

• ДИТЯЧИЙ ТА ДИТЯЧО-ЮНАЦЬКИЙ СПОРТ

• CHILDREN AND YOUTH SPORTS

УДК 796.015.132.56

THE STRUCTURE
OF ORIENTEERING COMPETITORS'
PHYSICAL PREPAREDNESS AT THE STAGE
OF PRELIMINARY BASE TRAINING

Chrystyna HIMENES, Mykhaylo LYNETS'

*Lviv State University of Physical Culture*СТРУКТУРА ФІЗИЧНОЇ ПІДГОТОВЛЕНОСТІ СПОРТСМЕНІВ-ОРІЄНТУВАЛЬНИКІВ НА
ЕТАПІ ПОПЕРЕДНЬОЇ БАЗОВОЇ ПІДГОТОВКИ. Христинна ХІМЕНЕС, Михайло ЛИНЕЦЬ. *Львівський
державний університет фізичної культури*

Анотація. У статті підтверджено важливість фізичної підготовки в системі тренування спортсменів-орієнтувальників та визначено, що одним із перспективних напрямів її удосконалення, передусім, є встановлення кореляційних взаємозв'язків між компонентами фізичної підготовленості орієнтувальників на ранніх етапах підготовки. Мета роботи полягала у з'ясуванні наявності та рівня взаємозв'язків між показниками фізичної підготовленості 14 – 15-річних спортсменів-орієнтувальників. У дослідженні взяли участь 26 спортсменів-орієнтувальників III–II розрядів 14–15 років зі стажем занять 4–5 років. Рівень їхньої фізичної підготовленості визначався за 15-ма показниками. У результаті досліджень встановлено, що більшість компонентів фізичної підготовленості тісно корелюють між собою. Так, зокрема, із 44 наявних позитивних взаємозв'язків 27 мали рівень значущості $p \leq 0,001$, 6 – $p \leq 0,01$ та 11 – $p \leq 0,05$, ще два взаємозв'язки були визначені як негативні.

Ключові слова: спортсмен-орієнтувальник, фізична якість, кореляція.

Setting of the problem. Analysis of the last researches and publications. The need to provide the training program of the young orienteering competitors with the innovative approach in structure and content of educating and training influences that are apt to their age rhythm in ontogenesis makes the research of different facets of the given issue indispensable [5, 8]. One of the challenges this research presents is the study of physical training elements correlation in training orienteering competitors [2, 7] at the early stage of many years training. The research will broaden the knowledge in this sphere and will allow making the corrections in the process of young sportsmen training which at present resembles the training methods for qualified orienteering competitors.

Connection with important scientific themes. Work is executed in obedience to the theme of a 2.7 "Improvement of sportsmen's physical preparation system taking into account the individual and technical types of their preparedness" of the Erected plan research work in the field of physical culture and sport on 2011–2015 Ministry of Ukraine in matters of family, youth and sport.

Selection of unsolved parts of problem. Orienteering in Ukraine does not correspond to modern world requirements, especially in a section of child-youth preparation. Practice in training of children usually try to copy the method of preparation of highly skilled sportsmen, which results to the contradiction between the requirements of in-use facilities of preparation and possibilities of young organism. It does actual the question of research structure of young orienteering competitors' physical preparation.

Object is to clarify the existence and correlation levels between the physical preparedness indices of orienteering sportsmen aged 14–15.

Methods of the research: 1) analysis and generalization of references sources and empiric data; 2) pedagogical monitoring with the help of instrumental methods (hand and stature dynamometry, chronometry); 3. spierman correlation analysis.

The sportsmen of Lviv Sports School N6 for youngsters, and Lviv regional tourist centre for sport and excursion for young students were the subject of pedagogical monitoring in June 2011. 26

orienteering competitors of III-II sporting grades, aged 14–15 with 4–5 years length of training participated in the project.

The level of their physical preparedness was tested due to the specially designed testing program (15 indices), that we have tested in the previous research [6] as well as expanded according to the experience gained.

Research results and discussions. The correlation matrix analysis (table 1) shows that the highest correlation density ($p \leq 0,001$) in the structure of orienteering competitors physical preparedness indices at the stage of preliminary base training was achieved due to the results of speed endurance testing ($r=0,943$). Such correlation is logical as the sportsmen who cover the short distance quickly, show better results covering longer sprint distances [4]. The speed indices also had the high level of positive correlations together with the general endurance indices ($r=0,790$), abdominal muscles endurance ($r=-0,642$) and agility ($r=0,626$). The first two correlations were somewhat unexpected, however they can be explained by the transfer of physical qualities from one to another and one and the same quality to different physical exercises [1, 2, 3 etc]. As to speed and agility correlation it is most likely stipulated by the same energy supply mechanism known as phosphocreatine one [5, 8]. Besides, the rational coordination of movements allows the increase in exercise performance efficiency as well as the speed of running. There has been stated the high positive correlation between the indices of hand force and explosive muscle force of upper extremities and the trunk ($r=0,903$). Despite the fact that the throw of 1kg stuffed ball comparing with hand dynamometry, is of more global nature when the muscles are involved, but the ability to concentrate muscle force is of the highest importance in this case, as it is the main reason of this correlation. The master arm force of junior sportsmen was densely correlated with the results of stature dynamometry ($r=0,836$). The results obtained from two types of exercises provide us with the information about the level of sportsmen absolute force, though they define the level of its development in different section of locomotor apparatus.

Such correlation is mostly connected with the CNS capacity to concentrate muscle force and of course with the genetic stipulated structure of muscles. The hand force had some more tight correlations with the indices of speed ($r=-0,809$), force ($r=-0,743$), general endurance ($r=-0,619$) and rapidity ($r=-0,773$). The indices of stature force together with the development level of explosive force of upper extremities and the trunk ($r=0,817$) and lower extremities ($r=0,640$), leg muscle endurance ($r=0,655$) and speed endurance ($r=-0,650$) were of high level of importance. The data prove [1, 3] that at the preliminary stage of training the level of force development has a positive influence on rapidity manifestation in cyclic movements.

The correlation indices of lower extremities explosive muscle force together with the rapidity indices ($r=-0,639$), speed endurance ($r=-0,618$) and the explosive force of the upper extremities and trunk muscles ($r=0,606$) were of high level of importance. The first two correlations are due to the dependence of pace on explosive force and the last one is due to the fact that two exercises reveal the level of explosive force and of course the inner mechanisms of their performance are characterized by similar functional response of the athletes' organism. Besides the upper extremities and trunk explosive force had the high degree of correlation with the speed endurance indices ($r=-0,851$), rapidity ($r=-0,833$), leg muscles endurance ($r=0,820$) and general endurance ($r=-0,621$), which is explained through the wide transfer of physical qualities at the early stage of training [1, 3].

The leg muscles endurance indices had some more high level correlations besides above mentioned, namely with testing results of speed ($r=-0,724$) and general endurance ($r=-0,628$). It is logical, as the testing exercises mentioned characterize the level of different endurance manifestations that come in complex at competitions in orienteering [2, 7]. The correlation matrix of the examined group of athletes shows the important correlation between the results of speed and general endurance ($r=0,860$) that is due to the general progress trend and the manifestation of this physical quality [2, 4]. The speed and general endurance indices had tight correlations with the degree of agility development ($r=0,620$ and $0,658$ which is probably due to the positive transfer of physical qualities one on top the other [1, 3].

Table 1

Physical preparedness correlation indices of orienteering sportsmen aged 14-15

№	Test	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Hand dynamometry (kg)														
2	Stature dynamometry	836*													
3	Long jump from standing position (cm)	582	640												
4	The throw of 1 kg stuffed ball(cm)	903	817	606											
5	60 m race (sec)	-773	-650	-639	-833										
6	Ten-time hop from one foot to the other (m)	406	413	576	343	-387									
7	Lifting legs without bending at 45 angle	743	655	488	820	-642	359								
8	400m race	-809	-650	-618	-851	943	-401	-724							
9	5000m race	-619	-483	-397	-621	790	-431	-628	860						
10	Frontsplit (cm)	048	-141	024	049	028	029	061	-027	187					
11	Forward bend from high stand	-001	018	-180	-020	095	-379	-167	101	246	-178				
12	Bondarevsky test (sec)	-054	-073	304	-043	-087	304	226	-200	-374	-015	-324			
13	Rotations on gymnastic bench per 20 sec(number of rotations)	174	088	231	268	-276	273	336	-187	-14	024	187	78		
14	walking in straight line	-270	-437	-068	-370	252	-136	-085	140	-005	120	-110	487	043	
15	Zigzag running	-554	-447	-374	-503	626	-365	-386	620	658	017	273	-189	-012	220

Note: * "0" and ";" are omitted; Critical value $r=0,374$ while $p\leq 0,05$; $0,478$ while $p\leq 0,01$; $0,588$ while $p\leq 0,001$.

The correlations of medium level of importance ($p\leq 0,01$) were revealed among the stronger hand dynamometry results and the long jumps from standing position ($r=0,582$). These exercises are meant to involve different muscle groups albeit they are characterized by the ability of neuro-muscle apparatus to concentrate muscle force. The correlations of medium level of importance were detected between the hand force indices and agility ($r=-0,554$), stature dynamometry and general endurance ($r=-0,483$).

General endurance plays the leading role in competitive activity in orienteering which requires the involvement of practically all big muscle groups of locomotor apparatus, including back muscles that play important role in running upwards [8]. The correlations of that very level of importance were detected between lower extremities explosive force indices and leg muscles endurance indices ($r=0,576$) and abdominal muscles ($r=0,488$). The first correlation is explained by the technical re-

semblance of individual constituents in performing exercises. As for the second one, it is due to the fact that abdominal muscles are mostly involved while performing the standing jump, namely in the phase of pulling the legs after pushing and unbending them forward while landing. The correlations of the same level were stated between explosive force of upper extremities and trunk, and agility ($r=-0,503$), that is influenced by wide adaptation capabilities of young sportsmen and wide positive transfer of physical qualities from one onto another [1, 3].

There have been detected eleven correlations of low but credible ($p \leq 0,05$) level of importance (table1) between hand force indices, stature force, leg muscles endurance, area orienteering ability, agility, lower extremities explosive force and rapidity (r from $-0,374$ to $-0,447$). The legs muscle endurance indices correlated in its turn with general ($r=-0,431$) and speed endurance ($r=-0,401$), the abdominal muscles endurance correlated with agility ($r=-0,386$). The correlations between different forces are quite logical and correlations between other physical qualities once more verify the facts [1, 3] about wide positive transfer of physical qualities in teenagers.

The analyzed correlation showed except positive correlations of different levels of importance the reversed correlations in the structure of physical preparedness of orienteering competitors aged 14–15. It refers to the static balance, that had negative correlation with the area orienteering indices ($r=0,487$) as well as leg muscles endurance and mobility in hip joints and spine joints ($r=-0,379$). While establishing training programs the existence of such correlations should be taken into consideration as it proves to purposelessness of using the means of their development in one training. It should also be stressed that the hip joints mobility indices (10 and 11 tests) as well as dynamic balance indices (13-th test) didn't show any important correlations either between other or with any other physical preparedness index of orienteering competitors aged 14–15.

Thus, the study of physical preparedness structure of orienteering competitors aged 14–15 shows that most of its components are in tight correlations with each other. So, out of 44 actual positive correlations 27 had the level of importance as $p \leq 0,001$, 6- $p \leq 0,01$ and 11- $p \leq 0,05$ and two more indices were defined as negative ones. The majority of correlations between physical preparedness components, even despite the fact that the sportsmen in the project trained according to the program of preliminary base training, have negative grounds which proves to the irrational structure of constitutional and substantive components of the existent physical training programs, thus shows the need in their renovation and perfection.

Conclusion:

1. There have been stated the important correlations of positive and reversed nature between the indices of young orienteering competitors physical preparedness, which should be considered in planning training sessions and physical qualities development tasks.

2. The correlation analysis results show that the structure and content of physical training of orienteering competitors aged 14–15 require immediate correction and renovation, as the great number of correlations have irrational influence of its means and methods on the level of their physical preparedness and may inflict the physical skills growth of the sportsmen at the stage of preliminary base training and many years of orienteering competitors training in future.

Prospect of subsequent researches. It is planned that the results will be basis for program of the differentiated development of physical qualities of orienteering competitors, which practice on the stage of previous base preparation.

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**СТРУКТУРА
ФИЗИЧЕСКОЙ ПОДГОТОВЛЕННОСТИ
СПОРТСМЕНОВ-ОРИЕНТИРОВЩИКОВ
НА ЭТАПЕ ПРЕДВАРИТЕЛЬНОЙ
БАЗОВОЙ ПОДГОТОВКИ**

Кристина ХИМЭНЭС, Михаил ЛИНЕЦ

*Львовский государственный университет
физической культуры*

Аннотация. В статье подтверждена важность физической подготовки в системе тренировки спортсменов-ориентировщиков и определено, что одним из перспективных направлений ее усовершенствования, прежде всего, является установление корреляционных взаимосвязей между компонентами физической подготовленности ориентировщиков на ранних этапах подготовки. Цель работы заключалась в выяснении наличия и уровня взаимосвязей между показателями физической подготовленности 14–15-летних спортсменов-ориентировщиков. В исследовании приняли участие 26 спортсменов-ориентировщиков III–II разрядов 14–15 лет со стажем занятий 4–5 лет. Уровень их физической подготовленности определялся по 15-ти показателям. В результате исследований установлено, что большинство компонентов физической подготовленности тесно коррелируют между собой. В частности, из 44 имеющихся позитивных взаимосвязей 27 имели уровень значимости $p \leq 0,001$, 6 – $p \leq 0,01$, 11 – $p \leq 0,05$, еще две взаимосвязи были определены как негативные.

Ключевые слова: спортсмен-ориентировщик, физическое качество, корреляция.

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Chrystyna HIMENES, Mykhaylo LYNETS'

Lviv State University of Physical Culture

Annotation. The importance of physical preparation in the system of orienteering competitors training is confirmed in the article. It is defined that the setting of correlation between constituents of orienteering competitors' physical preparedness during the early stages of preparation is one of perspective directions of its improvement. The purpose of work consisted in finding out the presence and level of intercommunications between the indices of physical preparedness of 14-15-years-old orienteering competitors. 26 orienteering competitors of III-II grades took part in the research. The level of their physical preparedness was determined by 15 indices. It is set as a result of researches, that most components of physical preparedness closely correlate between itself. In particular, from 44 present positive intercommunications 27 did have a level of meaningfulness of $p \leq 0,001$, 6 – $p \leq 0,01$, 11 – $p \leq 0,05$ and two intercommunications are defined as negative.

Key words: orienteering competitor, physical quality, correlation.