Examining some physical parameters of elite basketball players playing in different leagues

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This research was presented the XIV. European Conference on Social and Behavioral Sciences in Odessa-Ukraine, 23-26 August 2017, as an oral presentation.
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Abstract

Objective of this study is to examine some physical parameters of basketball players at elite level who are playing in different league levels. Total 24 sportsmen consisting of 12 sportsmen from Turkish Man Basketball 2nd League and 12 sportsmen from Turkey Men Basketball 3rd league whose training age is minimum 5, voluntarily participated to this study. Vertical jumping, 20 m speed running, hand grip strength (right and left), flexibility, 30 sec do sit-ups, 30 sec push-up, 20 m shuttle running tests were performed for determining physical properties of basketball players. It was determined that the 2nd league basketball players had better hand grip strength (right-left), Max VO_2 and anaerobic power values than basketball players playing in the 3rd league. Statistically significant difference was determined in 20 m speed running parameter (p<0.05). It was also determined that vertical jump, flexibility, 30 sec do sit-ups and 30 sec do push-up values were similar in two groups. Similarity which is observed in values of male basketball players who play in both leagues can be explained with proximity at rivalry levels between leagues. This proximity at competition level which is observed between particularly 2nd and 3rd leagues are projected in physical profiles of players. In addition to this differences which are seen in some parameters may be caused from differences in training programs. It is considered that technical, tactical and psychological properties of players are important for determining players between leagues in addition to physical properties.

Keywords: Basketball, different leagues, physical parameters.

INTRODUCTION

Basketball, which can be played by all age groups, is the second most favorite sport branch after football in Turkey. Moreover, it should be remembered that basketball is a struggle sport which necessitates technique-tactic and psycho-mental features, and where some motoric features like power, speed and endurance gain importance (5,13,22).

As it was mentioned that the motoric requisites of the positions of players in the game can create differences in physical fitness compounds (20), there are also studies stating that players in different positions can have similar physical features (15). Besides, factors such as beginning the game in the first five, entering afterwards, or total playing times of the players were reported to have no effect on physical fitness of the player (16). It is difficult to attribute success to only one factor in basketball (7,25). However, being tall, which is a dimension of physical structure, was accepted to be an advantage (4).

In the studies conducted, anthropometric and physiologic profiles of the successful basketball players were evaluated, and factors such as experience, body composition, endurance, balance between aerobic and anaerobic power were determined to be prior within others in the evaluation of elite level basketball players (10,23). Moreover, there are studies supporting that improving power and anaerobic power capacities is a must for success in basketball (19,21).

Together with numerous useful studies about basketball sport branch, it is also important to compare the motoric features of basketball players playing in different league levels, and to examine whether there are any differences. The aim of this research is to examine some physical parameters of elite level basketball players playing in different league levels.

MATERIALS & METHODS

In this study, 12 basketball players from Turkey Men's Basketball 2nd League (average age; 24.25±5.23) and 12 basketball players from Turkey Men's Basketball 3rd League (average age; 18.75±2.93), totally 24 basketball players, whose practice age was at least five, participated voluntarily. All of the tests and measurements were recorded in the interval period of the league, and necessary information about the tests was explained to the players before the applications. Vertical jumping values, anaerobic power, and 20 m shuttle run values of players were tested, and maximum oxygen utilization capacities (MaxVO2) were determined. 15 min warm up period was applied before the tests. In each test battery 2 tests were made with 5-10 min intervals and best values were recorded, except for the 30 sec sit-ups and 20 m shuttle run.

Tests Applied

Height and Body weight: In the linear measurements a tapeline with 0.01 m sensitivity score was used. Weight measurements were made with a digital weighing scale with a sensitivity level of 0.01 kg (27).

Body mass index (BMI): Using body weights and lengths, BMI was determined using the BMI = Body weight / (Length)^2 formula (18).

Sit and reach test: was determined on the sit and reach platform, and recorded in cm (9).

Hand Grasping Strength: Beginning from the right hand, the measurement was made with Jamar brand dynamometer and recorded in kg, while the subject was on foot, arm straight with a 10-15o angle from the shoulder on one side (9).

30 sec Sit-ups test: The soles of the feet are fully on the mat, knees bent (90o), hands are on each side and touching the neck, in a sitting position on the mat and the counts were recorded as the elbows touched the knees for 30 seconds (27).

30 sec push up test: The subjects were positioned as hands are on the gymnastic mat open in shoulder width, elbows are straight, knees do not touch to the ground and lumbar region does not bend down. With the start sign, the player approached his body 90o to the ground and each count recorded as he returned to the starting position (18).

Balance measurement; Balance scores were determined with Flamingo Balance device. Test lasted for one minute and at the end of the time, each balance attempt of the subject was counted and recorded as the balance result (26).

20 m speed test: A course with a 20-meter straight running track was prepared in the hall. The time between start and end was determined with NewTest 2000 photocell device and recorded in sec (2).

Vertical jump test: Determined using the vertical jumping gauge (9).

Anaerobic power measurement: Measurements of body weight with vertical jump distance (m) were determined by the Lewis formula using the resulting values (9).

(P=$\sqrt{4.9}$ * Body weight * $\sqrt{D}$) P= Anaerobic Power, D= Vertical jump distance (m).

Determining MaxVO2; 20 m shuttle run test was applied, and the number of the runs that the subject performed were used on evaluation table, thus MaxVO2 values were determined and recorded in ml/kg/min (9).

Table 1. Average values of the research group according to the leagues.

Variables	League	N	Mean	SD
Age	2nd	12	24.25	5.23
	3rd	12	18.75	2.93
Height	2nd	12	196.08	8.74
	3rd	12	194.58	7.65
Weight	2nd	12	96.67	11.83
	3rd	12	93.00	10.34
BMI	2nd	12	25.06	1.44
	3rd	12	24.49	1.21
Hand Grasping Strength (right)	2nd	12	55.92	1077
	3rd	12	51.91	8.23
Hand Grasping Strength (left)	2nd	12	54.93	11.21
	3rd	12	50.82	8.40
Vertical jump	2nd	12	45.00	5.12
	3rd	12	44.83	7.11
Anaerobic power	2nd	12	142.87	14.87
	3rd	12	137.19	16.21
Sit and reach	2nd	12	23.75	3.79
	3rd	12	21.42	5.14
30 sec sit-ups	2nd	12	23.58	4.46
	3rd	12	23.67	3.85
30 sec push-up	2nd	12	24.67	3.26
	3rd	12	24.33	4.42
20 m speed	2nd	12	3.25	0.28
	3rd	12	3.50	0.24
Max VO2	2nd	12	52.38	5.40
	3rd	12	47.70	5.27

Statistical analysis

SPSS 21.0 program was used in the analysis of the data obtained in the study. Arithmetic averages

and standard deviations were given with descriptive statistics. The inter-group differences were detected via Mann-Whitney U test. Significance level was admitted as p<0.05.

Table 2. Mann Whitney-U Analysis of the research group according to the leagues.

Variables	League	Mean Rank	U	p
Age	2nd	16.42	25.000	0.006*
	3rd	8.58		
Height	2nd	13.21	63.500	0.623
	3rd	11.79		
Weight	2nd	13.38	61.500	0.544
	3rd	11.63		
BMI	2nd	13.92	55.000	0.326
	3rd	11.08		
Hand Grasping	2nd	13.96	54.500	0.312
Strength (right)	3rd	11.04		
Hand Grasping	2nd	13.83	56.000	0.356
Strength (left)	3rd	11.17		
Vertical jump	2nd	13.33	62.000	0.563
	3rd	11.67		
Anaerobic power	2nd	13.92	55.000	0.326
	3rd	11.08		
Sit and reach	2nd	14.50	48.000	0.164
	3rd	10.50		
30 sec sit-ups	2nd	12.88	67.500	0.794
	3rd	12.13		
30 sec push-up	2nd	13.33	62.000	0.561
	3rd	11.67		
20 m speed	2nd	9.33	34.000	0.028*
	3rd	15.67		
Max VO$_2$	2nd	15.25	39.000	0.057
	3rd	9.75		

*p<0.05

RESULTS

When the average values of the 2nd League and 3rd League basketball players were examined, it was determined that there was statistically significant difference in age and 20 m speed parameters (p<0.05); however, there was no statistically significant difference between leagues in terms of stature, body weight, body mass index, grasping power (right-left hand), vertical jumping, anaerobic power, flexibility, 30 sec sit-ups, 30 sec push-ups, and MaxVO$_2$ values (p>0.05).

DISCUSSION

This study was conducted to examine some physical parameters of elite level basketball players playing in different league levels.

In the study conducted, it was determined that the basketball players playing in the 2nd League were older, taller, heavier, and with higher BMI's compared to the players of the 3rd League; however,

there was no statistically significant difference in between the average values of the leagues except age.

Pamuk et al. (21) determined that the average hand grasping value of the 2nd League basketball players was 45.56 kg, while it was 36.82 for the regional league basketball players, and reported that there was statistically significant difference between the leagues. In our study, it was observed that the values of the 2nd League players were better as well; however, there was no statistically significant difference. It is evaluated that this was because of the closeness of the leagues.

In the study conducted, it was observed that flexibility, 30 sec sit-ups, 30 sec push-ups, and vertical jumping average values were similar to each other. It was reported that 30 sec sit-up and push-up average values of university students with an age average of 21.3 was 26.2 and 25.9 respectively (1). In another study on male basketball players in university, flexibility average values of pivot and forward players were reported as respectively 10.83 cm and 10.67 cm; vertical jumping average values as 44.25 cm and 42.33 cm (15). In another study on a similar group, vertical jumping average values of pivot, forward, and point guard male university basketball players were respectively recorded as 56.34 cm, 64.27 cm and 68.12 cm (19); in another research on basketball players, flexibility value was determined as 24.2 cm before the short camp period with intense exercises (14). Although the flexibility and vertical jumping values do not correspond with certain studies (15,19), it can be mentioned that they were supported by other sources (1,8,11-12,14,21).

When the results of anaerobic power, MaxVO$_2$, and 20 m speed are examined, it was determined that 2nd League players had better average values, and that there was statistically significant difference with regards to 20 m speed parameter. Despite similar values in vertical jumping of 2nd and 3rd League players, 2nd League players reaching higher values could be resulted from their body weight excess. In a similar study on elite basketball players, 20 m speed average values were reported as 3.47 sec before the exercise camp and 3.14 sec after the camp (1), and they supported the results of our study; while it was determined 3.07 sec in elite level football players and 3.06 in handball players (11). This difference in team sports with similar energy systems could be either a result of the variables at the moment of measuring and testing, or a result of more time being allocated to speed practices in the exercise phases of the other sport branches. Average MaxVO$_2$ value of the 2nd

League players of the research was recorded as 52.38 ml/kg/min, while it was recorded as 47.70 ml/kg/min for the 3rd League players. The MaxVO2 results found in the literature review (3,11,15,21,24) are supporting our findings. Regarding 2nd and 3rd League basketball players of our research, higher values were observed both in 20 m speed and MaxVO2 average in favor of the 2nd League players, which was thought to be a result of more regular and special speed and endurance practices.

It could be accepted as a deficiency of the study that the basketball players were not evaluated according to their positions in the game (point guard, pivot, forward etc.). Besides, it is thought to be more useful that similar future researches be conducted with more participants and evaluated with other physical parameters.

As a conclusion, similarity in the values of male basketball players in both league levels can be explained with the proximity of competition levels of Turkish Basketball Leagues. It can be mentioned that this proximity in the competition levels reflected on physical profiles of the players. It is reported that as physiologic and anatomic maturity is completed in professional players, the differences in motoric features diminishes (17), and this principle is parallel with the findings of the study conducted. It is thought that the reason of 2nd and 3rd league level players being in different leagues is because of technique, tactic, and psychological features rather than physical characteristics. Besides, differences observed in some parameters could be stemmed from the differences in exercise programs.

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