

## Coordinative skills and development of strength in young athletes tennis practice

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**Abstract.** The study was carried out with the aim to improve sports performance, by reducing the percentage of errors in the execution of specific technical gestures of tennis discipline by fostering the development of coordination skills and strength, comparing the results of the athletes having the dominant limb right with those ones having the dominant left limb. Athletes have done training planned by the staff of sports clubs and, from November 2015 until May 2016, carried out 22 additional sessions, 3 per month with conventional methods and with the Pilates method.

The research was carried out using a method of observation and manual data collection to track sports performance of a sample of 20 young male athletes, aged between twelve and fourteen practicing the game of tennis for a period of eight months. Tests, of strength and coordinative, were administered at the beginning and at the end of the observation period with athletes divided into two groups, A and B. The group A was made by athletes with left limb while the dominant B was formed by those ones with right dominant limb.

Final data showed a percentage improvement of about 5% for group A and about 7-8% for group B. The research sample was monitored as the game of tennis is a sport that exposes, for his solicitation predominantly unilateral, frequent postural imbalances that can affect sports performance of young athletes.

**Key words:** *posture, coordination skills, strength, tennis.*

### Introduction

Tennis (1) is an individual sport that is practiced with the use, mainly, of one upper limb which is identified as the dominant limb (2). The dominance causes (3), frequently, postural imbalances that, in subjects in adolescence practicing sports activities, affect the competitive performance with poor use of conditional and coordination (4) skills with particular reference to strenght (5).

This condition is often confirmed with morphological and functional assessments made by the sports doctor for the issue of the suitability competitive sports doctor. The sample of twenty young male athletes (6) showed not homogenous (7) development of the trunk muscles and upper limb with particular reference to the athletes with the right dominance. The research team then determined that it was appropriate to make a comparison of performance among athletes with the right and left dominance, administering a course of additional training, athletic and technical, aimed at the harmonious development of coordination (8) skills and the ability to force conducting the compensatory enhancement (9) trunk and upper limbs, not forgetting the importance of the enhancement of the lower ones (10), and taking care with particular attention the precision of technical movements made with the racket (11).

### Material and Method

The study was performed on twenty young male athletes practicing tennis (12) for about two years, aged between twelve and fourteen, members of a club affiliated companies at FIT. Necessary prerequisite to be part of the sample of the research was the issue of the suitability medical-competitive sports.

The goal was to improve sports performance (13), by reducing the percentage of errors in the execution of specific technical gestures of the discipline court fostering the development of coordination (14) skills and strength (15), comparing the results of the athletes having the right dominant limb those with the dominant left limb.

The research was conducted with observational method and manual and computerized survey, from October 2015 to May 2016, processing the results and performances of the tests. The athletes were divided into two groups, A and B, each consisting of 10 subjects (Tab. 1). In group A were included parties with the left dominant limb (identified with 3,4,6,7,9,10,13,15,18,20 numbers) while B was formed with athletes having the 'right dominant limb (identified in the tables with 1,2,5,8,11,12,14,16,17,19 numbers).

The normal training methodology (16) prepared by the technical staff, consisting of three weekly training sessions connoted by athletic exercises and techniques, as well as by the accomplishment of training (17), and racing official races were added, starting from November, three monthly additional sessions for a total of 22 sessions characterized by specific relaxation and clearing exercises, eye-hand coordination and athletic enhancement for the upper and lower limbs (18). Especially in the months of November and December we gave mat work classes (19) or free body classes to articulate fluency and muscle strengthening (20). Starting from the month of January at mat work classes were gradually added enhancement sessions with great tools and techniques of tennis lessons (21, 22).

About the de-contraction and muscle toning activities you used the Pilates method (23) unconventional which is based on the development and refinement of the principles on health and muscle toning, with the application of Contrology exercises and with the use of rehabilitative equipment to replace moving and activities designed to stimulate muscle stamina and stimulate the response of deep antagonist muscles

At the end of the period they were administered again the tests that showed an improvement of the performance of the sample (Tab. 2).

The technical materials and survey instruments used were selected according to the objectives of the research, the characteristics of the tests and the specificity of the proposed workout path.

For collecting data they have been used to that purpose report grid (tab. 1, 2).

Facilities and technical equipment used were: regulation tennis court, checkered board numbered (1-9), ball of 1 kilos, tennis racket, tennis balls, Small tools of the Pilates Method: Mat, Gym band, Fit ball, Magic Circle, Great Tools: leg press, multipower, solid body, barbells, benches.

*Tests.* Tests (24) were administered after an athletic seat made up of an initial general activation, with a slow run for about 15 minutes interspersed with active recovery 1 minute every 5 minutes of running, and joint mobilization exercises and stretching (25) for a total time of about 30 minutes. The survey was carried out in the regulation tennis court with athletes placed on the goal lines.

Test 1: Measuring the distance shot with a medicine ball 1 kg. (For strength) and with the limb right than with the left (3 shots per limb = total 6 shots).

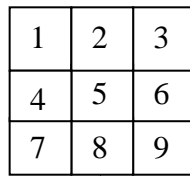
Start \_\_\_\_\_ Stop

Test 2: Collect score (precision) for the number of shots from a board placed at 10 m divided into nine panels (1-9) and with the limb right than with the left with a tennis ball, indexless (3 rolls = total limb 6 shots).

1	2	3
4	5	6
7	8	9

↑  
Start

Test 3: Collect score (precision) for the number of shots towards a board placed at 20 m divided into nine panels (1-9) and with the limb right than with the left with a tennis ball, indexless (3 shots = total limb 6 shots).



Start

Test 4: Repeat test 2 with racquet (6 shots total).

Test 5: Repeat test 3 with racquet (6 shots total).

Each athlete has made a total of 30 shots during the initial recognition and thirty shots during the final survey.

**Results**

From the initial screening (tab.1 and fig. 1, 2) it comes to light that all young athletes have shown different results between the shots made with the dominant limb and the less or not at all used. In particular it was noted that the third pitch of the programmed series, provided for each limb, would always be less effective and that the more precise shots were made by persons having the dominant left limb. At the beginning they were more precise the shots made with the only tennis ball without the aid of the racket.

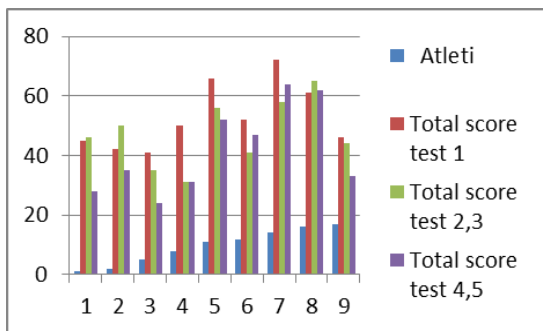
*Initial survey*

**Table 1.** Comparison Initial Results  
Group A- Athletes with left-dominant limb

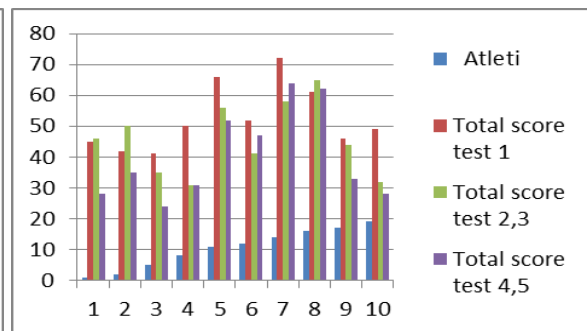
Athletes	Total score test 1	Total score test 2, 3	Total score test 3, 4
3	50	51	38
4	57	45	41
6	57	49	40
7	50	55	44
9	60	49	48
10	50	40	33
13	55	64	63
15	58	66	49
18	55	39	38
20	52	47	43

**Table 2.** Comparison Initial Results  
Group B- Athletes with right dominant limb

Athletes	Total score test 1	Total score test 2, 3	Total score test 4, 5
1	47	49	32
2	45	45	35
5	36	35	29
8	49	36	30
11	58	52	50
12	45	40	39
14	56	56	62
16	49	57	55
17	42	37	49
19	48	34	36



**Figure 1.** Initial Results group A



**Figure 2.** Initial Results group B

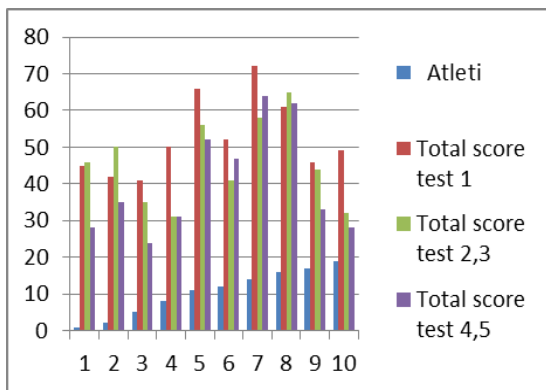
Final survey

**Table 3.** Comparison Final Results  
Group A - Athletes with left-dominant limb

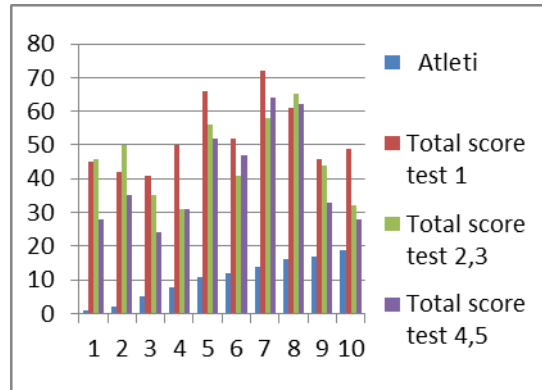
Athletes	Total score test 1	Total score test 2, 3	Total score test 3, 4
3	53	57	43
4	62	52	40
6	60	55	44
7	52	57	57
9	61	54	56
10	51	47	47
13	56	66	66
15	60	65	52
18	62	46	46
20	56	48	50

**Table 4.** Comparison Final Results  
Group B - Athletes with right dominant limb

Athletes	Total score test 1	Total score test 2, 3	Total score test 4, 5
1	45	46	28
2	42	50	35
5	41	35	24
8	50	31	31
11	66	56	52
12	52	41	47
14	72	58	64
16	61	65	62
17	46	44	33
19	49	32	28



**Figure 3.** Final Results group A



**Figure 4.** Final Results group B

The results obtained with the development of the course of the research have been passing because the numeric values processed in the initial phase, are significantly improved in the final one.

The group B came to light the most noticeable improvements both in terms of numbers and in terms of accuracy in performing the exercises.

The final survey (tab. 2 and fig. 3, 4), carried out at the end of the research period, has explained that the increase percentage of the performance were quantified, in total, in approximately 5% for group A and about 7-8% for group B, with specific reference to the improvement of the scores related to the tests performed with the racket. It emerges the performance boost for the tests with and without the ball with the racket of athletes n. 10 group A and n. 8 Group B.

**Discussion**

The course of the research has monitored, for an eight month period coinciding with the preparation and the start of the season of the tennis tournaments, the response of the sample to the motor proposed in order to improve the performance of athletes by making them aware of the control mechanisms and adaptation.

The decision to observe and monitor the performance of young athletes practicing tennis was prompted by the reflection that the game of tennis is a sport which gives, for his predominantly unilateral stress, frequent postural imbalances that can affect sports performance. Young people show difficulties in the management of his own body as the automatic control systems of motor skills, primarily those that govern the postural activities, are in crisis because of the continuous changes that occur in the various body segments in growth and, consequently, these automations must they are continually revised and reworked. Today's teenager spends most of his time at school or at home using video games and computer and also when engaged in any sport, in any case this is not spontaneous but always guided by an adult, and this affects the settings postural.

## Conclusion

All young athletes claimed to have received benefits during the period of work and in particular the group B components have emphasized that participation in extra sessions with the Pilates method (25), with the use of tools for the strengthening of force, it has led to a greater awareness in the management of personal mobility. They also stressed that it had found limited episodes of muscle contractures, increased shooting accuracy and an increase in strength after the exercises for the compensation of the non-dominant limb muscle development.

The study conducted testified that the use of specific methods of training, conventional or otherwise, regarding the development of motor skills of young athletes is effective.

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