

Bioenergetics of the Hockey Match of Russia and the USA at the Olympic Games in Pyeongchang

 Sivakov Vladimir Ilyich¹,  Ivan Fedorovich Cherkasov¹,  Matveeva Polina Alexandrovna¹ and  Elena Sergeevna Gladkih¹

ARTICLE INFORMATION

Original Research Paper

Doi:

Received December. 2019

Accepted March. 2020

Keywords:

bioenergy

game working capacity

hockey team of Russia and the USA
Olympic Games.

ABSTRACT

Objective: to substantiate the bioenergy of a hockey match for the game result of the hockey team of Russia and the USA at the Olympic Games in Pyeongchang.

Material and research methods: analysis of scientific and methodological literature, ascertaining experiment, analysis and synthesis of scientific information, method of mathematical statistics. The quantum method is a contact or remote assessment of hockey players' energy systems, used to assess the recovery process and functional state during and after competitive gaming activities. The color energy system of teams using the quantum method was estimated from 1 to 10 points. The study involved hockey teams from Russia and the United States at the Olympic Games in Pyeongchang.

The results of the study. The revealed results of the study showed that the energy system of the hockey teams of Russia and the USA at the Olympic Games in Pyeongchang before the start of the match is different in color energy state and the functional preparedness of the hockey match is different. Before the start of the hockey match, the hockey players of the Russian hockey teams are in a state of green-red energy in the form of a vertical information square, which helps to achieve a high game result. Before the start of the hockey match with the US hockey team, the color energy system is mid-level, contains 3, 8 points of green and 6, 2 points of red color energy in the form of an information ellipsoid circle. This color energy in form is not "energy-efficient" in relation to

the vertical color information energy system of the square of the Russian hockey team. **Conclusion.** Hockey players of national teams have a different color bioenergy system, shape, content and, accordingly, a different game result will have a hockey match. The functional performance of the hockey team depends not only on the content, but also on the form of the color bioenergy system, which determines the potential capabilities of the hockey team. Currently, bioenergy in sports of the highest achievements has diagnostic and prognostic value.

1. Introduction

Relevance. The manifestation of the bioenergy system of hockey players during a hockey match is determined by the quantum method, which is the operational control of the competitive load carried out in competitive activity. Performing aerobic-anaerobic physical activity changes the bioenergy and the bioenergy system of hockey players. The study of the bioenergetics of hockey players has been substantively studied from the perspective of the color bioenergy system [7].

Studying the real correlation of the color bioenergy system of teams will make it possible to predict the results of game matches, determine the functional state, recovery process, the adaptation process and rationally build game tactics taking into account team bioenergy at the Olympic Games [2, 3].

Hockey players of national teams have a different color bioenergy system, shape, content and, accordingly, a different game result will have a hockey match. The functional performance of the hockey team depends not only on the content, but also on the form of the color bioenergy system, which determines the potential capabilities of the hockey team. Currently, bioenergy is dynamically developing in the sport of the highest achievements [9]. The interest in studying the bioenergetics of athletes is due to the real results of color bioenergetics both from the external and internal sides of the anaerobic-anaerobic load, it is determined promptly, accurately and effectively in competitive activity [4].

Color bioenergy allows you to optimize game performance through a complete set of hockey links (five), taking into account the energy compatibility of the players. Before a hockey game, the level of bioenergy system (energy power) of hockey players is determined low, medium, high [1].

The color bioenergy system of hockey players is developed by the anaerobic-anaerobic mechanism of functional performance. The color bioenergy system of hockey players reveals a functional state, special preparedness, athletic form, overwork, overstrain, overtraining [3].

In the study of R.V. Tambovtseva in the study of bioenergy indicators after a test of physical activity after a three-day fasting found that substrate-energy insufficiency affects the energy exchange of athletes [11].

Research hypothesis. The achievement of high prizes at the Olympic Games is facilitated by the high level of the bioenergy system of hockey players having (bright red, red, green colors) in the form of a vertical square, performing color energy control of the state of the sports uniform and special physical fitness. The high level of the color bioenergy system of hockey players contributes to a sports form that provides high recovery processes and functionality at the Olympic Games.

Objective: to substantiate the bioenergy of a hockey match on the game result of the hockey team of Russia and the USA at the Olympic Games in Pyeongchang.

Material and methods of research: ascertaining experiment, analysis and synthesis of information, the method of mathematical statistics for the accuracy of Student's t-test, the method of quantum evaluation of the energy and functional state of hockey players of the national teams of Russia and the USA at the Olympic Games in Pyeongchang. The quantum method is a contact or remote impact on the energy system of hockey players, used to diagnose, assess the restoration of a functional state during and after a game, during the training and competitive load. It does not matter the distance between the quantum method of a hockey player or a hockey team in the process of recovery of the color power system and functional state [8]. Static analysis involved calculating the validity of Student's t-test, where the differences between the comparative results of the ascertaining experiment were determined. Statistical processing of the results of the hockey team of Russia and the USA was carried out according to the Student's t-criterion between the sample averages at the 5% significance level ($P < 0.05$), which is considered to be quite a reliable criterion for pedagogical research. The color power system of teams was determined in points from 1 to 10.

Of the information energy forms of the energy system among hockey players, the hockey team determined four levels by the quantum method: low - horizontal square with green-red energy; the middle one is a vertical square with yellow-red energy; high - vertical square with red content; light red, green-red, red-green color energy; and the highest

is an ellipsoidal circle with the contents of red, light red, green-red, red-green color energy. In the hockey teams of Russia and the USA, the highest energy system was not revealed in the final, but only a high level of the energy system was revealed.

Study participants. The study involved hockey national teams of Russia and the USA in the final at the Olympic Games in Pyeongchang.

Organization of the study. The study was conducted at the Olympic Games in Pyeongchang during the hockey final match of the hockey match of Russia and the USA. Quantum method was used to determine the color energy system of the teams of Russia and the USA.

Research Results

Let us present for consideration and justification the game activity of the teams of Russia and the USA at the Olympic Games of the hockey match (02.17.2018).

The results of the study of gaming activity showed that hockey teams in Russia and the United States showed different color energy levels - low, medium, high - and accordingly, the forms of the energy system in the work of the energy centers of the energy system of the spinal canal, neuromuscular and functional systems. Bringing hockey teams to a high level of special physical fitness and game results contributes only to a high level of the power system, i.e. light red, green red, red color of energy in the form of a vertical square, declaring the high functional sports capabilities of the team in game matches.

The energy system of the hockey teams of Russia and the USA at the Olympic Games in Pyeongchang before the match was different in color energy manifestation and different athletic form and special physical fitness for the hockey match. Before the start of the hockey match, hockey players of the hockey teams of Russia are in a state of green-red energy in the form of a vertical information square, which helps to achieve a high game result with 3.4 points - green and 6, 6 points - red color energy state. Moreover, not only the color of energy determines the success of a hockey match, but also the form containing the energy system of various levels of the information square.

Before the start of the hockey match with the US hockey team, the color energy system is mid-level, contains 3, 8 points of green and 6, 2 points of red color energy in the form of an information ellipsoid circle. This color energy in form is not “energy-efficient” in relation to the vertical color information energy system of the square of the Russian hockey team.

After ten minutes of playing time, the content of the color information ellipsoid circle of the USA hockey team changes to the shape of a vertical information square, and on the right side there are no clear energy boundaries of the square. The shape of the information square with no energy border and 9.0 points of red energy confirms the losing result of a hockey match. The power system is connected with the game result of the USA hockey team. The low informational energy background of the hockey team does not contribute to a dynamic recovery process. The US hockey team at the Olympic Games lost 4-0 to Russia, lacking the functional, technical, tactical and bioenergetic advantages in game activity.

Next, we consider the energy differences in the color energy system of the hockey team of Russia and the USA at the Olympic Games in Pyeongchang after twenty minutes of playing time in the first, second, third half.

At the end of the first half, the hockey team of the USA changed the shape of the vertical informational energy square with no border on the right side: 10.0 points - a red circle and 9.0 green energy after a missed goal. The lack of a clear border information system of the US team affected the missed puck. The predominance of 9.0 green color

energy in the form of a vertical informational energy square indicates a decrease in functional performance and the onset of overwork of the hockey team.

At the end of the first half, the score was scored 0: 1 by the Russian hockey team. The bioenergy system of the Russian hockey team changes from 9.0 points of red energy to 10, 0 points of the red color energy system of the vertical informational energy square, i.e. the information form of the circle changes 100%. The color energy content of the Russian hockey team is 100% of the red color energy system, which indicates the increased functional performance of hockey players.

At the end of the second half, the USA hockey team after the puck missed, the indicators of the color energy system of the vertical information square changed: 2, 2 points of green color energy in the cent of the square in the form of a rhombus with red energy along the edges and 7.8 points of dark green color energy with the preservation of shape vertical informational energy square. For the US hockey team, an increase to 8.0 points in the dark green color energy system at the end of the second half is associated with a decrease in functionality and an increase in overvoltage of the functional system, which is uncharacteristic for the Olympic match.

At the end of the second half, the hockey team of Russia retained the energy system indicators at the level of 9, 2 points of red color energy, and 0.8 points of green color energy located at the bottom of the energy square. At the same time, the shape of the vertical informational energy square has not changed. Preserving the shape of the vertical informational energy square and its energy system is an additional mechanism for replenishing red color energy with the third goal scored by the Russian hockey team.

The US hockey team did not show an effective game at the Olympic Games, since there was no energy border on the right side of the square. This indicated the fatigue of the functional system of the US hockey team. The Russian hockey team on the day of the hockey match revealed energy differences in the form of informational, energy boundaries of the square and circle.

After twenty minutes of the third half, the US hockey team's color information form of the vertical energy square contained 4.3 points of green energy and 5.7 points of red color energy in the form of falling rain.

After twenty minutes of the third half, the hockey team of Russia changed its color informational energy form: 6.4 points - red energy and 3.6 points green energy in the form of a circle, which indicates a decrease in psychophysiological stress, which ended in victory for the Russian team. The results of the bioenergy system of the hockey team of Russia and the USA are presented in the table.

Table - Bioenergy system of the hockey team of Russia and the USA in the final of the Pyeongchang Olympic Games (in points)

Bioenergy system of hockey team	Periods of hockey game	X ± m		t P
		Russia n=27	USA n= 26	
Red color	Start	6,6 ± 0,1	6,2 ± 0,1	4,00 < 0,001
Red color	Finish	6,4 ± 0,2	5,7 ± 0,2	2,33 < 0,05

Green color	Start	$3,4 \pm 0,1$	$3,8 \pm 0,1$	$4,00 < 0,001$
Green color	Finish	$3,6 \pm 0,2$	$4,3 \pm 0,2$	$2,33 < 0,05$

At the Russian hockey team, we note significant differences between the color power system of the US hockey team of crane and green colors. The Russian hockey team showed statistically significant results of red energy - from 6.6 to 6.4 at the end of the match ($P < 0.001$). The US hockey team statistically significantly reduced the results of red energy during a hockey match - from 6.2 to 5.7 points, and green color energy - from 3.8 to 4.3 points ($P < 0.001$). The results of mathematical statistics confirmed the hypothesis of the study and give reason to believe that the bioenergy of the hockey team reflects and shows the state of the sports form and the game result of the teams.

The novelty of the study is that they determined:

- 1) energy-diagnostic control of the bioenergy system of the hockey team, which allows you to evaluate the recovery process, sports results in competitive activity;
- 2) a high level of bioenergy system, which provides (bright red, red, green color) in the form of a vertical square, performing energy control and the state of the sports form;
- 3) the color of energy in a form that is not “energy-efficient” with respect to the vertical color power system of the square of the hockey team, the power system changes - the functional state of the team on the day of the competition also changes.

The results of mathematical statistics confirmed the hypothesis of the study and give reason to believe that the bioenergy of the hockey team reflects and shows the state of the sports form and the game result of the teams.

Discussion.

This is an important indicator and criterion by which the color energy level of hockey player's readiness for high results at the Olympic Games is determined.

In the work of Volnih, Lapshina (2011) note that the developed color energy system of athletes determines the development of the aerobic-anaerobic mechanism of energy supply during muscular activity at various distances in competitive activity [5].

The medium level of the developed color energy system is evidenced by light red color, and the low level of the color energy system is evidenced by dark red, yellow, brown color [9].

On the functional sports capabilities and the willingness of athletes on the day of the competition will have different manifestations of colors. The color energy state of hockey players is an energy prerequisite for the diagnosis and prediction of successful competitive activity [6]. There are studies and authors who believe that the color energy system affects the functional performance of athletes in competitive activity, and it has diagnostic value in determining the functional state of athletes [8].

Static analysis of the studies shows that the color background is red, green energy systems of athletes is an indicator of prognostic function. This is also evidenced by the work of Belousova (2018) et al. that the energy systems of athletes are interconnected with the functional state and functional performance of athletes in the education of general and special physical and motor qualities and believe that a low level of special physical fitness reduces the

energy and functional capabilities of athletes [1].

In the study of bioenergy in sports Volkov, N.I. applying correlation analysis established positive correlation relationships between developed and undeveloped energy systems of athletes in educational and competitive activities [2, 3, 4].

The above research results of the above works complement our research [6] about the need to track and take into account the color energy system of athletes in order to not only determine the development of the functional system in educational work, but also in competitive activity through diagnostic and operational monitoring of functional performance.

The study we associate with the fact that the lack of diagnostic accounting for the color energy system of athletes will not contribute to the scientific justification of the quantum method in the study of the color energy system and the functional state of athletes [2].

The author can agree with the results of the research mentioned above by the fact that the higher the level of functional performance, the higher the level of the developed energy system of athletes [10].

It should be noted that further scientific research in the study of the color and functional energy system of hockey players in this direction will contribute to the operational control of the functional state, recovery processes, sports results that will not allow the process of premature fatigue, overwork, overstrain, injury in the training and competitive activities of skiers [9; 11].

Studying the color energy system will allow in the competitive activity to predict the sporting result and determine the pre-launch readiness for the day of the competition, since every day it is dynamic, cyclical, variable, has a different color state, and accordingly, the sporting result. The study will increase the effectiveness of pedagogical diagnostic control in competitive activity not only among hockey players, but also among athletes in cyclic, acyclic, and mixed sports [7].

Findings

1. The study of the color bioenergy system will allow in the competitive activity to predict the sports result and determine the team's game readiness on the day of the competition, since every day it is dynamic, cyclical, variable, has a different color state, and accordingly, the sports result. The study will increase the effectiveness of operational diagnostic monitoring in competitive activity not only among hockey players, but also among athletes in various sports.

2. The bioenergy content of the hockey team with a predominance of red color energy contributes to the increased functional performance of hockey players. The change in the color structure of the bioenergy of the hockey team is associated with fatigue, overwork and a decrease in the functional performance of hockey players.

3. Hockey players of national teams have a different color bioenergy system, shape, content and, accordingly, a different game result will have a hockey match. The functional performance of the hockey team depends not only on the content, but also on the form of the color bioenergy system, which determines the potential capabilities of the hockey team. Currently, bioenergy in sports of the highest achievements has diagnostic and prognostic value.

References

Belousova, N.A., V.I. Sivakov and V.P. Maltsev, 2018. [Psychophysiological predictors of successful educational



- trajectory realization of young hockey players]. J.Theor. Pract. Phys. Culture, 12: 22-23.
- Volkov, N.I., 2009. [Problems and prospects of sports bioenergy]. J.Theor. Pract. Phys. Culture, 1: 77-80.
- Volkov, N.I. and V. I. Oleynikov, 2011. [Bioenergy of sports: monograp]. Soviet Sport, Moscow, Russian, ISBN:9785971805250, Pages 160 (In Russian).
- Volkov, N.I., 2016. [Bioenergetic factors of special endurance in running for medium and long distances]. Diss. oc. biological sciences. Moscow, Russian, Pages: 213 (In Russian).
- Volnih, D.U. and E.A.Lapshina, 2011. [Symbolism of color in Japanese culture. New ideas of the new century: proceedings of the international scientific conference]. FAD PNU; Vol. 1: 305-308.
- Font X, Garay L, and S Jones, 2016. [Social Cognitive Theory of sustainability empathy. Original Research Article Annals of Tourism Research]. Pages: 65–80.
- Gubanova, L. S., 2010. [Bioenergetic Criteria of Adaptation to Cyclic Training]. Moscow, Sofia, Russian, Pages 200 (In Russian).
- Sivakov, V.I., D.V. Sivakov and V.V. Sivakov, 2016. [Metod v povyshenii ehnergosistemy sportsmenov]. J. Uchenye zapiski universiteta im. P.F. Lesgafta, 12: 116.
- Sivakov, V.I., S.A. Aitkulov and I.F.Cherkasov, 2017. [Quantum energy method for diagnostics and competitive success forecasts in elite sports]. J.Theor. Pract. Phys. Culture, 6: 21-24.
- Sivakov, V.I., S.A Aitkulov, I.F. Cherkasov, E.V. Perepelyukova and L.M. Kravtsova, 2018. [Quantum energy rating method for competitive performance forecasts in continental hockey league matches]. J. Theor. Pract. Phys. Culture, 6: 62.
- Tambovtseva, R.V., 2016. Anaerobic glycolysis characteristics in untrained boys depending on age and physical load. J. Theor. Pract. Phys. Culture, 1: 9.