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Original scientific paper

REGRESSION ANALYSIS RESULTS OF MORPHOLOGICAL CHARACTERISTICS ASSESMENT AND SPECIFIC MOTOR VARIABLES IN INITIAL MEASUREMENT OF 16 AND 17 YEARS OLD BASKETBALL PLAYERS WHO PLAY IN THE SAME LEVEL OF COMPETITION

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Abstract

A sample with 108 members was realized with 16 and 17 years old female basketball players, members of the youth schools of FBC "Struga 2009", FBC "Krosig" Skopje, and FBC "Bashkimi" Prizren, to determine the effects of sixteen-week practice process for developing explosive strength of the lower limbs. The sample was composed of three groups, realized by 36 female basketball players. The first experimental group E-1 realized 16 week-experimental program for improvement of the explosive power of lower extremities with plyometric training in FBC "Struga 2009" from Struga. The second experimental group E-2 realized 16-week experimental program for improvement of the explosive power of lower extremities with exercises of general character for development of the explosive power called "Chess table" in FBC "Krosig" from Skopje. Control group K-1 realized technical-tactical elements as provided with the trainer program of the club FBC "Bashkimi" from Prizren. In this research were applied in total 12 anthropometric variables, (6) six variables for assessing the general motor skills and (6) six variables for assessing the specific motor skills. The system of predictive anthropometric variables does not have significant effect on most of the criterion variables. It can be noticed that the variables that assess the volumes and subcutaneous fat tissue have a negative impact on the specific motor variables. Considering the age of the examinees, a proper engagement and effort will lead them to better results.

Keywords: experimental program, explosive power, regression analysis, specific motor skills

1. Introduction

The main purpose of this research is to find the important elements for achieving success in basketball. Physical preparation (explosive power of lower extremities) of the basketball players in the final decade is becoming more and more important as the contemporary basketball game requires maximal prepared players. There has been made an effort through testing of some motor characteristics in 3 female teams in order to get relevant data about the success in basketball. The methods of explosive power development (plyometric - isometric) are being successfully adopted for many years in the technology of sport preparation in all types of sport. 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 specific motor abilities has a direct impact in the successful scoring of the game and achieving high success in it (Blaśković & Hofman, 1984; Pasalić, Rađo & Brdaić, 2004). Pavlović (1983) has given equation specifications success playing basketball, which contains and explains the share of each factor in the result of basketball. Such trainings, despite the fact that affect the muscle quality, also increase the importance of the results of the main skills, such as muscle stiffness. In this research it is noticed that the young basketball players, when under the influence of the programmed training process, usually achieve better results in the final measurement rather than in the initial one. This research gives answer to the following questions and dilemmas: where should the plyometric training be placed in the training programme, which exercises are more efficient for basketball players, how long it is necessary to train, with what workload intensity and in which period of training process should the analyzed experimental program be applied.

2. Material & methods

The examinees were young basketball players aged 16 and 17, who had been trained at least 4 years. The examinees in question are members of the following young schools of basketball clubs: “FBC Struga 2009” from Struga, "FBC Krosig” from Skopje, “FBC Bashkimi” from Prizren. This model of research in total includes 108 examinees who were divided in 3 sub-models, with 36 examinees in each of them. The first experimental group E-1 realized 16 week-experimental program for improvement of the explosive power of lower extremities with plyometric training in FBC “Struga 2009” from Struga. The second experimental group E-2 realized 16-week experimental program for improvement of the explosive power of lower extremities with exercises of general character for development of the explosive power called “Chess table” in FBC “Krosig” from Skopje. Control group K-1 realized technical-tactical elements as provided with the trainer program of the club FBC “Bashkimi” from Prizren. During this research there were executed two measurements: initial and final measurement. A total of 24 variables were used in the study, of which: a total of 12 variables were used to assess the morphological characteristics of the examinees, such as: Body height (BH), Upper-arm volume (UAV), Forearm volume (FV), Thigh volume(THV), Lower- leg volume (LLV), Upper-arm adipose tissue (UAAT), Adipose tissue in the back (ATB), Forearm adipose tissue (FAT), Thigh adipose tissue (THAT), Lower-leg adipose tissue (LLAT), Belly fat (BF), Body weight (BW). The research applied a total of six (6) variables for the assessment of the specific motor skills: movement in back space in basketball position (BSBP); movement in a defensive basketball position 6x4m (MDB6X4); vertical jump on a ball that hangs for 10 sec (VJ10S); rejection of the ball from the board in a jump with both hands (RBJBH); dribble penetration to the basket and shooting for 30 sec (DPSH30); kamikaze ball (KB).

3. Results and discussion

Some of the authors who have dealt with similar studies as our research. Naumovski M., and Petrov Gj. (2002), conducted a study of a sample of 10 basketball teams, participants in 15 championship matches, from the best basketball league in the Republic of Macedonia, in order to determine the relationship and impact of the variable defensive jumps, attack jumps and defensive balls taken in defense (treated as a predictor system), with the variable achieved match result

(treated as a criterion variable). Based on the performed analysis and the obtained results, it was concluded that:The predictor system of variables has a statistically significant correlation and impact on the criterion variable result.There is a statistically significant partial influence of the variable jump on the criterion variable result. Based on the obtained results, it can be said that the analyzed situational motor structures have an impact on the final result and they should be paid special attention in the teaching-training process.Kërstevski,B.(2007), conducted a three-month experimental study, with the main goal to determine the effects of the twelve-week systematic training process for the development of explosive force in the lower extremities. The author stated that after the application of the twelve-week experimental program, the explosive force of the lower extremities was increased in the experimental groups E-1 and E-2, which realized the applied program at the beginning and at the end of the training.

To determine the relation between the variables for morphological characteristics assessment and specific motor variables, a linear regression analysis was used for the initial measurement in the first sub-model examinees.

The predictor system includes 12 anthropometric variables, and the criterion system consists of six variables for assessing the specific motor skills of the examinees.

We will interpret the results which indicate statistically significant impact of the predictor system (anthropometric variables) on the criterion variable.

Table 1. Regression analysis of MDB6X4 (movement in a defensive basketball position 6x4m) variable, in the initial measurement at the first sub-model examinees.

		St. Err.			
	BETA	of BETA	Part. corel.	t(13)	p-level
UAV	-1.17934	.560496	-.504024	-2.10409	.055399
FV	-.42286	.338747	-.327162	-1.24829	.233938
THV	-.09237	.254593	-.100123	-.36282	.722568
LLV	-.66827	.301313	-.523938	-2.21787	.044995
UAAT	.10560	.244534	.118919	.43183	.672939
ATB	-.66457	.430720	-.393421	-1.54292	.146835
FAT	.18665	.265342	.191489	.70344	.494187
THAT	.22780	.382718	.162881	.59522	.561913
LLAT	.20465	.565073	.099941	.36216	.723054
BF	.51297	.576494	.239602	.88982	.389734
BH	.01253	.404403	.008594	.03099	.975750
BW	2.3698	1.033063	.536794	2.29395	.039095
	RO=.88932	**Δ= .79089**	**F=3.073**	**Q(F)<.02355**	

UAV- Upper-arm volume; FV- Forearm volume; THV- Thigh volume; LLV- Lower- leg volume; UAAT- Upper-arm adipose tissue; ATB- Adipose tissue in the back; FAT- Forearm adipose tissue; THAT- Thigh adipose tissue; LLAT- Lower-leg adipose tissue; BF- Belly fat; BH- Body height; BW- Body weight

In table 1, the results show that the system of predictor variables have a statistically significant impact on the criterion variable, which is noticed from the value of Q(F)< .02355 and the significance level p<.05. The value of the multiple correlation is RO = .64712 which is relatively high, and the coefficient of determination indicates 58% of the variance of the criterion variable, and the remaining 21% may be evident to other variables.

Table 2. Regression analysis of RBJBH (rejection of the ball from the board in a jump with both hands) variable, in the initial measurement at the first sub-model examinees.

		St. Err.			
	BETA	of BETA	Part. corel.	t(13)	p-level
UAV	-1.46464	.504325	-.627290	-2.90417	.012309
FV	-.57754	.304799	-.465203	-1.89483	.080572
THV	-.15600	.229078	-.185592	-.68099	.507825
LLV	-.17248	.271117	-.173761	-.63618	.535700
UAAT	.42902	.220027	.475684	1.94983	.073099
ATB	-.46841	.387555	-.317830	-1.20862	.248333
FAT	-.30593	.238751	-.334869	-1.28137	.222449
THAT	.04642	.344363	.037364	.13481	.894826
LLAT	-.63601	.508443	-.327770	-1.25090	.233018
BF	.06470	.518719	.034572	.12472	.902649
BH	-.54322	.363875	-.382552	-1.49287	.159339
BW	2.79093	.929533	.639918	3.00251	.010190
	RO=.91142	**Δ= .83070**	**F=3.9868**	**Q(F)<.0079**	

UAV- Upper-arm volume; FV- Forearm volume; THV- Thigh volume; LLV- Lower- leg volume; UAAT- Upper-arm adipose tissue; ATB- Adipose tissue in the back; FAT- Forearm adipose tissue; THAT- Thigh adipose tissue; LLAT- Lower-leg adipose tissue; BF- Belly fat; BH- Body height; BW- Body weight

In table 2, the results show that the system of predictor variables have a statistically significant impact on the criterion variable, which is noticed from the value of Q(F)<.0079 and the significance level p<.05. The value of the multiple correlation is RO = .91142 which is relatively high, and the coefficient of determination indicates 83% of the variance of the criterion variable, and the remaining 17% may be evident to other variables.

Regression analysis results of specific motor variables in the initial measurement at the second sub-model examinees. From the results, one may conclude that the predictor system (anthropometric variables) does not have statistically significant impact on any of the criterion variables.

Regression analysis results of specific motor variables in the initial measurement at the third sub-model examinees. The criterion system consists of six variables for assessing the specific motor skills. From the results, one may conclude that the predictor system (anthropometric variables) has a statistically significant influence only on one criterion variable: kamikaze ball (KB) variable.

Table 3. Regression analysis of KB (kamikaze ball) variable, in the initial measurement at the third sub-model examinees.

		St. Err.			
	BETA	of BETA	Part. corel.	t(13)	p-level
UAV	.104670	.389364	.074352	.26882	.792284
FV	-.647725	.337671	-.469683	-1.91821	.077314
THV	-.671626	.502962	-.347303	-1.33534	.204676
LLV	.220991	.296120	.202687	.74629	.468774
UAAT	-.078989	.222054	-.098182	-.35572	.727756
ATB	.805638	.250033	.666347	3.22212	.006677
FAT	-.330102	.219350	-.385182	-1.50491	.156251
THAT	.480573	.338091	.366761	1.42143	.178736
LLAT	-.124430	.254000	-.134632	-.48988	.632381
BF	-.769082	.279030	-.607322	-2.75627	.016341
BH	-.089224	.209718	-.117185	-.42545	.677469
BW	1.184470	.510479	.541163	2.32031	.037228
	RO=.882	**Δ=.77793**	**F=2.8464**	**Q(F)<.03171**	

UAV- Upper-arm volume; FV- Forearm volume; THV- Thigh volume; LLV- Lower- leg volume; UAAT- Upper-arm adipose tissue; ATB- Adipose tissue in the back; FAT- Forearm adipose tissue; THAT- Thigh adipose tissue; LLAT- Lower-leg adipose tissue; BF- Belly fat; BH- Body height; BW- Body weight

In table 3, the results show that the system of predictor variables have a statistically significant impact on the criterion variable, which is noticed from the value of Q(F)<.03171 and the significance level p<.05. The value of the multiple correlation is RO=.882, and the coefficient of determination Δ=.77793 indicates 78% of the variance of the criterion variable.

4. Conclusion

This research was conducted in order to confirm the effect resulting from the application of two experimental models for the development of explosive power of the lower extremities, lasting 16 weeks.

In the initial measurement at the first sub-model examinees, the predictor system (anthropometric variables) has a statistically significant influence only on specific motor variables: movement in a defensive basketball position 6x4m (MDB6X4) and rejection of the ball from the board in a jump with both hands (RBJBH).

In the initial measurement at the second sub-model examinees, anthropometric variables do not have statistically significant impact on specific motor variables.

In the initial measurement at the third sub-model examinees, the predictor system (anthropometric variables) has a statistically significant influence only on specific motor variable KAMIKAZE.

Significant impact have the following variables: Adipose tissue in the back (ATB), Belly fat (BF), Body weight (BW).

In order to achieve excellent result, it is necessary to create and plan sports training that will enable the athlete to achieve the desired goal in the most optimal way. A group of professionals often participate in the sports training planning where each of them give suggestions and recommendations.

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