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The effect of one period HIIT training and BCAA supplementation on indicators muscle damage in non-athlete men

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INTRODUCTION

It is important to realize that each amino acid plays a different metabolic or biochemical role in the human body and that deficiency of one amino acid may also affect the functioning. It is worth noting here that the requirements for specific amino acids are directly altered when the body is under stress. In the other words, physical disorders and plasma amino acid levels bear a direct relationship to each other. One of these amino acids that isused by the athletes is BCAA. The BCAAs ,include leucine, isoleucine, and valine represent 3 of the 20 amino acids that are used in the formation of proteins. BCAA supplementation may help prevent muscle damage during aerobic exercisedue to leucine's potential regulatory rolein protein synthesis, altered hormone levels, and increasing the amino acid content in free pools which may prevent the need for protein degradation(1). The aim of this research was study of effects of BCAA supplementation and HIIT training on the muscle injury factors (creatine kinase (CK), lactate dehydrogenase (LDH) and aldolase(ALD).

MATERIALS AND METHODS

Subjects.16 healthy men of age 21.3± o.8, height 174±2 cm, 72.5±11 kg and maximal oxygen uptake 2.8± 0.7 l/min participated in this study. subjects fully informed of the nature and the possible risks associated with the study before volunteered to participate. First Subjects participated in a high intensity interval training (HIIT) include 5 sets of 2 minute running on a treadmill (%85 $VO2_{max}$) with 1 min rest between every set. Blood sampling was done immediately after finishing the HIIT. Then, the subjects were divided in two groups (experimental and control groups). Both of groups participated in a HIIT program for 3 weeks, 3 sessions per week. Experimental group used BCAA supplement, one gram capsule, 3 capsules per day for 3 weeks. After the last training session, blood sampling was done immediately. All of the blood samples were sent to the laboratory for terminating enzyme activity of CK, LDH and ALD.

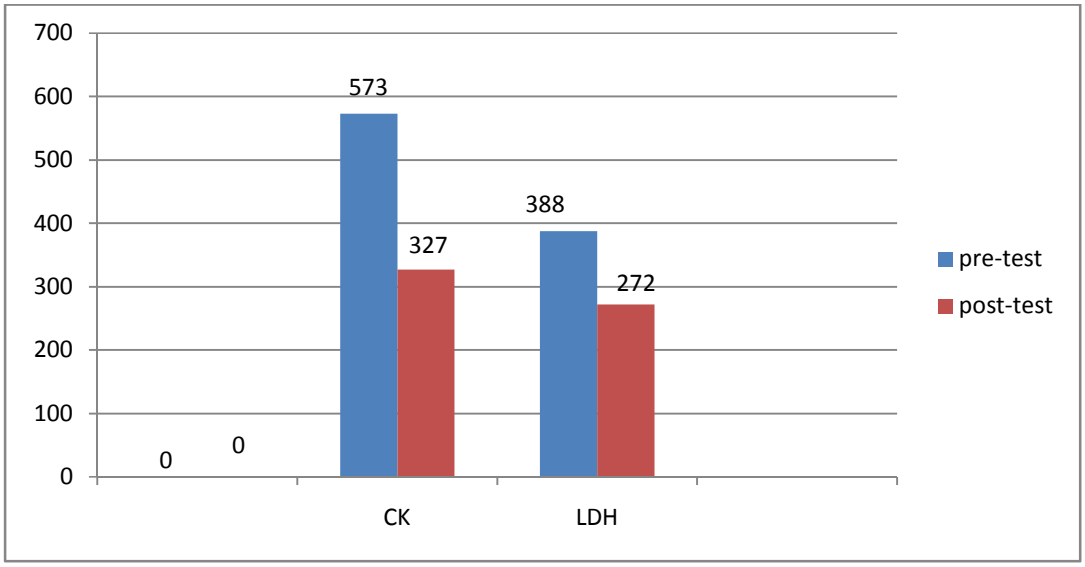
RESULTS

The statistical data of independentt-test show that there are significant differences in CK and LDH variables between experimental and control groups in pre and post-test ($p<0.05$) but no different in ALD variable. Below Table show these data.

Table 1.Statistical data(t-test)

Group / variable	Pre-test	Post-test	t	Sig.
CK	573.25±17.442	327.25±17.790	53.054	*
LDH	388.88±11.581	272±15.829	17.317	*
ALD	7.562±0.6675	7.562±0.6675	1.834	-

Chart1. Pre-test and post-test for CK and LDH



DISCUSSION

According to the data presented, BCAA supplementation appears to be an interesting nutritional for preventing muscle soreness. Although some studies have reported that BCAA supplementation using are reduced muscle damages. Oral BCAA administration (12 g/d for 2 weeks and additionally 20 g each before and after the exercise test) also reportedly suppresses the rise in serum creatine kinase activity for several days after exercise (2).Most of the study like this research have shown that BCAA administration can reduce muscle soreness(3). The mechanisms that underlie these BCAA effects have not yet been examined. However, one possibility is that BCAA may attenuate exercise-induced protein breakdown, while leucine may stimulate muscle protein synthesis(4). Also several studies in recent years have inferred an anabolic effect of leucine or the BCAA on muscle protein synthesis(5). In the other hand,

When BCAA ingested before aerobic exercise, exogenous BCAA increases concentrations of human growth hormone and helps attenuate a dropin testosterone, resulting in a more anabolic environment (6). The administration of either BCAA or alpha-ketoisocaproate, the keto analogue of leucine, inhibits protein catabolism in vitro (7). In addition, it has been suggested that a decrease of amino acid in the free muscle pool, as would occur during prolonged exercise, might act as a signal to promote muscle protein. Degradation, thereby replenishing the pool (8). Therefore, keeping the pool high in BCAA through supplementation might suppress the signal for muscle protein breakdown or speed recovery.

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