A COMPARISON OF SWEDISH MASSAGE AND ACTIVE STATIC STRETCHING ON MUSCLE PAIN AND STRESS IN THE STUDENTS OF THAILAND NATIONAL SPORTS UNIVERSITY SISAKET CAMPUS

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Abstract

This study aims to comparison of Swedish massage and active static stretching on muscle pain and stress among the Swedish massage groups, together with great stretching with the group receiving only Swedish massage and the group who received outstanding Static stretching only before and after the experiment.

Methods: 30 volunteers with neck, shoulder, and lower back pain were placed into three randomized trial groups of 10 each. The first group of volunteers was provided rehabilitation using a Swedish massage program. combined with static stretching, the second group was provided rehabilitation with the Swedish massage program only and the third group was provided rehabilitation with the Static stretching program alone. The pain level was assessed with the visual analog scale; VAS and the stress level was assessed with the Suanprung Stress Test - 20 (SPST-20).

Results: In terms of pain, it was found that the pain level between experimental group 1, experimental group 2, and experimental group 3. After the experiment, there was no statistically significant difference at the .05 level. and stress found between experimental group 1, experimental group 2, and experimental group 3. After the experiment, there was no statistically significant difference at the .05 level. This study found that all 3 methods can reduce pain immediately after rehabilitation.

Keywords: Swedish Massage, Static Stretching, Muscle Pain, Stress

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Introduction

Neck and shoulder pain are common in people of all ages and genders. It was found that there was a prevalence of 30-35% and about 2-11% had symptoms so severe that they had to stop working. or stop doing that activity (Phithaksilp, 2016) From a survey of myalgia data using VAS assessment among students at Thailand National Sports University, Faculty of Sports and Health Science, Academic Year 2021, it was found that of 60 students 45% of then had muscle pain in the neck 30% had muscle pain in the shoulder area 20% had muscle pain in the lower back and 5% had pain in other areas. The students also had stress from studying. It was found that the current online method of learning where students have to sit and study for more than 4-8 hours a day, results in pain in the muscles around the neck, shoulders, and back. Among people who work repetitively or sit in the same position for a long time, especially those who use computers, phones or tablets in classes or working often have health problems related to disorders of the skeletal system and muscles. (Musculoskeletal disorders: MSDs) (Rittideah, 2018). From past studies, it was found that methods for preventing and treating muscle aches and pains from the practice of repetitive activities, include stretching, self-exercise, universal massage and anti-inflammatory drugs. (nonsteroidal; NSAIDs), ultrasound, heat, and cold (Arayasompho, 2019).

Massage is another method that can be used to treat muscle pain. There are many types of massage such as Thai massage, Swedish massage, sports massage, and body massage, each of which has different techniques, including stroking, pressing, shaking, rolling, and squeezing. (Sritoomma et al., 2014). Receiving massage helps to increase blood circulation, reduce muscle tension, reduce pain, and help the body relax. (Tantilipikorn, 2020). In Swedish massage the palms of both hands are placed against the skin in the area to be massaged. As a result, pain or muscle injury is reduced, blood flow is increased, the angle of movement, is increased and it can help relieve stress. In addition to the message stretching can be used to treat muscle pain. (Yaruang, 2016; Tantilipikorn, 2020).

Stretching is one of the most effective ways to increase the ability of muscles and joints to perform their full range of motion. (Boonsom, 2017) Stretching is one way to warm up and cool down. Stretching can used for reducing muscle spasms and Increasing blood circulation, resulting in a pain-relieving effect. Ylinen et al. (2009) stated that stretching can increase flexibility. Stretching results in the following physiological changes: Muscles become very flexible and able to contract efficiently and relax quickly. The efficiency of transporting oxygen to muscles and other organs increases, nerve signaling and metabolic processes in muscles increases, blood flow in the muscles increases. The strength, power and speed of the muscles increases while moving. The chance of injury and overuse of the muscles is reduced. Muscle flexibility is increased as well as the ability to tensile and stretch. It reduces the risk of muscle injury in tendons and joints.

Therefore, Swedish massage and persistent stretching are options to treat muscle pain in the neck, shoulders and lower back. Swedish massage can reduce muscle pain and help relieve stress. Muscle stretching can reduce pain, reduce muscle tension, and can help relieve stress. Past studies have not found a definite answer about massage combined with stretching. The authors were interested in comparing the effects of Swedish massage combined with persistent stretching on the neck, shoulder, lower back pain and stress in the students of Thailand National Sports University Sisaket Campus. By comparing a 20 minute, 3 days per week program of Swedish massage with static stretching program it was Swedish massage and a program of only static stretching,

of only investigated which method helped to reduce pain in the neck, shoulders and lower back for those who had pain from sitting at work or studying online during the COVID-19 virus epidemic do so they could do their daily activities more effectively.

Objective

1. To study the effects of Swedish massage combined with static stretching, the Swedish massage method alone. and how static stretching alone has an effect on pain and stress within the group before and after the experiment.

2. To compare the effects of pain. and stress between the groups receiving Swedish massages combined with static stretching with the group receiving only Swedish massages and the group that received only static stretching before and after the experiment.

Methodology

This study was approved in advance by Thailand National Sports University Ethics Committee for research involving human subjects, Approval number SCI 032/2565. The sample size was determined using data from a research study entitled, Comparison of therapeutic effects between physical program with Ketoprofen gel and Diclofenac gel with low back pain syndrome on acute herniated nucleus pulposus patients: a randomized controlled trial. (Longlalerng, 2019). This study taken to calculate the effect size equal to 0.8, the level of confident 0.05

Population and Sample

Thirty male students in the Faculty of Sports and Health Science, Thailand National Sports University Sisaket Campus, aged between 18-25 years, were randomized into three groups by simple random sampling. The groups include the Swedish massage and Active Static Stretching therapy group (10 persons), Swedish massage therapy group (10 persons) and the static stretching therapy group (10 persons). In this research, data were collected at the laboratory of Thailand National Sports University Sisaket Campus. The sampling was applied using value of pain value (VAS) and Suanprung Stress Test -20 (SPST-20). In addition, samples were randomly entered into the research by sampling with the following criteria for selection of research participants: volunteers voluntarily participated in the experiment by signing the consent form to participate in the research project. Volunteers should experience neck, shoulder, and lower back pain. The pain was measured using visual analog scales: where VAS at a level of 4-6 is considered moderate pain. They should have no underlying disease or chronic skin disease, inflammation, or osteoporosis which can pose an obstacle to the Swedish massage and stretching program. Volunteers must have been vaccinated against the COVID-19 virus for at least 2 doses and were not infected with COVID-19 prior to inclusion for at least 2 weeks before the experiment.

Procedure and protocol

The Swedish massage with Active Static Stretching therapy group will perform 6 massage techniques for a total of 30 minutes (15 minutes of massage and 15 minutes of stretching). The Swedish massage only therapy group will perform the for massage 30 minutes. The Active Static Stretching only therapy group will perform the

stretching 30 minutes for 3 times a week, every other day. The pain level and the stress of the samples will be tested before the experiment and again after 6 weeks of the experiment. Results are displayed in the form of mean and standard deviation, and statistics are tested at the significance level of 0.05 using statistical tests. Nonparametric statistics will be also be allected by analyzing differences between groups as well using Kruskal-Wallis test and Mann-Whitney U tests. For differences within groups, Friedman test and Wilcoxon's signed ranks tests were used. Sample were analyzed by SPSS Version 19 program with statistical significance set at $p < 0.05$.

TABLE 1. Physical characteristics of participants who performed Swedish massage and Active Static Stretching therapy group (Group 1), Swedish massage therapy group (Group 2) and Static Stretching therapy group (Group 3).

Sample	Age (yr)		Weight (kg)		Height (cm)	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Group 1 (n=10)	21.36	1.60	69.48	9.21	172.36	5.75
Group 2 (n=10)	21.64	1.75	68.28	9.49	173.80	5.70
Group 3 (n=10)	21.42	1.72	68.31	9.32	172.44	5.72

Note: Group 1: Swedish massage and Active Static Stretching therapy group; Group 2: Swedish massage therapy group; Group 3: Stretching therapy group.

TABLE 2. Comparison of averages and standard deviation of muscle pain within experimental Group 1, Group 2 and Group 3.

VAS (Pain) Group 1				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	4.80	1.251	-2.816*	.005
Post-test	0.40	0.516		
Pain Group 2				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	4.70	1.229	-2.825*	.005
Post-test	0.60	0.516		

Pain Group 3				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	4.90	1.286	-2.820*	.005
Post-test	0.50	0.527		

Note: *Significant difference at p-value < 0.05

TABLE 3. comparison of the average and the standard deviation of VAS after the experiment between Group 1, Group 2, and Group 3

Pain (VAS)				
Sample	$\bar{x}$	**S.D.**	**F**	**P**
Group 1	0.40	0.516		
Group 2	0.60	0.516	0.370	0.694
Group 3	0.50	0.527		

TABLE 4. Comparison of averages and standard deviation of Stress Within experimental Group 1, Group 2 and Group 3.

Stress group 1				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	23.5	0.534	-3.051*	.002
Post-test	0.60	0.516		
Stress group 2				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	23.6	0.524	-2.972*	.003
Post-test	0.40	0.516		
Stress group 3				
Sample	$\bar{x}$	S.D.	Z	P
Pre-test	23.4	0.512	-3.051*	.002
Post-test	0.50	0.527		

Note: *Significant difference at p-value < 0.05

TABLE 5. Comparison of the average and the standard deviation of Stress after the experiment between Group 1, Group 2, and Group 3.

	Stress (SPST-20)			
Sample	$\bar{x}$	**S.D.**	**F**	**P**
Group1	0.60	0.516		
Group2	0.40	0.516	0.370	0.694
Group3	0.50	0.527		

Result

All three rehabilitation methods can effectively reduce pain and stress immediately after treatment.

Discussions

All three rehabilitation methods can effectively reduce pain immediately after treatment., there was no statistically significant difference at the .05 level. The 1st experimental group had a tendency to reduce pain more because Swedish massage combined with residual stretching has an effect on the musculoskeletal system which is comprised of muscles, tendons, fascia, sensory and motor nerves, and may include sensory nerve endings. The proper contraction of the muscles is beneficial to the body. Massaging hard and for more than half an hour will cause the muscles to relax and tighten, so it is suitable for muscle recovery. It also increases blood and lymph circulation, resulting in better waste excretion (Jun-Ho, H., Min-Jeong, K., Hyuk-Jin, Y., Yu-Jin, L., Yun-Hee, S. 2020). In addition, massage has a stimulating effect on blood and lymph circulation causing changes in blood pressure and lymphatic vessels. Rubbing massage, affects the blood and lymph circulation at the level of the skin and soft tissues under the skin. Massaging pressure or rubbing on the skin has the effect of improving the blood supply to the skin and giving it a pale pink color. In Caucasians, we call this condition hyperemia. This is because the skin tissue secretes histamine, which stimulates the blood capillaries in the skin to expand. Deep-pressure massage has the same effect at a deeper level. In addition, increased blood flow may be a result of stimulation of the sympathetic nervous system. Better excretion of substances or residual wastes Reduces inflammation or swelling and can reduce pain. This is because the blood contains fibrin and platelets, which help in the repair of injured tissues. When massage affects the circulatory system and lymphatic systems, it stimulates the healing process of injured or inflamed tissues. The effects of deep massage on the circulatory system may persist for up to 45 minutes (Kaye et al. 2008). When massage is used in conjunction with the patient's residual stretching or the test subject stretches by himself, the exertion and feeling of tightness from stretching will be moderate. The stretcher will feel the appropriate force by himself, which makes the muscles not sore too much Stretching is another way to move lactic acid out of the muscles to reduce muscle pain and also results in the body returning to normal faster (Krabuanrat, 2009). In addition, good stretching allows the stretched ligaments and muscle fibers to be longer and wider than normal, thus helping to prevent the tearing of the muscle fibers. This will help reduce injury. Usually, we will stretch the muscles in the warm-up and cool down. Stretching can be done in many ways depending on objective, ability, and training conditions. (Boonsom, 2017) In addition, stretching affects physiological changes,

including Increases in muscle temperature and core temperature of the body, and increases metabolism. Enhances Cardiovascular Function and Improves Physical Performance (Bishop, 2003). It also has the effect of increasing oxygen delivery to muscles, vasodilation (Hellsten, Y., Nyberg, M., Jensen, L. G., & Mortensen, S. P. 2012), enzymatic reactions to energy production, and range of motion. (Tibodeau and Patton, 2020) Increases nerve conduction rate (Bishop, 2003). Increases the speed of contraction and relaxation of the muscles, which increases the temperature within the muscle fibers resulting in an increase in the metabolism within the muscle cells, increases the rate of blood flow, and reduces the viscosity of the muscles, causing The coordination of muscles and nerves between muscles and groups is smooth and correct (Pearson, 1992).

In terms of stress, All three rehabilitation methods can effectively reduce stress immediately after treatment, there was no statistically significant difference at the .05 level, Swedish massage has a significant impact on the nervous system, which encompasses the brain, spinal cord, nerves, and sensory receptors. It also influences the autonomic nervous system, which plays a crucial role in maintaining bodily balance. (Tiffany J. Field, et al.) Prolonged exposure to stress can significantly disrupt the digestive system and bowel movements, leading to a range of issues such as bloating, indigestion, constipation, and abdominal cramps caused by excessive contraction of the stomach muscles. Swedish massage, with its ability to induce relaxation through the autonomic nervous system, can effectively restore balance and promote normal bodily functions. Warming up sets the stage for mental focus and concentration by gradually increasing blood flow to the brain. This enhanced blood supply delivers more oxygen and nutrients to the brain cells, promoting alertness, cognitive function, and decision-making abilities. A well-designed warm-up can incorporate elements that mimic the actual competition environment, such as game sounds, simulated pressure situations, and even interactions with teammates or opponents. This exposure helps athletes mentally adapt to the competitive atmosphere and reduce anxiety or distractions during the actual event. Consistent with Duangduen Rittidech (2018), who stated that stress from prolonged work and mental health problems can be prevented by modifying work behaviors and postures, such as arranging work desks and adjusting sitting positions appropriately. This includes using chairs with backs and adjusting the height to match the desk, adjusting the computer screen height to eye level, adjusting the use of computer keyboards and mice, and maintaining proper posture, such as avoiding hunching over or crossing legs. Additionally, it is important to modify movement behaviors or work activities as appropriate, such as taking breaks from work at intervals to relax muscles and move the body to increase blood flow. Regular exercise or stretching is also recommended to improve muscle strength and flexibility.

Comparison of Pain and Stress Effects Between Groups Receiving Swedish Massage with Passive Stretching, Swedish Massage Only, and Passive Stretching Only After Exercise Found that, Group that uses Swedish massage methods combined with static stretching (Experimental Group 1) The group that used the Swedish massage method only. (Experimental Group 2) and the group that used only muscle stretching methods. (Experimental Group 3) After the experiment there was no statistically significant difference at the .05 level. The Experimental Group 1 had a greater tendency for pain to decrease due to Swedish massage combined with static stretching has an effect on The muscular system consists of muscles, ligaments, fascia, sensory and motor nerves, and may include sensory receptors at nerve endings. (Proprioceptors), Proper muscle contraction is beneficial to the body. By massaging vigorously and for more than half an hour, it will cause the muscles to relax and tense,

making it suitable for use in muscle rehabilitation. and relax the muscles It also increases blood and lymph circulation. Resulting in better waste excretion (Han et al. 2014). And when massage is used in conjunction with static muscle stretching, which the patient or the subject performs the stretching on his own. The exertion and feeling of tension from stretching will be appropriate. The stretcher will be able to feel the appropriate force by himself. This causes the muscles to not be too sore. And stretching is another way to move lactic acid out of the muscles. Reduces muscle pain It also results in the body returning to normal faster (Charoen Kwanrat, 2007, Wattana Chalayondecha, 2009). In terms of stress from the study it was found that Stress levels between Experimental Group 1, Experimental Group 2, and Experimental Group 3 After the experiment, there was no statistically significant difference at the .05 level, with Experimental Group 2 having a tendency for stress to decrease more. This may be because Group that uses Swedish massage methods combined with static stretching (Experimental Group 1) and the group that used only muscle stretching methods. (Experimental Group 3) had static muscle stretching, which is a rehabilitation therapy that the subjects had to perform on their own. This may be the reason. The group that only used the Swedish massage method had slightly greater reductions in stress levels. Because you don't have to exert effort. or try to recover on your own Stretching also caused subjects' heart rates to increase more than Swedish massage alone. This is consistent with Bunsom N., (2017), who said that stretching muscles It is one of the ways to warm up and cool down. This is a simple method that is commonly used to increase muscle flexibility and range of motion in joints. By stretching the muscles continuously. It is a method of stretching muscles that is easy to do. It will have a beneficial effect on reducing muscle spasms. increase blood circulation Makes it effective in reducing pain.

Recommendation

1. The design of rehabilitation programs should be increased to include more diversity.
2. Increase the range of pain assessments. To see better treatment results

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