



EFFECT OF CREATINE SUPPLEMENTATION ON STRENGTH IN RESISTANCE TRAINED ATHLETES: A BRIEF REVIEW

Physiology

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ABSTRACT

Creatine supplementation is one of the most common and popular ergogenic aids among athletes. It is found that creatine supplementation along with resistance training augments muscle strength and performances. Increase in muscle fiber (hypertrophy) and weight lifting performances have also been observed with creatine supplementation. This article reviewed various references of creatine supplementation and its efficacy on strength in athletes. A systemic review has been conducted on various clinical studies using PubMed and manual search as a source. This review showed that creatine supplementation has promising result in improvement of strength among athletes. The review also emphasizes on future thrust in areas of research on nutritional supplements to enhance performance in athletes.

KEYWORDS

Creatine Supplement, Ergogenic Aids, Strength, Performance.

INTRODUCTION

Physical fitness is a state of health and well being. It is achieved through proper nutrition¹, moderate to vigorous physical exercise² and sufficient rest³. Lots of nutritional products are available in fitness industry. Athletes enhance their performance by various nutritional supplements like creatine, Beta- alanine, arginine.

Creatine monohydrate is most widely available and supplement of choice for many athletes in order to improve their sports performance. Its ergogenic efficacy and safety profile make this nutritional supplement one of the most researched supplement in sports science.

Since 1920, the importance of creatine monohydrate supplementation have been studied⁴. The exogenous ingestion of creatine is mainly used as ergogenic supplement because of its known fact to improve performance in muscular strength, enhance short burst of muscular endurance and improve training effectiveness.

Creatine is primarily located in skeletal muscle and their improve ments attributed due to increased skeletal muscle free creatine and phosphocreatine along with increased resynthesis of adenosine triphosphate, both of which enhance⁵ muscle strength and weightlifting performances.

Although several studies have evaluated effect of creatine supplementation along with resistance training improves strength and performances but in India as sports science industry is slowly coming

into prominences so very limited research work is carried out as of now. Therefore, the purpose of this review to evaluate efficacy of creatine supplementation on strength in resistance trained athletes.

MATERIAL AND METHODS

INCLUSION CRITERIA

Young healthy male athletes on creatine supplementation along with resistance training are included in this study. From the articles, data only on muscle strength and weightlifting performance is assessed. The studies of 1-3 months duration for creatine supplement is considered in this article.

EXCLUSION CRITERIA

Articles related to older subjects with creatine supplementation along with resistance training are excluded in this study and studies of creatine supplementation efficacy along with protein or carbohydrate are also excluded.

This article reviewed various references of creatine supplementation and its efficacy on strength in resistance trained athletes. Studies showing creatine supplementation group and placebo group that performed same resistance training protocol are taken and then outcomes are compared in both the groups. So, 16 studies met the inclusion criteria (Table 1). Almost all studies used 1RM bench press test, Squat test, Leg press test as exercise protocol. Number of repetitions are also assessed using standard weight.

TABLE:1 Effect on Muscle Strength and Weightlifting Performance following same Resistance training protocol on Creatine supplementation and Placebo Group.

S. No	Subjects (Male)	Supplementation Duration	Period of Resistance Training	Exercise Protocol during supplementation	Control Group	Placebo Group	References
1.	21	21 days	Untrained	3 weeks resistance training	- Bench press - 11% increase - Leg press - 54% increase	- Bench press - 4% increase - Leg press - 29% increase	6
2	16	84 days	Untrained	12 weeks	Leg press - 54% increase	Leg press - 29% increase	7
3	17	63 days	Resistance trained football players	9 weeks	- Bench press - 5% increase - Squat - 9% increase	- Bench press - No change - Squat - 5% increase	8
4	30	28 days	Untrained	4 weeks	- Bench press - 18% increase - Leg press - 42% increase	- Bench press (9% increase) - Leg press - 16% increase	9
5	21	37 days	5 years	8 weeks	- Bench press - 9% increase - Leg press - 17% increase - Bench press repetitions - 16% increase	- Bench press - 7% increase - Leg press - 8% increase - Bench press repetitions (4% increase)	10

6	23	42	1 year	6weeks	• 28% increase in 1RM	• 16% increase	11
7	24	56	3 years	8 weeks	• 7 % increase in bench press	• 5 % increase in bench press	12
8	20	35 days	Trained	5 weeks	• Bench press - 10% increase • Squat- 12% increase	• Bench press - 4% increase • Squat- 8% increase	13
9	35	42 days	2 years	6 weeks	• Bench press - 10% increase • Leg press - 12% increase	• Bench press - 1% increase • Leg press 10% increase	14
10	16	70 days	Resistance trained football players	10 weeks	• Bench press - 3% increase • Squat - 11% increase	• No change	15
11	19	84 days	2yrs	12 weeks	• Bench press - 24% increase • Squat - 32% increase	• Bench press - 16% increase • Squat 24% increase	16
12	18	26 days	2years	6 weeks	• Bench press - 8% increase • Bench press repetitions - 39% increase	• Bench press (2% increase) • Bench press repetitions - No Change	17
13	25	28 days	Resistance trained football players	7 weeks	• Increase in bench press lifting volume	• Decrease in bench press lifting volume	18
14	39	56 days	Resistance trained football players	8 weeks	• 6 % increase in bench press	• No change in bench press	19
15	14	7 days	6 years	2 weeks	• Bench press - 45% increase • Leg press- 43% increase • Bench press repetitions - 30% increase	• Bench press - 38% increase • Leg press- 25% increase • Bench press repetitions- No change	20
16	8	28 days	11 years	7 weeks	• Bench press - 6% increase • Bench press repetitions – 26% increase	• No Change	21

RESULT

Several studies have evaluated the combined effect of creatine supplementation and resistance training on muscle strength and weightlifting performances. Of the 16 studies reviewed, the average increase in muscle strength following creatine supplementation plus resistance training is greater than average increase in muscle strength in placebo. There is greater increase in weightlifting performances too. Thus, there is significant improvement in muscle strength and weight lifting performances after creatine supplementation in concomitant with resistance training.

CONCLUSION

The study has shown that creatine is a potential ergogenic nutritional supplement among athletes. Evidence proved that creatine supplement during resistance training improves muscle strength and performances. A large number of studies are published on creatine but still exact physiologic mechanism by which it affects strength is unclear as uncertainty remains due to dosage strategies, exercise protocols and individual variability.

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