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# Effect Of Isolated And Combined Training Of Aerobic And Yoga On Mean Arterial Pressure Among Football Players

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## Abstract

The purpose of the study was to find out the effect of isolated and combined training of aerobic and yoga on mean arterial pressure among football players. To achieve this purpose of the study, sixty male football were selected as subjects who were from the Mar Athanasius College of Engineering, Kothamangalam. The selected subjects were aged between 18 to 22 years. They were divided into four equal groups of fifteen each, Group I underwent aerobic training, Group II underwent yogic training, Group III underwent combined training and Group IV acted as control that did not participate in any special training apart from their regular curricular activities. The subjects were tested on selected criterion variable such as mean arterial pressure prior to and immediately after the training period. The selected criterion variable such as mean arterial pressure was assessed by sphygmomanometer. The analysis of covariance (ANCOVA) was used to find out the significant differences if any, between the experimental group and control group on selected criterion variable. In all the cases, 0.05 level of confidence was fixed to test the significance, which was considered as an appropriate. The result of the present study has revealed that there was a significant difference among the experimental and control group on mean arterial pressure.

**Keywords:** mean arterial pressure, aerobic training, yogic training, combined training, football players.

## INTRODUCTION

The primary objective of sports training is to stress various bodily systems to bring about positive adaptation in order to enhance sporting performance. To achieve this objective, coaches and athletes systematically apply a number of training principles including overload, specificity and progression, organized through what is commonly termed periodisation. The application of these principles involves the manipulation of various programme design variables including choice of exercise, order of training activities/exercises, training intensity (load and repetition), rest periods between sets and activities/exercises and training frequency and volume in order to provide periods of stimulus and recovery, with the successful balance of these factors resulting in positive adaptation. Aerobic exercise is vigorous, oxygenated large muscle exercise, which stimulates heart and lungs activity for a specific period of time to bring about beneficial changes in the cardiovascular system. The main objective of aerobic dance, like any others form of aerobics is to increase the maximum amount of oxygen that the body can process in a given amount of time. The aerobic effect depends on the body's ability to (a) rapidly breathe large amounts of air, (b) forcefully deliver large volumes of blood, and (c) effectively deliver oxygen to all parts of the body. In simplest terms, the aerobic effect is large muscle activity that brings about a reduction in resting heart rate. Aerobic conditioning is synonymous with the first component of health-related fitness: cardiovascular efficiency. Improved cardio respiratory endurance is one of the most important benefits of aerobic training programs. The Sanskrit word "Prana" means "vital force" or "cosmic energy". It also signifies "life" or "breath". "Ayama" means 'control'. Hence, Pranayama means the control of the vital force through concentration and regulated breathing. Prana is not the supply of a particular volume of oxygen-nitrogen mix when we inhale. Nor is prana the volume of carbon dioxide mixed with the residual air that comes out when we exhale. Of course, the physico-chemical actions are there, but the prana sits at the root of the two processes -- exhalation and inhalation. It is the vital invisible force that enables us to breath out or to breath in. Numerous recreational exercisers complete their cardiovascular and strength training workouts either during the same training session or within hours of each other. This sequential exercise regime is referred to as "concurrent training. The "fatigue hypothesis," which theorizes that strength performance is reduced due to fatigue caused by the prior cardiovascular work. Muscle fatigue is a multifactorial phenomenon, however, caused by an increase in cellular protons (due to acidosis), a decrease in energy-providing substrates and neural drive, and structural damage to the muscle cells. The physiological response to dynamic aerobic exercise is an increase in oxygen consumption and heart rate that parallels the intensity of the imposed activity and a curvilinear increase in stroke volume. There is a progressive increase in systolic blood pressure, with maintenance of or a slight decrease in the diastolic blood pressure and a concomitant widening of the pulse pressure. Blood is shunted from the viscera to active skeletal muscle, where increased oxygen extraction widens the systematic arteriovenous oxygen difference. Thus aerobic exercise imposes primarily a volume load on the myocardium. Blood pressure varies depending on situation, activity, and disease states, and is regulated by the nervous and endocrine systems. Blood pressure that is pathologically low is called hypotension, and pressure that is pathologically high is hypertension. Both have many causes and can range from mild to severe, with both acute and chronic forms. Chronic hypertension is a risk factor for many complications, including peripheral vascular disease, heart attack, and stroke. Hypertension is generally more common, also due to the demands of modern lifestyles. Hypertension and hypotension go often undetected because of infrequent monitoring. Mean arterial blood pressure increases in response to dynamic exercise, largely owing to an increase in systolic pressure, because diastolic pressure remains at near-resting levels. The increase in mean arterial pressure is a normal and desirable response, the result of resetting of the arterial baroreflex to a higher pressure. Without such a resetting, the body would experience severe arterial hypertension during intense activity. The acute changes in blood pressure after an episode of exercise may be an important aspect of the role of physical activity in helping control blood pressure in hypertensive patients. Regular physical activity — at least 30 to 60 minutes most days of the week — can lower your blood pressure by 4 to 9 millimeters of mercury (mm Hg). And it doesn't take long to see a difference. If you haven't been active, increasing your exercise level can lower your blood pressure within just a few weeks. If you have prehypertension — systolic pressure between 120 and 139 or diastolic pressure between 80 and 89 — exercise can help you avoid developing full-blown hypertension. If you already have hypertension, regular physical activity can bring your blood pressure down to safer levels. Talk to your doctor about developing an exercise program. Your doctor can help determine whether you need any exercise restrictions. Even moderate activity for 10 minutes at a time, such as walking and light strength training, can help. But avoid being a "weekend warrior." Trying to squeeze all your exercise in on the weekends to make up for weekday inactivity isn't a good strategy. Those sudden bursts of activity could actually be risky.

## METHODOLOGY

In the present study all the students studying in educational institutions' of Mar Athanasius College of Engineering, Kothamangalam area were considered as population for the study. A representative sample of 60 football players in the age of 18-22 years was chosen as sample for the study. The selected participants were divided into four groups. Group I underwent aerobic training, group II underwent yoga training, group III underwent combined training and group IV act as control group. The experimental groups underwent twelve weeks of training in their particular workout. For this study dependent variable is mean arterial pressure.

**A. Test Administration – Mean Arterial Pressure**

The subject was asked to sit with feet flat, legs uncrossed, the arm free of any clothing and relaxed. The arm was kept on a table to the heart level and back well supported and rested comfortably on a chair for 5 minutes. The cuff of Sphygmomanometer was wrapped around the upper arm above the elbow of the subject. The cuff was then inflated with air pressure by pumping up a hand bulb and placed the stethoscope completely over their brachial artery. This air pressure inside the cuffis higher than the systolic blood pressure, the artery remains occluded or collapsed and no sound is heard through the applied stethoscope in the antecubital fossa. When the artery is occluded, no blood will flow past the point of occlusion. Then the air pressure was slowly released as tester watched the mercury Colum. The first sound of the pulse was heard in the stethoscope the reading in millimeters of mercury at that instant was recorded as the systolic blood pressure. The tester continued to release the pressure slowly until the pulse vanished and the reading was recorded as the diastolic blood pressure in millimeters of mercury.

*Mean Arterial Blood Pressure Calculations*

Mean arterial pressure (MAP) is the mean or average, blood pressure in the arterial system. Mean arterial pressure represents the integration or combination, of both the systolic and diastolic blood pressure.

Mean arterial pressure (MAP) = Diastolic blood pressure (DBP) + 1/3 (Systolic blood pressure – Diastolic blood pressure) MAP = DBP + 1/3 (DBP-SBP).

**B. Analysis of Data**

The data obtained were analyzed by analysis of covariance (ANCOVA). Analysis of covariance was computed for any number of experimental groups, the obtained ‘F’ ratio compared with critical F value for significance. When the F ratio was found to be significant, scheffe’s post hoc test was used to find out the paired mean significant difference.

**RESULTS**

The statistical analysis comparing the initial and final means of mean arterial pressure due to aerobic, yoga and combined training have been presented in Table I.

**Table I.** Computation Of Analysis Of Covariance On Mean Arterial Pressure

| Test | Aerobic Training | Yoga Training | Combined Training | Control Group | Source of Variance | Sum of Squares | df | Mean Squares | Obtained ‘F’ Ratio |
|---|---|---|---|---|---|---|---|---|---|
| **Pre-Test Mean** | 85.52 | 84.58 | 84.62 | 84.64 | **B:** | 31.74 | 3 | 10.58 | 0.21 |
| **S.D.** | 1.02 | 0.98 | 1.12 | 0.86 | **W:** | 2812.32 | 56 | 50.22 | |
| **Post-test Mean** | 82.58 | 81.52 | 82.28 | 84.44 | **B:** | 128.63 | 3 | 42.88 | 6.11* |
| **S.D.** | 1.24 | 1.06 | 0.97 | 1.04 | **W:** | 393.11 | 56 | 7.02 | |
| **Adjusted Post-test Mean** | 82.56 | 81.48 | 82.42 | 84.54 | **B:** | 133.87 | 3 | 44.62 | 8.04* |
| | | | | | **W:** | 305.24 | 55 | 5.55 | |

*Significant at 0.05 level of confidence.

The table value for significance at 0.05 level with df 3 and 56 and 3 and 55 are 3.16 and 3.03 respectively.

The table I shows that the pre-test means of aerobic, yoga, combined training groups and control group are 85.58, 84.58, 84.62 and 84.64 respectively. The obtained 'F' ratio of 0.21 for pre-test means is less than the table value of 3.16 for df 3 and 56 required for significance at 0.05 level. The post-test means of aerobic, yoga, combined training groups and control group are 82.58, 81.52, 82.28 and 84.44 respectively. The obtained 'F' ratio of 6.11 for post-test mean is more than the table value 3.16 for df 3 and 56 required for significance at 0.05 level.

The adjusted post-test means of aerobic, yoga, combined training groups and control group are 82.56, 81.48, 82.42 and 84.54 respectively. The obtained 'F' ratio of 8.04 for adjusted post-test means is more than the table value of 3.03 for df 3 and 55 required for significance at 0.05 level.

The result of the study indicates that there is a significant difference among adjusted post-test means of aerobic, yoga, combined training groups and control group. To determine the significant difference among the four paired means, Scheffe'S post-hoc test was applied and the results are presented in Table II.

**Table II.** Scheffe's Test For The Difference Between The Adjusted Post-Test Paired Means Of Mean Arterial Pressure

| Adjusted Post-test Means | | | | Mean Differences | Confidence Interval |
|---|---|---|---|---|---|
| Aerobic Training | Yoga Training | Combined Training | Control group | | |
| 82.56 | 81.48 | | | 1.08 | 1.38 |
| 82.56 | | 82.28 | | 0.28 | 1.38 |
| 82.56 | | | 84.54 | 1.98* | 1.38 |
| | 81.48 | 82.28 | | 0.80 | 1.38 |
| | 81.48 | | 84.54 | 3.06* | 1.38 |
| | | 82.28 | 84.54 | 2.26* | 1.38 |

*Significant at 0.05 level of confidence.

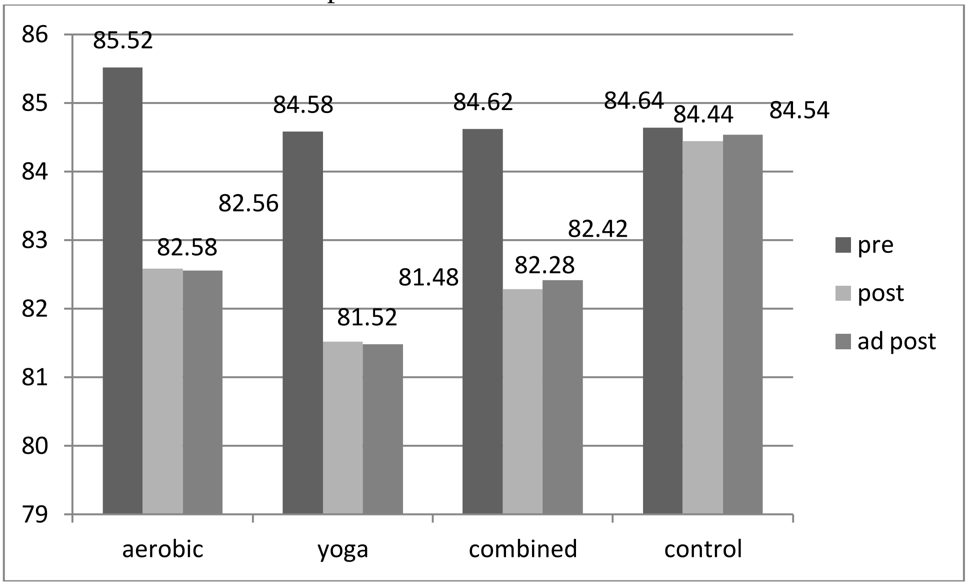
Table II shows that the adjusted post-test mean difference in mean arterial blood pressure between aerobic training and control, yoga training and control and combined training and control groups are 1.98, 3.06 and 2.26 respectively, which are higher than the confidence interval value of 1.38. But aerobic and yoga training, aerobic and combined training and yoga and combined training mean difference are 1.08, 0.28 and 0.80 respectively, which are lesser than the confidence interval value of 1.38.

The adjusted post-test mean values of aerobic, yoga, combined training groups and control group on mean arterial blood pressure were graphically represented in Figure.

## DISCUSSION/CONCLUSIONS

The findings of the study proved that there was a significant difference existed between control group and aerobic training, yoga training and combined training groups. Thus, twelve weeks of experimental treatment reduction in mean arterial blood pressure of the football players compared to control group. However there was no significant difference between experimental groups on mean arterial blood pressure. The above findings are in consonance with the study conducted by Chakraborty and others, Choudhary Sunita, Poovaiah and Shelvam, and Satyanarayana.

**Figure -** Mean Values Of Aerobic Training, Yoga Training, Combined Training And Control Groups On Mean Arterial Pressure

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