Jurnal Keterapian Fisik
Vol. 9, No. 2, November 2024
https://doi.org/10.37341/jkf.v9i2.447

Original Research

The Effect of Myofascial Release Iliotibial Band on Reducing Pain and Increasing Functional Activity in Knee Osteoarthritis

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ABSTRACT

Background: *Knee osteoarthritis is the most common case suffered by elderly women. The population at high risk of experiencing knee osteoarthritis is women at 18% compared to men at around 9.6% worldwide, older age, excessive body weight, and having had a knee injury or having had previous knee surgery.*

Methods: *The design of this study was a two-group pre-and post-test design. The research compares the effect of the myofascial release of the iliotibial band on reducing pain and increasing functional activity in knee osteoarthritis. The research subjects were all clients who had been diagnosed with osteoarthritis by a doctor.*

Results: *The results of the test for the difference in pain scores with VAS before and after treatment in group 1 showed a value of p = 0.000 or a value of p < 0.05, while the functional ability scores with WOMAC before and after group 1 treatment showed a p-value = 0.000 or a p-value < 0.05, which means that there was an effect of standard therapy on reducing pain and increasing functional activity in osteoarthritis knees in group 1 so that the hypothesis was accepted.*

Conclusion: *There is a difference in effect between standard therapy and standard therapy plus myofascial release of the iliotibial band to increase functional activity in knee osteoarthritis. There is a difference in the effect of standard therapy and standard therapy plus myofascial release iliotibial band on increasing functional activity (p = 0.00) in knee osteoarthritis.*

ARTICLE HISTORY
Received: September 27th, 2024
Accepted: November 28th, 2024

KEYWORDS
functional activity, knee osteoatrhritis, myofascial release iliotibial band, pain;

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Cite this as: Rustiana Kusumawati, Y. ., & Utomo, B. (2024). The Effect of Myofascial Release Iliotibial Band on Reducing Pain and Increasing Functional Activity in Knee Osteoarthritis. *Jurnal Keterapian Fisik*, *9*(2), 66–73. https://doi.org/10.37341/jkf.v9i2.447

INTRODUCTION

Osteoarthritis is a degenerative disease of the knee joint due to the process of abrasion of joint cartilage and the formation of new bone on the surface of the joint, which can cause muscle and tendon weakness, causing pain and impaired movement and function, which results in impaired or decreased functional ability. Another fundamental aspect of the pathological process of osteoarthritis is the reduced lubricating ability of the synovial fluid boundary (Katz, Arant, & Loeser, 2021; Kumar, 2024). The population at high risk of experiencing knee osteoarthritis is women at 18%

compared to men at around 9.6% worldwide, older age, excessive body weight, and having had a knee injury or having had previous knee surgery.

In women, the prevalence increases at menopause. Many studies show that a decrease in oestrogen during menopause can increase a woman's risk of developing knee osteoarthritis (Unuvar, Demirdel, & Gercek, 2024; Webster, K. E., & Hewett, 2022). Knee osteoarthritis is a chronic joint cartilage and periarticular disorder that is very common and is a cause of disability in old age (Yallappa, 2020). Under normal conditions, controlled knee movement, cartilage tissue, which includes the meniscus and hyaline cartilage, plays a role.

This cartilage will eventually wear out. The meniscus protects the bones from touching each other. Together with the meniscus, ligaments also function to protect the joints. Abnormal joints are the cause of osteoarthritis (Bardoloi, Bhutia, Bhatia, & Paul, 2017; Vaidya, 2022). Degeneration in osteoarthritis consists of thinning of the medial cartilage, narrowing of the joint space, and loss of the tibial plateau, resulting in spastic adduction and varus deformity. This process is related to increasing accuracy in the iliotibial band on the lateral side of the knee, causing new inflammation, especially in the lower iliotibial band, which is close to the knee joint.

Another factor is the weakness of the hip abductor muscles, which is believed to cause iliotibial friction syndrome. Clinically, knee osteoarthritis will complain of pain in the lateral part of the knee. This pain will contribute to increased tension in the iliotibial band fascia area or myofascial trigger points (MTrPs). Tenderness in the iliotibial band will spread towards the lateral knee. If the tension in the iliotibial band is not treated, movement pain will occur in the knee (Bardoloi et al., 2017; Batool et al., 2023; Yallappa, 2020).

Myofascial release is a passive stretching technique of the fascia to release tension in the superficial area between the muscle and the fascia. Myofascial release is a type of manipulation that functions to facilitate stretching and increase tissue extensibility (Alouis, Mohamed, & Roshdy, 2023; Bergqvist, 2022; Jung et al., 2017). Pain in knee osteoarthritis results in joint stiffness and loss of functional ability. Pain in the form of a sharp or burning sensation that occurs in the muscles or tendons around the joint.

The pain that appears is intermittent, when the joint is working, and disappears when the joint is at rest. Delivery stiffness usually appears 30 minutes after activity. There are several measuring instruments that describe pain in knee osteoarthritis sufferers. The pain measurement tool used is the Visual Analogue Scale (VAS). The use of VAS to measure the degree of pain is because VAS has been widely used in research and clinical use (Kumar, 2024; Alqahtani, 2024; Rizka Kusumaningsih, Muhammad Hasan, 2015).

Knee osteoarthritis often complains of difficulty in carrying out personal activities independently, such as getting up from sitting, standing, walking, and all activities that involve lying down on the knee joint. There are several measuring tools that describe the functional abilities of knee osteoarthritis sufferers. One of them is the Western Ontario and McMaster Universities Arthritis Index (WOMAC). There are 24 items in the WOMAC index, which are divided into 3 assessment subscales, which consist of assessing pain (5 items), stiffness (2 items), and physical function (17 items). In this study, WOMAC was given at pre- and post-treatment (Hussien, 2024; Riddle & Perera, 2020).

MATERIALS AND METHOD

This research experiment design is a two-group design before and after the test. Standard therapy is transcutaneous electrical stimulation (TENS), shortwave diathermy (SWD), and standard therapy plus myofascial release of the iliotibial band on increasing functional activity. The study compared the effect of myofascial iliotibial band release on reducing pain and increasing functional activity in knee osteoarthritis. This research was conducted from August 2023 to January 2024. The research location used was the Fitasoma Tohudan Independent Physiotherapy Practice, Colomadu, Karanganyar.

The subjects of this study with random sampling were all diagnosed with osteoarthritis by a doctor and met the following inclusion criteria: (1) Knee osteoarthritis grade 1 diagnosed by a doctor, (2) presence of tension in the iliotibial band, and (3) willing to be respondents. Exclusion criteria include (1) subjects with malignant tumors in the knee, (2) subjects with fractures in spasms experiencing knee osteoarthritis, and (3) subjects with open wounds in the iliotibial band area. Criteria for dropping out include (1) the patient does not take part in 3 consecutive or intermittent therapies, (2) knee pain increases beyond the patient's tolerance limit, and (3) does not take part in the post-test.

The measuring tool used to assess pain is VAS, while functional activity is using the WOMAC index. This research was declared appropriate by the Health Research Ethics Commission Faculty of Medicine of University Muhammadiyah Surakarta with ethical clearance letter number 4968/B.2/KEPK-FKUMS/VIII/2023.

RESULTS

The research entitled The Effect of the Myofascial Release Illiotibial Band on Reducing Pain and Increasing Functional Activity in Knee Osteoarthritis was carried out at the Fitasoma Physiotherapy Practice, Colomadu, Karanganyar, in August 2023–January 2024 for 12 times over 4 weeks. This research used total sampling in 30 osteoarthritis patients. The subjects were randomly divided into 2 groups, namely group 1, 15 subjects who received standard therapy, and group 2, 15 subjects who received standard therapy with the addition of a myofascial release illiotibial band.

Table 1. Characteristics of Respondents

Variable		Group 1	Group 2
Gender	Man	2	4
	Woman	13	11
	Total	15	15
Age	Minimal	47	45
	Maximal	74	74
	Average	59.6	63,2
BMI	Not enough	0	4
	Normal	10	8
	Obesity	5	4

The characteristics of the research subjects based on gender in this study were, in group I, there were 2 men (13.3%) and 13 women (86.7%). Group 2 consisted of 4 male people (26.7%) and 11 female people (73.3%). These data show that the subject characteristics based on gender in the two groups are relatively the same.

The characteristics of the research subjects based on age in this panel were that Group I had an average age of 59.6 years; the youngest was 47 years, and the oldest was 74 years. Meanwhile, in group II, the average age was 63.2 years, the youngest was 45 years, and the oldest was 74 years. This shows that the two groups have relatively similar age characteristics.

The distribution of group 1 in the normal weight category was 5 people (50%), and in the obese category there were 5 people (50%). Meanwhile, in group 2 there were 8 people in the thin weight category (40%), 8 people in the normal category (40%), and 4 people in the fat category (20%).

Table 2. Univariate Analysis

	Pain				**Functional Activity**			
	Min	**Max**	**mean**	**Standart deviation**	**Min**	**Max**	**Mean**	**Standart Deviation**
Pre test1	30	74	55,9	13,05	17	78	46,36	17,99
Pre test2	42	75	59,7	9,88	31	67	49,09	11,96
Post test1	30	55	34,3	11,31	13	66	40,64	11,70
Post test2	25	55	41,8	9,31	12	43	22,64	8,28

The condition of the research subjects was obtained from pain measurements before treatment with VAS in group 1. The average VAS value was 55.9, with a standard deviation value of 13.05. Meanwhile, group 2 had a mean pain score of 59.7, with a standard deviation of 9.88. This shows that the VAS scores of the two groups before being given treatment were relatively the same. Assessment of the functional activity of research subjects before being given standard therapy treatment with initial conditions assessed by the functional activity index with WOMAC was that group 1 had a mean of 46.36 with a standard deviation value of 17.99, and group 2 had a mean of 49.09 with a standard deviation value of 11.96.

The final condition of the subjects in both groups after being given treatment 12 times for 4 weeks showed that the VAS pain measurement results in both groups after being given treatment in group 1 had an average pain value of 34.3 with a standard deviation value of 11.31. Meanwhile, in group 2, the VAS mean was 41.8 with a standard deviation value of 9.31. This shows that there was a significant reduction in pain in group 2 compared to group 1. The functional activity value of the research subjects after being treated in group I had a mean of 40.64 with a standard deviation value of 16.70, and group II had a mean of 22.64 with a standard deviation value of 8.28.

Table 3. Difference before and after treatment in the two groups

Group	**Pain**			**Functional Activity**		
	Pre test	**Post testt**	**Difference**	**Pre test**	**Post test**	**Difference**
1	55,9	34,3	21,6	46,36	40,64	5,72
2	59,7	41,8	17,9	49,09	22,64	26,45

The difference in mean values in pain scores before and after treatment in group 1 and group 2. The mean difference in Group 1 was 21.6, while in Group 2 the mean difference was 17.9. This shows that there was a decrease in pain scores in group 2 more than in group 1. The difference between the functional activity scores before and after treatment in group 1 was 5.72, which indicates an increase in functional activity of

5.72, while in group 2 there was an increase in activity. functional was 26.45, which means that the increase in functional activity in group 2 was better than in Group 1.

Table 4. Normality Test

Group	Pain		Functional Activity	
	Pre test	Post test	Pre test	Post test
1	0.912	0.821	0.155	0.248
2	0.757	0.064	0.212	0.659

Testing the normality of pain and functional activity before and after treatment in both groups using the Shapiro-Wilk test resulted in a p-value > 0.05, so it can be concluded that the data is normally distributed (Table 6.8). Thus, the hypothesis test used is a parametric test. Meanwhile, the difference test before and after treatment in one group uses the paired sample t-test, and the test between group 1 and group 2 uses the independent sample t-test.

Table 5. Parametric Prerequisition Test

Pain		Functional Activity	
Lavene's test	Test the difference between 2 groups before treatment	*Lavene's test*	Test the difference between 2 groups before treatment
0.270	0.379	0.074	0.946

The results of the homogeneity of variance test using Levene's test showed that the pain between the two groups was p = 0.270, meaning the p-value was > 0.05. Meanwhile, the results of the functional activity values in the two groups are homogeneous because they have a significance value of 0.74; thus it can be concluded that the data are homogeneous. Testing the homogeneity of the 2 groups before treatment using the independent sample t-test for pain in both groups obtained a significance value of 0.379, and the functional activity value obtained a significance value of 0.946 with a p-value > 0.0. From the prerequisite tests, it can be concluded that the two groups at the start of treatment had equivalent pain and functional activity scores.

Table 6. Paired Sample T-Test Pain Value

Pain	Value p	Information
Pain before and after group 1 treatment	0.000	meaningful
Pain before and after group 2 treatment	0.000	meaningful

The results of the test for the difference in pain scores with VAS before and after treatment in group 1 showed a value of p = 0.000 or a value of p < 0.05, which means that there was an effect of standard therapy on reducing pain in knee osteoarthritis in group 1, so the hypothesis was accepted.

Table 7. Paired Sample T-Test Functional Activity Value

Functional Activity	Value p	Information
Functional Activity before and after group 1 treatment	0.000	meaningful
Functional Activity before and after group 2	0.000	meaningful

Functional Activity	Value p	Information
treatment		

The results of the test for differences in functional ability scores with WOMAC before and after group 1 treatment showed a p-value = 0.000 or a p-value < 0.05, which means that there was an effect of standard therapy on increasing functional activity in osteoarthritis knees in group 1 so that the hypothesis was accepted.

Table 8. Independent Sample T-Test Pain and Functional Activity

	Sig (2-*tailled)*	Information
Pain after treatment groups 1 and 2	0.007	influence
Functional Activity after treatment groups 1 and 2	0.007	influence

The results of the test for different pain scores using VAS before and after treatment in group 1 showed a p-value = 0.000 or a p-value < 0.05, which means there was an effect of standard therapy plus the myofascial release of the iliotibial band on reducing pain in the osteoarthritis knee in group 2, so the hypothesis was accepted. This research (Hussien, 2024) is entitled Adding Deep Front Line Myofascial Release to Exercise Therapy in Knee Osteoarthritis in *The Medical Journal of Cairo University*. There was a significant improvement in VAS, WOMAC, and ROM post-treatment in both groups compared with pretreatment (p > 0.001).

The post-treatment between-group comparison revealed a significant improvement of VAS, WOMAC, and knee flexion ROM of the study group in favor of the control group (p < 0.05). There was no significant difference in extension ROM between groups post-treatment (p > 0.05). Conclusion: Adding the deep line myofascial release to exercises has a superior result than using exercises alone in patients with knee osteoarthritis.

DISCUSSION

In this study, the standard therapy given was short wave diathermy (SWD) and transcutaneous electrical stimulation (TENS), then added with myofascial release of the iliotibial band to reduce pain. The results of the test for difference in pain scores with VAS before and after treatment in group 1 obtained a value of p = 0.000 or a p-value <0.05, which means that there is an effect of standard therapy plus the myofascial release of the illiotibial band on reducing pain in osteoarthritis of the knee in group 2, so the hypothesis is accepted. The results of the VAS value difference test before and after treatment in group II obtained the results of the analysis of the results p = 0.000 (p < 0.005), which means that there is a significant difference.

So it can be concluded that there is a decrease in pain after being given myofascial release of the iliotibial band in patients with knee osteoarthritis. Fawzy Gomaa & Albert Zaky, (2016) examined the effect of myofascial release on the iliotibial band tracts in patients with knee osteoarthritis. The purpose of this study was to determine the relationship between myofascial release on the iliotibial band tract on flexibility changes in patellar alignment in osteoarthritis patients and changes in tenderness threshold. Research design: randomised controlled trial.

The intervention was carried out for 4 weeks with as many as 36 female patients aged 50-59 years. The results of this study show that the exercise program combined with myofascial release techniques has a significant effect on tracts of iliotibial band flexibility, patella straightness, and tenderness threshold in knee osteoarthritis with a p-value <0.005. Standard therapy plus iliotibial band myofascial release to increase functional activity in knee osteoarthritis is consistent with research (Riddle & Perera, 2020) entitled "The WOMAC Functional Scale and Crosstalk From Co-occurring Pain Sites in People With Knee Pain," which states that causal modeling provided evidence of crosstalk in both osteoarthritis.

For example, in osteoarthritis, multiple statistical models demonstrated significant increases in coefficient of determination values ($P < 0.001$) as additional pain areas were added to the models. Crosstalk appears to be a clinically important source of error in the WOMAC scale, particularly for patients with a larger number of painful body regions and when contralateral knee joint pain is more severe. This study has important implications for arthritis research. It should also raise clinician awareness of the threat to score interpretation and the need to consider the extent of pain in other body regions when interpreting WOMAC scores.

The mechanism of effectiveness of the study is that myofascial trigger points will cause tenderness at certain points. The pain will cause the patient to be reluctant to move, resulting in muscle and fascia stiffness. This will lead to a decrease in LGS and activity barriers. Providing soft tissue mobilisation will increase connective tissue hydration and eliminate adhesions so that soft tissue movements, such as muscles and fascia, will return to normal.

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