

# THE PILATES PROGRAM. A MEAN OF IMPROVING BALANCE-RELATED MOTOR ABILITIES

Mihaela CHICOMBAN<sup>1</sup>

**Abstract:** *The Pilates training program is a system of exercises created by Joseph Pilates in 1900, which enhances balance, proper breathing, body awareness and graceful movement for more effective body conditioning. Nowadays the Pilates training can be practised everywhere as it is taught in private sports centres, in the academia, gyms and medical practices, and clients range from professional athletes to individuals with a limited physical capacity as a consequence of illnesses or accidents.*

**Key words:** *Pilates, fitness, balance, training.*

## 1. Introduction

Pilates training is a system of exercises created by Joseph Pilates in 1900, which enhances balance, proper breathing, body awareness and graceful movement for more effective body conditioning. For the past few years there has been significant progress in the Pilates training which gained ground in 1990 when it turned from a less known type of exercise into an extremely popular fitness activity, which had formerly been used mostly by dancers, singers, circus performers and actors. Nowadays the Pilates training can be practised everywhere as it is taught in private sports centres, in the academia,

gyms and medical practices, and clients range from professional athletes to individuals with a limited physical capacity as a consequence of illnesses or accidents [7], [9]. The relationship between balance and lower accident risk has been accurately established in many areas, but in athletic performance things are not as straightforward. According to the available data, there have been sports activities in which an increased level of balance proved to be associated to a significant extent to accuracy in gun shooting sports and archery as well as in the maximum ice-skating speed attained for ice hockey [6].

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<sup>1</sup> Department of Motric Performance", *Transilvania* University of Braşov.

## 2. The Pilates Program

The Pilates training is a system of physical and mental exercises that basically improves proper body posture, balance, flexibility, major muscle strength and resistance in sustaining balance. Furthermore, it contributes to stress relief, to the improvement of concentration and breathing, it prevents sports injuries and induces a sense of wellbeing [3].

The recourse to Pilates for developing athletes' motor abilities has gained momentum and scientific articles indicate an enhancement of mobility, considerable muscle development, expansion and balance improvement [4], [6].

Pilates training activates the muscles of the core, of the pelvis, of the shoulder and of the lower and upper extremities, thus strengthening the internal abdominal muscles and spinal muscles, breathing and proper alignment. This type of training can be performed standing, inclined or seated, using one's own body weight in floor-based drills, on exercise mats or with the help of specialized equipment [4].

### 2.1. The Principles of the Pilates Program

The Pilates method relies on a series of principles devised by Joseph Pilates, which must be observed during the performance of the exercises, among which the most important are the following:

- Breathing: involves both efficient pulmonary ventilation as well as the cardiovascular function; breathing patterns that are managed before and during exercise enhance mental

focus and physical relaxation and can improve spinal stability or mobility.

- Concentration: entails the obliteration of negative thoughts so that the subject can focus and be fully aware of what they are feeling and doing.
- Relaxation: presupposes the simultaneous release of muscle tension from the body. Alternatively, it can refer to the relative relaxation of agonist muscles when the antagonist muscles can thus function efficiently.
- The optimal control of abdominal muscles over spinal mobility and stability requires an accurate functioning of the lumbar spine through an adequate abdominal muscle activity. The proper spinal elongation and alignment are inextricably linked to a correct stabilization of the back, to mobilisation and to the primary musculoskeletal function in such a way as to achieve ideal static and dynamic positions.
- Accuracy: "represents the ability to sense and to identify the primary components of an action and then refine the manner in which they are carried out" [1, p.48].

## 3. Material and Methods

### 3.1. Pilates on exercise mat

The exercises on a gym mat are usually static but they can also be dynamic, they are performed by using only one's own body weight either standing or lying down, initially using a wide trunk support

base, inclined, in lateral positions or lying on the back while the movement of the limbs is modified in order to vary the momentum of the force on the trunk muscles, and then followed by different positions and segmental movements meant to improve body control and posture as well as flexibility and physical strength.

"During the exercises, the focus is on maintaining some positions of the body that activate the internal abdominal muscles and which contribute to achieving balance in accordance with the principles put forward by Joseph Pilates and listed above" [2, p.23 ]. The outcome of the gym mat exercises is similar to that of equipment-assisted exercises but, as opposed to the latter, gym mat Pilates is more practical because the sessions are far more accessible, they can be done at home, the exercises range from beginner to advanced level, but with regard to people with limited motor abilities, availability is lower than for Pilates on Reformer or other equipment and the assistance of the trainer in correcting mistakes is more restrict [5].

### **3.2. Pilates with fitness equipment or objects**

The exercises for which fitness equipment or objects are used do not require a higher degree of difficulty than the ones on mats due to the fact that their application is considerably more engaging by the recourse to various levels of resistance and far more convenient and effective for people with limited motor abilities owing to the

possibility to modify the positions of the pieces of equipment and also to the simplified manner of performing exercises which can be either static or dynamic, with the same results as the ones performed on a gym mat.

Some of these pieces of equipment and objects are: Reformer, Gravity (Gravity Training Sistem), Cadillac, Wunda Chair, Bosu.

The full affiliation (groups, laboratories and the institutions) of the authors will be specified as references in the footnote (Insert Reference, Footnote, Bottom of page); these ones will be marked with Arabic numerals. If several authors are part of the same organization, then its name may be written once and the authors will be marked with the same figure.

### **4. Objectives**

The aim of this article is to confirm an improvement of balance through the Pilates program exercises and, at the same time, to devise an adequate training plan which would assist athletes in obtaining better results and in acquiring the fundamental principles of movements, especially from a locomotors point of view. The general and specific tests, to which both the control group and the experimental group have been subjected, have been selected in order to assess the static and dynamic balance of subjects.

- a. General balance testing: *The Romberg Test on Bosu*
- b. Specific balance testing: *The Y-Balance Test, The Balance Board Test*

## 5. Results and Discussions

### 5.1. Results of the Romberg Test on Bosu

According to the data in Table 1, both groups had good results in the final testing, the experimental group scoring a difference of only 3.8 seconds from the control group and the coefficient of variation for the experimental group

reached 20,9% in the initial testing and 13,01% in the final testing, which indicates weak homogeneity. In the final testing stage the results of this test display a slight but rather insignificant improvement of the static balance in the experimental group.

Table 1

*Romberg test on Bosu – Initial and final testing*

<i>Nr.</i>	<i>Name</i>	<i>Time (s) with eyes closed</i>	<i>Name</i>	<i>Time (s) with eyes closed</i>
<b>Control Group I.T</b>			<b>Experimental Group I.T</b>	
1	V.A.	24	C.I.	28
2	G.B.	22	A.I.	26
3	F.C.	16	V.R.	15
4	B.R.	18	A.A.	17
5	H.A.	19	M.L.	25
6	I.C.	23	M.S.	22
7	P.A.	23	A.C.	19
8	F.T.	26	G.T.	24
<i>Arithmetic mean</i>		<b>21,4</b>	<i>Arithmetic mean</i>	<b>22</b>
<i>S.D</i>		<b>3,38</b>	<i>S.D</i>	<b>4,6</b>
<i>C.V.</i>		<b>15,8%</b>	<i>C.V.</i>	<b>20,9%</b>
<b>Control Group F.T</b>			<b>Experimental Group F.T</b>	
1	V.A.	26	C.I.	30
2	G.B.	23	A.I.	28
3	F.C.	16	V.R.	20
4	B.R.	19	A.A.	24
5	H.A.	22	M.L.	27
6	I.C.	23	M.S.	26
7	P.A.	25	A.C.	24
8	F.T.	24	G.T.	30
<i>Arithmetic mean</i>		<b>22,2</b>	<i>Arithmetic mean</i>	<b>26,1</b>
<i>S.D</i>		<b>3,28</b>	<i>S.D</i>	<b>3,4</b>
<i>C.V.</i>		<b>14,8%</b>	<i>C.V.</i>	<b>13%</b>

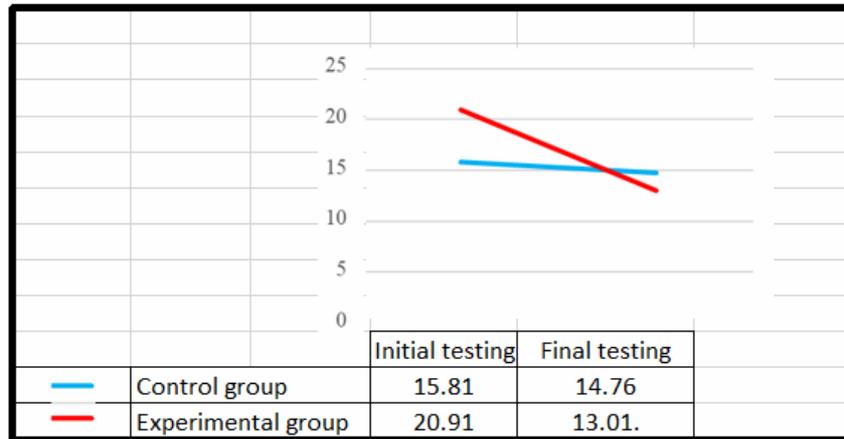


Fig. 1. *Coefficient of Variation Chart for the Romberg Test on Bosu*

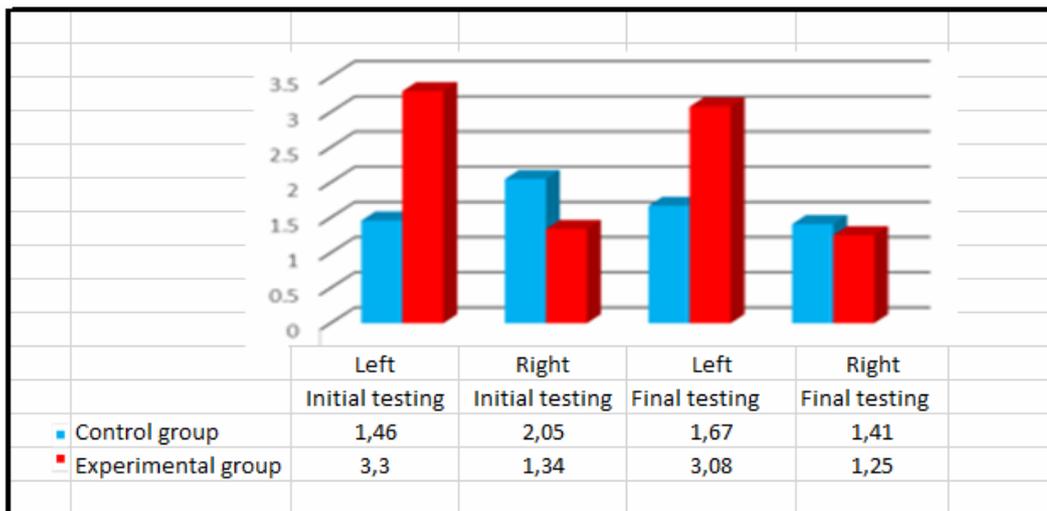


Fig. 2. *Coefficient of Variation Chart for the Y-balance Test*

**5.2. Interpretation of the results of the Bosu Test**

In the final testing the experimental group scored significant results managing to increase leg distance by approximately 7-8 cm; the mean value of the absolute distance in the initial testing was 87,6 cm for the left leg and 88,3 cm for the right leg whereas, in the final testing, these values amounted to

95,5 cm for the left leg and 96,2 for the right leg. The coefficient of variation for the experimental group was of 3,30% and 1,34% in the initial testing and 3,08%, 1,25% respectively in the final testing, all these values indicating good homogeneity.

In the final testing stage, the results of this test demonstrate a significant improvement of dynamic balance in the experimental group as compared to the

control group (-7,2 cm for the left leg and -8,2 cm for the right leg) at the same time managing to decrease the number of injuries (attaining a score which is lower than 90% triggers a 3,5 times increase in accident risk).

### 5.3. Interpretation of the Results of the Y-Balance Test

According to the data in table 2 both groups had better results in the final testing, the experimental group (0.37)

scoring a difference of only 0.65 demerit points from the control group (1) and the coefficient of variation for the experimental group reached 75,5% in the initial testing and 138% in the final testing, which indicates weak homogeneity. In the final testing stage the results of this test display insufficient progress with regard to static balance in the experimental group.

*The Bosu Test - Initial and final testing*

Table 2

<b>Nr.</b>	<b>Name</b>	<b>Points (max. 6)</b>	<b>Name</b>	<b>Points (max. 6)</b>
<b>Control Group I.T</b>			<b>Experimental Group I.T</b>	
1	V.A.	4	C.I.	3
2	G.B.	3	A.I.	2
3	F.C.	1	V.R.	3
4	B.R.	2	A.A.	2
5	H.A.	2	M.L.	1
6	I.C.	2	M.S.	1
7	P.A.	2	A.C.	2
8	F.T.	0	G.T.	1
<i>Arithmetic Mean</i>		<b>2</b>	<i>Arithmetic Mean</i>	<b>1,8</b>
<i>S.D</i>		<b>1,195</b>	<i>S.D</i>	<b>0,834</b>
<i>C.V.</i>		<b>59,7</b>	<i>C.V.</i>	<b>44,5</b>
<b>Control Group F.T</b>			<b>Experimental Group F.T</b>	
1	V.A.	4	C.I.	6
2	G.B.	4	A.I.	4
3	F.C.	1	V.R.	5
4	B.R.	3	A.A.	4
5	H.A.	2	M.L.	4
6	I.C.	2	M.S.	4
7	P.A.	3	A.C.	5
8	F.T.	0	G.T.	4
<i>Arithmetic Mean</i>		<b>2,3</b>	<i>Arithmetic Mean</i>	<b>4,5</b>
<i>S.D</i>		<b>1,407</b>	<i>S.D</i>	<b>0,755</b>
<i>C.V.</i>		<b>59,2</b>	<i>C.V.</i>	<b>16,8</b>

S.D = standard deviation; C.V. = Coefficient of Variation; I.T = initial testing; F.T = final testing

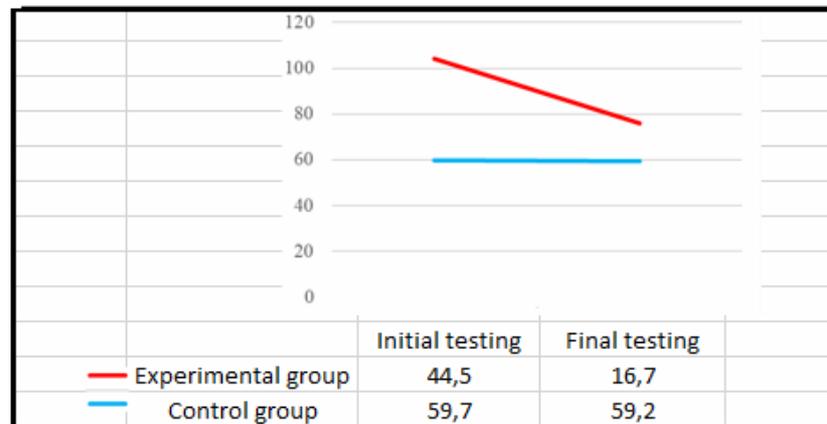


Fig. 3. *Coefficient of Variation Chart for the Bosu Test*

## 6. Conclusions

The results recorded in this research support the functionality of the applied method, they structure the standard of balance improvement and favour an increased level of physical training, which fully confirms the scientific hypothesis put forward at the beginning of this research paper.

## 7. Recommendations

- Integration of the Pilates training program into the agility and mobility training sessions and using it as specifically as possible for every practised sport.
- The incorporation of the Pilates program as a method of specific training on land.
- Pilates training should precede regular training sessions.
- The application of the Pilates training will bring about a quality upgrade of the technical component and it will equally assure the acquisition of

technical elements and procedures in a form that comes closest to the optimal model of their performance.

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