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Method of Estimating the Predisposition of the Individual To Psychotic Disorders of Schizophrenic Spectrum Based on Measurement of the Balance of Nerve Processes

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Abstract

The article notes that one of the three nervous system properties (NSP): the strength, mobility and balance of excitation and inhibition processes proposed by the Russian physiologist, academic I.P. Pavlov, the creator of the higher nervous activity types doctrine, the "balance" property has been studied to a lesser extent. Professor E.P. Ilyin, founder and head of Russian differential psychophysiology scientific school, according to the results of experimental studies, proposed to consider the property of "balance" in two aspects: "external" and "internal" balances of excitation and inhibition processes in their magnitude. E.P. Ilyin also developed motor express methods for measuring both balances and NSP: the strength and mobility of excitation and inhibition processes. The article considers the author's innovative Method of assessing the predisposition of individuals to schizophrenic spectrum of psychotic disorders based on measuring the balance of nervous processes, and taking into account age. It is noted that the Method allows implementing an individual approach to prescribe antipsychotic drugs, ensuring objectivity and accuracy of treatment effectiveness evaluation in early stages of therapy. It is essential that the Method is not time consuming and can be carried out by both a psychiatrist and a medical psychologist without use of expensive equipment and consumables. It is emphasized that E.P. Ilyin's motor techniques for measuring NSP are already implemented on the basis of mobile devices, so there are no restrictions on the number of individuals for whom a preventive assessment of predisposition to psychotic disorders can be carried out in a wide age range.

Keywords: Differential psychophysiology, experimental studies, nervous system properties, balance of nervous processes, psychotic disorders

General Provisions

It is known that the study of human movements is of great interest for a wide variety of fields of knowledge: physiology, psychophysiology, psychiatry, neuropathology, pedagogy, psychology, and others. In the motor organization of a person, his behavior reflects a holistic characteristic of him as an individual, personality, subject of activity, individuality. Motor activity represents significant manifestations of features of psychodynamics, temperament, character. If we talk about human graphic movements, they are characterized by the highest level of regulation on the part of the central nervous system. In the preface to the Russian translation of the book by E. Mira y Lopez: "Graphic Methodology of Personality Research", editor N.A. Grishchenko notes: "...throughout the last century, graphic tests (projective, intellectual, pictographic, graphological, and others) played a large role in the study of the holistic psychological organization of human beings. This was facilitated by serious research on the identification of the relationship of results of performance of graphic tests with the peculiarities of development of intelligence, speech, character, features of personality and subject of activity. Among the numerous graphical tests, the test of myokinetic diagnostics is of particular importance... The uniqueness of the technique of E. Mira y Lopez, which is to identify the ratio of temperamental attitudes and behavioral reactions of personality based on the study of the space-time organization of graphical movements..." (Mira y Lopez, E. 2002, p. 5).

E. Mira y Lopez himself, the author of the method of myokinetic psychodiagnostics (hereinafter — MKP), thus defines the principle of myokinesia: "... any mental activity from an objective point

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of view is a sequence of actions, each of which is supported by appropriate settings; any change in behavior requires a change in the pattern of muscle stress, and thus changes the "equilibrium formula" every time. In other words, *mental inequilibrium and myokinetic inequilibrium are two sides of the same individual process* and hence seeing one can be boldly to infer the presence of another. *Changes in the level of mental tension should be reflected at the level of muscle tension* (highlighted by the author — A.D.) provided that the conscious adjustment of the latter is excluded by the subject himself" (Mira y Lopez, E. 2002, p. 13). We briefly noted the method of MKP because, firstly, the author used it to study the person not only in the norm, but also in various pathological conditions, in particular, studied several forms of manifestation of schizophrenia. Secondly, the method of MKP is, in fact, close to the Method of estimating the predisposition of individuals to psychotic disorders of the schizophrenic spectrum, proposed by us and discussed below Unfortunately, in the said book by Mira y Lopez, in the section on myokinetic diagnosis of schizophrenia, there is no data on the connection of this disease with the accuracy of evaluation by subjects of spatial segments. Disadvantages of the method of MKP can also include its bulkiness, significant expendable material, substantial time costs for implementation, difficulties of introducing into the practice of working with large groups of tested subjects as the specificity of the method makes it difficult to translate it into digital format for diagnostics using modern computer and mobile devices.

According to the results of years of experimental research, Russian physiologist, winner of the Nobel Prize in Physiology and Medicine (for 1904), Academician I.P. Pavlov revealed three properties of nervous systems (Pavlov 1951): strength, mobility, balance of excitation and inhibition processes. The "balance" property, characterizing the ratio of nerve processes, was the first of the properties put forward by Pavlov, but according to Professor E.P. Ilyin, it is still the least studied. Experimental research in various spheres of activity (educational, sports, professional) allowed Ilyin, the author of motor express methods for measuring the properties of the human nervous system (hereinafter — PNS), to highlight two new types of balance: "external" and "internal" balances of excitation and inhibition processes by their magnitude (Ilyin 1972). Ilyin's point of view on the problem of the "balance" property differs from the approach taken in the scientific psychophysiological school of B.M. Teplov — V.D. Nebylitsyn, where balances were considered: by strength, dynamism, lability, mobility of the nervous system (Nebylitsyn 1966, 1990). In one of his monographs, E.P. Ilyin reasonably questioned this approach in the issue of balances with respect to three properties: strength, dynamism, lability (Ilyin 2001, p. 108-111).

From another perspective, Ilyin suggested that the balance between the magnitude of excitation and inhibition is expressed differently on different regulatory circuits in the central nervous system, as reflected in the concepts proposed by him: "external" balance and "internal" balance, where the former characterizes the emotional and motivational level of regulation, the latter reflects the level of regulation, related to the need for motor activity, and characterizes deeper processes in the central nervous system (Ilyin 2001). The lack of identity of the two balances follows from the facts identified by Ilyin: 1) there are no direct correlations between the balances (neither positive, nor negative); 2) in "external" and "internal" balance there are their specific manifestations in the peculiarities of behavior and activity of individuals, which is reflected in the frequency of occurrence of typological features of manifestation of these properties in representatives of different sports and professions; 3) in some human conditions (monotony, psychic absorption) shifts in these balances are divergent (reciprocal relations), then is, the shift of the "external" balance towards excitation corresponds to the shift of the "internal" balance towards inhibition, and the shift of the "external" balance towards inhibition corresponds to the shift of the "external" balance towards inhibition corresponds to the shift of the "internal" balance towards excitation.

It is known that "reciprocity" (lat. reciprocus — returning, reverse, reciprocal) is one of the physiological mechanisms of coordination of the activity of nerve centers, providing reciprocal, opposite directional regulatory influence on organ and tissue functions. According to E.P. Ilyin, this nature of the "shift" of balances is related to mechanisms of self-regulation of the level of activation in the central nervous system, "transfusing" of activity from one level of regulation in the other; in two types of balance two activation systems manifest themselves: the reticular formation and the hypothalamus. What ratio between excitation and inhibition will show in a given person depends on his type of response to the situation: in some people a typical reaction is an excitatory reaction, in others — an inhibition one, in third, there is an indifference reaction and the underlying ratio between excitation and inhibition — their balance. It should be noted that in experimental studies it has been established that if you measure the balances of the subject in a state of calm wakefulness, the constancy of this typology for this subject will be distinct. The constancy coefficients of the "external" balance in the absolute majority of cases were valid at 0.01 within 0.42-0.66. The "internal" balance also shows greater stability: correlation coefficients between retests in most cases reached values of 0.46-0.52 and even 0.81 at reliability from 0.05 to 0.001 (Ilyin 2001, p. 392).

The above fact that "external" and "internal" balances have their specific manifestations in the peculiarities of behavior and activities of representatives of different sports and professions, also found confirmation in our later studies (Drozdovski 2014, 2015, 2017, 2019). Our studies of the manifestations of PNS, unlike those carried out by the representatives of the scientific psychophysiological school of E.P. Ilyin in the 70s and 80s of the previous century, which is reflected in the monographs of E.P. Ilyin (Ilyin, 2008, 2008a, 2011), were carried out by us using a software and hardware complex (Drozdovski 2019, p. 169-196), which allowed to carry out measurements and processing of results in the field, in automatic mode and noticeably increase the sample of subjects in a wide age range (6 years old and older). The transition to digital format was made possible after we applied "digitization" to indicate the high, medium or low severity of each five PNS's measured by motor methods of Ilyin (Drozdovski 2017, p. 60-65). For example, for the "external" and "internal" balances considered here, the digitization will be as follows: 1 — excitation prevails, 2 — balance, 3 — inhibition prevails. It was agreed that in the double-digit digital *code* the first number characterizes the severity of the "external" balance, the second - the severity of the "internal", and thus, the following combinations of balance expressions are possible in the ***code*** : 11, 21, 31, 32, 33, 23, 13, 12, 22.

Innovative Method of Estimation of Predisposition to Psychotic Disorders of Schizophrenic Spectrum Based on Measurement of the Balance of Nervous Processes

Early detection of individuals predisposed to psychotic disorders of the schizophrenic spectrum, as well as an express estimation of the efficacy of treatment of patients with an established diagnosis, will significantly reduce the costs of their keeping and treatment in inpatient facilities. This will be facilitated by preventive measures to prevent and control stress factors that can start the process of transition from the stages of predisposition — to the sick and chronic forms of it. Modern instrumental methods with sufficient accuracy allow to determine exactly what form of disease the patient has. These methods are aimed at differentiative diagnostics of nosologies within schizophrenic spectrum disorders and can be used by specialists for cases where adverse behavioral signs of the disease are already marked through external forms of behavior and must be clarified by methods recognized in psychiatry. However, often these and other signs do not have external manifestations and then diagnosis of the disease is much more complicated. In addition, known instrumental diagnostic methods are complex, require considerable time and financial costs, so their application is not economically appropriate for preventive detection of individuals' predisposition to psychotic disorders, especially when diagnostics need to be carried out promptly, on large groups of subjects and in wide age range. Preventive estimation of predisposition to psychotic disorders acquires particular importance in the selection of candidates or admission of specialists to the workplace in complicated occupations (e.g. aviation crews, air traffic controllers and rail traffic controllers, power system operators, military specialties, hazardous production) where mistakes in making responsible decisions can lead to catastrophic consequences. To resolve the noted difficulties there was proposed the "Method of Estimating the Predisposition of Individuals to Psychotic Disorders of the Schizophrenic Spectrum on the Basis of the Balance of Nervous Processes by their Magnitude" (Drozdovski, 2020a).

The study of N.Yu. Oganesyan is known: "Dance Therapy in Rehabilitation of Psychotic Disorders" (Oganesyan 2005), where according to the purpose of the study, the task was set to assess the dynamics of the psycho-emotional and bodily manifestations in patients during the course of dance therapy. Two groups of patients of the rehabilitation unit in a psychiatric hospital were examined to solve this task. The total number of respondents was 120. The main group (group 1) included 90 people who took part in group dance therapy. The control group (group 2) included patients (total — 30 people) of the same unit who did not undergo dance therapy. Verification of the diagnosis was carried out by specialists with medical education. Of 120 patients, 76 people were diagnosed with F-20 — schizophrenia, 10 people — with F-3 (mood disorders, affective disorders), 29 people — with F-23 (acute transient psychotic disorders), 5 people — with F-23,9 (acute and transient psychotic disorder, not specified). The study by Oganesyan involved 29 men and 91 women. The age of patients was distributed as follows: under 20 years old — 9 people; 20-30 years old — 45 people, 30-40 years old — 26 people; 40-50 years old — 28 people, 50-60 years old — 9 people, and over 60 years old — 3 people. The average age of the subjects was 35. All patients before the beginning of dance therapy underwent a comprehensive clinical and psychiatric examination, the diagnosis was copied from medical history with the permission of the attending doctors. The study notes that the main and control groups did not receive other types of psychotherapy at the time of the study. The subject matter of the study was: change of sensoromotor, emotional-personal (psycho-emotional), communicative and other components of the personality of patients with psychotic disorders under the influence of dance therapy. In accordance with the task, the author of the study created a program of short-term dance therapy, the duration of which was determined by working conditions in a psychiatric hospital. The duration of the therapy course was 10 sessions, 1.5-2 hours twice a week, where after each dance class, patients also participated in meditation sessions. To solve the tasks of the study by N.Yu. Oganesyan there was used a number of psychological methods and techniques, among which there was also used the motor technique by E.P. Ilyin (its graphical version based on assessment of reproduction of segments) to measure the property of the "external" balance of nerve processes by their magnitude (Ilyin 1972, 2001).

Measurement of "external" balance by E.P. Ilyin's motor method involves the making of pre-set segments for five times by the tested subjects (with closed eyes) with subsequent attempts at their accurate reproduction. Short (15-20 millimeters) and long segments (45-60 mm) are set. If both on short and long segments, the subject has excesses, then the conclusion follows - "excitation prevails", if there are shortenings everywhere, then — "inhibition prevails". In cases where there are excesses on small segments, and on long segments there are shortenings, this indicates the balance of unequal processes.

Results of the study by N.Yu. Oganesyan on the impact of dance therapy on the psychophysiological condition of patients of two groups: the main (group 1 — the rehabilitation program included dance therapy sessions) and the experimental (group 2 — without dance therapy), are presented in Table 1 (Oganesyan 2005, table 6, p. 112).

Table 1: Quantitative indicators of measurement of "external" balance (in millimeters) in the main (group 1) and control (2) groups before and after treatment

Indicator	Group 1 (M±m)			Group 2 (M±m)			P
	Before	After	Difference	Before	After	Difference	
Amount of excesses on small amplitude	0.7±0.40	1.0±0.35	0.2±0.44	0.0±0.0	0.0±0.0	0.0	
Amount of shortenings on small amplitude	38.2±2.40	15.6±1.25	-2.6±2.20	36.7±3.49	41.3±3.20	4.6±3.06	0.001
Amount of excesses on large amplitude	0.4±0.18	1.3±0.38	0.8±0.42	0.0±0.0	0.0±0.0	0.0	0.05
Amount of shortenings on large amplitude	73.9±4.36	29.0±2.93	-4.9±4.55	69.5±4.97	72.5±4.32	3.0±4.28	0.001
Sum of excesses	1.1±0.71			0			
Sum of shortenings	-67.6±5.99			7.6±5.97			0

Table 1 shows the average values of "external" balance before and after treatment, as well as the values of their changes (shown in millimeters). It should be noted that according to the requirements of Ilyin's motor technique, the indicators of the quantities of shortenings before and after treatment in Table 1 are defined as the sums of shortenings for five movements on small amplitudes and five movements on large amplitudes (it would be more correct to speak about segments, the results of their measurements — in millimeters, however, in his work N.Yu. Oganesyan uses

the term “amplitude”). Table 1 shows that in both groups there is a marked prevalence of shortenings on small and large amplitudes, indicating a significant prevalence in all 120 patients, as before and after the course of treatment, of inhibition processes over excitation processes by their magnitude. Comparison of the two groups on indicators of shortenings on small and large amplitudes allowed Oganesyan to conclude on the effectiveness of dance therapy in improving the condition of patients with the diagnosis ”psychotic disorders of the schizophrenic spectrum.” It should be noted that similar conclusions were also drawn from the analysis of other methods and techniques used in this study. For example, the author noted that “...the average value on both small and large amplitudes decreased statistically significantly in group 1 and rose slightly in group 2 (p=0.001)), indicating the tendency to harmonize external balance in the main group (probably as a result of dance therapy), and the reverse of this trend in group 2, whose patients received only traditional treatment” (Oganesyan 2005, p. 112).

In the study, N.Yu. Oganesyan stressed that “As a result of the use of dance therapy for psychotic patients, motor functions and spatial imagination improve, self-esteem increases, anxiety decreases, concentration of attention at the bodily level and communication abilities improve, emotional and bodily expression increases” (Oganesyan 2005, p. 170). It is important to note here that both before and after dance therapy in none of the patients in groups 1 and 2 in Oganesyan's study there was not a single case where any patient was characterized by the property of “external” balance as “balanced”, and especially as — “excitation over inhibition prevails”. This is an essential fact in the substantiation of our stated Method of assessment of individuals' predisposition to psychotic disorders of the schizophrenic spectrum.

For our purposes, we introduce the concept of “integral indicator” (denoted as N) and note that in Table 1 it consists of two sums (in millimeters): 1) shortenings on small amplitudes and 2) shortenings on large amplitudes. In group 1, both before and at the end of dance therapy, N values were, respectively, 38.2+73.9=112.1 mm and 15.6+29.0=44.6 mm, where the average spread of N indicators was, respectively, 6.8 mm and 4.2 mm. In group 2, which did not undergo dance therapy, integral indicators of shortenings before and after treatment were, respectively, 36.7+69.5=106.2 mm and 41.3+72.5=113.8 mm, and the spread of N indicators was respectively — 8.5 mm and 7.5 mm. The integrated indicators of shortenings for groups 1 and 2 will also be presented below in Table 2.

In order to substantiate the Method, it is important to focus on the main facts obtained in the experimental study of N.Yu. Oganesyan:

1) all 120 patients with psychotic disorders of schizophrenic spectrum who were treated in a rehabilitation unit in a psychiatric hospital and took part in experiments, were characterized in a stable way by the preponderance of inhibition processes over excitation processes according to the property of “external” balance measured by the motor method by E.P. Ilyin;

2) for the entire period of the study there was no case where the property “external” balance in a particular patient was characterized by the typological feature “balance” as per the property of “external” balance, and moreover, “the preponderance of excitation over inhibition”.

3) integral N indicator, which characterizes the degree of preponderance of inhibition processes over excitation processes, in group 1 of patients receiving dance therapy, before therapy began amounted to — 112.1±6.8 mm and after therapy to — 44.6±4.2 mm. In the group of patients who did not receive dance therapy, the integral N indicator, as the degree of preponderance of inhibition over excitation, was, respectively, 106.2±8.5 mm and 113.8±7.5 mm per the same period of treatment in hospital.

4) reduction of the integral N indicator during the treatment of patients with psychotic disorders of the schizophrenic spectrum, can be used as a marker of the effectiveness of the treatment methods used (in point 3 in group 1 before dance therapy N= 112.1±6.8 mm, after - N= 44.6±4.2 mm (all N values are in millimeters).

We know the results of experimental studies conducted by us in several age groups: students of general education school (from grades 1 to 11, sample — 1595), students of different departments of a university (sample — 352 people, average age — 22.3 years old), as well as representatives (sample — 255 people) from different spheres of professional activity (Drozdovski 2008, 2017, 2018). The total sample of subjects for whom we know indicators of “external” balance of nerve processes measured on the basis of Ilyin's motor method was 2202 people.

In accordance with the tasks of substantiating the objectivity of the proposed Method for estimating individuals' predisposition to psychotic disorders, the total sample was divided into four experimental groups: junior students (grade 1-3, age 6-10, sample - 344 people); secondary students (grades 5-8, age 11-14, 861 people); senior students (grades 9-11, age 15-17, 390 people); adults subjects (older than 18 years, sample - 607 people). The group of adult subjects was formed from students of a university (sample — 352 people, average age — 22.3 years old) and representatives of different professions (sample — 255 people).

As was already noted, Ilyin's motor method for measuring “external” balance allow to identify three typological groups among the tested subjects: 1) excitation processes prevail over inhibition processes; 2) inhibition prevails over excitation; 3) relative equilibrium of excitation and inhibition processes by their magnitude.

Since according to the results of the study by N.Yu. Oganesyan we know that all 120 subjects diagnosed with “psychotic disorders of schizophrenic spectrum” were characterized, both before and after treatment, by the preponderance of inhibition by the “external” balance property, in each of the four experimental groups we identified the subjects in whom the “external” balance property when measuring by the motor method by Ilyin, was also characterized as “preponderance of inhibition processes”. The proportion of such subjects in each of the experimental groups was: junior students, 26.4 per cent; secondary students, 27.3 per cent; senior students, 24.5 per cent; adult subjects, 26.0 per cent. It follows that the proportion of subjects with the “preponderance of inhibition

processes" in different age experimental groups is about the same order.

In these experimental groups, the integral indicator (N, in millimeters) was also determined, characterizing the degree of preponderance of inhibition processes over excitation processes by the property of "external" balance, as well as the value of N spread (standard deviation ±n from the average value). Values (N±n) for the three groups of students of general education schools (ages 6 to 17), for the group of adult subjects (over 18 years), and for patients of group 1 (they underwent dance therapy) and group 2 (treatment without dance therapy) are reflected in Table 2.

Table 2: Integral indicators (N) of the preponderance of inhibition as per the "external" balance (in millimeters) in four experimental groups (schoolchildren and adults), as well as in the main (group 1, where dance therapy was used) and in control (group 2, therapy not used) groups of patients with diagnoses (before and after treatment)

Groups of subjects (age)		Sample (people)	Integral indicator, spread N±n, mm	Indicator of preponderance of inhibition within +1n, N+1n, mm	Criteria of predisposition to disorder > N+2n, mm
Junior grades (6-10 years)		91	85.6±40.6	126.2	>166.8
Middle grades (11-14 years))		235	63.2±29.7	92.9	>122.6
Senior grades (15-17 years)		95	54.6±28.4	83.1	>111.4
Adults (over 18 years)		158	52.3±29.0	81.3	>110.3
Group 1	before therapy	90	112.1±6.8	range for N: 105.3 —119.9	
	after therapy		45.6±4.2	range for N: not taken into account	
Group 2	before treatment	30	106.2±8.5	range for N: 97.7 — 114.7	
	after treatment		113.8±7.5	range for N: 106.3 — 121.3	

Table 2 shows that the integral indicators (N) consisting of the sum of shortenings in five small and the sum of shortenings in five large segments, which characterize the degree of preponderance of inhibition processes over excitation processes as per the "external" balance property, in three groups of subjects (students of 5-8, 9-11 grades, adults), are close in magnitude. Slightly larger values of this indicator (85.6 mm) and standard deviation (±n=40.6 mm) in the "junior grades" group (grades 1-3), relative to other age groups can be explained by the fact that at the age of 6-10 the process of forming thin motor skills has not yet been completed. Table 2 also shows that in group 1 before dance therapy N=113.1 mm and in group 2 before treatment N=106.2 mm and after treatment without dance therapy N=113.8 mm, that is, N values are much higher than in three groups of school students and adult tested subjects. It is also significant that all tested subjects from the five groups presented in Table 2 are characterized by the preponderance of inhibition as per the "external" balance property, however, in the tested subjects of groups 1 and 2, patients of an inpatient hospital with psychotic disorders of schizophrenic spectrum, the preponderance of inhibition processes is significantly stronger.

Table 2 also shows the range of changes in N: in group 1 before treatment, it ranges from 105.3 mm to 119.9 mm (N range after treatment is not taken into account here), and in group 2 the N indicator varies from 97.7 mm to 114.7 mm (before treatment) and from 106.3 mm to 121.3 mm (after treatment). It is to these ranges that integral indicators with an addition of two standard deviations (N+2n) in experimental groups of schoolchildren and adults are approximated. This fact allows to establish criteria for estimating the predisposition of individuals, taking into account their age, to psychotic disorders of schizophrenic spectrum, if the indicator of the preponderance of inhibition as per the "external" balance property will be greater than N+2n values (in millimeters):

1. for junior schoolchildren (grade 1-3, age 6-10) — more than 166.8 mm;
2. for students of middle classes (grade 5-8, age 11-14) — more than 122.6 mm;
3. for high school students (grade 9-11, age 15-17) — more than 111.4 mm;
4. for adults (over 18 years of age) — greater than 110.3 mm.

Thus, Table 2 presents a differentiated scale of criteria for estimating the predisposition of individuals to psychotic disorders of schizophrenic spectrum, where their age peculiarities are taken into account. It should be noted that among the total number of students and adults (sample of 2202 people) who took part in the study, 25 people were assigned to the category "predisposed to psychotic disorders of schizophrenic spectrum", postfactum. Consequently, the incidence of individuals with this type of disorder in the total sample was 1.1%, which is virtually the same as known data for the human population (0.8 -0.9%).

Discussion

Table 1 shows the decrease in the integral indicator (N, in millimeters) of the "external" balance in group 1: before dance therapy N= 112.1±6.8 mm, after - N= 44.6±4.2 mm. This fact shows that under the influence of dance therapy in this group of patients, the severity of inhibition processes as per the "external" balance property has significantly decreased, and although it is still characterized by "the preponderance of inhibition over excitation", but already within the average "norm" N =52,3±29.0 mm, which is characteristic of age category over 18 years of age (see Table 2). As already noted, the use of dance therapy in psychotic patients has improved motor functions, spatial imagination, concentration on the bodily level, communication abilities, increased emotional and bodily expression, decreased anxiety, increased self-esteem. If you try from a scientific position to explain the effectiveness of dance therapy in the rehabilitation of psychotic disorders of schizophrenic spectrum, you will need to consider that in the study of N.Yu. Oganesyan the value of the "internal" balance was not measured, and it will also be necessary to pay attention to the following.

Firstly, onthe thematic plan of 10 sessions of complex dance therapy conducted in group 1, which includes the following highlights, performing psychotherapeutic function (Oganesyan 2005, p.76-77):

1. Corrective gymnastics, the task of which is to prepare the body for dance, to promote the removal of muscle cramps.
2. Dance, which carries a leading role in the session, reveals emotions and bodily freedom of expression, actualizes and

enhances communication functions, is a platform for the catharsic response of intra-personal problems of patients. The functions of nonverbal catharsis are: the function of catharsic release of individually-constrained emotions, including socially undesirable ones; the function of motor-rhythmic energy release; the function of self-regulation as the result of the first two.

3. Relaxation, which has the function of autotraining necessary in dance therapy to enhance the reaction of emotions in the imagination and rest after the dance part.
4. Drawing images of relaxation followed by a story that fulfills a psychotherapeutic role and allows the verbalisation of experiences during dance and relaxation.

So, the key points in paragraphs 1-4 are: dance as a form of motor activity and relaxation as a form of rest after dance.

Secondly, let's pay attention to the facts of manifestation of properties of "external" and "internal" balance identified by E.P. Ilyin (Ilyin, 2001):

5) there are observed changes in the "external" balance measured in the tested subjects in the state of hypnosis or immediately after awakening at night, compared to the daily indicators in the state of calm wakefulness, where the tested subjects, both with the preponderance of excitation and with the preponderance of inhibition according to the "external" balance during the day, in the state of hypnosis or immediately after the night awakening, were characterized by "balance";

6) when a person's motor activity decreases the degree of preponderance of excitation over inhibition as per the "internal" balance property, and when meeting the need for motor activity — internal excitation decreases;

7) in some human conditions (monotony, mental absorption) the shifts on the properties "external" and "internal" balance are divergent (reciprocal relations), thus the shift of the "external" balance towards excitation corresponds to the shift of the "internal" balance towards inhibition, and the shift of the "external" balance towards inhibition corresponds to shift of "internal" balance towards excitation.

So, the key points in paragraphs 5-7 are: a) dream-like states (sleep, hypnosis); b) an increase in the individual's motor activity causes a decrease in the degree of preponderance of inhibition processes over excitation as per the "external" balance property. Generalizing the things noted in paragraphs 1-7, it is possible, from the standpoint of known scientific facts, to explain the effect of the positive influence of dance therapy in rehabilitation of psychotic disorders of schizophrenic spectrum: dance as a form of motor activity and relaxation as rest after dance, cause a marked decrease in the degree of preponderance of inhibition processes over excitation processes, which leads to a marked improvement in the condition of the patient.

The distinctive feature of the Method proposed by us for preventive estimation of the individual's predisposition to psychotic disorders of schizophrenic spectrum on the basis of measurement of nerve balance processes, is:

1. does not require large time costs (no more than 8-10 minutes per tested subject);
2. is used without the application of any test tasks traditional for psychology offered to the tested subject;
3. does not depend on personal preferences and subjective influence on the results of diagnostics by the person conducting examination;
4. allows to implement an individual approach to prescribing antipsychotic drugs, ensuring the accuracy and objectivity of evaluation of the effectiveness of treatment at the early stages of therapy, contributing to a timely change in therapeutic tactics;
5. can be carried out by both a psychiatrist and a medical psychologist without the use of expensive equipment and consumables.

Taking into account the fact that the motor method by E.P. Ilyin for measuring the properties of the nervous system is already implemented on the basis of mobile devices (tablets), there are no restrictions on the number of individuals for whom the predisposition to psychotic disorders of schizophrenic spectrum can be evaluated in a wide age range.

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