

## **The effect of line dance on body composition in female student's population with recessive obesity.**

**Linlin Fan<sup>1</sup>, Jixiang Yu<sup>2</sup>, Jian Li<sup>3</sup>, Yaping Liu<sup>1\*</sup>**

<sup>1</sup>Department of Endocrinology, Shandong Jining No.1 People's Hospital, PR China

<sup>2</sup>Department of Vascular Surgery, Shandong Jining No.1 People's Hospital, PR China

<sup>3</sup>Department of Bone and Joint Surgery, Shandong Jining No.1 People's Hospital, PR China

### **Abstract**

**Objective:** This research was aimed to explore the effect of line dance on body composition of female students.

**Methods:** Twenty students were selected as the experimental group. The training was arranged 3 times one week. The training included 10 minutes preparation, 40 minutes training, and 10 minutes ending. The maximum heart rate was controlled from 60% to 75%. Moreover, the pulse was controlled below 75% of the highest heart rate.

**Results:** Twelve weeks later, the Body Mass Index (BMI) and weight of training group were reduced. Compared with control group, the difference was not statistically significant ( $P>0.05$ ), and the indexes including body fat content, body fat percentage, skinfold thickness of forearm as well as under shoulder of the experimental group were significantly different ( $P<0.05$ ). The Fat Free Mass (FFM) of experimental group was higher than the control group but had no statistical difference. The blood lipid biochemical index reduced, with slightly fall in TC, TG, and LDL potency ( $P<0.05$ ). Compared with control group, HDL potency increased significantly ( $P<0.05$ ).

**Conclusion:** Long-term line dance has an effect on the decreasing of body composition of female student's population with recessive obesity.

**Keywords:** Line dance, Female students, Recessive obesity, Fat metabolism.

*Accepted on April 30, 2017*

### **Background**

Line dance is a branch of globalization dance, originated from the Western Country Dance in 70s in the United States. Line dance is a mass sport that integrates bodybuilding, entertainment, ornamental value, and enjoyment. For young women, especially, line dance can improve cardiovascular and respiratory system, improves heart function, shape figure, lose weight, postpone aging process, refine the mind, and excites emotions.

With the continuous development of society and living standard, our life style changes correspondingly, which leads to the decline of muscular labor and more obese people. As one of the important problems faced by many countries, obesity is directly related to many aspects including national health and medical care. Recessive obesity is a newly emerged subject in related research field. The weight and BMI of people with recessive obesity are in normal ranges. However, the health risk is almost the same with obesity. What's more, female with

recessive obesity tends to be younger. Therefore, it is of great importance to make a scientific and reasonable prescription to prevent and reduce the health risks brought by recessive obesity [1-3]. In this study, 20 female college students were selected as experimental group for 12 weeks line dance training. The weight, body fat percentage, and blood fat were tested and recorded. This study is aimed to explore the way to reduce the health risks brought by recessive obesity, with reliable research data.

### **Materials and Methods**

#### **General data**

Forty female college students were selected and randomly divided into experimental group and control group averagely. All subjects were volunteers, with acknowledgement of the study content. All subjects in this study have no contraindications of sports exercise. The general data,

including age and height, of both groups shows no significant difference, with  $P > 0.05$ , as shown in Table 1.

**Table 1.** General data of subjects in both groups.

Group	No. of cases	Age (y)	Height (cm)	Weight (kg)	BMI (kg (m <sup>2</sup> )-1)	Body fat percentage (%)
Experimental group	20	20.22 1.20	157.04 5.94	52.96 4.85	21.44 0.91	28.64 2.28
Control group	20	20.10 1.19	157.05 5.92	53.13 3.93	21.42 0.89	28.65 2.26

### Research methods

All subjects received body composition and blood fat examination before and after research: 1) Before the detection of body composition, subjects need to be free from alcohol for 24 h, food for 4 h, and exercise for 4 h. The body composition was analysed using body composition analyser in supine position when subjects were relaxed. 2) For blood fat detection, all subjects need to provide elbow vein blood in the morning on an empty stomach condition. However, for the first and last exercise, the experimental group provided elbow vein blood right after exercises for blood fat test. Both groups needed to control food intake of high calorie and fat, and were barred from any other sports exercise and heavy manual labor besides PE classes [4]. On above basis, the experimental group received line dance of 12 weeks, with the following training plan.

### Exercise frequency and time

The training was arranged at 18:00 to 09:00 on each Monday, Wednesday, and Friday. 10 min preparation, 40 min basic training, and 10 min ending were included.

### Exercise intensity

The maximum heart rate was controlled between 60% and 75%, and pulse was controlled below 75% of the highest heart rate. The students were randomly selected during each training to measure heart rate with the telemetry. 10 s after each stages, the pulse was measured to monitor the training intensity.

### Exercise details

10 min preparation includes toughness and warm-up exercise of various joints, with background music of 100-135 beat/min. 40 min basic training are related exercise of basic movements combinations, including kicking, twisting, sliding, cross step, moonwalk, taptoe, treadmill step, and rock step. These movements are explosive, with other higher frequency, strength, and extent. The background music is controlled in

120-135 beat/min. 10 min ending includes relax and stretch gymnastics, with background music of 95-120 beat/min.

### Observation indexes

This study observes indexes including weight, vital statistics, body fact percentage, body mass, under shoulder and forearm skinfold thickness, WHR, and blood fat. Vital statistics includes chest circumference, waistline, and hipline. Body mass index is calculated by weight (kg)/height<sup>2</sup> (m<sup>2</sup>) [5]. Blood fat test includes LDL, HDL, TC, and TG. Under shoulder and forearm skinfold thickness is  $(1.0397-D)/0.00133$ . Body fat percentage is  $(4.570/D-4.142) \times 100.00\%$ .

### Statistical analysis

SPSS17.0 was used for data statistic and analysis, ( $\bar{x}$  s) for measurement data, and t for test. When  $P < 0.05$ , the data difference is significant, with statistical significance.

### Results

After 12 weeks line dance training, the Body Mass Index (BMI) and weight of the experimental group were reduced. Compared with control group, the difference was not statistically significant, with  $P > 0.05$ . Compared with the control group, the indexes including body fat content, body fat percentage, skinfold thickness of forearm and under shoulder of the experimental group were significantly different, with  $P < 0.05$ . The Fat Free Mass (FFM) of the experimental group was higher than the control group, but has no significant difference ( $P > 0.05$ ). The body measurement was reduced. The difference of WHR was not statistically significant, with  $P > 0.05$ , as shown in Table 2. The blood lipid biochemical index reduced, with slightly fall in TC, TG, and LDL potency. Compared with control group, the difference was statistically significant, with  $P < 0.05$ . HDL potency increased. Compared with control group, the difference was statistically significant, with  $P < 0.05$ , as shown in Table 3.

**Table 2.** Body composition comparison of both groups before and after experiment.

Item	Before experiment		After experiment	
	Experimental group	Control group	Experimental group	Control group
Abdominal skinfold thickness	50.82 7.68	50.79 7.78	47.79 7.52*#	50.86 7.90

Waist-to-hip ratio	0.83 0.06	0.82 0.04	0.81 0.01	0.81 0.05
Weight (kg)	52.96 4.87	53.58 3.81	51.94 4.85	53.59 3.76
BMI (kg·m <sup>2</sup> )	21.44 0.88	21.42 0.89	21.26 0.76	21.44 0.93
Body fat percentage (%)	28.66 2.28	28.65 2.26	26.64 2.28*#	28.65 2.36
Body fat content (kg)	15.28 1.43	15.32 1.40	13.28 1.42*#	15.36 1.39
FFM (kg)	37.78 3.44	38.24 2.38	38.69 3.44	38.25 2.39

Note: Compared with values before experiment, \*means P<0.05; Compared with the same group, #means P<0.05.

**Table 3.** Comparison of blood fat of both groups before and after experiment.

Blood fat composition	Before experiment		After experiment	
	Experimental group	Control group	Experimental group	Control group
TC (mmol/L)	4.45 0.25	4.42 0.29	4.40 0.37	4.39 0.41
TG (mmol/L)	1.21 0.11	1.22 0.12	1.18 0.12	1.20 0.12
LDL (mmol/L)	2.24 0.25	2.22 0.24	2.06 0.25*#	2.24 0.22
HDL (mmol/L)	1.70 0.48	1.67 0.38	1.92 0.19*#	1.68 0.40

Note: Compared with values before experiment, \*means P<0.05; Compared with the same group, #means P<0.05.

## Discussion

Obesity has become a global health problem, which affects the quality of population, and social and economic benefits. It is reported that obese people in China have reached 70 million, which accounts for 4.50% of the whole population; among which, 17% of urban population are obese. First-tier cities, such as Beijing and Shanghai have become major obese cities [6-8]. Children and women are becoming important parts of obese people. Children, especially have exceed 50% of total obese people. Besides the impact on figure, obesity can cause high hyperlipidemia, hypertension, myocardial infarction, and fatty liver. If obese female in menopause suffers from cervical cancer and breast cancer, the mortality is much higher than normal people's. Recessive obesity is a newly emerged subject in related research field. There aren't many domestic researchers, especially for the recessive obesity sports prescriptions for college students. To be clear, the standard for recessive obesity is as follows: BMI ranges from 19.8 to 24.2, which is the standard range. The body fat rate of female exceeds 20.00% while that of female exceeds 26.00%; or the total skinfold thickness under shoulder and forearm reach 34 mm (male) or 46 mm (female). The BMI of people with recessive obesity falls in normal range, therefore, they don't regard themselves as obese. That is to say, they don't pay attention to the health problems that faced by the obese. However, people with recessive obesity also have these risks, which may lead to greater health risks due to neglecting. With age grows, peoples fat mostly accumulates in abdominal and back. According to clinical survey, in the obese people around China, 45.00% and 84.00% are male and female recessive obese people accordingly. At present, the number of college students with recessive obesity, especially female college

students increase year by year. The reason includes inappropriate diet, no sports exercises, and various weight loss products. In this way, it is of great importance to make a scientific and reasonable exercise prescription [9-12] to prevent and reduce the health risks brought by recessive obesity. In this study, the female college students in the experimental group received line dance training for 12 weeks. Compared with values before experiment and that of the control group, the weight and BMI declines. But the data showed no statistical significance. The reason is that despite the energy consumed by exercise, their muscle fiber and FFM increases, which leads to the insignificant difference when compared with values before experiment. The skinfold thickness under shoulder and forearm, body fat percentage, body fat content of the experimental group show statistically significant difference when compared with values before experiment and that of the control group, with P<0.05. That is to say, long term line dance exercise can help build better figure and more reasonable body composition.

Obesity is one of the important factors lead to abnormal lipid metabolism, which needs to be relieved by diet control greater amount of exercise [13]. In this study, the blood lipid biochemical level of the experimental group decreased thanks to the control of high calorie and high fat intake, and line dance exercise of 3 times a week for 12 weeks. The TC and TG level and LDL concentration decline in a short extent. Compared with control group, the difference was statistically significant, with P<0.05. The HDL concentration increases significantly. Compared with the control group, the data shows significant difference, with P<0.05, which supports the above idea.

In conclusion, long-term line dance exercise can help reduce body composition of recessive obesity and build a healthier body for better school life.

## References

1. Guo Y. Research on effect of exercise-diet intervention and local knead on lipid metabolism and weight loss. Shanghai: Shanghai University Sport 2014.
2. Li Y, Huang P, Chen X. Effect of aerobic exercise combined with strength training on female college students with recessive obesity contemporary sports technology. *J Sport Med* 2015; 5 : 26-27.
3. Liu L, Yang S. Influence of kickboxing on recessive obese body composition of middle-aged women. *China School Phys Edu* 2015; 2: 88-92.
4. Chen T, Yu J. Effects of dance cheerleading on body composition of female university students. *J Guangzhou Sport Univ* 2016; 36: 104-107.
5. Dai J. Establishment of BMI screening standard of 7 to 18 Wei and Han nationalities and association study of PLIN gene polymorphism and obesity and intervention effect. *Urumchi Xinjiang Med Univ* 2009.
6. Li M, Wang D. Status Quo of recessive obesity of female college students in Shijiazhuang City. *Chinese J School Health* 2012; 33: 366-367.
7. Chen Y, Li L, Zhai F. Status Quo testing and analysis of recessive obesity of normal female college students. *Fujian Sport Univ* 2011; 30: 43-45.
8. Luo R. Changes in body composition of female undergraduate students after 8-week aerobic fitness running. *J Clin Rehab Tissue Eng Res* 2008; 12: 5577-5580.
9. He K. Design and implementation of college students physique healthy exercise prescription system. Beijing Univ Technol 2013.
10. Cui K. Body composition and fat distribution characteristics of college students with different body fat rate. Hangzhou Norm Univ 2012.
11. Fan J, Zhang X, Fu L. Influence of different mode of exercise on body composition among female college students. *Chinese J School Health* 2016; 38: 354-357.
12. Li M, Wang D. Status Quo of recessive obesity of female college students in Shijiazhuang City. *Chinese J School Health* 2012; 33: 366-367.
13. Zhang X, Wang Q, Xiao G. Design and implementation of exercise prescription for masked obesity suffered by college students. *J Phys Edu* 2005; 12: 133-135.

## \*Correspondence to

Yaping Liu  
 Department of Endocrinology  
 Shandong Jining No.1 People's Hospital  
 PR China