

Journal of Sport and Kinetic Movement

No 25
Vol. 1/2015

ISSN 2286 – 3524
ISSN-L 2286 – 3524



"JOURNAL OF SPORT AND KINETIC MOVEMENT"

pISSN:2286 –3524 ;eISSN-2286 –3524

contact:

sport_kinetic_movement@yahoo.com

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ISSN 2286 – 3524
ISSN-L 2286 – 3524

Publisher: **Universitaria**
156 Brestei Street, 200177, Craiova, Romania

Editorial office address:
University of Craiova, Physical Education and Sports Faculty
156 Brestei Street, 200177, Craiova, Romania

THE AUTHORS ASSUME THE ENTIRE CONTENT OF THE PAPERS.

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ELECTRON BEAM AND MICROWAVE FOR FLUE GASES TREATMENT

Anca-Mihaela (BULEARCĂ) STOIAN, Denisa-Constantina AMZOIU, Ioan CĂLINESCU, Gabriela RĂU

University of Medicine and Pharmacy of Craiova, Faculty of Pharmacy, Petru Rareș Street, 200349 Craiova, Romania

Politehnica University of Bucharest, Faculty of Applied Chemistry and Material Science, 1-7 Gh. Polizu Street, sector 1, 011061 Bucharest, Romania

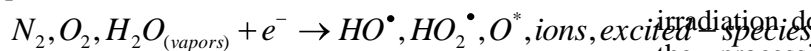
Abstract. Different acidic oxides pollutants like sulphur dioxide (SO₂) and nitrogen oxides (NO_x), with direct effect on air, water, ground, and consequently on human health, have determined extensive researches for flue gases treatment by implementation of irradiation technologies. In this sense, the physical and chemical mechanisms through which pollutants removal takes place have to be very well understood. A synthetic gaseous mixture containing SO₂ and NO_x was used. Its composition was similar to flue gases from power plants that burn coal or oil with a high concentration in sulphur. At global level, the irradiation method with electron beam is already used. The combined electron beam and microwave irradiation treatment represents a recent method. Moreover, the presence of ammonia in the gaseous mixture leads to pollutants conversion into fertilizers used in agriculture. Therefore, the main aim of this research activity is the removal within the same step of SO₂ and NO_x acidic oxides with high yields. In addition, the reduction of consumption energy and of associated costs is also wanted. In order to better understand the technique, a mathematical model associated to the irradiation process was realized. Highlighting its strong points, this technology of combined electron beam and microwave irradiation might be implemented in industry, on the large scale.

Keywords: electron beam, microwave, irradiation, SO_x and NO_x removal

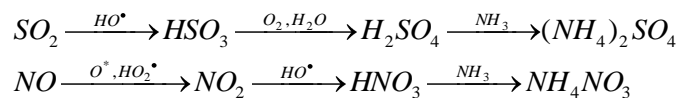
1. INTRODUCTION

At this present moment, some pilot and industrial installations for flue gases treatment by electron beam (EB) irradiation already exist at global level [4]. Their inconvenient is the energy consumption which is rather high (electron beam needs power of around 2-4% from the total energy that is produced by the plant) [6,9]. For this reason, it is necessary to discover new solutions and develop new techniques for reducing both the energy and the costs.

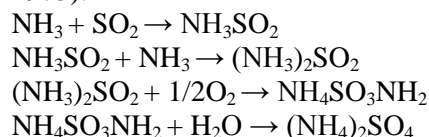
When they are subjected to electron beam irradiation process, the flue gases components, especially N₂, O₂ and H₂O, are transformed into reactive species (free radicals, ions, excited atoms) that have a high oxidation potential [15,11.]:



In the presence of these reactive species, NO_x and SO₂, components of flue gases, are oxidized and nitric acid and sulphuric acid, respectively, are produced as intermediate products. Then, the acids are neutralized with ammonia, producing powders of ammonium nitrate and ammonium sulphate, respectively [5,2.]:



Besides these reactions, radiochemically initiated, ammonium sulphate is also produced by thermal pathway (Hartley Jr. and Matteson, 1975):



After electron beam irradiation and in the presence of NH₃, SO₂ and NO_x are transformed into products used in agriculture as fertilizers, namely (NH₄)₂SO₄ and NH₄NO₃ [4,9,14].

For SO₂ and NO_x removal from flue gases, the irradiation dose is the main parameter. Thus, the processing costs reduction could be realized by implementing methods for treatment that implies the dose reduction [4,12, 1].

The electron beam and microwave (MW) irradiation combined treatment represents a feasible solution, from the removal efficiencies and economical points of view [8].

The present research paper highlights the advantages of the irradiation technology by electron beam and microwave, in order to reduce the EB irradiation dose (which implies

very expensive equipments) with cheaper MW irradiation, because only when the irradiation treatment would clearly demonstrate its strong points, it could be implemented in industry, on large scale.

The electron beam and microwave combined irradiation in the presence of ammonia represents a new method for treatment, which removes both acidic oxides SO_2 and NO_x through a single step, with high efficiencies [13,10, 3].

During the experimental work, the main parameters were temperature, SO_2 and NO_x initial concentrations, total flow rate of gases, water concentration and the stoichiometric ratio of ammonia.

2. EXPERIMENTAL

2.1 Synthetic gas obtaining

The experimental part was performed in the National Institute for Lasers, Plasma and Radiation Physics (INFPLR – Romanian acronym) Bucharest, irradiation laboratories. For the experimental programme accomplishment, a synthetic gas was obtained. It had a composition similar to flue gases from power plants that use coal or oil rich in sulphur during the burning process, namely: 10–15% oxygen, 8–10% carbon dioxide, 9–12% water, 0.1–0.2% sulphur dioxide and 0.02–0.04% nitrogen oxide. This gaseous mixture was obtained by mixing known flow rates of air, carbon dioxide, sulphur dioxide, and nitrogen monoxide. Then, in this mixture, a known flow rate of water was introduced and after that, water was evaporated. A compressor (without oil) supplied the air. The other gases were obtained from their cylinders. Before heating and water evaporation, the gas flow was in the range of 1000–2000 L/h.

NH_3 was used as reagent, as an aqueous solution of 25% concentration. The flow rate of ammonia solution was determined to obtain some stoichiometric ratio of ammonia: $\text{SR}(\text{NH}_3) = \text{NH}_3 / (2 \times \text{SO}_2 + \text{NO}_x) \times 100$ (the concentrations of NH_3 , SO_2 and NO_x were in ppmv).

2.2 Pilot laboratory installation

The experimental laboratory installation for the successive irradiation with EB and MW consists of two distinct reactors. First is the reactor for the EB irradiation, which has a

length of 3 m and a volume of approximately 90 L, and the second one is the microwave irradiation reactor of 1 m length and a volume of 0.5 L (see Figure 1). The reactor for EB irradiation is continuously heated for maintaining a temperature of approximately 70°C , the optimum temperature for the acidic oxides SO_2 and NO transformation reactions into fertilizers, in the presence of NH_3 and under electron beam and microwave combined irradiation. Temperature is measured with a thermocouple, at the exit from reactor.

The ammonia solution was fed from a burette and dosed by a Masterflex peristaltic pump, exactly in front of the gases heater, thus ammonia is evaporated in short time.

A heated filter, for avoiding water condensation, collected the solid reaction product.

For the gases analyses, their measurements were realized at the entrance and at the exit of the reactor.

The gases were analyzed by the Horiba ENDA 600 analyzer, which has the possibility of sampling from two measurement distinct points (entrance and exit). The analyzer is equipped with a device that allows transmission of the analyzed data to a computer and their storage with a frequency of readings from 1 to 12 seconds. The acidic oxides concentrations from the entrance and the exit of the installation represent the mean values that were computed from the registered data at time intervals of 12 seconds, from a registration device. By determining the acid oxides concentrations from the entrance and exit, the SO_2 and NO removal efficiencies were calculated.

2.3 The experimental research objectives

The main objective of the experimental research was to determine the removal efficiencies for SO_2 and NO from a gaseous mixture, under the successive irradiation with electron beam and microwave and in the presence of NH_3 , by modifying some working parameters.

For the beginning, a set of working conditions (total gas flow rate, acidic oxides concentrations, NH_3 and H_2O flow rates, gases temperature) was established and then the following steps were accomplished.

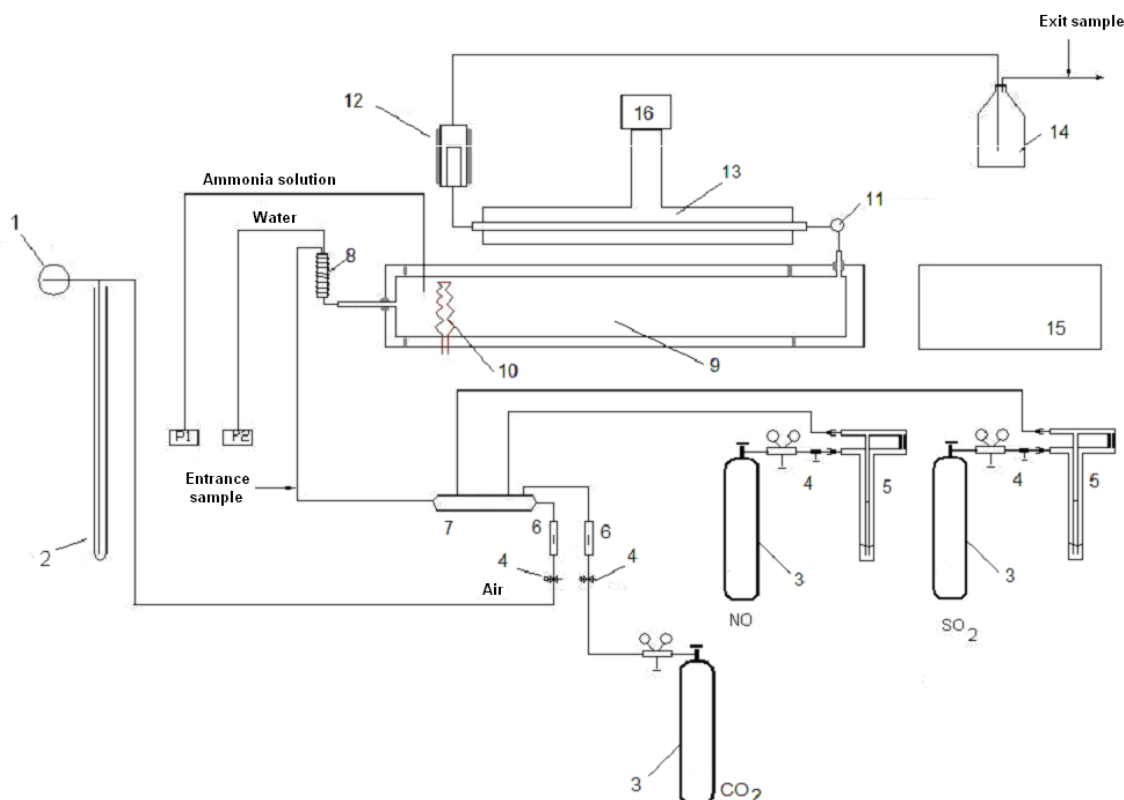


Figure 1. The laboratory experimental installation for flue gases treatment by successive irradiation with EB and MW

- 1 – compressor; 2 – safety valve; 3 – gas storage cylinders; 4 – tuning valve; 5 – flow-meters; 6 – rotameters;
- 7 – gas mixing bowl; 8 – water vaporizer (column filled with ceramics and heated by an electrical resistance);
- 9 – EB irradiation reactor; 10 – electrical resistance; 11 – thermocouple; 12 – particles filter; 13 – MW irradiation reactor; 14 – bubble bowl; 15 – laboratory electron beam accelerator; 16 – magnetron;
- P1, P2 – peristaltic dosing pumps.

- Step 1. A stationary regime is obtained for the installation that is fed only with gases with a composition similar to flue gases (without ammonia). This step implies the obligatory heating of installation at a temperature of 60–70°C in order to avoid water condensation and acidic gases absorption into it;
- Step 2. Start the ammonia supply and determine the removal efficiency of the acidic gases in the absence of irradiation, only thermal;
- Step 3. Start EB irradiation and determine the acidic oxides removal efficiency in such conditions;

- Step 4. Start also the MW irradiation, the gases irradiation takes place successively, first with EB and then with MW.

For accurate results, for each of the 2, 3 and 4 steps described above, a stationary regime was established before the concentrations measurements. Thus, it took a while, a time interval of 2–3 times the gas residence time in the system. For each step, the solid reaction product was collected and it was subjected to analyses, the obtained results not being included in the aim of this paper.

Three sets of experiments were realized.

RESULTS AND DISCUSSION

Figures 2, 3 and 4 present the removal efficiencies of acidic oxides SO₂ and NO function of the treatment conditions, for all three sets of experiments.

In all the performed experimental sets, it is observed that, in the absence of EB irradiation, SO₂ is removed with efficiencies between 67 and 88% (thermal reactions for SO₂ conversion into sulphate and sulphite take place). The SO₂ removal efficiency is higher for flue gases with an elevated humidity content (80% for 12% water – see experimental 1 from Fig. 2 versus 70% for 9% water – see experimental 1 from Fig. 3) and

slightly rises with the ammonia amount (see experiments 1, 2 and 3 from Fig. 4). These data confirm the proposed mechanism for SO₂ thermal transformation that takes place with the aerosol particles obtaining process and is favoured by the high water concentrations and the presence of ammonia.

In the thermal process, the nitric oxides conversion is practically non-existent. When the irradiation takes place only with microwave, the SO₂ removal efficiency raises slowly, but the nitric oxides remain untransformed (see experiments 2 and 3 from Fig. 2). This fact shows that only the MW irradiation cannot generate the appearance of the active species, capable to oxidize the nitric oxides from the gaseous phase.

In the case of EB irradiation, the process is complete, with the simultaneous removal of sulphur and nitric oxides. In such conditions, the SO₂ removal efficiency reaches 97% in the most favourable conditions: 17 kGy dose, 75°C temperature, 12% humidity and the stoichiometric amount of ammonia (SR(NH₃)) equal with 100% (experiment 7 from Fig. 2). When dose is diminished to its half, the decrease of the removal efficiency is low (see experiments 6 and 7 from Fig. 2 versus experiments 2 and 3 from Fig. 3), due to the fact that SO₂ conversion is mainly thermal and to a lesser extent due to gases radiolysis.

The decrease in the ammonia stoichiometric ratio from 100% to 85% and then to 70% determines the diminishing of the SO₂ removal efficiency from 89% to 84% and then to 74% (see experiments 7, 8 and 9 from Fig. 4).

The successive irradiation with EB and MW has a slightly positive effect regarding the SO₂ removal efficiency (see experiments 4 and 5 from Fig. 2; experiments 4 and 5 from Fig. 3, and experiments 7, 8 and 9 from Fig. 4). For SO₂, an increase in the removal efficiency by 2–3% in comparison with the values obtained only by EB irradiation is obtained.

Regarding the nitric oxides, it is noticed that their removal is much harder. If SO₂ can be thermally removed by chemical reaction with ammonia and in the presence of water and oxygen, nitric oxides need the existence of active species that are able to oxidize NO to NO₂ and NO₃ and to form nitric acid and then ammonium nitrate. This process is strongly related and dependent on the irradiation dose. High doses allow the obtaining of high

removal efficiencies (see experiments 6 and 7 from Fig. 2, and experiments 2 and 3 from Fig. 3).

Reducing the water content from 12% to 9% does not affect too much the NO_x removal efficiency (see experiments 2 and 3 from Fig. 3 versus experiments 6 and 7 from Fig. 2). However, if NH₃ is not sufficient, the NO_x removal efficiency sharply decreases, this being much dramatic than the one registered in the SO₂ case, which is less affected (see experiments 4, 5 and 6 from Fig. 4).

In the case of MW and EB combined irradiation process, it is noted a significant increase in the NO_x removal efficiency. This effect becomes much more important when small EB doses are used (in Fig. 2, at 8.7 kGy dose it is obtained an increase in the efficiency from 50 to 70%, and at 17.3 kGy the increase is from 88 to 92% – see experiments 4, 5, 6 and 7).

This effect could be explained by the microwaves capacity to sustain the non-thermal plasma state realized by the EB irradiation. Maintaining the gaseous mixture a long time in this condition improves the removal efficiency especially for NO, the most difficult compound to be removed. Moreover, in our opinion, additional use of microwaves to electron beams inside plasma volume could lead to a free electron multiplication effect and therefore to an increase in the chemical reaction velocity and efficiency. This effect depends on several parameters, especially on microwave electric field strength.

CONCLUSIONS

This paper has studied the process for sulphur and nitrogen oxides removal from a flue gas mixture, with a similar composition to gases obtained from burning of the fossil fuels with high sulphur content. The treatment with ammonia solution was the used method, in order to transform the acidic oxides into ammonium sulphate and nitrate.

It was demonstrated that SO₂ conversion takes place largely by thermal pathway, while NO_x transformation is possible only in the presence of EB irradiation.

Due to EB irradiation high costs, EB + MW successive irradiation method was used. By this combined irradiation process, good results are obtained even if the irradiation took place at low doses with EB, but in the presence of MW.

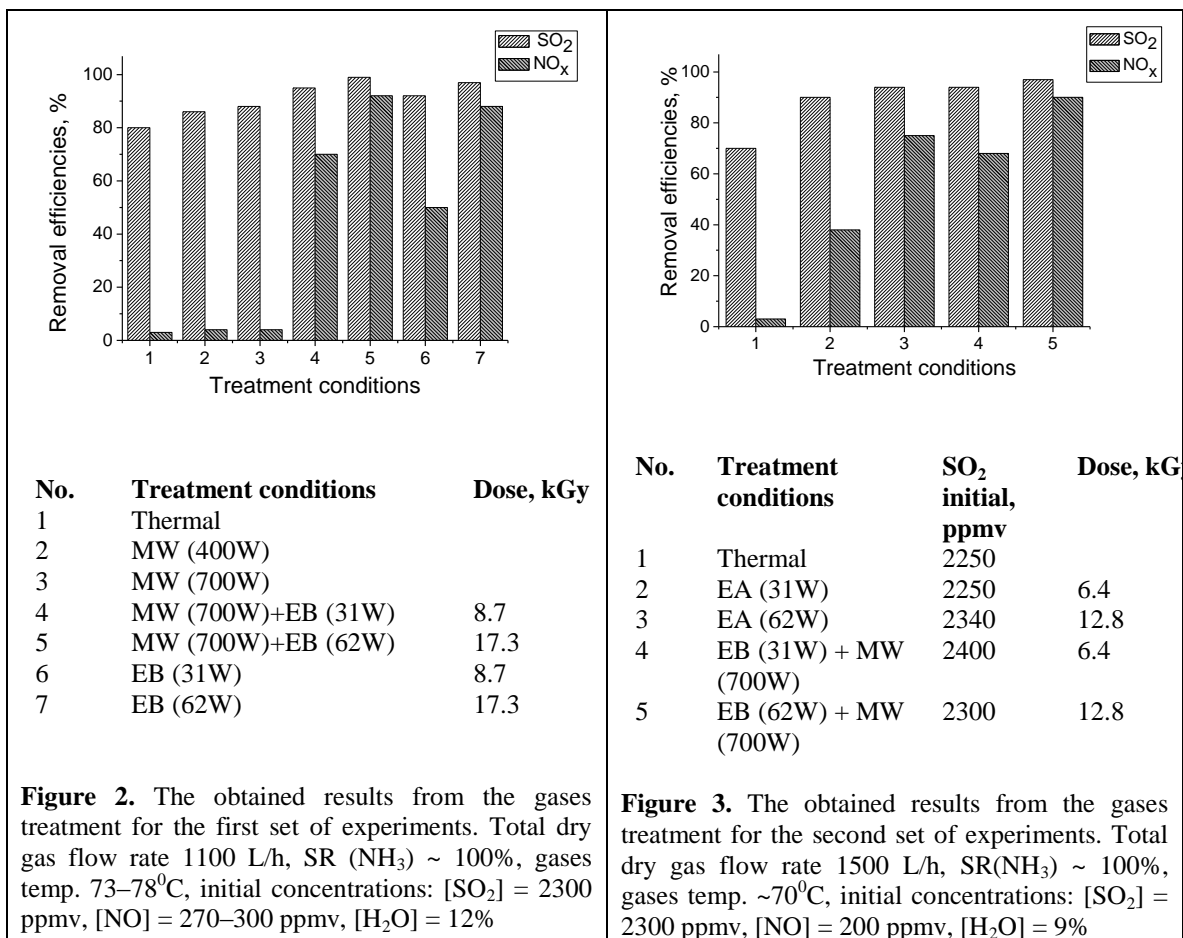


Figure 2. The obtained results from the gases treatment for the first set of experiments. Total dry gas flow rate 1100 L/h, SR (NH₃) ~ 100%, gases temp. 73–78⁰C, initial concentrations: [SO₂] = 2300 ppmv, [NO] = 270–300 ppmv, [H₂O] = 12%

Figure 3. The obtained results from the gases treatment for the second set of experiments. Total dry gas flow rate 1500 L/h, SR(NH₃) ~ 100%, gases temp. ~70⁰C, initial concentrations: [SO₂] = 2300 ppmv, [NO] = 200 ppmv, [H₂O] = 9%

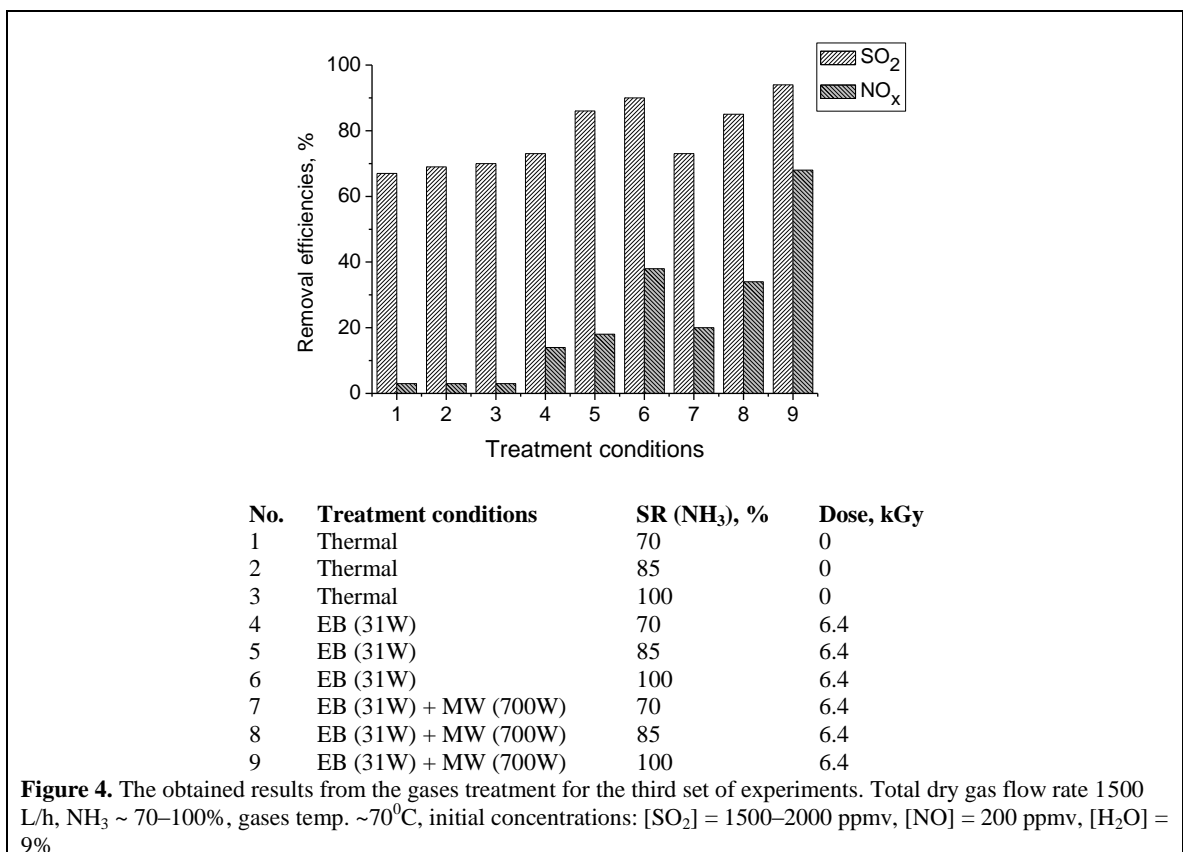


Figure 4. The obtained results from the gases treatment for the third set of experiments. Total dry gas flow rate 1500 L/h, NH₃ ~ 70–100%, gases temp. ~70⁰C, initial concentrations: [SO₂] = 1500–2000 ppmv, [NO] = 200 ppmv, [H₂O] = 9%

The real MW power introduced in the system (actually absorbed by the gaseous mixture) is much smaller than the used power. Using a reactor with a greater volume and in which EB and MW irradiation process takes place concomitant would allow a much better absorption of the microwaves. In such case, the specific used MW energy could be diminished. Such a reactor will be developed.

On the laboratory installation, the influence of the following parameters on the sulphur and nitrogen oxides removal efficiencies was determined: the gases water content, the irradiation dose with EB, the treatment type (thermal, EB irradiation only, MW irradiation only, successive irradiation with EB and MW), stoichiometric ratio of the used ammonia.

The most important working parameters were determined for each case. Thus, for SO₂ removal efficiency it was observed that the most important parameters are the gas humidity and the ammonia presence in sufficient amounts. For nitrogen oxides, the parameters with the highest influence are the EB irradiation dose and the presence of ammonia.

The favourable effect of the combined irradiation process with EB and MW was put into evidence especially for the nitrogen oxides that are much harder to be removed. Similar removal efficiencies are obtained when EB irradiation doses are reduced to half, but EB and MW successive irradiation is performed.

The researches will be continued both experimentally and by realizing a complex mathematical model that could explain the phenomena and the interactions observed during the experimental part.

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THE EFFECT OF STRENGTH TRAINING REGARDING AEROBIC FITNESS IN YOUTH BASKETBALL PLAYERS

SPAHI. A, BILALI. A, JARANI, J

Sports University of Tirana, Albania

Corresponding author: andispahi@gmail.com

Abstract

Introduction. The aims of this longitudinal study was to evaluate and compare aerobic fitness before (PRE) and after (POST) during a 6-month fitness training in youth basketball players (twice weekly)

Methods. Twenty-eight youth (male) basketball players (age range 17-18 years) participated in this intervention study. They were assessed Pre and Post training through aerobic fitness (ergometer test) tests. The intervention study lasted 6 months (twice weekly) on a fitness gym (strength training). The duration for each training set had lasted for each 45 min (8 fitness machines was used).

Results. Results for aerobic fitness assessment showed that: pre test was 3.25 l/min (SD 0.6) and post test 3.61 l/min (SD 0.2) at ($p=0.001$); pre test 39.9 ml/kg/min (SD 2.1) and post test 44.4 ml/kg/min (SD 2.7) at ($p=0.001$).

Conclusion. Results showed significant improvement regarding aerobic fitness with 0.36 l/min and 4.5 ml/kg/min during six month training twice weekly. This study showed the importance of strength training in aerobic fitness in youth basketball players

Keywords; *basketball, strength training, youth, cardio respiratory fitness*

Introduction

Basketball is a very popular sport and player's preparation consists in a mixed kind of training with regard to aerobic and anaerobic capacity. Today most coaches use fitness training to enhance the performance of youth fitness level and to have better results [5,1,2]. Young athletes should be allowed 2 to 4 weeks of adaptation to basic resistance training that should consist of a minimum of 2 sessions per week, with a limited number of sets (one or two), basic exercises, moderate loads (12-15 RM) and adequate recovery (approximately 48 hours). This is important whether it is the first time an individual has weight trained or a new programme is being started after weeks or months of no training [5,13]. The literature concerning the physical preparation is huge, although the literature concerning basketball strength training in youth is still scarce [8,9]. Different estimating techniques are known in order to define muscle coercion, endurance, and speed. When body mass and fat mass rises, aerobic capacity seems to drop [12]. Nevertheless, reduction of fat mass and growth of lean body mass evidently enhance VO_2 maximum [10]. This includes abilities and motions particular to the sport, at intensities enough to encourage aerobic adjustments, are being ever more applied in professional team sports habitat [7].

The aims of this longitudinal study was to evaluate and compare aerobic fitness before (PRE) and after (POST) during a 6-month fitness training in youth basketball players (twice weekly)

Methods

Subjects

Twenty-eight youth (male) basketball players (age range 17-18 years) participated in this intervention study. The mean age of the selected players was 17.6 ± 0.67 . They were assessed Pre and Post training through aerobic fitness (ergometer test) tests. The intervention study lasted 6 months (twice weekly) on a fitness gym (strength training). The duration for each training set had lasted for each 45 min (8 fitness machines was used). The selected players had 4.6 ± 2.7 years of playing experience and regularly participate in training prior to the commencement of this study and played regularly in Albanian championship basketball national tournament for a period of 3.1 yrs.

Protocol of the test

Cardio respiratory fitness was determined using an incremental running test on an ergometer bicycle to voluntary exhaustion. Expired oxygen (O_2) and carbon dioxide (CO_2) flow and concentrations were measured using an open circuit breath by-breath automated gas analyser. The results for each participant were

shown in l/ min and ml/kg/min and then transferred in statistical analysis as mean scores for the entire participants.

Intervention

The Intervention on youth basketball players lasted for 6 months. The total frequency was twice weekly with a duration per session 45 min. The training intervention was performed on the fitness gym (strength training) placed in the gym of Sports University of Tirana. Strength exercise was performed using 8 machines while the agility exercises (speed and agility exercises) were lasted with duration 10- 15 min (4-6 exercises).

Statistical Analysis

The data were gathered and organized in excel file. Than were transferred and analysis using statistical package SPSS (Windows version). Initially, we calculated the descriptive statistics (minimum, maximum, means and

SDs) for cardio respiratory fitness. The statistical analysis for the comparison between the mean values of variable was the independent sample t -test, where a high level of significance was adopted ($p \leq 0.005$). It was used ANOVA test for pre- post comparison for the variable and then a post hoc analysis using Bonferroni equation. Only $p \leq 0.005$ were considered statistically difference for two time measurement with regard to cardio respiratory fitness in youth basketball players. SPSS statistical program was used for calculation of the results obtained from this research study.

Results

The results on table 1 show descriptive statistics for age of participants in this study. The sample consisted in 28 youth basketball players with a mean age of 17.6 years old and standard deviation 0.6 years.

Table 1 Descriptive statistics for age by time measurement

Measurement Time	N	Minimum	Maximum	Mean	Std. Deviation
Pre Age	28	16.8	18.7	17.6	0.6
Post Age	28	17.3	19.2	18.3	0.6

Results for aerobic fitness assessment in table 2 showed that: pre test was 3.25 l/min (minimum 2.9 and maximum 3.8 l/min) and post test 3.61 l/min (minimum 2.9 and maximum 4.3 l/min) while for pre test was 39.9 ml/kg/min (minimum 30.0 and maximum 48 ml/kg/min) and post test 44.4 ml/kg/min (minimum 37.0 and maximum 55 ml/kg/min).

Table 2 Descriptive statistics for cardiorespiratory fitness by time measurement

Measurement Time	N	Minimum	Maximum	Mean	Std. Deviation
Pre Vo2Max L/min	28	2.9	3.8	3.25	0.6
Pre Vo2Max ml/kg/min	28	30.0	48.0	39.9	2.1
Post Vo2Max L/min	28	2.9	4.3	3.61	0.2
Post Vo2Max ml/kg/min	28	37.0	55.0	44.4	2.7

Results for aerobic fitness assessment in table 3 showed that: pre test was 3.25 l/min (SD 0.6) and post test 3.61 l/min (SD 0.2); pre test 39.9 ml/kg/min (SD 2.1) and post test 44.4 ml/kg/min (SD 2.7).

Table 3 Mean score for cardiorespiratory fitness

Measurement_Time	N	Mean	Std. Deviation	Std. Error Mean
Vo2Max L/min Pre	28	3.251	0.630	0.143
Vo2Max L/min Post	28	3.611	0.279	0.193
Vo2Max ml/kg/min Pre	28	39.990	2.100	1.667
Vo2Max ml/kg/min Post	28	44.403	2.714	2.172

Variables Groups in table 4 for pre and post-test cardio respiratory fitness shows that; pre and post mean difference was 0.37 l/min (std error difference 0.24) at $p = 0.043$ ($F=0.681$) while pre and post mean difference was 4.40 ml/kg/min (std error difference 2.73) at $p = 0.027$ ($F=1.549$).

Table 4.Independent Samples Test for cardiorespiratory fitness pre and post measurement

	Levene's Test for Equality of Variances		t	Sig. (2-tailed)	t-test for Equality of Means			
	F	Sig.			Mean Diff	Std. Error Difference	95% C L Lower	Upper
Vo2Max L/min	0.681	0.221	-1.54	0.043	-0.37	0.2403	-0.8793	0.1393
Vo2Max ml/kg/min	1.549	0.131	1.609	0.027	4.403	2.7374	-10.2063	1.3996

Discussion

The result of the study showed that 6 months intervention on youth basketball player’s specific strength training manifested significant improvements in cardio respiratory fitness capacity. The total frequency of this training was twice weekly with a duration per session 45 min and the strength exercise was performed using 8 machines while the agility exercises (speed and agility exercises) were lasted with duration 10- 15 min (4-6 exercises). The results for cardio respiratory fitness show statistical significant improvement on 0.37 l/min (std error difference 0.24) at $p = 0.043$ ($F=0.681$) and 4.40 ml/kg/min (std error difference 2.73) at $p = 0.027$ ($F=1.549$). This clearly indicates that after adjusting pretest scores, there was a significant difference between the two time measurements on adjusted post-test scores. The changes perceived in this study have been reported earlier in basketball [3] and soccer athletes [6]. The changes obtained in this study seemed to be lower than the 7.50 to 9 percent increases in cardiorespiratory fitness on observed in soccer sportsmen ensuing eight to ten weeks of performing a resembling sport particular aerobic endurance training round compared to control category [4,11]. The causes for small alteration provided in cardio respiratory fitness ability was at first, changes scrutinized could be due to the fact that the exercising was performed during the competitive stage in this study contrasted to the preliminary phase in previous studies [4,11]. The strength of this study was that is the first time in Albania that was performed this kind of study in the field of basketball and using a strength training session in youth. Later it will be very sufficient for the results of

this intervention study if this data could be compared with a control group basketball players in order to find the improvement compared to this group with regard to cardio respiratory fitness. To finalize the results showed significant improvement regarding aerobic fitness with 0.36 l/min and 4.5 ml/kg/min during sic month training twice weekly. This study showed the importance of strength training in aerobic fitness in youth basketball players.

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CAFFEINE EFFECTS ON THE PERFORMANCE OF SERVICES TO VOLLEYBALL PLAYERS

Artan KALAJA, Nora DEDA, Julian KRAJA

*Faculty of Education Sciences, University of Shkodra "Luigj Gurakuqi",
Physical Education Department*

Faculty of Natural Sciences University of Shkodra "Luigj Gurakuqi", Infirmary

Abstract. Caffeine, one of the most popular psychoactive substances known for the effects of the stimulus and central nervous system stimulant that cause increased cardiac frequency and blood circulation. If coffee, tea and soda alone do not provide the desired stimulus effect, consumers are turning to a new mode in the use of caffeine, which consists in the consumption of energy drinks. These drinks are made up of caffeine, sugar, some herbal ingredients and are preferred by young people and sportsmen. Caffeine is found in guarana, cocoa plant, cola plant, etc. Chemically, caffeine is a methylxanthine, family which includes theophylline and theobromine. Methylxanthines cause release of catecholamine stimulating receptors B₁, B₂ adenosine by blocking the adenosine neurotransmitter, resulting in growth of cAMP (cyclic adenosine monophosphate) intracellular. Caffeine has 100% accessibility by oral route. Its volume of distribution is 0.6 l / kg and 36% related to protein. Metabolized in the liver by the P450 system to activate dimethylxanthine stimulants theophylline and theobromine. Its elimination in normal adults not smokers is 4.5 in / hour.

Key words: caffeine, caffeine effects, speed and quality in volleyball

Purpose

With this study we hope that the experiment will provide valuable information for volleyball players who use these substances containing caffeine as stimulants for their effects on service performance results.

Hypothesis

The hypothesis of this experiment is to highlight the incentives that energy drinks containing caffeine make in increasing the speed and quality to the technical service element.

Equipment

For this experiment we need a chronometer to record the time, volleyball court, a basket of balls, a pen, paper and a source of energy drinks.

Methodology

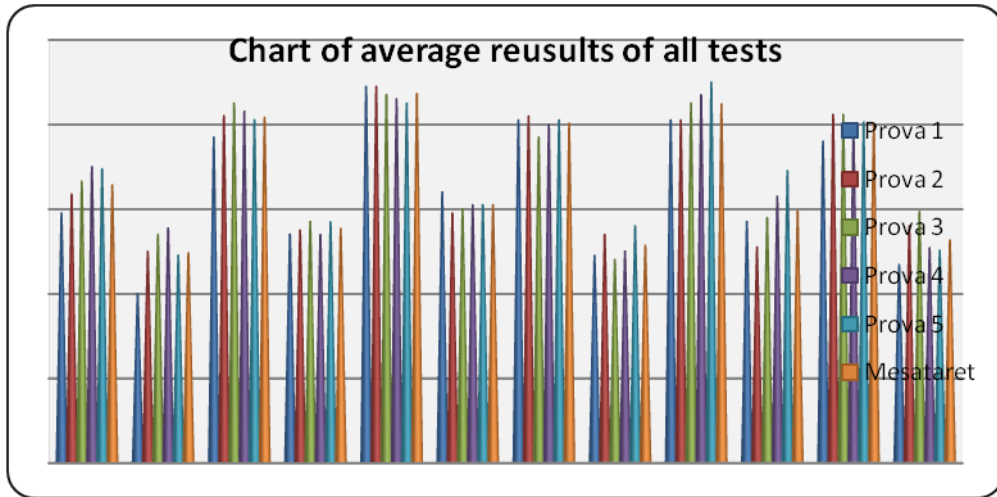
16 volleyball players of "Vllaznia Club", aged 20-25 years, who exercise regularly, will be installed in the ball serving area and will perform ball services 5 times consecutive in a period of about 30 seconds each time and see how the number of services and their accuracy will be within this time in a predetermined area fixed before (distance 18 meters, in a quad 3.5m X 3.5m, at the end of zone 5). First step is to finish the 5 times of service and put a record of 30 seconds and also the right average in every test. Next step is drinking an energy drink and wait 5 minutes to perform all fifth tests, then repeat the same test for two times more. At last wait 30 minutes after the 3 energy drinks are consumed and make repetition of all the test.

Results

Table 1

	Without drinking	After 1 drink	After 2 drinks	After 3 drinks	After 30 min.	Next day
Tests	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality
Test 1	14.75/10	19.25/13.5	22.25/16	20.25/12.25	20.25/14.25	19/11.71
Test 2	15.87/12.5	20.5/13.75	22.25/14.75	20.5/13.5	20.25/12.75	20.57/14
Test 3	16.62/13.5	21.25/14.25	21.75/15	19.25/12	21.25/14.5	20.57/14.85
Test 4	17.5/13.87	20.75/13.5	21.5/15.25	20/12.5	21.75/15.75	20/12.71
Test 5	17.37/12.27	20.27/14.25	21.25/15.25	20.25/14	22.5/17.25	20.14/12.57
Average	16.42/12.42	20.40/13.85	21.8/15.25	20.05/12.85	21.2/14.9	20.05/13.16

Chart 1

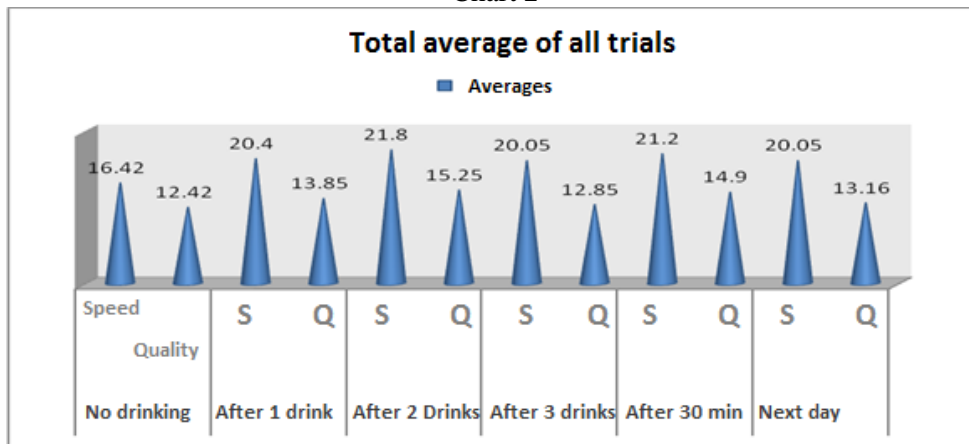


In the table above can be noticed the speed and accuracy of their services grow in number, especially in the case after two drinks and after 30 minutes after consumption of energy drinks. Also, grown of speed and accuracy (in number) is noticed even after taking the first and the third drink. The highest level of results is in tests is also observed in trials 3, 4, 5.

Table 2

	Without drinking	After 1 drink	After 2 drinks	After 3 drinks	After 30 min.	Next day
Tests	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality	Speed/Quality
Average	16.42/12.42	20.40/13.85	21.8/15.25	20.05/12.85	21.2/14.9	20.05/13.16

Chart 2

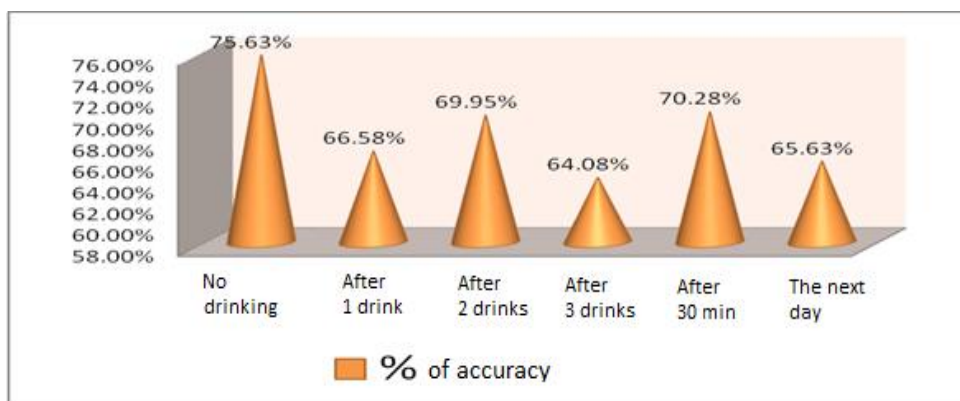


In the table above presenting only averages of all the evidence taken together, is spotted that the highest average happens after receiving the second energy drink, then is ranked the average 30 minutes after three total drinks, after taking three drinks and the next day, after taking a drink and finally the lowest average is the initial evidence.

Table 3

	Without drinking	After 1 drink	After 2 drinks	After 3 drinks	After 30 min.	Next day
% of quality	75.63%	66.58%	69.95%	64.08%	70.28%	65.63%

Chart 3



This table shows the percentage of total accuracy in all the trials. As noticed, the highest accuracy happens in the first moment when we didn't take any energy drinks. Then follows 30 minutes after, when all the drinks are taken, after two energy drinks, after one energy drink, and finally the next day after receiving three energy drinks.

Conclusions:

Based on the results, simply starting from table no. 1, it seems at first that the impact of caffeine on performance and accuracy of their services affects strongly. It is noticed the increase of the speed of service, but also only by referring to numbers we have a numerical increase of the quality service. In the graph no. 1, you can see that the speed and accuracy of their services grow in number, especially in the case after two drinks and after 30 minutes after the consumption of energy drinks. Also, the increase of speed and accuracy (in number) is observed even after taking the first and third drink. Also the highest level of results in tests is noticed in trials 3, 4, 5.

Also, starting from the graph 2, which shows graphically the total averages of all evidences, is observed that the highest average is after receiving the second energy drink, then is ranked the average after 30 minutes after three total drinks, after taking three drinks and the next day, after taking a drink and finally average decrease is the initial evidence.

Graph no. 3, is the graph that brings interesting data regarding the impact of caffeine on performance and quality of services to volleyball players. As shown, the highest accuracy of service is when the volleyball players still have not consumed energy drink. Then by taking energy drinks, service accuracy drops significantly.

Finally the experiment with energetic beverages (caffeine) in volleyball players did not fully correspond with the hypothesis. Caffeine really gives a significant increase in

the speed of service but on the other hand it must be noticed that the accuracy of the service is lower than without the consumption of these stimulants.

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SCHOOL PHYSICAL EDUCATION IN BULGARIA AT THE BEGINNING OF XXI CENTURY – UP-TO-DATE ANALYSIS

Ljubomir BORISOV, Ivan KOLEV, Boyanka PENEVA

*Department of Theory of Physical Education; Department of Technical and Ice Sports
Department of Theory of Physical Education National Sports Academy, Sofia – Bulgaria*

Abstract. Physical education is the school subject most responsible for the physical and psychic health of young generation. So it has a worthy place in the curriculum. Critical analysis on its results and influence on pupils show some circumstances that hinder its satisfactory implementation.

The French socialist leader and democrat Jean Jaures (1859 – 1914) says that humanity is in a constant evolution to revolution. In education as revolutions we can concern the reforms that are done periodically. In the different school subjects they aim to overcome the negatives of the circumstances, on one hand, and to introduce some good practices, on the other hand.

This paper is an attempt for a critical review on the state and the reforms of school physical education in Bulgaria at the end of XX and at the beginning of XXI century. Some recommendations are done for betterment of the expected results in physical education at schools.

Key words: educational content, motor activity, PE programmes, physical fitness, equipment.

Introduction

“The Law of transformation of quantity into quality defines a general mechanism of evolution. Quantitative changes in a system take place continuously. When a certain limit of quantitative evolution is reached, a system experiences qualitative changes. New quality increases rate of growth. During this process quantitative changes take place continuously whereas qualitative changes take place in discrete steps.” Using this quotation of Vladimir Petrov (2002) as an introduction, we will try to follow its way of action in the Bulgarian system of school physical education during the last decades [3].

Furthermore, we will base our presentation on some of the most distinct features of the World at the end of XX century. Without any pretence for priority, we can outline the following ones:

(a) Information technologies (especially the Internet), mass media, and telecommunications put the world’s knowledge at the disposal of many people both in the industrialized societies and in some of the developing countries as well.

(b) Process of globalization is established in all social fields.

(c) XX century is the century of the human rights.

(d) XX century is determined also to be more century of the quantity than of the quality.

What has to be expected in XXI century in the area of education with accent to physical education of the growing generation?

Research Objectives

We limited our attention only on some factors that are of main importance for the successful outcomes in physical education at schools. And they are:

- 1) Time allocation of PE in school schedule
 - 2) Educational content of the school subject
 - 3) Qualification of the teachers in PE
 - 4) Place of the disabled or with unequal status pupils in school, respectively in the PE lessons
- #### **Materials, Methods and Data Analysis Procedures**

With the intention to be (1) maximum all-embracing of the things that happen in school physical education in Bulgaria, (2) experience of many years, and (3) comparison with (a) the ideal model that can be built for the nowadays school PE or (b) good or rejected practices in other countries, we will construct our paper, having in mind the last two decades of XX century and the first decade of XXI century.

Time Allocation of PE in School Schedule

At the 80-ies and the 90-ies up to 1999 all classes had 3 PE lessons per week. The exception was with (a) the 7 years old pupils from 1st class who had 3 ½ lessons per week, situated 4 lessons during the first term (September – January) and 3 lessons during the second term (February – May), and (b) the 12 – 14 years old pupils from 6th and 7th class with 2 lessons per week. Nowadays nobody can do acceptable explanation is the fact in point (b) by a mere chance, the advancing puberty, or some other passing circumstance was the reason for it. Furthermore, an even distribution of the PE lessons during the week was considered at that time.

This position of the PE lessons in school schedule continued up to 1999. Ministry of Education's order of that time lessened the obligatory PE lessons to 2 per week for all classes from 1st to 12th class. The reason for this act of the ministry was the imposing of computer education and information technologies, from one side, and foreign languages, from the other side, in school schedule. All opportunities at the end of the 90-ies already were used: if in the 60-ies and 70-ies older pupils had 5 lessons per day, at the beginning of the 80-ies the lessons increased to 6 and 7 per day, to come the moment of 8 lessons per day in the secondary schools on the background of the lessening of the physical education, music and art lessons at the end of the XX. Changes in the educational system occurred immediately at the beginning of the XXI century in two ways: (a) Lessons were lessened maximum to 7 per day (Saturdays and Sundays are free), and (b) PE lessons were increased to 3 per week.

The restored third PE lesson was named "Module lesson" and the initial intention was it to serve the motor activity of pupils but under the supervision of a teacher of other specialization (e. g. geography, philosophy, ethics, etc.) and very rarely by PE teacher. In the case we cannot speak about realization of a new educational content but about exercising in already known motor activities – games, tourism, fitness, etc. One school year was enough to be seen that this kind of organization was doomed to failure. PE teachers were given the opportunity to lead all three lessons of all pupils in all classes (*See conclusion and recommendation 1*).

Educational Content of the School Subject

Since 13 June 2000 are made public the National requirements (National Curriculums) concerning the educational content of the school subjects in Bulgaria. If in the USA with its 49 + 2 states the acceptance of the National Curriculums was more than necessity (serious differences in the educational content for the classes in the different states and unpredictable changes of the living place of many families with youngsters in them), in many other countries (in Bulgaria too) their acceptance can be considered more as acceptance of a new fashion in world's educational tendencies than necessity. Having a glance on other countries national curriculums one can see the great freedom they give to the different sports and

other motor activities to find their place among children and adolescents at schools. A well known fact is that every sport and motor activity can be learnt at younger age but under advisable methods and instructions. So, in many National Curriculums we can find the presence of all sports, e. g. the mountain biking in the USA national curriculums. On the other hand municipality of Berlin (the capital of Germany) had taken the decision every child at age 10-years-old has to have the necessary skills for biking. Other is the question who will teach children to bike [2]. In the National Curriculum of Great Britain (1996) in practice present all sports as well but gathered in seven groups of motor activities with a list of more of the belonging sports to them and always with completion on etcetera (etc.). So, in the PE curriculums we can find (1) the sports games, (2) gymnastics, (3) track-and field events, (4) dances, (5) Eastern martial arts and wrestling, (6) skiing, and (7) swimming.

Though the expected freedom in Bulgaria the educational content of physical education did not received any broadness in comparison with its state during the last 3 – 4 decades. At the beginning of the 60-ies of XX century in the schools was introduced a well considered system for PE getting in it three main sports: (1) gymnastics, (2) track-and-field events, and (3) sports games. During the 70-ies in the secondary schools pupils could also learn wrestling (for the males) and rhythmical gymnastics (for the females) as sports with tradition and international successes for the teams from Bulgaria. At the end of the 70-ies and the beginning of the 80-ies obligatory swimming was introduced in the 3rd class/grade with the engagement every schoolboy or schoolgirl to be able to swim 25 m at the end of the school year.

Political changes in Bulgaria in 1989 and globalization of many demands to social life (including education of young generation) at the end of XX century provoked some changes in the Bulgarian PE system but we can define them as not so much radical. When concerning the PE content, the same three main sports (gymnastics, track-and-field events, and sports games) stay at schools but now they are named as *basiccore content*. There is introduced also *additional core content* with swimming, dances, tourism, aerobics, physical fitness, body-building, etc. in it. These really are some

changes but we cannot define them as radical as they are in this attitude in some countries. But let us return back to the Bulgarian PE national requirements. On their bases the programmes of the classes from I to XII are built but at the same time some given instructions by the PE inspectors in the Ministry of Education reduce this PE content: PE teacher can chose (according to his/her narrow specialty and the circumstances at the schools, sometimes the wishes of the pupils) educational content from two basic core sports and one additional core sport. But follows one additional instruction: from the two basic sports one always must be a sports game. In practice these sports games in enormous percent are basketball and volleyball. Or told with other words there stays the danger the educational content to be reduced in 2/3 to basketball and volleyball – a tendency that was registered in some Western countries in the 80-ies of XX century. At the same time apparatus gymnastics by and by got out of the gym halls without serious attempts to change it with basic gymnastics or aerobics to be done [4] (*See conclusion and recommendation 2*).

Qualification of the teachers in PE

Up to 1989 – 1992 in all classes (from I to XII class) PE was conducted by specialists in PE and sport including PE lessons in I – IV class. All this reflected to the efficiency of work and motor abilities of pupils to better. More as economic we can define the reasons because of which in the second half of the 90-ies the generalists in I – IV class started to conduct all school subjects including PE as well. In the case were registered two groups of teachers: the first one (usually the older teachers) who used only balls and some popular little games to fill their PE lessons, and the second one (usually the younger and the male teachers) who tried to diversify PE lessons with different motor activities but always chaotically given as if this PE lesson was a stress for them. But in both occasions never can be spoken about motor skill learning. Generalists were not ready for this new for them mission.

Bulgarian experience does not mean that it is impossible the generalists in primary school to lead the PE lessons. In England it is a general practice the generalists to be also the teachers in PE but an organization is made that is in their help when they have some doubt in their teaching. Except vocational courses the generalist can go for consultation to his

colleague specialist in PE in the upper course of study. Furthermore, about physical education teachers can draw information from Internet by a distributed system, e. g. the one of Dr. S.R. Lloyd, adviser and inspector in physical education and his consultative group in year 2000.

Though this positive foreign experience undoubtedly the PE specialists reach results easier and better than the generalists at primary school. Because of this reason in Bulgaria they were restored back to their working places only in a year or two. So, nowadays in all classes PE lessons are lead by specialists (*See conclusion and recommendation 3*).

Place of the disabled or with unequal status pupils in school (including PE lessons)

Globalization of information throughout the world with quick spreading of the good practices in all social spheres, on one hand, and the increasing humanity during the last decades, on the other hand, undoubtedly led to a new attitude to the disabled people. The number of these people with extra problems constantly increases. Still in 2008 the World Health Organization (WHO) declares the living of about 650 million people with disabilities of various types on the globe. That means that 1/10 part of world's population has some disability. Told with other words this means that one man from 10 people is disabled and this fact makes the problem very serious. Paying attention to younger generation and to the increasing number of the disabled children, in society grows new attitude to them. A new vision to them arises: now they must not be segregated from the other part of pupils in special schools as if they differ too much from the other “normal” children. As a result in all countries a process for their return back to the mainstream school is seen. This process is known as integration or inclusion.

The number of the special school decreases and in some countries they now lack at all. E. g. England needed 30 years to resolve this problem, Austria needed 28 years. Now in England there are not special schools anymore. The mainstream schools managed to get all children with disabilities. For children with multiple disabilities (total number around 760) there are organized daily centres and related services, visited by lots of specialists and physicians. Hungary closed all special schools too but only in a year had to open some of

them. In such occasion for new functions of the special schools is spoken.

In the case of Bulgaria to the middle of the year 2007 around 4 000 pupils with special educational needs had left the special schools and had gone to the general mainstream school. At the middle of the year 2008 the total number of the children with disabilities is somewhere around 20 000. A rough calculation shows that one of every 5 children has returned back to the mainstream school and this tendency continues. Though this process at the beginning of school year 2008/2009 the number of the special schools in Bulgaria is 274. It is evident that the process of closing the special schools has gone on as in school year 2013/2014 the total number of the special schools in Bulgaria is 71 and their category is as follows: health schools – 11, for children with intellectual deficiency – 47, for children with behavioral problems – 4, social boarding-schools – 3, for blind, deaf, or with speech-language pathology children – 6 (retrieved on 26 April 2015) from the National Statistic Institute [5].

Children need their physical activity to be healthy and industrious. Disabled children need physical activity too. In the general class the PE teacher is the person to define the way the disabled pupils will participate in the work of the class. All this depends on the extent and the kind of disability. Sometimes disabled pupils do not differ in their motor abilities from their classmates. Sometimes and more often individual plans to them have to be offered. At the beginning and years ago, the PE teachers were slightly timid but step by step they become more and more self-confident in their work with the pupils with special educational needs and help them to find their place in the class (*See conclusion and recommendation 4*).

Conclusions and Recommendations

(1) Academic education at school that leads to mental overload because of memorizing of dry facts that early or late the pupils forget has to leave place to the developing method of their abilities. To the presence of PE in school schedule nowadays we must look more from its physiological and health positions. The PE

lessons have to serve as relax from mental overload and not only their educational functions to be observed. This is connected with radical changes in school subject's content and will be a great honour to educational systems that can manage to do these changes though the difficulties..

(2) Educational content of PE must be highly varied (there can find place all sports, sports disciplines and motor activities) and to give opportunity for choice. The training effect must be sought not in the late secondary school age but in early pre-school and primary school age. Special attention has to be given to the locomotor movements including right posture and gait as well. Otherwise there is a danger of "sportivization" of the PE educational content.

(3) The better way is specialists of PE to be the teachers but by good management and lacking of circumstances the generalists in primary school can try to give the best of them to cope with PE teaching. If necessary the educational system has to create opportunities.

(4) Integration of disabled pupils in mainstream schools has to be encouraged and PE teachers have to be more self-confident and at the same time to use tact when necessary by the work with them in the class. The individual plans and support not to be forgotten.

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DOCTOR - PATIENT COMMUNICATION

Maria SOLOMON, Gabriel RADU, Ionut A. BULESCU, Victor L. PURCAREA

Prosthodontics department, Faculty of Dentistry, "Carol Davila" University, Bucharest, Romania

OB-GYN, Emergency University Hospital Bucharest, Romania

Department of Anatomy "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania, Associate Professor

Corresponding author: Radu Gabriel 0726.205.746 gabriel.radu88@yahoo.com

Abstract: One of the biggest challenges doctors face nowadays is establishing an efficient communication with their patients. Expectations are high on both sides, time is short and the need to be as efficient as possible can sometimes lead to misunderstandings. The doctor bears the responsibility of his patient's well being but the patient on the other hand has the need to know as many details as possible about his disease or treatment even if he fails to understand the doctors explanations. More often than not, these situations lead to frustration, anger, hopelessness on either side, which aren't in the benefit of neither of them.

Keywords: *lack of understanding, psychological stress, dissatisfaction, miscommunication, frustration, expectations, different needs*

One of the biggest challenges a doctor encounters in the relation with the patient is trying to explain the diagnosis, challenge which gets more difficult with the severity of the diagnosis. The way a patient receives his diagnosis can have serious consequences on his mental status and therefore even on the evolution of the disease. The doctor must show tact and empathy, as the patient is placed in a vulnerable position in such moments from several points of view. On one hand his health is seriously affected and on the other hand the capacity of understanding the complexity of the pathology and diagnosis are below the doctor's level. The patient may not have a complete understanding of the situation and might feel overwhelmed by all the explanations and he might even refuse to accept the reality.

Doctor - patient communication is essential regardless of the medical specialization. Despite this, most often, the patients' needs and desires of information are not satisfied. These problems are usually caused by a vicious communication that is not adapted to each patient. This reaches a level of psychological distress.

Such communication leads to patient dissatisfaction, low compliance, results below expectations and to an increased stress level for the doctor.

Three factors are considered to affect communication between a doctor and his patient. The first factor that can be incriminated is the shock the patients gets while receiving the diagnosis. A shock or denial can lead to incapacity of understanding

the doctor's explanations. In many cases, the patients cannot understand complicated explanations because of the terminology used. Secondly, the doctors lack training and competence to give explanations centered on the understanding of each patient. The third factor that can be incriminated is the time spent on a consultation, and also the lack of privacy while examining the patient and also while giving explanations.

It is considered that among all the interpersonal relations, the doctor - patient relation is the most complex and the most difficult one. Especially because it is based on the interaction of two individuals who are not on the same level in terms of medical training, knowledge, socially or professionally. And also because this relation is usually non-voluntary, the patient is forced by circumstances of vital importance to see a doctor having a large amount of emotional involvement.

Negative emotions in health services can be included in categories such as anger, fear, sadness and shame, which, in turn, include the following specific emotions: anger, frustration, irritation, fright; fear, panic, nervousness, anxiety and terror; sadness, disappointment and helplessness, respectively, embarrassment, shame, humiliation, regret, disgust and loathing.

While the methods and technology used in patients' diagnosis is constantly evolving, the doctor - patient relation is the most important method through which they exchange information.

From a doctor's point of view, through the communication with the patient, he seeks to obtain as much information as possible to correctly diagnose the patient and also to establish an adequate treatment plan. From a patient's point of view, this relationship aims to fulfill two needs: the need to know and understand where the pain or problem comes from, and the need to feel understood and taken seriously by the doctor.

Therefore, the needs of both doctor and the patient must be understood and fulfilled in terms of receiving and sharing information. While patients share information about their symptoms, doctors look for relevant information that will guide them to diagnosis and treatment. Then, doctors must find a communication channel that is understood by the patient through which he can send the necessary diagnosis and treatment explanations.

Doctor's vocabulary is another important aspect in communication between the two. The doctor is considered bilingual: he speaks his native language, the everyday use, but is also fluent in medical language. Usually, the patient is not familiar with this language, and the doctor must commute the medical language to native in order to make himself understood.

Conventional health services consultation has changed with patients' access to virtual communities, known also under the name of online communities. A virtual community in general, acts as a reference group, being closely connected with online interpersonal communication (eWOM) and considered, in fact, a repository of information. Interpersonal communication online (eWOM) is described as any "positive or negative remarks made by potential customers, current or former about a product of a company, that they have access to via the Internet".

Patients have access nowadays to a lot of information through the Internet and are used to document themselves on anything they do not know or do not understand. Therefore, when the doctor gives the impression that he might hide certain information or that he is too busy to explain what happens with the patient, the latter refers to Internet, which can sometimes give wrong or incomplete information. The patient may want to document in advance on diagnosis or treatment before having the opportunity to receive any

explanations from the doctor or even check the truthfulness of information provided by the doctor. This usually leads to mistrust of the patient, a reticent attitude or even leads him to seek another opinion from a different doctor. In such cases the doctor must have patience and not abandon the patient, he needs to explain that not all information found on the Internet is accurate or complete.

With the evolution of technology and Internet, most patients began searching for information online through virtual communities in order to obtain practical information provided in the form of side views of other patients and also emotional support. Individuals are using the Internet and virtual communities when they have a health problem because they consider this to be an environment in which they can exchange ideas and can get informed. EWOM message is defined as an experimental representation of reality, expressed through positive or negative statements, or a combination of both, by people using a variety of environment-specific online tools such as forums, emails, chat rooms, discussion boards, blogs, reviews, ratings and social networks.

A situation with a real difficulty in terms of communication between doctor and patient is the case of patients with mental incapacity. Whether it is the case of stroke consequences, elderly patients with varying degrees of senile dementia or patients with psychomotor retard, in these situations, difficulties arise from the beginning, being very difficult for the doctor to perform a correct anamnesis, to record a medical history or to make a proper examination. These patients are often reluctant, they easily lose patience, don't remember important information or are unable to provide it. Sometimes they don't understand the indications given by the doctor during examination or treatment, making his job even harder. Most often they don't realize what is happening to them and cannot understand the diagnosis. In such cases the doctor turns towards the members of the family and establishes a communication with them. They are the ones that offer relevant information for history taking and are most often the ones to whom the doctor communicates the diagnosis. They will take over the responsibility of the treatment at home, the patient being unable to care for himself.

Improving the doctor-patient communication:

Listening: The patient should be encouraged to describe with his own words the problems encountered during anamnesis.

Non-verbal communication: Non-verbal communication can help create an environment that provides security, privacy and trust. Eye contact helps the patient feel understood and taken seriously by the doctor. This is the reason why doctors should control their facial expression. A serene, relaxed figure creates the image of a strong, assured, well-trained professional that will generate confidence and hope to the patient. The confidence that he found the doctor he wanted and the hope that his illness will have a cure.

Common Expectations: Often, patient's expectations are not realistic. He comes to the doctor hoping to find out that he is well, and the doctor has to give him bad news about his health. So there are three questions that can be scored in any history taking:

- What do you think happens to you?
- What are your fears?
- How do you think I can help you?

Empathy: The doctor patient should understand patients' problems social, professional or family problems. Depending on the problems encountered, some patients may feel ashamed and often unwilling to discuss what is bothering them. A doctor's empathy means that he can show the capacity of understanding the patient's pain and stress while retaining objective.

Reinsurance: It is important for the doctor not to promise the impossible or unobtainable.

Establishing a treatment plan: After the anamnesis and the investigations are over both doctor and patient should agree on a treatment plan.

Responsibility: It is important for the patient to manage his disease / affection. The doctor should ask him: "How you manage your symptoms?" and not "how is your pain?". This switches responsibility for pain and symptoms from doctor to patient, and helps the patient understand the role he has during his treatment.

Setting limits: Frequent phone calls, unscheduled visits and unrealistic expectations are ways in which patients lose their perspective on the responsibility they have in their treatment. There is a need to draw very

clear lines: strict appointments and phone calls only during certain hours.

Nowadays the doctor should not forget that there are virtual communities built and structured around pharmaceuticals and health problems. However, it is essential to focus on the differences between virtual communities and traditional patient support groups. Virtual groups have fewer boundaries demarcated in participation compared to traditional information sources, such as patient support groups and, in addition, time and commitment requirements are reduced in the case of virtual communities and also the patient can remain anonymous. In most cases, virtual communities offer alternative health diagnosis and treatment, mutual support and advice from others who have had the same problem. So, virtual healthcare communities offer online tools to search for information, self-diagnostic and interpersonal communication. Thus, despite being known as virtual communities, the term virtual is used wrongly suggesting that these communities are less real than others. However, as demonstrated by practical life, these social groups have a real existence for participants, and therefore have more influence on their behavior.

Although social interaction using a computer for communication resembles the face-to-face interaction, the anonymity feature has an effect of intimacy and closeness because it reduces ridicule and rejection. The communication with the help of computers increases the number of users as they can overcome both the time and space barriers offering greater moral comfort.

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IMPROVEMENT OF VERTICAL JUMPS ABILITY INFLUENCED BY PLYOMETRIC EXERCISES IN FEMALE VOLLEYBALL PLAYERS

Enkeleida LLESHI, Junida POGONI

Sport Sciences Research Institute, Sports University of Tirana

Abstract

The aim of this study is to define the effect of a Plyometric Training (PT) to volleyball players female in Albania and to evaluate the vertical jump height during the test Squat Jump (SJ), Countermovement Jump (CMJ), Drop Jump (DJ). The data were taken prior to Pre and Post afterwards PT. We give positive energy producing utilization of elastic energy to the female in volleyball. The data base is based on: before and after 12 weeks of exercise rebounds and is analyzed by ANOVA. Subjects are 2 female volleyball teams (N = 20). There is a Control (CO) panel and Experimental (EX) tests performed on three different SJ, CMJ, DJ 40cm in (Ergo jump test) and platforms Leonardo® Ground Force Reagimit Plate (GRFP) which express F_{max} (kN), P_{max} (w/kg), Time Contact (TCs), Air Time (TAs), TA/TCs. For each one person is measured Body Height (BH), Body Weight (BW), Body Mass (BMI). The 12-week program was implemented by the EX group 2 times a week and resulted in a significant increase in vertical jump in the force value and maximum power of group CO. This study proved that plyometric exercises improve physical qualities especially muscular force and consequently the vertical jumper skills. It also serves on their integration as a part of a whole program for volleyball players.

Keywords: elastic energy, drop 40cm jump, counter movement & squat jump.

Introduction

The Volleyball game is characterized by the activity of jump performance in attack and block. Considering the importance of this activity for the performance score and the frequency in which they occurs during game types of dance SJ, CMJ and DJ are an important indicator in volleyball game. Those jump styles we have implemented in a training program to volleyball player female in Albania over 12 weekly sessions with 2 seasons at week. Usages of plyometric exercises of DJ type during training in the sport of volleyball have shown an increase performance during the concentric phase of the muscle contraction. Observed during the concentric phase, this improvement is known to discharge the elastic energy stored in the sequence of elastic elements muscle during eccentric contraction, the length of the extension [1]. Komi & Bosco in their study have compared the performance of vertical leap in males and females in these three cases, SJ, CMJ and DJ, where men's had a better performance than women, but women had a good use of elastic energy stored [2]. One earlier study from Sheppard. Et. Al has reported that exist an average connection between force / power measurement in jump SJ and CMJ performance in elite volleyball team [3]. A lot of researchers found that dance in height can be greatly improved bouncing between plyometric compared a group exercise DJ, a group exercise isokinetic, and a controller group [2,4]. They found that both DJ

and isokinetic group jumped above obviously than the control group. A group of scholars have compared training with training CMJ DJ in training with weights [5]. They found no significant differences between the DJ and CMJ group; both groups improved their ability in vertical jump by 8.4 cm after 4 weeks Trainings This study proved that plyometric exercise support to volleyball female players as part of a 12-week program for improving the skills serve vertical jumper and performances of force and strength of the lower extremities.

The experimental approach of the problem

The data base was taken from players standard preparations of conditional for a 12 weeks period with 2 sessions in week. The objects of this study were the volleyball female players which participate in volleyball national Championship in Albania trained 10 hours per week, the experimental group has developed 3 hours in the gym for the plyometric exercise development and general exercise 7 hours technical-tactical control group developed only 10 hours technical exercise general in week .

Subject

Participate two female volleyball teams with 10 athletes, whose physical characteristics are presented in table 1. All of them were part of the Championship volleyball. Were given clear explanations to all participants on the study, including the benefits and risks of participation and if after these explanations, they refused to participate in the study, did not affect their

decision in selecting their team's matches. All participants gave their written consent to participate in the testing and data collection.

Procedures and Methods

The volleyball players female test was done 24 hours after a total rest. We start with the assessments of anthropometric measurements and then to the tests in vertical jump performance of the three tests protocol and DJ SJ.CMJ and was elected to a height of 40 cm [6,7]. All the participants were informed about the tests on which will start the test also was decides to repeat the specific tests. Then they performed in maximum vertical jumps with hands in bowl with an odd rule to all of these

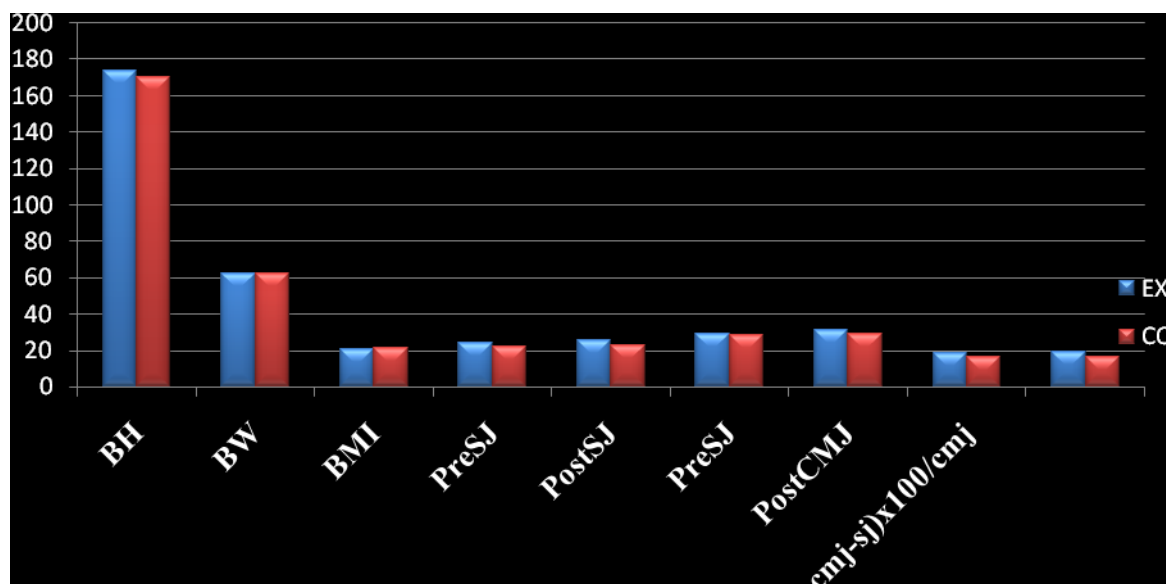
disciplines: CMJ, DJ and SJ. The e SJ and CMJ tests were developed in Ergo test Technology. Ergo jump in order to define the use of elastic energy but also we Platform Leonardo(GRFP) for determining the force and power extremities .Tests have been developed in laboratory environments Sports of University of Tirana.

Results

The table below present's data anthropometric measurements taken both groups in the study but data test SJ and CMJ obtained from the test protocol in Ergo test Technology Ergo jump[6,7].

Tab.1. The general table of the SJ&CMJ tests in (Ergotest Technology Ergo jump)

Nr	Teams	Age	Body Height BH cm	Body Weight BW kg	BMI Kg/m ²	Jump SJ		Jump CMJ		CMJSJx100/cmj	
						Pre	Post	Pre	Post	Pre	Post
10	EX	17	173.7	62.06	20.64	23.89	25.33	29.06	31.29	18.74	19.39
	SD					1.6	4.9	6.5	2.08	2.9	3.5
10	CO	18	170.3	62.5	20.96	22.33	23.02	28.44	28.83	16.18	16.48
	SD					0.8	3.8	2.6	2.01	2.8	1.8



Analyses

In tab.1 are presented in general the average data of the tests practiced to the volleyball players of two groups of the study, where the Experimental(EX) group compared to the Control (CO) group have difference in BH 173.7 ±3, BW62.05±2,BMI 20.96%±0.1.The jumps in the test performance, the positive

energy and the elastic energy were calculated by using the Komi & Bosco method [2]. The positive energy (Epos) provided from the evaluation of the bended leg jump/squat/represents the contractual performance over pure concentric contraction. Squat Jump test provides a part of the quick jump ability for developing a fast explosive

force. The Countermovement Jump test, provides quick measure of the strength of the jump [8]. The Pearson correlation shows for SJ and CMJ tests, a strong and positive correlation. The SJ correlation between the two groups even if its is technically positive the ValueR=0,004, the relation between the two variables is weak and closer to the value zero and the value of R², determining coefficient is 0. While the CMJ correlation between the two groups in time the value of R=-,1016 even though technically is a negative correlation the relation between the variables is weak and closer to value zero. The R² value, determining coefficient, is 0,0128. From what we can see in tab.1, the EX group has had a significant growth compared to the control group. According to C.BOSCO the difference between CMJ and SJ test has

proposed the assessment of "elastic quality" of the athletes in teams using the concept of "elasticity index" that comes from the difference of these tests. The well managed capacity from the elastic energy corresponds to 8-10 cm. The difference between these two tests, is called the fast power index. And by applying the formulas $(CMJ-SJ) \times 100 / CMJ$ (Bosco.,1985) we gain the elasticity coefficient expressed in % , is an indicator of the accumulated energy capacity as a result of the elastic muscular extension (eccentric) that precedes the muscular contraction(concentric), shows the obtained team values. Jumps of CMJ and SJ type are needed and if these athletes don't demonstrate to have these type of features, means that they need a better training to develop fast power index.

Tab.2. The general table of the SJ tests in the platform GRFP

Nr	EXPERIMENTAL SJ PRE	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.49	2.41	2.15	0.39
	Max.	1.88	2.82	2.32	0.52
	Min.	1.14	2.05	1.97	0.29
Nr	EXPERIMENTAL SJ POST	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.26	2.48	2.3	0.44
	Max.	1.72	3.07	2.57	0.46
	Min.	1	1.91	2.15	0.31
Nr	CONTROL SJ PRE	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.46	2.38	2.05	0.39
	Max.	1.17	2.79	2.24	0.42
	Min.	1.12	2.05	1.97	0.29
Nr	CONTROL SJ POST	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.45	2.26	2.16	0.40
	Max.	1.18	2.80	2.29	0.39
	Min.	1.13	2.05	1.97	0.29

Tab.3. The general table of the CMJ tests in the platform GFRP

Nr	EXPERIMENTAL CMJ PRE	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.59	2.47	2.22	0.33
	Max.	2	2.94	2.44	0.4
	Min.	1.29	2.11	2.05	0.28
Nr	EXPERIMENTAL CMJ POST	Fmax KN	Pmax kW	Vmax m/s	JH m
10	Average	1.55	2.67	2.33	0.36
	Max.	1.92	3.15	2.52	0.44
	Min.	1.38	2.15	2.2	0.31
Nr	CONTROL CMJ PRE	Fmax KN	Pmax kW	Vmaxm/s	JH m

10	Average	1.52	2.34	2.18	0.29
	Max.	1.86	2.84	2.36	0.4
	Min.	1.39	2.11	2.40	0.28
Nr	CONTROL	Fmax	Pmax	Vmax	JH m
	CMJ POST	KN	kW	m/s	
10	Average	1.55	2.41	2.21	0.31
	Max.	1.65	2.97	2.42	0.36
	Min.	1.34	2.12	2.3	0.25

SJ(squat jump), CMJ(countermovement jump), Fmax (force maximum Kn), Pmax (Power maximum kW), Vmax (speed maximum m/s), JH(Jump High gravity m),

Data analyses

The Fmax, Pmax, Vmax and Jump High data of the below extremities in the volley players was registered in the GFRP platform with a connected microcomputer. The participants used the maximal force to jump as high as they can. During the jump, the players stayed in the force platform used in the study. Two of the ANOVA measurement factors were used to test the training differences in group and in time, before and after testing. The differences variation were in the high jump force and maximal power. The Alpha level was set $p < 0.05$ for all comparisons. Therefore the tests were used for evaluating the changes in the max force and max power during the 12 weeks

training of the plyometric exercises. The Pearson system was used for calculating the changes of the jump percentages in CMJ and SJ tests of power, force between the two groups. The correlation had $R=0,8603$ values between Fmax and Pmax in SJ test and shows that is a strong positive correlation, which means that the Fmax results are diverse from the Pmax result (and vice versa). The $eR^2=0,3721$ value, significant coefficient. While the Fmax and Pmax correlation in the CMJ test technically is a negative correlation, where $r=0.7319$ the relation between the variables is weak and closer to the value zero. The value of the defying coefficient is $R^2=0,0938$.

Tab.3. The general table of the Drop Jump 40cm test in the GFRP platform

Nr	Group	Fmax		P max		TimeContactTCs		Air Time(TA)s		TA/TC s	
		Pre	kN Post	Pre	w/kg Post	Pre	Post	Pre	Post	Pre	Post
10	Average	2.57	2.37	24.85	25.86	0.358	0.376	0.448	0.463	1.3	1.36
	Max.	4.49	4.43	30.76	34.78	0.486	0.511	0.495	0.512	1.62	2.1
	Min.	1.78	1.48	18.25	19.93	0.266	0.209	0.411	0.431	0.85	0.87
Nr	Group	Fmax		P max		TimeContact(TC)s		Air Time(TA)s		TA/TC s	
		Pre	kN Post	Pre	w/kg Post	Pre	Post	Pre	Post	Pre	Post
10	Average	2.47	2.32	23.81	24.06	0.348	0.366	0.428	0.443	1.28	1.3
	Max.	4.49	4.43	30.76	34.78	0.486	0.511	0.495	0.512	1.52	1.98
	Min.	1.56	1.38	17.25	18.93	0.266	0.209	0.411	0.431	0.65	0.77

Discussion

The vertical jumps of the DJ type are a training style developed in order to improve force, power and velocity. The result of this study demonstrates that the experimental group has clearly improved the vertical jump in height in comparison with the control group. The improvement may be attributed to the growth of the positive energy. Our result suggested that CMJ and DJ training are both effective for improving the vertical jump abilities. Bartholomew found out that also plyometric training is not more effective than CMJ training for improving the vertical jump abilities [10]. But we think that the applied

CMJ tests is as effective as DJ training in this context.

The results of this study specifies that the mechanism for improving the jump abilities by following the DJ training and that is of the plyometric exercises type. The DJ training can enhance the neuromuscular factors that affect the training specifics. As it is shown in the tables 1 and 2, the groups show that SJ and CJM test improve only the vertical jump in height and the production of positive energy in jump. While the experimental group trained in plyometric exercises of DJ40cm type, improves the jump in height as well as in max power and max force.

Our results sustain the hypothesis that DJ training is superior towards the 12 weeks training of the experimental group different from the control group that hasn't been scheduled for training of the DJ 40cm plyometric type.

The majority of training studies have not pointed to the other differences that may have been influenced by the training programs. Adams, T in 7 weeks training, measured the vertical jumping ability through the Sergeant jump and did not evaluate changes in the positive energy or effects in the elastic energy [10]. In a 12 weeks study evaluated the subjects/individuals with specific programs but presented only vertical jumps height and did not discuss the changes in the positive energy or the effects in the elastic energy.

Conclusion

The result of the current study showed that 12-week program clearly improved the vertical jump height and production of positive energy for both trained. To us it resulted acceptable the 12 weeks training of the plyometric exercises on these age groups. The plyometric training is connected to the power production of the lower part of the body and is applied with the DJ test and the players perform with higher power in "drop jump" than "countermovement jump". The coaches need for exercises that spend less time and in the same time help players to improve the jumping abilities, excluding the damage risk "Drop Jumping" is thought to complete these needs.

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TO CYCLING AND TOURISM IN BULGARIA

Ivan KOLEV, Velimira NIKOLAEVA

NSA "Vasil Levski"-Department of Technical and Ice Sport

Abstract: At the present time cycling is one of the most popular sports. This is due to many reasons. Above all, cycling is much healthier, across mass application among people of different ages and professions. Favorable are its impacts on the organism in functional clean nature and for the physical development and mental unloading of the individuals.

This paper is a short history of bicycle tourism in Europe, on one hand, and a study upon its first steps during the years 1980 – 1990 in Bulgaria, on the other hand. The conclusions are connected with the main factors in contemporary society that provoke the interest to biking and bicycle tourism for the well-being of people.

Keywords: bike (bicycle), cycling and tourism, bicycle tourism and excursions, holidays

Introduction

At the present time cycling is one of the most popular sports. It is completely true maxim that you should try it to understand it [6]. This is due to many reasons. Above all, cycling is much healthier, across mass application among people of different ages and professions. It is to move quickly to close distances to the favorable impact of the organism in functional clean nature and for physical development and mental unloading. Bike is the most ecological, clean and unique vehicle, a product of the technical progress, which travels a certain distance 7-8 times faster than a walker does [7].

Bicycle tourism is directly related to the emergence and development of the main vehicle for its practice. Interesting information in this respect we found in the book "The Essence of Body Exercises", printed in Sofia in 1943, or one year after the opening of the State higher school of physical education. Its author is the teacher in this new higher school associated prof. B. Yordanov. In the foreword in order to reveal the motive for writing the book he states: "For the students at the State's higher school of physical education and also for the students of Sofia University, and of some other higher schools which follow the articles „Bodily education" as a second major, to assimilate better my material during the first school year. "in the book are not treated issues about bicycle tourism but is mentioned "outing/hiking" with abike", which in a good manner and without fatigues is appropriate for both women and adolescents"[4].

We focus only on some curious facts that outline the setting of bi cycle as a basic tool for competitive cycling and for bicycle tourism.

The leading motive of man to create a vehicle that can be driven with his own muscle power is his strong desire to move faster and easier. This desire of man to get around with the help of a vehicle driven by muscle power is carried out in the middle of the 15th century.

Today most modern researchers unanimously referred to as designer and constructor of the bike the famous Leonardo da Vinci, one of the brightest representatives of the Renaissance. He is renown for the precision primarily as a painter, but has achieved a prestigious reputation as a scientist, physicist, astronomer, mathematician, and engineer. Meanwhile in the XVII and XVIII century the bicycle underwent various modifications. Although too far from the idea of da Vinci, still looking for a favourable decision is hard to make a bicycle.

In France in 1791. Count de Sivrak constructed of wood two wheel machine. It represents two wheels, interconnected with the axis. Be possible to move, standing on the top and pushing with the legs off the ground.

In 1801 Artamonov makes a real sensational transition with his travel of 200 km on difficult roads from his native village in the Ural mountains to Moscow with his "sam ok at" – told in other words "bicycle".

In 1817 Baron Karl Friedrich von Drais (1785 – 1851), a forester from Bavaria, who perfected the machine of De Sivrak – he invented the front wheel, which can steer the movement in progress. Patenting this means of transport, it marked the beginning of documented history in the improvement of the design of the bike.

During this period people are becoming more often to use the bike for excursions.

The purpose of this theoretical research is to reveal the characteristics of cycling tourism in Bulgaria.

Methodology

The study is conducted with the help of the methods: a study of literary sources and documentary materials, direct observation and participation in bicycle outings, excursions, holidays, in cycling and tourism. It is used also poll-interview for collecting information related to the first steps of bicycle tourism in Bulgaria.

Analysis of the Results

We found that in our country the bicycle is known by more than a century ago. At first it was used primarily as a vehicle for moving from one to another location, up to the place, the garden and to the private economy. Students are usually using the bike for light ride in the residential neighborhood or for shopping.

The foundation of the Republican Committee on Cycling to Higher Committee for Physical Culture in 1953 marks a new stage in the development of the bicycle tourism. It is fair to note that still in this early period is outlined the correct way of development of bicycle tourism. Constantly increases the number of the organized activities and the participants, already thinking about turning this kind of tourism into tourism for all.

Reasoning that bicycle tourism improves the health and physical abilities of people, that it contributes to the knowledge of the country and nature are not typical in the early period, when the bicycle tourism is still unknown. The reasons for this probably should be looked at the low degree of social development (underdeveloped public transport, cycling paths are inappropriate, etc.). Cases of exceptions are the individuals, small or larger informal groups of students and youths to have outings and rides on marches for half-day or day, for longer routes, mostly in isolated rural areas.

The first Republic's kolopohod (bicycle tour) route is from Kozloduy to Okolchitsa. The organized and conducted route is closely connected with the name of Nikola Kolev – a member of the Republican Committee of cycling and tourism. Participants in the route are totally 9 cycle tourists from Sofia, Pleven, Russe and Shumen.

Gradually the interest to the cycle tourism starts to cover more and more young people.

Increases the number of the events in different parts of the country. Their content is enriched with interesting specific routes, forms, contests and others. Significant is the contribution in this regard of the 1975 National holidays of bicycle tourism in Dimitrovgrad, in which participate over 2000 people and in 1979 in Razgrad with around 8000 participants. From 28 to 30 September 1984 in the surroundings of Kardjali is conducted the Third Republican Celebration of Cycling and Tourism.

A significant share to the development of the cycling tourism falls on the Bulgarian federation of cycling and tourism and the built to it republican committee on cycling and tourism. In 1984 the cycling and tourism clubs in all areas of the country are 360 with 14 600 members (among them 3000 are women).

A significant stimulus for the development of the bicycle tourism in the country is the tour "Rodina", which includes national bicycle routes. Reports of the Bulgarian touristic federation for the years 1975-1985 show significant contribution of cycling and tourism clubs, e.g. touristic clubs "Haidouk" - Kalofer, "Mircho Spasov" – Kardzhali, "Kajlashka dolina/valley"-Pleven, "Iskar" and "Vitosha"-Sofia, "Hebros" – Dimitrovgrad.

Particularly attractive are the bicycle excursions for the promotion of the bicycle tourism in the old Bulgarian capitals. Participants meet their cultural and educational interests, promote patriotic feelings, touch to the historical past of their homeland. The first day of the route (March, 1984) is 56 km in length, starting from the town of Veliko Tarnovo to reach campsite "Erevish" near Antonovo. In the second day the cyclists ride 65 km through Targovishte to reach Preslav. The third day the route is through Madara to Pliska, covering distance of 50 km.

The analysis of the data shows that during the period 1980-1990 the Bulgarian touristic union takes special care for the development of pedestrian hiking, ski-tourism, water and cycling tourism, caving and mountaineering, orientation and ski-orientation. Complexes and specialized sport-touring schools with sections for the mentioned above types of tourism in different settlements of the country are revealed.

Interest represent the values of the number of divisions and the number of bicyclists who train there (Table 1).

Table 1. Data about the development of bicycle tourism in Bulgaria

Number of	School year					
	1981-1982	1982-1983	1983-1984	1984-1985	1985-1986	1986-1987
Sections	121	182	184	236	262	284
Members	3674	5196	5220	7037	7566	8986
Bicycle tourism clubs	12	33	33	43	52	56
Members	288	792	792	1034	1248	1344

It is apparent from the table that there is a dynamic development of tourism and sports, which is evolved in the part "Specialized sports ttouristic schools" of the Bulgarian touristic union. Simultaneously with the learning process in these schools useful activity develop the cycling and tourism clubs of the union, which are 368 in 1986. The increase is observed bothin the number of the clubs and their members as well.

Notice that the growth of both number of the clubs and their members during the years 1982-1983 and 1983-1984 is minimal. With respect to bicycle tourism during those two school years is not registered any increase.

During the period 1984-1987 again is observed a significant increase in the number of the divisions/clubs and the participants in them.

An interesting fact is that the whole training-methodical and sports activity in the system of the Bulgarian touristic union is realized predominantly on the base of voluntary public participation. The staff is of 151persons, divided as follow: heads of the training-sports and methodical department "-29; directors of schools – 25; coaches – 52, instructors – 45.

Development of bicycle tourism does not end here. From published materials we know that bicycle tourism comes out and beyond the borders of our country. The First international tour is organized in 1967 and held its routes in Yugoslavia. The Second international tour of bicycle tourism is held in Romania in 1969. In 1979 the tour is enlarged to East Germany and Poland. In these tours and on the festivals in Sopot (Poland) there is a Bulgarian participation too.

Simultaneously with the favorable conditions are monitored and some restricting

development of bicycle tourism factors, such as: expensive yet a special base material, highly limited financial capabilities of cycling and tourism clubs, high saturation of roads with motor vehicles and the lack of cycle paths for bicycles.

To speed up the development process of bicycle tourism it is necessary to remove the limiting factors. In the existing conditions will be more useful to increase the number of instructors in cycling and tourism, to develop shorter and longer cycle paths with appropriate for the participants cultural, educational, emotional, volitional, motor-applied and leisure tasks. We recommend the routes for cycling and tourism to shift more and more to and in the natural environment, to use the comfortable roads and paths that at the same time are quiet, beautiful and safe.

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THE CANONICAL ANALYSIS OF THE COVARIANCES OF THE MUSICAL VARIABLES' SET AND THEIR IMAGE TRANSFORMATION DERIVED FROM THE PROJECTION INTO THE SPACE STRETCHED BY THE VECTORS OF DANCERS' COGNITIVE VARIABLES

**Jasna POPOVIC, Evagelia BOLI, Dragan POPOVIC,
Sonja ANTONIJEVIC, Milos POPOVIC**

*Faculty of Sport and Physical Education, University of Pristina
temporarily based in Leposavic, Serbia
e-mail: jasna.popovic@pr.ac.rs*

Abstract: Let Z_1 be a data matrix, in a standard normal form, obtained by the description of a random sample E from n objects on the sample V_1 from m_1 quantitative or quantified variables, and let Z_2 be another data matrix, also in a standard normal form, obtained by the description E on the sample V_2 from quantitative and qualified variables that $V_1 \cap V_2 = 0$. Assume, not omitting a possibility of generalisation, that $m_2 \leq m_1$, and define the intercorrelation matrices of variables from V_1 and V_2 , estimated under the maximum likelihood criterion, as $R_{11} = Z_1^t Z_1$ and $R_{22} = Z_2^t Z_2$, and define the matrix of cross-correlations between the variables from V_1 and V_2 as $R_{12} = R_{21}^t = Z_1^t Z_2$. Let $B = R_{11}^{-1} R_{12}$ be a matrix of the standardized regression coefficients obtained by resolving the regression problem $Z_1 B = Z_2 - E \mid \text{trag}(E^t E) = \text{minimum}$, and let $G = Z_1 B$ be a matrix of image variables from V_2 in the space spanned by the vectors of variables V_1 . Define, finally, the covariance matrix of variables from G as $M = G^t G = B^t R_{11} B$. The canonical covariance analysis in the generalized covariance image space can be defined as a solution of the problem $Z_2 x_p = k_p$, $G y_p = l_p \mid c_p = k_p^t l_p = \text{maximum}$, $x_p^t x_q = y_p^t y_q = \delta_{pq}$ where δ_{pq} are the Kroneker symbols. The covariances $c_p = k_p^t l_p = x_p^t M y_p$ between the linear combinations of variables from Z_2 and linear combinations of variables from G can be maximized by maximization of the function $f(x_p, y_p, \lambda_p, \eta_p) = x_p^t M y_p - 1/2 \lambda_p (x_p^t x_p - 1) - 1/2 \eta_p (y_p^t y_p - 1)$ $p = 1, \dots, m_2$ where λ_p and η_p are some unknown Lagrange multipliers.

Keywords: covariance, coefficientst, canonical, matrix, musical abilities, variables

Introduction

When talking about activities in the field of the art of music, it should be mentioned that they are, just like all other human activities, conditioned by the abilities of those who are engaged in them. The human ability to perceive, comprehend, and reproduce rhythmic, melodic and harmonic elements of music, which is classified as musicality, depends primarily on the role of cognitive personality factors. It can be assumed that cognitive factors will influence the success in musical activities, but the influence of the spatial factor seems to be the most significant. Spatialization is defined as the ability to determine relationships in a space or to solve the problems that can be posed as spatial problems. Nevertheless, other cognitive factors are certainly important for every form of musical activity. However, cognitive factors alone are not crucial for the success in an activity, as well as in a musical activity. In this research, relations between musicality and cognitive abilities will be studied.

Methods

Sample of respondents

The sample of respondents is conditioned by the financial capabilities necessary of the research procedure. Besides, the sample depends on the number of qualified and fully trained measurers, on the measurement instruments and standardized conditions for the realization of the planned research.

In order to conduct the research correctly and obtain results stable enough in terms of sampling error, it is necessary to include a sufficient number of the respondents into the sample. The size of the sample for this type of research is conditioned by the objectives and tasks of the research, the population size and the degree of variability of the applied system of parameters.

Based on the selected statistical-mathematical model and the research objective, the sample of respondents included 131 female dancers and 136 male dancers aged 11 - 13 actively involved in Standard and Latin American dancing in Serbian ballroom dance clubs

The size of the sample thus defined should satisfy the following criteria:

- the size of the sample should be planned so as to provide as many degrees of freedom as to consider any coefficient in the pattern, or correlation, matrix, which is equal to or bigger than 0.22, different from zero with an inference error less than 0.01.
- in order to successfully apply adequate statistical methods according to the latest convictions, the number of subjects in the sample must be five times bigger than the number of the applied variables.

In all the factor procedures, it should constantly be kept in mind that the analysis results depend on the three major systems which determine the selection and transformation of information: the sample of variables, sample of respondents, and the selected extraction, or rotation, method.

Sample of variables of musical abilities

The assessment of musical abilities has been performed on the basis of the well-known Seashore's test battery that estimates musicality. The test lasts for 30 minutes and consists of the 6 groups of tasks that are listened to from an audiotape, and the responses are recorded on the answer sheets prepared for this purpose. Auditory is provided by a regular layout of sound-speakers and volume so that all the respondents have equal experimental conditions.

This test assesses the following dimensions:

- Pitch perception test: it consists of five columns, and each column contains ten tasks. For each task, two tones are played. The respondent determines whether the second tone is higher or lower than the first tone.
- Loudness perception test: it consists of five columns. Each column contains ten tasks. For each task, two tones are played. The respondent determines whether the second tone is louder or softer than the first tone.
- Rhythm perception test: it consists of three columns. Each column contains ten tasks. For each task, two rhythmical structures are played. The respondent determines whether the second rhythmical structure is the same or different from the first one.
- Tone duration discrimination test: it consists of five columns. Each column contains ten tasks. For each task, two tones of different duration are played. The respondent determines whether the second tone is longer

or shorter than the first tone.

- Musical timbre perception test: it consists of five columns, and each column contains ten tasks. For each task, two tones are played. The respondent determines whether the second tone is the same or different from the first tone.

- Tonal memory test: it consists of three columns. Each column contains ten tasks. For each task of column A, two three-tone melodies are played. For column B, two four-tone melodies are played, and for column C two-five tone melodies are played. The respondent determines for each task which tone makes the second melody different from the first melody. For column A: the first, second or third tone, for column B: the first, second, third or fourth tone, and for column C: the first, second, third, fourth or fifth tone.

Evaluation is carried out so that one point is given for each correct answer in each task of all the tests. The total sum of points gained for each task in each test separately represents the result. The result expressed in points should be recalculated in percent. The female respondents, according to the scores gained on the particular tests, depending on age, are classified in certain classes from „A" to „E".

Sample of cognitive variables

For the assessment of the intellectual dimensions, the measurement instruments were selected so as to cover the cybernetic model and measure three types of cognitive processing.

For the assessment of the effectiveness of the input processor, or perceptual reasoning, the following test was selected:

IT-1: test of matching drawings to assess perceptual identification and discrimination. The test consists of 30 tasks, and the testing time is limited to 4 minutes. The difficulty of the tasks and their intercorrelations indicate that this is a typical speed test.

For the assessment of the effectiveness of the parallel processor, or identification of relations and correlates, the following measurement instrument was selected:

S-1: spatial reasoning test designed to assess rapid simultaneous education of spatial relations. It consists of 30 tasks to determine which of the 4 transversal projections of the brick cluster corresponds to the specified picture of the brick cluster. The testing time is 10 minutes.

For the assessment of the effectiveness of the

serial processor, or symbolic reasoning, the following measurement instrument was selected:

AL-4: synonyms-antonyms test to assess identification of the denotative meaning of verbal symbols. It consists of 40 double-choice tasks. The testing time is 2 minutes, therefore, this test belongs to the category of speed tests. The first main subject to measure is mostly defined by the tasks from the second half of the test and interpreted as the ability of rapid identification of the denotative meaning of verbal symbols.

Data processing methods

All the data in this research were processed at the Multidiscipline Research Center of the Faculty of Sport and Physical Education, University of Pristina, through the system of data processing software programs developed by D. Popovic, 1980, 1993, K. Momirovic & D. Popovic, 2003.

The method for asymmetry-based overlap analysis proposed in this research is based on the previously published paper written by Momirovic, Stalec and Zakrajsek on the generalised image transformations and on the method for decomposition of latent structures proposed by Dobric, Karaman and Momirovic (1983). The essence of the proposed method is canonical covariance analysis (Momirovic, Dobric & Karaman, 1983) of a set of variables and image transformation of this set of variables performed by the projection of the set into the space spanned by the vectors of some other set of variables. Although the aim of the proposed method, in a certain sense, is similar to the aim of the classical method for the overlap analysis (Van Den Wollenberg, 1977) and method for canonical factor overlap analysis (De Sarbo, 1981), the criterion function of canonical covariance analysis in the generalized image space is different from the criterion function of Van Den Wollenberg and De Sarbo's method, thus the interpretation of the obtained measures of association is based on completely different assumptions.

Algorithm

Let Z_1 be a data matrix, in a standard normal form, obtained by the description of a random sample E from n objects on the sample V_1 from m_1 quantitative or quantified variables, and let Z_2 be another data matrix, also in a standard normal form, obtained by the description E on the sample V_2 from quantitative and qualified variables that $V_1 \cap V_2$

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Let $B = R_{11}^{-1} R_{12}$ be a matrix of the standardized regression coefficients obtained by resolving the regression problem $Z_1 B = Z_2 - E \mid \text{trag}(E^t E) = \text{minimum}$, and let $G = Z_1 B$ be a matrix of image variables from V_2 in the space spanned by the vectors of variables V_1 . Define, finally, the covariance matrix of variables from G as $M = G^t G = B^t R_{11} B$.

The canonical covariance analysis in the generalized covariance image space can be defined as a solution of the problem $Z_2 x_p = k_p$, $G y_p = l_p \mid c_p = k_p^t l_p = \text{maximum}$, $x_p^t x_p = y_p^t y_p = \delta_{pq}$ where δ_{pq} are the Kroneker symbols. The covariances $c_p = k_p^t l_p = x_p^t M y_p$ between the linear combinations of variables from Z_2 and linear combinations of variables from G can be maximized by maximization of the function $f(x_p, y_p, \lambda_p, \eta_p) = x_p^t M y_p - 1/2 \lambda_p (x_p^t x_p - 1) - 1/2 \eta_p (y_p^t y_p - 1)$ $p = 1, \dots, m_2$ where λ_p and η_p are some unknown Lagrange multipliers.

Differentiation of function f in regard to the elements of vector x_p and then in regard to the elements of vector y_p provides, for $p = 1$, $\partial f / \partial x_p = M y_p - \lambda_p x_p \square M y_p = \lambda_p x_p \partial f / \partial y_p = M x_p - \eta_p y_p \square M x_p = \eta_p y_p$ so that, by multiplying the first result by x_p^t , and the second result by y_p^t , $x_p^t M y_p = \lambda_p$, $y_p^t M x_p = \eta_p \square \lambda_p = \eta_p = c_p$ is obtained, and since $M^t = M$, $x_p = y_p$, the problem comes down to the simple problem of characteristic values and vectors of matrix M $(M - \lambda_p I) x_p = 0$ $p = 1, \dots, m_2$, basically, to the problem of the principal components of variables from G .

Now let $\delta^2 = (\text{trag } M) / m^2$ be a generalized canonical index defined on the relations between the variables from Z_1 and Z_2 . A rational procedure for determining the number of significant latent dimensions, which are the generators of the relations between the analyzed sets of variables, is the well-known MEIG criterion defined by $k = \text{num}(\lambda_p \geq \delta^2)$. If $X = (x_p)$; $p = 1, \dots, k$ is a matrix of eigenvectors associated with the significant latent dimensions, and $C = (c_p)$; $p = 1, \dots, k$ is a diagonal matrix of the first k covariances between the variables k_p and l_p , the latent

dimensions obtained by the linear combinations of variables from Z_2 will be the vectors of the matrix $K = Z_2X$, the latent dimensions obtained by the linear combinations of variables from G will be the vectors of the matrix $L = GX$, and $C = K'L = X'MX$ will be a covariance matrix of variables from K and L , and, simultaneously, a covariance matrix of variables from L , because, obviously, $C = L'L = X'MX$.

Accordingly, the variables from K and L form one semibiorthogonal system, since $V = K'K = X'R_{22}X$ is not, in general, a diagonal matrix.

Let $D^2 = \text{diag } V$ be a variance matrix of variables from K . Therefore, the diagonal elements of the matrix $P = D^{-1}K'LC^{-1/2} = D^{-1}C^{1/2} = (\rho_p)$ will be quasicanonical correlations between the significant latent dimensions of variables from Z_2 and image variables from G . Asymptotic variances of quasicanonical correlations ρ_p are, naturally, $\sigma_p^2 = (1 - \rho_p^2)^2 / n$, thus, equal to the asymptotic variances of product-moment coefficient of any type of correlation. This fact may be used for the construction of approximate intervals of reliability and testing the hypothesis $H_p: \rho_p = \rho_{ph}$, where ρ_{ph} are hypothetical quasicanonical correlation coefficients.

Identification of the content of latent dimensions from L is very simple since, because of orthogonality of those dimensions both in the space of objects and in the space of variables from G , the matrix $S = G'L = XC$ is, at the same time, a pattern matrix and a structure matrix of nonstandardized latent dimensions, and the matrix $T = G'LC^{-1/2} = XC^{1/2}$ is a factor matrix of matrix M .

Identification of the content of latent dimensions K is slightly more complicated, since $W = D^{-1}VD^{-1}$, the intercorelation matrix of variables from K , is not generally a diagonal matrix. The structure matrix, in the space of standardized latent dimensions, is

$F = Z_2'KD^{-1} = R_{22}XD^{-1}$, so that, in the same space, $A = FW^{-1} = R_{22}X(X'R_{22}X)^{-1}D$

is a pattern matrix of variables Z_2 ; note that A and F are factor matrices of matrix R_{22} , because $AF^t = R_{22}X(X'R_{22}X)^{-1}X'R_{22}$, which is the proof that variables from K are the factors, in factor-analytical sense, of the variables Z_2 .

Results and discussion

By canonical covariance analysis (Momirovic, Dobric & Karaman, 1983), relations between the sets of variables for estimating musical and intellectual abilities of female respondents

involved in Standard and Latin-American dancing were determined.

In Table 1, cross-correlations of musical and intellectual variables are presented, Table 4 presents canonical correlation coefficients, the square roots of the canonical equation and their significance, and in Tables 2 and 3, correlations of variables for estimating musical and intellectual abilities with canonical dimensions are presented.

By inspecting the matrix of cross-correlations of musical and intellectual variables, it can be noticed that statistically significant relations between the efficient processing of the input processor and the test for the evaluation of pitch, tone loudness and timbre were obtained. Also it may be observed that significant relations between the effectiveness of the serial processor and the tests for the evaluation of tone duration, rhythm, pitch, melodic memory, and musical timbre, were obtained, as well noticeable positive relations between the effectiveness of the parallel processor and the tests for estimating melodic memory, tone duration and rhythm.

The analysis of characteristic roots indicates that the significant connection for rejecting a null hypothesis is possible for two roots, which means that from three hypothetical possible canonical dimensions, two are sufficient to explain the relations between two examined systems of variables (Table 4).

In the space of musical abilities (Table 2), the first canonical factor is defined by a negative sign in the tests to assess melodic memory, tone duration, and rhythm. A correspondent factor in the space of intellectual abilities is defined by the tests for evaluation of the parallel processor and the effectiveness of the serial processing.

From the above, it necessarily follows that in this sport discipline, the ability to memorize musical layouts, recognize the rhythm and tone duration are directly related to the effectiveness of the parallel and serial processors, and the ability to determine the tone pitch and timbre is somehow connected with the input processor. It is also necessary to know that auditory sensitivity depends on tone loudness as well as the tone pitch. Auditory sensitivity is greater to high than low tones so it seems that a higher tone is stronger than a low tone of the same acoustic intensity.

On the other hand, auditory sensitivity does not increase equally with the increase of

loudness. The strongest sense of tone is only about 30 times stronger than the weakest one. The second canonical factor in the space of musical abilities is best defined by the test for recognizing the tone pitch and timbre.

A correspondent factor in the space of cognitive abilities is defined only by the test for estimating the effectiveness of the input processor.

The analysis of both canonical dimensions leads to the conclusion that the input processor and pitch perception ability may probably be subordinated to a common regulatory mechanism which coordinates the functioning of these two abilities. If all the obtained information is summarized, the following can be concluded:

Spatial or simultaneous integration of the information related to the rhythmic figures (or beyond the rhythmic structures) doubtlessly

includes a factor of education, which means there are relations between the elements of dance structures and the elements of rhythmic structures as well as there is some regularity which regulates the whole process of thinking regarding rhythmic tasks or problems.

However, since simultaneous information integration almost never appears independently, because most of the problems cannot be solved in only one manner, that is, simultaneously or serially. The information, including the rhythmic information, of the dancers are processed in time-structured series, therefore, serial and successive processing evaluated by verbal and numerical tests, significantly influence the reception, retention and processing of rhythmic operations.

The connection of the input processor with musical abilities of dancers should also be pointed out.

Table 1.. CROSS-CORRELATIONS BETWEEN VARIABLES OF MUSICALITY AND COGNITIVE ABILITIES OF DANCERS

TEST	IT1	AL4	SI
PITCH	.33	.33	.03
LOUDNESS	.26	-.04	-.07
RYTHM	.08	.36	.31
DURATION	-.02	.37	.39
TIMBRE	.14	.27	.10
MEMORY	-.03	.28	.57

Table 2. CANONICAL FACTOR STRUCTURE OF VARIABLES OF MUSICALITY

TEST	CAN1	CAN2
PITCH	-.19	-.85
LOUDNESS	.19	-.39
RYTHM	-.61	-.24
DURATION	-.73	-.00
TIMBRE	-.28	-.44
MEMPORY	-.84	.29

Table 3. CANONICAL FACTOR STRUCTURE OF COGNITIVE VARIABLES

TEST	CAN1	CAN2
IT1	-.01	-.71
AL4	-.69	-.63
SI	-.84	.27

Table 4. CANONICAL VARIABLES

R	R-sqr.	Chi-sqr.	Lambda	df	p
.68	.47	123.48	.47	18	.00
.48	.23	45.93	.77	10	.00

Conclusion

The research was conducted in order to determine relations between musical and intellectual abilities of ballroom dancers.

For the assessment of relations between musical and intellectual abilities, 267 dancers aged 11-13 involved in Standard and Latin American dancing were tested.

In order to assess musical abilities, the well-known Seashore's battery of tests for musicality assessment was applied. The battery evaluates the following tests: pitch perception test, loudness perception test, rhythm perception test, tone duration test, musical timbre perception test, and melodic memory ability test.

To assess cognitive abilities, the researchers applied three measurement instruments selected so as to perform structure analysis based on the cybernetic model designed by Das, Kirby & Jarman, and Momirovic, Bosnar & Horge 1982, and to measure three types of intellectual processing.

For estimating the effectiveness of the perceptual processor, test IT-1 was chosen; for estimating the effectiveness of the serial processor - test AL-4; and for estimating the effectiveness of the parallel processor - test S-1.

All the data in this research were processed at the Multidiscipline Research Center of the Faculty of Sport and Physical Education, University of Pristina, through the system of data processing software programs developed by D. Popovic, 1980, 1993, K. Momirovic & D. Popovic, 2003. Relations within the set of variables for assessment of musical and intellectual abilities of the respondents actively engaged in ballroom dancing were determined by means of canonical covariance analysis. The analysis of characteristic roots indicates the fact that for rejecting a null hypothesis, significant correlation is possible only for two roots, which means that out of three hypothetic possible canonical dimensions, two are sufficient to explain the relations between the two examined systems of variables. In the space of musical abilities, the first canonical factor is defined by a negative sign on the tests for the assessment of melodic memory, tone

duration, and rhythm. The correspondent factor in the space of intellectual abilities is defined by the test for the assessment of the parallel processor and the test for the assessment of the effectiveness of serial processing. The second canonical factor in the space of musical abilities is best defined by the pitch perception test and the musical timbre perception test. The correspondent factor in the space of intellectual abilities is only defined by the test for assessment of the effectiveness of the input processor.

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PROBLEMS AND PERSPECTIVES OF PARAOLYMPIC SPORT'S DEVELOPMENT IN KAZAKHSTAN

MARCHIBAYEVA U.S.

Eurasian National University Named After L.N. Gumilyev, Astana, Kazakhstan

Abstract: This article describes the problems and prospects of development of Paralympic sport in Kazakhstan. Outlined in some details not only the rights of persons with disabilities, but also those conditions which have to be created by the government and public institutions.

Keywords: *Paralympic sport, Sport, Physical Education, Training*

The purpose of the chosen theme is to conduct the state-of-the-art review of Paralympic sport and adaptive physical culture. The goal defines the following tasks:

- to review the current status of Paralympic sport;

- to make an analysis of the problems and prospects of Paralympic sport in Kazakhstan.

In this paper, we used the following methods: comparative, cultural, processing method, and material review of prominent Russian scientists, researchers, trainers and statistical data. The point of view according to which the society's care of the disabled citizens is a criterion of its cultural and social development has general distribution. "One of the indicators of a civilized society is its attitude towards disabled people", - Professor S. A. Kusainov considers. The UN resolution, adopted on 9 December 1975. These conditions include the environmental conditions of employment, including motivation from the society, providing medical care, psychological adaptation and creation of social conditions, including personal transport, as well as methodological, technical and professional provision.

According to the World Health Organization, the disabled people make up about 10% of the world population. These statistics are typical for Kazakhstan. Despite the medical advances, the number of cripples is slowly but steadily increasing, especially among the children and adolescents. Until recently, this problem of this quite significant category of the population was ignored and yet lately as a result of a gradual humanization of society the Universal declaration of Human Rights, the World Action Program concerning disabled people and Standard Rules of the UN on realization of equal opportunities of disabled people were adopted. In the most foreign countries the system of involvement of

disabled people in physical culture and sports is fulfilled, which includes a hospital, rehabilitation center, sports clubs and clubs for people with disabilities. The main goal of involvement of persons with disabilities to regular physical training and sports is to restore lost contact with the outside world, to create the necessary conditions for a reunion with the society, participation in socially useful labor and rehabilitation. In addition, physical culture and sport help mental and physical improvement of this category of population, facilitating their social integration and physical rehabilitation. In foreign countries physical activity for recreation, entertainment, communication, acquisition or maintenance of physical fitness required level of physical form are very popular among cripples. The cripples tend to be deprived of ability of free movement; therefore they often have disorders of the cardiovascular and respiratory systems.

Physical well-being activities in such cases is an effective means of prevention and the restoration of normal functioning of an organism, as well as helping them to acquire the level of physical fitness that is needed, for instance, for a disabled person in order that he could use a stroller, prosthesis or orthosis. For example, in the U.S. 10 million persons with disabilities make up 5% of the population, receive from the state the aid in the amount of 7% of the total national income. You can argue with the assertion that it's exactly the disabled sports movement in the West stimulates legislative recognition of their civil rights, but it is undeniable that the sports movement "Barrier" in the 50s - 60s. in many countries drew the attention to their capabilities and capacities. Based on the above, in the World program of actions regarding the invalids it is marked: "sport importance for invalids gets all greater confession. Therefore state members

must encourage all kinds of sport activities of disabled persons, in particular, by the grant of the proper facilities and correct organization of this activity. "Until recently, in Kazakhstan this group of population belonged to the number actually turned off from normal society's life. Their problems were not accepted to discuss publicly.

The 90 years have made serious changes in society's attitude towards people with disabilities in Kazakhstan. Calling ways of achievement of major goals in work with disabled people, the developers note following: "to create an adequate established structure of the state and public control of physical culture and sports of disabled people"[1]. This statement inadvertently leads to the idea that the current crisis socio-economic situation in Kazakhstan requires adequate governance and funding this important area. Among the priority directions of activities on the development of the adaptive physical education, the developers of Concept fairly call:

- The involvement of as many people with disabilities in physical culture;
- Sport education and propaganda provision to ensure the development of physical culture and sports among the disabled;
- Ensuring accessibility of existing health and fitness and sports facilities;
- Training, skills upgrading and retraining of specialists for rehabilitation and sports activities with people with disabilities;
- To create a legal basis for the development of physical culture, sport disabled.

Undoubted advantage of this concept is proposals on the division of powers and functions in the system for the physical among governments in the field of physical culture and sports. In this regard, it should be emphasized that the center of gravity moves to the locals. The local authorities are in the first place, should create equal conditions for physical culture and sports of all categories of the population.

Adaptive physical education has been studied intensively in recent years and involves scientific substantiation of wide range of issues: legal support for training and competitive activity; management for strain and recreation; pharmacological support for disabled athletes during periods of near-limit and the limit of physical and mental stress; unconventional means and methods of

recovery; socialization and communication activities; technical and engineering training as a new kind of sports training and many others. It's investigated the biological and socio-psychological effects from the use of motor actions associated with the subjective risk, but with guaranteed security and operated to prevent depression, frustration, and various kinds of socially unacceptable dependency (alcohol, psychoactive drugs, gambling, etc.). The technologies based on the integration of motor activity with the means and methods of art (music, dance, mime, drawing, sculpting, etc.) and involving the displacement from the conscious the previous picture of the world, the absorption of new impressions, images, activity, immersion in activities, stimulating work vacationing brain areas (it both hemispheres), in all spheres of human perception, find a scientific substantiation. Creative types of adaptive physical culture give the opportunity to recast their negative status (aggression, fear, alienation, anxiety, etc.), to know yourself better; experiment with your body and movement; receive sensory satisfaction and pleasure sensations own body[2]. It's produced the specialty of sector employees in various areas of science (pedagogy, psychology, medicine, physiology, biomechanics, mathematical statistics, etc.), as well as the accumulation of extensive practical experience in the field of adaptive physical education (APE) and adaptive sports (AS) provide a comprehensive approach to solving problems related to:

1. The development of regulatory frameworks of adaptive physical culture and sports;
2. Justification of innovation technologies of scientific and methodological support of sports activities for people with impaired health status;
3. Diagnosis (including a computer), evaluation and control of the state to people involved in physical exercise and sports;
4. Providing practical assistance in the correction of existing functional disorders;
5. Organization and carriage of scientific conferences on the APE;
6. Preparation of highly qualified personnel in the APE (postgraduate studies, conducting dissertation research and its defense).

Let's consider the development of Paralympic sport on the example of the Karaganda region. Regional Specialized School of disability sport in operation since June 5, 2003 and is the only

public institution in the Karaganda region for people with disabilities. It embodies educational programs of additional development of disabled athletes of all ages with limited opportunities: violation of the musculoskeletal system; sight violation; hearing disorder;

Over 300 disabled athletes study at school. For them 9 types of sports are cultivated: swimming, athletics, table tennis, football, mini-football, weightlifting, volleyball sitting, checkers, chess and togyzkumalak. 15 higher qualified coaches are working with them. They worthily participate in competitions of various ranks. They became participants of the Paralympic Games and Deaflympics. The national team of the Republic of Kazakhstan has 37 disabled athletes.

Wheelchairs Dances for people with disabilities gain the growing popularity in Kazakhstan, attracting the attention of viewers. It was stated by the Vice President of the Paralympic Committee of the Republic of Kazakhstan at the press conference within the starting Wheelchairs Dances championship of Kazakhstan. Those who previously had no idea about wheelchairs dances, now have another opinion, recognizing it as the beautiful and aesthetic sport. This kind of Paralympic sports like wheelchairs dances appeared in Kazakhstan rather recently. Despite this there is first progress - prizes at the World Championships in Tokyo. In 2013, Kazakhstan applied qualifying table, and since 2014, during the wheelchairs dances competitions, we can assign the titles such as "Candidate Master", "Master of Sports" and "the Master of Sports of the international class". It should also be noted that the International Paralympic Committee has considered the issue of inclusion of wheelchair dances into the program of Paralympic Games in 2016, as a result of gaining popularity.

All these questions lie within the competence of the Regional Departments of Sports and akimats and, in our opinion; it's not very difficult to solve the problem fundamentally. But the truth is that wheelchair users can not normally enter the Parliament in Astana. Ramps do not meet any standards of Construction Norms and Regulations. In Kazakhstan, there are more than 600,000 people with disabilities. 300,000 of them are willing and able to play sports. For the majority of them sport is the only way of

development, communication and social adaptation. Perhaps, disabled people should create their own party? Perhaps then they will be heard?

Almaty recently has submitted an application to carry through the Olympic Winter Games in 2022. Hence, the Paralympic Games, too. If we win –the athletes from all over the world will gathered here for the Games. Then it would be necessary to equip the transport infrastructure of the city and places with lifts and places for wheelchairs, refitted facilities of sports and general use. It would be essential to make the contrast color paths on the sidewalks for the visually impaired, tactile paths in pools and huge number of other important things. The ramps and paths that exist now are mostly decorative. They are not suitable for the use: either too steep or narrow or slippery.

In Rio de Janeiro, within the preparation for the Olympics-2016 the whole city is done over according to the requirements of the Paralympic Games. Even the subway is equipped with specific facilities for disabled athletes. I deem Almaty will cope with this challenge and build all needful. Kazakhstan is not a poor country; however none of our cities has proper infrastructure for them. In the West, person with disabilities is a full member of society. And professional athletes with disabilities generally perceived as supermen. Disabled people who thanks to the will and desire to live overcome all burdens and reach the highest results in sports, really people from capital letter! When people talk about the Paralympics, we often heard the word "equality". In the majority of countries this word is the statement, but in ours - the question mark. However, according to the law of our country on sport and physical culture, Olympians and Paralympian are inhabitants of different planets.

Victories of our athletes are widely reported in the press, they are interviewing, and we hold meetings with them. Akimats give our champions apartments and cash prizes. But what's about athletes with disabilities? Again - nothing. Though only for this year, there are 33 gold, 42 silver and 39 bronze medals in the bank of Paralympics in Kazakhstan[3]. And five world records! Probably it's not needed to explain how much pain, labor and courage behind this success. From the point of view of preparing its Paralympic reserve, our neighbors in the CIS, Russia has seven major

training centers for winter and summer sports, in Belarus - 4, in Azerbaijan - 3, in Ukraine - 4! But what do we have?

Summary and Conclusions. Revitalization of the work with disabled persons in the field of physical culture and sports, undoubtedly contributes to the humanization of society itself, a change in its attitude towards this population, and thus is of great social importance. It must be admitted that the problem of physical rehabilitation and social integration of persons with disabilities by means of physical culture and sports are being solved slowly. The main reasons of the poor development of physical culture and sports among the disabled individuals are the practical absence of specialized recreation and sports facilities, lack of the equipment and inventory, poor network sports clubs, youth sports schools and offices for people with disabilities in all types of institutions of further education on sports and sports orientation. Active sporting activities, participation in competitions are the forms of communication so urgently needed, restore mental balance, relieve feelings of isolation, return confidence and respect for themselves, and give the

opportunity to return to active life. The main purpose nevertheless is an involvement of the greatest possible number of people with disabilities into intense sport activities in order to use physical activities and sports as one of the most important means for their rehabilitation and reintegration into society, since this engagement provides mental setup which is extremely necessary for a successful reunion with the community and participation in useful labor. The involvement in physical culture and sports is effective, and in some cases the only method for physical rehabilitation and social adaptation.

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NURSING CARE REHABILITATION PROCESS

Pavlinka P. DOBRILOVA, Anna M. MARINOVA, Iveta M. MARINOVA

Subsidiary "Prof. Dr. Ivan Mitev" to Vratsa, Medical University of Sofia, Bulgaria

Abstract: The quality of services in rehabilitation hospitals is influenced not only by the overall organization and management. This are important factors to provide modern health services but as the main and decisive factor remains health care with its structure and components, the network and bridges of communication and interaction between healthcare teams, the teams and patients using the rehabilitation hospitals service in the country.

The aim of the study was to examine the need of nursing care in the rehabilitation process to meet the needs of patients as a condition for increasing the efficiency and quality of services in rehabilitation hospitals.

Keywords: *nursing care, rehabilitation process, quality*

Introduction: The philosophy of nursing activity in rehabilitation hospitals is expressed in patient compliance to achieve optimum level of health in each situation observed by care planning and provision of appropriate interventions [21].

The professional activities that nurses can perform independently and as appointed by a doctor, are legally regulated. These activities are: provision and collection of health information; health promotion, prevention and disease prevention; medical and health care provision; re-socialization, re-adaptation and rehabilitation; carrying out treatment; emergency medical assistance; project development, training and research in the field of health care. Rehabilitation activities include:

- Carrying out psychosocial rehabilitation of patients with major diseases;
- Organizing and conducting a general strengthening, mobilization and quenching procedures;
- Early rehabilitation of hospitalized patients;
- Training in the use of aids, devices and equipment for movement;
- Support the strengthening, adaptation and return the persons in their families and social environment;
- Assistance for society adaptation to the person [16].

Through teaching people of different ages and knowing the risk factors for disease in each age period, nursing staff helps people to understand how to change their behavior to protect their own health, the health of their children and relatives or to keep it on the maximum possible level. Patients and family members education on issues relating to health is an important function of nursing staff. In some cases this may be specific habits training to take care for himself or for a child or for an

adult relative. In other cases it is a preparation for medical examination, for acceptance of drugs (eg, insertion technique of insulin) and in the third case - training for rational / diet / nutrition. Educating patients, the nurse helps them to adapt to their condition, to maintain the maximum possible level of body comfort or to change their lifestyle to reduce the risk factors causing the disease [15]. The role of nurses in rehabilitation is not just as artists but also as program supervisors and teachers for the sick people [17]. They must be effectively trained to meet the specific needs of patients and their families. Health professionals must have the necessary knowledge and skills to determine the psychological and social needs of their patients and for management of many complex issues that arise in the implementation of rehabilitation programs [4]. Rehabilitation hospitals take essential medical and nursing social functions along with medical and pedagogical nursing functions. They are an essential component of the quality of hospital care and are important for the adaptation of the patient in the hospital. This includes activities such as: meeting and accommodation of the patient in the hospital, provision of sufficient volume and quality information of the patient, respect the patient's rights, support and development of his psychosocial adaptation and sustainability, maintaining good relations with relatives the patient and others. [6].

It is vital to determine the impact of the disease on functional status and ability to cope independently in everyday life. Functional status is represented by several elements - dealing with the basic and instrumental activities of daily living and social roles of personality, a state of sensory organs mobility. The functional capacity of individuals to cope with basic daily activities represent their

competence to take care for themselves and to perform self-six basic activities - feeding, bathing, dressing, using the toilet, bed and out of bed, control pelvic reservoirs (continence) [6].

Training in activities of life in the first place must be consistent with the degree of disability and functional status of patients with chronic disease.

Depending on this and based on their dependency on outside help, patients can be divided mainly into three groups (there are other subsets which cover addictions, including control of chronic diseases and not only affecting physical dependence) lying, unable to cope unaided; moving with help - their dependency is less; patients who are able to move themselves.

Patient education should always seek the assistance of the trained person, based on the principle of consciousness and activity, the patient must be pre motivated to perform a certain action or training. Here the appropriate pattern of behavior is the model of partnership. The patient should be motivated, explaining him what activities he can perform independently after training.

Psycho-social support and physical rehabilitation must be comprehensive and individualized. The complexity is determined by the fact that it must be extended to all fields and systems that are associated with the patient.

Individualization implies the nurse to comply with chronic disease, general condition, sex, age, interests, education, family values,

intellect and characteristics of personality (personality and character traits), the social environment, which is connected to the patient, and other factors based on the overall assessment of the patient's condition.

Everyone needs to obtain information about the world around him. When the patient can not obtain such information, the nurse can actively assist.

Objective: To investigate the importance of nursing care in the rehabilitation process to meet the needs of patients as a condition for increasing the efficiency and quality of services in rehabilitation hospitals.

Material and Methods: The study was conducted in six rehabilitation hospitals in the Republic of Bulgaria during the period December 2011 - December 2013. The opinion of 806 patients is studied by direct individual poll. Statistical processing is performed by a computer program SPSS v.19, and the graphics are made by Microsoft Excel.

Results: The patients studied were mainly women - 59.1% while the share of men is 40.9%. Average age of the patients surveyed is 65 (min. 18, max. 90), according to the specificity of these hospitals. Of the respondents 76.4 % are urban residents and 23.6% are rural residents. The most common value of the average hospital stay was 7 days (min. 3 days, max. 20 days) due to the restrictions imposed by the National Health Fund, financing the treatment of patients in the Republic of Bulgaria, the length of stay by clinical paths. Education of the respondents is presented in Table 1.

Table 1. Distribution of the patients studied in education

Education	number of persons/N/	share %
Primary	101	12,5
Secondary	416	51,6
Specialist	130	16,1
Bachelor	89	11,1
Master	70	8,7
total	806	100

The question to patients "Do you think that you have knowledge and skills in caring to improve your health?" The proportion of respondents having such knowledge and skills is relatively low, as evidenced by Figure 1.

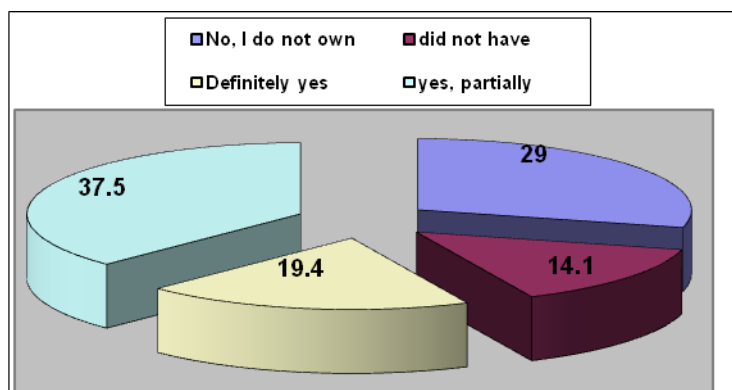


Figure 1. Self-assessment of patient knowledge and skills for adequate care

The results show that the largest proportion of patients - 43.1% do not have knowledge and skills to care targeted at their needs and problems, 29% stated they do not own skills, and 14.1% did not have. Partial knowledge and skills in caring for health improvements have 37.5%. A positive response is indicated only 19.4% of respondents. Rehabilitation process in chronically ill patients is long and lengthy and it is impossible to bring about the necessary results if the patient is not well trained and prepared for it. In the process of care must be involved not only the patient but also the family and relatives of the patient as partners of the rehabilitation team. So we asked the question "Do you think your relatives have knowledge and skills in caring to improve your health?". Responses were also unsatisfactory (Fig. 2):

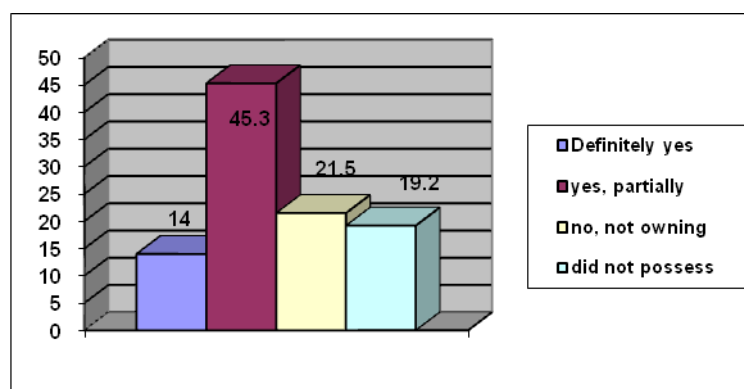


Figure 2. Evaluation of patients on the knowledge and skills to care for their relatives

From the results presented in the figure it is clear that relatives of patients who participate in the rehabilitation process does not possess the necessary knowledge and skills - 40.7%, of which 21.5% do not own, and 19.2% do not possess. Partial knowledge and skills in care have 45.3% of relatives. Completely positive responses are only 14%. Therefore patients and their families need to be trained to enable the rehabilitation and care of patients with chronic diseases to achieve its efficiency.

Table 2. Participants in patient education

answer	share
Nurse	26,4 %
Patients relativestraining bya nurse	15,9 %
Training by a doctor	14,2 %
Training by a therapist	4,5 %
Nobody trained me	30,1 %
no answer	8,9 %

Almost 1/3 of surveyed patients (30.1%) indicated that they were trained, 8.9% have no response, suggesting that they are not trained. Nurses have trained 26.4% of respondents and 15.9% of patients by their relatives, doctors have trained 14.1% of patients and rehabilitation therapists - 4.5%. These results indicate the need to educate patients and their families by qualified health care professionals.

Informing patients nurses help them to adapt to their condition, to preserve the maximum possible level of comfort or to change their lifestyle to reduce risk factors for disease.

In the basis of information and advice for patients and their families, aimed at satisfying their needs, lie the principles of a holistic approach - an approach to the individual patient, taking into account not only the physical but also psychological, emotional, intellectual, social and spiritual needs. Quality of the information determines the success of treatment in rehabilitation hospitals.

To examine the need to include nursing care as part of a rehabilitation package of services we decided to find out whether patients have such needs (Figure 3).

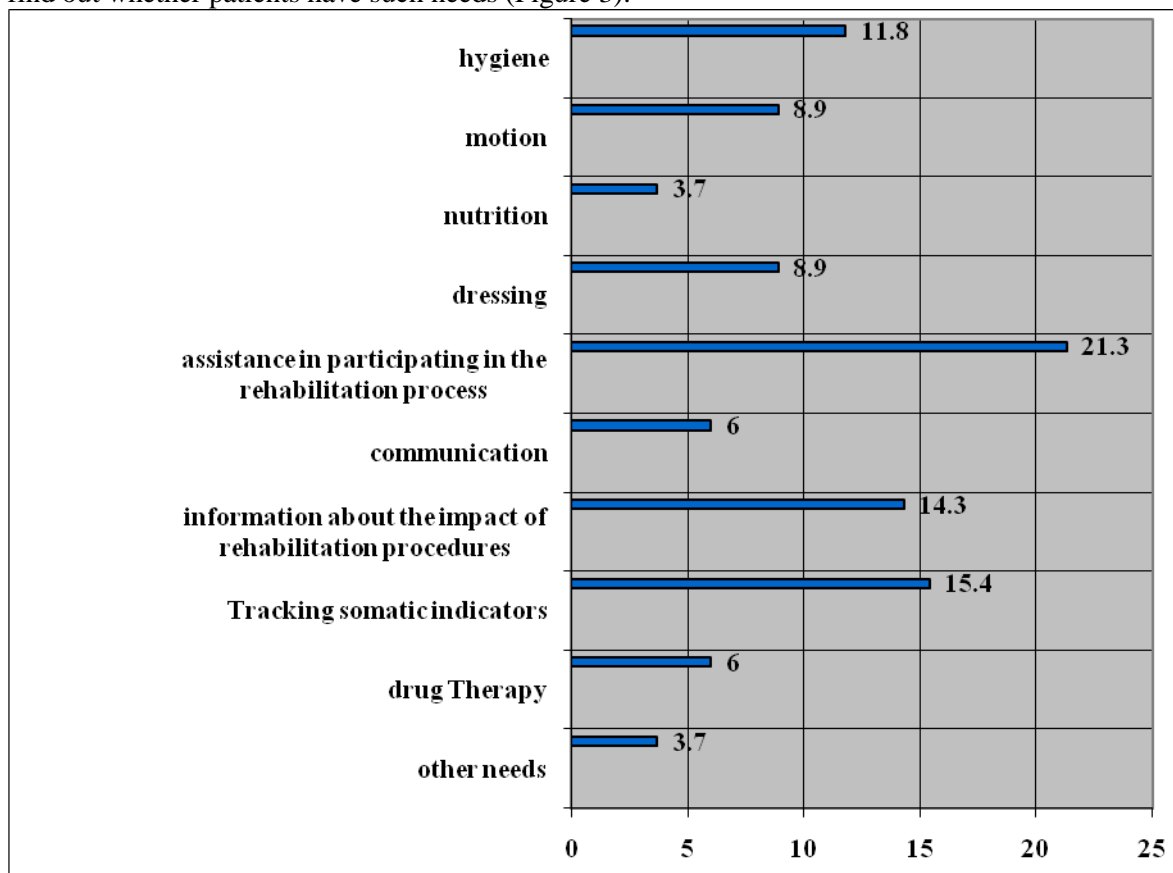


Figure 3. Patients' opinion about their needs for nursing care

It is evident that all patients need nursing intervention in the process of rehabilitation. The largest share of those (50.5%) whose health needs are related to the need of nursing activities in the conduct of rehabilitation procedures, of which 21.3% need help in planning and participating in the rehabilitation process, 14.3% have need for information and education on the impact of rehabilitation procedures, 8.9% need help dressing and undressing during their performance and 6% reported that have difficulty in communicateon. It's not a small the part of individuals (24.4%) who need to carry out fundamental (basic) care - support / carry in daily hygiene activities - 11.8%, support for travel and movement during the stay - 8.9% and 3.7% need help with meals. Care monitoring need 15.4% of respondents

associated with monitoring vital indicators (measurement of temperature, pulse, blood pressure, respiration, excretion of urine and feces) and 6% need the necessary technical care with support and assistance in conducting medication therapy. The remaining 3.7% of the patients have other needs associated with nursing activities.

To achieve the objectives in meeting the healthcare needs the nurse should encourage, stimulate the patient's autonomy and independence. This requires the nurse to assess with the patient's need for health care appropriate to age, illness, the degree of disability and others.

The pprovision of quality new type health care in specialized rehabilitation hospitals means expansion of nursing functions by including them in job descriptions, training of

nurses in the profession and innovation in finding the right and proper place of the nurse in the rehabilitation team.

Conclusions:

1. The study proved the need to include nursing in the package of services provided to patients in rehabilitation hospitals.
2. Patients and their families should be seen as partners in the rehabilitation process with emphasis on their active cooperation in determining the needs of nursing.
3. The largest proportion of individuals (50.5%) are those whose health needs are related to the need of nursing activities in the conduct of rehabilitation procedures - assistance in planning and participating in the rehabilitation process and the need for information and education.

Conclusion: The specifics of medical and health care needs of specialists from different fields to work together in the interest of the patient. Nurses in rehabilitation hospitals need to solve a variety of situations in the performance of their professional duties in collaboration with other specialists. So they become members of a multidisciplinary team where except the relevant doctor they interact with other health professionals. To perform quality professional tasks health care providers need to develop skills to participate in a team with a variety of medical and non-medical teams.

Rehabilitation hospitals are hospitals that are in the market for health services and to be competitive they have to offer other types of service which meets the needs of consumers. According to the patients opinion the presence of the nurse is essential in the process of rehabilitation. The quality of nursing care in rehabilitation hospitals must meet the expectations of the patient and his needs, both in terms of technical implementation of care and procedures and the relationships arising in the process of providing. The patient should not only receive the care but needs to be a partner in this care. This requires nurses to provide care according to their needs, taking a holistic approach that would increase the efficiency and quality of services in these hospitals. Patients and their families should be seen as partners in the rehabilitation process with emphasis on their active cooperation in determining healthcare needs.

To increase the quality of services in rehabilitation hospitals is necessary to introduce a package of nursing services, satisfying patients desire and entrance choice and assessment of their health needs and planning the nursing care in the rehabilitation process.

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THE IMPORTANCE OF SPRINT AND AGILITY IN THE SOCCER PLAYER POSITION

Nurja FATJON, Keida USHTELENCA, Petani VITJOLA, Spahiu MEHMET

The University of Shkodra, "Luigj Gurakuqi"

Sports University of Tirana

Corresponding author; Fatjon Nurja nurja@yahoo.com Shkoder, Albania

Abstract

Introduction. The current level of sprint and agility is of importance in the soccer field regarding their position. The aim of this study was to find out the current level of sprint and agility with regard to soccer position

Methods. The participant was 81 youth soccer players with an average body weight 48 kg (+/- 9.4 kg), body height 157.6 cm (+/- 8.1cm) and BMI 19.1 kg/m² (2.6 kg/m²). The participant undertook anthropometrics parameters evaluation and performed three speed test (10m and 30m sprint test, speed and agility 10x5m)

Results. The results for three speed test for each position into the field show that; **Goalkeeper:** speed 10m (2.32 s; +/- 0.36s), speed 30m (5.21s; +/- 0.43s), speed and agility 10x5m (22 s; +/- 1.52s). **Defenders:** speed 10m (2.22 s; +/- 0.37s), speed 30m (5.04s; +/- 0.52s), speed and agility 10x5m (20.86 s; +/- 1.59s). **Midfielders:** speed 10m (2.28 s; +/- 0.41s), speed 30m (4.96s; +/- 0.47s), speed and agility 10x5m (20.32 s; +/- 0.95s). **Forwards:** speed 10m (2.27 s; +/- 0.41s), speed 30m (5.05s; +/- 0.43s), speed and agility 10x5m (20.42 s; +/- 1.39s)

Conclusion. The results show that midfielders and forwards players have better results regarding speed and agility. The finding of this study research for comparison by position for sprint and agility test performed showed no statistical significance difference in youth soccer players

Keywords; youth, soccer, sprint, speed

Introduction

The youth ability to perform high-speed running actions such as sprints to win possession of the ball or to pass defending players is believed to be critical to the outcome of soccer matches [1]. As such, sprint ability has been reported to be a physical prerequisite for professional soccer players [4,9]. Nevertheless, found no difference in sprint performance between successful and unsuccessful players progressing to professional levels [7]. The results from a work by Bunc (1999) states that the biggest changes in soccer in last years were especially made in condition figures which regard to speed-force assumptions in playing performance [2]. The condition according to (Psotta et al., 2006) presents 30-40% of playing performance.

The current level of sprint and agility is of importance in the soccer field regarding their position. Youth soccer players classified as elite and non-elite, or as possessing high and low levels of soccer ability differ in body size and maturity, and in strength, flexibility and soccer specific skills [6,8,12]. Unfortunately, size and maturity status are generally not controlled in comparisons of functional tests and sport-specific skills.

High-level soccer is a tactical game. As such, player behavior on the field is often

constrained by tactical tasks that can vary because of factors such as playing style, playing position, or match score [1,5,14]. Such tactical constraints may modulate the relationship between maximal performance (i.e., an intrinsic physical quality determined via specific field or laboratory tests) and actual performance during the game, game physical performance). The aim of this study was to find out the current level of sprint and agility with regard to soccer position and show if there is any significant difference by field position in youth players.

Methods

The participant was 81 (eighty one) youth soccer players members of the some football clubs in the city of Shkodra in Albania. They were randomly assigned to this study. Mean age of participant was 16.4 years old (SD 1.5.). The average body weight was 48 kg (+/- 9.4 kg), body height 157.6 cm (+/- 8.1cm) and BMI 19.1 kg/m² (2.6 kg/m²). The participant undertook anthropometrics parameters evaluation and performed three speed test (10m and 30m sprint test, speed and agility 10x5m).

Protocol of the tests

The purpose of the test 10m and 20m sprint is to determine acceleration, maximum running speed and speed endurance. The test involves running a single maximum sprint over a set

distance, with time recorded (10m and 20m). After a standardized warm up, the test is conducted over a certain distance, such as 10, 20, meters. The starting position should be standardized, starting from a stationary position with a foot behind the starting line, with no rocking movements. We use a measure of the time for 10 meters and 20 meters in seconds from a stationary start as a score.

The purpose of the test 10x5 m is a test of speed and agility. Procedure: of this test is as follows; marker cones and/or lines are placed five meters apart. Start with a foot at one marker. When instructed by the timer, the subject runs to the opposite marker, turns and returns to the starting line. This is repeated five times without stopping (covering 50 meters total). At each marker both feet must fully cross the line. The score is record the total time taken to complete the 50 m course.

Statistical analysis

A descriptive statistics (mean \pm SD) was calculated for all of the variables (speed 10m, speed 20m and agility 10x5m) created before in an excel database taken for the field tests. An analysis of variance (ANOVA) was used to determine whether differences existed between groups positions in the changes in each variable. The post-hoc paired t-test with a Bonferroni adjustment were utilized for indentifying the specific differences. All of the data were conducted using SPSS, version 11.0 (SPSS, Inc. Chicago, IL, USA). The significance level was set at $p < 0.05$.

Results

Data of table 1 show descriptive statistics for anthropometric variables. Results show that 81 participant youth soccer players did the measurement for anthropometrics as follows; weight had mean values 47.9 kg (SD 9.4), height had mean values 1.58 m (SD 8.1) and body mass index 19.1 kg/m² (SD 2.6).

Table 1. Descriptive Statistics for anthropometrics

	N	Minimum	Maximum	Mean	Std. Deviation
Weight	81	22.00	82.00	47.9630	9.38469
Height	81	138.00	183.00	157.5926	8.18009
BMI	81	10.76	24.49	19.0537	2.60029
Valid N	81				

Results on table 2 show that youth soccer players did the assessment for speed and agility as follows; speed 10m had mean values 2.7 seconds (SD 0.4), speed 30m had mean values 5.6 seconds (SD 0.5) and agility 20.5 seconds (SD 1.4).

Table 2 Descriptive Statistics for speed and agility

N	Minimum	Maximum	Mean	Std. Deviation	
Speed_10m	68	2.40	3.27	2.7501	.38548
Speed_30m	65	5.21	6.25	5.6143	.47560
Speed_Agility_10x5 m	54	17.3	25.0	20.584	1.3347

Data on table 3 show the results for descriptive Statistics for speed and agility by position of the players as follows; Goalkeeper: speed 10m (2.32 s; +/- 0.36s), speed 30m (5.21s; +/- 0.43s), speed and agility 10x5m (22 s; +/- 1.52s). Defenders: speed 10m (2.22 s; +/- 0.37s), speed 30m (5.04s; +/- 0.52s), speed and agility 10x5m (20.86 s; +/- 1.59s). Midfielders: speed 10m (2.28 s; +/- 0.41s), speed 30m (4.96s; +/- 0.47s), speed and agility 10x5m (20.32 s; +/- 0.95s). Forwards: speed 10m (2.27 s; +/- 0.41s), speed 30m (5.05s; +/- 0.43s), speed and agility 10x5m (20.42 s; +/- 1.39s)

Table 3 Descriptive Statistics for speed and agility by position of the players

Position	N	Minimum	Maximum	Mean	Std. Deviation
Goalkeeper	2	2.32	2.52	2.3200	.1421
Speed_10m	2	5.21	5.21	5.2100	.1231
Speed_30m	2	22.0	22.0	21.980	.1121
Speed_Agility_10x 5m	2				
Valid N (listwise)					
Defender	28	1.80	3.27	2.2200	.36984
Speed_10m	27	4.23	6.25	5.0433	.51764
Speed_30m	21	18.0	25.0	20.860	1.5947
Speed_Agility_10x 5m	20				
Valid N (listwise)					
Midfielder	26	1.80	3.06	2.2842	.40696
Speed_10m	25	4.23	5.75	4.9596	.46956
Speed_30m	20	17.3	21.9	20.322	.9484
Speed_Agility_10x 5m	18				
Valid N (listwise)					
Offense	12	1.80	2.97	2.2683	.41257
Speed_10m	12	4.34	5.58	5.0467	.43379
Speed_30m	12	18.1	23.0	20.421	1.3895
Speed_Agility_10x 5m	12				
Valid N (listwise)					

Data of table 4 show results for comparison for speed 10 m by position. When we compare the mean data by position if the descriptive statistics show differences the ANOVA test performed for comparison showed no statistical significance; speed 10m (mean difference and Std Error for comparison goalkeeper vs defender, midfielder, offence)- goalkeeper vs defender (-0.19 s; 0.28s; Sig= 0.507), goalkeeper vs midfielder (- 0.254 s; 0.28s; Sig= 0.377) goalkeeper vs offense (- 0.238 s; 0.297s; Sig= 0.426. The other comparisons are shown in table as follows (table 4).

Table 4 ANOVA comparison for speed 10 m by position of the players

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Speed_10 m	GoalKeeper	GoalKeeper			
		Defender	-.19000	.28449	.507
		Midfielder	-.25423	.28555	.377
		Ofense	-.23833	.29721	.426
	Defender	GoalKeeper	.19000	.28449	.507
		Defender			
		Midfielder	-.06423	.10510	.543
		Ofense	-.04833	.13357	.719
	Midfielder	GoalKeeper	.25423	.28555	.377
		Defender	.06423	.10510	.543
		Midfielder			
		Ofense	.01590	.13581	.907
Ofense	GoalKeeper	.23833	.29721	.426	
	Defender	.04833	.13357	.719	
	Midfielder	-.01590	.13581	.907	
	Ofense				

Data of table 5 show results for comparison for speed 30 m by position. When we compare the mean data by position if the descriptive statistics show differences the ANOVA test performed for comparison showed no statistical significance; speed 30m (mean difference and Std Error for comparison goalkeeper vs defender, midfielder, offence)- goalkeeper vs defender (0.18 s; 0.35s; Sig= 0.608), goalkeeper vs midfielder (0.265 s; 0.353s; Sig= 0.455) goalkeeper vs offense (0.178s; 0.367s; Sig= 0.629. The other comparisons are shown in table as follows (table 5).

Table 5 ANOVA comparison for speed 30 m by position of the players

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Speed_30m	GoalKeeper	GoalKeeper			
		Defender	.18167	.35230	.608
		Midfielder	.26540	.35327	.455
		Ofense	.17833	.36717	.629
	Defender	GoalKeeper	-.18167	.35230	.608
		Defender			
	Midfielder	.08373	.13343	.533	

		Ofense	-.00333	.16679	.984
	Midfielder	GoalKeeper	-.26540	.35327	.455
		Defender	-.08373	.13343	.533
		Midfielder			
		Ofense	-.08707	.16883	.608
	Ofense	GoalKeeper	-.17833	.36717	.629
		Defender	.00333	.16679	.984
		Midfielder	.08707	.16883	.608
		Ofense			

Data of table 6 show results for comparison for agility 5x10 m by position. When we compare the mean data by position if the descriptive statistics show differences the ANOVA test performed for comparison showed no statistical significance; agility 5x 10m (mean difference and Std Error for comparison goalkeeper vs defender, midfielder, offence)- goalkeeper vs defender (1.23 s; 0.97s; Sig= 0.214), goalkeeper vs midfielder (1.76 s; 0.98s; Sig= 0.77) goalkeeper vs offense (1.66 s; 1.01s; Sig= 0.105). The other comparisons are shown in table as follows (table 6).

Table 6 ANOVA comparison for agility 10x 5m by position of the players

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Speed_Agility_10x5m	GoalKeeper	GoalKeeper			
		Defender	1.2305	.9787	.214
		Midfielder	1.7675	.9809	.077
		Ofense	1.6692	1.0101	.105
	Defender	GoalKeeper	-1.2305	.9787	.214
		Defender			
		Midfielder	.5370	.4132	.200
		Ofense	.4387	.4786	.364
	Midfielder	GoalKeeper	-1.7675	.9809	.077
		Defender	-.5370	.4132	.200
		Midfielder			
		Ofense	-.0983	.4829	.839
	Ofense	GoalKeeper	-1.6692	1.0101	.105
		Defender	-.4387	.4786	.364
Midfielder		.0983	.4829	.839	
Ofense					

Discussion

The current level of sprint and agility is of importance in the soccer field regarding their position. Youth soccer players classified as elite and non-elite, or as possessing high and low levels of soccer ability differ in body size and maturity and in strength, flexibility and soccer specific skills [6,8,12]. Unfortunately, size and maturity status are generally not controlled in comparisons of functional tests and sport-specific skills.

The results of this study showed that midfielders and forwards players have better results regarding speed and agility. ANOVA test for comparison by position for each test performed in this study showed no statistical significance difference even though descriptive statistics showed the results had difference. As such, sprint ability has been reported to be a physical prerequisite for professional soccer players found no difference in sprint performance between successful and unsuccessful players progressing to professional levels [4,9,7]. Other studies of youth players generally consider specific skills, in contrast with an overall skill score. For example, elite (national team) late-adolescent soccer players performed better on a shuttle run and vertical jump compared with non-elite (regional team) players [10]. The elite players were also older, taller and heavier than the non-elite players, but the age and size differences were not controlled in making the comparisons by position. An indicator of biological maturity status was not included in the study.

We agree with statements of that football players do not have to dispose with extraordinary performance in any field of physical performance but they have to have appropriate high level in all fields [10]. The results from a study by [2] mention that physiological presuppositions and norms represent necessary conditions for success at the professional level, but they are not sufficient.

To finalize the finding of this study research for comparison by position for sprint and agility test performed showed no statistical significance difference in youth soccer players.

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THE INCIDENCE OF TERMINAL EDENTULOUS DENTITIONS AND POSIBILITIES FOR PROSTHETIC RESTORATION – A RETROSPECTIVE STUDY

Mirela Lucia OPRI, R. RÎCĂ, H. MANOLEA, M.R. POPESCU, Ana-Maria RÎCĂ

Faculty of Dental Medicine, UMF Craiova

Abstract. A correct rehabilitation of the extended partially edentulous status of the patients should induce an equilibrium between the elements of the stomatognathic system and the chosen therapeutic method for a long period of time.

280 patients have been chosen for this study both men and women, from both the rural and urban areas, with uniterminal and biterminal edentulous areas, with and without prosthetic restoration treatments. They have been examined by correlating the clinical exam with data obtained by conducting a specially elaborated inquiry designed to observe the behavioral model of patients with edentulous status.

The obtained statistic results represent a certainty of the fact that the status of oral health of the population must be improved in both the rural and the urban area, and that dispensarization is not to be neglected.

Introduction: The desire do look better cannot be considered a vanity in a socially and economically competitive world. A pleasant look is literally necessary for the social integration of the individual no matter the age, more so when we talk about the younger patients with edentulous status.

The evaluation of the incidence of bi-terminal and uni-terminal edentulous dentitions is a starting point for the argumentation and diversification of the chosen treatment solution dictated by a series of very important parameters regarding the general health status, the local health status, the dental and periodontal health status. The conducted statistic studies are meant to quantify the interrelation between the class of edentulism, the bone atrophy and resorption status and the chosen therapeutic solution possibly represented by dental implants and/or skeletal partial dentures.

Objective

The study's objective was to establish the clinical and biopsychological indices of every chosen patient. We have also wanted to establish the degree of acceptance of the prosthetic treatment for the patients taken into consideration.

Materials and method

280 patients have been chosen for this study and examined in a private clinic between January 2010 and December 2011. The patients have been examined by correlating the clinical exam with data obtained by conducting a specially elaborated inquiry designed to observe the behavioral model of patients with edentulous status. The inquiry contained questions formulated in a clear and simple way.

Results

This study comprised of 150 men and 130 women. The prevalence of the male patients taken into consideration for the study can be seen very easily. (Fig.1)

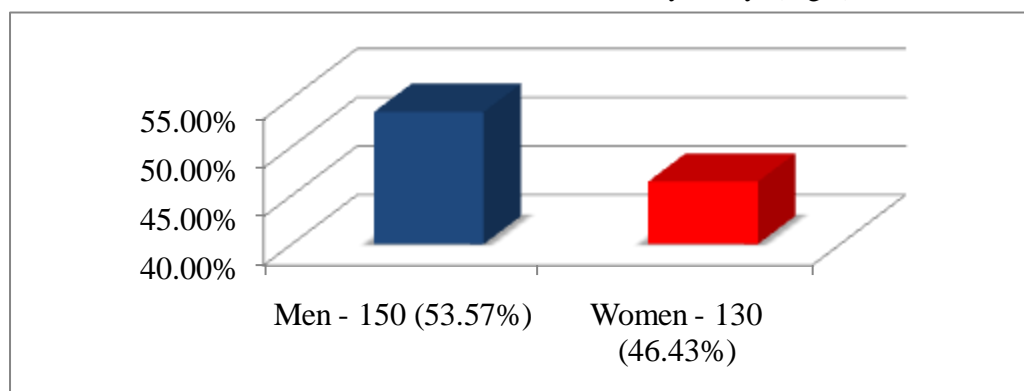


Figure 1.

The examined patients originated both from rural and urban areas: 200 patients originated from the urban area (71.42%) and only 80 patients originated from the rural area. (Fig.2)

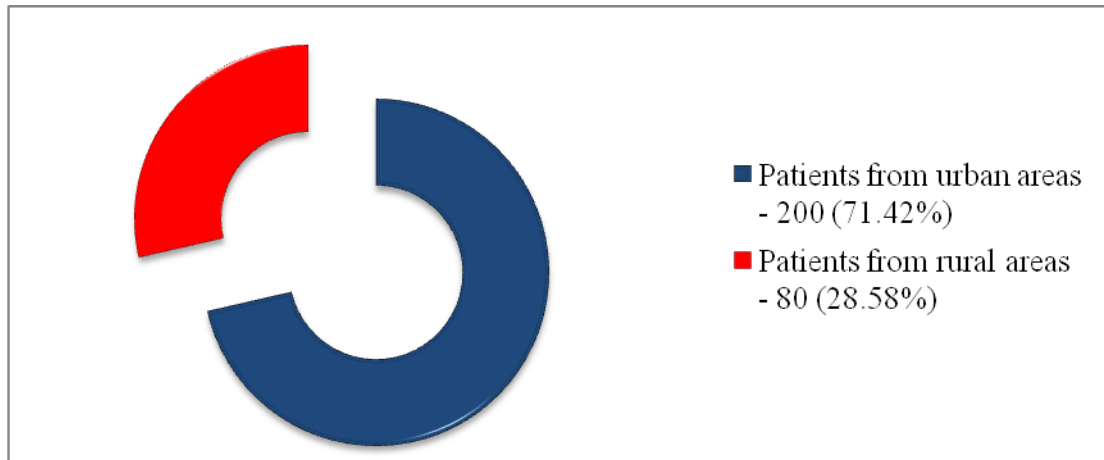


Figure 2.

Regarding the edentulous status, 160 examined patients had biterminal edentulous dentitions and only 120 patients had uniterminal edentulous dentitions.

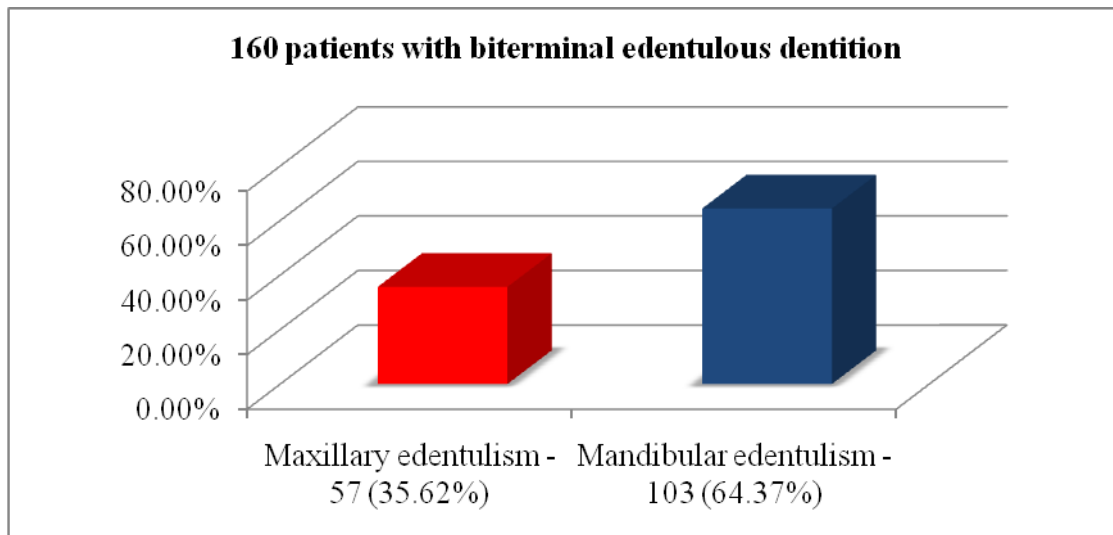


Figure 3.

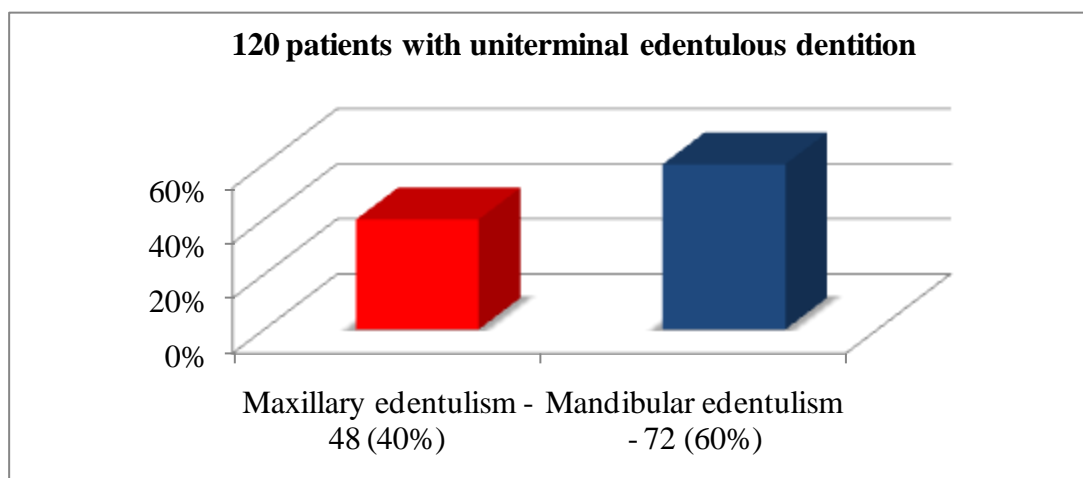


Figure 4.

57 patients with biterminal edentulous dentition had maxillary edentulism and almost double the number, 103 had mandibular edentulism. (Fig.3).

48 patients with uniterminal edentulous dentition had maxillary edentulism and 72 patients had mandibular edentulism. (Fig.4).

Another very important parameter for the oral health status and for the emotional status of the patient derives from the patients oral rehabilitation status. Only 88 patients in our study have a prosthetic restoration. (Fig.5).

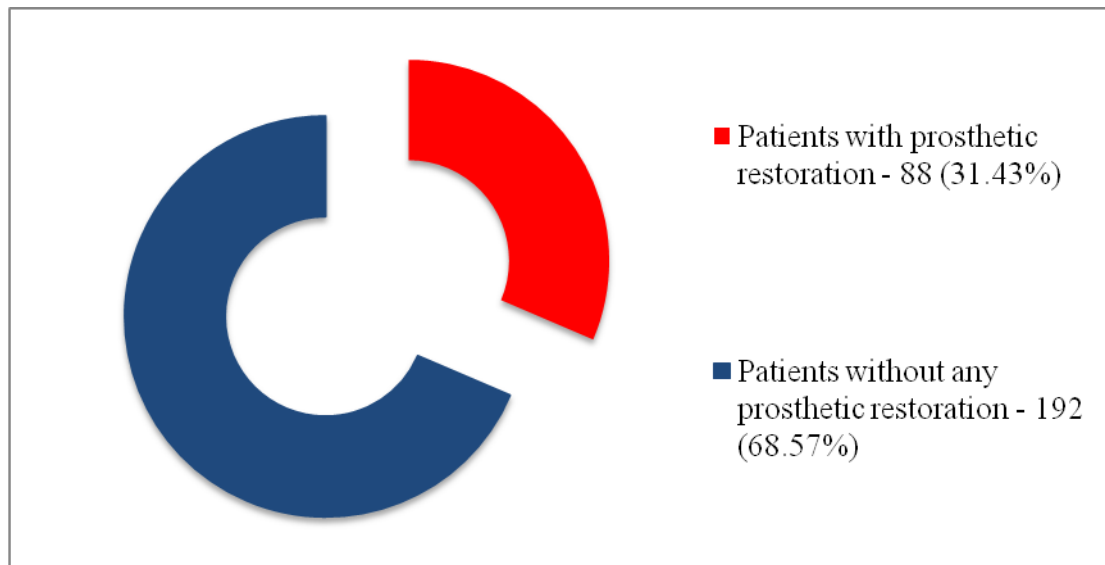


Figure 5.

By analyzing the status of the patients with prosthetic restorations we have observed that only 3 patients with correctly conducted prosthetic restorations have implant-supported overdentures. The rest of the 32 patients with correctly conducted prosthetic treatments have skeletal dentures (10 patients) and partial acrylic dentures (19 patients). (Fig.6).

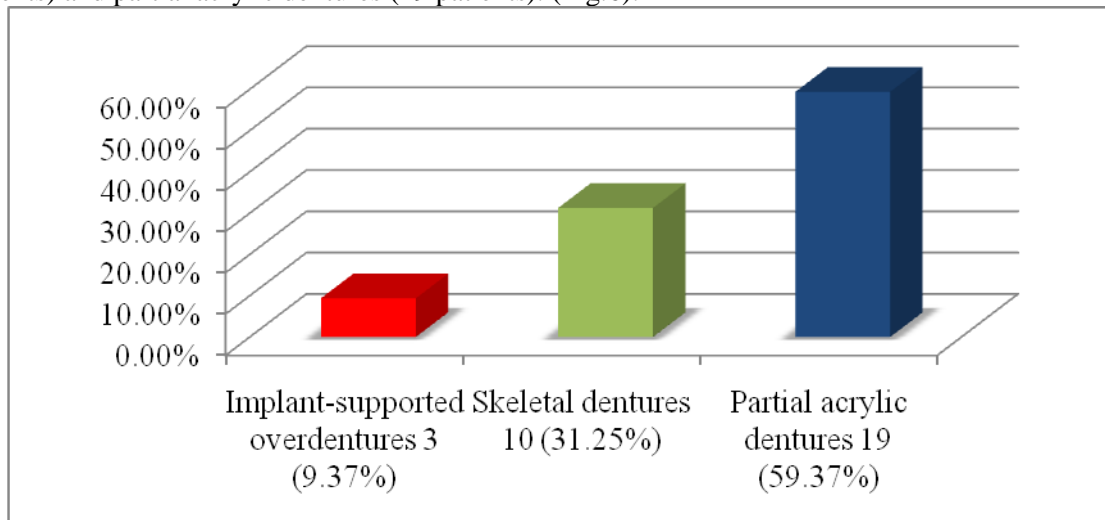


Figure 6.

We have also conducted a specially elaborated inquiry designed to observe the behavioral model of patients with edentulous status especially regarding an oral prosthetic rehabilitation treatment. In our study we can see a predominance of the patients with college education over the patients with a faculty degree.

214 patients undergo dental exams only when necessary 40 patients undergo regular dental exams every year and only 26 patients undergo regular dental exams every 6 months. (Fig.7)

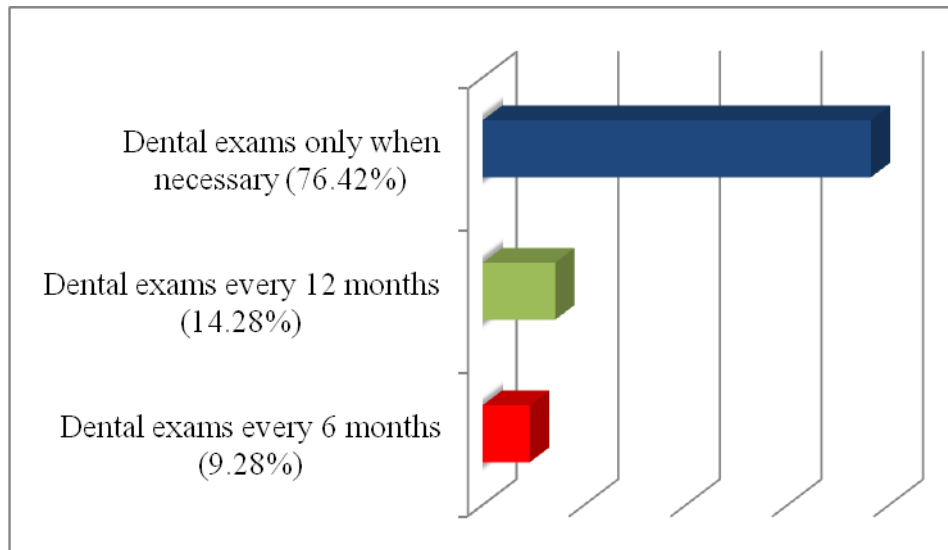


Figura 7.

177 out of the total number of patients refuse to undergo a prosthetic oral rehabilitation treatment, 81 patients consider this treatment necessary and only 22 consider it mandatory. (Fig.8).

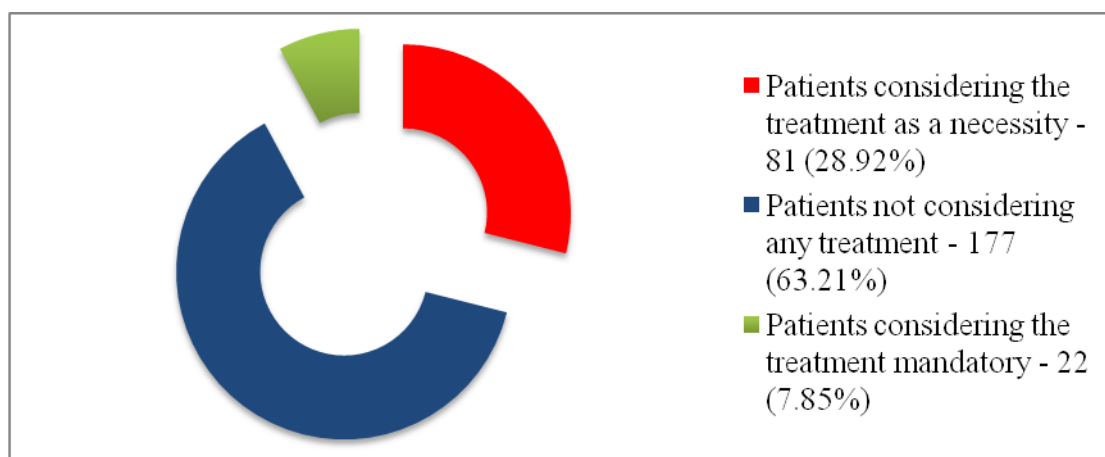


Figura 8.

Discussions

Edentulism as well as the incorrect prosthetic rehabilitation can contribute to a decrease in the life quality of patients and even to a decrease in the life expectancy of elderly patients. [1]

The preoperative trait anxiety level is associated with postoperative pain sensation in partially edentulous patients receiving implant denture, suggesting the necessity of preoperative anxiety intervention in clinical practice. [7]

The failure of the partial removable prosthetic restoration treatment is caused by the rejection of this type of rehabilitation by the patient usually because of subjective and objective reasons or when there is a psychological factor involved. [2,3]

Conclusions

The evaluation of the incidence and prevalence of the long span edentulous dentition is a starting point for the argumentation and diversification of the chosen treatment.

The obtained statistic results represent a certainty of the fact that the status of oral health of the population must be improved in both the rural and the urban area, and that dispensarization is not to be neglected.

Acknowledgement. All authors have contributed equally to the paper.

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DISABILITY AND (RE)HABILITATION EDUCATIONAL NEEDS IN ROMANIA – FINDINGS OF THE M-CARE PROJECT

Eugenia ROSULESCU, Ilona ILINCA, Florin STANCU, Lucia D'INGIANNNA, Mihaela ZAVALEANU, Calogero FOTI

Department of Physical Therapy and Sports Medicine, University of Craiova

General Directorate of Social Assistance and Child Protection Dolj

Department of Physical and Rehabilitation Medicine, Tor Vergata University of Rome

Introduction: The focus of this paper is on the role of demand and motivation, through participants' needs analyzes, in adult education and formulating agendas for health, social, educational policy and quality based on their own needs and experiences. The research has been carried out within the framework of the Grundtvig Learning Partnership project "Mutual caring—from knowledge to action (M-CARE)".

Material and Methods: The research has been carried out within the framework of the Grundtvig LLP project "M-CARE – Mutual caring—from knowledge to action", started on 1st of August 2013, involving medical universities (University of Craiova-Romania, Tor Vergata University of Rome-Italy), socio-medical stakeholders (General Directorate of Social Assistance/Department for Disabled People Protection Dolj-Romania), NGOs (Latvia and Poland). The methods used were document analysis and statistical analysis of a quantitative survey. Romanian partners have sent 260 questionnaires to different organizations and respondents, while 161 (more than half) of them were returned, using a mix of different methods (face to face interviews, or distribution through electronic format). The chosen interviewed people were patients, parents/relatives carers, or trainers/medical specialists experienced in working with disability affected people.

Results: The majority of the respondents (79/161) were to some extent familiar with disability legislation in their country, while 41.6% (67/161) of them have indicated that they unfamiliar with this issue. A high majority of Romanian respondents were very unsatisfied about proactive intervention to help families and patients avoid the social problems and social isolation (125/161, 77.6%), availability of assistive devices (75.8%, 122/161).

Conclusions: This survey offer different aspects concerning the needs for medical/caring education in disability and point to a possibility of a gap between the EU policy and programs and the general public awareness.

Introduction

Europe and its regions are facing many great challenges that result from the socio-economic and demographic changes: people are ageing, birth rates remain low; shrink of the youth/actives people group that financing the public services, increasing demand for high quality services and treatments. According to European Disability Strategy 2010-2020 [1], one in six people in the European Union (EU) has a disability, making around 80 million who are often prevented from taking part fully in society and economy because of environmental and attitudinal barriers. For people with disabilities the rate of poverty is 70 % higher than the average partly due to limited access to employment. Full economic and social participation of people with disabilities is essential if the EU's Europe 2020 strategy is to succeed in creating smart, sustainable and inclusive

growth. Between the eight main areas for action in disability field are: Employment, Education and training, and Health. The disability equality scenario shows that higher participation rates of workers with disability could play a very significant role in increasing the future labor supply in EU countries.

At EU level there are still many controversies and challenges regarding disability definition, education and practice. *Dilemmas on disability definitions and approaches* arise due to the fact that actually EU programs and policies for people with disabilities are generally based on an understanding of disability as a continuous state of disability: the Commission Regulation (EU) No 317/2010/16 April 2010, adopting the specifications of the 2011 ad hoc module on employment of disabled people for the Labour Force sample Survey (LFS) [2], is based on "longstanding health condition or

disease”, longer than 6 months, when defining health indicators used by EUROSTAT in European LFS. Therefore the “all-or-nothing” nature of most disability income supports leaves many affected people with no realistic alternative other than to resign themselves to being classified as ‘disabled’; and leave the workforce. There are still *gaps between education and practice* in disability assessment and (re)habilitation processes: the significant rise in the number of disability beneficiaries in recent decades requires EU countries to rethink their approach to addressing working-age disability; there was and still is too much focus on a diagnosis of loss of physical and/or mental functioning, as assessed by medical practitioners with no or limited expertise in (re)habilitation. Practitioner’s competencies in the area of disability affect the fairness and validity of assessments and interventions. Concerning the *health and social care*, the medical diagnosis is often not effective as the full means of determining the type of supports that might help the individual. New approaches are needed to move away from providing supports based on a diagnosis or medical criteria to providing supports based on the impact of disability. Differences in the impact of a disability between one individual and another may be the result of the nature and severity of the health condition, their life circumstances, and the barriers and supports that are part of their lives.

Besides the previously mentioned issues, more people are living longer than ever before, including people with various disabilities. An increasing number of people with disabilities are still living at home with family carers who are aged 70 or older. The carers may be parents, siblings, grandparents, close relatives or friends. They have often spent a lifetime care and assistance in a regular and sustained manner without payment, to a person who is frail and/or aged, disabled/chronically ill. Carers are at risk

of financial, health and social burden, not only when caring, but when caring comes to an end because significant barriers to reengaging with society. Many do not recognize the skills they have gained through caring. From our experience of work with caregivers, we found the next priorities and needs for them: to be recognized, respected and valued; hidden carers to be identified and supported; the improvement of services for carers and the people they care for; to be supported to combine caring and education or work.

Therefore, the reasons mentioned above actuated and provided us the motivation to create the M-CARE Learning Partnership involving the exchange of knowledge, information, staff and learners across Europe. This Learning Partnership is focused on motivation and demand, on participants’ needs analysis, setting objectives which are participant-led, introducing new concepts, but universally applicable, which can lead to innovative strategies that are sustainable and cost neutral. Through the development of mutualistic relationships in education and healthcare services our ability to share life/ or learned experiences will increase, for a better collaboration in envisioning and creating a more humane and integrated society.

The M-CARE basic premise was that mutual caring understanding and transfer (routines and ways of coping developed by families through both the caring person and affected person are looking after each other) can provide the basis for an innovative learning approach, in which ‘mutual care’ and ‘interdependency’ should underlie educational topics on disability issues. The main objective of this project was to understand and define, develop and promote good practices in supporting families to plan for a future where a person with chronically ill/disabilities is providing care to their elderly carers through the concept of mutual caring. The introduction and practical application of these new concepts

(but universally applicable) into care process can lead to innovative strategies that are sustainable and cost neutral.

The concept behind the “mutual care approach” focuses on the interpersonal care-dependent person or carer-patient dynamics where there is a mutual exchange of care between the carer and care recipient, in contrast to the conventional approach to carer-care recipient relationships where care is provided by the carer to the cared person. There is an abundance of projects and initiatives that target persons with disability and their caregivers, as resulted from our research activities unrolled during the 2 years life of M-CARE. However challenges and barriers still exist. We have identified many impediments to effective knowledge, care services, education and real inclusion: the majority of these initiatives are still constructed, largely subconsciously, within the framework of the dominant world views and paradigms; neither “care” nor “dependency” has simple, uncontested meanings; the “individualizing and excluding” language of dependency should be replaced by recognition of the basic social condition of “interdependence” and caring solidarity [3,4].

Our limited and informal prior surveys had shown that many learners/trainers (be they family or specialists caregivers) have difficulties to address some of the emotional, medical, financial conflictive aspects, such as: treatments available for the patient’s pathology, information or guides of available centers for treatment, or centers for support from NGOs, support and knowledge to access them if there are any available, information on networks of families in similar situation, emotional support to accept the gift of taking care of the development of a special human being, professional care networks and interdisciplinary teams care consisting of educational, social and healthcare specialists.

Our study objectives were to identify the M-CARE project participant’s educational, professional/personal needs in caring process and social inclusion, by taken the assumption that M-CARE participant learners (parents, patients, healthcare specialists, social workers) can be productively involved in formulating agendas for health/social/educational policy and quality based on their own needs and experiences.

Material and Methods

The research has been carried out within the framework of the Grundtvig LLP project ““M-CARE – Mutual caring—from knowledge to action”, started on 1st of August 2013, involving medical universities (University of Craiova-Romania / UCV, Tor Vergata University of Rome-Italy), socio-medical stakeholders (General Directorate of Social Assistance and Children Protection, Department for Disabled People Protection Dolj-Romania / DGASPC), NGOs (Latvia and Poland). To develop and design the Project’s workshops concept, the project partners in their countries had to conduct needs analyzes to be able to adequately address the actual needs of learners and trainers within the field of interdisciplinary approach and patients/family carers participation in multidisciplinary team care of impaired people.

These surveys addressed to the personal and professional issues and difficulties for individuals, families, professional trainers or carers that arise in their life and work with adults or children affected by disabilities. The surveys data have been collected through local interviews, in the Project participant country Romania, with the help of a questionnaire [3] jointly created by Romanian partners. The objectives in designing M-CARE needs questionnaire have been: to maximize the proportion of subjects answering our questionnaire—that is, the response rate; to obtain accurate relevant information for M-CARE needs survey.

A number of issues to be considered were included: research questions to be answered, target audience, resources, content and wording, question placement, sequence, layout, length, response format. Representatives from participant organizations decided to use independent variables that stand alone and aren't changed by the other variables they were trying to measure, based on the fact that in a research study, the independent variable defines a principal focus of research interest. It is the consequent variable that is presumably affected by one or more independent variables that are either manipulated by the researcher or observed by the researcher and regarded as antecedent conditions that determine the value of the dependent variable; the dependent variable is the participant's response [5].

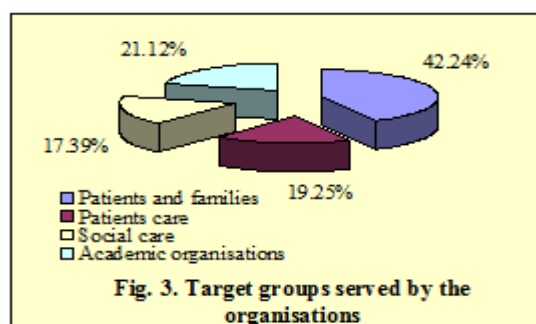
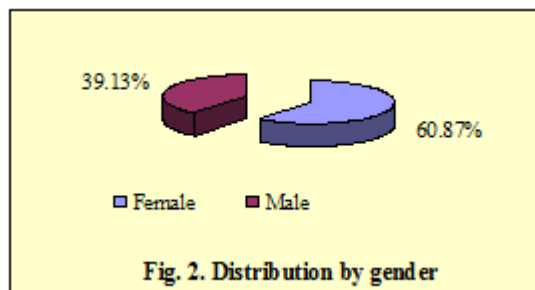
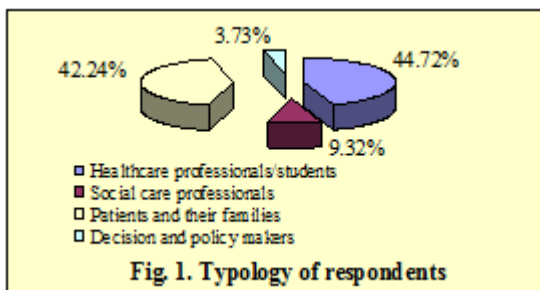
The main parts of the questionnaire were discussed during Romanian partners meeting, where representatives of partners' organizations and experts took part. It was very important to develop framework of the questionnaire during the meeting, because in such case all partners had possibility to contribute to it with their experience and develop common idea for the research. It was agreed that questionnaire should contain following parts: (1) Introduction (demographic information about respondents); (2) Personal knowledge about medical or social medical issues, legislation and

standards of care; (3) Training/educational needs on mutual care approaches - information concerning training on care standards in which respondents took part, availability of such courses and the need for trainings on different topics of care process (see the Annex).

The methods used were document analysis and statistical analysis of a quantitative survey. Romanian partners have sent questionnaires to different respondents, using a mix of methods (face to face interviews, or distribution through electronic format), but the most effective was the distribution of the questionnaires during some special events (seminars, workshops, conferences, etc.) or sending to the people or organizations with which project partners were cooperating. The chosen interviewed people were patients, parents/relatives caregivers, or trainers/medical specialists experienced in working with disability affected people.

Results

More than 260 questionnaires were sent to different organizations and respondents, while 161 (more than half, 61.92%) of them were returned. Questioning was taking place during 9 months: from May 2014 to January 2015. Partners were responsible for collection of the questionnaires from respondents and imputing their answers to the Excel table. The methods used were document analysis and statistical analysis of a quantitative survey.



Personal knowledge about medical or social medical issues, legislation and standards of care (SOC)

The next set of questions was focusing on respondents' knowledge of different care issues. The majority of the respondents (79/161) only to some extent are familiar with disability legislation in their country, while 41.6% (67/161) of them have indicated that they are completely unfamiliar with this issue. Regarding disability health policy, 109/161 (67.7%) respondents declared that are not informed about it.

The same tendencies have been noticed in answers to the question if respondents are familiar with disability networks or patients registries in their country: a small percent of the respondents knows very little about these topics (17.4%, 28/161), and 99 (61.5%) of the respondents were completely ignorant with these information channels.

Table 1. Being familiar with disability care issues at National level

		4 - Yes, completely	3 - Yes, to a great extent	2 - Yes, to some extent	1 - Not at all
a.	Are you familiar with the disability legislation in your country?	3	12	79	67
b.	Are you familiar with disability health policy in your country (National programmes, plans etc?)	7	11	34	109
c.	Are you familiar with your disability networks or patients registries (National registry on different diseases) in your country?	10	24	28	99

Almost the same situation has been noticed speaking about the interdisciplinary or multidisciplinary approach on diagnosis and management of disability.

It should be noticed, that even 52.8 percent (85/161) of Romanians have no idea about the framework of coordinated multidisciplinary team in disorder/disability management, 64/161 were to some extent familiar with this topic.

A high majority of Romanian respondents were uninformed about psychosocial management and proactive intervention to help families and patients to avoid the social problems and social isolation (125/161, 77.6%), and the use or availability of assistive devices (75.8%, 122/161).

Table 2. Being familiar with disability multidisciplinary/interdisciplinary management

		4 - Yes, completely	3 - Yes, to a great extent	2 - Yes, to some extent	1 - Not at all
a.	Are you familiar with the framework of coordinated multidisciplinary team in disorder/disability management?	5	7	64	85
b.	Are you familiar with Rehabilitation management (Stretching, Positioning, Splinting, Orthoses, Exercise/activity, Seating, Standing devices, Adaptive equipment, Assistive technology, Manual/motorized wheelchairs)?	6	24	122	9
c.	Are you familiar with Psychosocial management (Intervention for learning, behavior and coping, Psychotherapy, Pharmacological, Social, Educational, Supportive care)?	5	12	19	125

Discussions

The questionnaire was designed to focus on the personal needs, experience and

skills of interviewed people when facing and/or addressing difficult and conflictive situations regarding communication,

knowledge of medical decisions/treatment alternatives or caring process issues with the patients or other specialists they work with (learners, colleagues). The development of tools that enable the assessment of family carers' needs is a step towards recognizing family as partners in care. These tools will enable family caregivers to identify as such and to express their needs, and will empower them. It will be easier for them to access information and advice, and to make alternative or contingency plans if they are not willing or are unable to continue to provide care.

One limitation of our study may be sample size. The consultation document points out that our M-CARE Grundtvig Project wants to serve as a platform for all stakeholders in the disability care field to participate on our joint objectives.

By this research work we found that there are still unmet education and training needs: (1) For people with disabilities: the need of empowering people living with disability (or disadvantaged population group) in terms of knowledge on their rights, policy, inclusion and full participation in society, adaptability and employability skills, raising the knowledge on their diseases, career planning, employment and self-employment abilities, and how to access information/services/technology and employment resources, so that they can enjoy their full rights and benefit fully from participating in society and in EU economy; (2) For researchers and education/training providers: the need of exploring a plurality of disability definitions to design, disseminate and translate a multidisciplinary knowledge framework on disability (re)habilitation, to ensure a raised relevance of this subject in professionals' training and disability policy's coherence, and to enhance individual potential and equip graduates with the knowledge and multidisciplinary transferable competences; (3) For health and social professional caregivers (medical

practitioners, nurses, physical therapists, social workers, psychologists ..): the need of continuing education in assessing persons with disabilities, accommodations, evolving technology, and laws governing disability issues.

Conclusions

The conclusions of the applied survey offer different aspects concerning the needs for medical/caring education in the Romanian disability educational field and point to a possibility of a gap between the EU policy and programs and the general public awareness on disabling diseases. The development of tools that enable the assessment of family carers' needs is a step towards recognizing family carers as partners in care. These tools will enable family carers, or patients, to identify as such and to express their needs, and will empower them. It will be easier for them to access information and advice, and to make alternative or contingency plans if they are not willing or are unable to continue to provide care. This assessment will also promote greater collaboration between service providers and family carers, and will inform the development of family caregivers training programs.

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Annex

QUESTIONNAIRE: Needs analysis on participants to M-CARE Project (patients or their carers/families)

1st part.

Introduction

1.1. You are (check only one answer)

- Patient
- Family member/carer
- Professional carer (health/social)

1.2. You are

- Female Male

1.3. You are aged

- 15-17 18-30 31-40 41-50 51-60 61+

1.4. Main target group served by your organisation

- Patients and families
- Patients care (hospitals, rehabilitation clinics, other medical practices)
- Social care (public or private services)
- Academic organizations
- None of the above
-

2nd part.

Personal knowledge about medical or social medical issues, legislation and standards of care

2.1. National level (please rate each question).

		4 - Yes, completely	3 - Yes, to a great extent	2 - Yes, to some extent	1 - Not at all
a.	Are you familiar with the disability legislation in your country?				
b.	Are you familiar with disability health policy in your country (National programmes, plans etc?)				
c.	Are you familiar with your disability networks or patients registries (National registry on different diseases) in your country?				

2.2. Do you know of any statistical publication in your country on disability themes?

- Yes No

2.3. If Yes, do you personally use this publication in your work/activities?

- Yes No

2.4. European and International levels (please rate each question)

		4 - Yes, completely	3 - Yes, to a great extent	2 - Yes, to some extent	1 - Not at all
a.	Are you familiar with the European legislation on disability?				
b.	Are you familiar with the Multidisciplinary or Interdisciplinary Approach on diagnosis and management of different disorders/disabilities?				
c.	Are you familiar with the EU institutions/ organisations dealing with care guidelines on different disorders/disabilities?				
d.	Are you familiar with European networks or global patients registries of different disorders/disabilities?				
e.	Are you familiar with European research/care projects?				

2.5. Personal knowledge about multidisciplinary/interdisciplinary management:

		4 - Yes, completely	3 - Yes, to a great extent	2 - Yes, to some extent	1 - Not at all

a.	Are you familiar with the framework of coordinated multidisciplinary team in disorder/disability management?				
b.	Are you familiar with Rehabilitation management (Stretching, Positioning, Splinting, Orthoses, Exercise/activity, Seating, Standing devices, Adaptive equipment, Assistive technology, Manual/motorized wheelchairs)?				
c.	Are you familiar with Psychosocial management (Intervention for learning, behavior and coping, Psychotherapy, Pharmacological, Social, Educational, Supportive care)?				

*3rd part.***Personal knowledge about Care topics available educational/training sessions****3.1. Have you participated in any training on medical/social care themes?** Yes No**3.2. If yes, how many training sessions did you get on care themes during last 5 years:** 1 2 3/more**3.3. Is the offer of courses on care issues in your country sufficient?** Yes No No opinion**3.4. Is the information about available adult education courses on care themes easy accessible?** Yes, I know where to find such information. No, it is very difficult to find. Yes, but it might be more efficient. No, I can not find any information. I have never searched for such information. I have no opinion.**3.5. Please circle a number on each line from the scale that best describe your level of satisfaction with each form of care topics available to you:**

Education/training sessions		Not required	Not satisfied	Slightly satisfied	Very satisfied
a.	Location of education sessions				
b.	Education sessions about your specific disorder/disability for you				
c.	Education sessions about your specific disorder/disability for your carer				
d.	Education sessions about medical treatments				
e.	Community awareness about disability				
f.	Education about symptoms management (ex: exercise, nutrition, physical therapy, rehabilitation)				
g.	Online educational resources				

3.6. Please circle a number on each line from the scale that best describe your level of satisfaction with each type of information topics available to you:

Information – printed or online		Not required	Not satisfied	Slightly satisfied	Very satisfied
a.	Up-to-date information about current research in your disability field				
b.	What services the local organization of your disability provide				
c.	What services you are eligible for from local government/council services				
d.	What financial assistance you are eligible for				
e.	Information about welfare and benefits entitlements				

THE EFFECTIVENESS OF AQUATIC PHYSICAL THERAPY IN STROKE ADULT: SYSTEMATIC REVIEW

Ilona ILINCA, Eugenia ROSULESCU

*University of Craiova, Faculty of Physical Education and Sport, Craiova
Neuromotor Adults Rehabilitation Center St. Maria, Craiova*

Abstract.

Introduction: Hydrotherapy offers an extra spectrum of possibilities in the rehabilitation of complex neurological disability due to stroke. The present study aimed to search scientific literature regarding effectiveness of aquatic physical therapy intervention on functioning and disability after stroke.

Material and Methods: A search was made in Medline (Pubmed), and PEDro for the period 2005 to May 2015. Only randomized controlled trials (RCTs) on aquatic interventions in patients with diagnosed stroke were included.

Results: Based on the review of research databases, 10 papers (studies) were chosen for further analysis. The greatest number of various aquatic activities was used in experimental programs. Taking into account all analyzed studies, we can see that Halliwick Therapy, balance board underwater exercises, gait training and underwater Treadmill were the most common form of activities and exercise in the water. The aquatic exercise programs used in the analyzed studies were aimed at increasing the postural balance, gait patterns and activities of daily living (ADL) in stroke patients. The analysis of the obtained results in the studies indicated that the applied aquatic therapy had various effects in terms of statistically significant improvement in measured outcomes in stroke patients.

Conclusions: The analysis of the aquatic interventions shows that they can have positive effects on improving the balance, gait and functional activities of chronic stroke patients. Although a large part of the researchers demonstrated results with the practice of hydrotherapy, present clinical practice should be improved through the design of better and larger studies. There is a clear need for well-designed studies to assess the influence of aquatic physical therapy for patients after stroke.

Key words: *aquatic exercise, influence, stroke*

Introduction

Stroke or cerebrovascular accident (CVA) represents nowadays one of the principal causes of morbidity and mortality in adults and the leading cause of disability in the developed world. Stroke incidence remains high in the European Union being approximately one million per year. It increases with age and is more common in males than in females (incidence ratio 1.3/1).

The World Health Organization (WHO) defines stroke as 'rapidly developing clinical signs of focal disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin' [1].

It is considered one of the leading causes of motor impairment, especially among the elderly patients. The stroke sufferer can experience several neurological deficits, like hemiparesis, communication disorders, cognitive deficits or disorders in visuospatial perception, depending on the

locality and severity of damage to the brain tissue.

These impairments have an important impact in patient's life by restricting their ability to perform activities of daily living such as dressing, eating, driving, bathing cooking and housekeeping. After completing rehabilitation program, approximately 50%-60% of stroke suffers still experience some degree of motor impairment, and approximately 50% are at least partly dependent in basic daily activities. [2].

Physical therapy intervention plays a central role in managing the cerebrovascular accident and can help patients to overcome the limitations they experience; it focuses on function, movement, and optimal use of the patient's potential.

Hydrotherapy offers an extra spectrum of possibilities in the rehabilitation of complex neurological disability due to stroke. Hydrotherapy includes physical exercises and mobilizations performed while the body is *immersed*, the patients

benefiting from the complex action of mechanical, thermal and chemical water factors. In neurological rehabilitation the aquatic environment can be used to improve the skills which the patients aren't able to safely perform on land, thus potentially speeding rehabilitation.

The present study aimed to search scientific literature regarding effectiveness of aquatic physical therapy intervention on functioning and disability after stroke.

Methods.

Literature searches

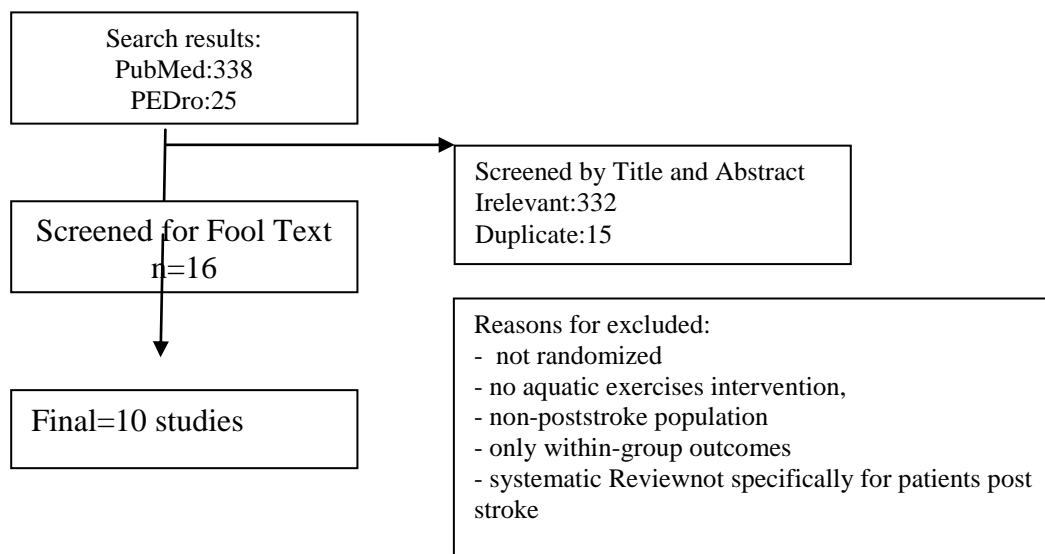
Relevant publications were identified by searching the electronic databases Medline (Medline was searched using Pubmed) and PEDro (Physiotherapy Evidence Database) up to 1 May 2015.

Inclusion criteria

Studies were included if they met the following inclusion criteria: The studies

were conducted in the period between 2005 and 2015, participants had to be patients with diagnosed stroke (chronic stroke > 6 months after onset) aged 18 and older; the experimental intervention should have been a longitudinal study with an aquatic exercise programme; the outcomes were measured post intervention and belonged to the domain of physical therapy and the studies should have been published in English.

This review does not address studies relating to balneotherapy, aqua-fitness or other water based interventions that do not require a pool. The search was done by employing keywords: "stroke" combined with hydrotherapy, aquatic physical therapy, aquatic exercise and water pool therapy. The titles of the research, the abstracts and the full texts were read and analyzed by two independent reviewers.



Results and discussion

According to the selected keywords, the initial study involved 363 papers. Out of 363 papers, 15 were eliminated because those were the papers repeated in the search engine results, according to the chosen keywords. 332 were eliminated because the subjects were not individuals with stroke or they did not present the desired association between hydrotherapy (aquatic physical therapy) and the stroke. These studies addressed local application techniques (without immersion in the pool) and they were not experimental. Three papers were eliminated because they were review papers. Two papers were eliminated because the research was not a longitudinal study. There were 10 articles that fulfilled the inclusion criteria. The characteristics and classifications of these studies are included in this review and presented in chart 1. All studies presented specified eligibility criteria, intention to treat, and most reported primary outcome measurements, thus providing better quality studies.

The final number of the paper which satisfied the criteria was 10 papers. The selected papers were further analyzed. The results of the analysis of 10 studies that met the established criteria are presented in Tables 1 and Table 2.

Table 1. Summary of Studies

Authors , years	Design	Participantis,n
Kim et al. (2015)	RCT	20(E=10, C=10)
Furnary et al. (2014)	RCT, single blinded	40 (E=20,C=20)
Tripp et al.(2014)	RCT	30(E=14, C=16)
Park et al.(2014)	RCT	22(E=11, C=11)
Jung et al.(2014)	RCT	30(E=15, C=15)
Han et al.(2013)	Cohort	62(E=31, C=31)
Park et al.(2011)	RCT	44 (E=22, C=22)
Park et al.(2011)	RCT	46 (E=23, C=23)
Lee et al. (2010)	RCT, Single-blinded	34 (E=17, C=17)
Noh et al.(2008)	RCT, single blinded	25(E=13, C=12)

Table 2. Review of outcomes and results

Authors , years	Intervention	Control	Frequency/Duration	Outcomes
Kim et al. (2015)	lower extremity patterns in an aquatic environment	lower extremity patterns on the ground	5 x/wk, 6 weeks, 30 min	BBS, TUGT,FRT, OLST
Furnary et al. (2014)	Halliwick Therapy +Ai Chi (+land)	ROM, UE + LE strengthening, Postural Control, Gait Training	6x/wk, 8 weeks, 1 hour	Cadence
Tripp et al.(2014)	HalliwickTherapy+conv entional physiotherapeutic treatment	Conventional physiotherapeutic treatment	3x/wk, 2 weeks, 45 min	BBS, functional gait and basic functional mobility
Park et al.(2014)	Underwater Treadmill	Postural control, Gait and balance training, functional electrical stimulation, OT	2x/wk, 4 weeks, 30 mins	Static and dynamic balance
Jung et al.(2014)	Aquatic Obstacle Training	Land Obstacle Training	3x/wk, 12 weeks, 40 min	Static balance, eyes closed (force plate)
Han et al.(2013)	Aquatic Proprioceptive Exercise	Land Proprioceptive Exercise	3x/wk, 6 weeks, 40 min	Joint position sense, sway area, BBC
Park et al.(2011)	Aquatic exercises	Land exercises: Strengthening, Gait training, Balance, Stretching	6x/wk, 6 weeks, 35 mins	JPS (Joint position sense) and POMA (performance - oriented mobility assessment)
Park et al.(2011)	Aquatic exercises	Land exercises	6x/wk, 6 weeks, 35 mins	Balance (parameters of sway of the centre of pressure)
Lee et al. (2010)	10 types of tasks-oriented training underwater	10 types of tasks-oriented training - land	3x/wk ,12 weeks, 50 mins	Static Balance(ML, AP sway)
Noh et	Ai Chi and Halliwick	balance and weight-	3x/wk, 8 weeks, 1 hour	BBS, weight-

al.(2008)		bearing exercises		bearing ability, muscle strength and gait.
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Subject characteristics

A total of 176 participants with cerebrovascular accident were included in this study. The largest number of examinees in the study was 62. [3]. In other studies, the number of subjects did not exceed 30, while the lowest number of examinees in the survey was 20 [4].

Intervention strategies

Duration of aquatic intervention in the analyzed articles was frequently between 6 and 12 weeks, which can be considered an optimal time needed for adaptation in order to achieve certain changes in the body and improves outcomes and achieves physical therapy goals. Minimum duration of each hydrotherapy session was 30-35 minutes in 4 experimental programs [5,6,4], while maximum duration was 1 hour. [7,8]. In three researches, duration of each aquatic session was 40-45 minutes [9,3,1]. In the research done by Lee et al. (2010) duration of an individual training was 50.[10].

Weekly frequency of aquatic physical therapy was between twice a week to six times a week. Three times a week frequency of hydrotherapy was in five studies [10,7,3,11,9]. In one study, the frequency of exercise was five times a week [4].

Kim et al. (2015) used aquatic therapy which implied proprioceptive neuromuscular facilitation (PNF) patterns in experimental group and lower extremity patterns on the ground in a control group. Furnary et al. (2014) used for experimental group hydrokinesytherapy (Halliwick method and Ai Chi) associated a conventional physical therapy and for control group only a conventional physical therapy (ROM, UE + LE strengthening, Postural Control, Gait Training).

Tripp et al.(2014) used to experimental group aquatic physiotherapy method (Halliwick-Therapy) and conventional physiotherapeutic treatment and for control group only a conventional physiotherapeutic treatment.

Park et al.(2014) conducted a randomized controlled trial on stroke and aquatic therapy. Both groups received general rehabilitation program (Postural control, Gait and balance training, FES, OT). The underwater treadmill group received additional underwater gait training.

Jung et al.(2014) evaluated the effects of water and land-based obstacle training on static balance of chronic stroke patients. The subjects were randomized into 2 different interventions: aquatic obstacle training for aqua group and land obstacle training for land group.

Han et al.(2013) compared groups in aquatic proprioceptive exercise and a control group (land proprioceptive exercise) and verified clinical benefits in both intervention groups.

Park et al published two prospective randomized studies during 2011 and compared the effect of land exercises and aquatic exercises on chronic stroke patients.

Lee et al. (2010) proposed 10 types of tasks- oriented training underwater for experimental group and the same balance tasks on the ground in a control group.

Kim et al. (2015) used aquatic therapy which implied Ai Chi and Halliwick methods, which focused on balance and weight-bearing exercises in experimental group and gym exercises in a control group.

The greatest number of various aquatic activities was used in experimental programs. Taking into account all analyzed studies, we can see that Halliwick Therapy, balance board underwater exercises, gait training, underwater Treadmill were the most common form of activities and exercise in the water.

Result measurements

The aquatic exercise programs used in the analyzed studies were aimed at increasing the postural balance, gait patterns and

activities of daily living (ADL) in stroke patients.

Different outcomes were used accordingly. Knowing all outcome measures analyzed in the examined researches, the test which was used most often was: Berg Balance Scale (BBS). There was a statistically significant improvement in balance and ADL in stroke patients after aquatic proprioceptive neuromuscular facilitation patterns than ground-based training. [4]. Tripp et al.(2014) found that subjects in the Halliwick-Therapy group attained significant improvement of the Berg Balance Scale and the functional gait ability compared to the control group.

The results found by Han et al.(2013) suggest that aquatic exercise is more effective than land exercise at improving the joint position sense and balance (BBC). Noh et al. (2008) also found improvement in postural balance efficiency using BBC in the aquatic therapy group, compared with the conventional therapy group.

In other articles the researchers used different tools (Good balance system, force plate, Biometrics motion analysis System) to evaluate the results of studies. Jung et al.(2014) suggests that the mean velocities of mediolateral (ML) and anteroposterior (AP), and sway area with the eyes closed in the aqua group was significantly better than the land group. Lee et al. (2010) found significant improvements in anteroposterior and mediolateral velocity with eyes open and eyes closed in the water training group.

Using the Biometrics motion analysis System, Park et al.(2011), suggests that aquatic exercises is more effective than land exercises at improving the JPS (Joint position sense) and clinical functions.

In the study by Park et al.(2014), underwater treadmill gait training was not more effective at improving the balance ability of stroke patients than land-based training.

The analysis of the obtained results in the studies indicated that the applied aquatic therapy had various effects in terms of

statistically significant improvement in measured outcomes in stroke patients.

Conclusion

The analysis of the aquatic interventions shows that they can have positive effects on improving the balance, gait and functional activities of chronic stroke patients. In people following stroke, a variety of aquatic activities and exercises can be used.

Aquatic therapy may be a useful and safe alternative for people after stroke and it can be used as an adjunct to land-based intervention especially for individuals with fear of falling.

A small number of studies require further research on aquatic physical therapy. Although a large part of the researchers demonstrated results with the practice of hydrotherapy, present clinical practice should be improved through the design of better and larger studies. There is a clear need for well-designed studies to assess the influence of aquatic physical therapy for patients after stroke.

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THE DEVELOPMENT OF SPASTIC UPPER LIMB FUNCTIONALITY FOR THE CHILDREN WITH CEREBRAL PALSY

Stănoiu Cosmina, Roşulescu Eugenia, Dincă Diana Elena, Mihaela Zavaleanu

1. DGASPC Dolj, Romania

2. University of Craiova, Romania

Introduction: The analysis of motor characteristics of the upper limb is essential in cerebral palsy (CP), but only few studies approach the upper limb functional development in this group of children. Upper limb functionality for the spastic child is modified in different ways.

Material and Methods: We have investigated a group of 72 children diagnosed with spastic CP who were participating in programs of rehabilitation held in specialized centres of DGASPC Dolj.

Results: The functional evaluation of manual ability in children present in the study was based on the manual ability classification system resulted in 28 (39%) and 14 (19%) level I and II children whose manual ability allows them to easily manipulate objects or to fulfill the activities at a low speed. 18 (25%) children need help in fulfilling activities and also find it difficult to manipulate objects (MACS level III) whereas 9 (13%) and 3 (4%) children were classified as level IV and level V which means they suffer from a severely limited ability of manipulating objects. Considering the clinical form of CP, the ABILHAND Scale score was the highest for the diplegic CP subjects with a 40,04 average (CI95%-38-41) and a 41 median (25-75%). The subjects suffering from hemiplegic spastic CP presented a higher ABILHAND score (average 34,96(21-24): CI95%, 26-41) than the ones suffering from spastic quadriplegia CP (average 19,28, CI 59%, 12-28).

Conclusions: An objective evaluation of the hand's function is required in order to select the suitable rehabilitation program. Results provide a better understanding of the relationship between functionality or activity limitations and provide credibility for the usage of these classification systems and scales to develop therapeutically planning and to evaluate the interventions results.

Introduction

The analysis of motor characteristics of the upper limb is essential in cerebral palsy (CP), but only few studies approach the upper limb functional development in this group of children. Upper limb functionality for the spastic child is modified in different ways. Studies rapport hand dysfunction for almost 50% of CP cases [1].

The origins of those dysfunctions have multiple causes, first of all is the spasticity, or the lack of central coordination of posture, arm and hand mobility but also visual impairment or other sensorial information play an important role.

Spasticity can appear in any muscle of upper limb if it exist specific patterns of central motor neuron lesions.

For example, if we talk about the upper limb specific spastic pattern we talk about:

adduction with internal rotation of the shoulder, flexion of elbow and wrist, pronation of forearm and hand, flexion of fingers and adduction of thumb.

The limited motor behaviour expressed by biomechanics constrains at the musculoskeletal system are due to the smaller development speed of the muscle comparing with the bones increase in length, so we can encounter muscular imbalances.

The well-observed effects of spasticity on skeletal muscle in patients with CP include decreased longitudinal growth of the muscle fiber length, decreased muscle volume, change in motor unit size, and altered fiber type distribution and neuromotor junction type [2,3].

The severity of upper limb involvement in children with hemiplegic CP varies from

mild clumsiness in fine motor control to fixed muscle contractures that limit active extension of the elbow, wrist or fingers, and supination of the forearm [4].

The clinical characteristics of hand dysfunctions in the CP include: difficulties in the extension of upper limb, forearm in supine and finger extension, inability to grasp objects, difficulty in fine motor task execution (writing) [5]

Children with hemiplegic CP often have difficulty with the timing of reaching movements, difficulty with grasping and with the coordination of fingertip forces during precision grasp [6].

Even more, tactile sensitivity is impaired in 50% of children with hemiplegic and mirror movements are common and present a different severity [7].

All of those deficiencies have a significant impact on neuromotor development, special for voluntary mobility, and on motor learning patterns by the deprivation of experience. The child exploration capacity and the capacity of learning notions about the environment are predetermine by the delayed motor acquisition or aberrant development with a negative impact on life quality.

In the late 15 years a special attention was given to the control of grip strength when handling objects in children with PC. The excessive flexion of fist and elbow in the same moment with forearm pronation won't allow handling the objects. Releasing an object from the hand is usually affected by slow fist flexion being caused by the inability to do the extension of the fingers and wrist in the same time. The movement is limited due to the decrease of the extensor muscle strength, increase muscle tone and contraction of flexor muscles.

Not long ago it was provided exaggerated importance to limb muscle spasticity in motor neuron lesion from PC without appreciate enough the motor deficit of antagonistic muscles that go from mild weakness to complete paralysis in some cases [8].

Rather it is present a deficit of voluntary control linked to impairment of pyramidal tract than a true paralysis (pseudo paralysis). Their antagonists usually present a degree of spasticity and a good power (normal).

Proximal muscles (external rotator and shoulder abductor and elbow extensors) is affected by paralysis in a lower degree, but muscle groups predominantly affected are the extensor muscles (extensors of wrist and fingers, abductor and long extensor of the thumb) and especially the supinator muscles at distal level.

The rigidity is another important feature of motor disorder from cerebral palsy. In CP, the rigidity is usually associated with spasticity and athetosis in some extent, resulting the limitation of the range of motion and limitation of ADL.

In the PC motor pattern, the rigidity/stiffness is the result of simultaneous co-contraction of hyperactive flexors and extensors (flexor and extensor muscles are contracted continuously and simultaneously).

These simultaneous contractions inhibit the smooth movement of flexion and extension and decrease the speed of movement causing rigidity and consequently deformities with loss of fine motor skills in fingers [9].

Cerebral palsy affects in various degrees the gross and fine motor function. The result is reflected both in the neuromotor development, particularly on voluntary mobility and on the motor learning processes by the lack of experience. The deformation of the upper limb in the case of spastic cerebral palsy is the consequence of the imbalance of spastic and the paretic muscle, often those acts on unstable joints also. The neurologic injury will slow down the development of normal typical movement pattern, often as a result of the adoption of asymmetric positions and limited range of motion.

The deformities can be classified as postural (resulting from increased/decreased of muscle tone) or positional

being a consequence of frequent adoption of certain position.

Muscle and bone development is influenced in different ways by the postural and positional deformities, leading to muscles imbalances, joints and bones deformation, and frequently, with reduced bone mineral density for the children unable to work independent. [10].

Also different types of deformation are commonly found in PC children due to the type of PC and to the degree of spasticity. Achieving independence in self-care and mobility has a great variation between individuals with PC [11].

Despite the fact that the lesion is static (doesn't progressing over the time), the resulting dysfunctions from muscular imbalance combined with secondary characteristics of cerebral palsy may contribute to worsening disability as the child grows. [12]. Wrist flexion is a characteristic posture and ulnar deviation associated with flexion of the thumb in the palm change the grasp and the release function.

A negative impact in the development of bimanual abilities is due to the apparition of movements in the mirror - uncontrolled and unconscious, when both hands are engaged in different activities (eg. a hand stabilizes one object, while the other hand act on the object).

The spasticity is a positive diagnosis sign for the central motor neuron syndrome and is characterized by a velocity-dependent increase in tonic stretch reflexes (muscle tone) with increased tendon reflexes, observed at the extent of muscle. [13].

Spasticity is defined by five characteristics:

1. it is selective, predominates in flexor and adductors muscles and is responsible for the deformation characteristic of the upper limb in flexion-pronation. The rule is that is less obvious at the shoulder and elbow and more severe in the distal part of the upper limb. At the shoulder, the adductor and internal rotator muscles and at elbow level concern the flexor muscles,

predominantly the brachial and biceps muscle, and possibly the brachioradialis.

Muscles attached to medial epicondyle are often spastic and they are responsible for both pronation and flexion deformity of the elbow.

Wrist flexors, especially the flexor carpi ulnaris is the most frequently affected by the spasticity in the upper limb and causes deformation feature in hiperflexion and ulnar deviation of the wrist. If finger flexors are also affected by spasticity, they also contribute to this deformation.

2. it is elastic – the stretching movements of the muscles involved determine some resistance which increases with the amount of force applied and correlate with the degree of spasticity. In contrast to the plastic contraction, the joint returns to the initial position as soon as the applied force is stopped. When the resistance force is maintained long enough, spasticity end - know like clasp-knife response.

In time, the magnitude of the extent increase in muscle, reflex contraction diminish in extensor muscles, phenomenon due to Golgi receptors, due to activation of secondary fusul afferences, due to inhibitory effect of flexion reflex afferents (recently was concluded that flexion reflex is absent in upper limb) the degree of resistance to stretch can be quantified by Bohannon modified Ashworth scale.

3. reflex activity fails to rest unlike other causes of muscles hypertonie and is exaggerated in the case of voluntary movement, emotion, fatigue and pain.

4. osteotendinous reflexes are exaggerated, short, diffuse and polikinetic. Clonus is rare in the upper limbs.

5. may be associated synkinesis that are involuntary movements that can be performed simultaneously with some voluntary movement of unaffected muscles. An example is the voluntary abduction of the shoulder to “active” extension movement of hand and abduction of finger.

Spasticity not only inhibits the alternative movement of the extremities, also the

support activity of antigravity muscle causing a variety of deformities in different parts of the body.

In the upper limb the spasticity affect the following muscles:

In the upper limb spasticity affect the following muscles: latissimus dorsi, pectoralis major, teres major, biceps, brachioradialis, brachialis, pronator ters si quadrates, flexor carpi radialis sau ulnaris, flexor digitorum profundus și superficialis, adductor pollicis

Although the mechanism is unknown, often muscles shortening (due to inactivity) cause muscle spasticity resulting in fixed deformities and functional complications. The deformities often lead to dislocation and wrist flexion, elbow flexion and occur shoulder adduction due muscle strength imbalance rather than spasticity [14].

Material and methods

We have investigated a group of 72 children diagnosed with spastic CP who

were participating in programs of rehabilitation held in specialised centres of DGASPC Dolj.

The 72 children diagnosed with spastic CP were divided considering topography as follows: 30 cases of hemiplegia (41,6%), 22 cases of spastic paraparesis (29,2%) and 21 cases of spastic quadriplegia (29,2%).

The average age of the children with CP participating in the study was 10.59 years (CI 95% 9.63-11.55), within the limits of 6.7 years old and 14.5. Most of them fit in the 11-12 years old age group (25 cases-34%), 22 cases (31%) in the 7-8 years old group, only 9 cases (13%) in the 13-14 years old group and 16 cases (22%) had ages between 9 and 10 years old. For the group participating in the study the parameters we registered refer to: clinical aspects (age, the anatomical distribution of the motor disorder) and functional aspects (Abilhand Kids and MACS).

Table 1. – Distribution based on spastic syndrome’s topography

SPASTIC TOPOGRAPHY		CP’S	Number (percentage) of subjects	
Hemiplegia	Right		16 (22.2%)	30 (41.6%)
	Left		14 (19.4%)	
Diplegia	21 (29.2%)			
Quadriplegia	21 (29.2%)			
TOTAL			72 (100%)	

Spastic syndrome was distributed as follows: 30 cases of hemiplegia (41.6%), 21 cases of diplegia (29.2%) and 21 cases of quadriplegia (29.2%). The functional evaluation of manual ability in children present in the study was based on the manual ability classification system resulted in 28 (39%) and 14 (19%) level I and II children whose manual ability allows them to easily manipulate objects or to fulfill the activities at a low speed. 18 (25%) children need help in fulfilling activities and also find it difficult to manipulate objects (MACS level III) whereas 9 (13%) and 3 (4%) children were classified as level IV and level V which means they suffer from a severely limited ability of manipulating objects.

The Manual Ability Classification Score (MACS) is a functional classification system that characterizes the extent to which an individual with CP, ages 4-18 years, has limited hand and arm motor function and describe the individual uses their hands to handle objects in daily activities. [15].

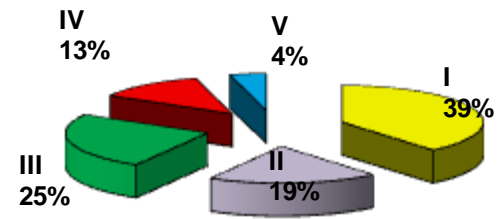
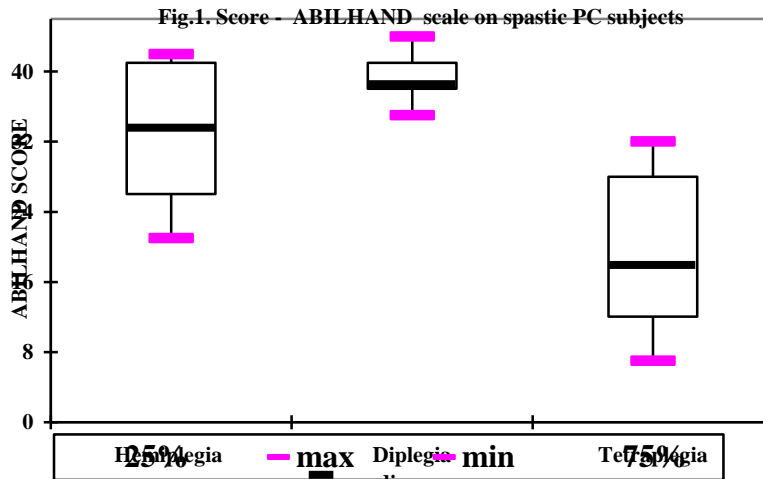


Fig.2. - Distribution of the MACS functional level in the studied group.

Tabel 2. Evaluation of manual ability in subjects suffering from spastic CP- ABILHAND Score according to CP topographic function:

SPASTIC CP	SPASTICITY TOPOGRAPHY	NUMBER (PERCENTAGE) OF SUBJECTS	ABILHAND SCORE		"T" STUDENT TEST
			Average (min-max)	Median (percentage 25-75%)	
72 (100%)	Hemiplegia (a)	30 (41.6%)	34.86 (21-42)	39 (26-41)	a-b: p<0.05
	Diplegia (b)	21 (29.2%)	40,04 (35-44)	41 (38-41)	b-c: p<0,001
	Quadriplegia (c)	21 (29.2%)	19.28 (7-32)	18 (12-28)	a-c: p<0,001

* ABILHAND Scale Score – min. 0, max. 46.

The functional evaluation of manual ability in children present in the study was accomplished using the ABILHAND Scale [16]. Considering the clinical form of CP, the ABILHAND Scale score was the highest for the diplegic CP subjects with a 40,04 average (CI95%-38-41) and a 41 median (25-75%).The subjects suffering from hemiplegic spastic CP presented a higher ABILHAND score (average 34,96(21-24): CI95%, 26-41) than the ones suffering from spastic quadriplegia CP (average 19,28, CI 59%, 12-28).

Further research is necessary to explore hand impairments problems on a larger study group, the aim be of providing guidelines for assessment and more focused planning of rehabilitation programs.

In conclusion, evaluating the affected limb in children suffering from CP is a complex activity which results in important information regarding rehabilitation strategies. These results lend support to previous studies showing that manual ability is an important part of functionality of the upper limb in CP.

Thereby, an objective evaluation of the hand's function is required in order to select the suitable

rehabilitation program. Results provide a better understanding of the relationship between functionality or activity limitations and provide credibility for the usage of these classification systems and scales to develop therapeutically planning and to evaluate the interventions results.

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