

## Comparing the Effect of Faradic and Aerobic Exercise on Circumference, % Fat and Endurance of Abdomen in Non-Athlete Women

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**Abstract:** The purpose of this research was to consider and compare the effect of faradic and aerobic exercise on circumference, % fat and endurance of abdomen in non-athlete women. 20 non-athlete women participated randomly in this research (K-S test used). They were divided into two groups: Faradic (F) and Aerobic (A). Before the research, their circumference was measured by a tape measure, % fat by caliper and endurance of abdomen by digital equipment for 30 seconds. After 24 sessions, those tests were repeated (after two months). Results indicated that circumference of abdomen decreased only in faradic group ( $p=0.000$ ) while %fat decreased (faradic:  $p=0.018$ , aerobic exercise:  $p=0.004$ ) and muscular endurance of abdomen increased in both groups (faradic:  $p=0.004$ , aerobic exercise:  $p=0.024$ ) significantly. Independent t test showed a significant difference in endurance ( $p=0.001$ ) but no significant difference in %fat ( $p=0.851$ ) and circumference of abdomen ( $p=0.765$ ) between the two groups. Also, the results showed that both protocols of training (faradic and aerobic) decreased circumference and %fat of abdomen but the significant effect of aerobic exercise on muscular endurance of abdomen was observed compared with faradic group.

**Key words:** Aerobic exercise % Circumference of abdomen % Faradic % Muscular Endurance of abdomen % fat of abdomen

### INTRODUCTION

Individuals' interest in exercise and physical activities to gain health and integrity makes the researchers carry out widespread studies on the relationship between the exercise and health. One of the points that most people emphasize in addition to wellness is to keep the suitable figures and statures. Among them, there is the endurance of abdomen that today its relationship with heart diseases is recognized and has attracted many researchers' attention [1,2].

Research on sports and slimming salons show that most of these salons do not emphasize sport but they use specific ways like heat, massage and faradic (electric stimulation system) to decrease weight and size of different parts of the body. Although research proved that physical exercises affect physical fitness, subcutaneous fat reduction of different parts of body and reduce whole body weight, people because of various injuries in some parts especially waist cannot perform exercises such as sit-up [3-5]. For the precise perception of electric stimulation system, first we should study the

contractions physiology. Impulse is a kind of depolarization wave, at the end of the connection of the nerve to muscle in the link that is called neuromuscular junction, with induction of electricity flow and chemical changes which causes contraction phenomenon. Therefore, in some cases that nerve stimulation for any reason (pressure, cut...) is not possible, muscle will be resolved and will be atrophy. So in order to prevent muscle atrophy and with no attempts by the individual, electricity flow can be used to boost and maintain the muscles. In healthy people, the results of such muscle stimulations cause muscle contraction which accompanies with the energy produced by abdominal fat. Faradic which is founded by a Canadian named Karl Louis causes the isotonic contraction (like the sports isotonic contraction). Some pads will be put on the sensitive spots that cause contraction and the physiological activities of that particular muscle and consequently via an increase in blood flow and lymph evacuation increases the power and reduces the fat storage. This procedure daily consumes maximum 35 calories of energy without establishing fatigue. Following cases were gained by this method:

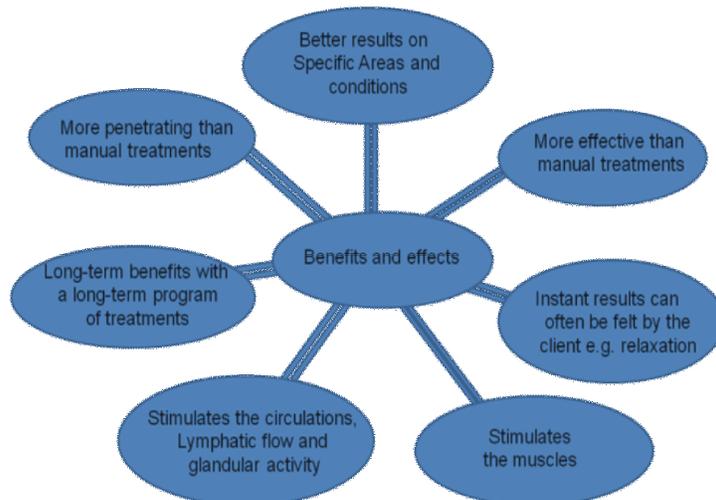


Fig. 1: The benefits and effects of faradic treatment

- C Breaking fat molecules, converting to the FFA (Free Fatty Acid) and entering the Krebs cycle.
- C Returning of the elasticity to skin and tone of muscle.
- C Increasing the power of atrophied muscle.
- C Stimulating the repelling of the liquids gathered in the organs.

It should be mentioned that some people should not use this method; those who use heart battery, those with epilepsy, pregnant women, those with skin problems or skin allergy, those who have proteases in different parts of their body.

The effect of the subcutaneous exercises in numerous studies was experimented; Vispute Sachin (2011) considered the effects of the subcutaneous sit-up exercises (alternated exercises, 7 sets, 10 repeats in each set and 10 seconds of rest between each two repeats) on the size of fat cells in different parts of the body by biopsy of the abdomen, %fat, sub-scapula and glutes. He showed a significant reduction in the thickness of the cells in the area under experiment (6).

Nikzad (1994) studied circumference abdomen of 20 subjects in an exercise program for eight weeks and five days a week. After conducting the protocols of training the extent of their abdomen, chest and shoulder fat were determined. The results showed a significant addition in the density of the body and a significant decrease in the subcutaneous fat in subjects [7].

The programs of aerobic training (endurance) were also studied in various cases. Despress (1985) compared the effect of the endurance exercises on the reduction of

arm and leg fat and came to the conclusion that the amount of the fat reduction in the whole body was more than their arm and leg [8].

There are many different types of muscle stimulation. Faradic was one of the first treatments to offer muscle stimulation. It tones muscles but takes a longer time to achieve the desired effect. Micro current is thought to be a more enjoyable sensation in comparison with original faradic treatments.

Micro current has originated from the medical field. When it was used to heal damaged muscles and surrounding tissues, the cosmetic effects became apparent. The contours were visibly lifted in the treated areas in addition to the healing tissues. The equipment has been modified to be used by beauty therapists and has been tended to replace the original faradic treatments in recent years.

In the slimming salons and the physiotherapy clinics and centers, faradic was used for muscular contraction in order to heal or reduce the size (the benefit of this system and the comparison with the exercise is represented in Fig.1).

## MATERIALS AND METHODS

**Subjects:** The study subjects were 35-55-year-old non-athlete women (n=16) who were randomly assigned to the faradic and aerobic [F (n=8) and A (n=8)] groups.

**The Exercise Protocol:** All the subjects were trained for 8 weeks and 3 sessions per week. Group (A) trained for 90

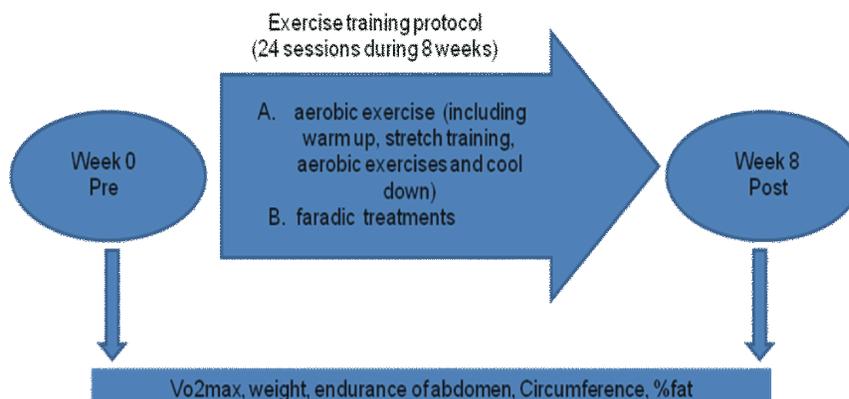


Fig. 2: Exercise training protocol

Table 1: Treatment program

Groups	Session/week	Time (minute)	Training
Aerobic training	3	90	Running, stretch, step training and endurance and strength training
Faradic treatment	3	60	Electrical stimulation based on strength and endurance of abdomen muscles

minutes per session that included juggling, stretching, steps and muscular endurance of the whole body. Group (F) was stimulated with faradic treatment for 60 minutes per session (Table 1 and Fig. 2).

**The Measurements Method:** At first, the circumference was measured by a tape measure (made in China), body weight (Bruer made in Germany), subcutaneous abdominal fat by caliper (Mitutoyo made in Japan) and abdominal muscle by strength test.

**Statistics:** To compare pretest and posttest, dependent and independent t test in the groups were used. For statistical calculation, SPSS16.5 was used (P<0.05).

### RESULTS

According to Table 2, the hypothesis of non-effectiveness of the faradic on abdomen subcutaneous fat was not accepted and the results showed that faradic significantly reduced the abdomen subcutaneous fat (p=0.018).

Also, the hypothesis related to the non-effectiveness of faradic in the abdomen circumference was rejected. The results showed that faradic decreased the measure of the abdomen circumference (p=0.001).

The hypothesis of the non-effectiveness of the faradic on endurance of the abdomen was also rejected. The results showed that faradic increased the endurance of the abdomen (p=0.004).

Table 2: Results of faradic treatments and aerobic exercise

	Group	Mean				
		differences	SD	t	df	P
% fat of abdomen	F	2.9698	0.9899	0.9522	8	0.018*
	A	1.9490	0.7957	5.069	8	0.004*
Circumference of abdomen	F	2.4749	0.8250	7.879	8	0.001*
	A	2.8048	1.1450	1.892	8	0.117
Endurance of abdomen	F	6.4442	2.1481	-3.931	8	0.004*
	A	2.9269	1.1949	-3.208	8	0.024*

Table 3: Results of faradic treatment and aerobic exercise between two groups (F and A)

	Mean				
	differences	SD	t	df	P
% fat of abdomen	4.11	10.08	-0.198	8	0.851
Circumference of abdomen	2.63	6.45	-0.316	8	0.765
Endurance of abdomen	1.83	4.50	-7.255	8	0.001*

The hypothesis of the non-effectiveness of the aerobic exercise on the circumference abdomen was rejected and the results showed that aerobic exercise significantly reduced the abdomen subcutaneous fat (p=0.004).

Table 2 shows that the hypothesis of non-effectiveness of aerobic exercises on abdomen was confirmed and the results showed that the aerobic exercises did not have an effect on the abdomen muscles (p=0.117).

The hypothesis of non-effectiveness of aerobic exercise on abdomen circumference was rejected and the results showed that the aerobic exercise increased the abdomen circumference ( $p=0.024$ ).

Statistical results in Table 3 showed that although both methods reduced the abdomen subcutaneous fat, there was not any significant relationship between the effects of activity of faradic training and aerobic exercise on the subjects' abdomen subcutaneous fat ( $p=0.851$ ).

There was not any significant difference between the faradic training and aerobic exercise in abdomen circumference and none of these methods were superior to the other one ( $p=0.765$ ). Of course, the intergroup results showed that only the faradic training reduced abdomen circumference.

Although both methods increased the endurance of abdomen, there was a significant difference between the effect of faradic activity and aerobic exercise on the circumference of abdomen and the aerobic exercise was more effective ( $p=0.001$ ).

## DISCUSSION

The results of this research indicated that the faradic training affected the circumference of abdomen and abdomen fat. Just as Mullen (2000) showed, galvanic and faradic training reduced the size of thigh and abdomen. In the mentioned research, fat and the muscle circumference and the comparison of these two methods were not evaluated [9,10].

Cureton (1969) studied two groups; one of them performed alternative exercises 4 days a week and the other one 2 days a week. Each session of training lasted 30 minutes and at the end, in the group with 4 sessions of training reduced fat more than the other group. This research showed that the aerobic system had an effect on the reduction of the whole body fat [11]. Also, Despres (1985) investigated the effects of the circumference exercises on the reduction of the percentage of arm and leg fat and came to the conclusion that these exercises had more effects on the reduction of the core fat. Also this research showed that circumference exercises reduced the whole body fat [9]. Gwinup and Williams (1971) investigated the effect of sport activities on two groups of women (control and running groups) and at the end of the activities; they found 3 cm decrease in the waist of running group and on WHR (waist/hip ratio) 1.3 cm [12]. It should be mentioned that in Gwinup *et al.* research, subjects were just running while in the current research, the aerobic group performed complex aerobic

exercises. As compared with these researches, Noland (1995) found out that none of these aerobic exercises and subcutaneous fat did not reduce the thigh, abdomen and pelvis fat [13].

Briggs (1984) in his research with the title of nutrition and physical education used walking as a sport activity. The subjects were middle-aged men. The training programs used in this research included 40 minutes of walking with the speed of 4-5 miles an hour. The results showed that although the body weight and the fat had a little decrease but this reduction was not significant and this result was not in line with the obtained results [14].

Sutter (2000) studied women with average BMI=24.9 who were divided into three groups: walking, running and control. The training program included 30 minutes of activity with intensity of 50%-70% maximum heart beat and during 4 to 6 sessions a week. Nutrition program of subjects did not change. Results showed that the whole body's percentage of fat in the running and walking groups reduced significantly. The abdomen fat that was measured in this research was the same as Traci research in some parts [15].

Gwinup (1971) studied women in three groups of walking, cycling and swimming. Results showed the significant reduction of fat percentage of whole body in walking group in comparison with the other two groups [12]. This finding is in line with the current research. Pollock *et al.* (1972) performed a training program for 20 weeks with 2 sessions per week and 45 minutes per session in two groups and observed a significant reduction of %fat in the 80% group [16]. This research is also in line with the recent research results.

## CONCLUSION

With due attention to some ways like heat, instruments like slimming belts or shaft are yet a case for question and it may have some negative effects; for example, shafts damages skin and capillary. So according to the results of this research and same researches, it is suggested that faradic treatment be used because those who have problems in waist or neck, this condition will contract the muscle. For those who do not have serious problems, aerobic training is not suggested because faradic treatment leads to more energy expenditure and the improvement of heart and lungs function through muscle development. According to the contradictions of various research results, widespread and more precise studies with more precise tools, more subjects and an increase of exercise time in performance are required.

## REFERENCES

1. Caroline S., J.M. Massaro, U. Hoffmann, K.M. Pou, P. Maurovich-Horvat, C.Y. Liu, R.S. Vasan, J.M. Murabito, S.L. Adrienne Cupples, R.B. D'Agostino Sr and C.J. O'Donnell, 2007. Abdominal Visceral and Subcutaneous Adipose Tissue Compartments Association With Metabolic Risk Factors in the Framingham Heart Study. *Circulation*. 116: 39-48.
2. Barnett, T.A., J. O'Loughlin, C.M. Sabiston, I. Karp, M. Bélanger, A. Van Hulst and M. Lambert, 2010. Teens and Screens: The Influence of Screen Time on Adiposity in Adolescents. *American Journal of Epidemiology*, 172(3): 255-262.
3. Snodgrass, J.J., W.R. Leonard, L.A. Tarskaia, V.P. Alekseev, V.G. Krivoshapkin, 2005. Basal metabolic rate in the Yakut (Sakha) of Siberia. *Am. J. Hum. Biol.*, 17: 155-172 .
4. Wells, J.C., S. Charoensiriwath and P. Treleaven, 2011. Reproduction, aging and body shape by three-dimensional photonic scanning in Thai men and women. *Am J. Hum. Biol.*, 23: 291-298.
5. Wells, J.C., 2006. The evolution of human fatness and susceptibility to obesity: an ethological approach. *Biol. Rev.*, 81: 183-205.
6. Vispute Sachin, S., J.D. Smith, J.D. LeCheminant and S. Kimberly, 2011. The Effect of Abdominal Exercise on Abdominal Fat. *J. Strength & Conditioning Research*, 25(9): 2559-2564.
7. Nikzad, M., 1994. The effect of steady training on % fat of body. MD. Dissertation.
8. Despress, J.P., C. Bouchard, A. Tremblay, R. Savard, M. Marcotte, 1985. Effects of aerobic training on fat distribution in male subjects. *Med. Sci. Sports Exerc.*, 17(1): 113-8.
9. Wells, J.C., T.J. Cole and P. Treleaven, 2008. Age-variability in body shape associated with excess weight: the UK National Sizing Survey. *Obesity*. 16: 435-441.
10. Wells, J.C.K., 2010a. The evolutionary biology of human body fatness:thrift and control. Cambridge: Cambridge University Press.
11. Cureton, T.K. and J. Greninger, 1969. "Effect of frequency of training on working capacity cardiovascular function and body composition of adult men" *Med. Sci. in sports and Exerc.*, 1: 70-74 .
12. Gwinup, G. and J. Williams, 1971. Thickness of subcutaneous fat and activity of underlying muscles. *Pub mid. Mar.*, 74(3): 408-411.
13. Noland, M. and J.T. Kearney, 1995. "Anthropometric and densitometry responses of woman to specific and general exercise" *Res. Quarterly*, 49: 323-328.
14. Briggs, G.M., 2000. The role of comprehensive school health education programs in the link between health and academic performance. Massachusetts Department of Education Learning Support Services.
15. Sutter, D., 2000 Question 12b. [www.nhlbi.nih.gov/guidelines/obesity/12b.pdf](http://www.nhlbi.nih.gov/guidelines/obesity/12b.pdf).
16. Pollock mol and Co. 1972. Effect of training two days per week at different intensities on middle aged men. *Journal of Clinical Nutrition*. 71(5): 1242-1248.