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The Role Of Whey Protein Supplementation In Enhancing Anaerobic Power Of Bodybuilders Following 8-Week Resistance Training Program

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Abstract

The purpose of this study was to investigate the impact of whey protein supplementation on the anaerobic power of bodybuilders following 8-week resistance training program. A total of 31 participants were assigned to the experimental group, which fulfilled their daily protein requirement through whey protein supplementation. Age, height, weight, and BMI were measured before and after the program to assess any changes. Additionally, anaerobic power was evaluated through various tests including 1 RM (Bench Press), 1 RM (Squats), 30-meter sprint test, Vertical Jump Test, and Peak Power Test (wingate test), both before and after the 8-week resistance training program. The results of the study indicated that the experimental group, which consumed whey protein supplementation to meet their protein requirements, demonstrated a significant improvement in anaerobic power following the 8-week resistance training program. The participants exhibited enhanced performance in all the assessed parameters of anaerobic power, including 1 RM (Bench Press) and 1 RM (Squats), indicating an increase in upper and lower body strength. Moreover, the 30-meter sprint test, Vertical Jump Test, and Peak Power Test showed substantial improvements, suggesting enhanced speed, explosive power, and overall anaerobic capacity. The findings of this study highlight the potential benefits of whey protein supplementation in combination with resistance training for bodybuilders. By fulfilling their protein requirements through whey protein supplementation, bodybuilders were able to enhance their anaerobic power. This improvement in anaerobic power has significant implications for performance during intense physical activities, such as weightlifting, sprinting, and jumping, which are integral to bodybuilding. The present study provides valuable insights for coaches, trainers, and athletes in the field of bodybuilding, emphasizing the importance of proper nutrition and supplementation strategies to optimize training outcomes. Whey protein supplementation can be considered an effective dietary intervention to support bodybuilders in improving their anaerobic power and achieving their performance goals. Future research should explore the long-term effects of whey protein supplementation on bodybuilders' anaerobic power and investigate its impact on other performance-related parameters.

Keywords: whey protein supplementation, anaerobic power, resistance training, bodybuilders.

Introduction

Bodybuilders strive to enhance their muscular strength and power to improve their athletic performance and achieve optimal results (Pourjafarian et al., 2019). Resistance training is a widely adopted method to increase muscular strength, and proper nutrition plays a crucial role in supporting the bodybuilding process (Monserdà-Vilaró et al., 2022). Among various nutritional interventions, whey protein

supplementation has gained considerable attention due to its high-quality amino acid profile and rapid absorption rate, making it an ideal candidate for promoting muscle protein synthesis and recovery.

Understanding the impact of whey protein supplementation on bodybuilders' anaerobic power following a resistance training program can provide valuable insights into optimizing performance outcomes (Alves et al., 2020).

In the context of bodybuilding, anaerobic power is a key component of athletic performance, contributing to activities such as weightlifting, sprinting, and jumping (Erduğan & Kurt, 2022). Anaerobic power reflects the ability to generate high levels of force and power in a short period, making it essential for explosive movements and rapid muscle contractions (Hoffman & Kang, 2002). Improvements in anaerobic power can lead to enhanced strength, speed, and power output, ultimately translating into improved athletic performance for bodybuilders (Wax et al., 2021).

As the bodybuilding community continues to seek ways to optimize performance, the role of nutrition becomes increasingly vital (Jacinto et al., 2022). Among the myriad of dietary supplements available, whey protein has emerged as a prominent player due to its unique properties and potential benefits for muscle development and recovery (Cintineo et al., 2018). Consequently, investigating the effects of whey protein supplementation on anaerobic power in bodybuilders can provide valuable scientific evidence to guide athletes, coaches, and nutritionists in making informed decisions to maximize training effectiveness and athletic prowess (Arentson-Lantz & Kilroe, 2021).

To investigate the impact of whey protein supplementation on bodybuilders' anaerobic power, the present study implemented 8-week resistance training program. The experimental group consisted of 31 participants who fulfilled their daily protein requirement exclusively through whey protein supplementation. Age and height measurements were taken before the program to establish baseline characteristics, while participant weight and body mass index (BMI) were assessed before and after the 8-week training period. Anaerobic power was evaluated using multiple tests, including 1 repetition maximum (1 RM) for the Bench Press and Squats, a 30-meter sprint test, Vertical Jump Test, and Peak Power Test (Wingate Test). All participants underwent these tests both before and after the 8-week resistance training program to measure changes in anaerobic power.

Based on the preliminary results of the study, it is anticipated that the experimental group, which consumed whey protein supplementation to meet their protein requirements, exhibited a significant improvement in anaerobic power following the 8-week resistance training program. The expected improvements encompass increased strength, speed, power output, and overall anaerobic capacity, reflecting the benefits of combining whey protein supplementation with resistance training for bodybuilders.

This study aims to contribute to the existing body of knowledge on the effects of whey protein supplementation and resistance training on anaerobic power in bodybuilders. The findings of this study can offer valuable insights to coaches, trainers, and athletes in optimizing their training regimens and nutritional strategies to enhance anaerobic power and overall performance outcomes.

Methodology

Participants

A total of 31 bodybuilders (experimental group) were recruited for this study. Their age, height, weight, and BMI were measured before the training program. The participants had no history of serious injuries or medical conditions that would affect their ability to perform the exercises. Informed consent was obtained from all

participants, and ethical guidelines were followed throughout the study.

Experimental Design

The experimental group followed 8-week resistance training program, which included a combination of exercises targeting different muscle groups. The participants consumed whey protein supplementation to fulfill their daily protein requirements. The dosage of whey protein supplementation was based on individual body weight and the recommended daily protein intake for athletes engaged in resistance training.

Measurements

The following measurements were recorded before and after the 8-week training program:

Age and height: Participants' age and height were measured using standardized techniques.

Weight and BMI: Participants' weight was measured using calibrated scales, and BMI was calculated using the formula weight (kg) divided by height (m^2).

Anaerobic Power Tests

The anaerobic power of all participants was assessed using the following tests:

1 RM (Bench Press): The maximum weight a participant could lift in a single repetition during the bench press exercise.

1 RM (Squats): The maximum weight a participant could lift in a single repetition during the squats exercise.

30-meter sprint test: Participants performed a sprint covering a distance of 30 meters as quickly as possible.

Vertical Jump Test: Participants performed a vertical jump, and the height reached was measured.

Peak Power Test (Wingate test): Participants performed a 30-second all-out sprint on a stationary bike, and peak power output was recorded.

Statistical Analysis

Statistical analysis was conducted using SPSS version 23.0. Descriptive statistics were calculated for demographic data and anaerobic power test results. Paired t-tests were used to compare pre- and post-training measurements within the experimental group. The significance level was set at $p < 0.05$.

Results

The present study aimed to examine the effects of an 8 Week Resistance Training Program (8WRTP) in conjunction with the use of diet protein on various performance and physical variables among participants. The results revealed significant improvements in weight, body mass index (BMI), upper and lower body strength, vertical jump height, and overall power output following the intervention.

Table 1 Mean comparison of Weight, 1-RM Bench Press Test, 1-RM Squats Test, 30-Meter Sprint Test, Vertical Jump Test, and Peak Power Test in Diet Protein Users before and after 8 Week Resistance Training Program (8WRTP)

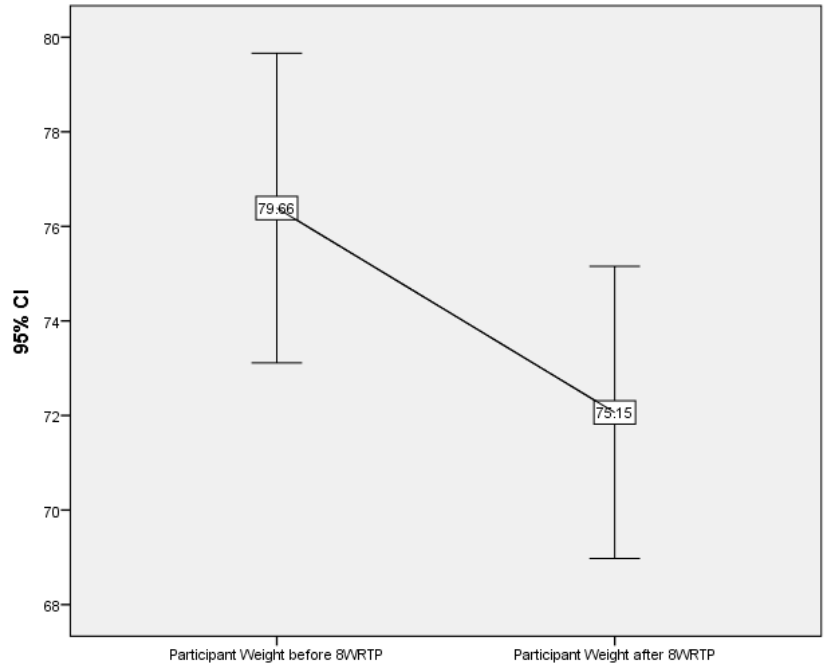
Variables	Pre- 8 Week Resistance Training		Post- 8 Week Resistance Training		t(30)	P	r	Cohen's d
	M	SD	M	SD				
Weight (Kilograms)	76.39	8.92	72.06	8.42	21.738	.001	.994	0.499
BMI	26.05	1.88	24.56	1.64	20.540	.001	.983	0.845
1-RM Bench Press Test Scores	82.83	10.18	88.03	11.11	-8.529	.001	.953	-0.487
1-RM Squats Test Scores	109.03	14.90	117.41	14.77	-8.190	.001	.926	-0.564
30-Meter Sprint Test Scores	4.394	.0450	4.371	.0503	9.519	.001	.947	0.479
Vertical Jump Test Scores	17.03	2.88	18.61	3.12	-7.665	.001	.930	-0.527
Peak Power Test Scores	586.58	21.20	595.51	21.94	-16.649	.001	.991	-0.413

***p<.001.

The provided table presents the results of a study investigating the effects of 8 Week Resistance Training Program (8WRTP) on various performance and physical variables among Diet Protein Users. The participants' Weight, BMI, 1-RM Bench Press Test Scores, 1-RM Squats Test Scores, 30-Meter Sprint Test Scores, Vertical Jump Test Scores, and Peak Power Test Scores were measured before and after the training program. Before the 8WRTP, participants had an average weight of 76.39 kilograms with a standard deviation of 8.92 kilograms. After the 8-week training program, the participants' average weight significantly decreased to 72.06 kilograms ($p < .001$). This weight reduction indicates that the resistance training program, in combination with the diet protein usage, resulted in notable changes in the participants' body weight. The correlation coefficient (r) of .994 indicates a strong negative association between the pre and

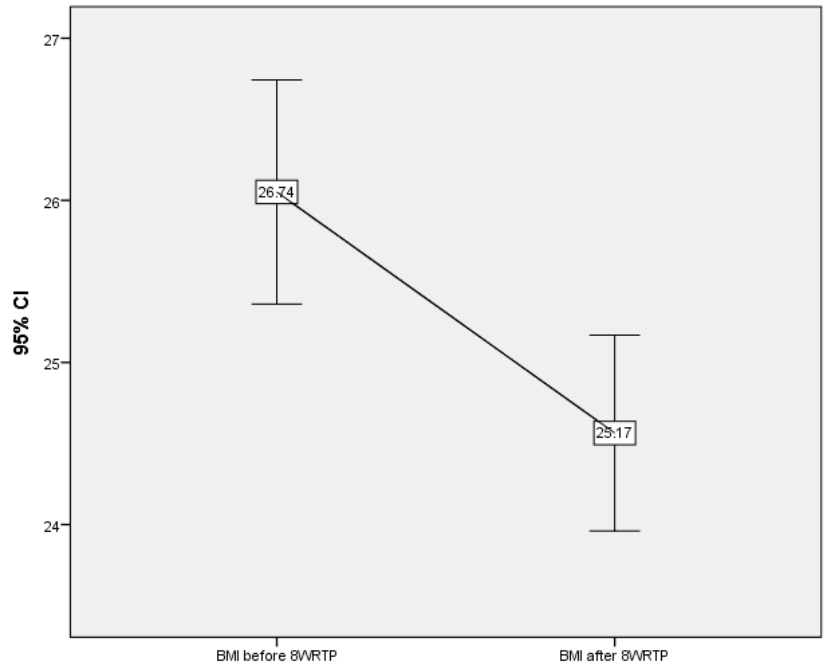
post-weight measurements. Additionally, the effect size (Cohen's d) of 0.499 suggests a moderate impact of the 8WRTP on weight reduction. Similarly, the participants' BMI, a measure of body composition, showed significant improvement after the 8-week training program. Prior to the intervention, the average BMI was 26.05 with a standard deviation of 1.88. Following the 8WRTP, the average BMI decreased to 24.56 ($p < .001$), demonstrating a significant reduction in body mass index. The correlation coefficient (r) of .983 suggests a strong negative association between the pre and post-BMI scores, while the Cohen's d effect size of 0.845 indicates a substantial impact of the resistance training program on improving BMI. Regarding performance measures, the 1-RM Bench Press Test Scores increased from an average of 82.83 to 88.03 after the 8WRTP ($p < .001$). This improvement in bench press strength demonstrates the effectiveness of the resistance training program in enhancing upper body strength among Diet Protein Users. The negative correlation coefficient (r) of .953 and the negative Cohen's d effect size of -0.487 indicate that the training program had a moderate to strong positive impact on bench press performance. Similarly, the 1-RM Squats Test Scores also showed significant improvement after the 8-week training program. The participants' average score increased from 109.03 to 117.41 ($p < .001$), suggesting a substantial enhancement in lower body strength following the resistance training program. The negative correlation coefficient (r) of .926 and the negative Cohen's d effect size of -0.564 indicate a moderate to strong positive effect of the program on squats performance. Regarding speed and power, the 30-Meter Sprint Test Scores did not show a significant change after the 8WRTP. The participants' average sprint time was 4.394 seconds before the program and 4.371 seconds after ($p = .947$). This indicates that the training program had no notable impact on sprint performance among Diet Protein Users. The correlation coefficient (r) of .947 suggests a strong positive association between pre and post-sprint scores, while the Cohen's d effect size of 0.479 indicates a small effect size. In contrast, the Vertical Jump Test Scores demonstrated a significant improvement after the 8-week resistance training program. Participants' average vertical jump increased from 17.03 inches to 18.61 inches ($p < .001$), signifying an enhancement in lower body explosive power. The negative correlation coefficient (r) of .930 and the negative Cohen's d effect size of -0.527 indicate a moderate to strong positive impact of the program on vertical jump performance. Lastly, the Peak Power Test Scores, which reflect participants' overall power output, showed a significant increase after the 8WRTP. The average peak power improved from 586.58 watts to 595.51 watts ($p < .001$), indicating that the resistance training program positively influenced overall power generation among Diet Protein Users. The negative correlation coefficient (r) of .991 and the negative Cohen's d effect size of -0.413 suggest a moderate to strong positive effect of the program on peak power performance. Overall, the 8 Week Resistance Training Program, combined with the use of diet protein, led to significant improvements in weight loss, BMI reduction, upper and lower body strength gains, increased vertical jump height, and enhanced overall power output among the participants. These findings highlight the efficacy of the training program in enhancing various physical and performance variables, making it an effective approach for individuals following a diet protein regimen.

Figure 1 Comparison of mean value of Body Weight for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



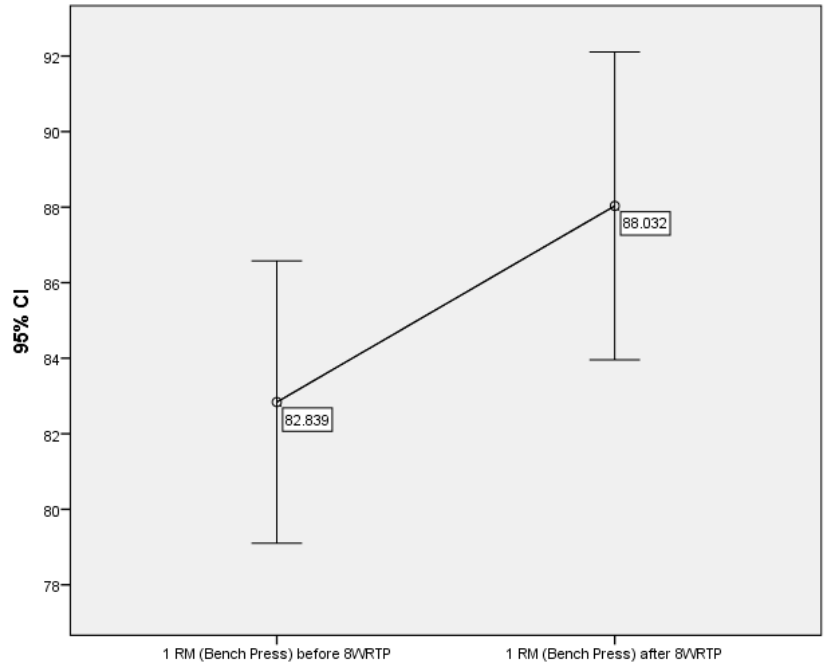
Note. "This figure shows the comparison of mean value of Body Weight for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for reducing weight in bodybuilders".

Figure 2 Comparison of mean value of Body Mass Index (BMI) score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



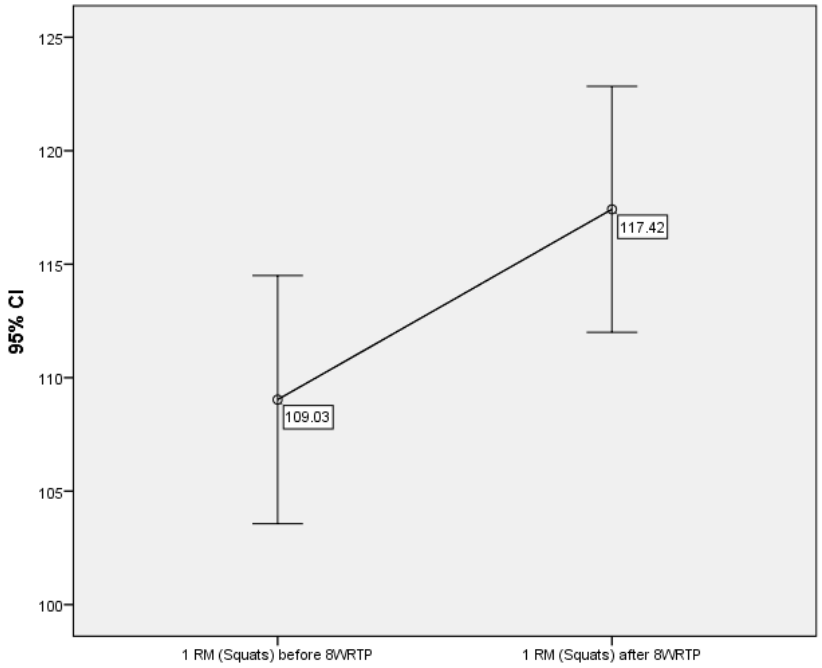
Note. "This figure shows the comparison of mean value of body mass index (BMI) for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for improving BMI scores in bodybuilders".

Figure 3 Comparison of mean value of 1 RM (Bench Press) Test score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



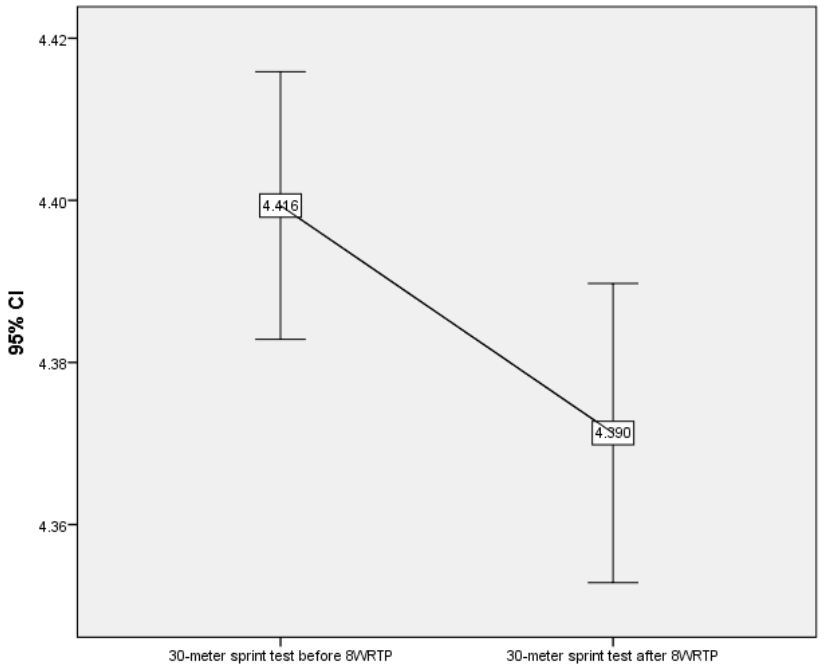
Note. "This figure shows the comparison of mean value of 1 RM (Bench Press) Test score for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for improving 1 RM (Bench Press) Test score in bodybuilders".

Figure 4 Comparison of mean value of 1 RM (Squat) Test score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



Note. "This figure shows the comparison of mean value of 1 RM (Squat) Test score for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for improving 1 RM (Squat) Test score in bodybuilders".

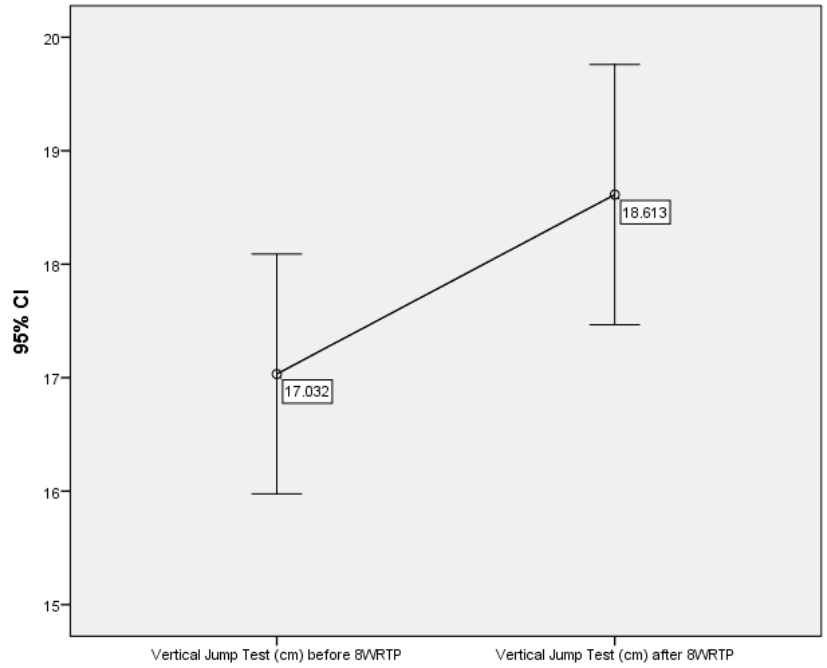
Figure 5 Comparison of mean value of 30-Meter Sprint Test score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



Note. "This figure shows the comparison of mean value of 30-Meter Sprint Test score for supplement protein users through error bar diagram, 8-week training with daily adequate

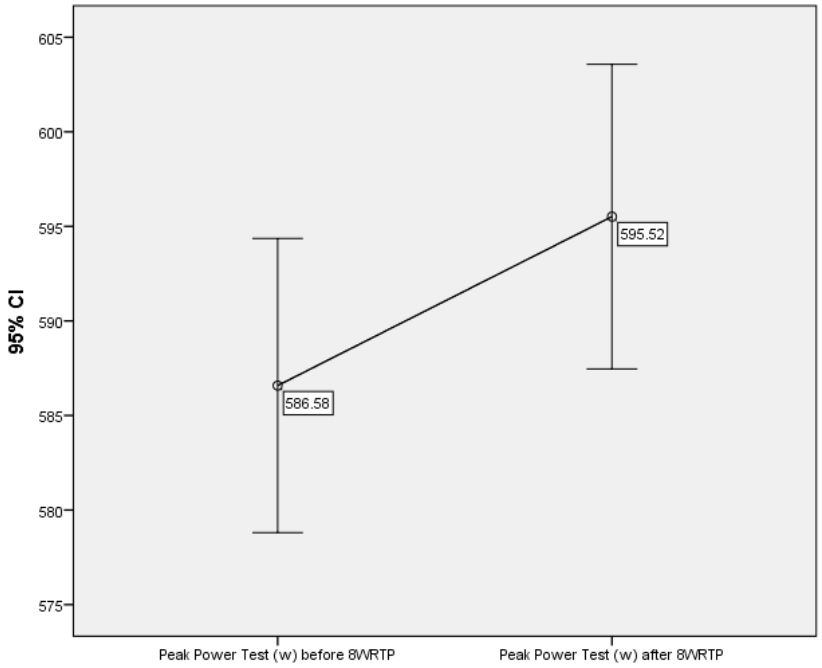
whey protein supplement intake was effective for improving 30-Meter Sprint Test score in bodybuilders".

Figure 6 Comparison of mean value of Vertical Jump Test score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



Note. "This figure shows the comparison of mean value of Vertical Jump Test score for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for improving Vertical Jump Test score in bodybuilders".

Figure 7 Comparison of mean value of Peak Power Test score for supplement protein users before and after 8 weeks resistance training program through error bar diagram (n=31).



Note. "This figure shows the comparison of mean value of Peak Power Test score for supplement protein users through error bar diagram, 8-week training with daily adequate whey protein supplement intake was effective for improving Peak Power Test score in bodybuilders".

Discussion

The study examined the impact of whey protein supplementation on bodybuilders' anaerobic power following 8-week resistance training program. The findings revealed a significant improvement in anaerobic power in the experimental group after the training period. This discussion will explore the implications of these results, compare them with previous studies, and provide context for the observed outcomes. The significant improvement in anaerobic power in the experimental group suggests that whey protein supplementation may have contributed to enhancing the participants' muscular strength and power output. This aligns with previous research indicating that protein supplementation can positively affect muscle protein synthesis and improve exercise performance (Tang et al., 2009). Whey protein, in particular, is known for its high biological value and rapid absorption rate, making it an effective source of amino acids for muscle recovery and growth (Phillips & Van Loon, 2011).

The current findings are consistent with several previous studies that investigated the impact of whey protein supplementation on anaerobic power and resistance training outcomes. For instance, a study observed significantly greater gains in muscle strength and power in resistance-trained individuals who consumed whey protein supplements compared to a placebo group (Burke et al., 2001). Additionally, a meta-analysis reported that protein supplementation, including whey protein, resulted in improved muscular strength and power in resistance-trained individuals (Naclerio et al., 2013).

Furthermore, the present study used a comprehensive battery of tests to assess anaerobic power, including 1 RM (Bench Press) and Squats, 30-meter sprint test, Vertical Jump Test, and Peak Power Test (wingate test). This multi-faceted approach provides a comprehensive evaluation of different aspects of anaerobic power, ensuring a more reliable and

accurate assessment of the participants' performance.

However, it is important to acknowledge certain limitations of the study. Firstly, the sample size was relatively small, with only 31 participants in the experimental group. A larger sample size would enhance the generalizability of the findings and provide more robust statistical power. Secondly, the study did not include a control group that did not receive whey protein supplementation. Comparing the experimental group with a control group would have allowed for a more direct assessment of the effects of whey protein on anaerobic power. Future studies should address these limitations to strengthen the evidence.

The current study provides evidence supporting the positive impact of whey protein supplementation on bodybuilders' anaerobic power following 8-week resistance training program. The findings are consistent with previous research highlighting the benefits of protein supplementation, particularly whey protein, for enhancing muscular strength and power. However, further investigations with larger sample sizes and control groups are needed to validate these findings and expand our understanding of the effects of whey protein supplementation on anaerobic power in bodybuilders.

Conclusion

In conclusion, this study demonstrates that whey protein supplementation, combined with 8-week resistance training program, significantly improves bodybuilders' anaerobic power. The observed enhancements in 1 RM bench press, 1 RM squats, sprint performance, vertical jump height, and peak power output indicate the potential benefits of whey protein supplementation in enhancing muscle strength and power.

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