

## EFFECT OF EXERCISE TRAINING ON PHYSICAL FITNESS INDEX (PFI)

L. Shashikala<sup>1</sup>, K. S. Tejaswini<sup>2</sup>

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**ABSTRACT:** This study was undertaken to know the effects of short term exercise training and sports activities on PFI. The 30 CPEd students formed the test group. Age and sex matched 30 DEd students formed the control group. At the beginning of their course, first phase of recordings were done. After 12 weeks of exercise training 2<sup>nd</sup> phase of recording were taken. PFI was recorded. Our study showed that there is significant increase ( $P < 0.005$ ) in PFI in 2<sup>nd</sup> phase compare to 1<sup>st</sup> phase in test group.

**KEYWORDS:** Exercise, PFI, Harvard step test.

**INTRODUCTION:** Regular exercise training has beneficial effects on cardiovascular and respiratory system. Exercise causes marked improvement in lung functions and expanding the reserve capacity of the heart by increasing cardiac output. PFI measures physical fitness for muscular work and ability to recover from work.

**MATERIALS AND METHODS:** CPEd students formed the test group. Their course duration is for 1 year. Their curriculum includes regular coaching and practice of volleyball, basketball, hockey, football, cricket and athletics etc. Age & sex were matched. Student volunteers of DEd college formed the control group. Their curriculum did not include physical activity.

PFI was determined by Harvard step test. Resting pulse rate of each subject was recorded before starting the test. The subjects were explained about the test procedure.

**Step Test Procedure:** The observer calls the rhythm, at the signal "start" stopwatch is started, metronome is turned on. The subject places one foot on the platform and later the other, and immediately steps down, bringing down first the same foot which he placed up first. At exactly 2 second intervals the signal 'up' is given and rhythm is maintained the subject is exercised at the rate of 30 times a minute. The duration of his effort to the nearest second was noted. All subjects were stopped at 5 minutes if they could go that long.

When the subject successfully completes the test, recovery time starts counting. He is made to sit quietly on a chair or lie on the cot. Beginning exactly one minute after he stops, the radial pulse was taken. Three readings were taken during this recovery phase. The first reading was from 1 min to 1 min 30 seconds, after the exercise, the second reading was from 2 minute to 2 minute 30 seconds after the exercise and the third reading from 3 minute to 3 minute 30 seconds after the exercise.

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$$PFI = \frac{\text{Duration of exercise in seconds} \times 100}{2 \times \text{sum of the three half minute post exercise pulse counts}}$$

The first phase recording were timed with starting of CPED course i.e. before starting of exercise training. 2<sup>nd</sup> phase of recording after 12 weeks of exercise training. In control group the first recording were taken at the starting of the course, 2<sup>nd</sup> phase of recording after 12 weeks. Recording in both subject and controls were taken between 7:00 am and 8:30 am.

## STATISTICAL ANALYSIS:

Following statistical methods were employed in the present study.

- ANOVA- repeated measure
- Independent samples 't' test
- Paired samples 't' test.

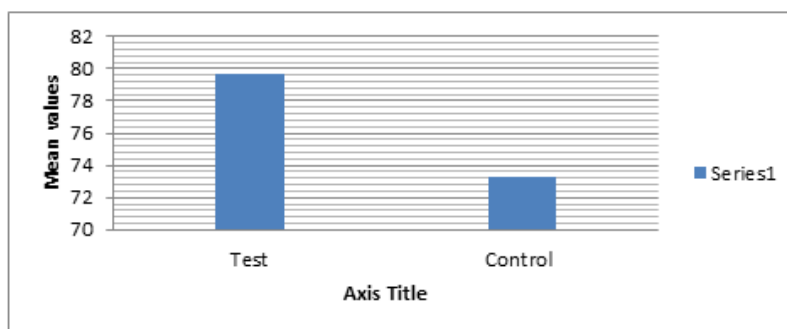
**RESULTS:** Results showed significant increase in PFI(P<0.005) in second phase reading in test group.

**Table 1:** Comparison of first phase of readings PFI in test and control groups. All values are mean±SD n=30 in each group.

Groups	PFI
Test	79.67±13.90
Control	73.30±16.36
Significance	NS

Table 1

First phase recordings showed no significant differences between test and controls groups. This confirms complete randomizations of the groups.



**Fig. 1: Comparison of first page of readings of PFI in test and control groups NS – not significant (p> 0.05)**

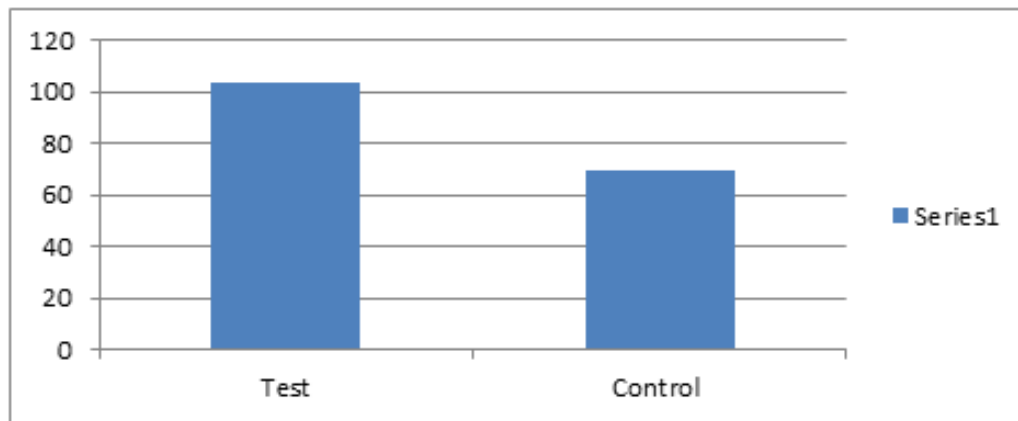
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**Table 2:** Comparison of second phase of readings of PFI in test and control groups. All values are mean $\pm$ SD, n=30 in each group.

Groups	PFI
Test	103.4 $\pm$ 14.24
Control	69.60 $\pm$ 16.37
Significance	S

Table 2

Second phase recordings showed significant difference between test and control groups.



**Fig. 2: Comparison of 2<sup>nd</sup> phase of readings of PFI in test and controls group S- Significant (p<0.05)**

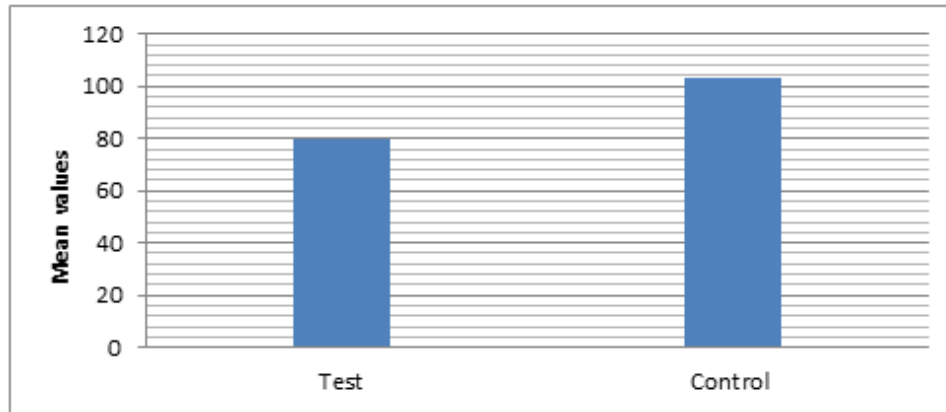
**Table 3:** Comparison of first and second phase of readings of PFI in test group. All values are mean  $\pm$ SD, n=30 in each group.

Groups	PFI
Test	79.69 $\pm$ 13.80
Control	103.46 $\pm$ 14.2
Significance	S

Table 3

There were significant differences in PFI between first and second phase of readings in the test groups.

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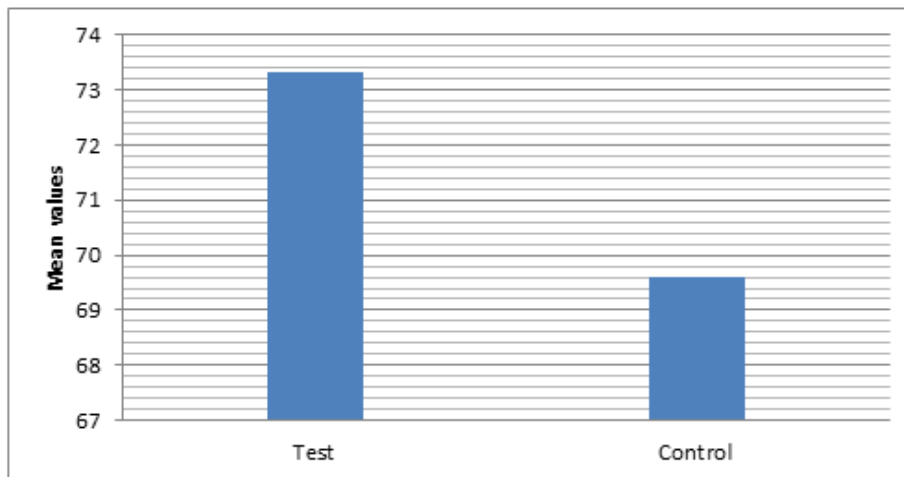
**Fig. 3: Comparison of first and second phase of readings of PFI in test group**

**Table 4:** Comparisons of first and second phase of readings PFI in control group. All values are mean±SD, n=30 in each group.

Groups	PFI
Test	73.31±16.37
Control	69.60±16.37
Significance	NS

Table 4

There was no significant differences in PFI between first and second phase of readings in the control groups



**Fig. 4: Comparison of first and second phase of readings of PFI in control group**

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**DISCUSSION:** There is an increasing evidence to show that regular physical activity causes many desirable physical, physiological and psychological changes in an individual consequently raising his level of fitness.

Previous studies have shown that exercise training leads to decrease resting pulse rate, which is the cause for increased fitness index. The negative correlation between fitness index and resting pulse rate has been reported by Gallapha JR and L. Brocha.<sup>(1)</sup>

Berne has stated that the low resting heart rate is caused by a higher vagal tone and a lower sympathetic tone. Both trained and untrained subject have same maximal heart rate. But trained subject attained maximal heart rate later when compared untrained subject.<sup>(2)</sup>

It has been proposed by Boltscp that bradycardia with training results from two factors namely

- 1) Decrease in intrinsic firing of SANode.
- 2) Increase in tonic vagal cardio inhibitory activity.

**Lt Col:** Gupta KK<sup>(3)</sup> stated increasing PFI was due to early recovery of pulse after exercise. Recovery time signifies the duration by which a person recovers from the stress produced by a given activity.

## BECAUSE OF TRAINING:

1. Rate of ATP synthesis increases.
2. Rate of removal of lactic acid increases.
3. Rate of diffusion of gases increases.

**CONCLUSION:** Our study showed significant increase in PFI ( $P < 0.005$ ) in second phase reading in test group. Improvement in PFI depends on the resting pulse rate and recovery after exercise. If the resting pulse rate decreases, the recovery time after exercise is also decreased. So further study can be done to evaluate different programmes to improve the coaching in CPED courses.

## REFERENCES:

1. Gallagha JR, Bcouha L.A simple method of calculating fitness in boys. The step test J of Biol and medicine 1943: 15: 781-783.
2. Robert MB: Editor Rober MB. Cardiovascular Physiology 8 Addition. Harvard private limited New delhi 2001: PP 277.
3. Lt Col Gupta KK. The use of the physical efficiency test in the evolution of physical improvement after a military course involving severe physical training. Indian journal of physiol and pharmacol 1967: 11 (3): 89-93.
4. MC caudly JH Baison A the validity of circulatory respiratory measures as an index of endurance condition in training. Research quarterly 1940: 31: 3-11.
5. Hammand Association of decreased myocardial beeta resectors and cronotropic response in Isoprolelon and exercise in pigs following chronic dynamic exercise circulation research 1987: 60: 720-25.
6. Keen, Slon observation of Harvard step test. J Appl Physiol 1958: 13-241-46.

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**AUTHORS:**

1. L. Shashikala
2. K. S. Tejaswini

**PARTICULARS OF CONTRIBUTORS:**

1. Assistant Professor, Department of Physiology, Mandya Institute of Medical Sciences.
2. Associate Professor, Department of Physiology, Mysore Medical College & Research Institute.

**NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. L. Shashikala,  
# 745/A, 13<sup>th</sup> Main,  
Kamakshi Hospital Road,  
Kuvempu Nagar, Mysore.  
E-mail: drshashi.md@gmail.com

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