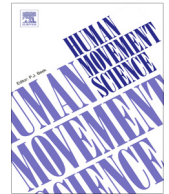




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Human Movement Science

journal homepage: www.elsevier.com/locate/humov

Full Length Article

Differentiating technical skill and motor abilities in selected and non-selected 3–5 year old team-sports players

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ARTICLE INFO

Article history:

Received 29 July 2015

Revised 2 February 2016

Accepted 4 February 2016

Available online 22 February 2016

Keywords:

Youth development

Football

Training

Sprinting

Agility

ABSTRACT

This study examined the difference in 22 3–5 year old boys selected to an advanced or non-advanced group on an English community-based professional club training program. Time to complete 15 m linear sprint and 15 m zig-zag agility tests, with and without a ball, were used to assess the children's technical skill and motor ability. Age and body mass of both groups were the same, whereas height was greater and BMI was lower in the selected group ($p < 0.01$). Linear sprint times without and with the ball were 3.98 ± 0.35 and 4.44 ± 0.36 s, respectively for the selected and corresponding times were 4.64 ± 1.04 and 11.2 ± 5.37 s for the non-selected ($p < 0.01$, ES 0.8, 1.8). Similar results were found when a change of movement was included, both with and without the ball. A model of selection indicated that performance in an agility test with the ball and height had the greatest discriminatory power and explained 95.5% of between group variance. Selected players performed significantly better in tests when ball control was required. These findings suggest that technical proficiency and physical differences may influence team selection in three to five year old children.

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1. Introduction

Differences in physical and performance characteristics between elite, semi-elite and non-elite levels are well documented in adults or adolescents participating in individual (Ooh, Žvan, & Burnik, 2012) and team sports (Bracko, 2001; Elferink-Gemser, Kanekens, Lyons, Tromp, & Visscher, 2010; Freeston, Ferdinands, & Rooney, 2007; Gissis et al., 2006). Elite performers are associated with possessing superior speed, agility, jump height, throwing velocity and accuracy than their non-elite counterparts. Objective measures of performance are very difficult to obtain in soccer compared to individual sports due to its multifactorial nature (Meylan, Cronin, Oliver, & Hughes, 2010; Vaeyens et al., 2006). However, physical and physiological profiling including measures such as sprint speed, agility, leg power, strength, endurance and ball dribbling can discriminate between elite and non-elite youth players and predict future success in soccer players (Gissis et al., 2006; Meylan et al., 2010).

Interestingly, the factors influencing whether players are elite, sub-elite or non-elite change based on players age, with speed and soccer technique having the greatest discriminatory ability in U13 and U14 players, whereas aerobic endurance is more important in U15 and U16 players (Vaeyens et al., 2006). Thus, long term athletic development is a dynamic process in which the tests chosen must factor in the individual's stage of development (Vaeyens et al., 2006). Selection of youth

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players is an important but challenging task for staff in football academies as decisions can be highly subjective and distinguishing between current ability and future potential is difficult, particularly at periods of rapid developmental change (Unnithan, White, Georgiou, Iga, & Drust, 2012; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). It is proposed that greater use of game specific protocols or match analysis to identify ability may be more successful than traditional testing protocols (Gabbett, Jenkins, & Abernethy, 2009; Unnithan et al., 2012; Waldron & Murphy, 2013). Waldron and Murphy (2013) performed traditional fitness tests alongside competitive match analysis and found that elite U14 players covered greater distances, performed at higher intensities, completed more successful ball retention, whilst also running and dribbling at a higher pace. It is of note that, despite measuring many match related parameters, 10 m sprint time was the most useful variable for distinguishing between elite and sub-elite players (Waldron & Murphy, 2013). However it is not known if sprint speed, agility and dribbling ability can be used in the identification of elite players in those under 12.

There is little research on the development of sprint speed and agility in the 3–5 age group. Previous research in older age groups (7–18 year olds) has demonstrated that linear speed increases annually and at 12 years old for boys is approximately 75% of that of corresponding 18 year olds (Papaiakovou et al., 2009). Isokinetic concentric and eccentric strength also progressively develop between the ages of 6 and 12, but ranges between 40 and 50% of an equivalent 18 year old, indicating that sprint speed develops earlier than lower body strength (Bassa, Kotzamanidis, Patikas, & Paraschos, 2001). Whilst linear sprinting is seen more as a closed skill (Yanci, Reina, Los Arcos, & Camara, 2013), the addition of cones and a ball to be controlled change this towards a more open, match-related skill (Sheppard & Young, 2006), providing the dual tasks of controlling the ball and running (Meckel, Geva, & Eliakim, 2012).

The aim of the study was to assess the technical skill and motor abilities of a cohort of young children attending a soccer coaching program and to identify if physical characteristics, speed, agility and dribbling ability discriminate between those selected and those not selected for more advanced training.

2. Methodology

2.1. Participants' physical characteristics

The parents of 35 children, aged between three and five years, who attended a Little Dribblers session were contacted to invite their children to participate in the study. 25 accepted this offer and were provided with study information. Subsequently three children failed to attend further sessions and were removed from the study. A total of 22 boys were included in the study. Each parent provided full informed consent and ethical approval for the study was obtained from the University of Sunderland Research Ethics Committee.

2.2. Training programme

The Little Dribblers program is run by a professional football club's foundation, for children aged under five. The sessions utilise story book coaching sessions, where a coach uses a story to engage players into completing the tasks at their own pace. From these sessions squad players are selected for further, more advanced training. The main aim of the advanced session is generate as many touches of the ball as possible in training drills and small sided games, with a focus on ball control, rather than passing and running. Players are selected for the advanced squad by a two-step process. An individual Sunderland Association Football Club (SAFC) coach identifies players based on their ball control and speed of dribbling during small sided games in regular sessions, and they are subsequently observed by the head coach of the advanced squad for final selection. It is unclear whether the selection process identified players who are actually more technically adept as the decision by the head coach is subjective.

2.3. Procedure

Participant testing was completed during regular Little Dribblers sessions at the SAFC Foundation of Light. Each child performed the tests individually and testing was independent of the club selection process, with the tests being performed solely for the purpose of this study and the information not shared with coaches prior to selection. Participants were removed for testing after at least 10 min of the session to ensure they had received an adequate warm-up. Body mass and height was recorded to the nearest 0.1 kg and 0.5 cm, using a Seca 761 scale and Seca 213 stadiometer respectively (Seca UK, Birmingham, UK). Each child completed two sprint tests and two agility tests and timings were assessed using two sets of Smartspeed light gates to an accuracy of 0.01 s (Fusion Sport, Coopers Plains, QLD, Australia) at a height of 0.4 m. Initially participants were verbally instructed to sprint maximally over 15 m. For all tests, participants commenced movement in a static, standing position immediately behind the timing gates. Following this, they were then instructed to dribble a Nike Technique football (size 4; Nike Inc., Beaverton, OR) over 15 m, again as quickly as possible. If the participant lost control of the ball, the trial was cancelled and repeated. The sprint tests were repeated two further times with a two minute rest between each trial to prevent fatigue. Following a further five minute rest period the participant performed the agility tests. Marker cones (height 6 cm, diameter 20 cm) were placed between the light-gates at 4, 8 and 12 m along the centre line of the 15 m track. The participant was instructed to sprint as fast as possible down the track, weaving between the cones without

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