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Original article

RELATIONSHIPS BETWEEN QUICKNESS AND SPEED PERFORMANCE IN AMPUTEE FOOTBALLERS

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Abstract

*Problem statement.*Nowadays, rehabilitation of individuals with disabilities includes many sports activities such as soccer and basketboll. The purposes of this study were to examine relationships between quickness and speed performance in amputee footballers.

*Methods.*Ten amputee footballers volunteered to participate in this research. The mean (SD) age was 25,80±4,32 years, high was 1,77±0,09 m, and body weight was 69,90±10,337 for the 10 amputee footballers; the mean (SD) quickness was 1,18±0,10 second and speed was 5,27±0,37 second the for amputee footballers. We applied a testing procedure that included measurements of the quickness and speed. Photocells were placed at the start, 5 m (quickness), and 30 m (speed) in order to collect sprint times over the 2 distances.

*Results.*A significant positive correlation existed between quickness with speed ($r = 0,645$; $P<0,05$).

In conclusion, when amputee players have highest output speed, they can more success in speed. Speed effected output speed (quickness).

Key words: Amputee, velocity, speediness, soccer.

Introduction

Speed and quicknes are important components of sport performance. Speed and quickness training is perfect for seniors because it will condition fitness aspects that are generally lost with age-speed and quickness (Miller et al. 2001).

Quickness is considered both a multidirectional skill that combines explosiveness, reactiveness, and acceleration and agility while incorporating flexibility, strength, and neuromuscular coordination by allowing the athlete to move at a higher rate of speed (Brown and et al. 2000).

Soccer is one of the most widely played sports in the world and is a sport characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking, and tackling (Arnason et al. 2004; Bangsbo and Michalsik 2002; Harris and Reilly 1998; Wisloff et al. 1998).

Elite soccer is a complex sport, and performance depends on a number of factors, such as physical fitness, psychological factors, player technique, and team tactics (Rösch et al. 2000).

Furthermore, elite players are mostly characterized by reaction ability in the distances ranging from 5 to 10 m (Sporis et al. 1953).

İndividuals with disabilities, such as lower-extremity amputees and those with spinal cord injury are at an increased risk of cardiovascular disease as a major cause of premature death, which is due to lack of physical activity and a sedentary lifestyle (Devivo et al. 2002; Devivo et al. 1992). An amputee has to wear a prosthesis to walk, but the energy expenditure required to walk with a prosthesis is far higher than that required for an able-bodied person.

The higher the level of amputation, the greater the energy demand (Gailey et al. 1994; Waters et al. 1976; Gonzalez et al. 1974). Nowadays, rehabilitation of individuals with disabilities includes many sports activities such as soccer, basketboll, table tennis. Amputee football (soccer) may seem difficult for a unilateral amputee, but in many countries there is an amputee football federation with its own league.

In amputee football, matches are played between teams of seven players using bilateral crutches. Wearing a prosthetic device is not allowed during match play. For competition in such a condition, players need good conditioning, muscle strength, and coordination of the extremities (Yazicioglu et al. 2007).

We can find no published literature on functional performance which is named, quickness and speed in amputee football. Therefore, the purposes of this study were to examine relationships between quickness and speed performance in amputee footballers.

Material and method

The purposes of this study were to examine relationships between quickness and speed

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performance in amputee footballers.

Ten amputee footballers volunteered to participate in this research. The mean (SD) age was 25,80±4,32 years, height was 1,77±0,09 m, and weight was 69,90±10,37 kg for the 10 amputee footballers. We applied a testing procedure that included measurements of the quickness and speed. Before conducting the investigation, all players were informed of the risks of the study and gave informed consent.

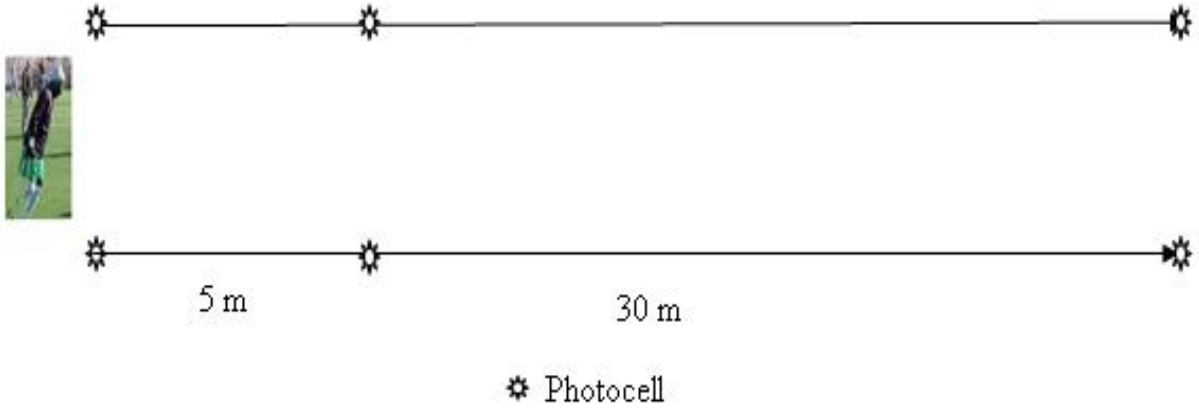
The study was approved by an ethics board and met the conditions of the Helsinki Declaration. Each test was applied three times, with a 3-minute interval, and the best result was recorded. At the beginning of each session, all players, completed a 10 minute dynamic warm-up consisting of jogging, dynamic stretching and submaximal sprints.

Automated timers, cone, and tape measure for distance were used. Timing of all repetitions was measured by an electronic timing system. The beam was set at a height of 0.5 meters above the start/finish line. Players' height is measured with an instrument sensitive to 1 mm. Their body weight is measured with a weigh-bridge sensitive up to 20 g while they are dressed in only shorts (and no shoes). Height variable is in terms of meters, and body weight variable is in terms of kilograms.

Quickness and speed tests

Photocells were placed at the start, 5 m (quickness), and 30 m (speed) in order to collect sprint times over the 2 distances. The starting position was standardized for all players. Players started the approximately 30 cm back from the starting line.

All players wore rubber-soled track shoes. Therefore, Quicness was evaluated for 5-m. Speed was evaluated for 30-m test. Test was applied three times, with a 3-minute interval, and the best result was recorded for statistical analysis.



Statistical Analysis

We summarized the data and evaluated the means and standard deviations. The better of 3 trials was used for analysis for each test. Relationships between quickness and speed was then determined by Pearson correlations. An alpha level of 0.05 was used for all analyses. Statistical analyses were conducted in SPSS 16.

Results

Table 1. Stature characteristics of the amputee footballers and performance

	N	Mean	Std. Deviation
Age (year)	10	25,80	4,32
Height (m)	10	1,77	0,09
Body weight (kg)	10	69,90	10,37
Quickness (s)	10	1,18	0,05
Speed (s)	10	5,27	0,37

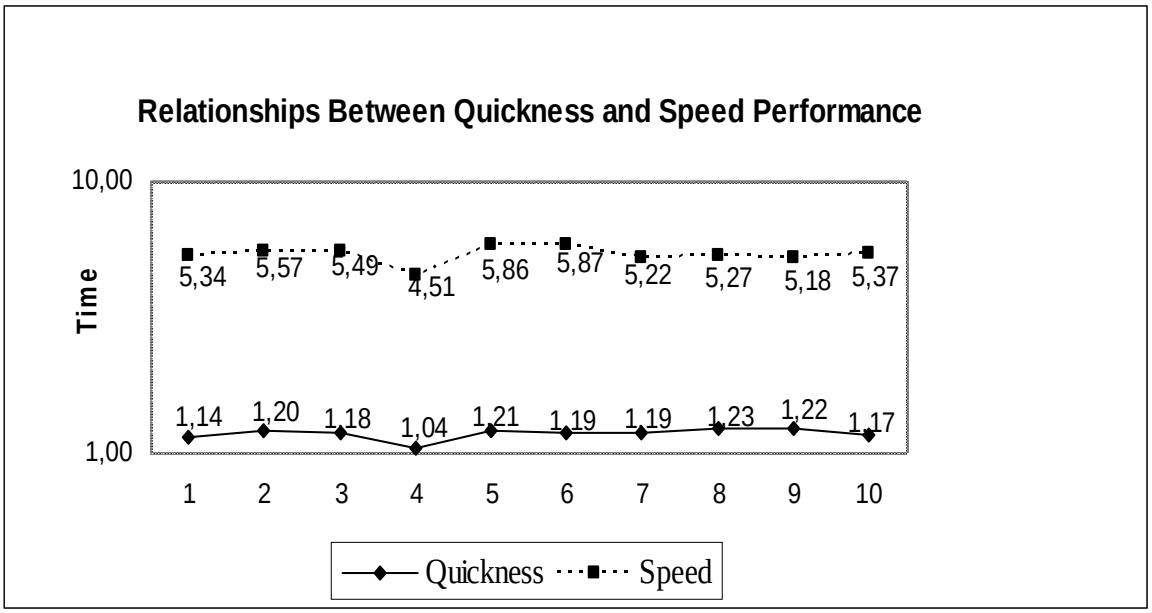
The mean (SD) age was 25,80±4,32 years, high was 1,77±0,09 m, and body weight was 69,90±10,337 for the 10 amputee footballers; the mean (SD) quickness was 1,18±0,10 second and speed was 5,27±0,37 second the for amputee footballers.

Table 2. Bivariate correlations for quickness and speed variables.

		Quickness
Speed (s)	R	0,645*
	P	0,044
	N	10

*P<0,05

Performance results are shown in Table 2. A significant positive correlation existed between quickness with speed (r = 0,645; P<0,05).



Dıscuss

The purpose of the present study was to examine relationships between quickness and speed performance in amputee footballers.

A significant positive correlation existed between quickness and speed (r = 0,645; P<0,05).

Keogh et al. (2009) analyzed a range of anthropometric flexibility and muscular strength measures of low and high handicap players (0.3±0.5 and 20.3±2.4 respectively), reporting that a golf-specific cable wood chop displayed the highest overall association (r = 0.70) with club head speed.

The importance of trunk rotary strength and power has been highlighted previously, with lower handicap players (<0) displaying significantly greater (p<0.001) hip and torso strength than higher handicap players (10–20,25), with the majority of work done on the golf shaft generated from the torso (Nesbit and Serranno 2005).

It has been established in previous studies that physical fitness test data collected from individuals with intellectual disabilities have a high test-retest reliability (r = 0.80) (13,36), and as such, their results can be trusted, repeated, and respected (Barwick et al 2012).

Spearman product-moment correlation coefficients shows significant positive correlation between speed (20 m, 30 m) and quickness (10 m sprint), values of correlation range from r=0.679 to r=0.962 (Sporiš et al. 2011).

In contrast to the results of our research, no significant correlation was found between speed and quickness in a research paper (Young et al. 1996).

A study investigated the relationship between body composition, anaerobic performance and sprint performance of amputee soccer players.

A significant correlation was found between counter movement jump, relative counter movement jump, squat jump, 10 m, 20 m and 30 m sprint performance (P<0,05) (Ozkan et al. 2012).

Little and Williams (2005) found that acceleration for 10 m is 1,83±0,08 s for professional soccer players.

The performances on the 10-m test for acceleration, the flying 20-m test for maximum speed, and the zigzag test for agility were all correlated at high levels of statistical significance (p<0.0005).

In conclusion, when amputee players have highest output speed, they can more success in speed. Speed effected output speed (quickness).

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