

Influence Of Sport Massage Using A Combination Of Lights And Infrared On Recovery And The Performance Of The Ragasukma Athletics Disc Throw Athletes Club In Tulungagung Regency

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Abstract

High-performance sports such as discus throwing can cause muscle fatigue due to high-intensity and continuous training programs, so an effective recovery method is needed to speed up the recovery process. Recovery and maintaining athlete performance. The combination method between sport massage and warm exposure from the infrared. It is thought to be able to improve blood circulation, reduce muscle tension, accelerate the transport of metabolic waste, and support the athlete's physical readiness to undertake the next training session. This study aims to determine whether or not there is an influence of giving sport massage using a combination of warm exposure from the infrared light on recovery and the performance of discus throwers in Tulungagung Regency. This study used an experimental method with a randomized design. One Group Pretest-Posttest Design, with 6 discus throwers in Tulungagung Regency as the research subjects. The research instrument used was measuring discus throw performance through a throw distance test before and after treatment, and instruments in the form of a questionnaire were given periodically to recovery athletes during the research process. Based on the measurement results, all athletes experienced an increase in discus throw distance after treatment, with a percentage increase ranging from 2.5% to 17.9%, with an average performance increase of 10%. In addition, the measurement results show an increase in scores from the initial condition, with an average value of 37 to 55.5 after treatment was given, with an average percentage increase of 50.14%.

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1. INTRODUCTION

In sports, especially in the athletics discus throw competition, optimal performance for an athlete is greatly influenced by prime physical condition and the body's recovery ability, or *recovery of* athletes in post-training and post-match sessions. Good physical condition is a must for an athlete to achieve optimal performance. In this competition, an athlete is required to possess complex physical abilities. Wulandari (2022) explains that "discus throwers require specific physical conditions such as strength, speed, flexibility, coordination, balance, and especially muscle explosiveness to achieve optimal performance." In addition, athletes must be able to produce discus release speed (*release*). A high level of endurance is achieved through a series of sequential movements, starting with the rotation and support of the feet, hips, trunk, shoulders, and arms. Therefore, effective supportive recovery methods are needed to accelerate muscle tissue regeneration and restore the athlete's body to optimal performance. An athlete's performance is not

only determined by continuous physical training but also by an optimal recovery process.

There are several options for recovery methods. For athletes, the most common ones include consuming balanced, nutritious food, getting enough sleep, acupuncture therapy, cupping methods, *massage*, taking an ice bath, doing a light exercise program or *rest* active, for example, doing light jogging and swimming activities to doing *rest* passively or with total rest. Of the many recovery methods described above, researchers have combined the following methods: *sport massage* with a combination of warm exposure from the *infrared*. *Sport massage* is a series of forms of soft tissue manipulation in the body that are specifically addressed to individuals involved in physical activity, particularly athletes. *Sport massage* can be performed manually by a professional therapist or with tools to support client comfort during treatment. According to Rizal Afandi et al. (2023), "*Sports massage*" is a manipulation performed on athletes either by hand or special tools to improve blood circulation as a treatment or to relieve fatigue. According to Baha'u Adzanil Umam (2020), the aim of *massage* is generally for warm-up sessions or *warming-up* and can also help the healing process of minor injuries. In addition, *massage* exercise can be used to stretch muscles to speed up the recovery process, which is usually called *recovery*. *Infrared* is a supporting tool after doing *treatment sport massage*. A warming sensation occurs when a part of the body is exposed to light from the lamp. This occurs because infrared rays penetrate the skin and stimulate capillary blood vessels to dilate. This dilation increases blood flow, allowing oxygen and nutrients to reach muscle tissue more quickly. According to Vivi Endaryanti (2022), post-massage infrared therapy can help maintain the increased blood flow that has developed during *massage*, so that the tissue recovery process runs more optimally." The duration given is sufficient, with 10 to 15 minutes per muscle section at a warm temperature. Therefore, research on the effects of *sports massage* using a combination of warm exposure from the *infrared* to *recovery* and the performance of athletes after training is important to carry out. Based on the importance of these recovery methods for athletes after training, it is hoped that sports practitioners, especially coaches will *official* and an athlete is able to understand and be able to practice techniques of *sports massage* and the use of *infrared*. Furthermore, in the future, this method can be incorporated into a regular training program, not just when an athlete experiences an injury. This way, the fitness level, performance, and achievements of athletes, particularly track and field athletes, can be continuously improved in each competition.

Several previous studies have examined sport massage as a recovery method in isolation. Anas Wahyu Bachtiar et al. (2022), for example, found that sport massage reduced lower-limb muscle pain among youth football players, while Fiqky Ravinda Kumara et al. (2024) reported that sport massage alone improved recovery among rock-climbing athletes, and Muhammad Sulthoni Puruso Nindyo et al. (2025) showed that sport massage improved muscle flexibility and pain threshold among Kabaddi athletes. Other studies have combined massage with a different modality, such as Sianipar et al. (2025), who examined fitness massage together with active recovery for reducing delayed onset muscle soreness (DOMS). However, none of these studies specifically combined sport massage with infrared heat exposure, nor did they focus on discus throw athletes, whose performance depends on explosive, rotational movements involving the legs, hips, trunk, shoulders, and arms simultaneously. This gap indicates the need for research that specifically examines the combined effect of sport massage and infrared exposure on both recovery and throwing performance among discus throwers. The novelty of the present study therefore lies in testing this specific combination of recovery modalities on a track-and-field population whose performance and recovery demands differ from the football, climbing, and combat-sport athletes examined in prior research.

2. METHOD

This research uses a quantitative approach with an experimental method using a design. *One Group Pretest–Posttest Design*. This design was chosen to determine the effect of giving *sport massage* combined with warm exposure from the *infrared* on *recovery* and the performance of the discus thrower athlete Ragasukma Athletics Club in Tulungagung Regency before and after

treatment. The research population was all discus throw athletes who were members of Ragasukma Athletics Club in Tulungagung Regency. The sampling technique used total sampling, meaning all members of the population were used as research samples because the number of athletes was relatively small and met the research criteria. Data collection techniques included testing the throwing distance results before and after treatment and using a questionnaire to measure the level of *recovery* of athletes after undergoing a training session and receiving treatment, such as *sports massage* with a combination of warm exposure from the *infrared*.

Data analysis in this study followed a systematic quantitative procedure, referring to the framework described by Syahputri (2023). The collected pre-test and post-test data, both for discus throw distance and the recovery questionnaire scores, were first analyzed descriptively to obtain the mean, standard deviation, median, minimum, and maximum values. A normality test was then conducted using the skewness value, with data considered normally distributed if the skewness value fell within the range of -1 to +1. Because part of the data was found to be outside this range, the nonparametric Wilcoxon Signed Rank Test was used to test the research hypothesis rather than a parametric paired-sample t-test. In addition, the percentage increase in performance and recovery scores for each athlete was calculated and categorized using an effectiveness criterion ($>20\%$ = very effective, $10-20\%$ = effective, $<10\%$ = less effective) to determine the practical magnitude of the treatment's effect.

3. RESULTS AND DISCUSSION

The analysis conducted by the author included data analysis of respondent characteristics, descriptive analysis of the research variables, and classical assumption testing to meet statistical requirements. Furthermore, the researcher used a normality test to determine whether the data distribution in the study was normal or abnormal, and a hypothesis test to determine whether the method influenced *sports massage* using a combination of warm light exposure of *infrared* to *recovery* and the performance of athletic athletes in the discus throw competition in Tulungagung Regency.

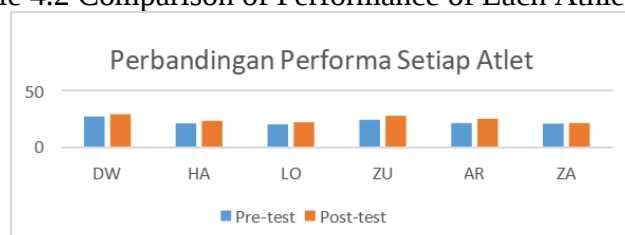
1. Overall Results of Pre-Test and Post-Test Performance of Discus Throwing Athletes in Tulungagung Regency.

a. Data pre-test dan post-test

Table 4.1 Pre-test and Post-test Data

Athlete	Pre-test	Post-test
DW	26,96	28,98
HA	21,04	23,25
IT	20,06	21,80
TO	24,21	27,68
WITH	21,21	25,02
FOR	20,80	21,33

Table 4.2 Comparison of Performance of Each Athlete



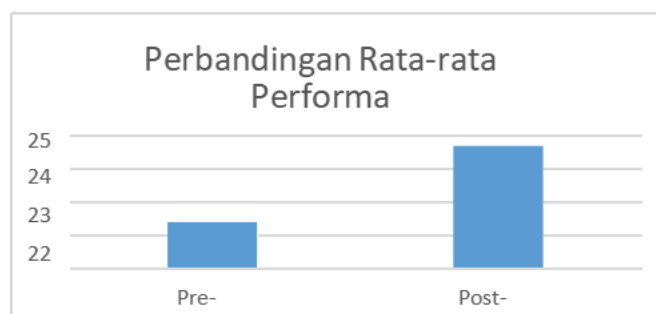
b. Descriptive Performance Analysis

Table 4.3 Descriptive Analysis of Performance

Variables	Mean	SD	Min	Max
Pre-test	22,38	2,659646593	20,06	26,96
Post-test	24,67666667	3,13583588	21,33	28,98

The results of the descriptive analysis of discus throwing performance showed an increase in value after being given treatment of *sport massage* by using a combination of warm exposure from the *infrared*. During the pre-test, the average score (mean) was 22.38 with a standard deviation of 2.66, a minimum score of 20.06, and a maximum score of 26.96. Meanwhile, during the post-test, the average score increased to 24.68 with a standard deviation of 3.14, a minimum score of 21.33, and a maximum score of 28.98. The median score also increased from 21.13 in the pre-test to 24.14 in the post-test. The data range increased from 6.90 to 7.65, indicating a greater variation in performance results after the treatment. Overall, the results of the descriptive analysis indicate that the athletes' discus throwing performance improved after being given *sport massage* using a combination of warm exposure from the *infrared*. If displayed in the form of a bar chart, it will look like this:

Table 4.4 Comparison of average discus throw performance



Performance Normality Test

Table 4.5 Performance Normality Test

DATA	SKEWNESS	INFORMATION
Pre-test	1,3038	Abnormal
Post-test	0,4147	Normal

The results of the normality test using the skewness value showed that the pre-test data had a skewness value of 1.3038, which is outside the range of -1 to +1, so it can be concluded that the data are not normally distributed. Meanwhile, the post-test data had a skewness value of 0.4147, which is within the range of -1 to +1, so the data is normally distributed. This indicates that after being given treatment, *sport massage* using a combination of warm exposure from the *infrared*, the data distribution becomes closer to normal.

c. Performance Hypothesis Testing

Table 4.6 Performance Hypothesis Test

Athlete	Pretest	Posttest	D	BS	RANK	(+/-)
DW	26,96	28,98	2,02	2,02	3	+
HA	21,04	23,25	2,21	2,21	4	+
IT	20,06	21,80	1,74	1,74	2	+
TO	24,21	27,68	3,47	3,47	5	+
WITH	21,21	25,02	3,81	3,81	6	+
FOR	20,80	21,33	0,53	0,53	1	+

The results of the Wilcoxon Signed Rank Test showed that all athletes experienced an increase in discus throwing performance after being given treatment of sport massage using a combination of warm exposure from the infrared. The number of positive rankings is 21, and the number of negative rankings is 0, resulting in a calculated T value of 0.

These results show that there is an influence of giving sport massage using a combination of warm exposure from the infrared on the performance of discus throw athletes in Tulungagung Regency. Thus, the research hypothesis states that there is an influence of sport massage using a combination of warm exposure from the infrared on the performance of discus throwers is acceptable.

d. Average Improvement in Discus Throwing Performance

Table 4.7 Percentage Performance Improvement

Athlete	Pre-test	Post-test	%
DW	26,96	28,98	7%
HA	21,04	23,25	11%
IT	20,06	21,80	9%
TO	24,21	27,68	14%
WITH	21,21	25,02	18%
FOR	20,80	21,33	3%
RATIO-RATIO	22,38	24,68	10%

S(+)	21
S(-)	0
T	0

The percentage increase shows that the athletes' discus throwing performance increased after being given treatment of *sport massage* using a combination of warm exposure from the *infrared*. The percentage increase in performance ranged from 3% to 18%, with an average increase of 10%. The highest increase occurred in AR athletes at 18%, while the lowest increase occurred in ZA athletes at 3%. Overall, these results indicate that administering *sport massage* using a combination of warm exposure from the *infrared* has a positive impact on improving the discus throwing performance of Tulungagung Regency athletes.

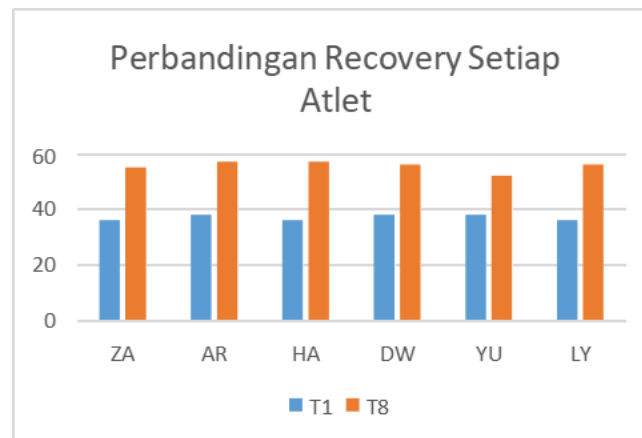
1. Overall Questionnaire Results

a. Total Athlete Questionnaire Score

Table 4.8 Total Questionnaire Score

Athlete	T1	T8
FOR	36	55
WITH	38	57
HA	36	57
DW	38	56
YU	38	52
LY	36	56

Table 4.9 Comparison of Recovery for Each Athlete



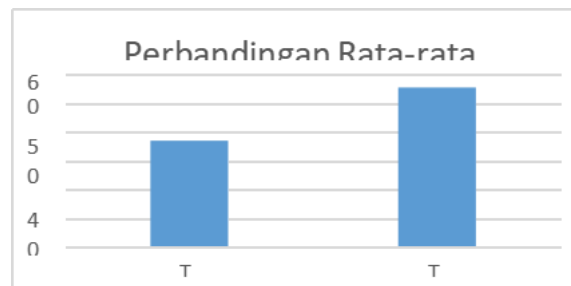
b. Descriptive Questionnaire Test

Table 4. 10 Descriptive Questionnaire Tests

Variables	Mean	SD	Min	Max
T1	37	1,095445115	36	38
T8	55,5	1,870828693	52	57

The results of the descriptive analysis showed an increase in athletes' recovery scores from the initial meeting (T1) to the final meeting (T8). The average score increased from 37 to 55.5. The median value increased from 37 to 56, while the standard deviation increased from 1.10 to 1.87. The minimum value increased from 36 to 52, and the maximum value increased from 38 to 57. Overall, these results indicate an increase in athletes' recovery scores after being given treatments: *sport massage* using a combination of warm exposure from the *infrared*. If displayed in the form of a bar chart, it will look like this:

Table 4.11 Comparison of Average Recovery



c. Questionnaire Normality Test

Table 4.12 Questionnaire Normality Test

Data	Skewness	Information
T1	0,0000	Normal
T2	-1,6494	Abnormal

The results of the normality test using the skewness value show that the data *are normal*. At the initial meeting (T1) the skewness value was 0.000, which ranged from -1 to +1, indicating a normal distribution. Meanwhile, the recovery data at the final meeting (T8) had a skewness value of -1.649, which was outside the range from -1 to +1, indicating a non-normal distribution. Therefore, hypothesis testing was conducted using the nonparametric Wilcoxon Signed Rank Test.

d. Questionnaire Hypothesis Test

Table 4.13 Questionnaire Hypothesis Test

Athlete	T1	T8	D	ABS	RANK	(+/-)
FOR	36	55	19	19	3,5	+
WITH	38	57	19	19	3,5	+
HA	36	57	21	21	6	+
DW	38	56	18	18	2	+
YU	38	52	14	14	1	+
LY	36	56	20	20	5	+

S(+)	21
S(-)	0
T	0

The results of the Wilcoxon Signed Rank Test show that all athletes experienced an increase in their scores in *recovery* after being given treatment, *sport massage*

using a combination of warm exposure from the *infrared*. The number of positive rankings is 21, and the negative rankings are 0, so the calculated T value is 0. These results indicate that there is an influence of *sport* massage using a combination of warm exposure from the *infrared* to *recovery* in discus throw athletes from Tulungagung Regency.

e. Effectiveness Analysis *Recovery*

Table 4.14 Effectiveness Analysis *Recovery*

Athlete	T1	T8	%
FOR	36	55	53%
WITH	38	57	50%
HA	36	57	58%
DW	38	56	47%
YU	38	52	37%
LY	36	56	56%
RATIO-RATIO			50%

Table 4. 15 Recovery Effectiveness Analysis Categories

%	Category
>20%	Very Effective
10-20%	Effective
<10%	Less Effective

The results of the effectiveness analysis show that the *recovery* athletes experienced improvement after being given treatment with *sports massage* using a combination of warm exposure from infrared lamps. The percentage increase in *recovery* ranged from 37% to 58%, with an average increase of 50%. Based on the effectiveness criteria used, this value falls into the very effective category. Thus, *sport massage* using a combination of warm exposure from infrared lamps may be an effective supporting method for increasing *recovery* discus thrower athlete from Tulungagung Regency, although this conclusion should be interpreted with caution given the absence of a control group in this study.

These findings are broadly consistent with several previous studies on sport massage as a recovery intervention, despite methodological and population differences. Fiqky Ravinda Kumara et al. (2024) similarly found that sport massage improved recovery among rock-climbing athletes, while Muhammad Sulthoni Puruso Nindyo et al. (2025) reported improved muscle flexibility and pain threshold following sport massage in Kabaddi athletes, both of which, like the present study, involve athletes with high demands on explosive muscle performance. Likewise, Sianipar et al. (2025) found that a combination of fitness massage and active recovery significantly reduced delayed onset muscle soreness (DOMS), supporting the general premise that soft-tissue manipulation techniques can accelerate physiological recovery. In line with this, the systematic review by Syahrul Darmawan et al. (2025) concluded that active recovery methods consistently reduce post-exercise heart rate more effectively than passive rest, reinforcing the broader pattern observed in the present study, namely that structured recovery interventions are associated with measurable, positive changes in athletes' physiological readiness. While these earlier studies employed different combinations of recovery techniques and different athlete populations,

the consistent direction of improvement across studies strengthens the plausibility that the sport massage and infrared combination applied in this study contributed to the observed gains in recovery and throwing performance among Tulungagung Regency's discus throwers.

4. CONCLUSION

The results of the study showed that there was an increase in discus throwing ability after being given treatment of *sport massage* using a combination of warm exposure from the *infrared light*. This increase can be seen from the average pre-test score of 22.38 meters, increased to 24.68 meters in the post-test. In addition, all athletes experienced an increase in throwing results. This increase in performance is thought to have occurred due to *sport massage* providing a mechanical effect on muscle tissue, thereby helping to improve blood circulation, reduce muscle tension, and improve *neuromuscular readiness*. However, because this study used a one-group pretest–posttest design without a comparison or control group, this explanation should be regarded as a plausible interpretation rather than a definitively established causal mechanism.

Based on the results of research data analysis, data analysis, and discussion regarding the influence of *sport massage* using a combination of lights *infra red* to *recovery* and the performance of discus throw athletes in Tulungagung Regency, it can be concluded that the research results show an increase in recovery scores for athletes from an average of 37.00 to 55.50. An increase of 50% shows that the combination of *sport massage* and warm exposure from the *infrared* provides a positive effect on the athlete's recovery process. *Recovery*: Good posture is very important for discus throwers because the training activity involves high-intensity muscle contractions, especially in several muscles, including leg muscles, hip muscles, back muscles, arm muscles, and shoulder muscles.

It is important to note that this study has a methodological limitation: the One Group Pretest-Posttest Design used does not include a control or comparison group that did not receive the sport massage and infrared treatment. As a result, the improvements observed in discus throw performance and recovery scores cannot be attributed with certainty solely to the treatment; other factors such as the athletes' regular training routine, natural physiological adaptation over time, familiarization with the throwing test, and athletes' expectations of improvement may also have contributed to the observed changes. Future research is recommended to use a randomized controlled design with a separate control group receiving standard training without the sport massage and infrared treatment, in order to more definitively isolate the specific contribution of this recovery method to athletes' performance and recovery.

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