

LONGITUDINAL CHANGES IN SPRINT PERFORMANCE IN RELATION TO FITNESS DEVELOPMENT IN U-15 SOCCER PLAYERS

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Introduction

Sprint ability is generally accepted as one of the essentials of modern soccer so information that relates sprinting to physical developments in young soccer players is important. We have investigated longitudinal changes in 20 meter sprinting times as well as anthropometric and fitness profiles of U-15 soccer players for 2 years. The first aim of the study was to examine the relation between sprint ability and fitness variables in young soccer players. The second aim was to compare the magnitude of fitness developments between players showing different improvements in sprint ability for 2 years.

Methods

Fifty youth players aged 12.8 ± 0.6 yrs at the start of this study participated. The 20 meter sprint times (ST) of the players was measured by infrared photocell sensors at intervals of 6 months for 2 years. Body composition, body shape were measured by three-dimensional photonic scanning ; cross-sectional areas (CSA) of the thigh, gluteus maximus and psoas major muscles were measured by MRI ; and vertical jumps and $VO_2\max$ were also measured. Pearson-product correlations between the variables were calculated

to examine their relation. The 10 players showing the largest improvement (L; -0.22 ± 0.03 sec) in ST were compared with the 10 players showing the smallest improvement (S; -0.01 ± 0.03 sec) by a non-paired t-test.

Results & Discussion

There was a significant positive correlation between the ST and % of body fat while there were negative correlations between the ST and fat-free-mass, thigh circumferences and muscle CSA. The highest correlation ($r=-0.73$) was observed in upper-thigh muscle CSA. Larger longitudinal increments in fat-free mass and muscle CSA were observed in L than in S (Tab.1). The differences in percentage between L and S were the greatest in CSA for gluteus maximus and psoas major muscles.

Table 1. Average longitudinal increments in fitness variables in L and S over 2 years.physical strength in U-15 youth players.

	L	S
Fat-free-mass(kg)	10.4†	6.3
Middle thigh circumference(cm)	3.9†	2.7
Psoas major CSA(cm ²)	3.1	2.0
Gluteus maximus muscle CSA(cm ²)	24.7†	15.8
Upper thigh muscle CSA(cm ²)	30.5†	23.3
Middle thigh muscle CSA(cm ²)	26.1†	18.1
Squat jump(cm)	4.4	2.3
$VO_2\max$ (ml/kg/min)	5.0	1.7

†:p<0.05 Significantly different from S

Conclusion

These results cumulatively suggest that greater size development in hip-related muscles contributes to improved sprint ability in U-15 soccer players.