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Effect of Creatine Supplement Muscular Strength in Active Women

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Abstract : Creatine (Cr) is a naturally occurring compound, that is found in the skeletal and cardiac muscles and exogenous creatine feedings can add to the body's total creatine pool. The purpose of this study was to investigate the effect of creatine supplementation on muscular strength in active women. The participants of this study were 26 health women assigned randomly to two groups of creatine (Cr, n=13) and placebo (C, n=13). Both of group performance six days strength training, but creatine group drinks 10 mg four times per day. The maximal concentric contraction of quadriceps muscle was measured in before and after training. Results showed average power and peak force of extension and flexion muscle increased in Cr group than control group. In conclusion may creatine supplementation improves muscle performance in physical active women.

Key words: Creatine supplementation · Muscle strength · Active women

INTRODUCTION

Nutritional supplements are commonly used by recreational and competitive athletes as ergogenic aids to improve their physique and performance capabilities [1]. Some studies demonstrated improved capacity for high intensity workouts, higher maximal strength of muscle groups and higher muscle mass in subjects who took the supplement. The most significant improvements are seen in those individuals with the lowest initial total creatine.
Creatine is a naturally occurring compound, that is found in the skeletal and cardiac muscles and exogenous creatine feedings can add to the body's total creatine pool [2].

Increase of creatine concentrations, which may enhance the ability to sustain high adenosine triphosphate (ATP) turnover rates during strenuous exercise [3]. As a result creatine supplementation may delay neuromuscular fatigue [4], improve muscle strength and power output [5] and increase muscle size. If this benefit holds true, in theory, the fatigue-delaying properties may allow an athlete to train more intensely in short duration, high intensity bouts, which could result in a greater increase in, muscle mass as well as gains in strength and power [6,7].

Endurance (aerobic) exercises such as running, stationary cycling and swimming show no improvement with creatine supplementation. However, there have been numerous studies that support short-term use of creatine monohydrate in activities that require short periods of high-intensity power and strength. These include weightlifting, sprinting and rowing [3].

Chrusch *et al.* (2001) reported that creatine supplementation enhanced strength and lean mass following 12-weeks of training [8]. Most studies demonstrating the efficacy of short-term (5- 6 days) creatine supplementation have used a loading dose (20 g•d21) as their supplement regime [9,10].

The aim of this study was to investigate the effect of craetine supplement on muscle strength on physical education women during their practice season.

MATERIALS AND METHOD

Subjects: Twenty six healthy females students volunteers participated in the study who were randomly assigned to two groups.

Ten women consider as the control group (only exercise training), those who were taking creatine drug during a period of 6 weeks exercise training consider as a case group. Muscle function was taken before and after the athletes took supplement and training. The effect of creatine supplement was investigated after consumption with 10 mg per/day in six week with sprint and strength exercise in case group.

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Experimental Design : The subjects referred to the lab on two days which were before and after six days strength training. In first session height, weight, fat percentage was measured. Following the familiarization session subjects were randomly assigned to either a placebo group (20g/day dextrose) or creatine supplement group (20g/day Creatine monohydrate). All subjects performance strength exercise in six day. Before and after a period measured of training, muscle function of subject (maximal voluntary concentric contraction of preferred quadriceps muscle using an isokinetic device) [11].

Statistical Analysis: All statistical analyses were performed with using SPSS 11.5 (Statistical Package for Social Science) and t-test was used to determine the association of each factor and to be significant was considered at $p < 0.05$.

RESULTS

Anthropometrics characteristics of 2 groups (placebo and creatine supplementation) are shown in Table 1.

The result shows that significant different were between control and test group in mean power (knee extension and flexion) (p= 0/01, p=0/011) and peak force (knee extension and flexion) (p=0/01, p=0/02) (Figure 1-4).

Table 1: Anthropometric measurement of subjects

Variables	Control (n=13)	Test (n=13)
Age (year)	22/2± 3/1	21/33±2/14
Height (cm)	163/33± 4/21	164/44 ±5.46
Weight (kg)	60 ±6/11	62/70± 5/56
Fat (%)	21/31 ±2/44	23/4 ±1/89
BMI(kg/m^2)	22/6 ± 3/22	23/13 ±2/76

Data were presented as mean and SD.

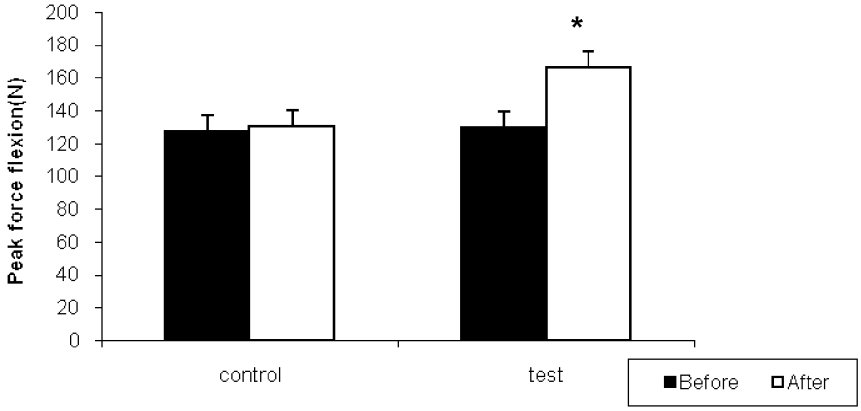

Fig. 1: Effect of exercise on peak force flexion (N) of subject in control and creatine supplementation . Data were presented as mean and SD. Correlation was significant at the p< 0.05 level

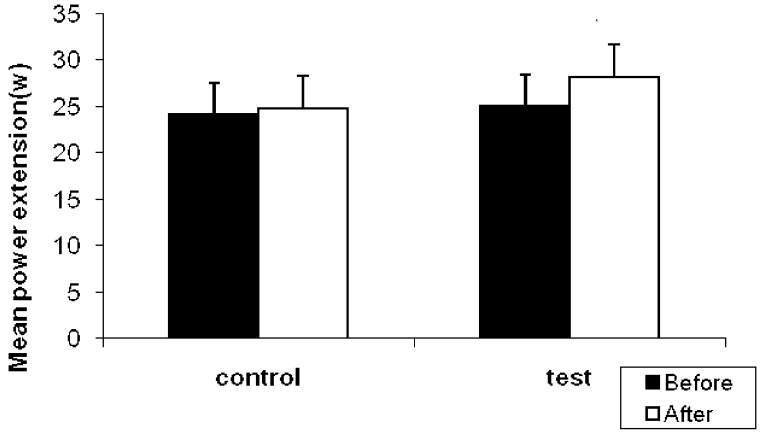

Fig. 2: Effect of exercise on power extension, (W) in control and creatine supplementation . Data were presented as mean and SD. Correlation was significant at the p< 0.05 level

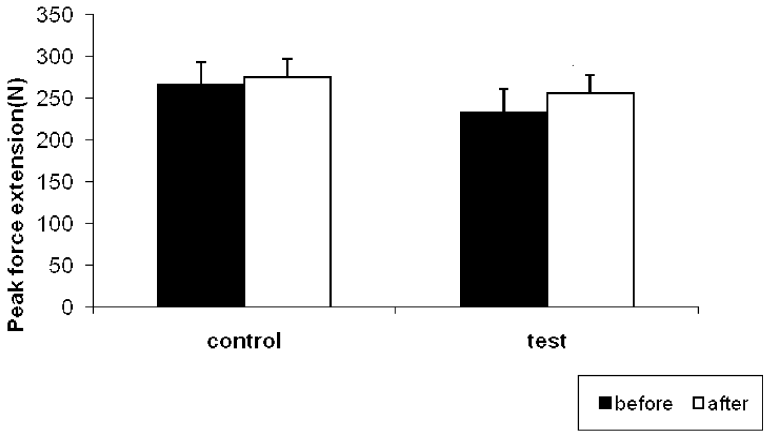

Fig. 3: Effect of exercise on power extention (N) and peak force of subject in control and creatine supplementation . Data were presented as mean and SD. Correlation was significant at the $p< 0.05$ level

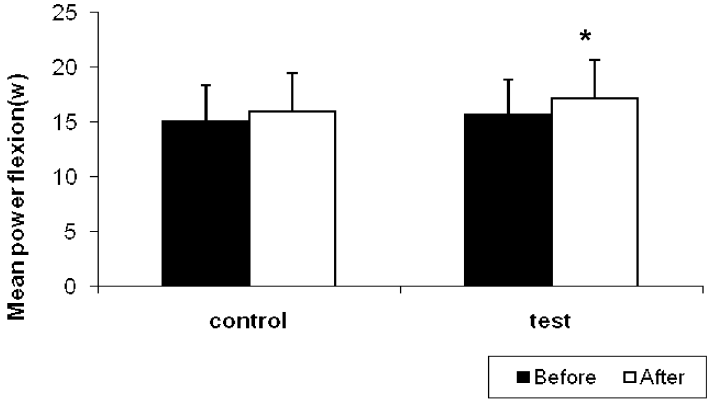

Fig. 4: Effect of exercise on power flexsion (W) and peak force in control and creatine supplementation . Data were presented as mean and SD. Correlation was significant at the $p< 0.05$ level

DISCUSSION

Results of this study demonstrate that Cr supplementation improved power performance and peak force of active women than placebo group.

This result was not agreed with results of Hoffman (2005). The fundamental difference between the present study and Hoffman was dosing regimen and supplement duration. Hoffman using 6g/day one session a day of Creatine supplement in her study [12], while we treated 20g/day creatine supplementation in present investigation.

Our present findings clearly indicate that the potential of Cr to enhance muscular functional capacity. One of the physiological roles of creatine is increasing the rephosphorylation of adenosine diphosphate through the creatine kinase reaction [13].

Two other studies reported improved muscle strength characteristics after either 12 (14) or 14 wk (15) of Cr intake in conjunction with a heavy resistance training program in men . Previous research has suggested that creatine supplementation elevates muscle creatine stores by 20% (14). It was reasonable to assume that Cr might stimulate the effects of resistance exercise training on muscle force and power output.

Brose *et al*. (2003) recently demonstrated that, compared with placebo, Cr in conjunction with 14 wk of heavy resistance training increased fat-free mass and isometric knee extension torque in male subjects by 3 and 25%, respectively.

CONCLUSION

This study shows that creatine supplementation at doses of 10 mg/day an effective to enhance muscle strength with strength training and may improve performance in active women.

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