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Comparison of speed, agility, anaerobic strength and anthropometric characteristics in male basketball and handball players

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Abstract

The purpose of this study was to compare speed, agility, anaerobic strength and some anthropometric characteristics of male Basketball and Handball Players. The sample of the study comprised of male Basketball and Handball team players participating in north zone intervarsity tournament (17-24 aged) (n1=24) (n2=24). Within the scope of the study, the following techniques were applied: 30-meter speed test for determining speeds of the players, Illinois agility test for determining agility of the players, Sargent jump test for determining anaerobic strengths of the players, height weight measurement and body-mass index (B.M.I) for determining anthropometric characteristics of the players. The players were informed of the test protocols before the tests and they voluntarily participated in the study. Statistical analysis of the tests was conducted by using independent sample t-test in SPSS 20.00 program. After the tests, it was found that there was a significant differences in favour of Basketball players in speeds and anaerobic strengths ($p < 0, 05$) while there was not any significant difference statistically in agility test ($p > 0,05$). As a result, there was significant difference among values regarding speed, anaerobic strength and anthropometric characteristics of male Basketball and Handball players while there was not a significant difference in agility values.

Keywords: Basketball players, handball players, agility, speed, anaerobic strength

1. Introduction

Workout capacity showing up through the use of anaerobic energy transfer systems of skeletal muscles during maximal and submaximal physical activity is defined as “anaerobic capacity”. Anaerobic workout is a type of physical activity which means revealing explosive power, which is a workload over anaerobic threshold value and which manifests itself with fatigue. It is impossible to continue anaerobic activity for a long time (Yıldız, 2012) [14]. Team sports like Basketball and Handball include different actions which are to be performed in a short duration such as jumping, jogging, and running towards various directions and altering direction during the match. According to Massuça & Fragoso (2011) [1], body composition and body mass are contributing factors among others to optimal exercise and performance, body mass can influence an athlete’s speed, endurance, and power, whereas body composition can affect strength and agility. Handball is team sport which requires a high standard of aerobic and anaerobic fitness in order to complete 60 minutes of competitive play and to achieve success through an intermittent high intensity body-contact and well-coordinated activities (Buchheit, Lepretre, Behaegel, Millet, & Ahmaidi, 2009) [3]. Speed as a psychomotor capacity and the related attributes have a vital effect on Basketball playing performance. A player who is not sufficiently quick can't prevail at top level in modern day basketball. In General, speed can be said as a capacity which empowers a player to move as swift as possible under the circumstances at a given level of resistance. If the resistance against which the muscles move is high, then the speed or the efficiency of movement largely depends on speed strength. Particular types of speed, as required in today’s Basketball & Handball, also include agility. Although expert literature flourishes with different definitions of agility, the predominant one is that agility is the ability to rapidly change the direction and rhythm (speed) of movement. Some authors have emphasized it important for the prevention of sport injuries, while few consider it to be a prerequisite for high-level basketball performance.

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Agility is the physical ability to apply deceleration, changing direction, acceleration in a very short time efficiently. Human body is a composition of muscles, lipids and bones in different ratios and densities. These components affect performance in different ratios depending on sports branches. Effective test programs show whether players are suitable for the related sports branch or not physically. Therefore, sports scientists have been focusing heavily on studying body compositions and physical profiles of the players as well as their physiological profiles (Albay *et al.*, 2008) [2]. Anthropometric characteristics can be determinative in enhancing or determining performance and ability level (Reilly *et al.*, 2000) [5]. The anthropometric and physical examinations contribute to the preference of the player and the training model to be applied as well as forming a foresight in the targeted success. Today, sportsmen should be faster, more skilful, higher quality in terms of anthropometric and physiological capacities in all sports branches (Ersöz *et al.*, 1996) [4]. Speed, Agility, Anaerobic strength and Anthropometric structure are some of the most important characteristics of the players in sports branches like Basketball and Handball which are generally played in intensive tempo with sudden accelerations and sudden directions swifts. As a result, this study was carried out in order to determine speed, agility, anaerobic strength and some anthropometric characteristics of male Basketball and Handball players.

2. Material & Methods

2.1 Participants

Total, 48 North Zone intervarsity Basketball & Handball players aged between 17 - 25 participated in this study.

2.2 Anthropometric measurements

Body height (to nearest 0.1 cm) and body mass (to nearest 0.05 kg,) were measured and body mass index (BMI) was calculated as the body mass per (height)² in kg/m² were chosen

as the general anthropometric variables.

2.3 Speed test: 30-meter speed test was applied on the participants. Test was performed by determining a 30-meter distance and making the players run from a starting point and measurement was recorded.

2.4 Illinois agility test: A test racetrack of width 5 meters, length 10 meters composing of four cones was used to mark the start, finish and the two turning points, with four cones on 3.3 meters intervals were placed in the middle was set. Participants started to run from starting point of test racetrack in facedown position and hands by their shoulders. On the 'Go' command the stopwatch was started, and the athlete got up as quickly as possible and ran around the course in the direction indicated, without knocking the cones over, to the finish line, at which the timing was stopped. Finish time of the racetrack was recorded on second basis

2.5 Anaerobic strength: Anaerobic strength test was performed by using Sargent jumping board. The last point contacted by fingertips through stretching two arms up while keeping the feet together and standing upright was marked on the board and then the subject contacted the board by jumping upwards with his two feet. The participants did not take step while jumping upwards. After three attempts, the best score was recorded. (Sargent jump= P=(√ 4.9 Weight√ D) kgm/s).

2.6 Statistical Analysis: SPSS 20.00 packet program was used as statistical analysis in our study. Independent Sample T Test was applied in order to determine analysis correlation among measurements. Values lower than p (0<0.5) were accepted as having significant difference.

3. Results

Table 1: Anthropometric characteristics of Basketball & Handball players

Variable	Branch	N	MEAN	SD	Mean difference	SEDM	t- value
Height (cm)	Basketball players	24	177.10	2.40	3.92	1.01	2.76*
	Handball players	24	173.18	1.64			
Weight (kg)	Basketball players	24	72.12	1.56	0.57	1.45	0.57
	Handball players	24	71.55	1.32			
BMI (kg/m2)	Basketball players	24	22.63	1.22	1.38	0.52	2.54*
	Handball players	24	24.01	1.31			

Table-1: shows the demographic characteristics of basketball and handball players. The mean height of basketball players was 177.10 cm and handball players were 173.18 cm. The

mean weight of basketball players was 72.12 kg and handball players were 71.55 kg. The mean value of body mass index of basketball players was 22.63 and handball players were 24.01.

Table 2: Comparison of Speed, Agility & Anaerobic Strength of the Basketball & Handball Players

Variables	Branch	N	Mean	SD	Mean difference	SEDM	t value
Speed (s)	Basketball players	24	4.53	0.28	0.22	0.16	2.624*
	Handball players	24	4.60	0.30			
Agility (s)	Basketball players	24	11.21	1.01	0.09	0.12	1.416
	Handball players	24	11.30	0.98			
Anaerobic strength ()	Basketball players	24	36.33	1.32	4.67	0.85	7.312*
	Handball players	24	31.66	1.26			

* Significance 0.05 level

Table 2 showed the comparison of Speed, Agility & Anaerobic Strength between Basketball and Handball players. Results indicated that basketball players had significantly greater values in Speed & Anaerobic Strength however no significant

difference was seen in Agility component.

4. Discussion

In the present study Speed, Agility, Anaerobic Strength of

Basketball & Handball players were compared. The results showed that there was significant difference among the Basketball & Handball players regarding Speed and Anaerobic Strength though no significant difference was seen among the players in Agility component. Along with that Basketball players seemed to be taller and heavier although the Handball Players had a higher BMI ratio. Similar findings were seen when Bayios *et al.* (2006) ^[6] compared the anthropometric characteristics and body compositions of basketball and handball athletes, reporting that Basketball players were taller than Handball players. The literature reports that explosive power is an important feature for Basketball players (Aşçi and Açıkkada, 2007 ^[7]). In the present study, players who practised basketball had better results in tests pertaining to explosive power than those who played Handball. Ackland *et al.* (1997) ^[8] reported that, on average, a basketball athlete jumps 46 times per game; this action should enhance basketball players' performance scores when testing explosive power of the lower limbs. It has been proved in the past with the use of isokinetic tests at slow velocities testing lower limb strength, that basketball players were more powerful than any other athlete (Imwold, *et al.*, 1983, Zakas, *et al.*, 1995,) ^[9, 10]. An insignificant difference in agility between handball and basketball players was also obtained. These results of the study are in agreement with the findings of Singh (2013) ^[12]. However significant difference was seen in Speed among the Basketball and Handball players. Berg *et al.* (1995) ^[11] found exact average values on sprinting performance between basketball and football players, indicating that not only the covered distance is crucial in the development of the various abilities of the athletes, but also the distance per player ratio and the number of contact actions during the game can be important factors.

The cause of differences in performance between basketball and handball players can be accounted to the low requirements of movement in some positions such as goalkeepers or defensive specialists in handball. In Basketball players with such profiles does not exist, and all the players on the court have to perform a greater percentage of the total movements, fast breaks and transitions between courts.

5. Conclusions

When comparison was done between Basketball & Handball player Basketball players were found taller and had higher scores in anaerobic strength, and speed though no significant difference was found among agility. The present study should help physical education teachers and coaches to identify talents and to understand the physical variables most affected by the practise of these sports. More data would be helpful on the above studied variables along with physiological and physical variables to assess relationship among them and with performance in intervarsity Basketball and Handball players

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