

Effect of Moderate and Low Intensities of Resistance Training on Selected Morphological Parameters among Men Kabaddi Players

M.Vijayamirtharaj, Ph.D Scholar, and

P.K.Senthilkumar, Assistant Professor, Tamil Nadu Physical Education and Sports University, Chennai-600 127

Abstract

The purpose of this study was to determine the effect of moderate and low intensities of resistance training on morphological parameters among kabaddi players. A total of twenty (30) kabaddi players were selected randomly and divided into three equal groups ($n = 10$) namely Moderate Intensity resistance training group (MI: 60% IRM-1Repetition maximum), Low Intensity resistance training group (LI: , 50% IRM-1Repetition maximum) and control groups. Resistance training program includes (bench press, military curl, arm curl, lat pull down, leg press and leg extension), with three sets and 7-8 repetitions in moderate intensity group and 12-13 repetitions in low intensity group. Morphological parameter was assessed by using standard test. The data were collected before and after participation in a 12-week resistance training programme. Results indicated that the obtained F-value of Body Mass Index and Percent Body Fat was significantly decreased and Lean Body Mass was increased. The 12 weeks of moderate intensity resistance training may be more effective in improving morphological parameters such as Body Mass Index, Lean body Mass and Percent Body Fat than low intensity resistance training. It is therefore, recommended that kabaddi players should participate in moderate intensity resistance training to achieve optimal gains in muscle size, strength, fitness and performance.

Key words: Resistance training, Body Mass Index and Lean body Mass and Percent Body Fat.

Introduction

Morphology is Greek word, morph- means 'shape, form', and morphology is study of form or forms. In biology morphology refers to the study of the form and structure of organisms (Mark Aronoff, Kirsten Fudeman, (2011). Body composition assessment is a valuable tool that can help coaches and sports scientists assess and monitor the success of training programs (Stapff, 2000). The choice of a body composition method often depends on the intended purpose for which data are to be used and also on the availability of the techniques. Considering high performance sports, body composition assessment can be used to determine the effectiveness of exercise training and also to monitor the health status of the athlete (Ackland, et al., 2012).

Resistance training, also known as strength or weight training, is well established as an effective method of exercise for developing muscular fitness (Hass, 2001). Fleck and Kraemer, (1988) described the primary goals

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of resistance training as improving muscular strength and endurance, while other health-related benefits derived from resistance training include increases in bone mass, reduced blood pressure, increase muscle and connective tissue cross-sectional area (CSA), reduced body fat, and it may relieve low back pain (Kraemer, Ratamess and French, 2002). The aim of the study was to investigate whether the sequence of execution of moderate and low resistance exercises, during the same session, significantly affected post-exercise body mass index, lean body mass and percent body fat among kabaddi players.

Materials and Methods

In the present study, 30 college level men kabaddi players were selected and their age ranged between 20 and 25 years. The subjects were randomly divided into three group namely moderate intensity (60% 1RM) (n=10), low-intensity (50%1RM) (n = 10) and control (n = 10) groups. The Body weight and stretched stature were measured to the nearest 0.1 kg and 0.1 cm, respectively, with the subjects dressed in light clothing and without shoes (Marfell-Jones et al., 2006), using a stadiometer with a balance-beam scale. The body mass index was calculated according to the formula of body weight/stature² (Kg·m⁻²). BMI or body mass index is a tool for indicating weight status in adult. It is a measure of weight for height. Body density was estimated from the sum of the skin-fold sites (Durnin and Womersley, 1974). Estimated percentage body fat was calculated from a standard equation (Siri, 1956). Lean Body Mass (LBM) was calculated by subtracting fat mass from total body mass. Lean body mass is the energy utilizing component of the body weight excluding skeletal mass and body fat. LBM is expressed in kilograms, Lean body mass represent both structural and functional proteins. Resistance training was performed 3 sessions per week for 12 weeks. Training sessions involved the Moderate Intensity exercise group (MI) and Low Intensity exercise group (LI). Therefore, both groups performed the same volume of resistance training programme for 12 – weeks. The training intensities were different and included Moderate Intensity of 3 sets, 10 repetitions and 60% 1-Repetition maximum (60% 1RM) and Low Intensity of 3 sets, 10 repetitions, and 50% 1-Repetition maximum (50% 1RM) groups. One week prior to the experiment, the participants underwent a 1RM test for the six dynamic continuous exercises with external resistance (bench press, lat-machine pull-down, cable biceps curl, leg press, leg curl and leg extension). The 1RM testing protocol has been previously described elsewhere (Simao, Farinatti, Polito, Viveiros & Fleck, 2007).

Statistical analysis

Data were statistically analysed by using Analysis of Covariance (ANCOVA) and to determine whether the differences of means in each parameter between the groups were significant. Scheffe's post hoc test was used if the 'F' was significant, the differences were considered significant

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when ($P < 0.05$). Accordingly, a statistical software package (SPSS-10) was used.

Results

Table-I
Calculation of Analysis of Covariance on Body Mass Index, Lean Body Mass and Percentage of Body Fat

Variables	Test	Moderate Intensity	Low Intensity	Control Group	SV	SS	df	MS	F
Body Mass Index	Pre test	24.38	24.06	24.31	B	0.56	2	0.28	1.20
					W	6.29	27	0.23	
	Post test	22.99	23.22	24.19	B	8.11	2	4.06	12.68*
					W	8.63	27	0.32	
	Adjusted	22.90	23.35	24.15	B	7.99	2	4.00	18.51*
					W	5.61	26	0.22	
	Mean gain	1.39	0.84	0.12					
	Lean Body Mass	Pre test	50.93	51.14	52.33	B	11.46	2	5.73
W						137.87	27	5.11	
Post test		54.58	54.06	51.96	B	38.45	2	19.23	3.87*
					W	134.00	27	4.96	
Adjusted		55.08	54.36	51.16	B	80.30	2	40.15	63.95*
					W	16.32	26	0.63	
Mean gain		3.65	2.91	0.37					
Percentage of Body Fat		Pre test	23.38	23.57	22.79	B	3.23	2	1.61
	W					39.81	27	1.47	
	Post test	19.20	20.16	22.92	B	74.35	2	37.17	24.92*
					W	40.28	27	1.49	
	Adjusted	19.10	19.92	23.26	B	90.94	2	45.47	68.36*
					W	17.29	26	0.67	
	Mean gain	4.17	3.40	0.12					

*Significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 27 = 3.35 and 2 and 26 = 3.37

In the present study, effect of moderate and low intensities of resistance training on selected morphological parameters of kabaddi players were significant decrease ($P < 0.05$) in Body Mass Index and Percentage Body Fat was noted after 12 weeks of training. On the other hand significant increase ($P < 0.05$) in Lean Body Mass was noted after 12 weeks of training. However, no significant change was noted in stature following the training program.

Table II

Scheffe's Post Hoc Analysis on Body Mass Index, Lean Body Mass and Percentage of Body Fat

Variables	Control Group	Moderate Intensity	Low Intensity	Mean Difference	CI
Body Mass Index	24.15	22.90		1.25*	0.43
	24.15		23.35	0.80*	
		22.90	23.35	0.45*	
Lean Body Mass	51.16	55.08		3.92*	0.73
	51.16		54.36	3.20*	
		55.08	54.36	0.72	
Percentage of body fat	23.26	19.10		4.16*	0.76
	23.26		19.92	3.34*	
		19.10	19.92	0.81*	

*Significant

Discussion

Since the ancient times, it has been believed that suitable physique has an importance to achieve success in particular sports. The measurement of height and weight has some importance in selecting sports personal (Beunen and Malina, 1988; Beunen et al., 1997). The estimation of body composition permits the quantification of gross size of an individual into two major structural components namely fat mass and lean body mass. This appraisal provides an important baseline to develop an effective training programme. The body composition especially in sports persons is a better guide for determining the desirable weight rather than using the standard height-weight-age tables of normal population, because of the presence of high proportion of muscular content in their total body composition (Franks et al., 1999). Stature and body mass have significant impact on kabaddi players. Body mass come into play since kabaddi is a body contact game. Heavy weight (not over weight) players get an advantage in defense. However, a standard body mass is required for every playing positions. The present study showed no significant change in stature among the players after the training. However, significant increase in lean body mass was noted after 12 weeks of training. The percentage of body fat plays an important role for the assessment of physical fitness of the players (Sergej, 2003). Present study showed a decrease in body fat and body mass index in the kabaddi players. Moderate resistance training increases the fat utilization during exercise, which may be the cause of the reduced fat level after training. Therefore, a low level of body fat as well as an increase in fat free body mass plays a key role in keeping physical fitness.

Conclusion

It was concluded that resistance training induced changes in different morphological parameters after 12 week training intervention among kabaddi players. Further, it was proved that moderate intensity (60% 1RM) of resistance training better than low-intensity (50%1RM) of resistance training in altering the Body Mass Index, Percentage Body Fat and Lean Body Mass of kabaddi players. Since, the data on kabaddi players of the present study may provide a useful database to the coaches to develop their training program.

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