ACTA SCIENTIFIC NUTRITIONAL HEALTH

Volume 3 Issue 7 July 2019

Review Article

Effects of Creatine Supplementation in Aerobic Training

Juliano Elias Farah and Maria Gisele Santos*

Universidade Federal do Paraná, Brazil

***Corresponding Author:** Maria Gisele Santos, Universidade Federal do Paraná, Brazil.

Received: May 24, 2019; **Published:** June 12, 2019

Abstract

Superior results with regard to performance of physical activities (force increase, power and endurance muscular) to be obtain through appropriate diet alimentary, in whole of structure of the training. The creatine supplementation to promote high of force (relative and absolute) and muscle potency, that effect are anaerobic activities, even, some study to relate about effects in aerobic activities (high in the performance in aerobic activities and changeling in the utilize in the energetics substrates during exercise).

Keywords: Aerobic; Anaerobic; Physical

Introduction

Needs for better results lead athletes and physical activity practitioners to search for effective ways to optimize performance and body composition. Improvements in physical performance can be achieved through appropriate nutritional habits [1], linked to the control of the intensities and rest periods of the exercises, obtained through the appropriate control of the training methods [2]. Constantly, performance standards are surpassed by better prepared individuals and more specialized in the activities they practice, and possibly use some ergogenic resource to achieve their achievements. Any type of substance, process or procedure that may be capable of improving physical performance, including pharmacological agents, nutritional, physiological, psychological and mechanical components, is considered an ergogenic resource [1,3]. One of the variables of the training that can cause significant impact on the desired results is the nutritional component. The elaboration of a diet containing adequate amounts of macronutrients (carbohydrates, proteins and fats) and micro-nutrients (water, vitamins and minerals) is essential to obtain satisfactory results. However, deficiencies in the intake of certain nutrients (es) are constantly observed, due to the high metabolic demand of the activity practiced. In Brazil, there is nowadays a great use of supplements, which are used both for ergogenic and aesthetic purposes (Director of the Brazilian society of medicine of sports, 2003). One of the most popular compounds among athletes is creatine [4], in its monohydrate form, and it is one of the most widely used and researched supplements in recent times [5].

Effects of creatine supplementation on aerobic training

Studies using creatine supplementation in conjunction with aerobic activities remain limited in the literature, however, it has been suggested that creatine supplementation may modify the use of energy substrates during prolonged submaximal exercises, leading to increased performance [6]. Likewise, repetitive sprints performed on bicycles, characterized as intermittent aerobic activities, can be increased concomitantly with creatine supplementation [5,7].

However, some researches on feeding and supplementation are strong in their positions, reporting that the use of creatine as an ergogenic resource in prolonged activities does not find any support in the scientific literature (Director of Brazilian society of medicine of sports, 2003). Perhaps certain positions are due to non-use of creatine phosphate (CP), as an energetic contributor, during aerobic activities [8].

Analyzing the isolated use of high energy inorganic phosphates (ATP-CP) on aerobic exercise, it would be valid to affirm that creatine does not cause an improvement in performance, but one of the processes by which creatine would have an ergogenic action on oxidative metabolism, (1) and (2), in which the CP and creatine

may serve as auxiliary energy messengers between the mitochondria and the cytoplasmic sites for the use of ATP [7].

A study performed with handball players (n = 9), supplemented with creatine for five days (20 g/day), underwent a resistance run test, and the protocol consisted of running around a court (40 x 20m) during five minutes continuously, starting at a speed of 10 km/h and increasing speed at 2 km/h at the end of each stage (5min), but before the start of the next cycle three minutes of recovery were taken, gauge of lactate concentration. The test went on uninterrupted until the maximal voluntary exhaustion. There were no significant differences ($p > 0.05$) in the lactate concentrations of the supplemented group, nor were there any improvements in the mean time of exhaustion. The authors concluded that creatine supplementation was not effective in causing a performance increase in the discontinuous running test with increasing speed [9].

Another study investigating the effects of creatine supplementation (20 g/day of creatine for five days + 5 g/day of creatine for 35 - 50 days) on maximal oxygen uptake (VO_2 max) in a bicycle test with moderate loads ($p < 0.05$), but the magnitude of these reductions was correlated (r). In this case, the magnitude of these reductions was correlated ($p < 0.05$). = 0.87) with the percentage of type 2 fibers in the vastus lateralis muscles, indicating that recruitment of motor units and activated muscle volume may interfere with the maximum VO_2 submaximal test results [10].

The results of creatine supplementation on aerobic activities remain limited [6], controversial results are obtained in different methodological researches, however, current results show that creatine may be effective for certain aerobic physical activities [5]. Therefore, this is a field of research that still needs to be explored, using structured methodologies and based on the literature, so that the next results are reliable and reliable to subsequent studies [11-38].

Conclusion

Adherence to appropriate eating habits and routine and structured training may be sufficient to achieve the desired goals, both for aesthetic and competitive purposes. However, to optimize performance in distinct physical activities, mainly activities with anaerobic energy systems predominance (ATP-PC and anaerobic glycolysis), the use of creatine as an ergogenic supplement may be of significant importance.

Therefore, the use of creatine supplementation seems to be effective to bring about performance improvements in activities with anaerobic predominance, however, intermittent aerobic activities may also benefit. Due to the high demand for studies that obtained positive results in the performance of physical activities, creatine supplementation as an ergogenic resource is of great value, likewise due to the lack of concrete arguments regarding adverse reactions, few restrictions on their intake, proving to be an effective supplement for both the athletic community and non-competitive exercise practitioners.

Bibliography

1. Fox EL., *et al.* "Bases fisiológicas da Educação Física e dos Desportos". *Rio de Janeiro: Guanabara Koogan* (1991).

2. Verkhoshansky YV. "Problemas atuais da metodologia do treino desportivo". *Revista Treinamento Desportivo* 1.1 (1996): 33-45.

3. Williams MH. "The ergogenics edge: pushing the limiits of sports performance". *USA: Human Kinetics* (1998).

4. Kreider RB. "Effects of creatina supplementation on performance and training adaptations". *Molecular and Cellular Biochemistry* 244.1 (2003): 89-94.

5. Fleck SJ., *et al.* "Efeito da suplementação de creatine em sprints no pedalar e na performance de sprints repetitivos no pedalar". *Revista Brasileira de Ciência e Movimento* 8.3 (2000): 25-32.

6. Williams MH and Branch JD. "Creatine supplementation and exercise performance: an update". *Journal of American College Nutrition* 17.3 (1998): 216-234.

7. Williams MH., *et al.* Creatina São Paulo: Editora Manole LTDA (2000).

8. ACSM (American College of Sports Medicine). "The physiological and health effects of oral creatine supplementation". *Medicine and Science in Sports and Exercise* 32.3 (2000): 706-717.

9. Izquierdo M., *et al.* "Effects of creatine supplementation on muscle power, endurance, and sprint performance". *Medicine and Science in Sports and Exercise* 34.2 (2002): 332-343.

10. Jones AM., *et al.* "Effect of creatine supplementation on oxygen uptake kinetics during submaximal cycle exercise". *Journal of Applied Physiology* 92.6 (2002): 2571-2577.

11. Balsom PD., *et al.* "Creatine in humans with special reference to creatine supplementation". *Sports Medicine* 18.4 (1994): 268-280.

12. Becque Md., *et al.* "Effects of oral creatine supplementation on muscular strength and body composition". *Medicine and Science in Sports and Exercise* 32.3 (2000): 654-658.

13. Bird SP. "Creatine supplementation and exercise performance: a brief review". *Journal of Sports Science and Medicine* 2 (2003): 123-132.

14. Brudnak MA. "Creatina: are the benefits worth the risk?". *Toxicology Letters* 150.1 (2004): 123-130.

15. Burke DG., *et al*. "Effect of creatine and weight training on muscle creatine and performance in vegetarians". *Medicine and Science in Sports and Exercise* 35.11 (2003): 1946-1955.

16. Diretriz DA., *et al.* "Modificações dietéticas, reposição hídrica, suplementos alimentares e drogas: comprovação de ação ergogênica e potenciais riscos para a saúde". *Revista Brasileira de Medicina do Esporte* 9.2 (2003): 43-56.

17. Eckerson JM., *et al.* "Effect of two and five days of creatine loading on anaerobic working capacity in women". *Journal of Strength and Conditioning Research* 18.1 (2004): 168-173.

18. Goldberg PG and Bechtel PJ. "Effects of low dose creatine supplementation on strenght, speed and power events by male athletes". *Medicine and Science in Sports and Exercise* 29.5 (1997): 251.

19. Havenetidis K., *et al.* "The use of varying creatine regimens on sprint cycling". *Journal of Sports Science and Medicine* 2.3 (2003): 88-97.

20. Huso Me., *et al.* "Creatine supplementation influences substrate utilization at rest". *Journal of Applied Physiology* 93.6 (2002): 2018-2022.

21. Juhn MS. "Oral creatine supplementation". Physican and Sportsmedicine 27.5 (1999).

22. Kilduff LP., *et al.* "Effects of creatine on isometric bench-press performance in resistance-trained humans". *Medicine and Science in Sports and Exercise* 34.7 (2002): 1176-1183.

23. Kocak S and Karli U. "Effects of high dose oral creatine supplementation on anaerobic capacity of elite wrestlers". *The Journal of Sports Medicine and Physical Fitness* 43.4 (2003): 488-492.

24. Kurosawa Y., *et al*. "Creatine supplementation enhances anaerobic ATP synthesis during a single 10 sec maximal handgrip exercise". *Mollecular and Cellular Biochemistry* 244.1-2 (2003): 105-112.

25. Kutz MR and Gunter MJ. "Creatine monohydrate supplementation on body weight and percent body fat". *Journal of Strength and Conditioning Research* 17.4 (2003): 817-821.

26. Lehmkuhl M., *et al.* "The effects of 8 weeks of creatine monohydrate and glutamine supplementation on body composition and performance measures". *Journal of Strength and Conditioning Research* 17.3 (2003): 425-438.

27. Powers ME., *et al.* "Creatine Supplementation Increases Total Body Water Without Altering Fluid Distribution". *Journal of Athletic Training* 38.1 (2003): 44-50.

28. Preen D., *et al.* "Effect of creatine loading on long-term sprint exercise performance and metabolism". *Medicine and Science in Sports and Exercise* 33.5 (2001): 814-821.

29. Rawson ES and Volek JS. "Effects of creatine supplementation and resistance training on muscle strenght and weighlifting performance". *Journal of Strength and Conditioning Research* 17.4 (2003): 822-831.

30. Schroder H., *et al.* "Risk assessment of the potential side effects of long-term creatine supplementation in team sport athletes". *European Journal of Nutrition* 44.4 (2004): 255-261.

31. Skare OC., *et al.* "Creatine supplementation improves sprint performance in male sprinters". *Scandinavian Journal of Medicine and Science in Sports* 11.2 (2001): 96-102.

32. Snow RJ., *et al.* "Effect of creatine supplementation on sprint exercise performance and muscle metabolism". *Journal of Applied Physiology* 84.5 (1998): 1667-1673.

33. Tarnopolski MA and Maclennan DP. "Creatine monohydrate supplementation enhances high – intensity exercise performance in males and females". *International Journal of Sports Nutrition and Exercise Metabolism* 10.4 (2000): 452-463.

34. Vandenberghr K., *et al.* "Long-term creatine intake is beneficial to muscle performance during resistance training". *Journal of Applied Physiology* 83.6 (1997): 2055-2063.

35. Volek JS., et al. "Creatine supplementation: effect on muscular performance during high-intensity resistance exercise". Medicine and Science in Sports and Exercise 28.5 (1996): 81.

36. Volek JS and Rawson ES. "Scientific Basis and Practical Aspects of Creatine Supplementation for Athletes". *Nutrition* 20.7 (2004): 609-614.

37. Volek JS*., et al.* "The effects of creatine supplementation on muscular performance and body composition responses to short-term resistance training overreaching". *European Journal of Applied Physiology* 91.5 (2004): 628-637.

38. Willoughby DS and Rosene J. "Effects of oral creatine and resistance training on myosin heavy chain expression". *Medicine and Science in Sports and Exercise* 33.10 (2001): 1674-1681.

Volume 3 Issue 7 July 2019