

The Contribution of Vertical Jump to Repeated Sprint Ability Among Soccer Players

KHALED BAUCHE¹, HOCINE GUERROUMI², AMINE SAIDI³, ABDERRAHMEN TAHCHI⁴, REDOUANE BERREDJEM⁵

¹Laboratory of Modern Sciences in Physical and Sports Activities, Institute of Sciences and Techniques of Physical and Sports Activities, University of Bouira, 10000 Bouira, Algeria.

E-mail: k.baouche@univ-bouira.dz

²Laboratory of Modern Sciences in Physical and Sports Activities, Institute of Sciences and Techniques of Physical and Sports Activities, University of Bouira, 10000 Bouira, Algeria.

E-mail: h.guerroumi@univ-bouira.dz

³Laboratory of Modern Sciences in Physical and Sports Activities, Institute of Sciences and Techniques of Physical and Sports Activities, University of Bouira, 10000 Bouira, Algeria.

E-mail: a.saidi@univ-bouira.dz

⁴Laboratory for the Analysis of Social and Institutional Processes, Institute of Sciences and Techniques of Physical and Sports Activities, University of Constantine 2, Algeria.

E-mail: abderrahmen.tahchi@univ-constantine2.dz

⁵Laboratory of Modern Sciences in Physical and Sports Activities, Institute of Sciences and Techniques of Physical and Sports Activities, University of Bouira, 10000 Bouira, Algeria.

E-mail: r.berredjem@univ-bouira.dz

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Abstract:

The study aimed to determine the percentage of contribution of vertical jump to repeated sprint ability; it was conducted in a cross-sectional and correlational design with a quantitative approach on a convenience sample of 26 players (age: 24.65 ± 4.72 years; height: 178.04 ± 4.32 cm; weight: 74.77 ± 3.30 kg). The Sargent (vertical jump) and RSA tests were used, and the data were processed through the Jasp software. The results showed a negative correlation between vertical jump and repeated sprint ability among Soccer players, with a percentage contributing 44%. As a recommendation for coaches, additional focus should be devoted to enhancing the vertical jump ability of soccer players to improve RSA performance.

Keywords: Vertical Jump, Repeated Sprint Ability.

Introduction

Developing the physical qualities of soccer players has become one of the basics of daily, periodic, and annual training sessions due to the modern physical requirements in soccer, which have created a great need to prepare players well. On the other hand, soccer games are considered an accurate indicator of the players' physical, functional, and motor levels, which has led soccer

specialists to analyze this activity (Rawabi, 2020). Rampinini et al. (2009) emphasized that many playing situations produce energy aerobically. However, the crucial ones require an anaerobic energy pathway, including acceleration, change of direction, and repeated sprint ability (RSA), making the latter an important element for success in soccer (Buchheit et al., 2010).

Among the studies that investigated the correlation between vertical jump performance and sprint speed, the study of Botero et al. (2023), higher altitude and/or reactive force index correlate positively with sprint speeds in 50-meter and 20-meter events. Baldi et al. (2017) study also examined associations between RSA and physiological and neuromuscular factors in soccer players; it has been shown that repeated sprint ability had a high (to very high) correlation with the individual level of jump performance.

In addition to what previous studies have examined, we see the importance of examining the contribution percentage of vertical jumps to repeated sprint ability. This may help coaches increase their focus on repeated sprint ability and its associated physical factors. The current study aims to determine the contribution of vertical jumps to repeated sprint ability among soccer players.

Methodology

Study Design

This study was designed through cross-sectional and correlational with a quantitative approach.

Participants

The study included 26 players representing the nadjem madinet lakhdaria soccer team in Algeria. Participants were recruited using convenience sampling based on accessibility to the researchers.

Data Collection

Data was collected by applying tests to the players during the sports season 2024-2025, which included:

- **Vertical jump (Sargent test)**. Purpose: to measure leg muscle explosive strength. Procedures:

The athlete positions laterally to a wall and extends the nearest hand upward. With feet grounded, www.psychologyandeducation.net

the fingertip's position is recorded. The athlete moves away from the wall and executes a maximal vertical jump. The objective is to contact the wall at the apex of the jump. Scoring: The result is recorded in centimeters by the difference between the first and second marks (Alawi & Radwan, 2001).

- **Repeated sprint ability (RSA test).** Purpose: This physical test measures several indicators, the most important of which is repeated sprint ability. Procedures: The RSA test consists of a 6 x 40 m (20m + 20m) with a 180-degree change in direction and a 20-second recovery. Scoring: The result is recorded by the mean sprint time (RSAm, seconds) (Impellizzeri et al. 2008, as mentioned in Guerroumi, 2023).

Data Analysis

The collected data were exported to JASP V 0.19.3. The demographic characteristics of participants were calculated and represented by the mean, standard deviation, and coefficient of variation. The approved significance level is 0.05. Bivariate correlation between variables was calculated using the Pearson correlation coefficient after checking the normality assumption using the Shapiro-Wilk test; in order to determine the contribution of vertical jump to repeated speed ability, simple linear regression was calculated, and the measures of effect size by value of R^2 was interpreted through Cohen's range "0.01 small, 0.09 medium, 0.24 large" (Yockey, 2016, p.173). Correlations between residuals were checked through Durbin Watson, which can disprove the test. This should be higher than 1 and less than 3, and ideally around 2 (Sampson, 2022, p.76).

Results

Table 1 presents the participants' characteristics. Table 2 shares descriptive statistics and Pearson correlation for study variables. Tables 3 present simple linear regression analysis results.

Table 1

Demographic characteristics of participants (N = 26).

Variables	N	Mean ± SD	Coefficient of Variation (%)
Age (years)		24.65 ± 4.72	19.15
Height (cm)	26	178.04 ± 4.32	2.43
Weight (kg)		74.77 ± 3.30	4.41

Note. N = number of participants, SD = Standard deviation.

The table includes the characteristics of the study participants. The values of the coefficient of variation showed a moderate variation in age (19.15%) and a lower variation in height and weight (2.43%, 4.41%), indicating the homogeneity of the participants.

Table 2

Pearson correlation between study variables.

Variables	N	Mean ± SD	Shapiro-Wilk Statistic (P-value)	Pearson (r)	P-value
VJ	26	55.46 ± 3.99	0.95 (0.211)	-0.67	<.001
RSA		7.74 ± 0.35			

Note. VJ = vertical jump, RSA = repeated sprint ability.

The correlation table shows that the negative correlation between the vertical jump and the repeated sprint ability is significant (r = -0.67, p <.001).

Table 3

Simple linear regression analysis of the contribution of vertical jump (as a predictor variable) to repeated sprint ability (as an outcome variable).

Model	R	R ²	Adjusted R ²	DW	F	P-Value	Coefficients			95% CI	
							B	t	P-Value	Lower	Upper
Intercept	0.67	0.44	0.42	2.08	19.18	<.001	10.98	14.82	<.001	9.45	12.51

VJ	-0.06	4.38	<.001	-0.09	-0.03
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Note. VJ = vertical jump, DW = Durbin Watson.

The simple linear regression analysis table shows that regression was significant and can significantly explain 44% (large effect size) of the variance in repeated sprint ability $F = 19.18$, $P < .001$. The predictor investigated, vertical jump ($B = -0.06$, $t = 4.38$, $p < .001$) were significant. Therefore, repeated sprint ability could be predicted using a regression equation:

$$\text{Repeated Sprint Ability} = 10.98 - (0.06 * \text{Vertical Jump})$$

Discussion

The Results indicated a negative correlation between vertical jump and repeated sprint ability, with a contribution of 44%, thereby underscoring the significance of jumping ability (explosive strength) to repeated sprint ability, as supported by the research of Botero et al. (2023), which posits that the ability to perform repeated jumps in soccer players enhances sprinting efficacy. Moreover, lower-limb power generated from vertical jumps is a pivotal factor in sprinting time performance, affecting stride frequency (González-Fernández et al., 2022). In addition, repeated sprint ability has been shown to correlate with jump performance, indicating that explosive strength for lower limbs is a crucial element for male soccer (Baldi et al., 2017).

Conclusion

The contribution of vertical jump to repeated sprint ability (RSA) among soccer players is significant, which means the importance of explosive strength in enhancing sprinting abilities. The results are constrained by a singular team's data and a limited sample size, thus limiting the generalization; future research should incorporate a larger sample and address the methodological in this study's lack of psychometric characteristics. As a recommendation, it appears prudent for coaches to allocate additional focus on vertical jump ability enhancement for soccer players to improve RSA performance.

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