



# EFFECTIVENESS OF IT BAND MYOFASCIAL RELEASE VERSUS STRETCHING FOR IMPROVING PAIN, FUNCTIONAL ABILITY AND FUNCTIONAL PERFORMANCE IN FEMALES WITH PATELLOFEMORAL PAIN SYNDROME.

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## ABSTRACT:

**BACKGROUND AND PURPOSE:** Patellofemoral pain syndrome is the most common musculoskeletal condition. It is also important that patellofemoral pain is evident in 71-75% of patients with tenderness on palpation of the edges of the patella. It is seen in 15%-45% of all knee problems in 16-40 years age group, most commonly in adolescents and young adults. It is characterized by progressive pain, typically provoked by ascending or descending stairs, squatting and sitting with flexed knee for prolonged period of time. **METHODOLOGY:** Total 30 females were randomly selected for both groups. In Group A (MFR Technique) 15 females and Group B (Stretching technique) 15 females with CONVENTIONAL exercises in Females with PFPS. The total treatment sessions 4 weeks, 3 sessions each week (12 Sessions) for both groups. **RESULT:** Result were statically analysed using paired t-test and unpaired t-test by using the SPSS version 25.0 and Excel version 2019. There was significant improvement in pre and post assessment NPRS, AKPS and STEP DOWN score with  $p < 0.05$  in both the group. Also, statistically significant  $p < 0.05$  in post NPRS, AKPS AND STEPDOWN TEST in between both the groups. **CONCLUSION:** This study concluded that Myofascial technique is more effective than stretching for improving pain, functional ability and functional performance in females with patellofemoral pain syndrome.

**KEY-WORDS:** Patellofemoral pain syndrome, IT band tightness, Fascia, AKPS, MFR, Stretching

## I. INTRODUCTION:

Patellofemoral joint is a modified plane joint of lower limb. The patella consists thickest layer of cartilage in the body. Patella has five facets: superior, inferior, lateral, medial, and odd. The odd facet is most frequently the first part of patella that affected in patellofemoral pain syndrome.<sup>1</sup> Patello-femoral pain can be defined as knee pain on anterior aspect involving the patella and retinaculum. It excludes other intra-articular and peripatellar pathologies. This syndrome is the wide term used to explain the pain in the front of the knee, around the patella or knee cap.<sup>2</sup>

PFPS is most common diagnostic condition among all outpatients setting presenting with knee pain, which includes about 15-45% of adolescents and active young adults.<sup>3</sup> Wilson T reported that prevalence of patellofemoral pain twice higher in females (62%) as compare to male (38%) in general population. It is more common in females due to higher Q angle, so that force increases between lateral patellar facet and lateral femoral condyle, while descending stair knee in more flexed position and hip in more adducted and internally rotated with weight bearing position.<sup>4</sup> In patellofemoral pain syndrome, patients present with complaints like anterior knee pain that typically occurs with activity and often becomes worsen due to activity. Common symptoms include stiffness or pain, or both, on prolonged sitting with knee flexed ('theatre sign'), pain provoked by activity such as; ascending or descending stair, squatting, or running.<sup>5</sup>

A tight iliotibial band is one of the common factors which can cause patellofemoral pain syndrome. It has been involved in several knee problems like patellofemoral syndrome and iliotibial band friction syndrome.<sup>6</sup> In patellofemoral pain syndrome, with repetitive flexion and extension of the knee a tight iliotibial band slides over the lateral femoral epicondyle prominence.<sup>7</sup>

We can treat PFPS with various physiotherapy techniques. Generally, we use conservative methods which includes; Rest, Cryotherapy, Inter Ferential Therapy, ultrasound sound, stretching and strengthening, manipulation, etc.<sup>8</sup> Conservative treatment involving the use of strengthening exercise and in soft tissue techniques, myofascial release and stretching technique are included.

Ajimsha et al defined MFR as "A form of manual therapy that involves the application of a low pressure, long duration stretch to the myofascial complex, aimed to restore optimal length, reduces pain and enhance function. MFR is used to release muscles shortness and tightness. While giving MFR, direct pressure is exerted on the soft tissue, it causes the fascia to stretch that increases ROM or to decrease pain breaking apart of fibrous adhesions between the different layers of the fascia and restores the soft tissue extensibility."<sup>9</sup>

Stretching is therapeutic maneuver which increases the mobility of soft tissues, improves range of motion by lengthening structures that adaptively shortened and become less mobile. It is effective for increases flexibility and decreases musculotendinus stiffness. It helps in reduce the tightness of IT band and elongates the tight lateral structures.<sup>10</sup>

A wide variety of treatment protocols are available for PFPS like kinesio taping, dry needling, custom-fitted foot orthosis, lumbopelvic manipulation and exercise therapy. But, both MFR technique and stretching technique are routinely used in physiotherapy clinic.<sup>11,12</sup>

So, the purpose of the study to see the effectiveness IT BAND myofascial release (MFR) versus stretching for improving pain, functional ability and functional performance in females with patellofemoral pain syndrome.

## II.METHODOLOGY:

Ethical approval was given from Parul University. Data was collected from Sainath hospital, Ahmedabad. This study included 30 female patients within the age group 18-40 years. Patients were allocated to two groups according inclusion criteria, having anterior knee pain while any two of activities; Jumping, running, kneeling, stair climbing, prolonged sitting, squatting.<sup>13</sup> Age Duration of symptoms more than 4 weeks. Diagnosed conformed by a patellar grind test and Tenderness of medial and lateral patellar facets.<sup>14</sup> Anterior knee pain scale of 50-80 before the intervention.<sup>15</sup> Mostly in women (housewife and working) standing more than 30 minutes days. Exclusion criteria included Knee meniscus, ligaments or tendon pathologies, Subluxation or dislocation of patella, Osgood-schlatter disease, plica syndrome,<sup>16</sup> NSAIDS or corticosteroid long use, pregnancy and athlete type training.<sup>17</sup> Patients aged less than 16 and more than 40 years to avoid pediatric Knee disorder and age related degenerative joint disease. Spinal or Lower extremity deformities, Any neuromuscular, rheumatological or metabolic disease.(i.e,Diabetic neuropathy).<sup>18</sup> Patients were randomly divided into two equal groups by simple random sampling Group A (Myofascial Release and conventional Therapy) N=15 and Group B (Stretching and conventional Therapy) N=15. The patients who were selected to take part in the study were explained about the pros and cons of the study. The consent was taken after explaining about study. After that patients were evaluated by the using assessment form. The data were collected pre and post treatment for the both groups. Total treatment sessions were 4 weeks, 3 sessions each week (12 Sessions) for both the groups.

**Outcomes:**

1. NUMERICAL PAIN RATING SCALE (NPRS)
2. ANTERIOR KNEE PAIN SCALE (AKPS)
3. STEP DOWN TEST(SDT)

**Conventional therapy:**

1. Isometric Quadriceps exercises (10 repetition 10 sec. hold)
  - SQE
  - VMO
2. Hip adductor and abductor strengthening exercises.
3. Lateral SLR (3sets,10sec hold)
4. Bridging while small ball holding between knees (10rep.,10 sec hold)
5. Calf & Hamstring stretching (30sec hold,5 repetition)

**Group–A (n=15) CONVENTIONAL THERAPY + MYOFASCIAL RELEASE TECHNIQUE:**

**Patient position:** Patients were asked to be in side lying position on unaffected side with hip and knee 30 degree flexed.

**Therapist position:** The therapist was stand behind the waist level of the patient and facing toward their feet.

**Technique:** First the area of treatment had been cleaned and dried properly. Soft fist or elbow was used to engage the fasciae at the greater trochanter. Then applied sustain gentle pressure in inferior direction at the line with the fibers of IT band from femur towards the knee. This pressure was held for 90 seconds followed by 60 seconds of rest period and repeated for 5 minutes. The patients received 12 treatment sessions in 4 weeks treatment by myofascial release technique.

**Group–B (n=15) CONVENTIONAL THERAPY + STRETCHING:****IT BAND STRETCHING:**

**Patient position:** patient was in a side lying position with the hip to be Stretched upper most and flex the bottom hip and knee.

**Therapist position:** standing behind the patient and stabilize the pelvis at the iliac crest with proximal hand to prevent the movement in any direction.

**Technique:** therapist flexed patient's knee with extended hip to neutral or slight hyperextension. To orient the IT band for the stretch, therapist moved the hip into small amount of flexion and abduction prior to extending. After that therapist adducts the hip with gravity and applies an additional stretch force with the help of therapist other hand to the lateral aspect of the distal femur to further adduct the hip. The stretch was held for 30 seconds; 5 repetitions were performed in one set. The leg would remain in the abducted position, if the band is tight and the patient would experience lateral knee pain. This makes the test positive.



### III.RESULT:

In this study, 30 females with PFPS were randomly selected for both groups. Group A (Myofascial Release and conventional Therapy) N=15 and Group B (Stretching and conventional Therapy) N=15. All subjects were eligible according to inclusion criteria. The total treatment sessions 4 weeks, 3 sessions each week (12 Sessions) for both the groups.

Table 1: Group A And B Age Distribution

	<b>GROUP A (n=15)</b>	<b>GROUP B(n=15)</b>
<b>AGE</b>	34.4 ± 4.31	31.13 ± 3.62

Table 1 shows Mean age and SD of age parameter of both study group subject.

Table 2 Intragroup Comparison Of Pre And Post Nprs Values In Group A (Mfr) And Group B (Stretching)

	<b>OUTCOME</b>	<b>MEAN</b>	<b>SD</b>	<b>P-VALUE</b>
<b>GROUP A</b>	<b>NPRS PRE</b>	6.13	0.74	<0.0001
	<b>NPRS POST</b>	2.6	0.82	
<b>GROUP B</b>	<b>NPRS PRE</b>	6.06	0.79	<0.0001
	<b>NPRS POST</b>	3.67	0.82	

Paired t-test was used to compare pre and post NPRS value. This values shows extremely statistically significant between both assessment score as P value is <0.0001. So, the results concluded significant improvement in NPRS in groups A (MFR) and group B (STRETCHING).

Table 3 Intragroup Pre And Post Comparison Of Akps Values For Group A(Mfr) And Group B(Stretching)

	<b>OUTCOME</b>	<b>MEAN</b>	<b>SD</b>	<b>P-VALUE</b>
<b>GROUP A</b>	<b>AKPS PRE</b>	65.66	7.26	<0.0001
	<b>AKPS POST</b>	89.13	3.83	
<b>GROUP B</b>	<b>AKPS PRE</b>	67.06	2.97	<0.0001
	<b>AKPS POST</b>	83.6	2.29	

Paired t-test was used to compare pre and post AKPS value. This values shows statistically significant between both assessment score as P value is <0.0001. So, the results concluded significant improvement in AKPS in groups A (MFR) and group B (STRETCHING)

Table 4 Intragroup Comparison Of Pre And Post Step Down Test Values In Group A(Mfr) And Group B(Stretching)

	<b>OUTCOME</b>	<b>MEAN</b>	<b>SD</b>	<b>P-VALUE</b>
<b>GROUP A</b>	<b>SDT PRE</b>	10.66	2.19	<0.0001
	<b>SDT POST</b>	17.06	2.12	
<b>GROUP B</b>	<b>SDT PRE</b>	10.53	2.29	<0.0001
	<b>SDT POST</b>	15	2.44	

Paired t-test was used to compare pre and post SDT value. This values shows extremely statistically significant between both assessment score as P value is <0.0001. So, the results concluded significant improvement in SDT in group A (MFR) group B (STRETCHING).

Table 5 Intergroup Comparison Of Post Nprs Test Values Between Group A And Group B

<b>OUTCOME</b>	<b>MEAN</b>	<b>SD</b>	<b>T-VALUE</b>	<b>P-VALUE</b>
<b>GROUP A</b>	2.6	0.83	3.55	0.0014
<b>GROUP B</b>	3.67	0.82		

The p value derived by applying unpaired t test is 0.0014 which is <0.05 indicating that there is significant difference in the improvement between the groups. MFR is more effective than IT band stretching.



Graph 1 Group A And Group B Nprs Mean Df Graph (Between Group)

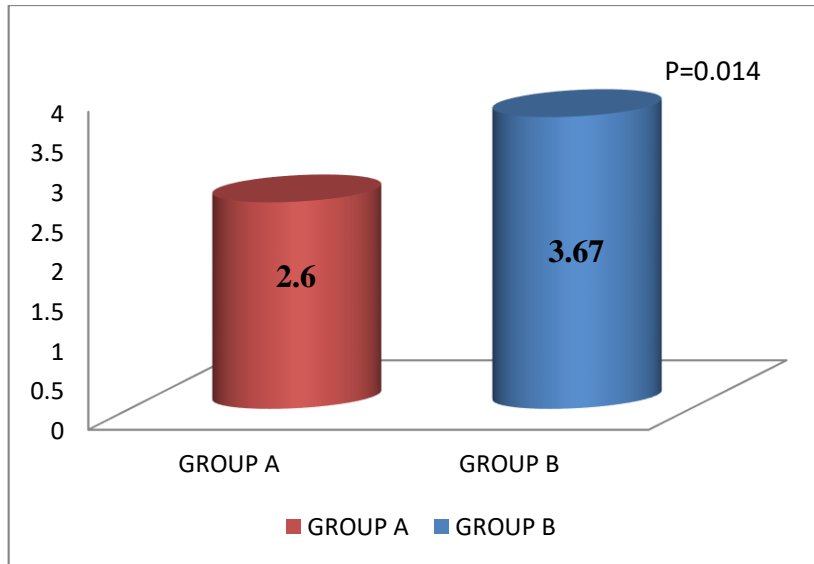


Table 6 Intergroup Comparison Of Post Akps Test Values Between Group A(Mfr) And Group B(Stretching)

OUTCOME	MEAN	SD	T-VALUE	P-VALUE
GROUP A	89.13	3.83	4.42	0.0001
GROUP B	83.6	2.97		

The p value is derived by applying unpaired t test is 0.0001 which is <0.05 indicating that there is significant difference in the improvement between the groups. MFR is more effective than IT band stretching.

Graph 2 Group A And Group B Akps Mean Df Graph (Between Group)

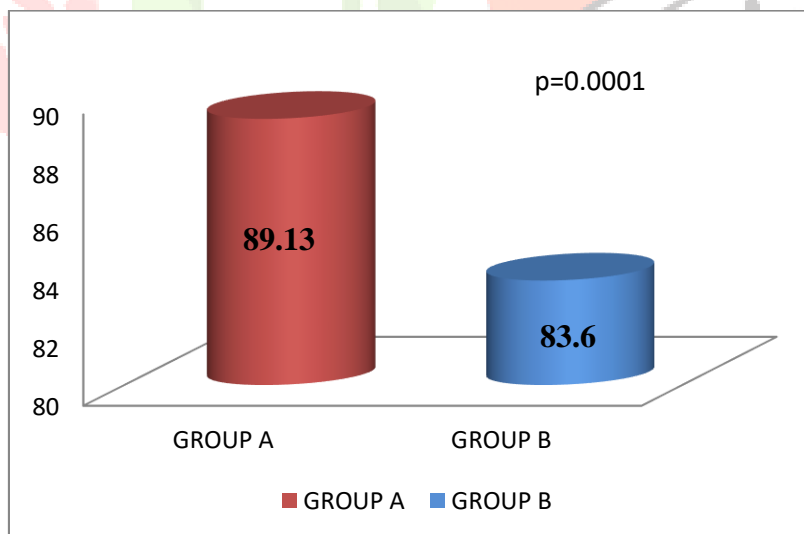
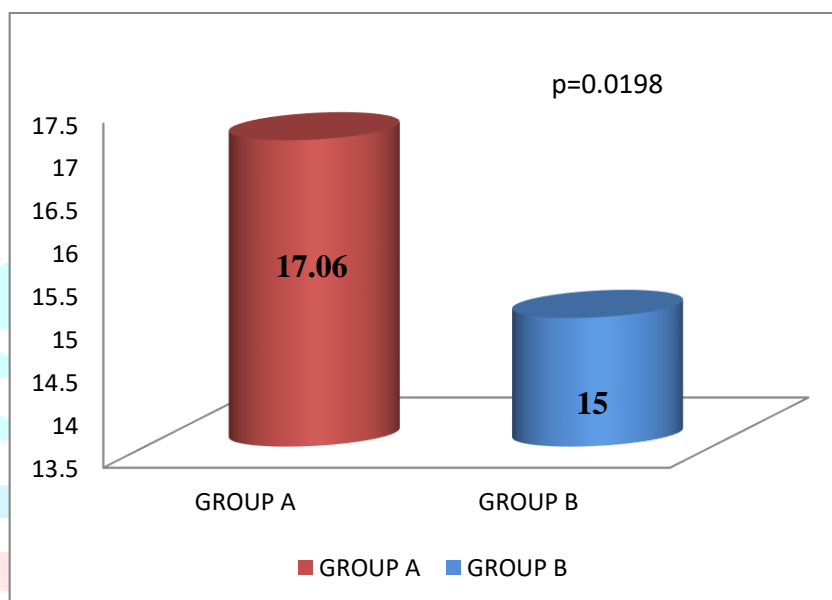


Table 7 Intergroup Comparison Of Post Step Down Test Values Between Group A(Mfr) And Group B(Stretching)

OUTCOME	MEAN	SD	T-VALUE	P-VALUE
GROUP A	17.06	2.12	2.47	0.0198
GROUP B	15	2.44		

The p value derived by applying unpaired t test is 0.0198 which is  $<0.05$  indicating that there is significant difference in the improvement between the groups. MFR is more effective than IT band stretching.

Graph 3 Group A And Group B Sdt Mean Df Graph (Between Group)



Paired T test was used to compare between intra group pre and post values. Calculated P value was  $<0.05$  between pre and post assessment values in both the group in all three parameter.

Between both group the inter group comparison of mean difference values help to find P value. The p value being  $<0.05$  in NPRS, AKPS and STEP DOWN TEST values indicates statistically significant difference between the groups. The inter group comparison of group A values in all three parameter scores was significantly more than group B. Statistically we explained that both groups were showing differences on NPRS, AKPS and STEP DOWN but more improvement seen in Group A (IT band MFR technique with conventional therapy).

#### IV.DISCUSSION:

This present study showed that both treatment protocols are effective to improving pain, functional ability and performance in females with PFPS. But, clinically there was greater improvement in subjects with MFR with conventional therapy as compare to stretching technique.

Both groups were evaluated for pain, functional ability and performance by using NPRS, AKPS and STEP DOWEN TEST as an outcome measure.

In present study, Group A was given Myofascial release with conventional therapy, statistically significant and greater improvement in all outcome measures and means were analysed from pre and post intervention level.

**Shah S and Bhalara** stated that, "In MFR technique, there is a facilitation of mechanical, neural and psycho physiological adaptive potential as interfaced by the myofascial system". Myofascial release is a technique which stretches the fascia and releases bonds between muscles and fascia in order to reduce pain, improve motion and to sustain myofascial balance within the body.<sup>19</sup> **Iona Gracie De Souza and Pavan Kumar G, 2020** studied effect of releasing myofascial chain in patients with PFPS. They concluded that

MFR is showing superior improvement due to release interconnected fascia that corrects lower extremity kinematics by reduction in pain; improve functional activities and reducing stress on patellofemoral joint.<sup>20</sup>

**Ebtessam Fawzy Gomaa and Lilian Albert Zaky, 2016** studied the effect of releasing myofascial chain on functional disability in patients with knee osteoarthritis. They concluded that MFR with exercise program showing significant improvement because of decreasing tension on IT band and reducing pain, stiffness and improvement in functional ability in patient with KOA.<sup>21</sup>

In present study, Group B was given stretching with conventional therapy, statistically significant improvement in all outcome measures and means were analysed from pre and post intervention level.

**Malarvizhi and Neha Bhatt, 2016** studied the outcome of strengthening exercises and iliotibial band stretching in PFPS. They concluded the effectiveness of stretching and strengthening of It band for reducing pain and improving hip abduction in PFPS patients in just one week of therapy.<sup>22</sup> **F Revelles Moyano et al, 2012** studied the effect of different exercise and stretching physiotherapy on pain and movement in PFPS. They concluded that IT band stretching with PNF technique showed improvement in pain, range of motion and function in patients with PFPS.<sup>23</sup>

Group A which was given MFR technique showed more improvement because of the direct center of treatment is muscle which shows inflexibility. Loosening the inter connected fascia which is correcting kinematics of lower extremity and movement pattern hence it is reducing stress present on patellofemoral joint. Same as pain gate theory that carries painful stimuli which is closing the gate to the pain perception at the cortex level. MFR is useful as its calming effect and because of human touch and personal attentiveness works on reduction in pain and activates parasympathetic response. There will be reduction in pain, anxiety, depression and stress because of its activation. Thus it has been demonstrated that myofascial release techniques are beneficial for individuals recovering from myofascial injuries and thereby reducing musculoskeletal pain due to release of serotonin.<sup>24</sup>

From the above literatures, it is proved that MFR and STRETCHING both are effective for improving pain, functional ability and performance in females with PFPS. But on the basis of analysis, the study proved that patients treated with IT band MFR technique showed more effectiveness on pain, functional ability and performance than patients treated IT band stretching.

## V.CONCLUSION:

So, this study concluded that both IT band MFR and stretching showed improvement in pain, functional ability and functional performance but IT band MFR technique was more effective than stretching.

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