

# EFFECT OF YOGA PRACTICE ON CARDIAC RECOVERY INDEX\*

D. V. MURALIDHARA AND K. V. RANGANATHAN\*\*

*Department of Physiology,  
Kasturba Medical College, Mangalore – 575 001*

(Received on April 20, 1982)

**Summary :** The effect of yogic training on Cardiac Recovery Index (CRI) was studied in ten healthy male medical students; and in ten matched controls. Statistically significant increase in CRI as assessed by Harvard Step Test, was observed in yoga trained subjects after two-and-half months of training.

**Key words :** yoga cardiac recovery index

## INTRODUCTION

It has been observed that yogic practice induces more vital effects than physical exercise which mostly effects skeletal muscles. A combined practice of several important asanas have been shown to bring about a considerable improvement in cardiorespiratory functions, adrenocortical functions, and a number of metabolic corrections in addition to remarkable psychological and neurophysiological improvements (8). The scientific basis and rationale underlying this claim has not been explored in detail, although some studies have been conducted to explore the physiological potentialities of yogis who have been practising yoga for several years. (1, 2). Only limited studies are available on the physiological effects of short term yogic practice (4, 6, 7, 8). The present study aims at the possibility of improvement in cardiac function by practice of yoga.

## MATERIALS AND METHODS

Ten male medical students (studying in Ist M.B.B.S.) who had no previous exposure to yogic exercises were selected randomly for the study. Their physical characteristics were, age  $19.0 \pm 0.67$  years, height  $170.3 \pm 5.71$  cms, weight  $54.2 \pm 4.89$  kgs and body surface area  $1.61 \pm 0.06$  sqm. Another 10 students with similar background who were sedentary were randomly selected as controls. The physical characteristics were,

\*Presented at 27th Conference of Association of Physiologists and Pharmacologists of India at Ludhiana in December 1981.

\*\*Present address : 30/1, Gopal Street, T. Nagar, Madras - 600 017

age  $19.7 \pm 0.68$  years, height  $166.0 \pm 3.76$  cms, weight  $57.3 \pm 3.83$  kgs and body surface area  $1.62 \pm 0.06$  sqm.

The study group underwent yoga training for a period of 2½ months. Yoga training was imparted daily for one hour in the evening and consisted of simple pranayamas lasting for 10 to 15 min followed by various asanas for 40 to 45 min. List of pranayamas and Asanas are given in Table I.

TABLE I : Pranayamas and Yogic asanas practised by the subjects.

Pranayamas	Simple deep breathing, Deep breathing with retention, Alternate single nasal breathing, Uddiyanabandha,
Asanas	Padmasana, Yogamudra, Gomukhasana, Matsyasana, Setubandhanasana, Bhujangasana, Salabhasana, Dhanurasana, Sarvangasana, Halasana, Paschimothanasana, Ustrasana, Bhadrasana, Anantasana, Marichyasana, Veerabhadrasana, Vrikshasana, Vatayanasana, Trikonasana, Savasana.

Cardiac Recovery Index (CRI) was assessed in Yoga trained subjects before and after the training period. Similar two readings were taken for the control group along with the study group. CR Index was estimated by Harvard Step Test (3, 5) and the data was analysed by 't' test.

## RESULTS

Table II shows cardiac recovery index among yoga trained and control subjects. The difference observed after the yoga training was statistically significant ( $t=5.57$ ,  $P<0.001$ ) whereas the difference observed among the control group was not statistically significant.

Among the yoga trained subjects an increase of 20 units was observed in 2 subjects, 10 to 15 units in 4, and less than 10 units in the remaining 4 subjects.

Table III shows the grades according to Fatigue Laboratory Index among the yoga trained subjects before and after training. After yoga training none remained in the poor grade, a 20% increase was observed in excellent grade.

TABLE II : Cardiac Recovery Index in Yoga trained and control groups.

YOGA GROUP			CONTROL GROUP		
<i>Cardiac recovery index (in units)</i>			<i>Cardiac recovery index (in units)</i>		
<i>First reading</i>	<i>Final reading</i>	<i>Difference</i>	<i>First reading</i>	<i>Final reading</i>	<i>Difference</i>
84	94	+10	83	66	-17
93	105	+12	96	105	+09
42	62	+20	56	57	+01
55	59	+04	85	80	-05
98	107	+09	100	86	-14
94	114	+20	78	84	+06
80	90	+10	53	67	+14
90	105	+15	82	101	+19
78	84	+06	82	63	-19
71	73	+02	100	108	+08
785	893	+108	815	817	+2
Mean of difference	=	10.8	—	—	0.2
S.D of difference	=	6.14	—	—	13.37
S.E. of difference	=	1.94	—	—	4.23
t Value	=	5.57	—	—	0.05
P Value	=	<0.001	—	—	Insignificant

TABLE III : Grades of cardiac recovery index of yoga trained subjects before and after the training.

<i>Grade</i>	<i>Units</i>	<i>Before training</i>		<i>After training</i>	
		<i>No. of subjects</i>	<i>Percent</i>	<i>No. of subjects</i>	<i>Percent</i>
Poor	Below 55	2	20	—	0
Below Average	55 - 64	0	0	2	20
Average	65 - 79	2	20	1	10
Good	80 - 89	2	20	1	10
Excellent	90 above	4	40	6	60
		10	100	10	100

## DISCUSSION

Fatigue Laboratory Index developed at the Harvard Laboratory, which is based upon changes in pulse rate by a standardised form of muscular exercise is a simple index measuring cardiac function. This test does not stipulate strict laboratory conditions and can be easily carried out. Students who volunteered for the yogic training participated regularly for two-and-a-half months. The sequence of Pranayamas followed by asanas was designed keeping the convenience of the participants and the experience of the authors as there are no hard and fast rules about the sequence of such exercises.

The yogic postures appear to have been devised specifically to influence and rehabilitate the vital organs by consuming little energy and producing maximal physiological efficiency (9). It has been postulated that such effects are brought about by improving the micro-circulation to the organs.

Several studies have shown the influence of short term yogic practice over physiological functions like heart rate, blood pressure, physical fitness etc. (4, 7, 8). Certain studies have shown the predominance of parasympathetic system after yoga practice (4, 7). The result of the present study also indicate the possibility of the influence of the vagal tone on Cardiac Recovery Index which increases after yoga practice.

## CONCLUSION

In the present study a significant increase in the cardiac function is noted as a result of short term yogic practice. There is an urgent need of planned scientific studies to evaluate the claims of yogic practice. And also it should be popularised as a means of promoting positive health for the common man in society at large.

## ACKNOWLEDGEMENTS

Authors are thankful to the Principal, Kasturba Medical College, Mangalore for his encouragement and the students who participated in the study and Dr. S.B. Rotti for his critical suggestions.

## REFERENCES

1. Anand, B.K., G.S. Chhina and Baldev Singh, Studies on Shri Ramanand yogi during his stay in an air-tight box. *Ind. J. Med. Res.*, **49** : 82-89, 1961.

2. Anand, B.K. and G.S. Chhina. Investigations on yogis claiming to stop their heart beats. *Ind. J. Med. Res.*, **49** : 90-94, 1961.
3. Hebbel, E. Hoff and L.A. Geddes. The Harvard Step Test, a test of physical efficiency. *Experimental Physiology*, pp 115-116, 1962.
4. Nayar, H.S., R.M. Mathur and R. Sampathkumar. Effect of yogic exercises on human physical efficiency. *Ind. J. Med. Res.*, **63** : 1369-1376, 1975.
5. Paul Dudley White. Functional tests of the heart and circulation. Heart Diseases. New York, The Macmillan Company, 4th edition: pp 245-249, 1956.
6. Salgar, D.C., V.S. Bisen and M.J. Jinturkar. Effect of Padmasana - a yogic exercise on muscular efficiency. *Ind. J. Med. Res.*, **63** : 768-772, 1975.
7. Santha Joseph, K. Sridharan, S.K.B. Patil, M.L. Kumari, W. Selvamurthy, N.T. Joseph and H.S. Nayar. Study of some physiological and biochemical parameters in subjects undergoing yogic training. *Ind. J. Med. Res.*, **74** : 120-124, 1981.
8. Udupa, K.N., R.H. Singh and R.M. Settiwar. Physiological and biochemical studies on effect of yogic and certain other exercises. *Ind. J. Med Res.*, **63** : 620-624, 1975.
9. Udupa, K.N. and R.H. Singh. The scientific basis of yoga. *JAMA*, **220** : 1365, 1972.