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The 3rd International CUA Graduate Students Symposium

University of Mohaghegh Ardabili June 5-6, 2016 سومین سمپوزیوم بینالمللی دانشجویان تحصیلات تکمیلی دانشگادهای عضو اتحادیهٔ قفقاز

> دانشگاہ محقق اردبیلی 17-17 خر دادماہ

Acute Effect of Glutamine Supplementation on Serum Levels of CPK after Eccentric Resistance Exercise in Untrained Young Men

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Abstract

Glutamine is the most abundant amino acid in human muscle protein synthesis is and can Creatine kinase (CPK) is one of biochemical degradation of muscle cells in blood serum reduce. Increased serum Creatine kinase and exercise extrovert is more pronounced among non-athletes. The aim of this study is acute influence of glutamine supplementation on serum levels of CPK after eccentric resistance exercise in young men. Methods: 16 randomly selected young man (age: 22.35 ± 2.27 yr; body mass: 69.91 ± 9.78 kg; height: 177.08 ± 4.32 cm) disabled and the two groups (N=8) control group (N=8) were divided that all subjects were obtained twice in the 8th with maximum dominant leg begins to warm up, then in 3 sets of 15 teeth with 70%1 RM performed knee flexion. Test the positive side move to the zero angle of the knee joint did and the motion negative (eccentric contraction of the quadriceps) was carried out by subjects. Also, rest for 3 minutes between each session was considered. The active group received glutamine acute. Blood samples were taken from the subjects after 24 hours and data using spss software and analyzed by parried sample T test (P<0.05). Results showed that acute consumption of glutamine in the active group (P = 0.04) were significant and in the control group (P = 0.36), no significant effect was observed. This study showed that acute consumption of glutamine can be Creatine kinase is reduced and muscle damage.

Keywords: Glutamine, Creatine kinase, eccentric exercise

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Introduction

Many athletes use a variety of dietary supplements to improve their performance and minimizing risk of injures to provide them with an advantage over their opponent (2). DOMS and impaired muscle function are the common consequences of excessive EE (1). Glutamine is the most abundant amino acid within the human body (4). Multiple roles of dietary protein and key amino acids such as glutamine create a variety of potential applications for hard-training athletes (4). Increase intramuscular glutamine levels have been directly linked to influencing muscle cell volume (9), which enhances protein synthesis, and increases muscle size. By increasing muscle mass, the contractile force of a muscle can be increased (2).During exercise, increases and decreases in plasma glutamine levels have been demonstrated and these variations are reflected by the type, duration, and intensity of exercise (6). Exercise induced muscle damage to muscle fibers resulting in an inflammatory response (7) and myofibrillar damage along the Z-band (8).

In general, DOMS continues to increase after exercise and peaks between 24 and 48 h after exercise). The reasons behind DOMS have been a steady interest for many sports scientists for a long time. Although several factors including lactic acid, connective tissue damage surrounding muscles, muscle temperature, muscle spasm, inflammatory responses, free radicals, and nitric oxides have been suggested for causing DOMS, there is no clear explanation Previous literatures have speculated that the cause of DOMS is due to structural muscle damages and perturbation of calcium homeostasis or acute inflammatory responses to exercise .The EMG spectrum from eccentric, concentric muscle contractions and increased serum levels of muscle proteins such as creatine kinase (CK) in humans were studied as a factor of mechanical damage of muscle fiber and functional change of metabolic tissue (9,10). Prophylactic and therapeutic nutritional interventions involving protein, protein hydrolysate, mixed amino acids, selective amino acids, and branched-chain amino acids have been demonstrated to be effective in reducing some or all of the symptoms of muscle damage following isolated eccentric muscle actions (11,13), resistance exercise (14),downhill running (15), and endurance exercise (17).

Method

16 randomly selected young man (age: 22.35 ± 2.27 yr; body mass: 69.91 ± 9.78 kg; height: 177.08±4.32cm) disabled and the two groups (n=8) control group (n=8) were divided that all subjects were obtained twice in the 8th with maximum dominant leg begins to warm up, then in 3 sets of 15 teeth with 70%1 RM performed knee flexion. Test the positive side move to the zero angle of the knee joint did and the motion negative (eccentric contraction of the quadriceps) was carried out by subjects. Also, rest for 3 minutes between each session was considered. The active group

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received L-Glutamine acute. Blood samples were taken from the subjects after 24 hours and data using spss software and analyzed by parried sample T test ($P \le 0.05$).

Results and Discussion

CPK one of the tiny blood factors that are indicative of muscle damage in the hours after intense exercise significant increase in the blood and muscle. Extreme eccentric muscle exercises cause more damage, and enzymes in the plasma to enter into the muscle cells and thus can be identified muscle damage after exercise. Research a lot about that eccentric exercise causes muscle damage and destruction there. The sports supplements can reduce muscle damage and its value in plasma research also shows that the amino acid intake can prevent further muscle damage. Glutamine is the most abundant amino acid in human muscle that can damage and destroy muscle cells after eccentric exercise prevent the aim of this study is that acute consumption of glutamine what the outcome will be. Results showed that acute consumption of glutamine in the active group (P = 0.04) were significant and in the control group (P = 0.36), no significant effect was observed. This study showed that acute consumption of glutamine can be CPK is reduced and muscle damage.

References

1. O'Reilly K, Warhol M, Fielding R, Frontera W, Meredith C, Evans W. Eccentric exercise-induced muscle damage impairs muscle glycogen repletion. J Appl Physiol. 1987;63:252–6. [PubMed]

2. Waddell D, Fredricks K. Effects of a Glutamine Supplement on the Skeletal Muscle Contractile Force of Mice. Am J Undergraduate Res. 2005;4:11–8.

3. Rahmani Nia F, Farzaneh E, Damirchi A, Shamsi Majlan A. Effect of L-Glutamine Supplementation on Electromyographic Activity of the Quadriceps Muscle Injured By Eccentric Exercise. Iran J Basic Med Sci; 2013; 16: 808-812.

4. Lowery L, Forsythe CE. Protein and overtraining: potential applications for free-living athletes. J Int Soc Sports Nutr. 2006;3:42–50. [PMC free article] [PubMed]

5. Cruzat VF, Rogero MM, Tirapegui J. Effects of supplementation with free glutamine and the dipeptide alanyl-glutamine on parameters of muscle damage and inflammation in rats submitted to prolonged exercise. J Cell Biochem Funct. 2010;28:24–30. [PubMed]

6. Babij P, Mattews SM, Rennie MJ. Changes in blood ammonina, lactate, and amino acids in relation to workload during bicycle ergometer exercise in man. Eur J Appl Physiol. 1983;50:405–

7. Newsholme EA. Why is L-glutamine metabolism important to cells of the immune system in health, post-injury, surgery, or infection. J Nutr. 2001;131:2515–2522. [PubMed]

8. Clarkson P, Hubal M. Exercise-induced muscle damage in humans. Am J Phys Med Rehabil. 2002;81:52–69. [PubMed]

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9. Low SY, Taylor PM, Rennie MJ. Response of glutamine transport in cultured rat skeletal muscle to osmotically induced changes in cell volume. J Physiol. 1996;492:877–85. [PMC free article] [PubMed] 10. Joohyung Lee, College of Physical Education, Kookmin University, 77 Jeongneung-ro, Seongbuk-gu, Seoul 136-702, Korea, Tel: +82-2-910-4782, Fax: +82-2-910-4789,

11.Merletti R, Lo Conte L, Sathyan D. Repeatability of Electrically-evokedMyoelectric Signals in the Human Tibialis Anterior Muscle. J Electromyogr Kines. 1995;5:67–80. [PubMed]

12.Zhou Y, Li Y, Wang R. Evaluation of exercise-induced muscle damage by surface electromyography. J Electromyogr Kines. 2011;21:356–62. [PubMed]

13.Buckley JD, Thomson RL, Coates AM, et al. Supplementation with a whey protein hydrolysate enhances recovery of muscle force-generating capacity following eccentric exercise. J Sci Med Sport. 2010;13:178–81. [PubMed]

14.R. B., fc. W. OGILVIE, AND J. A. SCHWANE. Eccentric exercise-induced injury to rat skeletal muscle. J. Appl. Physiol.: Respirat. Environ. Exercise Physiol. These experiments were designed to study skeletal muscle p54(1): 80-93, 1983.-

15.Nosaka K, Sacco P, Mawatari K. Effects of amino acid supplementation on muscle soreness and damage. Int J Sport Nutr Exerc Metab. 2006;16:620–35. [PubMed]

16.Kraemer WJ, Ratamess NA, Volek JS, et al. The effect of amino acid supplementation on hormonal responses to resistance training overreaching. Metabolism. 2006;55:282–91. [PubMed]

17.Etheridge T, Philp A, Watt PW. A single protein meal increases the recovery of muscle function following an acute eccentric exercise bout. Appl Physiol Nutr Metab. 2008;33:1–6. [PubMed]

18.<u>Phillips T</u>, <u>Childs AC</u>, <u>Dreon DM</u>, <u>Phinney S</u>, <u>Leeuwenburgh C</u> University of Florida, Biochemistry of Aging Laboratory, College of Health and Human Performance, Center for Exercise Science, College of Medicine, Gainesville 32611, USA. <u>Medicine and Science in Sports and Exercise</u> [2003, 35(12):2032-2037]

19.Greer BK, Woodard JL, White JP, et al. Branched-chain amino acid supplementation and indicators of muscle damage after endurance exercise. Int J Sport Nutr Exerc Metab.

20. W. J. Evans, C. N. Meredith, J. G. Cannon, C. A. Dinarello, W. R. Frontera, V. A. Hughes, B. H. Jones, H. G. Knuttgen Journal of Applied Physiology Published 1 November 1986 Vol. 61 no. 5, 1864-1868 DOI:
21. <u>Nosaka K</u>, <u>Clarkson PM</u> Exercise and Sports Science, Department of Environmental Science, Yokohoma City University, Japan. <u>International Journal of Sports Medicine</u> [1996, 17(2):120-127]

22. Vinicius Fernandes Cruzat¹, Marcelo Macedo Rogero² and Julio Tirapegui¹, Effects of supplementation with free glutamine and the dipeptide alanyl-glutamine on parameters of muscle damage and inflammation in rats submitted to prolonged exercise. Article first published online: 2 NOV 2009 DOI: 10.1002/cbf.1611