"CORE POWER UNLEASHED: TRANSFORM YOUR PULMONARY HEALTH WITH ENHANCED VO2 AND FEV1"

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Abstract

In this study, 45 students from Government Higher Secondary School Barbugh Imamsahib in Shopian, India, were selected as subjects. They were divided into three groups of fifteen: a yogic practice group, a core strength group, and a combined training group. The variables chosen for this study were VO2max (maximum oxygen consumption) and FEV1 (forced expiratory volume in one second). The participants underwent a 12-week training program, conducted 4 days per week for 45 to 60 minutes per session, including appropriate warm-up and cool-down exercises. The criterion variables were assessed before and immediately after the training program. Data analysis was performed using ANCOVA (analysis of covariance), and Scheffé's post hoc test was applied to determine paired mean differences if the obtained F-ratio was significant. The level of significance was set at 0.05. The results indicated a significant difference among the experimental groups in the selected VO2max and FEV1 parameters.

Keywords: ***Pulmonary Variable, Scheffé's post hoc test, Vo2 Max, Fev1, Adolescent School Boys***

1. INTRODUCTION

In the modern world physical activity plays an important role. Man becomes fit for physical activities by developing required skills, strength and endurance. Man should be more fit than what the daily necessities of his life required, so that he can meet the occasional emergencies that arise. These emergencies may include sudden need to increase great efficiency in his working hours to take care of some immediate situation. The situation may be very vital and upsetting. Whatever the emergency that thrusts it on man, he has to carry on. Sports are a means of developing this emergency fitness. Spirometry is a gold standard pulmonary function test that measures how an individual inhales or exhales volumes of air as a function of time. It is the most important and most frequently performed pulmonary function testing procedure, having become indispensible for the prevention, diagnosis, and evaluation of various respiratory impairments.

In Europe, spirometric results are currently interpreted in accordance with the guidelines established by the European Coal and Steel Community (ECSC), which provide the normal-range reference values for the general population. Among the known determinants of lung function, the duration, type, and intensity of exercise have been shown to affect lung development and volumes. In addition, athletes can be distinguished from members of the general population in that, in general, the former show better cardiovascular function, larger stroke volume, and greater maximal cardiac output **(Chamari 2014).** Bearing all of this in mind, we can assume that athletes would present with higher spirometric values in comparison with the general population. However, there have been only a few studies addressing the effect of physical activity on pulmonary function test results and investigating the association. Approximately 80-90% of the adult population suffers from lower back pain (lumbar - sacral dysfunction). Treatment for this condition varies, however core stabilization exercises are now often used for rehabilitation and prevention of low back pain. The idea of training these muscles is to create support for the spine before movement. When the spine is supported before movement it helps to reduce sheer force and compression during movement. The main concept of core training involves using multiple muscles in a co-ordinate movement, rather than isolating a specific muscle as in most

weight lifting. Stability exercises focus on working the deep muscles of the entire torso. The nature and magnitude of the training effect has been shown to be dependent upon the intensity, frequency, duration of each training session, the length of time of the programme, and the initial fitness level of the individual **(Atomi & Miyashita1980; Katch et al. 1978; Pollock 1973; Sady et al. 1980).** This review will attempt to isolate the influence of each of these factors, and the interactions between them, on cardio respiratory fitness. Although cardio respiratory fitness could encompass a wide variety of dependent variables under many different resting and exercise conditions, maximum aerobic power VO2 (Maximum oxygen consumption) is the one most often used to investigate the functional state of, or adaptations in, the oxygen transport system.

This oxygen transport system includes the ability to take up, transport, and utilize oxygen and has therefore been described as the best single measure of cardio respiratory fitness (**Golden & Vaccaro 1984; MacDougall et al. 1982**). Since the research base on the effects of varying intensities, durations, frequencies, and length of training programmes on V02 max is substantial, this review will focus on VO2(Maximum oxygen consumption) as the primary variable for monitoring the effectiveness of different training regimens. However, changes in other cardio respiratory variables at both maximal and sub-maximal loads will be used to substantiate trends or suggest mechanisms. Endurance is defined as the ability of muscles to maintain exercise, and without it, improving and developing of other factors of fitness are too hard to reach. Muscle adaptations because of endurance training involves an increase in mitochondrial capacity, capillary density, myoglobin, and VO2max, whereas resistance training results in an increased muscle force, glycolytic enzyme activity, intracellular ATP, and muscle hypertrophy **(Swensen 1998).** Combined training (strength and endurance training in the same session) has been commonly used by athletes to improve neuromuscular responses and energy systems **(Djamil 1985).** Several studies have shown that combined training results in a development of muscle strength or power.

The endurance training leads to substantial improvements in cardiovascular fitness and that resistance training leads to substantial improvements in muscle mass and strength in people **(Frontera, 1990)**. Based on the existing evidence concerning exercise prescription for young adults, it has been recommended to include both cardiovascular for developing cardio respiratory fitness and resistance training for developing muscle mass and strength **(Guide 1993).** Previous studies suggest that strength gains will be compromised when trained simultaneously with aerobic power, and this has been referred to as the interference phenomenon **(Dudley 1985)**. Some studies have shown that combined training of strength and endurance results in compromised strength development. But some studies shows that combined resistance and endurance training can result in similar strength and muscle power gains as resistance training alone in previously untrained men **(Carthy 1995).**

2. MATERIALS & METHODS

For the purpose of the study 45 students from Government Higher Secondary school Barbugh Imamsahib Shopian India were selected as subjects. The subjects were divided into three (3) groups of fifteen (15) each, namely yogic practice group, core strength and combined training group. The speed and explosive power were selected as psychomotor variables. The variables were testes by using 50 m dash and Sarjent jump. The experimental groups underwent there training for 12 weeks, 4 days per week, 45 to 60 minutes per day with suitable warming up and cooling down exercise. The aerobic training group underwent training on Jogging, interval running, stair climbing, hopping and so on, the resistance training group underwent Military press, bench press, shoulder press, dumbbells, half squared and so on with 60 to 75% of intensity from their 1RM and the combined training group underwent training on both aerobic and resistance training. The criterion variables were tested prior to and immediately after the training programme

Table 1

ANALYSIS OF COVARIANCE OF VO2 MAX AND FEV1 AMONG YOGIC PRACTICE GROUP, CORE STRENGTH TRAINING GROUP AND COMBINED TRAINING GROUP.

Variables	Adjusted Post Test	Yogic Group	Core Strength Group	Combined Group	Source of Variance	Sum of Square	Degrees of Freedom	Mean Square	'F' Ratio
VO_2 MAX	Mean	47.35	48.95	50.22	B	62.22	2	31.11	5.387*
					W	236.80	41	5.776	
FEV_1	Mean	2.45	2.24	2.47	B	0.49	2	0.24	65.847*
					W	0.153	41	0.004	

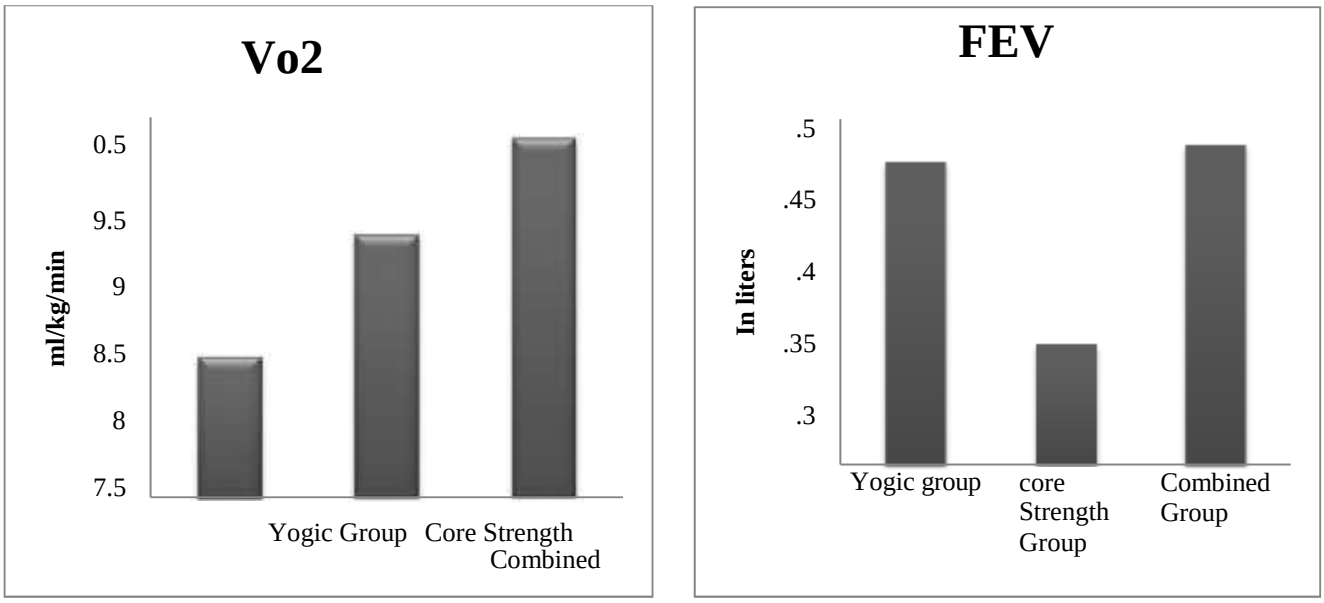
* Significant at .05 level of confidence.
(The table values required for significance at 0.05 level of confidence for 2 and 41 was 3.23).

TABLE: 2
SCHEFFE'S POST HOC TEST OF VO_2 MAX AND FEV_1 AMONG YOGIC PRACTICE GROUP, CORE STRENGTH TRAININGGROUP AND COMBINED TRAINING GROUP

Variables	Test	Yoga GroupVs Core Strength Group	Yoga GroupVs Combined Group	Core Strength GroupVs Combined Group
VO_2 Max	*Mean difference*	1.60	2.87	1.27
	P - Value	0.077	0.002	0.156
	Significance	**In. Sig**	**Sig**	**In. Sig**
FEV_1	*Mean difference*	0.208	0.025	0.233
	P - Value	0.000	0.279	0.000
	Significance	**Sig**	**In. Sig**	**Sig**

The table 2 shows that, the scheffe's test on VO2 max shows that there was a significant difference between yogic practice group and combined yogic practice core strength training group. The result on also shows that in significant difference found between yogic practice group and core strength training group, core strength training group and combined yogic practice core strength training group. The scheffe's test on FEV1 shows that there was a significant difference between yogic practice group and core strength training group, core strength training group and combined yogic practice core strength training group. The result on FEV1 shows that insignificant difference between yogic practice group and core strength training group. The result shows that there was a significant improvement on VO2 Max and FEV1 due to isolated and combined yogic practice and core strength training among yogic practice group, core strength training group and combined yogic practice core strength training group. The combined yogic practice core strength training group shows better improvement on VO2 Max and FEV1 when compare with isolated yogic and core strength training group.

Figure – 1
BAR DIAGRAM OF MEAN VALUES ON VO2 Max AND FEV1 AMONG YOGIC PRACTICE GROUP, CORE STRENGTHTRAINING GROUP AND COMBINED TRAINING GROUP



3. DISCUSSION

The successful combination of training depends on many factors such as the athlete's genetic potential, length of training experience, current physical preparation form, intensity and extent of training, optimal periodization, nutrition and supplementation etc. The combined performed training for strength and endurance induces the increase in anaerobic power and maximal oxygen uptake. A number of previous studies reported the greatest reduction in body fat in the endurance training group than the combined group, whereas (Park et al 2003), reported the highest decrease in body fat percentage in combined training group. Therefore, combined training is an effective method in reducing body fat and improving body composition (Nader 2006). The results of this study also showed that aerobic power significantly increased after training programs in both exercise groups compared with the control group. In line with this, most of the previous studies reported an increase in VO2max in endurance and combined groups. However, some of these studies suggested significant reduction in VO2max in the resistance training group (Balabinis et al 2003.

(Baker D 2001) studies reported no changes in muscle strength after combined training. Moreover, manyprevious studies have demonstrated a positive effect of combined training on muscle strength, muscle endurance, and maximal aerobic capacity reported little increase in aerobic power (maximal aerobic capacity) in nontrained people after 12 weeks of combined resistance and endurance training, with respect to the endurance training. They also showed significant increase in lean body mass in resistance groups, but significant decrease in body fat percentage in endurance and combined groups; however, VO2 max increases were observed only in endurance group.

4. CONCLUSION

The study concluded that the combined training was the best training method for improving vo2 max. and FEV1. This conclusion of this study may help the trainer design the optimal exercise program for athletes.

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