Study Regarding the Physical Training of Female Junior III High Jumpers

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Abstract

Juniors III (14-15 year olds) were introduced in athletics three decades ago. In women's high jumping events the winning result was around 1.55 meters. Currently, the debut in athletics is around the age of 6-7, and in high jumping the winning result is over 1.60 m. This year even, during the winter competitions, the women's event was won with 1.63 m, while the value of 1.55 m was not even in the top three places. Of course, these performances have determined changes in the elaboration strategy of annual, stage, and weekly training plans. Because School Sports Club Bacău has had good and very good results in this event throughout time, this study aims to emphasize the main means and methods used to develop the specific high jumping motor skills in the training of female juniors III. The working hypothesis was the following: *the specific means and methods used to train the female juniors III from SSC Bacau for the high jumping event could constitute a national training model and an important model in establishing the training strategies for starting out coaches.*The research methods used in this scientific endeavor were: the documentation method, the observational experiment, the observation method; the statistical-mathematical method of recording and interpreting the data. The study has confirmed partially the working hypothesis.

Keywords: high jump, female junior athletes, physical training

1. Introduction

Specific physical training is very important in attaining the top performance goals, because through this training component one can continue the general physical development in tight connection with the particularities of the event (physiological, methodical, tactical, technical, etc.). Iacovlev (1967) states that *a body that is previously hardened and strengthened will develop quicker high physiological levels*, an aspect that was proven over time. The only difference is that at that time the top track and field performances envisaged professional athletes who had a general physical training of 6-8 years. The current track and field national and international competition system comprises competitions in which athletes in all age categories compete in individual events. This made the coaches pass to the specialization of the athletes on one or two track and field events since an early age, which leads to a reduction of the hardening and strengthening period of the young people's bodies.

Considering these aspects, the selection of adequate training means is extremely important. "Non-specific elements can lead to an incorrect specialization in the athlete's development and as a consequence to bad performances" (T. Bompa - 2002). A specific physical training, during which the effort is performed at high intensity, can have negative effects, such as the overwork of the central nervous system, early fatigue, exhaustion, and more frequent injuries.

Table 1 presents a distribution model of effort during the mesocycle, made by Dragnea and Mate Teodorescu in 2002.

Table 1. Distribution of effort during the mesocycle (Dragnea & Mate Teodorescu, 2002)

Type of mesocycle	**Place and value of the mesocycle**			
Accommodation	**Medium effort**	**Medium effort**	**Submaximal effort**	**Small effort**
	no great effort	1 lesson with great effort	3 lessons with great effort	recovery
Basic	**Submaximal effort**	**Submaximal effort**	**Exhaustive effort**	**Small effort**

	4 lessons with great effort	3 lessons with great effort	5 lessons with maximal effort	recovery
Training	**Exhaustive effort**	**Small effort**	**Exhaustive effort**	**Small effort**
	5 lessons with maximal effort	recovery	5 lessons with maximal effort	recovery
Pre-competition	**Maximal effort**	**Submaximal effort**	**Medium effort**	**Small effort**
	4 lessons with great effort	2 lessons with great effort	1 lesson with great effort	recovery
Competition	**Medium effort**	**Competition effort**	**Small effort**	**Competition effort**
	1 lesson with great effort		recovery	

The athletic training modeling is the main way of increasing the performance ability, of getting into athletic shape, aiming to get the best results during the competitions. The process of adaptation of the body to the effort is done during training - the basic structural unit, over the course of the entire first training year (Oprea, 2015). When learning a technical element, one must take into account the following rules: stage learning, global approach, practice in easy conditions, practice at reduced speed, simplified rules, age appropriate materials, practice with passive partners, etc. At the age of juniors the technique is still changing.

This is due to the close relationship between the high jumping technique and the development level of the conditional and coordination skills.

Currently, one can say that the only technique used in high jumping worldwide is the Fosbury Flop, particularized on groups of jumpers. For a good run-up and take-off, the high jumper must consider the following aspects: *"the passive element - straightening the shoulders, changing the horizontal speed into vertical speed through blocking; the active element - take-off and stretching, contracting the extensor muscles; the run-up element - engaging the attacking leg and the arms in the vertical motion"* (Wolfgang, 1993). This stage of the jump implies however a high spring.

In defining spring, as with any other physical education and sports notion, there are various opinions. The literature lists the following definitions, among others:

"*The ability to take off from the ground through jumping*" (Zeno),

"*The ability to manifest higher values of this skill within as little time as possible*" (Ioselini qtd in Mitra and Mogoş, 1980),

"*The take-off power, the projection of the body toward a high point*" (Bompa),

"The spring *is the ability of a muscle group to develop maximum strength within as little time as possible*" (Dragnea),

"*An athlete's ability to take off from the ground in height or length through a combination of strength and speed.*" (Romanian Language Dictionary).

Semantically, spring is synonymous with "*dynamic strength"*, according to Novikov, *"speed strength*", according to Baroga, *"explosive strength"*, according to Gheorghe and "*reactive power*" Alexandru.

2. Aim, hypothesis, and research methods

The high jump is one of the most spectacular track and field events, being more popular with the public than any of the other events, without, however, denying their spectacular nature. High jumping is an event of great technical and physical engagement, demanding a great deal from the athletes, physically and mentally. The fitness that an athlete must maintain throughout the two hours of competition is the result of a technical and physical training directed toward the realization of athletic fitness.

This paper's objective was to create a training model for the fall training period, for the junior III female high jumpers. The research tasks came from the general objective, envisaging the systematization and quantification of the training means for the previously mentioned event and age category, the observation and monitoring of the adaptation of the female athletes' bodies throughout the training period, the observation of the female athletes' behavior throughout the competitions.

The starting hypothesis was the following: *the specific means and methods used to train the female juniors III from SSC Bacau (fall training period - 3 months) for the high jumping event could constitute a national training model and an important model in establishing the training strategies for starting out coaches.*

In conducting our research, we studied the professional literature, we used the experiment method (observational), the tests method, and the statistical mathematical method for analyzing the data.

3. Research subjects

The subjects of this study are currently part of the professional group of the Bacau School Sports Club, track and field section, coached by Mrs. Maria Hagima. The subjects' name, birth year and best performances are presented in Table 2.

Table 2. The subjects of the study

No.	**Subjects**	**Birth year**	**Best performance in their career**	**Results / Performance**
				Junior III National Championships
1	F.A.	1980	1.83	**1st place/ 1.58**
2	P.A.	1986	1.74	**1st place/ 1.61**
3	A.S.	1994	1.70	**3rd place/1.52**
4	D.I.	2001	1.58	**4th place/1.55**
5	M.C.	2003	1.59	**2nd place/ 1.59**
6	V.R.	2004	1.58	**1st place/ 1.58**
7	P.N.	2003	1.55	**4th place/ 1.55**
Average		***1995***	***1.66***	***1.57***

As one can see in Table 2, all these female jumpers ranked in the first four positions at the National Championships, winning the event three times, twice coming second, and twice coming fourth. It must be mentioned also that at this age category there are many female athletes with close values, the final ranking being made based on the number of trials. For example, during the 2016 National Championships, no less than 6 female athletes had the same result, the ranking being made based on the number of trials or the height at which they had competed.

FA was selected at the age of 11 and had her best performance after 12 years of training, at the age of 22.

PA was also selected at the age of 11 and had her best performance after 8 years of training, at the age of 19, when she left her career as a professional athlete.

AS was selected at the age of 10 and had her best performance after 5 years of training.

DI was selected at the age of 9 and at the current date she had her best performance at the age of 16, but she is still in training.

MC was selected at the age of 8 and at the current date she had her best performance at the age of 14, but she is still in training.

VR was selected at the age of 8 and at the current date she had her best performance at the age of 13, but she is still in training.

PN was selected at the age of 9 and at the current date she had her best performance at the age of 15, but she is still in training.

3. Development of the research

The improvement of the training model according to the particularities of the female athletes was and is the coach's creative activity, which transposed into successive stages leads to the accomplishment of the final goals. The change in the configuration of the model aiming to optimize the practical activity was the main goal of each training year, throughout the entire activity, more precisely between 1990 and 2017.

That is why the authors of this paper believe that the centralized data that will be presented in what follows will help the young coaches with little experience. The data refers only to the fall training period of three months and envisages the main means composing the technical training (Table 3). Other aspects of the specific physical training are presented in Tables 4 and 5 - the values recorded by the athletes during the control challenges (specific and non-specific).

The development of the research started from the model of the high jumper featured in the 1989 issue of *Buletin metodic*, CNPEFS, The Romanian Athletics Foundation, edited by several experts under the guidance of Professor Titus Tatu. Throughout the study, the formulation of certain clear objectives for each stage has led to an improvement of the performances and of the athletic fitness. Also, during the training process the traditional training principles were combined with the modern ones. The authors of this study believe that key to the success of the trained female athletes was their multiple style training, which was the central element in the planning of the training sessions.

4. Results of the research

Winning the title of Junior III National Champion three times, 2 medals (silver and bronze), and 2 fourth place positions is due to using a *training strategy that proved to be effective for the age category and for the event that this paper studied.*

The following tables (3-5) present the results recorded by the female athletes studied in this research during the challenges envisaging the technical training, the non-specific and the specific physical training.

Table 3. Centralizer - technical training (preparatory period - fall - 3 months)

No.	MEANS No. of repetitions	Name							Average	% of the general total
		F.A.	P.A.	A.S.	D.I.	M.C.	V.R.	P.N.		
1	Standing H.J.	60	50	60	60	60	60.	60	**58.5**	**10.64**
2	Stepping HJ	90	90	80	100	100	60	90	**87.5**	**17.50**
4	3 step run HJ	120	100	100	120	120	120	100	**111.4**	**23.21**
5	5 step run HJ	100	80	80	100	100	60	100	**88.57**	**16.11**
6	Running HJ - competition	60	60	60	50	50	30	60	**62.85**	**13.97**
8	HJ with a tap on the bench	120	120	100	120	120	120	120	**117.1**	**22.10**
General Total		**550**	**500**	**480**	**550**	**550**	**450**	**530**	**528.92**	

As seen in Table 4, the most used means during the technical training throughout the fall period (three months) were the three-step run-up jumps (23.21% of the total jumps), followed by the high jumps with a tap on the bench or trampoline (22.10%), and the five-step run-up jumps (16.11%).

Again, it must be mentioned that the presented model is just a part of the general training model - the main elements envisaging the technical training and the values recorded by the female athletes during the specific and non-specific control challenges over a three months period (the fall training period).

Table 4. Centralizer - non-specific control challenges

No.	Challenge	F.A.	P.A.	A.S.	D.I.	M.C.	V.R.	P.N.	Average
1	50 m (sec)	6.6	7.0	7.1	6.5	6.9	6.6	6.8	**6.67**
2	Abd.30 sec (no. rep)	36	30	32	36	36	32	30	**33.14**
3	30m (sec)	4.21	4.45	4.48	4.18	4.37	4.23	4.32	**4.32**
4	Squat (kg)	20	20	20	25	25	-	20	**21.16 (no V.R.)**
5	150 m (sec)	22.40	23.04	22.81	21.33	22.14	21.87	22.08	**22.32**
6	Lg.f.e (m)	2.12	2.18	2.24	2.37	2.21	2.28	2.23	**2.23**
7	TRS f.e (m)	6.71	6.87	7.12	7.40	6.80	6.98	6.97	**6.97**

In regards to the results recorded during the control challenges, their average shows that a female athlete who wants a place on the podium for the high jump event at the Junior III National Championships, should run 6.67 seconds over 50 m with a standing start, she should be able to do 33.14 abdominals in 30 seconds, and to perform a long jump of 2.23 m without run-up and a triple jump of 6.97 m without run-up. In regards to the weight work, this is not very used in the female athletes' training at this age category, the development of spring and general strength being done mainly through plyometrics or drills that are specific to other track and field events (hurdles, long jumping). That is why, athlete VR, who is still a child I, did not work with weights.

Table 5. Centralizer - specific control challenges

No.	EVENT	F.A.	P.A.	A.S.	D.I.	M.C.	V.R.	P.N.	AVERAGE
1	Standing H.J.	1.20	1.15	1.10	1.20	1.10	1.25	1.10	**1.16**
2	HJ with steps, 5-step spring	1.35	1.30	1.30	1.35	1.35	1.40	1.30	**1.34**
3	3 step run HJ	1.35	1.35	1.35	1.40	1.40	1.43	1.30	**1.37**
4	5 step run HJ	1.40	1.40	1.40	1.50	1.50	1.61	1.38	**1.46**
5	J competition (m)	1.52	1.55	1.48	1.55	1.52	1.61	1.48	**1.53**
6	Vertical take-off (cm)	39	40	42	44	43	44	42	**42**

The specific control challenge results reveal that although athlete VR did not work with weights, she is the only female athlete with above average results in all of the specific control challenges, especially considering that she is still a child I, the other female athletes being junior III. Also, this athlete is a 4 time national champion at children II category (indoor and outdoor) and 2 times national champion at children I category (indoor and outdoor). Her competition results

rise to the value of a junior III, and even a junior II, but the Romanian Athletic Federation rulebook does not allow her to participate in the competitions for these age categories.

5. Conclusions

The study has confirmed the working hypothesis, in the sense that the specific means and methods used to train the female juniors III from SSC Bacau (fall training period - 3 months) for the high jumping event can constitute a national training model and an important model in establishing the training strategies for starting out coaches.

The average values recorded by the female athletes in this study during the control challenges and during the main means used in the technical training can constitute models for the monitoring of female junior III high jumpers.

Another aspect highlighted by the study is that in order to get good results from female junior III high jumpers during competitions one needs a training period of approximately 4 years. In this case, the female athletes' general training focused on multiple events, thus it can be said that none of the subjects was specialized on one single athletic event (high jumping). The female athletes' top performances (throughout their career) were recorded after 12 years of training in the case of athlete FA, and after 8 years of training in the case of athlete PA. The other female athletes (except for AS) are still in training, thus they have not reached their top performance in their career.

Another aspect emphasized by this study was that the age at which the female athletes leave the professional athletic life has dropped together with the selection age. This aspect raises many questions regarding the selection at the age of 8, and the authors of this paper believe that this partially explains the very poor results of the senior athletes during the major competitions and the very small number of athletes at this age category.

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Study Regarding the Importance of Warm-Up According to the Specifics of the Competition, Aiming to Improve Athletic Performance

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Abstract

The warm-up practice has been universally accepted a long time ago. While the general principles regarding the necessity of warm-up remain valid, in the last few years there is evidence that questions the use of the traditional warm-up methods, and introduces potential areas for future development. This study aims to analyze the warm-up times mentioned in the competition rules for three sports - track and field athletics, boxing, and team handball. This study, conducted on Bacau athletes, highlights in its conclusions the necessity for "training" the warm-up, for the conservation of the athlete's energy for competition, and at the same time, creating multiple ways for