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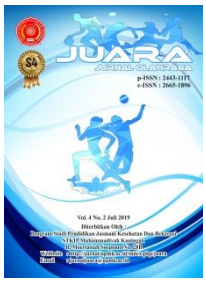

The Impact of Giving Sports Massage and Active Recovery on Lactate Recovery

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Abstract

This study aimed to determine the difference in the effect of the sports massage recovery method and active recovery on the lactate levels of wrestling athletes. The sample in this research consisted of 6 female athletes in West Java PON wrestling divided into two groups, namely the group that used sports massage and used active recovery. The analysis and data calculation results revealed that active recovery showed more significant results in reducing lactate levels (3.8 ± 0.54) compared to sports massage (2.6 ± 0.23).

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INTRODUCTION

Wrestling is a sport that requires constant dynamic performance during the fight (Arslanoğlu, Şenel, & Aydoğmuş, 2015) wrestling is a sport that is quite challenging because, in competition, athletes are required in the shortest time to recover their bodies after competing (Chaabene et al. al., 2017). Lactate is a highly dynamic metabolite and an essential energy source during exercise (Cruz et al., 2012). Recent studies have attempted to estimate the state of aerobic/anaerobic fitness through blood glucose levels (Simões et al., 2010; Sotero, Pardono, Landwehr, Campbell, & Simoes, 2009). Extreme workloads during wrestling matches increase blood lactate by 15 mml/L, sometimes even 20 mml/L (Kraemer et al., 2001).

The cause of hyperglycemia in wrestling matches due to wrestling is short-

term, high-intensity exercise that raises glucose to higher levels (Kjaer et al., 1991). The significant changes in these metabolites allow the diagnosis of anaerobic in wrestling matches (Karninčić et al., 2009). Proper recovery is an essential aspect in the preparation stage of elite athletes (Bieuzen et al., 2014). Athletes' performance decline can occur due to the stressful components of training and competition (Barnett, 2006). This damage may be temporary or permanent. Short-term damage occurs due to metabolic disorders after high-intensity exercise (Westerblad, Allen, & Lännergren, 2002), which may cause disturbances in the contractile process (Maffiuletti, 2010). In the short term affect subsequent performance. (Allen, Lamb, & Westerblad, 2008). Longer damage may be associated with exercise-induced muscle injury and delayed muscle pain (Cheung, Hume, & Maxwell, 2003). Recently, sports massage has become increasingly popular and has begun to be widely used to improve performance, overcome fatigue, and facilitate the recovery process (Weerapong, Hume, & Kolt, 2005).

There are benefits in giving massage to the athlete's ability to recover his body to restore fatigue conditions to be back in shape or in prime condition. Massage or massage is based on the idea that the heart is the center of growth. Therefore, treatment follows the circulatory system, especially the arteries, and moves inward from the ends of the body towards the heart. (Purnomo, 2014). The benefits of massage on recovery are increasing blood circulation, breaking down lactate formed, and decreasing pain (Bakar et al., 2015). In a study (Wiltshire et al., 2010), it was concluded that the effect of massage decreased 25% lactic acid levels after 10 minutes. Minutes to recover. Active recovery is a recovery method in which athletes participate in the functional movement to increase blood flow and have been shown in previous studies as the most effective form of recovery (Warren, Brown, Landers, & Stahura, 2011). Research has found lactate removal and performance improvement with active recovery rather than passive recovery in various forms of exercise (White & Wells, 2015). Swimming athletes in functional recovery studies may have a better effect than passive recovery (Hinzpeter, Zamorano, Cuzmar, Lopez, & Burboa, 2014). Carter et al. (2002) investigated the impact of exercise recovery mode on thermoregulatory and cardiovascular responses, with data suggesting that mild active recovery may play an essential role in post-activity heat dissipation. It has been found that the best Active Recovery comes from activities that progressively decrease exercise intensity by 60-30% of the estimated maximum heart rate (HR) of people who exercise (Monedero & Donne, 2000).

METHODS

The research method used is an experiment. The research design in this

research is Cross Over Design. According to (West & Turner, 2010; Ramadan & Juniarti, 2020), the Cross over Design study sample received treatment two or more times.

The sample in this study was six people in West Java PON Wrestling Athletes. This research was carried out at the Wrestling Hall of West Java, Jl. Pajajan No. 66, Bandung City, West Java. The sampling technique used in this research is Total Sampling, which means that all samples in the population are sampled in the study.

The instruments in this study were Accutrend Lactate to measure the lactate levels of athletes before warming up, pre-test and post-test, Wrestling Match Simulation with a duration of 3 minutes x 2 was used to increase athletes' lactate levels (H Karninčić, Gamulin, & Nurkić, 2013), then treatment The recovery used is Sports Massage and Active recovery with a duration of 20 minutes (Johnson, 2015).

The steps taken in the study were selecting the population and sample. Before starting the research, the sample was asked to fill out and sign the informed consent, namely the consent form. Then the sample was divided into two groups randomly (Random). This study was divided into two treatment periods and one washout period. In the first period, before warming up, blood samples will be drawn to check lactate levels. After warming up, the samples will perform a wrestling match simulation. Then blood is taken to prevent lactate (Pretest). After the simulation is done, the sample will be given treatment. Experimental group 1 was assigned the Sports massage treatment, and experimental group 2 was given the Active recovery treatment for 20 minutes each, then blood lactate was taken as the final reference value (Posttest). After Period one ends, there will be a washout period of 7 days to avoid the Carry Out effect. The second period in the study was almost the same in the procedure, only to cross or exchange the treatments in each group. Experimental group 1 was given Active Recovery treatment, while experimental group 2 was Sports Massage. The data obtained were then analyzed statistically using the SPSS version 22 application using Paired Sample T-Test and Independent Sample T-test.

FINDINGS AND DISCUSSION

Findings

The minimum age for the sample is 22 years old, while the maximum period is 30 years, with an average age of 25.6 years and a standard deviation of 2.6. The minimum weight is 53 kg, while the maximum is 68 kg, with an average weight of 62.5 kg and a standard deviation of 5.18. The minimum height is 153 cm, while the maximum is 170 cm, with an average size of 161.8 cm and a standard deviation of 5.8.

Based on table 1, it is known that the overall number of samples from each variable is N = 6. Variable Lactate Levels in the Sports Massage Pre Test treatment has a mean of 8.5 with a standard deviation of 0.99. Sports Massage Post Test has a Mean of 5.9 with a

standard deviation of 0.92 Variable Lactate Levels Treatment Active Recovery Pre Test has a Mean of 8.7 with a standard deviation of 1.39. The Lactate Active Recovery Post Test variable has a mean of 4.8 with a standard deviation of 1.27.

Table 2 Descriptive Statistics

No.	Athlete Lactate Level	N	Min	max	Mean	St.Dev
1.	SM Pretest	6	7.3	10.3	8.5	0.99
2.	SMPost test	6	4.6	7.5	5.9	0.92
3.	ARPretest	6	7.3	11	8.7	1.39
4	ARPosttest	6	3.6	6.4	4.8	1.27

SM = Sport Massage
AR= Active Recovery

Figure 1 Explains the average value of the pre-test and post-test after being given the Sports massage treatment to the whole group. The pre-test is 8.5 mmol/L while the post-test is 5.9 mmol/L. Furthermore, Based on Figure 2, depicting the pre-test and post-test lactate levels after being given Active Recovery treatment, it is known that the athlete's lactate level value in the pre-test was 8.63 mmol/L while the post-test was 3.48 mmol/L.

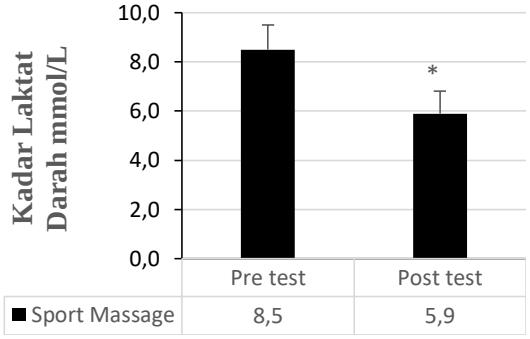

Figure 1 Lactate Levels Athletes Treatment Sport Massage

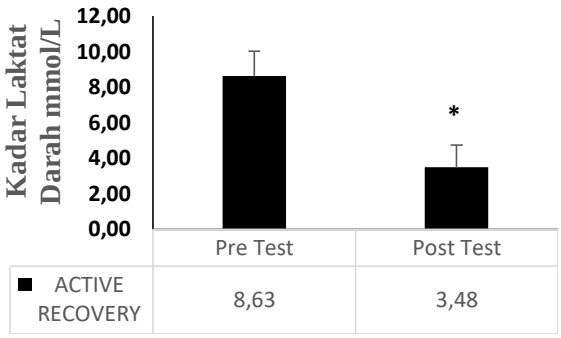

Figure 2 Lactate Levels in Active Recovery Treatment Athletes Treatment

Discussion

The lactate concentration after the match, presented in this study, an average of 7-9 mmol/L, appears to be slightly lower than the value reported by (Barbas et al., 2011) of 16-19 mmol/L. This difference in blood lactate values can be associated with the motivation of a real competitive wrestler, as opposed to a simulated tournament, or perhaps a different duration of time (3x2 instead of the previous 2x5 minutes). Most other studies investigated blood lactate in wrestlers during match simulations and wrestling camps (H Karninčić et al., 2013) or Wingate arm crank test (García-Pallarés, María López-Gullón, Muriel, Díaz, & Izquierdo, 2011), whereas the results This research was recorded during the official national tournament. Nevertheless, similar effects of high blood lactate levels were obtained in simulated matches and competition, indicating the high-intensity nature of wrestling matches.

Lactate, a strong anion, accumulates in skeletal muscle when the exercise intensity is above the anaerobic threshold, resulting in a decrease in intramuscular pH due to the dissociation of H2O into H+ and OH2 maintain electroneutrality (Lindgren et al., 2010). Lactic acid accumulation can cause fatigue (Pinar S, et.al, 2012). The reduction of lactic acid during recovery after exercise or competition is associated with several factors. These factors include the bicarbonate transfer system, a decrease or change in lactic acid from the muscles to the blood, blood flow, and slow or fast lactic acid carrying to the liver, muscles, and heart (Pinar et al., 2012).

Lactic acid produced during metabolism cannot be removed directly from the body but is reduced through gluconeogenesis and oxidation processes during recovery. The method of reducing lactic acid is also influenced by the speed of blood flow, the ability to oxidize lactic acid, the ability to release lactic acid from the muscles into the blood, and the transport of lactic acid to other tissues (liver, strength, and heart) which can be used for glucose resynthesis. Hussain & Verma, 2017). According to De Aguiar et al. (2017), lactic acid can be used as a carbon source to replenish glucose supplies through the gluconeogenesis process. Active recovery is one of the most effective recoveries to increase the speed of blood flow through the working muscle system (Mota et al., 2017) so that the transport of lactic acid that has accumulated in the muscles is also more optimal (Valenzuela, de la Villa, & Ferragut). , 2015).

In addition, active recovery can increase the use of type I muscle fibers which contain a lot of myoglobin, mitochondria, and oxidative enzymes, so that the reduction of lactic acid can occur more quickly (Menzies et al., 2010). The work of the heart also influences the process of reducing lactic acid. The more stable the heart pumps blood, the faster the lactic acid levels in the muscles and the blood. Burr et al. (2015) found that active recovery can slow down the decrease in cardiac output (Q) than using passive recovery. Another study also found a reduction in systolic and diastolic blood pressure using active recovery less than using passive recovery (Arazi, Mosavi, Basir, & Karam, 2012)

Massage can increase blood flow through the mechanism of temperature changes in the skin and superficial hyperemia (Ali Rasooli, Koushkie Jahromi, Asadmanesh, & Salesi, 2012). This increase in blood flow can help reduce lactic acid levels, thereby increasing the effectiveness of recovery and preventing muscle fatigue (Wiltshire et al., 2010). Other studies have also revealed that massage can improve muscle recovery and reduce the risk of DOMS after exercising (Best et al., 2008). Psychological massage can reduce levels of anxiety and stress (Lindgren et al., 2010) so that the body feels comfortable after exercising. Recovery through massage (Zadkhosh, Ariaee, Atri, Rashidlamir, & Saadatyar, 2015). Through this comfortable feeling, the fatigue level in soccer players will also be lower (Kurebayashi et al., 2016).

CONCLUSION

This study found an effect of Sports Massage and Active recovery in reducing blood lactate levels of wrestling athletes after a match, but more significant results were found in this study on reducing blood lactate levels using the Active Recovery method. The suggestion in this study is that the active recovery method, apart from being cheap and easy, is certainly more practical for athletes to help the recovery process of the body experiencing fatigue.

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