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Evaluation of Cardiac efficacy in relation to different proportions of circulatory and Resistance training among well trained athletes

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Abstract

Cardiac output is the amount of blood the heart pumps in 1 minute, and it is dependent on the heart rate, contractility, preload, and after load. The age of the subjects ranged from 16-20 years. The subjects were (n=15) randomly assigned as to three equal groups of college players. Experimental Group –I act as Circulatory training exercises, Group –II acted as Resistance training ,Group –III acted as Yogic training group for a period of 12 weeks training except Saturday and Sundays every weeks as in stipulated time . the subjects were tested in order to find out cardiac output. The data were collected before and after the training period, pre and post test were analyzed by using ANOVA. The levels of significance for the study were chosen as 0.05 level. Cardiac output has no significance difference among these three experimental groups. Yogic training proportions are the better proportion to increases the ventricular diastolic volume and decreases the stroke volume ultimately it leads to increase the cardiac output.

Introduction

The amount of blood the heart pumps through the circulatory system in a minute. The amount of blood put out by the left ventricle of the heart in one contraction is called the stroke volume. A normal adult has a **cardiac output** of 4.7 liters (5 quarts) of blood per minute.

Cardiac output is the amount of blood the heart pumps in 1 minute, and it is dependent on the heart rate, contractility, preload, and after load. Understanding of the applicability and practical relevance of each of these four components is important when interpreting cardiac output values. In the present article, we use a simple analogy comparing cardiac output with the speed of a bicycle to help appreciate better the effects of various disease processes and interventions on cardiac output and its four components. Primary prevention for the general public should focus on maintenance of a body mass index (BMI) less than 25 kg/m^2, consuming a healthful diet, avoidance of tobacco, systolic pressures of less than 140 mmHg and

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diastolic pressures less than 90 mmHg, LDL cholesterol less than 130 mg/dL, HDL cholesterol greater than 35 mg/dL, and glycated hemoglobin less than 6.5%. Secondary prevention of chronic disease focuses on correcting deviations from these goals.

Factors of affect Cardiac out put

Anything that decreases cardiac output, also decreases blood pressure, because there is less pressure on the vessel walls. An increase in cardiac output results in increased blood pressure.

Methodology

For this study 45 players were selected from various department of Polytechnic College Chennai as subjects. The age of the subjects ranged from 16-20 years. The study was formulated true random group design. The subjects were (n=15) randomly assigned as to three equal groups of college players. Experimental Group –I act as Circulatory training exercises, Group –II acted as Resistance training ,Group –III acted as Yogic training group for a period of 12 weeks training except Saturday and Sundays every weeks as in stipulated time . the subjects were tested in order to find out cardiac output. The data were collected before and after the training period, pre and post test were analyzed by using ANCOVA. The levels of significance for the study were chosen as 0.05 levels.

Day 1: yoga warm up, back + biceps , 15 to 20 min cardio, yoga cool down

Day 2: Yoga warm up, legs + calves, 15 to 20 min cardio, yoga cool down

Day 3: Yoga warm up, chest + triceps, 15 to 20 min cardio, yoga cool down

Day 4: Yoga warm up, legs, 15 to 20 min HIIT cardio, yoga cool down

Day 5: Yoga warm up, shoulders, 10 to 15 min cardio, yoga cool down recovery

Results and discussion

By Jan Praetorius and others 2019 .After training, cardiac output was reduced at moderate workloads (13.1%) causing a change of the relation between oxygen uptake and cardiac output from hyperkinetic to normal. During heavy exercise the cardiac output was increased (5.5%) after training. Similar changes were observed in muscle blood flow, which was reduced at sub maximal loads (14.9%) and increased at maximal (8.6%).

Matthew S. Mellema and their team 2015 Cardiac output is an important measure of cardiovascular function. It provides insights into bulk blood delivery to the body as a whole. When taken together with measurements of the oxygen content of blood, it allows for the

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Vol-22-Issue-10-November-2019

determination of whole body oxygen delivery. Cardiac output measurements also make it possible for the caregiver to determine important physiologic indicators such as intrapulmonary shunt, systemic and oxygen consumption and pulmonary vascular resistance.

M. Harold Laughlin 2019– This work was supported in part by National Heart, Lung, and Blood Institute Grants HL-52490 and HL-36088. "Advances in physiology education" As a result, exercise capacity is limited in hot, humid environments because less cardiac output can be delivered to active muscle. Also, exercise stress can be used in diagnosis of cardio respiratory disease because of the tight relationship between exercise intensity, heart rate, cardiac output, and cardiovascular function.

Klasnja AV et.al.,2013, At rest, the two groups had similar values of cardiac power output (1·08 ± 0·2 W versus 1·1 ± 0·24 W, P>0·05), The study provides new evidence that resting measures of cardiac structure and function need to be considered with caution in interpretation of maximal cardiac performance.Peak exercise CPO and reserve were only moderately correlated with end-diastolic volume (r = 0·54; r = 0·46, P<0·05) and end-diastolic left ventricular internal diameter (r = 0·48; r = 0·42, P<0·05), respectively. Athletes demonstrated greater maximal cardiac pumping capability and reserve than non-athletes.

Sathish gurunathrao patil and others 2017 Elderly individuals aged ≥60 years with PP ≥ 60 mmHg were recruited for the study. Yoga (study) group (n = 30) was assigned for yoga training and walking (exercise) group (n = 30) for walking with loosening practices for one hour in the morning for 6 days in a week for 3 months. significant difference between-group was found in RHR (p = 0.036), PD (p = 0.02), ED% (p = 0.049), LVET (p = 0.048), DT (p = 0.02) and RPP (p = 0.001).

Arbab-Zadeh et al., 2004 evaluated l in master athletes and sedentary seniors on left ventricular compliance with aging and has shown that prolonged, sustained through endurance training preserves ventricular compliance by echocardiography.

Galetta et al.,2004 has demonstrated that the expected pattern of left ventricular diastolic function changes normally seen in response to age is modified in the elderly trained athletes and suggested that exercise training can effectively prevent aging effects on heart in older individuals.

Sharad jain 2016 studied was done to find out direct effect of Shavasana on cardiac output and peripheral resistance by using Impedance Cardiovasograph aged 17-23 years, The

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practice of Shavasana for short duration immediately improves cardiovascular parameters including cardiac output and might be beneficial in normal subjects and as well of hypertensive patients .

Parasar 2012 Cardiac output and peripheral resistance can be measured noninvasively by using impadence cardiovasograph (Nivomon L.T.Medicals)

Tables and Figures

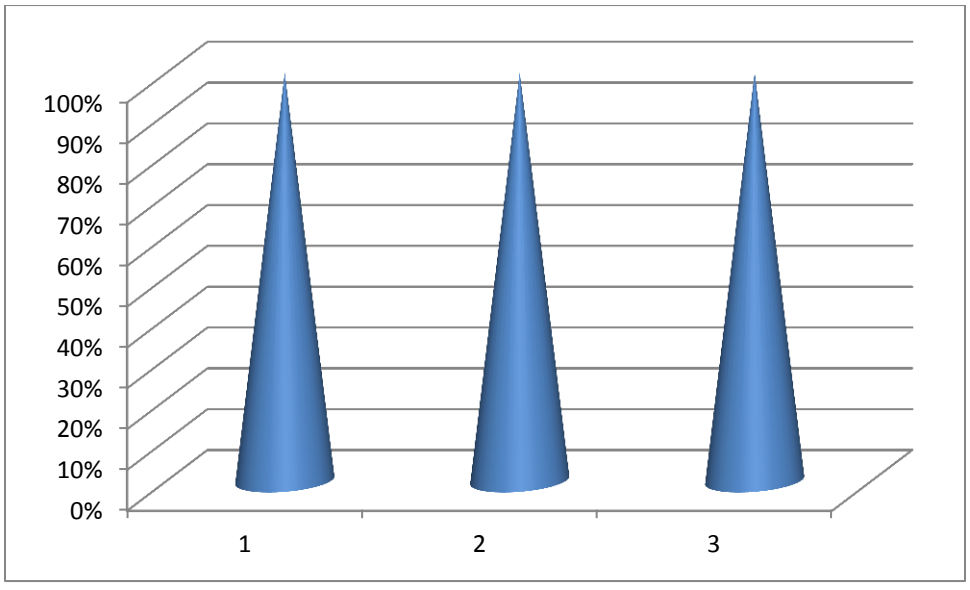
Table 1

Analysis of variance for the cardiac output at rest data on aerobic and anaerobic group, aerobic and anaerobic group and aerobic and anaerobic group.

	Circulatory training group	Resistance training group	Yogic training group	Source of Variance	df	Sum of Squares	Mean Square	Obtained F ratio
Mean	4650	4631.02	4694.43	B	2	31653.66	15826.83	1.848
SD	125.25	49.99	88.29	W	42	359624.26	8562.48	

*Significance at 0.05 level of confidence. The table value for significance at 0.05 level with the degrees of freedom 2and 42 is 3.222

The Mean values of Circulatory Resistance Yogic training groups on Cardiac out put in graphical shows



ISSN:0971-1260
Vol-22-Issue-10-November-2019

Conclusion

Cardiac output has no significance difference among these three experimental groups. Yogic training proportions are the better proportion to increases the ventricular diastolic volume and decreases the stroke volume ultimately it leads to increase the cardiac output.

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