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Effects of whey protein supplement and concurrent training on body composition and muscular fitness of male weight lifters

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Abstract
This study was to examine the combined effects of whey protein supplement and concurrent training on body composition and muscular fitness of Debre Markos town male weight lifters. Body composition and muscular fitness testing measures were recorded in male weight lifters (n=22, age 20-23 years before and after an 8 week combined concurrent training and whey protein supplement. Body composition assessment included "BMI" test and 3site skin folds test for body fat percentage and the muscular fitness testing, push up test for muscular endurance, sit up test for abdominal strength and 1RM test for upper body strength, comparison were made using paired sample t- test and persons correlation has been made. Significant improvement were made in skin fold caliper and BMI test (p<0.05), 1RM test (p<0.05), sit up test (p<0.05), and Push up test (p<0.05). Generally based on mean value the respondents 8 week whey protein supplement and concurrent training have a positive effect on body composition and muscular fitness performance of weight lifters of experimental group than control group. Whey protein supplement and concurrent training program was improved weight lifters body composition and muscular fitness performance.

Keywords: Whey protein, concurrent training, body composition, muscular fitness

Introduction
The consumption of nutritional supplements is common among athletes especially weight lifters to improve performance. Supplements that promoted to improve exercise and athletic performances are sometimes called "ergogenic aids" or "performance supplements and studies have been shown that nutritional supplements with weight lifting can increase muscle fiber size and strength [1]. Liquid meal supplements that are high in protein boost total energy and specific nutrient intake at a time when one's appetite is often suppressed [2]. Whey protein supplements are a complete high quality and the richest known source of branched chain amino acids (BCAAs) as well as all essential amino acids. The BCAAs serve for muscle energy production and fuel for the immune system as well as activate the mechanisms that underline recovery [3].

The essential amino acids are indispensable for stimulating a high rate of protein synthesis within adult muscle [4]. At the molecular level, stimulating protein synthesis and minimizing protein breakdown are the two processes essential amino acid to efficient recovery after exercise [5]. Like most other protein supplements, whey protein powders claim to promote the maintenance of positive nitrogen balance athletes [6]. Whey protein has a far superior capacity to stimulate the rate of muscle protein synthesis and decrease the rate of protein degradation after exercise. Compared to other forms of protein, whey has a great stimulatory effect – this has been attributed to its high leucine content and rapid rate of digestion [7].

Concurrent Training (CT) is the combination of resistance and endurance training in periodized program to maximize all aspects of physical performance. Unless an athlete is in a pure-power sport like Olympic Weightlifting, or a pure-endurance sport like long distance cycling; a combination of both power related and endurance related attributes are required to excel in mixed-type sports [8]. Muscular fitness is the combination of muscular strength and muscular endurance exercise.

And endurance exercises lead to a significant increase in type I muscle fibers, since these fibers have a large amount of mitochondria [9]. Strength exercise leads to muscle hypertrophy due to the increase in the number of fibril proteins [10].

Methodology

Twenty two male weight lifters (mean ±SD; age 21.3±1.05 years, height 1.64±.08 meter weight experimental group 57.7± 7.4 and 59.67 ±.63 control group during pre test.

All participants were informed of the potential risks and benefits and provided written informed consent and parental consent prior to participation. During the first week of the study, participants performed the baseline testing Protocol, followed by an 8-week training program the final week consisted of the post-testing protocol.

Procedures First the researcher obtained the ethical clearance from concerning body and meets the participants of the study, during the familiarization session; participants were informed all procedures and familiarized with all performance measured. Before the participants were started the training program and whey protein supplementation the participant were got awareness not to take other nutritional supplement during the study and not exercise for at least 24 hours prior to each trial. Next to this the participants were performed pre test process at base line week 0 and muscular fitness variables and body commotion were measured. Then the participants were grouped randomly into control and experimental group. After that both groups were going to start concurrent training and the experimental group was consume whey protein supplement.

Testing was conducted at the same time of day for both pre- and post-testing sessions. Anthropometric data such as age, height, weight, body mass index (BMI), and 3-site skin fold assessment and strength performance was recorded first.

Skin fold Assessment: The athletes' height and weight were taken at the start of the testing sessions using a studio meter followed by skin fold measurement using Lange Skin fold Calipers performed all pre- and post test-skin fold assessments to ensure validity. All measurements were made on the right side of the body, with the subjects in the standing position. A 3-site method for males was used chest, calf and thigh) following standard ACSM skin fold testing procedures.

Muscular fitness Testing Procedures

Following anthropometric measurements, the athletes performed a 10-minute general warm-up consisting of dynamic movements and sub maximal running intervals. The athletes were given a 5-10 minute rest period between each performance test, and were encouraged to drink water as needed during the testing sessions.

Concurrent Training Program

Following the pre-testing protocol, the athletes participated in an 8-week concurrent training and whey protein supplementation the training program was for four non-consecutive days each week. Training duration was held for 50 minute.

Table 1: Testing and training schedule

Week 1	Week 2-9	Week10
Pre test	intervention program	Post test

Table 2: Sample Periodized Concurrent Training Program for the first month

	Monday	Wednesday	Friday	Sunday
Week 1 (60%)	Shoulder pres3x5 Push up3x6 Squat3x5	Dead lifts (3 x 5 rep Pull-ups(10-15 reps Chin-ups (10-15)	Shoulder pres3x5 Squat 3x5 Dumbbell 2x10 rep	sit up 3x10 Push up3x6 Bicep curl2x10
Week2 (65%)	Shoulder pres3x5	Dead lifts (3 x 5 rep	sit up 3x10	Shoulder pres3x5
	Push up 3x6 Squat3x5	Pull-ups (10-15 reps Chin-ups (10-15reps	Squat3x5 Dumbbell Triceps Extension 2x10	Pusup3x6 Bicep Curl (2 x 10)
Week3 (70%)	Clean and press (3 x 5 reps) sit up 3x10	sit up 3x10 Pusup3x6 Bicep curl2x10	Dead lifts (3 x 5) Pull-ups (10-15) Chin-ups (10-15)	Pusup3x6 Bicep Curl (2 x 10)
Week4 (75%)	Shoulder pres3x5 Squat3x5 Push up3x6	sit up 3x10 Pusup3x6 Bicep curl2x10	Dead lifts (3 x 5) Pull-ups (10-15) Chin-ups (10-15)	sit up 3x10 Pusup3x6 Bicep curl2x10

The intensity of the training increase progressively in each week based on individual ability trainees were increased to progress each week at each lift. If the athletes unable to perform properly at the chosen the load were decreased until the lift could properly performed the training volume remained the same in 8 week period. The intensity of the training increased in second month than the first.

Result and Discussion

The purpose of this study was to examine the effect of an 8 week concurrent training and whey protein supplement on body composition and muscular fitness on Debre Markos town weight lifters, the result indicated that whey protein supplement increased muscular fitness performance and improve body composition after 8 week concurrent training program and whey protein supplementation on weight lifters. There was significant change in all variables in from pre test to post test in the experimental group than control group (table 3and 4).

Table 3: Trainees body composition before and after 8 week training

Group	No	Variables	Pre test	Post test
Experimental Group	10	Body fat percentage	13.5± 2.01	12.1± 1.5
Control group	12		13.09 ±2.44	12.87± 2.42
Experimental Group	10	BMI	21.2±1.95	21.03±1.95
Control group	12		22.09 ± 1.22	22.25± 1.17

Mean body fat percentage decreased from pre test to post test it indicates that concurrent training with whey protein supplement had been a significant change on body composition (p<0.05).and these result are similar to other Finding, several studies has reported that WP supplementation promotes a reduction in fat mass in college-aged men over several months of resistance training [11].

In 8 week whey protein supplement and concurrent training program on body mass index study showed that whey protein supplement on the experimental group plays a great role for the decreasing of subjects' body weight due to this body mass index of experimental group changed significantly from pre test to post test but increased in control group from pre test to post test. In this case the study was indicates concurrent training with whey protein supplement was helps to optimize body weight of weight lifter.

Table 4: Effects of 8 week of concurrent training on muscular fitness

Group	N	Variables	Pre test	Post test
EG	10	sit up	38.7±9.66	44.1±10.38
CG	12		34.75±3.54	35.9 ±2.98
EG	10	Push up	52.5±17.2	62.4±15.3
CG	12		46.08±7.05	47.4±7.66
EG	10	1RM	1.14 ±0.08	1.24 ±0.05
CG	12		1.13 ±0.06	1.16 ± 0.6

Value (mean± SD), EG: experimental group, CG: control group

Muscular Fitness Measure

Muscular fitness (bench press, sit up, and push) significantly increased after 8 week of concurrent training and whey protein supplementation (p<0.05).

From this result the researcher was observed significant improvement on the experimental group than control group but there was also a little change on control group and this Finding related from two previous study support the positive effect of high quality protein supplementation, including whey, to maximize the increase in muscle mass [12] and strength when combined with prolonged (≥4 weeks) resistance training interventions. As depicted on the above table there was a great significant improvement observed sit up test in one minute on the experimental group than control group pre- post training tests mean value score of 8 week exercise These findings are supported by previous study indicated that whey supplementation is beneficial for strength performance [13] this finding is practically relevant with soldiers in the whey protein group performing on average 7 more push-ups relative to those in the CHO post-intervention after controlling for initial push-up performance. Other findings from previous meta-analyses of support the positive effect of high quality protein supplementation, including whey, maximize upper body muscle strength [14] when combined with resistance training interventions Other study showed that Whey protein after concurrent increases muscle protein synthesis 145% related with study healthy young men performed a bout of resistance exercise (8 sets of 5 repetitions), rested 15 minutes, and then performed 30 minutes of continuous cycling. On one occasion they were provided 25g of whey protein immediately after exercise, and on another occasion, they consumed only water (placebo). Compared to rest, the rate of muscle protein synthesis during 1-to-4 hours post-exercise was increased by 75% during placebo (water only) and by 145% when taking whey.

Conclusion

The finding of this study showed that whey protein supplement and concurrent training of weight lifters, there were observed body composition, muscular strength, upper body strength and muscular endurance improvement on the experimental group than control group due to whey protein supplement intervention on experimental group than control group because the presence of concurrent training and whey protein supplement but there is a little change on control group (concurrent training alone) Based on the above finding in all variables of experimental and control group null hypothesis rejected and alternative hypothesis was accepted.

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