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INFLUENCE OF BILATERAL EXERCISES ON SPEED AND FLEXIBILITY AMONG PRE-ADOLESCENT GIRLS

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Abstract:

The purpose of the study was designed to examine the effect of bilateral exercises on speed and flexibility of pre-adolescent girls. For the purpose of the study, thirty pre-adolescent girls studying in the schools in and around Warangal District, Telangana, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent bilateral exercises 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 speed and flexibility were selected as criterion variables. All the subjects of two groups were tested on selected dependent variables by using 50 mts run 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 bilateral exercises group and control group on speed and flexibility. And also it was found that there was a significant improvement on speed and flexibility due to twelve weeks of bilateral exercises.

Key Words: Bilateral Exercises, Speed, Flexibility, Pre-Adolescent Girls

Introduction:

Bilateral exercises are movements in which both limbs of the body work simultaneously to produce force and complete a movement pattern. The term bilateral refers to the involvement of both sides of the body at the same time. Common examples include squats, dead lifts, bench presses, overhead presses, leg presses, and Olympic lifts. These exercises form the foundation of most strength and conditioning programs because they allow athletes to generate high levels of force and handle greater external loads than unilateral exercises.

Bilateral training plays a crucial role in enhancing muscular strength, power, neuromuscular coordination, and overall athletic performance. Since both limbs work together simultaneously, bilateral exercises recruit large muscle groups and facilitate greater motor unit activation, leading to substantial improvements in force production. This characteristic makes bilateral training particularly valuable for athletes participating in sports that require explosive actions such as sprinting, jumping, throwing, and change-of-direction movements.

From a physiological perspective, bilateral exercises promote adaptations in the neuromuscular system by improving intermuscular and intramuscular coordination. Regular participation in bilateral resistance training increases muscle cross-sectional area, maximal voluntary contraction, and neural drive, thereby enhancing overall performance capacity. Research has consistently demonstrated that bilateral resistance training is highly effective for developing maximal strength because both limbs contribute simultaneously to force production, allowing the use of heavier loads and greater training intensities.

In sports performance settings, bilateral exercises are frequently incorporated into training programs to improve lower- and upper-body strength. Exercises such as back squats and dead lifts have been shown to contribute significantly to sprint speed, vertical jump performance, and change-of-direction ability. Strong relationships have been reported between maximal bilateral strength and athletic performance indicators, emphasizing the importance of bilateral training in athlete development programs.

Recent systematic reviews and meta-analyses have indicated that both unilateral and bilateral training methods can effectively improve athletic performance; however, bilateral exercises tend to produce superior gains in bilateral strength performance due to the principle of specificity. Furthermore, bilateral movements enable athletes to train with higher absolute loads, which can stimulate greater adaptations in muscle strength and power development.

For volleyball, football, handball, cricket, and other competitive sports, bilateral exercises are particularly beneficial because they enhance the force-generating capacity of the lower limbs and trunk musculature, which are essential for jumping, sprinting, tackling, striking, and throwing actions. Consequently, bilateral resistance training remains a cornerstone of strength and conditioning programs aimed at optimizing athletic performance and reducing injury risk.

Methodology:

The purpose of the study was designed to examine the influence of bilateral exercises on speed and flexibility of pre-adolescent girls. For the purpose of the study, thirty pre-adolescent girls studying in the schools in and around Warangal District, Telangana, India were selected as subjects. They were divided into two equal groups. Each group consisted of the fifteen subjects. Group I underwent bilateral exercises 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 speed and flexibility were selected as criterion variables. All the subjects of two groups were tested on selected dependent

variables by using 50 mts run 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:

Speed:

The analysis of covariance on speed of the pre and post test scores of bilateral exercises group and control group have been analyzed and presented in table 1.

Table 1: Analysis of Covariance of the Data on Speed of Pre and Post Tests Scores of Bilateral Exercises and Control Groups

Test	Bilateral Exercises Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	8.40	8.37	Between	0.004	1	0.004	0.27
S.D.	0.12	0.14	Within	0.422	28	0.015	
Post Test							
Mean	8.14	8.35	Between	0.333	1	0.333	9.97*
S.D.	0.12	0.14	Within	0.935	28	0.033	
Adjusted Post Test							
Mean	8.13	8.36	Between	0.390	1	0.390	31.10*
			Within	0.338	27	0.013	

* 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 bilateral exercises group and control group are 8.13 and 8.36 respectively on speed. The obtained "F" ratio of 31.10 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 speed.

The results of the study indicated that there was a significant difference between the adjusted post-test means of bilateral exercises group and control group on speed.

Flexibility:

The analysis of covariance on flexibility of the pre and post test scores of bilateral exercises 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 Bilateral Exercises and Control Groups

Test	Bilateral Exercises Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pre Test							
Mean	17.07	16.93	Between	0.13	1	0.13	0.05
S.D.	1.57	1.57	Within	71.87	28	2.57	
Post Test							
Mean	19.07	17.00	Between	32.03	1	32.03	8.54*
S.D.	1.53	1.55	Within	104.97	28	3.75	
Adjusted Post Test							
Mean	19.00	17.06	Between	28.14	1	28.14	111.51*
			Within	6.81	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 bilateral exercises group and control group are 19.00 and 17.06 respectively on flexibility. The obtained "F" ratio of 111.51 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 bilateral exercises group and control group on flexibility.

Conclusions:

- There was a significant difference between bilateral exercises group and control group on speed and flexibility.
- And also it was found that there was a significant improvement on selected criterion variables such as speed and flexibility due to bilateral exercises.

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