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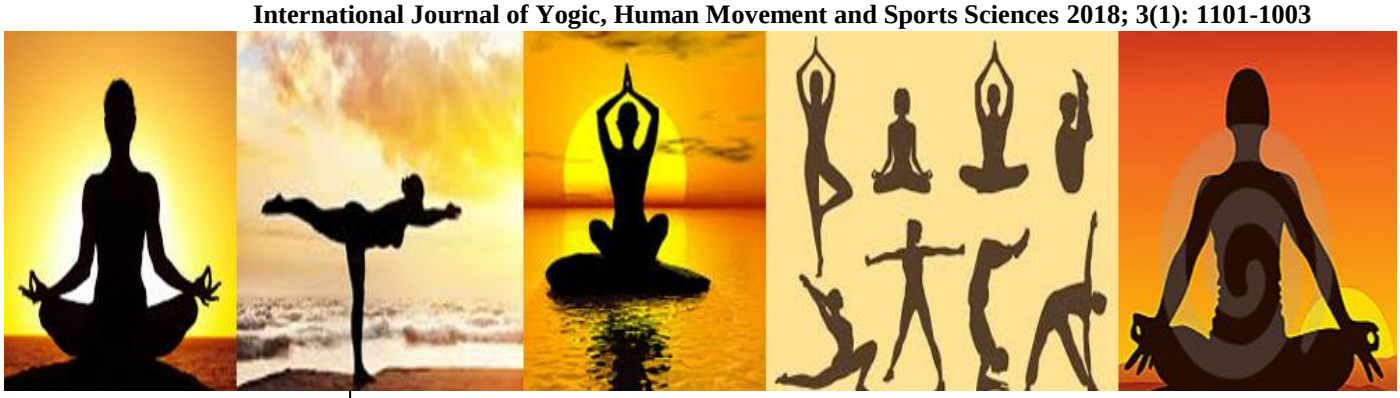

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Impact of submaximal and maximal aerobic training on selected pulmonary variable among under 14 years cricketer

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Abstract
The purpose of the study was to find out the impact of submaximal and maximal aerobic training on selected pulmonary variable among under 14 years cricketer. Forty five under 14 years cricketer were selected randomly as subjects from YMCA, Cricket Academy at Chennai city, Tamil Nadu, India. The subjects were divided in to three groups of fifteen each named as submaximal aerobic training group, maximal aerobic training group and control group. The training program is scheduled at 6.30 am to 7.30 am on alternate days. The VO_2 max was selected as criterion variables and tested by Queens's college step test. The subjects were tested prior to and after the twelve weeks of experimentation. The obtained data from the experimental and control group were statistically analyzed with analysis of covariance (ANCOVA). Scheffe's post hoc test applied to examine the paired mean difference between groups if, the obtained 'f' value found significant on the selected criterion variable. The level of confidence was fixed at 0.05. The result shows that the experimental groups had achieved significant improvement on VO_2 max when compared to control group

Keywords: Sub-maximal aerobic, maximal aerobic, pulmonary and VO_2 max

Introduction
Modern-day cricket has experienced a shift towards limited over games, where the emphasis is on scoring runs at a rapid rate. Although the use of protective equipment in cricket is mandatory, players perceive that leg guards, in particular, can restrict their motion Physical demands of cricket presumably vary by both game format and performance level. Cricket is the most popular sport in India; it is played by many people in open spaces throughout the country though it is not the nation's official national sport "Maximal oxygen uptake (VO_2 max) is widely accepted as the single best measure of cardiovascular fitness and maximal aerobic power. Absolute values of VO_2 max are typically higher in men than in women. The average untrained healthy male will have a VO_2 max of approximately 35–40 mL/ (kg· min). These score can improve with training and decrease with age, though the degree of trainability also varies very widely: conditioning may double VO_2 max in some individuals. In sports where endurance is an important component in performance, such as cycling, rowing, cross-country skiing, swimming and running, world-class athletes typically have high VO_2 max. (Heyward V, 1998) [12].
The term fitness is an important aspect to be developed in the minds of all the people irrespective of age and sex. Much attention has to be focused on youth physical fitness. A sound and well organized physical education program in the schools and colleges will be right solution for these problems. (Bucher, 2002).

Methodology
To achieve the purpose of the study, forty five under 14 years cricketer were selected randomly as subjects from YMCA, Cricket Academy at Chennai city, Tamil Nadu, India. The subjects were divided in to three groups of fifteen each named as submaximal aerobic training group, maximal aerobic training group and control group. The training program is scheduled at 6.30 am to 7.30 am on alternate days. The VO_2 max was selected as criterion variables and

tested by Queens's college step test. The subjects were tested prior to and after the twelve weeks of experimentation. The obtained data from the experimental and control group were statistically analyzed with analysis of covariance (ANCOVA). Scheffe's post hoc test applied to examine the paired mean difference between groups if, the obtained 'f' value found significant on the selected criterion variable. The level of confidence was fixed at 0.05.

Results and Discussions

Table 1: Analysis of Covariance on Vo_2 Max of Experimental and Control Group

Mean	Submaximal Aerobic Training Group	Maximal Aerobic Training Group	Control Group	SOV	SS	Df	MS	'F' Ratio
Pre-test Mean	43.24	43.37	43.42	B	0.266	2	0.133	0.02
S.D.	2.42	2.24	2.20	W	220.92	42	5.26	
Post-test Mean	46.14	48.22	43.54	B	165.00	2	82.5	11.88*
S.D.	2.28	3.32	2.13	W	291.62	42	6.94	
Adjusted post-test Mean	46.24	48.19	43.46	B	169.24	2	84.62	51.70*
				W	67.10	41	1.63	

*Significant at 0.05 level of confidence

The required value for significance at 0.05 level of confidence for 2 and 42 and 41 are 3.22 and 3.23.

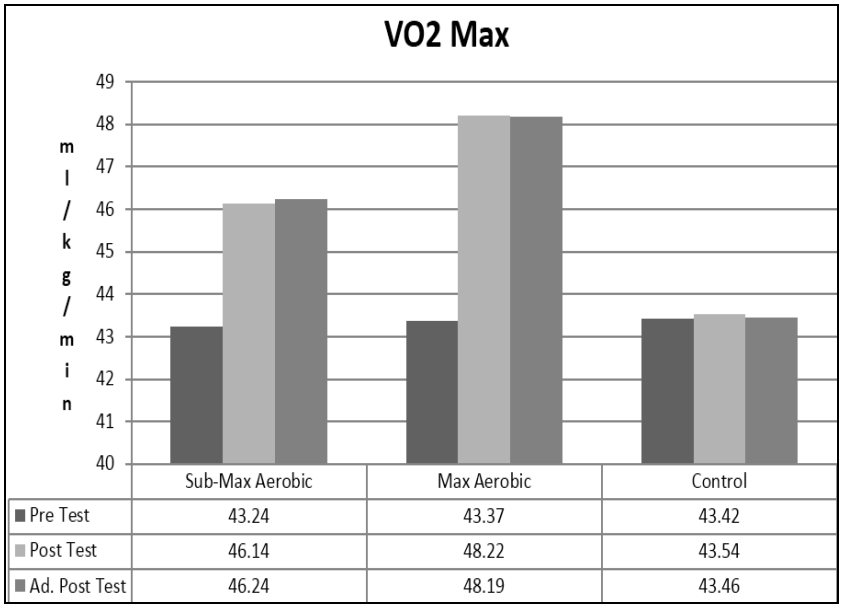
The table I reveals that there was a significant difference among submaximal aerobic training group, maximal aerobic training group and control group on VO_2 max. Further, the Scheffe's post hoc test applied to know the paired mean differences the same presented in table II

Table 2: Scheffe's Post-Hoc Test on Vo_2 Max

Submaximal Aerobic Training Group	Maximal Aerobic Training Group	Control Group	Mean difference	Confidence Interval value
46.24	48.19	-	1.95*	1.16
46.24	-	43.46	2.78*	
-	48.19	43.46	4.73*	

*Significant at 0.05 level of confidence.

The Scheffe's post hoc test on VO_2 max shows that there was a significant difference between groups. Further, the maximal aerobic training shows better improvement on VO_2 max. However, the sub maximal aerobic training group also shows improvement from the baseline score on VO_2. The control group had never change on the initial mean. Hence, the result shows that there was a significant impact on maximal and submaximal aerobic training on VO_2. The maximal aerobic training has better protocol on improvement of VO_2.



Discussion on Result

The result on VO2 max shows improvement on experimental groups. The maximal aerobic training shows better improvement on selected pulmonary variable. The above result was discussed with previous results of various presentations given below. Donald, 1999 revived that the propranolol on O_2 uptake during exercise was a function of the intensity of the muscular effort. At submaximal levels of work, VO_2 was unchanged, the fall in cardiac output after fl-adrenergic blockade being fully compensated for by an increase in the arteriovenous O_2 difference. At maximal levels of work, the fall in cardiac output was incompletely compensated for, and the maximal achieved was therefore reduced (Kahler, 2001) [14]. The reduction in O_2 uptake, and therefore in the O_2 delivery to the tissues during maximal exercise, presumably accounts for the striking reductions in the endurance times for maximal exercise that were produced (Bishop, 2007) [1]. However, the duration of the sprints was relatively short and it seems possible that the running speed that can be achieved during such a brief bout of exercise may

not be critically dependent on O_2 delivery to the tissues (Furusaw, 2000) [9]. Both submaximal heart rate and BP mirrored the VO2 response, with no significant differences between runners and bickers. These data agree with previous studies, showing a greater effect of training specificity during maximal bicycle than during maximal treadmill exercise. However, during submaximal exercise, training specificity appear to have a greater effect during treadmill exercise than bicycle exercise (Fernhall B and Kohrt, 1990) [7]. The VO_2 kinetics at the start and at the end of exercise are probably more related, but it is unresolved which protocols and parameters might best be used to study aspect of exercise performance. Duration of a submaximal exercise at a constant work rate and the distance walked during a 6-min walking test are gaining wide popularity as parameters of submaximal performance (Metra, 1998) [18].

Conclusion

Based on the result the study concluded that, there was a significant improvement on VO_2 Max due to submaximal and maximal aerobic training. Further, the maximal aerobic training shows better improvement on VO_2 Max. The maximal aerobic training has better protocol on improvement of VO_2 among under 14 cricketers.

Implication

Maximal aerobic training may be used to develop better pulmonary (VO_2 Max) function of school level cricketers.

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