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STUDY REGARDING THE MOTOR PROFICIENCY AGE OF THE PRIMARY SCHOOL STUDENTS

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Abstract
Background. In the primary school cycle, physical education and sports plays an important role in the development of the child's personality. From the point of view of its special objectives, psychomotricity offers the child both the details and the frame favorable to the development and the improvement of a system of acquirements, by means of which he can act in an efficient way and adapt in optimal conditions to the request imposed by the environment in which he develops his activity. This elicits from the point of view of those involved in a direct and indirect way in the instructional-educational process the comprehension of the internal mechanisms which lie at the basis of the psychomotor phenomenon and the identification of the main evaluation modalities of its different components, in a certain moment, in order to emphasize the possible deviations from a child's normal ontogenetic development.
A correct and specific approach of all the psychomotor components that takes into account both the age and the objectives of the instruction already established, will be reflected at the level of the child's behavior by getting some essential acquisitions, which will form the premises of his development to a superior stage and the acquirement of new behaviors.
Purpose. Using a part of the Bruininks-Oseretsky Test – Second Edition, the main goal of this study was to analyze a possible difference between motor proficiency age and chronological age of the subjects, in the Upper-Limb Coordination subtest.
Methods. Regarding the methods, 40 subjects, male and female primary school students, coming from urban and rural areas, were selected to participate in this research experiment.
Results. The average motor proficiency age for the Upper-Limb Coordination subtest is 10 years and 5 months. The average chronological age of 9 years and 3 months is lower than the average motor proficiency age by 1 year and 2 months. The standard deviation and the coefficient of variation indicate a nonhomogeneous structure of the lot in relation to the motor proficiency age. The effect size index of Cohen indicates that the differences between the two ages are medium towards high. The verification of the statistical hypothesis through the dependent t-Test indicates a statistically significant difference of means (P=0.002 is smaller than 0.05).
Conclusion. Besides the outline of an objective image regarding the psychomotor development of the students in the primary school cycle, at the level of the evaluated aspects, the analysis of the results of this experiment constitutes an essential feed-back in the design and monitoring of the training programs specific to the educational process.

Keywords: psychomotor development, primary school students, upper-limb coordination

Introduction

In the primary school cycle, physical education and sports plays an important role in the development of the child's personality. From the point of view of its special objectives, psychomotricity offers the child both the details and the frame favorable to the development and the improvement of a system of acquirements, by means of which he can act in an efficient way and adapt in optimal conditions to the request imposed by the environment in which he develops his activity. This elicits from the point of view of those involved in a direct and indirect way in the instructional-educational process the comprehension of the internal mechanisms which lie at the basis of the psychomotor phenomenon and the identification of the main evaluation modalities of its different components, in a certain moment, in order to emphasize the possible deviations from a child's normal ontogenetic development.

A correct and specific approach of all the psychomotor components that takes into account both the age and the objectives of the instruction already established, will be reflected at the level of the child's behavior by getting some essential acquisitions, which will form the premises of his development to a superior stage and the acquirement of new behaviors.

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Purpose:

Due to the large scale use of the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition for testing of different psychomotor components or the entire psychomotor capacity led to its recognition as one of the most important and valid evaluation instruments. Using a part of the Bruininks-Oseretsky Test – Second Edition, the main goal of this study was to analyze a possible difference between motor proficiency age and chronological age of the subjects, in the Upper-Limb Coordination subtest.

Hypothesis:

The results obtained from the assessment of primary school students through the Bruininks-Oseretsky Test – Second Edition will reveal significant differences between motor proficiency age and chronological age of the subjects, in the Upper-Limb Coordination subtest.

Methods:

For the research, part of the author's doctoral thesis, a number of 40 subjects were selected (20 boys and 20 girls), 1st up to 4th grade students, coming from urban and rural areas alike. Regarding the urban area, of the 20 selected subjects, 15 were students from David Praporgescu 113 Elementary School, while the remaining 5 belonged to 162 Elementary School. In the rural area, the subjects were students of Simion Bărnuţiu Elementary School from the village of Tiur, Alba County.

As an assessment tool, we used the improved version of the Bruininks-Oseretsky Test (BOT-2), a series of tests administered individually, with very precise and well-targeted objectives, which aim at evaluating a large range of motor skills, on subjects between the ages of 4 and 21. This test was conceived to be used, among others, by kinesiotherapists, psychologists, sports teachers, coaches and it seeks to offer them an efficient instrument for measuring fine and gross motor skills. BOT-2 evaluates abilities from four different motor areas:

- Fine Manual Coordination/ Fine Manual Control: Subtest 1 – Fine Motor Precision; Subtest 2 – Fine Motor Integration;
- Manual Coordination: Subtest 3 – Manual Dexterity; Subtest 7 – Upper Limb Coordination;
- Body Coordination (General): Subtest 4- Bilateral Coordination; Subtest 5 – Balance;
- Strength and Agility: Subtest 6 – Running Speed and Agility; Subtest 8 – Strength.

For this research, from the total of eight subtests specific to the motor areas described above, we opted for the Upper-Limb Coordination subtest, which involve the following items:

Item 1: Dropping and Catching a Ball – Both Hands
Item 2: Catching a Tossed Ball – Both Hands
Item 3: Dropping and Catching a Ball – Both Hands
Item 4: Catching a Tossed Ball – One Hand
Item 5: Dribbling a Ball – One Hand
Item 6: Dribbling a Ball – Alternating Hands
Item 7: Throwing a Ball at a Target

Results:

Statistical processing of the research results was accomplished using the BOT-2 ASSIST™, Scoring and Reporting System (software belonging to the Bruininks-Oseretsky Test, Second Edition) and EXCEL 2003 Software of Microsoft Company. The BOT-2 ASSIST™ converts total scores obtained by subjects after applying the Bruininks-Oseretsky Test, Second Edition into derived scores, which shows a common significance in terms of their interpretation from a subtest to another and from one age group to the other.

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As part of our scientific approach, interpretation of the results was based on scale score, which tells how far an examinees' point score is from the mean point score of examinees of the same age, taking into account the standard deviation of point scores in the population sampled.

Table 1: *Statistical interpretation of the results obtained by the students on the Upper-Limb Coordination subtest:*

Statistical indicators	**Upper-Limb Coordination Subtest**	
	Chronological Age	**Motor Proficiency Age**
Arithmetic mean	9.22	10.44
Median	9.42	9.83
Standard deviation	1.21	2.64
Maximum value	11.42	19.00
Minimum value	7.08	6.83
Amplitude	4.33	12.17
Coefficient of variation (%)	13.1%	25.2%
Difference of means	-	1.219
Effect size (Cohen)	-	0.53
Dependent T Test		
T critical	2.02	
Degrees of freedom between the groups -df	39	
T Test (Student)		
T calculated	3.37	
P	0.002	

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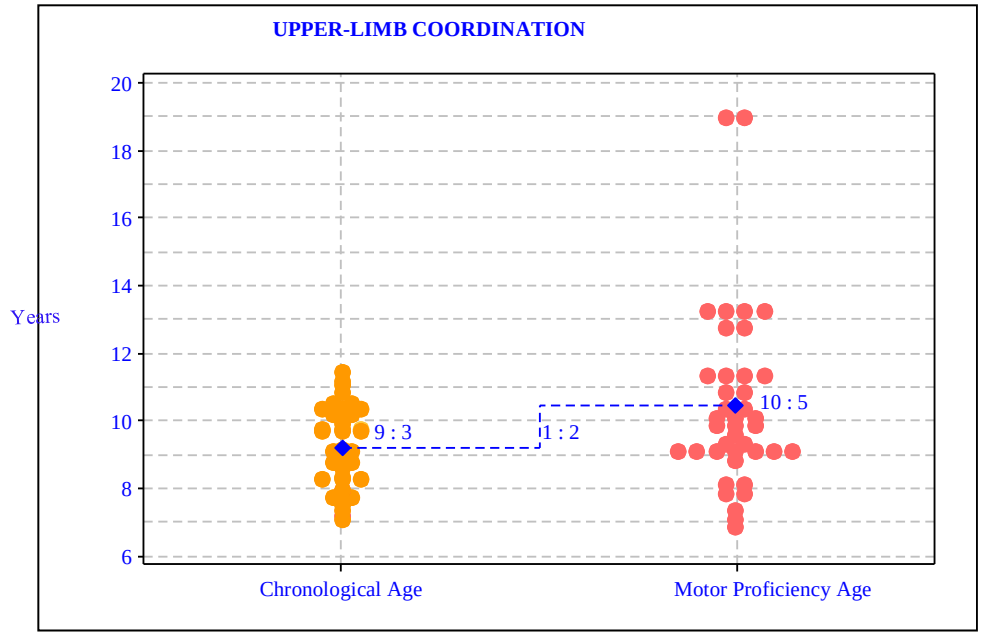

Fig.1: Individual Value Plot of Chronological and Motor Proficiency Age for Upper-Limb Coordination subtest

Conclusions

Psychomotricity represents a fundamental psychobehavioral component with an extremely high influence over the ontogenetic development of the individual. Of major importance for the physical education field and not only, it offers the child, through a systematic and correct approach of its inner components, a favorable climate for an efficient adjustment to the requirements of the social and school environments.

The values for the Upper-Limb Coordination subtest were measured for 40 subjects. The average motor proficiency age for Upper-Limb Coordination is 10 years and 5 months. The average chronological age of 9 years and 3 months is lower than the average motor proficiency age by 1 year and 2 months. The standard deviation and the coefficient of variation indicate a nonhomogeneous structure of the lot in relation to the motor proficiency age. The effect size index of Cohen indicates that the differences between the two ages are medium towards high. The verification of the statistical hypothesis through the dependent T Test indicates a statistically significant difference of means, P=0.002 being smaller than 0.05. Thus, we reject the null hypothesis and accept the alternative hypothesis.

Besides the outline of an objective image regarding the psychomotor development of the students in the primary school cycle, at the level of the evaluated aspects, the analysis of the results of this experiment constitutes an essential feed-back in the design and monitoring of the training programs specific to the educational process.

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COMPARATIVE STUDY REGARDING THE OPTIMIZATION OF THE PHYSICAL TRAINING AND THE EFFORT CAPACITY OF THE FEMALE STUDENTS, PARTICIPATING IN THE PHYSICAL EDUCATION COURSES AT THE UNIVERSITY OF BUCHAREST

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Abstract.
In the paradigm of the modern pedagogy, a "physically educated" person is a person: with a good physical condition, aware of the importance of practicing physical exercise in order to maintain and strengthen health, keen to move and who enjoys the physical effort, which promotes an active, dynamic, healthy and balanced life style as a social value, which develops social relations.[1]

Starting from this premise, we propose in this paper to identify the extent to which the objectives of physical education in higher education, related to physical, somatic and functional parameters, are achieved through the participation of female students in aerobics, fitness, volleyball and table tennis courses.

The hypothesis of our experimental approach: The means specific to each sports discipline listed above, used in the physical education lessons with the female students in the higher education, will influence differently the level of the physical training and the somatic and functional parameters of them, some of the sports being more efficient in this regard.

The research methods used: the analysis of the specialized literature, the pedagogical observation, the method of the tests, the pedagogical experiment, the statistical method of data processing and the graphical method of presenting the results.

Subjects: In our study, were involved 80 students from first year enrolled in aerobics, fitness, volleyball and table tennis courses, 20 for each sports discipline mentioned.

Results: We recorded the results aimed at the somatic, motor and functional evaluation both at the beginning of the academic year 2018-2019 and at the end of it, after completing the specific programs of the four sport disciplines.

Conclusions: The sports disciplines included in our experimental study had different effects at the level of the investigated parameters, the specific means of aerobics having by far the most significant contributions to the somatic and functional progress that the girls, in general, and the students of our sample in particular, wish from a motor activity.

Keywords: students, physical education, aerobics, fitness, volleyball, table tennis

Introduction

In the paradigm of the modern pedagogy, a "physically educated" person is a person: with a good physical condition, aware of the importance of practicing physical exercise in order to maintain and strengthen health, keen to move and who enjoys the physical effort, which promotes an active, dynamic, healthy and balanced life style as a social value, which develops social relations.

At the University of Bucharest, within the physical education lessons, students can choose one of the many sports disciplines included in the educational offer: aerobic gymnastics, dance sport, fitness, folk dance, karate, self-defense, football, basketball, volleyball, handball, badminton, tennis, table tennis.

All the sports disciplines included in the DEFS educational curricula aim to fulfill the general objectives of physical education regarding the general and the specific motricity, the harmonious physical development, the baggage of technical-tactical skills, the effort capacity etc.

Over the years, through various surveys that we have carried out among the students who have enrolled in the physical education course, we have tried to identify what are their motivations underlying the participation in a motor activity. The opinions ranged from satisfying the need for movement, to the desire to improve their

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physical appearance, to enrich their technical repertoire, as well as their motor luggage, to the desire to increase their effort capacity, to the need for socialization, etc.

The research organization

The purpose of the paper

The idea of this study started from the curiosity to identify at the girls participating in the aerobics, fitness, volleyball and table tennis courses, the extent to which the somatic, motor and functional objectives are met through the specific contents of the mentioned sports disciplines.

We also aim to disseminate the results of this study in the sense that, in the future, students will be guided to practice those sporting disciplines that satisfy their main sporting needs, which should be in my view the main criterion for choosing a sport. sports disciplines.

The research objectives

To achieve the proposed goal, the following research objectives were set:

- Establishing the research sample –80 students, 20 in each of the 4 sports disciplines;
- The initial evaluation of somatic, motor and functional parameters;
- Carrying on the programs of aerobic gymnastics, fitness, volleyball and table tennis;
- The final evaluation;
- Analyzing and interpreting the results.

The hypothesis of the research

The means specific to each sports discipline listed above, used in the physical education lessons with the female students in the higher education, will influence differently the level of the physical training and the somatic and functional parameters of them, some of the sports being more efficient in this regard.

The research stages

The initial testing took place at the beginning of the academic year 2018-2019, during the week 1-5 October, being evaluated a series of somatic, motor and functional parameters. During the academic year, the subjects of our research participated once a week in the chosen courses, acting on them with the specific means.

The final testing took place in May 2018, at the end of the academic year, to highlight the changes recorded at the level of the measured parameters.

The Subjects and the place of the research

To conduct the experiment, the sample was composed of 80 UB students (girls), year I, aged 18-21 years, enrolled in aerobics, fitness, volleyball and table tennis classes.

The research methods

In our approach we used the following research methods:

- The study of the specialized literature;
- The statistical-mathematical method;
- The graphical method;
- The tests method:
  - For the evaluation of somatic parameters: BMI calculation, waist perimeter measurement and thigh perimeter measurement;
  - For the evaluation of the motor parameters: push-ups, trunk crunches / 30 s, long jump, mobility test, speed evaluation test.
  - For evaluation of functional parameters: heart rate measurement, Harvard test, Ruffier test

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All courses last 90 minutes, during which the motor density varies, depending on the characteristics of each sport discipline.

The aerobics lessons are held on a continuous musical background, which establishes the rhythm and tempo of the work, and also gives a feeling of good disposition and attractiveness. The form of exercise is the global one, with no "dead times", the intensity of the exercises can be gradually graded, and the main muscle groups are engaged in action one at a time.

In sports games, volleyball and table tennis, the physical component is approached globally, by the whole group, but the technical-tactical topics involve the practice in pairs, which leads to the decrease of the motor density at certain moments of the lesson.

Within the fitness lessons the students are working in circuit, 3 sets x 30 seconds on each device, 2 girls on each device.

Results

The Somatic/morphological evaluation

Table 1. *The Dynamics of the somatic parameters*

Tests	Aerobics		Fitness		Volleyball		Table tennis	
	I.T.	F.T	I.T.	F.T	I.T.	F.T	I.T.	F.T
	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$
BMI	21.57	20.15	21.75	20.51	21.55	21.42	21.54	21.47
Waste perimeter (cm)	66.5	62.2	66	64.8	65.8	65.4	66.1	65.9
Thigh perimeter (cm)	53	52	53.1	52.3	53.2	53	53.1	53

In order to determine the somatic/morphological level of the students participating in our study, we calculated the body mass index and we measured the perimeter of the waist and the thigh. (table no. 1)

Regarding the body mass index, the differences between the initial and the final tests are statistically significant for the girls participating in the aerobics, fitness and volleyball courses, because the statistical t is greater than the tabular one, for $p < 0.05$. The students participating in the table tennis lessons also recorded differences between the two tests, but by calculating the significance test it was shown that they are not significant.

The changes in the values of this index are accounted for by the fluctuations in weight, because the height no longer supports changes at this age in the case of girls. Consequently, we can say that the systematic practice of aerobics, fitness and volleyball lessons by the subjects of our research has positively influenced this parameter, weight, and implicitly the body mass index.

Regarding the perimeter of the waist and thigh, as shown in table no. 1, there are differences between the values recorded in the 2 tests, for the students participating in all sports, but by calculating the significance test it was shown that only the girls who accessed the gymnastics and fitness classes obtained statistical significance results. Thus, we can say that the specific means of these sports disciplines have positive effects on these parameters, which are so important for girls in terms of aesthetic.

The graphical presentation of the somatic/morphological parameters are shown in figure no. 1, figure no. 2 and figure no. 3.

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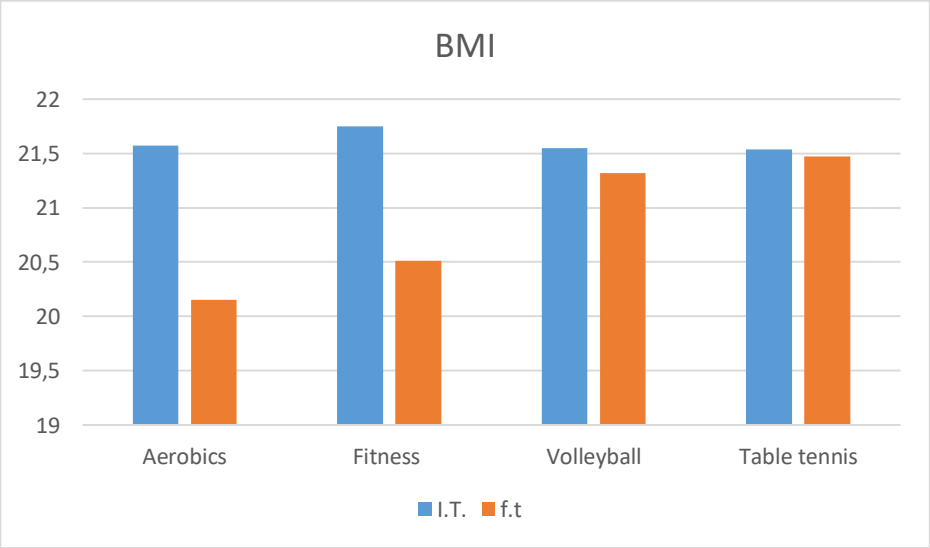

Fig. 1 – The average values of BMI

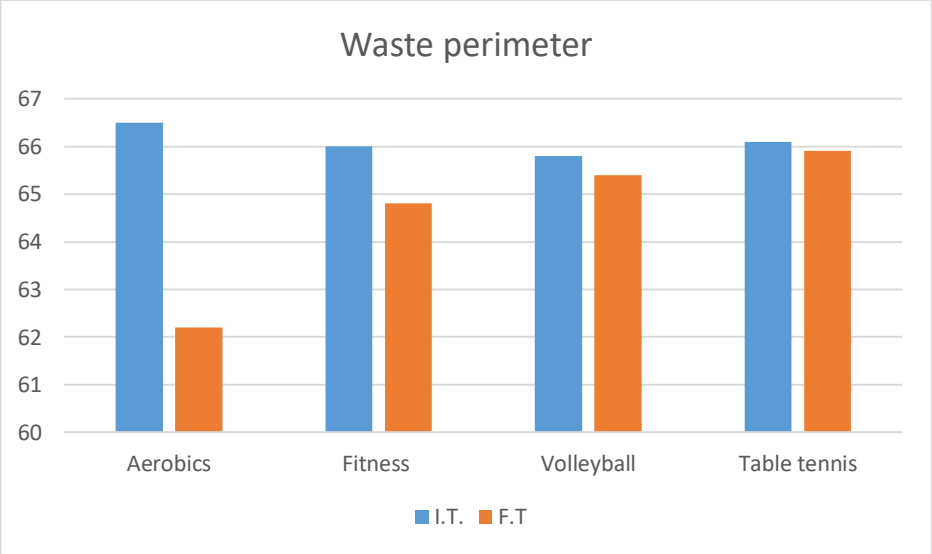

Fig. 2 – The average values of waste perimeter

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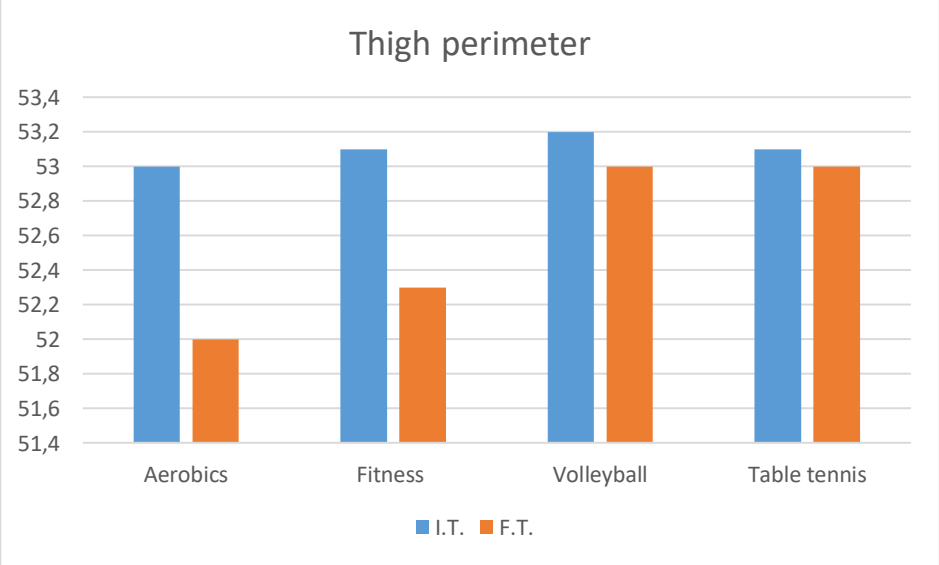

Fig. 3 – The average values of thigh perimeter

The functional evaluation

Table 2. *The Dynamics of the somatic parameters*

Tests	**Aerobics**		**Fitness**		**Volleyball**		**Table tennis**	
	I.T.	F.T	I.T.	F.T	I.T.	F.T	I.T.	F.T
	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$
Heart rate(beats/min)	73.05	70.3	74	72.5	73.2	72.9	73.1	72.9
Ruffier Test	11.3	9.6	11.2	10	11.3	10.9	11.4	11
Harvard Test (HI)	65.12	67.1	64.9	65.6	65	67.1	64.8	65.7

One of the objectives of physical education is the harmony between morphological and functional indices.

Thus, to determine the adaptation of the body to the effort by participating in the physical education courses, we measured the level of functional indices, through the following tests: heart rate measurement, Ruffier test and Harvard test.

As shown in table no. 2, the differences between the heart rate averages between the initial and the final testing exist for all the research subjects, but by calculating the significance test, it turns out that only the girls who participated in aerobic and fitness classes achieved statistically significant results. The same situation can be found in the case of the Ruffier index. We can come to the conclusion that the action systems specific to these sports disciplines are more effective for the increasing the adaptation to effort, compared to the specific content of volleyball and table tennis, in the case of girls.

In the case of the Harvard test, the return of the heart rate, following a submaximal effort, represents an indicator of the physical condition of the students included in our experiment. Analyzing the differences between the average values of the Harvard index between the two tests and by calculating the significance test, we observe that only for the girls participating in the aerobics course and those of the volleyball, the statistical t is greater than the tablular t at a significance threshold $p < 0.05$, which confirms the hypothesis that the results have statistical representativeness, which demonstrates the efficiency of the specific training.

The graphical presentation of the somatic/morphological parameters are shown in figure no. 4, figure no. 5 and figure no. 6.

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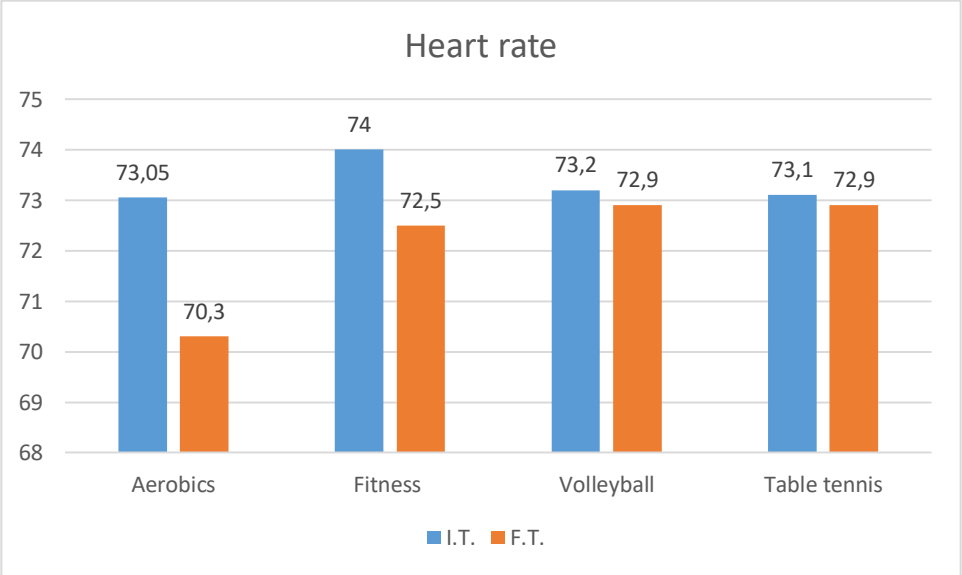

Fig. 4 – The average values of the heart rate

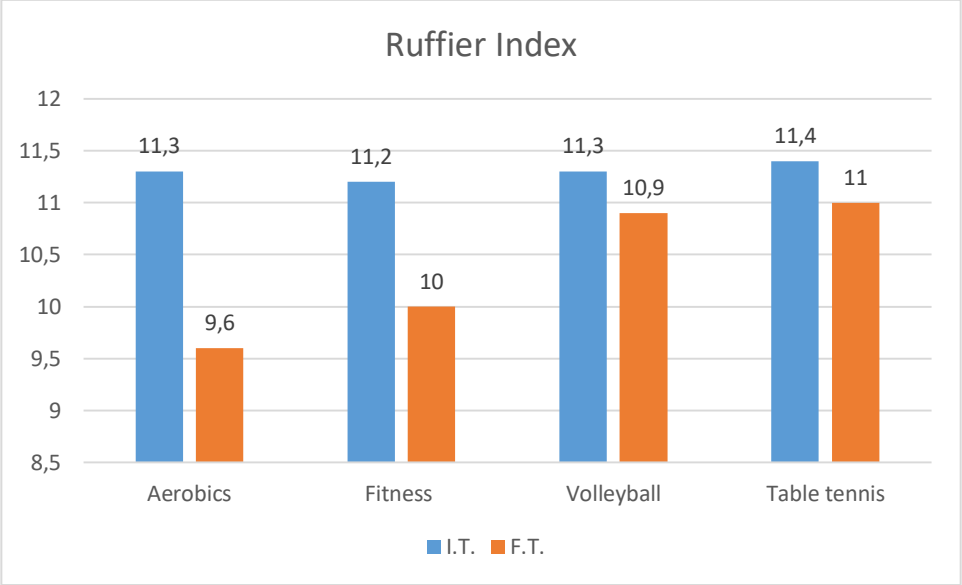

Fig. 5 – The average values of the Ruffier Index

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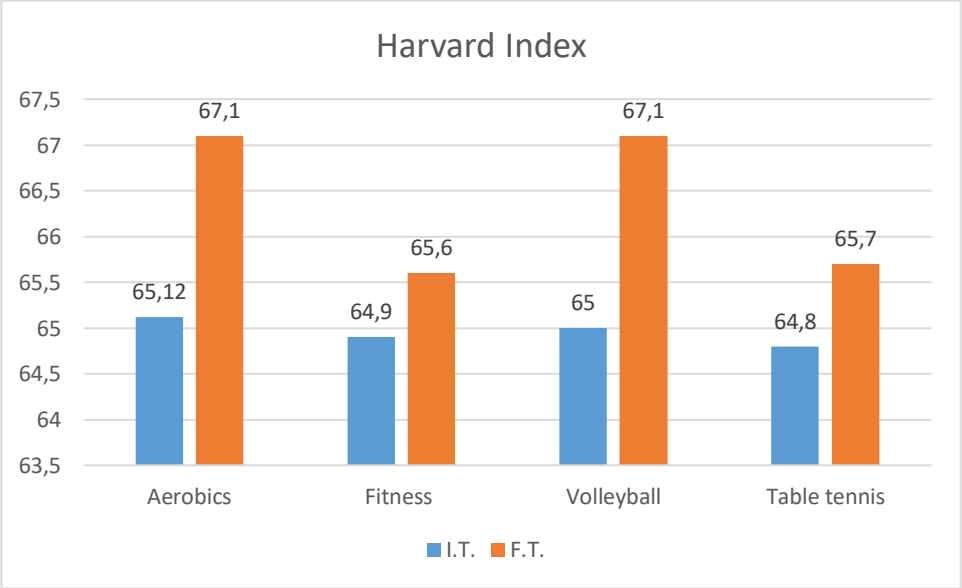

Fig. 6 – The average values of the Harvard Index

The evaluation of the general motricity

Table 3. *The Dynamics of the motor parameters*

Tests	**Aerobics**		**Fitness**		**Volleyball**		**Table tennis**	
	I.T.	F.T	I.T.	F.T	I.T.	F.T	I.T.	F.T
	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$
Push ups	9.90	10.75	9.7	10.8	9.83	10.15	9.8	10.1
Crunches (rep./30s)	18.3	20	18.3	19.9	18.2	18.7	18.1	18.6
Long jump (cm)	170	175.2	171	175	172	180	171	179
Mobility (cm)	3.83	5.71	3.70	4.20	3.8	4.3	3.75	4.25
Speed– 50 m (m/s)	8.3	8.1	8.1	8.0	8.2	7.7	8.2	8.0

To perform this type of evaluation we used 6 tests of general motricity: push-ups, crunches/30 seconds, long jump, mobility, running speed / 50m.

In the table no. 3 are presented the arithmetic means of the values recorded by the students participating in our study, both at the initial and the final tests, at the tests of general motricity.

By calculating the differences between these values, as well as the significance test t, it is found that statistically significant results were obtained for the push-ups, the crunches, the mobility - at the aerobics and fitness lessons, the speed was significantly improved in the case of students participating in the volleyball courses, the explosive force in the lower limbs has made significant progress in the subjects participating in the table tennis and volleyball courses.

In other words, each component of the general motricity mentioned above has undergone obvious and significant improvements through the efficient use of the action means specific to the related sports disciplines.

The graphical presentation of some of the motor parameters are shown in figure no. 7 and figure no. 8.

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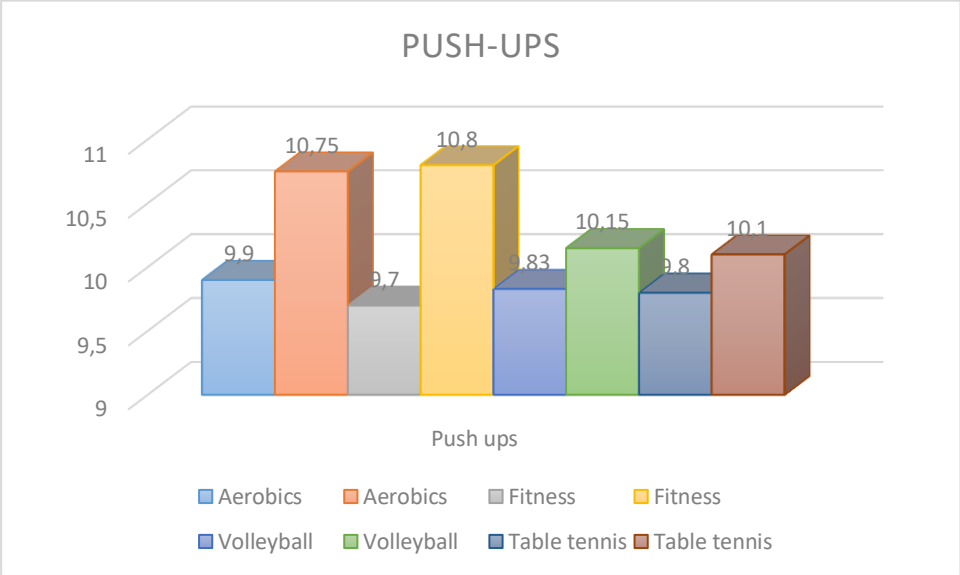

Fig. 7 – The average values of the push-ups

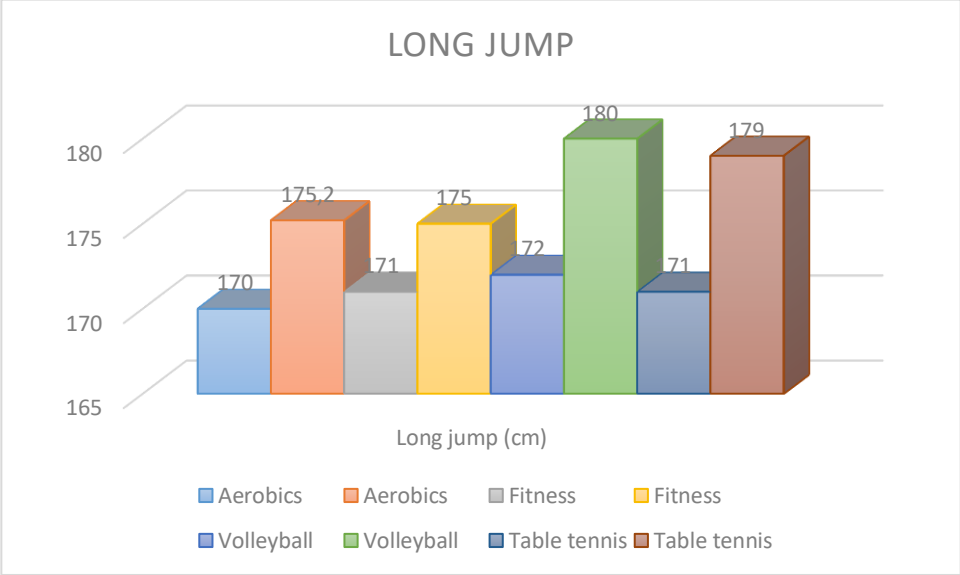

Fig. 8 – The average values of the Long jump

Conclusions

Regarding the dynamics of somatic/morphological indices, all the subjects of our approach registered progress during the training year, but it was proved that the representative results were obtained by the participants in the aerobics and fitness lessons. Therefore, it has been demonstrated statistically that through the content of these sports disciplines, the somatic parameters that interest girls to a large extent, can be positively influenced.

The functional adaptation of the body to the effort had significant improvements for girls who practiced aerobics and fitness, a good physical condition recording at the end of the training period, according to the results of the Harvard test, also the girls practicing volleyball.

The general motricity parameters were influenced differently by the four sports disciplines used in our experiment. Thus, the strength of the upper limbs and the trunk, as well as the mobility, have obviously

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improved by participating in aerobics and fitness lessons. The operational structures specific to volleyball and table tennis have led to significant progress in the strength of the lower limbs, while the speed of the girls participating in the volleyball course has improved.

We consider it appropriate to disseminate the results of our study among students who enroll in physical education courses at the University of Bucharest, so that their choice will be made according to what expectations they have by participating in such an activity.

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