

## Physiological Responses to Calisthenic Exercises Applied to Sedentary Women-an Educational Study

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**Abstract---** In this study, it was aimed to determine some physiological responses of calisthenic exercises applied to sedentary women. The pretest-posttest model was used in the study. Before the study, the participants were asked whether they had any health problems. In this study, 15 volunteer women with a mean age of  $23.73 \pm 1.70$  years and a mean height of  $165.93 \pm 4.00$ , who regularly attend a private sports center, were included in the study. Before and after the exercise program, body weight, fat percentage and blood samples were taken in the morning on an empty stomach by experts in the appropriate laboratory environment in the health institution. The obtained data were analyzed with the SPSS 22.0 package program. As a result; It was determined that the 8-week calisthenic exercise program applied positively affected some physiological parameters of sedentary women. It is concluded that if necessary incentives and guidance are given, calisthenic exercises can be easily applied by everyone.

**Keywords---** Sedentary, Calisthenic, Exercise and Physiological Response.

### I. Introduction

When we look at the history of humanity, information is obtained in the context of the historical findings of a process that has evolved from traditional societies to modern societies. The phenomena experienced in this process, such as modernity, industrial revolution, urbanization and capitalism and related technological developments, have clearly affected both the daily life fictions of individuals and their relations with nature. As a matter of fact, a social order independent of changes and transformations is absolutely impossible.

As the phenomenon of capitalism manifests itself in cities as a production system, it has reshaped both the society and the leisure concept of individuals. The phenomenon of capitalism, which changes everything for profit, has transformed work into a code and changed the daily activities of individuals. In this sense, the concept of individual(s) leisure time differentiates the time that the individual allocates for himself and the actions he takes during this time. As a result of this differentiation, it is one of the reasons that push individuals to an inactive life.

In the changing social order based on urbanization, individuals cannot do sports activities basically due to many reasons such as traffic density, air pollution, decrease in parks, absence of green areas, lack of sports fields. On the other hand, it is very important to have activities based on exercise in order to increase the quality of life of the individual and to be happier and more peaceful in daily life.

Exercise is defined as the set of planned and repetitive movements performed with the aim of preserving and improving the physical appearance of the individual (Johnson, 2003; Civan et al., 2018). Today, there are types of exercises that can be easily performed in almost any condition. One of them is calisthenic exercises.

Calisthenic exercises; It is a type of exercise that can differ in duration and intensity at a certain pace, can be easily integrated, applicable and useful (Baştuğ, 2017). Calisthenic exercise; It can be preferred in order to objectively evaluate physical performance, to be suitable for home exercise programs, to be safe for use in individuals with chronic diseases, to be modified according to the individual, and to contribute to balance, strength, agility, coordination and endurance (Bozan & Donat, 2016). Calisthenic exercises can also be done individually or in groups (Adam, 1997; Kocamaz, 2017). It is very enjoyable when done as a group and can be adjusted according to the physical fitness of the individuals. There is no harm in applying it to sedentary and elderly individuals. It can be given as an exercise program that can be applied at home, or it can be used in schools to support physical education (Kurt et al., 2010, Bayraktar, 2018). Such exercises will take people away from their sedentary life to some extent and are very convenient in terms of applicability.

A sedentary lifestyle can make individuals gain weight. On the other hand, if planned and effective exercise is done, the amount of blood and muscle increases and the amount of fat accumulated under the skin decreases. Some studies have shown that body fat can change dynamically with the effect of exercise (Dönmez, 1998). In this

context, it is understood that; Exercise has a positive effect on the human body not only physically but also physiologically.

According to the guidelines of the American Sports Medicine Association (ACSM) and the American Dietetic Association (AODA), it is emphasized that adults should do at least thirty minutes of moderate-intensity activity every day of the week or most days (three/five days) (Pate et al., 1995). that; The benefits of exercise in the human body from past to present are inevitable. When the literature is reviewed, positive effects of exercise on blood lipids can also be seen.

Based on this information, in our research; The aim of this study was to investigate the physiological effects of the calisthenic exercise program applied to sedentary women.

## II. Materials and Methods

### Research Model and Participants

The pretest-posttest model was used in the research. Before the study, the participants were asked whether they had any health problems. In this study, 15 volunteer women with a mean age of  $23.73 \pm 1.70$  years and a mean height of  $165.93 \pm 4.00$  cm, who regularly attend a private sports center, were included in the study.

### Body Mass Index (BMI)

Body composition can also be expressed as a combination of body fat mass and lean body mass (Turğut and Metin, 2019; Eghbal Moghanlou et al 2021). In our study, a bioelectrical impedance analyzer (TANITA BC-418) was used to determine the body fat percentage measurements of the participants.

### Blood Fat Measurement Parameters

5 ml blood samples were taken from the participants in the morning on an empty stomach in the resting state before the exercise. After 8 weeks (3 days a week,  $3 \times 12$  repetitions) of calisthenic exercise, 5 ml blood samples were taken again on an empty stomach. LDL, HDL, total cholesterol and triglyceride values were obtained after blood samples were taken by experts in the appropriate laboratory environment of the state hospital and complete blood counts were measured with the Abott C16200 device. During the study, there were not any diet program given to the participants.

Table 1: Exercise Program

Exercises	The number of repetitions
<b>Pistol Squat</b>	3*12 repetition
<b>Lunge Stop</b>	3*12 repetition
<b>Leg Raise</b>	3*12 repetition
<b>Rus Twist</b>	3*12 repetition
<b>Ters pull-up</b>	3*12 repetition
<b>Crunch</b>	3*12 repetition
<b>Shoulder tabs</b>	3*12 repetition
<b>Inverse pull-up</b>	3*12 repetition

### Statistical Analysis

SPSS 22.0 package program was used in the analysis of the obtained data. The dependent groups t test (Wilcoxon Ranks Test), which is one of the non-parametric tests, was used to determine the differences between the pre-test and post-test values of the study group.

## III. Results

Table 2: Frequency Table for Some Physical Characteristics of the Participants

	N	Age (year) (Mean±SD)	Height (cm) (Mean±SD)
<b>Kadıñ</b>	15	23,73± 1,70	165,93±4,00

When the physical characteristics of the women participating in the study are examined in Table 2; age and height were respectively:  $23.73 \pm 1.70$  years,  $165.93 \pm 4.00$  cm.

Table 3: Differences Between Measuring Values of Physiological Parameters Before and After Calisthenic Exercises

Measurements (cm)	Ranks	N	Mean Rank	Rank Total	Z	p
<b>Weight</b> <b>Öñ Test- Son Test</b>	Negative Ranks	15 <sup>a</sup>	8,00	120,00	-3,41*	<b>,001**</b>
	Positive Ranks	0 <sup>b</sup>	,00	,00		
	Equal	0 <sup>c</sup>				
<b>Fat Percentage</b> <b>Öñ Test- Son Test</b>	Negative Ranks	15 <sup>d</sup>	8,00	120,00	-3,40*	<b>,001**</b>
	Positive Ranks	0 <sup>e</sup>	,00	,00		
	Equal	0				

<b>HDL mg/dL</b> <b>Ön Test- Son Test</b>	Negative Ranks	0 <sup>f</sup>	,00	,00	-3,40*	<b>,001**</b>
	Positive Ranks	15 <sup>g</sup>	8,00	120,00		
	Equal	0 <sup>h</sup>				
<b>LDL mg/dL</b> <b>Ön Test- Son Test</b>	Negative Ranks	15 <sup>j</sup>	8,00	120,00	-3,40*	<b>,001**</b>
	Positive Ranks	0 <sup>k</sup>	,00	,00		
	Equal	0 <sup>l</sup>				
<b>Triglycerid mg/dL</b> <b>Ön Test- Son Test</b>	Negative Ranks	15 <sup>m</sup>	8,00	120,00	-3,40	<b>,001**</b>
	Positive Ranks	0 <sup>n</sup>	,00	,00		
	Equal	0 <sup>o</sup>				
<b>Total kolesterol mg/dL</b> <b>Ön Test- Son Test</b>	Negative Ranks	15 <sup>p</sup>	8,00	120,00	-3,40	<b>,001**</b>
	Positive Ranks	0 <sup>q</sup>	,00	,00		
	Equal	0 <sup>r</sup>				

p<0,05\*

When Table 3 is examined; It was observed that the positive changes in weight, fat percentage and blood fats (HDL, LDL, Triglyceride and Total Cholesterol) of the calisthenic exercise program applied to the sedentary women included in the study were statistically significant (p<0.05). It is understood that; The positive effects of the exercise program applied can also be understood from the blood fat measurement values. In this context, it can be said that the physiological response to exercise has an important effect.

#### IV. Discussion

In the study, it was conducted to examine the effect of the calisthenic exercise program applied to the women who regularly go to the sports center on the blood lipid values, and in line with the results of our research, the weight, fat percentage and blood fats (Triglyceride, Cholesterol, HDL and LDL) of sedentary women who did regular calisthenic exercise for eight weeks. levels were found to have a positive effect.

There are many studies showing that there is a relationship between regular exercise habits and an increase in quality of life. In the research of Vergili (2012); found that twelve-week calisthenic-pilates exercises applied to healthy sedentary women improved health-related quality of life. On the other hand, Gönülaç et al., (2010) conducted a study and studies showed that exercise caused decreases in the level of harmful blood fats such as triglycerides and lipoproteins, and an increase in HDL (beneficial lipoprotein) was observed. When the results of this study are examined, it is understood that the literature shows similarities with our findings.

In another research; Çolakoğlu (2008) investigated the effects of calisthenic exercises applied to sedentary middle-aged women on physical fitness parameters. As a result of the research; Physical fitness values (strength, flexibility, blood pressure, 35 resting heart rate) of women were positively affected by calisthenic exercise. When viewed from another angle; It has been determined that calisthenic exercises have a positive effect on blood pressure values as a physiological response.

Şenel and Erbaş (2018) In their study, the application of calisthenic and pilates exercises in middle-aged sedentary women increased body fat percentage, fat weight, lean body weight, waist/hip ratio, heart rate, flexibility, sit-ups, push-ups, right-left hand grip strength and It has been determined that there are positive effects on aerobic power parameters. They concluded that calisthenic exercise is effective in burning fat. It is observed that there are studies that show similarities with the findings of our current research in the literature.

Some of the existing studies in the literature prove that every individual can get rid of excess weight with regular aerobic exercises. Individuals who exercise regularly and continuously can not only get rid of all the health disadvantages of being overweight, but also become dynamic and productive people by improving all functional capacities of their organisms (Erkan, 2000).

In a study, sedentary women were given 30 minutes of aerobic exercise 3 days a week for 3 months, and a significant increase was observed in the aerobic power of the exercise group at the end of the program (Lovelady et al., 2004). In another study, Karacan and Çolakoğlu (2003) found a significant decrease (p<0.05) in body weight, body fat percentage, body mass index, total total cholesterol, LDL total cholesterol and triglyceride values at the end of 8 weeks of exercise.

İri et al (2010) investigated the effect of 60-minute walking exercise for 8 weeks on aerobic capacity and blood lipids in sedentary women. As a result of the exercises applied, it was observed that there were significant decreases in HDL and LDL values; They emphasized that there was no significant change in cholesterol and triglyceride values. In another study, it is known that changes occur in lipid and lipoprotein profiles as a result of aerobic exercises (Katzmarzyk, 2001). On the other hand, in another study, middle-aged women were given pilates exercises for one hour once a week for six months. At the end of this period, no significant change was observed in weight, body fat percentage, waist and hip circumference values (Pouramir et al., 2004; Gökgül, 2013). Considering the

results of this study, we can say that it does not show similarity with our research result. Age factor may be the result of that.

As a result; It was determined that the 8-week calisthenic exercise program positively affected some physiological parameters of sedentary women. At the same time, it should be noted that; Clistenic exercises are considered to be at the forefront in terms of preferability as they are exercises that can be performed in the home environment, without the need for high costs.

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