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INFLUENCE OF PLYOMETRIC DRILL PROGRAMME AND PLYOMETRIC EXERCISE SIMILAR WITH LOCKED LOCOMOTIVE CABLE RESISTANCE EXERCISE PROGRAMME ON THE IMPROVEMENT OF ANTHROPOMETRIC VARIABLES OF TEENAGE PUPILS

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Abstract

The purpose of the study was to investigate the influence of plyometric drill programme and plyometric exercise similar with locked locomotive cable resistance exercise programme on the improvement of anthropometric variables of teenage pupils. To achieve the purpose, forty five subjects were selected at random and their ages ranged from 17 to 19 years. The subjects were divided into three equal groups. The study was formulated as a true random group design, consisting of a pre-test and post-test. The subjects (n=45) were randomly assigned to three equal groups of fifteen subjects each. The groups were assigned as Plyometric training (PT), Plyometric training parallel with closed kinetic chain resistance training (PTPCKCRT) and control group (CG) in an equivalent manner. The following are the selected criterion variables; anthropometric variables of body mass index, thigh girth, and calf girth. All the subjects were tested immediately prior and after the experimental programme. Analysis of co variance (ANCOVA) was applied to analyse the significant difference. 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 as an appropriate. Based on the result of the study it was concluded that, the plyometric training programme parallel with closed kinetic chain resistance training programme produced a significant development on the selected anthropometric variables better than the plyometric trainingprogramme.

Keywords: Plyometric, Closed Kinetic Chain, Anthropometric, Adolescents.

INTRODUCTION

Today's life mostly depends more on science and technology. Sportsmen are being exposed to the exercises and training methods which have proved beneficial for achieving high standards. The modern trends in sports and games reflect advanced technological developments and scientific methods of training. When the distal segment is fixed and proximal segments move, the motion is called closed kinetic chain motion. Closed kinetic chain exercise better mimic activities of daily living, they improve the "functional" fitness. They are great for athletes, too, since sports require multiple joint and muscle movements it works many muscle groups at once.

Plyometrics are power improvement workouts designed specifically for athletes and advanced exercisers who have a well-conditioned body. Systematic plyometric exercises follow a specific pattern of muscle contractions. These exercises use movements that develop the ability to generate a large amount of force quickly.

METHODOLOGY

SELECTION OF THESUBJECTS

To achieve the purpose of the present study, forty-five subjects were selected at random and their ages ranged from 17 to 19 years. The subjects were divided into three equal groups. The study was formulated as a true random group design, consisting of a pre-test and post-test. The subjects (n=45) were randomly assigned to three equal groups of fifteen subjects each. The groups were assigned as Plyometric training (PT), Plyometric training with parallel closed kinetic chain resistance training (PTPKCRT) and control group (CG) in an equivalent manner. The variables under lie the components which are highly related to the performance were chosen as criterion variables;anthropometric variables of body mass index, thigh girth, and calf girth.

ANALYSIS OF DATA

The analysis of covariance on selected anthropometric variables of the pre test and post test scores of Plyometric training group, Plyometric training with parallel closed kinetic chain resistance training group and control group have been analyzed and presented in the following tables.Plyometrics are power improvement workouts designed specifically for athletes and advanced exercisers who have a well-conditioned body. Systematic plyometric exercises follow a specific pattern of muscle contractions. These exercises use movements that develop the ability to generate a large amount of force quickly.

TABLE I

ANALYSIS OF VARIANCE ON PRE – TEST, POST – TEST AND ANALYSIS OF COVARIANCE ON ADJUSTED POST – TEST MEANS OF PLYOMETRIC TRAINING GROUP (PT) , PLYOMETRIC TRAINING PARALLEL WITH CLOSED KINETIC CHAIN RESISTANCE TRAINING GROUP (PTPCKCRT) AND CONTROL GROUPS (CG) ON BODY MASS INDEX

BODY MASS INDEX								
Tests	**PT**	**PTPCKCRT**	**CG**	**Source of Variance**	**Sum of Squares**	**Df**	**Mean Squares**	**F-ratio**
Pre-Test Means in inches	23.87	23.85	23.55	B	0.95	2	0.47	0.25
				W	79.15	42	1.88	
Post-Test Means in inches	21.93	20.64	22.75	B	33.95	2	16.97	8.08*
				W	88.22	42	2.10	
Adjusted Post-Test Means in inches	21.91	20.62	22.78	B	35.23	2	17.61	8.41*
				W	85.86	41	2.09	

TABLE II

ANALYSIS OF VARIANCE ON PRE – TEST, POST – TEST AND ANALYSIS OF COVARIANCE ON ADJUSTED POST – TEST MEANS OF PLYOMETRIC TRAINING GROUP (PT) , PLYOMETRIC TRAINING PARALLEL WITH CLOSED KINETIC CHAIN RESISTANCE TRAINING GROUP (PTPCKCRT) AND CONTROL GROUPS (CG) ON THIGH GIRTH

THIGH GIRTH								
Tests	PT	PTPCKCRT	CG	Source of Variance	Sum of Squares	Df	Mean Squares	F-ratio
Pre-Test Means in counts/min	46.60	46.20	45.16	B	16.41	2	8.20	0.44
				W	779.83	42	18.56	
Post-Test Means in counts/min	49.80	52.06	45.76	B	305.47	2	152.73	12.96*
				W	494.76	42	11.78	
Adjusted Post-Test Means in counts/min	49.44	51.94	46.24	B	242.16	2	121.08	21.34*

TABLE III
ANALYSIS OF VARIANCE ON PRE – TEST, POST – TEST AND ANALYSIS OF COVARIANCE ON ADJUSTED POST – TEST MEANS OF PLYOMETRIC TRAINING GROUP (PT) , PLYOMETRIC TRAINING PARALLEL WITH CLOSED KINETIC CHAIN RESISTANCE TRAINING GROUP (PTPCKCRT) AND CONTROL GROUPS (CG) ON CALF GIRTH

CALF GIRTH								
Tests	PT	PTPCKCRT	CG	Source of Variance	Sum of Squares	Df	Mean Squares	F-ratio
Pre-Test Means in seconds	32.33	33.00	33.07	B	4.93	2	2.47	0.44
				W	236.27	42	5.63	
Post-Test Means in seconds	34.60	37.07	33.67	B	92.58	2	46.29	7.97*
				W	243.87	42	5.81	
Adjusted Post-Test Means in seconds	34.96	36.91	33.46	B	89.86	2	44.93	18.41*
				W	100.05	41	2.44	

An examination of the above tables I, II, and III indicated that the results of ANOVA for pre test scores of the plyometric training group, plyometric training parallel with closed kinetic chain resistance training group and control group. The obtained F-ratio for the pre-test was 0.25, 0.44, and 0.44 respectively. It was found to be lesser than the required 'F' ratio of 3.22. In the post-test data analysis, the F- test was applied to test the significance of mean difference if any among the plyometric training group, plyometric training parallel with closed kinetic chain resistance training group and control group on body mass index, thigh girth, and calf girth. The obtained F- ratio for the post-test was 8.08, 12.96, and 7.97. The F-ratio needed for significant differences on the mean, for degrees of freedom 2, 42 was 3.22 at 0.05 level of confidence. Since the observed F-ratio on this variable was found to be higher than the F- ratio needed for significance, it was inferred that the mean differences among the three groups on thebody mass index, thigh girth, and calf girth used in the study at the end of the treatment period was statistically significant.

The F-ratio obtained from the testing the adjusted post-test means among the three groups namely plyometric training group, plyometric training parallel with closed kinetic chain resistance training group and control group on body mass index, thigh girth, and calf girth was 8.41, 21.34, and 18.41 respectively. The obtained F- ratio on body mass index, thigh girth, and calf girth among the three groups was statistically significant since they exceeded the needed F- ratio (3.23) for degree of freedom 2 and 41, at 0.05 level of confidence. From this it was concluded that the measurements of body mass index, thigh girth, and calf girth was significantly influenced by the treatments used in thisstudy..

TABLE IV

SCHEFFE'STEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED MEANS OF PLYOMETRIC TRAINING, PLYOMETRIC TRAINING PARALLEL WITH CLOSED KINETIC CHAIN RESISTANCE TRAINING AND CONTROL GROUP ON SELECTED ANTHROPOMETRIC VARIABLES

	PT	PTPCKCRT	CG	MD	CI value
BODY MASS INDEX	21.91	20.62	----------	1.29*	0.76
	21.91	-------	22.78	0.87*	
	--------	20.62	22.78	2.16*	
THIGH GIRTH	49.44	51.94	----------	2.50*	2.20
	49.44	-------	46.24	3.20*	
	--------	51.94	46.24	5.70*	
CALF GIRTH	34.96	36.91	----------	1.95*	1.45
	34.96	-------	33.46	1.50*	
	--------	36.91	33.46	3.45*	

Table - IV shows the mean difference values between the plyometric training group, plyometric training parallel with closed kinetic chain resistance training group and control group are 1.29, 0.87 and 2.16respectively on body mass index which were greater than required confidence interval value 0.76 at 0.05 level of confidence. Hence, the above comparisons were significant. The mean differences between plyometric training and control group, plyometric training parallel with closed kinetic chain resistance training and control group and plyometric training and plyometric training parallel with closed kinetic chain resistance training group were 2.50, 3.20 and 5.70 respectively on thigh girth which were greater than required confidence interval value 2.20 at 0.05 level of confidence. Hence, the above comparisons weresignificant.

The mean differences between plyometric training and control group, plyometric training parallel with closed kinetic chain resistance training and control group and plyometric training and plyometric training parallel with closed kinetic chain resistance training group were 0.13, 0.39 and 0.52 respectively on speed which were greater than required confidence interval value 0.34 at 0.05 level of confidence. Hence, the above comparisons were significant.The mean differences between plyometric training and control group, plyometric training parallel with closed kinetic chain resistance training and control group and plyometric training and plyometric training parallel with closed kinetic chain resistance training group were 1.95, 1.50 and 3.45 respectively on calf girth which were greater than required confidence interval value 1.45 at 0.05 level of confidence. Hence, the above comparisons were significant. The means differences of plyometric training group and control group, and plyometric training parallel with closed kinetic chain resistance training group and control group were found to be greater than the critical value. Hence it was found to besignificant.

RESULT AND DISCUSSIONS

When Plyometric training and control group was compared, the present study demonstrated an increase in the body mass index 8.08% and 3.39% respectively, thigh girth 6.87% and 1.33% respectively, calf girth 5.97% and 1.81% respectively. When plyometric training parallel with closed kinetic chain resistance training programme was compared, plyometric training and plyometric training programme parallel with closed kinetic chain resistance training programme respectively the present study demonstrated an increase in the body mass index 8.08% and 13.46% respectively, thigh girth 6.87% and 12.68% respectively, calf girth 5.97% and 12.30%respectivelyFurther when plyometric training programme parallel with closed kinetic chain resistance training programme and control group was compared, the present study demonstrated an increase in the , body mass index 13.46% and 3.39% respectively, thigh girth 12.68%and % respectively, calf girth 12.30% and 1.81% respectively. Thus the plyometric training programme parallel with closed kinetic chain resistancetraining programme is superior to the other training and the control group for developing the anthropometric variables (body mass index, thigh girth, and calfgirth)

CONCLUSION

The plyometric training programme parallel with closed kinetic chain resistance training programme produced a significant development on the anthropometric better than the plyometric training programme.

1. The plyometric training programme produced a significant development on the anthropometric variables.
2. The plyometric training programme parallel with closed kinetic chain resistance training programme produced a significant change on the anthropometricvariables.

3. The control group did not exhibit any significant changes in the anthropometric variables.

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