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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 there were divided into 3 equal groups: Group –I= a resistance training group (n=15), Group –II= a resistance circuit training group (n=15), and Group –III= a control group (n=15). The sit and reach test and 12 minutes cooper test were 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 was 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 variable of flexibility. However, the resistance circuit training group showed signs of improvement in the flexibility in sit and reach test performance that was significantly greater than the improvement in the other 2 groups (resistance training and control group). This study provides support for the use of a resistance circuit training of traditional weight training and circuit method to improve the flexibility.

Keywords: *Resistance training, Resistance circuit training, Flexibility*

1. 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 in indispensable part of any fitness program. Several studies used resistance training and 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, & Kocak, 1997; Potteiger, et. al., 1999). The rapid eccentric movement creates a stretch reflex that produces a more forceful concentric muscle action (Wagner, & 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 (Clutch, et. al., 1983; Wagner, & 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 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, & Sale, 1993; Hakkinen, & Komi, 1985). Resistance circuit training has been advocated for sports that require the athletes to have explosiveness and an increased vertical jumping ability.

2. Methodology

Selection of subject to achieve the purpose of the study 45 male kabaddi players were selected as subject from vellalar college of engineering and technology, erode, the age of the subject were between 17 to 21 years, all of the subjects had successfully passed a physical exam which they were screened for any possible injury are illness. The received all the necessary information about the studies procedures in oral and written form, each subject completed a medical history forms a training back ground, questionnaire, and a written informed consent forms. The study was formulated has pre and post test random group design. In which 60 subject were divided in to three equal groups. The experimental group I (N-15 RTG) resistance training performed, the experimental group (N-15 RCTG) resistance circuit training performed. (N-15 CG) they did not practice any specific training.

	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			

Table 1: Pre and post test mean value of Resistance Training Group on Flexibility
** Significant at 0.05 levels (2.14)*

Table 1 shows the obtained 't' ratio for pre and post test mean difference RTG on flexibility of 13.48. The obtained 't' ratios when compared with the table value of 2.14 for the degrees of freedom (1, 14) it was found to be statistically showed significant at 0.05 level of confidence. It was observed that the mean gains and losses made from pre and post test were significantly showed improvement on flexibility (4.53 p< 0.05),

	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			

Table 2: Pre and post test mean value of Resistance Circuit Training Group on Flexibility
** Significant at 0.05 levels (2.14)*

Table 2 shows the obtained 't' ratios for pre and post test mean difference RCTG on flexibility of 13.48. The obtained 't' ratios when compared with the table value of 2.14 for the degrees of freedom (1, 14) it was found to be statistically showed significant at 0.05 level of confidence. It was observed that the mean gains and losses made from pre and post test were significantly showed improvement on flexibility (6.53 p< 0.05),

	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			

Table 3: Pre and post test mean value of control group on Flexibility
** Significant at 0.05 levels (2.14)*

Table 2 shows the obtained 't' ratios for pre and post test mean difference RCTG on flexibility of 1.87. The obtained 't ratios when compared with the table value of 2.14 for the degrees of freedom (1, 14) it was found to be statistically showed in significant at 0.05 level of confidence.

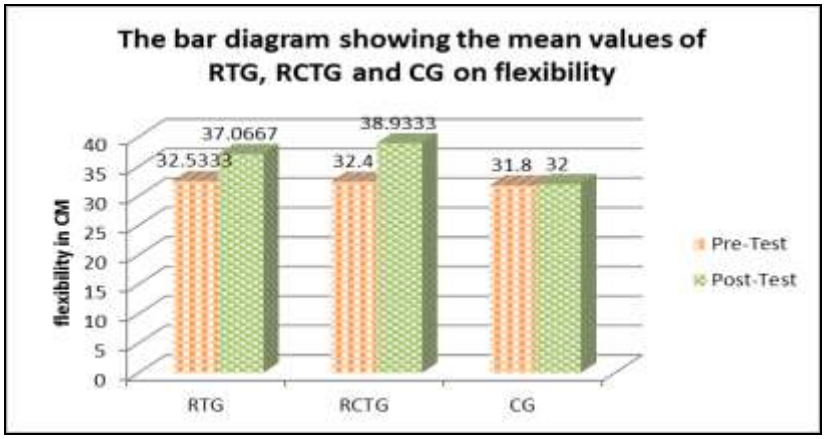

Figure 1: Bar diagram showing that the Pre-test and post test means of the experimental groups and control group on Flexibility

2.1. Analysis of Variance on Pre and Post on RTG, RCTG and CG on Flexibility

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

		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		

Table 4
** Significant at 0.05 level*

Table shows that the pre test means on flexibility of resistance training group, resistance circuit training and control group were 32.53,32.40 and 32.8 respectively and the obtained F ratio of .477 was lesser than the required table value of 3.22 indicates that there was no significant 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 group were 37.06, 3893 and 32 respectively and the obtained F ratio of 33.80 was lower than the required table value of 3.22 which indicates that there was no significant at 0.05 level of confidence for the degree of freedom 2 and 42.

	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		

Table 5: Analysis of co variance on RTG, RCTG and CG on flexibility

The adjusted post test means on flexibility of resistance training group, resistance circuit training and control group 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 at 0.05 level of confidence for the degree of freedom 2 and 41.

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

Table 6: Scheffe's test for the difference s between the adjusted post test paired means of flexibility
** Significant at 0.05 level*

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

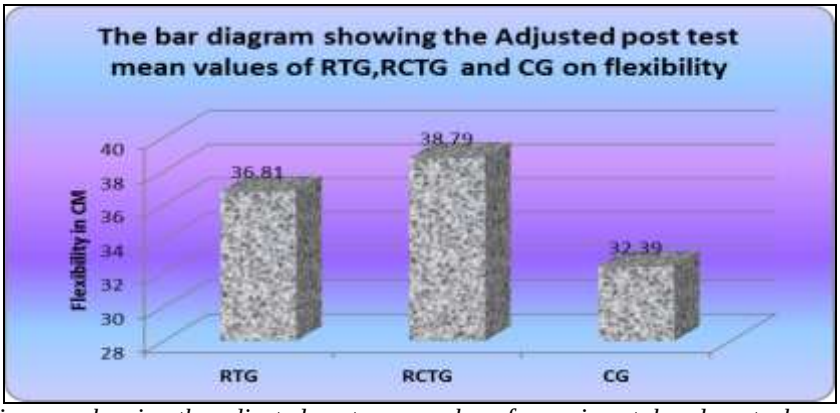

Figure 2: Bar diagram showing the adjusted post mean value of experimental and control group on Flexibility

3. Result

1. Resistance training improved the flexibility of collegiate male kabaddi players.
2. Resistance circuit training improved the flexibility of collegiate male kabaddi players.
3. Resistance circuit training improved the flexibility better than the resistance training group of collegiate male kabaddi players.
4. Resistance training improved the flexibility better than the control group.

4. Conclusion

Resistance circuit training is the best training to improved the flexibility of collegiate male kabaddi players.

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