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INFLUENCE OF CIRCULAR STRENGTH TRAINING SYSTEM ON SELECTED PHYSICAL FITNESS COMPONENTS AND PERFORMANCE VARIABLES AMONG FIELD HOCKEY PLAYERS

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Abstract:

The purpose of the study was to find out the influence of circular strength training on selected physical fitness components and performance namely grip strength, muscular strength, core strength, muscular flexibility, muscular endurance among male field hockey players. To achieve the purpose of the study thirty male field hockey players have been randomly selected from various colleges in the state of Tamil Nadu, India. The age of subjects were ranged from 18 to 25 years. The subjects had past experience of at least three years in field hockey and only who those represented their respective college teams were taken as subjects. A series of physical fitness components tests was carried out on each participant. Grip strength assessed by Grip dynamometer, muscular strength assessed by push ups, core strength assessed by plank test, muscular flexibility assessed by sit and reach, muscular endurance assessed by half squat jump and performance variables assessed by subjective rating. The subjects were randomly assigned into two groups of fifteen each, such as experimental and control groups. The experimental group participated in the circular strength training for 3 days a week, one session per day and for 12 weeks each session lasted 45 minutes. The control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected variables prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed to test the level of significance difference, if any between groups. The results of the study showed that there was significant differences exist between circular strength training group and control group. And also circular strength training group showed significant improvement on grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance compared to control group.

Key Words: Circular Strength Training, Grip Strength, Core Strength & Biceps Curl

Introduction:

Field hockey is a sport with a long history that has undergone quite rapid and radical changes. The advent of the synthetic playing surface has changed the physical, physiological, technical and tactical requirements of the game at all levels, but in particular at the elite level. Physique and body composition have an important role for playing field hockey Montgomery, (2006); Quinney et al., (2008) .Tarter et al.,(2009). In field hockey lots of movements and skills are involved so a high level of physical demand is required for match play (Montgomery, 2006; Quinney et al.,(2008) and Tarter et al., (2009). Muscle strength one of the dynamic factors of motor performance and importance lies in that it greatly influential on the speed of motor performance and motor skill proficiency required and is an important cause of progress performance Mufti (1998). Aweys, (2000) explain that muscle strength is a physical attributes that

contribute to a prominent role in the mastery and development of tactical skill and performance and have a significant role in highlighting the emergence of some other physical attributes. Mohammed (1992) & Abul Ela (1984) indicated that muscle strength is one of the physical attributes important for sports and special games friction such as football and develop longer need to access the individual with a high level and muscle strength is not only a physical attributes but are the most important physical attributes upon which to develop other qualities such as speeding, endurance, agility and flexibility.

One of the methods which used to improve the muscular endurance is circular strength training (CST) which pioneered by Scott Sonnon, and further developed by his elite Faculty Coaching Staff, CST is the cutting edge of health, fitness and sports performance enhancement. It's unique among fitness systems in offering a complete "health first" approach. Other systems place function (attributes like strength, endurance or speed) first, valuing those things over and often at the expense of health. Circular Strength Training is made up of three "wings" or sub-disciplines. Though they can and are practiced independently, the three wings of CST integrate seamlessly into a stand-alone health and fitness system. Intu-Flow is an incrementally progressive system of dynamic joint mobility exercises designed to feed and lubricate your joints and connective tissues and restore all of your joints to their full, healthy range of motion. Beginning CST athletes start with the Intu -Flow, and long term athletes use it to release stored tension, speed recovery from training, and to maintain the health and longevity of their bodies.

Prasara yoga takes the range of motion and coordination that you recovered with the Intu - Flow to the next level. It transforms physical performance by teaching one how to re-integrate the breath, movement and structure—the key to accessing flow state in any activity. Prasara specifically focuses on the releasing of chains of tension throughout the body. Tension caused by fear, anxiety, trauma, habit, and even exercise are pulped and released through the practice of Prasara yoga. Prasara works in the opposite and teaches you to release this habitual tension. Paired with the Intu-Flow, Prasara will give the ability to strut around the stage and contort yourself in a freakish display of athleticism while holding a note and making it look easy.

Clubbell Athletics is the third weighted wing of CST. Unlike machines, free weights, and Kettlebells, the Clubbell was specifically designed to be moved in three dimensions, just as people move in the real world. Clubbell allow one to develop the rotary and angular strength of the prime movers (translating directly to athletic performance in any activity), to develop selective tension (the ability to apply exactly the right amount of force for the task at hand, rather than the "full on/full off" approach of traditional strength training), and to develop incredible grip strength and stamina. Clubbell Athletics is simply the most sophisticated, fun and creative vehicle for strength and conditioning ever conceived. (Ryan, 2011). Circular strength training provides a technique to cover every factor of an individual's remedial, fitness, and sports performance. According to the above, and from believe of the researcher that, strong muscles should carry on strong bone. Hence, the purpose of this study was to investigate the effects of influence of circular strength training system on strength parameters and performance variables among field hockey players.

Methodology:

To achieve the purpose of the study thirty male field hockey players have been randomly selected from various colleges in the state of Tamil Nadu, India. The age of subjects were ranged from 18 to 25 years. The subjects had past experience of at least

three years in field hockey and only who those represented their respective college teams were taken as subjects. A series of physical fitness components tests was carried out on each participant. Grip strength assessed by Grip dynamometer, muscular strength assessed by push ups, core strength assessed by plank test, muscular flexibility assessed by sit and reach, muscular endurance assessed by half squat jump and performance variables assessed by subjective rating. The subjects were randomly assigned into two groups of fifteen each, such as experimental and control groups. The experimental group participated in the circular strength training for 3 days a week, one session per day and for 12 weeks each session lasted 45 minutes. The control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected variables prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed to test the level of significance difference, if any between groups.

Table 1: Criterion Measures

S.No	Variables	Tests /Tools Administered	Unit of Measurement
1	Grip strength	Grip dynamometer	In kg
2	Muscular Strength	Push ups	Numbers
3	Core strength	Plank test	In seconds (1/100)
4	Muscular flexibility	Sit and Reach	Centimeters
5	Muscular Endurance	Half Squat Jump	Numbers
6	Performance	Judges rating	In Points

Table 2: Descriptive Analysis of Physical Fitness Components and Performance Variables among Control and Experimental Groups

S.No	Variables	Group	Pre-Test Mean	SD (±)	Post –Test Mean	SD (±)	Adjusted Mean
1	Grip Strength	CG	57.34	0.28	60.55	1.03	60.58
		CSTG	57.57	0.50	61.50	0.28	61.47
2	Muscular Strength	CG	17.39	0.24	18.86	0.24	18.86
		CSTG	17.49	0.30	20.06	0.77	20.05
3	Core Strength	CG	129.08	0.52	172.13	2.58	172.15
		CSTG	128.99	0.62	175.64	0.60	175.62
4	Muscular Flexibility	CG	22.50	0.28	23.95	0.98	23.94
		CSTG	22.39	0.24	24.61	0.32	24.62
5	Muscular Endurance	CG	21.62	0.27	22.46	1.02	22.46
		CSTG	21.54	0.26	23.47	0.26	23.46
6	Performance	CG	5.19	0.18	6.18	0.24	6.18
		CSTG	5.318	0.19	6.39	0.20	6.398

CG= Control Group CSTG= Circular Strength Training Group

The tables-II the pre, post-test means, standard deviations and adjusted means on physical fitness components and performance of male field hockey players were numerical presented. The analysis of covariance on selected variables of control group and Circular strength training group is presented in table – III

Table 3: Computation of Analysis of Covariance on Physical Fitness Components and Performance Variables among Male Field Hockey Players

S.No	Variables	Test	Sum of Variance	Sum of Squares	df	Mean Square	F ratio
1	Grip strength	Pre-test	Between groups	0.36	1	0.36	2.17
			Within groups	4.71	28	0.16	
		Post-test	Between groups	6.82	1	6.82	11.91*
			Within groups	16.02	28	0.57	
		Adjusted means	Between sets	5.55	1	5.55	9.56*
			Within sets	15.67	27	0.58	
2	Muscular strength	Pre-test	Between groups	0.06	1	0.06	0.81
			Within groups	2.13	28	0.07	
		Post-test	Between groups	10.79	1	10.79	32.24*
			Within groups	9.37	28	0.33	
		Adjusted means	Between sets	10.25	1	10.25	29.69*
			Within sets	9.33	27	0.34	
3	Core strength	Pre-test	Between groups	0.05	1	0.05	0.15
			Within groups	9.33	28	0.33	
		Post-test	Between groups	92.76	1	92.76	26.32*
			Within groups	98.66	28	3.52	
		Adjusted means	Between sets	89.96	1	89.96	25.28*
			Within sets	96.08	27	3.55	
4	Muscular flexibility	Pre-test	Between groups	0.09	1	0.09	1.30
			Within groups	1.93	28	0.06	
		Post-test	Between groups	3.22	1	3.22	6.04*
			Within groups	14.90	28	0.53	
		Adjusted means	Between sets	3.29	1	3.29	5.99*
			Within sets	14.82	27	0.54	
5	Muscular endurance	Pre-test	Between groups	0.05	1	0.05	0.75
			Within groups	2.05	28	0.07	
		Post-test	Between groups	7.65	1	7.65	13.74*
			Within groups	15.60	28	0.55	
		Adjusted means	Between sets	7.29	1	7.29	12.65*
			Within sets	15.56	27	0.57	
6	Performance	Pre-test	Between groups	0.11	1	0.11	3.15
			Within groups	1.01	28	0.03	
		Post-test	Between groups	0.33	1	0.33	6.62*
			Within groups	1.43	28	0.05	
		Adjusted means	Between sets	0.31	1	0.31	5.98*
			Within sets	1.42	27	0.05	

**Significant at 0.05level of confidences*
(The table values required for significance at 0.05 level of confidence for 1 & 28 and 1 & 27 are 4.21 and 4.20 respectively).

In the table the results of analysis of covariance on grip strength, muscular strength, core strength, muscular flexibility muscular endurance and performance. The obtained 'F' ratio of 2.17, 0.81, 0.15, 1.30, 0.75 and 3.15 for Pre-test means was less than the table value of 4.21 for df 1 and 28 required for significance at 0.05 level of

confidence on grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance. The obtained 'F' ratio of 11.91, 32.24, 26.32, 6.04, 13.74 and 6.62 for post-test means was greater than the table value of 4.21 for df 1 and 28 required for significance at 0.05 level of confidence on grip strength, muscular strength, core strength, muscular flexibility muscular endurance and performance. The obtained 'F' ratio of 9.56, 29.69, 25.28, 5.99, 12.65 and 5.98 for adjusted post-test means was greater than the table value of 4.20 for df 1 and 27 required for significance at 0.05 level of confidence on grip strength, muscular strength, core strength, muscular flexibility muscular endurance and performance. The result of the study indicated that there was a significant difference among the adjusted post test means of Circular strength training group and control group on grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance. And also Circular strength training group showed significant improvement on grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance compared to control group.

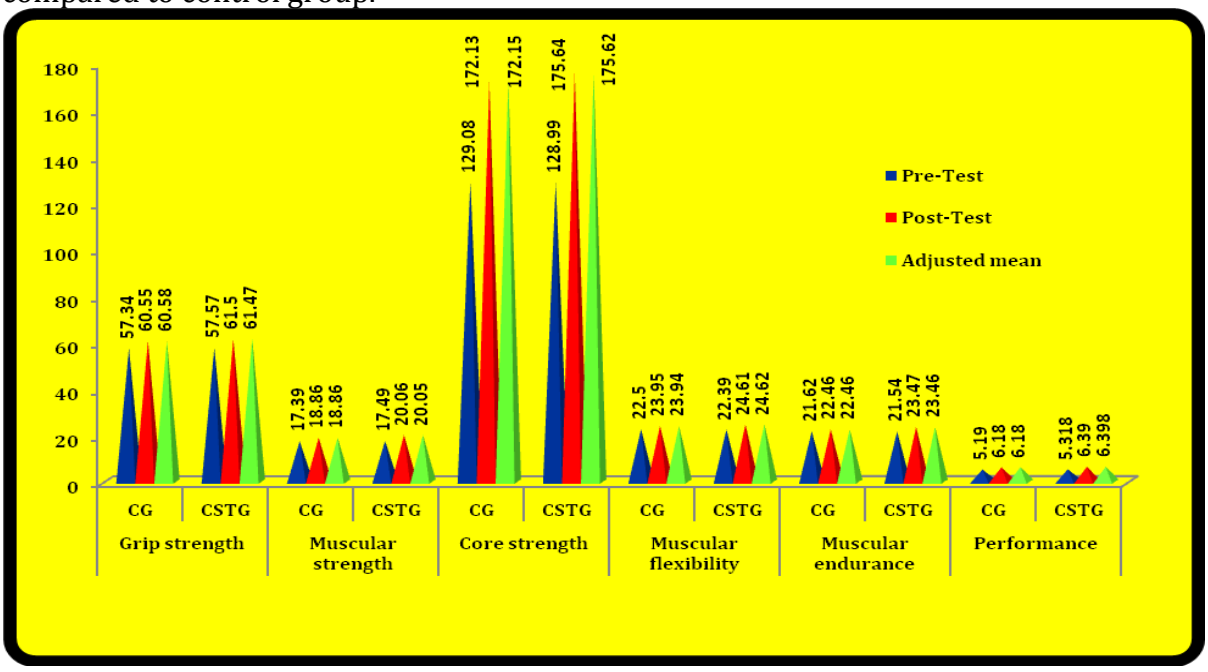

Figure 1: The pre, post and adjusted mean values of grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance index of both control and experimental groups are graphically represented in the figure-I

Discussion of Findings:

The results of the study indicate that the experimental group which underwent Circular strength training had showed significant improved in the selected variables namely such as grip strength, muscular strength, core strength, muscular flexibility, muscular endurance and performance when compared to the control group. The control group did not show significant improvement in any of the selected variables. The past studies on selected physical fitness components and performance reveals of Rameshkumar and Jayachandran (2016) opined that circular strength training showed significant improvement in all the performance variables such grip strength, maximum strength, core strength, explosive power, flexibility and performance. Amr hamza (2013) Found that circular strength training, for 10 weeks, resulted in significant improvement in muscle strength, muscle power and performance than the control group. Iga , et al. (2009) opined that young male soccer players conventionally or

resistance-trained showed higher values of isokinetic concentric and eccentric strength of the lower limb extensor and flexor muscles of the knee joint of the dominant and non-dominant limb than non-soccer players. Soderman, et al. (2000) found that young female soccer players had significantly higher concentric and eccentric peak torque of the thigh muscles than controls

Conclusions:

From the analysis of data, the following conclusions were drawn.

- ✓ The experimental group field hockey players showed significant improvement in all the performance variables such grip strength, muscular strength, core strength, muscular flexibility muscular endurance and performance.
- ✓ The control group field hockey players did not show significant improvement in any of selected variables.

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