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Efficacy Muscle Energy Technique for Low Back Pain

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Abstract: *Background: Low back pain is one of the common musculoskeletal disorders. Muscle energy technique (MET) may be a useful intervention for treating such disorder. Objective: The aim of this study was to compare the effectof MET in people with mechanical back pain. Methods: A randomized controlled trial was undertaken. thirty patients with mechanical back pain were randomly allocated to either the MET group or control group. The former group receivedMET pre-post 3 and 6 times, and the latter group MET pre-post 6 and 12 times treatment. Treatment was given once a day for 30 days. A numerical pain rating scale (NPRS) was used to measure the intensity of pain was immediately beforetreatment and again on the 3th, 6th and 12th day. Results: NPRS scores showed no significant improvement in MET 3thand 6hh time and MET groups on the 6th and 12th day post intervention (p <0.05). However, NPRS scores showed betterimprovement in the MET group A as compared to the MET group B (p < 0.015). Conclusion: Muscle energy technique was better in improving pain in people with mechanical back pain.*

Keywords: *Muscle energy technique, Low Back Pain, Manual Therapy*

1. INTRODUCTION

Low back pain (LBP) occurs due to static body position associated with the onset of low back pain. Lower back pain occurs as a result of working more in a sitting position. Low back pain (LBP) is pain referred from the 12th rib margin tothe gluteal fold area either one or both to the lower leg that lasts for at least one day.(1) For a decade, The Global Burdenof Disease reported that the prevalence of chronic LBP had increased by 18.7% every three months, while the prevalenceof patients who had LBP for more than three months had increased by 17.5%.(1) Limited mobility and inability to carry out activities of daily life are the impacts of LBP. So that physiotherapy is recommended to help recovery and reduce disability.(2)

Physiotherapy is a health service that develops, maintains and restores individual / group movement and body function which includes manual physiotherapy, using electrotherapy modalities, and exercise.(3) The application of a manual formof therapy that focuses on reducing pain due to muscle spasm is the muscle energy technique (MET).(4)

Muscle energy technique (MET) is applied to reduce pain and increase joint space. This method is applied to various pathological conditions and asymptomatic subjects.(5) One of the research studies with female subjects aged 30-55 yearswho experienced gluteal pain and followed by a positive freiburg test, with a measuring instrument using the VAS and Lower Extremity Functional Scale (LEFS) with a treatment duration of 10-15 minutes

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per session for 14 sessions for 2 weeks. This study aims to determine the effectiveness of MET versus stetching in patients with piriformis syndrome by administering the short wave diathermy (SWD) modality. In this study, it was revealed that there was a significant difference in which MET administration with SWD was more effective than giving stretching with SWD in subjects withpiriformis syndrome.(6)

2. MATERIALS AND METHODS

Primary data is data collected directly by researchers using the NPRS measuring instrument. Randomly, the sample used was 30 respondents, both male and female, with an age range of 20-70 years. The study design used the exeperimen cohort method during January 2021. The sample population of patients who came to the Physiotherapy Unit. Dr. Soepraeon Hospital Malang was divided into two groups, group A: giving MET intervention before, 3 times and 6 timesphysiotherapy; group B: giving MET before, 6 times and 12 times physiotherapy. This study used a numeric rating pain scale (NPRS) measurement tool before, and after 6 physiotherapy interventions and 12 physiotherapy interventions for 1month. This research is based on a letter of approval from the local ethics commission.

After the data was collected, the data were processed and analyzed using SPSS version 19.00, which was processed using the univariat statistical test to describe the normal distribution of data distribution. This study used the normality test. To see the correlation between the test variables used in this study is bivariate analysis with normal data distributionusing ANOVA test. (7)

Muscle Energy Technique

Muscle Energy Technique (MET) is a manual therapy technique by giving isometric muscle contractions followed bystretching the muscles of the painful area, which aims to improve musculoskeletal function and reduce pain. The patientsleeps on his back in a comfortable and relaxed state, the trunk and hips are in a neutral position. One hand of the physiotherapist is on the knee fossa popllitea and is in full flexion of the knee, and the other hand is on the ankle with theankle dorsi. Then the physiotherapist performs resistance to the patient and the patient is instructed to resist the resistanceof the physiotherapist with 8 counts in 3 repetitions, then stretching is carried out at the end of the detention for 30 secondsthis is expressed in a set

3. RESULT

Table 1. Nilai mean pre, post 6x dan 12 kali intervensi MFRT

	NPRS 1	NPRS 2	NPRS 3	Signifikan
Group A	5.2(±0.79)	4.3(±1.06)	4.1(±1.52)	0,015
Group B	7.2(±0.89)	6.3(±1.36)	5.1(±1.72)	

Table 1 showed that group A and group B had effect on reducing pain after 6 and 12 times of physiotherapy with a Pvalue of 0.015> 0.05

4. DISCUSS

The output data on the provision of intervention showed positive results. Vijayan and colleagues stated that the muscleenergy technique involves isometric contraction of the muscle that is antagonistic to the piriformis muscle. Which causes antagonistic muscle inhibition which causes reduced muscle tone, improves physical performance ability, prevents injury, reduces muscle soreness, and increases flexibility.(6) With MET application, there may be decreased proinflammatory cytokines and desensitization of peripheral nociceptors. Blood and lymphatic flow can also be affected due to rhythmic muscle contractions and there may be changes in interstitial pressure and increased transcapillary blood flow. Tolerance to stretching increased as the individual's pain perception decreased with MET application. When isometric contraction and stretching occur simultaneously, muscle and joint proprioceptors and mechanoreceptors are stimulated more stronglythan by stretching alone. This may reduce the sensation of pain and also create stretching which causes a decrease in muscle spasm.(8) The reduction in pain after static stretching in the mucle energy technique could be due to the golgi tendon organ (GTO) inhibitory effect, which reduces motor nerve release, resulting in relaxation of the musculotendinousunits that reset rest length and modification of pacinian cells. This reflection will allow relaxation of tension in the musculotendinogen units and decrease the perception of pain.(9) The Golgi tendon organ is relatively insensitive to changes in muscle stretching but responds to increased muscle strength. Stretching sensation is measured by two types ofafferents: primary (type Ia) and secondary (type II). There is one type Ia fiber and between zero and five type II fibers per spindle. Type Ia fibers supply all of the intrafusal belly muscle fibers to the equatorial region. Type II fibers terminate atthe polar ends of the spindle. Muscle spindles also act as proprioceptors because the efferent fibers innervate them. Thesemyelinated motor neurons originate from efferents that supply the

extrrafusal muscles. This motor neuron excitation doesnot affect the overall muscle tension but maintains the tension in the muscle spindles to maintain the length of the extrafusal fibers effectively. Finally, spindle afferents actively increase in response to passive stretching Physiologically, stretching into the muscle fibers results in activation of the muscle spindle afferent Ia which projects to the spine and activates efferent α-motor neurons, and subsequently, motor neurons of the homonymous muscle cause intra-fiber contraction. and extrafusal. Simultaneously, type Ia fibers activate interneurons in the spine to inhibit motor neurons α ofthe antagonistic muscle. This circuit is simply described as a "stretch reflex." This pathway is thought to prevent excessivemuscle lengthening and play a role in activities such as bipedal walking and posture.(10)

5. CONCLUSION

Muscle energy technique was better in improving pain in people with 12 times treatment of mechanical back pain.

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