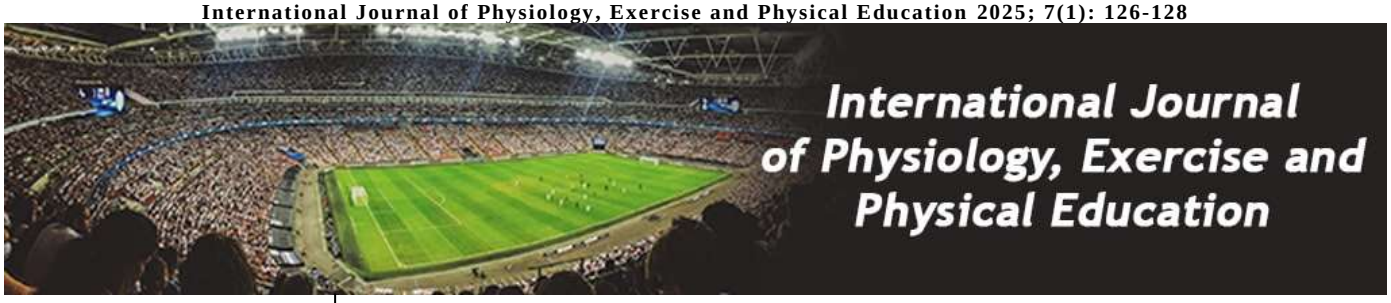

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Effects of circuit training on muscular power: A quasi-experimental study

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Abstract
The aim of this study was to find out the effects of circuit training on muscular power. A quasi-experimental study was conducted on One hundred twenty (N=120), female field hockey players (age 18-25 years). The subjects were divided into following groups: Group-A: Experimental Group [Grass Field]: (N_1=40), Group-B: Experimental Group [Synthetic Field]: (N_2=40)" Group-C: Control Group [Control one]: (N_3=40). The Paired-Samples t-test were included in the present study. Muscular Power (Grass Field): The absolute value of the calculated t exceeds the critical value (5.6581>2.023), so the means are significantly different. Muscular Power (Synthetic Field): The absolute value of the calculated t exceeds the critical value (11.1695>2.023), so the means are significantly different. Muscular Power (Control Group): The absolute value of the calculated t exceeds the critical value (0.457<2.023), so the means are not significantly different.

Keywords: Circuit training, muscular power, grass field, synthetic field

Introduction
Physical fitness is universally acknowledged as a fundamental pillar of health and quality of life. According to Caspersen, Powell, and Christenson (1985) [1], it refers to one's capacity to perform daily activities efficiently, sustain energy for recreational pursuits, and handle unexpected physical demands. Studies indicate that individuals with higher fitness levels exhibit lower susceptibility to chronic conditions, including heart disease, diabetes, and some cancers (Warburton, Nicol, & Bredin, 2006) [7]. Despite its proven advantages, global physical activity levels have deteriorated, especially in developed nations, where modern conveniences and desk-bound jobs have minimized routine physical exertion (Hallal *et al*., 2012) [4]. Engaging in regular exercise strengthens cardiovascular health by enhancing blood flow and stabilizing blood pressure, while also improving metabolic efficiency through better glucose regulation (Shiroma & Lee, 2010) [6]. Beyond physical health, exercise promotes mental well-being by triggering endorphin production and alleviating symptoms of anxiety, depression, and stress. Alarmingly, inactivity has reached epidemic proportions. The World Health Organization (2022) estimates that more than 1.4 billion adults do not meet the recommended activity thresholds, leading to nearly 5 million preventable deaths annually from conditions like heart disease and diabetes (Ding *et al*., 2016) [25]. Contributing factors include sedentary work environments, urban sprawl, and excessive digital screen use (Guthold *et al*., 2018) [3].

Selection of Subjects
The study was conducted on One hundred twenty (N=120), female field hockey players (age 18-25 years). The subjects were divided into following groups:

- **Group-A:** Experimental Group [Grass Field]: (N_1=40)
- **Group-B:** Experimental Group [Synthetic Field]: (N_2=40)
- **Group-C:** Control Group [Control one] (N_3=40)

Variable and administration of test
Muscular Power
(Standing Broad Jump Test)

Fig 1: The subject performing Standing Broad Jump Test.

Statistical Analysis: The Paired-Samples t-test were included in the present study.

Results

Table 1: Paired (Dependent) T Test statistics of Muscular Power (Grass Field) of Pre-Test and Post Test Field Hockey Players (N=40).

Muscular Power		
	Pre-Test	**Post Test**
Mean	1.8443	1.9525
Stand. Dev.	0.1114	0.1249
n	40	40
t	5.6581	
critical value	2.023	
Since | t | > critical value		There is sig. diff.

Muscular Power

The absolute value of the calculated *t* exceeds the critical value (5.6581>2.023), so the means are significantly different.

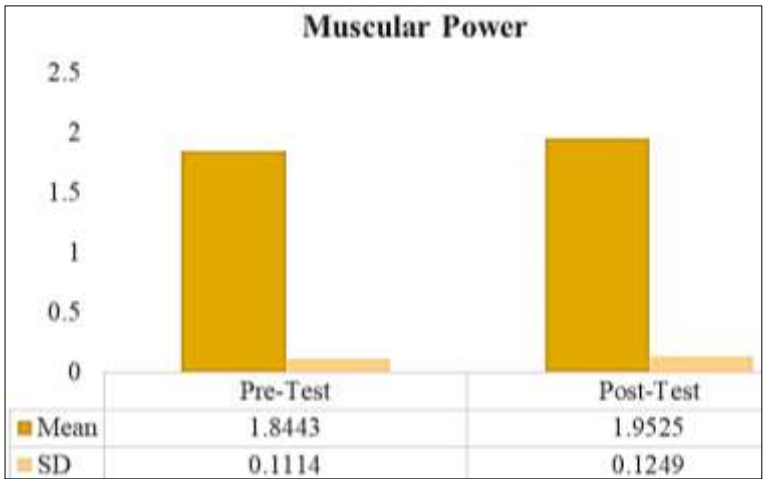

Fig 2: Mean and SD comparison of Muscular Power (Grass Field) of Pre-Test and Post Test Field Hockey Players (N=40).

Table 2: Paired (Dependent) T Test statistics of Muscular Power (Synthetic Field) of Pre-Test and Post Test Field Hockey Players (N=40).

Muscular Power		
	Pre-Test	**Post Test**
Mean	1.792	1.946
Stand. Dev.	0.0975	0.099
n	40	40
t	11.1695	
critical value	2.023	
since | t | > critical value		there is sig. diff.

Muscular Power

The absolute value of the calculated *t* exceeds the critical value (11.1695>2.023), so the means are significantly different.

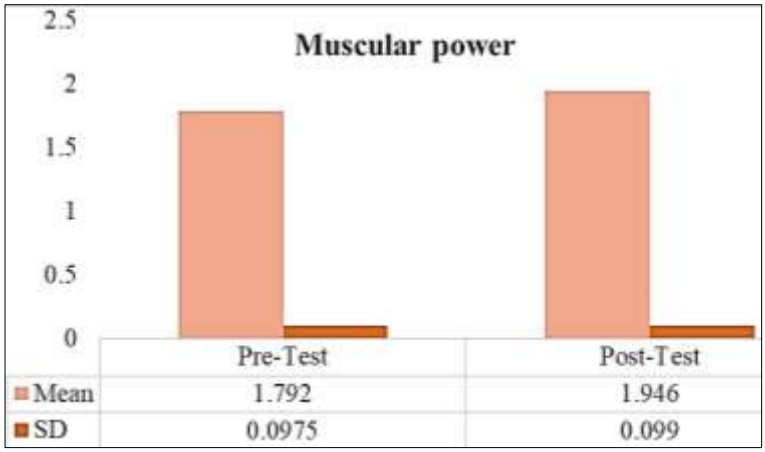

Fig 3: Mean and SD comparison of muscular power (Synthetic Field) of Pre-Test and Post Test Field Hockey Players (N=40).

Table 3: Paired (Dependent) T Test statistics of Muscular Power (Control Group) of Pre-Test and Post Test Field Hockey Players (N=40).

Muscular Power		
	Pre-Test	**Post Test**
Mean	1.812	1.8138
Stand. Dev.	0.1054	0.102
n	40	40
t	0.4574	
critical value	2.023	
since | t | < criticall value		no sig. diff.

Muscular power

The absolute value of the calculated t exceeds the critical value (0.457<2.023), so the means are not significantly different.

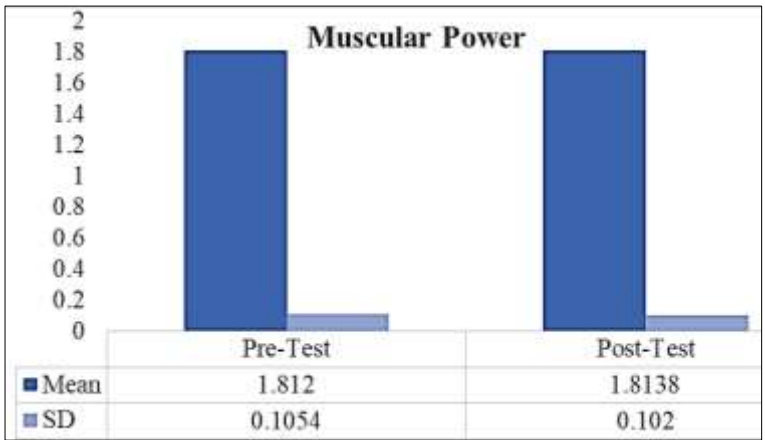

Fig 4: Mean and SD comparison of muscular power (Control Group) of Pre-Test and Post Test Field Hockey Players (N=40).

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