

Research Paper

Effects of Three Types of Massage on Serum Levels of Malondialdehyde, Superoxide Dismutase and Glutathione Peroxidase After One Session of Exhaustive Exercise in Female Futsal Players



Bahare Heydari¹ , Mohsen Ghofrani¹ , *Mohammad Ebrahim Bahram²

1. Department of Physical Education and Sport Sciences, Faculty of Educational Sciences and Psychology, University of Sistan and Baluchestan, Zahedan, Iran.
2. Department of Physical Education and Sport Sciences, Faculty of Educational Sciences and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.



Citation: Heydari B, Ghofrani M, Bahram ME. [Effects of Three Types of Massage on Serum Levels of Malondialdehyde, Superoxide Dismutase and Glutathione Peroxidase After One Session of Exhaustive Exercise in Female Futsal Players (Persian)]. Complementary Medicine Journal. 2021; 10(4):328-339. <https://doi.org/10.32598/cmja.10.4.631.2>

<https://doi.org/10.32598/cmja.10.4.631.2>



Article Info:

Received: 11 Oct 2020

Accepted: 06 Nov 2020

Available Online: 01 Jan 2021

Keywords:

Massage, Malondialdehyde, Glutathione peroxidase, Superoxide dismutase, Exhaustive exercise

ABSTRACT

Objective The production of reactive oxygen species in exercise causes oxidative stress which disturbs the balance of oxidants and antioxidants, causing destructive effects on cells. The present study aims to investigate the effect of three types of massage (Swedish, Russian, Thai) on serum levels of Malondialdehyde (MDA), Glutathione Peroxidase (GPX) and Superoxide Dismutase (SOD) following one session of exhaustive exercise.

Methods This quasi-experimental study was conducted on 48 female futsal players aged 17-22 years in Zahedan, Iran who were selected using a purposive sampling method, and randomly divided into four groups of Swedish massage (Long strokes with pressing and tapping using hands), Russian massage (Medium to high pressure), Thai massage (Pressure to certain parts of the body) and Control. The exercise program was based on Bruce protocol. Serum levels of MDA, GPX and SOD were measured by before and immediately after exercise and after massage. Data analysis was performed using repeated measures ANOVA, considering a significance level of $P \leq 0.05$.

Results In all three types of massage, there was a significant decrease in serum level of MDA (0.22 ± 0.08), and a significant increase in GPX (1.84 ± 0.46) and SOD (10.02 ± 2.86) levels after exhaustive ($P = 0.001$). No significant difference was observed in the control group.

Conclusion It seems that Russian, Thai, and Swedish types of massage can affect the serum levels of the MDA (as an oxidative stress marker) and the antioxidant enzymes of GPX and SOD during the post-exercise recovery period.

Extended Abstract

1. Introduction

Malondialdehyde (MDA) is a small but stable product of the lipid peroxidation that is resulted from the breakdown of unstable peroxides of unsaturated fatty acids

[3] Given that intense exercise causes oxidative stress, cells use the enzymatic antioxidant defense system including Glutathione Peroxidase (GPX) and Superoxide Dismutase (SOD) as the first line of defense against oxidative stress. Massage includes a group of manual techniques on body tissues to affect the neuromuscular, skin, and joints systems, reduce stress and pain, and improve the blood and lymphatic circulation. It has long been used as a complementary

* Corresponding Author:

Mohammad Ebrahim Bahram, PhD.

Address: Department of Physical Education and Sport Sciences, Faculty of Educational Sciences and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.

Tel: +98 (913) 2627940

E-mail: bahramsport2010@gmail.com

method for the treatment and improvement of body function and the prevention of injuries [10].

To our knowledge, no studies have been conducted on the effect of massage after exercise on the MDA, SOD and GPX markers. However, there are some studies on the effect of various massages on the markers of muscle injury, oxidation, anti-oxidation, and immune system. Yousefi et al. showed that massage after intense physical activity had a positive effect on immunoglobulin A and neutrophils in athletes with disabilities [14]. Naghizadeh et al. reported that the serum levels of creatinine kinase and lactate dehydrogenase slightly increased after massage compared to an eccentric exercise session [15]. Sadat and Hosseinizadeh in a study investigated the effect of sport massage on hematological parameters in semi-professional male runners. Their results showed a significant difference between the two types of active and sports massage in white blood cell, hemoglobin and hematocrit levels [16]. It has also been reported that massage has no effect on the strength and athletic performance and may even cause a decline in athletic performance [19]. Considering the importance of the massage, the present study aims to evaluate the effect of three types of massage on serum levels of MDA, SOD and GPX following a session of exhaustive exercise.

2. Materials and Methods

This is a quasi-experimental study conducted on 48 female futsal players aged 17-22 years in Zahedan, Iran during 2019-2020, who were voluntarily participated and randomly divided into four groups: Swedish massage, Russian massage, Thai massage, and control. Five cc of fasting blood was taken from the anterior brachial vein of subjects three times simultaneously from 8 to 10 A.M. To examine the difference within groups, repeated measures ANOVA was used and to measure differences between groups, one-way ANOVA was carried out. The significance level was set at 0.05.

3. Results

As shown in Table 1, the results of repeated measures ANOVA showed that massage after exhaustive exercise leads to a significant reduction in MDA ($F=73.811$, $P=0.001$), GPX ($F=44.237$, $P=0.001$) and SOD ($F=14.594$, $P=0.001$) levels. The results of one-way ANOVA showed a significant difference between the effects of three types of sports massage on serum levels of MDA, SOD and GPX after one session of exhaustive exercise ($P=0.001$).

Table 1. Between-subjects and within-subjects effects tests (Repeated measures ANOVA)

Variables	Groups	Mean±SD			Sig.	
		Pre-exercise	After Massage	Immediately After Exercise	Within-subjects	Between-subjects
MDA (nmol/mg protein)	Swedish massage	0.63±0.12	0.64±0.12	0.41±0.04	0.04*	0.001*
	Russian massage	0.61±0.10	0.061±0.10	0.48±0.05	0.02*	
	Thai massage	0.60±0.12	0.61±0.12	0.45±0.03	0.03*	
	Control	0.57±0.14	0.56±0.15	0.57±0.14	0.26	
SOD (µm/mg protein)	Swedish massage	61.68±5.85	61.66±4.84	71.70±2.99	0.02*	0.001*
	Russian massage	61.39±3.09	61.38±3.09	68.26±2.84	0.002*	
	Thai massage	51.86±4.19	54.35±4.69	65.29±2.86	0.01*	
	Control	55.03±4.05	54.86±5.82	51.36±5.42	0.09	
GPX (µm/mg protein)	Swedish massage	2.54±0.92	2.53±0.93	4.38±4.38	0.002*	0.003*
	Russian massage	2.74±0.87	2.72±0.86	3.24±0.10	0.003*	
	Swedish massage	3.20±0.92	3.21±0.89	0.041±0.04	0.04*	
	Russian massage	2.42±0.77	2.44±0.71	0.48±0.05	0.02*	

* The difference is significance at $P \leq 0.05$.

4. Conclusion

This study aimed to investigate the effect of three types of massage on serum levels of MDA, SOD and GPX following a session of exhaustive exercise. To the best of our knowledge, there is no other similar study to compare our findings with their results. Yousefi and Azamian in a study showed that 20 minutes of effleurage sports massage can have a beneficial effect on the immune system of wheelchair basketball players [14]. This is consistent with our results. There is a powerful antioxidant called cytochrome that recycles reactive oxygen species and produces water by transferring electrons to oxygen; it reduces electron emission and, thus, the production of reactive oxygen species, and electron leakage [22].

The findings of the present study are against the results of Ang et al. and Kim et al. [24, 25]. This discrepancy may be due to the type and technique of applied massage. Consistent with the present study, Piri et al. showed that massage therapy leads to a significant reduction in oxidation markers by 25% [26]. Against the present study, Billhall et al. showed that massage therapy has no effect on biochemical markers [32]. Due to impaired balance between the oxygen consumption and the oxygen required by the involved tissues and the creation of a process called ischemia, exhaustive exercise seems to cause damage to unsaturated lipids in tissue membranes and production of reactive oxygen species, which in turn stimulates lipid peroxidation and ultimately increases the production of free radicals.

It seems that the use of massage during the recovery period and rest after exhaustive exercise can reduce the level of MDA, as an oxidative stress marker, and increase oxidative enzymes of SOD and GPX.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the University of Sistan and Baluchestan (Code: IR.US.Rec.1399.31409). All participants in this study signed a written consent form and were assured of the confidentiality of their information.

Funding

This study was extracted from the MA. thesis of first author at the Department of Physical Education and Sports Sciences, University of Sistan and Baluchestan.

Authors' contributions

All authors contributed equally in preparing this article.

Conflicts of interest

The authors declared no conflict of interest.