International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 4, Issue 7 - 2017

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.07.008

Evaluating the Impact of Omega-3 Supplementation intake on Creatine Kinase index after one Session of Resistance Training in Inactive Individuals

Shahla Hojjat[1*], Alireza Rahimi[1], Sahar Yadi[2]

1. Department of Physical Education and Sport Sciences, Islamic Azad University, Karaj Branch, Iran.
2. M.Sc, Islamic Azad University, Karaj Branch, Iran.

*Corresponding author: Shahla Hojat, Department of Physical Education and Sport Sciences, Islamic Azad University, Karaj Branch, Iran. E-mail: *academicilam@gmail.com;* Tel: +989127926703

Abstract

Creatine Kinase is an enzyme that consumes and metabolizes energy in the body, especially in the bloodstream. Although this enzyme is found in very low amounts, there are higher levels of this enzyme in different tissues. The main objective of the present study is evaluating the impact of omega 3 supplementation intake on CK index after one session of resistance training in inactive individuals. In this study, 40 patients with inactive women in Karaj, with an average age of 28.16±2.45 years, height 161.58±3.45 cm and weight 59.97±4.30 kg, randomly targeted in four groups of 10 patients (dose groups 2000, 3000, 4000 and placebo) were enrolled. Initially, the subjects participated in a place of resistance training and then practice immediately and 24 hours after their blood samples to estimate the rate of 5cc,LDH serum was used (pre-test). After a period of thirty days omega-3 supplementation in the form of two doses of thousand mg (for 2000), three doses of thousand mg (for 3000), and four doses of thousand mg (for 4000) per day received in capsule form. During this period, the control group received omega-3 free capsules. One day after the supplementation period, the test subjects were taken. For data analysis used from SPSS version 18. The results showed that omega-3 supplementation at a dose of 2000 no significant effect on the level of LDH in women, disabled, immediately after resistance exercise had ($P>0.05$). But the effect of supplementation with doses of 3000 and 4000 had a significant effect on the level of LDH in non-active women immediately and 24 hours after a resistance training ($P<0.05$). The effects of doses higher than the dose in 2000 was 3000 and 4000. According to the results, we can say that omega-3 supplementation for a month with a daily intake of 3000 or 4000mg/day for disabled women to be effective.

Keywords: Omega-3, Creatine Kinase, Resistance Training, Inactive Individuals.

Introduction

Resistance training is a type of resistance action, in which any attempt is made against a force that causes resistance in the athlete. In fact, resistance exercises are performed to increase the force and size of the skeletal muscle [1]. Musculoskeletal and muscular pain, emerging in two forms of acute and late, are some common complication of physical activity. This condition is an unpleasant status accompanied with pain, stiffness, and palpitations in the muscles. This complication usually occurs after extraterrestrial contraction and can occur in professional athletes and it will continue to affect their athletic activities and their proper function and result in an athlete's deprivation. Therefore, athletes and coaches should try to prevent and treat this problem. Unfortunately, there is still no proper approach to preventing and treating this muscular disorder. There are many theories about the causes and ways of preventing and treating this disorder; however, none of them are certain and more researches are required in this specific area [2].Creatinekinase is an enzyme that consumes and metabolizes energy in the body, especially in the bloodstream and it consists of two subunits; B subunit is specific to brain and M is specific to muscle tissues; when these two subunits are combined, three isoforms of BB-CK, MB-CK, and M-CK are formed [3], functioning in cerebrovascular cells or muscle myofibrium structures. Although this enzyme is found in very low amounts, there are higher levels of this enzyme in different tissues, with the highest rate being in cerebrospinal and the cerebrospinal fluids; this enzyme is absent in lupus and erythrocytes tissues [4]. Omega-3 fatty acids are from the family of fatty PUFAs acids. There are three types of omega-3 fatty acids that play essential role in the body; 20: 3 alpha-linolenic acid: ALA is the only essential fatty acid that the body cannot synthesize; Eicosapentaenoic acid: EPA; 20: 5 and Docosahexaenoic acid: DHA; 22: 6, both of which are long chain fatty acids and can be used as a starting point for the synthesis of linoleic acid [5, 6]. Getting high levels of omega 3 fatty acid in your diet is known as a health donor in humans. Omega-3 fatty acid reduces blood lipids and has anti-inflammatory, anti-arrhythmic, and regurgitation properties. Regular physical exercise has a moderate positive effect on body function, maintaining well-being and preventing illness. All those who engage in a very intense physical activity for the first time, experience pain, burning, or local sensitivity to stress in the muscle and surrounding areas; so, there have always been, and will be, subjects who have stopped physical exercise because of bodily pain and muscle cramp [7]. The present study was conducted to examine the impact of omega 3 supplementation intake on CK index after one session of resistance training in inactive individuals.

Materials and Methods

The present semi-experimental, applied study was conducted using pre-test and post-test steps. The subjects included non-active women in the city of Karaj, with a BMI of $20<BMI<25 kg/m^2$ and an age range of 25 to 35 years old, who were non-smokers, without endocrine disease, diabetes, cardiovascular and immune system and blood pressure disorders, no alcohol, no excessive consumption of fish oil and omega-3 fatty acids, a history of recent tissue damage, and no history of taking suppressive drugs. The study subjects were categorized in four groups of 10, with various dosages of 200, 3000, 4000 mg/day, and placebo. All information about patients, including general condition, health and well-being, medical records and medications, drug use, diet and daily physical activity, was evaluated. Considering the age and sex of subjects as factors affecting the factor studied, the age and sex of subjects were selected in a homogeneous manner. Required information was collected through a researcher-made questionnaire; measurement of body weight was performed at least 3 hours apart from a meal. In order to familiarize the subjects with the instruments and devices used, the subjects were invited to the sports hall to get familiar with the proper method of weight lifting and proper breathing technique one month before the beginning of the study. In order to determine optimal maximal repetition, the training of footprints, knee bending, knee flattening, chest pain, armpit movement and abdominal movement were performed using Technology, Italy Body Building Machine, equipped with a computer system with special software; Brzycki formulation was used for the calculation of required equations. An intensive physical activity session includes knee flexion, chest press, armpit movement, and abdominal movement performed by the subject with a 70% repetition of each movement. The rest interval between stations was 2 minutes. Additionally, 5 cc blood samples of all tested subjects were collected 30 minutes before exercise (at rest and after 12 hours fasting) and, then, immediately, and 24 hours after intense exercise program. In the next stage, supplement-receiving groups received three days of recovery and, then, took omega 3 intakes with two 1000 mg dosages for the first group, three 1000 mg dosages for the second group, and four 1000 mg dosages for the third group. One day after the completion of supplement intake period, the subjects were tested again at the current test site and under the same conditions of pre-test step. Collected data was analyzed through SPSS18 and chi-square tests [8-10], and $P<0.05$ was considered as significance level.

Findings

40 subjects were examined in the present study. The highest mean age and height were 29.42±2.11 years and 162.5±3.49 cm and the lowest mean weight ad BMI turned out to be 58.94±4.51 kg and 224.49±2.74 kg/m^2, which were related to the group receiving 4000 mg/day dosage; the highest BMI was related to the group receiving 3000 mg/day dosage (Table 1). The highest mean,3.82±0.43, of creatine kinase immediately after the exercise in the pre-test step was related to the group recipient of 4000 mg/day; the

highest amount of this enzyme in the post-test step was related to placebo group, with a rate of 3.55±0.34. The highest mean of creatine kinase in 24 hours after the pretest, 2.02±0.28, and post-test, 1.98±0.29, steps turned out to be related to placebo group (Table2). The results of the present study, also, showed that the impact of 3000 and 4000 mg/day dosages of omega3 supplementation turned to be significant on the level of creatine kinase enzyme of inactive women immediately after the exercise (P<0.05)(Table3).

Table 1. Information on the age, height, weight, and BMI of studies subjects

Groups	Age (year)	Height (cm)	Weight (kg)	BMI (kg/m^2)
Dose 2000	28.31±2.19	161.29±3.27	59.01±4.19	22.77±2.51
Dose 3000	27.83±2.85	160.74±3.14	60.70±4.43	23.71±2.12
Dose 4000	29.42±2.11	162.5±3.49	58.94±4.51	22.49±2.74
Placebo	27.08±2.67	161.8±3.90	61.23±4.70	23.57±2.80

Table 2. The level of CK in groups with different doses of omega-3 and placebo

Test steps		CK level with a dosage of 2000	CK level with a dosage of 3000	CK level with a dosage of 4000	Placebo
Immediately after training	**Pre-test**	3.57±0.42	3.71±0.35	3.82±0.43	3.49±0.37
	Post-test	3.44±0.44	3.01±0.29	3.10±0.33	3.55±0.34
24 hours after training	**Pre-test**	1.92±0.31	1.82±0.25	1.95±0.32	2.02±0.28
	Post-test	1.83±0.30	1.51±0.19	1.57±0.27	1.98±0.29

Table 3. Comparison of the difference between the mean CK levels immediately after training in different groups

Index	Groups (I)	Groups (J)	Average Comparison	P-value
Creatine kinase	**Dose 2000**	**placebo**	0.07	0.081
	Dose 3000	**placebo**	0.64	0.003
	Dose 4000	**placebo**	0.66	0.003
	Dose 2000	**Dose 3000**	-0.57	0.004
	Dose 3000	**Dose 4000**	-0.02	0.149
	Dose 4000	**Dose 2000**	0.59	0.004

Discussion

Having proper knowledge regarding appropriate exercises to successfully advance physical fitness programs and athletic skills is one of the major goals of physical education and sport research. One of the challenges ahead, is the pressure and force of exercises which, sometimes, causes injury, such as acute and delayed muscle bruising resulting from unusual exercise, in the athlete and his estrangement from sport and training environment [11, 12]. Acute bouts often occur during or immediately after an intense physical activity which, ultimately, causes fatigue, which is mistakenly associated with anemia and the accumulation of metabolic waste [13]. In fact, one of the causes of local fatigue is the accumulation of lactic acid in active organs and the concentration of hydrogen ion in the blood [14]. Considering the role of enzymes and the effect of physical activity and the various consumables on them, the use of enzyme activity changes is very important in evaluation and diagnosis of diseases and tissue damage [15,16]. CK enzyme is one of the most well-known and most reliable clinical indicators, which is believed to increase the amount of the enzyme in the blood as damage to the heart-muscle cells in the body [16,17].In fact, unsaturated omega-3 fatty acids that are essential for the health of the body cannot be synthesized by body; therefore, they should be obtained through food or dietary supplements, the best source of which is fish, which contains more levels and groups of fatty acids [18].

Therefore, the present study was conducted to examine the impact of omega 3 supplementation intake on CK index after one session of resistance training in inactive women in the city of Karaj. The results of the present study indicated an average age of 28.16±2.45 years, height of 161.58±3.45 cm, and weight of 59.97±4.30 kg in subjects. Also, omega-3 supplementation with a dose of 2000 mg/day did not affect CK levels in inactive women immediately and 24 hours post-exercise resistance ($P>0.05$). However, there turned out to be a significant relationship between 3000 and 4000mg/day doses of Omega-3 and CK levels immediately after exercise training and 24 hours later ($P<0.05$). based on the findings of Rodrigues et al study (2010), which was conducted to investigate the effect of upper resistance exercise with different rest periods on cell damage, 2 sessions of 3 sets resistance activity, with an intensity of 80% and 5 upper trunk movement, increased the level of CK serum significantly in untrained men, which was consistent with the results of the present study [19]. The results of Jouris et al study (2011), which was conducted to examine the effect of omega-3 fatty acidsupplementation on the inflammatory response to eccentric strength exercise, showed that one week intake of omega-3 fatty acids, modifies inflammatory markers, such as white blood cells, and asthma symptoms, such as the limb, after a session of extrinsic resistance in healthy adult men and women [20]; this is also consistent with the findings of the present study. In most studies that have investigated the effects of intense exercise and training, especially resistance exercises, on the level of activity of enzymes such as Creatine kinase, a significant change in these enzymes has been reported. It has been reported that resistance activity has been shown to cause ultrastructural damage to muscle cell counts, which results in the release of the intracellular content, including creatine kinase [21]. Overall, it seems that the use of dietary supplements can modify and eliminate the significant increase in the concentration of enzymes in the cellular and muscular damage of the athlete. As reported in studies, omega-3 fatty acids reduce cellular damage after adult ischemic conditions [22].

Conclusion

The results of the present study showed that one session of resistance exercise is expected to increase the level of Creatine kinase in inactive women. However, the intake of omega-3 fatty acids with doses of 3000 and 4000 mg/day will prevent further increases in this index in supplemented athletes and, therefore, can be a good way to prevent inflammatory and cell-mediated reactions in inactive women. It is recommended that inactive women use an omega-3 supplement for one month, immediately and 24 hours after intense resistance, with a daily dose of 3,000 or 4,000 mg/day, to prevent inflammation.

References

1. Panahi J, Havasian MR, Roozegar MA. Knowledge of physical education teachers' toward tooth avulsion in Tehran, Iran.J Oral Health Oral Epidemiol. 2014; 3(2):66-71.
2. Ibrahim KH, Rahmani-nia F, Talebi E. The effect of two methods of vitamin C intake and extraterrestrial extensibility of elbow flexor muscles after delayed muscle soreness. J of Harakat. 2001; 7(7):67-76.
3. Dufour R, Lott JA, Henry JB. Clinical enzymology. In: Henry JB. Clinical Diagnosis and Management by Labrotoary Methods.20th ed. Philadelphia, Saunders, 2001.
4. Burtis CA, Ashwood ER. Clinical chemistry.5th ed. Philadelphia, Saunders, 2001.
5. Lerman RH. Essential fatty acids.AlternTher Health Med. 2006; 12(3):20-9.
6. Stillwell W, Shaikh SR, Zerouga M, Siddiqui R, Wassall SR. Docosahexaenoic acid affects cell signaling by altering lipid rafts. ReprodNutr Dev. 2005; 45(5):559-79.
7. Rezaei S, Afsharnejad T, Moosavi SV, YousefzadehSh, Soltani R. Validation of the Persian version of pain selfefficacy scale: A psychometric chronic low back pain patients. Journal of Fundamentals of Mental Health. 2012; 13(4):328-45.
8. Havasian MR, Panahi J, Pakzad I, Davoudian A, Jalilian A, ZamanianAzodi M. Study of Inhibitory effect of alcoholic and aqueous extract of Scrophulariastriata (tashnedari) on candida albicans in vitro.J of Pejouhesh. 2013; 36(5):19-23.
9. Mohamad Reza Havasian, SepidehAmouzadeh, JasemMohamadi. The Study of Inhibitory Effect of Different Extracts of Scrophulariastriata on Common pathogens, A Systematic Review. Int. J. Adv. Res. Biol. Sci. 2017; 4(6):87-92.
10. Mahmoodi Z, Havasian MR, Afshari J, Salarzaei M. Comparison of the Time Interval between the Onset of Clinical Symptoms and Receiving Streptokinase in Patients with Acute Myocardial Infarction (AMI) at Amir Hospital in Zabol, Iran, 2013. Int. J. Adv. Res. Biol. Sci. 2017; 4(5): 95-100.

11. Faulkner JA, Brooks SV, Opiteck JA. Injury to skeletal muscle fibers during contractions: conditions of occurrence and prevention. Physical therapy. 1993; 73(12):911-21.
12. Friden J. Muscle soreness after exercise: implications of morphological changes. International journal of sports medicine. 1984; 5(02):57-66.
13. Asmussen E. Observations on experimental muscular soreness. ActaRheumatologicaScandinavica. 1956; 2(1-4):109-16.
14. Fitts, RH. Mechanisms of muscular fatiqueIn : Resource manual for exercise testing and prescription. American College of Sports Medicine.Lea &Febiger, Philadelphia.Exercise, 1993.
15. Brancaccio P, Maffulli N, Limongelli FM. Creatine kinase monitoring in sport medicine. British medical bulletin. 2007; 81(1):209-30.
16. Souza CA, Garcez-Leme LE. Evaluation of myocardial alterations using the enzymatic profile of elderly long-distance runners.European Review of Aging and Physical Activity. 2006; 3(2):91-4.
17. Chanoit GP, Concordet D, Lefebvre HP, Orcel K, BRAUN JP. Exercise does not induce major changes in plasma muscle enzymes, creatinine, glucose and total proteins concentrations in untrained beagle dogs. Transboundary and Emerging Diseases. 2002; 49(4):222-24.
18. Havasian MR, Panahi J, Ruzegar MA. Ilam Lipid and Glucose Study: A cross-sectional epidemiologic study. Nova Journal of Medical and Biological Sciences. 2014; 2(5):1-6.
19. Rodrigues BM, Dantas E, de Salles BF, Miranda H, Koch AJ, Willardson JM, Simão R. Creatine kinase and lactate dehydrogenase responses after upper-body resistance exercise with different rest intervals. The Journal of Strength & Conditioning Research. 2010; 24(6):1657-62.
20. Jouris KB. McDaniel JL. Weiss EP. The effect of omega-3 fatty acid supplementation on the inflammatory response to eccentric strength exercise, Journal of Sports Science and Medicine. 2011; 10(3):432-38.
21. Roth, SM. Martel, GF. Ivey, FM. Lamer, J. Metter, EJ. Hurley, BF. Rogers, MA. High-volume, heavy-resistance strength training and muscle damage in young and older women, J Appl Physiol. 2000; 88(3):1112–18.
22. Duzova H, Karakoc Y, Emre MH, Dogan ZY, Kilinc E. Effects of acute moderate and strenuous exercise bouts on IL-17 production and inflammatory response in trained rats. Journal of Sports Science &Medicine. 2009; 8(2):219-24

Access this Article in Online	
	Website: www.ijarbs.com
Quick Response Code	Subject: Biochemistry
DOI:10.22192/ijarbs.2017.04.07.008	

How to cite this article:

Shahla Hojjat, Alireza Rahimi, Sahar Yadi. (2017). Evaluating the Impact of Omega-3 Supplementation intake on Creatine Kinase index after one Session of Resistance Training in Inactive Individuals. Int. J. Adv. Res. Biol. Sci. 4(7): 63-67.

DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.07.008