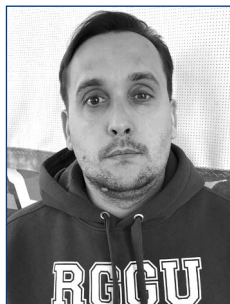


Analysis of training means for jumpers and jumpers in horizontal jumps

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Abstract

Due to the difficult geopolitical situation in the world, Russian sport is going through a critical period. Currently, Russian athletes are under sanctions imposed by the Olympic Committee. In conjunction with the above, there is a decline in sports achievements and sports performance of highly qualified jumpers, since they cannot compete at the Olympic Games and World Championships. To improve technical preparedness, and therefore the effectiveness of competitions, experts strive to develop new training methods. The purpose of the study was to analyze the means of preparing jumpers and jumpers in horizontal jumps.

Keywords: *jumpers, horizontal jump, triple jump.*

Introduction. The physical indicators of women are associated with the characteristics of the female body, namely: the content of adipose tissue is significantly higher than that of male athletes, and accordingly, muscle tissue in the overall body composition is less as a percentage. Also, female athletes have a smaller cross-sectional cross-section of muscle fibers. In terms of anthropometric indicators, women have 10-12 cm less height and 10-15 kg less weight, shorter limbs and a longer torso. [1] If we consider the spine, the parts of the spine are more mobile, and the lumbar lordosis is more pronounced. The hemoglobin content in women is lower compared to men, by an average of 10%. Female athletes also have a lower rate of oxygen consumption: in absolute terms by 50%, in relative terms by 30%. [1] When working with women, it is necessary to differentiate the principles of training in connection with the above-mentioned characteristics of the female body, namely: under no circumstances should female athletes be trained according to the same principles of training as male athletes.

One of the main tasks of a jumper in the support phases of a triple jump is the ability to transition horizontal speed and shift the overall center of mass by

30-35 degrees during the take-off period. In this regard, the key points of the triple jump are the large shock loads on the athlete's musculoskeletal system in the support phases of the triple jump, which can reach up to 1000-1200 kg [1] in the second and third take-off. These loads can contribute to the development of hip, knee, and ankle injuries in triple jumpers.

Methods and structure of the study. Research was carried out by members of a comprehensive scientific group at training camps and competitions at the Russian Athletics Championships (jumping group). Highly qualified jumpers and jumpers (20 people) took part in the study.

The work used the method of analyzing literature sources in this field, competition protocols since 2003 in the triple jump (male/female).

A statistical method was also used to analyze the obtained data. Data from control measurements were obtained using PD timing and video analysis.

Results of the study and discussion. A comparison of the information content of the main indicators of technical readiness in the triple jump for men and women did not reveal any fundamental differences in these indicators (Table 1). In the table presented,



one can observe a significant negative correlation between the competitive result and the % share of the “jump” in the length of the triple jump. We associate these changes with an increase in the qualifications of jumpers. Based on the above, it can be argued that the “jump-dominant” technique and the “high-speed” version of the triple jump are promising. [1]

Noteworthy are the significant differences (about 30%) in the parameter of the vertical component of the speed of departure of the second repulsion be-

tween men and women (Table 2). It is in the efficiency of performing the second take-off that female jumpers lag significantly behind male jumpers. A change in the velocity vector by 30-35 degrees in 0.13-0.16 [4] s is associated with large impact loads on the musculoskeletal system of athletes and requires the highest level of development of special strength. It is in this phase that women experience the greatest difficulty, and it is here that the most promising area of improvement in the women’s triple jump is found.

Table 1 Indicators of technical readiness in the triple jump for men and women

indicators	Competition result, m	V before the last 5 m of the run, m/s	V before the last 5 m of the run, m/s	T total supports, s	T total flight, s	L jump, %	L leap, %	L step, %	V average horizontal, m/s	Power factor	Speed realization coefficient
woman n=42	1,00	0,81	0,82	-0,53	0,72	-0,32	0,13	0,16	0,75	0,70	0,66
men n=46	1,00	0,7	0,75	-0,42	0,62	-0,29	0,22	-0,04	0,67	0,57	0,67

Table 2 Horizontal and vertical components of takeoff speed in three phases of the triple jump (World Cup finalists)*

Options V, m/s	V horizontal jump	V vertical jump	V horizontal step	V vertical step	V horizontal leap	V vertical leap
men	9,77 ± 0,15	2,40 ± 0,16	8,61 ± 0,27	1,95 ± 0,22	7,02 ± 0,33	2,79 ± 0,26
woman	8,40 ± 0,23	2,34 ± 0,25	7,58 ± 0,27	1,52 ± 0,27	6,46 ± 0,29	2,53 ± 0,13

Table 3 Comparative characteristics of triple jump parameters for men and women - World Cup finalists*

indicators	men	woman	difference, %
L _{run-up, step} , m	20,3±2,4	18,8±2,3	-7,4
V _{before repulsion} , m/s	10,41±0,24	9,37±0,21	-10,0
Result, m	17,42±0,38	14,57±0,42	-16,4
t _{first repulsion} , ms	126±15	129±17	+2,4
t _{second repulsion} , ms	140±27	151±29	+7,9
t _{third repulsion} , ms	157±17	163±23	+3,8
t _{flight in a jump} , ms	543±35	539±43	-0,7
t _{flight in step} , ms	460±43	371±52	-19,3
t _{flight in a leap} , ms	689±48	656±53	-4,8
t _{total jump} , ms	1692±111	1566±113	-7,6
L _{jump} , m	6,41±0,17	5,41±0,23	-15,6
L _{step} , m	5,21±0,22	4,09±0,27	-21,5
L _{leap} , m	6,11±0,22	5,27±0,26	-13,7
L _{jump} , % of average	36,1±0,9	36,6±1,2	+0,5
L _{step} , % of average	29,4±1,2	27,7±1,7	-1,7
L _{leap} , % of average	34,5±1,2	35,7±1,1	+1,2



Table 4 Comparative characteristics of the angular parameters of the second take-off of the triple jump among men and women – finalists of the World Cup

Options	men	woman	difference	P
£ settings, degrees	58,1±3,2	63,4 ± 6,7	5,3	>0,05
Repulsion amplitude, degrees	60,0 ± 4,2	55,4 ± 4,6	4,6	>0,05
£ between the thighs when standing on a support, degrees	49,7 ± 10,3	47,4 ± 13,3	2,3	>0,05
£ flexion in the knee joint in the depreciation phase, degrees	132,6 ± 7,6	130 ± 5,1	2,6	>0,05
£ flexion at the hip joint in the depreciation phase, degrees	143,1 ± 9,5	140,1 ± 6,0	3,0	>0,05
£ repulsion, degrees	61,9 ± 5,3	61,1 ± 4,8	0,8	>0,05
Mach amplitude, degrees	151,6 ± 10,4	151,9 ± 15,7	0,3	>0,05
t supports	0,155 ± 0,110	0,153 ± 0,095	0,002	>0,05
£ between the thighs at lift-off, degrees	101,9 ± 7,5	104,4 ± 5,3	2,5	>0,05
Repulsion power	3,70 ± 0,30	3,48 ± 0,19	0,22	>0,05
V takeoff run, m/s	10,48 ± 0,17	9,39 ± 0,16	1,09	<0,01
Competition result, m	17,41 ± 0,38	14,70 ± 0,29	2,71	<0,01

G.V. Samoilov comes to similar conclusions, on the basis of studies of technical features of triple jumpers, can be identified: a smaller percentage of the “step” in the rhythmic structure of the triple, when compared

with male indicators (by 1.7%) (Table 3). Triple jumpers do not always ineffectively perform the second take-off of a triple jump and perform a “step” along a low trajectory, as if “overshooting” this phase of the

Table 5 Level of specialization of outstanding jumpers and triple jumpers Jumpers men

Name	triple jump	L	Special (Tj/L)
Benks V.	17,97	8,11	2,22
Konli M.	18,17	8,46	2,15
Simkins Ch.	17,86	7,35	2,43
Markov Kh.	17,92	8,23	2,18
Protsenko O.	17,69	8,01	2,21
Kovalenko A.	17,77	8,06	2,20
Edvards D.	18,29	7,41	2,47
Kapustin D.	17,86	7,68	2,33
Kharrison K.	18,09	8,04	2,25
Kesada I.	17,85	7,88	2,27
Average	17,95	7,92	2,27
Stan. deviation	0,18	0,33	0,10
P	P > 0,05		

Jumpers woman

Kravets I.	15,50	7,37	2,10
Lebedeva T.	15,36	7,01	2,19
Kasparkova	15,20	6,56	2,32
Marinova T.	15,20	6,46	2,35
Pranzheva I.	15,18	6,97	2,18
Mateesku R.	15,16	6,43	2,36
Khansen A.	15,16	6,43	2,36
Lasovskaia I.	15,09	6,71	2,25
Biriukova A.	15,09	6,56	2,30
Chen I.	15,03	7,22	2,08
Average	15,20	6,78	2,25
Stan. deviation	0,13	0,32	0,10
P	P > 0,05		



triple jump, reducing the time of the flight phase of the “step”, which is 19.3% less than men - jumpers. And the angular parameters of the second take-off of the triple jump are the same for women and men athletes (Table 4). [1]

A comparative analysis of the indicator of specialization in the triple jump of the strongest jumpers and female jumpers in the world shows that the best female triple jumpers have reached the level of specialization of male jumpers ($P > 0.05$; Table 5). [2,3]

In the process of training jumpers and triple jumpers, the special preparation means are no different. The differences and differences are due to the volume and intensity measures of existing remedies. For male jumpers, training means are more intense than for women.

Conclusions. There is a decrease in the take-off speed in the last section in the experimental group for men and women. It is necessary, while maintaining the traditionally high level of technical and jumping readiness of Russian jumpers, to pay special attention to improving running training with the target task of increasing the speed capabilities of jumpers and transferring increased sprinting readiness to take-off speed.

As a result of the study, an area in which it is necessary to work to improve the performance of athletes in the triple jump was identified. It is necessary to improve the efficiency parameters of the vertical component of the second repulsion departure speed. To do this, it is necessary to differentiate the load taking into account the morpho-functional, anthropometric and other characteristics of the female body. The in-

tensity of running training in female jumpers, as well as in male jumpers, should be within 95-100% of MAX, which will contribute to the development of speed qualities of athletes, in which there is a significant gap in the training of athletes in horizontal jumps.

References

1. Kurbatov O.V. Tekhnologii upravleniya spetsialnoy podgotovkoy zhenshchin-pryguniy s trampolina na etape sportivnogo sovershenstvovaniya. PhD diss. Moscow, 2005. 148 p.: ill.
2. Ogandzhanov A. L. Pedagogicheskiye tekhnologii individualnoy podgotovki kvalifitsirovannykh legkoatletov-prygunov v vodu: spetsialnost 13.00.04 “Teoriya i metodika fizicheskogo vospitaniya, sportivnoy trenirovki, ozdorovitelnoy i adaptivnoy fizicheskoy kultury”. Doct. diss. (Hab.). Moscow, 2007. 384 p.
3. Ogandzhanov A. L. Rukovodstvo podgotovkoy kvalifitsirovannykh legkoatletov-prygunov s trampolina. Moscow: Fizicheskaya kultura publ., 2005. 191 p.
4. Sigel A.V. Kachestvenno novyy podkhod v protsesse obucheniya studentov igre v golf s ispolzovaniyem kompyuternykh simulyatorov dlya analiza i korrektsii vsekh vidov udarov. Studencheskiy sport v sovremennom mire. Proceedings national scientific-practical conference with international participation, St. Petersburg, May 26-27, 2023. St. Petersburg: Sankt-Peterburgskiy politekhnicheskii universitet Petra Velikogo publ., 2023. pp. 319-323.