

Original Research Article

## Evaluation of Aerobic Capacity in Regular Yoga Practitioners and Indian Classical Dancers: A Comparative Study

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### ABSTRACT

**Background:** The study was done to compare aerobic capacity in regular Yoga practitioners and Indian Classical Dancers using Queens College Step Test.

**Materials and Methods:** Yoga practitioners (Group A=50) and Indian classical dancers (Group B=50) aged 17-30 years, with minimum regular 6 months practice, recruited from multiple institutes across Pune, undergone Queens College Step Test and VO<sub>2</sub> max was obtained using prediction equation.

**Results:** The mean BMI of Yoga practitioners was higher (males=21.40, females= 20.34) as compared to Classical dancers (males=20.95, females=19.93) with (p=0.5082, 0.1950). The mean VO<sub>2</sub> max of Yoga practitioners was less (males=66.64, females=48.86) as compared Classical Dancers (males=72.85, females=48.93) with (p= 0.0061, 0.9576). The VO<sub>2</sub> max varied with years of training in both the groups with mean VO<sub>2</sub> of 58.41 (<1yr), 69.70 (1-5yrs), 76.05 (>5yrs) in males and 42.94 (<1yr), 50.80 (1-5yrs), 50.66 (>5yrs) in females practicing Yoga. Mean VO<sub>2</sub> of classical dancers was 72.66 (1-5yrs), 73.53 (>5yrs) in males while in females was 43.64 (<1yr), 49.04 (1-5yrs), 50.42 (>5yrs).

**Conclusion:** Indian Classical Dancers showed significantly higher VO<sub>2</sub> max and lower BMI as compared to yoga practitioners. VO<sub>2</sub> max improved with advancement of training in both Indian Classical Dancers and Yoga practitioners.

**Keywords:** VO<sub>2</sub> max, BMI, Queens College Step Test, Indian Classical Dancers, Yoga Practitioners.

### INTRODUCTION

Fitness is a general term used to describe the ability to perform physical work. With an increase in awareness of lifestyle diseases, various forms of exercises are practiced to avail the health benefits. Many people are currently involved in cardio respiratory fitness and resistance training programs and efforts to promote participation in all forms of physical activity are being developed and implemented. [1] It has been pointed out that the quantity and quality of exercise needed to attain health related benefits may differ from what is

recommended for fitness benefits. [2] For cardio-respiratory fitness and body composition 3-5 days per week with duration of 20-60 minutes of continuous or intermittent aerobic activity has been recommended. [3] Any activity that uses large muscle groups, which can be maintained continuously, and is rhythmical and aerobic in nature, can be opted for; e.g., walking, hiking, cycling-bicycling, aerobic dance or group exercises. [4]

Recently the world celebrated International Day of Yoga on 21<sup>st</sup> June. Yoga based on ancient tradition utilizes a

series of specific bodily postures practiced for health and relaxation. This 5000 year old tradition embodies unity of mind and body, harmony between man and nature; a holistic approach to health and well being. Yoga is very much relevant even today as it is both a physical activity and an effective way of managing stress. [5]

On the other hand classical dance provides an active, non-competitive form of exercise that has potential positive effects for physical health as well as mental and emotional well being. It helps in establishment of connection between mind and body, improves balance. Bharatnatyam consists of three aspects, Nritya (rhythmical and repetitive movements i.e. dance proper), Natya (language of gestures, poses and mime) and Nritya (combination of nritya and natya). Nritya commands movement of each and every part of the body. Natya and Nritya are helpful in reducing the stress and increasing functions of limbic systems, reticular activating system by releasing neurotransmitters. [6]

#### **Aim and objectives**

**Aim:** To compare aerobic capacity in regular Yoga practitioners and Indian Classical Dancers.

#### **Objectives:**

1. To assess aerobic capacity in regular Yoga practitioners using Queens College Step Test.
2. To assess aerobic capacity in Indian Classical Dancers using Queens College Step Test.
3. To compare maximal oxygen consumption (VO<sub>2</sub> max) estimated from Queens College Step Test in regular Yoga practitioners & Indian Classical Dancers.

## **MATERIALS AND METHODS**

**Study design:** Comparative study.

**Participants:** Yoga practitioners (Group A=50) and Indian classical dancers (Group B=50) aged 17-30 years both male and female with minimum regular 6 months practice (with one session of one to two hour's duration and minimum 3 days in a

week) were recruited. Individuals with history of symptoms related to cardiopulmonary diseases and recent lower limb musculoskeletal injuries, that may hinder the test performance, were excluded.

**Procedure:** The study was approved from the Institutional Ethical Committee of Tilak Maharashtra Vidyapeeth, Pune. A list of institutes across the Pune city was derived through web search and those willing to participate were recruited for the study. The purpose of the study and test procedure was explained to the participants and a written consent was taken. The participants were evaluated for BMI and resting pulse rate was recorded. The subjects underwent Queens College Step Test as per the standard guidelines. Metronome was set so as to allow the subject to make contact with a foot on each beep in an up-up-down-down manner for 3 min. At the end of 3min recovery heart rate was recorded. VO<sub>2</sub> max was obtained using prediction equation.

#### **Statistical analysis**

Statistical analysis was performed using SPSS software. Unpaired t-test was used for in- between group comparison to compare mean BMI and mean VO<sub>2</sub> max of both the groups. ANOVA was used for within group comparison of mean VO<sub>2</sub> max with years of training.

## **RESULTS**

Table 1 shows comparison of mean BMI and mean VO<sub>2</sub> max of Yoga practitioners and Indian classical dancers. The mean BMI was significantly higher in Yoga practitioners as compared to Indian Classical dancers in both males (p=0.5082) and females (p=0.1950). The mean VO<sub>2</sub> max was significantly higher in Indian Classical dancers as compared to Yoga practitioners in both males (p=0.0061) and females (p=0.9576).

As shown in Table 2, variations in mean VO<sub>2</sub> max were observed with years of training in both the groups with higher VO<sub>2</sub> max in 1-5 years training compared to less than 1 year training and relatively less difference between 1-5 years and 5-10 years

of training in both Yoga practitioners and Indian Classical Dancers.

**Table1: Comparison of mean VO<sub>2</sub> max of yoga practitioners and Indian classical dancers**

	Male				Female			
	VO <sub>2</sub> max (ml/kg/min)	SD	BMI (kg/m <sup>2</sup> )	SD	VO <sub>2</sub> max (ml/kg/min)	SD	BMI (kg/m <sup>2</sup> )	SD
<b>Yoga Practitioners</b>	66.64	±6.26	21.40	±1.75	48.86	±7.14	20.34	±1.25
<b>Indian Classical Dancers</b>	72.85	±1.78	20.95	±1.40	48.93	±4.03	19.93	±1.46
<b>p values</b>	0.0061		0.5082		0.9576		0.1950	

**Table 2: Shows within group comparison with years of training of VO<sub>2</sub> max & BMI of both the groups**

		Yoga Practitioners			Indian Classical Dancers		
		< 1 year	1-5 years	5-10 years	< 1 year	1-5 years	5-10 years
<b>Females(N)</b>		11	23	2	3	25	12
VO <sub>2</sub> max (ml/kg/min)	mean	42.94	50.80	50.66	43.64	49.04	50.42
	SD	±0.99	±7.37	±0.52	±0.70	±2.91	±0.73
	p value	0.0005			0.0004		
BMI (kg/m <sup>2</sup> )	mean	20.50	20.32	19.49	20.17	20.01	19.33
	SD	±1.46	±1.17	±0.29	±3.69	±1.14	±0.80
	p value	0.0238			0.0376		
<b>Males(N)</b>		4	9	1	-	8	2
VO <sub>2</sub> Max (ml/kg/min)	Mean	58.41	69.70	76.05	-	72.66	73.53
	SD	±3.21	±3.44	-	-	±0.89	±1.18
	p value	0.000			0.2712		
BMI (kg/m <sup>2</sup> )	Mean	22.60	20.88	23.30	-	21.54	20.77
	SD	±0.77	±1.83	-	-	±1.39	±1.17
	p value	0.0001			0.4956		

## DISCUSSION

The study compared the aerobic capacity in regular Yoga practitioners and Indian Classical Dancers. Indian Classical Dancers showed significantly higher VO<sub>2</sub> max and lower BMI as compared to Yoga Practitioners. This can be correlated with the type of physical activity involved in both the groups. The effect of any aerobic training is dependent on exercise of sufficient intensity, duration, and frequency. [7]

Indian Classical Dance includes high impact physical activity sustained for longer duration of time as compared to Yoga. Kathak form of classical dance involves mainly vigor of dynamic foot work and pin point spins, the subtle movements of the face blended with miming of stories of all kinds. Bharatnatyam includes complex steps in different postures with expressions which involve each and every part of the body of the dancer. [6] Such intense aerobic activities when performed on regular basis over a period of time would have resulted in an improvement of VO<sub>2</sub>max. Gaikwad et al [6] in their study compared aerobic capacity in Indian classical dancers with regular physical exercise group, concluded that mean VO<sub>2</sub>max was higher in Indian

Classical Dancers (38.59ml/kg/min) than the ones engaged in gymnasium (33.77 ml/kg/min).

Whereas Yoga has vertical, horizontal and circumferential movements which feedback the systems through concentrated blood supply to the needed areas of the body. [8] Yoga is a slow-paced movement exercise separated by periods of static stretching which includes warm up, breathing exercise (pranayama) including voluntary inhalation, retention, and then voluntary exhalation. Thus improvement in lung functions and better utilization of oxygen at cellular level is obtained. An improvement seen in both lung functions as well as cellular machinery explains the raise in VO<sub>2</sub> max after regular practice of Yoga. [9] Ray et al [10] found significant improvement in VO<sub>2</sub> max after Yogic training while studying effect of yogic exercises on physical and mental health of young fellowship course trainees. Hovsepian et al [11] in their study of training effects of yoga and aerobic on pulmonary function tests and physical fitness parameters concluded that yoga training can lead to significant improvement in most variables except VO<sub>2</sub> max.

The study also compared the variation in VO<sub>2</sub> max and BMI with the years of training. Participants involved in 1-5 years of training showed higher mean VO<sub>2</sub> max as compared to those involved up to 1 year of training. Participants involved in 1-5 years of training must have undergone higher levels or grades of training of Indian Classical Dance and Yoga that involves higher intensity, duration, frequency as compared to amateurs.

The mean VO<sub>2</sub> max of participants with 1-5 years & 5-10 years of training showed comparatively less improvement in both the groups. This could be co-related to effect of initial conditioning effect with adaptations to the exercise of same intensity in later stages as a result of no change in training stimulus threshold.

Yoga & Indian Classical Dance being a culturally adopted physical activities in India can be considered as a regime of aerobic exercise training in order to break the monotonicity of the routine of exercise program thus reducing dropouts and promoting physical fitness. The study could assess only post training VO<sub>2</sub> max, however, pre training fitness levels are important to compare the effect of training; thus, a randomised control trial can be done comparing pre and post training VO<sub>2</sub> max in both the groups.

## CONCLUSION

Indian Classical Dancers showed significantly higher VO<sub>2</sub> max and lower BMI as compared to yoga practitioners. VO<sub>2</sub> max improved with advancement of training in both Indian Classical Dancers and Yoga practitioners.

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