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A comparative effect of different SAQ training on selected physiological variables among school athletes

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Abstract
The main purpose of the investigation was to know the comparative effect of SAQ equipment training, SAQ non-equipment training and SAQ combine training (with equipment and non-equipment) on selected physiological variables among school athletes. The subjects for the present study were consisting of sixty 60 male school athletes of Jawahar Navodaya Vidyalaya, Longowal, Sangrur, Punjab. The age ranged from 14-17 year. The subjects were assigned into two groups, SAQ training experimental groups (N=45) and control group (N=15). To further investigation the SAQ training experiment group was sub-divided into GROUP-A: SAQ equipment training group, GROUP-B: SAQ non-equipment training group and GROUP-C: SAQ combine training group (with equipment and non-equipment). These groups were randomly formed. To find out the differential effect of the three treatment groups SAQ equipment training group, SAQ non-equipment training group and SAQ combine training group and control group, Analysis of Covariance (ANCOVA) test was computed with the help of SPSS 16 version computer software. The LSD post-hoc test was applied in cases where 'F'-ratio has shown significance to find out which of the differences of the paired means were significant. The level of significance chosen was 0.05. The results show that SAQ combine training demonstrated maximum effects on resting pulse rate, resting respiratory rate, peak expiratory flow rate, maximum breath holding capacity as compare to SAQ equipment training, SAQ non-equipment training and control group. SAQ non-equipment training proved to be best treatment to systolic blood pressure, diastolic blood pressure as compare to SAQ equipment training, SAQ combine training and control group.

Keywords: SAQ training, blood pressure, resting pulse rate, resting respiratory rate, peak expiratory flow rate, maximum breath holding capacity

Introduction
The practice of physical education and sport is a fundamental right for all. Every human being has a fundamental right of access to physical education and sport, which is essential for the full development of his personality. The freedom to develop physical, intellectual and moral powers through physical education and sport must be guaranteed both within the educational system and in other aspects of social life. Physical education and sport for an essential element of lifelong education in the overall education system. Physical education and sport, as an essential dimension of education and culture, must develop the abilities, will-power and self-discipline of every human being as a fully integrated member of society. The continuity of physical activity and the practice of sports must be ensured throughout life by means of a global, lifelong and democratized education (UNESCO's, 1978) [1]. This is very right that athlete can development in the sports only through the means of competition and enthusiasm.
Sports' training has become more efficient and effective as results of applied and fundamental research in the area of mechanics, physiology, psychology, nutrients and sports medicine. The training program needs to be individualized. By varying the combination of intensity and volume of exercise, one can develop programs that meet the unique goals and needs of each trainee. Intensity is an important component of training. The programming component of speed, agility and quickness (SAQ) training is similar to reactive training and follows the same concept of integrated performance paradigm. Speed is this text essentially refers to state ahead speed, agility refers to short burst of movement that involve change of direction and quickness refers to the ability to react to a stimulus and change the motion of the body. Professional can effectively make use of SAQ training to add intensity, complexity and provide a simple and exciting variety to a routine workout.
SAQ training allow a client to enhance his or her ability to accelerate, decelerate and dynamically stability the entire body during the higher velocity acceleration and deceleration movements in all planes of motion (such as running, cutting and changing direction), it may further help the nervous system to respond or react more affectively to demands placed on it and enhance muscular recruitment and co-ordination when performed with correct mechanics (Clerk *et al*., 2008) [2]. Polman *et al*. (2009) [3] stated that the SAQ training method "involves progressive exercises to develop an athlete's ability to be more skilful at faster speeds and with greater precision".

Procedure and Methodology
The objective of the present study was to the compare the effect of SAQ equipment training, SAQ non-equipment training and SAQ combine training (with equipment and non-

equipment) on physiological, body composition and motor fitness variables among school male athletes. The subjects for the present study were consisting of sixty 60 male school athletes of Jawahar Navodaya Vidyalaya, Longowal, Sangrur, Punjab. The age ranged from 14-17 year. This was an experiment study and random group design was adopted to divide the sixty (60) subjects randomly into four equal groups of fifteen (15) subjects in each. Then, the subjects were randomly assigned to three experimental groups and one group served as the controlled group. These SAQ training groups were, GROUP-A: SAQ equipment training group, GROUP-B: SAQ non-equipment training group and GROUP-C: SAQ combine training group (with equipment and non-equipment). Measurements of physiological variables were taken before and after an experimental training period of twelve weeks. To find out the differential effect of the three treatment groups SAQ equipment training group, SAQ non-equipment training group and SAQ combine training group and control group, Analysis of Covariance (ANCOVA) test was computed with the help of SPSS 16 version computer software. The LSD post-hoc test was applied in cases where 'F'-ratio has shown significance to find out which of the differences of the paired means were significant. The level of significance chosen was 0.05.

Results and Discussion

The Analysis of Covariance (ANCOVA) for different training groups (Experimental group-A: SAQ Equipment Group, Experimental group-B: SAQ Non-Equipment Group, Experimental group-C: SAQ Combined training group) among male school athletes for Physiological variables are presented in following table.

Table 1: Analysis of Co-Variance (Ancova) On Physiological Variables among Male School Athletes

(Adjusted Final Mean)	Group (Mean)				Source of Variance	Sum of Squares	*df*	Mean Square	'F'
	Exp GP-A	Exp GP-B	Exp GP-C	Cont GP.					
Resting Pulse Rate	71.87	72.08	71.18	74.61	Between Groups	100.9	3	33.64	11.38*
					Within Groups	162.5	55	2.96	
Systolic Blood Pressure	118.2	117.4	118.3	121.2	Between Groups	125.14	3	125.14	6.40*
					Within Groups	358.56	55	358.56	
Diastolic Blood Pressure	76.59	75.80	75.88	79.94	Between Groups	149.18	3	49.72	9.46*
					Within Groups	288.83	55	5.25	
Resting Respiratory Rate	15.90	16.05	15.52	18.27	Between Groups	68.59	3	22.86	30.07*
					Within Groups	41.81	55	0.76	
Peak Expiratory Flow Rate	377.7	376.7	389.4	341.6	Between Groups	18899.89	3	6299.96	18.11*
					Within Groups	19127.91	55	347.78	
Maximum Breath Holding Capacity	35.77	36.06	36.09	32.94	Between Groups	102.84	3	34.280	4.19*
					Within Groups	449.09	55	8.165	

Significant at 0.05 level $'F'_{0.05}(3, 55) = 2.77$

The significant differences were shown among SAQ equipment training group (GP-A), SAQ non-equipment training group (GP-B), SAQ combine training group (GP-C) and control group the obtained F-ratio of resting pulse rate, systolic blood pressure, diastolic blood pressure, resting respiratory rate, peak expiratory flow rate and maximum breath holding capacity for adjusted post test means were 11.38*, 6.40*, 9.46*, 30.07*, 18.11* and 4.19* respectively which are more than the table value of 2.77 for *df* 3 and 55 required for significant at 0.05 level of confidence.

Hence the adjusted final mean F ratio value was found to be statistically significant and the result was subjected to LSD post hoc test to find out the paired mean differences among the groups is presented in Table-2.

Table 2: Significant Differences between the Paired Adjusted Final Means of Physiological Variables among Different Training Groups

Variable	Groups (Mean)				M.D	Sig.
	EXP. GP-A	EXP. GP-B	EXP. GP-C	CONT. GP.		
Resting Pulse Rate	71.87	72.08			0.21	0.743
	71.87		71.18		0.69	0.280
	71.87			74.61	2.74	0.000*
		72.08	71.18		0.90	0.161
		72.08		74.61	2.54	0.000*
			71.18	74.61	3.43	0.000*
Systolic Blood Pressure	118.2	117.4			0.8	0.414
	118.2		118.3		0.1	0.914
	118.2			121.2	3	0.002*
		117.4	118.3		0.9	0.356
		117.4		121.2	3.8	0.000*
			118.3	121.2	2.9	0.003*
Diastolic Blood Pressure	76.59	75.80			0.79	0.349
	76.59		75.88		0.71	0.408
	76.59			79.94	3.35	0.000*
		75.80	75.88		0.08	0.920

		75.80		79.94	4.14	0.000*
			75.88	79.94	4.06	0.000*
Resting Respiratory Rate	15.90	16.05			0.15	0.642
	15.90		15.52		0.38	0.256
	15.90			18.27	2.37	0.000*
		16.05	15.52		0.53	0.105
		16.05		18.27	2.22	0.000*
			15.52	18.27	2.75	0.000*
Peak Expiratory Flow Rate	377.7	376.7			1	0.883
	377.7		389.4		11.7	0.091
	377.7			341.6	36.1	0.000*
		376.7	389.4		12.7	0.067
		376.7		341.6	35.1	0.000*
			389.4	341.6	47.8	0.000*
Maximum Breath Holding Capacity	35.77	36.06			0.29	0.784
	35.77		36.09		0.32	0.762
	35.77			32.94	2.83	0.009*
		36.06	36.09		0.03	0.978
		36.06		32.94	3.12	0.004*
			36.09	32.94	3.15	0.004*

From the description presented in table-2, it has been found that there were significant differences in the adjusted means on resting pulse rate of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 2.74, 2.54, 3.43 respectively, on systolic blood pressure of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 3, 3.8, 2.9 respectively, on diastolic blood pressure of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 3.35, 4.14, 4.06 respectively, on resting respiratory rate of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 2.37, 2.22, 2.75 respectively, on peak expiratory flow rate of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 36.1, 35.1, 47.8 respectively, on maximum breath holding capacity of SAQ equipment training group (GP-A) and control group, SAQ non-equipment training group (GP-B) and Control group, SAQ combine training group (GP-C) and control group are 2.83, 3.12, 3.15 respectively.

Conclusions

On the basis of the findings of the study, the following conclusion was framed:

- SAQ combine training demonstrated maximum effects on resting pulse rate, resting respiratory rate, peak expiratory flow rate, maximum breath holding capacity as compare to SAQ equipment training, SAQ non-equipment training and control group.
- SAQ non-equipment training proved to be best treatment to systolic blood pressure, diastolic blood pressure as compare to SAQ equipment training, SAQ combine training and control group.

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