RESEARCH PAPER | Physical education | Volume : 3 | Issue : 4 | April 2013 | ISSN - 2249-555X

# Role of Yogic Practice on Physical Health: A Review

KEYWORDS: Yoga, physical health

**Rameswar Pal**
Senior Research Fellow, Centre for Advanced Research and Training in Yoga (CARTY), Delhi

**Mantu Saha**
Scientist – E Work Physiology & Yoga, Defence Institute of Physiology and Allied Sciences, Delhi

**ABSTRACT** *Yoga is a six orthodox system of Indian culture. Regular yogic practice helps to build up physiological, psychological and physical health of an individual. Yoga improves the overall functioning of all the systems such as nervous system, cardiovascular system, respiratory system, digestive system, endocrine system, musculoskeletal system and maintain in a more stable state. It has the ability to improve work capacity by improving aerobic capacity, anaerobic power, joint flexibility and muscle strength. Yogic practice alters biochemical variables such as lipid profile, neurotransmitters improve the health. Yogic practice has the ability to improve physical health of the practitioner.*

**Introduction**
The word 'yoga' derived from Sanskrit root 'yuj' meaning 'union'. Yoga is commonly translated as "union" and is the combination of heart, mind, and body. Yoga helps to build up psychophysiological health, emotional harmony and pranic balance through the eradication of stress from the mind. Practice of asanas, pranayamas and meditation result in reduced mental stress. It provides the practitioner with psychophysiological fitness, energetic, intelligence, creativity, holistic health and integrated personality. Regular yogic practices help in the constructive development of body and mind. There are many forms of yoga mentioned in the literature.

Popularity of yoga is increasing in India and abroad due to its beneficial health impacts. Hatha means Ha "sun," and tha "moon," balancing and joining the opposites. The physical postures help strengthen the body and make it more flexible (Ray et al., 2001a). Physical and mental exercises are meant to synchronize Hatha Yoga is perhaps the path of Yoga you are most familiar with since this is the most popular branch of Yoga in the West. This branch of Yoga uses physical poses or Asana, Breathing Techniques or Pranayama, and Meditation to achieve better health, as well as spirituality. It may have role to shift the body and mind towards more parasympathetic state. Yoga may alter brain functions by altering the brain peptide and neuro – endocrine functions. In this recent era yoga is also used as a therapeutic tool for many chronic, psychosomatic and lifestyle related disorders such as hypertension, coronary artery disease, type – II diabetes, back pain and bowel syndrome etc.

There are still a misconception about yoga, that yoga is an exercise, a way for us to keep fit. It is partly true, but if you think that Yoga is just that then you are greatly mistaken. Yoga develops the body since a weak one is a hindrance to spiritual growth. It does not simply focus on the physical but on the mental and spiritual aspects as well. But many scientific studies demonstrate yoga as an exercise (Ray et al., 2001b, Rai et al., 1993 and 1994).

**Origin of Yoga**
All the orthodox systems of Indian philosophy have one goal in view, the liberation of soul through perfection. Yoga is long popular practice in India that has become increasingly more common in western society to bring balance physical, mental and emotional health. The first book of humankind Rigveda, mentions about yogic meditation and Yajurveda enlightens about the yogic practice for enhancing mental health, physical strength and prosperity. Bhagavad – Gita is the first record and also mention repeatedly the term pranayama and Samadhi. Rishis of ancient India developed Hatha yoga, which includes asana, pranayama, mudra and bandh etc. Two of the common components of Hatha Yoga are the postures (asanas) and the breath (pranayama). Long term yogic practice can explore body movements while strengthening, balancing, stretching, and aligning the body.

**Role of Yogic Practice on Physical Health**
It is well established that yogic practice helps in the upliftment of various functions of body and mind. Several reports have been made with regard to its effects on cardiovascular, respiratory, metabolic, hormonal, neural systems, performance, muscle strength and body composition (Selvamurthy et al., 1983; Murugesan et al., 2000; Anand & Chinna, 1961; Sinha et al., 2004).

Role of Yogic Practice on cardio vascular physiology: Several studies have reported improvement in physiological, physical and psychological functions. Yogic practice decreases skin temperature, oral temperature, respiratory and some degrees of resistance against physical and environmental stress in both male and female practitioner (Selvamurthy et al., (1983) and Ray et al., (2001a). Yogic practice has a beneficial role on cardiovascular system. Studies reported that long term as well as short term yogic practice decreased heart rate and blood pressure. Telles et al., (1996) reported that right nostril breathing (surya anulom vilom pranayama) decreases heart rate and blood pressure. Improvement of cardiovascular parameters after three weeks of slow breathing was reported, where as there weeks of fast breathing increased HR, BP and also the practitioner goes towards parasympathetic state reported by Madanmohan et al., (2005). Sudarshan kriya yoga was also found beneficial to decrease blood pressure (Agte et al., 2011). Improvent of BP and HR was reported in the practitioner of above 40 age group (Bharashankar et al., 2003). Muralidhara & Ranganathan (1982) have reported an improvement in cardiac recovery index after 10 week yoga training. Regular yogic practice increased vitality, alleviated psychological stress and reduced cardiovascular risks (Selvamurthy et al., 1983; Ray et al., 2001a). Yoga has a great beneficial effect on autonomic nervous system to maintain the homeostasis (Streeter et al., 2012 and Murlikrishnan 2012). Yoga also relieves stress by its relaxing ability. Heart rate variability (HRV) has been established as a non invasive tool to study cardiac autonomic activity. Iyenger yoga is associated with significant increase of cardiac vagul modulation and cardiac parasympathetic modulation among healthy yoga practitioner (Khattab K et al., 2007). Iyenger yoga practitioner showed a lower heart rate, blood pressure and low frequency power of HRV (Shaprio et al., 2007). Literatures available yoga has a beneficial role on autonomic modulation. Researchers showed the beneficial effects of yoga mantra. Agnihotra a is

Volume : 3 | Issue : 4 | April 2013 | ISSN - 2249-555X

traditionally performed as prayer also showed a decrement in heart rate and blood pressure during practice session and increment of power of alpha band as well as shifting towards lower range was recorded by Selvamurthy et al., (1989). RR interval, systolic and diastolic blood pressure modulation by rosary prayer a yoga mantra was also reported (Bernardi et al., 2001). Telles et al., (1995) demonstrated the beneficial and relaxing effect of OM meditation on heart rate, respiratory rate, skin resistance, finger plethysmography amplitude and oxygen consumption. Savasana a relaxing technique have the ability to decrease heart rate, blood pressure and rate pressure product where as no significant alteration was recorded in low frequency power, high frequency power and total spectral power (Madanmohan et al., 2004). Streeter el al., (2007) demonstrated a many yoga asanas session would be able to increase gamma amino butyric acid level of the practitioner.

Role of yogic practice on musculoskeletal system, cardio respiratory system & performance: Regular yogic practice provides the practitioner with more physical flexibility (Ray et al., 1983 and 2001a), muscle endurance (Ray et al., 1986; Madanmohan et al., 1992), maximal work output and oxygen consumption (Raju et al., 1997; Ray et al., 2001b). Yogic practice also improves physical performance in terms of aerobic performance, anaerobic performance and cardiovascular endurance (Ray et al., 2001b, Balasubramanian et al., 1991). Reports also available on the effects of Hatha yoga training to shift the lactate threshold towards higher workload of exercise and also showed improvement in work capacity (Ray et al., 2001b). Studies showed that yoga has a beneficial role in energy cost or energy expenditure and perceived exertion (Ray et al., 2001b). Rai et al., 1993 and 1994 demonstrated that virasana and siddhasana increases oxygen consumption, carbon di oxide elimination respiratory exchange rate and energy expenditure during the practice session. Sinha et al., (2004) and Ray et al., (2010) demonstrated cardioespiratory changes and energy expenditure of different postures (asanas), breathing maneuvers (pranayama) and meditation. It has been reported that yoga improve cardio respiratory functions, aerobic capacity and improves body composition by decreasing fat and increasing lean body mass also have a profound effect anaerobic power and anaerobic threshold (Balasubramanian and Pansare 1991, Bera et al., 1993 and Ray 2001a). Studies on the effects of various yogic postures in terms of oxygen consumption, carbon dioxide elimination, the minute ventilation etc have been reported in literature (Ray et al., 2010). Madanmohan et al., 2004 has demonstrated that yogic practices reduced exercise induced cardio vascular responses. Yogic practices have the great involvement in the improvement of lung function parameters. Reports are available on the effects of Hatha yogic practice to improve force vital capacity, Force expiratory volume, maximum ventilator volume, peak expiratory flow rate (Prakash et al., 2007). Yogic practices also decreases respiratory rate or breathing frequency and increase breathe holding time (Joshi et al., 1992). Reports of single asanas practice demonstrated that virasana and siddhasana increases the rate of respiration or breathing frequency, minute ventilation and tidal volume (Rai et al., 1993 and 1994). Improvement of hand grip strength of both hands after practicing various pranayama was reported in the literatures (Raghuraj et al., 1997). Studies showed that yogic practice have the beneficial role in the in the improvement of handgrip strength and hand grip endurance (Madanmohan et al., 2008, 1992 and Raghuraj et al., 1997). Flexibility of hip, trunk, neck, knee and shoulder was recorded progressively improvement after three months and six months of yogic practices in the male and female (Ray et al., 2001). Improvement of body composition cardiovascular endurance anaerobic power was described by Bera et al., (1993). Kundalini yoga alter electromyographic architecture and relaxed the muscle reported by Narayan et al., (1990).

Role of yogic practice on lipid profile and other biochemical variables: Yogic Practice and its role on Beneficial effect of yoga on physiological, physical and biochemical has been well accepted. The effect of yoga on lipid profile, endocrine and reactive oxygen species and some other biochemical parameters has been established. Literature showed that yogic practice may alter the lipid profile and decrease the chances of heart attack. Yogic practice reduces the total cholesterol; total triglyceride and low density lipoprotein also increase high density lipoprotein cholesterol. Yogic practice may beneficial to decrease blood glucose level in type – II diabetic and non diabetic volunteers. Yogic practices also decrease lipid profile level in the diabetic patient. . Hatha yoga exercises helped in the improvement in type 2 diabetes mellitus by decreasing fasting blood glucose and also improved lipid profile markers (Gordon et al., 2008, Malhotra et al., 2010 and Singh et al., 2008).

Yoga also reduced stress and inflammation (Yadav et al., 2012 and kiecolt et al., 2010). Yoga might have positive benefits in inflammation. Practicing yoga showed 22% reduction in Interleukin 6 and 20% reduction in C reactive protein (Pullen et al., 2008). The effect of yoga on inflammatory response is in a contradiction, another study did not found any changes in CRP after yogic practice, where as this study recorded reduction in BP, HR and BMI significantly.

Studies also reported that yoga has a great beneficial effect on therapeutic approach. Hatha yoga exercises helps in the improvement in type 2 diabetes mellitus by decreasing fasting blood glucose and also improves lipid profile markers (Gordon et al., 2008, Malhotra et al., 2010 and Singh et al., 2008).

Volume : 3 | Issue : 4 | April 2013 | ISSN - 2249-555X

**REFERENCE** Agte VV, Tarwadi K. Sudarshan kriya yoga for treating type 2 diabetes: a preliminary study. Altern Complem Ther 2004; 10: 220 – 222. | Anand BK, Chinna GS, Singh B (1961). Studies on Sri Ramanand Yogi during his stay in an air tight box. Indian J. Med. Res.; 49: 82-89. | Balasubramanian B, Pansare MS. Effect of yoga on aerobic and anaerobic power of muscles. Indian J Physiol Pharmacol 1991; 35:281-282. | Bera TK, Rajapurkar MV. Body composition, cardiovascular endurance and anaerobic power of yogic practitioner. Indian J Physiol Pharmacol 1993;37:225-228. | Bernardi L, Sleight P, Bandinelli G, Cencetti S, Fattorini L, Wdowczyc-Szulc J, Lagi A. Effect of rosary prayer and yoga mantras on autonomic cardiovascular rhythms: comparative study. BMJ. 2001;323(7327):1446-9. | Bharshankar JR, Bharshankar RN, Deshpande VN, Kaore SB, Gosavi GB. Effect of yoga on cardiovascular system in subjects above 40 years. Indian J Physiol Pharmacol. 2003; 47: 202-206. | Bharshankar JR, Bharshankar RN, Deshpande VN, Kaore SB, Gosavi GB. Effect of yoga on cardiovascular system in subjects above 40 years. Indian J Physiol Pharmacol. 2003; 47(2):202-6. | Gordon LA, Morrison EY, McGrowder DA, Young R, Fraser YT, Zamora EM, et al., Effect of exercise therapy on lipid profile and oxidative stress indicators in patients with type 2 diabetes. BMC Complement Altern Med 2008; 8:21. doi: 10.1186/1472-6882-8-21. | Joshi LN, Joshi VD, Gokhale LV. Effect of short term 'Pranayam' practice on breathing rate and ventilatory functions of lung. Indian J Physiol Pharmacol. 1992 Apr;36(2):105-8. | Khattab K, Khattab AA, Ortak J, Richardt G, Bonnemeier H. Iyengar Yoga Increases Cardiac Parasympathetic Nervous Modulation Among Healthy Yoga Practitioners. Evid Based Complement Alternat Med. 2007; 4(4): 511–517. doi: 10.1093/ecam/nem087 | Kiecolt-Glaser JK, Christian L, Preston H, Houts CR, Malarkey WB, Emery CF, Glaser R. Stress, inflammation, and yoga practice. Psychosom Med 2010;72:113-121. | Madanmohan, Mahadevan SK, Balakrishnan S, Gopalakrishnan M, Prakash ES. Effect of six weeks yoga training on weight loss following step test, respiratory pressures, handgrip strength and handgrip endurance in young healthy subjects. Indian J Physiol Pharmacol. 2008 Apr-Jun;52(2):164-70. | Madanmohan, Thombre DP, Balakumar B, Nambinarayanan TK, Thakur S, Krishnamurthy N, Chandrabose A. Effect of yoga training on reaction time, respiratory endurance and muscle strength. Indian J Physiol Pharmacol. 1992;36(4):229-33. | Madanmohan, Udupa K, Bhavanani AB, Shatapathy CC, Sahai A. Modulation of cardiovascular response to exercise by yoga training. Indian J Physiol Pharmacol. 2004;48(4):461-5. | Madanmohan, Udupa K, Bhavanani AB, Vijayalakshmi P, Surendiran A. Effect of slow and fast pranayams on reaction time and cardiorespiratory variables. Indian J Physiol Pharmacol. 2005 Jul-Sep;49(3):313-8. | Malhotra V, Singh S, Sharma SB, Gupta P, Prasad A, Tandoon OP, Madhu SV, Jai Ganga R. The status of NIDDM patients after yoga asanas: assessment of important parameters. J Clin and Diagno Res 2010; 4: 2652 – 2667. | Muralidhara DV and Ranganathan KV. Effect of yoga practice on cardiac recovery index. Indian J Physiol Pharmacol 1982; 26: 279 - 283. | Muralikrishnan K, Balakrishnan B, Balasubramanian K, Visnegarawla F. Measurement of the effect of Isha Yoga on cardiac autonomic nervous system using short-term heart rate variability. J Ayurveda Integr Med 2012; 3:91-96. | Murugesan R, Govindarajulu N, Bera TK. Effect of selected yogic practices on the management of hypertension. Indian J Physiol Pharmacol 2000;44: 207-210. | Narayan R, Kamat A, Khanolkar M, Kamat S, Desai SR, Dhume RA. Quantitative evaluation of muscle relaxation induced by Kundalini yoga with the help of EMG integrator. Indian J Physiol Pharmacol. 1990; 34(4):279-81. | Prakash S, Meshram S, Ramtekkar U. Athletes, yogis and individuals with sedentary lifestyles; do their lung functions differ? Indian J Physiol Pharmacol. 2007 Jan-Mar;51(1):76-80. | Pullen PR, Nagamia SH, Mehta PK, Thompson WR, Benardot D, Hammoud R, Parrott JM, Sola S, Khan BV. Effects of yoga on inflammation and exercise capacity in patients with chronic heart failure. J Card Fail. 2008 Jun;14(5):407-13. doi: 10.1016/j.cardfail.2007.12.007. | Raghuraj P, Nagarathna R, Nagendra HR, Telles S. Pranayama increases grip strength without lateralized effects. Indian J Physiol Pharmacol. 1997;41(2):129-33. | Rai L, Ram K, Kant U, Madan SK, Sharma SK. Energy expenditure and ventilatory responses during Siddhasana--a yogic seated posture. Indian J Physiol Pharmacol. 1994; 38(1):29-33. | Rai L, Ram K. Energy expenditure and ventilatory responses during Virasana--a yogic standing posture. Indian J Physiol Pharmacol. 1993; 37(1):45-50. | Raju PS, Prasad KV, Venkata RY, Murthy KJ, Reddy MV. Influence of intensive yoga training on physiological changes in 6 adult women: a case report. J Altern Complement Med 1997; 3: 291- 295. | Ray US, Hegde KS, Selvamurthy W. Effects of yogic asanas and physical exercises on body flexibility in middle – aged men. The Yoga Review 1983; 3: 75-79. | Ray US, Hegde KS, Selvamurthy W. Improvement in muscular efficiency as related to a standard task after yogic exercises in middle – aged men. Indian J. Med. Res 1986; 83: 343-348. | Ray US, Mukhopadhyaya S, Purkayastha SS, Asnani V, Tomer OS, Prashad R, Thakur L, Selvamurthy W. Effect of yogic exercises on physical and mental health of young fellowship course trainees. Indian J Physiol Pharmacol 2001a; 45:37-53. | Ray US, Pathak A, Tomer OS. Hatha yoga practices: Energy expenditure, respiratory changes and intensity of exercise. eCAM advanced access published june 21, 2010.doi: 10.1093/ecam/neq046. 1- 12. | Ray US, Sinha B, Tomer OS, Pathak A, Dasgupta T, Selvamurthy W. Aerobic capacity & perceived exertion after practice of Hatha yogic exercises. Indian J Med Res 2001b; 114:215-221. | Selvamurthy W, Deshpande M, Mukhopadyay S, Ray US, Thankur L and Anand JP Physiological effects of mantras on mind and body proceedings of conference 'Mantra Yoga', N Delhi, 34-42, 1989. | Selvamurthy W, Nayer HS, Joseph TN, Joseph S. (1983). Physiological effects of yogic practice. Nimhans journal. 1(1): 71-80. | Shapiro D, Cook IA, Davydov DM, Ottaviani C, Leuchter AF, and Abrams M. Yoga as a Complementary Treatment of Depression: Effects of Traits and Moods on Treatment Outcome. Evid Based Complement Alternat Med. 2007 4(4): 493–502. doi: 10.1093/ecam/nel114 | Singh S, Kyizom T, Singh KP, Tandon OP and Madhu SV. Influence of pranayamas and yoga – asanas on serum insulin, blood glucose and lipid profile in type 2 diabetes. Ind J Clin Biochem. 2008;23: 365 – 368. | Sinha, B., Ray, U.S., Pathak, A., & Selvamurthy, W. (2004). Energy cost and cardiorespiratory changes during the practice of suryanamaskar. Indian Journal of Physiology & Pharmacology, 48, 184-190. | Streeter CC, Gerbarg PL, Saper RB, Ciraulo DA, Brown RP. Effects of yoga on the autonomic nervous system, gamma-aminobutyric-acid, and allostasis in epilepsy, depression, and post-traumatic stress disorder. Med Hypotheses 2012;78:571-579. | Telles S, Nagarathna R, Nagendra HR. Autonomic changes during "OM" meditation. Indian J Physiol Pharmacol. 1995; 39(4):418-20. | Telles S, Nagarathna R, Nagendra HR. Physiological measures of right nostril breathing. J Altern Complement Med. 1996;2(4):479-84. | Yadav RK, Magan D, Mehta N, Sharma R, Mahapatra SC. Efficacy of a short-term yoga-based lifestyle intervention in reducing stress and inflammation: preliminary results. J Altern Complement Med 2012; 18:662-667. |