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The Effect of Interval Training Combined with Beta-Alanine Supplementation on Physical Fitness Factors in Male Futsal Player

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Extended Abstract

Introduction

Futsal is a high-intensity interval sport that requires significant physical effort, specialized training programs, and nutritional strategies to optimize performance. Interval training, characterized by alternating periods of high-intensity exercise and designated recovery intervals, is a proven method for improving various aspects of physical fitness, including aerobic and anaerobic power, agility, and speed. Beta-alanine, a non-essential amino acid, is known to increase muscle carnosine levels, which can positively affect muscular carnosine, cellular calcium regulation, buffering capacity, and reduce lactic acid accumulation during high-intensity exercise, ultimately enhancing performance and delaying fatigue. This study aims to fill the existing research gap by evaluating the combined effect of interval training and beta-alanine supplementation on the physical fitness of futsal players compared to interval training alone. Previous research has examined the effects of interval training, beta-alanine, and their combination in various sports. These studies demonstrate potential benefits while also highlighting the need for further research in specific areas such as futsal.

Method

This semi-experimental study with a pre-test post-test design was conducted in a practical manner. The study population included male futsal players from Isfahan city, of whom 40 were randomly selected and divided into two groups: the high-intensity interval training with beta-alanine supplementation group and the high-intensity interval training with placebo group. Entry criteria for this study included gender: male, body mass index between 23 to 28, and absence of heart disease and orthopedic disorders. Participant selection was done through online advertisements and futsal clubs in Isfahan. After selection and confirming their participation, participants received detailed information and signed a consent form. Height and weight were measured using a Seca stadiometer and scale made in Germany. All tests were conducted in the morning. Participants' weight was measured with minimal or light clothing and without shoes, and their height was recorded in centimeters. Pre-test and post-test assessments included anthropometric indices, agility, sprint speed, anaerobic power, and aerobic power conducted by the researcher. The training program was executed over six weeks with three sessions per week. The training protocol included 10 repetitions of one-minute running at 90% maximum heart rate, with active recovery periods of one minute. The intervention group received six grams of beta-alanine daily, which was consumed 30 minutes before and immediately after exercise. The beta-alanine supplementation was six grams per day. After six weeks, pre-test assessments were repeated. The Illinois test was used to measure agility, the 40-meter Sprint test for speed, the anaerobic Rast test for anaerobic power, and the Shuttle run test for aerobic power. For data analysis, descriptive statistics indices including mean and standard deviation were used. The normal distribution of data was

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evaluated using the Shapiro-Wilk test, and homogeneity of variances was assessed with the Levene's test. Subsequently, One-way analysis of variance was used for between-group significance and Paired T-test for within-group changes ($p < 0.05$). All statistical calculations were performed using SPSS version 23 software.

Results

Statistical findings indicate that after six weeks of training, both groups showed significant increases in speed, agility, anaerobic power, and aerobic power. Furthermore, the high-intensity interval training group with beta-alanine supplementation exhibited significantly greater increases in speed, agility, anaerobic power, and aerobic power compared to the placebo group ($p < 0.05$).

Discussion and Conclusion

This study demonstrated that high-intensity interval training can effectively improve physical and motor performance in futsal players. Beta-alanine supplementation boosts muscle carnosine levels, which improves the muscle's capacity to withstand acid buildup during intense physical activity. The use of beta-alanine supplementation in conjunction with this type of training can lead to greater improvements in physical fitness and reduced fatigue. The study suggests potential mechanisms such as increased buffering capacity due to beta-alanine, which may enhance performance during high-intensity intervals. These findings have practical implications for futsal training programs, indicating that the combined intervention can be a valuable tool for optimizing physical fitness in athletes.

Therefore, combining interval training with beta-alanine supplementation is recommended as an effective method for improving futsal players' performance. The study also notes limitations and suggests areas for future research, including long-term effects, different training protocols, and larger sample sizes.

Keywords: Interval training, physical fitness, beta-alanine, futsal.

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