Research Paper | *International Journal of Physical Education,* Vol. 4 No. 2 (October, 2011) : 177-180

Effect of different phases of training on body composition among university kabaddi players

ARANGA PANBILNATHAN AND K.V. BALAMURUGAN

Received : *July, 2011;* **Revised :** *August, 2011;* **Accepted :** *September, 2011*

See end of the article for authors' affiliations

Correspondence to:

ARANGA.PANBILNATHAN
Department of Physical Education and Sports Sciences, Annamalai University, Annamalainagar, CHIDAMBARAM (T.N.) INDIA

ABSTRACT

In physical fitness, body composition are used to describe the percentages of fat, bone and muscle in human bodies. Because muscular tissue takes up less space in our body than fat tissue, our body composition, as well as our weight, determines leanness. Two people at the same height and same body weight may look completely different from each other because they have a different body composition. The aim of this study is to find out the effect of changes during different phases of training on body composition variables such as body mass index and per cent body fat. 30 University level men Kabaddi players were selected and given resistance training under different phases, conditioning, intensive, in season, and off season by manipulating the load, intensities and frequencies of selected weight training exercises. Results proved that different phases of training altered body mass index and there was significant differences between initial and in-season phase. Though per cent body fat showed reduction but they were not significant at 0.05 level at any stage. It was concluded that the different phases of training can be utilized for improving body composition variables by university level men Kabaddi players.

Panbilnathan, Aranga and Balamurugan, K.V. (2011). Effect of different phases of training on body composition among university kabaddi players. *Internat. J. Phy. Edu.*, **4** (1) : 177-180.

Key words : Resistance training, Conditioning phase, Intensive phase, In-season phase, Off-season phase, Body mass index, Per cent body fat

The National Institute of Health recommends that a healthy adult male's body should have between 6 and 24 per cent fat and a female should have 14-31 per cent. Levels significantly above these amounts may indicate excess body fat. Athletes, leaner individuals, and more muscular individuals will have a body fat percentage lower than these levels. In general, most athletes experience greater performance benefits at body fat percentages between 7 and 19 per cent for men, and 10 and 25 per cent for women, depending on the sport. Training methods includes weight training, interval training, fartlek training, circuit training, isotonic training, isometric training and isokinetic training. The heart activity is accelerated by exercise and strengthens its fibres. Exercise also stimulates growth, and strengthens the bones, muscles, ligaments and tendons (Singh, 1991). Different activities can be carried out with different intensities which may have different effect in organism. It is better to start gradually and take more time reaching the objectives than to start at a high level drop out because of injury caused by either the intensity or frequency of the programme (Morehouse and Gross, 1975). Thus, training programmes form different phases.

Body mass index (BMI):

The body mass index (BMI) is a heuristic proxy for human body fat based on an individual's weight and height. BMI does not actually measure the percentage of body fat. It was invented between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing "social physics". Body mass index is defined as the individual's body weight divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of kg/m^2.

Per cent body fat :

A person's body fat percentage is the total weight of the person's fat divided by the person's weight and consists of essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage for women is greater than that for men, due to the demands of childbearing and other hormonal functions. Essential fat is 3%–5% in men, and 8%–12% in women. Storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. The minimum recommended total body fat percentage exceeds the essential fat percentage value reported above

Different phases of training :

Sports training programme phases revolve around peaking for major competitions, phases generally progress as follows, the first phase of training prepares the athlete for more intensive weight training with heavier weight loads. It is referred to as the conditioning phase, the hypertrophy phase, or the starter phase. Fitness training programmes typically advance to a more intensive training phase where weight loads are consistently increased until fitness training goals are met under intensive training phase. Then the athlete performs a maintenance or in-season phase in which the athlete stabilize the level of performance which enables for major competition at the right time. The off season phase permits for an active rest so that the athlete can gain recovery in preparation for the next season phase. To phase at the desired level of strength (Fleck and Kraemer,1996 ; Powers *et al.,* 2006; Schmidt and Wrisberg, 2000) different phases of training progress from low intensity and high volume, to high intensity and low volume. In other words, do more repetitions with lighter weights early in training and fewer repetitions with heavier weights later in training. Testing after each of the phases of training will help one make sound decisions for adjusting the training programme in subsequent phases. This is how one personalizes the training programme to promote continuous improvement toward the goals.

Sanchez-Medina *et al.* (2010) analyzed the contribution of the propulsive and braking phases among different percentages of the one-repetition maximum (1RM) in the concentric bench press exercise and highlighted the importance of considering the contribution of the propulsive and braking phases in isoinertial strength and power assessments. Delecluse *et al.* (1995) analyzed the effect of high-resistance (HR) and high-velocity (HV) training on the different phases of 100-m sprint performance and by means of a principal component analysis on all speed variables, three phases were distinguished: initial acceleration (0-10 m), building-up running speed to a maximum (10-36 m), and maintaining maximum speed in the second part of the run (36-100 m). Padilla *et al.* (2001) evaluated exercise intensity and load during mass-start stages in professional road cycling, using competition heart rate (HR) recordings and found that load zones reflected the physiological demands of different mass-start cycling stage categories. which could be useful for planning precompetition training strategies. Padilla *et al.* (2008) examined the exercise intensity and load of the mountain passes of the major 3-week races according to their difficulty (length and slope) and position within the stage and reported that mountain passes are highly demanding and that their intensity is related not only to the difficulty of the ascents but also to the position within the stage.

It was found that very few attempts were made to find out the effect of different phases of training on selected body composition variables of university level men Kabaddi players. The purposes of this research was to find out the body composition changes during different phases of training among university men Kabaddi players.

METHODOLOGY

Subject :

To achieve the purpose of this study, 30 men Kabaddi players, who represented the Annamalai University at inter-university tournaments were selected and tested of their body composition variables such as body mass index, per cent body fat which formed the initial scores of the subjects.

Testing tool :

The subjects underwent resistance training under four phases namely, conditioning, intensive, in-season and off-season phases. Each phase of training lasted for 3 weeks and the subjects were tested of their selected body composition on completion of each phase of training. The investigators selected five resistance (weight training) exercises namely, Military press, Barebell rows, Squats, Standing calf raises and Leg press and determined the 1 RM for each resistance exercise using Brzycki Formula (Brzycki, 1998). The aim of conditioning phase, was to make the body to adjust to the stress of weight training and for this purpose the subjects were given 40% to 50% of 1 RM with different repetitions. The intensive phase was to gain greater levels of strength, power and other qualities that transfer from weight training to sport skills, hence the subjects were trained with resistance training of 50% to 70% of 1 RM with different repetitions and varied frequencies. The in-season phase aimed at stabilizing the level of performance on the fitness components built during the previous phases and gain a competitive edge for peaking for major competitions at the right time, hence the subjects were trained with resistance training of 70% to 80% of 1 RM with increased repetitions and varied frequencies. The off-season phase would permit the subjects for an active rest to get recovery in preparation for the next pre-season phase, which would be otherwise called the detraining phase.

Statistical analysis :

The obtained data of initial (1st day of the training session), end of the 3rd week (conditioning phase), end of

6th week (intensive phase), end of 9th week (in-season phase) and end of 12th week (off-season phase) on selected criterion variables were subjected to statistical treatment using repeated ANOVA and the results are presented in Table 1 and 2.

OBSERVATIONS AND DISCUSSION

The results presented in Table 1 proved that the obtained F value of 3.00 was greater than the required table value of 2.35 with degrees of freedom 4, and 145 at 0.05 level, and it was proved that different phases of resistance training significantly altered the body mass index of the university Kabaddi players. Results were subjected to statistical post hoc analysis using Scheffe's confidence interval test and the results are presented in Table 2 which proved that there was significant difference between initial scores and in-season phase scores as the obtained value of 2.06 was greater than the required confidence interval value of 2.00. The results proved that due to different phases of resistance training, the body mass index was gradually altered at every phase of the training comparing to initial scores. Though there was reduction in all the phases comparing to initial scores, the difference between initial and in-season phase alone was significant.

The results on per cent body fat proved that the obtained F value of 0.86 was less than the required table value of value of 2.35 with degrees of freedom 4, and 145 at 0.05 level. This proved that there was no significant alteration in per cent body fat due to different phases of resistance training.

In this study, the investigators arranged the training schedule as suggested by Powers *et al.* (2006); Schmidt and Wrisberg (2000) at different phases of training progress from low intensity and high volume, to high intensity and low volume, this significantly altered the weight of the subjects which resulted in significant reduction in body mass index. However, the weight reduction has not be observed on the per cent body fat, which may take some more time, that is why, though it was noted reduction in per cent body fat among the subjects, the differences was not significant. The results

Table 1: Results on repeated analysis of variance body composition variables

Means on completion of different phases					Source of variance	Sum of squares	df	Means squares	F
Initial	Conditioning	Intensive	In-season	Off season					
Calculation of repeated analysis of variance on body mass index (In index numbers)									
21.39	20.78	20.25	19.34	19.89	Subjects	294.11	29.00		3.00*
					Trials	75.54	4.00	18.89	
					Residuals	914.31	145.00	6.31	
					Total	544.66	149.00		
Calculation of repeated analysis of variance on per cent body fat (In percentage)									
14.65	14.10	14.00	14.06	14.10	Subjects	48.83	29.00		0.86
					Trials	8.52	4.00	2.13	
					Residuals	361.11	145.00	2.49	
					Total	401.42	149.00		

Required $F_{(0.05),\,(4,145)} = 2.35$ *Significant

Table 2: Scheffe's post hoc analysis results on body mass index

Means on completion of different phases					Mean difference	Reqd. C. I.
Initial	Conditioning	Intensive	In-season	Off season		
21.39	20.78				0.61	2.00
21.39		20.25			1.15	2.00
21.39			19.34		2.06*	2.00
21.39				19.89	1.50	2.00
	20.78	20.25			0.53	2.00
	20.78		19.34		1.44	2.00
	20.78			19.89	0.89	2.00
		20.25	19.34		0.91	2.00
		20.25		19.89	0.36	2.00
			19.34	19.89	-0.55	2.00

* Significant

of this study is in agreement with the findings of Padilla *et al.* (2001 and 2008) who found that load zones reflected the physiological demands of different mass-start cycling stage categories. This could be useful for planning precompetition training strategies. And the results of this study are in agreement with the findings of Sanchez-Medina *et al.* (2010) analyzed the contribution of the propulsive and braking phases among different percentages of the one-repetition maximum (1RM) in the concentric bench press exercise and highlighted the importance of considering the contribution of the propulsive and braking phases in strength and power assessments

Conclusion:

It was concluded that different phases of resistance training can be better utilized for improving body composition variables by university level men Kabaddi players.

Authors' affiliations:
K.V. BALAMURUGAN, Department of Physical Education, Annamalai University, Annamalai nagar, CHIDAMBARAM (T.N.) INDIA

REFERENCES

Delecluse, C. (1995). Influence of high-resistance and high-velocity training on sprint performance, *Med. Sci. Sports Exerc.,* **27**(8):1203-1209.

Fleck, S.J. and Kraemer, W.J. (1996). *Periodization breakthrough! Ronkonkoma*, Advanced Research Press, New York.

Morehouse, Lawrence E. and Gross, Leaonard (1975). *Total fitness in 30 minutes a week*, New York: Simon and Schuster, pp. 35.

Padilla (2001). Exercise intensity and load during mass-start stage races in professional road cycling. *Med. Sci. Sports Exerc.,* **33**(5) : 796-802.

Padilla (2008). Exercise intensity and load during uphill cycling in professional 3-week races. *Eur. J. Appl. Physiol.,* **102**(4) : 431-438.

Powers, S.K., Dodd, S.L. and Noland, V.J. (2006). *Total fitness and wellness* (4th Ed.). San Francisco: Pearson Education. pp. 11

Sanchez-Medina, L. (2010). Importance of the propulsive phase in strength assessment, *Internat. J. Sports Med.,* **31**(2):123-129.

Schmidt, R.A. and Wrisberg, C.A. (2000). *Motor learning and performance: A problem-based learning approach* (2nd Ed.). Champaign, IL: Human Kinetics.

Singh, Hardayal (1991). *Science of Sports Training*, New Delhi: D.V.S. Publications, New Delhi. p. 13.

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