ANTHROPOLOGICAL ANALYSIS OF THE CROATIAN U16 BASKETBALL MEN'S NATIONAL TEAM – A COMPARATIVE ANALYSIS OF TWO GENERATIONS

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Abstract

The aim of this research was to conduct a comparative analysis of anthropological characteristics of basketball players from the U16 Men's National Team born in 1997 or 1998 with the present U16 generation born in 2000 and 2001.

The participants in this research were twenty one (21) players, members of the U16 Men's National Team. The research included tests for assessing morphological characteristics, as well as test for motor and functional abilities.

Based on the obtained results, the conclusion can be made that the present generation of U16 basketball players born in 2000 or 2001 showed quite similar modal characteristics to the ones demonstrated by the U16 generation of players born in 1997 and 1998 in their results of tests for assessing morphological characteristics, motor and functional abilities.

Key words: *basketball, morphological characteristics, motor and functional abilities, U16*

Introduction

Basketball is a complex sports activity and, as such, it consists of simple and complex movements that are performed in conditions of different intensity during the cooperation of team players in a basketball game (Rupčić, T., Matković, B., Knjaz, D., 2010; McArdle WD., Katch FI., Katch VL., 2010). The above-mentioned requires players to demonstrate a high level of acquisition in motor skills – elements of basketball technique, development of physical conditioning and motor abilities, as well as good conative characteristics and cognitive abilities.

For a basketball players to be able to perform the mentioned activities, certain motor abilities must be at a high level of acquisition. According to Milanović (2010), motor abilities enable strong, quick, long, precise or coordinated performance of various motor tasks. From the aspect of motor abilities, basketball is dominated by agility (changes of direction with the ball, opening for ball reception, moving in defensive stance), lower-limb explosive strength (vertical jumping ability – offensive and defensive stance), upper-limb explosive strength (passing the ball), balance, shooting or passing precision, speed (starting speed and acceleration), endurance (aerobic and anaerobic), etc.

Agility is defined as the ability to decelerate, accelerate and change the direction of movement while maintaining good body control, which is closely connected with balance as it requires the player to perform continued transfer of the body's centre of gravity (Brown L. E. et al., 2004; Arthur et al., 1998; Brittengam, G., 1996; Costello et al., 1993; Murphy et al., 1997; 1998; Smythe, 1995) that is manifested in specific basketball movements, such as movements in the defensive stance, opening for ball reception, etc.

High aerobic capacity ensures the slower onset of fatigue and faster recovery in short breaks during a basketball game, whereas anaerobic energetic capacity assures endurance in high-intensity repetitive activities (Matković, R.B., Matković B., Knjaz, D., 2005).

The aim of this paper was to present a comparative analysis of morphological characteristics, as well as motor and functional abilities in U16 members of the Croatian National Team born in 1997 and 1998 with the present generation of Croatian U16 basketball players born in 2000 and 2001.

Methods

The sample of examinees was composed of twenty one (21) U16 National Team players. Ten (10) of them, born in 2001/2002, averagely aged 14.9±0.6. and eleven (11) of them, born in 1997/1998, averagely aged 15.7±0.4. All the participants were informed, both in written and orally, on the methods of implementation of the measurements, as well as on the purpose of the tests that were performed. Results of the 10 examinees born in 2001/2002 were compared with the results of research conducted by Borović et al., 2016 aimed at determining the modal characteristics of the 11 potential U16 National Team players, generation born 1997/98.

The sample of variables was composed of morphological characteristics and test for assessment of motor and functional abilities with validated metric characteristics (Metikoš et al., 1982; Blašković, Milanović and Matković, 1982; Jukić et al., 2008).

Morphological measures used in this research were body height, body weight and body mass index. Motor abilities for assessing agility were measured by using the 20-yard test (20Y) and Side-Step test (SSTEP). Explosive strength in sprinting was tested with the 20-meter run, while explosive strength in the vertical jumping ability was assessed with the Countermovement jump test (CMJ). The 300-metre sprint test was used for assessing the functional anaerobic endurance capacity (15x20 m).

Data processing was performed by using the programme package Statistica for Windows, ver. 12. The following parameters were calculated for each variable: arithmetic mean (AM), standard deviation (SD), minimum value (MIN) and maximum value (MAX).

Results

Table 1. presents descriptive statistical parameters of morphological characteristics, motor and functional abilities of the potential candidates for the U16 National Team born in 1997 and 1998 (Borović et al., 2016).

Table 1: Descriptive statistical parameters of morphological characteristics, motor and functional abilities of potential U16 Men's National Team players 1997/98

Variable	Valid N	AM	MIN	MAX	SD
BH (cm)	11	194,45	184,30	205,20	7,22
BW (kg)	11	81,87	70,90	95,50	7,63
BMI	11	21,67	18,80	23,80	1,75
CMJ	11	45,30	38,83	58,60	6,35
SSTEP	11	7,41	6,70	8,28	0,39
20Y	11	4,97	4,65	5,18	0,15
20m	11	3,397	3,26	3,67	0,13
300m - time	11	68,05	62,71	74,04	3,47

AM – arithmetic mean; MIN – minimum value; MAX – maximum value; SD – standard deviation; BH – body height; BW – body weight; BMI – body mass index; CMJ – Countermovement jump test; SSTEP – Side-Step test; 20Y – 20-yard test; 20m – 20-meter running test; 300m - time – 300-meter sprint test

The results presented in the above table were also used for a research conducted by Borović et al., 2016 aimed at determining the modal characteristics of potential U16 National Team players. The mentioned table was used for a comparison with the results of the present U16 generation of players who are also potential members of the National Team. Based on this research, it shall be determined if the 2000/2001 generation meets the modal characteristics demonstrated by the 1997/98 generation, as well as if their results show significant deviations when compared with the results in Table 1.

Table 2: Descriptive statistical parameters of morphological characteristics, motor and functional abilities of potential U16 Men's National Team players 2000/01

Variable	Valid N	AM	MIN	MAX	SD
BH (cm)	10	189,80	181,00	199,70	6,63
BW (kg)	10	77,76	66,30	104,10	11,82
BMI	10	21,46	19,00	26,00	2,05
CMJ	10	41,84	33,90	52,00	5,50
SSTEP	10	8,25	7,87	8,89	0,35
20Y	10	4,94	4,61	5,30	0,21
20m	10	3,40	3,13	3,75	0,17
300m - time	10	69,23	64,13	76,06	3,36

AM – arithmetic mean; MIN – minimum value; MAX – maximum value; SD – standard deviation; BH – body height; BW – body weight; BMI – body mass index; CMJ – Countermovement jump test; SSTEP – Side-Step test; 20Y – 20-yard test; 20m – 20-meter running test; 300m - time – 300-meter sprint test.

Table 3: T-test for independent samples – generation 1997/98 and 2000/01

Variable	AM 1	AM 2	T-value	df	p	Valid N 1	Valid N 2	SD 1	SD 2	F-ratio Variances	p Variances
BH (cm)	189,8	194,5	-1,53	19	0,142	10	11	6,64	7,223	1,184	0,810
BW (kg)	77,8	81,9	-0,96	19	0,351	10	11	11,83	7,635	2,399	0,189
BMI	21,5	21,7	-0,26	19	0,801	10	11	2,06	1,752	1,380	0,621
CMJ	41,8	45,3	-1,33	19	0,199	10	11	5,51	6,358	1,334	0,676
SSTEP	**8,3**	**7,4**	**5,11**	**19**	**0,000**	**10**	**11**	**0,35**	**0,394**	**1,256**	**0,742**
20Y	4,9	5,0	-0,32	19	0,751	10	11	0,21	0,156	1,814	0,367
20m	3,4	3,4	0,17	19	0,867	10	11	0,18	0,139	1,622	0,462
300m - time	69,2	68,1	0,79	19	0,437	10	11	3,36	3,472	1,066	0,933

AM – arithmetic mean; MIN – minimum value; MAX – maximum value; SD – standard deviation; BH – body height; BW – body weight; BMI – body mass index; CMJ – Countermovement jump test; SSTEP – Side-Step test; 20Y – 20-yard test; 20m – 20-meter running test; 300m - time – 300-meter sprint test.

Discussion

Upon analysing the results of measurements for assessing morphological characteristics, in terms of body height and body weight, the two generations of U16 players showed that the 2000/01 generation was slightly lower on average 189,80±6,63 cm, as well as lighter 77.76±11.82 kg when compared with the 1997/98 generation and their average body height of 194,45±7,22 cm and body weight of 81.87±7.63 kg. According to a research conducted in Lithuania by Kamandulis et al. (2013), the average height of their U16 players was 186.8±8.4 cm, while their body weight was 79.3±12.1. The results for body mass index for the 1997/98 generation (21.67±1.72 kg/m²) and the 2000/01 generation (21.47±2.05 kg/m²) was compared with the results of a research conducted by Marić, Katić and Jeličić, (2013) in which tests were performed in 5 basketball clubs from the U16 First League in Bosnia and Herzegovina where the measured body mass index was 20.81 kg/m². The above-mentioned results lead to the conclusion that the 1997/98 generation is a very high generation in relation to the 2000/01 generation and Lithuanian U16 players, whereas body mass index results show no significant deviations between the compared groups. The body mass index of U16 players from Bosnia and Herzegovina showed somewhat lower values than the ones measured for our examinees, however, their results undoubtedly belong in the group of persons with normal body mass index (Wilmore et al., 2008).

As one of the essential success factors in basketball performance, motor abilities were also assessed as part of this research. The results demonstrate that the 1997/98 generation accomplished higher results in CMJ tests (45.30±6.35cm) and in the 20-meter sprint (3,39±0,13 sec) when compared with the 2000/01 generation (CMJ 41,84±5,50 cm and 20 m 3,40±0,17 sec). The determined differences between the results are not as significant, however, they do indicate a slight advantage of the 1997/98 generation. Brekalo et al. (2013) also performed the mentioned 20-meter test with U16 basketball players from the top three clubs in Bosnia and Herzegovina. These results were 3,54±0,26 sec slower than both generations of Croatian U16 players. Coelho e Silva et al. (2008) conducted a research on a national level with U16 players in Portugal (n=28), averagely aged 15,0-15.9, using the CMJ test. In relation to our U16 players from both generations, Portuguese examinees demonstrated lower result in the mentioned CMJ test (37,9 cm).

The results of the 300-metre sprint test for assessing functional capacities showed a minimum time difference for the covered distance in both generations. The 2000/2001 generation covered the mentioned distance in 69,23±3,36 sec, whereas the 1997/98 generation did it in 68,05±3,47 sec. The conclusion can be made that the present U16 generation is very close to the model characteristics.

Table 3. demonstrates results of the T-test for independent samples between the two U16 generations of players which show statistically significant differences in benefit of the 1997/98 generation in relation to the 2000/01 generation in the Side-Step test for assessing motor abilities (SSTEP) p=0,00. There were no statistically significant differences between the two groups among the other measured indicators which leads to the conclusion that the present U16 generation is close to the modal characteristics demonstrated by the 1997/98 generation.

Conclusion

Based on the obtained results on morphological characteristics of the 1997/98 generation of U16 National Team players in relation to the 2000/01 generation, the conclusion can be made that from the aspect of longitudinal and transversal dimensionality, the 2000/2001 generation showed lower values. The reason for this can be found in their chronological age which was lower at the moment of the measurements. The results of most motor ability tests for the 2000/2001 generation are satisfactory in terms of modal values. A statistically significant difference was recorded in the Side-Step test (SSTEP) which is connected with agility. The mentioned motor ability can be influenced by the way of specific training and thus brought closer to the desired values.

When considering the results of the present U16 generation of players born in 2000 and 2001, it can be said that their level of motor abilities is at a very high level and that they can reach their potentials during their future training process, and in that way, bring their performance of technical and tactical elements to the most high level.

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