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Correlation analysis of explosive power and special physical fitness in elite womens soccer players

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INTRODUCTION:

Football is a comprehensive sport that requires basic physical fitness. The lower limbs are used to generate the strength needed to quickly achieve sprints and change in direction [1]. The explosive power of the lower body is a necessary core ability. From a strength and conditioning perspective, explosive power is an important ability that contributes to various aspects of physical fitness. Researchers have often used vertical jump height as one of the indicators of maximum explosive power. [2] However, the relationship between maximum explosive power and the special ability output of women players in football has not yet been studied. As such, our purpose in this study was to explore the correlation between explosive power and the physical fitness of outstanding women football players.

METHODS:

We recruited 20 college womens elite football players as voluntary participants. All experimental participants fully warmed up after the various test procedures were explained to them. We recorded body composition measurements, and the participants performed vertical jump, standing long jump, 505, pro agility, Illinois, 10 m sprint, 40 m sprint, 300 yard shuttle, and yo-yo tests. The experimental equipment included: Inbody 370s, Opto jump, Witty, starting pistol. We used SPSS 20.0 for Pearson product difference correlation analysis.

RESULTS:

The results show a significantly positive correlation between vertical jump and standing long jump, showed a significant positive correlation between vertical jump and standing long jump ($r = 0.694$; $P = 0.001$) and significantly negative correlation between the 10 meter sprint, ($r = -0.629$; $P = 0.003$), 40 meter sprint ($r = -0.547$; $P = 0.013$), pro agility ($r = -0.527$; $P = 0.017$), 300 yard shuttle test ($r = -0.397$; $P = 0.083$)

CONCLUSION:

The results of the correlation analysis show that the vertical jump was significantly positively correlated with the standing long jump, followed by the 10 meter sprint, 40 meter sprint, pro agility, and 300 yard sprint. The vertical jump is a short-term explosive power output movement and requires explosive power. In the 300 yard turn-back test, the participant must turn back every 25 yards; explosive movements are also required for the direction change. Therefore, the contribution of explosive power is also related to anaerobic ability during the return run test. Our findings demonstrate that explosive power affects athletic sprint performance, agility, and anaerobic capacity. The results of this study can be used as a guideline of vertical jump height as an indicator of specific sports performance and to help players and coaches more effectively and purposefully monitor training results.

1. Burggraaf et al. (2021) 2. Collins et al. (2023)

Topic: Training and Testing

Presentation Poster

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