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ORIGINAL ARTICLE

The relationship between sprint ability, agility and vertical jump performance in young soccer players



Relation entre la performance de l'habilité de sprint, l'agilité et le saut vertical chez des jeunes joueurs de football

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Soccer;
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Summary

Objective. – The purpose of this study was to examine the relationships between speed, agility and vertical jump performance in young soccer players.

Material and methods. – Fifteen soccer players (average age 16.0 ± 0.8 years; average height 168.4 ± 4.7 cm; average body mass 62.6 ± 7.7 kg; average training age 6.0 ± 2.0 years) participated in this study voluntarily. The sprinting ability of each player was determined using 10-m and 30-m single-sprint times; zigzag agility with the ball (ZAWB) and without the ball (ZAWHB) test times were used to determine their agility; and squat jump (SJ) and countermovement jump (CMJ) heights were used for the determination of vertical jump ability.

Results. – The results of Pearson Product Moment Correlation analysis indicated moderate to strong correlations between 10-meter sprint times and 30-meter sprint times ($r = 0.714$; $P = 0.01$) and ZAWHB ($r = 0.567$; $P = 0.02$). Similarly, 30-meter sprint times were moderate to strong correlated with CMJ ability ($r = -0.599$; $P = 0.02$) and ZAWHB ($r = 0.744$; $P = 0.01$). A strong correlation was also found between CMJ ability and SJ ability ($r = 0.706$; $P = 0.01$) and between CMJ ability and ZAWHB ($r = -0.769$; $P = 0.01$). In addition, SJ ability was strongly correlated with ZAWHB ($r = -0.712$; $P = 0.01$). Finally, ZAWHB was moderate correlated with ZAWB ($r = 0.566$; $P = 0.02$). In conclusion, the findings of the present study indicated that there is a significant correlation between sprint ability and agility. In addition, significant correlations were found both between

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MOTS CLÉS

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vertical jumping ability and sprinting ability and between vertical jumping ability and ZAWHB test performance in soccer players.

Conclusion. – The results of the study therefore suggest that speed, agility without the ball and vertical jumping ability share common physiological and biomechanical determinants.

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Résumé

Objectif. – L'objectif de ce travail est d'examiner la performance de la vitesse, l'agilité et le saut vertical chez de jeunes joueurs de football.

Matériel et méthodes. – Quinze joueurs de football (âge moyen $16,0 \pm 0,8$ ans, taille moyenne $168,4 \pm 4,7$ cm, poids moyen $62,6 \pm 7,7$ kg, âge moyen d'entraînement $6,0 \pm 2,0$ ans) ont participé à cette étude volontairement. La capacité de sprint de chaque joueur a été déterminée en utilisant la durée de sprint unique de 10 m et de 30 m ; la durée du test de la capacité de zigzag (ZAWB) détermine leurs capacités (ZAWHB) avec et sans le ballon, le *squat jump* et le saut haut en contre-mouvement ont été utilisés pour la détermination de la capacité de saut vertical.

Résultats. – Les résultats de l'analyse de Pearson Product Moment Correlation ont indiqué une modérée à forte corrélation entre le temps de sprint de 10 mètres et de 30 mètres ($r=0,714$; $p=0,01$) et le ZAWHB ($r=0,567$; $p=0,02$). Une forte corrélation a été également trouvée entre le CMJ et le SJ ($r=0,706$; $p=0,01$) et entre le CMJ et le ZAWHB ($r=-0,744$; $p=0,01$). En outre, la capacité de SJ était fortement corrélée avec le ZAWHB ($r=-0,712$; $p=0,01$). Enfin, le ZAWHB était en corrélation modérée avec le ZAWB ($r=0,566$; $p=0,02$). En conclusion, les résultats de la présente étude ont indiqué qu'il existe une corrélation significative entre la capacité de sprint et d'agilité. En outre, les corrélations significatives ont été trouvées entre les deux capacités de saut vertical et la capacité de sprint et entre la capacité de saut vertical et la performance de test de ZAWHB chez les joueurs de football.

Conclusion. – Les résultats d'études suggèrent que la vitesse, l'agilité sans le ballon et la capacité de saut vertical sont des déterminants physiologiques et biomécaniques.

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1. Introduction

High-intensity movements during soccer games can be categorized into actions requiring rapid acceleration (10-m sprint), actions at maximum speed (30-m sprint), or actions requiring agility [1]. Maximum speed and acceleration are important qualities in field sports, with running speed over short distances fundamental to success [2]. Stolen et al. [3] reported that 96% of sprint bouts during a soccer game are shorter than 30-m, with 49% being shorter than 10-m. Agility, meanwhile, requires rapid, repetitive decelerations and accelerations over short distances apparently using a different running technique; it also involves perceptual skill [4].

Numerous studies have focused on the relationships between high intensity movements in soccer players. However, the findings appeared to be inconsistent. Of those that have, some have found a strong correlation between high intensity movements, while other studies have found a weak correlation. For example, Little and Williams [1] found high level correlations between 10-m sprint, 20-m sprint and zigzag performance in professional soccer players ($P < 0.0005$). In another study, Spaniol et al. [5] have investigated the relationship between 40 yard dash times (speed) and 20 yard shuttle run times (agility) of professional football players. The results showed that there were significant relationship between speed and agility of professional football players. Similarly, Köklü et al. [6] found high level significant relationship between 10-m and 30-m speed times in young soccer players. On the other hand, Cronin and

Hansen [7] reported weak associations between counter-movement and squat jump performance and 5-m, 10-m, and 30-m sprint times. Similarly, Salaj and Markovic [8] found weak correlations between 5-m, 10-m and 20-m speed and 20 yards shuttle run times (agility) of professional football players. Moreover, Buttifant et al. [9] reported no significant correlations between 20-m sprinting and 20-m agility. Salaj and Markovic [8] reported that the reason of observed discrepancy between results of these studies could be several factors such as the subjects' age, gender, and level of physical fitness and skill, sample size, type of performance tests used, or rest intervals between tests. In addition, no study has examined the relationships between sprinting, agility with the ball and vertical jump performance, even though vertical jumping and agility with the ball are integral to effective soccer performance. If a significant relationship can be found between speed, agility and vertical jump performance, it could help coaches to use the available training time more efficiently. Therefore, the purpose of this study was to examine the relationship between speed, agility and vertical jump performance in young soccer players.

2. Methods**2.1. Subjects**

Fifteen soccer players (average height 168.4 ± 4.7 cm; average body mass 62.6 ± 7.7 kg; average age 16.0 ± 0.8 years;

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