

# Effect of Classical Symphony Music on Muscular Endurance in Young Obese Males: A Physiological and Exercise Performance Study

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## Abstract

Obesity is associated with functional limitations in muscle performance and increased likelihood of developing a functional disability such as mobility, strength and dynamic balance limitations. Mosso's ergograph technique is an advanced and widely accepted technique in the ergography. Music and exercise will show a significant change in ergography readings, eventually shows the influence of on the muscle contraction. The current study is aimed to evaluate the effect music on muscular endurance test in obese male individuals. BMI assessment were performed for the all participants and the individuals falling under obese category were involved in the study (BMI >25). The Test group participants were asked to listen to music using headphones for 10 minutes and endurance tests were performed pre and post music. Muscular endurance tests include Handgrip dynamometer and Mosso's Ergography. Student t- test will be applied and SPSS statistical assessment tools will be used. There may be an improved functioning of neural system due to the influence music.

## Keywords:

Muscle endurance, Mosso's ergography, BMI, Music

## Introduction

Obesity is associated with functional limitations in muscle performance<sup>(1)</sup> and increased likelihood of developing a functional disability such as mobility, strength and dynamic balance limitations<sup>(1,2)</sup>. but the previous studies said that music will enhance the muscle endurance<sup>(3)</sup>. Ergograph is a technique of graphical recording of the muscular contraction<sup>(2)</sup>. Mosso's ergograph technique is an advanced and widely accepted technique in the ergography<sup>(2)</sup>. It has been said that when neural systems are affected by different factors like stress, obesity etc, music and exercise will show a significant change in ergography readings, eventually showing the influence on the muscle contraction<sup>(5)</sup>. The aim of our study is to evaluate the effect of music on muscular endurance in obese individuals.

## Materials and methods

The subjects were identified from Saveetha Medical College and Hospital aged between 18-24 years. Alcoholics, smokers, subjects with h/o diabetes, hypertension and any musculoskeletal disorders were excluded. The study was conducted after getting approval from institutional review board (SMC/IEC/2018/11/253). The nature and benefits of the study was explained to the subjects before starting each procedure. In this study only male participants were recruited. BMI assessment was performed by checking weight in kg ÷ height in cms. The individuals falling under the obese (>25 Kg/m<sup>2</sup>) category were recruited in the study. Participants were asked to perform the Hand grip test and Mosso's Ergography. Participants were asked to listen to classical symphony for a period of 15 minutes using headphones with closed eyes. They were asked to perform hand grip test and Mosso's Ergography, prior these 15 minutes. After listening the music again the hand grip and the mosso's ergograph were performed and endurance values before and after the music were compared in obese subjects using Student paired t-test.

### Hand grip test (kg):

The proper instructions were given to the subject: arm should touch lateral side of the body, the forearm should keep in 90° then place the hand dynamometer in the participant's hand and request the participant to squeeze to his maximum, the needle will automatically record the force (in Kg)

### Mosso's Ergography test (joule):

Subject was made to sit comfortably and asked him to insert the index and ring finger into the tube holders and asked the participant to lift the load by maximal contraction of middle finger until he gets fatigued. For Each 30

sec,500gms of weight were added Work done recorded as graph. Using mosso’s ergography, formula which was used to calculate work done was  $W = F \times S$ . W= work done , F = load in kg , S = sum of the vertical amplitude in each ergogram.

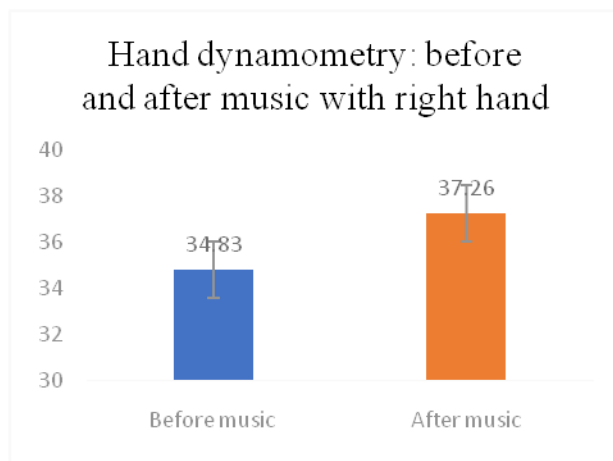
**Statistical Analysis:**

The results for Hand grip test and Mosso’s ergography in obese individuals were compared before and after music using the paired T – test. Statistical significance was set at  $p < 0.05$ .

**Results**

*Table 1: Hand dynamometry: before and after music with right hand (kg) n = 30*

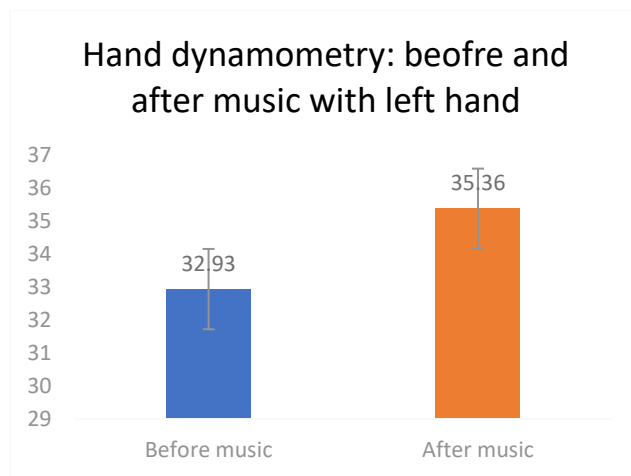
Parameter	Mean± SD	P –value
Before music	34.83 ± 4.75	0.000
After music	37.26 ±5.61	



P <0.005 Statistically highly significant

*Table 2: Hand dynamometry before and after music with left hand (kg) n =30*

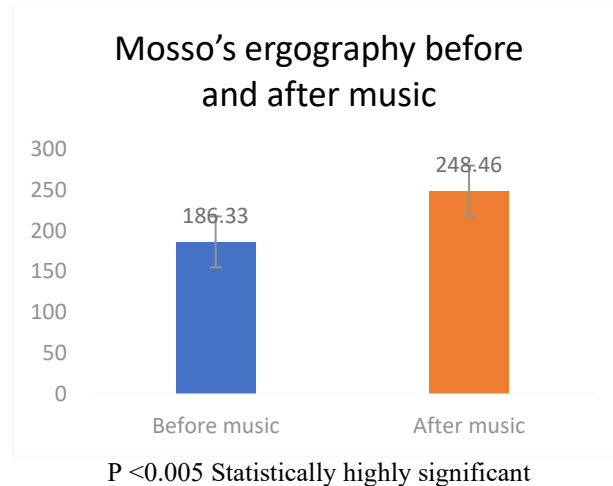
Parameter	Mean± SD	P –value
Before music	32.93 ± 5.12	0.000
After music	35.36 ±5.57	



P <0.005 Statistically highly significant

**Table 3: Mosso's ergography before and after music (joule) n = 30**

Parameter	Mean± SD	P –value
Before music	186.33 ± 25.75	0.000
After music	248.46 ± 40.31	



## Discussion

Various literatures have shown the effects of music on cardiorespiratory exercise, pregnant women and older adult performance for years, but a few studies have examined the effect of music on muscular endurance in young obese individuals. The prevalence of obesity is a prominent public health concern. (15). The research of many authors indicated that overweight and obesity, expressed by the Body Mass Index (BMI), negatively influence the level of endurance-strength abilities.(16)

The major results of our study showed that there was a better performance after music using hand dynamometer and mosso's ergography. The present study findings provide evidence for the importance of music on muscular endurance in obesity. It is stated that listening to self selected motivated music creates an ergogenic acute effect and it is recommended to use music during strength workout to have a better strength endurance performance.(17)

## Conclusion

In light of these study findings, music may be used as an additional aid for obese individuals to maintain their skeletal muscle endurance during any physical activity and aerobic exercise in healthy young males. Our research confirmed also the usefulness of the test in assessing the relationships between the nutritional status and endurance-strength abilities of young adults.

**Conflict of interest:** None.

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