ISSN: 2278-4632
Vol-10 Issue-8 No. 5 August 2020

"EFFECT OF CONDITIONING, DECONDITIONING AND RECONDITIONING ON LVEDD, LVESD, LVEDV AND LVESV OF ADULT MALES"

Dr. Kishore Mukhopadhyay Associate Professor in Physical Education, Department of Physical Education, Union Christian Training College, Berhampore, West Bengal, India
Email: Kishore.km2007@gmail.com

Abstract

Introduction: Changes in echocardigraphic standard measurements as a consequence of 8 weeks of conditioning 4 weeks of deconditioning and 6 weeks of reconditioning have not been comprehensively studied.

Sample: Twenty four residential untrained male subjects (age between 22-24 years) were selected for the study.

Methodology: Two-dimensional and Doppler echocardiography studies were performed for measuring left ventricular end diastolic diameter (LVEDD), left ventricular end systolic diameter (LVESD), left ventricular end diastolic volume (LVEDV) and left ventricular end systolic volume(LVESV) of the subject. Before conditioning protocol of eight weeks, at the end of conditioning programme, at the end of four weeks of deconditioning and at the end of six weeks of reconditioning the criterion parameters were measured i.e. four times the data were collected from the subjects.

Analysis of data: Repeated measures design was applied for the study and 't' tests were applied for statistical purpose. The statistical analysis was tested for significance at the 0.05 level of confidence.

Findings and conclusions : The t value of LVESV ($P<0.01$) decreased significantly following 12 weeks of conditioning programme where as the other variables remain unaffected .There was no change of any of the variables after 4 weeks of deconditioning programme and at the end of 6 weeks of reconditioning.

Key wards: Left ventricular end diastolic diameter, Left ventricular end systolic diameter, Left ventricular end diastolic volumes and Left ventricular end systolic volumes.

Introduction:

The left ventricular size and function during exercise under different preloads have not been characterized at comparable heart rates and mean blood pressure in the same subject during trained and untrained states. Nor has the effect of deconditioning been delineated in subjects who have been training intensely for many years (Martin W. H, Coyle E.F, Bloomfield S.A, and Ehsani.A.A1986).). The relationship does not change with training versus detraining state (Mandigou et.al. 2002). Prolonged and intense endurance training is through to promote an increase in heart mass and researchers believe detraining results in a decline in heart mass (G.Galanti, L,Scarti, S Castellani and L Toncelli 1987),). What is not clear, however, is whether the training induced increases in ventricular volume and myocardial well thickness regress totally with inactivity. Athletes who become sedentary have enlarged hearts and an elevated vo_{2max} level in contrast to people who never trained (McArdle. WD, Katch. FL and Katch. VL. (2007).

ISSN: 2278-4632
Vol-10 Issue-8 No. 5 August 2020

The purpose of the study was to evaluate the effect of 8 weeks conditioning, 4 weeks deconditioning and again 6 weeks reconditioning on echocardioghaphically determined left ventricular end diastolic diameter, Left ventricular end systolic diameter, Left ventricular end diastolic volumes and Left ventricular end systolic volumes of adult males.

Methods:

Twenty four residential untrained male subjects (age between 22-24 years) were selected for the study. Before the conditioning protocol two-dimensional and Doppler echocardiography studies were performed for measuring determined left ventricular end diastolic diameter (LVEDD), left ventricular end systolic diameter (LVESD), left ventricular end diastolic volume (LVEDV) and left ventricular end systolic volume(LVESV) of t6he subject. Images of the heart were obtained in multiple cross sectional planes by using standard transducer position (*Tajik and coworkers 1978*).

After conditioning, deconditioning and reconditioning protocol the required data were collected from both the groups. Repeated measured design was applied for the study and't' tests (Garet H. E. 1969)) were applied for statistical purpose. The statistical analysis was tested for significance at 0.05 level of confidence. Before conditioning protocol of eight weeks, at the end of conditioning programme, at the end of four weeks deconditioning and at the end of six weeks reconditioning the criterion parameters were measured i.e. four times the data were collected from the subjects.Table-1 represents the conditioning protocol of the subjects.

Table-1. conditioning protocol of the subjects.

Treatment	Duration	Daily schedule	Weekly plan	Nature of activity
Conditioning	8 weeks	135 minutes in the morning and 90 minutes in the evening	5 days in a week	Warming up, continues run, lite apparatus drills, free hand exercises etc. Heart rate=140 btpm
Deconditioning	4 Weeks	rest	rest	rest
Reconditioning	6 Weeks	135 minutes in the morning and 90 minutes in the evening	5 days in a week	Warming up, continues run, lite apparatus drills, free hand exercises major games etc. Heart rates =140 btpm

Result and Discussion:

TABLE -1. Mean and standard deviation of the subjects

Variables	No.	Pre Condition Test		Post Condition Test		Decondition Test		Recondition Test	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
LVEDD (cm)	24	47.89	2.75	47.83	2.72	47.86	2.71	47.8	2.63
LVESD (cm)	24	31.37	0.86	28.36	2.56	28.63	2.24	28.63	2.24
LVESV(ml)	24	48.39	12.19	42.58	16.79	42.58	16.26	42.69	16.07
LVEDV (ml)	24	106.87	13.34	106.92	15.37	106.59	15.16	106.55	15.38

ISSN: 2278-4632
Vol-10 Issue-8 No. 5 August 2020

Table-2. Pair 't' test value of the subjects

Variables	Pre Vs Post test	Post Vs Decond test	Decond Vs Recond test
LVEDD	0.54	1.14	0.58
LVESD	5.07 *	0.79	-
LVESV	24	48.39	12.19
LVEDV	24	106.87	13.34

*** Significant at 0.01 level (2.807)**

The results of the tests shown in Table 1 and 2 which indicate that the t value of LVESD ($P<0.01$) , decreased significantly following 8 weeks of conditioning programme where as the other variables remain unaffected .There was no change of any of the variables after 4 weeks of deconditioning programme and at the end of 6 weeks of reconditioning.

The changes of LVEDD and LVEDV were insignificant of subjects following three different conditioning programme of our study. In general, the training for endurance activity usually requires prolonged efforts, during which CO was sustained at high levels. The response of this type of stimulus, which may be called volume stress, might have facilitated cardiac hypertrophy through an increase in the size of the ventricular cavity. Athletes with left ventricular cavity dimension showed evidence of greater cardiac dimensional adaptation to training. In our present study, the duration of conditioning might not sufficient enough for significant increase of left ventricular end diastolic diameter and left ventricular end diastolic volume. The study of *Pelliccia (1999*) found that most of the elite athletes had absolute left ventricular cavity dimension within normal limits. The magnitude of cavity dimension seems extraordinary given the fact that in normal populations (*Knutsen and co workers 1989, Devereux and coworkers 1984, Valdeg and coworkers 1979*) or in previously sedentary persons undergoing short-term exercise training programmes (*DeMaria and co-workers 1978 and Adams and coworkers 1981*). It is necessary to point out that hypertrophy of the myocardium does not manifest in every endurance-trained athlete. One of the reasons of the myocardium remodeling response might be insufficient training programme stimulus in this regards (*Laughlin MH and McAllister RM 1992 and Urhausen A and Kindermann W 1999).* The findings of the present study was found to be in agreement with the views of Pellicia (1999) ,Knutsen (1989), Devereux (1984) and Veldeg (1979).

In fact, for significant development of LVEDD & LVEDV requires prolonged period. The duration of training employed in this study might have been inadequate and hence there was no significant increase in LVEDD & LVEDV of the experimental subjects. The finding of LVEDD was found to be in agreement with the views of *Rubal (1987), Snoeckx (1982*)and *DeMaria (1978)* and the findings of LVEDV were duly supported by *Wolfe and co-workers (1979*).

Due to conditioning programme, the subjects had to carry out a higher pre-load in regular way, for 8weeks, which has resulted in an increase in CO during the workout. The resting bradycardia with increased SV, which needs a powerful contraction of the left ventricle. The insignificant decrease of LVESD &significant ($p<0.01$) LVESV of the experimental subjects may be due to powerful stroke output and resting bradycardia. The finding of LVESV was found to be in agreement with the views of *Estorri and co-workers (1986).*

ISSN: 2278-4632
Vol-10 Issue-8 No. 5 August 2020

Conclusion:

24 male residential student were selected for the study. All the students were performed 8 weeks of conditioning, 4weeks of deconditioning and again 6weeks of reconditioning. Before conditioning and at the end of each stage the tests were conducted for collecting the data, which were statistically treated.Within the limitations of the present study the following conclusions have been drawn,

1. LVEDD and LVESD of the subjects were insignificantly changed following 8 weeks of conditioning whereas remained unchanged after, 4 weeks of deconditioning and 6 weeks of reconditioning.

2. LVESV of the subjects were significantly decreased following 8 weeks of conditioning whereas remained unchanged after, 4 weeks of deconditioning and 6 weeks of reconditioning.

3. LVEDV of the subjects were insignificantly improved following 8 weeks of conditioning whereas remained unchanged after, 4 weeks of deconditioning and 6 weeks of reconditioning.

References:

Adams TD. et al. 1981. Noninvasive evaluation of exercise training in college- age man. *Circulation*.,**64**:958-65.

DeMaria AN, Nuemann A, Lee G, Fowler T and Mason DT. 1978. Alterations in ventricular mass and performance induced by exercise training in man evaluated by echocardiography. *Circulation*.,**57**: 237-44.

Devereux RB et al. 1984. Standardization of M mode echocardiographic left ventricular anatomic measurements. *J AM Coll Cardiol*.,**4**:1222-30.

Estorri *et.al.* 1986. "Radionuclide Assessment of Left Ventricular Function at Rest and During Exercise in Rugby Players," *J.Sports.Med*,**26**:31.

G. Galanti, L,Scarti, S Castellani and L Toncelli (1987), Application of new criteria of left ventricular hypertrophy in a population of athletes. Cardiologia; 32:383-387.

Garet H. E. (1969) Statistics in Psychology .Vakils Jeffer and Simmons Pvt. Ltd., Bombay, p. 226.

Knutsen KM, Stugaard M, Michelsen S and Otterstad JE. 1989. M-mode echocardiographic findings in apparently healthy, non- athletic Norwegrians aged 20-70 years , influence of age , sex and body surface area. *J Intern Med.*,**225**:111-5.

Laughlin MH and McAllister RM. 1992. Exercise training induced vascular adaptations. *J Appl Physiol.*,**73**(6):2209-25.

Mandigou et.al. (2002) Physical training increases heart rate variability in healthy prepubertal children. European Journal of Clinical Investigation, 32:7, 479 – 487.

ISSN: 2278-4632
Vol-10 Issue-8 No. 5 August 2020

Martin W. H, Coyle E.F, Bloomfield S.A, and Ehsani.A.A(1986). Effects of Physical Deconditioning after Intense endurance training on left ventricular dimensions and stroke volume. JAAC, 7:5,982-9.

McArdle. WD, Katch. FL and Katch. VL. (2007) Exercise Physiology: Energy, Nutrition & Human Performance. Lippincott Williams & Wilkns, Philadelphia. 470-480.

Pelliccia. A, Maron. BJ. 1997. Outer limits of the athlete's heart the effect of gender and relevance to the differential diagnosis with primary cardiac diseases. *Cardiology Clinics*., **15**:381-396.

Rubal. B.J., Muhailani A.R.Al and Rosentsweig. J. 1987. Effect of Physical Conditioning on Heart Size and Wall Thickness of College Women. *Med.Sci.Sports. Exerc.***19**: 5,423-429.

Snoeckx. et al. 1982. Echocardiographic Dimensions in Athletes in Relation to Their Training Programmes. *Medicine and Science in Sports and Exercise.*,**19**,6:428-434.

Tajik et. al. 1978. Two –dimensional real-time ultrasonic imaging of the heart and great vessels: Technique, image orientation and validation. *Mayo Clin Proc*, **53**:271-303.

Urhausen A and Kindermann W. 1999. Sports-specific adaptations and differentiation of athlete's heart. *Sports med.*; **28**(4):237-44.

Valdaz RS et al. 1979.Evaluation of echocardiogram as an epidemiological tool in an asymptomatic population. *Circulation*., **60**:921-9.

Wolfe. L.A., Cunningham. D.A., Rechnitzer. P.A. and Nichol. P.M. 1979. Effects of Endurance Training on Left Ventricular Dimensions in Healthy Man. *J. Appl.Physiol***, 47**,1: 207-12.