



ANALYSIS OF THE CHANGES IN PERCENT BODY FAT DURING PREPARATORY PERIOD OF TRAINING AMONG HANDBALL PLAYERS

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ABSTRACT: -The aim of this study was to find out the changes in percent body fat during preparatory period of training among Handball Players. The present study was confined to randomly select 30 college Handball players from affiliated to *Andhra Kesari University, Ongole, Andhra Pradesh* State. The age group of the subjects were between 19-25 years with standard deviation ± 2.15 . Taking into consideration the importance of the body composition variable percent body fat was selected for this study. In the present study, preparatory training of the Handball Players 12 weeks ahead of scheduled competitions was considered and the training session was further divided into three phases, namely, phase I (I to IV weeks), phase II (V to VIII weeks) and phase III (IX to XII weeks) are considered as independent variables. This research adapted “Repeated Measures Research” method to compare body composition variable after each phase of preparatory training and the effect of each phase of preparatory training was compared with the initial scores of the subjects. Repeated measures research aims in collection of data during different times and phases of the same group of subjects with a view to discovering something about the influences of different phases on selected criterion variables. Data on body composition variable was collected at initial and at the end of three phases of preparatory training. The collected data were subjected to statistical treatment using repeated measures of Analysis of Variance. In all cases 0.05 level was fixed to test the hypothesis of this study. Finding reveals that, 12 weeks of preparatory training significantly reduced body composition variable, percent body fat after completion of II and III phases of training compared to initial scores of the Handball Players.

Keywords: *Percent body fat, Preparatory period, Handball Players*

INTRODUCTION

Improving skill means that the performance of any motor task becomes more efficient thereby reducing the time taken to complete the task and the level of effort required. This increased level of skillfulness could also mean more enjoyment and satisfaction for the performer by increasing the ease with which the task can be completed or by allowing new, more complex skills to be attempted. If by understanding the processes that govern the control of movement, we can show the way for all individuals to improve their ability to perform the myriad of motor tasks that they confront, then we can claim to have made a real contribution to improving the quality of life within our society (Kerr, 1982).

Sports in the present world have become extremely competitive. It is not the mere



participation or practice that brings out victory to an individual. Therefore, sports life is affected by various factors like physiology, biomechanics, sports training, sports medicine, sociology and psychology etcetera. All the coaches, trainers, physical educational personals and doctors are doing their best to improve the performance of the players of their country. Athlete players of all the countries are also trying hard to bring laurels, medals for their countries in international competitions.

Athletic performance has dramatically progressed over the past few years. Performance levels unimaginable before are now commonplace, and the number of athletes capable of outstanding results is increasing. One factor is that athletics is a challenging field, and intense motivation has encouraged long, hard hours of work. Also, coaching has become more sophisticated, partially from the assistance of sport specialists and scientists. A broader base of knowledge about athletes now exists, which is reflected in training methodology (Bompa, 1999)

Most scientific knowledge, whether from experience or research, aims to understand and improve the effects of exercise on the body. Exercise is now the focus of sport science. Research from several sciences enriches the theory and methodology of training, which has become a branch of science. The athlete is the subject of the science of training. The athlete is the subject of the science of training. The athlete represents a vast source of information for the coach and sport scientist.

There are different methods of specific training programmes available for the development of speed, muscular strength level, endurance and cardio respiratory endurance to their maximum. Training methods includes weight training, interval training, fartlek training, circuit training, isotonic training, isometric training, isokinetic training. But before giving training the coaches or physical education teachers should have clear understanding of the method of training to be given to the sports men concerning. The basic scientific principles and guide lines for constructing an effective conditioning programme. Since there are specific principles and guidelines that must be and bored to in order for optimal training adaptation to take place.

Training programme should be designed to suit the specific energy sources needed for athletics, specific event or contest. Moreover, it is generally agreed among coaches and exercise physiologist that everybody does not respond to training in the same manner. There are certain anatomical (trunk, shoulder, pelvis, chest, abdomen, upper and lower extremities) and physiological (blood volume, blood pressure, heart rate, cardiac output and vital capacity). Sex difference which favor both male and female for specific activities, coaches and physical Cuest.fisioter.2024.53(3):7554-7561



education teacher should also have an idea of factors influencing in the pre-adolescent an adolescent period during the training period.

Football is the most watched and played sport in the world, and it also one of the most diverse sports in terms of energy systems, performance markers, and variety of movements used. Specifically, the sport of football requires various degrees of aerobic and anaerobic energy systems depending on the game-plan, opponent, and what position the athlete plays. This study aimed to examine how a typical training program is developed and the type of strength and power development training programs that are currently implemented at the elite level. The purpose of the study was to find out the effects of preparatory training on percent body fat among Handball Players.

METHODOLOGY

The present study was confined to randomly selected 30 college Handball Players from affiliated to the present study was confined to randomly select 30 college Handball players from affiliated to *Andhra Kesari University, Ongole, Andhra Pradesh* State. The age group of the subjects were between 19-25 years with standard deviation ± 2.15 . All the subjects were oriented with regard to the purpose of the study, the benefits, significance of the study, test procedures and all the subjects volunteered to participate in this research. Taking into consideration the importance of the body composition variable percent body fat was selected for this study. In the present study, preparatory training of the Handball Players 12 weeks ahead of scheduled competitions was considered and the training session was further divided into three phases, namely, phase I (I to IV weeks), phase II (V to VIII weeks) and phase III (IX to XII weeks) are considered as independent variables.

Training Programme

In this research the interventional treatment for the selected college level Handball Players were the preparatory phases of training or the periodization phases revolve around peaking for major competitions phases and generally progress from conditioning training phase (CTP), to intensive training phase (ITP), then to in-season training phase (ISTP), and finally off season training phase (OSTP). The CTP phase is the starter phase. The ITP phase is to increase workloads to the peak performance. The ISTP phase is to maintain the peak performance for competitions and OSTP phase permits for an active rest so that the athlete can gain recovery in preparation for the next season phase.

Phase- I –Training: The training phase that is made to prepare for competition of any sport or game is considered as pre-season training. For the operational purpose of the



study, the training a football player gets for his all-round development of the four weeks prior to competition is considered as phase I training.

Phase- II –Training: The training phase II that is made during Vth week to VIIIth week prior to competition of any sport or game is considered as II phase training. For the operational purpose of the study, four weeks training a football player gets conditioning to maintain his fitness obtained through first phase and second phase through different conditioning to compete the game normally from start.

Phase -III –Training: The training III phase that is made after the second phase of training for the period IX week to XII week prior to competition of any sport or game is considered as phase III training. For the operational purpose of the study, the third phase would be immediately before the competition and the training schedule conducted between ninth weeks to twelfth week the football player of four weeks after completing II phase training.

Statistical Technique

Data were collected at initial stage and on completion of three phases of training, namely, initial scores, initial, conditioning, phase (I to IV weeks), second phase (V to VIII weeks) and third phase of training (IX to XII weeks) training. To analyze the data repeated ANOVA was computed. The level of significance was fixed at 0.05 level. When the F ratio was found to be significant, Scheffe's post hoc test was used to find out the paired mean significant difference. (Thirumalaisamy, 1998). Scheffe's post hoc test has the greatest power and is the most conservation with respect to Type 1 error: this method loads to the smallest number of significance differences. The difference between two means would be significant if it exceed Scheffe F. In order to be significant, F' must equal $(k - 1) (F_{.05} \text{ or } F_{.01})$. Thus, the necessary F' ratios for the difference between paired adjusted mean $(k-1)$ would be computed and compared for significance.

RESULT

In order to find out the changes during the preparatory training of Handball Players on body composition variable percent body fat data were collected from the subjects at the time of starting preparatory training, (Initial scores); at the end of four weeks preparatory training (Phase I); at the end of eight weeks preparatory training (Phase II) and at the end of 12 weeks preparatory training (Phase III). The obtained data were subjected to statistical treatment using



repeated ANOVA. The analysis of data through statistical tools descriptive statistics, mean, standard deviation, minimum and maximum on body composition variable, Percent Body Fat is presented in Table-1.

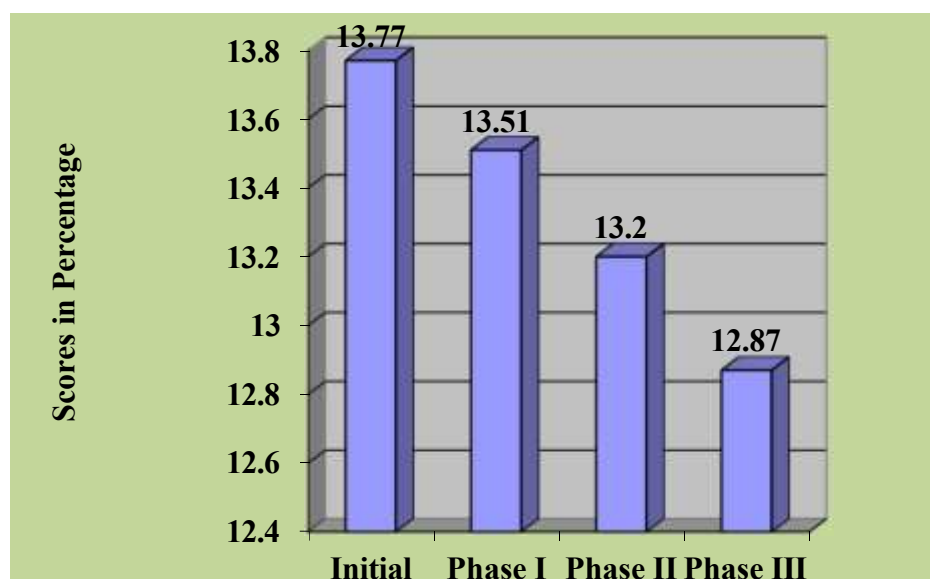
Table -1: Descriptive Statistics, Mean, Standard Deviation and Range on Percent Body Fat at different phases of preparatory training of Handball Players

Different Phases	N	Mean	Standard Deviation	Range	
				Min	Max
Initial	30	13.77	1.19	11.60	16.25
Phase I	30	13.51	1.16	11.19	15.98
Phase II	30	13.20	1.02	11.00	14.95
Phase III	60	12.87	0.93	10.76	14.55

The results presented in Table-1 proved that the initial mean values on Percent Body Fat was 13.77 with standard deviation ± 1.19 . After completion of Phase I the mean value was 13.51 with standard deviation ± 1.16 . After completion of phase II the mean value was 13.20 with standard deviation ± 1.02 . The mean value after completion of Phase III was 12.87 with standard deviation 0.93.

The obtained means were graphically presented through bar diagram in Figure II for better understanding of the results.

Figure-I: Mean Values of Different Phases of Preparatory Training on Percent Body Fat among Handball Players



Since there were differences in means among different phases of preparatory training, Cuest.fisioter.2024.53(3):7554-7561 7558



to test statistical significance repeated measures of ANOVA was used and results presented in Table-1.

Table-2: Repeated Measures of ANOVA Results on Body Composition Variable Percent Body Fat among Handball Players

Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Subjects	130.05	29		15.92*
Trials	13.51	3	4.50	
Residuals	32.80	116	0.28	
Total	149.34	119		

Table F-ratio at 0.05 level of confidence for 3 and 119 (df) =2.43 .

*Significant at 0.05 level

The obtained F value 15.92 was greater than the required F value of 2.43 to be significant at 0.05 level. As the obtained F value was greater than the required table F value, it was found that there was significant difference among different phases of preparatory training on body composition variable Percent Body Fat of Handball Players.

Since significant F value was obtained, the results were further subjected to statistical treatment using Scheffe's confidence interval test and the results presented in Table-3.

Table-3: Multiple Comparisons of Paired Means among varied phases of preparatory training on body composition variable Percent Body Fat

Initial	Phase I	Phase II	Phase III	MD	Required C I
13.77	13.51			0.25	0.37
13.77		13.20		0.57*	0.37
13.77			12.87	0.89*	0.37
	13.51	13.20		0.31	0.37
	13.51		12.87	0.64*	0.37
		13.20	12.87	0.33	0.37

Reqd CI : Confidence Interval

* Significant

The following paired mean comparisons were significant as the obtained mean differences were greater than the required confidence 0.37

Initial Vs Phase II (MD: 0.57) Initial Vs Phase III (MD: 0.89) Phase I Vs Phase III (MD: 0.64)

The following paired mean comparisons were significant as the obtained mean differences were greater than the required confidence 0.37. Initial Vs Phase I (MD: 0.25) Phase



I Vs Phase II (MD: 0.31) Phase II Vs Phase III (MD: 0.33)

DISCUSSIONS

Descriptive statistics, mean standard deviation, range consists of minimum and maximum of initial scores, completion of phase I preparatory training, phase II of preparatory training and phase III of preparatory training on body composition variable was obtained and presented in Tables-2 on percent body fat proved that there exists differences due to different phased of training on body composition variable percent body fat of Handball Players.

To test statistical significance of the differences, obtained data were subjected to statistical treatment using Repeated ANOVA and the results presented in Table-3 on percent body fat. The obtained F values 15.02 was significant as the obtained 'F' values were greater than required table value to be significant.

Since significant F values were obtained, the obtained results were further subjected to post hoc analysis using Scheffe's confidence interval. The results presented in Table-3, showed comparing to initial scores percent body fat significantly changed on completion of II and III phases of preparatory training compared to initial levels. Thus, the overall findings of this study showed that body composition variable, percent body fat significantly changed due to preparatory training among Handball Players compared to their initial levels.

The findings of this study were in agreement with the findings of Hagen Hartmann (2015), who divided training objectives into consecutive phases to gain morphological adaptations (hypertrophy phase) and neural adaptations (strength and power phases) is called strength-power periodization (SPP). And found different phases of training produce hypertrophy and strength improvements in advanced athletes, consisting of Handball Players, weight lifters and throwers.

Obesity means an excess amount of body fat. Though everyone needs some body fat, too much can cause health problems. Though we can measure weight, it does not denote whether an individual is overweight or not. Certain other measurement like Body Mass Index (BMI), Waist Circumference and skinfold thickness are more useful (Palanivel, 2004). Since fat takes up more space on the body, a person who has a high body fat percentage but the same height and weight as a person with a low body fat percentage and more lean muscle will look larger and less lean. This is why it's important to use body composition, and not scale weight, to determine overall physical fitness and leanness (Answer Fitness, 2009). Fat is a relatively water free, concentrated fuel. Fat content of the body constitutes approximately 15% of the body weight for males and 25% for female's requirements of aerobic exercise (McArdle, 1985). Physical activity is of paramount importance in the treatment of obesity. Exercise

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should be taken on a regular basis over a protected period of time if it is to be effective.
(Lawrence Gray Kumar, 2002)

CONCLUSION

It was concluded that 12 weeks preparatory training, divided into three phases of training, each consisting of 4 weeks, significantly changed body composition variable, percent body fat on completion of II and III phases of training compared to initial scores of the Handball Players. The study found significant differences due to different phases of preparatory training, it was recommended depending upon the needs, training schedules and dieting would be formulated for Handball Players during their preparatory training.

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