Analysis of the psychomotor indicators of the SKA-Neftyanik-2 ball hockey players during the two-year performance period

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Abstract. The article is devoted to the problem of studying psychomotor indicators in ball hockey players during two-year training cycles 2018-2019, 2019-2020 and before the start of the new season. In the course of the study conducted from August 2018 to September 2020, it was revealed that the persistent positive dynamics of changes in psychomotor indicators in ball hockey players during the two-year period of performance was registered in such indicators as: mobility of nervous processes, approximate visual search reaction (OSPR), volumetric attention and discrimination reaction.

Keywords: psychomotor skills, ball hockey players, training cycle, annual cycle, mobility of nervous processes, hardware software complex "Neurosoft-Psychotest", psychophysical state.

Introduction

From 2018 to 2020, a research group of teachers of the Far Eastern State Academy of Physical Culture carried out state-funded research work on the topic ""Development of methods of competitive training of athletes in bandy "" by order of the Ministry of Sports of the Russian Federation for 2018-2020.

Currently, the issue of the need for systematic comprehensive monitoring of the psychophysical state and indicators of technical and tactical training of athletes, adjusting the training process taking into account their individual characteristics, the specifics of climatic and geographical conditions is becoming particularly relevant.

The purpose of this work is to improve the system of training ball hockey players, taking into account regular monitoring of their condition and timely correction of the training process in the conditions of the Far East.

To do this, it will be necessary to study the parameters of the psychophysical, emotional and functional state of hockey players in the annual cycle of training athletes, which will further make a certain contribution to improving the system of training ball hockey players on the basis of regular monitoring of their condition and correction of the training process, taking into account the specific climatic and geographical conditions of the Russian Far East.

The choice of psychomotor testing is due to the fact that in situational sports, which include ball hockey, the qualities of psychomotor skills (reaction speed, reaction to a moving object, volume and concentration of attention, etc.) that prevail in game actions or contribute to making a decision about action are of significant importance. To a large extent, these qualities can determine the success or failure of purposeful game activity in bandy [3].

To assess the dynamics of changes in psychomotor indicators, the hardware software complex "Neurosoft-Psychotest" was used, which allows us to assess the current functional state of the central nervous system, reflecting the psychomotor abilities of an individual.

1. The experimental part

During the competitive period of two annual cycles from August 2018 to September 2020, changes in psychomotor indicators were studied in the ball hockey players of the SKA-NEFTYANIK-2 team. The following methods were studied: approximate visual-search reaction according to the Schulte-Platonov tables (OSPR), simple visual-motor reaction (PZMR), choice reaction, reaction to a moving object (RDO), discrimination reaction, concentration of attention, volumetric attention.

To assess the speed of the course of nervous and mental processes in the central nervous system (CNS), the average time of PZMR for diagnosing the mobility of nervous processes in the central nervous system was subtracted from the average time of the discrimination reaction.

Studies of psychomotor indicators of ball hockey players were conducted in the preparatory period (August 2018, September 2019 and 2020) of the 2018-2019 season, 2019-2020 and 2020-2021, during the team's competitive activities (December 2018, 2019) and after the end of the 2018-2019 season. (July 2019). In July 2020, the study was not conducted due to restrictive measures to prevent the spread of COVID-19 coronavirus infection in the Khabarovsk Territory.

The athletes of the SKA-NEFTYANIK-2 team were examined in the morning hours in the laboratory of "Monitoring of physical condition" of the Far Eastern State Academy of Physical Culture. The number of examined ball hockey players varied between 19-23 people.

2. Results

Analysis of the dynamics of changes in psychomotor indicators in ball hockey players from August 2018 to September 2020 showed that such indicators as: PMR (ms) (on average-212ms – the average reaction speed during the study), choice reactions (ms) (on average - 317ms - high reaction speed during the study), the number of errors on the green color in the choice reaction (on average – 0.6 times during the study), the number of accurate reactions to a moving object (times)(on average -14 times - the average level of accuracy of reactions during the study) and the concentration index (ms) (on average - 268ms- intermediate type between the inert and mobile type of higher nervous activity during the study) there were no significant differences between the intermediate studies until September 2020. The results are presented in Tables 1 and 2.

Table 1-Changes in the psychomotor indicators of SKA - Neftyanik-2 ball hockey players in the annual cycle 2018-2019.

Psychomotor indicators	August 2018	December 2018	July 2019	September 2019
PZMR (milliseconds)	210±3,2	208±3,8	216±7,2	216±3,8
OZPR (seconds)	45,5±2,3	40±2,2	39±3,1	35±3,0
Choice reaction (milliseconds)	305±8,3	310±7,8	323±8,6	326,5±6,1
Number of errors per red color (times)	0,7±0,1	0,4±0,5	0,15±0,08	0,6±0,2
Number of errors per green color (times)	0,8±0,1	0,7±0,1	0,7±0,2	0,6±0,08
Concentration of attention (milliseconds)	277±5,6	268±5,2	269±1,7	262±7,2
Volumetric attention (milliseconds)	378,5±9,5	370±7,8	350±7,3	357±9,2
Mobility of nervous processes (milliseconds)	148±2,6	124±1,4	113±3,2	102±2,4
Discrimination reaction (milliseconds)	358±5,8	332±5,2	329±10,4	318±6,2
The number of exact reactions (times) in the RDO	12±0,4	13±0,3	14±0,25	14±0,4

Table 2-Changes in the psychomotor indicators of SKA- Neftyanik-2 ball hockey players in the annual cycle 2019-2020.

Psychomotor indicators	September 2019	December 2019	September 2020
PZMR (milliseconds)	216±3,8	214±3,4	210±3,3
OZPR (seconds)	35±3,0	37±2,7	35±2,8
Choice reaction (milliseconds)	326,5±6,1	321±6,9	315±7,2
Number of errors per red color (times)	0,6±0,2	0,4±0,1	0,5±0,2
Number of errors per green color (times)	0,6±0,08	0,5±0,1	0,5±0,09
Concentration of attention (milliseconds)	262±7,2	268±6,4	264±5,8
Volumetric attention (milliseconds)	357±9,2	354,5±8,8	351±8,1
Mobility of nervous processes (milliseconds)	102±2,4	100±2,4	106±2,3
Discrimination reaction (milliseconds)	318±6,2	314±5,8	316±5,6
The number of exact reactions (times) in the RDO	14±0,4	15±0,3	14±0,5

After studying the dynamics of changes in the indicator of the time of the approximate visual search reaction (OZPR), it was revealed that in July 2019 (39 seconds - the average indicator) and September 2019 and 2020 (35 seconds - the average indicator) these indicators significantly improved compared to the indicator of August 2018 (45,5 seconds-below the average) by 14,3% and 23,1%, respectively ($p < 0,05$).

During the study of the indicator of the number of errors for red in the choice reaction, it was found that the indicator of July 2019 (0,15 times) had a significant improvement by 78,6% compared to the indicator of August 2018 (0,7 times) and the indicators of December 2018 and

2019 (0.4 times) by 42,9% also had a significant improvement compared to the indicator of August 2018 (0,7 times).

The study of the volume attention index (ms) revealed a stable positive dynamics of improvement of this indicator from 378,5 to 351milliseconds, but significant differences were recorded between the indicator of July 2019 (350ms) and December 2020 (351ms), which, respectively, improved by 7,5% and 7,3% significantly compared to the indicator of August 2018 (378 millisecond- is an intermediate type between the inert and mobile types of higher nervous activity).

During the study of the discrimination response index (ms), there was a tendency to improve it from 358ms (intermediate type between the inert and mobile types of higher nervous activity) (August 2018) to 314-316 milliseconds (intermediate type between the inert and mobile types of higher nervous activity) (December 2019 - September 2020) by 12,3% and 11,7%, respectively (p <0,05).

And finally, the indicator of the mobility of nervous processes (ms) recorded in August 2018 (148 milliseconds - below the average level) had a positive dynamics of a significant decrease during the study to 100 milliseconds -above the average level (December 2019). This indicator has improved by 32,4%.

As a result of the analysis of psychomotor indicators recorded during the two-year cycle from August 2018 to September 2020, it can be noted that most of the indicators tended to improve, but significant differences were found only in four indicators: Mobility of nervous processes - by 32,4%, OSPR – by 23,1%, Discrimination response-by 12,3% and Volume attention-by 7,5%.

The indicators of PZMR, concentration of attention and choice reaction between the studies of August 2018 and September 2020 had no significant differences (p<0,05), and even a slight deterioration in the final indicator of the choice reaction was recorded-315 milliseconds (September 2020) compared to the indicator of August 2018 (305ms)- by 3,3%.

3. CONCLUSIONS

During the study, it was revealed that the indicators of psychomotor activity recorded in ball hockey players during the two-year cycle from August 2018 to September 2020 have a significant difference (p<0,05) in such indicators as: mobility of nervous processes (milliseconds), OSPR(seconds), discrimination reaction (milliseconds) and volumetric attention.

Having analyzed the change in psychomotor indicators in ball hockey players for two years, we can say that a stable positive dynamics of improvement during this period was registered in such indicators as: mobility of nervous processes, approximate visual search reaction (OSPR), volumetric attention and discrimination reaction.

Some indicators of the speed of psychomotor reactions (PZMR, concentration of attention, choice reaction) recorded in ball hockey players of different qualifications during the preparatory and competitive period of the annual cycle differ slightly from each other, which suggests that the

mental qualities associated with performing complex psychomotor actions are quite stable and individual.

Based on the conducted research, we can speak about the effectiveness of corrections promptly introduced into the training process of ball hockey players based on the results of the performance of the SKA-Neftyanik-2 team, which became the bronze medalist of the Russian youth championship among the teams of the Highest League of the 2018-2019 season. Khabarovsk residents were the only ones among the youth teams who managed to climb the podium along with adult teams of masters from Sayan (Abakan) and Mayak (Krasnoturinsk)[1].

From October 7 to 13, 2019, SKA-Neftyanik-2 hockey players performed at a representative tournament in Kemerovo dedicated to Mikhail Volkov, one of the discoverers of Kuzbass. For the first time in the organization of this tournament in 2016, the team took an honorable third place out of 8 teams participating in the tournament. Moreover, the 1st and 2nd places were taken again by adult teams of masters from Sayan (Abakan) and Kuzbass (Kemerovo) [2].

From March 18 to 28, 2020, the 2nd stage of the final All-Russian competitions among the teams of the Highest League in bandy for the 2019-2020 season was canceled by the Directorate for organizing and conducting competitions of the Russian Bandy Federation due to the threat of the spread of a new coronavirus infection in Russia (2019-nCoV) [4].

References

1.   "Doubles of SKA-Neftyanik won the bronze medals of the championship of Russia" (2019), available at. – URL: https:// DVhab.ru/sport.

2.   "The understudies did not disappoint"(2019), available at. – URL: https:// Skabandy.ru.

3. Mezentsev, V.V. (2016), "Evaluation of the functional capabilities of young hockey players using hardware and software complexes", International Sports games "Children of Asia" - a factor in promoting the ideas of Olympism and training the sports reserve, Yakutsk Russian Federation, pp.393-395.

4. "Cancellation of the final competitions in Moscow"(2020), available at. – URL: https:// rusbandy.ru/news.