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Original article

MEANS IN THE TRAINING OF TENNIS PLAYERS- STUDENTS OF PHYSICAL EDUCATION AND SPORTS UNIVERSITIES

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Abstract

Aim. The present scientific work deals with the issue of applying the tennis specific operating systems into the student's training, students who are members of their university teams.

Exercise structures specific to the basic tennis shots have been elaborated in the preparatory and pre-competition periods.

Methods. In this context, exercise diagrams have been elaborated for the perfecting of the forehand backhand, serve, volley, smash and lob shots as well as applying them in the singles and doubles game, with the purpose of perfecting the tactic.

Results. The algorithms used have concluded: the ball exchange at singles for the improvement of the length control of executions; the option of the lob, the volley from the side movement and of the serve in different areas.

Conclusion. The elaborated operating systems have been applied in tennis lessons for a macro cycle of 4 months, with the purpose of participating in the National University Championship, Bucharest, 2-4 June 2017.

Keywords: tennis, student, technical, tactic, perfection

Introduction

The concept of psychomotor education in tennis is given by its presence as one of the main specific objectives of training. In line with establishing these before the tennis training process, a series of authors (Segărceanu, 1998; Hoskins, 2003) have evaluated their role in:

- neuro-muscular development (Calota, Cordun, 2013);
- general physical development and multilateral physical training;
- physical training: training of basic movement skills; gesture formation (Holdevici, Vasilescu, 1998);
- the development of movement functions (Bompa, 2003);
- control over the environment; control over the body (Gidu, 2012)

According to Holdevici, Vasilescu, (1998), one of the objectives of physical education and sports could be summarized as such:"The development of psychomotor skills", which includes:

- the development of motor skills;
- the development of kinesthesia (the complex perception of movement);
- the development of motor skills and reflexes;
- the development of the body's work capacity and capacity to adapt to specific movements.

Gidu, 2011, and Negrea, Musat, 2015, consider that psychomotor education is a basic form of education in sports training, as it conditions the entire preparation process. The learning process cannot be efficient *„if the child is not aware of his/her own body, does not know its limits and cannot place him/herself in space, cannot master time and has not acquired sufficient coordination and stability in gesture skills of movement"*.

In tennis, in order to complete a movement, there are several essential components, such as: hand-to-eye coordination; coordination in space; the image of one's own body; rhythm; direction; symmetrical activity; and so on (Voiculescu, 2002). Therefore, there is no drive ability, as an act in itself, and psychomotricity, an integral complex function in which elements of movement are correlated to thought, language, affection and social behavior, its usual development being coordinated by all the bio-psycho-social factors. In the process of acquiring the main technical procedures in tennis, we identify a more educational general "*gross drive ability*", which is executed by use of the large muscles in the body (the serve shot, the forehand shot, the backhand shot), and a more "*subtle drive ability*", which involves the smaller muscles and special movements such as gripping, grip maneuver and changes at grip level, according to the shot that is to be executed (Green, 1992 and Gidu, 2011).

In tennis, hand-to-eye coordination, hand-to-

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foot coordination, coordination in space, image of oneself, rhythm, direction, symmetric activity, and so on, are all essential elements in order to execute a movement. Therefore, there is no drive ability as an act in itself and psychomotricity is an integral complex function in which elements of movement are correlated to thought, language, affection and social behavior, its usual development being coordinated by all the bio-psycho-social factors. In the process of acquiring the main technical procedures in tennis, we identify a more educational general "*gross drive ability*", which is executed by use of the large muscles in the body (the serve shot, the forehand shot, the backhand shot), and a more "*subtle drive ability*", which involves the smaller muscles and special movements such as gripping, grip maneuver and changes at grip level, according to the shot that is to be executed (Calota, 2016).

Method

Research premises and hypothesis

In order to orient the process of technical and tactical training of the tennis playing students within our research, we have begun based on the following premises:

- Give the high demands of a national university tennis championship, we consider that the entire preparation process must follow the requirements set at this level, both somatically and functionally, as well as technically and tactically.
- We consider that the optimal projection of action technology and the approach of certain methods and means for the attack phase, specific to the actual game conditions, are necessary at the base of the technical and tactical training in tennis.
- The preparation of the experiment group will focus on the approach of an action technology which will ensure the technical and tactical training, at university team level in tennis.

Research hypothesis

It is assumed that the implementation of certain methods and means for the attack phase in the tennis training process will contribute to the improvement of technical and tactical preparation at university team level in tennis.

The experiment itself was carried out between November 15th 2016 and March 15th 2016, at university tennis player level within the Ovidius University, at the Faculty of Physical Education and Sports. Verification games were organized on Saturdays and Sundays (home games). The special training program for the experiment group was run over a period of 4 months. During the experiment, the players were in training stage and have benefitted from a special training program into which an action technology specific to technical and tactical preparation was added (table 1).

Tests were run on the experiment group and the comparative group during training hours (at the beginning and at the end). Tests were run on days with sunny weather, minimal wind and temperatures of 15^{0}C, with no wind. The following research methods were applied: the specialty literature method; the observation method; the testing method; the mathematical and statistical processing and interpretation of data method; and the graphical representation method.

Table 1.Indicative model of complex technical and tactical actions applied to operation systems at the study group level

No. of volley shots	1	2	3	4	5	6	7	8
Technical and tactical action typology	forehand cross; backhand volley cross	long line forehand; backhand long line volley	forehand cross; long line forehand volley	long line forehand; forehandvolley cross	backhand cross; backhandvolley cross	long line backhand; backhand cross volley	backhand cross; long line backhand volley	long line backhand; forehand long line volley

Results

General physical training parameters

The level of general physical training development has shown considerable progress at the end of the research, a progress which was demonstrated by the results obtained by the subjects belonging to the study group.

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Table 2. Comparative analysis of group averages which characterize the general physical training parameters of the players subjected to testing at the beginning the experiment

Position	Parameters compared	$\overline{X} \pm Em$		Criteria	
		Study group	Comparative group	"t"	"p"
1	Medicinal ball throwing	9,44 ± 0,21	8,26 ± 0,08	1,13	> 0.05
2	Sustained pull-ups	22,44 ± 0,23	20,44 ± 0,07	1,45	> 0.05
3	Static leap	196,6 ± 0,58	195,93 ± 0,62	1.08	> 0.05
4	30m sprint	5,3 ± 0,66	5,18 ± 0,53	0,92	> 0.05
5	Oina ball throwing	30,88 ± 0,77	26,33 ± 0,15	0,77	> 0.05
6	Pushups	19,33 ± 1,23	17,6 ± 1,06	0.54	> 0.05
7	The "Fan"	45,75 ± 1,12	42,43 ± 1,054	0.20	> 0.05
8	The "Compass"	42,2 ± 1,03	42,8 ± 1,25	0.37	> 0.05

Table 3. Comparative analysis of group averages which characterize the general physical training parameters of the players submitted to testing at the end of the experiment

Position	Parameters compared	$\overline{X} \pm Em$		Criteria	
		Study group	Comparative group	"t"	"p"
1	Medicinal ball throwing	13,26 ± 1,05	10,53 ± 1,26	0,83	> 0.05
2	Sustained pull-ups	28,95 ± 0,84	21,52 ± 1,10	2.12	< 0.1
3	Static leap	229,13 ± 0,26	212,06 ± 0,84	2.99	< 0.001
4	30m sprint	4,83 ± 0,22	5,04 ± 0,86	1.78	< 0.1
5	Oina ball throwing	30,83 ± 0,11	29,2 ± 0,24	0,57	> 0.05
6	Pushups	21,46 ± 0,06	19,46 ± 0,10	1.82	< 0.1
7	The "Fan"	41,82 ± 0,05	43,64 ± 0,09	1.90	< 0.1
8	The "Compass"	46 ± 0,86	41,33 ± 0,88	2.22	< 0.05

Compared to the average performance obtained at initial testing (table 2), where all the parameters submitted to study had statistically insignificant group calculation differences, upon final testing (table 9) we observe significant differences on most parameters, in favor the experiment group. Based on the comparative analysis of the group which defines the general physical training, we have compiled the dynamics of results obtained upon the proposed and carried out tests. The calculation of the significant statistical differences between the two study groups, upon final testing, present significant values in favor of the study group with p=0,01; p=0,05 and p=0,001, n-1, for the following parameters: sustained pull-ups (t=2,12>1,76 – p=0,01); static leap (t=2,99>2,97 – p=0,001); 30m sprint (t=1,78>1,76 – p=0,01); pushups(t=1,82>1,76 – p=0,01); the "Fan" (t=1,90>1,76 – p=0,01); the "Compass" (t=2,22>2,14– p=0,05).Following the statistical processing of the results obtained by the study group subjects, we observed that their average performances have gradually increased from one testing to the other. If the comparative group subjects have had minimal improvement, as a result of traditional training, the performances recorded by subjects from the experiment group prove the validity of the research and the viability of the applied algorithmic training system. The testing of the technical and tactical training, which targeted a series of parameters that were focused on each of the technical procedures in the attack phase (the serve, the smash and the volley), as well as on different technical procedures, such as technical and tactical complex combinations, is highlighted at the end of the research, through an increase in average performance at study group level. Based on the comparative analysis of the group which characterizes the technical and tactical training on initial testing, we observe that the statistical differences are not significant between the two subject groups (table 4).

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Table 4. Comparative analysis of group averages characterizing techincal and tactical training parameters (Tests) of the players submitted to testing at the beginning of the experiment

Position	Parameters compared		$\overline{X} \pm Em$		Criteria	
			Study group	Comparative group	"t"	"p"
1	Test no.1 – Target smash with lobed ball	1	3,53 ± 0,08	3,4 ± 1,01	1.20	> 0.05
		2	2,53 ± 0,09	2 ± 1,59	1.35	> 0.05
		3	3,2 ± 1,05	2,8 ± 0,58	1.04	> 0.05
		4	2,46 ± 0,56	2,2 ± 0,74	1.05	> 0.05
2	Test no.2 – Fixed point serve	1	1,2 ± 0,48	1,2 ± 0,73	0.95	> 0.05
		2	2 ± 0,49	1,8 ± 0,61	0.86	> 0.05
		3	1,2 ± 0,53	1,2 ± 0,16	0.88	> 0.05
		4	1,73 ± 1,35	1,4 ± 0,18	0.84	> 0.05
3	Test no.3 – Wall target serve		7,53 ± 1,10	6,6 ± 0,10	1.01	> 0.05
4	Test no.4 – Target volley shots with launched ball	1	6,66 ± 0,11	5,6 ± 0,09	1.08	> 0.05
		2	6,26 ± 0,09	4,4 ± 1,03	1.64	> 0.05
		3	5,26 ± 0,06	4,2 ± 1,68	1.50	> 0.05
		4	5 ± 0,89	3,8 ± 1,98	0.84	> 0.05
5	Test no.5 – Alternative volley shots with launched ball	1	5,33 ± 0,98	4,6 ± 1,54	0.72	> 0.05
		2	5,33 ± 1,19	4,2 ± 0,86	0.20	> 0.05
		3	6 ± 1,12	5 ± 0,77	0.15	> 0.05
		4	4,33 ± 0,57	3,73 ± 0,64	0.34	> 0.05

After statistical processing of the final testing results, the subjects from the study group have shown superior average performance results, compared to the subjects from the comparative group.

Thus, as shown in table 5, on test no. 1 - target smash with lobed ball, adapted to the tennis game, the average results are between the average of 5.46 and 6.33 (number of successful shots), whereas the comparative group had results averaging between 5.00 and 6.26 (successful shots).Here, the calculation of the significance of the difference between averages shows significant statistical differences between the four moments of evaluation upon final testing, where t has values ranging between 2.22 and 2.56, at the same significance threshold of 0.05, n-1.

Table5. Comparative analysis of group averages which characterizes technincal and tactical training parameters (Tests) of players submitted to testing at the end of the experiment

Position	Parameters compared		$\overline{X} \pm Em$		Criteria	
			Study group	Comparative group	"t"	"p"
1	Test no.1 – Target smash with lobed ball	1	6,33 ± 0,23	6,26 ± 1,13	2.56	< 0.05
		2	5,73 ± 0,28	4,73 ± 1,18	2.44	< 0.05
		3	6,06 ± 0,75	5,46 ± 0,95	2.22	< 0.05
		4	5,46 ± 0,64	5 ± 0,86	2.35	< 0.05
2	Test no.2 – Fixed point serve	1	5,2 ± 0,13	2,4 ± 0,73	1.98	< 0.1
		2	4,8 ± 1,38	3 ± 0,64	1.87	< 0.1
		3	4 ± 1,91	2,86 ± 0,61	1.86	< 0.1
		4	4,6 ± 1,56	2,6 ± 0,63	2.08	< 0.1
3	Test no.3 – Wall target serve		9,13 ± 0,98	8,6 ± 0,61	2.51	< 0.05
4	Test no.4 – Target volley shots with launched ball	1	8,66 ± 0,89	6,06 ± 0,16	3.08	< 0.001
		2	8,53 ± 0,77	5,6 ± 0,18	3.10	< 0.001
		3	7,6 ± 0,08	4,93 ± 0,61	2.99	< 0.001
		4	7,33 ± 0,53	4,93 ± 0,34	3.56	< 0.001
5	Test no.5 – Alternative volley shots with launched ball	1	7,33 ± 0,27	5,8 ± 0,38	2.51	< 0.05
		2	7,4 ± 0,44	5,33 ± 0,77	2.33	< 0.05
		3	7,53 ± 0,13	6,13 ± 0,76	1.91	< 0.1
		4	6,6 ± 0,19	4,93 ± 0,28	1.80	< 0.1

Discussion

For the serve shot, the selection of the two tests, the fixed point serve and the wall target serve, has demonstrated the technical training of the two groups, in the context of manifestation of coordination capacity in increased concentration conditions. Based on the comparative analysis averages obtained at each moment of test no. 2 on initial testing, there were no significant modifications (table 4). On the other hand, upon final testing, for the study group, during all phases of the test, the calculation of significant average differences presents the values of t as being significant at the thresholds of 0.01 and 0.05.

Test no. 3 – wall target serve confirms upon final testing that the tennis players belonging to the study group have recorded a successful shot average of 9.13 out of 10, whereas the players from the comparative group have recorded an average of 8.6 successful shots. The calculation of significant average differences expresses the t value of 2,51>2,14, p=0,05, n-1, in favor of the study group.

According to the objectives and tasks formulated by us for test no. 4 - target volley shots with launched ball, upon final testing we have observed (table 5) that the average results are located in the average range of 7.33 and 8.66 (number of successful shots) on all stages, whereas the comparative group scored averages between 4.93 and 6.06 (successful shots). Thus, the calculation of significant differences between averages presents significant statistical values during all four sequences of evaluation upon final testing, in favor of the study group, where t has values ranging from 2.99 to 3.56, at the same significance threshold of 0.001, n-1.

The final test - alternative volley shots with launched ball was comprised of four moments, out of wish to obtain an objective differentiation at technical improvement level of this particular shot that is often applied in the attack phase. Thus, if upon initial testing subjects from both groups scored relatively equal average performances (table 5), upon final testing the study group obtained an average score of 7.33successful shots, compared to that of 6.13 obtained by the comparative group. The calculation of significant average differences established a value of t =2,51>2,14, to 0,05, n-1.

Conclusion

1. The application of the training model over a period of time has determined modifications of the parameters submitted to research, presenting significant increases in the performance tennis players from the study group. The results of the statistic calculation express an increase on general and specific physical training tests; the technical and tactical training tests, which were validly significant after the *Student* test at the p = 0,05, p = 0,01, p = 0,001 significance threshold and n-1 leeway.
2. The implementation of certain methods and means in the training process that are materialized through algorithmic systems specific to the consolidation and improvement of attack phase shots, at study group student level, namely the representative tennis team, certainly allows for the improvement of technical and tactical training at this level.
3. The model of technical and tactical training in the attack phase, at university tennis team level, will contribute to the reorientation of selection criteria for this age category, and also to a more exact projection of the training process dynamics.

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