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EFFECT OF CROSS ROPE TRAINING ON STRENGTHENDURANCE AND FLEXIBILITY AMONG UNIVERSITY MEN STUDENTS

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Abstract:

The purpose of the study was designed to examine the effect of cross rope training on strength endurance and flexibility of university men students. For the purpose of the study, thirty university men students studying bachelor's degree in Annamalai University, Annamalai Nagar, Tamil Nadu, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent cross rope training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The following variables namely strength endurance and flexibility were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using bend knee sit-ups and sit and reach test respectively at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference, if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate. The results of the study showed that there was a significant difference between cross rope training group and control group on strength endurance and flexibility. And also it was found that there was a significant improvement on strength endurance and flexibility due to twelve weeks of cross rope training.

Key Words: Cross Rope Training, Strength Endurance, Flexibility, University Men Students

Introduction:

Cross rope running is a physical training activity that combines running with rope-based movement patterns, often similar to rope skipping or cross-step rope drills. It is used in sports conditioning programs to improve coordination, speed, agility, cardiovascular endurance, and muscular strength. Athletes perform running movements while synchronizing their steps with a rope action, usually crossing the rope or arms during the movement pattern. This training method is commonly used in athletic conditioning, physical education, and fitness programs because it enhances both neuromuscular coordination and aerobic capacity.

Cross rope running involves rhythmic jumping or stepping movements where the rope is crossed in front of the body during running or skipping motion. The athlete continuously moves forward or in place while rotating the rope and crossing the arms at specific intervals. This activity requires precise timing, balance, and coordination between the upper and lower body. The exercise engages multiple muscle groups including the calves, quadriceps, hamstrings, gluteal muscles, shoulders, and forearms, making it an effective full-body workout.

Physiologically, cross rope running improves cardio-respiratory endurance by increasing heart rate and oxygen consumption during repeated movements. It also develops muscular endurance and explosive power because the athlete performs repeated jumps and quick foot contacts with the ground. Additionally, the activity enhances agility, balance, and rhythm, which are essential for athletes involved in sports such as athletics, boxing, football, and basketball.

Another important benefit of cross rope running is the development of motor coordination and reaction time. Since the athlete must synchronize rope movement with foot placement, the nervous system becomes more efficient in controlling movement patterns. This leads to improved speed and quickness, which are crucial for many competitive sports.

In training programs, cross rope running can be performed as part of warm-up routines, interval training sessions, or plyometric conditioning. The intensity and duration can be adjusted depending on the fitness level of the athlete. For example, beginners may perform short intervals of 20-30 seconds, while trained athletes may perform longer bouts with varied speed and complex rope crossing patterns.

Cross rope running is a highly effective conditioning exercise that improves cardiovascular fitness, muscular strength, coordination, and agility simultaneously. Because of its versatility and minimal equipment requirement, it is widely used by coaches and trainers to enhance athletic performance and general physical fitness.

Methodology:

The purpose of the study was designed to examine the effect of cross rope training on strength endurance and flexibility of university men students. For the purpose of the study, thirty university men students studying bachelor's degree in Annamalai University, Annamalai Nagar, Tamil Nadu, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent cross rope training for three days per week for twelve weeks. Group II acted as control who did not undergo any special training programme apart from their regular physical education programme. The following variables namely strength endurance and flexibility were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using bend knee sit-ups and sit and reach test respectively at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant difference, if any among

the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered appropriate.

Analysis of the Data:

Strength Endurance:

The analysis of covariance on strength endurance of the pre and post test scores of cross rope training group and control group have been analyzed and presented in table 1.

Table 1: Analysis of Covariance of the Data on Strength Endurance of Pre and Post Tests Scores of Cross Rope Training and Control Groups

Test	Cross Rope Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	41.07	40.20	Between	5.63	1	5.63	1.56
S.D.	1.84	1.89	Within	101.33	28	3.62	
Post Test							
Mean	46.13	40.40	Between	246.53	1	246.53	19.51*
S.D.	1.83	1.89	Within	353.87	28	12.64	
Adjusted Post Test							
Mean	45.72	40.81	Between	171.65	1	171.65	272.35*
			Within	17.02	27	0.63	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 28 and 2 and 27 are 3.34 and 3.35 respectively).

The table 1 shows that the adjusted post-test means of cross rope training group and control group are 45.72 and 40.81 respectively on strength endurance. The obtained "F" ratio of 272.35 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on strength endurance. The results of the study indicated that there was a significant difference between the adjusted post-test means of cross rope training group and control group on strength endurance.

Flexibility:

The analysis of covariance on flexibility of the pre and post test scores of cross rope training group and control group have been analyzed and presented in table 2.

Table 2: Analysis of Covariance of the Data on Flexibility of Pre and Post Tests Scores of Cross Rope Training and Control Groups

Test	Cross Rope Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	17.00	16.87	Between	0.13	1	0.13	0.05
S.D.	1.55	1.55	Within	69.73	28	2.49	
Post Test							
Mean	19.00	16.93	Between	32.03	1	32.03	8.71*
S.D.	1.50	1.53	Within	102.97	28	3.68	
Adjusted Post Test							
Mean	18.94	17.00	Between	28.14	1	28.14	111.47*
			Within	6.82	27	0.25	

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 28 and 2 and 27 are 3.34 and 3.35 respectively).

The table 2 shows that the adjusted post-test means of cross rope training group and control group are 18.94 and 17.00 respectively on flexibility. The obtained "F" ratio of 111.47 for adjusted post-test means is more than the table value of 3.35 for df 1 and 27 required for significance at .05 level of confidence on flexibility. The results of the study indicated that there was a significant difference between the adjusted post-test means of cross rope training group and control group on flexibility.

Conclusions:

- There was a significant difference between cross rope training group and control group on strength endurance and flexibility.
- And also it was found that there was a significant improvement on selected criterion variables such as strength endurance and flexibility due to cross rope training.

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