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INFLUENCE OF THE PROGRAM OF PHYSICAL TRAINING OF HIGHLY SKILLED HOCKEY PLAYERS (FORWARDS) ON INDICATORS OF THE COMPETITIVE ACTIVITY

Abstract. Purpose: *to define the efficiency of the program of physical training of highly skilled sportswomen on indicators of the competitive activity in field hockey that was offered in the first pre-season of an annual macrocycle. Material and methods:* *influence of the offered program was decided with the help of testing of motive qualities and technical elements of female hockey players. Results:* *correlation between indicators of the competitive activity of players of attack and the level of physical preparation was found out. Conclusions:* *positive influence of introduction of the program on physical preparation for highly skilled female hockey players, namely – forwards, on indicators of their competitive activity is revealed.*

Keywords: *field hockey, physical preparation, indicators of the competitive activity, physical qualities, preparation stage.*

Introduction. Modern field hockey – is a sport which demands a high level of the development of physical qualities and on this basis of the corresponding technical and tactical preparedness.

The effective system of preparation can provide successful performances in competitions of a high rank which consists of three main subsystems of trainings: competitions and factors which increase the efficiency of competitive and training activity.

The improvement of the educational – training process for the purpose of the achievement of it's the most effective functioning (within optimum) perhaps thanks to the comprehensive accounting of regularities of sports preparation, its external and internal conditions and factors, application of modern means and methods, studying of features of certain players and team, in general [8].

One of factors which promote the increase of efficiency of the training process is the control of physical fitness of sportsmen as physical preparation plays the main role in formation of motive abilities of hockey players on a grass [5].

Physical preparation takes the leading place in the system of training of sportsmen of high qualification therefore the related questions always remain actual, it was and it is a basis of numerous researches, fundamental works of V. Platonov, M. Bulatova [7], A. Godika [1], O. Fedotova [8], etc. are devoted to it.

The purpose of physical preparation in an annual cycle of training of the qualified hockey players is the achievement of the highest level of the development of motive potential taking into account requirements of the competitive activity. The

modern analysis of the competitive activity in field hockey allows to draw a conclusion on the significant growth in indicators of the activity of a game, the density of technical and tactical actions of players (number of actions in unit of time) which are the evidence of the increase of a functionality and a level of physical fitness of hockey players respectively [5; 8].

The development of a technique of influence on the leading systems of power supply by the optimization of the main components of dispensing of physical activities (intensity, number of repetitions, duration of intervals of work and rest, nature of rest, level of coordination complexity, and so forth), and also rational distribution of loadings of a different orientation, throughout an annual cycle of preparation is one of the directions of the improvement of physical training of highly skilled hockey players [2; 6].

In the modern theory and practice of the field hockey the problem of physical preparation remains insufficiently developed that is confirmed by the absence of evidence-based recommendations concerning a construction and a control of the process of physical preparation, a dynamics of the development of physical qualities, at different stages of an annual training cycle and the corresponding application of special means and methods.

Communication of the research with scientific programs, plans, subjects.

The research is executed on the basis of the Built plan of the research work in the sphere of physical culture and sport for 2006-2010 behind a subject 2.1.11p "Optimization of the educational-training process of sportsmen in game sports in an annual cycle of preparation" (number of the state registration is 0107U004731).

The aim of the research: to define the efficiency of influence of the offered program of physical training of highly skilled sportswomen in field hockey (forwards) on indicators of the competitive activity.

The tasks of the research:

- to analyse a condition of a problem of physical preparation in team game sports;
- to define a structure and contents of the program of physical preparation in the first preparatory period;
- to confirm the efficiency of influence of the program from physical preparation on indicators of the competitive activity of highly skilled hockey players (forwards) experimentally.

Material and methods of the research. Such methods of the research were used for the solution of the put tasks:

- analysis of scientifically methodical and special literature, normative documents;
- pedagogical methods of the research (pedagogical supervision, pedagogical testing, pedagogical experiment);
- medicobiological methods (pulsometry, veloergometry);
- methods of mathematical statistics.

Results of the research and their discussion. As a result of the experiment parameters of planning of physical preparation the skilled hockey players were offered and certain changes in the structure of preparedness which occurred

throughout an annual training cycle. The correlation analysis between indicators of physical fitness and indicators of the competitive activity allows to certify the existence between them a large number of statistical interrelations that gives the chance to provide that the increase and the maintenance will improve game indicators at the certain level of physical abilities.

It is necessary to be engaged in the development and the improvement of physical qualities during all annual cycle of preparation, but the greatest attention is paid to it in the course of the preparatory period therefore not casual at creation of the program of the annual training cycle "the development and the improvement of physical qualities" tasks in the preparatory period is priority [4].

Thus, the development of training programs on physical training for players of different roles became the purpose of our research which would consider certain peculiar features in the structure of preparedness of highly skilled hockey players and their efficiency [3]. Therefore a change in the structure of physical preparation was the first step for the development of such programs according to game roles in the first preparatory period of an annual microcycle (tab. 1).

The task of general – preparatory stage of the first preparatory period is the creation of the base of physical fitness of players first of all. Therefore, having analyzed the obtained data, we introduced amendments in planning of loadings of different orientation separately for each of groups of players: defenders, midfielders and forwards.

Modern field hockey advances rather strict requirements to forwards concerning the level of their technical and tactical skill, physical and functional fitness.

The analysis of correlation communications (tab. 2) between indicators of forwards in field hockey gives the chance to note that the greatest number of interrelations with competitive technical and tactical actions have high-speed and power qualities which beat off the nature of overwhelming movements of players of this role: accelerations, passes, kicks, and so forth. High statistical sheaves with these qualities have almost all TTA which were defined by us in the course of the competitive activity ($r=0,71-0,90$), the exception is made by the quality of performance of outplaying ($r=-0,68$) and the effectiveness ratio ($r=-0,58$) with which there are average connections and efficiency of the performance of maintaining ($r=-0,30$) which answers a weak interrelation with high-speed and power qualities.

High-speed qualities have high statistical connections with number of picking out ($r=0,73$), average interrelations with quality of performance of dribbling ($r=0,53$), picking out ($r=0,69$), quantity of shots for a goal ($r=0,64$), the coefficient of intensity ($r=-0,57$). It isn't revealed statistical communications between high-speed indicators and quality of the performance of stops. Results of forwards in shuttle run have strong statistical communication with number of passes ($r=0,81$), dribbling ($r=0,83$), grasp changes ($r=0,73$), quality of performance of shots at a goal ($r=0,81$) and the coefficient of intensity ($r=0,83$). Average statistical communication exists with the effectiveness ratio ($r=0,59$). The aren't connection with quality indicators of the performance of stops and picking out.

The training program from physical preparation for hockey players of high qualification in the first preparatory period of an annual training cycle

Content of exercises	Orientation		Intensity	Dosing	Method of training	Role
	pedagogical	physiologic				
Basic development mesocycle						
Cross-country race	General endurance	Aerobic	Average	3000 m	Repeated	D, F, M/f
Cross-country race	General endurance	Aerobic	Low – average	6000 m	Repeated	D, F, M/f
Fartlek	High-speed endurance	Anaerobic glycolytic	High – low	200–400–200–400	Interval	D, F, M/f
Pace running	High-speed endurance	Anaerobic glycolytic	High	1000 m	Interval	D, F, M/f
Run of 50 m in 50 m of walking	High-speed endurance	Anaerobic glycolytic	High	10 times	Interval	M/f
Run of 200 m – 400 – 600 – 800 – 1000 – 800 – 600 – 400 – 200	High-speed endurance	Anaerobic glycolytic	High	SE: 3 min – 4 – 5 – 6 – 7 – 6 – 5 – 4	Interval and serial	M/f
Stretching	Flexibility	Aerobic	Low	8–10 min	Repeated	D, F, M/f
Acceleration on 15 m from a movement	Speed	Anaerobic	High	5 times	Repeated	D, F
Acceleration on 20 m from a place	Speed	Anaerobic	High	5 times	Repeated	D
Acceleration on 10 m from a place and from a movement	Speed	Anaerobic	High	5 times	Repeated	F
Acceleration on 30 m from a place and from a movement	Speed	Anaerobic	High	5 times	Repeated	M/f
Jumps through out a gymnastic bench	High-speed and power	Mixed	Average	5–8 sets	Interval and serial	D, F, M/f
Jumps through out 10 barriers, acceleration of 10 m	High-speed and power	Mixed	High	5 sets	Interval and serial	D, F, M/f
Run of 30 m (rotation of a usual run)	Dexterity	Mixed	Average	Repeat 6 times	Repeated	D, M/f

and a back forward in each 5 m)						
Run of 200 m – run up a ladder. Descent – run by a ladder up, descent – run of 200 m	Endurance	Aerobic and anaerobic	Average – high – low and so forth	1–2 circles	Repeated	M/f
Acceleration from different starting position.	Speed	Anaerobic	High	10 times	Repeated	M/f
Performance of passes in a square with a movement in the course of a pass. Each player has to run 2 times in perimeter of a square. To run 3 times after rest.	Special speed	Anaerobic	High		Repeated	D, M/f
Run with the maximum frequency on a place (10 s), a overthrow forward, breakthrough on 20 m	Dexterity, speed	Mixed	High	5 times	Interval	M/f, F
Three overthrows forward, jumps through out five barriers 0,7 m high (distance between barriers – 1 m), a overthrow forward, breakthrough on 15 m	Dexterity, high- speed and power	Mixed	Average – high	5 times	Interval	M/f
6 players of attack and 4 players of protection take place about the central line of a field. Players of group of attack move with a ball to the gate at the maximum speed of run. A task of players of protection – to catch a ball	Special speed	Anaerobic	High	6 times	Repeated	D, F
Basic stabilizing mesocycle						
Stretching	Flexibility	Aerobic	Low	8 min	Repeated	D, M/f, F
Run around (the last one does acceleration and becomes directing)	Special	Anaerobic glycolytic	High – average	4 min	Interval and repeated	D, M/f
Uniform, variable run	Endurance	Aerobic	Low – average	1200–2000 m	Repeated, interval	D, M/f, F

Run up ladder. Descent	General endurance	Mixed	High – low	36 steps	Interval and repeated	D, M/f, F
20 jumps on a place	High-speed and power	Mixed	Average	4 sets with SE 30 s	Repeated	D, M/f, F
Jumps from a full crouch stand	High-speed and power	Mixed	Average	3 sets of 10 jumps	Repeated	M/f, H
Run in connection with jumps in a gym of 20x30 m: the 1st circle – usual; the 2nd – with jumps throughout benches and jumps up to basketball backboards; the 3rd – usual; the 4th – with jumps and so forth	High-speed and power	Mixed	Average	7 km	Interval and repeated	D, M/f, F
Run on 15 m from a movement	High-speed and power	Anaerobic	High	5–10 times	Repeated	D, F
Run on 50 m from a place	Speed	Anaerobic	High	5 times	Repeated	D, M/f
Jumps on a place (knees to a chest) behind an acceleration of signal on 10 m	Speed	Anaerobic	High	5 times	Repeated	F
S.P. – forwards stand a back forward on the line of start, defenders – for 5 m from them (facing the line of start). Behind a trainer's signal forwards run 5 m a back forward and having developed on 180° carry out acceleration of 20 m. Tasks of defenders to catch up and touch forwards. M/f play in couples	Speed	Mixed	High	Repeat 5 times	Competitive	D, F, M/f
Relay with change of the direction of the movement. Players are distributed on two teams. Behind a signal the first in each team begin to run "slalom" between racks and reach to the finish, come back to the line of start	Dexterity	Mixed	High	Repeat 3–5 times	Competitive	D, M/f, F
Exercise is carried out in a square of	Special speed	Anaerobic	High	7–12 min	Repeated	D, M/f,

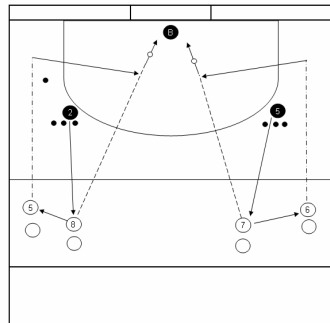
20-30 m. "Eight": the player No. 1 does a fast pass to the player No. 2 and accelerates on his place. The player No. 2, having got a ball, passes to the player No. 3 and also he accelerates on his place and so forth						F
Passes of stuffed balls by hands and feet in couples from different starting positions.	High-speed and power	Aerobic	Average	4-7 sets of 10 changes over	Repeated	M/f
The player No. 2 passes to the player No. 8 who in one touch passes to the player No. 5. Then the player No. 5 carries out an octopus with a ball on 25-30 m and passes under a throw to the player No. 8. The same is carried out on the opposite flank	Speed, high-speed and power	Mixed	High			M/f, F
High-speed dribbling by the forward from a midfield to a blow circle. The defender has to choose a moment and at a full speed moves in advance to the player who owns a ball	Special speed	Anaerobic	High	10-15 min	Repeated	D, F
Relay with a change of the direction of the movement with a stuffed ball in hands. Behind a signal the first in each team begin to run slalom between racks to the line of the finish, then come back to a start place	Dexterity	Mixed	High	Repeat 5 times	Competitive	D, F

Table 2

Correlation matrix of interrelation of indicators of functional preparedness of hockey players on a grass – forwards (n=5) and their TTA in games of the Ukrainian championship (n=15)

Indicators	Run on 30 m	Long jump	Shuttle run of 180 m	Run of 2000 m
Stops	-0,24 (0,04)	-0,85 (-0,74)	0,46 (0,02)	0,65 (0,56)
Passes	-0,32 (-0,39)	-0,78 (-0,72)	0,81 (0,28)	0,65 (0,42)
Dribbling	-0,15 (-0,53)	-0,81 (-0,30)	0,83 (-0,31)	0,78 (-0,24)
Outplaying	-0,25 (-0,36)	-0,85 (-0,68)	0,48 (0,08)	0,65 (0,33)
Picking out	0,73 (-0,69)	0,77 (-0,71)	0,40 (0,25)	0,21 (0,15)
Grasp change	0,41 (-,46)	-0,95 (-0,73)	0,73 (0,11)	0,66 (0,26)
Shots at a goal	0,64 (-0,43)	-0,78 (-0,90)	0,31 (0,81)	0,25 (0,64)
ER	-0,40	-0,58	0,59	0,43
CI	-0,57	-0,86	0,83	0,51

Note. In the table the specified correlation level with quantitative indices, in handles with their high-quality performance.

The general endurance which was defined in run on 2000 m, has strong statistical communication only with the frequency of application by forwards of dribbling in the course of a game ($r=0,78$). There are average statistical connections with the majority of indicators of the competitive activity, namely: with quantity ($r=0,65$) and quality ($r=0,56$) of the performance of stops, number of passes ($r=0,65$), outplaying ($r=0,65$), grasp changes ($r=0,66$), quality of the performance of shots at a goal ($r=0,64$) and the coefficient of intensity ($r=0,51$).

There are weak or very weak statistical connections between all other indicators of forwards.

Conclusions. The analysis of a condition of a problem of physical training of sportsmen of high qualification, including in team game sports, testified that physical preparation is one of the important links in the general structure of the training process and significantly influences the parties of preparation and the competitive activity first of all.

Results of the conducted researches showed that introduction of effective individually group program of physical preparation positively influences the productivity and the efficiency of the competitive activity of forwards, creates all prerequisites for the realization of functional and physical potential of an organism of sportswomen. The optimum structure of preparedness of hockey players becomes a base for the stability of manifestation of high rates of the competitive activity.

It is certain that there are statistical interrelations between indicators of physical fitness of highly skilled sportswomen in field hockey and indicators of the

competitive activity. It is found out that the quantity and the degree of such interrelations at players can be miscellaneous. The received information can be used for the purpose of the correction of planning of means of training.

We see **prospects of the subsequent researches** in this direction in the development and the introduced training programs on physical training for female hockey players on a grass of high qualification for the purpose of the optimization of the level of their physical fitness and the development of motive qualities which play an important role for the performance of game functions by them during the competitive activity.

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