

Research Paper :

Effects of isolated and combined effects of concurrent plyometric and circuit based plyometric training on selected physical and physiological variables among college men students

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ABSTRACT

The purpose of the study, 80 college men students were selected randomly from Ananda College, Devakottai, Tamilnadu as subjects. Their age ranged from 18 to 21 years. They were divided into four equal groups namely, Experimental group I, Experimental group II, Experimental group III and Control group. In a week, three days, the Experimental group I underwent concurrent plyometric training, Experimental group II underwent circuit based of plyometric training, Experimental group III underwent combination of both the training and control group was not given any specific training. The variables chosen were namely, leg explosive power, cardio respiratory endurance, resting pulse rate and Vo_2 max. They were assessed before and after the training period of 12 weeks. The analysis of covariance was used to determine of any significant difference was present among the four groups of the dependent variables. The study showed that the selected physical and physiological variables were significantly improved due to the influence of isolated and combined effect of concurrent plyometric training and circuit based plyometric training.

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Sports science generally aims at identifying and developing performance variables essential for competitive excellence. In addition to other indices like muscle endurance and power, muscle strength plays a cardinal role in achieving the athletic excellence. The final common denominator in athletic events is what the muscles can do for you - what strength they can give when it is needed, what power they can achieve in the performance of work and how long they can continue in the fit activity. Plyometric consists of a number of steps jumps, depth jumps and complex jumps at different volume. In this study, an attempt was made to find out the effects of concurrent plyometric and circuit based plyometric training on selected physical and physiological variables among the college men students.

METHODOLOGY

In a week three days the experimental group I underwent concurrent plyometric training, (plyometric and weight, plyometric and continuous run, plyometric and circuit training) experimental group II underwent circuit based plyometric training (lateral jump with single leg, Lateral Jump over barrier, standing long jump, standing triple jump, standing jump and reach, standing jump over barrier, 1-2-3 drill). Experimental group III underwent combination of both the training and the control group

was not given any specific training. The leg explosive power, cardio respiratory endurance, resting pulse rate and Vo_2 max were chosen as criterion variables. They assessed before and after the training period of 12 weeks. The analysis of covariance was used to determine of any significant difference was present among the four groups of the dependent variables

OBSERVATIONS AND DISCUSSION

Table 1 shows the analyzed data on leg explosive power. The pre-test, post-test and adjusted post test means of the leg explosive power were (1.413, 1.438, 1.403, 1.403), (1.415, 1.697, 2.031, 2.343) and (1.414, 1.685, 2.037, 2.349) for the control group and experimental group I, II, III, respectively. The obtained 'F' ratio in the sequence was for pre-test 0.18, post-test 350.708 and adjusted post-test 786.8424. The obtained 'F' ratio was greater than the Table 'F' ratio. Therefore, it was proved that experimental group III has been better than the other three groups.

Table 2 shows the analyzed data on cardio respiratory endurance. The pre-test, post-test and adjusted post-test means of the cardio respiratory endurance were (1275.000, 1257.500, 1267.500, 1275.000), (1280.000, 1887.500, 2127.500, 2735.000) and (1275.000, 1894.435, 2128.271, 3181.148) for the control group and

Table 1 : Computation of analysis of covariance on leg explosive power (Scores in meters)

	Control group	Exp. group I	Exp. group II	Exp. group III	Source of variance	Sum of squares	df	Mean squares	F ratio
Pre-test means	1.413	1.438	1.403	1.403	B	0.01	3	0.0033	0.18
					W	1.39	76	0.0163	
Post –test means	1.415	1.697	2.031	2.343	B	8.86	3	0.9533	350.708*
					W	0.64	76	0.0084	
Adjusted post-test means	1.414	1.685	2.037	2.349	B	9.05	3	3.0160	786.8424*
					W	0.29	75	0.0038	

Table F ratio at 0.05 level of confidence for 3 and 76 (df 2.73) 3 and 75 (df 2.73)

experimental group I, II, III, respectively. The obtained 'F' ratio in the sequence was for pre-test 0.1577, post-test 885.5667 and adjusted post-test 1749.1645. The obtained 'F' ratio was greater than the Table 'F' ratio. Therefore, it was proved that experimental group III has been better than the other three groups.

Table 3 shows the analyzed data on resting pulse rate. The pre-test, post-test and adjusted post-test means of the resting pulse rate were (75.3,75.2,75.6,74.7), (75.4, 67.9, 65.45,63.05) and (75.4, 67.9, 65.3, 63.14) for the control group and experimental group I, II, III, respectively. The obtained 'F' ratio in sequence was for pre-test 0.56 post-test 131.98 and adjusted post-test 143.20. The obtained 'F' ratio was greater than the Table 'F' ratio. Therefore, it was proved that experimental group III has been better than the other three groups.

Table 4 shows the analyzed data on Vo_2 max. The pre-test, post-test and adjusted post-test means of the

Vo_2 max were (1.913,1.954,1.961,1.930), (1.914, 2.446, 2.766, 2.972) and (1.914,2.441,2.759,2.975) for the control group and experimental group I, II, III, respectively. The obtained 'F' ratio in sequence was for pre-test 1.6522 post-test 342.2484 and adjusted post-test 364.8829. The obtained 'F' ratio was greater than the Table 'F' ratio. Therefore, it was proved that experimental group III has been better than the other three groups.

Fox (1993) stated that power is a function of force and strength. The ability to develop considerable power is a prime factor in athletic success. Power is a performance of work expressed per unit of time. The ability to jump, sprint, put the short or to perform fast starts are few examples of athletics conversing energy to power. The term explosive power has been associated with this anaerobic metabolism. Shaver (1982) stated that the decreased pulse rate at rest is a consequence of polymetric training that is carried out continuously for 8

Table 2 : Computation of analysis of covariance on cardio respiratory endurance (Scores in meters)

	Control group	Exp. group I	Exp. group II	Exp. group III	Source of variance	Sum of squares	df	Mean squares	F ratio
Pre-test means	1275.000	1257.500	1267.500	1275.000	B	4125.00	3	1375.00	0.1577
					W	662750.00	76	8720.40	
Post –test means	1280.000	1887.500	2127.500	2735.000	B	17535093.75	3	5545031.25	885.5667*
					W	501625.00	76	6600.33	
Adjusted post-test means	1275.000	1894.435	2128.271	3181.148	B	17480266.89	3	5826755.63	1749.1645*
					W	249837.37	75	3331.17	

Table F ratio at 0.05 level of confidence for 3 and 76 (df 2.73) 3 and 75 (df 2.73).

Table 3 : Computation of analysis of covariance on resting pulse rate (Scores in minute)

	Control group	Exp. group I	Exp. group II	Exp. group III	Source of variance	Sum of squares	df	Mean squares	F ratio
Pre-test means	75.3	75.2	75.6	74.7	B	9.24	3	3.0800	0.56
					W	414.15	76	5.449	
Post –test means	75.4	67.9	65.45	63.05	B	607.74	3	202.58	131.98*
					W	116.75	76	1.5349	
Adjusted Post-test means	75.4	67.9	65.3	63.14	B	94.18	3	198.05	143.20*
					W	3.13	75	1.38	

Table F ratio at 0.05 level of confidence for 3 and 76 (df 2.73) 3 and 75 (df 2.73).

Table 4 : Computation of analysis of covariance on VO₂ max (Scores in litres per minute)

	Control group	Exp. group I	Exp. group II	Exp. group III	Source of variance	Sum of squares	df	Mean squares	F ratio
Pre-test means	1.913	1.954	1.961	1.930	B	0.03	3	0.0100	1.6522
					W	0.46	76	0.0061	
Post –test means	1.914	2.446	2.766	2.972	B	6.89	3	2.2967	342.2484*
					W	0.51	76	0.0067	
Adjusted post-test means	1.914	2.441	2.759	2.975	B	6.73	3	2.2433	364.8829*
					W	0.46	75	0.0061	

Table F ratio at 0.05 level of confidence for 3 and 76 (df 2.73) 3 and 75 (df 2.73)

weeks. The cause of resting brady cardiac in related to effects of training on the autonomic nervous system that are particularly reflected in the vagues nervous to the heart. Vo₂ max is the criterion for an individuals aerobic power and hence scores or research works have been completed on Vo₂ max. The present study are in conformity with previously published reports on effects of training on Vo₂ max.

Conclusion:

– The leg explosive power, cardio respiratory endurance, resting pulse rate and Vo₂ max were significantly improved due to the influence of isolated and combined effects of concurrent plyometric training and circuit based plyometric training.

– Further, concurrent plyometric training significantly improved the leg explosive power, cardio respiratory endurance, resting pulse rate and Vo₂ max greater than that of circuit based plyometric training and control group.

– Circuit based plyometric training significantly

improved the leg explosive power, cardio respiratory endurance, resting pulse rate and Vo₂ max greater than that of control group.

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