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Physical performance and aerobic capabilities of field hockey players, taking into account their playing role

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Abstract

Purpose: to establish the prospects and differences between hockey players performing various playing roles in terms of physical performance and aerobic capabilities.

Methods: to obtain a full assessment of the physical development and functional fitness of hockey players in the team aspect, anthropometric and physiological testing methods were applied and the quantitative results obtained were processed by adequate and generally accepted methods of mathematical statistics.

Results: The evaluation of the indicators for PW-170 showed that according to the indicators of physical performance, out of 11 strikers in field hockey, 6 strikers (Yus-nov, Bol-ev, Abdu-ov, Kel-ov, Ashi-ev, Mar-ov) are promising - whose fluctuations of PWC -170 range from 1322.2 kg/m/min. up to 1702.2kg/m/min. According to the MOC indicator, 53.7% of the attackers had an average level, and 36.3% had an average level of aerobic capabilities. The style of conduct and the pace of the game depend on the attackers, since in field hockey, the team is always on the attack, then on the defense. Depending on this, the players occupy certain positions on the field. If a team player has mastered the ball, other players of the same team must choose the right position to receive the ball and be released from the care of the opponent using the help of partners. It is also necessary to ensure that you do not find yourself in an "out of the game" position. To ensure success in single combat with an opponent, as well as with approximately equal physical development and technical capabilities of the attacker and the defender, the advantage will always be for those who are more tactically literate in any game situation and are characterized by high speed qualities. An important role in the victory belongs to the technical skill of the goalkeepers, whose actions are carried out in the range of 180 degrees near the gate at a distance of 1m-1.15 m. that is, the goalkeeper should be able to choose the position that is most advantageous for protecting the goal. The choice of the goalkeeper's position depends entirely on the actions of the attackers, especially the player who owns the ball.

Conlcusion: As a result of the conducted research, the difference between players of various gaming roles was established not only in terms of physical performance according to PWC-170, but also in terms of aerobic capabilities based on the informative indicator of MOC. Defenders have the highest indicators of physical performance according to PWC-170, but attackers have 1.7% lower than defenders. The PWC-170 was 3.04% lower for goalkeepers than for defenders. The lowest PWC- 170 index for midfielders is 1256.3±164.5kg/m/min –its difference with defenders was 5.4%. According to the MOC indicator, the best results were found in defenders-59.05 = 5.42 l/min. Forwards have a lower MOC than defenders by 1.5%, goalkeepers also have a lower MOC by 2.2%. Midfielders have the lowest MOC scores – the MOC value is 5.4% lower compared to defenders. The obtained data can be recommended as criteria characterizing the functional state of hockey players of various playing roles and have prognostic significance, retaining their informativeness as the players' athletic skills grow.

Keywords: Field hockey, physical fitness, level of physical development, functional state, morphofunctional styles, motor activity.

Introduction

At the present stage, sports training and competitive activity, including in field hockey, is characterized by an increase in physical and nervous loads. It is particularly necessary to highlight the increase in the role and effectiveness of those collective methods of conducting the game, which are based on high functional readiness and high requirements for technical and tactical actions in conditions of forceful counteraction and lack of time (Anders E 1998, VM Zatsiorsky, VK Zaitsev, I Koloskov 2013, VM Shestakov 2013, IE Konovalov, VI Volchkova 2015, Kostyukevich VM 2008, 2017).

In this regard, it seems to be a completely unresolved problem-the development of criteria for general physical, special - motor and functional readiness of hockey players, taking into account their playing role. Modern hockey has become more combinational, faster in all components of the game. From the point of view of physiology, functional training is provided by adaptive processes aimed at improving the functions necessary for the type of activity under study. Special attention is paid to the development and introduction into the practice of physical culture and sports of accessible and informative methods for assessing the functional state of life support systems, predicting physical performance and their achievements in various sports, including field hockey. The specificity of some sports, primarily sports games, with an exceptionally long competitive period is reflected in various points of view on the definition of the rational structure and content of the training process in different periods of the

macrocycle and the technology of formation and management of athletes' fitness in conditions of frequently repeated matches, tournaments (3, 4). In addition, it should be borne in mind that hockey is a team game and is characterized by the specifics of players performing various game roles: goalkeepers, defenders, midfielders, attackers. It should be noted that even within certain playing roles, there are subspecies of both defenders and midfielders, in which the game is of a purely specific nature.

Methods

The study involved 40 field hockey players who are students of the Department of theory and methodology of winter sports of Uzbek State University of Physical Culture and Sports, members of the national field hockey team of the Republic of Uzbekistan, as well as members of the national field hockey team of the Tashkent region.

Results and discussion

In order to obtain a full assessment of the physical development and functional fitness of hockey players in the team aspect, anthropometric and physiological testing methods were used to predict the prospects of an athlete in his chosen sport and determine the results at competitions. Physical performance was determined by PWC-170, set as kg/m/min, as well as in terms of watts; The indicator of aerobic capacity of the MOC was measured both in absolute terms of l/min and relative values–ml/kg/min. The obtained quantitative results were processed by adequate and generally accepted methods of mathematical statistics.

The task of the goalkeeper is to always be in front of the ball, opposite the player with the ball and a circular review to evaluate the flight of the ball in space. Analysis of the PWC-170 indicator for goalkeepers was 3.04% lower than for defenders.

The inviolability of the gates of their team largely depends on the competent play and coordinated actions of the defenders. The main task of defenders is the correct organization of defense in the circle of impact. Defenders should be positioned so as not to move far from the strike circle and at the same time keep the opponent's attackers at a respectful distance from the goal and support their midfielders when attacking. The highest indicators of physical performance according to PWC-170 were found in defenders, but for attackers this indicator is 1.7% lower than for defenders. The most promising defenders, which are characterized by high performance and high aerobic capabilities, were found in Abdu-ova – 1441.5; MOC - 65.2; Also, PWC-170 was 1402.3 kg/m/min, and MOC–67.0 l/min; good indicators of aerobic capabilities were established for Ismva. MOC– it was -60,61 l/min. In general, defenders are characterized by an average level of aerobic capacity, which is-58.9 ± 5.06 l/min. The lowest indicator is for midfielders – its difference was 5.4%. According to the MOC indicator, defenders also have the best results, this indicator is 1.5% lower for attackers, and the MOC goalkeepers are 2.2% lower. According to VM Kostyukevich, the midfield line is the link of the team. Playing in the place of a midfielder requires a hockey player to have a versatile physical training. First of all, the defender

Table 1. Physical performance and aerobic capabilities of strikers in field hockey

Full name	Category	Playing role	PWC 170 kg/m/min	PWC 170 watt	MOC		
					Absolute	Relative	Mark
Rustamov M	CMS	striker	1222.9	203.8	3.760	62.6	Good
Ashirbaev J	CMS	striker	1350.9	225	4.0419	62.1	Good
Risaliyev R	CMS	striker	1098.2	183.6	3.456	58.1	Average
Abdukarimov A	1	striker	1385.6	230.9	4.118	59.6	Average
Yusufjonov J	1	striker	1702.0	283.6	4.898	59.0	Average
Boltaev Sh	1	striker	1409.8	234.9	4.171	59.6	Average
Naimov M	1	striker	1086.0	181.0	3.459	52.4	Low
MArdonov M	1	striker	1322.5	220.4	3.979	58.5	Average
Keldiyorov K	1	striker	1387.2	231.2	4.1218	49.0	Low
Holyigitov H	1	striker	1152.8	192.1	3.606	52.2	Low
Kurdoshev M	1	striker	1232.2	205.2	3.780	44.4	Low
$\bar{x} \pm \sigma$			1304.5± 183.92	217.4± 30.56	3.935± 0.45	56.1± 4.54	

Table 2. **Assessment of physical performance and aerobic capabilities of goalkeepers in field hockey**

Full name	Category	Playing role	PWC 170 kg/m/min	PWC 170 watt	MOC		
					Absolute	Relative	Mark
Fazilov J	CMS	goalkeeper	1205.1	200.8	3.721	57.2	Average
Fazilov J	1	goalkeeper	1339.5	223.2	4.016	61.7	Good
Ibragimov A	1	goalkeeper	1310.8	218.4	3.953	54.9	Average
Rustamov Z	1	goalkeeper	1135.7	189.2	3.568	46.4	Low
Karimov M	CMS	goalkeeper	1236.6	206.1	3.798	53.4	Low
Sobirjonov	CMS	goalkeeper	1386.0	231.0	4.119	45.7	Low
Nurmuradov	CMS	goalkeeper	1397.8	232.9	4.145	63.3	Good
$\bar{x} \pm \sigma$			1287.4± 97.93	214.5± 16.3	3.903± 0.21	54.7± 6.84	

Table 3. **Assessment of physical performance and aerobic capabilities of defenders in field hockey**

Full name	Category	Playing role	PWC 170 kg/m/min	PWC 170 watt	MOC		
					Absolute	Relative	Mark
Abubakirov D	CMS	defender	1317.5	219.5	3.968	55.1	Average
Tozhaliev J	CMS	defender	1402.3	226.1	4.155	67.0	Great
Aloutdinov D	2	defender	1308.8	218.1	3.949	57.2	Average
Komilov S	CMS	defender	1500.8	250.1	4.371	56.0	Average
Ismoilov D	CMS	defender	1153.7	192.2	3.606	60.61	Good
Hayitbekov	1	defender	1476.9	246.5	4.319	50.2	Low
Ahmetjanov	1	defender	1250.7	208.4	3.821	54.6	Average
Ismoilov K	CMS	defender	1160.7	198.2	3.62	61.6	Good
Abdulhakimov A	CMS	defender	1441.5	240.2	4.241	65.2	Great
Kadamboev R	1	defender	1273.1	212.1	3.870	59.5	Average
$\bar{x} \pm \sigma$			1327.9± 125.02	220.5± 20.54	3.991± 0.28	58.9± 5.06	

Table 4. **Assessment of physical performance and aerobic capabilities of midfielders in field hockey**

Full name	Category	Playing role	PWC 170 kg/ m/min	PWC 170 watt	MOC		
					Absolute	Rela-tive	Mark
Komilov J	CMS	midfielders	1297.6	216.2	3.924	61.3	Good
Salimjonov N	CMS	midfielders	1263.7	210.6	3.850	57.4	Average
Kucharov D	1	midfielders	1329.9	221.6	3.995	61.4	Good
Kamilov J	CMS	midfielders	1468.6	244.7	4.3	68.2	Great
Asrorov M	1	midfielders	1344.2	224.0	4.027	57.5	Average
Tojaliyev J	CMS	midfielders	1136.4	189.3	3.570	59.5	Average
Normamatov F	1	midfielders	918.9	153.1	3.0915	58.3	Average
Abdumajidov L	1	midfielders	1291.5	215.5	3.911	48.8	Low
$\bar{x} \pm \sigma$			1256.3± 164.5	209.4± 27.43	3.834± 0.36	59.05± 5.42	

must be a hardy, mobile player in order to maintain working capacity throughout the match. A midfielder needs to have a good starting speed, be strong, agile and tenacious when selecting the ball. The functions of the midfield players are much more diverse than those of other team players. Midfielders are obliged to destroy the attack of the opposing team in time, participate in the defense of their goal and organize the attack of the opponents' goal. For promising defenders, hockey players on the grass should be indicated on the Com-va J physical performance was 1468.6 kg / m/ min, or in watts – 244.7, and aerobic capabilities are

evaluated perfectly and showed 68.2 l / min, in Asr-ova J performance – 1344.2 kg / m/min or 224 watts, MOC -57.5, Kam-ov J -1297, 6kg/ m/min or -216.2 watts. Analysis of digital data in tables №1, №2, №3, №4 It allows us to conclude that the difference in the relative indicators of physical performance and the indicator of maximum oxygen consumption is statistically significant.

Conclusion

As a result of the conducted research, the difference between players of various gaming roles was established not only in terms of physical performance according to PWC-170, but also in terms of aerobic capabilities based on the informative indicator of MOC. Defenders have the highest indicators of physical performance according to PWC-170, but attackers have 1.7% lower than defenders. The PWC-170 was 3.04% lower for goalkeepers than for defenders. The lowest PWC- 170 index for midfielders is 1256.3±164.5kg/m/min –its difference with defenders was 5.4%. According to the MOC indicator, the best results were found in defenders-59.05 = 5.42 l/min. Forwards have a lower MOC than defenders by 1.5%, goalkeepers also have a lower MOC by 2.2%. Midfielders have the lowest MOC scores – the MOC value is 5.4% lower compared to defenders. The obtained data can be recommended as criteria characterizing the functional state of hockey players of various playing roles and have prognostic significance, retaining their informativeness as the players' athletic skills grow.

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