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The effect of creatine supplementation on fat free mass in handball players

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ABSTRACT

Creatine is among the main ergogenic agents used in sports aiming to achieve increased power, performance, lean body mass (LBM) and delayed fatigue. Creatine supplementation has been associated with increased LBM and strength and reduced muscle mass loss.The aim of this study was the effect of creatine supplementation on fat free mass in handball players.24 handball players were randomly assigned in a double-blind method to either a creatine treatment (CT, n=12) group or a placebo (PL, n=12) group. The CT group ingested 20 g daily (5 g × 4 times) for five days. The effect of creatine supplementation was tested usingpaired t test and independent t tests for comparisons data. Statistical significance was set at p<0.05.The test results showed that creatine supplementation had significant effect on fat free mass of handball players included in groups CT. fat free mass was significantly higher than placebo group (p<0.01). There was no significant change in placebo group between pre- and post-test in fat free. on the other hand body weight in CT group significant change about 0/6Kg (p<0.01). Independence t test results also showed that the mean difference between groups in pretest and posttest was not statistically significant.This study suggests that short-term creatine supplementation significantly changed handball player's fat free mass.

Key Words: creatine supplementation, handball players, fat free mass.

INTRODUCTION

Many studies have shown that oral creatine supplementation increases total creatine and creatine phosphate (CrP) content in human skeletal muscle [1, 2]. Ingestion of 20g creatine per day for a period of 2–6 days has been shown to result in an approx. 20% increase in muscle CrP concentration [3]. A higher CrP concentration increases its availability for ATP re-phosphorylation, and via this mechanism may lead to the well-known improvements in performance during repeated high-intensity exercise tasks [4]. Subsequently, creatine supplementation has become a common practice in both professional and recreational athletes. So far, most research has focused on the ergogenic capacity of short-term creatine supplementation (i.e. loading phase, loading phase plus short maintenance) and only few data are available on the effects of prolonged creatine supplementation.It is generally assumed that short-term creatine supplementation has no, or evens a negative, effect on endurance performance [5]. However, Brannon observed an increase in muscle citrate synthase activity following a prolonged (4 week) creatine supplementation period in both rats that were trained, as well as in those that remained untrained, during the supplementation period [6]. With citrate synthase as a mitochondrial marker enzyme, these results suggested that prolonged creatine ingestion could affect muscle oxidative capacity, skeletal muscle substrate utilization and endurance performance during submaximal exercise [7].

In many studies, a significant increase in body mass has been observed following short-term creatine supplementation [8]. In general, the increase in body mass with creatine loading ranges from 1.0 to 2.2kg. This gain in body mass has been suggested to result from water retention in skeletal muscle due to increased cellular

osmolarity [9]. However, creatine ingestion has also been suspected to stimulate myofibrillar protein synthesis [10] and/or inhibit protein breakdown [11]. High combined doses of creatine and caffeine does not affect the LBM composition of either sedentary or exercised rats, however, caffeine supplementation alone reduces the percentage of fat in the carcass. The employed vertical jump regimen increases the percentages of water and protein and reduces the fat percentage in these animals [12].In a study was to examine the changes in bench press strength (BPS), vertical jump (VJ), 100 yd dash time, and fat-free weight (FFW) in football players following 8 weeks of supplementation with a carbohydrate placebo (CHO), creatine monohydrate (CM), or CM plus CHO. The CM+CHO group was experienced significant ($p<0.05$) improvement in BPS, VJ, 100 yd dash time and FFW when compared to the CHO group. However, delta scores for the CM group were not significantly different from the CHO group. These data suggest that CHO taken with CM during training may be superior to training alone for enhancing exercise performance and FFW [13].Noonan compared the effects of different dosages of creatine relative to fat free mass on strength, % body fat, body mass (BM), fat free mass (FFM), 40-yd dash time, and vertical jump (VJ) height. Both experimental groups had significant improvements in the bench press; the group ingesting 300 mg * kg-1 FFM of creatine improved significantly more than the control group ($p < 0.05$). Forty-yard dash improvement was significantly better as a result of ingesting 100 mg * kg-1 FFM of creatine compared to the control group. Only the 100-mg group significantly improved 40-yd time. No significant differences among groups were noted in BM, % body fat, FFM, or VJ. In conclusion, ingestion of 100 or 300 mg * kg-1 FFM of creatine for 8 weeks in conjunction with weight training and speed training significantly improved 40-yd dash time and bench press strength, respectively [14]. The aim of this study was the effect of creatine supplementation on fat free mass in handball players.

MATERIALS AND METHODS

24 handball players were randomly assigned in a double-blind method to either a creatine treatment (CT, n=12) group or a placebo (PL, n=12) group. The CT group ingested 20 g daily (5 g × 4 times) for five days. The effect of creatine supplementation was tested usingpaired t test and independent t tests for comparisons data. Statistical significance was set at $p<0.05$.

RESULTS AND DISCUSSION

The test results showed that creatine supplementation had significant effect on fat free mass of handball players included in groups CT. fat free mass was significantly higher than placebo group ($p<0.01$). There was no significant change in placebo group between pre- and post-test in fat free. on the other hand body weight in CT group significant change about 0/6Kg ($p<0.01$). Independence t test results also showed that the mean difference between groups in pretest and posttest was not statistically significant.

Statistic variable		Pre-test (average ± SD)	Post-test (average ± SD)	T	P
fat free mass	Creatine	128.13 ±17	136 ±2	-2.234	0.001*
	Placebo	122.10±1.23	125 ±7	-5.467	0.001*

CONCLUSION

This study suggests that short-term creatine supplementation significantly changed handball player's fat free mass. In support of present research, the Bourgeois (2008) was done on Creatine monohydrate attenuates body fat accumulation in children with acute lymphoblastic leukemia during maintenance chemotherapy. Children with ALL treated with corticosteroids as part of a maintenance protocol of chemotherapy showed an increase in % BF that was attenuated by CrM supplementation [15].

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