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The Effect Of Protein And Carbohydrate Timing After Training Sessions On Muscle Recovery Speed In Al-Shatra Football Club Players

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Abstract

Objectives. The study aimed to investigate the effect of post-training protein and carbohydrate timing on (1) muscle recovery speed and (2) selected physical performance indicators among Al-Shatra Football Club players.

Materials and Methods. The experimental method was used with a two-group design (experimental vs. control). Fourteen (14) advanced-level players were randomly selected. The experimental group consumed a standardized combination of protein (20–25 g whey) and carbohydrate (40–50 g glucose/maltodextrin) within 20 minutes after each training session, while the control group continued their regular diet. The study was conducted from January 6 to February 8, 2025. Outcomes included muscle recovery speed and physical performance (strength endurance, speed endurance, and maximum sprint speed). Data were analyzed using descriptive statistics and independent samples t-tests (SPSS v23; $\alpha = 0.05$).

Results. Statistically significant differences were found in favor of the experimental group for all measured variables. Muscle recovery speed was faster (28.32 ± 2.57 vs. 32.47 ± 3.75 minutes; $p = 0.00$). Strength endurance, speed endurance, and maximum sprint speed also showed significant improvements (all $p = 0.00$).

Conclusions. Post-training protein and carbohydrate intake implemented immediately after training positively accelerates muscle recovery and supports better physical performance in football players, indicating the practical value of evidence-based nutrient timing strategies at the club level.

Keywords: Nutrient Timing; Protein; Carbohydrate; Muscle Recovery; Football; Physical Performance.

Introduction

Athletes continuously strive to enhance their physical and functional capacities and improve competitive performance. One effective approach is integrating structured training programs with scientifically designed nutritional strategies (Kerksick et al., 2017). The synchronization between training and nutrition—often referred to as nutrient timing—has become a critical factor in optimizing performance and accelerating post-exercise recovery (Ivy & Portman, 2004).

With increasing training loads and competition demands, conventional diets may be insufficient to meet athletes' energy and recovery requirements (Burke & Deakin, 2015). Post-exercise protein and carbohydrate intake is a key strategy that supports muscle repair, glycogen resynthesis, and reduced fatigue (Tipton & Wolfe, 2001; Thomas et al., 2016). Research suggests that consuming these nutrients within a defined post-training window can improve recovery and readiness for subsequent training sessions (Ivy, 2001). However, at the club level, coaches may overlook the importance of post-training nutrient timing, and there is limited applied evidence on timing-based protocols in football settings. Therefore, this study investigated whether consuming proteins and carbohydrates immediately after training accelerates muscle recovery and improves physical performance among Al-Shatra Football Club players. The study hypothesized statistically significant differences between groups in favor of the experimental group.

Materials and Methods

Study Participants.

The research population consisted of advanced-level players of Al-Shatra Football Club. Fourteen (14) players were randomly selected and allocated into two groups (experimental and control). Participants were evaluated for sample homogeneity to ensure comparability in age, height, and body mass.

Table 1. Homogeneity Of Variables Among The Research Sample Members (n = 14)

No.	Variable	Unit	Mean	SD	Skewness
1	Age	years	31.87	8.34	0.30
2	Height	cm	164.12	6.26	0.28
3	Weight	kg	85.87	13.35	0.85

Study Organization.

The study was conducted from January 6, 2025 to February 8, 2025 at Al-Shatra Sports Club Stadium. The experimental group followed a post-training supplementation protocol consisting of protein (e.g., whey protein 20–25 g) combined with carbohydrates (e.g., 40–50 g glucose or maltodextrin) dissolved in 250 ml of water and consumed within 20 minutes after each training session. The control group maintained their regular diet without standardized post-training supplementation. All performance and recovery tests were conducted on Sunday, January 9, 2025, using pre- and post-training measurements to evaluate muscle recovery speed and physical performance indicators. Measurement tools included a measuring tape, digital scale, and an anthropometric measurement kit to ensure standardized recording procedures (Marfell-Jones et al., 2012).

Statistical Analysis.

The statistical treatments included arithmetic mean, standard deviation, and skewness coefficient to describe and evaluate sample characteristics. Differences between the experimental and control groups were examined using the independent samples t-test. Analyses were conducted using SPSS (version 23), with the level of significance set at $\alpha = 0.05$ (Field, 2018).

Results

Table 2 presents the descriptive statistics for the experimental and control groups, along with mean differences and significance levels for muscle recovery speed and physical performance variables.

Table 2. Significance Of Differences Between Experimental And Control Groups

Variable	Unit	Experimental Mean	Experimental SD	Control Mean	Control SD	Mean Difference	Sig.
Muscle Recovery Speed	minutes	28.32	2.57	32.47	3.75	4.15	0.00
Strength Endurance	repetitions	44.23	2.05	41.57	2.01	2.66	0.00
Speed Endurance	time	47.85	0.89	51.45	0.11	3.60	0.00
Maximum Speed	time	6.27	0.11	8.23	0.38	1.96	0.00

All variables showed statistically significant differences in favor of the experimental group ($p = 0.00$), with reported t-values ranging from 8.64 to 12.53 across the measured variables.

Discussion

The findings indicate that immediate post-training protein and carbohydrate supplementation improves muscle recovery speed and selected physical performance indicators. This can be explained by faster glycogen resynthesis, improved energy availability, and enhanced recovery processes when nutrients are consumed within the post-exercise window (Ivy, 2001; Kerksick et al., 2017). In contrast, players who did not receive standardized post-training supplementation may rely primarily on endogenous energy sources, which can contribute to earlier fatigue and slower recovery (Tipton & Wolfe, 2004). Applying an evidence-based nutrient timing strategy at the club level may help coaches optimize readiness for subsequent training sessions and maintain performance consistency. Further studies may examine different timing windows, dosages, and additional physiological recovery markers.

Conclusions

Post-training protein and carbohydrate intake has a positive effect on accelerating muscle recovery and delaying fatigue in football players. The supplementation program produced the greatest improvement in muscle recovery speed, followed by strength endurance, speed endurance, and maximum sprint speed. Implementing evidence-based post-training nutritional timing can enhance physical performance and optimize recovery in competitive football.

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Conflict of Interest

The author declares no conflict of interest.

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