Journal of Physical Education and Sport ® (JPES), 13(1), Art 16, pp. 91 - 100, 2013
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

The effect of a combined training program with Greek dances and Pilates on the balance of blind children

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Published online: March 25, 2013
(Accepted for publication March 10, 2013)

DOI:**10.7752/jpes.2013.01016;**

Abstract:
The purpose of the present study was to examine the effect of a program with Greek dances and Pilates on the balance ability of children who are blind. Fourteen blind children, 15.93+1.33 years old, participated in this study. Nine individuals were assigned to the experimental group and underwent an 8-week intervention program with Greek traditional dancing, and Pilates movements at a frequency of 2 training sessions per week, for 45 minutes each session, while five individuals were assigned to the control group and participated in the school physical education lessons at a frequency of 2 lessons per week, for 45 minutes each lesson for 8 weeks, the analytic content of which is defined from the Ministry of Education. For balance assessment, the tasks for static and dynamic balance of the MABC-2 (Henderson et al., 2007) and the BOT-2 (Bruininks, & Bruininks, 2005) were used. For data analysis the non-parametric tests Kruskal-Wallis and Wilcoxon of the SPSS ver. 18.0 for windows were used. After the intervention program with Greek traditional dances and Pilates, were observed significant improvements on the three tasks of static balance ($p<0.05$-0.01), as well as on the four tasks of dynamic balance ($p<0.05$-0.01) in the experimental group. Likewise no significant difference was observed in the control group. Consequently, the combination of Greek dances and Pilates may be used as an alternative physical activity form, in order to produce benefits in both static and dynamic balance for individuals who are blind.
Key words: visual impairment or loss, stability, dance, alternative physical activity.

Introduction

Professional athletes must continually seek physical, technical, tactical and psychological excellence. They Vision plays a major role in both the maintenance of balance and its recovery. Visual impairment can affect the equilibrium of proprioceptive systems, resulting in problems with balance, posture, coordination, tension of the neck and shoulder muscles, and loss of spinal rotation and reciprocal arm swing (38). Individuals with vision loss have decreased postural stability. Therefore they are unable to compensate for restricted visual input to maintain postural stability (36), which in turn affects their ability to balance and increases the likelihood of falling (34). Postural control and balance involve controlling the position of the body in space for stability and orientation (41). Visually impaired persons need these basic motor skills in straight-line walking and for detecting veering (47). Poor balance results in problems with straight walking and control of turns, thus making independent navigation difficult (44).

Balance improvement is considered to be most important because its acquisition even at a minimal level provides the opportunity to walk, run, and jump in various ways, whereas individuals with good balance can turn their attention while participating to more complex and demanding activities (18). Balance improvement can be achieved through activities like Pilates and dance which can also be used to develop flexibility, focus, and facilitate movement, as well as to help the child gain confidence and develop skills (14).

On one side, the Pilates method of exercise is a contemporary, anatomically-based approach which caters to people of all ages, all body types, and all fitness abilities (10), and may contribute to improved performance in balance tests (19). Pilates based training has become popular among a wide variety of athletes and people seeking fitness and rehabilitation (21) and can be easily integrated into traditional resistance and balance training programs. Pilates training contains muscle strengthening, lengthening and breathing to develop trunk muscles and restore muscle balance (2). Moreover, Pilates can improve fitness parameters, as well as physical abilities such as flexibility, proprioception, balance and coordination (42). In addition, Pilates based training found to have positive effects on balance in healthy adults (16), as well as in an elderly population (11).

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On the other side, attending dance movement sessions can have numerous benefits to the visually impaired children on many different levels. They learn to become members of a group and to express their feelings and emotions physically in a non-aggressive manner. Familiarity with their bodies is increased and they learn to use them creatively. Physical flexibility, co-ordination and cardiovascular fitness improve. It is sometimes referred to as an art sport because it combines gymnastic and poetic qualities, or as a healing art because it promotes physical and mental well-being (3). Clearly, dance provides the opportunity to explore, create, discover, and enjoy and is recognized not only as a supportive means of the learning process but also as a tool that contributes to the self-respect of each individual (15). Dance and creative dance, with its heavy emphasis on static and dynamic balance, affects motor performance and self-concept. As for balance, dance influences static and dynamic balance to a great extent and is consequently considered as the ideal physical activity for children (23, 28), for older people (9, 27, 29), for persons with balance, and/or kinaesthetic problems (31), for individuals with mental retardation (46), for hearing impaired persons (37), and for those with visual impairments (22).

However, on reviewing the literature, it seems that there is a lack of research efforts noted regarding the effectiveness of a combination of traditional dance and Pilates on improving static and dynamic balance of individuals with vision loss, and especially of children. Thus, the purpose of the present study was to examine the effect of a program with Greek traditional dances and Pilates on the balance ability of children who are blind.

Method

Experimental Approach to the Problem

The hypotheses developed in the Introduction section were tested by measuring static and dynamic balance of 11 blind children before and after their participation in a combined training program with Greek traditional dances and Pilates movements, and by comparing the differences between the two measurements. Moreover, the measurements of the experimental group were compared with the measurements of a control group, constituted of 5 blind children who were in all respects identical with the subjects of the experimental group, who were just attending all the school lessons and physical education lessons as well.

Subjects

From all the students of the Music High School and Lyceum in Athens city, eighteen (18) students who are blind, were sitting under all academic disciplines in the inclusion/integration class and were chosen to participate in the research. After that, a telephone communication/invitation was made to each student's parents, in regard to the research. In continuity, sixteen (16) students from the second grade of Gymnasium to the third grade of Lyceum, 7 girls and 9 boys, volunteered to participate in the research. A written informed consent approved by an Institutional Review Board for the use of Human subjects for the participation in the research was obtained from the parents of all the participants. All the students had certification of medical control so that they could participate in physical education lessons.

The students were, then, separated randomly to an experimental (n=11), and a control group (n=5), that were in all respects identical. At the end of the research, the data of two students of the experimental group were excluded because, due to illnesses, they missed more than two exercise bouts. Finally, the students of the experimental group that were studied were nine, and of the control group were five. The somatometric characteristics of the two groups are presented in Table 1. As for age, height, weight and body mass index, no significant differences between the experimental and the control group were found.

Table 1. Sample's somatometric characteristics

Group	Age (y)	Height (m)	Weight (kg)	Body Mass Index (kg/m^2)
Experimental (*n=9*)	15.67±1.32	1.68±0.07	61.89±9.37	21.88±1.65
Control (*n=5*)	16.40±1.34	1.71±0.08	65.20±8.04	22.16±0.90

Values are presented as *mean±SD*

Procedures

For the conduct of the research an approval was given from the school headmaster, after the aim and the design of the research were described. The procedures were in agreement with the ethical standards of the Declaration of Helsinki of the World Medical Association (2000).

Before the beginning of the research, a description of the general requirements was given and, moreover, the aim of the research was described to the participants without any briefing relative to previous research findings. Particular emphasis was given on the need for regular participation of the subjects of both groups. It was, also, noted that a student who missed more than two exercise bouts (2 absences out of 16 sessions), for any reason, would be excluded from the research.

The experimental group followed an 8-week training program with Greek traditional dances and Pilates movements, at a frequency of 2 training sessions per week, for 45 min each session. Each session started with a 5-min warm-up period that included stretching exercises for avoiding possible injuries. Next, the main part of each session included Greek traditional dances (~20 min) and Pilates movements (~15 min), that were performed in a standing position. Approximately 1-2 min were given to children in order to prepare themselves and take their places in the space after the Greek traditional dances.

The Greek traditional dancing part was constituted of six Greek traditional dances (Table 2), from different areas of Greece. In order to begin dancing, the subjects were holding each other using a variety of handholds, creating a hemi-cycle. The dances that were performed included a variety of simple kinetic patterns with music accompaniment. The dances' intensity ranged from low to moderate (32), so that the subjects could keep dancing continuously throughout the dancing part. The duration of each dance was about 2.5 to 3.5 min. Essential breaks of approximately 10 sec in between dances were made in order to change dance and to give a fast verbal feedback concerning the following dance.

Table 2. Greek traditional dances

Traditional dance	Duration	Musicmeter	Handhold
Syrto sta tria	3.5 min	3/4	W-shape
Fast Chasapiko	2.5 min	2/4	Shoulder grip
Podaraki	3.0 min	6/8	Simple-arms down
Fyssouni	2.5 min	9/8	Shoulder grip
Panagiota	3.0 min	7/8	W-shape
Kageleftos	3.5 min	2/4	Arm-in-arm

For the selection of Greek traditional dances the following criteria were taken into account: a) The degree of difficulty, according to the subjects' skill level. b) Familiar, desirable and pleasant music for the children with the accompaniment of songs where it was possible. c) Simple steps and simple combinations of steps. d) Medium tempo.

The Pilates movements part was constituted of ten different exercises (Table 3), that performed while the subjects were standing in an upright position with sufficient space between them and included a variety of simple kinetic patterns with or without a Pilates ball. The children had to control their body mass in different combinations of arm and leg movements, as well as with the upper body tilted forwards at an angle of 45^{o} to 90^{o}. The Pilates movements, according to Pilates philosophy, were performed slowly, so that the subjects could keep their balance throughout the exercise. The duration of each Pilates movement-exercise was about 1 to 1.5 min. Essential breaks of approximately 5 sec in between exercises were made in order to change exercise and to give a fast verbal feedback concerning the following exercise.

Table 3. Pilates Movements - Exercises

Duration-Repetitions	Exercise Description
1. Perform 10 repetitions on each side.	Place opposite hand to opposite shoulder, with elbows in front and above at shoulder height. With abs tight, exhale and lift your right knee at a right angle to your right elbow. Lower the leg slowly and repeat with the left leg.
2. 30 sec	Stand with your back to a wall and feet apart equal to shoulder-width apart, holding a ball. Bend your knees as if sitting on an invisible chair. The thighs should be parallel to the floor. Raise your arms forward at shoulder height and hold for 30 sec.
3. Perform 10 repetitions on each side	Bring your right hand behind the head with the elbow out. Then lift the right leg stretched out in front parallel to the floor. With the trunk fixed, bring the leg stretched at sideways and then back in front. The same is performed with the left arm and leg.
4. Perform 5 repetitions on each side	As in 3. Instead of having the hand behind the head, perform holding a ball in the hand. The arm follows the movements of the leg in front-and-up, and at sideways.
5. 30 sec on each leg	We keep balance on one leg for 30 sec, with the other leg bent and folded back, and the arms extended down. Perform the same with the other leg.
6. 30 sec on each leg	As in 5. Differentiation: The subject stands on a low beam and holds a ball with the arms extended forward.
7. 30 sec on each leg	Stand on one leg with the free leg bent in front at a right angle, and rotate a ball around the body for 30 sec. Perform the same with the other leg
8. 30 sec on each leg	Stand on one leg with the free leg bent in front at a right angle, and rotate a ball around your thigh for 30 sec. Perform the same with the other leg.
9. 30 sec on each side	Stand on one leg and hold a ball. Throw your weight slowly downward and forward until the arms come extended forward and the free leg stretched backwards, parallel to the ground, trying to keep balance for 30 sec. Perform the same with the other leg.
10. 30 sec on each leg	Stand on one leg, with the free leg bent in front at a right angle. Extend the opposite arm on the side at the shoulder height trying to keep balance for 30 sec. Perform the same with the other leg.

*When referring to a ball, it is a Pilates ball

The selection of Pilates movements was made according to the following criteria: (a) the existence of an important relationship between functional ankle stability and the ability to maintain balance. (b) Good posture helps blind people to determine their own position in relation to the environment. (c) They emphasize balance and controlled movement.

Each training session concluded with a 5-min cooldown period including stretching exercises. All participants wore athletic shoes and sports clothes during each session. The instructor always stood in front of the participants providing continuously verbal feedback and including extra description of the movements. The name of each dance and exercise helped the participants to memorize it more quickly. The instructor repeated key-words or the verbal instructions in different words, if she noticed that an individual had not followed an instruction.

The control group followed an 8-week program with the school's physical education lessons, at a frequency of 2 lessons per week, for 45 min each lesson. Each lesson started with a 5-min warm-up period that included stretching exercises for avoiding possible injuries. Next, the main part included basketball, volleyball, handball, football, and track and field exercises, as well as flexibility and muscle strengthening exercises, according to the analytic content defined from the Ministry of Education. Each lesson concluded with a 5-min cooldown period including stretching exercises.

The teaching of Greek traditional dances, and Pilates movements for the experimental group, as well of physical education lessons for the control group began one month before the application of the intervention program and of the program with the physical education lessons, aiming at avoiding any loss of practice time during program sessions and was conducted by a teacher of physical education with extensive practical experience in Greek dances, Pilates and physical activity in general, as well as in blind subjects. The training sessions, the physical education lessons and the static and dynamic balance measurements were organized without problems at the indoor gymnasium of the participants' school, an environment especially designed for subjects who are blind.

The test for the participants of both groups included two measurements (initial and final). More specifically, for the experimental group two measurements were carried out, that is, before and after the application of the 8-week intervention program with Greek traditional dances, and Pilates movements. For the control group the two measurements were carried out before and after the 8-week participation in the school physical education lessons.

As for the balance measurements, from reviewing the literature there couldn't be found special tests measuring static and dynamic balance for individuals who are blind. For this reason, reliable and proven tests for sighted individuals were used. For the balance assessment were used the tasks for static and dynamic balance of the Movement Assessment Battery for Children - second edition (MABC-2), for Age Band 3 (11-16 year olds), one of the most widely used assessments in the field of Developmental Coordination Disorder (13), and of the Bruininks-Oseretsky Test of Motor Proficiency-2 Short Form (BOT-2), an individually administered test that uses engaging, goal-directed activities to measure a wide array of motor skills in individuals aged 4 through 21 (4). The two tests designed to measure motor skills and possibly to screen for motor impairment rather than measure motor performance.

Table 4. The tasks used for the assessment of static and dynamic balance

The Movement Assessment Battery for Children-2		
Tasks	**Description**	**Recordings**
1)Static Balance	Two-board balance - the child balances on 2 balance boards placing one foot in front of the other heel-to-toe- two trials - record the number of seconds up to 30 the child could maintain balance.	Record the maximum number of seconds the child could stand on 2 balance boards.
2)Dynamic Balance	Walking toe-to heel backwards on a-4.5m line - the child walks backwards on the line, placing the toe of the one foot against the heel of the other foot, and has to make 15 right steps or reaches to end the line - two trials - record the number of correct consecutive steps the child makes from the beginning of the line.	Record the maximum number of correct consecutive steps from the beginning to the end of the line.
3)Dynamic Balance	Zig-Zag Hopping - the child starts standing on one foot on the first mat, makes five continuous hops diagonally from one mat to the next, and stops on the target mat - two trials -both legs are tested - record the number of correct consecutive hops from the start with maximum of five.	Record the maximum number of correct consecutive hops from the start to the end on the target mat.

The Bruininks-Oseretsky Test of Motor Proficiency-2 Short Form		
Tasks	**Description**	**Recordings**
1)Dynamic Balance	Walking forward on a 6m-line with hands on waist–two trials- record the number of correct steps up to 6.	Walking forward on a 6m-line - record the number of correct steps.
2)Static Balance	Standing on one leg on a balance beam for 10 seconds with the other foot lifted to at least 45^{o} with hands on waist – two trials - record the maximum number of seconds without fall up to 10 seconds- Both legs are tested.	Standing on one leg on a low balance beam for as long is possible - record the maximum number of seconds without fall.

All the used, mats, lines or balance beams were from a material that the children can feel with feet.

However, in the present study the tasks for static and dynamic balance were used in order to measure test-retest differences that is, before and after the implementation of the intervention program and the participation in school's physical education lessons, recording the maximum number of correct steps instead of the correct steps up to a specific number, and the maximum number of seconds instead of the seconds up to a specific number (Table 4).

Statistical Analysis

For the statistical analysis the Statistical Package for Social Sciences (SPSS) ver. 18.0 for windows was used. Calculation of the means and *SDs* of data was included using descriptive statistics. The *non-parametric test Kruskal-Wallis* was used for analysis of between groups' differences in each measured task. Initial and final measurements constituted the dependent variables, with independent variable being the (experimental and control) group using the *Wilcoxon* 2-related sample test. The level of significance was set at $p<0.05$.

Results

The non-parametric Kruskal-Wallis test revealed no significant results between the experimental and control group in initial measurements. However, significant differences found between the two groups in final measurements that is after the 8-week intervention program (Table 5).

Table 5. Kruskal-Wallis test: Pre-post-values of balance tasks

Measure	Group	*N*	Mean rank	Chi-square	*df*	Asymp. Sig. (2 tailed) *p*
MABC-2						
Two-board balance (Pretest)	Experim.	9	7.33	0.041	1	0.840
	Control	5	7.80			
Two-board balance (Postest)	Experim.	9	8.89	2.834	1	0.092
	Control	5	5.00			
Walking backwards (Pretest)	Experim.	9	8.95	3.030	1	0.080
	Control	5	4.95			
Walking backwards (Postest)	Experim.	9	4.10	5.218	1	0.022
	Control	5	9.39			
Zig-zag hopping with right leg (Pretest)	Experim.	9	7.44	0.005	1	0.942
	Control	5	7.60			
Zig-zag hopping with right leg (Postest)	Experim.	9	9.22	4.583	1	0.032
	Control	5	4.40			
Zig-zag hopping with left leg (Pretest)	Experim.	9	6.83	0.770	1	0.380
	Control	5	8.70			
Zig-zag hopping with left leg (Postest)	Experim.	9	8.67	2.410	1	0.121
	Control	5	5.40			
BOT-2						
Walking forward on a line (Pretest)	Experim.	9	5.70	3.154	1	0.068
	Control	5	9.95			
Walking forward on a line (Postest)	Experim.	9	7.44	0.005	1	0.946
	Control	5	7.60			
Standing on the right leg on a balance beam (Pretest)	Experim.	9	7.17	0.165	1	0.685
	Control	5	8.10			
Standing on the right leg on a balance beam (Postest)	Experim.	9	8.94	3.024	1	0.082
	Control	5	4.90			
Standing on the left leg on a balance beam (Pretest)	Experim.	9	8.22	0.768	1	0.381
	Control	5	6.20			
Standing on the left leg on a balance beam (Postest)	Experim.	9	9.33	4.883	1	0.027
	Control	5	4.20			

Descriptive statistics for each measurement of balance of MABC-2 and BOT-2 tests assessed prior to and following the intervention program for the experimental group and the significance of any demonstrated change are shown in Table 6. In addition, in Figure 1 are presented the mean changes after the intervention program for the experimental group.

Table 6. Descriptive data of measurements for balance and significance for the Experimental Group, before and after the Greek traditional dances and Pilates

Measure	*Pretest*		*Posttest*			
	M	***SD***	***M***	***SD***	***z***	***p***
MABC-2						
Two-board balance (sec)	14.11	9.4	37.44	3.60	-2.547	<0.01
Walking backwards (steps)	14.33	1.658	19.56	6.146	-2.395	<0.05
Zig-zag hopping with right leg (hops)	4.11	1.054	6.22	2.949	-2.226	< 0.05
Zig-zag hopping with left leg (hops)	4.11	0.601	6.78	3.270	-2.354	< 0.05
BOT-2						
Walking forward on a line (steps)	8.00	4.00	13.00	3.742	-2.530	< 0.01
Standing on the right leg on a balance beam (sec)	6.11	2.522	14.22	10.195	-2.201	< 0.05
Standing on the left leg on a balance beam (sec)	7.67	2.598	14.56	9.580	-1.970	< 0.05

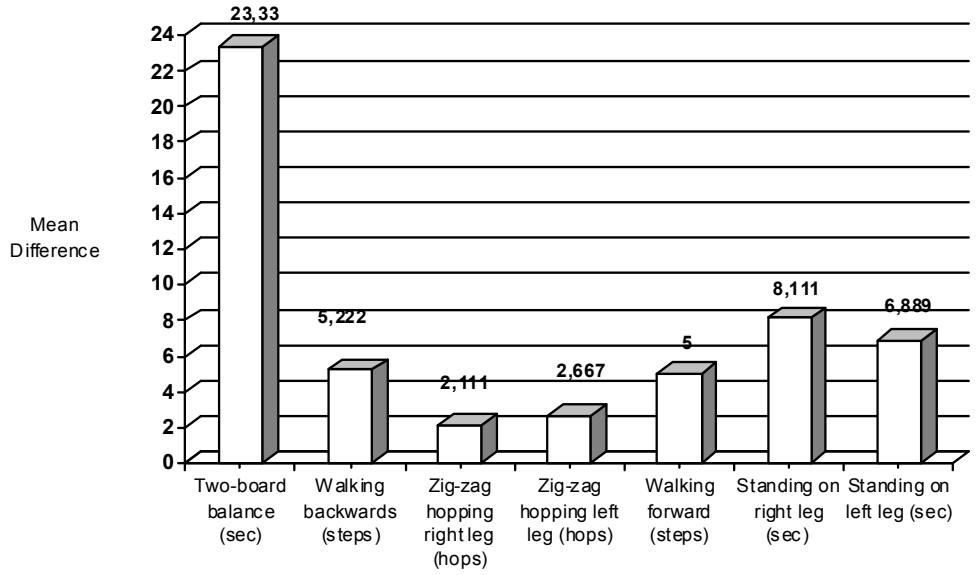

Figure 1. Mean Difference of the measurements before and after the Greek traditional dances and Pilates for the Experimental Group.

There were found big improvements in all the variables of balance for the experimental group (Fig. 1). Moreover, the *non-parametric Wilcoxon signed rank test* revealed that the differences in all the measured variables for the experimental group after the intervention program were significant (Table 6).

Descriptive statistics for each measurement of balance of MABC-2 and BOT-2 tests assessed prior to and following the physical education lessons for the control group and the significance of any demonstrated change are shown in Table 7. In addition, in Fig. 2 are presented the mean changes for the control group.

Table 7. Descriptive data of measurements for balance and significance for the Control Group

Measure	*Pretest*		*Posttest*			
	M	***SD***	***M***	***SD***	***z***	***p***
MABC-2						
Two-board balance (sec)	13.60	9.423	16.40	13.576	-1.633	NS
Walking backwards (steps)	11.80	2.387	11.60	3.507	-0.272	NS
Zig-zag hopping with right leg (hops)	4.20	0.837	3.60	0.894	-1.732	NS
Zig-zag hopping with left leg (hops)	4.40	0.894	4.40	0.894	0.00	NS
BOT-2						
Walking forward on a line (steps)	12.80	2.950	13.00	1.414	-0.677	NS
Standing on the right leg on a balance beam (sec)	6.40	2.510	6.40	3.209	0.00	NS
Standing on the left leg on a balance beam (sec)	6.40	2.074	7.60	4.336	-0.962	NS

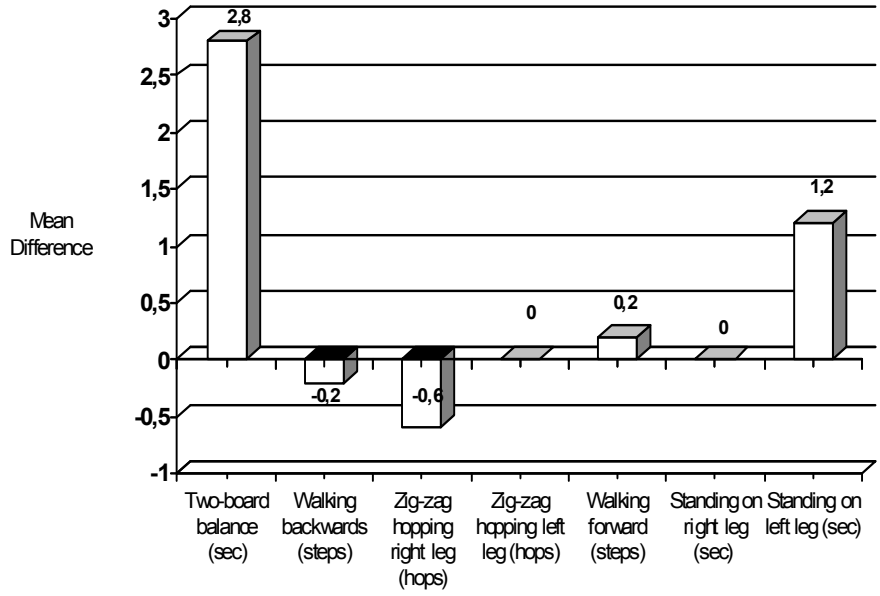

Figure 2. Mean Difference of the measurements for the Control Group.

There was no significant difference for the control group according to the *non-parametric Wilcoxon signed rank test*. Thus, after the 8-week program with Greek traditional dances and Pilates, there was a significant improvement in terms of static and dynamic balance ability in the experimental group (Table 6), while no difference was found after the 8-week participation in the physical education lessons in the control group (Table 7).

Discussion

Concerning the balance ability, children who are blind have a disadvantage compared with the sighted children due to their disability, and due to the fact that they tend to participate in physical activities less often (30). So, interventions are needed for the improvement of blind children's balance (12). Studies have shown that the participation in sports and physical activities improves blind children's balance. More specifically, Ray et al. (35) found out that Tai Chi promotes strength and balance for individuals who are visually impaired. Moreover, Colak et al. (8) showed a significant advantage of blind and visually impaired goalball team players over their respective control groups on the Flamingo balance test. In agreement with these findings, the children of the experimental group in the present study after practising in Greek traditional dances and Pilates for 8 weeks achieved significant improvement in terms of static and dynamic balance ability. In reverse, the children of the control group who didn't participate in any specific exercise program didn't present any improvement in all the measured balance variables.

Besides, the higher levels of static and dynamic balance ability exhibited by the participants of the experimental group because of the application of the Greek traditional dancing and Pilates program are also strengthened by the findings of previous research studies in which even programs that are short in duration, like a

short-term intervention consisting of a sports education camp (33), or a 1-week developmental sports camp (25), led to improved motor skill performance in children with visual impairment. In addition, our study suggests that the duration of the 8 weeks of the Greek traditional dance and Pilates intervention is long enough to allow children who are blind to develop statistically significant improvements in balance. In accordance to this assessment, balance improved in 11 participants and physical condition in 22 participants in a 5-6 week program with physical training which was designed to develop balance and coordination in 24 visually impaired and deaf-blind people (43).

Moreover, Lieberman (24) suggested that children with visual impairment should participate in movement activities with changing conditions as well as activities that are more constant in order to experience the performance of different kinds of motor skills. The forces generated while rapidly changing direction, stopping, landing, as well as during jumping may lead to excellent balancing properties (8). Such types of activities are dance and Pilates, too. Thus, it is not just practicing but mainly it is practicing on dance and Pilates, the performance of complex motor skills that requires a great sense of balance, which improved children's balance in the present study.

Dance can help develop the spatial concepts of children with visual impairments that are essential for independent movement, as it was shown after a program of instruction with exercises based on dance techniques, short dance combinations, and a three-minute dance routine (6). Moreover, in a study by Larsson and Frandin (22), a dance-based training in blind and visually impaired adults aged 30-62 years improved their dynamic balance. Attending dance movement sessions, the blind children discover that their whole body can record senses of feeling. It is a movement form uniquely suited to blind and deaf/blind people because it is based on the sense of touch, as two people move in close physical contact (3).

Furthermore, the contribution of Pilates based exercise training was very important for blind children's balance improvement in the present study. Pilates may develop trunk muscles and restore muscle balance by using a combination of muscle strengthening, lengthening and breathing (2). Pilates exercises' advantage is that they are suitable for each age, all body types and for all fitness abilities due to the modifiable nature of movements (5, 17, 40), and that they may improve balance, offering a static to dynamic muscular re-education approach to the participants (19). These characteristics may explain the effect of Pilates on blind children's balance in the present study, because Pilates exercises were adapted to blind children's body types and movement abilities and were oriented to their balance improvement. Besides, the use of balance-specific exercises, including Pilates, Tai Chi and other soft forms of martial arts, may have more influence on balance measurements such as postural sway and static balance (39).

In agreement, other investigators found that Pilates-based exercise improved the dynamic balance in healthy adults (16), in older adults (42), as well in 15-18 years old girl students with lumbar hyperlordosis, indicating that Pilates exercises have a potential role to improve the students' postural abnormalities (45). In addition, Clary et al. (7) found that Ballates training improved effectively the dynamic balance, while step aerobics and walking programs improved both static and dynamic balance in sedentary blind and visually impaired females aged 50-75 years. Krebs (20) also showed that a Hatha Yoga exercise program improved the body image, balance and spatial awareness of visually impaired students. As a result, it could be said that the implemented Greek traditional dance and Pilates program may, indeed, provide an opportunity for children who are blind to improve their balance. So, practice in tasks like dance and Pilates can help the blind young participants to demonstrate a better sense of balance in non-dancing/Pilates tasks that can be supported by the theory for the transfer of motor abilities. Thus, based on the general motor ability hypothesis (1), the better sense of balance as a human motor skill, should remain observable among various tests requiring balance skills. In addition, the philosophy of dance and Pilates is similar to the aims of education programs in which are valued the opportunities for non-competitive, success-oriented and creative experiences for young children. Pilates and dance, at an early age, not only prevent bad posture and motor impairment from developing, but they also improve the coordination and balance of all the children (26), mainly of those with visual impairments.

Conclusions

Consequently, the present study clearly shows that blind children's static and dynamic balance ability can be significantly improved by using a Greek traditional dance and Pilates program. The increase of balance scores that the blind children in the experimental group obtained in the final measurement, in comparison with the unchangeable scores of the blind children in the control group, is a clear evidence of the benefits of the 8-week intervention program. It remains a subject of future studies to further specify the effectiveness of Greek traditional dancing and Pilates exercises separately on the static and dynamic balance ability, as well as on other abilities of blind individuals of all ages.

Practical Applications

From the results of the present study, it can be said that for this specific sample of blind individuals there is a direct relationship between the application of Greek traditional dance, as well as Pilates movements, and the significant improvement of static and dynamic balance ability. Greek traditional dance and Pilates movements

constitute an exceptional way of exercise for improving balance and, consequently, for preventing fall incidents, as well as for providing the opportunity to walk, run and jump in various ways and for detecting veering of individuals who are blind. Thus, Greek traditional dance and Pilates movements can provide a direct positive effect not only on the improvement of physical and motor skills of blind children, but also on the independence and on the improvement of their quality of life in childhood, as well as in adulthood.

Following an action research approach, the overall intention of the study is to present its findings to Greek traditional dance teachers, to Pilates practitioners and additionally to Physical Education teachers, and in the light of these findings, to encourage them to apply programs with Greek traditional dances and Pilates movements for children with visual impairment. Educators need to guide blind children's natural urge to dancing and Pilates and preserve their movement spontaneity during adult life, they need to encourage children to learn and grow through movement, dance activities and Pilates based exercises. Thus, it is imperative practitioners, teachers, physical educator teachers, parents and people who work on individuals who are blind to encourage them to participate in physical activity and certainly in Greek traditional dancing and Pilates movements whose contribution is very big in the development / improvement of the balance ability, which in turn is very important in everyday life of these people. Consequently, on the one side Greek traditional dances and Pilates, as exercise forms, should constitute an integral part of school physical education lessons of children who are blind, while on the other side children who are blind should, also, participate in Greek traditional dance and Pilates movements beyond their school obligations.

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