Comparison of Different Weight training Variation on Extracellular Water and Fat Free Mass

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Abstract:

Purpose: The purpose of the study was to compare the different weight training variation on fat free mass and extracellular fluid. **Method**: Total 40 male served as subject for this study and they were divided into four groups, comprising of 10 subject in each group. They were categorized in four different group i.e. Sub maximal, Maximal, Supra Maximal and Controlled group and were selected randomly through simple random sampling methods. The entire subject ranged between 18 to 21 years and enrolled in first semester of undergraduate program of L.N.I.P.E, Guwahati. The data pertaining the Fat free Mass and extracellular fluid were examined by ANCOVA statistical tool applied with the level of significance 0.05 for testing the hypothesis.**Result**: The selected variable fat free mass were found significant difference between all the three group compared to control group and insignificant difference were found for the Extracellular Fluid between the three training group.

Key Words:

Sub maximal training, Maximal training, Supra Maximal training & Maltros bio scan.

Introduction:

The body composition is a factor contributing to the sports performance. The body varies with age and sex and the desirable body composition of athletes can vary depending on the sport, training level and energy intake. At non-athletes, the assessment of body composition is important in order to appreciate the nutritional status and monitoring the treatment. The assessment of human body composition has played an important role in the determination of nutritional status in clinical and metabolic settings as well as an indicator of muscle mass in professional and amateur sports. For a variety of reasons, body fat analysis is a very popular practice in contemporary Western culture. Professional and amateur athletes care about body fat for aesthetic and health reasons and perhaps, most importantly, to gain a competitive edge. Athletes often try to achieve a certain level of body fat, depending on the demands of the sport (Nash, 1985). The measurement of body composition provides additional information for counseling clients on diet and exercise programs. If the percentage body fat is known, it is possible to calculate the desired weight: Desired weight = current weight – [(current weight x (% fat/100)] / [1.00 – (ideal % fat/100)] (Jackson & Pollock, 1985. Optimal percentage body fat varies with the goal of the client.

The Major components of body composition are adipose, skeletal muscle, bone, visceral, and brain tissues. In particular, whole body fat-free mass (FFM) is of interest in the field of sports science as a component of body composition and has been found to be associated with talent identification, athletic performance, and body mass management. Prediction models use the circumferences of arm, thigh, calf, skin fold, and body height as independent variables. The accuracy of the developed equations for predicting FFM has previously been established. In addition, anthropometric variables derived from body height and mass are associated with FFM in athletes. Furthermore, body mass-to-waist ratio (BM/W) has been shown to be a strong indicator for whole body skeletal muscle volume in children. Body height and mass and waist circumference are conveniently

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determined without a special measurement technique or apparatus. For athletes, if body size and shape indices derived from these anthropometric variables can be predictors for FFM, it could be a more convenient measure for estimating FFM in comparison to traditional anthropometric prediction models.

Weight training intensity basically refers to how much weight you will be lifting and how heavy or light that weight is for you on a given exercise. The lighter the weight, easier it is for you, the lower the intensity. The heavier the weight /harder it is for you, the higher the intensity. It is simply work done with heavy loads that don't require maximal effort .The weight exist in the range between 75% and 90% percent of one Rep. In order to develop maximal strength relatively heavy load must be used greater than 85% of one repetition maximum (1RM). This permits only a small number of repetitions between 1 and 5 per set. Maximal effort is required on each lift and as such this type of training is very taxing. Supra-maximal training means using weight and resistance that is beyond your current strength levels. It is using heavy weights that you normally would not be able to lift at all. One of the benefits of supra-maximal training is that almost any exercise will feel light and easy after you finish a set of supra-maximal holds or negatives. The scope of comparative effect between Sub maximal, maximal and supramaximal intensities on body composition still need to be explored much. If anyone of the three training variation is shown to produce changes in body composition, perhaps that type of program would be more appealing to those who have difficulty adhering to choose the appropriate intensity level of weight training.

Material and Methods

Total 40 Male (N=40) served as subject for this study and they were divided into 4 group, comprising of 10 subject each. They were categorized in four different group i.e. Sub maximal, Maximal, Supra maximal and controlled group and were selected randomly through simple random sampling methods. All the subject age ranged between 18 to 21 years and was the first semester of undergraduate program of L.N.I.P.E, Guwahati. On the basis of the literature available and reviews of the fat free mass selected as a variable of the study. The selected variable Extracellular Water and Fat free Mass were obtained with the instrument and procedure by the researcher on time effect data. The three groups (i.e. sub maximal, Maximal and Supra Maximal) with different intensities performed five exercise on regularly day with duration of one hours per session and five exercise consist of Leg Extension , Leg Press, Leg Flexion , Chest Fly and Abdominal Crunch. For the collection of data of extracellular water and fat free mass "Maltros Bioscan Bioelectrical Impedance "Body composition were used. The data collected pre and post of the training program weeks. To find out the difference or to compare different training program on extracellular water and fat free mass ANCOVA statistical tool applied with the level of significance 0.05.

Result:

Descriptive Statistics like mean, standard deviation for the selected variables were calculated and present in table no 1. The result pertaining to the Analysis of Covariance for the selected variables is presented from Table 2, 3 and 4.

Table-1
Descriptive Statistics of Mean and Standard Deviation of selected Body Compositions

Body Composition	Group	N	Mean	Standard Deviation
Fat-free mass	Supramaximal	10	59.41	3.96
	Maximal	10	59.69	12.86
	Submaximal	10	56.37	7.09
Extracellular fluid	Supramaximal	10	18.20	3.62
	Maximal	10	18.40	2.35
	Submaximal	10	20.10	3.65

Table-2
Analysis of Covariance of different groups obesevation in relation to fat-free mass

Adjusted post test mean				sources of variance	sum of square	df	mean squares	f ratio
supramaximal Group	maximal group	submaximal group	control group					
58.971	59.128	58.716	58.220	between	4.68	3	1.561	3.89*
				within	14.01	35	.400	

*Significant at F0.05 (3, 35) =2.87

It is evident from table 4 that the calculated value of the F- Ratio (3.89) in relation to fat free mass is higher than the tabulated F-Ratio (2.87) at 0.05 level of significance. It revealed that there is significant difference among admitted post Mean difference of different groups. To find out the paired mean difference LSD Post Hoc test was applied and finding pertaining to this has been presented in Table 3.

Table-3
Least Significant difference Post Hoc test of the adjusted post test paired mean of fat free mass different groups.

(I) Treatment	(J) Treatment	Mean Diff.(I-J)	Sig. a (p-value)
Control	Maximal	-.908*	.003
	Submaximal	-.497	.088
	Supramaximal	-.752*	.013
Maximal	Control	.908*	.003
	Submaximal	.412	.155
	Supramaximal	.157	.587
Submaximal	Control	.497	.088
	Maximal	-.412	.155
	Supramaximal	-.255	.380
Supramaximal	Control	.752*	.013
	Maximal	-.157	.587
	Submaximal	.255	.380

Table 3 revealed that since F-statistics is significant, post hoc comparison has been made for the adjusted means of the three treatment groups .It may be noted here that P-value for the mean difference between control and supramaximal is 0.013 and control and maximal is 0.003. Both these p-values are less than 0.05 which is significant at 5% level. After analyzing of post hoc mean comparison that there was a significant difference on Fat-Free Mass between Supramaximal and control groups ; and Maximal and control groups .

Hence it is concluded that Maximal intensity training program is better than Supramaximal training programme, Submaximal training programme and control groups in improving Fat-Free Mass. The graphical representation of mean of fat free mass at different training programme has been presented in figure 1.

Figure 1
Adjusted Post Test Mean comparison Of Fat Free Mass of different training Group

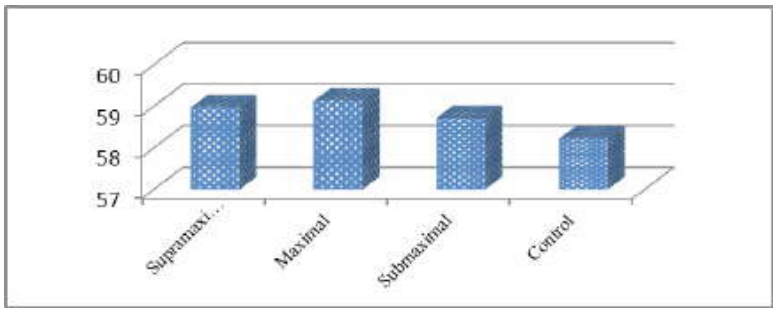

Table 4
Analysis of Covariance of different group observation in relation to Extracellular fluid

Adjusted Post Test Means				Sources Of variance	Sum of Square	Df	Mean Square	F-ratio
Supra maximal Group	Maximal Group	Submaximal Group	Control Group					
19.13	18.80	19.13	20.44	Between	16.10	3	5.369	2.43
				Within	77.18	35	2.205	

***Significant , F0.05(3,35)=2.87**

It is evident from table -8 that the calculated value of F ratio (2.43) in relation to Extracellular fluid in lesser than the tabulated value of F ratio (2.87) at 0.05 level of significant. So, it is evident that there in insignificant difference between estimated adjusted post- test mean of Extracellular cellular fluid in different groups.

Discussion

The objectives of this investigation were that to extent training method and implementation and concept of types of training i.e. Supra maximal, sub maximal and maximal are selected to identify its impact on fat free mass and extra cellular fluid of body composition. To conceptualized the result of the study the researcher try to throw the highlight on variation of training and its impact on selected body composition variables. To access the six week variation of training effect, pre and post data of all groups were taken. The findings of the study indicate that there was significant effect of variation of training on fat free mass and extracellular fluid. Fat free mass in absolute quality of the body composition which is basically understood and learnt as the potential factor and genetically based. In concern of body composition, regular planned and systematic training normally have got three dimension changes. First, the fat mass goes down and lean body mass increases and lastly depend upon the changes in total body weight either increase, decrease or even no changes. High intensity exercise such as supra maximal and maximal program gaining popularity in the context of fat management. More muscles mass involved in exercise, greater the contribution of muscles pump to venous return. Hence, increase in muscles mass help to receive an increased cardiac output. Various studies found positive correlation between the supra maximal and Maximal Training with fat free mass (increase) and fat mass (decrease). This correlation also indicates that increase in fat free mass may be one of the reasons for increased Vo2 max too. From the investigation it is also indicate that these were no significant effect of any Variation of exercise on extracellular fluid. This is because of training influence and position.

Conclusion

On the basis of the analysis and limitation of the study, it was observed that fat free mass were found significant difference between all the three

groups compared to control group. But insignificant difference were found for Extracellular Fluid between all three training group.

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