Effects of Sport Massage in Preventing Decreased Immunity After Sub-Maximal Physical Exercise

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Effects of Sport Massage in Preventing Decreased Immunity After Sub-Maximal Physical Exercise

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***Abstract*—Physical exercise with heavy and tiring intensity can cause the formation of free radicals and the potential for oxidative stress. This oxidative stress due to strenuous and exhausting physical exercise is a physiological process that can cause the immune system to become depressed or decrease immune function. The purpose of this study was to determine the effect of sports massage to prevent decreased immunity after sub maximal physical exercise. The study design was an experimental pre and post test group design. The subjects were 20 students from the Department of Sport Science, Universitas Negeri Medan, randomly divided into 2 groups, group 1: given sub-maximal physical exercise and without sports massage; Group 2: sub-maximal physical exercise and given a sports massage. The results showed that the values of leukocytes and lymphocytes in the sub-maximal exercise group given sports massage were lower than the sub-maximal physical exercise group and without sports massage ($p < 0.05$). Sub maximal physical exercise accompanied by sports massage can prevent a decrease in immunity.**

Keywords: sport massage, physical exercise, immunity

I. INTRODUCTION

Oxidative stress due to physical exercise with heavy and tiring intensity can cause physiological functional changes. Physical exercise is a stimulus received by the hypothalamus, then the hypothalamus gives a signal to the HPA axis, then the HPA axis responds and gives positive and negative responses to the body [1].

The number of leukocytes increases during exercise and the increase is related to the intensity and duration of the exercise. Sub-maximal physical exercise can also increase the number of lymphocytes. After sub-maximal physical exercise, the number of leukocytes and lymphocytes increases for several hours and returns to normal within 24 hours.The human body has an immune system for body defense. consisting of leukocytes and lymphocytes [2].

Recovery with sports massage after exercise should be done to improve athlete performance [3]. Regular sports massage will increase blood flow so that the blood will slowly return to normal and reduce muscle stiffness [4]. (Weerapong, Hume & Kolt 2005). Research on the effects of sports massage therapy related to immunity is relatively limited and needs further proof.

II. METHODS

A. Subject

The subjects of the study were 20 students, 18-20 years old, male and no smoking.

B. Location and total time duration of research

This research was performed at the Physical Laboratory, Department of Sports Science, Faculty of Sport Sciences, Universitas Negeri Medan, North Sumatra, Indonesia.

C. Design of Research

The study design was an experimental pre and post-test group design. The study subjects were randomly divided into 2 groups, 10 people each. Group 1: given sub-maximal physical exercise and without sports massage; Group 2: given sub-maximal physical exercise and sports massage Sport massage given for 14 days, after doing sub-maximal physical exercise. Before and after treatment on the research subjects, the number of leukocytes and lymphocytes was examined. Data obtained were analyzed statistically with SPSS.

III. RESULTS

The results showed an increase in the number of leukocytes and lymphocytes in the sub-maximal physical exercise group without being given a sports massage are 8049 109/L vs 12190 109/L and 35,5 % vs 48,4 %. Whereas in the sub-maximal physical exercise group given sports massage, the increase in the number of leukocytes and lymphocytes was smaller are 7813 109/L vs 9101 109/L dan 48,4 % vs 40,6 %.

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TABLE 1. AVERAGE NUMBER OF LEUKOCYTES AND LYMPHOCYTES

Variable		Group 1	Group 2
Leukocytes (10^3/L)	Pre test	8049	7813
	Post tes	12190	9101
Lymphocytes (%)	Pre test	35,5	36,1
	Post tes	48,4	40,6

IV. DISCUSSION

Stress due to physical exercise responded by the body by activating the cardiorespiratory system, norepinephrine (NE) system, the metabolic system and the HPA axis. Active hypothalamus-pituitary-adrenal axis (HPA), causing conditioning stimuli in the limbic flow-hypothalamus-pituitary-adrenal Axis (LHPA axis), then stimulates the hypothalamus and causes the secretion of the hormone corticotrophin-releasing hormone (CRH) [5].

The CRH hormone stimulates the hypothalamus for ACTH secretion. Increased ACTH secretion, causes increased cortisol secretion [6]. HPA Axis will affect the neuroendocrine system and have a direct impact on the immune system [7]. The immune system is characterized by an increase in the number of leukocytes and lymphocytes in the blood [8].

Research by Kader (2010) states that an increase in the immune system response by increasing levels of NK (natural killer), neutrophils and lymphocytes [9]. Free radicals are formed during sub-maximal physical exercise due to the release of superoxide electrons from the mitochondria and an increase in excess oxygen consumption [10].

The formation of free radicals in various body tissues can reduce the immune system, namely leukocytes and lymphocytes. During heavy and exhausting sub-maximal physical exercise, the number of leukocytes will increase due to mobilize of the bone marrow. Giving massage manipulation will help improve blood vessel circulation so that blood will slowly return to normal [11].

Massage is an activated recovery effort whose purpose is to accelerate recovery through increased circulation. Recovery is the recovery of normal homeostatic conditions, which are the best physiological conditions for body cells [12]. Physiologically, massage is proven to reduce heart rate and improve blood and lymph circulation. These physiological benefits have been used by athletes both to support physical performance and for other purposes such as prevention, therapy and rehabilitation of injuries and the negative effects of sports [13].

V. CONCLUSION

In this study an increase in the number of leukocytes and lymphocytes after sub-maximal physical exercise in both groups. The increase in the number of leukocytes and lymphocytes was smaller in the group that received sports massage after sub-maximal physical exercise compared to the group that did not receive a massage

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