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Fighting exercises with partner, as a means of developing strength in students' upper limbs at the University of Bucharest

Exerciţiile de luptă cu partener, mijloc de dezvoltare a forţei trenului superior la studenţii Universităţii din Bucureşti

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Abstract

Background. Presently in the physical educational model in non-sport universities, motric qualities take a central part of interest, their upper degree of development influencing the basic fitness level and the knowledge process of specific theories.

The test of developing upper limb strength has remained almost the same as in the old SUVAD system. The exercise is very easy to perform and the dynamics of physical fitness progress recommends the effectiveness of this exercise also for the future. The practice of karate do Shotokan with its specific movements develops a complex system of motric application and also influences in a positive way the development of specific and basic motric qualities.

Aims. The direction of research in our case is aimed at the influence and improvement in motric qualities such as the development of strength in the upper limbs, with the help of martial arts for students of non-sport universities during physical educational classes, together of course with the improvement in technical and specific martial arts training – in our particular case – karate do Shotokan.

Methods. The training methods applied in this research were specific karate do Shotokan exercises with a partner. The subjects developed their activity according to the specific algorithmic training methods of this martial art style and they participated in two lessons per week. The group that was investigated included 15 boys and 5 girls, all students at the University of Bucharest for the last two university years.

The scientific methods used were: the experimental method, the method of measurement and testing, the statistics-mathematics method and the graphic representation method which allowed us to express the processing data and the results.

Results. The statistics presents the result of the experiment. By comparing the results of the initial and final tests, a better progress is registered in both groups at the end of the experiment.

Conclusions. The research confirms the hypothesis of a link between karate do Shotokan and the development of strength in the upper limbs for students from non-sport specific universities.

Key words: strength in upper limbs, exercises with partner, karate do Shotokan.

Rezumat

Premize. În cadrul componentelor modelului de educaţie fizică din învăţământul superior de neprofil, calităţile motrice ocupă un rol central, nivelul lor ridicat de dezvoltare influenţând pozitiv nivelul pregătirii fizice de bază şi procesele de asimilare a cunoştinţelor specifice. Proba de flotări din culcat frontal s-a menţinut printre testele folosite anterior în sistemul SUVAD ca metodă de apreciere a dezvoltării forţei la nivelul trenului superior, fără să sufere modificări în modelele de testare actuale. Uşurinţa executării, obiectivitatea aprecierii şi eficacitatea dezvoltării acestei calităţi o recomandă de asemenea şi pentru viitor. Practica karate Shotokan cu mijloacele sale specifice a dezvoltat un sistem complex de exerciţii specifice, în cazul nostru cele cu partener, care pot influenţa pozitiv dezvoltarea calităţilor motrice.

Obiective. Direcţia de cercetare în cadrul experimentului prezentat este orientată către influenţa exerciţiilor de luptă cu partener din karate Shotokan asupra dezvoltării forţei în membrele superioare, prin exerciţiile specifice acestei discipline sportive.

Metode. Metodele caracteristice sistemului de luptă din karate Shotokan folosite în cadrul experimentului au fost exerciţiile cu partener. Subiecţii şi-au desfăşurat activitatea conform algoritmilor specifici acestui stil de arte marţiale şi au participat la două lecţii săptămânale pe parcursul a patru semestre. Metodele ştiinţifice întrebuinţate au fost: metoda

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experimentală, metoda măsurării şi testării, metoda statistico-matematică şi metoda reprezentării grafice.

Rezultate. Metoda calculului statistic prezintă rezultatele experimentului. Comparând diferenţele mediilor grupei experimentale la băieţi şi fete la testările iniţiale şi finale, în urma aplicării algoritmilor specifici, se evidenţiază un progres sensibil mai bun la ambele grupe.

Concluzii. Acestea confirmă ipoteza cercetării, demonstrând că poate exista o influenţă semnificativă şi o legătură directă între mijloacele karate Shotokan şi dezvoltarea forţei în membrele superioare, la studenţii unei instituţii de învăţământ superior de neprofil sportiv, respectiv Universitatea din Bucureşti.

Cuvinte cheie: forţă în trenul superior, exerciţii cu partener, karate do Shotokan.

Introduction

As part of the modernizing program of the instructive-educational process and of working out new strategies for perfecting the evaluation system in applied higher education forms, within the practical work of physical education in faculties with non-sport specific profiles, the push-up sport event from face lying to the floor has been maintained among the tests that were previously used in the SUVAD system as an evaluation method of strength development in the upper body, without any changes in the existing testing models. The easy learning of the execution, technique, the objective evaluation system and the assessment of the performance obtained, the evolution of the physical training progress recommend it in the future as an efficient method of strength assessment in the upper body (Jinga & Pop, 2007).

Within the University of Bucharest, the assessment system also represents a stimulative means for students, being correlated with the specificity of the selected subject (Ganciu, 2008).

As a training method of optional physical education subjects in the University of Bucharest, karate do Shotokan is aimed at favorably influencing the dynamics of developing motric qualities within this institution of non-sport education forms (Lestaru, 2010).

There are data about the practice of karate do in non-sport Universities from abroad, especially in Japan, where karate do Shotokan has mainly spread in the Universities of Tokyo, Osaka, Kobe etc., in which it represents one of the main forms of the students' physical training (Masataka, 2010; Okazaki & Stricevic, 2003)

The value of the specific means of karate do Shotokan practiced by the students of these centers has caused training using karate-do to be adopted in some other countries all over the world such as: France, USA, Great Britain, Italy, Netherlands etc. (Groenewold, 2006; Habersetzer, 2003).

In the university of Bucharest, karate lessons represented a very attractive subject in the early 1990's; a great number of students chose and still choose to practice martial arts during physical education lessons.

The fighting exercises with partner in karate do Shotokan represent a traditional training method and they were used as part of our experiment as a means of developing strength in the upper body by exercises performed in contests and exercises in wich the partner influences directly the doer's action.

On the whole, according to several authors, we can say that the main characteristic of exercises that are specific to martial arts, particularly to the Shotokan style, is the dynamism with which these exercises are executed, for example the performance of some specific techniques, such as: punchings, blockings, projections, evasions, immobilizations, grippings and luxations, different forms of stepping and movements etc., all these being sometimes executed at a supermaximum level, thus determining a specific training of the basic motric qualities and of those that are determinant for the chosen fight style or for the one practiced in that institution (Amalinei, 2006; Deliu, 2008; Kanazawa, 2010).

Due to its specific features, practicing karate do Shotokan contributes to the formation of a complex system of applied utilitarian motric skills and influences in a positive way the improvement/development of basic and specific motric qualities.

Presently, we cannot talk about practicing a sport branch without a certain degree of strength development. In budo (martial arts), strength development in the upper body is needful in the techniques of projections, punching and kicking, as well as in applying the defense techniques that represent an important aspect of training.

As each technical method specific to karate do is performed under certain conditions, for example: number of repetitions, intensity, pauses between exercises or between series, it develops a certain motric quality in a higher or lower proportion. It is known that one cannot work precisely on just a motric quality, by practice the other qualities are influenced to a greater or smaller extent in variable percentages (Deliu, 2008).

Objectives

The problem of research in our case is represented by the influence and the improvement of motric qualities by means of martial arts in students from non-sport specific universities during physical education classes, along with the improvement of technical and physical specific training in the case of subjects who have chosen an optional sport discipline, in our case karate do Shotokan.

The work experience of the sport and physical culture teaching staff, along with the bibliographic study of the current issue have allowed during our experiment to choose the proper specific karate Shotokan exercises in which the muscles can apply force in the following situations: isometric contractions, without modifying the length of the fiber muscles (blocking tehniques, force positions, immobilization techniques, kata Sanchin, Hangetsu etc.), in positive muscular contractions (punching techniques, blocking techniques etc.), during negative muscular contractions (blocking techniques, esquives etc.) (Bompa, 2001; Deliu, 2008; Dragnea and Teodorescu, 2002).

The value of the specific means of martial arts and the choice of the best training methods for developing these motric qualities as a form of training with students represent a constant concern through self-experience and

the specificity of the discipline concerned, each teacher trying to improve the physical training performance of the students with whom they work and above all, to find the correct methods of registration, examination and the correct way of evaluating the achieved progress.

Hypothesis

We asume that if a physical education program of specific karate do Shotokan means is applied, we can obtain an improvement in the strength of upper limbs. Also, how strong the influence of these specific means is regarding the final indicators during the test for developing strength in the upper limbs will be investigated.

Materials and methods

This research was performed following the optimization of the educational process in the direction of developing the efficiency and quality of karate do Shotokan lessons through the application of a fundamental scientific system in harmony with the curriculum program and requiring optimal lessons. The subjects applied the activity according to the algorithmic syllabus specific for this martial art and they participated in 2 lessons per week.

We mention that according to the Helsinki Declaration, Amsterdam Protocol and Directive 86/609/EEC, the approval of the Ethics Commission of the Departement of Physical Education and Sport of the University of Bucharest regarding research on human subjects was obtained and also, the subjects' consent for their personal participation in the research.

Research protocol

The research was carried out in three stages:

Stage I - 01 - 15 October 2010

The subjects of the experiment were selected using a self-assessment survey which provided the database regarding the purpose of this research.

Stage II - 15 October 2010

The first specific testing of the experimental group.

Also, in this stage we established the program and the methodology of the karate do Shotokan lessons that were used for the research.

Stage III - 15 October 2010 - 25 May 2012

The teaching experiment was applied together with the final testing of physical exercise capacity.

a) *Period of the research*

The research was applied during 4 semesters of the academic years 2010-2011 and 2011-2012. The investigations were performed in the sport hall of the Faculty of Foreign Languages of the University of Bucharest.

b) *Subjects and groups*

The group that was investigated included 15 boys and 5 girls, 1st and 2nd year students of the University of Bucharest, aged between 18-21 years.

c) *Tests applied*

The assessment that provided the specific data regarding the quality and efficiency of the strategies applied was done using the control test.

For the testing of strength in upper limbs, the subject lies face down to the floor, pushing the body with hands and tips of the toes (for girls, the weight is distributed on hands and bent knees). From here, they execute flexion at 90 degrees and extension of the arms. The number of correct executions in 30 seconds will be recorded (Tudor, 2008).

d) *Statistical processing*

The statistical processing of data used the Microsoft Excel version 2003.

- Calculation (sums, the average difference, percentage calculation).
- Statistical interpretation of the results of students during testing for each analyzed issue (Gagea, 1999).

During the research, the students from the experimental group chose the karate do Shotokan discipline and they practiced specific fighting exercises with a partner. The time allocated for each lesson was 25-35 min and each lesson contained specific programs regarding this motric quality and included 4-5 exercises.

The final testing was done in June 2012, which assessed the level of development of this motric quality. Data systematization and processing during the experiment ended the research.

During our lesons, the effort in the training session was built up steadily according to the adaptation of the human body to the effort and to the specific technical level.

For developing strength in upper limbs, the following exercises with partner were used: see Table I (Lestaru, 2010).

Results

Table II and Fig. 1 show the results of the test of strength in upper limbs and also, the statistical and graphic interpretation of the specific data:

Table II

Comparative analysis of the values regarding the development of strength in push-up tests (boys and girls).

No.	Name of the test		Experimental group		t	p
			Initial test $\overline{X} \pm m$	Final test $\overline{X} \pm m$		
1	Push-ups (repetitions/ 30 sec.)	B	21.6±1.04	24.75±0.97	2.21	<0.05
		G	18±0.77	22±1.15	2.89	<0.05

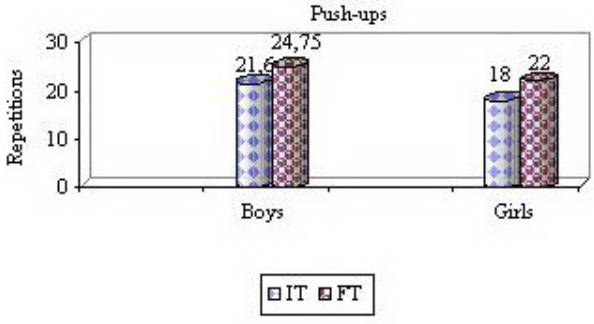

Fig. 1 – Dynamics of indicators for the initial and final push-up test (boys and girls).

Table I
Specific exercises with partner for developing strength in upper limbs.

The exercise	Picture	Dosage
Ex. 1 Both partners assume kiba dachi (fighting stance), holding each other's forearms. They move their arms forward and backwards, trying each time to increase the speed in choku zuki (straight forward punch);		- 3 series x 10 s.
Ex. 2 Tori (the attacker) from freestyle stance executes gyaku zuki (forward punch) in heavier conditions determined by a gummy band attached to the wrist and pulled back by Uke (the defender), during one technique or combination of techniques;		- Series of 30 s.
Ex. 3 The practice in Gohon Kumite (5 steps fight) of the favorite techniques, trying to overcome the partner's strength with static isometric contractions;	 	The contractions will not be longer than 7-10 sec. with pauses at the end of the exercise (1 minute to 3 minutes). The exercises will alternate left-right and upper and middle level.
Ex. 4 Face to face with partner in semifrontal stance: Tori attacks gyaku zuki, Uke executes kaisho uke (blocking technique with open hand) and counter attacks with gyaku zuki in which the first applies the same blocking and keeps repeating changing the roles;		- Series of 10 repetitions left-right, 3 reprises.
Ex. 5 From freestyle stance, the attacker executes the technique oi zuki (punching technique) and the defender taking simultaneously one step back applies with the forward forearm any of the following defense techniques: age uke, soto ude uke or te nagashi uke. In return, the defender assumes the role of the attacker and so on;		- Executed at maximum speed, 10 times right and the same for the left side, 1-3 reprises.

Ex. 6
Competition: who executes more direct punching techniques in series with high speed at the sand bag (oi tsuki – gyaku zuki) in 10 or 20 sec.

- Series of a maximum number of punching techniques in 10-20 s.

Ex. 7
From zenkutsu dachi stance with left foot forward, Tori executes gyaku zuki aiming the partner's abdominal area in slow motion but increasing gradually the muscle contraction of his attacking arm. Uke tries to resist by pushing forward;

- Alternative series of 5-10 techniques while steadily increasing the muscular contractions, 5-7 s.

Ex. 8
High repetition series of ippon kumite (fight at one step sparring) or sanbon kumite (fight at three steps sparring) with preferred techniques, with maximum speed and 35-40% loading and with a long enough pause for recuperation between series;

- The executions will be applied on the left-right side and on high and middle level.

Ex. 9
Facing the partner, the attacker from freestyle stance executes successive attacks aiming the middle area of his partner with maximum speed, in semicontact system with punching techniques. The defender keeps Shizentai (the formal stance);

- 5-10 techniques executed in series of 30 s.

Ex. 10
The partners are facing each other in freestyle stance. Tori (the attacker) executes freely one fighting technique with hands or feet toward his partner. Uke (the defender) reacts with the proper defending technique in high speed, trying to surpass the speed of the attacker. There are series of 10 repetitions, followed by a rest pause long enough for a full recuperation between series.

Series of 10 repetitions.
The pauses are long enough to allow complete recuperation.

Discussion

In our country, in most university centers, we consider that physical education lessons are far too few for acquiring notable results such as in sport performance. In our research, it is considered that two training sessions per week are enough to reach the objective of developing strength in upper limbs by means of karate do Shotokan, but there is still one unsolved problem, the same as in sport performance for students, which works against this objective and delays the obtaining of sport performance. The reason is the interruption of sport specific training for a too long period during holidays (2-3 months a year).

In our students, physical performance in this discipline requires great attention. It should provide the development of basic motric qualities and functional body capacities in general, but also, the building and consolidation of basic skills which condition the practice of this sport discipline (Deliu, 2008).

Conclusions

1. The boys from the experimental group had a final average value of 24.75, which is higher than the initial one of 21.6, with a difference of 3.15. The calculation of the significance of the difference is expressed by (calculated t) = 1.761; the difference being considerable ($p<0.05$).

2. The girls from the experimental group had a final average value of 22, which is higher than the initial one of 18, with a difference of 4. The calculation of the significance of the difference is expressed by (calculated t) = 2.98, representing a higher value compared to (tabulated t) = 2.132; the difference being considerable ($p<0.05$).

3. By comparing the differences of the averages in the experimental groups of boys and girls at the initial and final testing, after applying specific algorithms, a much better progress is noted in both groups.

4. By choosing the right algorithms, by using an appropriate dosage and an adequate motivation for a consistent participation in physical education classes, positive results can be obtained regarding the development of strength in upper limbs using fighting exercises with partner in karate do Shotokan.

Conflicts of interest

There are no conflicts of interest.

Acknowledgement

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