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Effect of fitness training different modalities on anaerobic power and vital capacity of novice adolescent boys

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Abstract
The aim of this study was to find out the effect of different modalities of fitness training on anaerobic power and vital capacity of novice adolescent boys. To achieve the purpose of this study, sixty novice adolescent boys were selected and were were divided into four groups consisting of 15 in e ach. They were trained using different modalities of fitness training, namely, aerobic training, step aerobics training kettlebell training. The subjects were measured of their anaerobic power and vital capacity using standard tests The selected modalities of fitness trainings were administered to the subjects. After the completion experimental period of 12 weeks, the subjects were measured of their anaerobic power and vital capacity. The results proved significant improvement in anaerobic power and vital capacity of the novice adolescent boys due to different modalities of fitness training. Comparing among the experimental groups, there was no significant difference on anaerobic power and vital capacity among the groups in altering anaerobic power and vital capacity. It was concluded that different modalities of fitness training can beneficially alter the anaerobic power and vital capacity of novice adolescent boys.

Keywords: Anaerobic power, kettlebell training, fitness, adolescent boys

Introduction
Modern living has taken all the exercise out of our lives and so in order to get fit and have to put it back again, regular exercise is necessary to develop and maintain an optional level of health, performance and appearance. It makes feel good, both physically and mentally. Looking young is a reflection of good health. Regular physical exercise enhance the function of the joints; increase the sense of physical well-being and promotes a sense of feeling good; increases physical working capacity by increasing cardiorespiratory fitness, muscle strength and endurance and decreases the risk of serious diseases that could lead to early disability and death. Ukoho (1988) [9] express that "exercise has shown to improve health prospects in various ways. It helps to reduce body fat and overall weight and reduce blood pressure. Exercise ensures better digestion, respiration and efficient blood circulation." Exercise tolerance is increased, risk factors are controlled and even progression and regression of coronary artery disease can be influenced by training and diet. "Regular physical activity is important for maintenance of health and may lead to a better quality of life. Training has to be followed not less than two to three hours per week in at least three sessions at an intensity corresponding to 60 to 85% of maximum heart rate achieved in a symptom limited maximum exercise test. Thus, exercise occupies a leading role in keeping persons fit." (Ukoho (1988) [9].

"Fitness and physical activity are important for health, growth and development during childhood and adolescence. Adolescence is a critical period for the acquisition of health-related behaviours and behaviours learned in childhood are known to track into adulthood" (Telama R: (2009) [8]. However, "physical inactivity is now a major public health problem reportedly responsible for 9% of premature mortality worldwide in 2008. Despite the health benefits of physical activity there has been evidence of decreasing levels in recent decades." (Merrick *et al.* (2005) [4] Likewise, evidence shows that "fitness has been declining over recent decades. Poor fitness is associated with increased risk of cardiovascular disease in children.

In spite of the fact that there is a growing emphasis on the importance of physical activity, factors promoting physical fitness remain unclear in childhood and adolescence," (Merrick *et al*. (2005) [4]. "The prevalence of adolescents not meeting the current physical activity guidelines has been estimated at 80.3%. Active travel to school and opportunities for physically active play are declining and sedentary activities are increasing." (Kwan *et al*. (2012) [2].

Obert, P. *et al*. (2001) [5] had conducted a study on the effect of a 13 week aerobic training programme on the maximal power developed during a force velocity test in prepubertal boys and girls and concluded that aerobic training in prepubertal children actually altered the anaerobic performance factors of force and power production. Aerobic training in children influences anaerobic performances. Kraemer *et al*. (2001) [1] conducted a study on resistance training combined with bench-step aerobics which enhances women's health profile and found the inclusion of both modalities to an exercise program is most effective for improving total body fitness and a woman's health profile. Mahdiabadi J *et al*. (2013) [3] compared the effect of aerobic continuous and interval training on the left ventricular structure and function and found eight-week aerobic continuous and interval training can affect left ventricular structure and function. Selvalakshmi (2007) [6] conducted a study on effect of varied aerobic training program on obese women working in it companies for the purpose of the study aerobic refers to a variety of exercise that stimulate heart and lung activity for a time period sufficiently long to produce beneficial changes in the body. And found vital capacity showed significant improvement due to varied aerobic exercises, whereas no significant improvement in resting heart rate. Selvam, and Sudha (2008) [7] conducted a study on selected effect of aerobic exercise on selected physiological variables among college girls. The results for the study reveal that aerobic exercise has a significant effect in the improvement of the physiological variables resting pulse rate, breath holding time, vital capacity and respiratory rate.

The previous researches proved that there were studies to find out the effects of different modalities of fitness training on selected physiological variables among different groups of population. The studies further show that there was further scope for studies to determine the effect of different modalities of fitness training, namely, aerobic training, step aerobic training and kettlebell training on anaerobic power and vital capacity of novice adolescent boys.

Methodology

To achieve the purpose of this study, sixty novice adolescent boys were selected randomly from different schools in Annamalai Nagar, who were not participated in any sports and games and novice for introduction of fitness training in the age group of fifteen to seventeen years. The subjects were divided into four groups consisting of 15 in each. They were trained using different packages of physical activities, namely, aerobic training, step aerobics training kettlebell training. The subjects were measured of their anaerobic power and vital capacity through standard tests. The selected subjects were divided into four groups, namely, Group I – Aerobic fitness training group, Group II – Step aerobic fitness training group, Group III Kettlebell training group and Group IV control group which will not undergo any special training. The selected modalities of fitness trainings were administered to the subjects. After the completion experimental period of 12 weeks, the subjects were measured of their anaerobic power and vital capacity and results analysed for meaningful interpretation and discussions based on initial and post experimental period scores.

Results

Table 1: Descriptive statistics on effect of different modalities of fitness training on anaerobic power and vital capacity

Groups	Test	Mean	Standard Deviation	Range	
				Min	Max
Anaerobic Power					
Aerobic training	Initial	746.67	62.10	645.00	873.00
	Final	765.67	56.42	674.00	894.00
	Adjusted Mean	763.41			
Step aerobic training	Initial	742.67	54.13	658.00	873.00
	Final	762.73	53.50	668.00	891.00
	Adjusted Mean	764.29			
Kettlebell training	Initial	741.53	47.13	660.00	852.00
	Final	764.33	48.75	692.00	872.00
	Adjusted Mean	766.97			
Control Group	Initial	746.33	44.55	695.00	873.00
	Final	747.60	42.67	700.00	870.00
	Adjusted Mean	745.67			
Vital capacity					
Aerobic training	Initial	3506.67	488.02	2850.00	4450.00
	Final	3712	519	3050	4750.00
	Adjusted Mean	3811.97			
Step aerobic training	Initial	3620.00	527.73	2650.00	4500.00
	Final	3876.67	597.50	2750.00	4750.00
	Adjusted Mean	3867.84			
Kettlebell training	Initial	3703.33	352.27	2850.00	4250.00
	Final	4018.00	436.96	3050.00	4750.00
	Adjusted Mean	3928.93			
Control Group	Initial	3613.33	431.14	2550.00	4050.00
	Final	3673.33	278.94	3150.00	4000.00
	Adjusted Mean	3670.93			

The obtained mean differences were subjected to statistical treatment through ANCOVA as shown in Table II.

Table 2: Ancova results on effects of different modalities of fitness training on anaerobic power and vital capacity

	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Results On Anaerobic Power					
Pre Test Mean	Between	300.87	3	100.29	0.04
	Within	153887.73	56	2748.00	
Post Test Mean	Between	3181.38	3	1060.46	0.41
	Within	143395.20	56	2560.63	
Adjusted Post Test Mean	Between	4257.15	3	1419.05	19.26*
	Within	4053.27	55	73.70	
Results On Vital Capacity					
Pre Test Mean	Between	292458.33	3	97486.11	0.47
	Within	11573000.00	56	206660.71	
Post Test Mean	Between	1134934.58	3	378311.53	1.69
	Within	12531540.00	56	223777.50	
Adjusted Post Test Mean	Between	544345.55	3	181448.52	5.54*
	Within	1801086.74	55	32747.03	

Required $F_{(0.05),\,(df\ 3,55)} = 2.17$

* Significant at 0.05 level of confidence

The statistical analysis through ANCOVA to find out the significance of the differences in means proved significant F values and to test the paired mean comparisons to find the effects of different modalities of training post hoc analysis was made and results presented in Table III.

Table 3: Post Hoc Analysis of Paired Mean Comparisons on the Effects of different modalities of fitness training on anaerobic power and Vital Capacity

Aerobic training Group	Step aerobic training Group	Kettlebell training Group	Control Group	MEAN DIFF	C.I
On anaerobic power					
763.41	764.29			-0.87	8.95
763.41		766.97		-3.55	8.95
763.41			745.67	17.75*	8.95
	764.29	766.97		-2.68	8.95
	764.29		745.67	18.62*	8.95
		766.97	745.67	21.30*	8.95
On Vital Capacity					
3811.97	3867.84			-55.87	188.76
3811.97		3928.93		-116.96	188.76
3811.97			3670.93	141.04	188.76
	3867.84	3928.93		-61.09	188.76
	3867.84		3670.93	196.91*	188.76
		3928.93	3670.93	258.00*	188.76

***** Significant at 0.05 level.

Discussions

The results proved that pre-test mean on anaerobic power of aerobic training group was 746.67, step aerobic training group was 742.67 kettlebell training group was 741.53 and control group was 746.33. After the 12 weeks experimental treatments, the post-test means aerobic training group was 765.67, step aerobic training group was 762.73 kettlebell training group was 764.33 and control group was 747.60 As for vital capacity pre-test mean on vital capacity of aerobic training group was 3506.67 step aerobic training group was 3620.00 kettlebell training group was 3 703.33 and control group was 3613.33. The post test scores on vital capacity showed that mean aerobic training group was 3712 step aerobic training group was 3876.67 kettlebell training group was 4018.00 and control group was 3673.33. Taking into consideration of the pre-test means and post-test means, adjusted means, analysis of covariance was done. The obtained F value on adjusted means on anaerobic power was 19.26 and vital capacity was 5.54. Thus, it was proved that different modalities of fitness training, aerobic training, step aerobic training and kettlebell training significantly improved anaerobic power and vital capacity of the novice adolescent boys. The paired adjusted mean comparisons proved all the three experimental groups, namely, aerobic training, step aerobic training and kettlebell training were significantly greater than control group on anaerobic power and vital capacity was significantly improved due to step aerobic training and kettlebell training compared to control group.

Obert, P. *et al*. (2001) [5] had conducted a study on the effect of a 13 week aerobic training programme on the maximal power developed during a force velocity test among boys and girls. It was found maximal power and anaerobic factors increased significantly in the trained group even when muscle mass change was accounted for. The increase in anaerobic power and vital capacity was due mainly to force production and altered the anaerobic performance factors of force because of 12 weeks training on different modalities of fitness training. No changes were noted in the control group.

Conclusion

It was concluded that different modalities of fitness training can beneficially alter the anaerobic power and vital capacity of novice adolescent boys.

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