pain, improving physical function, and quality of movement in patients with Lateral Patellar Tracking Disorder. However, neither treatment demonstrated superiority over the other. Hence both the treatment strategies could be used to reduce symptoms associated with LPTD and enhance patient quality of life and independence.

**Conflict of interest:** The authors declared on any conflict of interest.

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