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USE OF CIRCADIAN RHYTHMS OF LAWN TENNIS PLAYERS IN RELATION TO THEIR PSYCHOMOTOR SKILLS

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Abstract: *Biorhythm or circadian rhythm represents a biological process through which the human body adopts a rhythmicity, which can be measured once every 24 hours. An analytical analysis of human biorhythms and their interaction in the synergy of psychomotor capabilities of lawn tennis players was performed. The reliability of performances in official competitions is conditioned by the integral preparation of the athlete, the components of which are optimal technical and tactical, physical, functional and mental training, taking into account the manifestation of his biorhythms. Biorhythmology is currently of great theoretical and practical importance in sports training. However, certain principles and provisions of biorhythmology in sports are insufficiently highlighted and scientifically justified, but, without a doubt, research in this direction gives the expected practical result. A series of aspects of psychophysiology are highlighted, the solution of which largely depends on the success of using biorhythms to increase the efficiency of sports activities. The dynamics of the circadian rhythms of the psychophysiological functions are reflected in the volume and intensity of the applied training and competition tasks, as well as in the physical recovery after their performance. In order to identify the relationship between biorhythms and sports and psychomotor performances of athletes, we analyzed the results obtained in competitions by tennis students (the best and worst of the season). The analysis of the obtained results showed that the best sports and test results are presented by tennis players during the optimal phases of the biorhythm, and the worst - during critical periods. It is necessary to take into account the characteristics of the biorhythm when predicting and analyzing the performances of athletes in certain competitions and the test parameters that characterize their psychomotor capabilities as determining factors of sports and tactical abilities. It has been established that psychomotor indices and sports performance of tennis players are interconnected with the periods of biorhythms. In the negative period and on the critical days, the greatest decrease in the reactions to the moving object (RMO) was observed, the decrease in the state-impact force, which provides the force of the deep (postural) muscles of the trunk, involved in maintaining both statodynamic and dynamic, one of the factors of motor-coordinating qualities of tennis players.*

Key Words: Biobiorhythms, Physical, Emotional, Intellectual Capacities, Critical Days, Psychomotor Skills.

INTRODUCTION

In the last three decades worldwide, there has been an increased interest in the study of the rhythmic organization of processes in the body [7]. Interest in human biorhythms is natural, because rhythms dominate in nature and cover all manifestations of life - from the activity of subcellular structures and separate cells to the complex forms of behaviour of the organism. According to V.M. Dilman (1985), problemsadaptation, standards and homeostasis must be considered and treated according to the cyclical course of vital processes. From the point of view of biorhythmology, it is more correct to talk not about homeostatic constancy, but about homeostatic dynamics, which creates stability in the body, conditioned by chronobiological processes.

Chronobiology (from Crono – "time") is the science that studies periodic (discrete) phenomen a that occur over time in living organisms and their adaptation to solar and lunar rhythms, called biological rhythms or biorhythms.

The purpose of the study is to investigate some psychomotor functions influenced by biorhythms to allow predicting success in different activities.

Research methodology and organization. The given study was carried out with the students of the State University of Physical Education and Sport in Chisinau, Republic of Moldova for two years. Each athlete underwent a complete examination four times according to the following schedule:

- **Reflexometry -**for the evaluation of simple motor reactions to light-visual-motor (LVM), sound-auditory-motor (SAM) stimuli.
- **The ruler drop**- to evaluate the complex response of the reaction to a moving object (RMO).
- **Quètelet index, g/cm** - characterizes proportionality, body strength and physical harmony.
- **Tapping-test, 10 s -**maximum movement speed (MMS) evaluation.
- **Romberg test -**the evaluation of static equilibrium (SED) [6, 8, 9].
- **Anthropometry**-to assess the maximum force of the wrist muscles (FmaxM), maximum leg strength (FmaxP), active body mass index (BMI, kg/mg), morphological maturity index (BMI, un.m.) [2, 4].

The biological clock starts working from the first moments of birth. This is considered to be the starting point of the report. That figure is divided by the number of days of each cycle: the physical cycle - 23 days, the emotional cycle - 28 days and the intellectual cycle - 33 days. The remainder obtained from these calculations determines the position of each of the cycles [5].

The mathematical processing of the data was carried out in accordance with the recommendations of specialists in the field [1, 13].

Results and discussion. Human life, like everything in nature, is inevitably linked to the factors of time. One of the effective forms of adaptation of the body to the external environment is the rhythmicity of physiological functions. Biorhythms vary from an hour and a half to a year. Diurnal or circadian rhythms have the greatest impact on the body's performance. Three biorhythms are known, which significantly influence human performance: physical, emotional and intellectual. There are "peak" days in human life, when perfection is achieved in all activities, but also "critical" days, which can be accompanied by various negative effects. Calculating the cycle of each biorhythm allows us to determine how successful the corresponding activity will be in a certain period of time.

Tension and relaxation phases characterize the rise and fall of performance throughout the day.

Amplitude is the difference between maximum and minimum performance during the day (tension amplitude) and at night (relaxation amplitude). Total amplitude is the difference between maximum and minimum performance over the daily cycle.

Acrophasis it is the time when performance reaches the highest point in a biorhythm [11].

Human Physical Biorhythm has duration of 23 days. The first half of the cycle is a positive period, accompanied by good health and the success of activities that require physical effort. The second half of the cycle is a negative period, and critical days are those when a person has a decrease in physical performance, a disruption in dexterity and motor skills.

Emotional Biorhythm of a person determines his creativity and also affects his relationships. In the first half creative activities and friendly interpersonal relationships

are represented as a "discharge phase". The next, the "reset phase", is less successful, with painful reactions to failure and resentment.

Duration **Intellectual Biorhythm** of a person is 33 days. The positive period is characterized by mental acuity, with easy and quick solving of all mental tasks, including tactical and technical ones in sports. In the negative period man feels the lack of intellectual information and tries to reduce his discomfort by reading literature, advice from teachers. During the decline period (the negative period), the potential energy needed to subsequently reach the "peak phase" in the positive period is accumulated.

Human biorhythms do not act independently, each has an impact on the others, according to the principle of synergism - the cooperative interaction of biorhythms and psychomotor abilities [14].

When considering biorhythms in the student's vital activities, one must take into account the presence of critical days as a transition from one phase of the biorhythmic cycle to another, whether positive or negative. Any critical day is accompanied by a state of instability, regardless of activity. For example, a person's physical biorhythm affects their general state. The negative side affects the emotional and intellectual sphere of human activities. Or, on a "peak" day of a person's emotional biorhythm, a negative value of the physical cycle will significantly reduce his creativity.

In order to use the body's internal resources as well as possible, it is recommended to take into account the peak days and critical days of a person's biorhythm. Particularly important are those periods when all three cycles are in a positive phase [10, 11].

During the study days, the emotional (E), physical (P) and intellectual (I) biorhythms and their combinations (E+P; E+I; P+I; E+F+I) were calculated, as well as the individual percentage of their coincidence with each psychomotor function. A significant correlation of the average group indicators with the level of sensorimotor functions was determined.

However, the influence of biorhythms on the level of psychomotor functions also has an individual character. The analysis of the character of the relationship between biorhythms and the variability of results in lawn tennis showed that this relationship has a pronounced individual and group character. For example, a master of sports in lawn tennis showed the highest performance with favourable E-biorhythm values (r = + 657,

P < 0.05) with a combination of E+I (r = + 0.750, P < 0.05) and E+P+I (r = + 0.675). In one of the tennis players the highest performance was observed with optimal values of P-biorhythm (r = + 0.780, P > 0.05), I+P (r = + 0.810, P < 0.01) and E +P+I (r = 0.650), which is reflected in the level of certain psychomotor functions. It should be noted that the most significant relationship between biorhythms and performance in lawn tennis is with the combination of E+I or P+I.

The results of the study support the statement regarding the influence of biorhythms on the level of individual psychomotor functions, on the one hand, and on the performance of sports activities that involve complex psychomotor coordination, on the other hand.

Any motor activity has at its base a reason that satisfies a certain need, which determines the general and specialized orientation of this activity, which can be work or training. Psychomotor action, which is determined by its closest regulator - the goal, is the main element of the activity structure (in addition to motivation and needs) [12].

In addition, the performance of physical exercises, that is, voluntary motor activity, is carried out under the control of consciousness, and the manifestation of motor skills - with the participation of volitional, conscious effort, which occurs as part of the mental and physiological movement control organs, reflected in various qualities psychomotor (physical) [6].

According to V.P. Ozerov (2002), human psychomotor skills represent the core of motor skills based on the cognitive-motor component (C+M), which includes sensorimotor (LVM + SAM), physical (P) and emotional (E) capacities of psychophysical activity conditioned by the influence of human biorhythms.

In lawn tennis, a determining factor of the reaction and anticipation of the opponent's actions is the reaction speed expressed during the visual-motor and auditory-motor reactions (VMR, AMR), the maximum speed of movements (MSM), sensitive reactions to the moving object (RMO) under the influence of the biological rhythms of the athletes' body, the differences being 1.6; 1.8 and respectively 5.4%.

Accuracy in hitting a ball is usually not a mechanical process, but a manifestation of the athlete's intelligence, his mental activity in the conditions of intellectual and physical biorhythms (I+P).

Thus, some morphofunctional indicators are observed, on which depends to a certain extent the successful penetration into the mechanism of biorhythms and the possibilities of their use in the theory and practice of sports.

Starting from the above, the information on the morphofunctional state should become a mandatory part of the medical-pedagogical control program together with taking into consideration the athletes' biorhythms.

CONCLUSIONS

The study of the correlation between the biological rhythms of athletes with psychomotor performances and their reliability showed that, in order to improve the test results, the testing of psychomotor functions in subjects should be performed at least three times: on the general exam day; in the phase of decrease and respectively in the increase of their biorhythms, which will allow a more correct diagnosis of the subjects' psychomotor abilities and predict successful performances during the competitive period.

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