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The Effectiveness of Thai Massage on the Range of Motion and Muscular Strength of the Arm in Collegiate Basketball Players, Mae Fah Luang University

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ABSTRACT

Introduction: Basketball is a fast pace sport, where the players are required to move quickly, catch and shoot the ball. Basketball players have been developed various techniques using upper limbs such as shooting, throwing, passing, and dribbling. In addition to exercise training for high level of physical fitness, sports massage with stimulating technique is also using for the short-term effectiveness.

Objective: The purpose of this study was to determine the effectiveness of Thai massage on the range of motion (ROM) of the right shoulder and muscular strength of the right arm in the collegiate basketball players.

Methods: Twenty subjects, aged from 19 to 24 years old, were equally randomized into two groups: Thai massage group was treated with Thai Massage program and control group was treated with Swedish massage program for 10 minutes. Shoulder ROM and grip strength were measured immediately before the intervention, and after the intervention. The duration of the trial was 2 times, with the first trial - two days off - the second trial.

Results: The results showed that Thai massage program improved range of motion of the right shoulder. Data showed a significant difference in shoulder abduction ($p<0.05$) and adduction ($p<0.05$) compared with control group. Additionally, Thai massage program significantly promoted short-term effect on muscular strength of the right arm ($p<0.05$) compared with control group in 2 trials.

Conclusion: These results suggested that the Thai massage program has an short-term effects on the range of motion of the right shoulder and muscular strength of the right arm, compared to Swedish massage in the control group.

Keywords: *Range of motion, Muscular strength, Thai massage, Swedish massage*

Introduction

Basketball is about scoring goals and scoring. The goal is achieved by shooting the ball through the opponent's basket or hoop using the muscles in the arm. Points are awarded by throwing the ball into the hoop from above. Basketball has developed various playing techniques such as shooting, passing, and dribbling. including the player position for athletes who are equipped with physical fitness and skilled performance, that person has a very good chance of winning against their opponents. This sudden movement requires the control and coordination of the neuromuscular nervous system (Coordination) as well, so it will be accurate and fast (Speed). In addition, sports massage with a quick and stimulating technique is also the preferred method used by athletes before the competitions or training sessions. Exercising and playing sports is the coordination of all muscles and when working repeatedly for a long time. The body will become fatigued, which causes the body's nervous system to be

impaired in order to maintain the muscles and unable to build. The energy in a steady-state (steady-state) if the athlete has a complete physical preparation will have a greater chance of winning in that competition, which sports massage is widely used. At present, both the leading coaches in fitness gyms Including athletes [1,2] report that sports massage can be divided into 3 types: pre-match massage. Massage for most athletes, Swedish massage is a form of massage that is universal and is accepted all over the world in principle, Swedish massage is a massage of touch, press, squeeze and touch the different parts of the body using the principle. The same massage as Thai massage is a massage to relax the mind and body for comfort and healing. A study [3] compared Swedish massage and Thai massage in physiology and psychology. They were randomly assigned to receive either Thai massage or Swedish massage. Dependent variables were blood pressure and heart rate, range of motion. Awareness of Anxiety and Emotions The physical assessment was assessed 48 hours before and after the massage. The results showed that Thai massage and Swedish massage were equally effective. The benefits of massage for athletes are to increase blood flow, expand blood, increase the amount of blood that the heart pumps out, reduce the pulse rate increase the readiness of body Affects the stimulation, causing the maximum energy of the muscles to increase [4,5], can relieve muscle tension. and allows the connective tissue to be more stretched since massage helps to stretch or relax the fascia muscles. Ligaments that hold bones and muscles which helps to increase the backflow of the veins and increase the flow of arteries to replace more Histamine is released causing blood vessels to dilate. increased skin temperature resulting in the excretion of waste products from various metabolic processes including lactic acid (lactic acid) faster. At the same time, it helps to increase the supply of oxygen and nutrients to the tissues. It helps to heal and reduce muscle spasms as well. There is a drain or a reduction in the amount of various pain neurochemicals. born in the injured area Reduces the stimulation of small nerve fibers Affects the recovery of muscle function after exercise. Relaxation helps the athlete's body to return to normal faster [6]. Massage during the match and post-match massage, where the pre-match massage is a stimulating massage on the superficial tissue with fast strokes with light weights, use common tech, avoiding deep, heavy strokes, or press only the joints. This type of massage can be performed three days before the match up to four hours before the match. According [7], it was found that regular stretching of muscles improves mobility and prevents injuries. In addition, if an athlete develops a good level of flexibility, it will improve the technical skills that athletes need to use force, agility, and increased mobility. In this study, research was conducted to apply the results of the research to athletes to optimize arm muscle strength before training and before the competition. The purpose of this study wants to study the effectiveness of Thai Massage on the range of motion of the right shoulder and muscular strength of the right arm in collegiate basketball players.

Methodology

Participants

The research design in this study is clinical research conducted as a controlled trial. Researchers will recruit participants who are male, undergraduate students who are basketball players under the Basketball Club of Mae Fah Luang University, aged 19 to 24, 20 participants. The participants were in good health and have not a history of serious diseases such as bone cancer, arm vein thrombosis, diabetes, etc., or had serious injuries to the muscles and ligaments at the shoulder for at least six months, must have similar physical fitness and must have a 2-day muscle break. During the trial, the experimenter had an accident such as an injury to the muscles, bones, and joints of the arm. The participants can leave the experiment at any time.

Methods

Participants who passed the criteria will be informed about the research objectives and the protocol. After they listen to the orientation, all of them must give verbal consent and sign their written consents to this study. They are also informed that they can drop out any time they wish even before they complete the trial. Participants were divided into two groups: an experimental group of 10 people and a control group of 10 people, by choosing sealed envelopes. A lottery was drawn, using code 01 as a basketball player group receiving a Thai massage program and 02 as a basketball player group receiving a Swedish massage program. The researcher will collect the information before and after these participants receive the Thai massage program and participants receive the Swedish massage program by measuring the range of motion of the shoulder with a goniometer, a push-pull dynamometer; measuring muscle strength with a Handgrip Dynamometer. Experimental group, participants who received a Thai massage program will receive a Thai massage two times, with the first trial - two days off - the second trial. Use the thumb and hands to massage the body area and apply 50 pounds of force for massage. a Thai massage program had an inner arm massage, a wind gate point, and an outer arm massage, the total massage time is 10 minutes. Only the right arm. Control group, participants who received a Swedish massage program will receive a Swedish massage two times, with the first trial - two days off - the second trial. Use the hands to massage the body area and apply light force for massage. A Swedish massage program had effleurage, petrissage, friction, vibration, and tapotement. The total massage time is 10 minutes.

Statistical Analysis

The results are shown in terms of the standard deviation (S.D.) for the Shoulder range of motion (ROM) and muscular strength of the right arm by using an SPSS program. And compare the results of the Thai massage program, the repeated measures ANOVA statistic was used as a mean score difference between the experimental group and the control group. Including the difference in the experimental group.

Results

The sample group participating in this research study were 20 male students of Mae Fah Luang University, divided into the group receiving Thai massage and a control group of 10 people each. The experimental group has an average age of 21.80±1.13 years and an average weight of 73.70±10.12 kg. average height 175.50±4.64 cm. The control group has an average age of 21.20±0.63 years and an average weight of 67.70±2.40 kg. average height 173.40±6.04 cm

Table 1 Basic information of the experimental and control groups show average and standard deviation.

Basic information	The experimental group (n = 10)	The control group (n = 10)
Age (year)	21.80±1.13	21.20±0.63
Weight (kg.)	73.70±10.12	67.70±2.40
Height (cm.)	175.50±4.64	173.40±6.04

The average muscular strength of the right arm in the experimental group. Pretest, first post-test, and second post-test were 84.39, 89.25, and 93.99, respectively. In the control group. Pretest, first post-test, and second post-test were 76.24, 82.38, and 87.12, respectively. The average range of motion of the right shoulder, Rt. Shoulder adduction (◦) in the experimental group. Pretest, first post-test, and second post-test were 47.00, 47.60, and 47.20, respectively. In the control group. Pretest, first post-test, and second post-test were 47.10, 48.20, and 49.20, respectively.

Table 2 The results of the comparison of the average range of motion of the right shoulder and the muscular strength of the right arm of the experimental group and control group.

Variable	Experimental			Control		
	Pre	Post1	Post 2	Pre	Post 1	Post 2
Rt. Hand grip (lb.)	84.39	89.25	93.99	76.24	82.38	87.12
Rt.Shoulder adduction (◦)	47.10	48.20	49.20	47.00	47.60	47.20
Rt.Shoulder abduction (◦)	176.60	178.40	178.60	177.70	178.60	178.80

From table 3 The muscular strength of the right arm between the experimental group and the control group. Before receiving Thai massage in the experimental group and receiving Swedish massage in the control group, there was a statistically significant difference (p<0.05). The experiment and control groups were 84.39 ± 16.35 and 76.24 ± 10.32, respectively, and the muscular strength of the right arm of the experimental group was higher than the control group. The average range of motion of the right shoulder, Rt. Shoulder abduction (◦) in the experimental group. Pretest, first post-test, and second post-test were 177.70, 178.60, and 178.80, respectively. In the control group. Pretest, first post-test, and second post-test were 176.60, 178.40, and 178.60, respectively. The muscular strength of the right arm between the experimental group and control group. After the first receiving massage, Thai massage in the experimental group, and Swedish massage in the control group. There was a statistically significant difference (p<0.05). The experiment and control groups were 89.25 ± 18.68 and 82.38 ± 8.72, respectively, and the muscular strength of the right arm of the experimental group was higher than the control group. The muscular strength of the right arm between the experimental group and control group. After the second receiving massage, Thai massage in the experimental group, and Swedish massage in the control group. There was a statistically significant difference (p<0.05). The experiment and control groups were 93.99 ± 19.40 and 87.12 ± 8.88, respectively, and the muscular strength of the right arm of the experimental group was higher than the control group.

Table 3 The results of the comparison of the average muscular strength of the right arm of experimental group and control group

Period	Rt. Hand grip (lb.) muscular strength	
	Experimental	**Control**
Pre	84.39 ± 16.35	76.24 ± 10.32
Post 1	89.25 ± 18.68*	82.38 ± 8.72
Post 2	93.99 ± 19.40*	87.12 ± 8.88

* Significant differences between the experimental group and the control group (p<0.05).

From table 4 Range of motion of Rt. Shoulder adduction between Experimental group and Control group. Before receiving Thai massage in the experimental group and receiving Swedish massage in the control group, there was a statistically significant difference (p<0.05). The experiment and control groups were 47.00 ± 3.09 and 47.10 ± 2.38, respectively, and Rt. Shoulder abduction of the experimental group was lower than the control group. Range of motion of Rt. Shoulder adduction between Experimental group. After the first, receiving Thai massage, there was a statistically significant difference (p<0.05), which was 48.20 ± 2.10. Range of motion of Rt. Shoulder adduction between Control group. After the first, receiving Swedish massage is not a statistically significant difference (p<0.05, were 49.20 ± 1.03. And Rt. The shoulder adduction of the experimental group was lower than the control group. Range of motion of Rt. Shoulder adduction between Experimental group and Control group. After the second receiving massage, Thai massage in the experimental group, and Swedish massage in the control group. Is that not a statistically significant difference (p<0.05). The experiment and control groups were 47.60 ± 2.63and 47.20 ± 3.42, respectively, and Rt. The shoulder abduction of the experimental group was lower than the control group.

Table 4 The results of the comparison of the average range of motion (ROM) of the right shoulder, Rt. Shoulder adduction of experimental group and control group

Period	Rt. Shoulder adduction (◦) range of motion (ROM)	
	Experimental	**Control**
Pre	47.10 ± 2.38	47.00 ±3.09
Post 1	48.20 ± 2.10*	47.60 ± 2.63
Post 2	49.20 ± 1.03*	47.20 ± 3.42

* Significant differences between the experimental group and the control group (p<0.05).

From table 5 Range of motion of Rt. Shoulder abduction between experimental group and control group. Before receiving Thai massage in the experimental group and receiving Swedish massage in the control group, there was a statistically significant difference (p<0.05). The experiment and control groups were 176.60 ± 3.06and177.70 ± 1.95, respectively, and Rt.The shoulder abduction of the experimental group was higher than the control group. Range of motion of Rt. Shoulder abduction between experimental group and control group. After the first receiving massage, Thai massage in the experimental group, and Swedish massage in the control group. There was a statistically significant difference (p<0.05). The experiment and control groups were 178.40 ± 2.76and178.60 ± 1.71, respectively, and Rt. The shoulder abduction of the experimental group was higher than the control group.Range of motion of Rt. Shoulder abduction between experimental group and control group. After the second receiving massage, Thai massage in the experimental group, and Swedish massage in the control group. There was a statistically significant difference (p<0.05). The experiment and control groups were 178.80 ± 1.62 and 178.60 ± 2.55, respectively, and Rt. The shoulder abduction of the experimental group was higher than the control group.

Table 5 The results of the comparison of the average range of motion (ROM) of the right shoulder, Rt. Shoulder abduction of experimental group and control group

Period	Rt. Shoulder abduction (◦) range of motion (ROM)	
	Experimental	**Control**
Pre	176.60 ± 3.06	177.70 ± 1.95
Post 1	178.40 ± 2.76*	178.60 ± 1.71
Post 2	178.60 ± 2.55*	178.80 ± 1.62

* Significant differences between the experimental group and the control group (p<0.05).

Discussion

From research of the effectiveness of Thai massage on the range of motion and muscular strength of the arm in collegiate basketball players, Mae Fah Luang University. That the researcher has studied and gathered various opinions as well as related research results can be presented to discuss the results according to each hypothesis as follows: the range of motion of the right shoulder and muscular strength of the right arm of the experimental group, after receiving the Thai massage program was greater than the control group. Form table 2 - 5 the results of the comparison of the average range of motion of the right shoulder and the muscular strength of the right arm of the experimental group and control group, there were significant differences in the range of motion of the right shoulder and muscular strength of the right arm of the experimental group and the control group. This is consistent with the research [8] found that Thai massage improves blood circulation. Massage also reduces muscle tightness, and the massage program causes the muscles to attach and relax the fascia muscles, tendons, bones, and muscles stretch and contract, there will be changes within the muscle at the sarcomere level in the capillary fibers. The sarcoma contracts and then relaxes retches or returns, staying the same width. [9] as a result of the conversion of chemical energy to mechanical energy. From this contraction, the whole muscle transmits a strong stream of mechanical energy to better contract the muscles. The result in movement is more efficient, known as the Stretch-shortening cycle [10]. A review of related research found that Thai massage helps muscles contract and relax, make the body have good movement. The range of motion of the right shoulder and muscular strength of the right arm of the experimental group after receiving the Thai massage Program in the 1st and 2nd time were not different from the control group. From table 2 Range of motion of the right shoulder and muscular strength of the right arm of the experimental group and control group in the 1st and 2nd time. Because the Thai massage program is only for the arms. Use a royal massage style. Using a massage pressure of 50 pounds means pressing a massage with a small weight or called a light weight, profoundly relaxing, this is consistent with the research [11] applied Thai massage. It is used for warm-ups that require intense muscle bursts. It was concluded that in the massage Each time has the same warm-up effect.

Conclusion

The research found the effectiveness of Thai massage on the range of motion and muscular strength of the arm by comparing the two massage sessions in collegiate basketball players, at Mae Fah Luang University. It was found that each time the movement of the range of motion and muscular strength of the arm, indicating that Thai massage program may have the effectiveness on the range of motion and muscular strength of the arm.

Competing Interests

The authors declare no conflict of interest. The funders had no role in the design of the study in the collection, analyses, or interpretation of the data in the waiting of the manuscripts or in the decision to publish the result.

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Author contributions

Conceptualization and methodology:T.T.,and K.S. Visualization: T.T.,K.S.,and C.V. Formal analysis: T.T.,K.S.,and C.V.Writing-original draft preparation: T.T.

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