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PHYSICAL CONDITIONING - SPEED AND AGILITY IN YOUTH FOOTBALL

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Abstract

Aim. The physiological demands of football game are complex; a good physical preparation are important for the successful of the technical actions which ultimately determine the outcome of the match. Physical conditioning training are characterized by explosive movements, acceleration and de-acceleration, agility, sprints and soccer-specific running with or without a ball. Speed is the capacity to cover a given distance as quickly as possible with the maximum exertion (100%) and also by the maximum speed at which a movement or a series of movements are performed (www.fifa.com). Agility is a important component of soccer play and was defined by a "a rapid whole-body movement with change of velocity or direction in response to a stimulus," based on the conception that agility has relationships with both physical and cognitive components."

The aim of the study is to summarize the theoretical aspects that has been undertaken regarding the role of physical conditioning (speed and agility) in youth football.

Conclusion. Training programs should be focused on the specific player post and individual fitness level, and must include specific training drills which improve acceleration, maximum speed, and agility.

Keywords: youth football, speed, agility, training

Introduction

The application of speed and agility training specifically for soccer is to improve a player's game performance. Game performance requires the integration of speed and agility with soccer techniques and skills. Quality movement is vital and not simply the speed of movement, but the speed of play, of ball control and of movement both before receiving the ball and after they pass the ball. This combination of efficiency and effectiveness separates the good players from the great players. The physiological demands of football game are complex, a good physical preparation are important for the successful of the technical actions which ultimately determine the outcome of the match. To succeed in soccer, players require a high level of physical fitness to cope with demands of the game and to allow for their technical and tactical skills to be used to their full throughout a match. During a soccer match, players cover about 10 km in total, which includes a sprint every 90 seconds (11% of overall activity) with each action lasting on average of 2 to 4 seconds and covering a distance of 15 m (Stolen et al., 2005). In terms of physiological demands, soccer is a sport

characterized by intermittent exercise with short bouts of intense activity alternated by longer periods of low-level, moderate-intensity exercise. Players are often required to repeatedly produce maximal or near maximal sprints of short duration (1-7 s) with brief recovery periods (Bangsbo et al., 1991; Withers, 1992). Therefore, the ability to repeat multiple sprints at high speed is important for soccer physical performance (Bangsbo, 1994; Wragg, 2000). High-speed actions in soccer have been categorized as requiring acceleration, maximal speed or agility skills (Gambetta, 1996). Physical preparation program is characterized by explosive movements, acceleration and de-acceleration, agility, sprints and soccer-specific running with or without a ball. Speed is a genetic motric capacity characteristics related to the nervous system and muscle fibers. It should be worked on in training very early with youngsters when the nervous system is adaptable 7-9 years, and 13-16 years. It is important to find opportunities to include speed or speed strength elements in every training session for young players (www.fifa.com).

Speed characteristics of soccer players

Speed is defined by the capacity to cover a given distance as quickly as possible with the maximum exertion (100%) and also by the maximum speed at which a movement or a series of movements are performed (www.fifa.com). The fundamental quality in football is a performance ability of the

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neuromuscular system. Soccer related sprinting skills can be categorized as straight line sprinting, agility and repeated sprint ability. Straight line sprinting is commonly further categorized as acceleration, maximal running velocity, and deceleration (Mero et al., 1992).

Little and Williams (2006) observed a significant correlation between acceleration, maximal speed and agility but concluded that there were enough unique characteristics in each component to consider them as unrelated to each other. This is an important distinction for coaches who work on improving speed and agility as the research suggests that different activities are needed for each (Milanović et al., 2013).

Agility is a important component of soccer play and was defined by a "speed in changing body positions or in changing direction" (Clarke, 1959). Sheppard & Young (2006) defined agility as "a rapid whole-body movement with change of velocity or direction in response to a stimulus," based on the conception that agility has relationships with both physical and cognitive components. Agility is also influenced by body balance, coordination, the position of the center of gravity, as well as running speed and skill. Agility can be improved with agility training drills but also by improving the specific individual fitness elements of speed, balance, power and co-ordination. Jullien et al., 2008 demonstrated that a short-term agility training programmer (3 weeks duration) improved agility test results among young professional soccer players. Repeated sprint ability is the ability to perform repeated sprints with brief recovery intervals (Dawson et al., 1993).

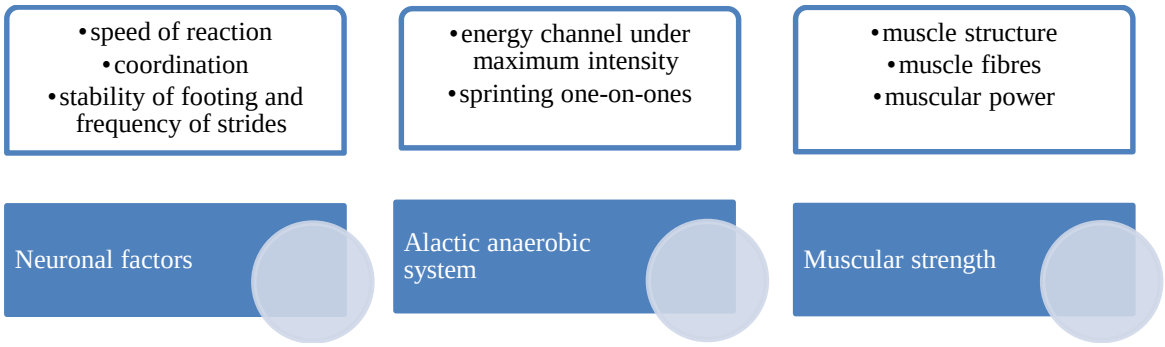
Linear sprint training improves linear sprinting skills (Tønnessen et al., 2011; Negrea, Musat, 2016), but not performance in sprints with changes of direction (Shalfawi et al., 2013; Young et al., 2001). Agility training improves the specific agility task performed during practice (Shalfawi et al., 2013; Milanović et al., 2013). Repeated sprinting improves repeated sprint ability (Ferrari Bravo et al., 2008; Tønnessen et al., 2011). The superiority of resisted or assisted sprint training compared to normal sprinting has so far not been clearly established (Spinks et al., 2007).

As such, different types of speed allow a player to be judged on this physical condition:

The anatomical and physiological foundations that influence speed

The nature of most of the different fibres is inherited genetically, but targeted speed training can develop the diameter of the fast twitch fibres – without losing the muscle elasticity that is essential for good coordination.

The energy from adenosine triphosphate (ATP) for training pure speed specifically in football comes from the alactic-anaerobic system. Strength development improves speed, and technical impetus is a decisive factor (www.fifa.com).



The different types of speed allow a player to be judged on this physical condition is: speed of reaction,speed off the mark, acceleration speed, speed of action (or execution).Elements and forms of speed training is: cyclic speed, acyclic speed, isolated speed, integrated speed, speed during practice games, maximum speed, optimum speed.

Method for speed training

The interval repetition method according to different types of speed is the preferred method for training and developing maximum and optimal speed of the footballer. Sprints must always be performed at 100% with a duration of 3-5 seconds, up to a maximum of 8-10 seconds. To work on the specific speed of the footballer, sprints of 20-40m are

required. Recovery between repetitions is generally semi-active or passive. Between sets, which can last 3 to 6-7 minutes depending on the volume of sprints (www.fifa.com). For speed training on the lactic-anaerobic system, the time of exertion is 10-15 seconds up to a maximum of 30 seconds. The recommended volume of speed in a training session for young players: basic training: 200 to 250m and intermediate training: 280 to 400m. (www.fifa.com).
Vescovi & McGuigan (2008) concluded that straight sprint, agility and vertical jump capabilities are independent locomotor skills.

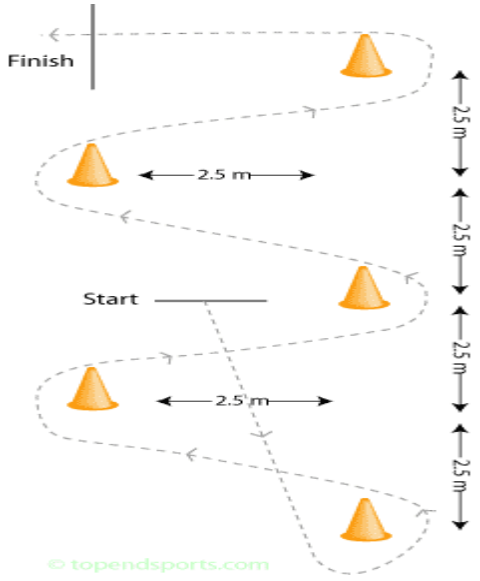
Speed-endurance method (lactic-anaerobic): Training in adapting maximum speed to speed that can be repeated in a match. Training work at maximum speed over longer periods of exertion (9-10 up to 15 seconds) that require the lactic-anaerobic energy system. Shuttle runs (4-6 x 10m) call on this reserve, as do runs in a real match situation like wide players (sprint: 50m and return for defensive repositioning 30-40m). This training aids the tolerance of lactic acid and its conversion into energy, albeit short-term energy.
The starting positions should be varied, as should the types of signals in order to reflect as closely as possible the reality of a match.

Methodological guidelines of speed training

- perform a good warm-up (activating the cardio-vascular system);
- exercises the speed at the beginning of training session;
- correct body posture for accelerating is necessary;
- speed training is necessary to be adapted for football;
- follow up with complete recovery;
- convert athletic speed into football speeds.

Recommended tests in basic training

- Linear sprinting: 20m, 30m, 40m and/or 50m, using photoelectric cells or manual stopwatch;
- Speed of reaction + speed off the mark 5m - 10m-15m;
- Agility: 25m with a change of direction every 2,5m.
- Speed-endurance - 4 x 10m with changes of direction (shuttle running);
- Speed-endurance + coordination.



Recommended tests in advanced training

- The Yo-Yo intermittent recovery tests (YIRT1-YIRT2)
- The Wingate Anaerobic Test (WAnT)

Planning training for soccer: the importance of periodization

Periodization is a theoretical model that offers a framework for the planning and systematic variation of an athlete's training prescription (Brown et al., 2005). The inclusion of variation in the prescribed training load is thought to be a fundamentally important concept in successful training programmers. (Gamble, 2010).

The variation in training load important for periodization is obtained by the use of a number of structural units that are used to realize the specific aim(s) associated with a training programmer. A variety of soccer drills and running protocols have been designed to train metabolic systems important to soccer. These primarily target the development of the aerobic and anaerobic systems (Morgans et al. 2014). Recent studies have shown that performance in the Yo-Yo intermittent recovery test correlates well with the physical match performance of elite soccer players (Krustrup P, et al 2003). Players are often required to repeatedly produce maximal or near maximal sprints of short duration (1-7s) with brief recovery periods (Bangsbo et al 1991; Withers 1992). Therefore, the ability to repeat multiple sprints at high speed is important for soccer physical performance (Bangsbo 1994; Wragg 2000). Specificity is widely identified as a fundamental factor in shaping the training response (Gamble 2010).

Periodising speed training

	CHARACTERISTICS
AGES 5-12	Focus on neuromuscular development by using exercises for both reaction (various starting signals) and movement speed (throws, very short runs and frequency of steps). They need to be performed before the complete maturation of the CNS.
AGES 13 AGES 13-17	Maintain reaction speed, develop the alactic anaerobic energy system and gradually implement appropriate muscle strengthening programmes.
AGES 18+	Players must be able to use able to use their general speed appropriately in match situation. Develop anaerobic endurance. At this stage, general speed can only be slightly improved through specific adaptation brought about by the strength training program.

http://en.coaching.itftennis.com/home.aspx

Conclusions

Speed and agility is indispensable in modern football, for physical performance.

Training programs should be focused on the specific player post and individual fitness level, and must include specific training drills which improve acceleration, maximum speed, and agility.

A training plan based on scientific principles is necessary, to provide the maximum performance at specific times and prevent overtraining.

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