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Physical Therapy Intervention for Iliotibial Band Syndrome

L. Ade Sintia Devi[1,*], Anak Agung Istri Agung Padmi Swari Dewi[1]

[1]Bachelor and Professional Program of Physical Therapy, College of Medicine, Universitas Udayana, Bali, Indonesia

ABSTRACT

Background: Iliotibial band syndrome (ITBS) is a non-traumatic overuse injury. It is the most common cause of lateral knee pain in runners, with an incidence rate of 22.2% in all lower extremity injuries in runners. The iliotibial band (ITB) is a thick fascia that originates from the iliac crest tubercle, tensor fascia latae, and lateral gluteal muscles. It then passes distally and attaches to the lateral patellar retinaculum, tubercle major, and proximal fibular head. This study aimed to determine the treatment of physiotherapy in cases of iliotibial band syndrome.

Methods: The research methods in this study are literature review or article literature studies. The research was conducted by reviewing several journal articles in Google Scholar, PubMed, NCBI, and Science Direct.

Results: Physiotherapy treatment in cases of iliotibial band syndrome can be in the form of stretching exercises to increase muscle strength, increase passive range of motion, and reduce pain. Exercises can be done by one-leg squats, extending with hip extension, clamshells, and hip abduction. In addition, a physiotherapy modality can be given to athletes with iliotibial band syndrome, namely radial shock wave therapy (RSWT), which increases the diffusion of cytokines in muscle shortening. The provision of manual therapy with the Mulligan method, namely mobilization with movements and independent exercises at home, can improve healing in cases of iliotibial band syndrome. The use of assistive devices, namely foam rollers, can also be used to increase myofascial release, thereby reducing muscle pain.

Conclusion: Based on the results of this study, it is known that there are exercises, physiotherapy modalities, manual therapy, and foam rollers that are effective in helping patients with iliotibial band syndrome cases.

Keywords: iliotibial band syndrome, physical therapy, athlete, rehabilitation.

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***Corresponding Author**: L. Ade Sintia Devi, Bachelor and Professional Program of Physical Therapy, College of Medicine, Universitas Udayana, Bali, Indonesia; Email: sintiadevi512@gmail.com

Introduction

Iliotibial band syndrome (ITBS) is a non-traumatic overuse injury. It is the most common cause of lateral knee pain in runners, with an incidence rate of 22.2% in all lower extremity injuries.[1] The incidence of ITBS by runners reaches 14%. In the ITBS population, the prevalence for women is estimated to be between 16%-50% and for men between 50%-81%. ITBS also occurs in cycling, hockey, swimming, rowing, basketball, tennis, and soccer.

The iliotibial band (ITB) is a thick fascia derived from the tubercle of the iliac crest, the tensor fascia latae, and the lateral gluteal muscles. It then passes distally and attaches to the lateral patellar retinaculum, the greater tubercle, and the proximal fibular head. The ITB also connects to the vastus lateralis muscle. ITB mediolateral movement on knee flexion leads to compression of the underlying adipose tissue rather than the friction of the ITB. This supports the notion that the pathoanatomical injury site is more likely related to the compression of fatty tissue beneath the canal rather than pathological changes from ITBS.[2] The inflammation zone occurs at 30° of knee flexion during the grounding and initial standing phase of running. During this period in the gait cycle, extrinsic contractions of the tensor fascia latae and gluteus maximus muscles cause the foot to slow down, producing tension in the iliotibial.[3]

Several risk factors associated with the occurrence of ITBS include a history of previous injuries, age (<34 years), a tight lateral fascial band (ITB), interval training, use of inappropriate footwear, running surface, high weekly mileage, and lack of recovery, downhill running, leg length inequality, increased knee flexion angle at heel strike, and weakness of the knee extensor, knee flexor, and hip abductor muscles.[1]

ITBS can be treated using conservative methods or surgery, with surgery indicated in refractory cases. Surgical treatment includes excision or removal of the affected distal portion of the ITB to loosen or lengthen it or bursectomy. Surgical intervention should only be considered if long-term

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conservative management is ineffective. Nonsurgical methods or conservative management are preferred and may include a combination of rest, activity modification, pain management, stretching, and strengthening. Conventional therapies used to treat runners with pain include nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids, deep friction massage, and stretching.[1]

Methods

A literature review is the research methodology used in this study. The study examined several journal articles on Google Scholar, PubMed, NCBI, and Science Direct. The journal under investigation emphasizes non-operative treatment, specifically physical therapy, exercise therapy, and strategies for dealing with cases of ITBS. The inclusion criteria: 1) published in English between 2014-2021, 2) reported about ITBS, 3) reported about exercise or home-based exercise for ITBS. The exclusion criteria: 1) the result of the study is not reported, and 2) exercises for ITBS are not reported.

Results

Five publications relevant to ITBS training, physiotherapy modality programs, and the efficiency of employing foam rolling in ITBS cases were chosen based on the results of a literature search using the randomized controlled trial technique published from 2010 to 2022. Janine McKay (2020) performed an 8-week randomized controlled trial in twenty-four female runners aged 19 to 45 by dividing the participants into three treatment groups, including a control group (group A) that underwent a program of stretching, a conventional exercises group (group B), and an experimental hip strengthening exercises group (group C). The composite y-balance test (YBT) and dynamometer (DN) for damaged and uninjured legs, the YBT (injured leg for posterior medial), lower extremity functional scale (LEFS), numeric pain rating scale (NPRS), and the single-limb mini squat (SLMS) all showed statistical significance ($p < 0.05$) within group C. Between group A and group C, statistical significance ($p < 0.05$) was discovered. For the injured/uninjured leg and the LEFS, the stretching group demonstrated statistically significant ($p < 0.05$) YBT anterior reach. Based on the overall reduction in pain, and improvement in strength and function in individuals with chronic ITBS, the study's findings suggest that experimental exercise may be a perfect option.[4]

Kristoffer Weckström (2016) compared radial shockwave therapy (RSWT) and manual therapy (ManT) in a randomized controlled clinical trial study involving 24 runners. Either RSWT or ManT was administered three times per week. At four weeks ($p = 0.796$) and eight weeks ($p = 0.155$) follow-up, there was no significant difference in pain reduction between the two therapies. As a result, both groups report having similar levels of pain reduction during the session ($p = 0.864$). At weeks 4 and 8, the RSWT group reported a pain reduction of 51% ($p = 0.022$) and 75% ($p = 0.004$), respectively. At weeks 4 and 8, the ManT group reported pain reductions of 61% ($p = 0.059$) and 56% ($p = 0.067$), respectively.[2]

In his 2017 study, Konstantinos Zemadanis examined the role of mobilization with movement (MWM) and auto-mobilization in reducing pain and improving functionality in recreational runners with ITBS. Based on this study, the MWM-treatment group's post-intervention NPRS and LEFS scores showed significant improvement ($p < 0.001$). On the contrary, the SHAM-MWM group showed no discernible differences in post-NPRS and LEFS scores ($p > 0.001$). Post-treatment ratings varied significantly between groups ($p < 0.001$).[5]

Another study by Brett Vaughan (2014) examined the pressure pain threshold (PPT) following three minutes of foam roller application on the right ITB of asymptomatic participants. Results showed a statistically significant rise in the PPT at the lower thigh right after treatment ($p < 0.05$).[6]

A recent randomized controlled trial study by Talin M Pepper (2021) investigated the effects of foam rolling, iliotibial complex stretching, and hip adduction passive range of motion (PROM) on ITB stiffness. No major impact or significant interactions were discovered for variability in group outcomes. The average PROM adduction was 0.8 higher post-intervention, suggesting that the hip adduction PROM has not changed significantly in any of the three groups.[7]

Discussion

The results showed that neither hip stretching nor core strengthening over eight weeks did not affect the YBT, DN, LEFS, NPS, and SLMS muscle testing, which may be associated with the short rehabilitation period. However, all three exercise regimens improved clinical outcomes, including pain, function, and strength; the stretching and experimental groups showed the most significant differences. In the experimental group, it showed a significant difference. These results suggest that practical exercises benefit patients with ITBS more than conventional exercises. The decreased gluteus medius strength results in a reduction of stabilization and control. Weakened gluteus medius muscles are known to cause lower extremity dysfunction and injuries, including ITBS. Several exercises activate the gluteus muscles, including single-leg squats, clamshells, and hip abduction lying down. All of the activities mentioned above were included in the experimental research group. This exercise can also activate the gluteus medius, resulting in increased function and strength associated with ITBS.[4]

Stretching exercises on the hip abductor muscles in the extension position with modification changes in the trunk flexion position, namely lateral flexion, and contralateral flexion, affect the ability to increase the range of motion of the hip joint in passive movements, namely 0.80. Stretching exercises can help in cases of ITBS with stiffness in the hip joint.[7]

In addition to providing exercises, modalities like radial shockwave therapy and manual therapy can reduce pain in patients with ITBS. ManT and RSWT have concurrent

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training programs, but also interventions target neuromuscular control, lower leg muscle strength, weight management, running retraining, and other internal and external components. The energy supplied to each RSWT treatment is individual. Intensity is determined using sensation-oriented feedback that the patient feels. Shock wave treatment stimulates soft tissue healing and inhibits nociceptors.[2]

Shockwave therapy enhances the diffusion of cytokines across the vessel wall to the painful area and stimulates the tendon healing response. Abnormal muscle shortening occurs due to increased excessive release of acetylcholine into the neuromuscular junction. Abnormal shortening induces local ischemia, increases shortening metabolism, and causes an energy crisis. Various pain-triggering substances (prostaglandins, bradykinin, substance P, CGRP, K+, serotonin, and histamine, etc.) are secreted due to energy crisis, which ultimately induces local pain by hypersensitization of muscle nociceptors.[8]

As part of the conservative treatment of ITBS, manual therapy has been used as a form of soft tissue mobilization but not as joint mobilization. Administration of manual therapy aims to improve the neuro-physiological by influencing the supraspinal so that pain can be reduced. Manual programs can also increase muscle re-training while running, increasing muscle ability.[2] MWM is one of the primary methods of the Mulligan concept, combining active patient movement simultaneously with passive therapeutic joint mobilization. This technique is relatively easy to implement, which results in immediate symptom improvement after one session.[5]

Foam rolling as a tool for myofascial release can reduce the pain threshold directly after using the device. This effect appears within 5 minutes of the tool usage, but there is no further change after the following 5 minutes. The use of foam rolling to reduce pain in ITBS occurs due to the responsive influence of nociceptors in the muscles compared to the skin. Foam rolling will stretch the muscle fascia, activating a decrease in the antinociceptive system to reduce the tenderness experienced. In contrast, the results are insignificant if foam rolling is used in healthy people without a previous history of ITBS.[6] Implementing foam rolling in people without ITBS symptoms does not affect that person.[7]

Conclusion

Physiotherapy treatment for iliotibial band syndrome can be in the form of stretching exercises, the use of physiotherapy modalities, namely RSWT, manual therapy using the Mulligan mobilization method with movement and independent exercises at home, and the use of assistive devices, namely foam rollers, which can also be used to improve effectiveness, range of motion, reduce pain, and stimulate the activation of the iliotibial band muscle.

Conflict of interest

No conflict of interest in this study.

Funding

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Ethical consideration

Since this literature study employed data from publicly accessible records, institutional ethical approval was not necessary.

Author contributions

While LASD developed the study concept, authored the article, and carried out the literature review, AAIAPSD revised the paper and searched the literature.

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