

THE IMPACT OF CERTAIN ANTHROPOMETRIC AND MOTOR INDICATORS ON THE EFFICIENCY OF SCORING POINTS IN BASKETBALL GAME OF 15 YEAR OLD STUDENTS

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(Research note)

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Abstract

This study is developed to verify the impact of certain morphological and mechanical variables on the execution of the technical elements (throwing hoops with two steps and free throws) in the basketball game. 161 students have been tested, 15 year old (boys) of the Primary School in Struga, which besides studying, are not active in basketball. According to the regressive analysis, it was verified that the morphological and mechanical variables that were used for evaluation, have no emphasized impact in scoring points on both cases.

Keywords: *elements of basketball, throwing hoops with two steps, free throw in the basket, predictor variables, criterion variables, specific motor skill*

INTRODUCTION

The school syllabus of all levels, have predicted a specified amount of physical culture classes. There is no doubt that a worthy percentage of these physical activities are predicted for a Basketball. Almost every student loves and picks this game from others. But to succeed in the progress of this game and to achieve higher scores, the desire to play and practice basketball isn't enough, but an extra commitment out of the school is needed. The elements that have impact for a successful game belong to different anthropological circumstances and technical-tactical characteristics of this game. The students of this age are capable to manipulate with the basket ball and they also possess firm knowledge for this game. The whole purpose of the game is to score points. These points are achieved from different positions and different situations of the players. The kids with taller bodies claim domination on this game. The faster and smarter players claim to score more baskets etc. So the success of scoring points depends more from locomotive skills and other psychophysical characteristics.

Numerous studies have verified that this

game requires a high psychophysical training, where it's all about the general and specific morphological characteristics, mechanical and functional capacity etc. (Jukić, Nakić, & Milanović, 2003). It has also been verified that the level of proportion between these anthropological expansions has a direct impact in the successful scoring of the game and achieving high success in it (Blašković, & Hofman, 1984; Pasalić, Rado, & Brdaić, 2004).

The proportion and the impact of the different anthropological expansions at young age, especially in students for whom basketball is only a school activity, vary from the ones of athletes. The level of impact of these factors on the technical elements is different. On athletes the different combinations in the game, the activity positions in the court during attack and defense are well defined (Trninić, 1996; Trninić, Dizdar, & Dezman, 2002). Based on these goals, adequate methods are planned and programmed for a successful training process.

Another problem is the way of defining and evaluating the efficiency of the basketball game. This evaluation is based on different methodologies that define the proportion

of different locomotive capacities and other characteristics of the players with the technical efficiencies and scoring points (Bregović, Matković, & Blasković, 1988; Pasalić et al., 2004; Tkalčić, Bradić, & Gregov, 2007). Many different models have been designed about the structure of the game and its activities in general (Trninić et al., 2002).

However, at young aged groups that are not very active in basketball, certain methods of training preparations and methodology for evaluating the game efficiency cannot be used the same as within the athletes.

The main goal of the study is to verify the partial impact of the predictable variable system on the criteria that represents variables for defining the efficiency in executing of the technical elements.

METHODS

The Sample of entity

This study is made with students of seventh and eighth grade of average age fifteen year old. The sample consists of students (boys) from the Primary School in Struga, all of them in good health condition. The number of tested students is 161. The test is made in school facilities and in optimum working conditions.

The Variable Sample

The study made in the sample of 15 year old students includes testing and measurement in three anthropological expansions: morphological characteristics, mechanical capacities, and situational-motor skills, or to be more exact, the execution of the technical elements.

The variables for evaluating the morphological characteristics are: Height (AGJATR), Span (AGJAKR), Biakromial width (AGJBIA), Arm Perimeter (APERKR), Forearm Perimeter (APERPK), Weight (AMASTR).

- For evaluating motor skills are used the following tests:

- For evaluating preciseness: aiming with a long aluminum pipe (MQGGJA), aiming with a short aluminum pipe (MQGSHA), aiming the mark on the wall with the inner part of the rack (MQMTBR).

- For evaluating explosive strength: Throwing the medical ball frontally from the position laying on the back (MHMPSH), High-Jump on the spot (MKGJVE), 20 meter run

from high start (MVR20M).

- For evaluating balance: Stand on one leg in length on the equipoise bench (MQTR1K), Stand on one leg crosswise on the equipoise bench (MQTR1K), Stand on one leg in length on the bench with eyes closed (MQGJSM).

- For evaluating flexibility: Open left leg from the position laying on the back (MHKMSH), Open right leg from the position laying on the back (MHKDSH), deep bend on the bench (MPPTHB).

- For evaluating static force: Hanging on a metal with clips (MQVAHN), Stay in horizontal position chest flat with the floor (MQHGJD), Stay in horizontal position back flat with the floor (MQHSHD).

- For evaluating the measurable structure: Aiming the horizontal tiles (MQPLLH).

- For evaluating orientation: Stretches and jumps (MZGJKR) and octave with bends (MTEPER).

The variables for evaluating the situational-mechanical capacities or technical elements are: Throw hoops with two steps (TGJDYH), and Free throws (TGJLIR).

RESULTS AND DISCUSSION

Based on the main purpose of this study, to define the impact of the predictable variable system on the criteria that represents two technical elements of the game, the regressive analysis has been applied.

On the first case the criteria is the technical element of throwing hoops with two steps. With the regressive analysis it was found the coefficient value of the multiplier correlation ($R=.478$), the square of the multiplier correlation ($R\text{ Square}=.228$) and the value of the coefficient $F(24, 136) = 1.674$ in the probability level ($p<0.035$).

The coefficient of the multiplier correlation (R) tells the significance of the intensity of the link-up of the variable system of the morphological and basic-mechanical characteristics with the criteria (throwing hoops with two steps). From Table 1., we can see that the variable of the criteria in the predictable variable morphological system has a higher coefficient with the variable of Weight (AMASTR) ($\text{Beta} = .363$). This variable (AMASTR) has a significant coefficient of prediction ($p = .042$), as the other anthropometric variables have no signifi-

cant coefficients. Only with the variable of the Height (AGJATR), the coefficient of prediction

is a little higher comparing with the other coefficients (Beta = .249), but however it does not

Table 1. The coefficients of the predictable variable system and the dependent variable: TGJDYH

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2.274	4.475		-.508	.612
AGJATR	.050	.032	.249	1.586	.115
AGJAKR	-.015	.048	-.038	-.307	.759
AGJBIA	-.014	.053	-.033	-.267	.790
APERKR	.077	.206	.096	.375	.708
APERPK	-.207	.165	-.344	-1.257	.211
AMASTR	.057	.028	.363	2.055	.042
MQGGJA	-.039	.021	-.173	-1.868	.064
MQGSHA	.026	.023	.106	1.138	.257
MQMTBR	.054	.032	.136	1.696	.092
MHMPSH	-.132	.137	-.097	-.969	.334
MKGJVE	-1.868	.816	-.217	-2.289	.024
MVR20M	.335	.231	.129	1.452	.149
MQGJIK	.020	.028	.069	.695	.488
MQTRIK	.034	.026	.110	1.282	.202
MQGJSM	-.149	.087	-.166	-1.714	.089
MHKMSH	-.027	.028	-.125	-.949	.344
MHKDSH	.059	.031	.254	1.891	.061
MPPTHB	.012	.021	.051	.589	.557
MQVAHN	.013	.008	.162	1.630	.105
MQHGJD	-.006	.007	-.084	-.828	.409
MQHSHD	-.004	.012	-.034	-.324	.747
MQPLH	.006	.059	.009	.109	.914
MZGJKR	-.003	.031	-.008	-.093	.926
MTEPER	.015	.055	.023	.268	.789

reach the verge of the statistic significances

The prediction of throwing hoops with two steps, for the mechanical circumstances is presented by the variable of High-Jump on the spot (MKGJVE) (Beta = -.217). This variable (MKGJVE) has a significant coefficient of prediction ($p = .024$), as the other mechanical variables have no significant coefficients. On the verge of the statistic significances is also the coefficient of the variable for open right leg from the position laying on the back (MHKDSH) (Beta = .254), but does not pass it ($p = .061$).

All the prediction values of mechanical variables are low and insignificant, with the exceptions mentioned above. This means that the impact of these basic mechanical capacities

have low impact on the technique of throwing hoops with two steps (the efficiency of scoring points). All these basic mechanical variables, including preciseness, explosive strength, balance, flexibility, static force, the measurable structure and orientation, don't have high impact in achieving scores with two-steps. This is as a result of these movable capacities which are not playing a big role in executing the two-step throwing in the hoop, for the students that play basketball only in school and are not active otherwise. Also, an influence has the free way of executing this technical element without maximal commitment of the above mentioned mechanical capacities.

In another case, the criterion variable

yielded the following regression parameters: $R = .485$, $R \text{ Square} = .235$, $F(24, 136) = 1.742$ and $p < 0.025$. The coefficient of the multiplier correlation (0.485) tells the significance of the intensity of the link-up of the variable system of the morphological and basic-mechanical characteristics with the criteria (free throws in the

hoop). *Table 2. The coefficients of the predictable variable system and the dependent variable: TGJLIR*

From Table 2., we can see that the variable of the criteria in the predictable variable morphological system has a higher coefficient with the variable of Weight (AMASTR) (Beta = .398).

able 2. The coefficients of the predictable variable system and the dependent variable: TGJLIR

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.106	3.917		.027	.978
AGJATR	.010	.028	.055	.351	.726
AGJAKR	-.032	.042	-.093	-.760	.448
AGJBIA	.069	.047	.183	1.483	.140
APERKR	.077	.181	.109	.428	.669
APERPK	-.185	.144	-.349	-1.283	.202
AMASTR	.055	.024	.398	2.268	.025
MQGGJA	-.013	.018	-.067	-.731	.466
MQGSHA	.006	.020	.027	.290	.772
MQMTBR	.012	.028	.034	.431	.667
MHMPSH	-.114	.120	-.095	-.950	.344
MKGJVE	-1.069	.714	-.141	-1.496	.137
MVR20M	.164	.202	.072	.812	.418
MQGJIK	.036	.025	.144	1.446	.150
MQTRIK	.031	.023	.115	1.346	.181
MQGJSM	-.092	.076	-.117	-1.210	.229
MHKMSH	-.062	.025	-.329	-2.506	.013
MHKDSH	.077	.027	.376	2.816	.006
MPPTHB	.005	.018	.025	.294	.770
MQVAHN	.009	.007	.123	1.242	.216
MQHGJD	-.004	.006	-.072	-.712	.478
MQHSHD	.009	.011	.088	.846	.399
MQPLLH	.011	.052	.018	.215	.830
MZGJKR	.043	.027	.145	1.612	.109
MTEPER	-.027	.049	-.047	-.560	.576

This variable (AMASTR) has a significant coefficient of prediction ($p = .025$), as the other anthropometric variables have no significant coefficients. Only with the variable of Arm Perimeter (APERKR), the coefficient of prediction is higher comparing with the other coefficients (Beta = $-.349$), but however it does not reach the verge of the statistic significances.

The prediction of free throwing in the hoop, for the mechanical circumstances is pre-

sented by the variable of Open left leg from the position laying on the back (MHKMSH) (Beta = $-.329$), with the significance coefficient of prediction ($p = .013$), as the variable for Open right leg from the position laying on the back (MHKDSH) has the value of the coefficient prediction (Beta = $.376$) and with a significance of prediction ($p = .006$). All other prediction values of mechanical variables are low and insignificant, with few exceptions.

From Table 2., we can see that the variable of the criteria in the predictable variable morphological system has a higher coefficient with the variable of Weight (AMASTR) (Beta = .398). This variable (AMASTR) has a significant coefficient of prediction ($p = .025$), as the other anthropometric variables have no significant coefficients. Only with the variable of Arm Perimeter (APERKR), the coefficient of prediction is higher comparing with the other coefficients (Beta = -.349), but however it does not reach the verge of the statistic significances.

The prediction of free throwing in the hoop, for the mechanical circumstances is presented by the variable of Open left leg from the position laying on the back (MHKMSH) (Beta = -.329), with the significance coefficient of prediction ($p = .013$), as the variable for Open right leg from the position laying on the back (MHKDSH) has the value of the coefficient prediction (Beta = .376) and with a significance of prediction ($p = .006$). All other prediction values of mechanical variables are low and insignificant, with few exceptions.

This means that the impact of these basic mechanical capacities have low impact on the technique of free throwing in the hoop (the efficiency of scoring points). All these basic mechanical variables, including preciseness, balance, flexibility, static force, the measurable structure and orientation, don't have high impact in achieving scores with free throws. Surely just like in the first case, this is as a result of these movable capacities not playing a big role in executing the two-step throwing in the hoop, for the students that play basketball only in school and are not active otherwise. Also, an influence has the free way of executing this technical element without maximal commitment of the above mentioned mechanical capacities.

CONCLUSION

To generalize the results of this study, it's possible only with this population that has morphological and mechanical characteristics of the level of students (15 year old) that are not very active in basketball. We can conclude that the morphological and basic-mechanical characteristics that are covered in this study have no considerable impact in the execution of the technical elements (throwing hoops with two steps (TGJJDYH) and free throwing in the hoop

(TGJLIR)). Even when there was a significant value of the regression coefficients, logically we can conclude that they play no significant role in the efficiency of the technical element.

However, similar studies on the active basketball players have verified that some of the covered mechanical capacities have a higher impact in the efficiency of execution of the technical elements (Pasalić et al., 2004); Tkalcic et al., 2007). This is also valid for other anthropological circumstances, where the impacts are emphasized, especially in the execution of situational assignments during the basketball game (Blasković, & Hofman, 1983; Bregović et al., 1988).

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ВЛИЈАНИЕТО НА НЕКОИ АНТРОПОМЕТРИСКИ И МОТОРНИ ПОКАЗАТЕЛИ ВРЗ ЕФИКАСНОСТА НА ПОСТИГНУВАЊЕТО ПОЕНИ ВО КОШАРКАТА КАЈ УЧЕНИЦИТЕ НА ВОЗРАСТ ОД 15 ГОДИНИ

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 (Испиражувачка белешка)

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Апстракт

Целта на истражувањето беше да се утврди влијанието на некои морфолошки и моторни показатели врз реализацијата на кошаркарските елементи: уфрлување на кош од двочекор, и слободни фрлања. Примерокот на испитаниците изнесуваше 161 ученик од основните училишта во Струга. Возраста на испитаниците беше на 15 години. Тие беа опфатени со редовна настава по физичко образование. Со примена на метадата на регресивна анализа е утврдено дека морфолошките и моторните показатели имаа статистичко значајно влијание врз успехот при уфрлувањето на кош, како и на слободните фрлања.

Клучни зборови: *кошаркарски елементи, уфрлување на кош од двочекор, слободни фрлања во кош, предикторски варијабли, кријериумски варијабли, специфични моторни варијабли*

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