



# The examination of the effects of a Greek traditional dance program on physical fitness parameters of high school students

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**Abstract:** The purpose of the present study was to examine the effects of a program with Greek Traditional Dance (GTD) as an alternative form of physical activity (PA) in the context of the school physical education (PE) course, on aerobic capacity, muscular strength, muscular endurance, and flexibility, of high school students. In the research participated voluntarily 36 high school students, aged 15-17 years, who were randomly divided into a GTD group (n=18) and a control group (n=18). Cooper's 12-minute walk test was used to assess aerobic capacity. For the evaluation of the other variables of physical fitness (PF), field tests from Eurofit Fitness Tests were used. All students performed the tests before and after the end of GTD program and regular PE school program. The statistical package SPSS/PC version 23.0 for windows was used for statistical analysis. The data analysis showed that after the GTD program aerobic capacity increased significantly from 1253.06±194.09 to 1426.00±201.48 meters (t=-6.156; p<0.001), muscular strength from 163.06±38.29 to 170.11±36.34 cm (t=-2.928; p<0.01), muscular endurance from 19.06±5.94 to 22.39±6.34 repetitions (t=-3.424; p<0.001), while flexibility remained unaltered. After the regular PE course program, the measured PF variables remained stable, except for muscular endurance which increased significantly from 17.72±4.01 to 18.67±3.90 repetitions (t=-2.799; p<0.01). The results of the present study demonstrate very positive effects of the GTD program, as an alternative form of PA during PE course at school, on PF parameters. As for the regular PE school program, although it may have some positive effects, it does not inspire student participation. Therefore, GTDs are an alternative form of PA that can inspire the participation of high school students, but also can form the basis of a lifelong exercise, with many positive effects on physical well-being parameters for students nowadays and adult citizens in the future.

**Keywords:** dance, adolescents, physical education, aerobic capacity, muscular strength, muscular endurance, flexibility.

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## INTRODUCTION

Adolescent participation in PA is necessary because of its benefits at a biological, developmental, and psychological level. In fact, it should be mentioned that at this age PA levels are a health indicator [1]. Adolescence is a critical age not only because of developmental changes, but also because of increased schoolwork load, many responsibilities, and reduced available free time. Unfortunately, all these factors affect in a negative way adolescents' engagement with PA. Thus, globally, 81% of adolescents aged 11-17 are insufficiently physically active [2]. In addition to the lack of PA, today's teenagers due to "modern lifestyle" spend a lot of time in front of screens, mobile phones, computers, all of which burden body posture and lead to musculoskeletal problems and, simultaneously, high rates of obesity [3,4].

Obesity in young people is one of the most important factors of chronic diseases. Diseases, such as obesity and hypertension in adulthood, are caused during childhood-adolescence, due to dietary and kinetic habits adopted at these ages [5]. Increasing PA in children, adolescents and adults not only helps prevent and manage cardiovascular diseases, type 2 diabetes, and cancer, but also reduces depression and anxiety symptoms, and cognitive decline -including Alzheimer's disease-, while improves memory [2]. In order to increase PA, WHO [2] recommends that children and adolescents, aged 5-17 years, participate in moderate-to-vigorous intensity mainly aerobic PA, on average, for at least 60 minutes every day of the week, and also participate in resistance exercises to strengthen muscles and bones, at least 3 times a week. In addition, it is recommended to reduce sedentary time and especially time spent in front of screens. Therefore, it is necessary to develop effective PA promotion interventions so that children and adolescents are motivated and involved as much as possible.

Adolescent students' engagement in exercise and PA is determined to a significant extent by the perceived benefits of participating in PA [1]. It is worth noting that adolescent involvement in sports and their performance improvement is accompanied by experiences of success and satisfaction, thus increasing the feeling of effectiveness and their will to adhere to PA [6]. School-based PE can contribute to enhancing students' self-efficacy and can positively influence children's attitudes and participation in exercise. Young individuals, aged 12 to 17 years, go through important transitions from elementary school to high school and from childhood to adulthood. In addition to becoming increasingly independent, they experience significant physical, mental, emotional, and social changes. PA levels decline at this age, with the greatest decline recorded at high school age. The influence from the environment (family, friends, role models) and of course the influence children receive from school, play a role in this [7]. Furthermore, demanding, and unpleasant experiences, during initial efforts to increase PA and also during school PE, lead to lower perceived control over PA and discourage future PA engagement. Conversely, enjoyable, and successful experiences help students realize the benefits of exercise, become motivated, and overcome internal and external barriers in order to adhere to PA in the long term [8].

According to the Ministry of Education and Religious Affairs of Greece [9], the main purpose of PE in high school is defined as a "lifelong exercise aiming to health and quality of life". Among other things, PE in high school must develop new skills in new PAs (sports, dances, etc.) and show improvement or the desired level of PF indicators related to health. Implementing programs with alternative forms of PA during PE course at school can make PE lessons more attractive and interesting in order for all students to participate, and possibly even those who do not like PE. Participating in PAs that are interesting, attractive, and addressed to all students -regardless of weight, height, body type, special physical skills and abilities, shyness, insecurity, loneliness, problems expressing themselves, and difficulties making friends- can motivate all students to choose a PA they like, to adhere to that PA and continue participating in it during adulthood.

One such PA is dance. People who participate in dance have fun, recreate, socialize, and improve their physical and mental health [10, 11]. In addition, participating in dance can activate a significant number of muscles, increase burning which results to a significant effect on metabolism, accelerate heart activity such as its endurance and blood flow, improve maximum oxygen intake, improve myocardial function, while increasing blood circulation and pulmonary ventilation. In addition, dance, as a PA, improves balance, thus reducing the risk of falls, especially in older people [12-15]. Aerobic dance relieves stress and improves social, cognitive, emotional, and physical development in adolescents [16]. In addition, dance is one of the favorite PA of adolescents, especially girls. More specifically, it is the third most popular PA because it is accompanied by pleasant music which helps people express their inner world, and offers a fun way to be physically active and in good PF. Therefore, dance is an attractive PA which can be adapted to match individuals' age, physical abilities, and culture [17], elements that are also mentioned in GTD. GTD as a form of PA has been shown to have positive effects both on physiological and psychosocial characteristics, as well as on health and well-being parameters of the participating individuals [18-20].

From the review of relevant literature appeared that there are reports on the effects of GTD programs on PF parameters in other age groups, such as adults, middle-aged and elderly people. However, as far as we know, there are no studies on the benefits of high school students from their participation in a GTD program during PE course at school. For these reasons, the purpose of the present study is to examine the effects of a GTD program, as an alternative form of PA in the context of school PE course, on aerobic capacity, muscular strength, muscular endurance, and flexibility of high school students from their participation in the program.

## MATERIAL AND METHODS

### *Participants*

Forty-five high school students from the city of Katerini in Greece, volunteered to participate in this study, after a briefing about the research. Subsequently, a second online briefing concerning the procedure, the separation in intervention and control group, the participation in at least 80% of the total lessons, as well as the inclusion criteria was held. All the students fulfilled the inclusion criteria, that is no participation in any GTD or exercise programs out of school. All students presented an Individual Student Health Card in order to participate in the research. In addition, all students provided written consent from their parents or guardians, after informing them about the research, allowing them to participate in the intervention program and measurements.

The subjects were separated randomly into an intervention group (n=23, 8 boys and 15 girls) and a control group (n=22, 8 boys and 14 girls). However, during the research 3 students changed school, 4 students took up modern dance lessons and started exercising out of school, and 2 students did not complete the required percentage of participation in the lessons due to absences (<80%). After that, 18 students (4 boys and 14 girls) participated in the intervention group and 18 students (8 boys and 10 girls) participated in the control group. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Research Ethics Committee of Aristotle University of Thessaloniki, (Protocol number: 176489/20/07/2021).

### *Procedure*

Firstly, all students answered questions during a personal interview with the PE teacher regarding age, academic performance of their previous school year and involvement in PA outside of school. Then, the students in both groups participated in tests to assess PF parameters, which were carried out during PE lessons at school. It is worth noting that there was given time for demonstration of the tests and instructions concerning correct and safe execution, as well as warm-up time. Afterwards, the students in

the intervention group participated in the GTD program, while the students in the control group participated in the regular PE school program.

More specifically, the students in the intervention group participated in a group program of GTDs during PE lesson at school, twice a week, for 45 minutes, for 10 weeks. At the beginning of each lesson, new dances were taught or already taught dances were practiced at a slow-to-moderate pace, to warm up the cardiorespiratory and musculoskeletal system [21]. Then, until the end of each lesson already taught dances were practiced at a fast tempo with the aim of reaching the heart rate at 162-192 beats per minute, i.e., at 80-95% of maximum Heart Rate (HRmax). Continuous training method was used. There were frequent rhythm alternations so that students could keep dancing continuously throughout each dance lesson. The performed GTDs were from different areas all over Greece. The program contained a variety of dances, regarding rhythm, kinetic repertoire, and style. The dances that were included in the program were: Kalamatianos, Tsamikos, Sirtos sta tria, Podaraki, Sfarlis, Baidouska, Zonaradikos, Macedonian Sirtos, Raiko, Zaramo, Lytos, Kori Eleni, Trehatos, Chromatista Tsurapia, Macedonian Antikristos, Zacharoula, Berati, Zagorisios, Rouga, Sirtos Zakynthinos, Pentozali, Ikariotikos, Rhodesian Pidichtos, Tick, Kotsari, slow Hasapia, and fast Hasapia. During dance execution, there was constant guidance concerning correct trunk posture - with activated abdominal muscles-, breathing, handhold, as well as regarding correct and safe execution of steps and whole-body movements.

The students in the control group participated in the regular PE school program, twice a week for 45 minutes, for 10 weeks. In the first part of PE course, there was an 8-10-minute warm-up, which contained relaxed jog or low-to-moderate intensity group game and stretching, followed by running exercises. The main part of PE course lasted 35-37 minutes and included basketball, handball, football, volleyball, ping-pong, badminton, circular-cross training, drills, jumping, throwing, competitive games, and body strengthening. The class ended with a 5-minute cool-down followed by relaxed exercises and stretches.

After the end of GTD program, and regular PE school program the students in both groups participated again in tests to assess PF parameters, during PE lessons at school. The personal interviews, measurements, GTD program and regular PE school program were conducted by a single, female investigator, teacher of PE lesson with extensive practical experience in GTDs and PE teaching.

### *Measurements*

#### *Aerobic capacity*

Cooper's 12-minute walk test [22] was used to assess aerobic capacity. In this test, children walk as fast as possible for 12 minutes and the distance covered is measured in meters (m). The measurement takes place in a specially designed and measured space, meter by meter. To check reliability of the test, heart beats per minute are measured at the end of each test, which for all students ranged from 168 to 192 beats per minute. Score: Distance covered during this 12-minute walk in m.

#### *Muscular strength*

In order to evaluate muscular strength, the standing long jump, from Eurofit Fitness Tests, was used. In this test, students stand with feet apart at regular distance (shoulder width), with toes just behind a starting line. With bent knees and both arms in the front and parallel to the ground, students swing both arms, push dynamically and jump as far as possible. Score: Distance from the starting line to the back of students' shoes in centimeters (cm). Two attempts are allowed and the best one is recorded.

#### *Muscular endurance*

To evaluate muscular endurance, the number of trunk curls in 30 sec, from Eurofit Fitness Tests, was used. In this test, a student lies on a mattress with their back straight and hands behind the neck. Their knees are bent at a 90° angle, heels and soles of the feet

touching the mat, with the help of a classmate. The student, starting from a sitting position, lies back on their back so that their shoulders touch the mat, and returns to a sitting position with elbows out and forward so that they touch their knees. The test begins when timer starts. Score: Total number of correct trunk curls made in a 30-sec time period.

#### *Flexibility*

To assess flexibility, the trunk bending from a sitting position with extended knees, from Eurofit Fitness Tests, was used. In this test, a ruler in cm is attached to the edge of a bench or a box. Students bend their torso forward with their arms fully extended as far as they can, while keeping their knees straight. The test is repeated twice and the best effort is recorded. Score: Ruler's mark in cm at the point where students' fingertips reach after bending.

#### *Statistical analysis*

The statistical package SPSS/PC version 23.0 for windows was used for the statistical process of the data. Firstly, a descriptive analysis of the results was done. The t-test for independent samples was used to test the differences between the 2 (two) groups at the baseline concerning their anthropometric characteristics. In addition, difference tests were carried out between the 2 (two) phases of the study in PF parameters. The tests were performed with t-test for dependent samples, when the differences during observations followed a normal distribution. However, wherever normality of differences was violated, t-test was replaced by non-parametric Wilcoxon test, which examines the possible significant difference in the medians of total scores. The level of significance was set at  $p < 0.05$ .

## **RESULTS**

In Table 1 are presented the anthropometric characteristics of the intervention group that participated in the GTD program, and the control group that participated in the regular PE school program. Independent samples t-tests showed that, at the baseline, there was no significant difference between the two groups, concerning age, height, weight, and Body Mass Index (BMI) (Table 1). In Figure 1 and Table 2 are shown the statistics for aerobic capacity, prior to and following the 10-week GTD program concerning the students in the intervention group and prior to and following the 10-week regular PE school program regarding the students in the control group. As for the GTD group, there was a significant improvement in students' aerobic capacity from  $1253.06 \pm 194.09$  m before intervention to  $1426.00 \pm 201.48$  m after intervention, ( $t = -6.156$ ;  $p < 0.001$ ). On the contrary, students' aerobic capacity in the control group remained almost unaltered ( $p = 0.846$ ) (Figure 1, Table 2). In Figure 2 and Table 2 are presented the statistics for muscular strength, prior to and following the 10-week GTD program for the students in the intervention group and prior to and following the 10-week regular PE school program for the students in the control group. It is obvious that muscular strength improved significantly in the GTD group from  $163.67 \pm 38.29$  cm to  $170.11 \pm 36.34$  cm after the 10-week GTD program ( $t = -2.928$ ;  $p < 0.01$ ), while remained unchanged for the control group after the 10-week regular PE school program (Figure 2, Table 2). In Figure 3 and Table 2 are shown the statistics for muscular endurance, prior to and following the 10-week GTD program for the students in the intervention group and prior to and following the 10-week regular PE school program for the students in the control group. In Figure 3 and Table 2 can be seen that students' muscular endurance in the GTD group improved significantly from  $19.06 \pm 5.94$  repetitions before the program to  $22.39 \pm 6.34$  repetitions after the program ( $t = -3.424$ ;  $p < 0.001$ ). Similarly, the students in the control group show a significant improvement in the second phase of measurements ( $t = -2.799$ ;  $p < 0.01$ ) in relation to their initial values ( $17.72 \pm 4.01$  repetitions before;  $18.67 \pm 3.90$  repetitions after). Moreover, in Figure 4 and Table 2 are shown statistics about flexibility, prior to and

following the 10-week GTD program for the students in the intervention group and prior to and following the 10-week regular PE school program for the students in the control group. Statistical analysis showed that flexibility remained almost unchanged both in the GTD group ( $p=0.260$ ) and in the control group ( $p=0.507$ ), a fact that was expected (Figure 4, Table 2).

Table 1. Sample's anthropometric characteristics.

Characteristics	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	Statistical significance
Age (years)	15.06 $\pm$ 0.24	15.44 $\pm$ 0.86	0.126
Height (m)	1.65 $\pm$ 0.76	1.68 $\pm$ 0.07	0.207
Weight (kg)	56.0 $\pm$ 10.76	62.0 $\pm$ 12.69	0.135
BMI (kg/m <sup>2</sup> )	20.47 $\pm$ 3.67	21.73 $\pm$ 3.40	0.294

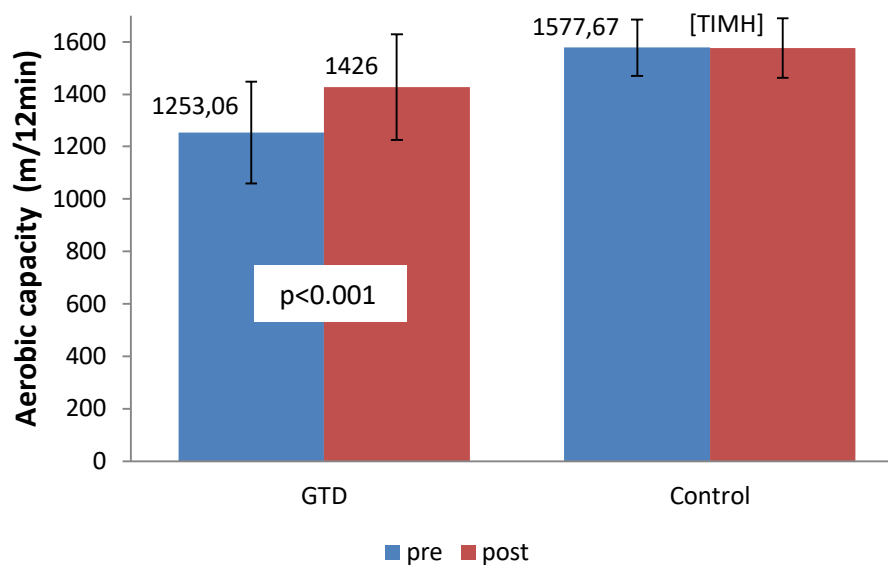


Figure 1. Aerobic capacity of the GTD group and the control group, before and after the 10-week period.

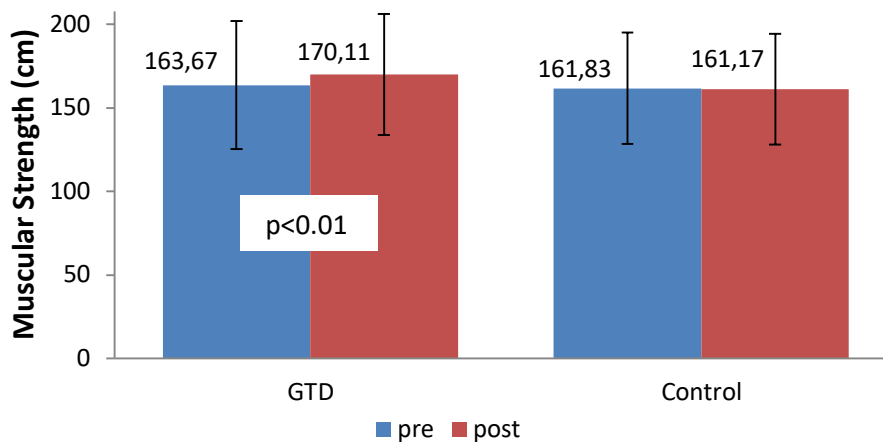


Figure 2. Muscular strength of the GTD group and the control group, before and after the 10-week period.

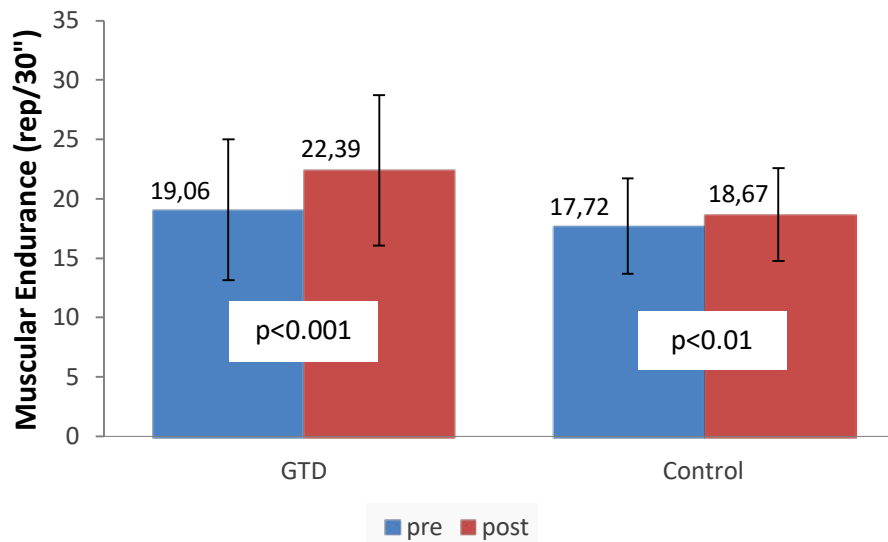


Figure 3. Muscular endurance of the GTD group and the control group, before and after the 10-week period.

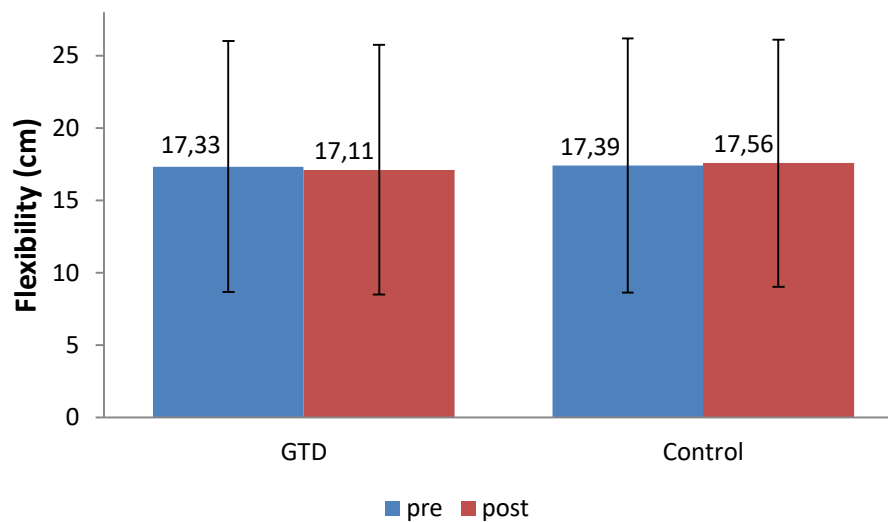


Figure 4. Flexibility of the GTD group and the control group, before and after the 10-week period ( $p>0.05$ ).

Table 2. Descriptive data and differences of physical fitness parameters of GTD and control group

Group	Physical FitnessParameters	Pre 10 weeks Mean±SD	Post 10 weeks Mean±SD	p
Greek traditional dance group	Aerobic capacity(m covered)	1253.06±194.09	1426.00±201.48	0.001
	Muscular strength (jump length in cm)	163.67±38.29	170.11±36.34	0.01
	Muscular endurance (number of curls in 30 sec)	19.06±5.94	22.39±6.34	0.001
	Flexibility (cm)	17.33±8.68	17.11±8.62	0.260
Control group	Aerobic capacity(m covered)	1577.67±107.00	1576.61±112.94	0.846
	Muscular strength (jump length in cm)	161.83±33.19	161.17±33.16	0.097
	Muscular endurance (number of curls in 30 sec)	17.72±4.01	18.67±3.90	0.01
	Flexibility (cm)	17.39±8.78	17.56±8.52	0.507

p - statistical significance

The statistical analysis of the results regarding measurements carried out before and after the 10-week GTD program, shows that the students who participated in GTDs, significantly improved all PF parameters, except for flexibility in which there was no differentiation. On the other side, the students in the control group who participated in regular PE school program presented no improvement in all PF parameters except for muscular endurance improvement. These results demonstrate that participating in the GTD program significantly improved students' PF (Table 2).

## DISCUSSION

The results of the present study demonstrate that the 10-week program with GTD during PE lesson at school had significant effects on high school students' PF. Specifically, there was an improvement in aerobic capacity, muscular strength, and muscular endurance in intervention group due to their participation in the GTD program. Conversely, control group's performance declined in aerobic capacity and muscular strength but improved in muscular endurance. Flexibility remained the same for both groups.

Regarding aerobic capacity, its significant improvement in the intervention group may be due to the intensity of GTDs, which was high, as students' HR ranged at 80-95% of HRmax. Besides, it has been shown that GTD is a form of aerobic exercise and can cause improvements in maximal oxygen uptake, cardiorespiratory endurance, myocardial function, while increasing blood circulation and pulmonary ventilation, similar to those of aerobic exercise [13-15,19]. The findings of the present study confirm the study of Blackmann et al. [23], who found that 8 high school girls, aged 14-15 years, who participated for 4 months in high school dance team, improved their maximal oxygen uptake compared to 8 girls who participated in PE class.

Similar results showed Flores [24] in a study of African American and Hispanic adolescent students in seventh grade, aged 12.6 years (mean). More specifically, the researcher formed an intervention group, consisting of 43 students who received a health education curriculum twice a week and Dance for Health, a dance oriented physical education class three times a week for 50 min. Each 50-min period was divided into 10 min for warm-up and cool-down and 40 min for moderate-to-high intensity aerobic dance. The latest popular hip-hop music was selected for dance routines developed by the instructors. The control group participated in usual PA consisted mostly of playground activities. Both groups participated in the study for 12 weeks. The results showed that the students in the intervention group had a significantly greater lowering in resting HR and BMI than the students in regular PE class. In addition, the program appears to be more effective with girls than boys. Thus, an aerobic dance program is proved to be an effective program to improve fitness and reduce weight in minority adolescent students. The researcher concluded it is likely that a program extending over the entire school year would have even greater effects.

Similarly, Adiputra et al. [25] examined the effects of Balinese dance, an ancient dance tradition that is part of the religious and artistic expression among Balinese people of Bali Island, on 60 young Balinese males, aged from 17 to 19 years. The subjects were divided into experimental group, that participated in a program of Balinese dance exercise, three times a week for 50 min for 8 weeks and control group, that did not participate in any program. The results showed a very significant improvement of  $VO_2$ max from  $2.7 \pm 0.5$  l/min or  $51.1 \pm 9.1$  ml/kg/min to  $3.1 \pm 0.5$  l/min or  $58.9 \pm 9.8$  ml/kg/min, regarding the experimental group. In addition, resting HR, blood pressure and body fat percent decreased significantly. The researchers concluded that Balinese dance exercise could be used as a program for PF maintenance. Moreover, findings of the present study agree with findings of other studies, in which was shown that engaging in GTD improves HR, oxygen uptake and aerobic capacity in middle-aged men and women [18,19,21,26,27]



and postmenopausal women [20], and also improves endurance in patients with chronic heart failure [28].

However, Dagka [29] found no effect of an 8-week creative dance program, 3 times a week for 40 min per class, on cardiovascular endurance as measured by the 3 min Step Test in primary school students aged 6 to 8 years, specifically 1st and 2nd grade of primary school. The fact that the program had no effect on cardiovascular endurance may be due to dance type and program duration. Nevertheless, other researchers found significant effects of dance programs on young children. More specifically, Mavridis et al. [30] and Kouli et al. [31] evaluated health-related fitness levels in young students, 6 to 7 and 10 to 11 years old, respectively. The experimental groups in both studies, followed an aerobic dance program for twelve weeks, three times per week, for 45-min sessions during PE class, while the control group followed regular PE school program. The results showed that cardiorespiratory endurance, muscular strength, muscular endurance, and flexibility improved considerably after applying the aerobic dance program. Studies of Mavridis et al. [30] and Kouli et al. [31] are confirmed by the results of the present research both in terms of aerobic capacity and muscular strength, as well as muscular endurance.

As for muscular strength, its significant improvement in the intervention group after the GTD program may be because during GTDs are performed small and big steps, slow and/or fast, walking and/or running steps, jumps on one or both legs, turns and spins, half sits, and body weight alterations between feet, during all of which leg muscles are mainly involved. In addition, the results of the present study confirm the results of Vordos et al. [28], who found significant improvements in aerobic capacity and lower limb strength, in twenty patients with chronic heart failure, who participated in a three-month physical rehabilitation program based on GTD concerning its main part sessions, consisting of three 40-65 min sessions weekly. However, the results of the present study disagree with the research of Serra et al. [32], in which participated female dancers, aged  $67.4 \pm 5.9$  years, from two traditional Schools of Samba in São Paulo Brazil and female non-dancers. The female dancers participated regularly in choreographed rehearsals of "Wing of Baianas" once or twice a week, for five months during the period before Carnival. The researchers did not find any difference between dancers and non-dancers concerning muscular strength.

As for muscular endurance, measured by the number of trunk curls ("curl ups") in 30 sec, its significant improvement in the intervention group after the GTD program may be due to activation of all trunk muscles, since dance execution and practice requires correct body posture. After all, a strong trunk is a necessary precondition for dance, because it plays a key role in stabilizing the trunk and transferring energy, providing coordination throughout the body, and also ensuring high-quality execution of all movements [33]. In agreement, Davis [34] showed in her research an improvement in muscular strength in young children, since dancing activates all body muscles and increases movement range. Actually, dance training at a young age does appear to affect muscular function and related parameters, and young dancers have relatively good leg muscle explosive strength and mechanical power [35]. As for the control group's improvement in muscular endurance, this may be due to its participation in regular PE class at school, during which they executed "curl ups". Besides, "curl ups" is a favorite exercise for adolescents because they focus mainly on abdominal muscle fitness.

Furthermore, as shown by the results of the present research, students' flexibility remained unchanged after the GTD program. The findings of the present study are in agreement with the study of Blackmann et al. [23], in which no improvement was observed concerning the flexibility of 8 high school girls who participated for 4 months in their high school dance team. On the contrary, Mavridis et al. [30] and Kouli et al. [31] found significant improvements in the flexibility of elementary school students, who participated in a dance aerobic program, but also performed special exercises during each training unit.

It is worth mentioning that during GTD sessions the participants experience and share a pleasant environment, musical accompaniment, rhythmic and repetitive movements, a circular dance shape, an attribute of being a group member, a feeling of sharing common activities, as well as enjoyment and pleasure. These experiences help release stress, express emotions, enhance mood states and have social relationships [36]. In addition, among GTD characteristics are the lack of competition and the ability to adapt to participants' age and abilities [18,37]. Therefore, in such an environment, in which adolescents feel "safe", since failure chances are greatly reduced, confidence in their abilities may develop and lifelong exercise participation may be achieved. After all, school PE is a course that can contribute to increasing both students' self-efficacy concerning exercise and exercise benefits, with the ultimate goal of lifelong exercise participation [8, 38].

Given the need to engage young people in PA that may have positive effects and also achieve lifelong engagement, the findings of this research are very important. Therefore, the positive effects of GTD during PE lessons on PF, may lead to an increase in students' PA levels and an improvement in life quality, as well as their health, both during their student life and adult life. This fact suggests that GTD is an investment for their future. In consequence, it is necessary to enrich PE courses with attractive and effective alternative activities, especially regarding the sensitive group of adolescent students. Traditional dancing is the best choice to make!

## CONCLUSION

The results of the present study demonstrate positive effects of a GTD program, as an alternative form of PA, during PE course at school, on PF parameters, specifically on aerobic capacity, muscular strength, and muscular endurance of high school students. Therefore, the implementation of programs with alternative forms of PA, such as GTD, during PE course at school, aimed at all students, regardless of abilities, personality, and character, can lead to a PF improvement. The improvement of adolescent students' PF is a very important fact concerning their growth and development. Also, learning these skills and adopting active lifestyles and PA behaviors will help adolescents later during their adult life. Additionally, although the sample of this research is a representative part of Greek adolescent students and there is an equivalent control group, however it is acknowledged that this was a preliminary study with a small sample size. Further randomized studies that include larger sample sizes are needed to generalize these effects to the whole Greek adolescent student population.

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