



ICSPEK 2013

Study on the Development of Vertical Jumping Force in U18 Junior Basketball Players

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Abstract

The main manifestation of force in the game of basketball is speed force. The most common term for force-velocity is "explosive force". In essence it is the individual's ability to engage a large number of neuromuscular units in the effort in a short time interval.

The evaluation of the basketball players' vertical jumping ability is a requirement in training juniors because of the multiple implications that ability has on the game technique and tactics.

In order to test vertical jumping abilities among U18 junior players we applied a dedicated test used by specialists not only in basketball but also in other sports.

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Selection and peer-review under responsibility of ICPEK 2013.

Keywords: explosive force, vertical jumping ability, basketball players', junior players, physical training;

1. Introduction

Physical training is a prerequisite for learning the technique and tactics of the game of basketball and their application in the game.

During the basketball game, the physical training consists in both developing and separate educating each driving capability and in developing and fully educating them based on the specific effort characteristics and driving skills derivatives: speed mode skill, skill mode speed, force under speed, game mode specific strength.

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The physical training process is based on the premise that, although in very different proportions, all driving skills are developed and educated, aiming at achieving higher availability performance for each driving capacity and capacity motor summed (integrated).

The main manifestation of the force in the game of basketball is under the speed force. The most common term for the force-velocity is "explosive force". In essence it is the individual's ability to engage in the effort, in a short time, a large number of neuromuscular units.

Worldwide, the question in place is of training the performance player able to cope successfully in the future to the increasing demands of basketball in major national and international competitions.

A senior basketball player – center, does approximately 50-100 jumping's on average per game with and without the ball, with and without completion in attack and defence, the driving skills being usually executed with their own weight load with and without the ball, with foreign presence in direct physical fight with the opponent in the rhythm and tempo imposed by alternating phases of the game.

At this juncture, the muscle activity, characterized by force is presented as a range of events: maximum force, explosive force (vertical jumping ability).

The explosive force is the capacity of a muscle to execute a certain muscular effort in the minimum amount of time, i.e. it is a combination. The explosive force is specific to basketball. The ability to jump, dynamic jumps to recover the ball, sudden jumps, dynamic actions to score hoops, sudden jumps to throw the ball and generally the entirety of dynamic actions involved in the game are strictly linked to the nature of this force and speed game. The ability to jump is closely related to the explosive force (Tudor, 1999)

2. Material and methods

2.1. Premises of the research

The main factors that condition the explosive force (vertical jumping ability):

- the „maximum optimal ”force level in dynamic regime;
- the contraction of the active muscular fibres speed;
- the motor nerve intensity and concentration;
- the ability to pay attention;
- the existence of the appropriate stereotype rapid engagement effort of the required number of neuromuscular units;
- the coordination of the muscle tone to that of the agonist muscle.

During the basketball game, the ability to perform vertical jumps plays a very important role. This manifestation of force is defined as the ability of some muscle groups to develop the maximum of force in a short time.

The vertical jumping ability (explosive force or under the speed force) is manifested differently in various body segments. So that an athlete can have explosive power in the upper limbs he should be slower in the lower limbs. It also believed that there is a good relationship between the isometric contraction force and the speed of execution of a movement.

To develop vertical jumping one must act either by increasing the maximum force or by increasing the speed of muscle contraction, or rather, through a combination of the two. The effectiveness of this combination is for the coach to know the weaknesses of each athlete and to establish the maximum force of the explosion force transformation. We recommend working with small weights that foster maximum speed manifestation. This system, however, does not lead to the improvement of the shrinkage and therefore the loads must be increased. Because in the game of basketball, as at other collective games, dynamic action of muscles is dominant, the dynamic exercises are preferred, and not the static ones (Moanță, 2000).

If the factors they depend on are assured, the force is a quality that is easily perfectible.

2.2. Hypothesis of the research

The labour objectification depends, therefore, on the pace of work of the body segments and exercises used for these.

The evaluation of the vertical jumping ability of the basketball players is a requirement in preparing juniors because of the multiple implications that the vertical jumping ability has on the technique and tactics of the game.

In this respect and on the theme, we have established a research hypothesis: “If the values registered for the vertical jumping ability test are known, then it will be possible to make assumptions regarding the level of development of the explosive force and, consequently, regarding the possibilities of technical and tactical expression of basketball players when this force manifests itself.”

2.3. Methods

In order to conduct this research the documentation method, the testing method and the method of statistical and mathematical interpretation were used.

For testing vertical jumping ability among U18 junior players, a dedicated test among specialists was performed, used not only in basketball but also in other sports branches, as follows:

The height of the athlete is measured with the arm raised up, the athlete standing against the wall with a side arm up. The separation height of the two legs is measured. The athlete in front of the panel sets a foot forward, giving them weight, gets the leg in the back next to the one in front, moves his weight on the back foot, performs an arm swing, brings his back foot near the front, and achieves explosive separation touching the metric tape on the panel with his or her fingertips. The result is given in inches by the difference between the point he reached with his fingers and the one his arm outstretched. The subject has two attempts and the best one is recorded.

2.4 Subjects

The research subjects were the men's basketball teams in the national championship edition from 2012 to 2013. A total of 12 teams was selected, each with 12 players, in total 144 subjects.

3. Results

The results interpretation was achieved through the average and the median mean calculated for the team and the players by position: guard, extreme, centre.

The average (X) is the synthesizing result of a single numerical expression of all of the observed individual levels and calculated by dividing the aggregated value of the feature to the total number of units

Median (M) is the term which occupies the central place in the series of features values, arranged in an ascending or descending order. The median divides the series into two equal parts: 50% of units are observed below the median and 50% over it.

After calculating the statistical indicators we have obtained the results listed in Table 1:

Table 1 - Average and median values

Team	Vertical jump – average and median values			
	Team	Guard	Extreme	Centre

	X	M	X	M	X	M	X	M
A	76.87	78.5	78.28	79	78.66	79	74.33	77
B	59.75	59.5	59.81	59	59	59	60	61
C	69.07	69	71.8	72	67.25	68	67.8	69
D	70.15	70	71.6	70	68.75	67.5	69.75	72
E	66.93	65	68.66	69	66.1	65	68	67
F	70.21	69	69	69	70.83	69	70.5	70
G	76.57	76.5	77.12	76	76	78	75	75
H	66	66	66.22	66	64	64	66	67
I	48.15	50	46	50	60	60	50.66	50
J	75.62	75.5	74.87	75.5	78.5	77.5	74.25	74
K	70.86	71	70.14	72	72.33	71	71	70
L	73.86	73	73.5	72	74	73	74.25	78
<i>AVERAGE</i>	68.67	70.18	68.91	70.87	69.61	69.79	68.46	70.12

The results interpretation was performed using the graphic method in order to grasp the differences between the suggestive values indicators calculated for teams and players who play guard, extreme, center compared with the reference value for this age group - 84 cm, considered as basketball players performance that allows adequate expression tactical and technical knowledge and achieve optimum performance. Value is credited with 20 points in the FR Basketball Scoreboard (Berceanu and Moanță, 2007).

In order to interpret the data, the results recorded during our study, will be interpreted against fixed maximum 20 points in the junior basketball scoring grid with values (set by David et al., 2000), according to Table 2 as the values representative for juniors 15-19 years (Table 2).

Table 2 - Standards for children of 16 – 19 years

Gender	Excellent	Above average	Average	Below average	Poor
Male	>65 cm	50 – 65 cm	40 – 49 cm	30 – 39 cm	<30 cm

The average and central tendency values, for teams, show that:

- One team falls below the value set by David;
- One team falls above the average established by David;
- 10 teams register values over the average determined by David – 65 cm:
- In positions,
- In positions players' averages – guard, forward, centre – have similar values, between 70.87 cm and 69.79 cm
- Guard players registered the following results:
 - 1 team falls within the average set by David;
 - 2 teams fall over the average set by David;
 - 9 teams have excellent values, according to David's scale.

- Extreme players registered the following results:
 - 4 teams fall over the average set by David;
 - 8 teams have excellent values, according to David's scale.
 - Centre players registered the following results:
 - 2 teams fall over the average set by David;
 - 10 teams have excellent values, according to David's scale.
- The result for U18 junior teams is lower compared to the FR Basketball requirements.

4. Conclusions

Vertical jumping ability is the most important of the special qualities of basketball players. It is closely linked with the explosive force and is one of the aims of the training. The player jumps to shoot, jumps to intercept the ball and jumps to recover it. It is known that the team which controls the recoveries wins the game, because their attacks multiply and minimize those of the opponent.

The values recorded in the tests performed and their statistical analysis in terms of average and median, show that the Junior U18 development for all teams the vertical jumping ability is lower compared to the maximum value set by the FR Basket.

The junior U18 have a low level of development of the vertical jumping ability, which is insufficient for practicing basketball at a competitive level of performance.

For this reason, the technical and tactical level can be developed so that the game can be practiced more efficiently.

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