

Effects of a Twelve-Week Aerobic Dance Exercises on Body Compositions Parameters in Young Women

Efectos de los Ejercicios de Danza Aeróbica Durante Doce Semanas sobre los Parámetros de Composición Corporal en Mujeres Jóvenes

Sasa Pantelic*; Zoran Milanovic*; Goran Sporis** & Jelica Stojanovic-Tosic*

PANTELIC, S.; MILANOVIC, Z.; SPORIS, G. & STOJANOVIC-TOSIC, J. Effects of a twelve-week aerobic dance exercises on body compositions parameters in young women. *Int. J. Morphol.*, 31(4):1243-1250, 2013.

SUMMARY: The aim of this study was to determine the effects of a twelve-week aerobic dance-training program on the body composition parameters of young women. The sample of 59 young women belonged to one of two groups, an experimental (EXP) or a control (CON) group. The experimental group consisted of 29 female subjects (age 23.1±1.9 years, body height 164.4±6.1 cm, body weight 62.1±5.6 kg, BMI 23.0±2.2 kg/m²), while the control group was made up of 30 subjects (age 22.7±1.8 years, body height 165.3±6.2 cm, body weight 59.4±6.3 kg, BMI 21.7±1.7 kg/m²). To assess body compositions, the following measures were used: the overall sum of the upper body skinfolds, the overall sum of the lower body skinfolds, the overall sum of skinfolds of the upper and lower body, the percentage of body fat, the percentage of muscle mass in the body, body height and body weight. For all of the sums of skinfolds for the subjects of the EXP group, we noted a statistically significant decrease ($p < 0.05$) at the final measuring in relation to the initial measuring (Σ SFUPPER - 39.35 mm compared to 42.87 mm; Σ SFLOWER - 39.35mm compared to 49.88 mm; Σ TOTAL SF - 76.97 mm compared to 92.75 mm). In the case of BF%, a decrease was noted at the final measuring in relation to the initial one (20.37% compared to 22.66%), which was statistically significant ($p < 0.05$). On the basis of our results, we can conclude that aerobic dance decreases subcutaneous fatty tissue and body composition of the young women.

KEY WORDS: Young women; Body fat; Muscle mass; Skinfolds.

INTRODUCTION

Dosed physical activity represents a significant factor for the preservation of the health and abilities of the human body. The importance of regular exercise for the maintenance and improvement of health has been confirmed in many studies (Blair *et al.*, 2004; Hu *et al.*, 2001). The modern way of life and work is such that technological development has forced man to focus more on intellectual and less on physical activities, which leads to health impairment and impairment to the normal functioning of organs and systems of organs (Weineck, 2004). The health of people with a sedentary lifestyle is usually affected by a decrease in the function of the locomotor, cardiovascular and respiratory systems. The modern way of life, which limits physical movements, leads to, especially in the case of people living in the city, an increase in cardiovascular diseases (myocardial heart attacks, hypertension, and the like), diseases of the intestines, an increase in body weight, an increase in the

BMI, an increase in body fat (Hass *et al.*, 2001) and the high rate of obesity is one of the most serious health risk factors (Saris *et al.*, 2003).

Physical activity is a vital part of a weight control program and comprehensive weight loss (Arslan, 2011). The positive effect of various aerobic physical activities on the changes in body composition and anthropometric characteristics of a person has been confirmed in many studies (Osei-Tutu & Campagna, 2005; Rahimi, 2006). Aerobic training activities are used to decrease body weight and body fat, and thus to change body composition (Jorgic *et al.*, 2011; Milanovic *et al.*, 2011, 2012). Apart from walking and running as a means of aerobic exercise used to decrease body weight and change body composition, various other exercise to music models are used which include steps, hops, turns, jumps, and other body movements (Milanovic *et al.*, 2012).

* Faculty of Sport and Physical Education, University of Nis, Serbia.

** Faculty of Kinesiology, University of Zagreb, Zagreb, Croatia.

Aerobic exercise to music or dance aerobics was especially popular during the last few years of the 20th century, primarily among women. A characteristic of this kind of exercise is that all of the people who are participating in the exercise to music program realize certain movements in the same rhythm and tempo, activating different muscle groups at the same time. Aerobic dance exercises have typically been developed as an aerobic exercise to reduce body compositions as well as improve physical fitness and performance (Kimura & Hozumi, 2012). Mandaric (2001) studied the effects of programmed exercise to music on a sample of 95 elementary school students. The results of this research have indicated statistically significant changes to almost all of the morphological characteristics after training program. Grant *et al.* (2004) have concluded that the utilized exercise program does have an effect on the increase in functional abilities and the change in the body composition of obese women after the aerobic dance programme. Kostic *et al.* (2006) has mentioned that dance aerobic training provide sufficient cardiorespiratory demand to promote weight loss in female. Most of these studies have investigated the body compositions by total fat or muscle mass expressed as body mass index, lean body mass, muscle mass or percentage of body fat. To our knowledge, practical issues such as the separate determination of body fat for upper and lower extremities as well as body fat reduction of different body area are still unclear.

Therefore, the aim of this study was to determine the effects of a twelve-week aerobic dance training program on the body composition parameters of young women. We assumed that that the aerobic training model of exercise to music can be an effective device for altering the thickness of skinfolds on the upper and lower body, as well as the body composition of young women.

MATERIAL AND METHOD

Participants. Fifty-nine of 66 female participants finished the training program and participated in the initial and final testing. Four participants dropped out from the experimental group and 3 from the control group. Participants dropped out from the experimental group due to lack of motivation to exercise ($n=2$), and lack of availability to participate in the study ($n=2$); three participants in the control group were ill during the final testing. The sample of 59 young women belonged to one of two groups, an experimental (EXP) or a control (CON) group. The experimental group consisted of 29 female subjects (age 23.1 ± 1.9 years, body height 164.4 ± 6.1 cm, body weight 62.1 ± 5.6 kg, BMI 23.0 ± 2.2 kg/m²), while the control group was made up of 30 subjects

(age 22.7 ± 1.8 years, body height 165.3 ± 6.2 cm, body weight 59.4 ± 6.3 kg, BMI 21.7 ± 1.7 kg/m²). The subjects of the experimental group participated in the aerobic training to music program. The training program was realized in the exercise hall of the Faculty of Sport and Physical Education in Nis, and all of the measurements were carried out at the Multidisciplinary Research Lab of the Faculty of Sport and Physical Education in Nis. The subjects of the (EXP) group were not suffering from any chronic illnesses, nor did they have any obstructions to the locomotor system, which could limit their range of motion during the realization of the aerobic training to music model. During the course of the experiment, these subjects did not participate in any other organized forms of physical activity, and were advised to continue with their everyday life activities and usual diet. All of the subjects in the experimental group voluntarily gave their consent to participate in the experiment and signed consent forms. The subjects in the (CON) group, apart from their everyday activities, did not participate in any organized physical activity and were advised to continue with their everyday activities and usual diets for the duration of the experiment. The Ethical Committee of the Faculty of Sport and Physical Education, University of Nis, certified that this investigation conformed to all ethical standards regarding scientific investigations involving human participants according to the Declaration of Helsinki.

Procedure. The initial testing took place before the beginning of the training program, and the final testing was performed after 12 weeks of intervention. During testing, the air temperature ranged from 22°C to 27°C. The initial and final testing always commenced at 10 a.m. and was completed by 1 pm to exclude diurnal variation of measurements. The effects of the aerobic training to music model on body composition were studied on the basis of how that training affected the thickness of skinfolds, percent of body fat and percent of muscle mass in the body. The following measures were used: the overall sum of the upper body skinfolds, the overall sum of the lower body skinfolds, the overall sum of skinfolds of the upper and lower body, the percentage of body fat, the percentage of muscle mass in the body, body height and body weight. SSFUPPER – the sum of the upper body skinfolds is made up of the overall sum of skinfolds in the following sites of the body: SFSCA – skinfold - subscapula, SFBIC – skinfold - biceps, SFTRI – skinfold- triceps. SSFLOWER – the sum of lower body skinfolds is made up of the overall sum of skinfolds in the following sites of the body: SFABD – skinfold - abdomen, SFTHI – skinfold – right thigh, and SFCAL – skinfold – right calf. STOTALSF – the overall sum of upper and lower body skinfolds. The choice of anthropometric measures was made in accordance to the effects of the utilized aerobic training to music. The anthropometric measuring was carried

out using the standard measuring instruments as stipulated by the International Biological Program (IBP). The skinfolds were measured using a Harpenden skinfold caliper (British Indicator, London, United Kingdom). Body weight, percentage of body fat (BF%) and the percentage of muscle mass (MM%) were calculated with the help of the bioelectrical impedance apparatus, TANITA UM-72 (Body Composition Monitor, Tanita Corp, Tokyo, Japan). Body height was assessed to the nearest 0.1 cm using a portable SECA Stadiometer 282 (SECA GmBH & Co, Hamburg, Germany). To calculate the values of the BMI we used a standard procedure based on the formula $BMI = \text{Body weight [kg]} / \text{Body Height [m]}^2$. The test-retest ICC for the skinfold assessment ranged from 0.94 to 0.99.

The exercise program. The experimental model is actually a disco-model of aerobic training to music which was created with the aim of affecting the body composition of the subjects in the EXP group. During the realization of the aerobic training model, all of the physiological and pedagogical principles of exercising were adhered to. The structure of the training sessions had the characteristics of the Hi/Lo model of aerobic exercise to music. Each part of the training session was realized at a different tempo, or in other words, the tempo varied depending on the phase of the training session. A total of 36 training sessions took place over a period of 12 weeks. Each training session lasted for a period of 60 minutes, and had an intensity of 60% to 80% of the maximum heart rate. All of the parts of the training session

were accompanied by music of an appropriate tempo. The characteristics of the aerobic training model are shown in Table I.

The music tempo for the introductory part of the training session was from 120 to 135 beats per minute (Brick, 1996). The exercises which were used for this part of the training session were aimed at preparing the joints and large muscle groups for the aerobic part of the training session. In addition to running and walking in place, the muscles and joints were warmed up by means of swings and circular movements.

The main part of the training session lasted for 40 minutes. It consisted of: a) an aerobic part and b) strength exercises. The aerobic part lasted for 35 minutes (Zagorc *et al.*, 1996). The tempo of the music changed based on the interval. The intervals whose realization required a higher heart frequency alternated with those whose realization required a lower heart rate frequency. It was in this part of the training session that the choreography was practiced. One choreography sequence of aerobic training consisted of dance elements and structures. A total of 20 choreographed sequences were performed. One choreographed sequence consisted of “four eights”. “One eight” consisted of eight movements and motions. The entire choreographed sequence consisted of 32 movements and motions. We used the popular international terms to name the steps used during the realization of the choreography for this type of exercise. The

Table I. The basic characteristics of the aerobic training model.

Training structure	Duration	Devises/activities	Tempo, type of music	Intensity
Warm-up	10 min	Walking and walking in place	120-135	
		Running and running in place “Warm-up” exercises for the joints		
Main/aerobic	35 min	20 choreographed sequences consisting of the following elements: march (walk), step touch, double step touch, side to side, leg curl, double leg curl, knee up, double knee up, grapevine, mambo, cha-cha-cha, V step, squat, hop, jump, turn...	135-155 Disco-dancing.	121-161
Main/strength	5 min	10 exercises for strengthening the abdomen, back, arms and shoulders, legs.	Each movement lasted for 1 sec	The body's own load was used
Cool down	10 min	Stretching and relaxation exercises activating multiple parts of the body, primarily the legs	One exercise lasted for approximately 30 sec	

choreographed sequences also consisted of a combination of arm and body movements, so as to increase the intensity of the exercise. In addition, there were combinations with jumps and more intense arm and body movements. If, during the realization of the training session, the subjects were unable to follow the choreographed steps or fit into the group exercise, they continued moving by marching and/or running in place (following the tempo of the music) until they were once again ready to synchronize their movements with those of the group. Our aim was to prevent the subjects from ceasing to move at any point during the training session. During the aerobic training part of the training session, the pulse of the subjects ranged from 121 to 161 beats per minute. The optimal intensity was calculated on the basis of the maximum heart rate frequency (225 minus the age of the subject). Using the obtained maximum heart rate for each of the subjects, we calculated the pulse for 60% and 80% of the maximum heart rate. Each subject monitored her heart rate frequency independently by controlling her heart rate with the help of a heart rate monitor (PC-15; SIGMA Elektro, GmbH & Co, Germany). If their heart rate rose over 161, the subject was instructed not to stop moving, but to cease their arm motions (which would have an effect on the intensity of the exercise), and to continue marching or running in place to a reduced tempo until the desired heart rate was achieved.

In the second half of the main part of the disco model of aerobic training, we used series of exercises to strengthen the wall of the abdominal cavity, the muscles of the back, the arms and the shoulders, the abductor and adductor muscles as well as the gluteal region, without any passive pauses. Each exercise was repeated 10 to 15 times. Ten to twelve exercises were done.

The final part of the training session consisted of relaxation and stretching exercises. Exercises of static stretching were utilized. In its final position, each exercise was realized for a total of 20 to 30 seconds. The subjects controlled their breathing, synchronizing it with the exercise, while the realization of the exercises was accompanied by soft music of a slow tempo.

Statistical Analyses. Data analysis was performed using STATISTICA 6.0 (StatSoft. Inc., Tulsa, OK, USA). Descriptive statistics were calculated for all experimental data. In addition, the Kolmogorov–Smirnov test of the normality of distribution was performed for all variables before the analysis, the homogeneity of variance was tested by the Levene test. To determine whether statistically significant differences existed between the means of the EXP and CON groups' initial and final measurement, we used a multivariate and univariate analyses of variance (MANOVA/ANOVA). The differences between the initial and final

measurements of the EXP and CON groups were determined using the t-test. Statistical significance was accepted for values of $p < 0.05$.

RESULTS

The Kolmogorov-Smirnov test showed that the data were normally distributed. Levene's test showed no violation of homogeneity of variance. The numeric values studied for the subjects of the EXP group at the initial measuring have indicated that the majority of the variables have numerically higher values in relation to the CON group (BODWE – 62.09 kg compared to 59.43 kg; Σ FSUPPER - 42.87 mm compared to 40.18 mm; Σ SFLOWER - 49.88 mm compared 45.39 mm; Σ TOTALSF - 92.75 mm compared to 86.01 mm; BF% - 22.66% compared to 21.14%). When it comes to MM%, lower numerical values have been noted for the subjects of the EXP group in relation to those of the CON group (31.73% compared to 32.80%). All of the values are within normal range for young women, and the calculated MANOVA/ANOVA coefficients have indicated that there was no statistically significant intergroup difference at the initial measuring (Wilks $\lambda = 0.77$, $F = 2.14$, $p > 0.05$; Table II).

The results of the measuring after the completion of the experiment have, for the subjects in the EXP group, indicated that the calculated values of all of the variables are numerically smaller in relation to the initial measuring, except for the percentage of muscle mass (MM%) which had increased slightly (from 31.73% to 32.50%), although the increase is not statistically significant. The values for body weight have decreased from 62.09 kg to 59.81 kg, which was not statistically significant. For all of the sums of skinfolds for the subjects of the EXP group, we noted a statistically significant decrease ($p < 0.05$) at the final measuring in relation to the initial measuring (Σ FSUPPER - 39.35 mm compared to 42.87 mm; Σ SFLOWER - 39.35 mm compared to 49.88 mm; Σ TOTALSF - 76.97 mm compared to 92.75 mm). In the case of BF%, a decrease was noted at the final measuring in relation to the initial one (20.37% compared to 22.66%), which was statistically significant ($p < 0.05$).

For the subjects of the control group, the percentage of muscle mass in their body composition was reduced (MM% from 32.80% to 30.38%, $p < 0.05$) at the final measuring in relation to the initial one, while for the other variables, even though there are numeric differences, no statistically significant difference was noted.

At the final measuring we noted a statistically significant difference between the groups at the multivariate

Table II. The values for skinfolds at the initial and final measuring .

Skinfolds	EXP (n=29)		CON (n=30)	
	Pre-training	Post-training	Pre-training	Post-training
Subscapula (mm)	13.2 (4.4)	12.5 (4.5)	11.4 (3.1)	12.0 (3.6)
Biceps (mm)	8.0 (2.9)	7.2 (2.7)	7.5 (2.4)	7.7 (2.7)
Triceps (mm)	21.7 (5.9)	18.2 (4.5)	21.3 (5.3)	21.3 (5.0)
Abdomen (mm)	18.5 (8.2)	14.8 (5.6)	14.6 (4.4)	15.0 (4.5)
Right thigh (mm)	19.4 (4.4)	16.6 (4.2)	17.7 (4.5)	18.2 (4.5)
Right calf (mm)	12.1 (3.7)	10.5 (2.9)	13.0 (3.0)	13.1 (2.9)

EXP - experimental group; CON - control group.

level (Wilkes $l = 0.65$, $F = 3.99$, $p < 0.05$; Table III), while the univariate analysis of variance (ANOVA) has indicated that there are significant intergroup differences for the sum of skinfolds of the upper body (SSFLOWER), the overall sum

of the skinfolds for the upper and lower body (STOTALSF), overall sum of skinfolds of the upper and lower body (STOTALSF) and the percentage of muscle mass in the structure of the body (MM%), all at the $p < 0.05$ level of significance.

Table III. Changes in the body composition after the experimental program.

Variables		Pre-training	Post-training
		Mean (SD)	Mean (SD)
Body weight (kg)	EXP	62.09 (5.6)	59.81 (5.2)
	CON	59.43 (6.3)	58.81 (5.6)
Σ upper body skinfolds (mm)	EXP	42.87 (9.7)	39.35 (9.4) *
	CON	40.18 (7.4)	41.01 (7.0)
Σ lower body skinfolds (mm)	EXP	49.88 (11.9)	39.35 (9.4) _§
	CON	45.35 (8.5)	46.33 (8.5)
Σ overall skinfolds (mm)	EXP	92.75 (18.6)	76.97 (15.4) *§
	CON	86.01 (12.4)	86.68 (11.9)
Percentage of body fat	EXP	22.66 (4.1)	20.37 (4.13)*
	CON	21.14 (2.5)	21.44 (2.5)
Percentage of muscle mass	EXP	31.73 (3.9)	32.50 (3.5) §
	CON	32.80 (3.5)	30.38 (3.4)*

EXP - experimental group; CON - control group; S – sum of; * - differences between initial and final measuring ($p < 0.05$); § - Significant difference between experimental and control group ($p < 0.05$).

DISCUSSION

The primary purpose of the current study was to determine the effects of aerobic dance on body compositions parameters in young women. We observed that 12-week aerobic dance training program led to significant decrease in measurements of body composition. Considering the fact that the subjects of the control group did not participate in any of the organized forms of physical activity, it is clear

that we were not expecting any significant changes in subcutaneous fatty tissue and body composition, and the significant changes to the values of the MM% can be explained by the inactivity of these subjects.

Following the realization of the disco model of aerobic training to music, for the subjects of the EXP group,

body mass was reduced by -3.7% and muscle mass (MM%) was increased by 2.4%. The results show that the numeric values of the variables for the evaluation of the body composition of the subjects of the EXP group have been reduced. For the Σ SFUPPER, a change of -8.2% was noted, and for the Σ SFLOWER and Σ TOTALSF this change was even greater (-21.1% and -17%). The decrease in BF% at the final in relation to the initial measuring was -10.1%. The programmed physical training in the disco model of aerobic training to music, with lasting for 60 minutes and at a 60% to 80% intensity of maximum heart rate frequency, has led to a decrease in the skinfolds and percentage of body fat, or in other words, has contributed to the change in the body composition of the subjects. The mechanisms which might possibly lead to the decrease in body fat during the realization of physical exercise which leads to lipolysis, are most probably caused by the increased consumption of energy, thus reducing body fat by using it as the primary energy source, which in turn would not be compensated by a further increase in the intake of calories. Exercises increase the ability to use fat and carbohydrates with an increase in fat reduction, which primarily takes place during low and medium intensity exercise, as was the case in our study. During high intensity exercise, it is the carbohydrates that are used as the primary energy source.

In the research on the influences of different forms of aerobic exercise, multiple authors have come across positive changes in body mass and overall fatty tissue at the final measuring, in relation to the initial one. Medved (1980) studied the influence of physical activity on the prevention of cardiovascular diseases and the regulation of body weight, and the results have indicated that physical activity is the best means of regulating body mass which is similar to the results of this study. The decrease in relative body mass in young women under the influence of increased intensity was confirmed in the studies carried out by Bryner *et al.* (1997) and Tremblay *et al.* (1990).

Physical exercise programs, during which the subjects are active for less than 30 minutes, three times a week, lead to small or no changes in body mass and body composition (Wilmore, 1983). What this generally means is that it is necessary for the bout of exercise to last at least 30 to 45 minutes, and for the subject to exercise at least three times a week (Hickson *et al.*, 1985). In our study, the loss of body mass was 2.3 kg, which supports the findings of previous research. The results of the study carried out by (Shimamoto *et al.*, 1998) confirm the hypothesis that low impact aerobics is a useful form of aerobic exercise for loss of body weight among middle-aged obese women and that this kind of exercise can lead

to a reduction in body mass of around 3.0kg and a decrease in the percentage of fatty tissue in the body by -6.1% or -5.3%.

Body mass and fatty tissue mass are reduced during the course of training programs of aerobic endurance (Wilmore), while the values of the fat free mass (FFM) remain the same or are even slightly increased. Wilmore has published the results of 32 studies in which the guidelines set up by the ACSM were used during the realization of the programs, and has indicated an average loss of overall body mass of 1.5 kg and a decrease in percentage of fatty tissue of 2.2%.

Our results confirm Gubiani & Pires Neto (2006) viewpoint that aerobic dance training programs to music significant influence ($p < 0.05$) on the reduction of skinfolds, the regional and overall sum of skinfolds, percentage of body fat and body weight. Varess *et al.* (1990) have proven in their research that programmed physical activity can contribute to quantitative and qualitative changes to the anthropometric characteristics of the body, especially a decrease in volume and skinfolds.

On the basis of our results, we can conclude that statistically more significant differences can be found in some of the studied variables for the evaluation of subcutaneous fatty tissue and body composition of the subjects of the experimental group (EXP), following the utilization of the aerobic exercise to music model. The results have indicated that there are statistically significant differences between the initial and final measuring of the variables for the evaluation of subcutaneous fatty tissue (Σ SFUPPER, Σ SFLOWER and Σ TOTALSF) and the percentage of body fat. At the final measuring, no statistically significant changes were found for muscle mass, but there was a numerical difference. Therefore, we can recommend that the appropriate physical strength exercises also be used as part of the aerobic program, so that an increase in muscle mass can be achieved.

The results have confirmed that the utilized disco model of aerobic training to music at an intensity of 60% to 80% of maximum heart frequency has led to a statistically significant decrease in all of the sums of skinfolds and percentage of body fat (BF%) among the subjects in the studied sample. The utilized aerobic exercise program can be recommended for everyday use in fitness clubs and other locations used for organized exercise, as the program of choice for the reduction of body weight and subcutaneous fatty tissue of the upper and lower body, or in other words, for the change in the body composition of young women.

PANTELIC, S.; MILANOVIC, Z.; SPORIS, G. & STOJANOVIC-TOSIC, J. Efectos de los ejercicios de danza aeróbica durante doce semanas sobre los parámetros de composición corporal en mujeres jóvenes. *Int. J. Morphol.*, 31(4):1243-1250, 2013.

RESUMEN: El objetivo de este estudio fue determinar los efectos de un programa de acondicionamiento de danza aeróbica de doce semanas sobre los parámetros de composición corporal de mujeres jóvenes. La muestra de 59 mujeres jóvenes se dividió en dos grupos, uno experimental y otro control. El grupo experimental estaba compuesto por 29 mujeres (edad $23,1 \pm 1,9$ años, estatura $164,4 \pm 6,1$ cm, peso corporal $62,1 \pm 5,6$ kg, IMC $23,0 \pm 2,2$ kg/m²), mientras que el grupo de control estaba compuesto por 30 mujeres (edad $22,7 \pm 1,8$ años, estatura $165,3 \pm 6,2$ cm, peso corporal $59,4 \pm 6,3$ kg, IMC $21,7 \pm 1,7$ kg/m²). Para evaluar la composición corporal, se utilizaron las siguientes medidas: la suma general de los pliegues cutáneos parte superior del cuerpo, la suma general de los pliegues cutáneos parte inferior del cuerpo, la suma general de los pliegues cutáneos de las partes superiores e inferiores del cuerpo, el porcentaje de grasa corporal, el porcentaje de masa muscular en el cuerpo, estatura y peso corporal. Al considerar todas las sumas de los pliegues cutáneos de las mujeres del grupo experimental, observamos una disminución estadísticamente significativa ($p < 0,05$) en la medición final en relación con la medición inicial (SPC SUPERIOR – 39,35 mm en comparación con 42,87 mm; SPCINFERIOR – 39,35 mm en comparación con 49,88 mm; SPC TOTAL – 76,97 mm comparación con 92,75 mm). En el caso de porcentaje de grasa corporal, se observó una disminución en la medición final en relación al porcentaje inicial (20,37% en comparación al 22,66%) lo cual fue estadísticamente significativo ($p < 0,05$). Basado en los resultados de nuestro estudio, podemos concluir que la danza aeróbica disminuye el tejido graso subcutáneo y la composición corporal de las mujeres jóvenes.

PALABRAS CLAVE: Mujeres jóvenes; Grasa corporal; Masa muscular; Pliegues cutáneos.

REFERENCES

- Arslan, F. The effects of an eight-week stepaerobic dance exercise programme on body composition parameters in middle-aged sedentary obese women. *Int. SportMed. J.*, 12(4):160-8, 2011.
- Blair, S. N.; LaMonte, M. J. & Nichaman, M. Z. The evolution of physical activity recommendations: how much is enough? *Am. J. Clin. Nutr.*, 79(5):913S-920S, 2004.
- Brick, L. *Fitness aerobics*. Hongkong, Human Kinetics Publishers, 1996.
- Bryner, R. W.; Toffle, R. C.; Ullrich, I. H. & Yeater, R. A. The effects of exercise intensity on body composition, weight loss, and dietary composition in women. *J. Am. Coll. Nutr.*, 16(1):68-73, 1997.
- Grant, S.; Todd, K.; Aitchison, T.; Kelly, P. & Stoddart, D. The effects of a 12-week group exercise programme on physiological and psychological variables and function in overweight women. *Publ. Health*, 118(1):31-42, 2004.
- Gubiani, G. L. & Pires Neto, C. S. Effects of a step training program on anthropometric and body composition variables of female college students. *Braz. J. Kintanthropom. Hum. Performance*, 1(1):89-95, 2006.
- Hass, C. J.; Feigenbaum, M. S. & Franklin, B. A. Prescription of resistance training for healthy populations. *Sports Med.*, 31(14):953-64, 2001.
- Hickson, R. C.; Foster, C.; Pollock, M. L.; Galassi, T. M. & Rich, S. Reduced training intensities and loss of aerobic power, endurance, and cardiac growth. *J. Appl. Physiol.*, 58(2):492-9, 1985.
- Hu, F. B.; Stampfer, M. J.; Solomon, C.; Liu, S.; Colditz, G. A.; Speizer, F. E.; Willett, W. C. & Manson, J. E. Physical activity and risk for cardiovascular events in diabetic women. *Ann. Intern. Med.*, 134(2):96-105, 2001.
- Jorgic, B.; Pantelic, S.; Milanovic, Z. & Kostic, R. The effects of physical exercise on the body composition of the elderly: A Systematic Review. *Facta Univ. Ser. Phys. Educ. Sports*, 9(4):439-53, 2011.
- Kimura, K. & Hozumi, N. Investigating the acute effect of an aerobic dance exercise program on neuro-cognitive function in the elderly. *Psychol. Sport Exerc.*, 13(5):623-9, 2012.
- Kostic, R.; Duraskovic, R.; Miletic, D. & Mikalacki, M. Changes in the cardiovascular fitness and body composition of women under the influence of the aerobic dance. *Facta Univ. Ser. Phys. Educ. Sports*, 4(1):59-71, 2006.
- Mandaric, S. Effects of programmed exercising to music of female pupils. *Facta Univ. Ser. Phys. Educ. Sports*, 1(8):37-49, 2001.
- Medved, R. Uloga fizič̃ke aktivnosti u prevenciji kardiovaskularnih oboljenja. *Sportnomedicinske objave*, 4:256-71, 1980.
- Milanovic, Z.; Pantelic, S.; Trajkovic, N. & Sporis, G. Basic anthropometric and body composition characteristics in

elderly population: A Systematic Review. *Facta Univ. Ser. Phys. Educ. Sports*, 9(2):173-82, 2011.

Milanovic, Z.; Sporis, G.; Pantelic, S.; Trajkovic, N. & Aleksandrovic, M. The Effects of Physical Exercise on Reducing Body Weight and Body Composition of Obese Middle Aged People. A Systematic review. *HealthMED*, 6(6):2175-89, 2012.

Osei-Tutu, K. B. & Campagna, P. D. The effects of short-vs. long-bout exercise on mood, $\dot{V}O_{2max}$, and percent body fat. *Prev. Med.*, 40(1):92-8, 2005.

Rahimi, R. Effect of moderate and high intensity weight training on the body composition of overweight men. *Facta Univ. Ser. Phys. Educ. Sports*, 4(2):93-101, 2006.

Saris, W.; Blair, S.; Van Baak, M.; Eaton, S.; Davies, P.; Di Pietro, L.; Fogelholm, M.; Rissanen, A.; Schoeller, D.; Swinburn, B.; Tremblay, A.; Westerterp, K. R. & Wyatt, H. How much physical activity is enough to prevent unhealthy weight gain? Outcome of the IASO 1st Stock Conference and consensus statement. *Obes. Rev.*, 4(2): 101-114, 2003.

Shimamoto, H.; Adachi, Y.; Takahashi, M. & Tanaka, K. Low impact aerobic dance as a useful exercise mode for reducing body mass in mildly obese middle-aged women. *Appl. Human Sci.*, 17(3):109-14, 1998.

Tremblay, A.; Després, J. P.; Leblanc, C. L.; Craig, C. L.; Ferris, B.; Stephens, T. & Bouchard, C. Effect of intensity of physical activity on body fatness and fat distribution. *Am. J. Clin. Nutr.*, 51(2):153-7, 1990.

Varess, J.; Sido, Z. & Jako, P. The evaluation of comparative physical exercise testing in obese patients. *Hungarian Rev. Sports Med.*, 31:42-52, 1990.

Weineck, J. *Optimales training*. Balingen, Spitta Verlag GmbH & Co. KG., 2004.

Wilmore, J. H. Body composition in sport and exercise: directions for future research. *Med. Sci. Sports Exerc.*, 15(1):21-31, 1983.

Zagorc, M.; Zaletel, P.; Izanc, N.; Martincic, B.; Lasan, M. & Petrovic, K. *Aerobika*. Ljubljana, Fakulteta za sport, Institut za Sport, 1996.

Correspondence to:
Zoran Milanovic, PhD
Faculty of Sport and Physical Education
Carnojevic'eva 10a, 18000 Nis
SERBIA

Tel: 00381 63 7 399 366

Email: zooro_85@yahoo.com

Received: 30-04-2013

Accepted: 16-08-2013