ORIGINAL ARTICLE

Physical Therapy Journal of Indonesia (*PTJI*) 2023, Volume 4, Number 1: 76-79
E-ISSN : 2722-6034 ; P-ISSN : 2722-0125

The potential of Mulligan mobilization with movement and blood flow restriction training for lateral epicondylitis

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ABSTRACT

Background: One activity that might cause lateral epicondylitis is sports. The symptoms of lateral epicondylitis include pain, a loss of strength, and decreased functional status. To counteract this problem by applying mulligan mobilization with movement and blood flow restriction training. This study aimed to determine the potential of mulligan mobilization with movement and blood flow restriction training to alleviate the problems in lateral epicondylitis. **Methods:** This study uses a literature review by conducting data studies related to mulligan mobilization with movement, blood flow restriction, and lateral epicondylitis. The initial search in 4 databases found a total of 31 articles. After the selection, using inclusion and exclusion criteria obtained, 24 articles. **Results:** Based on some literature shows that mulligan mobilization with movement and blood flow restriction training effectively can engage descending pain inhibitory systems and increase muscle activation for strength and functional status effect. **Conclusion:** Providing mulligan mobilization with movement and blood flow restriction training could ease pain and improve hand grip strength and functional activity that occurs when lateral epicondylitis occurs.

Keywords: blood flow restriction, lateral epicondylitis, mulligan mobilization movement.
Cite this Article: Kamayoga, I.D.G.A., Adyasputri, A.A.I.A.F., Adhitya, I.P.G.S., Prianthara, I.M.D., Widnyana, M., Utama, A.A.G.E.S., Putra, I.P.Y.P. 2023. The potential of Mulligan mobilization with movement and blood flow restriction training for lateral epicondylitis. *Physical Therapy Journal of Indonesia* 4(1): 76-79. DOI: 10.51559/ptji.v4i1.80

INTRODUCTION

Sport is an activity that plays an important role in our lives to keep healthy. However, engaging in sports can lead to musculoskeletal disorders. Soft tissue injuries, such as lateral epicondylitis, can occur during sports involving motions of the upper extremities. Lateral epicondylitis is also referred to as tennis elbow. Lateral epicondylitis was determined chronic symptom of deterioration in the common extensor tendon connection at the humeral epicondyle in the forearm. Sports requiring repetitive forearm movements, such as tennis and badminton, are a common source of this illness.[1]

Lateral epicondylitis was one of the most prevalent overuse symptoms affecting 1% to 3% of the population, which typically affects middle age between 35-50 years and has a peak incidence in this age group. There is no known gender disparity for this ailment.[2] Current research indicates that recreational sports players are more likely than elite players to experience lateral epicondylitis. The probable reason cause could be associated with improper mechanics can lead to greater extensor activity and increased shock impact force to be transmitted from the racket to the elbow joint.[3] Inflammation, physical trauma, age, and repeated wrist flexion or extension are some of the risk factors that might cause lateral epicondylitis. Pain in the lateral epicondyle region, typically near tendon attachments, is a sign of lateral epicondylitis and affects some everyday activities and quality of life. It also reduces the range of motion (ROM) and muscular strength.[4]

The rehabilitation of patients with lateral epicondylitis has been addressed by several conservative physiotherapy treatment approaches. The goals of those treatments were reducing pain, preserving the range of motion, and enhancing the strength of the affected muscles. Physiotherapy treatments that can be carried out in this condition are exercise therapy (resistance exercise and stretching), manual therapies (joint mobilization and massage)[5], and electrophysical modalities (extracorporeal shockwave therapy).[6] A sustained lateral glide to the elbow joint is part of the mulligan mobilization with movement (MVM) technique, a type of manual therapy that also involves accompanying physiological movement. This technique was shown to reduce pain, improve strength muscle, and functional activity.[7]

Moreover, blood flow restriction is also an exercise that can apply in epicondylitis lateral. Blood flow restriction (BFR) training is a strengthening exercise that works by reducing arterial blood flow in the muscles. A tourniquet or pressurized cuff is

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Received : 2023-04-12
Accepted : 2023-05-08
Published : 2023-06-02

placed in the proximal region of the body part being exercised in blood flow restriction. Blood flow restriction with low-intensity exercise is typically easier to tolerate by people with pain.[8] Additionally, there have not been many studies that demonstrate the value of mulligan mobilization with movement and blood flow restriction training, particularly for lateral epicondylitis. Based on this background, this study aims to examine these combination interventions to alleviate the problems in lateral epicondylitis.

METHODS

The method of this study is a literature review. The Google Scholar, PubMed, and Pedro journal databases were used to access the publications for the literature review, which covered the years 2013 through 2023 or the last 10 years. Studies that discussed mulligan mobilization with movement, blood flow restriction, and lateral epicondylitis were included in this study. Moreover, research design such as randomized controlled trials, systemic review, experimental study, meta-analysis, and clinical trial. The studies were excluded if the studies were not relevant to the main subject and did not report the result of the study. A total of 31 items were found in the initial search across 4 databases. The 24 articles were obtained after the selection process utilizing inclusion and exclusion criteria. The selected study was conducted in the flow chart below (Figure 1).

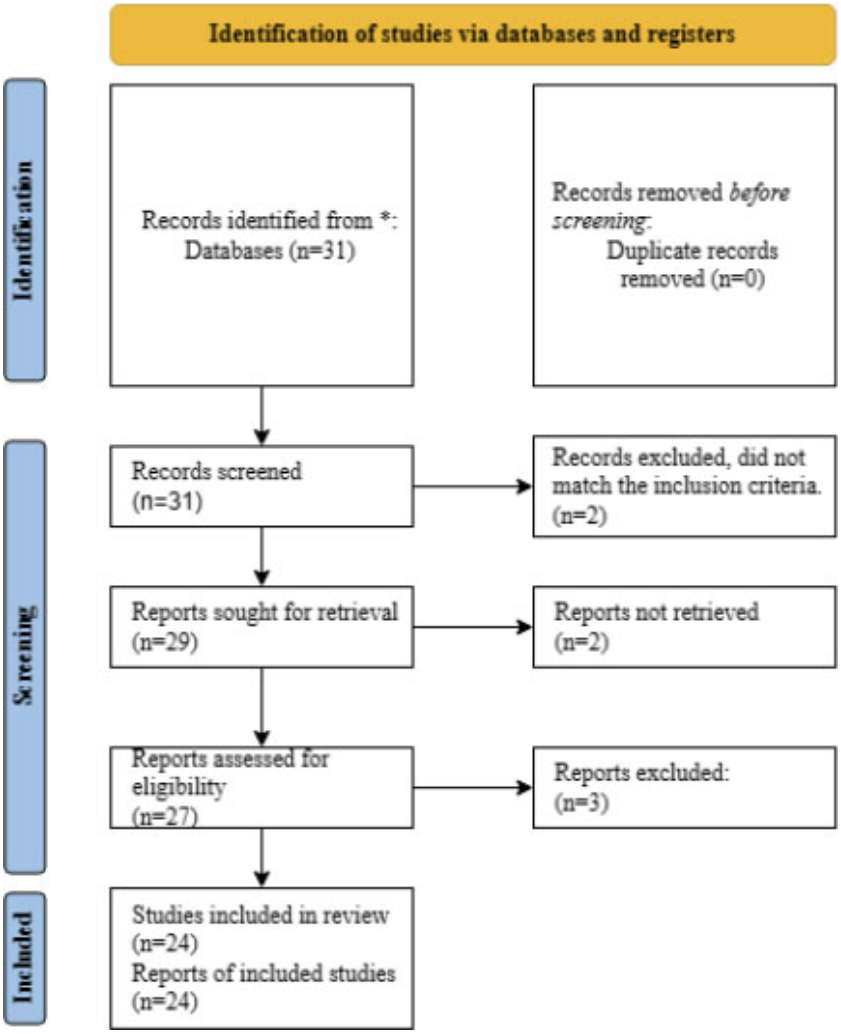

Figure 1. Flow Chart Diagram.

RESULTS

Lateral epicondylitis is one of the most common causes of chronic pain in the upper extremity. The common cause of lateral epicondylitis by mechanical overloading, which leads to abnormal microvascular responses.[3] Overuse and repetitive microtrauma of the wrist flexor and extensor tendons are assumed to be the mechanism for injury of the medial and lateral epicondylitis.[9] Literature studies showed that mobilization with movement for lateral epicondylitis is meant to cause "positional defects" to be realigned. It is poorly understood how manipulation might operate.[10] Furthermore, giving strengthening exercises will reduce pain and reduces tension in tendons.[11]

Mulligan mobilization with movement is carried out with the position of the participant in supine lying with their elbow extended and forearm pronated. The position therapist, while treating the participant, was standing by the side. The belt is positioned close to the elbow joint line, around the subject's forearm and the therapist's shoulder. To mobilize the proximal forearm, the therapist instructed the patient to make a painless fist while using the belt to aid the lateral glide of the pronated forearm. Three sets of 10 mobilizations with the movement were performed in each set.[12]

Blood flood restriction training applying to participants with arterial occlusive pressure (AOP) at 40% on the upper arm, and the load was adjusted with a dumbbell based on a pain-monitoring approach. If the participant reported no pain during or after exercise, the load would be increased by 0.5-1 kg each week.[13] Research showed that providing blood flow restriction training in low load resistance with progressive load for 6 weeks gives a better improvement in pain, function, and self-perceived recovery than without blood flow restriction training.[14]

Giving intervention with mulligan mobilization with movement showed the results after 10 sessions of treatment there was a decrease in pain intensity and functional status. This intervention delivers the sensory input necessary to engage descending

pain inhibitory systems and cause some or all of the pain-relieving effects. Both before and after application, it has hypoalgesic effects in addition to sympathoexcitatory effects.[10] Besides that, lateral epicondylitis causes weakness in the forearm muscles. To overcome this condition, combined with blood flow restriction training is one of the training that can be applied. This is also supported by research that states blood flow restriction training increases muscle activation and changes the energy supply during low intensity. Activation of the muscles was an important factor that contributes to muscle hypertrophy and strength of muscle[15]. The study had risks of bias, such as a small sample size and the transmission of strength from one limb to the other, however, it has previously been noticed that the cross-education impact is weak or nonexistent when both limbs are exercising with separate protocols, and heterogeneity across the included studies may potentially have increased bias.

DISCUSSION

One of the factors that contribute to epicondylitis lateral is excessive stress. Excessive stress also placed upon particular tendons leads to an increase in cross-linkage and unnecessary collagen deposition. When a tendon sustains too many microtears and is unable to repair properly, tendinosis can result from excessive stress, which can also be a potential source of microtears. For tasks that call for more strength and daily activities, we often use our dominant hand. As a result, lateral epicondylitis is more likely to affect our dominant hands.[16]

Tendons have a lower blood supply than muscles do. Tendons may become avascular for unduly long lengths of time when subjected to high tension over an extended period. As a result, this causes reperfusion injury and free radical production, which can impede healing.[17] Applying mulligan mobilization with movement and blood flow restriction training can overcome the problems that arise from lateral epicondylitis.[11,18]

Individuals with lateral epicondylitis, if not treated properly, can cause repeated injuries. The research states that mulligan mobilization with movement can lessen a complaint in the way of pain and enhancement functional activity.[16] Mulligan mobilization with movement on tolerance to repeated applications found that it enhanced pressure pain threshold and pain-free handgrip strength in chronic lateral epicondylitis while initially having hypoalgesic effects comparable to spinal manipulations and concomitant sympathoexcitation.[19]

Research has shown that mulligan mobilization with movement and blood flow restriction training for lateral epicondylitis is effective in reducing pain, increasing grip strength, and functional activity. Mulligan mobilization with movement produces some tactile response accompanied by compressive stimuli to soft tissues, suggesting the process of neurophysiological. These tactile or compressive stimuli may affect the motor neuron and spinal cord neurons that suppress nociperception through their afferent nerve activity. By allowing the patient to engage in repetitive pain-free movements, it may be possible to retrain the spinal cord circuitry.[20]

Lateral epicondylitis can affect decreasing muscle strength that influences certain daily activities. Blood flow restriction training might increase strength and the forearm muscle diameter with a low load intensity. Blood flow restriction training activates group III and IV afferent pathways, which inhibits the alpha motor neuron to allow for the completion of metabolic buildup. Increasing muscle activity and recruiting more muscle fibers are two ways to prevent conduction failure. A higher level of phosphorylation and protein synthesis results in an increase in muscle hypertrophy, which is accompanied by neuronal adaptations and myogenic components.[21]

Research showed the impact of low-load blood flow restriction training on chronic patellar tendinopathy after 3 weeks of treatment demonstrated a 50% decrease in pain scores[22]. After low-load blood flow restriction training, researchers hypothesized that the improvement in the subject's condition was brought on by tissue vascularization and structural changes in the tendons. Besides that, blood flow restriction training can enhance muscle-tendon protein production during the tendon healing process via the rapamycin complex signaling pathway.[23] Subsequently, a faster rate of tendon tissue healing which is linked to the proliferation and migration of tendon stem cells, is increased in hypoxic-conditioned culture media. In order that, blood flow restriction training can cause tissue healing in persons with lateral epicondylitis, which reduces pain, improves handgrip strength and elbow function.[24] The limitation of the study was no RCT studies were documented in order to improve the study's findings and apply them to the population.

CONCLUSION

Providing mulligan mobilization with movement and blood flow restriction training is susceptible to easing pain, improves hand grip strength and functional activity that occurs when lateral

epicondylitis. Combined mulligan mobilization with movement and blood flow restriction training can stimulate tactile or compressive stimuli that may affect the motor neuron and spinal cord neurons and enhance the proliferation and migration of tendon stem cells for the tendon tissue healing process. Future study on exercise regimens to stop the recurrence of lateral epicondylitis is anticipated.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest in this study.

AUTHORS CONTRIBUTIONS

IDGAK, AAIAFA, and IPGSA collected data and prepared the literature; IMDP, MW, AAGESU, and IPYPP conceived the study design, selected the literature, and formatted the article.

ETHICAL CONSIDERATION

This study reviewed the previous literature. Thus, this study does not need to obtain ethical clearance.

FUNDING

None.

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