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The Effects of two Modalities of Resistance Circuit Training on Flexibility of Collegiate Male Kabaddi Players

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Abstract

The purpose of this study was to find out the effects of two different training modalities of protocols-resistance training, resistance circuit training on flexibility. Based on their training, sixty male collegiate kabaddi players were selected from Vellalar College of Engineering and Technology, Erode and they were divided into 3 equal groups which are as follows: Group –I resistance training group (n=15), Group –II resistance circuit training group (n=15), and Group – III control group (n=15). The purpose was to find out the flexibility in sit and reach test, as measured before and after a six-week training period. Subjects in each of the training groups trained 2 days per week, whereas control subjects did not participate in any training activity. The data were analyzed by t ratio, analysis of variance, and analysis of co-variance, Scheffe's post hoc test. The results showed that all the training treatments elicited significant (P<0.05) improvement in all of the tested variables of flexibility. However, the resistance circuit training group showed signs of improvement in flexibility. Sit and reach test performance that was showed significantly greater improvement in the other 2 groups (resistance training and control group). This study provides support for the use of a resistance circuit training method to improve flexibility.

Keywords: Resistance training, Resistance Circuit Training, Flexibility.

Introduction

Resistance exercise, also known as weight training, means working or training with weights, free weights on a gym machine, or your own body weight. Resistance training is an indispensable part of any fitness program. Several studies on resistance training have shown that it improves power output and increases flexibility (Adams et al., 1992; Ioannis et al., 2000) by training the muscles to do more work in a shorter amount of time (Holcomba, 1996). This is accomplished by optimizing the stretch-shortening cycle, which occurs when the active muscle switches from rapid eccentric muscle action (deceleration) to rapid concentric muscle action (acceleration) (Wagner, and Kocak, 1997; Potteiger et al., 1999). The rapid eccentric movement creates a stretch reflex that produces a more forceful concentric muscle action (Wagner and Kocak, 1997; Cachnce, 1995) than could otherwise be generated from a resting position (Potteiger et. al., 1999). The faster the muscle is stretched, the greater the force produced, and the more powerful the muscle movement is (Clutch et al., 1983; Wagner and Kocak, 1997). Plyometric exercises that exploit the stretch-shortening cycle have been shown to enhance the performance of the concentric phase of movement (Gehri et al., 1998) and increase the power output (Adams et al., 1992; Paul, et. al., 2003). Jumping is a complex multi-joint action that demands not only force production but also a high power output. Numerous investigators have underlined the significance of maximal rate of force development in the improvement of flexibility (Behm and Sale 1993; Hakkinen and Komi, 1985). Resistance circuit training has been advocated for sports that requires the athletes to have explosiveness and an increased flexibility.

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Methodology

The purpose of the study was to find out the effects of two modalities of resistance circuit training on the flexibility of collegiate male kabaddi players. To achieve the purpose, 45 male kabaddi players were selected as subjects from Vellalar College of Engineering and Technology, Erode. The age of the subject was between 17 to 21 years, and all of the subjects had successfully passed a physical examination which screened them for any possible injury or illness. All necessary information about the studies procedures in oral and written form was received. The study formulated had pre and post test random group design by which 45 subjects were divided in to three equal groups. The experimental group I (N-15 RTG) underwent

resistance training performed, the experimental group (N-15 RCTG) had resistance circuit training. The entire group (N-15 CG) they did not have any specific training.

Results

Table I. Pre and post test mean value of Resistance Training Group Flexibility

	Mean	N	Std. Deviation	Std. Error Mean	M.D	't' ratio
Pre-Test	32.5333	15	2.0307	0.33	4.53	13.48*
Post-Test	37.0667	15	1.7099			

* Significant at 0.05 levels (2.14)

Table-I shows the obtained 't' ratio for pre and post test mean difference RTG on flexibility of 13.48. The obtained 't' ratios were higher than the table value of 2.14 for the degrees of freedom (1, 14). The result showed a statistically significant improvement at 0.05 level of confidence. It was observed that the mean gains and losses made from pre and post test significantly showed improvement in flexibility (4.53 $p < 0.05$) in resistance training group.

Table II. Pre and post test mean value of Resistance Circuit Training Group Flexibility

	Mean	N	Std. Deviation	Std. Error Mean	M.D	't' ratio
Pre-Test	32.4000	15	2.5857	0.52	6.53	12.68*
Post-Test	38.9333	15	3.3481			

* Significant at 0.05 levels (2.14)

Table-II shows the obtained 't' ratio for pre and post test mean difference RCTG on flexibility of 13.48. The obtained 't' ratios was higher than the table value of 2.14 for the degrees of freedom (1, 14). The result showed statistically significant improvement at 0.05 level of confidence. It was observed that the mean gains and losses made from pre and post test significantly showed improvement in flexibility (6.53 $p < 0.05$) in the resistance circuit training group.

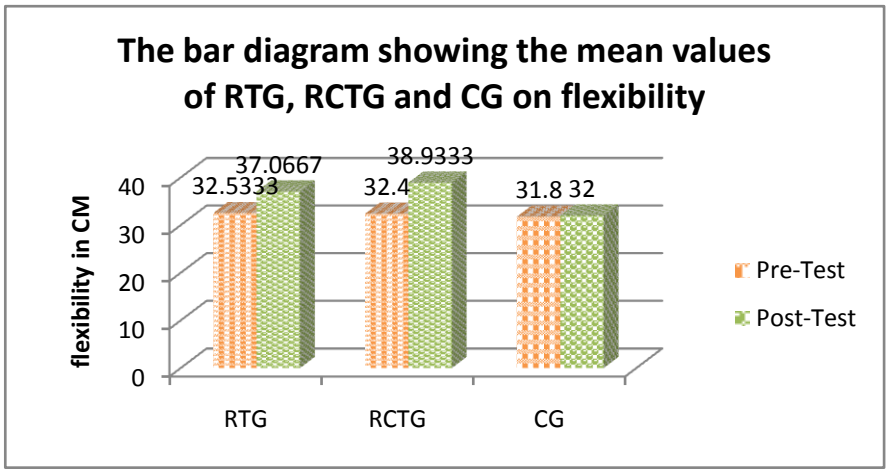
Table III. Pre and post test mean value of control group Flexibility

	Mean	N	Std. Deviation	Std. Error Mean	M.D	't' ratio
Pre-Test	31.8000	15	1.8974	0.11	0.20	1.87 *
Post-Test	32.0000	15	1.7321			

* Significant at 0.05 levels (2.14)

Table-III shows the obtained 't' ratios for pre and post test mean difference CG on flexibility of 1.87. The obtained 't ratio was lesser than the table value of 2.14 for the degrees of freedom (1, 14). It was found that the result did not showed any significant improvement at 0.05 level of confidence.

Figure I. Bar diagram showing the pre-test and post test means of the flexibility of the experimental and control groups.



The data on flexibility of the resistance training group, resistance circuit training and control groups collected before and after the experimental period were analyzed statistically and presented in Table IV.

Table IV. Analysis of variance in pre and post tests on flexibility of RTG, RCTG and CG

	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
Pre-Test	B.G.	4.578	2	2.289	.477	.624
	W.G.	201.733	42	4.803		
Post-Test	B.G	386.133	2	193.067	33.805	.000
	W.G	239.867	42	5.711		

* Significant at 0.05 level

Table IV shows that the pre test means on flexibility of resistance training group, resistance circuit training and control groups were 32.53,32.40 and 32.8 respectively. The obtained F ratio of .477 was lesser than the required table value of 3.22. The result indicates that there was no significant improvement at 0.05 level of confidence for the degrees of freedom 2 and 42. The post test means on flexibility of resistance training group, resistance circuit training and control groups were 37.06, 38.93 and 32 respectively. The obtained F ratio of 33.80 was higher than the required table value of 3.22 which indicates that there was a significant improvement at 0.05 level of confidence for the degrees of freedom 2 and 42.

Table V. Analysis of co variance in flexibility of RTG, RCTG and CG

	Sum of Squares	df	Mean Square	F	Sig.
B.G	316.152	2	158.076	81.527	.000
W.G	79.496	41	1.939		

The adjusted post test means of flexibility of resistance training group, resistance circuit training and control groups were 36.81, 38.79 and 32.39 respectively and the obtained F ratio of 81.52 was greater than the F ratio of 3.22 which indicates that was significant improvement at 0.05 level of confidence for the degrees of freedom 2 and 41.

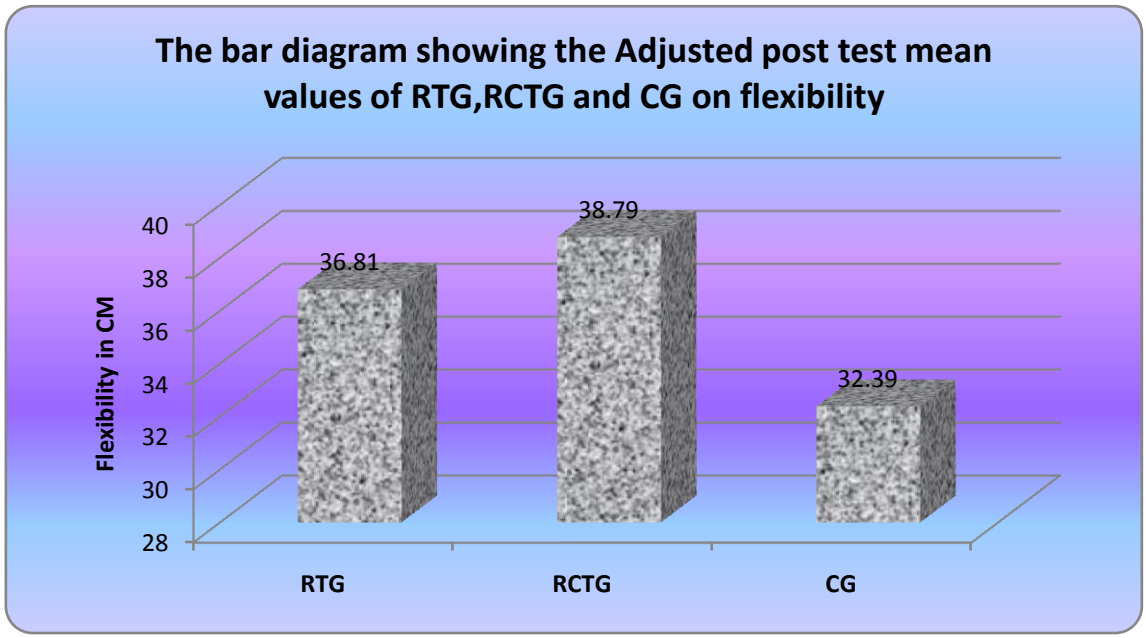
Table VI. Scheffe's test for the differences between the adjusted post test paired means of flexibility

RTG	RCTG	CG	Mean Difference	Confidential Interval
36.81	38.79	---	1.98*	0.45
36.81	---	32.39	4.42*	0.45
---	38.79	32.39	6.40*	0.45

* Significant at 0.05 level

This indicates that there is a significant increase in flexibility of the resistance circuit training group as a result of 6 weeks of exercise. The mean difference in flexibility of resistance training group, resistance circuit training group and control group were 1.98, 4.42 and 6.40 respectively. It was higher than the confidence interval of 0.45 required for significance at .05 level. This clearly indicates that there is a significant variation in flexibility.

Figure II. Bar diagram showing the adjusted post mean value of experimental and control groups on flexibility



Result

1. The resistance circuit training group, resistance training group significantly improved in flexibility from pre test to post tests. The flexibility increased in the resistance training group from pre test (32.53 ± 2.03) to post test (37.06 ± 1.70); in the resistance circuit training group from pre test (32.40 ± 2.58) to post test (38.93 ±2.34). The flexibility significantly improved in the pre test to post test in two experimental groups with no changes in the control group.
2. The present study demonstrated that an increase in flexibility of 13.92 %, 20.40 % estimated with sit and reach test for resistance circuit training, resistance training group respectively. The resistance circuit training group improved flexibility by 20.40 % better than the resistance training group 13.92 % and the resistance improved flexibility by 13.92 better than the control group.
3. The result of the present study is in line with the previous study alone by Wong PL.(2010)]. Finding found that the pre-season concurrent resistance and high-intensity interval training studies improved of flexibility.

Conclusion

1. It was concluded that the Resistance circuit training improved flexibility in collegiate male kabaddi players.
2. It was concluded that the Resistance training improved flexibility in collegiate male kabaddi players.
3. It was also concluded that the Resistance circuit training improved flexibility better than the Resistance training of collegiate male kabaddi players.
4. It was finally concluded that the Resistance training group showed greater flexibility than the control group of collegiate male kabaddi players.

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