

## EFFECT IN CIRCUIT RESISTANCE TRAINING ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES

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### ABSTRACT

*“Lack of activity destroys the good condition of every human being, while movement & methodical physical exercise save it & preserve it. (Plato) People today experienced more changes & crisis than any other generation advance in activity. (Cohen, 1993) We know that fitness habits, plays skills & recreational interest develop early in life & are here to modify as people reach adulthood. Circuit Training consist of a series of exercises performed in succession with a rest period of 15 sec. to 30 sec. between each bout of work lasting 30 sec to 60 sec. The purpose of this study was to be determining the effect in circuit Resistance training on selected physical & physiological variables. To find out significant difference between initial & final means of experimental group & control group in selected physiological variables it test was employed. Within the limitation of the present study, the following conclusion were drawn 1.10 weeks, circuit resistance training programme improved aerobic capacity, in untrained males. 2. Resting Heart Rate was decreased as a result of resistance training participation in 10 weeks of resistance training Programme. 3. Resistance training participation in a circuit Resistance Training programme brought about a decrease in Systolic & diastolic BP in untrained males. 4. Isotonic strength of untrained males, measured through (IRM) bench press & half squat improved as a result of 10 weeks Circuit resistance training Programme.*

**KEYWORDS:** Circuit, Resistance, Physical, Physiological.

### INTRODUCTION

“Lack of activity destroys the good condition of every human being, while movement & methodical physical exercise save it & preserve it. (Plato) People today experienced more changes & crisis than any other generation advance in activity. (Cohen, 1993) We know that fitness habits, plays skills & recreational interest develop early in life & are here to modify as people reach adulthood. Men & women who have learned good fitness habits & who have developed positive attitude towards activity will be better able to live productive lives. They contribute more to society & cost society less in terms of mental & physical health care & social problem. Elementary school is the most improve resistance training ant place to reach these habits, skill & attitudes. (Study Rink 1984) modern technologies have enabled our present day society to exist in a world where the concept of hard or even moderate physical work is almost absolute.

Resistance exercise provides a multitude of health benefits against chronic disease in older adults, including increased muscle strength, improved body composition (increased skeletal muscle mass and lowered fat mass), and improved bone density Mounting evidence suggests that RX can positively impact cardiovascular disease (CVD)-related risk factors, such as blood pressure, and emerging disease risk factors, such as glycosylated hemoglobin, elevated homocysteine level, insulin resistance, and systemic oxidative stress: RX effects on

blood lipids, cholesterol, and lipoproteins are mixed, as some studies indicate no changes in lipid or lipoprotein subtractions, whereas others do response resistance training such changes. Oxidative stress, elevations in homocysteine, and specific lipoproteins, such as lipoprotein a [Lp(a)], have recently received considerable attention as potential contributors to early and advanced stages of CVD and may be improve resistance training ant target pathways for disease prevention.

### AEROBIC CIRCUIT WEIGHT TRAINING ROUTINES

Since the consensus of past research suggests that circuit training only moderately improves aerobic fitness, researchers more recently have experimented with circuit weight sessions that include greater aerobic activity content. Let compare a course of two types of circuit session. Session A was a weight circuit comprising 30 seconds work periods at 40% of I RM with 15 seconds rest. Session B was a weight circuit also comprising 30 seconds work at 40% of 1 RM, but 30 seconds of jogging were insert resistance training ed between each station to increase the aerobic content. Group A improved V02max by 12% but Group B improved it by 18%. Both groups reduced body fat and increased strength to a similar extent.

**STATEMENT OF THE PROBLEM**

The purpose of this study was to be determining the effect in circuit Resistance training on selected physical & physiological variables.

**DELIMITATION**

- (i) This study was delimited to physically untrained men between the age group of 20 to 30 years.
- (ii) This study was delimited to the members of sukhas Health club, Trivandrum.
- (iii) The study was also limited to the following tests.
  - (a) Forestry step test to measure aerobic fitness.
  - (b) Isotonic strength test to measure, one repetition maximal (IRM)
  - (c) Resting Heart rate.
  - (d) Resting systolic & diastolic blood pressure.

**CIRCUIT RESISTANCE TRAINING**

Circuit Resistance Training is exercising through a special sequence of weight training station, while limiting the rest between sets. Thoroughly acquainted with the testing procedures. The Training schedule was explained to the experimental group so that there was ambiguity regarding the effect of resistance training that was required on their resistance training & the hardship they might endure.

The treatment were applied to the experimental group & were administered a Circuit Resistance by program. The control group continued attending their normal work, but did not resistance training participate in any kind of programme.

**DESIGN OF STUDY**

The study was of random group design. The subjects were divided of random into 2 groups. 'A' acted as experimental group & group 'B' acted as control group. The Training programme was done 6 days/week for a period of 10 weeks. All subjects were tested prior to

& after their completion of 10 weeks of pg programme.

**METHODOLOGY**

In this chapter, the methodology procedure adapted are described .This include the selection of subjects design of study criterion measures, reliability of the data, administration of the test items, collection of data ,administration of the training ,programme & statistical technique employed for the analysis of the data.

**SELECTION OF SUBJECT**

The investigation selected 60 physically untrained men between the age group of 20 to 30 from Trivandrum Health club .30 of them were assigned to the experimental group & the rest 30 acted as control group .these subjects were involve in recreational activities did not under go any organized physical training programme in the past. The subjects were briefed about the purpose & significance of the study in the presence of physical instructors of the Health club .all the subject agreed to under go the resting & training programmes .The subject thoroughly acquitted with the testing procedure .The training schedule was explained to group to that there was to ambiguity regarding the effect of resistance training that was required on their resistance training & the hardship they might endure.

The treatment were applied to the experimental group & were administrated a circuit resistance training programme .The control group continued attending their normal work, but did not resistance training participate in any kind of training programme. The reliability of the investigator in measuring physiological variable was tested by computing co-efficient of correlation between the cures obtained by experesistance training on five subjects. The coefficients are presented in Table I.

**TABLE I**  
**CO-EFFICIENT OF CORRELATION FOR TESTER RELIABILITY ON SELECTED PHYSIOLOGICAL VARIABLES**

Sno.	Variables	Co-efficient of reliability
1.	Resting Heart Rate	0.95
2.	Blood Pressure	0.94
3.	Aerobic capacity	0.93
4.	Isotonic strength	0.95

**TABLE II**  
**CO-EFFICIENT OF CORRELATION FOR TESTER RELIABILITY ON SELECTED PHYSIOLOGICAL VARIABLES**

Sno.	Variables	Co-efficient of reliability
1.	Resting Heart Rate	0.95
2.	Blood Pressure	0.94
3.	Aerobic capacity	0.92
4.	Isotonic strength	0.96

### COLLECTION OF DATA

The data resistance training to selected physiological variables such as aerobic capacity anaerobic power, blood pressure, resistance training rate & isotonic strength were collected by administrating the appropriate test & measurement procedures. The apparatus & procedures were explained prior to the administration of the tests.

### TRAINING PROGRAM

The experimental group underwent a training programme for 10 week in first four week subject performs one rotation of circuit training for the first few days subject showed some.

Uneasiness, then slowly got conditioned to the resistance given In second four week subject were able

to perform two rotations of training with much resistance. It considered at a series of weight resistance exercises performed in succession with a rest period of 15 to 20 sec between the each about of work which lasted 30 to 60 secs such exercise considered of 10 to 20 repetitions with a resistance of 40-70% of the total resting heart rate of the individual of the individuals IRM for that exercise circuit consists of 10 exercise station required 30 to 1 min to complete. The circuit included exercises both for upper & lower body the upper & lower body will be worked out on alternate days. The training programme resistance training ed with proper warming up for 5 min & ended with 5 minutes of cool down exercise & stretching. The exercise 'station' is as following:

### EXERCISES STATION

S no.	Day I	Day II
1	Warm up	Warm up
2	Bench pres	Squat
3	Bent over row	Leg press
4	Military press	Leg extension
5	Up right rowing	Leg curl
6	Lat pull down	Heel raise
7	Triceps extension	Toe raises
8	Biceps curl	Sit ups
9	Wrist curl	Back extension
10	Cool down	Cool down

### STATISTICAL TECHNIQUE

To find out significant difference between initial & final means of experimental group & control group in selected physiological variables it test was employed.

### ANALYSIS OF DATA AND RESULTS OF THE STUDY ANALYSIS OF DATA

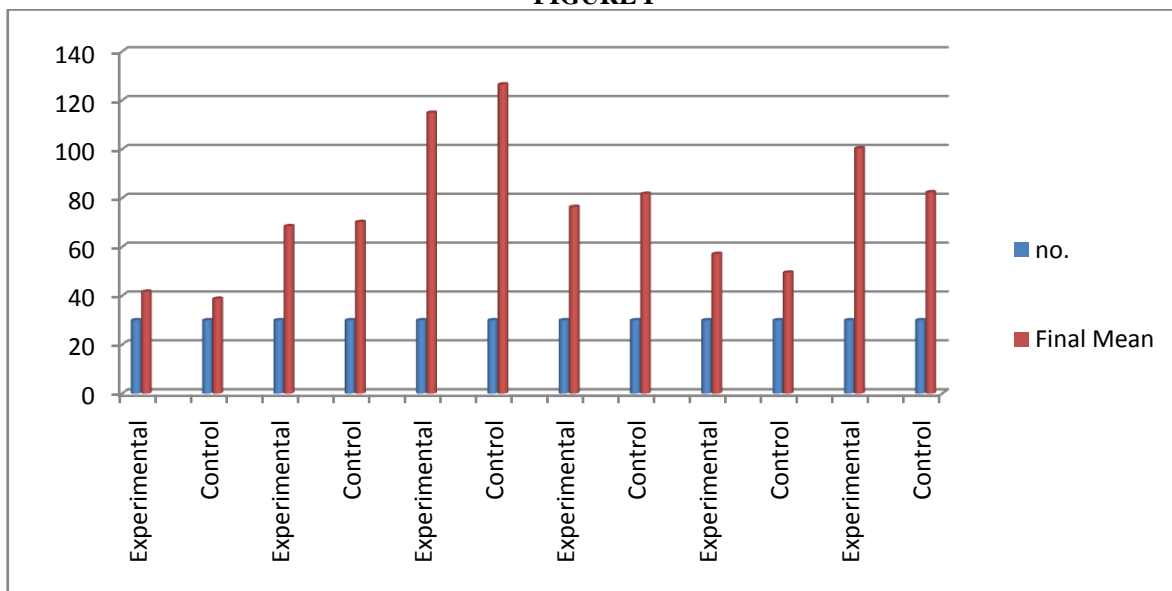
The statistical analysis of the data is presented

in this chapter the data collected on, anaerobic capacity ,power resistance training rate , Blood pressure, (systolic & Diastolic) & isotonic strength (Bent press & Half squat) were analyzed by applying 't' test to find out significant difference. If any between the pre test & post test means. The level of significance to asset the 't' ratio was set at 0.05 level of confidence.

TABLE III

Group	no.	Initial mean	Final Mean	Mean Difference	S.E	"t" test
<b>Difference of Mean of Experimental &amp; Control Group in Aerobic Capacity</b>						
Experimental	30	30.9	41.7	2.8	0.242	11.59**
Control	30	38.73	38.8	0.066	0.179	0.37
<b>Difference of Mean Of Experimental &amp; Control Group in Resting Heart Rate</b>						
Experimental	30	70.433	68.533	1.9	0.297	6.40**
Control	30	70	70.23	0.23	0.171	1.37
<b>Difference of Mean Of Experimental &amp; Control Group in Systolic Blood Pressure</b>						
Experimental	30	116.8	114.933	1.868	0.507	3.68**
Control	30	126.353	126.533	0.2	0.242	0.83
<b>Difference of Mean of Experimental &amp; Control Group on Diastolic Blood Pressure</b>						
Experimental	30	76.2	76.4	0.8	0.354	2.026**
Control	30	81.467	81.7633	0.267	0.159	1.68
<b>Difference of Mean of Experimental &amp; Control Group on Isotonic Strength(Bench Press)</b>						
Experimental	30	47.675	57.163	9.542	0.56	17.04**
Control	30	49.453	49.513	0.06	0.188	0.32
<b>Difference of mean of experimental &amp; control group on Isotonic Strength (Half Squat)</b>						
Experimental	30	82.371	100.39	18.019	1.083	16.64**
Control	30	82.147	82.376	0.229	0.3	1.096

FIGURE I



**DISCUSSION OF THE FINDING**

Analysis of the finding revealed that there were significant change in physiological variable of physically untrained men also underwent 10 week of circuit resistance training Programme. While in the case of control group there were no change seen in the selected physiological variables.

The experimental group improved in their aerobic capacity after the 10 week of circuit resistance training Programme. The trainees initially had difficulty in keeping pace with the schedule of training, but after weeks most of them got adjusted. Their getting adjusted to the programme itself, is considered a sign of improvement in aerobic capacity. It may be because of

the combined effect of factor like muscular strength muscular endurance and efficiency of the cardio & respiratory functions. Actually when some of the muscle groups were exercised heard & respiratory functions along the muscles had undergone work stress these stresses caused some physiological adaptive changes in the individual causing an increase in cardio respiratory endurance this finding is in conformity with Harris & Hally & Naghibzadeh. The Control group showed no improvement in aerobic capacity. The trainee showed to the fact that as the muscle in exercised, there is an increase in the lean body mass & consequently more anaerobic development of the muscle. The control group showed no significant change in anaerobic capacity. The experimental group showed a significant decrease in their resting HR. This may be due to an improvement in their cardio – vascular fitness enabling & to meet the body's requirements in lesser number of beats.

The control group showed no change in resting Heart training rate. The resting systolic Blood pressure & Diastolic Blood pressure decreased in experimental group. This finding is in conformity with Hurley et al., Harris & Hally & Quiocho. The control group did not show diff in their systolic & diastolic blood pressure. The isotonic training measured through Bench press & Half squat an improvement in the experimental group. The increases in isotonic strength may be due to an improvement increases in isotonic strength may be due to an improvement in muscular strength occurring due to an increase in muscle mass & contractile nature of the muscle. This finding is in basis agreement with Crabtree & Nagidgadeh. The control group showed no improvement in their isotonic strength. The Hypothesis stated earlier has been accepted as there were significant changes in selected physiological variables due to 10 weeks of resistance training participation in circuit training programme.

#### **SUMMARY & CONCLUSION RECOMMENDATION**

Circuit training is a form of progressive resistance by which is a widely used & proven method to improving muscular endurance but which depending on the nature of the circuit by 't' the choice of exercises has also been show to produce positive change in muscular strength. The method normally employs a circuit arrangement of exercise which permits progression from one station to another. Circuit training can take place in a variety of location it allow a large no of person to brain in a relatively space CREX Hayeline, (1990).

The subject for the study was 60 physically untrained men in the 20-30 years from Trivandrum Health club. 30 subjects each were assigned to experimental & control group. The experimental group regularly resistance training participated in the circuit resistance by programme six day in week which involved 10 exercise stations. The training programme consisted of a series of weight resistance exercise performed in succession with a rest period of 15 to 30 between each

bout of work which lasted 30 to 60 min (sec). Each exercises consisted of 10-20 repetition with a resistance of 40-60% of the individual one repetition maximum (IRM) for that exercise.

The test item selected for testing were forestry step test to measure aerobic capacity, resting heart rate , Resting blood pressure, (Diastolic & systolic) & Isotonic strength (bench press & Half squat). The programme was formulated in consultation with the experesistance training s in the field of physical education. The data for the study was calculated before & after 10 weeks of circuit resistance training Programme. From the experimental & control group. The significant of mean difference between the pre test & post test scores in all the variables were analyzed by employing 't' test. The level of significant to asses 't' ratio was let at 0.05 level of confidence. It is evident from the analysis of data that the subject assigned to experimental group, have shown significant changes in all physiological variables aerobic capacity, anaerobic power, resting heart rate, resting systolic Blood pressure, Resting diastolic Blood pressure, isotonic(bench press) & isotonic(Half squat). The control group did not show significant changes in any physiological variables.

#### **CONCLUSION**

- Within the limitation of the present study, the following conclusion were drawn
- 10 weeks, circuit resistance training programme improved aerobic capacity, in untrained males.
- Resting Heart Rate was decreased as a result of resistance training participation in 10 weeks of resistance training Programme.
- Resistance training participation in a circuit Resistance Training programme brought about a decrease in Systolic & diastolic BP in untrained males.
- Isotonic strength of untrained males, measured through (IRM) bench press & half squat improved as a result of 10 weeks Circuit resistance training Programme.

#### **RECOMMENDATION**

1. The resistance training Programme may be employed as an effective meal for improving both aerobic & aerobic fitness by coaches & teacher of Physical education.
2. Similar studies may be conducted on subjects of diff age & sex.
3. Studies on the effect of resistance training on the other variables may be under resistance training taken.
4. Similar studies may be conducted with different exercises stations.
5. The present study may be under resistance training taken on a large scale.

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