

## ORIGINAL ARTICLE

**Effects of Iliotibial Band Myofascial Release with and without Stretching in patients with Iliotibial Band Tightness Secondary to Knee Osteoarthritis**HAMNA RAHMAN<sup>1</sup>, ZIRWA AFZAL<sup>2</sup>, OSAMA RAMZAN<sup>3</sup>, SAMAN TAUSEEF<sup>4</sup>, TAHREEM USMAN<sup>5</sup>, SYEDA IQRA QADEER<sup>6</sup>, SANIA MAQBOOL<sup>7</sup><sup>1</sup>Senior Lecturer, Physiotherapist, Abwa College of Physical Therapy (Abwa Medical College)<sup>2</sup>Lecturer at University of Lahore.<sup>3</sup>Clinical Physiotherapist at Yasmin Physiotherapy Center<sup>4</sup>Instructor at Shifa Tameer-e-Millat University<sup>5</sup>Consultant Physical Therapist, Al-shiffa Future Hospital<sup>6</sup>Demonstrator, Department of Physical Medicine and Rehabilitation SHS, University of Management and Technology (UMT) Lahore,Correspondence to: Sania Maqbool, E-mail: [saniamaqbool28@gmail.com](mailto:saniamaqbool28@gmail.com), Cell: 0332-4164484**ABSTRACT****Background:** Knee osteoarthritis (OA), also referred to as degenerative joint disease of the knee, is brought on by wear-and-tear and the slow loss of articular cartilage. The term "iliotibial band" (IT band) also refers to the iliotibial tract or Maissiat's band.**Methodology:** This study was conducted using randomized clinical trial, quasi experimental research design as we need to make 2 groups and evaluate the effects of Iliotibial band myofascial release and stretching on the patients of knee OA. Study population was 36 individuals of ages 50-70 having knee osteoarthritis grade II or III characterized by Kellgren-Lawrence grades, visiting the physical therapy department of Mumtaz physiotherapy clinic. It was a randomized clinical trial with convenient sampling where participants were randomly allocated in two groups by simple random sampling, one group was experimental that received IT band myofascial release other than the stretching and baseline treatment and second group received the myofascial release and baseline treatment only. Data collection tools were Visual Analogue Scale (VAS) and Woman Osteoarthritis index. For the within group analysis of VAS, Friedman test was used and wilcoxon signed rank test was used for the within group analysis of the WOMAC. For the between group analysis of variables, Mann-whitney U test was used.**Results:** Both groups showed some significant improvement in all outcome measures ( $p < 0.05$ ), but the results produced by IT band Myofascial release along with stretching group was statistically significant in terms of reduced pain and disability ( $p < 0.0005$ ) as compared to myofascial release alone group. The iliotibial band myofascial release along with stretching has statistically significant effect in improving the pain and disability among knee osteoarthritis patients.**Practical Implication:** Iliotibial band tightness can potentially lead to the alterations in the mobility of patella and disturb the overall knee complex. Proper arthrokinematics of joint is necessary for ambulation. So, this study focused to draw results from combined therapy of IT band myofascial release and stretching will redound to the benefit of physiotherapy field considering that knee plays an important role in better Quality of life.**Conclusions:** The iliotibial band myofascial release along with stretching has statistically significant effect in improving the pain and disability among knee osteoarthritis patients.**Keywords:** IT Band; Myofascial Release; Stretching; WOMAC; VAS.**INTRODUCTION**

Osteoarthritis (OA), often known as wear and tear arthritis or age-related arthritis, is the most frequent form of synovial joint degeneration, characterized by cartilage degradation and eventual loss, synovial inflammation, subchondral bone alterations, and meniscus deterioration<sup>1</sup>. It is most common in women and men in elderly. Primary and secondary osteoarthritis of the knee can be differentiated. Primary osteoarthritis is defined as articular deterioration that occurs for no obvious reason. Secondary osteoarthritis results from either an improper distribution of force throughout the joint, as in post-traumatic causes, or aberrant articular cartilage<sup>2</sup>. OA, the most common disease of joints worldwide, most frequently affects the knee, which is the most frequently affected joint in the body. In one study, just 15% of participants with radiographic evidence of knee OA had symptoms<sup>4</sup>.

The articular cartilage (mostly type II) that covers the articular surfaces of bones is affected by osteoarthritis. When OA develops, the chemical reactions in articular cartilage are disrupted, resulting in changes in collagen of cartilage<sup>3</sup>. Medial part of the knee is involved in most of the cases due to which bow legs are most common presentation of the patients with knee osteoarthritis<sup>5</sup>.

The medial, lateral, and patellofemoral joints are all affected by knee OA, which typically advances slowly over a period of 10 to 15 years and restricts daily activities. It was previously believed to be an age-related, wear-and-tear articular cartilage disease unrelated to inflammation<sup>6</sup>.

Risk factors for knee osteoarthritis include injury and obesity. These may be the main risk factors for developing the condition. There are some jobs that require the repetitive movements such as heavy lifting/ labor. Repetitive knee bending movements may also be the risk factor for knee osteoarthritis<sup>7</sup>.

The iliotibial band (IT band) is also known as Maissiat's band or the iliotibial tract. It's a lengthy band of connective tissue, or fascia that goes from the hip to the knee and shinbone on the outside of your leg. The IT band aids in hip extension, abduction, and rotation. It also protects the outer thigh while stabilizing and moving the side of your knee. When IT band gets irritated, tight and inflamed this induces a friction over the lateral aspect of knee (Flato, 2017 #50). Iliotibial band syndrome occurring as a result of weak hip and gluteus muscles, loss of flexibility, excessive sitting, unbalanced leg lengths or any other cause can suffer inflammation near lateral epicondyle, this as a result induces knee osteoarthritis<sup>9</sup>. In the absence of any joint effusion, abrupt worsening of lateral knee symptoms is coupled with medial joint collapse and varus deformity. This is mostly related to iliotibial band syndrome, which is linked to chronic muscle spasms caused by magnesium shortage and long-term discomfort<sup>10</sup>.

The term myofascial release includes different techniques that are used to release fascial restrictions that leads to neuromuscular pathology<sup>11</sup>.

Myofascial release is widely practiced manual technique working on guided principle to break restriction causing somatic dysfunctions. Myofascial release along with other conventional therapies is found to be providing immediate relief from pain and reducing tissue tenderness<sup>12</sup>.

Structures involved in producing pain inside the knee, the neurological system's sensitivity to pain impulses emerging from

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the joint, external stimuli that activate articular sensations, and psychosocial characteristics of the person all play a role in the severity and intensity of pain<sup>13</sup>.

As a result, range of motion, flexibility, and muscle control are all enhanced. Extending range of motion by stretching can also be used therapeutically to reduce cramps and improve day-to-day function<sup>14</sup>.

Stretching of the iliotibial band, lateral fascia, gluteus medius, and other muscles is commonly prescribed as part of an iliotibial band tightness treatment plan. Manual therapy techniques are routinely recommended to relax myofascial limitations in the iliotibial band and adjacent structures<sup>15</sup>.

Availability of evidence regarding the combined use of IT band myofascial release technique and stretching in reduction of pain and physical disability in knee OA patient with tightness of IT band was very low, as criteria in previous studies were not clearly defined. This study operationalized specific defined knee OA patients with IT band tightness and stimulated the effects of combined therapy to manipulate pain and disability. Iliotibial band tightness can potentially lead to the alterations in the mobility of patella and disturb the overall knee complex. Proper arthrokinematics of joint is necessary for ambulation. So, this study focused to draw results from combined therapy of IT band myofascial release and stretching will redound to the benefit of physiotherapy field considering that knee plays an important role in better Quality of life. With the greater incidence of knee OA, there is increased need of substitute treatment to provide criterion defined therapy for the patient. The findings of this study will focus to emphasize the performance of knee OA patients having taut IT band.

## MATERIALS AND METHODS

The literature for the study was searched using the keywords such as knee osteoarthritis, iliotibial band tightness, myofascial release and stretching using the Boolean operations AND & OR on the multiple search engines majorly the Google Scholar and other search engines such as Cochrane Library, PubMed and PEDro. Literature only available in English language was considered. This study was conducted using randomized clinical trial, quasi experimental research design as we need to make 2 groups and evaluate the effects of Iliotibial band myofascial release and stretching on the patients of knee OA.

This study was conducted at Allied Hospital Faisalabad (physiotherapy department) and Al-Mumtaz physiotherapy clinic Faisalabad in a naturalistic environment under normal circumstances. The study required total of 4 months including the analysis of data and interpretation of thesis. The knee osteoarthritis patients of grade 2 and 3 as per Kellgren-Lawrence classification of knee OA, having pain while standing from chair and climbing stairs, visiting the physiotherapy Clinics were considered the population for this study.

Non-probability purposive sampling was used for the study and the group allocation was accomplished using simple randomization sampling technique. The participants after been recruited into the study were allotted to groups using the lottery method.

### Inclusion criteria

- Participants aging between 50-70 years
  - from chair or climbing stairs Male and female participants,
  - Participants having Grade 2 and grade 3 according to Kellgren-Lawrence Classification
  - Participants with IT band tightness assessed by Ober's test (16) along with the presence of trigger points as per the criteria of Travell and Simons
  - Participants willing to participate by signing the consent form
- Participants having complain of 50mm or greater on VAS while standing

### Exclusion criteria

- Participants with any diagnosed musculoskeletal or auto-immune disorder (spondylolisthesis, spondylitis, Rheumatoid arthritis etc.) other than knee OA,
- Participants having co-morbidities such as neoplasm etc.
- Participants undergone lower limb surgery in past 6 months.
- Participants having weight more than 120 kgs
- Participants having any wound or scar on the site of treatment.
- Participants having any neurological or vascular disorders or infectious disease and
- Participants with physical impairment such as vision problems,
- Participants taking medication (NSAIDS and steroids),
- Pregnant females,
- Inability to walk 10 meters without assistance, advanced osteoporosis, patient with complain of severe back pain and
- Knee Varus deformity greater than 10 degrees as diagnosed by X-ray, external tibial rotation, Pes-cavus or any predominant lower extremity deformity

**Data Collection Procedure:** Participants recruited into the study were allocated to two groups, Group A (MFR+ stretching) and group B (MFR) only. The participants of both groups were given the detail of therapy sessions they received and the participants were kept blind. The data was assessed by the physiotherapist at the time of enrollment into the study and later after the 6<sup>th</sup> and last after the 12<sup>th</sup> session.

The exercise or intervention plan was given to the patients depending upon their respective groups. Participants of both groups received exercise therapy as warm up (buttock squeeze for 5 seconds repeating for 5 times, both legs SLR hold for 10 seconds repeating for 5 times, both legs hamstring stretch for 15-20 seconds hold repeating for 5 times with break of 5 seconds after each repetition)<sup>17</sup> for 10 minutes along with the treatment plan as per the study plans. If any of the participants wanted to discontinue treatment, he/she could leave at any time during the study.

**Group A (MFR+Stretching):** The participants of group A received iliotibial band myofascial release and Stretching other than the exercise therapy. To perform the MFR on IT band, the patient lied supine line with the treatment leg on superior side and the hip and knee of the same side slightly flexed to aid the relaxation<sup>18</sup>. The adduction was then gained by positioning and gravity, it put the muscle in elongated position<sup>19</sup>. The longitudinal strokes were applied by the therapist thumb by placing it over the taut band and moderate pressure unpaful for patient was applied and this was continued for 3 minutes. After it the IT band of the patient was stretched. The time period for the treatment was 30 minutes.

**Group B (MFR only):** The participants of group B only received the IT band myofascial release in addition to the warm-up of exercise therapy. The total time period was 30 minutes.

**Data Collection Instruments:** The pain while performing activities such as standing from sitting positing and climbing stairs was assessed by the visual Analogous Scale. The pain, stiffness and functional disability due to knee OA were measured by the WOMAC questionnaire.

## RESULTS

Table 1 depicts the age and gender of participants. Table 2 and 3 depicts the descriptive statistics of the VAS at baseline, after 2<sup>nd</sup> week and after 4<sup>th</sup> week for group A and B participants.

Table 4 shows the Vas analysis between the groups. It can be seen from the above table that at baseline the VAS score was not statistically significant from each other (U=126, p=.956) and if we look at the post treatment VAS value and the individual descriptive statistics of the Friedman test, we saw that mean & median for the MFR+stretching group were more improved as compared to the MFR only group. So, it is concluded that treatment effect of MFR+stretching was statistically significant from

that of MFR only ( $U=81$ ,  $p=0.040$ ), the  $p$ -value is below 0.05 so, the results are significant.

Table 5 and 6 illustrates the disability subscale WOMAC scale for group A and B. Table 7 depicts the WOMAC analysis between the groups. The differences in the mean values can be seen. The mean of WOMAC at baseline for group A and B was

$70.94 \pm 7.65$  and  $70.13 \pm 8.21$ . The post-treatment WOMAC score for group A and B was  $49.75 \pm 6.37$  and  $63.31 \pm 8.57$  respectively. It can be seen that the baseline values were not significant from each other which means that the sample was taken from normal population.

Table 1: Age & gender of participant

	N	Mean	Std. Deviation	50th (Median)	Asymp. Sig
VAS group A at baseline	16	75.94	17.437	77.50	0.000
VAS group A after 2nd week	16	63.75	16.583	65.00	
VAS group A after 4th week	16	52.50	16.533	50.00	

Table 2: VAS within group A Analysis

	N	Mean	Std. Deviation	50th (Median)	Asymp. Sig
VAS group B at baseline	16	76.56	17.002	77.50	0.000
VAS group B after 2nd week	16	68.44	16.199	72.50	
VAS group B after 4th week	16	66.25	16.381	65.00	

Table 3: VAS within group B Analysis

	N	Mean	Std. Deviation	50th (Median)	Asymp. Sig
VAS group A at baseline	16	75.94	17.437	77.50	0.000
VAS group A after 2nd week	16	63.75	16.583	65.00	
VAS group A after 4th week	16	52.50	16.533	50.00	

Table 4 : VAS of group A & B Analysis

Age	Frequency	Percent	Cumulative Percent	gender	Frequency	Percent	Cumulative Percent
50-54	7	21.8	21.8	Male	15	46.8	46.8
55-59	9	28.2	50.0	Female	17	53.2	100.0
60-64	4	12.5	62.5	Total	32	100.0	
65-70	12	37.5	100.0				

Table 5: Disability subscale WOMAC within group A

	VAS at baseline	VAS after 4th week
Mann-Whitney U	126.000	81.000
Wilcoxon W	262.000	217.000
Z	-.076	-1.790
Asymp. Sig. (2-tailed)	.940	.073
Exact Sig. [2*(1-tailed Sig.)]	.956	.040

Table 6: Disability subscale WOMAC within group B analysis

		Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	Disability subscale WOMAC at baseline - Disability subscale WOMAC after 4th week			3.161	4.464			

Table 7: WOMAC analysis between A & B

		Mean	Std. Deviation	Paired Differences		t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	Disability subscale WOMAC at baseline - Disability subscale WOMAC after 4th week	13.000	3.141	11.326	14.674	16.555	15	.000

	Grouping variable	Mean	Std. Deviation	p-value
WOMAC at baseline	Group A	70.94	7.655	0.000
	Group B	70.13	8.213	
WOMAC after 4th week	Group A	49.75	6.372	0.000
	Group B	63.31	8.577	

## DISCUSSION

This research was conducted to analyze the effects of myofascial release technique in conjunction with stretching or without it on the pain and functional disability of the knee osteoarthritis patients. The study resulted that both groups demonstrated a significant improvement in pain and functional disability after 4 weeks of intervention given 3 times a week, with the experimental group showing a considerable improvement in pain functional disability.

Previous myofascial release studies were short-term, and while their findings were effective, they were not used in clinical practice. However, our findings after a reasonably lengthy duration of therapy (four weeks) confirmed both the short-term and long-term effects of myofascial release. The improvement in functional

disability could be explained by the fact that myofascial release group a had less pain and disability than myofascial release group B, which was consistent with the findings of Vernon and Schneider's systematic review, which found moderate to strong evidence supporting the use of trigger points release myofascial release for immediate pain relief<sup>20</sup>. Rupareliya and Shukla in 2017, carried out an interventional study to check the effects of IT band stretching on the function and pain in patients of unilateral knee osteoarthritis on 31 patients. The participants were divided into experimental and control groups, the participants of experimental group received conventional therapy and iliotibial band stretching whereas the participants of group B received just the conventional therapy. The assessment of pain and functional disability was done

by using NPRS and WOMAC outcome tool. The assessment was done before and after the intervention, the study resulted that both the interventional and control group had improved reduction in pain and functional limitation but the participants of experimental group had statistically significant improvement as compared to control group. The study concluded that IT band stretching along with conventional therapy can help reduction in pain and functional limitation in patients of unilateral knee osteoarthritis {Rupareliya,#51}.

Another study conducted to check the effects of IT band stretching on the function and pain in patients of unilateral knee osteoarthritis on 31 patients. The participants were divided into experimental and control groups, the participants of experimental group received conventional therapy and iliotibial band stretching whereas the participants of group B received just the conventional therapy. The assessment of pain and functional disability was done by using NPRS and WOMAC outcome tool. The assessment was done before and after the intervention, the study resulted that both the interventional and control group had improved reduction in pain and functional limitation but the participants of experimental group had statistically significant improvement as compared to control group.

The study concluded that IT band stretching along with conventional therapy can help reduction in pain and functional limitation in patients of unilateral knee osteoarthritis<sup>21</sup>. But in our study group A received myofascial release with stretching while group B received only myofascial technique. The assessment tools were VAS and WOMAC.

## CONCLUSION

The iliotibial band myofascial release along with stretching has statistically significant effect in improving the pain and disability among knee osteoarthritis patients.

**Recommendations:** Future studies should be done on a larger scale with greater sample size. This research project can be repeated for a longer period of time to gain better results and for a trustable effect size of treatment. It can also be repeated in conjunction with different strategies or treatment options in order to get better impact on practice. A greater number of researches done in this field will provide greater evidence-based practice for future clinicians and practitioners.

**Conflict of interest:** Nil

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