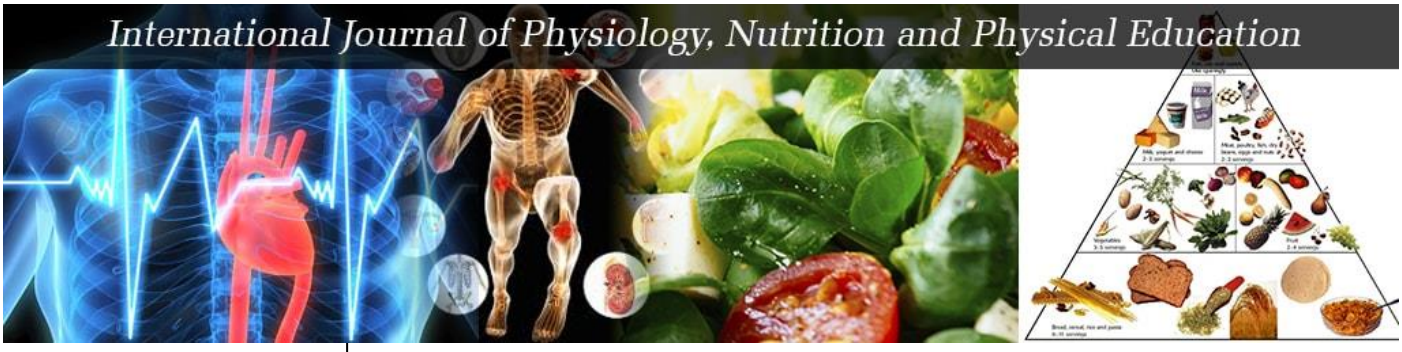

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Impact of sand aerobics and floor aerobics on endurance and muscular strength on college level hockey players

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Abstract
The purpose of this study was to find out the impact of sand aerobics and floor aerobics on endurance and muscular strength on college level hockey players. The subjects selected for this study were in the age group of 18 – 25 years. The subjects were divided into three groups. Each group consisting of twenty each, namely, experimental group I, experimental group II and control group. The selected subjects were randomly divided into groups equally of which experimental Group – I underwent sand aerobic, group – II underwent floor aerobics and group – III acted as Control Group. The following fitness variables were selected as dependent variables endurance and muscular Strength and the following variables were selected as independent variables sand aerobics and floor aerobics. The data collected on selected criterion variables were subjected to statistical analyse using analysis of covariance (ANCOVA) to find out the significant difference if any between the groups on selected variables separately. The results presented in sand aerobics training would have significantly greater influence on the selected fitness variables, namely, endurance and muscular strength than the floor aerobics among college men hockey players.

Keywords: Aerobics, sand aerobics, floor aerobics

Introduction
Every human being participates in some kind of sports activity or physical exercise during the course of his life. This exercise may assume different forms for different individuals. It may be walking, jogging, cycling, working in a factory, participation in games and sports etc. Regular participation in exercise programme markedly influences physical, physiological and mental fitness of an individual.

The word aerobic meaning is with oxygen to represent idea. Even so the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat. Oxygen is the spark the fuel needs to burn regardless aerobics is the word in general use. The fact is that Cooper (1969) [2] codified and organized what fitness means to many people. He is generally credited with being one of the main forces of the current fitness craze. The majority medical opinion is that aerobic programs strengthen heart muscle, increase the efficiency of lungs and offer other wonderful benefits.

Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. (Concise Oxford English Dictionary).

Many types of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise involving large muscle groups, and a cooling down period at the end. Both the term and the specific exercise method were developed by Kenneth H. Cooper, M.D., an exercise physiologist, and Col. Pauline Potts, physical therapist, both in the United States Air Force. Dr. Cooper, an avowed exercise enthusiast, was personally and professionally puzzled about why some people with excellent muscular strength were still prone to poor performance at

tasks such as long-distance running, swimming, and bicycling. He began measuring systematic human performance using a bicycle ergo meter, and began measuring sustained performance in terms of a person's ability to use oxygen. His ground breaking book, Aerobics, was published in 1968, and included scientific exercise programs using running, walking, swimming and bicycling. The book came at a fortuitous historical moment, when increasing weakness and inactivity in the general population was causing a perceived need for increased exercise. It became a bestseller. Cooper's data provided the scientific baseline for almost all modern aerobics programs, most of which are based on oxygen-consumption equivalency. (World Book of Encyclopaedia, 1993) [4].

Aerobic exercise and fitness can be contrasted with anaerobic exercise, of which strength training and weight training are the most salient examples. The two types of exercise differ by the duration and intensity of muscular contractions involved, as well as by how energy is generated within the muscle. Initially during aerobic exercise, glycogen is broken down to produce glucose, which is then broken down using oxygen to generate energy. In the absence of these carbohydrates, fat metabolism is initiated instead. The latter is a slow process, and is accompanied by a decline in performance level. This gradual switch to fat as fuel is a major cause of what marathon runner's call "hitting the wall". Anaerobic exercise, in contrast, refers to the initial phase of exercise, or to any short burst of intense exertion, in which the glycogen or sugar is consumed without oxygen, and is a far less efficient process. Operating an aerobically, an untrained 400-meter sprinter may "hit the wall" short of the full distance (Bouchard, *et al*. 1999) [6].

Fitness in the human body what fine tuning is to an engine. It enables us to perform up to our potential. Fitness can be described as a condition that helps us for better look, pleasant feel and do our best. More specifically, it is "the ability to perform daily tasks vigorously and alertly, with energy left over for enjoying leisure time activities and meeting emergency demands. It is the ability to endure, to bear up, to withstand stress, to carry on in circumstances where an unfit person could not continue, and is a major basis for good health and wellbeing" (Singh, 1991) [8].

Methodology

Sixty subjects were randomly selected from different colleges in Chennai and divided into three groups equally of which experimental group – I underwent sand aerobic, group – II underwent floor aerobic and group – III acted as control group. The subject's age ranged from 18 to 25 years. The fitness variables were selected as dependent variables endurance was measured through Cooper's 12 Minute Run / Walk test Muscular Strength was measured through push ups test and they performed touch out, side to side, double side to side, grapevine, cross over sand, jump on the spot, knee curl, front kick, knee and arm lift, side kick were selected as independent variables sand aerobics and floor aerobics. The initial and final scores in selected variables were subjected to statistical treatment using Analysis of Covariance (ANCOVA) to find out whether the mean differences were significant or not through the statistical packages for social sciences (SPSS, version 19.0 for Windows XP) was used to analyse the data. An alpha level of 0.05 was used to determine statistical significance.

Results and discussions

Table 1: Computation of analysis of covariance

		Floor aerobics	Sand aerobics	Control group	SOV	Sum of squares	df	Mean square	F ratio
Endurance	Pre-test mean	1789.00	1819.75	1882.50	B	70835.83	2	45417.92	2.91
					W	889778.75	57	15610.15	
	Post-test mean	2303.50	2347.00	1883.75	B	7617885.83	2	1308942.92	79.91*
					W	933668.75	57	16380.15	
	Adjusted post-test mean	2318.13	2350.77	1865.35	B	2711072.31	2	1355536.15	92.27*
					W	822652.64	57	14690.23	
Muscular strength	Pre-test mean	18.65	18.80	19.70	B	12.9	2	6.45	2.97
					W	123.75	57	2.17	
	Post-test mean	20.45	20.55	19.95	B	4.13	2	2.07	0.86
					W	136.88	57	2.40	
	Adjusted post-test mean	20.72	20.72	19.51	B	17.52	2	8.76	6.04*
					W	81.20	56	1.45	

F-ratio at 0.05 level of confidence for 2 and 57 (DF) =3.16, 2 and 56 (DF) =3.16 *Significant

Table I shows that the post test scores analysis proved that there was significant difference between the groups, as the obtained F value 79.91 was greater than the required F value of 3.16. This proved that the differences between the post- test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 92.27 was greater than the required F value of 3.16. This proved that there were significant differences among the means due to twelve weeks varied aerobic exercises on fitness variable endurance.

Table I also shows that the post test scores analysis proved that there was no significant difference between the groups, as The obtained F value 0.86 was lesser than the required F value of 3.16. This proved that the differences between the post- test means of the subjects were not significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 6.04 was greater than the required F value of 3.16. This proved that there were significant differences among the means due to twelve weeks varied aerobic exercises on fitness variable muscular strength.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table 2: Scheffe's confidence interval test

	Means			Mean Difference	Required C I
	Floor aerobics	**Sand aerobics**	**Control group**		
Endurance	2318.13	2350.77		32.64	95.44
	2318.13		1865.35	452.78*	95.44
		2350.77	1865.35	485.41*	95.44
Muscular Strength	20.72	20.72		0.00	0.95
	20.72		19.51	1.20*	0.95
		20.72	19.51	1.20*	0.95

*significant

The multiple mean comparisons shown in Table II proved that there existed significant differences between the adjusted means of sand aerobics and control group, floor aerobics and control group. There was no significant difference between sand aerobics and floor aerobic groups on endurance and muscular.

Conclusions

Sand and Floor aerobic exercises**,** significantly improved the endurance and muscular strength of the hockey players. There was no significant difference between floor aerobic and sand aerobic exercises.

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