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Relationship between motor skill and competition performance in collegiate badminton athletes

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Abstract

Recently, several studies have investigated the identification of talent in the world of sports, and the way it correlates with motor skills. The present study investigated the index of talent for collegiate badminton athletes. Subjects were 20 university badminton athletes (10 men and 10 women, from 18 to 22 years old). Male athletes who participated in intercollege badminton championships were contrasted with the other athletes. Female athletes who were ranked in the top 16 in intercollege badminton championships were contrasted with the other athletes. Body-based (3 items) and sensorimotor (6 items) characteristics were measured. Our results showed a positive correlation of the competition result with the pro-agility test in men, and with the vertical jump in women. Our findings suggest that adolescent badminton athletes with higher (body-based or sensorimotor) scores have higher career possibilities in badminton.

1. Introduction

Several studies have investigated talent identification in the world of sports (e.g., Franks et al., 1999). Motor skills (e.g., dash, agility, instantaneous force, movement speed) are necessary to succeed in several sport domains. In addition, it is often proposed that specific motor skills are required for specific sports. When specific motor skills are highlighted in one sport, they become a focus of attention for all athletes, as well as for all juniors and their coaches who use them as markers of talent. Junior talent identification is now performed in several countries, and in Japan since 2004.

Here we report a study performed with badminton athletes connecting performance level to basic motor skills and body-based (anthropometric) properties. In this study, we measured several basic skills assessing velocity, force, agility, and impulse, and determined in male and female badminton athletes how they correlate with performance.

2. Method

Participants were 40 badminton athletes (20 men and 20 women, 18 to 22 years old), all university students. Male athletes who participated in intercollege badminton championships (n=7, group 1) were contrasted with the other athletes (n=13, group 2). Female athletes who were ranked in the top 16 in intercollege badminton championships (n=8, group 1) were contrasted with the other athletes (n=12, group 2).

The height of each participant was obtained using a digital height measuring system (AD-6227, A&D Co. Ltd. Japan). Weight, and body fat percentage were also measured using a body composition meter (Inner scan BC-521, TANITA Corp. Japan).

The motor skill measurement items included a 20m dash test (Figure 1), a pro-agility test (Figure 2), a standing broad jump test (Figure 3), a side steps test (Figure 4) and a vertical jump test (Figure 5). Time performances at the 20m dash and the pro-agility tests were measured using an infrared ray sensor (Speedtrap2, Brower Timing System. U.S.A), and the vertical jump performance was measured with a mat switch (Fitro jumper, FiTRONiC s.r.o., Slovakia). Each test was performed twice, and the best performance was kept for analysis. Standard

descriptive (means and standard deviations) and inferential (Anovas) statistics were used.

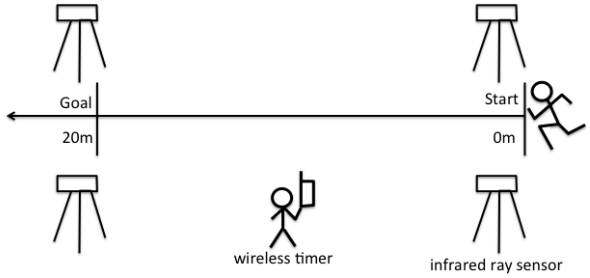

Figure 1. The 20m-dash test

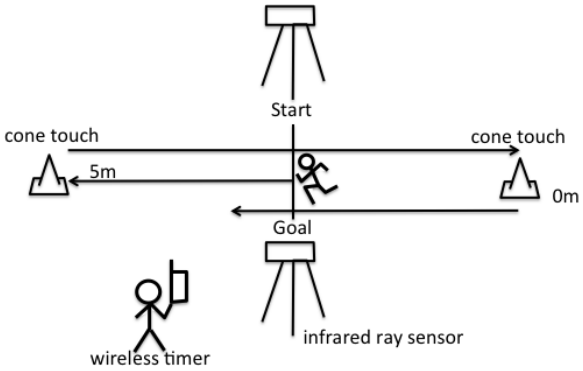

Figure 2. The pro-agility test

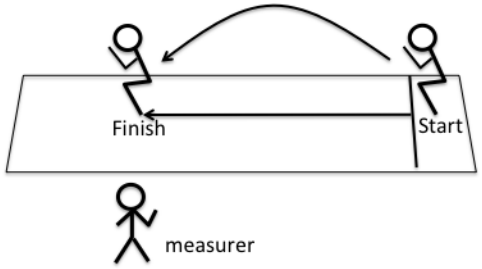

Figure 3. The standing broad jump test

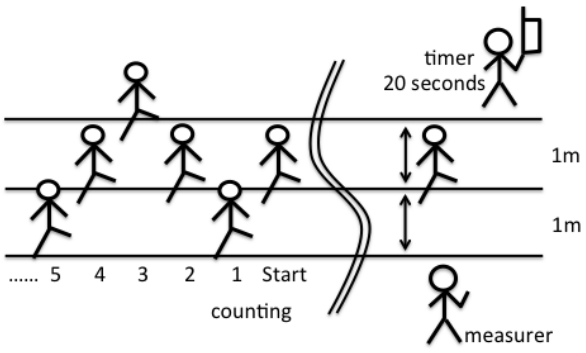

Figure 4. The side steps test

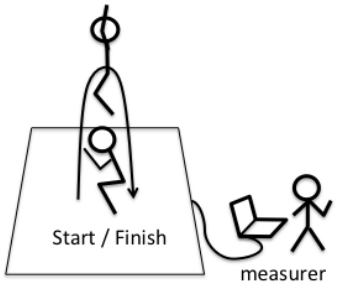

Figure 5. The vertical jump test

3. Results

A significant difference was observed in body-based characteristics and motor skills between men and women (Table 1). A significant difference was also observed between the competitive group (both for males and females) and the lower-level group, for the two following motor skills: pro-agility in men, vertical jump in women (Table 2). Mean values of 20m dash, standing broad jump, side steps and vertical jump performances tended to be higher for men's group 1 than for men's group 2, but the difference failed to reach significance. Similarly, mean values for 20m dash, pro-agility, standing broad jump and side steps performances tended to be higher for women's group 1 than women's group 2, but the difference failed to reach significance.

4. Discussion

Compared to men, women's motor skills were lower in absolute values. The differences in motor skills between men and women were certainly related to the difference in body-based characteristics, and would probably vanish when using a relative scale. As far as categories were concerned, there was a difference in agility and velocity in men, and in instantaneous force in women. Kicking movements on the floor are known to contribute to performance in badminton. The observed difference between men and women might be a difference in play style. The shuttle hit by men has a higher speed, and for this reason, the preparation phase to intercept the next shuttle is shortened and required more rapid movements. With level progression, movement speed to reach the shuttle and return to the home position increases and influences the game result. Other factors include turn capacity, rapid acceleration and deceleration to a stop.

Table 1. Statistics of body characteristics and motor skills for male and female badminton athletes.

	sex	n	mean	SD	
Height	Men	20	172.0	7.3	**
	Women	20	161.7	4.9	
Weight	Men	20	64.8	7.2	**
	Women	20	57.6	4.4	
% fat	Men	20	12.2	4.1	**
	Women	20	25.3	4.0	
20m dash	Men	20	3.2	0.1	**
	Women	20	3.6	0.2	
Pro-agility	Men	20	5.0	0.2	**
	Women	20	5.4	0.2	
Standing broad jump	Men	20	242.0	18.8	**
	Women	20	202.4	14.5	
Side steps	Men	20	63.8	6.0	**
	Women	20	58.8	4.5	
Vertical jump	Men	20	48.6	5.2	**
	Women	20	35.2	4.7	

** vs women $p<0.01$

Table 2 Statistics of body characteristics and motor skills during competition result

		Men			Women			
	group	n	mean	SD	n	mean	SD	
Height	1	7	172.2	6.7	8	161.4	4.4	
	2	13	171.9	7.9	12	162.0	5.4	
Weight	1	7	67.5	5.9	8	55.7	3.4	
	2	13	63.3	7.6	12	58.8	4.6	
% fat	1	7	14.3	3.6	8	23.7	3.7	
	2	13	11.1	4.1	12	26.3	4.0	
20m dash	1	7	3.1	0.1	8	3.5	0.2	
	2	13	3.2	0.1	12	3.7	0.1	
Pro-agility	1	7	4.8	0.2	* 8	5.4	0.2	
	2	13	5.0	0.2	12	5.5	0.2	
Standing broad jump	1	7	251.9	23.9	8	205.6	16.9	
	2	13	236.6	13.7	12	200.3	13.0	
Side steps	1	7	66.9	8.2	8	59.6	6.0	
	2	13	62.1	3.9	12	58.2	3.4	
Vertical jump	1	7	50.0	6.1	8	37.8	4.8	*
	2	13	47.8	4.7	12	33.5	3.9	

* vs group 2 $p<0.05$

Our findings therefore suggest that collegiate (adolescent) badminton athletes with higher scores in pro-agility and vertical jump have higher career possibilities in badminton. These results can be used as a guideline for coaches to adapt their coaching to the level and growth of their athletes. A longitudinal study with athletes of different ages is necessary to complement this preliminary evaluation.

5. Acknowledgements

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