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## **Comparative characteristics of anthropometric data and indicators of the cardiovascular system of cyclists of the category MASTERS of different age groups**

**Abstract. Purpose:** *the study of a functional state of athletes-cyclists of the category MASTERS of different age groups.*

**Material and Methods:** *the study was conducted using anthropometric testing and measurement of the cardiovascular system. Three groups of cyclists of the category MASTERS of different age groups took part in the study: I group 40–44 years old; II group 45–49 years old; group III 50–54 and older. Results:* *the analysis of the research data and anthropometric indicators of the cardiovascular category MASTERS of athletes of different age groups in relation to indicators in active sports shows that significant changes have occurred in larger number of indicators, in addition to growth of athletes. Conclusions:* *test measurements allow enough informative to compare the features of athletes of different age groups and found opportunities for correction and control the training process of cyclists of the category MASTERS.*

**Keywords:** *bicyclists of the category MASTERS, anthropometric data, indexes of the cardiovascular systems, age group.*

**Introduction.** Bicycle sport is one of the popular and spectacular sports in the world. It is widely presented in the program of the Olympic Games and the World Cups of types of bicycle sport are held every year [8]. Ukraine has the status of the “sports” state and classes by bicycle sport as traditional, national, public means of the improvement take a special place among means of formation of health of a person characteristic for our country [3].

Bicycle became not less popular as means of carrying out healthy leisure. A large number of clubs appears which purpose is the development and the promoting of bicycle sport, the involvement of veterans to sports activities and maintaining a healthy lifestyle due to the active development of bicycle sport among veterans in recent years, its exit to the international scene. Social activities not only increase efficiency, but also generate a number of new motive functions [9; 10]. In this regard there was a question of need of scientifically-methodical providing, rational planning and creation of the training process in training of sportsmen-cyclists of the category MASTERS.

Many scientifically-methodical works of different scientists (V. M. Platonov, 1988, 1997, 2005; L. V. Volkov, 1990, 1997) are devoted to a problem of a long-term training of sportsmen [2; 7]. In the works scientists represent a long-term training of sportsmen as a process which consists of 4 or 5 stages, the last of which comes to the end with an elite sport. The subsequent sports improvement of sportsmen, that is sport of veterans (MASTERS) is considered in the works of V. V. Mulik, 2002, V. I. Perevoznik, 2004 [5; 6].

The creation of model characteristics of a state of sportsmen-veterans can be used as a substitute of an object that the researches on model will allow receiving new data on the object. When experimenting with a model it is possible to receive the new facts which are a display of structure and function of model, they have a huge impact on the translation of experimentally carried out scientific works to the practical sphere of sport. Such role is played by numerous morphofunctional models at the solution of tasks at the creation of the training process [1; 4].

**Communication of the research with scientific programs, plans, subjects.** The researches which make the main content of the work, were carried out according to the Built plan of the research work in the sphere of physical culture and sport for 2011-2015 behind a subject 2.8. “Improvements of training of sportsmen in separate groups of sports”.

**The objective of the research:** to carry out the comparative analysis of anthropometrical data and indicators of the cardiovascular system of cyclists of the category MASTERS of different age groups (40–44 years old; 45–49 years old; 50–54 years old) in relation to the period of their active sports activities.

**Material and methods of the research.** The research was conducted with three groups of cyclists of the category MASTERS of different age groups: I group of 40-44 years old; II group of 45-49 years old; the III group of 50-54 years old and older, on 10 people in everyone, taking into account the existing rules of age groups of

competitions of bicycle sport on the highway. Sportsmen of all age groups actively participated in competitions on cycling at all stages of long-term preparation. Cyclists of the category MASTERS of all groups and constantly train and take part in competitions now.

**Results of the researches and their discussion.** Data of testings of anthropometrical data and indicators of the cardiovascular system in different age groups are provided in tab. 1-3.

The analysis of indicators of testing in the first age group of sportsmen of 40-44 years old (tab. 1) in compared to indicators of their active sports found out a substantial increase of body weight of sportsmen-veterans and an increase in heart rate at rest ( $p < 0,05$ ) that is caused by a sharp reduction of training and competitive loads, by a violation of a day regimen and process of food, and also other factors. The reliable changes aren't revealed from other indicators of testings ( $p > 0,05$ ).

Testing indicators in the second age group of sportsmen of 45-49 years old (tab. 2) in compared to the period of active sports authentically changed from such indicators, as: weight of sportsmen ( $t = 2,67$ ); HR at rest ( $t = 4,44$ ); arterial pressure of systolic ( $t = 3,19$ ) and diastolic ( $t = 7,91$ ).

Table 1

**The comparative characteristic of anthropometrical data and indicators of the cardiovascular system of cyclists of the category MASTERS of 40-44 years old during active sports activities and after (n=10)**

Indicators		During active sports		After active sports (40-44 years old)		Reliability assessment	
		$\sigma_1$	$\bar{X}_1 \pm m$	$\sigma_2$	$\bar{X}_2 \pm m$	t	p
Length of a body, sm		5,39	176,0 $\pm$ 1,71	5,55	175,8 $\pm$ 1,76	0,08	$p > 0,05$
Body weight, kg		5,80	72,5 $\pm$ 1,84	6,03	78,7 $\pm$ 1,91	2,34	$p < 0,05$
HR at rest, pbm <sup>-1</sup>		4,03	52,6 $\pm$ 1,30	4,80	58,9 $\pm$ 1,50	3,18	$p < 0,05$
Arterial pressure mm mer. col.	Systolic	7,09	112,5 $\pm$ 4,24	4,08	116,0 $\pm$ 1,02	0,74	$p > 0,05$
	Diastolic	5,68	71,0 $\pm$ 1,80	4,74	73,5 $\pm$ 1,50	1,07	$p > 0,05$

Table 2

**The comparative characteristic of anthropometrical data and indicators of the cardiovascular system of cyclists of the category MASTERS of 45-49 years old during active sports activities and after (n=10)**

Indicators		During active sports		After active sports (40-44 years old)		After active sports (45-49 years old)		Reliability assessment	
		$\sigma_1$	$\bar{X}_1 \pm m$	$\sigma_2$	$\bar{X}_2 \pm m$	$\sigma_3$	$\bar{X}_3 \pm m$	t	p
Length of a body, sm		5,39	178,5 $\pm$ 1,83	5,77	178,3 $\pm$ 1,83	5,75	178,0 $\pm$ 1,81	0,08 0,09 0,06	$p_1 - p_2 > 0,05$ $p_1 - p_3 > 0,05$ $p_2 - p_3 > 0,05$
Body weight, kg		5,47	73,1 $\pm$ 2,05	4,88	79,2 $\pm$ 2,18	5,59	79,7 $\pm$ 2,40	2,63 2,67 0,21	$p_1 - p_2 < 0,05$ $p_1 - p_3 < 0,05$ $p_2 - p_3 > 0,05$
HR at rest, pbm <sup>-1</sup>		4,39	55,8 $\pm$ 0,76	2,20	59,8 $\pm$ 0,70	1,90	62,5 $\pm$ 0,50	2,58 4,44 2,93	$p_1 - p_2 < 0,05$ $p_1 - p_3 < 0,05$ $p_2 - p_3 < 0,05$
Arterial pressure mm mer.col.	Systolic	6,77	114,5 $\pm$ 2,14	9,20	120,5 $\pm$ 2,91	11,55	128,0 $\pm$ 3,65	1,66 3,19 1,61	$p_1 - p_2 > 0,05$ $p_1 - p_3 < 0,05$ $p_2 - p_3 > 0,05$
	Diastolic	4,97	71,5 $\pm$ 1,57	4,71	81,0 $\pm$ 1,49	3,69	87,0 $\pm$ 2,17	4,38 7,91 3,17	$p_1 - p_2 < 0,05$ $p_1 - p_3 < 0,05$ $p_2 - p_3 < 0,05$

The reliable changes are found in the same indicators in the third age category of 50-54 years old (tab. 3), as in the second age group, but in a bigger difference: body weight of sportsmen ( $t = 4,66$ ); HR at rest ( $t = 8,79$ ); indicators of arterial pressure of systolic ( $t = 5,13$ ) and diastolic ( $t = 6,01$ ).

It should be also noted that length of a body of sportsmen was almost invariable for these periods of time while the increase in body weight of cyclists of the category MASTERS upon the termination of active sports took

place during the period till 50 years old that is naturally connected with a change, and exactly with a reduction of the mode of motive activity.

Table 3

**The comparative characteristic of anthropometrical data and indicators of the cardiovascular system of cyclists of the category MASTERS of 50-54 years old during active sports activities and after (n=10)**

Indicators	During active sports		After active sports (40–44 years old)		After active sports (45–49 years old)		After active sports (50–54 years old)		Reliability assessment		
	$\sigma_1$	$\bar{X}_1 \pm m$	$\sigma_2$	$\bar{X}_2 \pm m$	$\sigma_3$	$\bar{X}_3 \pm m$	$\sigma_4$	$\bar{X}_4 \pm m$	t	p	
Length of a body, sm	5,82	178,3±1,52	5,21	177,6±1,83	5,15	177,1±1,47	5,37	176,9±1,52	0,28 0,49 0,56	$p_1-p_2 > 0,05$ $p_1-p_3 > 0,05$ $p_1-p_4 > 0,05$	
Body weight, kg	5,07	73,3±1,63	4,91	76,8±2,12	5,23	80,9±2,08	4,71	83,5±2,26	1,57 3,30 4,66	$p_1-p_2 > 0,05$ $p_1-p_3 < 0,05$ $p_1-p_4 > 0,05$	
HR at rest, $\text{pbm}^{-1}$	4,31	58,4±0,92	3,50	62,4±0,92	2,73	66,5±0,85	3,35	73,6±0,72	2,27 5,00 8,79	$p_1-p_2 < 0,05$ $p_1-p_3 < 0,05$ $p_1-p_4 < 0,05$	
Arterial pressure mm mer.col.	Systolic	8,17	114,7±2,12	9,13	120,0±1,95	9,51	126,7±2,47	9,34	134,8±2,26	1,37 3,03 5,13	$p_1-p_2 > 0,05$ $p_1-p_3 < 0,05$ $p_1-p_4 < 0,05$
	Diastolic	6,32	67,5±1,50	5,57	71,5±1,71	6,94	78,3±1,45	6,71	85,0±1,70	1,50 3,97 6,01	$p_1-p_2 > 0,05$ $p_1-p_3 < 0,05$ $p_1-p_4 < 0,05$

The complex analysis of a state of health, a type of a constitution, anthropometrical data, a level of the development of physical qualities, properties of the nervous system is necessary for the researches of a functional condition of sportsmen of the category MASTERS which will allow correcting and constructing purposefully the training process individually for each age group.

The analysis of the conducted researches of anthropometrical data and indicators of the cardiovascular system (tab. 4) of sportsmen of the category MASTERS of different age groups in relation to indicators at active sports shows that the reliable changes ( $p < 0,05$ ) took place on a bigger number of indicators, except length of a body of sportsmen.

Table 4

**The comparative characteristic of reliability (t) of anthropometrical data and indicators of the cardiovascular system of cyclists of the category MASTERS of different age groups with indicators during active sports (n=30)**

Indicators	Age group		
	I group 40–44 years old	II group 45–49 years old	III group 50–54 years old
Length of a body, sm	0,08	0,09	0,56
Body weight, kg	2,34	2,67	4,66
HR at rest, $\text{pbm}^{-1}$	3,18	4,44	8,79
Arterial pressure mm mer.col.	Systolic	0,74	3,19
	Diastolic	1,07	7,91

As for the weight of veterans, the overwhelming gain happened for the first years of the end of sports career, then was stabilized, and at the advanced age tends even to decrease. Length of a body of athletes of reliable changes has no, though its some reduction is observed with age ( $p > 0,05$ ).

Thus, the results of the conducted researches allow drawing the following **conclusions**:

1. Indicators of the cardiovascular system of cyclists-veterans decrease after active performances in competitions, from 40 years old, however the greatest shifts ( $p < 0,05$ ) happen at the age after 45 years old.
2. The greatest changes of indicators of the cardiovascular system of veterans are noted in data of HR (40–

44 years old –  $t_1=3,18$ ; 45–49 years old –  $t_2=4,44$ ; 50–54 years old –  $t_3=8,79$ ), systolic arterial pressure ( $t_1=0,74$ ;  $t_2=3,19$ ;  $t_3=5,13$ ), diastolic arterial pressure ( $t_1=1,07$ ;  $t_2=7,91$ ;  $t_3=6,01$ ).

3. Indicators of length of a body and body weight of cyclists-veterans have the reliable changes in body weight of sportsmen which decreases in relation to the optimum: in 40–44 years old ( $t_1=2,34$ ), 45–49 years old ( $t_2=2,67$ ), 50–54 years old ( $t_3=4,66$ ); at the same time the growth of veterans authentically ( $p>0,05$ ) didn't change.

**Prospects of the subsequent researches.** The presented results of the researches are an initial link for the determination of features of the creation of training classes of cyclists of the category MASTERS.

#### References:

1. Azhippo O. Yu., Konovalov V. V., Prikhodko V. V., Dorofeeva T. I., Tabinska S. O., Zhuk V. O. *Vstup do vishchoi fizkulturnoi osviti: navchalniy posibnik [Admission to higher physical education: a tutorial]*, Kharkiv, 2014, pp. 52–53. (ukr)
2. Volkov L. V. *Teoriya sportivnogo otbora: sposobnosti, odarennost, talant [Theory of sports selection: ability, talent, talent]*, Kyiv, 1997, 128 p. (rus)
3. Gorina V. V., Kotlyar S. M. *Zbirnik naukovikh prats Kharkivskoi derzhavnoi akademii fizichnoi kulturi [Collected Works of Kharkiv State Academy of Physical Culture]*, Kharkiv, 2014, vol. 1(1), pp. 50–52. (ukr)
4. Kotlyar S. N. *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu [Pedagogy, psychology and medical-biological problems of physical education and sport]*, Kharkiv, 2003, vol. 2, pp. 63–67. (rus)
5. Mulik V. V. *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu [Pedagogy, psychology and medical-biological problems of physical education and sport]*, Kharkiv, 2003, vol. 2, pp. 82. (rus)
6. Perevoznik V. I., Mulik V. V. *Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin]*, Kharkiv, 2003, vol. 9, p. 91–94. (rus)
7. Platonov V. N., Polishchuk D. A. *Velosipednyy sport [Cycle Sport]*, 1983, vol. 2, p. 12–19. (rus)
8. Polishchuk D. A. *Velosipednyy sport [Cycle Sport]*, Kyiv, 1997, 341 p. (rus)
9. Prudnikova M. S., Gorina V. V. *Slobozans'kij nauk.-sport. visn. [Slobozhanskyi science and sport bulletin]*, Kharkiv, Kharkiv, 2011, vol. 4, pp. 23–30. (ukr)
10. Prudnikova M. S. *Doslidzhennya funktsionalnogo stanu veloturistiv 35–45 rokiv v period peredpokhidnoi pidgotovki. Fizichne vikhovannya i sport u konteksti derzhavnoi programi rozvitku fizichnoi kutumi v Ukraini: dosvid, problemi, perspektivi [Investigations of the functional state of cyclists 35-45 years before the hike during training. Physical education and sport in the context of the state program of physical culture in Ukraine: experience, problems and prospects]*, Zhitomir, 2014, pp. 235–237. (ukr)

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