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Effectiveness of combined deep tissue massage and stretching on pain, range of motion, and waist function of non-specific low back pain

Skuteczność połączonego masażu głębokiego tkankowego i rozciągania w leczeniu bólu, zakresu ruchu i funkcji talii przy niespecyficznym bólu dolnej części pleców

Enggista Hendriko Delano[1(A,B,C,D,E,F)], Wara Kushartanti[1(C,D,F)], Novita Intan Arovah[1(B,E,F)], Rina Yuniana[1(B,D,F)], Sabda Hussain As Shafi[1(D,F)], Wahyu Aji Nugroho[1(C,F)], Japhet Ndayisenga[2(D,F)]

[1]Department of Sports Science, Faculty of Sports and Health Sciences, Yogyakarta State University, Indonesia
[2]Institute of Physical Education and Sports, University of Burundi, Burundi

Abstract

The aim of this study was to determine the effectiveness of Deep Tissue Massage combined with stretching (DTMS) on Range of Motion (ROM), and waist function in non-specific cases of Low Back Pain. This research was a pre-experimental study using a pretest and posttest design. The research sample consisted of 21 people with non-specific Low Back Pain injuries taken by purposive sampling technique. The treatment used combined Deep Tissue Massage and stretching exercises. The treatment was carried out once with a duration of 30 minutes. Pain scale measurement used the VAS (Visual Analogue Scale) instrument. ROM used the modified Schober Test and Fingertip to Floor instruments. Measurement of waist function used the ODI (Oswestry Disability Index) instrument. The data analysis technique used was the Paired t-test. The results showed that Deep Tissue Massage combined with stretching reduced pain, significantly increased ROM and waist function ($p<0.05$). The conclusion of this study was that Deep Tissue Massage and stretching can reduce pain, increase ROM, and improve waist function so that it can be applied to patients with non-specific low back pain.

Keywords

deep tissue massage, stretching, pain, ROM, waist function, non-specific low back pain

Streszczenie

Celem tego badania było określenie skuteczności masażu głębokiego tkankowego połączonego z rozciąganiem (DTMS) w zakresie ruchu (ROM), oraz funkcji talii w przypadkach niespecyficznego bólu dolnej części pleców. Badanie to miało charakter przedeksperymentalny i wykorzystywało projekt przedtestu i potestu. Próbka badawcza składała się z 21 osób z niespecyficznymi urazami dolnej części pleców, wybranych techniką celowego doboru. Zastosowano łączony masaż głębokiego tkankowego oraz ćwiczenia rozciągające. Zabieg przeprowadzano raz, trwając 30 minut. Pomiar skali bólu wykorzystywał narzędzie VAS (Wizualna Skala Analogowa). ROM mierzono przy użyciu zmodyfikowanego testu Schobera i narzędzia Fingertip to Floor. Pomiar funkcji talii używał narzędzia ODI (Indeks Niepełnosprawności Oswestry). Technika analizy danych opierała się na teście t sparowanym. Wyniki pokazały, że masaż głębokiego tkankowego połączony z rozciąganiem zmniejszał ból, znacząco zwiększał ROM i funkcję talii ($p<0.05$). Wnioskiem z tego badania było, że masaż głębokiego tkankowego i rozciąganie mogą zmniejszać ból, zwiększać ROM i poprawiać funkcję talii, więc mogą być stosowane u pacjentów z niespecyficznym bólem dolnej części pleców.

Słowa kluczowe

masaż głęboki tkankowy, rozciąganie, ból, ROM, funkcja talii, niespecyficzny ból dolnej części pleców

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Introduction

Low Back Pain (LBP) is an abnormal condition in the lower back which is accompanied by a painful sensation so that it experiences limitations in movement. Low Back Pain can be caused by trauma, overuse, and incorrect working position. The factors that trigger the occurrence of Low Back Pain, namely internal and external factors. Internal factors include gender, age, physical fitness, health status, and body composition. While external factors include working time, work attitude, and repetitive movements. The cases of Low Back Pain are often caused by non-ergonomic positions at work.

The opinion that the cause of low back pain comes from nonspecific factors, radicular syndrome, and specific factors is widely held. Nonspecific factors, namely the presence of abnormalities in the soft tissue in the form of muscle injuries, ligaments, spasms, or muscle fatigue. Radicular syndrome is pain caused by abnormalities in the nerves. While specific factors result from vertebral fractures, infections, and tumors. Based on some of these opinions, it can be understood that when carrying out activities at work there is a risk of incurring Low Back Pain injury.

Low back pain is a case of musculoskeletal injury that is often experienced by the community, especially by workers. WHO data show that in industrialized countries 2-5% of workers experience Low Back Pain each year. Cases in Indonesia reach a percentage of 7.6-37% and the age group that often experiences Low Back Pain injuries is the age range of 20-40 years. Observations made at the HSC FIK UNY manipulative and rehabilitative therapy clinic from June 2021-January 2022, showed that the total number of patients treated was 2,185. A total of 265 or (12.13%) patients complained of injuries to the lower back. Based on the data above, it can be concluded that Low Back Pain injuries often occur and are felt as a serious health problem that can interfere with work productivity.

Disorders felt by sufferers of Low Back Pain are pain in the lumbar area, stiffness in the back muscles, decreased ROM, and reduced strength of the driving muscles in the back. The appearance of complex disorders in sufferers of Low Back Pain is what will cause a decrease in work productivity. If this problem cannot be resolved, it will also affect industrial productivity so that it can hamper economic growth. Therefore, proper management and treatment are needed to prevent and heal Low Back Pain injuries.

Handling and treatment of Low Back Pain injuries can be done by pharmacological and non-pharmacological methods. Pharmacological treatment can be done by consuming NSAID (Non-Steroidal Anti-Inflammatory Drugs), muscle relaxants, opioids, and antidepressant drugs. The use of drugs for a long time can cause side effects so that many people choose alternative treatments in the form of non-pharmacological treatments such as massage therapy and exercise therapy.

Massage is a therapeutic method that has been extensively researched for the recovery of various types of injuries, one of which is Deep Tissue Massage. This type of massage puts deep pressure on the muscle fibers that are experiencing tension so that the muscles relax again. In addition, many people also use stretching exercise therapy as an effort to reduce muscle tension. Both massage therapy and stretching have been widely studied for their usefulness. However, the application of this type of therapy is still carried out individually. Therefore, researchers want to know the effectiveness of Deep Tissue Massage combined with stretching on pain, ROM, and low back function in non-specific cases of Low Back Pain.

Materials and methods

Study design

This research is a pre-experimental study using a pretest-posttest design. This study used one sample group without using a control group. In this study, an initial test was carried out before treatment to obtain pretest data and measurements were carried out again after treatment to obtain posttest data.

Participants

The sample used in this study was 21 people with the incidental sampling method. This study used a purposive sampling technique, namely determining the sample with certain considerations based on inclusion and exclusion criteria. Patients with non-specific Low Back Pain, willing to respond, male sex, aged 20-60 years, and feel pain in the lower back occurring in the acute, subacute, and chronic phases. While the exclusion criteria included fractures, open wounds, a history of kidney disease, tumors, pancreatitis, and peptic ulcer.

Measurements

The variables to be measured are pain, ROM, and low back function. The measuring instrument used in this study was the VAS (Visual Analogue Scale) to measure pain. The scale uses the range 0-100. VAS has a validity value of r = 0.941 and reliability ICC = 0.97 [11]. Flexion and extension ROM measurements used the Modified-modified Schober Test, which has a product-moment correlation test-retest coefficient of 0.78-0.89 for flexion and 0.69-0.91 for extension. The flexion reliability coefficient value is 0.72, and the extension is 0.76, making it valid and reliable for the measurement process [12]. ROM measurement of right side flexion and left side flexion uses Fingertip to Floor, which has a validity value of r = 0.96 and ICC reliability = 0.99, making it valid and reliable to use for data retrieval [13]. Measurement of function used the ODI questionnaire (Oswestry Disability Index), which has a value of r = 0.947 and Cronbach's alpha 0.877, making it valid and reliable for data collection [14].

Procedures

The treatment applied in this study was Deep Tissue Massage and stretching. The treatment used stroking techniques in depth following the direction of the loin muscle fibers, buttock muscles, and thigh muscles, then followed by stretching movements. Deep Tissue Massage and stretching treatment were carried out once for 30 minutes. All respondents had signed a willingness to be a research sample, so they agreed to be treated.

Statistical analyses

Data processing used the SPSS data processing application version 25. The normality test is one of the prerequisite tests in

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data analysis. The normality test aims to determine whether the data are normally distributed or not. The normality test is important to determine the next calculation process. Before carrying out the different data test, it is necessary to analyze whether the data are normally distributed or not. If in the normality test the data are normally distributed, the calculation uses parametric calculations. If the data are not normally distributed, the calculation uses non-parametric. Data is said to be normally distributed if the p-value > 0.05, and if the p-value < 0.05, then the data are not normally distributed. The different test analysis uses the Paired t-test with a different test significance level of 0.05. The t-test will produce t-values and probability values (p), which can be used to prove whether or not there is a significant difference between pretest and posttest at a level of 5%. How to see the significant level by looking at the p-value. If $p < 0.05$, then there is a significant difference; if $p > 0.05$, then there is no significant difference.

Results

The results of the study will present sequentially the normality test results for Deep Tissue Massage combination stretching data, hypothesis test results, and effectiveness results of Deep Tissue Massage combination stretching treatment. The indicators to be measured were pain, flexion ROM, extension ROM, right side flexion ROM, and left side flexion ROM functions. The following are the results of the normality test for Deep Tissue Massage combination stretching data.

Table 1. Data normality test results Deep Tissue Massage combination stretching

Data	Sig.	Information
Pain	0.641	Normal
Flexion	0.343	Normal
Extension	0.424	Normal
Side Flex right	0.784	Normal
Side Flex Left	0.124	Normal
24-hour function	0.606	Normal
48-hour function	0.432	Normal
72-hour function	0.459	Normal

Table 1 shows the results of the normality test on the difference between the pretest and posttest data for the combination treatment of Deep Tissue Massage and stretching, which shows that the significance value of all data is $p > 0.05$. Thus, it can be concluded that all data are normally distributed. If the data are normally distributed, the statistical test used is parametric. Once the distribution of the data is known, then a hypothesis test can be carried out using the paired t-test.

Table 2. Hypothesis test results for the Deep Tissue Massage combination stretching treatment

Indicators	Analysis	Sig.	Information
Pain	Paired t test	0.000	Significant
Flexion	Paired t test	0.000	Significant
Extension	Paired t test	0.000	Significant
Side Flex right	Paired t test	0.000	Significant
Side Flex Left	Paired t test	0.001	Significant
24-hour function	Paired t test	0.000	Significant
48-hour function	Paired t test	0.000	Significant
72-hour function	Paired t test	0.000	Significant

Table 2 shows the results of the paired t-test for all indicators showing a significance value of $p < 0.05$. It can be concluded that there is a significant difference between the pretest and posttest data for each indicator. Thus it can be concluded that Deep Tissue Massage combined with stretching is effective in reducing pain, increasing ROM and waist function in non-specific cases of Low Back Pain.

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Table 3. Effectiveness results Deep Tissue Massage combination stretching treatment

Indicators	Mean Pretest	Mean Posttest	Difference	Effectiveness (%)
Pain	63.43	34.95	28.48	44.89
Flexion	5.74	6.47	0.73	12.71
Extension	3.33	4.39	1.06	31.83
Side Flex right	43.11	39.37	3.74	8.67
Side Flex Left	42.11	39.37	2.74	6.50
24-hour function	57.10	45.30	11.8	20.66
48-hour function	57.10	37.50	19.6	34.32
72-hour function	57.10	32.20	24.9	43.61

Table 3 shows the level of effectiveness of the deep tissue massage and stretching combination for each indicator. The highest effectiveness of this treatment can be seen in the pain indicator, which has an effectiveness level of 44.89%. Seventy-two hours after the treatment, the effectiveness is 43.61%. While ROM has the lowest effectiveness value compared to pain and function.

Discussion

Low Back Pain is the pain felt by the patient in the lower back, located in the area below the costal margin and above the inferior gluteal [15]. This injury can be caused by overuse or prolonged static movement. This can cause abnormalities in the muscles, ligaments, and tendons around the waist. In cases of Low Back Pain injuries, muscle spasms are found, causing pain when moving or standing still [16]. This condition is accompanied by stiff muscles, so that joint flexibility decreases. The two conditions above will cause a decrease in function in daily activities.

Giving therapy to Low Back Pain is a form of effort to help heal sufferers of Low Back Pain injuries. The therapy aims to relieve pain, reduce muscle spasms, which increase flexibility, and improve work function. Therapy that can be done in a non-pharmacological way is in the form of massage therapy and exercise. The recommended therapy in this study is Deep Tissue Massage therapy in combination with stretching.

Deep Tissue Massage therapy treatment is done slowly and with deep pressure. Deep Tissue Massage is a type of massage therapy that focuses on deep tissue in various layers of the body, especially muscles, fascia, and connective tissue [17]. This can provide a pain relief effect which is explained based on the gate control theory. Receptors that are stimulated during the massage treatment will send signals faster than the pain experienced so that the pain will be disguised [18]. Deep Tissue Massage can also be combined with stretching to increase flexibility in muscles and joints. Physiological stretching exercises will increase blood circulation so that more oxygen will be supplied to the cells [19]. So stretching can be combined with massage in order to obtain maximum healing results in Low Back Pain injuries. The combination of massage therapy and stretching movements will give a better muscle relaxation effect than just giving massage therapy alone [20].

Conclusion

The conclusion obtained from a series of studies that have been conducted is that Deep Tissue Massage in combination with stretching (DTMS) is effective in reducing pain, increasing Range of Motion (ROM), and improving the functional waist in non-specific cases of Low Back Pain. This study has limitations, namely the responders used are Low Back Pain sufferers in all phases of acute, subacute, and chronic, so further research is needed to find out the effective treatment in different phases of LBP.

Adres do korespondencji / Corresponding author

Enggista Hendriko Delano

E-mail: enggistahendriko.2022@student.uny.ac.id

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