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THE NEUROPSYCHOLOGICAL ASSESSMENT IN TAEKWONDO. A CASE STUDY

Evaluarea neuropsihologică în Taekwondo. Studiu de caz

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Rezumat. Scopul studiului de caz prezentat constă în investigarea concretă a dezvoltării neuropsihologice în perioada copilăriei mijlocii, în vederea realizării unei diagnoze cu privire la implicațiile practicării taekwondo-ului asupra funcțiilor neuropsihologice. Subiectul studiului de caz este un copil, de gen masculin, cu vârsta de 11 ani la data examinării. Pentru realizarea scopului propus, a fost utilizată bateria de teste NEPSY: A Development Neuropsychological Assessment for the Romanian population. Au fost utilizate testele din patru domenii ale dezvoltării neuropsihologice, cu următoarele subteste: din domeniul Atenție/Funcții Executive a fost folosit subtestul Turnul; din domeniul Limbaj, au fost folosite subtestele: Procesarea Fonologică; Numirea Rapidă; Înțelegerea Instrucțiunilor; Precizia Vizuomotorie; din domeniul Procesare Vizuospațială, au fost folosite subtestele: Copierea Desenului; Săgeți; Construcția din Cuburi; Găsirea Drumului; din domeniul Memorie și Învățare: Memoria Fețelor; Memoria Numelor; Învățarea Listei. Rezultatele subiectului în urma evaluării îl plasează la nivelul așteptat sau peste nivelul așteptat la toate cele patru domenii ale dezvoltării neuropsihologice. Considerăm că rezultatele acestui studiu pot constitui ipoteze ce pot fi testate prin studii ulterioare. Totodată, considerăm necesar ca selecția copiilor spre practicarea taekwondo-ului să se bazeze și pe evaluarea lor neuropsihologică, alături de testele specifice din taekwondo.

Cuvinte-cheie: evaluare neuropsihologică; taekwondo; copilăria mijlocie

Abstract. The purpose of the case study presented consists of concretely investigating the neuropsychological development in middle childhood period, in order to make a diagnosis regarding the implications of taekwondo practice on the neuropsychological functions. The subject of the case study is a child, male gender, aged 11 years on the date of the examination. To achieve the purpose proposed, it was used the NEPSY test battery: A Developmental Neuropsychological Assessment for the Romanian population. There were used tests from four domains of neuropsychological development, with the following subtests: from the domain of Attention/ Executive Functions, the "Tower" subtest; from the domain of Language, the subtests: Phonological Processing; Speeded Naming; Comprehension of Instructions; Visuomotor Precision; from the domain of Visuospatial Processing, the subtests: Design Copying; Arrows; Block Construction; Route Finding; from the domain of Memory and Learning: Memory for Faces; Memory for Names; List Memory. The subject's results after assessment place him above the expected level above the expected level in all four domains of neuropsychological development. We consider that the results of this study may represent a hypothesis which can be tested through further research. At the same time, we consider that the selection of children for the taekwondo practice should also be based on their neuropsychological assessment, together with the taekwondo-specific tests.

Keywords: neuropsychological assessment; taekwondo; middle childhood

Introduction

Middle childhood refers to the years between early childhood and adolescence; in other words, between approximately six and twelve years of age. It is a time of significant emotional, social, cognitive and physical development. In middle childhood, children strive to achieve competence, autonomy and to relate to others (*Middle childhood: Taking action together*, 2004: 9). The first change highlighted in this stage is the general orientation aspect. On this plane, there is an abandonment of interests from the preschool period, such as drawing or moulding. From this reason, the young schoolchild's products in these fields become less spontaneous, full of erasures. According to some specialists, the age of 7 years would be a kind of "eraser age", which emphasises the increase of critical spirit. It is the age when the children's preferences, on different planes, start changing; they begin to like better the biographies, legends, arithmetic lessons than the other lessons. Their interest in movies, cinematography and television becomes more obvious. After the age of 9, they start being interested in storybooks with exciting actions. Also during the early school age, a true "delirium of collecting" occurs (children collect picture cards, stamps, plants, leaves, pigeons, bunnies, insects, etc.). This expression of the personality ("collecting" things) highlights the inner need for reunification and classification. The small collections allow extracting the differential characteristics of comparable objects. Towards the 3rd and 4th grades, children become miniature geographers, botanists, zoologists, which represents an index for the clear expansion and decentralisation in the child's universe, on the mental and affective planes (Albu, 2007: 55).

In this context, early education provided by school and family leaves its mark on the children's subsequent development. According to Piaget's theory, at the age of 7 years, children enter the stage of concrete operations,

where they can use mental operations, such as reasoning, to solve real (concrete) problems. In this stage, children are capable of logical thinking, because they can take into account many aspects of a given situation. But their thought continues to be limited by the real situations of the type “here and now”. In this stage, of the concrete operations, children understand better than those in the preoperational stage the spatial concepts, as well as the concepts of causality, classification, inductive and deductive reasoning, conservation and number (Papalia, Olds and Feldman, 2010: 292).

The aim of the case study presented consists of concretely investigating the neuropsychological development in middle childhood period, in order to make a diagnosis regarding the implications of taekwondo practice on the neuropsychological functions.

At the individual assessment level, the present study has the following objectives:

- obtaining an integrative and contextual interpretation of performance, in order to describe a coherent picture of neuropsychological functioning;
- providing some viable suggestions, resulted from this assessment, in order to create a profile necessary for the selection of children who want to practice taekwondo.

Material and method

Neuropsychological test battery

For the neuropsychological assessment, it was used the NEPSY battery, A Developmental Neuropsychological Assessment, which is a recently developed instrument that endeavours to provide a comprehensive neuropsychological assessment of children aged 3 to 12 years (Korkman, Kirk and Kemp, 1998, apud Schmitt and Wodrich, 2004). The NEPSY battery contains many neuropsychological subtests that can be used in different combinations and that assess the neuropsychological development in five functional domains: Attention/Executive Functions; Language; Sensorimotor Functions; Visuospatial Processing; Memory and Learning. The results of the assessment are expressed in standardized scores (scaled scores) or centiles, which can be integrated in a performance profile. In the case study presented, we used the scaled scores of the results.

To achieve the aim proposed, we used the tests from the following domains of neuropsychological development:

- from the domain of *Attention/Executive Function*, it was used the *Tower* subtest, which assesses the executive functions of planning, monitoring, self-regulation and problem-solving.
- from the domain of *Language*, the following subtests were used:
 - *Phonological Processing*- it assesses the capacity to identify words from sequences of words and to form an auditory gestalt, as well as the phonological segmentation at the level of fragments of words (syllables) and at the level of sounds corresponding to letters;
 - *Speeded Naming*- it assesses the ability to quickly name familiar words. The child had to name rapidly the geometrical shapes, by indicating their form, size and colour;
 - *Comprehension of Instructions*- it assesses the ability to process and quickly respond to increasingly complex verbal instructions;
 - *Visuomotor Precision*- it assesses the fine motor speed, as well as the precision of eye-hand coordination, the child having to draw a line within a given route in the shortest possible time.
- from the domain of *Visuospatial Processing*, the following subtests were used:
 - *Design Copying*- it assesses the ability of visuomotor integration;
 - *Arrows*- it assesses the child's ability to establish the orientation of a line;
 - *Block Construction*- it assesses the ability to reproduce three-dimensional constructions after a model or a picture;
 - *Route Finding*- it assesses the knowledge of visuospatial relations and directionality, as well as the ability to use this knowledge in order to transfer a route from a map.
- from the domain of *Memory and Learning*, the following subtests were used:

- *Memory for Faces*- it assesses the ability to recognise faces. The child had to identify whether the faces from the Manual of Stimuli were a boy or a girl. Subsequently, he had to recognise those faces out of sequences of three each. Delayed Memory of the faces was applied 30 minutes after, the child's task being to recognize the faces presented previously;
- *Memory for Names*- it assesses the ability to memorize names. The child was shown eight pictures of some children that he had to keep in mind. Delayed Memory of the names was applied 30 minutes after, the child's task being to tell the names of the children in the sequence presented by the examiner;
- *List Memory* - it assesses the capacity to remember and reproduce a list of words. The child learned a list of 15 words that he repeated five times. After this stage, he was presented an inference list, and then the child had to repeat the first list. 30 minutes later, the child reproduced the first list of words. It was recorded the number of words that he was able to recall from the first list.

Design of the case study

The question from which we have started this case study was: *Which are the main neuropsychological domains the practice of taekwondo is based on?* This type of interrogation represents a justifying principle to achieve an explorative case study, its purpose being to develop pertinent hypotheses that can be checked through subsequent experimental research.

Case: Teodor P., 11 years old

Teodor P., right-handed, aged 11 years on the date of the assessment, a pupil in the 5th grade, lives with his parents, younger brother and grandmother. From the discussion with his mother and also from the forms filled in, no problems in the family's history or the child's background have been revealed. Teodor P. is an active child, who has been practicing taekwondo within an organized system since the age of 5. The frequency of training sessions was 2 times a week, with a break during the school holidays. In the competitive period, the training sessions had a frequency of 3 times a week. Each training session had a length of 60 minutes. At the time of the examination, the child was healthy, from the clinical point of view, without having ever presented some clinical or neurological disorder susceptible to endanger his psychic functions.

Results

Qualitative observations during the assessment

The qualitative observations are rigorously quantified for each set of the NEPSY battery, in order to compare it with some results and enable the specialist to achieve the quantitative assessment (Visu-Petra, 2008, p. 90). Teodor P. was accompanied by his mother at the testing, was cooperative with the examiners and responded to their requirements whenever necessary. During the assessment, Teodor P. proved attention, concentration, ambition and motivation in the test solving. He was very satisfied with finding that he could solve the *Tower* task earlier than the time imposed. During the assessment, he asked a 5-minute break to drink some water and relax. Testing took place within the Psychology Laboratory of the Bucharest National University of Physical Education and Sports and was conducted by a specialist.

Neuropsychological profile

The assessment was carefully conducted, within one single session that lasted 90 minutes. The neuropsychological profile of Teodor P., at the NEPSY test battery in the four domains submitted to assessment, is shown in Figure 1. The scores are scaled. The maximum score that can be reached is 20.

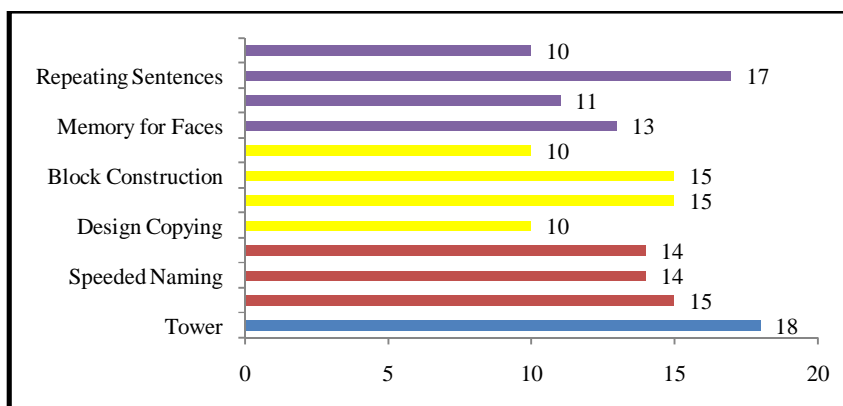


Fig.1. Teodor P. Performance in the NEPSY tasks

Discussions and conclusions

The assessment using the NEPSY battery provides further information important to the neuropsychological status of Teodor P. In the following lines, we shall analyse and discuss the assessment results on the four developmental domains.

As regards the domain of *Attention/ Executive Functions*, it is essential for achieving complex behaviours; these functions are involved in controlling attention, motor and cognitive inhibition, and planning at the level of superior functions. The *Tower* subtest measures the abilities of nonverbal assessment and problem-solving. The good performances (above the expected level) obtained by Teodor P. at this subtest emphasize a very good capacity of the child to generate new solutions and strategies in solving some problems. This capacity is essential to the practice of taekwondo, due to the heuristic character of this sport.

At the *Language* level, the child was assessed at the three subtests: *Phonological Processing*; *Speeded Naming and Comprehension of Instructions*. Language refers to the capacity to use words (=lexicon), to combine them coherently (= syntax), as well as to understand verbal messages. The scores obtained by Teodor P. at the three subtests are above the expected level. This thing is correlated with the child's high abilities to communicate and solve the problems specific to taekwondo, because, in taekwondo, it is used a Korean-specific terminology which any practitioner must learn. According to the scores obtained, Teodor P. has no difficulties in the comprehension of language, he integrates positively the Korean language and he solves problems in compliance with the instructions.

At the level of *Visuospatial Processing*, Teodor P. was assessed at the four subtests: *Design Copying*, *Arrows*, *Block Construction* and *Route Finding*. The score obtained for the design copying (10 points) places the child at the expected level, which highlights that he has a good ability of the fine motor coordination. Concerning the qualitative observations made during the subtest performing, the following aspects have been noticed: he plans the reproduction of each figure and analyses it by dividing it in background figures and detail figures; he calculates with patience the distance between lines, he tries to reproduce the design as correctly as possible. The scores achieved at the other three subtests place the child above the expected level, according to the NEPSY scale. The high development level of his visuospatial functions indicates a high capacity to integrate and coordinate the spatial information; he has a good capacity to estimate direction, angularity and orientation of the lines. These abilities of the child are correlated significantly to the spatial-temporal characteristics required by the execution of taekwondo techniques. We mention that taekwondo is a dynamic sport, in which all technical elements are accurately executed, in both time and space.

Regarding the domain of *Memory and Learning*, Teodor P. has covered all its subtests. The scaled score of 13, obtained at the *Memory for Faces*, places him above the expected level. This score proves a high ability to recognize the faces of those around him. The scaled score of 11, obtained at the *Memory for Names*, places him at the expected level, according to the NEPSY scale. Recalling the faces and names is a usual part of the children's daily experience. Recognizing or memorising the faces starts since the early childhood period and continues during childhood and adolescence. However, the younger children's strategies to identify faces that are not familiar to them differ from those of the older children; children under 10 use, for identifying faces that are not familiar to them, details such as: obvious traits, hairstyles, glasses; older children and adults adopt a holistic,

configuration-related strategy (Korkman, Kirk and Kemp, 2007). The result of 20 for the *Narrative Memory*, through the maximum number of points obtained, places him *above the expected level*, according to the NEPSY scale. As to the *List Memory*, Teodor P. has achieved a scaled score of 10, which situates him at the expected level, compared to the population mean. In conclusion, the results obtained by the subject for the domain of *Memory and Learning* are correlated significantly with the particularities demanded by the taekwondo Poomsae. Poomsae represents a series of parries and attacks combined rationally and always performed in the same succession and directions. During the execution of a Poomsae, the practitioner uses the offense and defence techniques against an imaginary opponent who attacks from multiple directions (Păunescu, 2007: 23).

To conclude, we consider that the results of this case study may represent the premises for future research that can be tested through empirical studies. The initial selection of children using the neuropsychological assessment stands for a scientific argument which may be at the basis of sports performances. Following the study results, we recommend the development of neuropsychological abilities by means of the taekwondo-specific exercises.

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THE INFLUENCE OF BODYBUILDING EXERCISES ON STRENGTH DEVELOPMENT

Influența exercițiilor de culturism asupra dezvoltării forței

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Rezumat. Scopul prezentei cercetări este de a identifica efectele pe care exercițiile specifice culturismului și fitnessului le au asupra capacității condiționale "forța", în rândul a 22 de studenți (cu vârste cuprinse între 19-20 de ani). Astfel, timp de 6 luni, subiecții au participat, în cadrul orei de educație fizică, la programe de culturism și fitness, unde au fost aplicate cu precădere exerciții de bază (multiarticulare). Culturismul și fitnessul dispun de exerciții fizice specifice, a căror acțiune este segmentară și localizată strict asupra grupelor sau mușchilor interesați, acțiunea acestora fiind în special asupra forței musculare. Subiecții au fost testați înainte și după aplicarea programelor de lucru, testele vizând forța la nivelul membrilor superioare, inferioare și la nivel abdominal. Eficiența programelor aplicate a fost validată de rezultatele testelor efectuate, diferențele mediilor inițiale și finale fiind semnificative la un prag $p < 0.05$.

Cuvinte-cheie: culturism, forță, studenți.

Abstract. The purpose of this research is to identify the effects of exercises specific to bodybuilding and fitness on the conditional capacity of "strength", among 22 students (aged between 19 and 20 years). Thus, for 6 months, the subjects participated, during the physical education classes, in bodybuilding and fitness programmes that mainly used basic (multiarticular) exercises. Bodybuilding and fitness encompass specific physical exercises whose action is segmentary and localized strictly on the groups or the muscle concerned, their action being exerted particularly on the muscle strength. The subjects were tested before and after applying the work programmes, the tests pertaining to the strength at the level of upper and lower limbs, but also at the abdominal level. The efficiency of the programmes applied was validated by the results of the tests performed, the differences between initial and final means being significant at a threshold of $p < 0.05$.

Keywords: bodybuilding, strength, students.

Introduction

Physical shape is considered an indicator of youth and vitality, and, consequently, it is sought after and appreciated in both the professional and the daily life. A body shaped according to some models existing in a certain period of the society's evolution is desirable for most of individuals. This aspect can be reached through the physical exercise, which may intervene with objective stimuli on some corporal segments or on the whole body.

The effects of movement on the individual are expressed through a substantial contribution to developing and maintaining the functional capacities, preserving the body's structures and limiting their deterioration due to the aging and the lack of stimulation. They are materialized in: power, strength and local endurance at the muscle level, agility, coordination, balance, speed - characteristic to a good motricity, the structure and functions of joints, flexibility, bone density at the osteoarticular apparatus level, aerobic capacity and endurance at the level of cardiorespiratory function, carbohydrate and lipid metabolism. The effects aforementioned are obtained in all the people, regardless of their age, either they are healthy or suffering from chronic diseases or different disorders.

Placing the movement, the human activity in an educational context has, as an argumentative basis, the close connections it develops, together with those related to the gross biological functions, the psychic processes and especially the cognitive ones (Neagu, 2010: 19).

O'Donovan *et al.* (2010) recommend for a healthy adult to perform at least 150 minutes of physical activity with a moderate aerobic effort every week or at least 75 minutes at high intensity. Weight training, circuit and other exercises complementary to the aerobic activity are preferable. At the same time, to keep their physical fitness, the persons who have already gone beyond the initiation threshold and are practicing sports for at least 6 months, may obtain health-related benefits by performing physical activities for 300 minutes a week, at moderate intensity. Weight exercises, which are recommended twice a week, may improve the muscle elasticity.

"The specificity of bodybuilding is that, through a system of exercises performed with different loads (dumbbells, barbells) and by means of some special machines, it develops a healthy, vigorous, strong, beautiful body, with harmonious and proportioned, visibly shaped and well embossed muscles" (Székely, 1992: 5-6).

Due to the extremely wide range of exercises, to the possibility of engaging the muscle groups separately, individually, and to the methodology easily adaptable to the requirements specific to diverse sports disciplines, bodybuilding has multiple directions of application.

The practice of bodybuilding does not require particular aptitudes, exceptional motor qualities or an age limit. Because the exercises are executed with barbells and different machines for the strength development, at which the load and, consequently, the physical effort can be dosed very subtly and accurately, body building is accessible not only to those born strong, but also to those with a deficit of muscular strength, inclusively to adolescents, elderly men and women (Székely, 1992: 5-6).

Strength has an important role in the development of performance capacity and in stimulating the growth and physical development processes. The passive support apparatus must not bear interactions and high pressures, but, at the same time, the stimuli administered gradually lead to adaptations in the very structure of bones, therefore training can be done in all the life stages, but carefully.

Exercises specific to bodybuilding have in their structure a wide range of movements, either fundamental ones or of isolation, they being performed in a repetitive system.

The method of working in series and with repetitions represents the basic method of the whole training system in bodybuilding. Repetition is called the execution with no break of a complete movement characteristic to a certain exercise. The series or round refers to the sum of consecutive repetitions within the same exercise, ended with a break (Székely, 1981: 129).

Material and method

The purpose of this research is to validate attractive work programmes that have in their structure means specific to bodybuilding and fitness, and to identify their impact on the strength at the level of upper and lower limbs, but also at the abdominal level.

Thus, for 6 months, 22 subjects (19 ± 1.5 years old), males, participated in fitness and bodybuilding lessons on a weekly basis, each session with a 60-minute duration, they being tested before applying the work programmes (T1) and at the end of the experiment (T2), by monitoring the progress recorded. The work programmes were individualized depending on the weight, necessity and previous motor experience of each subject, by mainly using basic (multiarticular) exercises. The number of repetitions was realized in a controlled manner, permanently under the concentration state and the instructor's supervision.

The tests consisted of:

- 1) Standing long jump (cm) – two jumps were executed and the best performance was recorded.
- 2) Arm bending and stretching from lying position with support (30s – number of repetitions).
- 3) Trunk raising upright from lying position, for 30s/number of repetitions.
- 4) **Finding the maximum strength (1RM), by means of the MaxLoad Calculator formula (Brzycki's equation)** (Brzycki, 1993; Mackenzie, 2000).

The method starts from the correlation existing between the number of repetitions executed and the percent of RM used, by obtaining thus the RM value according to Brzycki's formula: $1RM = \text{load} / 1.0278 - (0.0278 \times \text{reps})$ (Baechle, Earle and Wathen, 2000),

where: load = weight used at the machine; reps = number of repetitions

The protocol for the test administration includes: an initial warm-up phase and short duration stretching.

- an execution of repetitions with a maximal and constant amplitude (the method repeatability is very important);
- a constant speed (generally 2 seconds for each repetition);
- a correct breathing;
- a load that allows a maximum of 12 repetitions (the margin is between 6 and 12).

The test ends when the subject does not perform any repetition or when this is done incorrectly.

Statistical analysis

Data are presented as a group mean with standard deviation, standard error mean, minimum and maximum values and coefficient of variation. We use the Statistical Package for Social Science, version 16.0, to determine

whether the statistical difference is significant between pre and post intervention. The significance level was set at $p < 0.05$.

Results

Table 1. Results at the motor testing T1 and T2

Indicators	Abdominal strength T1	Abdominal strength T2	Arm strength T1	Arm strength T2	Lower limb strength T1	Lower limb strength T2
Mean	21.67	27.70	18.15	22.11	1.94	2.09
Standard dev.	7.85	5.48	4.58	4.04	0.15	0.16
Min. value	10	22	10	13	1.6	1.82
Max. value	36	38	26	29	2.25	2.4
Amplitude	26	16	16	16	0.65	0.58
Cv	36.25	19.79	25.24	18.28	7.93	7.71

The difference between initial mean and final mean in the abdominal strength testing is 6.03 repetitions, the progress recorded in the final testing being of 27.82%, a gain which is due to the participation in our experiment, where the means applied predominantly aimed at the abdominal region. At the same time, in the final testing it is observed a homogenization of the values recorded, the coefficient of variation decreasing from 36.25% in the first testing to 19.79% in the second one.

The average value of strength at the abdominal level, in the initial testing and final testing, differs significantly ($t = -10.057$, $df = 21$, bidirectional $p = 0.0001$), which fosters the evolution of our approach, the abdominal strength being strongly influenced by the work programmes applied to the students (Table 1). The difference between initial mean and final mean in the strength testing at the level of upper limbs is 3.96 repetitions, the progress in the final testing being of 21.81%. The coefficient of variation indicates a homogenization of the group in the final testing. The average value of strength at the level of upper limbs, in the initial testing and final testing, differs significantly ($t = -17.758$, $df = 21$, bidirectional $p = 0.0001$), which demonstrates the fact that the exercises specific to bodybuilding applied to the subjects have improved strength at the arm level (Table 2).

The difference between initial mean and final mean in the strength testing at the level of lower limbs is 15cm, the progress in the final testing being of 7.73%. The coefficient of variation indicates a very homogeneous group in both testing phases. The average value of strength at the level of lower limbs, in the initial testing and final testing, differs significantly ($t = -13.929$, $df = 21$, bidirectional $p = 0.0001$), the means applied improving strength in this segment (Table 1).

Table 2. Significance of the difference between the means T1 and T2

	Mean of the differences	T	Significance
Abdomen T1-T2	6.03	-10.057	0.0001*
Upper limbs T1-T2	3.96	-17.758	0.0001*
Lower limbs T1-T2	0.15	-13.929	0.0001*

* $p < 0.05$

Table 3. Results for the MaxLoad T1 and T2

Indicators	MaxLoad T1	MaxLoad T2
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Mean	46.46	52.28
Standard dev.	10.17	10.00
Min. value	31.69	40.33
Max. value	72.02	72.02
Amplitude	40.33	31.69
Cv	21.88	19.14

The difference between initial mean and final mean in the MaxLoad test is 5.81, the progress in the final testing being of 12.50%, the increase of maximum load for one repetition being obvious after practicing the exercises specific to bodybuilding (Table 3).

Table 4. Significance of the difference between the means It and Ft

	Mean of the differences	T	Significance
It-Ft	5.81	-11.344	0.0001*

* $p < 0.05$

The average value of the MaxLoad test, in the initial testing and final testing, differs significantly ($t = -11.344$, $df = 21$, bidirectional $p = 0.0001$), the exercises performed contributing significantly to strength improvement.

It is noticed the fact that the work programmes used, which are based on bodybuilding-specific exercises, have contributed to the strength development at the level of upper limbs, abdomen and lower limbs, the progress recorded validating the efficiency of their application within our research.

Discussions and conclusions

The exercises applied have had for effect not only the development of muscle strength, but also corporal modifications have been observed, the programmes contributing to remodelling the subjects' body. This remodelling may also have beneficial effects on the students' attitude towards the physical exercise, they expressing their desire to continue the activity in the fitness gym. The bodily aspect, together with a harmonious execution of movements, has always represented an aspiration for all the individuals, regardless of their gender, being a value rewarded and praised since the oldest times. However, there is a big difference between the age categories that perform movement, according to a study made in Great Britain (Roth, 2009), which reveals the fact that women are less active than men in all age categories. Averaging, 53% of the men and 35% of the women aged between 16 and 24 years practice physical activities at least 30 minutes in at least 5 days/week. Our research has fulfilled its purpose, strength being positively influenced by the bodybuilding and fitness exercises applied to the subjects. This is an important gain, strength being considered as one of the most important capacities that greatly influence the manifestation of all motor components. It is expressed at the body's level through its capacity to achieve efforts based on the muscular contraction (Macovei, 2011). It represents the capacity to overcome an external resistance or to oppose to it by means of a muscular contraction (Rață, 2006: 183).

The impact of work programmes applied to the subjects of the experimental research was felt on the physical fitness, especially on the muscle strength at the level of arms, abdomen, back and lower limbs, with obvious progress as a result of practicing the bodybuilding exercises in the physical education lesson.

Regardless of the multitude and complexity of the daily problems, a good physical fitness offers the satisfaction of some improved activities, the development of muscle strength having a positive influence on the youth's aesthetic and functional-related aspects, many specialists asserting that the biggest increases in the strength development are recorded at the age of 20 to 30 years, bodybuilding being one of the disciplines that act in this direction.

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INFLUENCES OF TOP PERFORMANCE TENNIS ON THE ORGANIZATION OF PERSONALITY

Influențele tenisului de înaltă performanță asupra organizării personalității

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Rezumat. Scopul acestui studiu constă în cunoașterea unor aspecte privind factorii de personalitate și caracteristicile tabloului psihic al anxietății, precum și dezvoltarea capacității de performanță a sportivilor care practică tenisul de performanță, acționându-se la nivel psihosocial. Studiul s-a realizat pe un număr de 10 sportivi de înaltă performanță. Testele psihologice utilizate în cercetare au fost: Chestionarul de Personalitate cu 5 Factori (CP5F) și Scalele Endler de Evaluare Multidimensională a Anxietății (EMAS). Testul Mann-Whitney pentru extraversiune, amabilitate, conștiinciozitate, stabilitate emoțională și autonomie au evidențiat următoarele valori: 10,5, 7,5, 12, 7, respectiv 9. Valoarea critică tabelară pentru nivelul alfa 0,05 și $N = 5$ (bărbați), respectiv $N = 5$ (femei), este 2. Întrucât valorile U calculate sunt mai mari decât valoarea critică tabelară, iar $p = 0,690$ (extraversiune), $p = 0,310$ (amabilitate), $p = 1,000$ (conștiinciozitate), $p = 0,310$ (stabilitate emoțională), respectiv $p = 0,548$ (autonomie), se poate concluziona că, sub raportul dimensiunilor menționate ale personalității, între jucătorii de tenis de top și jucătoarele de tenis de top, nu există diferențe semnificative din punct de vedere statistic. Rezultatele studiului plasează eșantionul de subiecți în media populației.

Cuvinte-cheie: personalitate; performanță; tenis.

Abstract. The purpose of this study is to know some aspects regarding the personality factors and the characteristics of the psychic picture of anxiety, as well as to develop the performance capacity of athletes who practice performance tennis, by acting at the psychosocial level. The study was conducted on a number of 10 top performance athletes. The psychological tests used in this research are: Five-Factor Personality Questionnaire (FFPQ); Endler Multidimensional Anxiety Scales (EMAS). The Mann-Whitney test for Extraversion, Agreeability, Conscientiousness, Neuroticism and Openness has revealed the following values: 10.5, 7.5, 12, 7, respectively 9. Critical tabular value for alpha level of 0.05 and $N = 5$ (men), respectively $N = 5$ (women), is 2. Because calculated U -values are higher than critical tabular value and $p = 0.690$ (extraversion), $p = 0.310$ (agreeability), $p = 1.000$ (conscientiousness), $p = 0.310$ (neuroticism), respectively $p = 0.548$ (openness), it can be concluded that, under the aspect of the personality dimensions mentioned, between top male tennis players and top female tennis players there are no significant differences, from the statistical point of view. The study results rank the sample of subjects investigated within the population average.

Keywords: personality; performance; tennis.

Introduction

Tennis is an individual sport in which players use consciously technical elements and procedures to hit the ball with the racket, under the conditions of an intense demand put on all motor qualities. Being a complex sports branch that involves all basic motor qualities, exerting them at an extremely high level, it has determined the specialists to sketch some characteristics of the top performance tennis players, the prototype of tennis champion: coordination capacity at a differentiated muscular effort, with a great physical demand, speed under all its manifestation forms (execution, movement and reaction speed), specific and general strength, operational thinking, speed endurance and, last but not least, mobility and suppleness. Besides the extended physical preparation and the permanent perfecting of technical and tactical elements, regardless of the age, but particularly in youth, the tennis game has a beneficial influence on the nervous system. This fact is explained by the trophic character of the frequency of nervous impulses that go to the cortex from the body's active segments and also by the role of movements in the metabolic regulation, ensuring an optimum excitability in the cerebral zones implicated, as well as in the direction and control of increasingly complex movements, stimulating the psychic-cognitive processes (Arsenescu, 2014).

The purpose of this study is to know some aspects regarding the personality factors and the characteristics of the psychic picture of anxiety, but also to develop the performance capacity of athletes who practice performance tennis, by acting at the psychosocial level.

Hypothesis of the research. The systematic practice of sports activity specific to performance tennis influences the personality development and organization (under the aspects of extraversion, neuroticism, conscientiousness, agreeability and openness). At the same time, sports activities specific to performance tennis influence the psychic picture of anxiety (as regards the trait anxiety), facilitating the harmonious development, at the level of affective system, and the emotional balance as well.

Material and method

Subjects of the research. 10 athletes (5 male subjects and 5 female subjects) practicing topperformance tennis. **Psychological tests used in the research.** The psychological tests used in the present research are part of the CAS⁺⁺ platform elaborated by COGNITROM and are accredited by the Psychologists' College of Romania on an indefinite period (Cognitrom, 2015). Tests were administered and then the psychological reports were prepared, under the supervision of specialists from the Psychology Laboratory within the National University of Physical Education and Sports, Bucharest.

The *Five-Factor Personality Questionnaire (FFPQ)* was achieved by Monica Albu (2008), according to the model of the test created by Hendriks (1997) - FFPI (Five-Factor Personality Inventory). The FFPQ Questionnaire is designed to evaluate the five super-factors of the Big Five model (Extraversion, Neuroticism, Conscientiousness, Agreeability and Openness). It contains six scales, one for each super-factor (whose name coincides with that of the super-factor which measures it), and a scale (called Social desirability) for the identification of persons whose responses do not conform to reality, either because they want to create a favourable image of self or they respond at random or they want to distinguish themselves from the other people (Albu, 2008).

Endler Multidimensional Anxiety Scales (EMAS) provide a multidimensional approach to the evaluation of anxiety, which brings a greater accuracy in predicting the individual responses to trait anxiety and understanding the individual pattern of anxious reactions to different situations (Cognitrom, 2015). The *traits scale* measures the individual's predisposition to feel the anxiety in four types of situations relevant for a wide range of experiences: social evaluation situations (*Do you find yourself in situations in which you are evaluated by other people?*); physical danger situations (*Do you find yourself in situations in which you are confronted or are going to be confronted with a physical danger?*); new and ambiguous situations (*Are you in a new or strange situation?*); daily routine situations (*Do you get involved in your daily routine?*).

Using the *Mann-Whitney U-test* (through the SPSS software) for two independent samples, we have checked whether there are statistically significant differences between the athletes investigated - top male tennis players and top female tennis players, in light of the different coordinates studied - extraversion, agreeability, conscientiousness, neuroticism and openness, anxiety in social evaluation situations, physical danger situations, new and ambiguous situations and daily routine situations.

Results

Table 1. Results for top male tennis players and top female tennis players FFPQ – descriptive statistics

			Minimum	Maximum	Mean	Std. Error
Extraversion	male players	tennis	67	76	70.0	1.58
	female players	tennis	64	81	72.60	3.14
Agreeability	male players	tennis	79	90	82.60	1.96
	female players	tennis	80	86	84.20	1.11
Conscientiousness	male players	tennis	85	101	96.20	2.87
	female players	tennis	86	110	96.20	4.31
Neuroticism	male players	tennis	75	83	79.80	1.46
	female players	tennis	64	90	76.40	4.15
Openness	male players	tennis	69	77	73.40	1.36

female players	tennis	69	87	78.20	4.03
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Table 2. Results for top male tennis players and top female tennis players EMAS-T – descriptive statistics

		Minimum	Maximum	Mean	Std. Error
Anxiety in social evaluationsituations	male tennis players	42	50	45.40	1.40
	female tennis players	41	47	44.20	1.02
Anxiety in physical dangersituations	male tennis players	41	55	46.20	2.51
	female tennis players	39	47	43.00	1.41
Anxiety in new and ambiguous situations	male tennis players	41	53	45.80	2.05
	female tennis players	42	49	44.60	1.20
Anxiety in daily routine situations	male tennis players	36	41	38.40	0.92
	female tennis players	34	38	35.40	0.74

Table 3. Results for top male tennis players and top female tennis players - mean and sum of ranks (personality dimensions investigated through the FFPQ questionnaire)

	Athletes	N	Mean Rank	Sum Ranks	of
Extraversion	male tennis players	5	5.10	25.50	
	female tennis players	5	5.90	29.50	
	Total	10			
Agreeability	male tennis players	5	4.50	22.50	
	female tennis players	5	6.50	32.50	
	Total	10			
Conscientiousness	male tennis players	5	5.60	28.00	
	female tennis players	5	5.40	27.00	
	Total	10			
Neuroticism	male tennis players	5	6.60	33.00	
	female tennis players	5	4.40	22.00	
	Total	10			
Openness	male tennis players	5	4.80	24.00	
	female tennis players	5	6.20	31.00	
	Total	10			

Table 4. Results for top male tennis players and top female tennis players – personality dimensions

Subjects ^b	Mann-Whitney U	Z	Asymp. tailed)	Sig. (2- Exact Sig.)]	Sig. [2*(1-tailed
Extraversion	10.500	-.419	0.675	0.690 ^a	
Agreeability	7.500	-1.051	0.293	0.310 ^a	
Conscientiousness	12.000	-0.106	0.916	1.000 ^a	
Neuroticism	7.000	-1.152	0.249	0.310 ^a	
Openness	9.000	-0.742	0.458	0.548 ^a	

a. Not corrected for ties b. Grouping Variable: subjects

Table 5. Results for topmale tennis playersand top female tennis players - mean and sum of ranks (facets of trait anxiety, highlighted through the EMAS-T instrument)

	Athletes	N	Mean Rank	Sum of Ranks
Anxiety in social evaluation situations	male tennis players	5	6.10	30.50
	female tennis players	5	4.90	24.50
	Total	10		
Anxiety in physical danger situations	male tennis players	5	6.40	32.00
	female tennis players	5	4.60	23.00
	Total	10		
Anxiety in new and ambiguous situations	male tennis players	5	5.80	29.00
	female tennis players	5	5.20	26.00
	Total	10		
Anxiety in daily routine situations	male tennis players	5	7.40	37.00
	female tennis players	5	3.60	18.00
	Total	10		

Table 6. Results for topmale tennis playersand top female tennis players– facets of trait anxiety

Subjects ^b	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
Anxiety in social evaluation situations	9.500	-.632	0.527	0.548 ^a
Anxiety in physical danger situations	8.000	-.946	0.344	0.421 ^a
Anxiety in new and ambiguous situations	11.000	-.315	0.753	0.841 ^a
Anxiety in daily routine situations	3.000	-2.003	0.045	0.056 ^a

a. Not corrected for ties

b. Grouping Variable: subjects

Discussions and conclusions

The research results have emphasized that, as regards the personality dimensions investigated - extraversion, agreeability, conscientiousness, neuroticism and openness, as well as the four facets of trait anxiety - anxiety in social evaluation situations, physical danger situations, new and ambiguous situations and daily routine situations, there are not excessive values - either marginal or extreme ones, in the case of each group of subjects submitted to the research - top male tennis players and top female tennis players.

Using the Mann-Whitney U-test for two independent samples, we have checked whether there are statistically significant differences between the athletes - top male tennis players and top female tennis players, concerning the different coordinates investigated - extraversion, agreeability, conscientiousness, neuroticism and openness, anxiety in social evaluation situations, physical danger situations, new and ambiguous situations and daily routine situations. After applying the FFPQ personality questionnaire, we mention the fact that none of the athletes has obtained high or low scores on the Social desirability scale. Thus, the top male and female tennis

players have not distorted the responses in the negative sense - to give the impression that they are thus different from the others, or in the positive sense- in order to create a positive image of self.

The values of Mann-Whitney test for extraversion, agreeability, conscientiousness, neuroticism and openness are: 10.5, 7.5, 12, 7, respectively 9. Critical tabular value for alpha level of 0.05 and $N = 5$ (men), respectively $N = 5$ (women), is 2. Because calculated U-values are higher than critical tabular value and $p = 0.690$ (extraversion), $p = 0.310$ (agreeability), $p = 1.000$ (conscientiousness), $p = 0.310$ (neuroticism), respectively $p = 0.548$ (openness), it can be concluded that, under the aspect of the personality dimensions mentioned, between top male tennis players and top female tennis players there are no significant differences, from the statistical point of view.

Concerning the values of Mann-Whitney test for anxiety in social evaluation situations, anxiety in physical danger situations and anxiety in new and ambiguous situations, these are: 9.5, 8, respectively 11. Critical tabular value for alpha level of 0.05 and $N = 5$ (men), respectively $N = 5$ (women), is 2. Because calculated U-values are higher than critical tabular value and $p = 0.548$ (anxiety in social evaluation situations), $p = 0.421$ (anxiety in physical danger situations), respectively $p = 0.841$ (anxiety in daily routine situations), it can be concluded that, in light of the aspects mentioned for the trait anxiety, between top male tennis players and top female tennis players there are no significant differences, from the statistical point of view (Table 6).

The value of Mann-Whitney test for anxiety in daily routine situations is 3. Because $p = 0.056$, it can be concluded that, in light of the aspects mentioned for the trait anxiety in daily routine situations, between top male tennis players with an average age of 31 years (Median = 38) and top female tennis players with an average age of 25 years (Median = 35) there are marginally significant differences, from the statistical point of view. But we mention that the two scores (38 and 35) rank both the men aged 31 years and the women aged 25 years within the population mean (more exactly, the score is slightly above the mean).

We can also notice that the top male tennis players with an average age of 31 years have achieved scores a little bit higher (but non-significant, from the statistical point of view) than the top female tennis players with an average age of 25 years, as regards the trait anxiety in the three situations: social evaluation, physical danger and new and ambiguous situations (Table 2). Thus, in the case of anxiety in social evaluation situations, as well as in the case of anxiety in new and ambiguous situations, the male athletes recorded a score placed slightly above the mean, while the female athletes obtained a medium level result. Then, in the case of anxiety in physical danger situations, the male tennis players recorded a medium level score, while the female tennis players obtained a result placed slightly below the mean. Taking into consideration the fact that the women athletes occupy a better position in the WTA rankings, compared to the men athletes (in the ATP rankings), we can recommend the male tennis players investigated that, through an appropriate psychic preparation, they try to become aware of the importance of maintaining their anxiety, in social evaluation situations and in new and ambiguous situations, at a medium level. But when anxiety is approached in relation to physical danger situations, it seems that a level which is slightly below the medium facilitates the achievement of some higher sports performances. In the case of neuroticism, openness, conscientiousness and agreeability (Table 1), the results rank both samples of participants investigated in the research (top athletes, males and females) within the population mean.

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OBSERVATIONS REGARDING THE MOTOR AGE AND THE CHRONOLOGICAL AGE IN PRIMARY SCHOOL CHILDREN

Observații privind vârsta motorie și vârsta cronologică la copiii din ciclul primar

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Rezumat. În mod tradițional, dezvoltarea motrică este privită ca un proces gradual de învățare a abilităților motorii în timpul primelor etape ale vieții, în copilărie și adolescență. Din această perspectivă, specialistul care se ocupă cu dezvoltarea motorie va testa copiii la diferite vârste, monitorizând progresul. Azi, cu toate acestea, este recunoscut faptul că studiul dezvoltării generale și al dezvoltării motorii, în special, nu poate fi redus la primii ani de viață a unui individ, ci trebuie să cuprindă o descriere și o explicație a modificărilor în comportamentul motric în timpul vârstei adulte și a vârstei înaintate. Lucrarea ținteste sublinierea importanței aplicării posibilităților de intervenție care să conducă la un echilibru între vârstă cronologică și vârstă motrică la copiii de școală primară. Pentru aceasta, au fost stabilite următoarele obiective: utilizarea unei intervenții aplicative care ar duce la o diferență redusă între vârstă cronologică, vârstă motrică și dezvoltarea fizică, precum și la îmbunătățirea dezvoltării motrice și fizice la copiii de școală primară.

Cuvinte cheie: vârstă motrică, vârstă cronologică, copii

Abstract. Traditionally, motor development is regarded as a gradual process of learning the motor skills during the first stages of life, in childhood and adolescence. From this perspective, the specialist dealing with motor development would test the children at various ages, monitoring their progress. Today, however, it is acknowledged that the study of development in general and of motor development in particular cannot be reduced to the first years of an individual's life, but must comprise a description and explanation of the changes in the motor behaviour during adult and old age. This paper aimed to emphasize the importance of the application of intervention possibilities that would lead to a balance between chronological age and motor age in primary school children. For this, the following objectives have been set: the use of an applicative intervention that would lead to a reduced difference between chronological age, motor age and physical development, and to the improvement of motor and physical development in primary school children.

Keywords: motor age, chronological age, children

Introduction

Motor development is characterized by structural and functional modifications in the motor system over time. It depends on the processes of maturing and learning and would express as motor actions and work output. At the school age, there is every possibility for a correct formation of a variety of motor skills that are specific to most sports branches. The great plasticity of the brain facilitates the formation of dynamic stereotypes, if a high number of repetitions are performed under relatively constant conditions (Epuran and Stănescu, 2010:190-196).

According to Rață and Rață (2008: 88), at this age group, one can easily and quickly develop the speed, aerobic endurance and coordination skills through drills using objects, with a partner, in a group, at different signals and with precise tasks. At primary school age, one intervenes to develop the motor skills and physical training with the help of games, competitions, at a medium and sub-maximal intensity, with medium durations and number of repetitions.

Traditionally, motor development is regarded as a reaction in the gradual process of learning the motor skills during the first stages of life, in childhood and adolescence. From this perspective, the specialist, in order to develop an effective instructive-educational process, would test the children at various ages, monitoring their progress. The study of development in general and of motor development in particular cannot be reduced to the first years of an individual's life, but must comprise a description and explanation of the changes in the motor behaviour during adult and old age (Dragnea and Bota, 1999: 125).

The aim of this research was to find and apply intervention possibilities that would lead to a balance between chronological age and motor age in primary school children.

For this study, the following **objectives** have been set:

- to use an applicative intervention that would lead to a reduced difference between chronological age, motor age, physical development and motor development;
- to emphasize the possibilities to improve the motor and physical age relation in primary school children.

This study tried to verify the **hypothesis** stating that by using a supplementary intervention in primary school children, based on drills envisaging the core components of motor activity, speed - strength - coordination - balance - quickness - simultaneity, one can decrease the level of motor deficit.

Materials and Methods

The group of subjects comprised in the research had a number of 60 primary school children aged between 6 years and 6 months and 10 years and 5 months, from School 10, Bacau, School 27, Bacau, and the “Stefan cel Mare” National Pedagogical College, Bacau, where the research was conducted.

The research methods were established according to the research objectives, as follows: *the bibliographical study method*, used to know the scientific foundation for this theme, as well as the new data from the professional literature; *the assessment method*, to assess the motor skills using *the Ozeretski-Guillmain test* (Lozincă and Marcu, 2005: 140), which has a general examination of motor activity; the test evaluates the essential components of motor activity as to its 4 aspects: speed– strength – coordination – endurance on the coordinates: dynamic hand coordination, general dynamic coordination, balance, quickness, spatial orientation; *the experimental method*, used here to verify the hypothesis and establish the effects of the applicative intervention programs in balancing the motor age and the chronological age; *the statistical-mathematical method*, used to transpose the results into assessment indices; and the *graphical representation method*, used in this research to highlight the significance of the data and to give a suggestive interpretation of the emphasized phenomena.

The research was conducted over a period of 9 months, between December 3, 2013, and August 15, 2014, comprising the following stages:

- December 3, 2013 - January 8, 2014 - creating the working groups and the applicative intervention programs;
- January 9 - June 26, 2014 - conducting the experiment/applicative intervention;
- June 27-30, 2014 - applying the motor assessment tests to the school children;
- July 1 - August 15, 2014 - analysis and interpretation of the data recorded during the final assessment tests.

The applicative intervention programs are created and applied differently, depending on the recorded level of motor development. In order to diminish the difference between the chronological age and the motor age, the following aspects were considered for the age groups:

- the individualization of programs based on the adaptation of performances in relation to the age and sex particularities, in order to acquire the motor skills that are specific to school age;
- the particularization of the applied intervention programs allowed the capitalization of the motor potential of every subject;
- establishing the relation between objectives - methods - means, aiming to correct and learn the performance for the specific motor education of primary school children;
- the applicative intervention programs for the experimental group were 80 minutes long, with a frequency of 1 session/week (on Saturdays, between 11 and 12 AM), over the course of 6 months (January - June 2014), being conducted in the gymnasium of the school where the research took place;
- the role of the assessments suggested in these intervention programs is to diagnose - through the identification of the motor skill levels specific for this age; to prognosticate - through the estimation of the level of acquirement of motor skills; and to motivate - through the activation and stimulation of the mental sphere for surpassing one's current motor level.

Results and Discussions

Table 1 presents an analysis of the differences between the initial and the final results recorded by the experimental and control groups, in order to see whether these differences are statistically significant. The data analysis was done using the Student's t-test for dependent variables, calculating and comparing the t-value obtained with the reference t-value for 29 degrees of freedom and a significance threshold of 0.05, the reference t-value being $t(29) = 2.05$.

Table 1. Results of the Student's t-test for dependent variables (experimental group)

Experimental group	Pair difference					t	df	Sig. (p)
	Arithmetic mean	Standard deviation	Standard error of the mean	95% the confidence interval				
				Inferior	Superior			
Vc.I								
Vc.F	-7.433	6.589	1.203	-9.894	-4.972	-6.178	29	0.000
Vm.I								
Vm.F	-22.400	7.828	1.429	-25.323	-19.476	-15.673	29	0.000
Dm.I								
Dm.F	14.966	10.417	1.901	11.076	18.856	7.869	29	0.000

Legend: Vc. - chronological age; Vm. - motor age; Dm. - motor age difference; I - initial; F - final.

The results recorded in the Student's t-test for dependent variables by the **experimental group** (Table 1) show that in regards to the *chronological age* (VC), the absolute value of t (29)=6.178 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the recorded initial and final results is highly statistically significant in regards to the *motor age* (VM), the absolute value of t(29)=15.673 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the initial and final results recorded by the experimental group is highly statistically significant in regards to the *motor age difference* (DM), the value of t(29)=7.869 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the recorded initial and final results is highly statistically significant. The Cohen's coefficient here is 1.44, which shows that the size of the effect is big in the case of the experimental group subjects' age difference.

Table 2. Results of the Student's t-test for dependent variables (control group)

Control group	Pair difference					T	df	Sig. (p)
	Arithmetic mean	Standard deviation	Standard error of the mean	95% the confidence interval				
				Inferior	Superior			
Vc.I								
Vc.F	-10.366	4.888	0.892	-12.191	-8.541	-11.616	29	0.000
Vm.I								
Vm.F	-15.800	7.928	1.447	-18.760	-12.839	-10.916	29	0.000
Dm.I								
Dm.F	5.433	9.364	1.709	1.936	8.930	3.178	29	0.004

Legend: Vc. - chronological age; Vm. - motor age; Dm. - motor age difference; I - initial; F - final.

The results recorded in the Student's t-test for dependent variables by the **control group** (Table 2) show that in regards to the *chronological age* (VC), the absolute value of t (29)=11.616 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the recorded initial and final results is highly statistically significant in regards to the *motor age* (VM), the absolute value of t (29)=10.916 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the initial and final results is highly statistically significant in regards to the *motor age difference* (DM), the value of t (29)=3.178 is higher than the reference value t=2.05 for df=29 degrees of freedom and a confidence threshold of 95%. This interpretation of the t-value, as well as p<0.05, indicate the fact that the difference between the recorded initial and final results of

the control group is highly statistically significant. The Cohen's coefficient here is 0.58, which shows that the size of the effect is small in this case.

Table 3, derived from the Student's t-test for independent variables, presents the averages recorded during the final testing by the experimental and control groups, their standard deviations and standard deviation for the average.

Table 3. Results of the Student's t-test for independent variables

Challenge	Group	N	Arithmetic mean	Standard deviation	Standard deviation for the average	Cohen's coefficient
VC	Experimental	30	107.47	14.173	2.587	-
	Control	30	108.53	14.597	2.665	
VM	Experimental	30	101.37	16.234	2.963	-
	Control	30	94.17	16.427	2.999	
DM	Experimental	30	6.10	9.703	1.771	0.5
	Control	30	14.37	7.024	1.282	

Legend: V.C. - chronological age; V.M. - motor age; D.M. - motor age difference.

In regards to the chronological age, one can see that the experimental group average during the final testing was 107.47 months (8 years and 11 months), and the control group average was 108.53 months (9 years and 1 month).

In regards to the motor age average, the experimental group's at the end of the experiment was 101.37 (8 years and 5 months), and the control group's was 94.17 months (7 years and 10 months), showing a difference of 7 months between the two groups.

In regards to the motor age differences, for the experimental group and the control group during the final testing, one can see that the experimental group presents an age difference average of 6.10 months, whereas the control group, an age difference average of 14.37, representing a difference of 8.27 months, the experimental group recording an obvious progress in regards to the motor age difference.

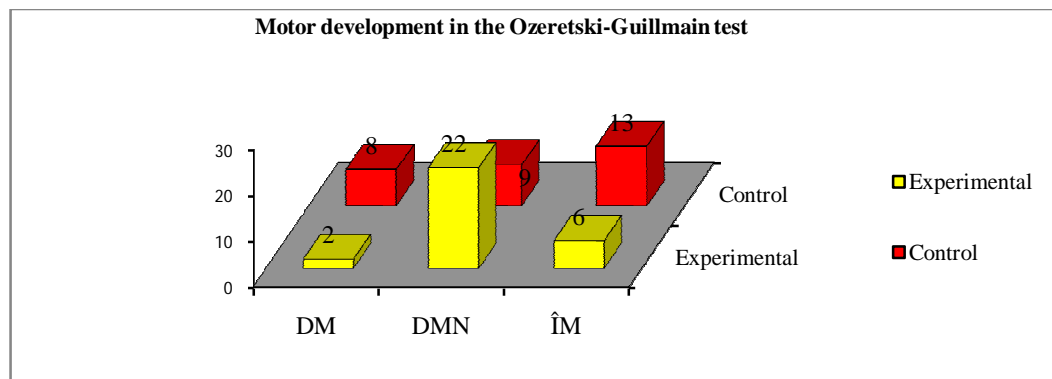


Fig.1. Graphical representation of the motor development for the Ozeretski-Guillmain test

Figure 1 presents the motor development results for the experimental and control groups after the final testing. Thus, one can see that 22 experimental group subjects had the diagnosis of normal motor development, unlike the control group, where only 9 subjects had this diagnosis. In regards to the motor retardation diagnosis, 6 experimental group subjects had it, unlike the control group, where 13 subjects had this diagnosis. The experimental group comprised 2 subjects with motor deficiency, unlike the control group, which had 8 subjects with this diagnosis. This graphical representation shows that a large number of subjects in the experimental group presented a normal motor development, in comparison to the control group, this being explained by the fact that an intervention plan was applied to the experimental group.

Conclusions

In regards to the **Ozeretski-Guillmain test** results, one can see that there is a high positive correlation between the chronological age and the motor age of the subjects, which shows that as the chronological curve ascends, the negative value curve of the motor age descends.

During the initial testing, 22 subjects (73.30%) in the experimental group had the diagnosis of *motor deficiency*, and 8 subjects (26.70%) had the diagnosis of *mild motor retardation*. During the final testing, 22 subjects, representing 73.30% of the experimental group subjects, had the diagnosis of *normal motor development*, 6 subjects, representing 20%, had the diagnosis of *mild motor retardation*, and 2 subjects, representing 6.70%, were diagnosed with *motor deficiency*.

During the initial testing, 21 subjects (70%) in the control group had the diagnosis of *motor deficiency*, and 9 subjects (30%) had the diagnosis of *motor retardation*. During the final testing, 9 subjects, representing 30% of the control group subjects, had the diagnosis of *normal motor development*, 13 subjects, representing 43.30%, had the diagnosis of *mild motor retardation*, and 8 subjects, representing 26.7%, were diagnosed with *motor deficiency*.

Thus, one can see that 22 experimental group subjects had the diagnosis of normal motor development, unlike the control group, where only 9 subjects had this diagnosis. In regards to the motor retardation diagnosis, 6 experimental group subjects had it, unlike the control group, where 13 subjects had this diagnosis. The experimental group comprised 2 subjects with motor deficiency, unlike the control group, which had 8 subjects with this diagnosis.

The hypothesis stating that *by using a supplementary intervention in primary school children, based on drills envisaging the core components of motor activity, speed - strength - coordination - balance - quickness - simultaneity, one can decrease the level of motor deficit*, was confirmed, this validation being supported by statistical analyses and graphical representations showing that the motor behaviour of the subjects was improved.

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LEVEL OF KNOWLEDGE OF THE COMMUNICATIONAL PHENOMENON IN JUNIOR BASKETBALL TRAINING IN ROMANIA

Nivelul de cunoaștere a fenomenului comunicațional în antrenamentele de baschet juniori din România

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Rezumat. Cercetarea integrează metode de analiză și evaluare a capacității comunicaționale a sportivilor, în raport cu alți parametri care influențează direct sau indirect creșterea performanței sportive. Accentul se pune pe măsurarea capacității de comunicare nonverbală a jucătorului de baschet din echipa de juniori și pe studiul oportunității unei asemenea cercetări. Oportunitatea cercetării a avut ca suport de studiu un chestionar de opinie care a fost aplicat unui număr de 81 de antrenori de baschet de la diverse cluburi din România (media de vârstă este de aproximativ 32 de ani, mai exact 31.8, cel mai tânăr având 20 de ani, iar cel mai vârstnic 57 de ani). Acest chestionar a facilitat obținerea unor informații valoroase privind nivelul de cunoaștere a fenomenului comunicațional în antrenamentele de baschet, gradul de utilitate a tehnicilor concrete de dezvoltare a abilităților de comunicare verbală și nonverbală ale sportivilor și implicațiile comunicării în procesele de coeziune a echipei.

Cuvinte-cheie: comunicare, baschet, chestionar de opinie.

Abstract. This research integrates methods of analysis and assessment of the athletes' communicational capacity, in relation with other parameters that influence directly or indirectly the increase of sports performance. The emphasis is put on the measurement of nonverbal communication capacity in the basketball player making part of a junior team and on the study of the opportuneness of such a research. The suitability of the research had for support an opinion questionnaire which was applied to a number of 81 basketball coaches from different clubs of Romania (the average age is about 32 years, more exactly 31.8, the youngest being 20 years and the oldest, 57 years). This questionnaire facilitated the collection of some valuable information regarding the level of knowledge of the communicational phenomenon in the basketball training sessions, the degree of usefulness of the concrete techniques for developing verbal and nonverbal communication abilities in athletes and the implications of communication on the team cohesion processes.

Keywords: communication, basketball, opinion questionnaire.

Introduction

Competitive basketball game has passed through a period of continuous and deep transformation in recent years, due to the evolution of the game dynamics during the final tournaments of different competitions at the world level. The characteristics and trends in the international basketball game, as a result of the transformations occurred in past few years and also of the amendments brought to official regulations, according to Popescu (2012:35) have lead to:

- modification of the game tempo and an endeavour to impose the game pace;
- appearance of stable couples of 2 and 3 players;
- simplification in constructing the collective attack;
- increase in the efficiency of defense, by combining the defense systems.

The feedback provided by the coach or the teammate represents a very important communicational element for objectifying the actions and attitudes in performance basketball. Increasing the performance level of a basketball team is not achieved only by the improvement of individual performances, but it also supposes the establishment of some balanced connections between the forces and tensions created during game, the quality of these connections determining the team cohesion.

" In sports, jump value can not be conceived strictly and solely to exercising the size and skills innate or cultivated , the psychological factor in the tie hierarchical priority of athletes is becoming increasingly popular and should be applied " (Dodan, 2004:38).

The analysis of verbal and nonverbal communication in performance basketball at junior teams and the knowledge of these forms of communication by the coaches and the players, in order to use them in the athletes' preparation for reaching sports performance, are topical concerns for the basketball management structures.

By applying the opinion questionnaire, it is aimed to increase the value of junior teams of the Romanian Basketball Federation, based on the knowledge and improvement of these forms of communication by the basketball coaches and players.

The purpose of this study is to identify the degree of knowledge of the communicational processes and the way in which they are used by the basketball coaches in the preparation process.

Objectives of the study:

- to identify the level of subjects' knowledge about the implications of the communication process in basketball game;
- to identify to what extent the coaches apply, in the training sessions, specific techniques for developing the athletes' communication capacity.

Hypothesis of the study: "Awareness of the communicational process by the basketball coaches facilitates the training process and is an important factor within the game relationships".

Research methods: This paper represents a case study in which we apply the questionnaire-based survey method, the tabulation method, the percentile method, the statistical-mathematical method - arithmetic mean.

Research design

To conduct the opinion survey, the questionnaire was addressed to a group of 81 basketball coaches working in different sports clubs throughout the country. The average age is about 32 years (more exactly 31.8), the youngest being 20 years and the oldest, 57 years.

Opinion questionnaire

The construction of the opinion questionnaire for coaches aims to collect their opinions about the importance of nonverbal communication in basketball game and about the usefulness of its utilization in developing the team sports abilities. This questionnaire includes 14 items with three variants of response (yes, no, I do not know), arranged in the following succession:

- Do you consider that if each player knows and does exactly what he has to do in a competition, communication is no more absolutely necessary?
- Is communication during training more important than communication during competitions?
- Do you think that a good communication among players reinforces the team cohesion?
- Do the players have to communicate permanently with the coach when they are on the playing field?
- Do the players have to communicate permanently among them when they are on the playing field?
- Do you consider that communication during training is more useful than communication during competitions?
- Is communication between the coach and the athletes during training more important than communication among teammates?
- As a coach, do you encourage verbal communication among athletes during training?
- But nonverbal communication (gestures, looks, touches, attitudes)?
- Do you use verbal communication techniques during training?
- But nonverbal communication techniques?
- Do you think that the ability to communicate must be a criterion for assessing the athletes?
- Does a better understanding of the opponent's nonverbal language lead to better knowing this one?
- Do you consider opportune the introduction in the training process of some technical-tactical means for increasing the players' communication capacity?

As regards the addressability of this questionnaire, it should be mentioned the fact that, being dedicated exclusively to basketball coaches, the degree of complexity and the language used were adjusted to this category of subjects, by trying to totally eliminate the possible dissensions or confusions.

Analysis and interpretation of results

Responses given by the subjects to the opinion questionnaire were submitted to a first analysis, focused on the frequencies of each type of response for each item (Table 1).

Table 1. Frequency of responses for each item

Items	Affirmative response Percentage %	Negative response Percentage %	“Undecided” response Percentage %
1	6.17	93.83	0
2	50.62	49.38	0
3	100	0	0
4	43.21	54.32	2.47
5	86.42	12.35	1.23
6	49.38	48.15	2.47
7	60.49	38.27	1.23
8	70.37	29.63	0
9	85.19	14.81	0
10	98.77	0	1.23
11	80.25	19.75	0
12	60.49	35.8	3.69
13	79.01	19.75	1.23
14	82.72	12.35	4.94

Analysing the responses given by the participants, a first observation related to the distribution of responses for the 14 items is that there is a question which has met the unanimity of responses. All the 81 participants in the study (basketball coaches) have responded in the affirmative to item number three, which refers to the influence of communication on the team cohesion. Therefore, it can be stated that 100% of the respondents agree to the assertion according to which *a good communication among players reinforces the team cohesion*.

It is to notice the fact that, out of the total of 1134 responses processed (14 questions and 81 participants in the study), it has been registered a percentage of 1.32% (15) uncertain responses, a percentage of 31% (347) negative responses and a percentage of 68% (772) positive responses. The significance of this observation is that the participants in the study have highly assumed the expression of their opinions.

At the same time, if we take into consideration this remark, we shall find a very interesting distribution of responses to items number two and six, referring to the importance and usefulness of communication during training/ during competitions. At both questions, the responses have been distributed relatively uniformly between the affirmative and the negative ones.

Thus, 41 participants consider that communication is more important during training than during competitions, while the other 40 respond in the negative to this assertion, the percentages being distributed very close to 50% (50.6% in the affirmative and 48.4% in the negative).

The analysis of responses to the first item of the questionnaire, referring to the necessity of communication among players during competition, reveals an interesting aspect that brings into discussion the subjects' age. Because the question “Do you consider that if each player knows and does exactly what he has to do in a competition, communication is no more absolutely necessary?” obtained only 5 positive responses (the majority of 93.83% responding in the negative), we tried to identify a common element for the 5 respondents. Thus, it has been found that all 5 respondents are aged beyond the average of the sample, respectively: 33, 33, 40, 44 and 46 years. We remind that the average age of the group of subjects is 31.8 and they are aged between 20 and 57 years.

The sixth question, formulated as a control question, gathers 40 affirmative responses, 39 negative and 2 “undecided” responses (also close to 50%, from the distribution point of view) and reflects the opinions related to the usefulness of communication during training/ during competitions.

The minute analysis of responses to the control question (number six, reformulation of question number two) shows a distribution relatively balanced of the subjects who have responded in the affirmative to question number two and in the negative to question number six, compared to those who have responded in the negative to question number two and in the affirmative to question number six. This fact may be due to a low level of item understanding by the participants in the research or to a superficiality of their involvement in the task of filling in the opinion questionnaire.

At the same time, inadvertences have been found in the logic of opinion formulation, an example being that a respondent stating that he uses in the training sessions nonverbal and verbal communication techniques responds, however, in the negative to the question about the fact of encouraging the use of these techniques.

Conclusions

Concerning the opinions of the coaches investigated, it must be reminded that the question to which the responses have been 100% in the affirmative is that referring to the existence of a connection between communication and the basketball team cohesion.

At the same time, it is important to note the fact that the subjects have responded in different percentages to the questions about the encouragement of verbal communication, compared to the encouragement of nonverbal communication. 70.37% of the coaches participating in the study have responded in the affirmative as regards the encouragement of verbal communication and 85.19% have responded in the affirmative as regards the encouragement of nonverbal communication.

Analysing the data obtained following the application of the opinion questionnaire to a significant number of basketball coaches, it can be stated that the awareness of the communicational process by the basketball coaches facilitates the training process and is an important factor within the game relationships, which proves that *the hypothesis of the research has been confirmed*.

The unanimous opinion of the coaches investigated regarding the increase of the basketball team cohesion, as an effect of the increase of the communication capacity is worth being remarked and represents a starting point in approaching the communicational phenomena and the influences they may engender.

The research suitability is justified by the fact that so far, according to the information collected after applying the opinion questionnaire, no instruments for measuring verbal or nonverbal communication competence have been used and no similar approach of basketball sports training sessions has been attempted, using techniques and methods which monitor the aspect related to the development of athletes' communicational capacity.

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STUDY ON THE CORRELATION BETWEEN TWO TESTS – PORTAGE AND THE “ASSESSMENT OF NEUROPSYCHIC DEVELOPMENT IN CHILDREN” – IN THE NORMAL PSYCHOMOTOR DEVELOPMENT IN PRETERM TWINS

Studiu privind corelația dintre testul Portage și testul „Aprecierea Dezvoltării Neuropsihice la Copii” în dezvoltarea normală a psihomotricității gemenilor născuți prematur

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Rezumat. Prematuritatea are uneori efecte negative asupra dezvoltării copilului, mai ales în cazul gemenilor, unde incidența crește cu 60%. Recuperarea psihomotrică se numără printre cele mai recente metode utilizate în domeniul terapeutic. Ipoteză: Intervenția precoce prin metode kinetologice adaptate gemenilor duce la o dezvoltare neuromotorie îmbunătățită, ajungând astfel în limitele normalului. Material și metodă: În studiu au fost cuprinși doi gemeni, fată și băiat. Aceștia au fost supuși testelor Portage și „Aprecierea dezvoltării neuropsihice la copii 0-36 luni”, iar programul implementat a inclus: exerciții fizice, masaj, metode de reeducare neuromotorie, hidroterapie și meloterapie. Rezultate: Analiza comparativă a evoluției gemenilor relevă două aspecte: băiatul are performanțe superioare, comparativ cu fata, însă, pe de altă parte, fata se dezvoltă mai rapid, recuperând din diferențe. Concluzii: Rezultatele obținute de cei doi gemeni la testele de tip neuropsihic sunt statistice semnificative, ceea ce indică faptul că programul aplicat copiilor, în urma testărilor, a adus îmbunătățiri evidente.

Cuvinte-cheie: gemeni, prematuritate, kinetoterapie, dezvoltare neuropsihică, Portage

Abstract. Prematurity sometimes has negative effects on child development, especially in the case of twins, where incidence increases by 60%. Psychomotor recovery is among the latest methods used in therapy. Hypothesis: Early intervention through physical therapy methods adapted to twins leads to improved neuromotor development, which ranges within normal parameters. Material and methods: The study comprised two twins: a girl and a boy. They were subjected to Portage test and “Assessment of neuropsychic development in children 0-36 months” test, and the programme implemented included the following: exercise, massage, neuromotor rehabilitation methods, hydrotherapy and music therapy. Results: The comparative analysis of the twins’ evolution reveals two aspects: the boy has superior performances compared to the girl, but, on the other hand, the girl has a faster growing rhythm, thus gradually mitigating the differences. Conclusions: The results obtained by the twins in the neuropsychic tests are statistically significant, indicating that the programme applied, after testing, has brought clear improvements.

Keywords: twins, prematurity, physical therapy, neuropsychic development, Portage

Introduction

A premature is a newborn alive whose birth weight is equal to or less than 2,500 grams, regardless of the duration of gestation (Șchiopu *et al.*, 1995: 68). Prematurity sometimes has negative effects on child development. The psychomotor development can be delayed (the child begins to verbalize later), but this delay can be made up for until the age of 3-5 (Seamon *et al.*, 1992: 386). Psychomotor recovery is among the latest methods used in therapeutic programmes, and it plays an important role in the system of recovery methods in both paediatric psychiatry and special education. The evolution of premature children should not be compared to that of children born at term and even to that of infants with the same characteristics. A basic understanding of the development of a child born at term or of a premature child is required to assess early intervention regarding child development (Bacus, 2013: 104). The multiple pregnancy involves the simultaneous development of two or more fetuses in the uterine cavity (Stamatian, 2003: 161-165). Complications are more numerous than in monofoetal pregnancies, which justifies the classification of twin pregnancy in the high risk category. The frequency of twins is 1.2%, but it represents 10% of all premature births. Prematurity risk increases by the number of fetuses: from twins – 60% to 96% – triplets. Relationships between twins – especially between monozygotic twins – are distinguished from ordinary relationships between siblings. Intense relationships between twins can have negative effects on their psychosocial development. Among the negative effects, it is worth mentioning the following: delayed speech development – twins play together all the time, they communicate with each other, and therefore they feel less need to communicate with others (Oancea-Ursu, 1998: 64).

Purpose. Assessing the importance of a recovery programme adapted to preterm twins by establishing a connection between the development indices of preterm twins (mental age, intelligence quotient, neuropsychic development assessment) and a qualitative variable (the three testing phases, children’s gender).

Hypothesis. Early, systematic and continuous intervention using physical therapy methods adapted to preterm twins leads to improved neuromotor development, which ranges within normal parameters.

Material and method

Application of physical therapy means on twins aged 0-3 should be dominated by the idea of stimulating and strengthening the natural process of growth and active psychosomatic development. However, this requires a very precise knowledge of the growth and development particularities concerning the entire period. The study comprised two twins: a girl and a boy.

At the time of initial tests, twins were 12 months old. They were subjected to two tests. The first is Portage test (an assessment test for young children), which can be helpful in two main directions: Portage has the advantage that the test questions can outline the adequate skills and status of the child at a certain age and the actual level of the child at the time of evaluation; the second direction is the evaluation of the child at a certain age, which can give a fairly accurate picture of the areas not covered by the child, where he/she needs help (Blumă *et al.*, 1984: 5). The second test is “assessment of neuropsychic development in children aged between 0 and 36 months” (a battery of tests that helps professionals assess their monthly progress). Both tests follow the neuropsychic evolution of the child on four main areas of behaviour: motor, cognitive, verbal, social-emotional (Chiriac *et al.*, 1977: 16-55).

The applied therapeutic programme included as follows: physical exercises (using play), massage, neuromotor rehabilitation methods (Bobath, Vojta, Kabat), hydrotherapy and music therapy. For statistical calculations and graphs, we used XLSTAT 2013 and Excel 2014 software trial version.

Results

The patient AA (girl) achieved, through the programme applied, a quantum leap in terms of self-service (Table 1) and she responded positively to the other types of behaviour. The other twin, AV (boy), responded better to the assessment of motor behaviour and he maintained this growth even after the midway point (Table 1). He also most definitely improved his self-service and socializing capacity.

Table 1. Twins' results at the Portage questionnaire

		Date	Socialization	Language	Self-service	Cognitive	Motor
A.A. Girl	Initial testing	1.2013	0.5	0.5	0.5	0.5	0.5
	Intermediate testing	7.2013	1	1	1.5	1	1
	Final testing	5.2014	2	1.5	2	1.5	2
A.V. Boy	Initial testing	1.2013	0.5	0.5	0.5	0.5	1
	Intermediate testing	7.2013	1	1	1.5	1	1.5
	Final testing	5.2014	2	1.5	2	1.5	2

The formulas used for the calculation in interpreting Portage test:

$$\text{Mental Age} = \frac{\text{Socialization} + \text{Language} + \text{Self Service} + \text{Cognitive} + \text{Motor}}{5}$$

$$\text{I.Q.} = \frac{\text{Mental Age}}{\text{Chronological Age}} \times 100$$

After interpreting the results of the questionnaire for patient AA - between initial and final stage -, we found a lower final difference between mental and chronological age than the initial difference, which confirms that she responds very well to the programme applied (Table 2). In addition, the graphic interpretation shows an

increase in the IQ: from the initial value of 71 to a value of 90, which classifies her as averagely intelligent. Between the initial and the final testing, we found a small difference between mental age and chronological age of the patient AV (Table 2); we also confirm an increase in IQ from a value of 85 to a value equal to 92.

Table 2. Results obtained for mental age, chronological age and intelligence quotient by the twins

Patient	Tests	Date	Mental Age	Chronological Age	I. Q.
A.A. Girl	Initial testing	1.2013	0.5	0.7	71
	Intermediate testing	7.2013	1.1	1.3	84
	Final testing	5.2014	1.8	2	90
A.V. Boy	Initial testing	1.2013	0.6	0.7	85
	Intermediate testing	7.2013	1.2	1.3	92
	Final testing	5.2014	1.8	2	92

The statistical analysis applied in the present study aimed at identifying and quantifying the links between development indices of preterm twins (mental age, intelligence quotient, neuropsychic development assessment) and a qualitative variable (the three testing phases, children's gender).

In twins, the comparative analysis of the evolution of parameters related to mental age, the IQ and the neuropsychic tests (Figure 1) reveals two aspects: the boy has superior performances compared to the girl, but, on the other hand, the girl has a faster growing rhythm, thus gradually mitigating the differences. In the final stage of the test, we found no differences in the mental age of the two children. We found that the two twins have a mental age ranging below average for all stages of development, but that they have an IQ above average, except for the initial stage (in case of the girl). The results of neuropsychic tests are below the average of samples in the initial and intermediate stages, but they increased above average in the final stage.

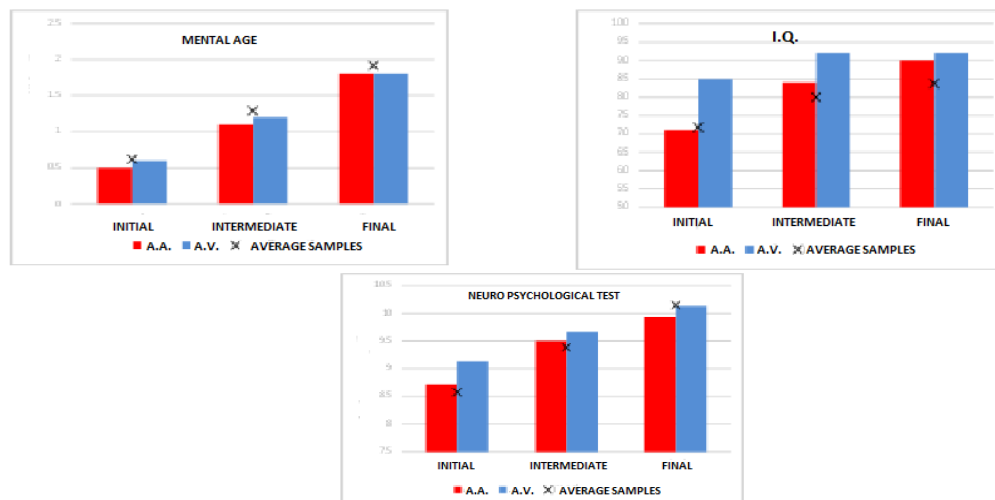


Fig. 1. Comparative evolution of twins in relation to mental age, IQ and neuropsychic test results

To facilitate the comparison of values, we standardized the data, to eliminate the effect of different size ranges. Standardization took into account the following relation (Apetrei *et al.*, 1996: 201):

$$Z_i = \frac{x_i - \bar{x}}{\sigma}$$

where: Z_i – standardized value (Z score); x_i – initial values of the data stream; \bar{x} – mean value of the array; σ – standard deviation of the array.

Through the nature of the operations performed, the string of standardized values always has the mean zero and the standard deviation is 1; each term expresses the number of standard deviations by which the initial value deviates from the average.

Standardization results presented in Fig. 2 show that the greatest differences between twins are associated to the initial stage (the girl's results in IQ test neuropsychic test are significantly lower compared to the boy's). Regarding mental age, differences are modest throughout all the stages of evolution. Overall, the average difference between the standardized values of the boy and the girl is -0.544, which is statistically significant, as indicated by the Student's t-test results (Table 3).

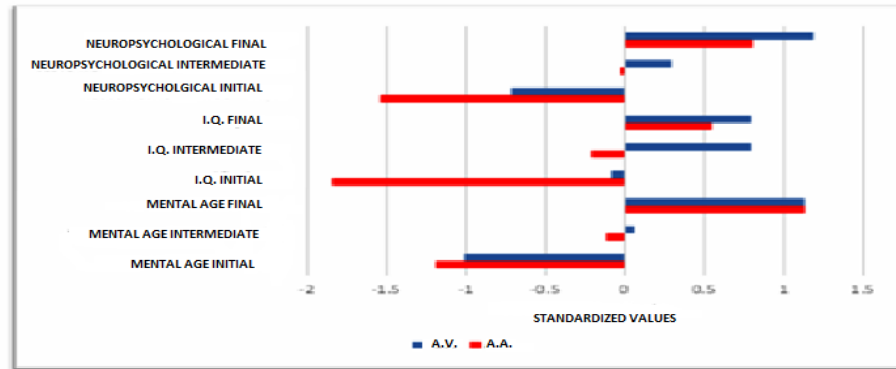


Fig. 2. Standardized values of the parameter for the two twins

Table 3. Results of the Student's t-test for average standardized values

Average – A.A.	-0.272
Average – A.V.	0.272
A.A. – A.V.	-0.544
t (observed value)	-2.927
t (theoretical value)	-1.860
Degrees of freedom	8
P Value	0.010
Level of significance	0.05

Conclusions

In Romania, the issue of psychomotricity in preterm twins has not been a long debated topic. Although it is a problem that specialists have to face almost daily, studies in these directions have mentioned it only briefly.

The results of the twins in neuropsychic tests are statistically significant, indicating that the programme applied to children after testing brought clear improvements on all five types of behaviour.

Following assessments, the initial hypothesis H1 - "Early, systematic and continuous intervention using physical therapy methods adapted to preterm twins leads to improved neuromotor development, which ranges within normal parameters" - was confirmed.

Kinesitherapists play an important role in family life - they underline the importance of daily physical activity in children and they instruct the parents concerning the proper type of gymnastics. In order for everyone involved in this process to enjoy the child's success, we recommend involving the child and family in a psychomotor education programme.

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RESEARCH REGARDING THE PLACE AND ROLE OF SELECTION IN HANDBALL

Studiu privind locul și rolul selecției în handbal

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Rezumat: *Experiența profesională a primului autor, acumulată ca sportiv de performanță, la catedră și în activitatea de antrenor, a permis identificarea unei serii de probleme cu care se confruntă activitatea sportivă de performanță la nivelul juniorilor (care coincide cu perioada adolescenței). Dintre principalele probleme identificate în cadrul procesului psihoeducațional, le amintim pe următoarele: selecția la nivelul copiilor și juniorilor, în majoritatea ramurilor de sport, se bazează în principal pe criterii de natură somatică și motrică, fără a lua în considerare aspectele de natură psihologică ale personalității fiecărui copil; pregătirea copiilor și juniorilor nu ține cont de particularitățile de vârstă, somatice și psihice ale acestora, sportivii fiind considerați niște seniori la o scară redusă, lucru ce împiedică evoluțiile ulterioare; îngrădirea inițiativei, a capacității de a lua decizii pe cont propriu în situațiile limită de joc prin schematizarea excesivă a acestuia, lucru ce are influențe negative asupra randamentului, eficienței în joc, dar mai ales a dezvoltării personalității sportivilor; neglijarea aspectelor ce țin de relația antrenor-sportiv, considerându-se de cele mai multe ori că această relație trebuie să fie unidirecțională, și anume dinspre antrenor spre sportiv, fără activarea verigilor de autoreglare a sistemului.*

Cuvinte-cheie: selecție, handbal, copii, criteriu psihologic.

Abstract: *The first author's professional experience accumulated as a performance athlete, physical education assistant lecturer and coach, allowed the identification of a number of issues the performance sports activity is confronted with at the junior level (coinciding with the adolescence period). Among the main problems identified throughout the psycho-educational process, we remind the following: selection at the children and junior level, in most sports areas, is principally based on somatic and motor criteria, without taking into account the psychological aspects of each child's personality; children's and juniors' preparation does not take into consideration the age-related, somatic and psychic particularities, the athletes being considered as small-scale seniors, a fact which deters their future evolution; limitation of their initiative, of the capacity to make their own decisions in the limit-situations during game, by excessively schematizing it, which has a negative impact on the game's efficiency, but especially on the athletes' personality development; neglecting the aspects that keep to the coach-athlete relationship, by considering, in most cases, that this relationship must be unidirectional, namely from the coach to the athlete, without activating the self-regulation systems.*

Keywords: selection, handball, children, psychological criteria.

Introduction

From a physical perspective, we can admit that childhood is one of the most active stages in human development. Children like to play, take part in physical and sports activities, and, beyond any doubt, they are passionate about competitions.

Parents, educators, coaches and sport managers are looking for the best training programs that could increase the children's sports potential. Coaches often become role models and children dream about exceeding the achievements of acknowledged athletes. But subjecting children to adult training programs represents a serious mistake. After all, children are not simply small adults. Children are unique human beings at every stage of their development, presenting different physiological capacities at different periods of their growing-up. Physical, physiological and psychological changes, which can be at times sudden, manifest themselves now, bringing about dramatic changes in behaviour. It is important for all those working with children to inform themselves well about all the above-mentioned changes, structuring their training so that it best suits each development stage.

Specialized literature is especially concerned with the aspects related to elite athletes and less with the training programs specifically designed for children.

In the twenty-first century, the entire system of physical education and sports activities organized with the purpose of strengthening, compensating, relaxing and recreating, is being reconsidered and extended at a large scale throughout the world. These activities are organically integrated in the life of the modern man and they constitute a major and constant concern for all those training the young generation for life, while creating the framework designed to ensure a rational balance in human development. In this context, studies and experiments

carried out under the guidance of some institutions and organizations reveal the fact that significant personality traits and behaviours can be efficiently shaped and developed within physical education programs and sports activities, which, compared to other curricula activities, manage to fully address the pupil's personality (Bompa, 2003: 1-3).

Hypotheses:

H1: The selection and training process based on cognitive behavioural testing can lead to the improvement of the subjective anxiety state, the acquiring of rational beliefs and the increase of athletic performance.

H2: Selection efficiency can increase, merely by including psychological personality throughout the assessment, with the purpose of addressing the athlete's personality.

H3: The presence of psychological indicators in the selection process may facilitate the efficiency of the handball-specific training.

The methods used:

- The method of testing
- The statistical method (SPSS 10.0)
- The method of teaching observation
- The experimental method

The testing method will be accompanied by the application of tests included in the **Psychological Evaluation Platform from Cognitrom Assessment System**, in collaboration with the Sports High School psychologist and with the informed consent of the subjects investigated.

Spatial ability

The evaluation of spatial skills can be placed in time as early as the beginning of intelligence testing (Binet and Simon, 1905). As a cognitive skill, spatial ability is often a major component of the psychological test battery or of the intelligence models (Guilford, Fruchter and Zimmerman, 1952). A number of studies on the cognitive structure consider it a part of the spatial-kinaesthetic intelligence (Gardner, 1983).

Spatial abilities represent the ability to generate, remember and transform abstract visual images (Lohman, 1979).

Emotional Distress Profile (EDP)

Although at the level of common sense affection is experienced as a conglomerate of feelings, being in a complex interaction, researchers have proved that the full range of experienced emotions can be reduced to a few basic dimensions. Thus, after several studies, Watson and Tellegen (1985) concluded that the emotion has a structure comprising two unrelated dimensions: *positive emotions and negative emotions*. Positive emotions are explained by the extent to which a person can experience pleasure and contentment, while negative emotions are explained by the degree of inconvenience experienced (psychological distress).

Based on an extensive clinical experience, Albert Ellis (1962, 1994, quoted by David, Schnur and Belloiu, 2002) formulated the binary model of distress, dividing the negative emotions into two categories - functional negative emotions and dysfunctional negative emotions. The functionality or dysfunctionality of negative emotions is given by: 1) the subjective experience associated with the emotion, (2) associated beliefs and (3) the behavioural consequences of that emotion (Ellis and DiGiuseppe, 1993). This categorization is based on qualitative differences between the emotions of the same valence, a difference that occurs mainly due to the underlying beliefs rather than to the variations in intensity (Ellis, 1994; Ellis and Harper, 1975). In other words, a higher intensity of "sadness" cannot be considered a "depression", the difference between the two emotional states being given by the specific beliefs that determine them (e.g., rational beliefs for functional negative emotions and irrational beliefs for dysfunctional negative emotions).

The Emotional Distress Profile represents a tool developed for *assessing the subjective dimension of the functional and dysfunctional negative emotions*.

Unconditional self-acceptance questionnaire

The unconditional self-acceptance makes reference to the fact that the individual "fully and unconditionally accepts himself whether or not he behaves intelligently, correctly or competently, and whether or not other people approve, respect or love him" (Ellis, 1977: 101). Unconditional acceptance can refer (1) to yourself, (2)

to the others and (3) to the living conditions.

The empirical data (Chamberlain and Haaga, 2001; David, Schnur and Belloiu, 2002) show that the implementation of this mode of evaluation in everyday life represents but a protective factor against stressful events. Research suggests (Chamberlain and Haaga, 2001) that when people are taught the “empirically validated life philosophy”, they assimilate it easier as follows: when they register a positive performance, they evaluate themselves positively (in terms of self-esteem), and when they register a negative performance, they evaluate their behaviour without assessing themselves (in terms of unconditional acceptance), which results in functional negative emotions (e.g. sadness), as opposed to dysfunctional negative emotions (e.g. depression). This is a pragmatic way of approximating a rational attitude in real life.

A. Dysfunctional Attitudes Scale

Dysfunctional Attitudes Scale (DAS - Weissman, 1979; Weissman and Beck, 1978) is an instrument which allows the assessment of various attitudes that may represent a predisposition for depression.

B. The cognitive level: standard progressive matrices

Standard Progressive Matrices assess the educational component of the G factor (Spearman). The educational ability is one that creates insights and relations, connections, discerning the meaning of confusion, perceiving and identifying relations between seemingly unrelated elements.

The essential characteristic of the educational ability is the capacity of generating new concepts, mainly nonverbal, thus allowing clear thinking.

The test provides an accurate estimation of the individual's ability to think clearly, at his/her own pace. The ability to think clearly is dependent on the health state and can be improved through practice, but to a lesser extent than the speed of intellectual functioning.

The results of the test must be considered in the context of additional information about the personal values and competencies assessed (interests, special skills, school results, etc.).

According to the score obtained, the classification is carried out as follows:

- LEVEL I: superior intelligence
- LEVEL II: above average intelligence
- LEVEL III: mid-level intelligence
- LEVEL IV: below average intelligence
- LEVEL V: intellectual disability

C. Personality: ZKPQ, YSQ (Zuckerman-Kuhlman Personality Questionnaire)

- The revised version of the ZKP questionnaire contains 99 items (ZKPQ 3rd group) distributed into five scales, which will be briefly described as follows:
 1. Sociability. The factor analysis identified a group of related items (parties and friends) indicating a preference for crowded parties and for interaction. The second factor shows intolerance towards social isolation in the case of extroverts and a preference for solitary activities in the case of introverts.
 2. Impulsive Sensation Seeking (ImpSS). The factor analysis of the items of this scale revealed two factors. The items included in the *impulsivity* factor describe the lack of planning and a tendency to act impulsively, without prior reflection. The *sensation seeking* factor describes the general need for sensations and restlessness; a preference for unexpected situations and friends, as well as the need for change and novelty.
 3. Activity (Act). The factor analysis identified two groups of items. One describes the need for activity, in general, impatience and restlessness when there is nothing to do. The second group of items (work effort) indicates a preference for a varied and sustained work, a high level of energy in everyday activities and tasks.
 4. Neuroticism-Anxiety (N-Anx). These items describe anger, emotional tensions, worries, constant indecision, lack of self-confidence and sensitivity to criticism.
 5. Aggression Hostility (Agg-Host). Half of the items describe the predisposition towards the verbal expression of aggressiveness. Others include rudeness, an antisocial behaviour, vengeance and enmity, a hot temper and the impatience manifested in interpersonal relationships.
 6. Infrequent. These items do not constitute a proper scale. The subjects that have not responded attentively or honestly can be excluded with the help of these items. They are exaggerated, socially desirable, but unsuitable to be considered as true.

Organizing and conducting the research

The sample of subjects: junior 2 team, male

Age: pupils aged 14 to 16

Location: Sports High School Bistrita, Bistrita-Nasaud

Period: School Year: 2012-2013

Table 1. The Zuckerman-Kuhlman Personality Questionnaire, Junior 2, Men

	Impulsive Sensation Seeking Scale	Anxiety Scale	Aggression Hostility Scale	Activity Scale	Sociability Scale
P. P.	Over threshold	Well above threshold	Well above threshold	Over threshold	Under threshold
P. S.	Over threshold	Well above threshold	Under threshold	Over threshold	Over threshold
M. P.	Over threshold	Over threshold	Well above threshold	Over threshold	Well above threshold
T. M.	Under threshold	Under threshold	Under threshold	Under threshold	Under threshold
T. C.	Well above threshold	Over threshold	Over threshold	Under threshold	Over threshold
K. R.	Well above threshold	Well above threshold	Over threshold	Under threshold	Well above threshold
P. R.	Over threshold	Over threshold	Under threshold	Over threshold	Over threshold
T. P.	Over threshold	Over threshold	Under threshold	Under threshold	Much under threshold
D. V.	Over threshold	Under threshold	Well above threshold	Under threshold	Under threshold
C. V.	Over threshold	Under threshold	Well above threshold	Under threshold	Well above threshold
V. R.	Over threshold	Under threshold	Well above threshold	Under threshold	Over threshold
S. A.	Well above threshold	Under threshold	Under threshold	Under threshold	Well above threshold
N. A.	Invalid Protocol				
A. C.	Invalid Protocol				

Result interpretation

The following general observations can be deduced from the ZKPQ personality questionnaire:

Most players register scores well above the threshold and over threshold on the impulsivity (11), anxiety (7), aggression (11) and sociability (9) scales and scores below threshold on the activity scale(8).

Taking into account the specific team games, more precisely communication, interrelationships, reciprocity, as success key factors, high and very high scores on the above-mentioned scale may mean or draw attention upon the following aspects:

1. The tendency towards impulsive acts, especially in competitions, in tense, fundamental or result situations; lack of planning or failure to comply with predetermined game strategies meant to be used in game-specific moments; team collaboration jeopardized by individual, selfish actions, with little chance of success; unexpected reactions, spontaneous reactions towards teammates, coaches, referees and spectators, in those particular contexts.

2. The athletes' aggressiveness, especially in the game of handball, is severely punished, any deviation

related to the intensity or the manifestation form of aggressiveness has, as a consequence, the enforcing of the punishments established in the regulations. That is why high scores on the aggressiveness scale can be associated with the tendency of triggering personal or group conflicts, with strong inner tensions, lack of self-confidence, sensitivity to criticism, all of these aspects hindering the training process in itself, as well as the competitive behaviour. People dominated by anxiety and aggressiveness are either failing in high emotionally charged situations or resort to hostility and violence in order to achieve the desired result. At the same time, they can also easily discourage themselves before the opponent, especially when the match does not develop in accordance with the predictions made before the start of the competition, and they intensely relive any failure over a long period of time, recovery being often problematic.

3. The failure behaviour is not less important, and that is when the team gives the coaches the impression that they intentionally want to lose the game. In contrast, low scores on the activity scale may indicate: low need for varied and intense stimulation; a low-energy level in sport activity. Anxious people usually prefer to avoid new, difficult situations, situations with a high degree of unpredictability, the completion factors being assessed as threatening, that is why they experience the fear of failure and become aggressive due to their negative image, low self-efficiency that makes them unable to cope with the situation.

4. Sociability is another factor that can represent an impediment in sports activities. Very high scores on the sociability scale imply strong preference for crowded, noisy parties and friends, intolerance towards social isolation and towards the sports training program, which at certain times is characterized by monotony and routine activities (low ambiguity tolerance and lack of stimulation specific for physical training camps and intense training periods). Another drawback of high scores on the sociability scale is likelihood that several strong personality athletes can relatively easily and frequently generate conflicts, in case of low-intensity factors, such personalities being often being conceited and stubborn (to which characteristics that are specific for this age range can be added: the search for identity, establishing one's role and status, the need for affirmation, bravery, thrills, etc.), all these leading to independent action, egocentrism, individualism and unfair competition. "Win at all costs" is the main creed that has negative consequences as concerns the interests of the team. On the other hand, a high score on the sociability scale can imply good communication skills and an interrelation capacity.

5. The infrequent scale of the ZKP questionnaire establishes the subjects that do not respond attentively or honestly to it, in these cases the protocol being invalid.

Custom interpretation of results:

P.P.: warnings on the anxiety and aggression scales, which can mean concern for minor things, poor ability to concentrate, fear of failure, emotion and confusion.

P.S.: possible problems connected to the tendency towards impulsive acts, poor decision-making capacity in tense situations, unstable performance, inconsistency and high anxiety that can lead to intellectual blockages and hasty actions.

M.P.: implies impulsivity, aggression and high sociability that can disrupt the progress of the game in key moments through nervous outbursts, verbal or physical aggressiveness, insults and verbal abuse.

T.M.: implies possible states of apathy, lack of involvement, communication and collaboration skills, thoroughness, weak ability to make decisions in short time, inability to perform under stress.

T.C.: implies mild impulsivity and anxiety that can lead to unstable performances.

K.R.: implies impulsivity, anxiety, aggression and high sociability, denoting a possible opinion leader, pronounced personality, but with a slight tendency towards superficiality and low endurance to prolonged efforts.

P.R.: implies performance anxiety, irrational and dysfunctional beliefs.

T.P.: implies slight impulsivity and anxiety.

D.I.: implies an aggressive behaviour tendency directed towards the referee, the coach and/or colleagues, rationalization search for culprits, frequent nervous and mental breakdowns.

C.V.: implies a relatively normal impulsivity and aggression level.

V.R.: implies very high scores on the aggression and the impulsivity scale, denoting mental, emotional and behavioural problems such as: hastiness, nervousness, low endurance under stress conditions, strong emotions or, on the contrary, vanity, arrogance, probabilistic success assessment, weak ability to overcome obstacles.

S.A.: denotes a possible inferiority complex, slight duplicity and a negative self-image.

A.C.: not to be interpreted

N.A.-not to be interpreted

t-Test

The t-test verifies the research hypotheses, namely whether the independent variable (mental preparation) affects the dependent variable (the results in sports competitions).

Table 2.Distance handball throwing

	Group of subjects	N	Average	Standard Deviation	Standard Deviation
Distance handball throwing (m), Final Test	Experimental Group	31	8.4149	1.4089	0.2530
	Control Group	31	6.0645	1.5903	0.2856

Table3.Standing long jump

	Group of subjects	N	Average	Standard Deviation	Standard Deviation
Standing long jump (cm), Final Test	Experimental Group	31	8.0968	1.3255	0.2381
	Control Group	31	6.2903	1.5534	0.2790

Table 4.30 m sprints from a standing start

	Group of subjects	N	Average	Standard Deviation	Standard Deviation
30m sprints from a standing start(cm), Final Test	Experimental Group	31	7.6452	1.6237	0.2381
	Control Group	31	6.7097	1.9697	0.2790

Conclusions and perspectives

The cognitive-behavioural intervention of the Sports High School psychologist in order to help the pupils to: manage their emotions, reduce their anxiety level, develop problem-solving and decision-making abilities through the decreasing of distorted thinking that has a direct impact upon the performance anxiety, and develop new problem-solving abilities with the purpose of efficiently adapting to the situations.

The statistical analysis carried out enabled the identification of significant differences between the final test results of the three sports activities, thus being demonstrated the fact that prior psychological preparation positively influence the results obtained in sporting events and competitions.

The results obtained from the research conducted highlight the importance and necessity of psychological tests in performance sports and especially at school level, where the foundations of great performance are being laid. As a result:

- The applied cognitive behavioural testing program has created a favourable environment for the entire group, as well as for each particular subject involved in the study, this being necessary in order to meet the sport demands;
- Dysfunctional, irrational cognitions can be identified and changed through psychological testing in the course of selection;
- The phrases “win at all costs”, “suitable at any age”, are no longer valid, the aim being the development of the pleasure of playing with the purpose of outdoing oneself, having gradually realistic objectives that lead to success (and not vice versa);
- Motivation should be an everyday task and it cannot occur simply by uttering monologues, no matter how persuasive they may be;
- The main assumption of the coach involves a paradigm change from “I want to win this game” or “I must win this game” to “I want to win over my athlete”, transforming the competition into a pleasure, a challenge and an opportunity for self-outdoing, and not a source of fears, concerns, frustrations and anxieties. Increasing the share of psychomotor training in the overall training process through appropriate forms and means opens the door towards better training of the future performance athletes.

The tests enabled us to obtain useful information regarding certain aspects of the athletes' personality and the way in which they perceive the relationship with their coaches throughout the psycho-educational process, as well as throughout competitions.

Within the experimental group, we have achieved a positive climate which allows a useful information exchange, while overcoming difficult situations and maintaining a high psychomotoric level during the training.

The research suggested new training and selection procedures, methods at the age range 14-16, as well as the necessity of psychological intervention.

No doubt that there are issues which have been not at all or only partially resolved. At the same time, generalization on the basis of small samples is controversial. However, despite the difficulties and obstacles, we believe (and research findings support this belief) that psychological intervention in sport practice is not just a fashionable activity, but a prerequisite for success. In an effort to provide a clearer picture and more rigorous data, we based our research on the specialized literature. As a novelty and individual contributions, we would like to mention:

A. The work concept—our starting hypothesis was the belief that the performance behaviour (in sport) depends not only on technical and tactical consistency, but equally on the psychological preparation;

B. The way in which the tests were integrated and applied required its adaptation to specific sport conditions;

C. Active participation and involvement in all areas involved in sport activity (selection, training, competitions, camps).

Consequently we believe that each psychologically reinforced athlete, each rationally sustained team, each coach that has acknowledged the advantage of adaptive thinking, would further facilitate the adopting of a winning mentality. Therefore, in our endeavour to select future champions, let us not forget, but even more, let us deliberately aim at developing well-adjusted personalities.

The benefits of taking part into the psychological preparation program have been statistically substantiated and it has been demonstrated the fact that psychological cognitive behavioural testing plays a significant role in achieving positive results and in restructuring dysfunctional and irrational thoughts, providing a functioning cognitive level; the research conducted have provided us with results that highlight the importance and need of psychological intervention in performance sports, especially at the selection level, where the foundations of the great performance are being laid, and in team sports, where difficulties are more complex and diverse, thus complicated by their immense variability!

Based on the above-mentioned considerations, it is required to verify the hypothesis that directs the cognitive-behavioural approach implemented at school sport level. The selection and training process supported by psychological cognitive-behavioural testing can lead to the improvement of the subjective anxiety state, the acquiring of rational beliefs and the increase of athletic performance.

We finally conclude that the more extensive and rigorous the information about this complex field of activity is, the more reduced are the chances of making mistakes, increasing the possibility of creating champions. Corroborating the data obtained as a result of the psychological research with the sport specific knowledge increases the quality of the selection process and, as a consequence, the performance that will be achieved.

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TRAINING OPTIMIZATION MANAGEMENT FOR THE RIGHT AND LEFT MIDDLE PLAYERS IN HANDBALL GAME, ECHELON JUNIORS I (GIRLS)

Managementul optimizării pregătirii interilor în jocul de handbal, la eșalonul de Juniori I (fete)

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Rezumat. *Lucrarea de față demonstrează că, prin aplicarea unei mai bune organizări, conduceri și desfășurări a antrenamentului în general și a pregătirii specializate a interilor în special, se poate optimiza această pregătire, concretizată prin creșterea eficacității aruncărilor la poartă. Au fost folosite metoda studiului bibliografic, metoda experimentului, metoda statistico-matematică și metoda grafică. Rezultatele obținute, exprimate în procente ce reprezintă eficacitatea medie a grupei de subiecți, au fost de 48.3% la testarea inițială și de 62.2% la testarea finală, ceea ce ne demonstrează că s-a înregistrat un progres de 13.9%. Concluzia este că pregătirea specializată a interilor, concretizată prin eficacitatea aruncărilor la poartă, se poate optimiza printr-un management mai bun al pregătirii și că demersul efectuat a fost eficient.*

Cuvinte-cheie: handbal, management sportiv, antrenament, optimizare, junior.

Abstract. *The present study demonstrates that, by applying a better organization, leadership and development of both training in general and specialised preparation of middle players in particular, this preparation can be optimized, which is concretized in an increased efficiency of the goal throws. We used the bibliographical study method, experimental method, statistical-mathematical method and graphical method. The results obtained, expressed in percentages representing the average efficiency of the group of subjects, were 48.3% at the initial testing and 62.2% at the final testing, which proves that a progress of 13.9% has been registered. The conclusion is that the specialised preparation of middle players, concretized in the goal throws' efficiency, can be optimized through a better training management, and that the approach achieved has been effective.*

Keywords: handball, sports management, training, optimization, juniors.

Introduction

Scientifically speaking, the rapid development and evolution of nowadays society are synonymous to a development of both quantity and quality in the field of high performance sports.

“The sport has come into the world in virtue of the human ideal. It is more than a religion, culture or subculture. On account of its values, it has to be defended and turned into profit” (Watt, 2003, quoted by Șanta-Moldovan, 2010: 6).

“As a modern life phenomenon practiced by hundreds of millions of people worldwide and watched as a show on huge sport arenas by billions, sport has developed a grand activity area. Every single town in this world has made certain that its athletes have where to train and where to compete” (Teodorescu, 2009a: 7).

“High performance, exceptional results and the ever increasing number of participants have entailed a new settlement made by the coaches: a solid and well-shaped training system, able to assure the athletes' fulfilment and satisfaction” (Teodorescu, 2009b: 7).

As a sports discipline, the handball game has developed together with a whole technical and tactical armoury. It has also entailed upon a huge mass of followers and protagonists, on the one hand, and numerous spectators, on the other hand. The game is organized on the basis of a competition system, on different age and performance categories.

“The handball game evolution may be attributed to the high technology breakthrough in the sports area. This has led to an improvement of both material and training conditions” (Baștiurea, 2001: 40).

The continuous development of sport performances is induced by a qualitative development of the training process, which is implicitly brought by numerous factors: the ability and professional training of the coach, the competition system, the contribution and help of additional sciences in establishing some efficient ways for scientifically working with the trainees. We can also mention here the trainees' motivation for practicing high performance sports, but also the material basis and the training conditions.

Starting with the game analysis and that of the teams participating in world championships and other world competitions, also including some valuable junior and youth teams, the aims and developing trends of modern handball game are: the ever increasing game speed, the technique orientation towards perfection and best speed

efficiency under the opponent's pressure, as well as the maximized improvement of the position specialization (the last being done in parallel with the mobility and effective playing on two or even three positions).

The training complexity consists of the fact that this is set according to the content of each training factor, on the one side, and according to the evaluation of both the opponent and game, at a national and international level, on the other side.

Within the handball specialty framework, continuous new researches are being done; they refer to the modern techniques used in both the sports training process and the educational process. At the same time, modern structure patterns of the specific training and competition effort are established, reported to multiannual training dates. New ways of improving the training process for the junior teams are being searched.

The most efficient methods of specific training are being used, in connection with the handball players' peculiarities and characteristics, things that may lead to an actual specialty.

Nowadays, the handball game is in the public eyes on the strength of a remarkable competition within important, wide scope tournaments. Thus, we can notice a continuous development tendency.

This development trend is determined by the researches having a pronounced creative feature, done by experts from many countries. Their aim is to improve all components belonging to the specialized training system, such as organizational, technical-material and scientific-methodological bases. All these impose a particular emphasis on the research of the new tendencies in the development of specialized training.

The study hypothesis is to see if this training could be improved by a better management, administration and game sequence of the middle players from the echelon Juniors I, girls. The evaluation would consist of measuring the goal throws' efficiency during the training process.

The objective of the present study is to take notice of the junior handball players' training and see if this can be optimized by a better management, administration and an improved game sequence, concretized in a higher goal throws' efficiency.

The aim is to show the raising of this efficiency by using the methods mentioned above.

Sports management. The "management" concept comes from the English term "to manage", meaning "to administer", "to lead", a definition approved worldwide and taken into consideration as "a coordination process of human, informational, material and financial resources, in view of accomplishing the organization's aims" (Rece and Grandy, 1984, quoted by Colibaba-Evuleț and Bota, 1998, p. 65).

Sports management means organizing, coordinating, leading and supervising or coaching, but also evaluating, surveying and guiding in sports training, in order to accomplish the team's high performance objectives.

Efficiency, as a main component of management, represents the extent to which an activity meets some demands or accomplishes a goal. In our particular case, it represents the extent to which administrating and managing an optimal training for a junior team 1 can lead to the performance development. This efficiency may be positive, naught or negative.

The managerial activity of both teams and handball players consists of organizing, administrating and developing an effective training, and has as a final aim achieving high sports performances.

These performances, regardless of the sports they belong to, are monitored at all levels, starting with the parents and ending with the teacher. They go from the athlete to the sports organization manager or the club manager and create the essence, the aim, the satisfaction, generating the sports policy.

In both the performance sports system and the high performance sports system, there is to be found a strong in-depth specialization for the sports tests. This one is equally used by the athletes and the coaches.

The training management is done by blending the management principles with the sports training principles. This leads to a training optimization for the handball players, in view of their participation in official competitions.

Within the framework of physical activity and sport, management takes some leading forms, as follows:

The forecast management - consists of forecasting, on a longer or shorter period of time, the incoming activity.

The strategic management - represents the management form which is fixed on some objectives and whose achievement requires a clear, concise and palpable identification of the means to carry them into effect. It is also needed to identify the most effective way of accomplishing these objectives.

The dynamic management - is the management on a daily basis, mainly consisting of an adaptation to the real every day situation.

The management through objectives -the objectives may be qualitative, by establishing a certain performance to be achieved, and quantitative, referring to mass, number, etc.

The management principles can be systematized as follows:

- The unity management principle
- The decision disposition unit principle
- The number of link principle
- The diapason control principle
- The division of labour or specialization principle
- The delegation of powers principle
- The principle of equilibrium between centralization and decentralization

We could generalize and analyse the training practice for high performance sports in countries that have a rich background in this field (like Sweden, Norway, Russia and Germany). In the latest years, multiple researches have been carried out in the field of sports training theory and methods by Filin (1968; 1974), Stein and Federhoff (1975), Trosse (1977), Bastian and Kreher (1978), Pollany (1978), Filin and Fomin(1980), Platonov (1980; 1984; 1998), Matveev (1997), Bompa (2002) and many other experts in this area of interest. All these allow us to characterize the fundamental directions which have determined the progress of this sport worldwide.

Handball game training. The experts' concerns, especially those of the theorists, have been put across in an assembly of principles and knowledge specific to the ample handball players' training process, also known as The Theory and Methods of Sports Training.

By "training", the psychologists understand "the wholeness of the human body challenges that lead to its both functional and morphological adaptability, finally expressed by an increase of the effort ability" (Harre, 1973; 11).

The specialized literature defines sports training as "a pedagogical process carried out in a systematic and gradual manner, having as a result an adaptation of the human body to both physical and psychic intense efforts that appear in competitions organized for different sport areas" (Dragnea, 1996: 9).

One of the sports training definitions is that "sports training is a pedagogical process governed by some scientific principles, which, through a planned and systematic influence on the capability of achieving a high performance, leads the athletes to obtaining remarkable results in a certain sport area" (Menschel, Steinand Fährmann, 1984: 6).

The sports training content establishes the structural elements that, on the strength of some laws and functional and methodical rules, lead to high performance. The complexity of the sports training content has increased continuously, as well as the development of sports performance and sports areas.

The handball players' performance ability grows through the training process, the competitions and other forms that lead to an optimal efficiency.

The training condition implies certain components, also called "the sports training components". These are: the physical component, which refers to the physical qualities (both the general and the handball-specific ones), the technical component, which refers to the technical skills of the handball players, the tactical component, which refers to the tactical skills of the handball players, the theoretical component, related to the theoretical knowledge about the game, regulations, refereeing, etc., and the psychological component, which deals with the handball players' psychic qualities. All these form an integral part of high performance achievement.

Due to the fact that the complexity of modern handball game training calls for ever increasing efforts from the players and the human body's adaptability, and as skill nearly reaches upmost limits, "the elaboration of some scientific legislative measures is needed, ones that can be applied in the training process. As a consequence, the sport science has developed rapidly in the last years, and this has led to the release of new principles in the training process. Thus, the training is considered a bio-psycho-social and multifactorial process" (Baştüre, 2007: 3).

It is considered that both the full understanding and putting into practice of the handball game training principles have a crucial significance in obtaining and maintaining high sports performances at a superior level.

These principles also constitute the start of both theory and practice in modern handball game training.

Material and method

The training method used in sports activity as a concept, according to DEX, can be defined as “a procedure or an assembly of procedures or means, which, carefully selected, judged, and judiciously put into practice lead to the accomplishment of the handball game training purpose. From the handball game training principles, we used in the experiment the effort supervision principles (the training continuity, the progressive effort, the versatility and utility of training, the cyclic alternation of training), the in-depth specialized instruction principle, the principle of adaptation to maximum intensity efforts. We also used the principle of versatile development of actuating skills and multifunction parameters, but the individualization principle was preponderant.

It is said that the individualization principle calls for an early choice of the training goals and targets, of the physical exercise form, character, intensity and duration. This choice should be made according to the handball players' age and gender, functional capabilities, training stage and health condition, also taking into consideration their physical and moral features. This implies a good knowledge of the handball players' characteristics, the continuous surveillance of their behaviour and an attunement of the training efforts to their physical and psychical capabilities.

The individualization principle “cannot be mistaken for the working procedure. The latter is quite circulated in the practical activity, namely the instructor's individual work together with each of the handball players” (http://www.aikido.ro/index_html_files/ANTREN_SPORTIV.pdf).

As a matter of fact, the individualization principle stands for the maximum capitalization of the handball player's availability and capabilities, thus ensuring a higher development of the performance ability. The individualization also refers to the subjective information and psychical reactivity to special stimulation.

The main method we used was the work on small groups of handball players. The idle times have been cut out by decreasing the breaks between renewals, shortening the times used for explanations and increasing the number of goal throws.

The participants in the experiment were the left and right middle players of the junior team from Sports Programme High School of Braila. There were six handball players divided into two groups of three players each, according to their team position (three right middle players and three left middle players).

The experiment was performed at the Sports Programme High School of Braila, between 1 October and 15 December 2014, at the High Performance Children group, Juniors I, girls. It took place in the sports games hall of the high school, a hall remarkably equipped with: a homologated volleyball court, a homologated handball court, locker rooms, a gym, a store room, a consulting room and also rooms for sports teachers.

The materials we used were 30 handball balls and 7 data status summarizing tables (a table for each handball player and one table to sum up all data from the other six).

The test consisted of performing 30 goal throws from the middle player position (left-right), 15 throws from the left middle player position and 15 throws from the right middle player position.

The throws were performed by jumping, 9-10 metres from the goal, preceded by dribbling shifting, starting from the court's centre, and they were done successively, the handball players slowly jogging to the centre and repeating the action.

In order to cut out the idle times, an intense work was carried out at both goals, the oral corrections were eliminated and the balls were prepared from the beginning at the court's centre by other four handball players who did not take part in the experiment.

Results

Table 1. Statistics of the games

Subjects	Total number of goal throws	Number of hits at Ti	Efficiency (%)	Number of hits at Tf	Efficiency (%)
S1	30	15	50	18	60
S2	30	12	40	17	56.60
S3	30	16	53.30	19	63.30
S4	30	14	46.60	19	63.30
S5	30	13	43.30	18	60

S6	30	17	56.60	21	70
Medium efficiency	---	---	48.30%	---	62.20%
The progress	13.90%				
Medium hits	---	14.5	---	18.67	---
The progress	4.17 throws				

Legend: S1-6=subjects 1,2, ... 6, Ti – initial testing, Tf – final testing

Table 1 shows that from a medium efficiency of 48.3% at the beginning of the experiment, obtained after the initial testing, it has been reached a medium efficiency of 62.2%, which is obviously higher, the registered progress being of 13.9%.

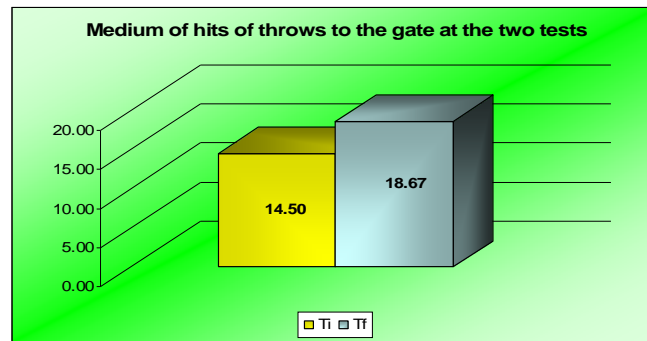


Fig. 1. Medium of the hits of throws to the gate at the two tests

Legend: Ti/Tf – initial testing/final testing

From the diagram 1, it can be seen that, on the score of our experiment, the average of the subjects' successful goal throws has increased from 14.5 at the initial testing to 18.7 at the final testing, the difference between the two tests being of 4.17 throws.

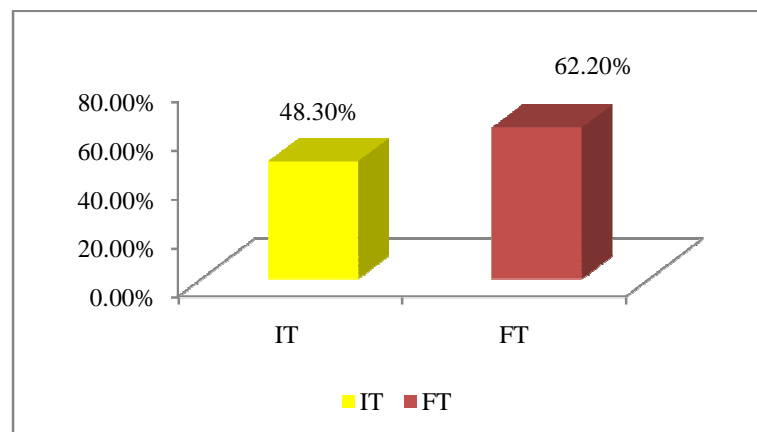


Fig. 2. Medium efficiency of the throw the gate at two tests

Legend: Ti/Tf – initial testing/final testing

Figure 2 presents the evolution of the average successful goal throws between the two tests, this meaning an increase from 48.3% at the initial testing to 62.2% at the final testing, the difference being of 13.9%

Conclusions

After studying and interpreting the results of the experiment, we can conclude that the hypothesis we proposed at the beginning of this research has been checked, so it is correct to affirm that a good and effective management can lead to the training optimization, incarnated in rising efficiency of the goal throws performed by the middle players.

We can also say that improving the goal throws' efficiency is not the only way of evaluating the management and optimization of the middle players' training, but there are many others. Among these, we mention the precision and speed used by the middle players in applying both the individual and the collective technique in school or official games, the actions' efficiency both in defence and attack, increasing the number of goal throws from one training to another and performing a certain number of goal throws in a specific time unit.

As a final conclusion, we can say that only through a better training organization, administration and development (a good and effective management), an optimization can be attained (by each handball player in particular and by the whole handball team in general).

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PHYSICAL EXERCISE, A MEANS OF IMPROVING THE QUALITY OF LIFE IN CHILDREN WITH CEREBRAL PALSY

Exercițiul fizic, mijloc de îmbunătățire a calității vieții la copiii cu paralizie cerebrală

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Rezumat. Lucrarea de față își propune să pună în evidențiere că pacienții cu paralizie cerebrală, care beneficiază de kinetoterapie, vor beneficia și de o creștere a calității vieții, tradusă prin creșterea gradului de independență funcțională. Obiectivele specifice ale acestui studiu au constat în evaluarea copilului, în funcție de următoarele dimensiuni ale calității vieții: bunăstarea fizică și funcțională, precum și capacitatea de a-și îndeplini sarcinile obișnuite în existența lui cotidiană. Pentru a sublinia necesitatea studiului, am plecat de ipotezele conform cărora, dacă utilizăm exercițiul fizic terapeutic ca mijloc de bază în scopul educării/reeducării mișcării, se poate asigura o motricitate cu indici superiori de eficiență a funcționalității și totodată, prin utilizarea metodelor și mijloacelor preluate din kinetoterapie, putem crește calitatea vieții, tradusă prin creșterea gradului de independență funcțională. Ca metode de cercetare, am folosit metoda documentării teoretice, metoda observației, metode de explorare și evaluare, metoda experimentului, metoda statistico-matematică, metode de prelucrare a datelor și de reprezentare grafică a rezultatelor. Rezultatele obținute în urma evaluărilor inițiale și finale au fost pozitive, înregistrând indici superiori în ceea ce privește calitatea vieții. Concluziile evidențiază faptul că programul de kinetoterapie specific, aplicat la copilul cu paralizie cerebrală, contribuie la îmbunătățirea calității vieții.

Cuvinte-cheie: exercițiu fizic, calitatea vieții, copil, paralizie cerebrală

Abstract. This paper aims to emphasize that patients with cerebral palsy receiving physical therapy will also benefit from an increased quality of life, translated by the increase of functional independence degree. The specific objectives of this study were to assess the child, according to the following dimensions of the quality of life: physical and functional well-being and ability to perform common tasks in the daily existence. To highlight the necessity of the study, we have started from the assumptions according to which, if we use therapeutic exercise as a basic means for the education/reeducation of movement, we can ensure a motricity with superior efficiency indices of functionality, and if we use the methods and means taken from physical therapy, we can improve the quality of life, translated by the increase of functional independence degree. As research methods, we used the theoretical documentation method, the observation method, exploration and evaluation methods, the experiment method, the statistical-mathematical method, methods of data processing and graphical representation of results. The results of the initial and final evaluations were positive, recording superior indices in terms of quality of life. Conclusions indicate that the specific physical therapy program, applied to children with cerebral palsy, contributes to improving the quality of life.

Keywords: physical exercise, quality of life, child, cerebral palsy

Introduction

According to international statistics, the incidence of cerebral palsy is 2 per 1,000 live births. In Romania, this represents approximately 500 children affected annually. Taking into account the period during which spastic lesions develop their full clinical picture, i.e. until the age of 10 years, it is estimated that there are about 5,000 children in Romania suffering from physical disabilities caused by cerebral motor infirmity. Newacheck (1992) estimated that more than 100,000 Americans under the age of 18 had some degree of neurological disability attributed to CP. In France and England (Evans, 1989: 121), it was estimated that 25% of patients with CP had a significant motor deficit, being unable to walk alone, and 30% had mental retardation. This experimental research aims to identify to what extent a program that is based on physical exercise can improve the functionality of children with cerebral palsy.

Materials and methods

For this study, which highlights the effect of physical exercise, we chose 10 subjects diagnosed with cerebral palsy located in grades III and IV of motor functionality, according to the classification of motor function (Rosenbaum *et al.*, 2007), with an intelligence quotient of 50-70 points. Children are aged 7-10 years and belong to the General Directorate of Social Assistance and Child Protection Bacău. Based on the records of observations individualized, subjects received intervention 3 times per week.

To emphasize the necessity of the study, we have started from the assumptions according to which, if we use therapeutic exercise as a basic means for the education/reeducation of movement, we can ensure a motricity with

superior efficiency indices of functionality, and if we use the methods and means taken from physical therapy, we can improve the quality of life, translated by the increase of functional independence degree.

The research was conducted over a 9-month period, from July 2013 to August 2014, as follows:

- July 1 - August 30, 2013 - evaluation and implementation of experimental research group, application of initial assessment tests and design of the intervention programs.
- September 1, 2013 - May 30, 2014 - application of the intervention programs and the final assessment tests.
- June 1 – August 20, 2014 - processing the estimated dynamic evolution parameters through charts, data collection and interpretation of results.

Methods and means:

- Bobath method;
- therapeutic exercise (posture, passive and active-reflective exercises, proprioceptive and exteroceptive stimulation).

Measurements and assessment tools

In order to determine the age particularities, the characteristics of biomotor potential development in each period, there were used tests for assessing the overall development and motor function. To assess motor and functional global development, we chose to use a test that aimed to highlight the degree to which the individual is limited in motor function: global motor function assessment test (EMFG) (Robănescu, 2001: 16). It is a standardized investigation designed and validated for measuring changes in overall functional motility over time in children with cerebral palsy.

Results and discussion

Table 1 presents the results of the assessment test for motor and functional global changes occurred in the indicators calculated (EMFG) (Robănescu, 2001: 6).

Table 1. The results from the global motor function assessment test (EMFG)

Item no.	I	V	Lying %		Seated %		Quadruped %		Orthostatic %		Away %	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1.	DM	4	80.39	98.03	78.33	88.33	52.38	66.66	24.20	28.20	4.16	15.22
2.	BSA	3	70.58	88.23	68.33	76.66	54.76	59.52	38.46	43.58	8.33	11.11
3.	CM	6	77.47	100	83.33	93.33	73.80	88.09	61.53	64.10	50.00	56.94
4.	MD	4	79.67	98.03	43.33	66.66	56.98	69.04	50.00	56.41	38.43	40.27
5.	SB	4	86.27	100	86.66	96.66	78.57	85.71	64.10	84.61	50.00	52.77
6.	MA	5	72.54	100	73.33	86.66	40.47	78.57	41.00	56.41	9.72	22.22
7.	MMA	5	76.47	88.23	73.33	93.33	47.61	69.04	35.89	53.84	11.11	40.27
8.	OA	6	81.96	100	81.66	93.33	69.04	76.19	51.41	66.66	38.88	43.05
9.	CP	7	82.76	96.07	79.35	90.00	76.87	73.80	58.99	48.71	46.79	38.88
10	L M	7	72.54	86.27	70.00	80.00	40.47	50.00	38.46	48.71	43.05	59.93

Table 2. The average results of individual indicators for paired samples in T-test EMFG

Paired samples	N	Minimum	Maximum	Average	Standard deviation	Coefficient of variation
initial lying	10	70.58	86.27	78.0650	5.08257	6.51
final lying	10	86.27	100.00	95.4860	5.62755	5.89
initial seated	10	43.33	86.66	73.7650	12.21345	16.56

finalseated	10	66.66	96.66	86.4960	9.37786	10.84
initial quadruped	10	40.47	78.57	59.0950	14.54651	24.62
final quadruped	10	50.00	88.09	71.6620	11.52514	16.08
initial orthostatic	10	24.20	64.10	46.4040	12.89842	27.80
finalorthostatic	10	28.20	84.61	55.1230	15.01286	27.24
initial away	10	4.16	50.00	30.0470	19.17032	63.80
final away	10	11.11	59.93	38.0660	16.94878	44.52
Valid N	10					

Table 2 presents the descriptive statistics of individual indicators EMFG calculated by t-test, for samples of the dependent variable pairs. Thus, it is observed that both the initial and final samples obtained low values of standard deviations and the coefficients of variation had most values below 30%, which indicates a very good homogeneity, a mean representative for the groups studied, both in the initial and the final testing phases. Coefficients of variation for walking test in both phases of testing exceed 30%, which means that the group has a lower homogeneity.

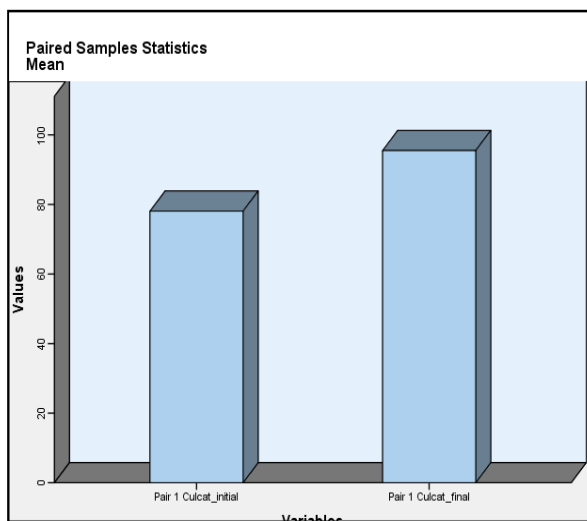


Fig. 1. Dynamics of changes: specific global lying position seated

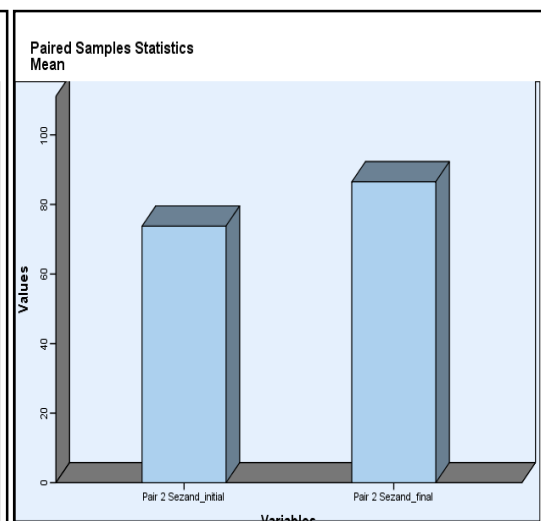


Fig. 2. Dynamics of changes: specific global position

For lying position: 78.06 initial arithmetic average and final average is 95.48, which shows an increase in the average value by 17.42, as shown in Fig 1. T-test for dependent samples is positive; the difference between the two testing phases positively increases motility and function in lying position.

For sitting position, 73.76 initial arithmetic average and final average is 86.49, which shows the progress of 12.73, as shown in Fig 2. T-test for dependent samples is positive; the difference between the two testing phases positively increases motility and functionality in sitting position.

Table 3. Descriptive analysis of standard deviations

Items	The differences between pairs					t	df	Significance threshold
	Average	Standard deviation	Std. error of the mean	95% Confidence interval difference				
				Inferior	Superior			
initial lying	-17.42100	4.76612	1.50718	-20.83048	-14.01152	-11.559	9	0.000
final lying								

initial seated	-12.73100	4.94632	1.56416	-16.26938	-9.19262	-8.139	9	0.000
final seated								
initial quadruped	-12.56700	11.10621	3.51209	-20.51191	-4.62209	-3.578	9	0.006
final quadruped								
initial orthostatic	-8.71900	9.14896	2.89316	-15.26377	-2.17423	-3.014	9	0.015
final orthostatic								
initial away	-8.01900	10.09773	3.19318	-15.24248	-0.79552	-2.511	9	0.033
final away								

M = mean difference between the two tests; *SD* = standard deviation of the sample resulting from differences in the two samples; Sample *t* = mark differences; paired samples *t*-test $t(5)=10$; *p* = probability materiality or error; $p<0.01$

As shown in Table 3, the correlation coefficient values are in the range 0.608-0.928, and $p<0.05$. The strongest correlation is seated, the indicator showing a positive correlation with a value of 0.928, followed by walking, with a very good positive correlation with the value of 0.895. A good correlation was seen for standing index, which has the value 0.795. Weaker correlations are recorded for lying indices, with correlation coefficients of 0.659 and 0.608. Table 3 shows the values calculated by Student's *t*-test, *t* - dependent variables, which are compared with the reference *t*-value in Table, 65 for a confidence interval of 95% and *df* = 9 (degrees of freedom).

Lying: the *t*-value = 11.559 obtained is greater than the value of the variable $t = 2.260$ in Fisher's table for *df* = 9 degrees of freedom and a confidence level of 0.05 or 95%. This value of *t* and $p < 0.05$ indicate that difference sare statistically significant.

Seated: the *t*-value = 8.139 obtained is greater than the value of the variable $t = 2.260$ in Fisher's table for *df* = 9 degrees of freedom and a confidence level of 0.05 or 95%. This value of *t* and $p < 0.05$ indicate that differences are statistically significant.

Standing: the *t*-value = 3.578 obtained is greater than the value of the variable $t = 2.260$ in Fisher's table for *df* = 9 degrees of freedom and a confidence level of 0.05 or 95%. This value of *t* and $p > 0.05$ indicate that for this test the differences are not statistically significant.

Orthostatic position: the *t*-value = 3.014 obtained is greater than the value of the variable $t = 2.260$ in Fisher's table for *df* = 9 degrees of freedom and a confidence level of 0.05 or 95%. This value of *t* and $p < 0.05$ indicate that differences are statistically significant.

Walking: the *t*-value = 2.511 obtained is greater than the value of the variable $t = 2.260$ in Fisher's table for *df* = 9 degrees of freedom and a confidence level of 0.05 or 95%. This value of *t* and $p < 0.05$ indicate that differences are statistically significant.

Conclusion

The studies included in the research allow us to highlight some conclusions regarding the degree of manifestation of cerebral palsy and increased functionality. Knowing and respecting the particularities of the condition of all the factors that may affect recovery and neuromotor development stages, closely related to the degree of maturation of the nervous system, ensure the optimal selection and application of rehabilitation exercises.

Using therapeutic exercise as a basic means for the education/reeducation of movement ensure superior efficiency indices of functionality. By using means and methods taken from physical therapy, the quality of life improves, which can be translated by the increase of functional independence. Classification of motor developmentis done according to the active movements and the motor function level, and we can thus provide important data on the prognosis of the disease.

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STUDY REGARDING SPATIAL ORIENTATION IN PRIMARY SCHOOL CHILDREN

Studiu privind orientarea spațială în ciclul primar

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Rezumat. Perioada școlară este în primul rând centrată pe problemele adaptării școlare și ale învățării și prezintă progrese importante în dezvoltarea psihică datorită procesului învățării care începe să fie conștientizat de școlar. Structura perceptiv-motrică de spațiu se realizează în mod special pe baza cunoașterii schemei corporale proprii și a altor persoane, pe cunoașterea pozițiilor propriului corp precum și a obiectelor în acțiune, pe baza unor acumulări din experiența proprie (vizuală, cutanată, kinestezică și auditivă). În această lucrare ne-am propus să subliniem importanța identificării nivelului de orientare spațială la copii din ciclul primar. În acest sens am stabilit ca și obiective realizarea unui studiu în vederea identificării nivelului de orientare spațială a copiilor din ciclul primar, precum și identificarea precoce a tulburărilor de orientare spațială, pentru a orienta procesul de educare sau reeducare în vederea dispariției sau diminuării acestora. Rezultatele obținute arată prezența tulburărilor de orientare spațială, ce pot conduce implicit și la declanșarea altor tulburări, dar și la incapacitatea subiecților de a percepe și stabili succesiunea evenimentelor motrice.

Cuvinte cheie: orientare spațială, copii, ciclul primar

Abstract. The primary school period is centered mainly on the problems of school adaptation and learning and presents important progress in the mental development due to the learning process of which the primary school child begins to be aware. The perceptive-motor spatial structure is formed mostly on the basis of the knowledge of one's own and of others' body schema, the knowledge of one's own body positions, as well of the position of objects in action, based on accumulations in one's own personal experience (visual, cutaneous, kinesthetic and auditory). This paper aims to emphasize the importance of identifying the level of spatial orientation in primary school children. For this, the following **objectives** have been set: to conduct a study to identify the level of spatial orientation in primary school children, as well as to early identify the spatial orientation disorders, in order to direct the education or reeducation process to eliminate or reduce the problems. The recorded results show the presence of spatial orientation disorders that may lead to other disorders and to the subjects' inability to perceive and establish the succession of the motor events.

Keywords: spatial orientation, children

Introduction

The spatial orientation, organization and structure form the major coordinates for knowledge during school years, both for the normal child and for the one with orientation problems.

Any phenomenon of objective relations is conducted in space and time, "an existence outside time being as big of an absurdity as an existence outside space".

Spatial orientation disorders are caused by an incorrect integration of one's body schema, by laterality disorders or by an insufficient training of the child in regards to manipulation activities.

The symptoms of spatial orientation disorders are:

- the child does not know spatial terms;
- the child is incapable of integrating in activities;
- the child knows spatial terms, but incorrectly perceives the positions, either on the right-left axis or on the vertical plane, with lexical-graphical consequences;
- the child has no spatial memory, is incapable to recognize familiar places and to reconstitute a course (Păunescu and Mușu, 1990: 160-161).

In regards to the temporal orientation, organization and structure disorders, they manifest through an incapacity to establish the order and succession of events, facts, etc., an inability to situate the facts or events "before" and "after", an incorrect left-right organization. The subject is incapable of perceiving intervals, of distinctly perceiving the words in a sentence (writing them as one word), presenting rhythm irregularities, being incapable of organizing his own time, incapable of foreseeing various activities, losing a lot of time in the initial stage and manifesting rush in the final stage (hence a large number of incorrect performances) (Horghidan and Mitache, 2000: 169).

The *aim* of this research is to identify the level of spatial orientation in primary school children. For this study, the following *objectives* have been set:

- to conduct a study to identify the level of spatial orientation in primary school children;

- to early identify the spatial orientation disorders, in order to direct the education or reeducation process to eliminate or reduce the problems.

This study tried to verify the *hypothesis* stating that *presumably, by applying specific assessment tests, one can discover the spatial orientation disorders in primary school children.*

Materials and Methods

The group of subjects comprised in the research had a number of 60 primary school children aged between 6 years and 6 months and 10 years and 5 months, from School 10, Bacau, School 27, Bacau, and the “Stefan cel Mare” National Pedagogical College, Bacau., where the research was conducted.

The research methods used were established according to the research objectives, as follows:

- *the bibliographical study method*, to know the scientific foundation for this theme, as well as the new data from the professional literature;
- *the assessment method*, in order to assess the orientation ability, through the **Piaget-Head spatial orientation challenge** (Table 1), envisaging the right-left spatial orientation, and in order for the psycho-motor examination to be as complete and precise as possible, the test must meet certain requirements: to be well explained so that the subjects can perform it fast and to be applicable to collective teaching. The examination criteria allow the comparison between same age subjects within a group, the comparison between the results recorded during the initial testing and during the various stages of reeducation in the same subject.

Table 1. The Piaget-Head spatial orientation (right-left) challenge (Vlad, 1999: 147)

Age	Description of the challenge	No. of challenges that must be correctly performed
6	Right-left - the child must recognize his own right and left. 1.show the left hand 2.show the right hand 3.show the right eye	3/3
7	A.Performing actions at voice command: 1. Put your right hand on your left ear; 2. Put your left hand on your right eye; 3. Put your right hand on your left eye; 4. Put your left hand on your right ear. B. The position of two objects (two balls of different colors) 5. Is the red ball to the right or to the left? 6. Is the blue ball to the right or to the left?	5/6
8	Right or left, recognition of the position of other person who sits in front of the child 1. the child touches my left hand 2. the child touches my right hand, then the examiner holds the ball in his right hand. 3. In which hand am I holding the ball?	3/3
9	Imitation of the movements performed by the examiner in front of the child 1. Left hand right eye; 2. Right hand right eye; 3. Right hand left eye; 4. Left hand left ear; 5. Right hand right ear; 6. Left hand right ear; 7. Right hand left ear; 8. Left hand left eye.	6/8
10	Imitation of the movements performed by the examiner in front of the child 1. Left hand right eye; 2. Right hand right eye;	6/8

3. Right hand left eye;
4. Left hand left ear;
5. Right hand right ear;
6. Left hand right ear;
7. Right hand left ear;
8. Left hand left eye.

- the *statistical-mathematical method* was used to transpose the results of the assessment into numerical data, the objectification of the phenomena being done through numbers;
- the *graphical representation method*, used in this research to highlight the significance of the data and to give a suggestive interpretation of the emphasized phenomena.

The research was conducted over a period of 6 months, between July 18, 2013, and January 5, 2014, comprising the following stages:

- July 18 - August 30, 2013 - choosing the assessment tests and creating working charts;
- September 3-12, 2013 - approaching the schools to get their approval to conduct the research;
- September 17-20, 2013 - applying the motor assessment tests to the school children;
- September 23 - December 9, 2013 - analysis and interpretation of the data recorded during the assessment tests;
- December 10, 2013 - January 5, 2014 - drawing the conclusions and writing the paper.

Results and Discussions

Table 2. Collective results for the Piaget-Head spatial orientation challenge

	No. of subjects	Minimum value	Maximum value	Arithmetic mean	Standard deviation	Coefficient of variability %
Grade I	19	0.00	3.00	1.42	0.69	48.73
Grade II	16	0.00	3.00	1.25	0.85	68.51
Grade III	15	0.00	3.00	1.26	1.22	96.53
Grade IV	11	0.00	3.00	1.45	1.12	77.56

Table 2 presents the collective results recorded by the subjects from the four grades during the Piaget-Head spatial orientation challenge, as follows:

- for the **first grade**, the minimum value of the number of unsuccessful performances during the Piaget-Head challenge is 0, the maximum one is 3, with an average of 1.42. The standard deviation has a small value, but the coefficient of variability is higher than 30%, meaning that the group has a low homogeneity as the number of unsuccessful performances is concerned;
- for the **second grade**, the minimum value of the number of unsuccessful performances during the Piaget-Head challenge is 0, the maximum one is 3, with an average of 1.25. The standard deviation has a small value, but the coefficient of variability is higher than 30%, meaning that the group has a low homogeneity as the number of unsuccessful performances is concerned;
- for the **third grade**, the minimum value of the number of unsuccessful performances during the Piaget-Head challenge is 0, the maximum one is 3, with an average of 1.26. The standard deviation has a small value, but the coefficient of variability is higher than 30%, meaning that the group has a low homogeneity as the number of unsuccessful performances is concerned;
- for the **fourth grade**, the minimum value of the number of unsuccessful performances during the Piaget-Head challenge is 0, the maximum one is 3, with an average of 1.45. The standard deviation has a small value, but

the coefficient of variability is higher than 30%, meaning that the group has a low homogeneity as the number of unsuccessful performances is concerned.

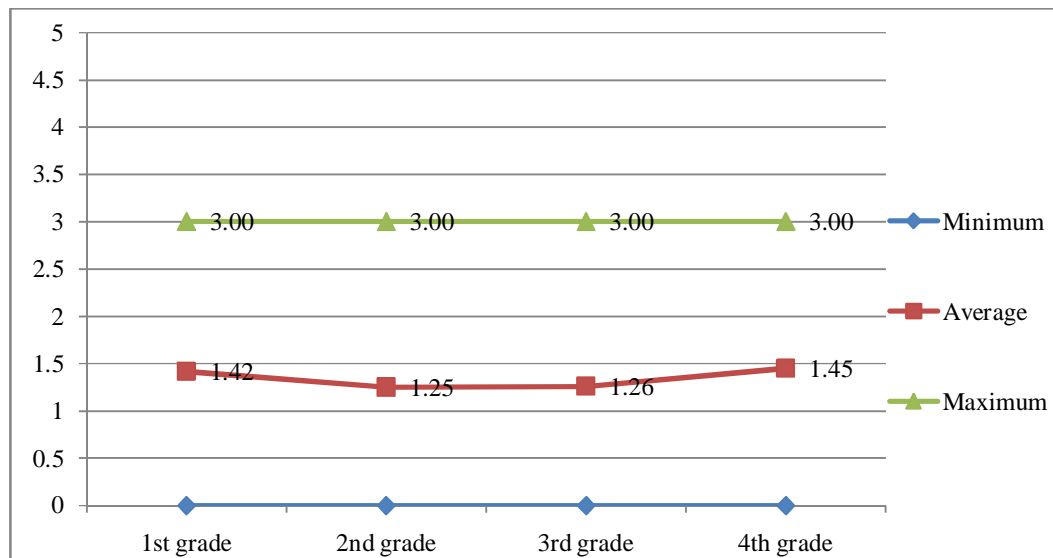


Fig.1. Graphical representation of the Piaget-Head challenge

Figure 1 shows that the minimum values recorded during the Piaget-Head spatial orientation challenge for grades I, II, III, IV are constantly 0. In regards to the maximum value, it is also equal for all grades (3). The arithmetic means have the values of 1.42 for the first grade, 1.25 for the second grade, 1.24 for the third grade, and 1.45 for the fourth grade.

Table 3. Collective results for the Piaget-Head spatial orientation challenge

Challenge Piaget-Head	Successful test				Unsuccessful test		First Grade (6 years old)
Accomplished challenges	1/3		2/3		3/3		
No. of subjects	3		2		0		
Percentage 1	60.00%		40.00%		0.00%		
Percentage 2	100%				0.00%		
Accomplished challenges	2/6	3/6		4/6	5/6	6/6	First Grade (7 years old)
No. of subjects	1	4		8	1	0	
Percentage 1	7.14%	28.57%		57.14%	7.14%	0.00%	
Percentage 2	92.86%				7.14%		
Accomplished challenges	1/6	2/6	3/6	4/6	5/6	6/6	Second grade (7 years old)
No. of subjects	0	1	4	1	1	0	
Percentage 1	0.00%	14.29%	57.14%	14.29%	14.29%	0.00%	
Percentage 2	85.71%				14.29%		
Accomplished challenges	1/3		2/3		3/3		Second grade (8 years old)
No. of subjects	1		6		2		
Percentage 1	11.11%		66.67%		22.22%		
Percentage 2	77.78%				22.22%		

Accomplished challenges		1/3		2/3		3/3		Third grade (9 y.o.)	
No. of subjects		0		0		4			
Percentage 1		0%		0%		100%			
Percentage 2		0%				100%			
Accomplished challenges	1/8	2/8	3/8	4/8	5/8	6/8	7/8	8/8	Third grade (9 years old)
No. of subjects	0	0	3	4	2	2	0	0	
Percentage 1	0.00%	0.00%	27.27%	36.36%	18.18%	18.18%	0.00%	0.00%	
Percentage 2	81.82%					18.18%			
Accomplished challenges	1/8	2/8	3/8	4/8	5/8	6/8	7/8	8/8	Fourth grade (9-10 y.o.)
No. of subjects	0	0	2	4	2	2	1	0	
Percentage 1	0.00%	0.00%	18.18%	36.36%	18.18%	18.18%	9.09%	0.00%	
Percentage 2	72.73%					27.27%			

Table 4. Collective percentage results for the Piaget-Head spatial orientation challenge

Grade	Unsuccessful test percentage	Successful test percentage
First grade (6 y.o.)	100%	0.00%
First grade (7 y.o.)	92.86%	7.14%
Second grade (7 y.o.)	85.71%	14.29%
Second grade (8 y.o.)	77.78%	22.22%
Third grade (8 y.o.)	0%	100%
Third grade (9 y.o.)	81.82%	18.18%
Fourth grade (9-10 y.o.)	72.73%	27.27%

Considering the number of subjects and the percentage results presented in Tables 2 and 3, and Figure 2, one can see that out of the 5 six-year-old **first grade** subjects, none succeeded in performing the Piaget-Head challenge (as seen in Table 2). Out of the 7-year-old first grade subjects, only 7.14% managed to successfully perform the test, the rest of 92.86 % being unsuccessful (as seen in Table 4). For the **second grade**, the success percentage is increased for the 7-year-old subjects, being of 14.29%, but also for the 8-year-olds, of 22.22% (as seen in Tables 2 and 3). All 4 eight-year-old **third grade** subjects succeeded, while from the 9-year-olds, only 18.18% succeeded (as seen in Tables 2 and 3). The fourth grade subjects record a success rate of 27.27%, the highest one among all the successful performances (as seen in Table 4).

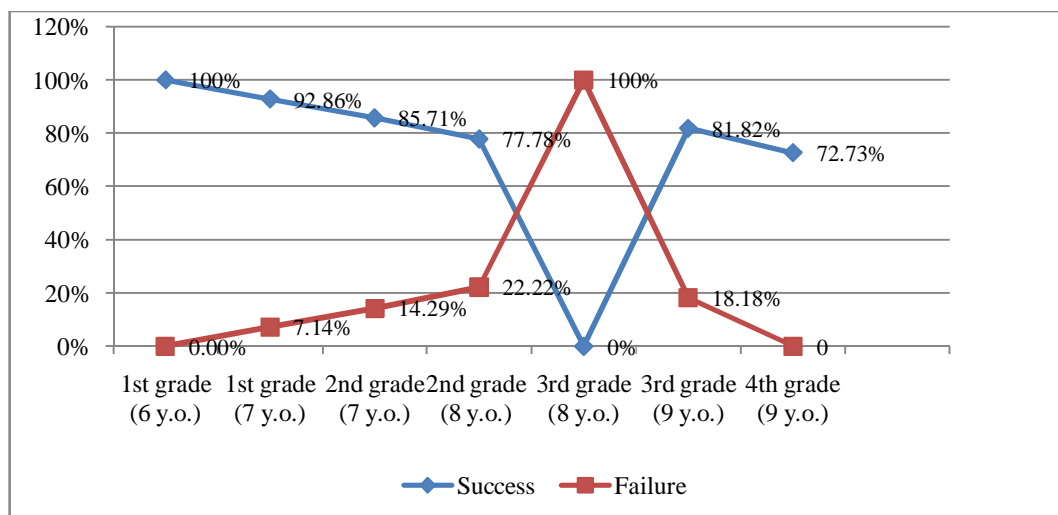


Fig. 2. Graphical percentage representation of the Piaget-Head challenge

From the analysis of the recorded data and of Figure 2, one can see that the curve representing the successful subjects has an ascending trajectory, while the curve representing the percentage of the unsuccessful subjects has a descending trajectory, with one exception for the third grade (8-year-olds), where the success rate is 100%, this being explained by the low number of subjects and the challenges that they had to perform.

Conclusions

After statistically analyzing the values recorded by the subjects after the Piaget-Head spatial orientation challenge, it was noted that spatial orientation improves with age. Based on the subjects' age and specific challenges that were applied, the hypothesis stating that *presumably, by applying specific assessment tests, one can discover the spatial orientation disorders in primary school children* was confirmed, subjects with spatial orientation disorders being recorded.

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PHYSICAL EXERCISE AND ITS ROLE IN A CORECT POSTURAL ALIGNMENT

Rolul exercițiului fizic în dobândirea unei posturi corecte

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Rezumat. Prezenta cercetare urmărește identificarea exercițiului fizic sub formă de joc în cadrul lecției de educație fizică asupra posturii corecte a 20 de elevi cu vârste cuprinse între 6-9 ani. În urma testării posturii prin intermediul soft-ului PostureScreen Mobile au fost depistate la majoritatea subiecților (18) atitudini deficitare, în special cifotice, capul anteriorizat, aspecte ce vor putea conduce în viitor la instalarea deficiențelor dacă nu sunt luate măsuri corespunzătoare. Astfel, timp de 6 luni, subiecții au fost incluși într-un program de lucru, în cadrul orei de educație fizică, utilizându-se jocuri de mișcare și exerciții cu obiecte portative. Subiecții au fost testați înainte și după aplicarea programelor de lucru, urmărindu-se evoluția flexibilității la nivelul spatelui (extensia). Rezultatele înregistrate la finalul cercetării au evidențiat progrese semnificative la toate testările (cele motrice și cele înregistrate cu PostureScreen Mobile), diferențele mediilor inițiale și finale fiind semnificative statistic la un $p < 0.05$, ceea ce confirmă valabilitatea demersului nostru. Profilaxia deficiențelor fizice poate fi realizată cu succes în cadrul orei de educație fizică atâta timp cât exercițiile elaborate urmăresc particularitățile colectivului de lucru.

Cuvinte cheie: exercițiu fizic, postură, profilaxie;

Abstract. This research aims to identify the effect of physical exercise like dynamic games in physical education class on correct posture of 20 students aged between 6-9 years. After testing posture through PostureScreen Mobile software, we have been detected in most subjects (18) poor attitudes, especially kyphotic, head forward, issues that could lead to future weaknesses installation unless appropriate measures are taken. Thus, for 6 months, subjects were included in a working program in physical education class using dynamic games and exercises with portable objects. Subjects were tested before and after the working programs, aiming at development of flexibility in the back (extension). The results at the end of the research have shown significant progress in all tests (the motor test and recorded with PostureScreen Mobile), initial and final averages differences being statistically significant at $p < 0.05$, which confirms the validity of our approach. Prophylaxis physical deficiencies can be successfully achieved in physical education class as long as we elaborate exercises aimed peculiarities to the subjects.

Keywords: physical exercise, posture, prophylaxis;

Introduction

Posture is the alignment and maintenance of body segments in certain positions such as standing, lying, or sitting and is an important indicator of the musculoskeletal health. It must correspond to a specific body position in space which minimizes anti-gravity stresses on body tissues (Grimme *et al*, 2002). In good postural alignment, the different parts of the body are maintained in a state of equilibrium with the least expenditure of energy. The accelerated somatic growth during childhood can induce the development of numerous postural defects, compromising physical development (Van Niekerk *et al*, 2008).

Current epidemiological studies have shown a high prevalence of abnormal spinal postures in children and teens (Foster, 2003), with scoliotic posture and thoracic kyphosis posture and being two of the most common faulty postural alignment.

The child's posture could be influenced by multiple intrinsic and extrinsic factors such as age, height, sex, emotional factors, incorrect postural habits, lack of appropriate teaching equipments with ergonomic essentials, using heavy bags and physiological changes during puberty. Furthermore, activities like playing on telephones, videogames and watching television help acquire inappropriate postures.

The postural deficiencies are numerous, especially in early school aged children and the most advantageous way to prevent and correct it is physical education and sports activities. If detected early, before producing structural changes of tissues, in most cases postural deficiencies can be corrected and even prevented through normal physical education programs.

If there are situation where vicious attitudes progress towards structural changes, that will require wearing corset or other orthopedic devices for muscle support or in advanced stages, orthopedic surgical intervention, schoolchildren should participate in regular exercises rehabilitation programs.

The postural deficiencies are numerous, especially in early school aged children and the most advantageous way to prevent and correct it is physical education and sports activities.

The process of educating the body attitude can begin after 5 years of age, the age at the ends of process of myelination of the nervous channels.

A child who is old 6-7 years is in a critical period of posture-genesis when there should be a prevention of the postural problems and deformities (Cordon *et al*, 2002). Between the years of seven and fourteen years, many morphological and functional changes are present that can influence the natural orthostatic posture and in this period of time active corrective exercises of appropriate programmes should be performed.

Postural screening and evaluation protocols is essential for detecting and preventing of postural problems and deformities in schoolchildren. A potential solution to the need for global measures of postural alignment could be a simple tool like computerized posture analysis software.

A number of postural assessment software have been development which often consists of digital markers for photographic images and tools for measuring a number of variable. These computer based assessment software include, amongst others, PostureScreen Mobile® (PSM) which is a postural analysis system that uses advanced techniques and non-invasive methods of diagnosis and assessment in medical rehabilitation.

The unit of postural analysis is used to determine postural deficiencies in the column spine through a video camera system that allows the acquisition of high-resolution images, images which are then processed using the software.

Many Physical Therapists and Personal Trainers, use postural analyses systems due to the non-invasive nature of the assessments and their feasibility of use in field settings. Quantitative measurements allow physicians and researchers not only to achieve an accurate assessment of postural changes but also to monitor improvement (Elisabeth *et al*, 2010).

The present study was designed to analyze the impact of corrective gymnastics programs on postural deviations for creating proper body posture in elementary schoolchildren.

Methods

The subjects of the research were 20 elementary school children (age 6-9 years) from a private school from Craiova. Subjects participated for 6 month in corrective gymnastics program which was performed in the same times with physical education classes. Permission to realise this research was granted from the manager of the school involved and from the parent's childrens who participated in this study.

We wanted to provide a differential treatment for subjects with postural deficiencies, the physical exercises and corrective activities being selected and included depend on existing deficiencies. The aims of our programs were to form de correct posture reflex, eccentric toning of muscles shortening and concentric toning of lengthening muscles, symmetrical strengthen abdominal and sacro-lumbar muscles and development of thoracic muscles.

Each session was initiated with a 5-10 minutes warm up. Corrective gymnastics program base on static exercises as the correct and hypercorrection posture, dynamic exercises and exercises for respiratory muscles also. Dynamic exercises included exercises with portable objects (medical balls, wooden rods) exercises using gymnastics devices (gym ladder) applicative exercises (hanging, climbing, crawling), corrective exercises performed in front of the mirror and adapted dynamic games. All the sessions ended in five minutes of cool down activities which included deep breathing and stretches.

To observe the impact of physical exercise, we test the subjects before (T1) and after (T2) aplying the working programs. The test were:

For measuring the flexibility of spinal extensors, the subject lied prostrate on the floor and placed the hands palm up against the thighs under the legs. They were asked to raise their head and trunk as much as they can and to the extent that the distance between the chin and the ground was measurable. This test was performed three times with a one-minute interval and the maximum record was considered as their score.

For measuring the shoulder flexibility, the subjects lied prostrate on the floor with arms fully extended overhead. After fixing their legs with the help of an assistant, the subject was given a wooden rod and instructed to hold it in both hands to the extent of their shoulder width. Then, with their face toward the ground they were asked to raise the wooden rod as much as they can without lifting their head. This test was also performed three times and the maximum record was taken as their score considered as their score.

Testing the posture with PostureScreen Mobile® (PSM) (Figure 1 and Figure 2). We used a professional Posture Analysis Screen in order to test the posture of the subjects. In this evaluation, we photographed each subject in orthostatic position (lateral and front view) after marked some anatomic point (eyes, subnasale, ear lobe, episternal notch, acromion, rib cage, anterior-superior iliac spine, greater trochanter of femur, lateral condyle of the femur, lateral and medial maleoli).

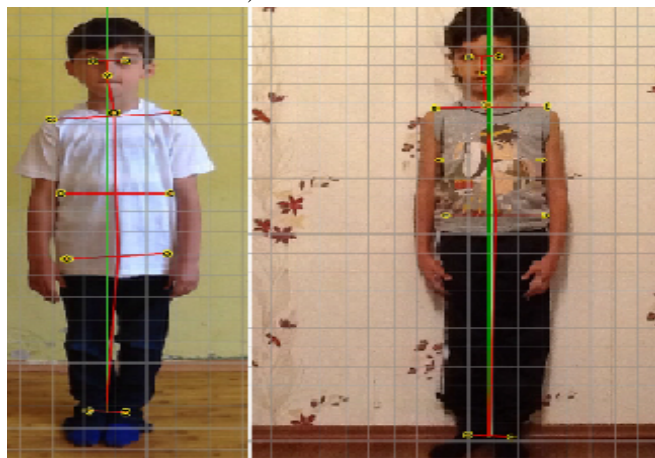


Fig. 1. The frontal view T1(left) and T2 (right)

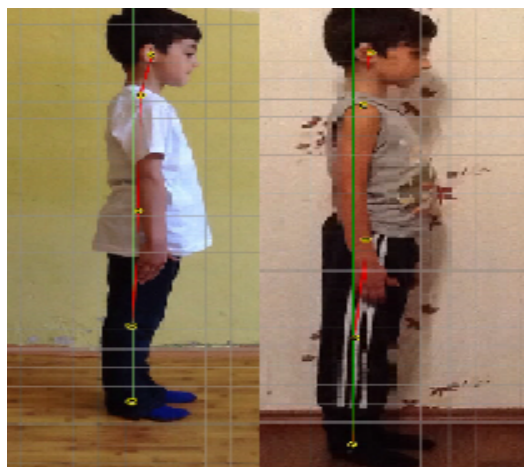


Fig. 2 The lateral view T1(left) and T2 (right)

Statistical Analyses

The data are presented as group mean with standard deviation, standard deviation, minimum and maximum values. We used the Statistical Package for Social Science version 21.0, Paired Simple Test, to determine whether the statistical difference is significant between pre and post intervention. The significance level was set at $p < 0.05$.

Results

Table 1 shows the initial and final values from the postural assessment from front view regarding the position of the head and shoulders. On shoulders, there were 12 subjects with head shift left and 8 with head shift right., the average of the first test being $1.36 (\pm 0.39^\circ)$ and $0.79 (\pm 0.20^\circ)$ at the second one.. Regarding the head forward, we obtained an average of $1.87 (\pm 0.70^\circ)$ at the first test and $1.30 (\pm 0.47^\circ)$ at the second one, the difference between the 2 tests being 0.47° . Hipsback register an improvement from $0.83 (\pm 0.37^\circ)$ till $0.43 (\pm 0.295^\circ)$. The three parameters tests recorded statistically significant differences of the means, at a threshold of $p < 0.05$, which validates the proposed work program (Table 2).

Table 1. Results from Posture Screen Mobile front view

	Minimum	Maximum	Mean	Std. Deviation
Head forward1	0.70	3.07	1.8795	0.701
head.forward2	0.53	2.03	1.3070	0.477
sholdershift1	0.74	1.86	1.3627	0.393
sholdershift2	0.42	1.03	0.7900	0.206
hipsback1	0.26	1.53	0.8373	0.377
hipsback2	0.00	0.89	0.4782	0.295

Table 2 Paired Simple Test Posture Screen Mobile front view

	Paired differences					t	Sig.(2-tailed)
	Mean	Std.Deviation	Std.Error Mean	95%			
				Lower	Upper		
Head forward T1-T2	0.57	0.33	.074	.41	.72	7.73	.001*
Shouldershift T1-T2	0.572	0.21	.065	.42	.71	8.80	.001*
Hipsback T1-T2	0.359	0.17	.051	.24	.47	7.00	.001*

* $p < 0.05$

Table 3 shows the results from the Posture Screen Mobile lateral view that present head shift left (for 12 subject) or right (for 8 subjects) and head tilted left for all the participants. It is a significant difference of the two means (T1-T2), which validates our approach ($p < 0.05$), as we showed in Table 4.

Table 3. Results from Posture Screen Mobile lateral view

	Minimum	Maximum	Mean	Std. Deviation
Head shift left 1	0.42	1.34	0.89	0.25
Head shift left 2	0.19	0.91	0.42	0.20
Head shift right 1	0.25	0.96	0.68	0.26
Head shift right2	0.15	0.61	0.35	0.17
Head tilted left 1	2.10	9.60	4.81	2.29
Head tilted left 2	1.80	5.50	3.06	1.17

Table 4. Paired Simple Test Posture Screen Mobile lateral view

Paired differences					t	Sig.(2-tailed)
Mean	Std.Deviation	Std.Error Mean	95%			
			Lower	Upper		

Head forward T1-T2	0.46	0.15	.04	.37	.56	10.50	.001
Shouldershift T1-T2	0.33	0.17	.066	.17	.49	5.08	.002
Hipsback T1-T2	1.74	1.31	.030	1.10	2.37	5.78	.001

* $p < 0.05$

Regarding the head and back extension we can observe in Table 5 better values in the second test, this values indicates an improvement in back flexibility after applying the proposed mean.

Table 5. Results from head and back extension

	Minimum	Maximum	Mean	Std. Deviation
Head extension T1	13	22	17.42	2.93
Head extension T2	18	25	21.42	2.43
Back extension T1	20	27	24.42	2.82
Back extension T2	26	31	28.85	1.67

Applying the Paired Simple Test (in Table 6), between initial and final testing, we obtained for head extension a value of t (-5.97) and t (-7.75) for back extension and bidirectional level of significance p (< 0.05), which validates our proposed working program.

Table 6. Paired Simple Test head and back extension

	Paired differences					t	Sig.(2-tailed)
	Mean	Std.Deviation	Std.Error Mean	95%			
				Lower	Upper		
Head extension T1- T2	-4.00	1.82	.69	-5.69	-2.31	-5.79	.001
Back extension T1-T2	-4.42	1.51	.57	-5.82	-3.03	-7.75	.001

* $p < 0.05$

Discussion

The unhealthy *lifestyles* of today's children, the rapid revolution in technology, excess of school work and other responsibilities or duties, low levels of physical activity, could cause *body posture alterations in young children*.

The postural deficiencies, both in children and adolescents, creating a serious health and social problem, representing a challenge for primary care and teaching environment.

According to various authors, different dynamics of postural development depending on sexual dimorphism, that is connected with dimorphism of somatic development. Studies also underline that development of boys is

more harmonious than development of girls. In our previous study we find that the occurrence of the vertebral faulty posture was more common in girls than in boys (Cosma *et al.*, 2014).

The key criterion for assessment of posture is the body symmetry. Asymmetries of the trunk often contribute to formation of postural anomalies.

Therefore, in this study, we used a modern posture analyses tool for detecting the presence of postural asymmetries and for assessment de effectiveness of corrective gymnastics programs on postural deviations in elementary schoolchildren.

In forming and maintaining a good posture, the most important role is played by muscles as an active part of the movement apparatus.

We introduced a corrective gymnastics program, focused on strength and flexibility, specifically of the group of postural antigravity muscles, in physical education classes for subjects with postural deficiencies performed under the control of physical education teachers and physiotherapists, for a period of 6 month.

The outcomes of this research clearly show that our combined program of corrective gymnastics with dynamic games had significant effects on improving de muscle flexibility and body symmetry in elementary schoolchildren in which in turn had a direct impact on improving their body posture. Other authors reached a similar conclusion in the possibility to improve the postural alignment to a considerable extent by implementing and performing adequate corrective exercises programs (Muftic, 2012; Torlakovic, 2012).

The findings of our study suggests that physical education teachers and physiotherapists can have a very active and important role in detecting and treating of postural defects, particularly in schoolchildren prior to their becoming a complex entity.

Conclusions

The early diagnosis of postural deficiencies along with early inclusion of children in specialized additional programs of corrective gymnastics can produce good results with positive effects, it is quite important.

It can be concluded that the specific corrective gymnastic program used for elementary school age children with impaired posture, in educational institution, contributes to a more effective correction of the body spatial control and improving the health-related quality of life.

Health professionals, teachers and parents should pay more attention to taking preventive steps to reduce negative, musculoskeletal-related consequences.

The results of this study also offer an opportunity of their comparing with the effects of other research that have the similar objectives.

Acknowledgment

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PERFORMANCE ANALYSIS OF 60 M HURDLES AT THE INDOOR NATIONAL CHAMPIONSHIP FOR SENIORS, 2014

Analiza performanțelor în proba de 60 m garduri la Campionatul Național de sală seniori, 2014

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Rezumat. În alergarea de sprint și garduri, capacitatea de lucru a sportivei este condiționată de accelerarea din momentul lansării de la start, dezvoltarea unei puteri maxime, menținerea vitezei atinse în timp, rezistența la oboseala care survine în procesul de alergare. Scopul cercetării este analiza și interpretarea evoluției alergătoarelor de 60 m garduri la Campionatul Național de sală și Cupa de Cristal Seniori din 2014. În proba de 60 m garduri femei a concursului studiat, s-au prezentat la start 12 sportive. Cele mai bune 8 performanțe după serii, în ordinea descrescătoare a performanțelor, s-au calificat în finală. Analizând rezultatele obținute în serii și finală, se observă că 5 din 8 atlete și-au îmbunătățit performanța în finală, 2 atlete au alergat mai slab decât în serii cu 0.02-0.18 secunde, iar o alergătoare a fost descalificată.

Cuvinte-cheie: garduri, rezultat, timp, atlete

Abstract. In the sprint and hurdles events, the working capacity of female athletes is conditioned by acceleration at the moment of launch from the start, development of a maximum power, maintaining of the speed reached, resistance to the fatigue that occurs in the running process. The purpose of this research is to analyse and interpret the evolution of women's 60 m hurdles at the Indoor National Championship and Crystal Cup Seniors, 2014. In 60 m hurdles, 12 athletes were present. The best eight athletes after heats, in descending order of performance, were qualified for the final. Analysing the results obtained in first round and final, it was noted that 5 of the 8 athletes improved their performance in the final, two athletes ran worse than in heats with 0.02-0.18 seconds and one was disqualified.

Keywords: hurdles, result, time, female athletes

Introduction

The interest in obtaining sports performance in a short time with high efficiency and minimal biological risks has led to a huge development of scientific research in the sports field, but also to an increased responsiveness for the knowledge transfer and application to other areas (Gagea, 2007: 7).

The performance levels in hurdles have marked a significant increase due to the development of a general plan and methodology of the training technique. Modern methods of training focus increasingly more on developing maximum displacement speed on the sprint, while imposing close race hurdles techniques.

In the sprint and hurdles events, the working capacity of female athletes is conditioned by acceleration at the moment of launch from the start, development of a maximum power, maintaining of the speed reached, resistance to the fatigue that occurs in the running process (Hücklekemkes, 1991: 3761).

Running hurdles is a real sequence of acceleration. In fact, clearing the hurdles involves necessarily a stall, so one cannot speak properly of maintaining speed, but rather of reaccelerating in the interval (Țifrea, 2002: 78).

Performance results greatly depend on the technical execution and the rhythm units. A unit rate is considered as a section of running ranges in time and space that occurs between two successive landings. The objectives of a rhythm unit: a time as short as possible, standardization times, the fastest average time of all nine spaces to run (Neder, 2002: 8).

Running hurdles is a running speed; the normal sequence of steps is interrupted after a specified number of cycles, by introducing a characteristic step, step over the hurdles (Tatu, Alexandrescu and Ardelean, 1983, p. 48). The hurdler is, above all, a good sprinter, quality without which there cannot be obtained a good performance in any hurdler.

One of the most important motor skills necessary in this event is speed or the ability to move quickly. From the mechanical point of view, speed is the ratio between space and time. The term "rate" incorporates three elements: reaction time, movement frequency per unit of time and walking a distance (Muraru, 2004: 147).

The motor qualities required to sprinters and hurdlers are speed, strength (especially anaerobic capacity), power, expansion, mobility, flexibility and skill. Speed is the predominant motor skill of a sprinter and a hurdler (Alexandrescu, 1991: 117).

Physical preparation is the pivot for all other components of training, even constituting the basis for the entire training process (Urichianu, 2013: 151).

There are two types of physical training: general and specific ones. General physical preparation is carried out along with technical improvement (Alexandrescu, 1991: 118). In the training of hurdlers, attention will be directed towards improving equally the physical, technical and psychological preparation.

100 m hurdles are characterized by the complex manifestation of all motor skills. The end result of running depends on the development of these qualities and the degree of assimilating the technique (Neder, 2002: 31).

To achieve higher sports performance is known among specialists as a fit state. So, being fit is a higher state of adaptation manifested in the best performance achieved in major (top) competitions (Dragnea, 1992: 39).

Purpose. This study aims to analyse and interpret the evolution of women's 60 m hurdles at the Indoor National Championship and Crystal Cup Seniors, 2014, in order to see what the current level of performance is in the studied event.

Methods. The methods used in this study are: literature review, observing the reactions of athletes in the warm-up before competition, at the start and after the event, recording the results in special sheets and graphical method.

Research hypothesis. It has been assumed that Romanian female hurdlers, with the equipment, technology and training methods and drills of new generation, are able to improve their performance from round to round in the same competition.

Results

The National Championship Final Round and Crystal Cup for seniors took place in the athletics hall of the "Lia Manoliu" National Sports Complex of Bucharest, in February 2014. In 60 m hurdles, 12 athletes were present. The results from heats are shown in Table 1 and Figure 1.

Table 1. Results of women's 60 m hurdles - heats (<http://www.fra.ro/rezultate/71392576367.pdf>)

Place	Results (sec.)
1	8.49
	8.51
3	8.56
4	8.82
5	8.88
6	9.00
7	9.07
8	9.33
9	9.40
10	9.41
11	10.19
12	DQ

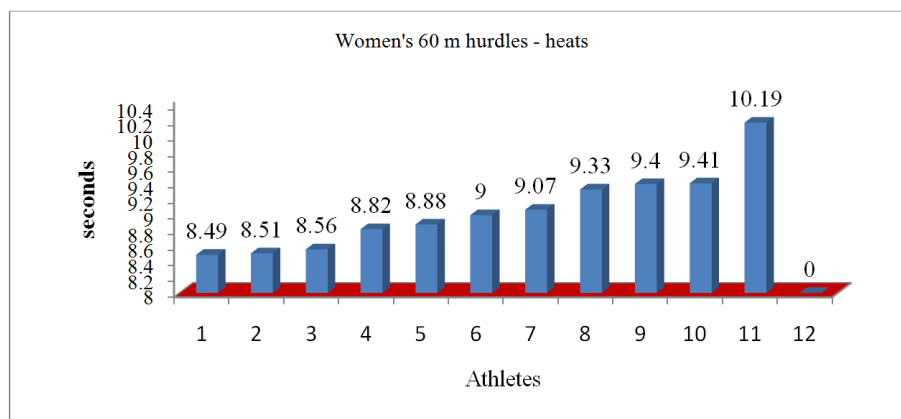


Fig. 1. The performances in women's 60 m hurdles- heats, at the Indoor National Athletics Championship, 2014

The best result obtained from heats was 8.49 seconds, the following result being 8.51 seconds. The first 5 times, they were below 9.00 seconds, the rest being registered between 9.00-10.19 seconds. One runner was disqualified. The difference between the best and the poorest result of the heats is 1.7 seconds.

The best eight athletes after heats, in descending order of performance, were qualified for the final. The results of the final are presented in Table 2 and Figure 2.

Table 2. Results of women's 60 m hurdles - FINAL (<http://www.fra.ro/rezultate/71392576367.pdf>)

Place	Results (sec.)
1	8.36
2	8.53
3	8.68
4	8.75
5	8.91
6	9.18
7	9.19
8	DQ

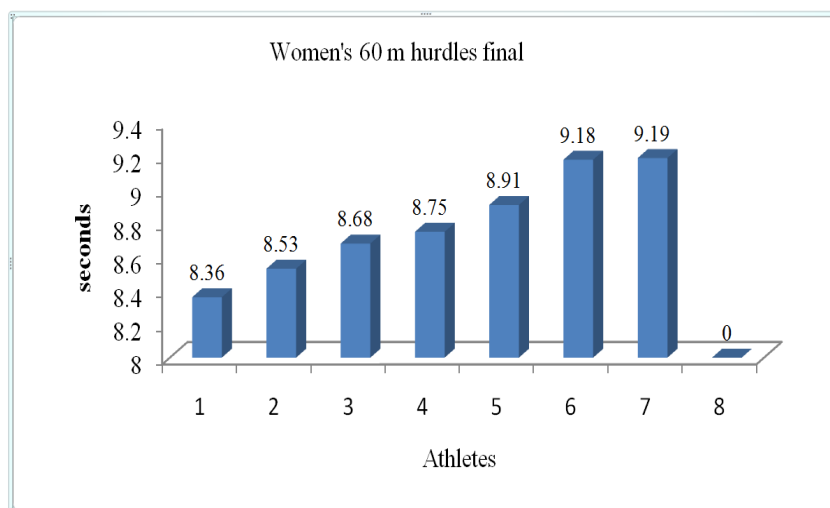


Fig. 2. The performances of women's 60 m hurdles– final, at the Indoor National Athletics Championship, 2014

In the final, 1st place was taken by the athlete who had the best result after heats, scoring 8.36 seconds. 2nd place was taken with the time of 8.53 seconds and 3rd place, with 8.68 seconds, more than 0.1 seconds from 2nd place. However, the difference between 1st place and 2nd to 4th places is 0.17-0.39 seconds, which is about 4m between these 4 runners on the finish line.

5th place was occupied with the time of 8.91 seconds, 6th place, with 9.18 seconds and 7th place, with 9.19 seconds. Between 4th and 7th places, there is a distance of more than 4 m on the finish line. Last hurdler of final was disqualified, so she did not count in the ranking. Analysing women's 60 m hurdles final race of the studied competition, it can be seen that there is a large difference in value between finalists, between the first and the last one being 0.83 seconds, which is very poor for a senior national championship.

Discussions

Confronting the contemporary era of sports impose tasks with an increasingly larger social value, which are directly related to the contribution they can make to improve health and increase exercise capacity, and therefore sports performance at all levels of development.

Sports shape is the main purpose of sports training process, programmed on a relatively long period of time, is the essence of sports performance activity, regardless of where it takes place.

Results in competitions are undoubtedly the main objective criterion for assessing the level of sports shape, being therefore necessary for the athlete to participate, before the main competitions, in a greater number of contests, some of them being addressed spontaneously and treated as a means of training and verification.

Unlike the field events in which the athlete has to perform the technique once per round, with time between rounds to try to make any adjustment that may be required, the hurdler has to repeat this technique ten times – though not necessarily the same way each time – during the race, in a set of circumstances which can change as the race progresses. Consequently, any time-loss in barrier clearance due to inefficiencies of technique may be multiplied by as much as ten if repeated (Ewen, 1985: 79).

This study aims to analyse and interpret the evolution of women's 60 m hurdles at the Indoor National Championship and Crystal Cup Seniors, 2014, in order to see what the current level of performance is in the studied event.

The best result obtained from heats was 8.49 seconds, the following result being 8.51 seconds. The first 5 times were below 9.00 seconds, the rest being registered between 9.00-10.19 seconds. One runner was disqualified. The difference between the best and the poorest result of the heats is 1.7 seconds.

Analysing the results obtained in first round and final, it was noted that 5 of the 8 athletes improved their performance in the final, two athletes ran worse than in heats with 0.02-0.18 seconds and one was disqualified.

Currently, the results of Romanian women hurdlers are far below those recorded in the world. There is a noticeable decline in performance obtained in this event, compared to previous years. The number of hurdlers is also down, so that in Romania, at senior level, barely 12 athletes participated in an Indoor National Championship, in this event.

Conclusions

1. Between 1st and other places in the final, there is a difference of 0.17-0.83 seconds, meaning a difference of more than 2-8 m in running between the winner and other finalists, which is very poor for a senior national championship.
2. 5 of the 8 finalists ran under 9 seconds and one was disqualified.
3. The hypothesis is partially confirmed. Analysing the results obtained in first round and final, it was noted that 5 of the 8 athletes improved their performance in the final and two athletes ran worse than in heats with 0.02-0.18 seconds. Advancement of training methods and means should lead to increased performance, but in 60m hurdles, in Romania, this has not happened, if we compare the results with previous years.
4. With these results, even the winner of the studied event cannot access further than first round in a major competition.

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Discobolul Journal promotes fundamental and applied research, in particular, the results obtained in national and international research projects and scientific contributions from the academic and socio-professional areas of interest related to the journal. Original materials that have not been published, in part or entirely, in other journals are allowed for publication. It is necessary that the items that have already been published to be 40% different, from those to which we refer in this section.

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Articles will be written in English and will be published after going through stages of reviewing, following the decision in this regard.

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The registration of the material for publication will be made after the payment of the subscription fee by each author, co-author and, where appropriate, additional duties.

Responsibility for the statements in the text rest exclusively with the authors. The Editor reserves the right to refuse to publish articles that do not comply with the terms given in the **Instructions for Authors** or where no changes were made to the requirements / recommendations.

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Articles will be written on A4 Word, using **Times New Roman font, size 10 pt., 1.5. Illustrations.** 4-5 are the maximum permissible illustration materials (tables, graphs, symbolic figures), they will bear titles and should be numbered as specified in the text, it is recommended that they be given to the size that is desired by the publication. Scanned materials are not allowed except for drawings / photos.

Tables should be numbered with Arabic numerals, in order of appearance in the text, they will be in a clear and concise way mentioned above each table. Figures/ drawings, graphs will have a higher quality (**min.300 pixels**) they will be referred to concisely and numbered under each occurrence. The acronyms used are to be detailed in their first appearance in the text.

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1. The first page will include:

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- **Abstract** in **Romanian** and **English**. The abstract must contain between 150-200 words.
- **Keywords** in **Romanian** and **English**. For each paper, the authors will select **3 to 5 words**, representing terms used in the paper.

2. The articles should not exceed **6 pages** for **research studies**, **4 pages** for **essay works**, **1 page** reviews, information, reports of scientific events.

- The **research study** will include: **Introduction** - Provide a brief introduction to the issues addressed, stating the purpose, the objective(s) of research and hypothesis (their) work. **Material and methods** - This section will describe the research methodology used, the modality of selection for the samples studied, the criteria for inclusion and exclusion, the method, the technique, the Statistical Programme used in processing the data, etc. **Results** - In this section the results obtained are shown concisely, typically by means of tables and graphs. It will present the descriptive and inferential statistics, differences between measurements (initial and final between experiment group and control group, etc.). It is mandatory to specify the level of significance (**p** value or the size of **d** effect), and the statistical test used. **Discussions** - they will specify new and important aspects of the study, interpretation of their results in the context of literature. **Conclusions** - The conclusions of the study will be stated clearly, establishing a link between them and the purposes of the study. **References** - will be prepared according to APA style (see list of references).

- **Case studies.** There are case reports of material obtained while working with an individual, group, community or organization. The case studies illustrate a problem, indicate a means to solve a problem, and / or shed light on the future needs for research, clinical applications, and theoretical aspects. In writing the case studies, the authors examine carefully the balance between providing important illustrative material and the responsibility of confidential case materials.

- **Essay-type articles/Reviews** of the literature (in the field of Sports Science and Physical Education, Sports Psychology, Sports Pedagogy, Sports Sociology, etc.) - will have the following structure: **Introduction**, the current level reflected in the literature, issues addressed; **Conclusions, References.**

• Book Reviews

3. List of references. Discobolul Journal recommended that the APA style (American Psychological Association, Ed 6) of drafting a list of references should be followed. The bibliographical sources are mentioned in the text between brackets.

Examples:

- According to Suchilin (2010, p.5), the biomechanical criteria are used for dividing the gymnastics elements into parts. Thus, the technical structure of gymnastics elements contains three levels...
- The Publication Manual of the American Psychological Association was first published in 1929 as a seven-page "standard of procedure, to which exceptions would doubtless be necessary, but to which reference might be made in cases of doubt" (Bentley et al., 1929, p. 57).

Check each source cited to appear in both the body text and in the reference list, while the author and the year are to be identified in terms of spelling. The list of references at the end of the scientific article provides information needed to identify each source. APA requires that each list to be dated at least double, and the list items to be indented from the second row of each element (APA Manual, sixth edition). They will mention: **author(s), year, title, city, publisher, pages**, depending on the source of citation (book, journal article, website).

Examples:

For the citation of a book

Arnheim, R. (1971). *Art and visual perception*. Berkeley, CA: University of California Press.

For the citation of a journal article

Page, E. (1968). The use of the computer in analysing student essays. *International Review of Education*, 14, 253-263.

For the citation of an article with many authors

Russel, F.D., Coppell, A.L., & Davenport, A. P. (1998). In vitro enzymatic processing of radiolabelled big ET-1 in human kidney as food ingredient. *Biochem Pharmacol*, 55(5), 697-701.

Wager, T. D., Rilling, J. K., Smith, E. E., Sokolik, A., Casey, K. L., Davidson, R. J., ... & Cohen, J. D. (2004). Placebo-induced changes in FMRI in the anticipation and experience of pain. *Science*, 303(5661), 1162-1167.

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Ion POPESCU^{1*}, Rodica STANESCU², Cornelia MIHALACHE³

¹ *Universitatea Națională de Educație Fizică și Sport, Constantin Noica, 140, București, Romania*

² *Universitatea Politehnică (adresă, oraș, țară)*

³ *Universitatea din Oradea (adresă, oraș, țară)*

**Adresă de corespondență: popescuioan@gmail.com*

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2. Articolul nu va depăși 6 pagini pentru studiile de cercetare, 4 pagini pentru lucrările tip eseu, 1 pagină pentru recenzii, informații, reportaje de la evenimente științifice.

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Exemplu:

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The Publication Manual of the American Psychological Association was first published in 1929 as a seven-page “standard of procedure, to which exceptions would doubtless be necessary, but to which reference might be made in cases of doubt” (Bentley et al., 1929, pp. 57-58).

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Arnheim, R. (1971). *Art and visual perception*. Berkeley, CA: University of California Press.

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