The effect of "iliotibial band stretching" on pain and function in patients with unilateral osteoarthritis of knee joint - An interventional study

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Abstract Background: Osteoarthritis is the second most common rheumatological problem with prevalence of 22% to 39% in India. Knee joint is the most commonly affected joint of the body. The tight muscles especially biarticular muscles like rectus femoris, iliotibial band further contribute to early degeneration of the joint. Tight iliotibial pulls the patella laterally during knee flexion movement and also externally rotates the tibia, causing the corresponding changes in the tibiofemoral joint contact pattern. Balance of the medial and the lateral static and dynamic stabilizers is necessary for proper alignment of joint. Hence, the aim of the study is to find the effect of iliotibial band stretching on pain and function in patients with unilateral osteoarthritis of knee joint. Methodology: This study was conducted on 31 patients of unilateral knee osteoarthritis, who were divided into two groups. Both the groups underwent conventional physiotherapy treatment and interventional group underwent Iliotibial band stretching in addition. Both the groups were assessed before and after the treatment to determine the extent of reduction in level of pain and functional limitationby using Numeric pain rating scale (NPRS) and WOMAC respectively. Result: At the end of 4 weeks, the patients in the both control group and intervention group showed reduction in pain and improvement in function. But interventional group showed statistically significant improvement than control group. (p < 0.05) Conclusion: Iliotibial band stretching along with conventional physiotherapy helps in reducing pain and improving function in patients with unilateral knee osteoarthritis. Key Words: Osteoarthritis, Knee joint, Iliotibial band, Ober's test.

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INTRODUCTION

Osteoarthritis is the second most common rheumatological problem and is most frequent joint disease with prevalence of 22% to 39% in India.^{1, 2, 3} Knee joint is the most commonly affected joint of the body.^{4,5}It is a disease of entire joint, involving cartilage, joint lining, ligament and bone.⁶ The prevalence of OA

increases with age, although there is strong association between OA and mechanical abnormalities.⁷The normal aging process brings about an almost imperceptible eminuation in normal muscle functions including strength, endurance, agility and flexibility. The tight muscles especially biarticular muscles like rectus femoris, iliotibial band further contribute to early degeneration of the joint.⁸ Tight iliotibial pulls the patella laterally during knee flexion movement and also externally rotates the tibia, which may increase the valgus vector at the knee and in turn, compound the excessive lateral tracking of patella. Physical therapy measures recommended for OA knee are: Heat and cold therapy, strengthening exercises of hip and knee muscles, Range of motion exercises and aerobics exercises. Strengthening of the muscles is important because stronger muscles improve the stability of the joints and lessen pain.9 Stretching of hamstring muscles is also frequently implicated in the exercise program.¹⁰However, there is paucity of literature that

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evaluates the effect of iliotibial band stretching in patients with OA knee. Hence, this study is designed to determine the effect of iliotibial band stretching on pain and function in patients with unilateral osteoarthritis of knee joint.

MATERIAL AND METHODS

Ethical clearance for this interventional study was obtained from Institutional Ethical committee prior to the study. 45 patients referred from the Orthopaedic OPD were screened for the eligibility. From that 31 patients with 50-65 age group having unilateral knee osteoarthritis iliotibial band tightness tested with Ober's test were included in the study. Written informed consent was taken from all the patients. Patients having knee deformities, prior trauma or surgery of knee, neurological, cardiovascular or medical illness and low back pain with or without radiculopathy were excluded. Patients were divided into two groups by convenience sequential sampling. Group A: Control group (n=16 patients). Patients in the control group were given conventional treatment of knee osteoarthritis. Group B: Interventional group (n=15 patients). Patients in the interventional group were given conventional treatment of knee osteoarthritis and Iliotibial band stretching. On first visit, a complete orthopaedic assessment was done which included the descriptive data for age, sex, height, weight, duration of symptoms, chief complaint, previous surgery, medications, Active and passive range of motion, Manual muscle testing and Ober's test were documented.

Pre intervention NPRS and WOMAC score were taken at the first day. After completing four weeks of treatment, post intervention NPRS and WOMAC score were taken. Each patient was treated for a period of 4 weeks and 6 days a week. Conventional treatment for both control and interventional group included progressive muscular strengthening program.¹⁰All the exercises are performed thrice daily and 10 repetitions of each exercise. Exercises are performed once in the department and twice at home.¹¹Conventional treatment included Quadriceps setting exercises, short arc terminal knee extension, straight leg raise, hip abductor strengthening in side lying. hamstring curls in prone lying position, quadriceps strengthening in high sitting position, hamstring muscle stretching, gastrocnemius muscle stretching, closed chain exercise- Partial squats, shortwave diathermy Group B was given Iliotibial band stretching along with conventional physiotherapy treatment. Iliotibial band was stretched manually with intensity consistent with the patient's response. Patient was positioned in Side lying, with the hip to be stretched uppermost. Pelvis was stabilized at the iliac crest with the proximal hand. Knee was flexed(Photograph 1, 2), patient's hip was abducted and extended so that hip is in line with the trunk. (Photograph 3, 4). Patient's hip was allowed to adduct with gravity and an additional stretch force was applied with hand to the lateral aspect of the distal femur to further adduct the hip (Photograph 5). 3 repetitions were performed, with a hold of 30 seconds.



Figure 1

Figure 2

Figure 3





Figure 5

RESULTS

Data were analysed using Statistical Package for Social Sciences version 16 (SPSS v.16) and Microsoft Excel 2010. Total 31 patients were included in the study. 4 patients from Group- A and 2 patients from Group- B discontinued the treatment. Hence, a total of 25 patients, 12 patients from Group- A and 13 patients of group B completed the study and data analysis was performed on the Numeric Pain Rating Scale (NPRS) and WOMAC score. Participant flow through the study is indicated in flow diagram.

Flow diagram of patient inclusion and participation



Mann-Whitney U test was applied to compare the baseline characteristics of the patients in both the groups. No statistically significant difference was found between both the groups. Wilcoxon signed rank test was applied for the analysis of pre and post treatment outcome measures within the group, within group analysis showed statistically significant difference in NPRS score (p<

0.05) for both the groups. Within group analysis showed statistically significant difference in WOMAC score(p< 0.05) for both the groups. (Table 1) Mann- Whitney U test was applied for between group analysis of all the outcome measures. Between group comparison showed statistically significant difference between group comparison was done. (p <0.05) (Table 2)

	NPRS SCORE				WOMAC SCORE			
	PRE	POST	Z-VALUE	p-VALUE	PRE	POST	Z-VALUE	p-VALUE
GROUP A	5.83 ± 1.64	3.17 ± 1.33	- 3.115	0.002	38.08± 11.00	17.17± 6.54	- 3.06	0.002
GROUP B	5.85 ± 1.81	2.15 ± 1.40	-3.236	0.001	39.77± 8.84	12.85 ± 4.35	-3.184	0.001

Table 2: Shows Difference of NPRS and WOMAC score of Group A and Group B									
OUTCOME MEASURE	GROUP- A (MEAN ± SD)	GROUP- B (MEAN ± SD)	U- VALUE	P – VALUE					
DIFFERENCE OF NPRS	2.67 ± 0.778	3.69 ± 0.751	29.000	0.005					
DIFFERENCE OF WOMAC	21.36 ± 5.045	26.92 ± 5.337	29.000	0.007					

DISCUSSION

At the end of 4 weeks, the patients in the both control group and interventional showed reduction in pain and improvement in function. But interventional group showed statistically significant improvement than control group. Thus, the study result shows that iliotibial band stretching along with conventional treatment is more effective than conventional treatment alone on outcome of pain (NPRS) and functional limitation (WOMAC). The findings of this study are similar to Ketki Kane Vishwas, who did a study on the effect of iliotibial band stretching on pain and function in 60 osteoarthritis knee patients. She compared one group who received iliotibial band stretching along with exercise and ultrasound and another group received ultrasound and exercises. They concluded iliotibial band has additional effect on improving

functional activity of walking, medial mobility of patella and Q angle after 5 days.¹² Due to pain, there is reflex inhibition and decreased ROM, so muscles become disuse in that particular area. A decrease in muscle length is also associated with aging.¹³ So, stretching is necessary. Iliotibial band tightness is associated in both anterior and lateral knee pain and so linked with excessive lateral deviation of patella and it will convert into lateral tilting and tracking of the patella.^{14, 15}Also, with the loading of the iliotibial band the tibia translates posteriorly and proximally and rotates in the external and valgus directions, accompanied by the corresponding changes in the tibiofemoral contact pattern and lateral shifting of the contact region on the patella. ^{16, 17, 18}So, tight structures contribute to further degeneration of the joint. Fulkerson and Hungerford state that the lateral retinacular bands are drawn posteriorly along with the iliotibial band on knee flexion. This causes progressive tilting of the patella laterally if the medial static stabilizers are or the dynamic stabilizers (VMO) are weak. Balance of the medial and lateral static and dynamic stabilizers is necessary for proper alignment of the patella and for pain-free function.

CONCLUSION

It can be concluded from the present study that Iliotibial band stretching along with conventional physiotherapy helps in reducing pain and improving function in patients with unilateral knee osteoarthritis.

LIMITATIONS OF THE STUDY

Randomization was not done in the present study. Further study with randomization of subjects can be carried out to emphasise the technique.

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