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**INCREASING THE PHYSICAL CONDITION OF STUDENTS BY
PLAYING HANDBALL**

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Abstract

Teaching - Learning – Evaluation Process of the study program Kinesiology and Special Drivability Faculty of Physical Education and Mountain Sports Brasov's main objective is training physiotherapists' specialists, who are able to satisfy the needs of citizens from different social and economic areas of the country, with different body disorders. Therefore, educational curriculum after which this learning process is conducted has a wide range of disciplines, aiming at acquiring the necessary skills in the field, but also to provide individual theoretical and practical training for the student and to the future specialist in the art of movement, prevention, physical and functional recovery of the body. These disciplines harmoniously combine theoretical and methodological contents and practical training with the ultimate aim of developing multiple sports skills, but also to increase physical condition and overall enrichment of sports skills. Thus, disciplines like athletics, gymnastics, soccer, swimming, skiing, Pilates, aqua gym and not least the game of handball meet the solving of these goals by requiring continuum physical efforts and varied beneficial effects on the body and health. In this study, I will present the contribution of the discipline "Prevention and wellness through handball" in educating the driving ability and increase physical condition indices of freshmen students during an academic year. Through this research I am trying to prove that we can achieve a high level of physical condition as a basis for acquisition of vocational skills through systematic, methodical and rigorously planned training and specific to handball game.

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1. Introduction

The reasons I chose the subject of the research regarding ways to stimulate student interest from KMS to perform physical activity in order to increase physical condition are multiple. Firstly the degree of specific culture held by them concerning future profession is very low. The vast majority has no knowledge about the field which they chose and content / subject discipline will have the route of specialization nor the importance or role of physical exercise in the chosen profession.

A further reason is related to the low preparation of their physical skills and insufficient technical and tactical motor acquisitions in sport branches (due to reduced number of hours of physical education in undergraduate cycles).

Going forward with arguments, the chosen profession - physiotherapist – is linked to the necessity of maintaining a static positions for implementing the procedures in patients. These positions have negative repercussions on their body systems and devices: trunk twisting, tension and pressure on the chest, limb isometric action, lifting and supporting people with different locomotors disorders and keeping a working positions longer. By practicing systematic physical exercise these shortcomings can be prevented or mitigated.

Not least was the methodology chosen and the forms for the subjects that participated in the acquisition of sports skills. Even though the handball discipline is rich in content and intense physically and mentally solicitation, I was able to arouse the interest and participation of students by alternating the standard exercises with motion games. The frequency in practical classes was in proportion of 91.75% and the cases of effective and affective outs were of a medical nature (physical indisposition, mild injury etc.). Analysis of student satisfaction at handball lessons was conducted by questionnaire evaluation of teaching submitted by the specialist and statistically analyzed.

Human motor behavior (Famose, J.P, 1993, Neagu N, 2010, 2012,) develops as a complex combination of movements, attitudes or postures used to adapt to the different, constantly changing environmental conditions. The motor skills of the body materialize in the harmony and easiness of motor expression upon the occasion of exercise, leisure, sports or expressive activities, by performing various movements involving one or several parts of the body or a combination of body parts, which require the intervention and coordination of the important muscle groups. Thus, the more multilaterally the body is trained, the better it integrates with the environment, being able to properly respond to stressful factors with a minimum level of effort. Adaptation (Dragnea A.C. Mate-Teodorescu, 2002) is the level that allows us to become acquainted to the environment. It is the dynamic balance between the assimilation of the external environment and the accommodation – the integration of the internal body structure information with the environmental requirements. The physical condition also is responsible for the level of people's integration with the environment and their adaptation to its requirements. The health condition comprises the way in which the body responds to either mechanical or mental strain pursuant to their favorable or more favorable effects.

The proper and systematic performance of motor activities triggers the increase of the physical, mental and social performance capacity, which, in the end, leads to good health and, implicitly, a high quality of life. Physical exercise, physical condition and health are interrelated. Thus, in the opinion of the reputed Mitra A, Mogos (quoted by Danila DM, 2011, p. 23) "physical exercise represents the voluntary, deliberately and systematically repeated movement within an educational process organized for the purpose of the achievement of concrete training and educational goals meant to develop and refine motor skills, abilities and qualities, with the multilateral education of personality"

Physical condition (Hales, D. Lauzon, L. 2004) could be defined as the capacity of the body to respond to environmental strain, with a proper cardiovascular, respiratory, muscular strength level underpinned by the high motor and especially will qualities.

Health does not only mean the absence of the illness but, instead, in the vision of WHO, 1896, health is the status of complete physical, mental and social wellbeing, which fosters personal growth and development, the capacity to cope with problems and attain complete comfort.

2. Methodology

2.1. Participants

The experiment included 66 subjects (32 girls and 34 boys), 1st year Kinetotherapy and Special Motility students at the Faculty of Physical Education and Mountain Sports from Brasov, and took place during years 2015-2016. The students covered a motility content specific to basic handball, adapted to their main field of study, so as to acquire practical and methodical knowledge, while also enhancing their motor capacity (The 2015-2016 curriculum for the Kinetotherapy and Special Motility Education Program).

2.2. Measurement

Pedagogic observation meant to collect information on the researched phenomenon, pedagogic experiment required in the elucidation of unknown facts through research, analysis of the training and education process, of the relation between the planning and achievement of the content, the method of the tests revealing the efficacy of the training efforts.

2.3. Procedure

The development of basic sports skills has been sought, through the initiation into the basic techniques – catching and passing, dribbling, goal-throw, feints, necessary tactical knowledge, providing an optimum framework for the performance of the bilateral game, while stimulating interest and emulation towards the formally organized motor activity, as well as towards the enhancement of physical fitness. Apart from the above, the general back, abdominal, arm muscle strengthening, coordination and leg muscular force and resistance exercises have been used ("Prevention and Physical Condition through Handball" Discipline Sheet for 2015-2016).

2.4. Statistical Analysis

The statistical data processing (Tudosî S, 1990) used were the following: arithmetic mean, dispersion, standard deviation and relevance coefficient, correlated samples.

2.5. Research hypothesis

This study starts from the premises that a high level of physical fitness may be attained through systematic, methodic and rigorously planned training, with the general and specific means in the handball game - a field discipline of Kinetotherapy. The research aimed at systematizing certain training elements in the Kinetotherapy (KMS) curriculum, meant to develop professional skills, but which, through their physical strain level, also lead to the increase of the physical fitness level. Thus, (Neagu N, 2012) the objectives of the research have materialized in: the study of the sports training sources with regards to the factors that help attain a high motor output; the identification of the measurable parameters in the

subsequent specialty training; the registration of the motor indicators achieved pursuant to the physical fitness tests; the result processing and study completion.

3. Results

3.1 The quantitative side - the students' endeavour to enhance their effort resistance - assessed through muscular strength tests (upper body raises while lying back/30sec., upper body raises while lying frontally/30sec, press-ups (no. of repetitions), jump-rope (no. of repetitions without rest time) and small marathon (450m/time). The initial tests were organized at the beginning of the first semester, during 10-20.10 2015, and they were completed during 25.05-3.06 2016. The results were added to the theoretical admission examination grade (see tables 1 and 2). The criteria list established the quantity of physical exercise each student had to make at the end of the practical lesson basics, while educating their segment and general body strength and the aerobic/specific resistance.

Table 1. Summary of experimental test results obtained by the girls and statistically and mathematically processed values

N=3 2	<i>Upper body raises from lying back/30sec.</i>		<i>Upper body raises from lying frontally/30sec.</i>		<i>Press-ups/no. of reps</i>		<i>Jump-rope No. of reps</i>		<i>Small marathon 300m/min.</i>	
	Initial test	Final test	Initial test	Final test	Initial test	Final test	Initial test	Final test	Initial test	Final test
\bar{M}	18.62	25.78	32.71	40.03	6.90	14.25	59.75	101.25	4'06''	3'04''
It-Ft	7.1		7.3		7.35		41.5		1'02''	
S ²	2.45		5.07		2.57		15.96		0.45	
S	1.56		2.25		1.58		3.98		0.67	
t	4.55 p ≥ 0.01		3.24 p ≥ 0.01		4.62 p ≥ 0.01		10.42 p ≥ 0.01		1.52 p ≥ 0.02	

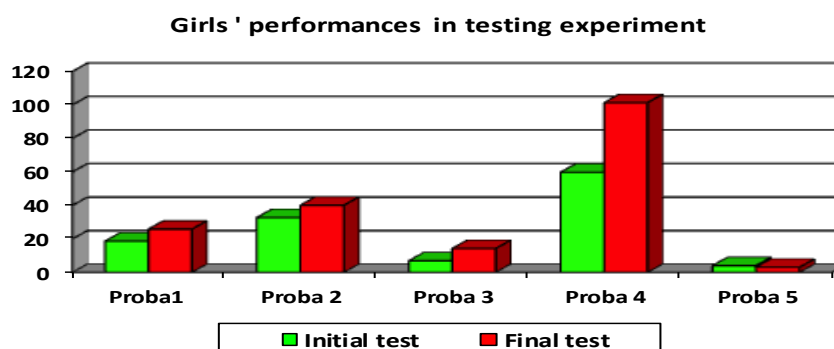


Figure 1. Representation of the performance achieved by girls upon the physical condition tests

A careful look at table 1 and figure 1 shows that the girls' average performance has significantly increased for each test. For abdominal flexors and back extensors, the initial test showed values of 18.62 and 32.71 repetitions, as compared to 25.78 and 40.03 repetitions upon the final test. By calculating the relevance of the difference between the mean values of the correlated samples, we have managed to

identify the value of the calculated t (4.55 and 3.24), which is greater than the one in Fisher's table (2.57) for the limit $p \geq 0.01$, for 32 subjects. The values obtained for the two tests show spread results of up to 2.45 reps and a standard deviation of 1.56 reps. It may be stated that the strength training program was 99.99% successful.

The results of the arm strength test through front support press-ups were much more obvious. Girls do not have high muscular strength in the arms, but exercise can bring relevant improvement. Thus, if at It, girls had an average of 6.9 repetitions, after 10 months of training, the results for this test increased to 14.25. The statically calculated T is 4.62, much higher than in Fisher's table (2.57) for limit $p \geq 0.01$.

For the girls, jump-rope should not raise any coordination or smooth performance issues, it being a known fact that they very often do this exercise – during first and secondary school years. However, It registered a value of 59.75 reps without interruptions, whereas the final test value was of 101.25 reps, 41.5 more than upon the initial testing. The calculated T is 10.42, higher than the table value for $p \geq 0.01$.

The last test, the small marathon brings to the forefront the resistance to speed, because distances are shorter, with direction and body movement shifts, stop-start-acceleration. If upon the first test the time covered was of 4.06 minutes, upon the final test the results were spectacular, reaching 3.04 minutes. This shows that resistance and strength can be educated with very good results as long as the principle of continuity is observed. The calculation of the t has confirmed our work hypothesis up to 99.8%, since the obtained value was of 1.52, much higher than in Fisher's table at $p \geq 0.02$.

Table 2. Summary of experimental test results obtained by the boys and statistically and mathematically processed values

N=34	<i>Upper body raises from lying back/30"</i>		<i>Upper body raises from lying frontally/30"</i>		<i>Press-ups/no. of reps</i>		<i>Jump-rope No. of reps</i>		<i>Small marathon 300m/min./sec.</i>	
	<i>Initial test</i>	<i>Final test</i>	<i>Initial test</i>	<i>Final test</i>	<i>Initial test</i>	<i>Final test</i>	<i>Initial test</i>	<i>Final test</i>	<i>Initial test</i>	<i>Final test</i>
\bar{M}	24	31.01	35.11	44.58	21.32	35.67	55.20	113.29	3'35"	3'13"
It-Ft	7.1		7.3		7.3		41.5		0.22 sec.	
S²	3.15		5.6		7.26		23.50		0.47	
S	1.77		2.36		2.69		4.84		0.68	
t	4.11 $p \geq 0.01$		3.09 $p \geq 0.01$		2.71 $p \geq 0.01$		8.57 $p \geq 0.01$		0.3235 $p \geq 0.08$	

If girls managed to improve their performance by 25% to 35%, the results obtained by the boys are just as promising. In the two muscular resistance tests (table 2 and figure 2), the boys started from an average of 24 reps, respectively 31.11 for back muscular strength and they have achieved an average performance of 31.01 reps for abdominal muscular strength and 44.58 for the back muscular strength. The T calculated for these two tests was higher (4.11 and 3.39) as compared to the table t 2.57 for n=34 subjects.

For test 3, press-ups, the boys had an average of 21.32 reps for the initial test and, upon the final test, they have achieved average performance of 35.67. The statically calculated T is higher (2.71) as compared to the one in Fisher's table (2.57) for $p \geq 0.01$.

In test 4, they have faced quite a lot of difficulties, being unable to synchronize movements. If at It 30% of the subjects were unable to connect several consecutive rounds, some being actually unable to jump two consecutive times and obtaining an average result of 55.2, upon the final test, the average number of rope jumps has increased to 113.29. This performance was widely spread, the lowest value being of 3 reps, and the highest of 103. At the end of the training stage, the differences between the motor action performance capacity and its quality has considerably decreased. The calculated T was of 8.57, higher than in Fisher's tables (2.57) at $p \geq 0.01$.

For the small marathon test, the initial performance was of 3.35 minutes reaching 3.13 upon the final testing. The calculated t reached 0.3235, more than the table t for $p \geq 0.08$.

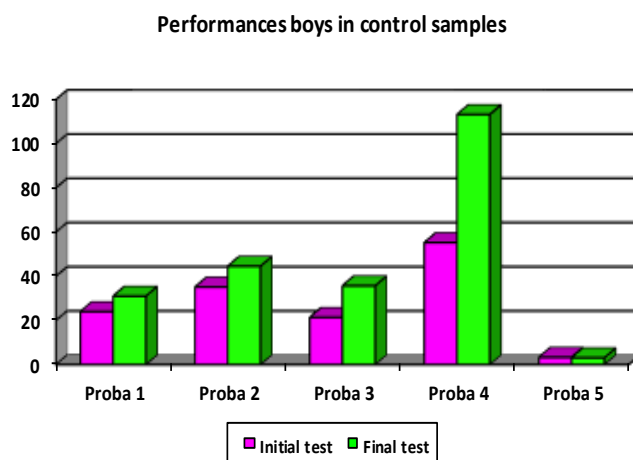


Figure 2. Representation of the performance achieved by boys upon the physical condition tests

3.2. *The qualitative level* of the handball-specific technical and tactical knowledge achieved expressed through grades. The discipline-specific technical content has been included in the didactic process for 10 months, a period during which field displacement procedures, ball catching and passing, dribbling, goal-throws, basic game and full effect bilateral game notions have been practiced. The objective was related to the achievement of professional and cross competencies, as well as the increase of the body capacity to withstand effort. The results expressed in grades are presented in table 3 and figure 3.

Table 3. Average technical test results

		Technical and tactical content													
		Run shot		Jump shot		Front step cross run-up shot		Back step cross run-up shot		Double step run-up shot		Hop run-up shot		Applicative route	
N=67		TI	TF	TI	TF	TI	TF	TI	TF	TI	TF	TI	TF	TI	TF
M		4,22	7,72	4,54	8,39	3,21	8,58	4,12	8,62	4,53	8,72	3,43	7,65	4,12	8,73
		4,95	9,05	6,05	9,17	4,64	8,82	5,14	9,38	4,75	8,79	5,32	8,79	5,72	9,14

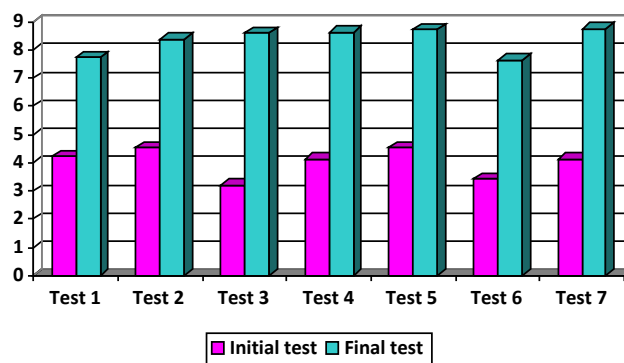


Figure 3. Representation of the technical test results obtained by the sample research subjects – Girls

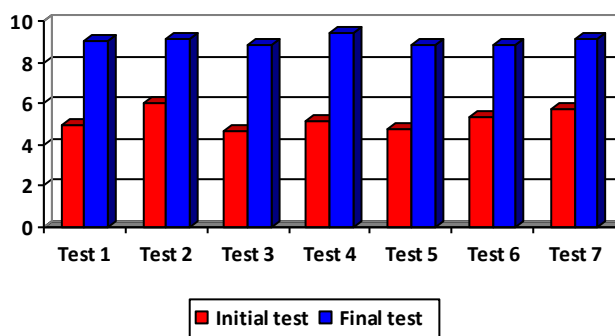


Figure 4. Representation of the technical test results obtained by the sample research subjects – Boys

Table 4. Assessment questionnaire of didactic activity made by students

<i>Crt. No.</i>	<i>Question</i>	<i>Average score</i>
1	The activity stimulated my interest in this discipline	4.83
2	Exposure and comments made by the teacher were clear	5.00
3	The atmosphere created by the teacher was pleasant	4.83
4	The teacher involved us in the seminar	4.83
5	The teacher showed us how to use knowledge and skills acquired	4.83
6	The teacher used appropriate methods of monitoring and ongoing evaluation skills for work seminar	5.00
7	The relationship with the teacher was collaboration and mutual respect	5.00
8	The theme and objectives were clearly outlined at the beginning of the semester	4.83
9	The teacher used effectively the time assigned for the didactic activity	5.00
10	Material covered in the seminar helped me to better understand and apply subject-specific concepts and methods studied	4.67
11	The teaching materials used helped me to better understand the matter	4.67
12	The teacher expressed willingness to answer our questions	5.00

Total number of respondents: 67

Global evaluation of the discipline:

Total score I1 - I12

4.87 for all respondents

Overall I was satisfied with the performance of the teacher.

5.00 for respondents with a frequency >25%

The frequency of students in class, in percentages: 91,75%

The share of students at classes <25% - 0%

4. Discussions and Conclusion

The review of the practical competency acquisitions should start from the fact that all subjects were initially tested in order to check the individual progress level. The test results show that 84.6% of the subjects were unable to respond to the minimum test requirements (grade 5), because they had not covered the handball curriculum during the pre-university physical education and sports classes. Thus, during the hours dedicated to the subject-matter, the teaching-learning level methods, the global training for more accessible processes, as well as the segmented or analytical methods for the more complex ones have been used, in order to achieve tactical learning. The final tests have revealed a good performance level for all technical disciplines, with higher average individual progress results of approximately 7.72 for run shooting (girls) and 9.38 for back cross leg shooting for boys.

Good and very good performance was registered for the applicative route - pass - running across a ranging pole - catching the ball thrown by the team mate - dribbling - jump pass to the pivot player - regaining - 6m penetration shot at the goal. The assessment of the performance capacity and of the implementation of the technical procedures and tactical actions focused on: the subjects' dexterity in handling and controlling the ball, confident passing, and the choice of the best technical alternatives for the tactical situation. The performance ranged between mean values of 8.73 for girls and 9.14 for boys.

Based on the data obtained pursuant to the experimental research and on the didactic observations concerning the education of the motor capacity and of the physical condition by covering the handball curriculum, it may be concluded that their acquisition:

- enhances the sports skills required for the performance of leisure activities
- enhances the quality of the technical process and bilateral game performance
- develops the accurate coordination of movements, of the locomotor system, and leads to the establishment of complex and unitary movement structures;
- fosters confidence and ease of performance;
- improves physical condition through the isolated repetition of technical processes and tactical actions, as well as through bilateral game;
- educates motor qualities: force, displacement and execution speed, coordination, spatial and temporal orientation, as well as general and specific resistance.
- educates the effort capacity, while optimizing the physical condition and the quality of motor executions.

Concerning the statistically processed results, we conclude that the level of physical effort systematically made during the specialty classes, based on the joint curriculum structure, has multiple influences on the education of the capacity and, especially, the optimization of the physical condition of the future kinotherapy specialist. The superior performance registered by both boys and girls in the physical capacity and, implicitly, physical condition, tests have reflected in the accuracy of handball-specific executions. If motor capacity indexes are educated in terms of the capacity to withstand effort, the level of specific motor acquisition also is higher. All subjects registered significant progress in terms of the motor capacity and physical condition

optimization.

Considering the experimental results obtained, we believe that the future kinetotherapy specialist needs a proper psychomotor education in order to be a reliable role model for his peers, hold sound knowledge on the personal and public health protection or recovery methods.

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