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Effect of continuous running and stair climbing on strength endurance among university badminton players

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Abstract
The aim of this research is to find out the effect of continuous running and stair climbing on strength endurance among university badminton players. For this purpose, randomly selected thirty badminton players from various faculties of Annamalai University were divided into three groups, continuous running, stair climbing, and control group. Continuous running group performed their specific training program with variation in the training program and Stair climbing exercise group after a warm up for 5 minutes underwent climbing stairs having 18 steps with vertical height of 3 meters with variation of slow, medium, high, medium and slow speed walk and sprints alternatively and finished each session with cool down exercises and the sessions lasted for 40 minutes in each day, on alternate days, forming three days a week. Statistical analysis of pre and post test means through ANCOVA and Scheffe's post hoc test proved that there was significant improvement in selected endurance variable such as strength endurance due to continuous running and stair climbing training especially among handball players.

Keywords: continuous running, stair climbing and strength endurance

Introduction
Continuous running and Stair climbing trainings are suitable exercises to burn fat and improves the condition of heart and lungs. They are creative, fun and very challenging patterns of movement, that is, on and off stair case can challenge the legs, foot steps and arms also.
Stair climbing training is a suitable exercise to burn fat and improves the condition of heart and lungs. "Physical Fitness provides capacity for doing all types of activities" Willgoose (1961) [2]. Currently there is wide interest to identify the most effective methods of training for strength and endurance development and this is of special significance for physical education programmes in schools and colleges. Training is usually defined as systematic process of repetitive, progressive exercise or work involving the learning process and acclimatization. (Lawrence Gray Kumar, 2002) [7].
Moritz CT, and Farley CT. (2006) found that humans simultaneously adjust leg compression magnitude and timing, as well as mechanical work output, to conserve center of mass dynamics on damped surfaces, hence runners may use similar strategies on natural energy-dissipating surfaces such as sand, mud and snow for improved strength endurance.

Methodology
The purpose of this research is to find out the effect of continuous running and stair climbing on strength endurance among male university badminton players To achieve the purpose pre and post test random group research design was adapted and thirty badminton players from various faculties of Annamalai University, Chidambaram, Tamilnadu, were randomly selected and their age group was between 18 to 23 years. The were divided into three groups (n = 10) as Group I, Group II and Group III, in which Group I underwent Continuous running and Group II underwent stair climbing for a period of eight weeks and Group III acted as control group. Continuous running group performed their specific training program with variation in the training program and Stair climbing exercise group after a warm up for 5 minutes underwent climbing stairs having 18 steps with vertical height of 3 meters with variation of slow, medium, high, medium and slow speed walk and sprints alternatively and finished each session with cool down exercises. and the sessions lasted for 40 minutes in each day, on alternate days, forming three days a week.
The investigator selected criterion variables Strength endurance, assessed by Bent knee sit ups, as endurance variables. The collected data prior to and after completion of the experimental period on selected variables were statistically examined by applying Analysis of Covariance (ANCOVA). In all the cases to test the significance, 0.05 level of confidence was fixed. Since three groups were involved, whenever significant results were found, Scheffe's post-hoc test was used to find out the significant difference between the paired means of groups.

Results

Table 1: Results on Calculation of Analysis of Covariance on Strength Endurance

Calculation of Analysis of Covariance on Strength Endurance								
	Continuous Running Group	**Stair Climbing Group**	**Control Group**	**Source of Variance**	**Sum of Squares**	**df**	**Mean Squares**	**Obtained F**
Pre Test Mean	39.10	40.80	40.70	Between	18.2	2	9.10	0.60
				Within	412.6	27	15.28	
Post Test Mean	44.40	43.10	41.50	Between	42.2	2	21.10	1.34
				Within	423.8	27	15.70	
Adjusted Post Test Mean	45.40	42.55	41.04	Between	94.5	2	47.25	15.24*
				Within	80.6	26	3.10	
Mean Diff	5.30	2.30	0.80					

Required $F_{(0.05)\,(2,27)} = 3.354$, $F_{(0.05),\,(2,26)} = 3.369$ *Significant

Table 2: Scheffe's Post Hoc Analysis Results

Post Hoc Analysis for Strength Endurance				
Stair Climbing Group	**Sand Dune Running Group**	**Control Group**	**Mean Difference**	**Reqd. C.I**
45.40	42.55		2.85*	2.04
45.40		41.04	4.36*	2.04
	42.55	41.04	1.51	2.04

*Significant

Discussion

The results presented in Table 1 and 2 proved that continuous running has significantly improved strength endurance, as measured by bent knee sit ups than stair climbing and control groups. While comparing between the treatment groups, it was found that continuous running is better than stair claiming.

Conclusion

- It was concluded that the Continuous running and Stair Climbing programs has resulted in significant improvement on selected criterion variable as compared to control group.
- It was concluded that continuous running can be better utilized for improving endurance variables than stair climbing, especially among badminton players.

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