CME-cum-Workshop on “YOGA AND LIFESTYLE DISORDERS”
22nd November, 2013
Venue: Ground Floor Lecture Hall, College Block

E-SOUVENIR
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Shri MK Rajagopalan
Chairman, Sri Balaji Educational and Charitable Public Trust

Patron

Prof KR Sethuraman
Vice Chancellor, Sri Balaji Vidyapeeth

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Prof. KA Narayan
Dr. S Ravichandran

Prof. S Krishnan
Prof. Nirmal Coumare
Prof. AR Srinivasan

Organizing Chairman

Prof. Madanmohan

Organizing Secretary
Dr. Ananda Balayogi Bhavanani

Finance Secretary
Mr. S Vasanthan

CORE TEAM

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Prof. K Henri Balraj
Dr. R Jagan Mohan

Prof. R Ramesh
Prof. K Jaiganesh
Smt Meena Ramanathan

Prof. Sudha Rao
Dr. S BalaNehru
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Dr. SP Santhakumari

Dr. SR Mangala Gowri
Dr. H Vishnupriya

Dr. T Jeneth Berlin Raj
Dr. B Prem

Miss. M Sangeetha
Miss. G Sarulatha
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MESSAGE FROM THE CHANCELLOR

It gives me immense pleasure to note the Centre for Yoga Therapy, Education and Research (CYTER) and the Department of Physiology are jointly organizing a scientific workshop on “Yoga and Lifestyle Disorders.”

The topic chosen includes both question and answer clearly indicating Yoga as an answer for the problems of today’s Life Style Disorders. The concept of Yoga being practised in our medical college reflects our holistic approach towards health, as well as the alternative form of medicine.

I wish all success for the phase II of CYTER as well as the scientific workshop.

M.K. Rajagopalan,
Chancellor
Sri Balaji Vidyapeeth University,
Puducherry
MESSAGE FROM THE VICE-CHANCELLOR

Most people are unaware of the difference between yoga and yoga therapy, and which is appropriate for them. Yoga therapy uses the ancient principles of yoga to enhance health and wellness at all levels of a person: physical, emotional, and spiritual. It is based on a holistic approach to an individual, because in order to acquire true health, all aspects of a person must be addressed in toto.

Yoga therapy is a good choice for:
• People with specific health concerns, who want to acquire tools specific to their condition to improve wellness.
• People who are looking for a fulfilling way to exercise. When done correctly, yoga is rewarding and intrinsically motivating.
• People who wish to slow aging and improve their health.
• People who would like to develop a fulfilling personal yoga practice.

Yoga therapy often enhances the benefits gained from modern medical treatments, while also reducing unwanted side-effects. By its unique action of simultaneously strengthening and relaxing both the mind and body, yoga therapy helps patients cope with health concerns more effectively and return more quickly to thriving good health.

It is therefore timely and appropriate for the Yoga therapy unit of MGMCI, which is currently in its phase-2 expansion to conduct a 1-day CME cum Workshop on Yoga and its place in modern evidence based healthcare. Given the breadth and depth of topic coverage in this scientific event, I am confident that it will be of great value to all the delegates.

I wish the event all the success and accolades that it deserves.

Prof K.R. SETHURAMAN.
Vice-Chancellor,
Sri Balaji Vidyapeeth.
MESSAGE FROM THE DEAN

I am extremely happy that the Department of Physiology and Center for Yoga Therapy, Education and Research are organising a one day seminar on Yoga for both health and disease.

I am sure that the proceedings will go a long way in creating awareness about the benefits of yoga based on scientific evidence.

I wish the seminar success.

Thanking You,

Prof. S. Krishnan,
DEAN (Admn)
MGMC&RI, Puducherry
MESSAGE FROM THE DEAN (PG)

I wish the CME-cum-Workshop on Yoga & Lifestyle disorder 2013, conducted by the Department of Physiology & Centre for Yoga Therapy, Education and Research (CYTER), a grand success.

Prof. N Ananthankrishnan
DEAN (Research and PG Studies)
MGMC&RI, Puducherry
MESSAGE FROM THE MEDICAL SUPERINTENDENT

Yoga is a mind and body practice with origins in ancient Indian philosophy. Yoga was considered as the Fifth most commonly used Complementary and Alternative Medicine Therapy in the treatment of chronic and systemic diseases. Lifestyle modification is commonly advised and practiced as an adjuvant in the treatment of chronic disorders since it’s proven to facilitate the healing process in chronic diseases like Diabetes mellitus and Hypertension. CYTER at MGMC&RI is contributing a lot towards patient care, research and creating awareness about the role of Yoga in lifestyle modification as part of modern medicine. I wish the event “Yoga and lifestyle disorders” a good success.

Prof. Nirmal Coumare. V
Medical Superintendent
MGMC&RI, Puducherry
MESSAGE FROM THE REGISTRAR

Lifestyle disorders have been assuming menacing proportions since the last decade. While modern medicine is geared up fully to confront and manage this catastrophe, the adjuvant role of complementary and alternative medicine cannot be undermined. Yoga therapy is one such alternate modality which is vibrant in our University. It is a matter of great pride that the Department of Physiology and CYTER, MGMCRRI have planned to organize a CME cum Workshop on 22.11.2013. CYTER under the able and eminent guidance of Prof. Madanmohan and Dr. Ananda Balayogi Bhavanani is sure to make rapid strides in patient care, academics and research. May success be associated with the endeavors of CYTER in its Phase-II activities.

Prof. A.R. SRINIVASAN
(Registrar, SBV)
MESSAGE FROM DEPUTY DIRECTOR

Yoga therapy has become prominent as a form of therapy in the entire globe. Now days patient-centered health services and the integration of complementary therapies is main focus in Health Industry. CYTER fully supports this shift to helping all beings learn how to care for themselves and helps to know well about the need of wellbeing. People have to understand how yoga really helps in healing the diseases. This understanding is encouraged through conducting more scientific meetings and explaining the evidence based reports to the people as well as the counter parts of those who are involving health care. People should understand that mental wellbeing is very much essential for healthier life which can be achieved by without medicines and other alternative complementary approaches like Yoga, Music, and Somatic Naturopathic approaches.

I congratulate the entire team for organizing this scientific programme, which will really going to deliver the evidence based link between the modern medicine and Yoga therapy. Wish you all the best.

Dr. S RAVICHANDRAN
DEPUTY DIRECTOR,
MGMCRI
MESSAGE FROM VICE PRINCIPAL

Yoga has evolved from an ascetic practice to become a universal language of spiritual exercise crossing many lines of religion and cultures. Used predominantly to promote physical, mental and spiritual health, its benefits have now been seen in diseases conditions also. I have personally benefitted enormously even with the little yoga that I practice.

The Center for Yoga Therapy, Education and Research is building the evidence base for the benefits of Yoga in health and disease conditions.

The one day seminar cum workshop is part of that effort and to disseminate the findings. The deliberations and interactions will help integration of two diverse sciences.

I wish the seminar all success.

Prof K A Narayan
Vice Principal, MGMCRI
FROM THE DESK OF THE ORGANIZING CHAIRMAN

It is a pleasure to welcome you to this day-long CME-cum-Workshop on “Yoga & Lifestyle Disorders.” At the outset, I wish to express my heart-felt gratitude to our hon’ble Chairman, Shri MK Rajagopalan for his encouragement and support for organizing this CME. Guidance and support of our respected Vice-Chancellor, Prof. KR Sethuraman made the planning of the programme a smooth affair. Dean Research and PG studies, Professor N Ananthakrishnan has been a source of inspiration and motivation. I am grateful to Prof. S Krishnan, Dean and Prof. KA Narayan, Vice-Principal for their support. Logistic support by the management of Sri Balaji Vidyapeeth University is gratefully acknowledged. I am grateful for the support extended by the Departments of Anatomy and Biochemistry and CIDRF. I thank my colleagues from the Department of Physiology for their unconditional support. I am sure that the day-long CME-cum-Workshop will be an enlightening and enjoyable experience for you and wish you all the best.

Prof. Madanmohan
Professor & Head, Dept. of Physiology, and
Director CYTER, MGMC&RI.
Welcome to this CME-cum-Workshop on “Yoga and lifestyle disorders” organized jointly by the Department of Physiology and the CYTER of MGMC&RI, Sri Balaji Vidyapeeth University. We also welcome you to the inauguration of Phase-II of CYTER that has been functioning at MGMC&RI since 2010.

Yoga is the original mind-body medicine that has enabled individuals to attain and maintain sukha sthanam, a dynamic sense of physical, mental and spiritual well being. Bhagavad-Gita defines Yoga as samatvam meaning thereby that Yoga is equanimity at all levels, a state wherein physical homeostasis and mental equanimity occur in a balanced and healthy harmony.

Yoga is the most perfect lifestyle module as it is comprehensive and holistic in its nature. Yogic lifestyle including diet, attitudes and various techniques help strengthen and develop positive health enabling us to withstand stress better. This Yogic “health insurance” is achieved by normalizing the perception of stress, optimizing the reaction to it and by releasing the pent-up stress effectively through various Yogic practices. Yoga is a wholistic and integral science of life dealing with physical, mental, emotional and spiritual health of the individual and society.

This CME-cum-Workshop aims to give participants an overview of the role Yoga can play in lifestyle disorders by inculcating a healthy lifestyle whose main components are: achar (healthy activities), vichar (right thoughts and right attitude towards life), ahar (healthy, nourishing diet) and vihar (proper recreational activities to relax body and mind). To live a healthy life, it is important to do healthy things and follow a healthy lifestyle. The modern world is facing a pandemic of lifestyle disorders that require changes to be made consciously by individuals themselves.

This CME-cum-Workshop will be beneficial for medical and paramedical professionals and students as well as Yoga practitioners and enthusiasts. It has been carefully planned by our team while keeping in mind the diverse needs of the delegates from medical, paramedical disciplines as well as Yoga teachers and enthusiasts.

We wish that this endeavor of ours will provide you an objective and succinct insight into the concepts and applications of Yoga in lifestyle disorders.

Dr Ananda Balayogi Bhavanani
Deputy Director, CYTER, MGMC&RI
**CME-cum-Workshop on YOGA AND LIFESTYLE DISORDERS**

**Friday, 22 November 2013**

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PROFILE

Prof K.R. SETHURAMAN.
MD, PGDHE

Professor K.R. Sethuraman is currently Vice Chancellor of Sri Balaji Vidyapeeth, Pondicherry. He is a well known clinician and popular medical educationist who served with distinction as Dean and Senior Professor of Faculty of Medicine and Deputy VC – Academic and International Affairs in the AIMST University, Malaysia from 2006 to 2013. He retired as Director-Professor (Internal) Medicine at JIPMER where he worked in various capacities from 1981 to 2006. During this period he was the prime force behind the National Teacher Training Centre (NTTC) that he headed as a Department of Medical Education & NTTC during 1996-2006. He was also lecturer in Cardiology at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum from 1978 to 1981. He has been consultant in Taskforce of JPT (MOHE) Panel on Medical Education in Malaysia, Training consultant for Training of Trainers: World Bank aided Health Systems Project: Andhra Pradesh (APVVP), Karnataka State (KHSDP) and Orissa State and Temporary advisor to WHO – HRH meet at Cape town, South Africa (2004), Psycho-social Issues meet at Bangkok (2005) and First South Asian Conference on PG medical education, Colombo (2005). He has authored more than 30 Pubmed Referenced papers, 40 invited papers, and 60 presentations in conferences/workshops in India, South Africa, Srilanka & Thailand. He has authored nine books including “Beyond Rational Therapy”, “Practical Echography”, “Medical Education: Principles & Practice”, “Implementing Innovations in Clinical Skill Training” and the well known “Trick or Treat – a survival guide to healthcare”, "Doctor-Patient Communication and “Post Mortem”- a Book serialised as 65 Tamil articles in “Junior Vikatan”. His video / computer-based educational units are very popular amongst clinicians and students as they include “Push, Promote or Educate.” - a WHO aided video, “Doctor-Patient Dyads.” - a video on common communication problems, “Patient Personality Types.” - a video on how to handle different patients, “Oral Examination” - part 4 of a video on National Board Examination, “Album of Clinical Cases.” - a collection of interesting & unique cases and five Computer based educational programmes
HOLISTIC HEALING & YOGA THERAPY
Prof K.R. SETHURAMAN.
MD, PGDHE

Holistic Medicine is similar to Integrative Medicine in its approach. It focuses on the ‘Preventive and therapeutic approach which sees the person as a whole being, including mind, body, & spirit, and not as a patient with an isolated malfunction of a particular system or organ.” Integrative medicine (IM) is healing-oriented medicine that takes account of the whole person, including all aspects of lifestyle.

Holistic Healing is very much a part of family medicine. “To heal is to achieve or acquire wholeness as a person; the wholeness involves physical, emotional, intellectual, social, and spiritual aspects of human experience” says Dr TR Egnew, a Chief of Family Medicine in Washington DC.

There are three types of Healing: Spontaneous natural healing, Technological healing (based on active medications or procedures) and Inter-personal healing (induced by Provider-Client relationship). Wickenburg consensus statement of 1988 has looked at various Factors in Healing and it estimated that Rational (Pharmacological or technological) factors only accounted for 20% of healing and the remainder resulted from Placebo effect (35%), Hawthorne effect (30) and Spiritual factor (15%)

Complementary & Alternative Medicine use among 1,055 patients of Mayo Heart Clinic in USA revealed that 82% reported use of CAM therapies, which included 24% mind-body therapies like Yoga& meditation, stress management, and other relaxation techniques. However, only 1 in 7 discussed it with their physicians for fear of refutation or ridicule. A similar study in Australia among 19209 women found that 1-in-3 used yoga and meditation as adjunct therapies.

Therefore Yoga-therapy is currently a very active area of research and include the following conditions:

- Psychological symptoms and disorders
- Mindfulness and job stress
- Anxiety
- Depression
- Sleep
- Pain syndromes
- Low back pain
- Headaches
- Osteoarthritis
- Rheumatoid arthritis
- Cardiovascular conditions
  - Coronary artery disease
  - Hypertension
- Yoga In Recent Research
- Autoimmune conditions
- Asthma
- Ashtanga yoga & Smoking
- Diabetes
- Multiple Sclerosis
- Lymphoma
- Breast Cancer
• Physical effects  
  o Weight loss  
  o Leg strength  

• Pregnancy conditions  
  o Hypertension and preterm labor  
  o Stress and vagal activity  
  o Labor pain  

• Physiological effects  
  o Heart rate and blood pressure  
  o Pulmonary measures  

• Ashtanga yoga & Smoking

Some of the recent evidences of Yoga therapy:

Ashtanga yoga for weight loss and well being in the Young: Ashtanga yoga is often referred to as “power yoga” as it is more aerobic in nature. Participants lost 2 kg on average after a 12-week program.

Yoga during pregnancy - Effects on maternal comfort, labour pain & outcomes: 74 primigravid Thai women were equally divided into experimental and control groups. yoga program involved six, 1-hr sessions at prescribed weeks of gestation. The Yoga-group had i) higher levels of maternal comfort during labour and 2 hour post-labour and ii) had experienced less labour pain

Yoga on Balance & Gait: A study of 27 women with musculoskeletal problems (osteoarthritis and low-back pain) who underwent 8 sessions (twice weekly x 4 weeks) of yoga therapy of asanas, stretching exercises and breathing techniques revealed that yoga had a positive effect on balance and gait of women with musculoskeletal problems.

Adverse effects of Incorrect Yoga practice included meditation-induced mania or psychosis, arterial occlusion, and “lotus neuropathy” which highlight the importance of using properly trained yoga therapists.

Mindless Rejection of Effective Rational Rx is at times of great concern to evidence-based practitioners. In a study of 2562 breast cancer survivors, the research question was, “does the use of alternative medicine affect breast cancer prognosis in those who reject systemic therapy?” The results showed that those who refused proven systemic treatment had double the risk of adverse outcomes and that alternative therapies did not alter the outcome of breast cancer. Therefore yoga therapy is only an adjunct in cancer management and not a replacement for standard therapy.

Looking in to the Future:

• Advances in neuro-imaging, genomics & metabolomics will help unravel the secrets of natural healing processes.  
  • We could offer evidence based therapy incorporating these “endogenous healthcare forces” thus unifying the art and science of healing.

• Let all the healing forces work together to help the suffering humanity.

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PROFILE

Prof MADANMOHAN
MBBS, MD (Physiology), PG Diploma in Yoga, MSc Yoga, DSc (Yoga), FIAY

Dr. Madanmohan is Professor & Head, Department of Physiology at the Mahatma Gandhi Medical College & Research Institute and Director CYTER. He has teaching & research experience of more than 42 years and his fields of research are yoga, yoga therapy, cardiovascular & respiratory physiology. He has delivered more than 45 invited talks on yoga in conferences, academic forums and organizations and has numerous awards including Gold Medal & Scroll of Honor, Annual Internal Oration (2009-10), JIPMER Scientific Society; Best Personalities of India Award and Gold Medal, Friendship Forum of India and Honorary appointment to the Research Board of Advisors (1999) of the American Biographical Institute.

He was Founder-Programme Director of ACYTER, JIPMER. He has 101 research papers (including original research work) in national and international journals, more than 74 abstracts and 28 magazine articles. He has guided 34 PG's (MD, MS, MSc, and PhD) students in their thesis work and 15 medical students in their ICMR Research Studentship. He has worked in 26 research projects as chief investigator / co-investigator. He has personally given yoga training to medical students, school children, police personnel and general public as well as yoga therapy to hospital patients. He has organized many workshops and CMEs in Yoga and edited 7 proceedings of workshops / CMEs / symposia and 3 reports of research projects in yoga. He has served as expert in selection committees of UPSC, JIPMER, University of Madras, NEIGRIHMS, Shillong, Pondicherry Government Medical College and AIIMS. He has also been part time MCI inspector (for UG & PG) for inspection of medical colleges and Member, Inspection Committee for Medical Colleges, Pondicherry University. He was honoured by Yoga Jivana Satsangha (International) with the Karma Yoga Shironmani in 2003 in recognition of his illustrious service for the integration of yoga and modern medicine.
Healthy lifestyle: a holistic view: Who does not want good health and long life? However, there is no free lunch and one has to earn it by living a disciplined and healthy lifestyle. Health is the best wealth, so says the sanskrit verse “Labhanam shreshtham arogyam”. If you possess good health, feel blessed, give thanks and preserve it at all costs. If not, do your best to achieve it, at any cost since our body is a temple of the Divine (Deho devalayah) and the means for performing all righteous deeds (Sharir madyam khalu dharma sadhanam). Vedic rishis have prayed for a full, enjoyable and independent life not just for 100 years, but even beyond (AUM tachakshur devahitam …… bhooyashch sharadah shatat. Yajurved, 36: 14). Many warriors of Mahabharat war (₽ 3000 BC ) were of venerable age and the great warrior Bhishma Pitamah was absolutely healthy and strong at 186 years. The secret of their long and healthy life was disciplined lifestyle in tune with the laws of Mother Nature. These universal Divine laws of nature are called as “Rit” in Vedic language. Yog and ayurved which belong to the Vedic tradition are rooted in nature. In spite of spectacular advances in medical science, “modern” man is a victim of a host of chronic health problems like hypertension, diabetes, chronic pains and insomnia. The primary cause of these problems is our artificial lifestyle that is away from and against the laws of nature.

What does being healthy mean? Health is difficult to define, easy to appreciate and a joy to enjoy. Positive health means perfect functioning of body and mind and ability to enjoy healthy life in its various dimensions. WHO definition of health is “A state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity”. It is a condition or quality expressing adequate functioning of the organism in a given situation. To this definition, WHO has added “spiritual wellbeing” also. However, it is not clear what spirituality means. Spirituality should not be confused with religion and this point has been discussed in the section on Spiritual Health and Healing: a Yogic Perspective. Physiological approach to the question of health is in terms of measurable, objective values. A person is healthy if his blood pressure, heart rate, body temperature, blood glucose and other parameters are within normal physiological range. A healthy person is able to meet adequately the demands of his profession / work, i.e. as a teacher, a soldier or a farm hand. In a healthy person, dynamically interacting homeostatic (regulatory) mechanisms of unimaginable complexity maintain various body functions and parameters within normal physiological range. These mechanisms are less developed and easily taxed in newborn (especially premature) babies and the elderly. In ayurved, the term for health is “swasth”, i.e. one who is established and comfortable in his own being, a state of being whole and feeling whole. Acharya Sushrut (~ 600 BC) has given poetically beautiful and philosophically holistic definition of health thus: “Health is a state of balance of elements, optimum digestion and elimination and happy senses, mind and soul” (Samadoshah samagnishcha. Sushrut Samhita, Sutrasthanam, 15:41).

Lifestyle is the way people live and this has immense influence on the status of health or disease. Since one’s lifestyle is developed early in life, it is advisable to cultivate healthy lifestyle in early childhood. Many factors determine one’s lifestyle. Economic status determines incidence of under-nutrition in poor and obesity in the rich. Cultural values of the society dictate the incidence of vegetarianism in the population. Sedentary life is a major factor for coronary artery disease while personal habits like smoking and alcoholism determine the incidence of heart disease and cirrhosis of liver. Exercise, healthy diet and rest and relaxation are important components of lifestyle. From the yogic point of view, proper posture and brahmacharya are very important components of one’s lifestyle. Yog is the most perfect lifestyle module as it is comprehensive and holistic in its nature.

Yog for healthy lifestyle: Yog is a scientific–spiritual discipline and conscious evolution of our physical, mental and spiritual aspects. Its ultimate aim is to become divine by achieving unity with the all-pervading Divine Consciousness. According to Sri Aurobindo, “All life is yog” because yog is a philosophy that can be applied to everyday activities of our daily life. The ancient marvel of yog which is the most precious gem of our cultural heritage has been preserved despite centuries of stagnation and suppression due to brutal foreign invasions. And now it is our duty to promote and propagate it for the benefit of entire humanity. Yog is holistic and its relevance is universal. It is the best means for improving our health as well as preventing and managing stress and stress disorders which are unmanageable by our health care delivery system.

According to materialistic view, we are essentially a body that has a mind. On the other hand, from the spiritual and yogic point of view, we are spiritual beings having human experience. In other words, we are an individual soul that has two beautiful instruments, body and mind. These three entities, i.e. soul, body and mind continuously and
dynamically interact with, and influence each other. Yog has profound influence on our total health and personality because it has desirable effect on all the three aspects of our being. Yog is holistic in nature since it is science, philosophy as well as art. It has promotive, preventive as well as curative potential. Its effect is augmentative as it improves our physical, mental as well as spiritual health. Yog is a time-tested and safe tradition. Compared to other modes of health intervention, it has many advantages. It is economical in terms of time, energy and resources. Being holistic, it is ideal for our horizontal, in-depth as well as vertical development. For prevention as well as management of stress and stress disorders, there is no method as effective and as far-reaching as yog. That is why Yogeshwar Krishn describes the superiority of a yogi in unambiguous terms (Tapasvibhyo adhiko yogi. Bhagavadgita, 6:46).

Proper posture: From yogic point of view, proper posture and movement are important components of healthy lifestyle. Posture is a manifestation of physical and mental balance and has powerful influence on physical aging and mental mood. Good posture is very important for energetic and active life. When you are stooped, you look old and feel old. Do not think that slumped posture is natural to old age. So, lift yourself against the physical weight of gravity and mental weight of aging. Whether sitting or standing, maintain a good, firmly upright but comfortable and relaxed posture as asan should be firm but comfortable (Sthir sukham asanam. Yog Darshan). Stand and move with grace and vigor and do not tighten your muscles stiff in unwanted and awkward position. Of the 700 muscles that we have, good posture needs only 5 key muscles. Yogic posture is ergonomically appropriate and physiologically sound. Therefore, avoid poor posture and slouching in a chair as it:

1. Distorts alignment of bones and creates more pressure on lower back.
2. Tenses muscles resulting in muscle pain and stiffness of joints.
3. Interferes with breathing and decreases vital capacity.
4. Interferes with circulation and oxygen delivery to brain resulting in poor concentration and drowsiness.
5. Results in poor digestion and constipation.
6. Decreases productivity and accelerates aging.

Yog improves physiological functions: Human body is a beautifully robust mechanism capable of taking care of itself. Yog assists this process and improves our physiological functions and health. Scientific research has shown that yogic techniques produce consistent and beneficial physiological changes and have sound scientific basis (Wallace RK. Science, 167: 1751, 1970; Madanmohan et al. Indian J Physiol Pharmacol, 36: 229, 1992). Even a few weeks of yog training can improve physiological and psychological functions. Practice of asans and pranayams results in overall improvement in physical fitness and cardio-respiratory functions. We have reported that yog training for 3 months produces a significant increase in respiratory pressures, breath holding times and hand-grip strength (Madanmohan et al. Indian J Physiol Pharmacol, 36: 229, 1992). This indicates an improved physical strength and cardio-respiratory function. In the same study, we also found a significant decrease in visual and auditory reaction times after the yog training. This indicates a faster and more efficient information processing by the brain. We have also reported that after yog training, exercise-induced stress to cardio-vascular system in less severe (Madanmohan et al. Indian J Physiol Pharmacol, 48:461,2004 ). This means that yog training can enable one to tolerate more severe exercise load. Other workers have found that yog training produces a significant improvement in dexterity scores and motor speed (Manjunath & Telles, Indian J Physiol Pharmacol, 43:225, 1999; Dash & Telles, Ibid, 43:458, 1999). Yogis are capable of remarkable feats of endurance (Vakil RJ. The Lancet, 2: 871, 1950) and control of their autonomic functions (Chhina GS, Proc International Union Physiol Sci, 10: 103, 1974).

Yog for mental health: Just as our body requires physical exercise, balanced diet and bathing for good health, our mind requires inner discipline for mental health. Ordinary mind is a clutter of uncontrolled thoughts. Meditation (dhyan) is the ideal way to calm the mind. Meditation is the inner (antarang) yogic discipline in which there is a continuous flow of thought towards a higher spiritual ideal in a higher spiritual center of our consciousness. It makes the mind one-pointed and produces psychosomatic relaxation. Meditation is not an ordinary concentration. It is a special kind of concentration based on the first two steps of ashtang yog. These two steps are i) yam or five moral virtues and ii) niyam or five spiritual discipline. Jap or repetition of holy name is very effective in achieving success in meditation. Jap should be done in a spirit of love and adoration as mystic worship and not in a mechanical way. Thus performed, jap and dyan are higher forms of worship to which our body, mind and soul, the whole being respond with better health and healing power. That is the secret of the power of yog. For success in dyan and to get attached to the universal Divine Consciousness, we have to create proper mood and loosen our worldly attachments. This attainment of unity and realization of identity is the goal of yog. In this state, our inner soul is freed from the thralldom of ego, mind and senses. Then problems of the world do not disturb our inner harmony. This is the basis of sound mental health,
a distinguishing characteristic of a yog sadhak. Yog is equanimity (Samatvam yog uchyate. Bhagavadgita, 2: 48) and evenness of temper is the essential feature of mental health.

Spiritual health and healing: a yogic perspective: Human body is the highest and best creation of the Divine and an instrument for performing noble deeds (Sharir madyam khalu dharma sadhanam). That is why Vedic Rishis have called this body has Devapuri and Ayodhya (Asht chakra navadvara devanam poorvayodhya. Atharvaved, 10: 2: 31). Our body-mind-soul complex is the real temple of the Divine. By yog sadhana, we should keep it fit, clean and pure and seek the Divine within. Spiritual healing is curing a disease by non-physical means, i.e. through powers outside medical intervention. By prayer, meditation and therapeutic touch, the healer channels Divine healing energy that improves patient's life force (pran shakti). There are claims that spiritual healing hastens recovery and even hopelessly ill patients can recover miraculously.

Faith, i.e. belief in a higher universal Divine power is the basis of the spirituality. Faith is what your heart tells you is true when you intellect cannot prove it. One can have faith in a religion or in eternal universal Truth called as Rit in Vedic language. It may be noted that spirituality is distinct from religion. Religion is a particular belief system and mode of worship. Religions are many, but spirituality is one. Religion may nurture spirituality, but spirituality does not depend on it. Prayer is another important component of spiritual life. Prayer can lift the mind and soothe the soul. Prayer enhances health and promotes healing of self and others. It is a medical secret - prayer heals. Performing actions and one's duty with a spirit of selfless service (Nishkam karmyog of Bhagavadgita) is an important component of spiritual life. A person who believes in all-pervading universal Divine power feels connected not only to everyone, but to all forms of life and the whole creation. This promotes universal love which is distinct from selfish romantic love. A person who has these spiritual qualities is an asset to the whole society.

Health benefits of spirituality are significant. Faith in higher Spiritual power relieves one of cares, anxieties and stress and promotes calmness and tranquility. Consequently, his heart rate, blood pressure, muscle tone, oxygen consumption and carbon dioxide production decrease. Even his cholesterol decreases over a period of time. Spiritually-oriented people get sick less often. They recover faster in case they fall sick. It is claimed that patients recover better if family and friends pray for them. Spirituality also decreases the incidence of stroke and death from heart disease and increases survival after surgery. Spirituality helps to prevent / overcome bad habits because spirituality is considered to be bigger than these. As a result, there is increase in longevity and quality of life. Here it is interesting to note that Benson (New England Journal of Medicine, 281: 1133, 1969) has reported that transcendental meditation (TM) can help one to kick off drug addiction, which is a serious problem among the “modern” youth.

Power of pranayam: It needs to be emphasized that slow and deep pranayam breathing has a powerful influence on our wellbeing. A simple exercise to relieve stress and promote wellbeing is to straighten and mildly arch your spine as you inhale (purak) slowly and sequentially and then exhale (rechak) as you bend forward and round your back. It is claimed that pranayam reduces obesity and purifies the body. According to Patanjali, pranayam destroys the covering of inner light and the mind gains the power concentration (Yog Darshan, 2: 52-53). Manusmriti (6: 71) says that pranayam purifies the impurities of senses and the mind.

From the physiological point of view, slow and deep breathing (as in mahat yog pranayam) has the following advantages:

i) It is economical as it reduces dead space ventilation.
ii) All the muscles of respiration are strengthened.
iii) Different parts of the chest and lungs are stretched, improving their flexibility.
iv) Abdominal viscera are gently massaged by the descending diaphragm.
v) Venous return (blood flow) to heart is improved.
vi) Mind-body coordination (thereby health) is improved.

There is evidence that pranayam has therapeutic potential. In an interesting work from our laboratories, we have demonstrated that subjects trained in yog can achieve a state of deep psychosomatic relaxation and significant decrease in oxygen consumption within 5 minutes of practicing savitri pranayam (Madamohan et al. The Yoga Review, 3: 25,1983). Savitri pranayam is a slow, deep and rhythmic breathing in which the ratio between purak, kumbhak, rechak and shunyak (bahya kumbhak) is 2:1:2:1. Telles and Desiraju ( Indian Journal of Medical Research, 94: 357, 1991) also have demonstrated that pranayam can decrease oxygen consumption significantly. More recently, we have demonstrated the beneficial effect of pranayam in patients having premature ventricular complexes and palpitation (Prakash et al. International Journal of Cardiology, 111: 450, 2006; Ravindra et al. Ibid, 108: 124, 2006). It is clear that the power of
pranayam is available to us freely. Let us use it for the benefit of the humanity.

Yog for prevention and management of stress: The all-pervasive stress and stress disorders are the bane of modern society. The main cause of stress among the affluent sections is material progress without a parallel development of inner, spiritual resources and this results in deep rooted conflicts and disharmony. Healthy balance between worldly enjoyment (bhog) and detachment (tyag) is good for mental health. This point is beautifully taught in a Vedic verse thus: “This whole universe is pervaded by Ishwar. Enjoy this world with a sense of detachment and do not covet the wealth of others” (Ishavasyam idam sarvam. Yajurved, 40: 1). Chronic stress results in disturbance of mental and physical equilibrium. The consequence is a host of chronic disorders like hypertension, angina, diabetes mellitus, peptic ulcer, irritable bowel, chronic pains, insomnia and cancers. It is alarming that the incidence of these lifestyle diseases is increasing in India. The problem is more marked in urban areas where people are living a routine of daily rat race. Over-ambitious, ever-struggling and restless persons (type “A” personality) are more prone to stress disorders. They can be screened in their early life by psychophysiological tests and taught yog relaxation techniques as a preventive measure.

Yog has a comprehensive and holistic approach to health and is the best treatment for stress and stress disorders. A judicious combination of simple stretching asans, slow rhythmic pranayams, yog nidra and dhyan is most effective and ideal for prevention and management of stress. Mantr (e.g. AUM) chanting, jap and bhajan singing, especially in a dedicated group (satsang) are very effective for managing stress and improving mental health. Yogeshwar Krishn gives a very high place to jap and bhajan singing when he says “Among the offerings, I am the offering of jap (Yajnanam jap yajnosmi, Bhagavadgita, 10: 25) and “He is the best yogi who worships Me by bhajan singing (Shraddhavan bhajate yo maam, Bhagavadgita, 6: 47).

Many workers have demonstrated the effectiveness of yogic techniques in the control of blood pressure and hypertension (Selvamurthy et al. Ind J Physiol Pharmacol, 42: 205, 1998: Datey et al. Angiology, 20: 325, 1969). Yog lays great stress on proper diet, a distinctive feature of which is emphasis on purity (satvik ahar) and moderation (mitahar). Overeating is a form of malnutrition that results in conditions like obesity, diabetes mellitus, and arthritis. Yogeshwar Krishn emphasizes the importance of regulation in diet, recreation, sleep-wakefulness and other activities for the yog sadhak (Yuktahar viharasya. Bhagavadgita, 6: 17). Chhandogya Upanishd emphasizes the importance of purity of diet for our inner purity (Ahar shuddhou satva shuddhi. 7: 26: 2). Purity of mind results in improved mental health and freedom from psycho-somatic disorders. It is clear that yogic lifestyle is very effective for prevention as well as management of stress and stress disorders.
PROFILE

Yogacharya S SRIDHARAN

Trustee, Krishnamacharya Yoga Mandiram; Member, Governing Body of Morarji Desai National Institute of Yoga, New Delhi

S Sridharan is a senior student of the renowned yoga teacher TKV Desikachar. He has been a dedicated student of his teacher since 1981, when he was working as a banker for one of India's largest banks. Over the course of his career, as his interest in Yoga became more profound, he began to be involved in the Krishnamacharya Yoga Mandiram (KYM), Chennai, India, initially as a teacher and then as a consultant. In the mid-1990's he quit his position as Vice President of the bank, to become fully involved in the KYM. He served the KYM as the Managing Trustee for over eight years, bringing extra ordinary changes including the obtaining of the ISO 9000 certification, that make the KYM a truly professional organization, ready to carry on the teachings of yoga into the next generation. Sridharan is one of the senior mentors of the teachers of the KYM, especially in the areas of meditation, classical texts; apart from Yoga Therapy. He is currently Trustee of KYM, Member of the Governing Body of Morarji Desai National Institute of Yoga, New Delhi and Member of the Governing Committee of Raja Veda Patasala, Kumbakonam.
YOGIC LIFESTYLE
Yogacharya S SRIDHARAN

“Life Style”, in simple terms, is a modern day usage to connote how one is spending time including the behavior and attitudes. This is related to the purpose of life as envisioned by an individual. Mostly the purpose of life is limited by the station of life, i.e. student, employment and earning, family life and retirement. Today, a student wants to get good grades and thus focuses on the marks/grades. Even, studying is oriented towards that goal and particularly to place one at the gateway of employment. The purpose of employment is directly linked to the earnings, which in turn is to increase the comforts of life. Today a family life is a social compulsion. At every stage there are limited goals and thus ‘life style’ is linked to the goals. A student today spends more time in the night to study and the cycle of the day is thus changed. There is hardly any time for physical activity leave alone good exercise pattern. An employed person’s clock is decided by his employer and often it could relate to a different time zone. A family person has hardly time left to introspect.

The ancients put the station of life under the term ‘Ashrama’ and divided it as, Brahmacharya, Grahasta, VAnaprasta and Sanyasa. The ancient model of ‘Ashrama’ was based on the four purpose of life (purushArtAs) which are “dharma, artha, kAma and moksha”, which can translate to “discipline, wealth, desire and liberation”. The ultimate purpose of life for the ancients was “liberation”, liberation from the cycle of birth and death. Thus the ancient ‘life style’ took into account the ultimate purpose of ‘liberation’ without compromising on the pleasure of living within the discipline.

There are various paths for ‘liberation’ and one can choose according to their background, taste and ability. One can choose the path of action or path of knowledge or path of devotion or path of total surrender. However, any of these paths need the basic discipline and this is provided by “Yoga”; the discipline at the body and mind level. Without this discipline no one can progress in any of these paths. They merely become attempts often leading to frustration.

Yoga has a well laid out path of discipline structured to address all the dimensions of the human system, i.e. annamaya (body), prANamaya (breath), manomaya (mind), vigyanamaya (ego/intellect) and anandamaya (emotion).

Yogic lifestyle thus disciplines the practitioner at all the levels and makes him/her fit for undertaking the spiritual path. Even if one does not have a spiritual inclination mere ‘yogic lifestyle’ will lead the person on the path of realisation, by providing a healthy body and mind. A healthy and perfect mind is the best tool for ‘Self realisation’.

There are various models of ‘yogic lifestyle’ based on various traditions and the path of realisation. From the Vedas, Sages culled out the points required for ‘life style’ and gave them in the form of ‘Agamas’ and ‘kalpa sUtras’. There are various divisions in them based on the particular Veda, i.e. Rg, Yajur, Sama or Atharva or the particular deity such as Vishnu, Shiva, Shakti, etc.

All of them have certain common regulations such as what should be done in what part of the day, etc. For all these regulations, there are certain common activities which will include Yogic tools of Asana, Pranayama and Dhyana.

One such model is called “Panca kAla ParAyanam”, which literally means “the activities to be filled with in the five parts of the day”. This is a part of the “PAncha RAtra Agama”. Here a day is divided into 5 parts and the activities are assigned to each part.

<table>
<thead>
<tr>
<th>Part of the day</th>
<th>What is to be done</th>
<th>Name in the Agama</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Early morning</td>
<td>Getting up and getting prepared for the day</td>
<td>Abhigamanam</td>
</tr>
<tr>
<td>(2) Forenoon</td>
<td>Collect things required for worship or spending time for earning things</td>
<td>UpAdAnam</td>
</tr>
<tr>
<td>(3) Noon</td>
<td>Worship</td>
<td>Ijya</td>
</tr>
<tr>
<td>(4) Afternoon</td>
<td>Study of scriptures towards ‘Self Realisation’</td>
<td>SvAdhyaya</td>
</tr>
<tr>
<td>(5) Night</td>
<td>Yoga (Here the word denotes sleep when the Individual Self merges with the Supreme Self)</td>
<td>Yoga</td>
</tr>
</tbody>
</table>
This model, even though it is practiced by a limited number of people in some form or other, cannot have direct relevance for practicing in the same way. But this can be adapted.

A yogic lifestyle is not just practice of yoga in the morning or in some part of the day depending upon the convenience. It is to integrate the yoga quantitatively and qualitatively into every part of the day. For example, in the above said model, practice of Asana, Pranayama and Dhyana will be found in at least four parts of the day except in the second part which is the part of employment. Here also the principles of Yama will be observed. The Early morning part will have a large portion of Sun Meditation including doing postures, breathing and meditation. In the Noon, worship will include largely meditation. In the afternoon, there will be recitation of scriptures and in the night a small Pranayama to end the day.

To adapt it to modern lifestyle will be to take up practice of a full length course of Asana and Pranayama and Meditation first thing in the morning. This can include Surya Namaskar and important postures such as MahAmudra, etc. The Pranayama could be “Nadi Sodhana Pranayama”. On return one can do a Pranayama course aimed at ‘unwinding’ and ‘relaxation’. This will have a longer exhalation and hold and can be “Chandra bhedana Pranayama”. Before hitting the bed, one can do a small Meditation to end the day properly and prepare for the next day. This can include relaxation of parts of the body and visualizing a nice natural scene or form of Divinity of choice and hear soothing music.

A yogic lifestyle, adapted to an individual, is possible in today’s contest and will bestow the benefit of a good physical and mental health turning one inwards towards ‘Self Realisation’ by still being a part of family life.
PROFILE

Dr. LATHA SATISH


Latha Satish is a doctorate in Psychology had her initial yoga training in the BKS Iyengar tradition. Marriage and career brought her to Chennai (1981) where she continued her passion for yoga under her guru Sri T.K.V Desikachar. Her doctoral work in health psychology melded with her interest in the role of yoga as a health management tool. Her dissertation on the role of yoga in management of hypertension and other stress related problems only strengthened her belief that yoga is an important tool to develop health. During this period of continuing with research she also studied with Desikachar texts like Yoga Sutra, Bhagavad Gita, Hatayoga Pradipika etc and started teaching part time at KYM. She formally completed the teacher training in yoga at KYM in 1990. The association with Desikachar afforded her the opportunity to take practical experiences to her scientific research and apply research based findings in her extensive practice. During her tenure as Research scientist in the department of psychology, University of Madras she completed many Funded research projects, guided PhD scholars exploring an integration of yoga and health psychology. She has published 30 research papers and continues to guide projects. Her close association with her guru inspired her teaching style. He often told her that research could not ‘capture’ the intangible miraculous changes that take place because of yoga practice. His insistence on the complexity of human life and existence and his faith and conviction in his father’s teachings instilled the importance of care and building relationships with care seekers. TVK Desikachar gave her a vast source of knowledge in yoga, meditation, contemplation, Indian culture and philosophy. Today she continues her search about yoga and its influences on the human condition. She provides yoga therapy and shares her knowledge with other yoga teachers. She is passionate about yoga research and supervises several research projects. She heads the premier institute – Krishnamacharya Yoga Mandiram, on the request of her teacher.
YOGA: THE ORIGINAL MIND BODY MEDICINE
Dr. LATHA SATISH
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The Mind–Body connections, interactions and miracles in onset of disease, its progression, in healing and rehabilitation is a recent phenomenon in modern medicine. Experts in the fields of immunology, neuroscience, psychology, psychiatry and epidemiology have recognized that 70–80% of problems or sufferings that human encounter lies at the mind body interactions and the solution is also dictated by the same interplay of psycho physiological systems.

Emergence of the terms like- holistic medicine, caring, healing rather than curing, patient doctor communication, faith, spirituality, alternative therapies and complementary medicine are testimony to the role of mind body medicine as the field that is defining the strategies of health promotion, maintenance and management These trends are of very recent origin dating back to the pioneer work in the field of stress, researches in yoga more specifically in meditation and also contribution of psycho-neuro-immunology.

The origin and roots of the mind body link, its interactions and implication for medicine can be traced to the Indian cultural heritage ie Veda-s and particularly the philosophy and practice of yoga. Sage patanjali has profounder this knowledge in the form of “sutra-s” (Brief aphorisms), and is accepted as the most authoritative text. Yoga sutra presents the concept of mind, senses, consciousness and the interplay of these entities.-thus represents the psychology that originated in India.

How Yoga of Patanjali facilitates the knowledge of mind and body and its implication for therapy? This is clearly delineated in the concept of Mind as a Matter, which is different from Consciousness and thus gives scope to regulate and control mind.

Mind which is characterized by the three guna-s, can be agitated and consequences of this can be felt at body, breath, thought level. The suggestions of different mental afflictions and the body breath oriented methods to pacify the mind is solutions which covers the holistic perspective in providing therapy

Somatic oriented practices, life styles, attitudes and its consequence on the mind and mind oriented practices and its impact on the body is extensively presented in yoga sutra and related scriptures. The great masters of the century have been models who demonstrated the practice of yoga as mind body medicine and kept these traditions alive. Today science is trying to explore this connection and is able to demonstrate its benefits.
PROFILE
Yogacharya Dr. Ananda Balayogi Bhavanani

MBBS, ADY, DPC, DSM, PGDFH, PGDY, FIAY, MD (Alt.Med)

Yogacharya Dr. Ananda Balayogi Bhavanani is Chairman of the International Centre for Yoga Education and Research at Ananda Ashram, Pondicherry, India (www.icyer.com). He is also chairman of Yoganjali Natyalayam, the premier institute of Yoga and Carnatic Music and Bharatanatyam in Pondicherry (www.rishiculture.org). He is son and successor of the internationally acclaimed Yoga team of Yogamaharishi Dr. Swami Gitananda Giri Guru Maharaj and Yogacharini Kalaimamani Ammaiji, Smt Meenakshi Devi Bhavanani.

He is a Gold Medalist in Medical Studies (MBBS) with postgraduate diplomas in both Family Health (PGDFH) as well as Yoga (PGDY) and the Advanced Diploma in Yoga under his illustrious parents in 1991-93. A Fellow of the Indian Academy of Yoga, he has authored 19 DVDs and 23 books on Yoga as well as published more than a hundred papers, compilations and abstracts on Yoga and Yoga research in National and International Journals.

He is a Classical Indian Vocalist, Percussionist, Music Composer and Choreographer of Indian Classical Dance in addition to his duties as Deputy Director of the Centre for Yoga Therapy Education and Research (CYTER), MGMCRI, Pondicherry. In recent years he has travelled abroad 13 times and conducted invited talks, public events, workshops, retreats and been major presenter at Yoga conferences in the UK, USA, Italy, Germany, Switzerland, Australia and New Zealand. He is an Honorary International Advisor to the International Association of Yoga Therapists (www.iayt.org), Australian Association of Yoga Therapists (www.yogatherapy.org.au) and various Gitananda Yoga Associations all over the world (www.rishiculture.org). He is a member of the Board of Directors of the Council for Yoga Accreditation International (www.cyai.org).
PSYCHOSOMATIC MECHANISMS OF YOGA
Yogacharya Dr. ANANDA BALAYOGI BHAVANANI

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Yoga is the original mind-body medicine that has enabled individuals to attain and maintain sukha sthanam, a dynamic sense of physical, mental and spiritual well being. Bhagavad-Gita defines Yoga as samatvam meaning thereby that Yoga is equanimity at all levels, a state wherein physical homeostasis and mental equanimity occur in a balanced and healthy harmony.

Yogamaharishi Dr Swami Gitananda Giri Guru Maharaj, the visionary founder of Ananda Ashram at the International Centre for Yoga Education and Research (ICYER) in Pondicherry and one of the foremost authorities on Yoga in the past century, has explained the concept of Yoga Chikitsa (Yoga as a therapy) in the following lucid manner.

“Yoga Chikitsa is virtually as old as Yoga itself; indeed, the ‘return of mind that feels separated from the Universe in which it exists’ represents the first Yoga therapy. Yoga Chikitsa could be termed as “man’s first attempt at unitive understanding of mind-emotions-physical distress and is the oldest wholistic concept and therapy in the world.”

To achieve this Yagic integration at all levels of our being, it is essential that we take into consideration the all encompassing multi dimensional aspects of Yoga that include the following: a healthy life nourishing diet, a healthy and natural environment, a wholistic lifestyle, adequate bodywork through Asanas, Mudras and Kriyas, invigorating breath work through the use of Pranayama and the production of a healthy thought process through the higher practices of Jnana Yoga and Raja Yoga.

PSYCHOSOMATIC DISORDERS:
The Nirvana Prakarana of the Laghu Yoga Vashishta, one of the ancient Yoga Texts describes in detail the origin and destruction of mental and bodily diseases. Sage Vashishta teaches Lord Rama that there are two major classifications of disease. Those that are caused by the mind are primary (adhija vyadhi, the psychosomatic, stress disorders) while those that afflict the body directly are secondary (anadhija vyadhi, infectious disease, accidents etc). The primary disease has two sub divisions. These are the samanya (ordinary physical diseases) and the Sara (the essential disorder of rebirth that may only be destroyed by atma jnana or knowledge of the Divine Self). Samanya diseases are the ones that affect us physically and may be destroyed by the correction of the mind-body disharmony. It is in these psychosomatic disorders that the actual practical application of Yoga practices as a mode of therapy can be very useful.
From the Yogic viewpoint of disease it can be seen that psychosomatic, stress related disorders appear to progress through four distinct phases. These can be understood as follows:

1. Psychic Phase: This phase is marked by mild but persistent psychological and behavioural symptoms of stress like irritability, disturbed sleep and other minor symptoms. This phase can be correlated with vijnanamaya and manomaya koshas. Yoga as a mind body therapy is very effective in this phase.

2. Psychosomatic Phase: If the stress continues there is an increase in symptoms, along with the appearance of generalized physiological symptoms such as occasional hypertension and tremors. This phase can be correlated with manomaya and pranamaya koshas. Yoga as a mind body therapy is very effective in this phase.

3. Somatic Phase: This phase is marked by disturbed function of organs, particularly the target, or involved organ. At this stage one begins to identify the diseased state. This phase can be correlated with pranamaya and annamaya koshas. Yoga as a therapy is less effective in this phase and may need to be used in conjunction with other methods of treatment.

4. Organic Phase: This phase is marked by full manifestation of the diseased state, with pathological changes such as an ulcerated stomach or chronic hypertension, becoming manifest in their totality with their resultant complications. This phase can be correlated with the annamaya kosha as the disease has become fixed in the physical body. Yoga
as a therapy has a palliative and ‘quality of life improving’ effect in this phase. It also has positive emotional and psychological effects even in terminal and end of life situations.

POTENTIALITIES:

Extensive research on Yoga being done all over the world has shown promise with regard to various disorders and diseases that seem to be amiable to Yoga therapy (www.iayt.org, www.icyer.com, www.svyasa.org). These include psychosomatic, stress disorders such as bronchial asthma, diabetes mellitus, hypertension, irritable bowel syndrome, gastrointestinal ulcer diseases, atherosclerosis, seizure disorder and headache. It also includes physical disorders such as heart disease, lung disease, and mental retardation. Psychiatric disorders such as anxiety disorders, obsessive-compulsive disorder, depression and substance abuse can also be managed along with other therapies. Musculoskeletal disorders such as lumbago, spondylosis, sciatica and carpel tunnel syndrome can be tackled effectively with Yoga practices that offer a lot of hope in metabolic disorders such as thyroid and other endocrine disorders, immune disorders, obesity and the modern metabolic syndrome.

It is well established that stress weakens our immune system. Scientific research in recent times has showed that the physiological, psychological and biochemical effects of Yoga are of an anti-stress nature. Mechanisms postulated included the restoration of autonomic balance as well as an improvement in restorative, regenerative and rehabilitative capacities of the individual. A healthy inner sense of wellbeing produced by a life of Yoga percolates down through the different levels of our existence from the higher to the lower producing health and wellbeing of a holistic nature.

Streeter et al (2012) recently proposed a theory to explain the benefits of Yoga practices in diverse, frequently comorbid medical conditions based on the concept that Yoga practices reduce allostatic load in stress response systems such that optimal homeostasis is restored.

They hypothesized that stress induces an:

1. Imbalance of the ANS with decreased parasympathetic and increased sympathetic activity,
2. Under activity of the gamma amino-butryric acid (GABA) system, the primary inhibitory neurotransmitter system, and
3. Increased allostatic load.

They further hypothesized that Yoga-based practices

1. Correct underactivity of the parasympathetic nervous system and GABA systems in part through stimulation of the vagus nerves, the main peripheral pathway of the parasympathetic nervous system, and
2. Reduce allostatic load.

According to the theory proposed by Streeter and colleagues, the decreased parasympathetic nervous system and GABAAergic activity that underlies stress-related disorders can be corrected by Yoga practices resulting in amelioration...
of disease symptoms. HRV testing has a great role to play in our understanding intrinsic mechanisms behind such potential effects of Yoga.

Innes et al had earlier (2005) also postulated two interconnected pathways (given below) by which Yoga reduces the risk of cardiovascular diseases through mechanisms of parasympathetic activation coupled with decreased reactivity of sympathoadrenal system and HPA axis.

**PSYCHOSOMATIC MECHANISMS OF YOGA:**

Yoga understands the influence of the mind on the body as well as that of the body on the mind. This is the principle of adhi-vyadhi elucidated in the Yoga Vasishta more than 5000 years ago! It is interesting that modern medicine has only realised this connection in the last hundred years whereas Yogic of India were teaching and practising it for thousands of years. No wonder Yoga may be considered as the original mind-body medicine.

We are what we think, yet we also start to think that which we do. Yogic concepts and techniques enable the development of right attitudes towards life and enable us to correct the numerous internal and external imbalances we suffer due to our wrong lifestyle/ genetic potential. Yoga enables us to take responsibility for our own health and happiness and as Swami Gitananda Giri would say, “If you want to be healthy do healthy things, if you want to be happy do happy things”.

The following are just a few of the mechanisms through which Yoga can be said to work as an integrated mind-body medicine:

1. Cleanses the accumulated toxins through various shuddi kriyas and generates a sense of relaxed lightness through jathis and vyayama type activities. Free flow in all bodily passages prevents the many infections that may occur when pathogens stagnate therein.

2. Adoption of a Yogic lifestyle with proper nourishing diet, creates positive antioxidant enhancement thus neutralizing free radicals while enabling a rejuvenative storehouse of nutrients packed with life energy to work on anabolic, reparative and healing processes.

3. Steadies the entire body through different physical postures held in a steady and comfortable manner without strain. Physical balance and a sense of ease with oneself enhance mental / emotional balance and enable all physiological processes to occur in a healthy manner.

4. Improves control over autonomic respiratory mechanisms through breathing patterns that generate energy and enhance emotional stability. The mind and emotions are related to our breathing pattern and rate and hence the slowing down of the breathing process influences autonomic functioning, metabolic processes as well as emotional responses.

5. Integrates body movements with the breath thus creating psychosomatic harmony. In Yoga the physical body is related to annamaya kosha (our anatomical existence) and the mind to manomaya kosha (our psychological existence). As the pranayama kosha (our physiological existence sustained by the energy of the breath) lies in between them, the breath is the key to psychosomatic harmony.

6. Focuses the mind positively on activities being done, thus enhancing energy flow and resultant healthy circulation to the different body parts and internal organs. Where the mind goes, there the prana flows!

7. Creates a calm internal environment through contemplative practices that in turn enable normalization of homeostatic mechanisms. Yoga is all about balance or samatvam at all levels of being. Mental balance produces physical balance and vice versa too.

8. Relaxes the body-emotion-mind complex through physical and mental techniques that enhance our pain threshold and coping ability in responding to external and internal stressors. This enhances the quality of life as seen in so many terminal cases where other therapies are not able to offer any solace.

9. Enhances self confidence and internal healing capacities through the cultivation of right attitudes towards life and moral-ethical living through yama-niyama and various Yogic psychological principles. Faith, self confidence and inner strength are most essential if at all we wish for healing, repair, rejuvenation and re-invigoration.

10. Yoga works towards restoration of normalcy in all systems of the human body with special emphasis on the psycho-neuro-immuno-endocrine axis. In addition to its preventive and restorative capabilities, Yoga also aims at promoting positive health that will help us to tide over health challenges that occur during our lifetime. This concept of positive health is one of Yoga’s unique contributions to modern healthcare as Yoga has both a preventive as well as promotive role in the healthcare of our masses. It is also inexpensive and can be used in tandem with other systems of medicine in an integrated manner to benefit patients.
NEED FOR COORDINATION:
The need of the modern age is to have an integrated approach towards therapy and to utilize Yoga therapy in coordination and collaboration with other systems of medicine such as Allopathy, Ayurveda, Siddha and Naturopathy. Physiotherapy and Chiropractic practices may be used with the Yoga if needed. Advice on diet and lifestyle is very important irrespective of the mode of therapy that is employed for a particular patient.

A WORD OF CAUTION:
A word of caution is also required. Though Yoga and Yoga therapy are very useful in bringing about a state of total health it is not a miracle cure for all problems. It needs a lot of discrimination on the part of both the therapist as well as the patient. It may not be useful in emergency conditions and there is a strong need to consult a qualified medical doctor where in doubt. Each patient is different and so the therapy has to be molded to suit the individual needs rather than relying on a specific therapy plan for patients suffering the same medical condition.

A very true problem is that there is a different approach of the different schools of Yoga to the same condition. It is better to follow any one system that one is conversant with, rather than trying to mix systems in a “Yogic Cocktail”. One must also be vigilant as there is a strong presence of numerous quacks pretending to be Yoga therapists and this leads to a bad name for Yoga therapy as well as Yoga in general.

CONCLUSION:
The dedicated practice of Yoga as a way of life is no doubt a panacea for problems related to psychosomatic, stress related physical, emotional and mental disorders and helps us regain our birthright of health and happiness. It is only when we are healthy and happy that we can fulfill our destiny. With the adoption of a proper attitude and lifestyle through the Yogic way of life, we can rise above our own circumstances and our life can blossom as a time of variety, creativity, and fulfillment.

Yoga helps us regain the ease we had lost through dis-ease (as implied by sthira sukham asanam-PYS). It also produces mental equanimity (samavatam yoga uchiate-BG) where the opposites cease to affect (tato dwandwa anabhihagatha-PYS). This enables us to move from a state of illness and disease to one of health and well being that ultimate allows us to move from the lower animal nature to the higher human nature and finally the highest Divine Nature that is our birthright.

REFERENCES AND RECOMMENDED READING:
12. Yoga: Step-by-Step. A 52 lesson Correspondence Course by Yogamaharishi Dr. Swami Gitananda Giri.
Stress is inevitable in the modern world because of the imbalance between the demands of one’s environment and one’s capabilities. In fact, it is the distress, which causes the problem and can be defined as every physical and mental tension that we experience as unpleasant. The environment today is more demanding. From childhood onwards, the development of capacities and capabilities of the individual is not able to keep pace with the increase of demands on them. This gap in most cases goes on widening. The huge crowds at Temples, churches and mosques in some way or the other are related to this imbalance. Everyone seems to be going there in order to beg or bribe the almighty to perform the balancing act.

When we talk of stress we must also remember that some amount of stress is necessary in order to bring out the best in us. However it is vital to learn how to manage stress and keep it under our control. It is important to also remember the words of Epictetus in 60 A.D. who said, “Men are not disturbed by things, but the views, they take of them”. As Swamiji Gitananda Giri Guru Maharaj jocularly used to say ‘You don’t have problems—you are the problem!” A positive frame of mind will help us to be cheerful and unstressed. Maharishi Patanjali’s advise in this regard to cultivate Pratipaksha Bhavanam (The Opposite View) is vital to achieve balance of the emotions and mind. It is also worth trying to follow his advice of Maitri-Sukha (Friendliness towards the happy), Karuna-Dukha (Compassion towards the suffering), Mudhita-Punya (Cheerfulness towards the virtuous) and Upekshanam-Apunya (Indifference towards the wicked).

The most common causes of stress are the Shat Ripus or the six enemies of the spirit. These are Kama (Uncontrolled passion), Krodha (Senseless Anger), Lobha (Greed), Moha (Blind infatuation), Mada (Massive Ego) and Matsarya (Malice / envy). Corruption of character, conduct, thought and interpersonal dealing is another cause of stress.

An environment where sadistic pleasure gives satisfaction, where ethics have little or scant regard, where self-interest is more important and where under cutting and backbiting are a common feature, will surely lead to the development of extreme stress. It is important to realise these facts and be aware of them in our life. Unless we develop awareness and consciousness of what we think, feel and do, there cannot be a lasting solution to stress. We must strive to become persons of “Equal mindedness in all situations” that is described as Stitha Prajna or Samabhava in the Srimad Bhagavad Gita.

Though stress probably cannot be avoided, it can, however, be managed. The following actions may help reduce/eliminate the stress.

1. Awareness: It is important that we first become aware of the stress and then try to let it go. Sharing your tension with a friend and/or a family member may solve the problem to a great extent. You cannot wish away problems by non-acknowledgement of them.

2. Movement: Movement helps in reducing tension. This can mean walking, jumping, making noise, swimming and playing. Stress tends to accumulates in the joints and movement helps to dissipate it. Rotation of the neck and shoulders in many cases helps a lot. Some corporates have even established stress-relieving chambers where employees may shout,
screams or hit a hanging pillow to relieve the pent up tension.

3. Yoga techniques: The regular practice of various Yoga techniques and inculcating the Yogic values in daily life will go a long way towards not only reducing the stress levels but also in giving us that elusive “Peace of Mind”. Yogic relaxation practices such as Shavasana and Yoga Nidra help to create a sense of awareness and relaxation in the whole body as well as the mind.

4. Hobby: A hobby can help to relieve tension because it helps us to divert our mind from an unpleasant occurrence. Music, dance, painting, cooking and gardening are effective ways to take our mind to a different “Zone”. Playing with your pet can also help relieve tension and many people have “Thera-pets” or pets that help them therapeutically!

5. Breathing: Breathing is one of the easiest ways of relieving stress. Whenever you feel tension rising, take a few deep breaths and you will immediately feel the difference.

6. Attitude: It is important to “Let things lie” for sometime when facing problems and many situations resolve on their own. Other situations may appear smaller and less stressful after some time. Development of a detached attitude can also help us to have a better perception of situations and this in turn helps us to face them better.

7. Visualization: Visualization of a pleasant solution to the problems can also help a lot. This is quite different from daydreaming. This is widely adopted by players and athletes for improving their performance. After a stressful encounter, coolly sit in your chair, close your eyes and visualize the episode as an act of an ignorant person and excuse him for the incident.

8. Auto-Suggestion: Another mental technique is Positive self-suggestion. The negative thoughts are to be replaced with positive ones and an attitude of “I can and I will” is to be developed.

9. Self effort: Stress is related to the individual’s environment and their tolerance capacity. As both of these are different in different people, each individual has to settle for their own method for managing their day-to-day problems. It must be clearly understood that we are responsible for our health and happiness and have a duty to take care of these Divine gifts. Swami Gitananda Giri used to often say, “Health and happiness are your birthright”. It is through our own efforts and will power that we can ultimately solve the problem of stress and achieve our birthrights.

Yoga is an integrated way of life in which awareness and consciousness play a great part in guiding our spiritual evolution through life in the social system itself by understanding that “Yoga is the science and art of right-use-ness of body, emotions and mind”.

BASIC WARMING UP PRACTICES

Jattis are basic movements of the body parts that help to release pent up tensions in those parts. They increase circulation to the part and also the flow of Pranic energy is increased due to the movements. A few of these practices will be described now.

Take up a comfortable standing position such as the Samasthiti Asana. Stand on one leg and shake the other leg. Repeat on the other side and then alternate a few times between right and left. Stand on both legs and start to shake your hands one at a time. Alternate between the right and left a few times and then start to shake both hands at the same time.

Shake your hands and move them up, down, to the left and to the right. Shake your hands all around you in a circular movement. This helps to energize the Pranamaya Kosha, our energy sheath or subtle body. Come back to the standing position.

Open the legs two feet apart and keep the hands on the hip. Move the torso in all four directions clock-wise and anti clock-wise in a grinding action. Then do it in a continuous manner. Bend forward and perform some toe touching with a bouncing action. Bounce to the front, and then move to your left. Move to your right and then come back to the front. Come back to the standing position.

Spread your feet a bit and lift both your arms to the side. Start to twist your torso from side to side a few times. Feel the stretch in your hip region and back. Come back to the standing position and relax with deep breathing for some time.

Sit down with both legs stretched out in front of you. Draw your right knee up to your chest and then kick out with a whooshing sound. Perform the same action on the left side. Continue to alternate legs for some time. Draw up both your knees and do the same action with a whooshing sound as you release the feet. Relax with your feet stretched out in front.
**SURYA NAMASKAR**

Rishikesh Surya Namaskar, the Yogic sun salutation is a series of twelve physical postures. These alternating backward and forward bending postures flex and stretch the spinal column through their maximum range giving a profound stretch to the whole body. The basic breathing principle is to inhale during upward and backward bending postures and exhale during forward bending postures.

Stand erect with your feet close together. Perform Namaskar Mudra by joining your palms together in front of your chest.

Breathe in and stretch your arms over your head into the Anjali Mudra and then arch your back. Feel the healthy stretch in your whole body.

Breathe out and bend forward while keeping your arms and back in one line and as straight as possible. Perform the Pada Hasta Asana by bringing your head to your knees while keeping your hands on either side of your feet.

Breathe in and extend your right leg back until it is straight as possible and you are balanced on your toes and hands. Your left leg should be bent with the sole flat on the ground. Lift your head and bend back and open up your chest. This is the Ashwa Sanchalana Asana, the equestrian posture.

While breathing out bring your left leg back towards the right and keep the feet just a foot apart with your heels flat to the ground. Simultaneously raise your buttocks and lower your head between your arms, so that your body forms a triangle with the ground. This is the Mehru Asana or mountain posture. While maintaining the posture, take a deep inhalation.

While breathing out drop both knees to the ground and slowly slide the body down at an angle and bring your chest and chin to the ground. Eight parts of your body namely your toes, knees, chest, hands and chin should touch the ground while the buttocks are kept up. You are your breath while performing this Ashtanga Bhumi Sparsha, the eight limbed prostration.

Breathe out and come into Bhujanga Asana, the Cobra posture. Focus your awareness at the base of your spine and feel a healthy stretch in your back and neck.

Exhale and come back to the Mehru Asana, the mountain posture. This strengthens the arms and legs as well as the spinal column. Inhale and bring your right leg forward in-between your hands while keeping your left leg in its original position to perform the Ashwa Sanchalana Asana. Breathe out and bring your left foot forward to come into the Pada Hasta Asana. Breathe in and come up and perform the Anjali Mudra and bend backward. Breathe out and come back to the standing while bringing your hands back to the chest in Namaskar Mudra.

To perform the Rishikesh Surya Namaskar on the opposite side perform the practice again with a slight modification. To complete the other half the same movements are repeated except that the left leg is brought back while performing the Ashwa Sanchalana the first time. The other postures such as Mehru Asana, Ashtanga Bhumi Sparsha and Bhujanga Asana are done in the same manner. When coming back to the Ashwa Sanchalana the left foot is brought forward and then the Pada Hasta is performed by joining right foot to the left before completing the practice with the Anjali Mudra and finally relaxing in the Sama Sthithi with deep breathing.

One full round consists of the 12 poses done twice in sequence. Practice 3 to 9 rounds of the Surya Namaskar daily for maximum benefit. When the exercises are done little quickly the gain is more physical and when they are done slowly with breath awareness the gain is more mental and spiritual.
YOGA ASANAS

TALA KRIYA
The term, “Tala” refers to a Palmyra tree and you should try to stretch yourself as tall as that tree while performing this practice. Take up a comfortable and stable Samasthiti Asana. Breathe in and lift both arms up over your head until they are parallel to each other. Let the palms of both hands face inward and then go up onto your toes and stretch up as high as possible. Hold the breath and feel the healthy stretch along your whole body from toes to finger tips. Breathe out and relax your arms back to your sides while coming back to the flat foot posture. Repeat the practice two more times at each session for maximum benefit. With practice the posture can be held for a longer time and normal breathing done while holding the posture for 30 to 45 seconds.

HASTHA KONA KRIYA
Stand in a steady Samastiti Asana with your arms by your side. Breathe in and lift your right arm over your head. Try to extend the arm over your head towards the left as far as possible without bending it. This gives a good stretch to the entire right side of the body. Slowly start to breathe out and lower your arm slowly back to the side. Repeat the practice a few more times.

Make sure that you lift your arm on the in breath and lower it on the out breath. Perform the practice on the opposite side by lifting your left arm over your head while breathing in. Extend it as far towards the right as possible without bending it. Feel the excellent stretch on the entire left side of your body. Lower your arm back to your side while breathing out. Repeat the practice a few more times.

The Hastha Kona Kriya helps to stretch and tone up the musculature of the arms, shoulders and the Para-spinal area in a way not done in day-to-day life. This helps trigger the relaxation response in these tissues that are normally tensed due to disuse, misuse and abuse. A sense of profound relaxation is obtained after the practice of this activity that is also known as the Ardha Kati Chakrasana.

TRIKONA ASANA
Stand in Samasthiti Asana. Place your feet two to three feet apart facing forwards. Stretch your arms to the sides so that they are pulling the chest in opposite directions. Turn your head and right foot to the right side and slowly bring your right hand down to the right foot and place the palm of the right hand on the ground in front of the right foot. Look up at the middle finger of the left hand. Let the entire torso get a good twist and stretch. Hold the position for 30 seconds while performing deep breathing. Release and come back up to the open arm position and then do the opposite side by placing your left hand down in front of the left foot. Hold the position for 30 seconds while performing deep breathing. When ready come back up to the Samasthiti Asana and relax with a few rounds of deep breathing.

VAKRA ASANA
Sit erect with your legs stretched out in the Uttana Asana. Bend your right knee and place the right foot by the side of the left knee. Turn to your right and place your right hand on the ground behind you to support your erect position. Bring your left arm round the outer side of the right knee and catch hold of the right big toe. Turn your head and look back over your right shoulder. The erect knee acts as a fulcrum for getting maximum twist of the spine. Keep your torso as straight as possible. Hold the posture for 30 seconds with soft breathing.

Release the posture and come back to the Uttana Asana. This posture gives an excellent massage to the abdominal organs and is very
useful for those suffering from diabetes as well as digestive disorders. It is also useful for neck and back problems. Repeat the practice on the opposite side in a similar manner. Hold the posture for 30 seconds with soft breathing. Release the posture and come back to the Uttana Asana and relax with deep breathing for some time.

**ARDHA MATSYENDRA ASANA**

Sit erect with both legs stretched out in front and your palms gently pressing on the ground by your sides in Uttana Asana. Fold your right knee and place the heel tight in against the perineum. Place your left foot by the side of your right thigh by crossing it over the knee. Bring your right hand round the outer side of the left knee passing between the chest and the knee and catch hold of the left big toe. Your right shoulder blade rests on the outer side of your left knee.

Take your left hand round your back and try to get a grip on your right thigh. Look back over your left shoulder. The erect knee acts as a fulcrum for getting maximum twist of the spine. Keep your trunk vertical. Hold the posture for 30 seconds with soft breathing. This posture gives an excellent massage to all the abdominal organs and is very useful for those suffering from diabetes as well as digestive disorders.

Release and come back to the Uttana Asana. Repeat on the opposite side by folding your left knee with the heel tight in against the perineum. Place your right foot by the side of your left thigh by crossing it over the knee. Bring your left hand round the outer side of the right knee passing between the chest and the knee and catch hold of the right big toe. Your left shoulder blade rests on the outer side of your right knee.

Take your right hand round your back and try to get a grip on your left thigh. Look back over your right shoulder. The erect knee acts as a fulcrum for getting maximum twist of the spine. Keep your trunk vertical. Hold the posture for 30 seconds with soft breathing. When you are ready slowly release the posture and come back to the Uttana Asana.

**CHATUS PADA ASANA AND VYAGRAHA PRANAYAMA**

Take up the Chatus Pada Asana with your weight evenly distributed between your hands and knees. Start breathing in and out for an equal count of six. While breathing in slowly lift your head and arch your back downwards. Then breathe out slowly and lower your head while arching your back upwards. Breathe in while lifting your head and arch your back down.

Breathe out while lowering your head and arching your back up. Repeat this excellent practice at least nine times at each session. Vyagraha Pranayama helps us to utilize all sections of our lungs in a balanced and controlled manner thus energizing the whole body with healing Pranic energy.

When ready slowly relax back to the Vajrasana for a period of quiet contemplation.

**BHUJANGINI MUDRA**

To perform the Cobra gesture, take up the Unmukha Asana which is a prone position with your entire body in a straight line. In this technique the emphasis is on the breathing pattern and the production of a mighty hissing sound through the clenched teeth. Slowly bring your arms forward and keep your palms on the ground alongside your shoulders. Take in a deep breath. While making a mighty hissing sound, flare back into the Bhujanga Asana. Slowly relax back onto the floor while breathing in and then again flare back with a mighty hiss. Repeat
this Mudra at least three to six times at each session. This technique helps release the pent up stress that accumulates in our system from our daily life and provides great emotional and mental relief.

It is an excellent stress-buster and is a must for all in this day and age. After completing the practice come back down to the face prone pose. Place your arms alongside your body and turn your head to the side. Relax for a few minutes and let the benefit of this Mudra seep into each and every cell of your body.

PAWAN MUKTA ASANA
Lie down in a comfortable Shavasana and start to breathe in and out for an equal count of six or eight. To perform the single legged Eka Pada Pawan Mukta Asana bend and lift your right knee while breathing in and simultaneously also lift your head off the ground. Catch hold of your knee with your arms and try to touch your knee to your forehead. Hold the position a few seconds and then while breathing out slowly release the position and lower your head while at the same time bringing your foot back to the ground.

Repeat this at least two more times to complete a set of three rounds of the practice. Relax a few seconds in the Shavasana and then perform the practice on the left side. Relax in Shavasana for a few minutes with deep and rhythmic breathing while concentrating on your abdominal area that will help to relax you further.

To perform the double legged Dwi Pada Pawan Mukta Asana bend and lift both your knees while breathing in. Bring them as close to your forehead as possible while simultaneously raising your head to meet the knees. Hold a few seconds and then while breathing out, lower your head and simultaneously bring your feet back to the ground. Repeat this two more times to complete a set of three rounds at each session.

Relax in Shavasana for a few minutes with deep and rhythmic breathing while concentrating on your abdominal area. This will help you to relax even further as the emotional tensions tend to tighten up the abdominal area leading to a feeling of “butterflies in the stomach”.

EKA PADA UTTANPADA ASANA
From Shava Asana lift your right leg up towards the sky on the in breath. Try not to bend the knee if possible. On the out breath lower the leg back to the ground. Use a breath cycle of in and out for a count of six or eight.

Repeat this two more times. Perform the same practice on the left side. Lift your left leg up towards the sky on the in breath. Try not to bend the knee if possible. On the out breath lower the leg back to the ground. Use a breath cycle of in and out for a count of six or eight. Repeat this two more times. After performing the practice at least three times on each side relax in Shava Asana with deep breathing.

DWI PADA UTTANPADA ASANA
From Shava Asana lift both legs up towards the sky on the in breath. Try not to bend the knees if possible. On the out breath lower the legs back to the ground. Use a breath cycle of in and out for a count of six or eight. Repeat this two more times and then relax in Shava Asana with deep breathing. Those who have back problems should not do straight leg lifting and should do it with bent knees instead to avoid increasing the strain on the back.
**SARVANGA ASANA**

Lie down in Shava Asana. Breathe in and lift both legs at a time until you are in the Dwi Pada Uttanpada Asana. Continue the upward motion and lift your back off the ground using both arms to support the lower back. Keep your trunk and legs in a straight line by supporting the entire trunk on the shoulders. Breathe in a shallow manner while concentrating on the healthy pressure at the throat region.

Release the posture after 10 to 15 seconds and while breathing out slowly come back to the Shava Asana. Roll your head from side to side to ease away any pressure that may have accumulated in the neck. After a short relaxation, repeat the practice two more times.

**VIPARITA KARANI**

Viparita Karani is the shoulder stand-like Mudra where the weight of the body is supported by the elbows while the hands are placed against the pelvic girdle. From the supine Shavasana slowly lift both your legs up as if performing the Sarvangasana. However the weight of your body should be balanced on your elbows and arms and not on your shoulders.

Hold the posture in a comfortable manner and then start to perform the incomplete and complete actions of this Mudra.

Perform the incomplete action by taking a deep inhalation and bringing your straightened legs towards your head so that your body makes an acute angle. Then perform the completed action by pushing your legs away while exhaling the breath. Make sure that your feet are extended in a rigid position making an obtuse angle.

Breathe in bringing your feet towards your head 1-2-3-4-5-6. Breathe out pushing your feet away 1, 2, 3,4,5,6.

Continue the practice for a minimum of three to nine rounds of this alternation between the incomplete and complete postures with the breath cycle at every session.

This Mudra promotes a healthy metabolic function by stimulating the pancreas and the uptake of insulin by cells of the body. It is highly recommended for the prevention, control and possible cure of conditions such as Diabetes Mellitus and imbalances of the thyroid gland. When ready slowly bring your legs down to the ground in a phased manner and enjoy a quiet period of relaxation in the Shavasana.

**SHAVASANA WITH SAVITRI PRANAYAMA**

Lie supine on the ground with your head preferably to the north enabling your body to be in alignment with the earth’s electromagnetic field. Make sure that your head and body are in a straight line while hands are kept relaxed by side with palms facing upwards. Bring your feet together and let forefeet fall away into a ‘v’ shape with heels as close together as possible.

Start to consciously watch your breath by letting your awareness settle in the abdominal area. Feel the abdominal movements as your abdomen rises as you breathe in and falls as you breathe out. After a few rounds of this practice, slowly let your awareness settle at the tip of your nose. Feel the cool inspired air flowing into your nostrils as you breathe in and become aware of the warm expired air flowing out of the nostrils when you breathe out.

Consciously regulate your breath so that the duration of the incoming and outgoing breathes are equal. The inspiration and expiration can be for a count of 4 or 6 initially and then with practice elongated to a count of 8 or 10. Perform at least nine rounds of this conscious deep breathing and enjoy the relaxed sensation that spreads throughout your body.

Relaxation in Shavasana can be further deepened by utilizing Savitri Pranayama to relax and rejuvenate your body, emotions and mind. Breathe in through your nose for a count of 6. Hold in the breath for a count of 3. Breathe out through your nose for a count of 6. Finally hold the breath out for a count of 3. Make sure that you are breathing in and out through both nostrils and that
you are using the complete Yogic breathing. Perform at least 9 rounds of this combination practice that heightens the relaxation to a very deep level.

After performing 10 to 15 minutes of the Shavasana slowly start to move your fingers and toes. Perform conscious stretching and make a smooth transition from the relaxed to the active state. Lift your left arm over your head and turn over onto your left side. Continue the turning action until you come into the face-prone posture. Perform Makara Asana by placing your right hand on the left while the left is placed palm down on the ground in front of you. Keep your forehead or chin on your right hand while keeping your legs a foot apart. Bring your hands forward near your shoulders and push yourself back into the Bhujanga Asana. Continue the back bending movement and go into the four footed Chatus Pada Asana. Relax into the Shashanga Asana with your arms stretched out in front and then finally come back to the Vajrasana. With your palms on your thighs sit quietly for some time and enjoy the effects of the deep relaxation that has spread to every part of your body.

SPANDA – NISHPANDA KRIYA

This practice is done from Shavasana using the yogic concept of Shpanda Nishpanda, which means the coupling of tension and relaxation. We consciously tense different parts of our body as much as possible and then relax them to the maximum in a step-by-step manner. This produces a better relaxation response than the mere attempt to relax without putting in the initial effort of tension.

Lie down in a comfortable supine Shavasana with your entire body in a single straight line. After a few seconds of relaxation in this position, start to tense your entire body part-by-part from your toes up to the top of your head until every part of your body is as tense as possible. Hold this 100% tension state of Spandha for a few seconds. Let all the muscles of your entire body be as tense as possible. At the peak of the tension, just ‘let go’ and immediately relax your entire body 100%. This is the state of Nishpanda. Enjoy this relaxed state and with conscious awareness continue to watch your breath as it comes in and goes out of your nose.

Repeat this practice again by tensing up your entire musculoskeletal system to the state of Spandha and hold it for a few seconds. When ready let go completely and enjoy the Nishpanda state for a few minutes.

To complete the practice repeat the Spandha – Nishpanda Kriya a third time by tensing up your entire musculoskeletal system from your toes to the top of your head. Hold the complete tension for a few seconds. When ready let go completely and enjoy the complete relaxation that ensures. Be aware of how all your muscles relax in this practice because the relaxation is deepened when it is contrasted with tension.

This practice is a boon for those suffering psychosomatic, stress induced and stress aggravated life disorders such as hypertension, diabetes, asthma, insomnia, peptic ulcers and bowel disorders.

MARMANASTHANAM KRIYA

The twenty-two sensitive parts of the body are known by the collective Sanskrit term Marmanasthanam. To concentrate upon these parts in a particular order or to command these areas to relax in a particular way while concentrating, gives a very satisfactory, deep relaxation that has been found by tested experiments to give relief even to compulsive dreaming. This is an excellent Kriya to do at the end of a strenuous session of Asanas and Pranayamas. The relaxation should be preceded by at least nine rounds of Savitri Pranayama, the Rhythmic Breath, to create the proper atmosphere. This technique (Kriya) can be done in two ways, one for relaxation the other for deep concentration. For deep concentration the technique is done from “feet to the head.” While concentrating upon twenty-two body parts, each part is commanded (by mind) “to relax” or a thought of peace or serenity” directed to the areas.

For relaxation, concentrate upon the (1) toes and command the toes to relax (2) feet (3) lower legs to knees (4) upper legs to hips (5) buttocks (6) base of spine (7) pelvic area (8) abdomen (9) chest and (10) shoulders. Now take your concentration down to the (11) fingers, and command the fingers to relax then (12) hands (13) lower arms to elbows (14) upper arms to shoulders where your concentration joins with body concentration (15) throat (neck) (16) around the mouth and chin (17) around the nose and cheeks (18) eyes (19) back around the ears (20) back of the head (21) top of the head (22) Cavernous Plexus in the middle of the forehead. All the while you should command “relaxation.” Perform Jyoti Dharana and Jyoti Dhyana (concentration and meditation on the Divine light) at the Bhramadhya Bindu (Midpoint between the eyebrows). Visualize the Divine Jyoti to be having the brilliance equal to 1000 suns but without the glare. Absorb yourself into this Divine Jyoti.
PRANAYAMA PRACTICES

PRANAVA PRANAYAMA
‘Tasya vachakah pranavaha’, the sacred sound of the Divine is the Pranava says Maharishi Patanjali. This develops abdominal, thoracic and clavicular regions of the lungs to their maximum capacity. This Pranayama has unlimited healing potential and brings about harmony of body, emotions and mind. It is an important part of Rishiculture Ashtanga Yoga tradition as taught by Yogamaharishi Dr Swami Gitananda Giri Guru Maharaj.

Adham Pranayama, the abdominal or lower chest breathing. Put the fingers into the Chin Mudra with the index and thumb fingers touching each other at the tips. Keep the other three fingers straight and united. Take a deep breath into the lower chest and abdominal regions and then let it out with the sound aaa…….

To perform thoracic or mid-chest breathing, the Madhyam Pranayama, curl your fingers inward to form Chinmaya Mudra. Take a deep breath into the mid chest and thoracic regions and then breathe out with the sound ooo…….

Adyam Pranayama is the clavicular or upper chest breathing and utilises Adhi Mudra. Clench your fists with your thumb in the centre. Keep the Adhi Mudra on your thighs and breathe deeply into the upper chest and clavicular regions and then exhale with the sound mmm…….

Joining the earlier three parts of the breath in a complete Yogic breath is the fourth stage, known was Mahat Yoga Pranayama. Put the Adhi Mudra with knuckles of your right and left hands touching in front of the navel. This is now known as the Brahma Mudra. Take a deep breath into the low, mid and upper chest regions. Now let the breath out with the sounds of aaa...ooo...mmm…. Relax and enjoy the feeling of potent healing energy flow through the entire body.

NASARGA MUKHA BHASTRIKA
Nasarga Mukha Bhastrika is a forceful expulsion of the breath through the mouth that can accompany different movements to relieve our pent up stress.

Take up a comfortable standing position and then start to shake your hands as vigorously as possible to help loosen up the accumulated tensions of your daily life. Visualize all the tensions that have accumulated in your wrist and elbow joints getting a good ‘shake up’ by this action. When you have got the tensions loosened up, take in a deep breath through your nose and clench your fist as if catching hold of all your accumulated tensions and stress. Now with a powerful blast through your mouth “whoosh” away all your accumulated tensions and stress as forcibly as possible.

Again shake your hands as fast as possible. Breathe in and catch hold of the tension in your fist. Throw it all away with a blast. Make sure that you are using your diaphragm muscle vigorously while blasting out the breath in this practice.

Perform this practice 3, 6 or 9 times as necessary. After performing 3 to 9 rounds of this practice, relax in the standing position and enjoy the feeling of relief that sweeps through your arms as you relax with some deep breathing.

CHANDRA PRANAYAMA
Sit in Vajrasana and perform Nasarga Mudra with your right hand. Close your right nostril with your thumb. Inhale slowly through your left nostril for a count of four. Now exhale through the same left nostril for a count of eight.

Keep your right nostril closed throughout the duration of the practice. Repeat the Chandra Pranayama for a minimum of nine rounds at each session.

Patients of lifestyle disorders such as anxiety, hypertension, insomnia, diabetes and other stressful conditions can benefit by practising this Pranayama 27 times before breakfast, lunch, dinner and before going to bed at night.
**BHHRAMARI PRANAYAMA**

Sit on the heels in the Vajrasana with the spine erect. Perform the Shanmuki Mudra with the thumbs of the hands closing the external auditory canal. The first two fingers are then placed over the closed eyelids while the ring fingers regulate the flow of air through the nostrils. The little fingers are placed over the closed lips. This Mudra helps in joining together the nerves of the hands with the facial and trigeminal nerves on the face.

Take a slow and deep breath in for six counts. Let out the breath very slowly while making a sound in the nasal passages like the high-pitched sound of a female bee. This buzzing sound is very much like the Anuswarah sound of “mmm” of the Pranava AUM. Repeat this at least nine times.

Bhramari is one of the Swara Pranayamas and stimulates the secretions and tones up nerve centres. This helps relive Pitta conditions and rejuvenates the skin. It also creates a beautiful voice. It is a contemplative prelude to Nada Yoga.

**CONTEMPLATIVE PRACTICES**

**PRANA DHARANA-BREATH AWARENESS:** Sit in Vajrasana or lie down in Shava Asana. Begin to be aware of your breathing and how the air passes down from the nostrils into the lungs and then back out the nostrils. Feel the abdominal movements as the abdomen rises with the in breath and falls with the out breath. Let your awareness settle in the abdomen. Feel the cool inspired air flowing into the nostrils and the warm expired air flowing out of the nostrils. Let your awareness settle at the tip of the nose. Consciously regulate the breath so that the ratio of insp: exp is equal. It can be a 4, 6, 8 or 10 count. Perform nine rounds of this practice.

**MINDFULNESS BASED MEDITATION:** One of the most productive of the many forms of “quiet sitting”, popularly grouped under the heading of meditation is the mindfulness based awareness of one’s thoughts. This is to be done without identifying with the thoughts and without either justifying or condemning them. Take up a straight back sitting position and sit facing to the North or East in the early morning. Keep your mind as placid as possible, as this is the important feature of the early morning meditation. Breathe slowly and rhythmically, but very quietly. Do not upset the peace. Hold your mind concentrated inside your head at a point in line with the eyebrows. Relax. Don’t attempt to force visualization, simply be alert and expectant. Presently, you will have the sensation of movement within the head, as though watching a “ticker tape” of your thoughts. The thoughts will be in extreme slow motion. Observe the thoughts. Don’t get emotionally involved with them, just watch them. You will actually be able to see your thoughts, as well as hear them. Usually, the thoughts are quite mundane, but benign. Simply observe them, passively and dispassionately.

**OM JAPA:** Take up any meditative posture and start to perform the Savitri Pranayama in a 6 by 3 or 8 by 4 rhythm. Make an audible Pranava OM in the Bindu Nadi. With Japa-Ajapa, make silent intonation of the Pranava OM concentrating at this same point. Do not let the mind waver away from either a conscious repetition of the Mantra OM, as Japa, or as the silent Ajapa.

**AJAPA JAPA:** Take up any meditative posture and start to perform the Savitri Pranayama in a 6 by 3 or 8 by 4 rhythm. As you breathe in listen to the sound of SAH made as the breath enters your respiratory passages. As you breathe out listen to the sound of HUM that is made as the breath leaves your respiratory passages. Concentrate on this Ajapa Japa of HAMSA SOHAM in tune with the breath.
PROFILE

Panel Discussion- “Yoga and psychosomatic disorders”
Dr. S. Eswaran, MD, DM, FIPS.
Professor & Head Department of Psychiatry, MGMCRi, Pondicherry.

Dr. S. Eswaran, MD, DM, FIPS is Professor & Head Department of Psychiatry, MGMCRi, Pondicherry. He has previously worked in numerous institutes such as Grant Medical College in Bombay, Pushpagiri hospital (now medical college) in Kerala, N.S.S. Hospital in Pandalam, Indira Gandhi Memorial Hospital in Male’ of the Republic of Maldives and Perundurai Medical College in Erode. He is Fellow of the Indian Psychiatric Society, Member of the Indian Academy of Medical Specialties and has numerous publications and clinical drug trials. He has presented many papers and been resource person in seminars organised by WHO, Ministry of Health, Maldives, University of Newcastle, Australia, UNICEF, Ministry of Women’s Affairs & Social Security, Public Health, Education etc in Maldives. He has served as Hon. Secretary of the Bombay Psychiatric Society (1979-1980), Organising Secretary of the 10th Annual Conference of The Indian Psychiatric Society, West Zone Branch, At Bombay (1979), Executive committee member for the First International Conference of Community Psychiatry, at Bombay (1982), Past editor - Journal of Community Psychiatry & Mental Health, published by Institute of Community Psychiatry & Mental Health, Bombay as well as Sub-editor on the review committee panel of “Pediatrics Online” an indexed e-journal.
PROFILE

Panel Discussion- “Yoga and psychosomatic disorders”
Yogacharini Cathy Davis

Cathy Davis started her medical studies in nursing in 1970. She became a registered nurse in 1974, and worked as both a nurse and a midwife in the late 70’s in Bristol. She has over 40 years of experience in that field, where she has worked with a variety of patients. She completed her Advanced Diploma in Midwifery in 1996, and was Elected Council (Board) member of The Royal College of Midwives, UK National Organization (Professional Body and Trade Union) in 1998.

In 1999, she completed her B. Sc. Hons. Midwifery (St Austell Cornwall), and was, a few years after, re-elected to the Royal College of Midwives Council. In 2006, she was elected as an Honorary Treasurer to The Royal College of Midwives, a position she fulfilled until 2010.

Cathy Davis has, in parallel to her professional practice, devoted much of her life to the study, practice and teaching of Richiculture Ashtangha Yoga, as expounded by Yogamaharishi Dr Swami Gitananda Giri. She was introduced to Gitananda Yoga by Yogacharini Nandini Devi, and started giving Yoga classes to patients and staff at the Health Centre where she worked in the late 1970’s. After giving birth to her first daughter, she participated in the 6 month Teachers Training Course at ICYER (1980-1981) with her husband and child. She and her family then travelled to South India and Sri Lanka, thus deepening her understanding of Yogic concepts through these cultural experiences. She was awarded the title Yogacharini.

Proud mother of three girls, Cathy has been, since 2000, returning to ICYER practically every year. She is now a semi–retired midwife. During the last few years, as a senior student, she has taken on the role of Assistant Teacher at ICYER.
PROFILE:

Practice session – “Yogic techniques for healthy living”
Yoga Chemmal Meena Ramanathan

BSc, MA, CYT, DNYS, PGDY, MSc (Yoga), PhD (in progress).
Yogachemmal Mrs. Meena Ramanathan, is Co-ordinator of CYTER, the Centre for Yoga Therapy Education and Research at MGMCRRI (Mahatma Gandhi Medical college & Research Institute). She has completed numerous undergraduate and post graduate degrees and diplomas in Yoga, science and English and is currently pursuing a PhD in Yoga through Tamil Nadu Physical Education and Sports University.

A student of the Rishiculture Ashtanga Yoga Paramparya, she has been trained under the expert guidance of Kalaimamani Meenakshi Devi Bhavanani and Yogacharya Dr Ananda Balayogi Bhavanani. She has been an integral part of that tradition for over a decade. Mrs. Meena Ramanathan has admirably trained thousands of students under the auspices of Pondicherry University as Coordinator Yoga courses in the Community College, as well as faculty of Annamalai University, Manonmaniym University, MGR University and Yoganjali Natyalayam. She is coordinator of Outreach Programs of Yoganjali Natyalayam and is a guest faculty at ACYTER, JIPMER. For the past 5 years, she has been giving practical Yoga training to staff and students of Pondicherry University.

Mrs. Meena Ramanathan has authored and co-authored a dozen books, and, half a dozen papers on Yoga in English and Tamil, in various journals. Her books on Thirukkural and Yoga, Applied Yoga, Gheranda Samhita and Primer of Yoga Theory are best sellers. She has received many awards such as Yoga Rathna, Yoga SevaMaamani, Yoga Chemmal, Bangalore Sundaram Award, Yoga Jyothi, Chellammal Award, Annai Sivakami Award and Mahan Aravindar Anmiga Sudar Award. She has been doing yeomen service for the past 8 years for the cause of senior citizens and special children of Pondicherry.
AN ARTICLE

YOGA: AN ANCIENT LIFE STYLE SUITABLE FOR MODERN MAN
Yogacharini MEENAKSHI DEVI BHAVANANI

The word Yoga has firmly entrenched itself in the global vocabulary. From Pretoria to Moscow, from Beijing to Rio de Janeiro, mention the word “Yoga” and people’s eyes light up with recognition and a dim awareness that Yoga is indeed something of great value.

But what is the value of Yoga? And what values have become associated with this ancient Sanskrit word? The majority believe Yoga is valuable because it cures or prevents disease, making it a superb keep fit exercise. Others will only value its effectiveness in weight reduction. Some, a few, will concede that Yoga practice bestows peace of mind and a feeling of well being, even of increased energy levels. Of course no one will deny that Yoga does indeed produce all these things. But! This is not and never has been the goal of Yoga. All these results are merely side benefits. The real purpose of Yoga was, is and shall always be Moksha, liberation, the achievement of the Highest Goal of Human Life, oneness with the Universal Self.

Yoga is a methodology that has developed over millennia of experimentation by the great Rishis of India aimed at achieving the ultimate perfection of the human spirit. Yoga transforms the lower animal nature to a human one, and the human nature to a God-like Being, radiating Sat (Reality) Chit (Consciousness) and Anandam (Bliss).

Yoga is not a magic pill. It is not a technique, a trick, a convenient button which can be pressed to accomplish a mundane goal. Yoga is a Way of Life, Yoga is the lifestyle of the Rishis of India who “Saw Reality” and who were compassionate enough to return to lower levels of consciousness to show a path to these less developed themselves, enabling them to achieve the same pinnacle of unfoldment of spirit. Yoga is a wholistic way of life that encompasses all aspects of human existence: physical, mental, moral, ethical, emotional, material and spiritual. Yoga shows us how the human incarnation may be lived according to Dharma, the Cosmic Law.

Yoga is the Science of Right – Use – Ness: a methodology for using body, mind and emotions in the right manner. This involves a whole way of moving, non-moving, thinking, non-thinking, feeling, emoting, speaking, eating, working, sleeping, contemplating and even breathing. Yoga teaches us the correct manner to use all these aspects of our human life.

Yoga is a lifestyle which evolved in the hermitages of the Rishis of Bharat. Yet, it is pertinent even today. It is a lifestyle rooted in restraint of the animal impulses (Yama) and cultivation of humane virtues (Niyama). It is discipline of body (Asana) and control of breath / Prana movement (Pranayama). Yoga advocates conscious use (not misuse) of the sensory organs both the Jnanendriyas as well as the Karmendriyas (Pratyahara). It teaches the correct use of mind in a non-personal, objective, positive, directed manner (Dharana). All these aspects of controlled living are woven into a natural, non-harmful, non-acquisitive, sensitive, simple, regulated life style which is guided by the high ideas of Dharma and Moksha.

Yoga, that most popular modern word, is a sound like an atomic bomb, which when penetrated deeply releases energy powerful enough to lift all its practitioners into higher realms of consciousness, propelling the Jiva far, far beyond the puny personality into the grand vision and life style of a true Universality.

Ashram Acharya and Director, International Centre for Yoga Education and Research at Ananda Ashram, Pondicherry. www.icyer.com and www.rishiculture.org
RESEARCH STUDIES ON YOGA THAT CAN PROVIDE A SCIENTIFIC BASIS OF USING YOGA IN PREVENTION AND MANAGEMENT OF LIFESTYLE DISORDERS


YOGA AS A THERAPEUTIC INTERVENTION: A BIBLIOMETRIC ANALYSIS OF PUBLISHED RESEARCH STUDIES.
Khalsa SB.

Although yoga is historically a spiritual discipline, it has also been used clinically as a therapeutic intervention. A bibliometric analysis on the biomedical journal literature involving research on the clinical application of yoga has revealed an increase in publication frequency over the past 3 decades with a substantial and growing use of randomized controlled trials. Types of medical conditions have included psychopathological (e.g. depression, anxiety), cardiovascular (e.g. hypertension, heart disease), respiratory (e.g. asthma), diabetes and a variety of others. A majority of this research has been conducted by Indian investigators and published in Indian journals, particularly yoga specialty journals, although recent trends indicate increasing contributions from investigators in the U.S. and England. Yoga therapy is a relatively novel and emerging clinical discipline within the broad category of mind-body medicine, whose growth is consistent with the burgeoning popularity of yoga in the West and the increasing worldwide use of alternative medicine.


A REVIEW OF YOGA PROGRAMS FOR FOUR LEADING RISK FACTORS OF CHRONIC DISEASES.
Yang K.

Yoga, a form of physical activity, is rapidly gaining in popularity and has many health benefits. Yet healthcare providers have been slow to recognize yoga for its ability to improve health conditions, and few interventions have been developed that take full advantage of its benefits. The purpose of this article is to review published studies using yoga programs and to determine the effect of yoga interventions on common risk factors of chronic diseases (overweight, hypertension, high glucose level and high cholesterol). A systematic search yielded 32 articles published between 1980 and April 2007. The studies found that yoga interventions are generally effective in reducing body weight, blood pressure, glucose level and high cholesterol, but only a few studies examined long-term adherence. Additionally, not enough studies included diverse populations at high risk for diabetes and its related common health problems.


LIFESTYLE MODIFICATION IN MANAGEMENT OF DIABETES MELLITUS
Sahay BK, Sahay RK.

India has the largest diabetic population in the world. Change in eating habits, increasing weight and decreased physical activity are major factors leading to increased incidence of type 2 diabetes. Obesity is the most important modifiable risk factor. Smoking is an independent risk factor for type 2 diabetes mellitus. Diet and exercise are primary therapeutic options for its management. Dietary management should not only aim to achieve glycaemic control but to normalise dyslipidaemia. Smoking cessation reduces the risk of morbidity and mortality in CAD. Exercise improves the condition of a diabetic patient. Exercise includes yoga practices which have a role to play in the prevention of type 2 diabetes.


EFFECT OF YOGA BASED LIFESTYLE INTERVENTION ON SUBJECTIVE WELL-BEING.
Sharma R, Gupta N, Bijlani RL.

Yoga is assuming importance in improving mental health and quality of life in the treatment of a number of psychiatric and psychosomatic disorders. The present study was a prospective controlled study to explore the short-term impact of a comprehensive but brief lifestyle intervention, based on yoga, on subjective well being levels in normal and diseased subjects. Normal healthy individuals and subjects having hypertension, coronary artery disease, diabetes mellitus or a variety of other illnesses were included in the study. The outcome measures were 'subjective well being inventory' (SUBI) scores, taken on the first and last day of the course. The inventory consists of questions related to one's feelings and attitude about various areas of life, such as happiness, achievement and interpersonal relationship. There was significant improvement in the subjective well being scores of the 77 subjects within a period of 10 days as
compared to controls. These observations suggest that a short lifestyle modification and stress management educational program leads to remarkable improvement in the subjective well being scores of the subjects and can therefore make an appreciable contribution to primary prevention as well as management of lifestyle diseases.

Fam Community Health. 2008 Jul-Sep;31(3):228-39
CONTEXTUALIZING THE EFFECTS OF YOGA THERAPY ON DIABETES MANAGEMENT: A REVIEW OF THE SOCIAL DETERMINANTS OF PHYSICAL ACTIVITY.
Alexander GK, Taylor AG, Innes KE, Kubok P, Selfe TK.
This article provides a review of literature both to identify the effects of yoga-based therapy on the management of type 2 diabetes mellitus and to examine the social context of physical activity. Findings from the review indicate that yoga has a positive short-term effect on multiple diabetes-related outcomes; however, long-term effects of yoga therapy on diabetes management remain unclear. The context of the social environment, including interpersonal relationships, community characteristics, and discrimination, influences the adoption and maintenance of health behaviors such as physical activity, including yoga practice. Further research is necessary to determine the extent of this influence.

ASHTANGA YOGA FOR CHILDREN AND ADOLESCENTS FOR WEIGHT MANAGEMENT AND PSYCHOLOGICAL WELL BEING: AN UNCONTROLLED OPEN PILOT STUDY.
Benavides S, Caballero J.
OBJECTIVE: The objective of this pilot study was to determine the effect of yoga on weight in youth at risk for developing type 2 diabetes. Secondly, the impact of participation in yoga on self-concept and psychiatric symptoms was measured. METHODS: A 12-week prospective pilot Ashtanga yoga program enrolled twenty children and adolescents. Weight was measured before and after the program. All participants completed self-concept, anxiety, and depression inventories at the initiation and completion of the program. RESULTS: Fourteen predominately Hispanic children, ages 8-15, completed the program. The average weight loss was 2kg. Weight decreased from 61.2 +/- 20.2kg to 59.2 +/- 19.2kg (p=0.01). Four of five children with low self-esteem improved, although two had decreases in self-esteem. Anxiety symptoms improved in the study. CONCLUSION: Ashtanga yoga may be beneficial as a weight loss strategy in a predominately Hispanic population.

BMC Health Serv Res. 2009 Feb 19;9:33.
COMMUNITY BASED YOGA CLASSES FOR TYPE 2 DIABETES: AN EXPLORATORY RANDOMISED CONTROLLED TRIAL.
Skoro-Kondza L, Tai SS, Gadelrab R, Drincevic D, Greenhalgh T.
BACKGROUND: Yoga is a popular therapy for diabetes but its efficacy is contested. The aim of this study was to explore the feasibility of researching community based yoga classes in Type 2 diabetes with a view to informing the design of a definitive, multi-centre trial METHODS: The study design was an exploratory randomised controlled trial with in-depth process evaluation. The setting was two multi-ethnic boroughs in London, UK; one with average and one with low mean socio-economic deprivation score. Classes were held at a sports centre or GP surgery. Participants were 59 people with Type 2 diabetes not taking insulin, recruited from general practice lists or opportunistically by general practice staff. The intervention group were offered 12 weeks of a twice-weekly 90-minute yoga class; the control group was a waiting list for the yoga classes. Both groups received advice and leaflets on healthy lifestyle and were encouraged to exercise. Primary outcome measure was HbA1c. Secondary outcome measures included attendance, weight, waist circumference, lipid levels, blood pressure, UKPDS cardiovascular risk score, diabetes-related quality of life (ADDQoL), and self-efficacy. Process measures were attendance at yoga sessions, self-reported frequency of practice between taught sessions, and qualitative data (interviews with patients and therapists, ethnographic observation of the yoga classes, and analysis of documents including minutes of meetings, correspondence, and exercise plans). RESULTS: Despite broad inclusion criteria, around two-thirds of the patients on GP diabetic registers proved ineligible, and 90% of the remainder declined to participate. Mean age of participants was 60 +/- 10 years. Attendance at yoga classes was around 50%. Nobody did the exercises regularly at home. Yoga teachers felt that most participants were unsuitable for ‘standard’ yoga exercises because of limited flexibility, lack of basic fitness, co-morbidity, and lack of confidence. There was a small fall in HbA1c in the yoga group which was not statistically significant and which was not sustained six months later, and no significant change in other outcome measures. CONCLUSION: The benefits of yoga in type 2 diabetes
suggested in some previous studies were not confirmed. Possible explanations (apart from lack of efficacy) include recruitment challenges; practical and motivational barriers to class attendance; physical and motivational barriers to engaging in the exercises; inadequate intensity and/or duration of yoga intervention; and insufficient personalisation of exercises to individual needs. All these factors should be considered when designing future trials.

Evid Based Complement Alternat Med. 2008 May 7

YOGA PRACTICE FOR THE MANAGEMENT OF TYPE II DIABETES MELLITUS IN ADULTS: A SYSTEMATIC REVIEW.

Aljasir B, Bryson M, Al-Shehri B.

The effect of practicing yoga for the management of type II Diabetes was assessed in this systematic review through searching related electronic databases and the grey literature to the end of May 2007 using Ovid. All randomized controlled clinical trials (RCTs) comparing yoga practice with other type of intervention or with regular practice or both, were included regardless of language or type of publication. Each study was assessed for quality by two independent reviewers. Mean difference was used for summarizing the effect of each study outcomes with 95% confidence intervals. Pooling of the studies did not take place due to the wide clinical variation between the studies. Publication bias was assessed by statistical methods. Five trials with 363 participants met the inclusion criteria with medium to high risk of bias and different intervention characteristics. The studies' results show improvement in outcomes among patients with diabetes type II. These improvements were mainly among short term or immediate diabetes outcomes and not all were statistically significant. The results were inconclusive and not significant for the long-term outcomes. No adverse effects were reported in any of the included studies. Short-term benefits for patients with diabetes may be achieved from practicing yoga. Further research is needed in this area. Factors like quality of the trials and other methodological issues should be improved by large randomized control trials with allocation concealment to assess the effectiveness of yoga on diabetes type II. A definitive recommendation for physicians to encourage their patients to practice yoga cannot be reached at present.


INSULIN SENSITIVITY AND CARDIAC AUTONOMIC FUNCTION IN YOUNG MALE PRACTITIONERS OF YOGA.

Chaya MS, Ramakrishnan G, Shastry S et al

BACKGROUND: While yoga is thought to reduce the risk of chronic non-communicable diseases such as diabetes, there are no studies on insulin sensitivity in long term practitioners of yoga. We assessed insulin sensitivity and cardiac autonomic function in long term practitioners of yoga. METHODS: Fifteen healthy, young, male practitioners of yoga were compared with 15 young, healthy males who did not practice yoga matched for body-mass index. Fasting insulin sensitivity was measured in the fasting state by the hyperinsulinaemic-euglycaemic clamp. RESULTS: There were no significant differences between the groups in their anthropometry or body composition. However, the fasting plasma insulin was significantly lower in the yoga group. The yoga group was also more insulin sensitive (yoga 7.82 [2.29] v. control 4.86 [11.97] (mg/[kg.min])/(microU/ml), p < 0.001). While the body weight and waist circumference were negatively correlated with glucose disposal rate in the controls, there were no similar correlations in the yoga group. The yoga group had significantly higher low-frequency power and lower normalized high-frequency power. CONCLUSION: Long term yoga practice (for 1 year or more) is associated with increased insulin sensitivity and attenuates the negative relationship between body weight or waist circumference and insulin sensitivity.

Metab Syndr Relat Disord. 2008 Fall;6(3):223-9.

RESTORATIVE YOGA IN ADULTS WITH METABOLIC SYNDROME: A RANDOMIZED, CONTROLLED PILOT TRIAL

Cohen BE, Chang AA, Grady D, Kanaya AM.

BACKGROUND: Metabolic syndrome increases the risk of diabetes and cardiovascular disease. Yoga improves some metabolic parameters, but it has not been studied in persons with metabolic syndrome. We conducted a randomized controlled pilot trial to determine whether a restorative yoga intervention was feasible and acceptable in underactive, overweight adults with metabolic syndrome. METHODS: Twenty six underactive, overweight adult men and women with metabolic syndrome were randomized to attend 15 yoga sessions of 90 minutes each over 10 weeks or to a wait-list control group. Feasibility was measured by recruitment rates, subject retention, and adherence. Acceptability was
assessed by interview and questionnaires. Changes in metabolic outcomes and questionnaire measures from baseline to week 10 were calculated. RESULTS: A total of 280 people were screened by phone, and 93 with high likelihood of metabolic syndrome were invited to a screening visit. Of the 68 who attended screening visits, 26 (38%) were randomized, and 24 (92%) completed the trial. Attendance at yoga classes and adherence to home practice exceeded our goals. In the yoga group, all participants gave the study the highest possible satisfaction rating, and the majority (87%) felt that the yoga poses were easy to perform. There was trend to reduced blood pressure (p = 0.07), a significant increase in energy level (p < 0.009), and trends to improvement in well-being (p < 0.12) and stress (p < 0.22) in the yoga versus control group. CONCLUSIONS: Restorative yoga was a feasible and acceptable intervention in overweight adults with metabolic syndrome. The efficacy of yoga for improving metabolic parameters in this population should be explored in a larger randomized controlled trial.


EFFECT OF EXERCISE THERAPY ON LIPID PROFILE AND OXIDATIVE STRESS INDICATORS IN PATIENTS WITH TYPE 2 DIABETES.

Gordon LA, Morrison EY, McGrowder DA et al

BACKGROUND: Yoga has been shown to be a simple and economical therapeutic modality that may be considered as a beneficial adjuvant for type 2 diabetes mellitus. This study investigated the impact of Hatha yoga and conventional physical training (PT) exercise regimens on biochemical, oxidative stress indicators and oxidant status in patients with type 2 diabetes. METHODS: This prospective randomized study consisted of 77 type 2 diabetic patients in the Hatha yoga exercise group that were matched with a similar number of type 2 diabetic patients in the conventional PT exercise and control groups. Biochemical parameters such as fasting blood glucose (FBG), serum total cholesterol (TC), triglycerides, low-density lipoprotein (LDL), very low-density lipoproteins (VLDL) and high-density lipoprotein (HDL) were determined at baseline and at two consecutive three monthly intervals. The oxidative stress indicators (malondialdehyde - MDA, protein oxidation - POX, phospholipase A2 - PLA2 activity) and oxidative status [superoxide dismutase (SOD) and catalase activities] were measured. RESULTS: The concentrations of FBG in the Hatha yoga and conventional PT exercise groups after six months decreased by 29.48% and 27.43% respectively (P < 0.0001) and there was a significant reduction in serum TC in both groups (P < 0.0001). The concentrations of VLDL in the managed groups after six months differed significantly from baseline values (P = 0.036). Lipid peroxidation as indicated by MDA significantly decreased by 19.9% and 18.1% in the Hatha yoga and conventional PT exercise groups respectively (P < 0.0001); whilst the activity of SOD significantly increased by 24.08% and 20.18% respectively (P = 0.031). There was no significant difference in the baseline and 6 months activities of PLA2 and catalase after six months although the latter increased by 13.68% and 13.19% in the Hatha yoga and conventional PT exercise groups respectively (P = 0.144). CONCLUSION: The study demonstrate the efficacy of Hatha yoga exercise on fasting blood glucose, lipid profile, oxidative stress markers and antioxidant status in patients with type 2 diabetes and suggest that Hatha yoga exercise and conventional PT exercise may have therapeutic preventative and protective effects on diabetes mellitus by decreasing oxidative stress and improving antioxidant status. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry (ANZCTR): ACTRN12608000217303.

TWISTING WITHOUT SHOUTING. A GENTLE INTRODUCTION TO THE JOYS OF YOGA.
Butler C.
A small trial of type 2 patients from London's Yoga Biomedical Trust found that a 12-week yoga program helped reduce fasting blood glucose and hemoglobin A1C levels; the much larger Medicare Demonstration Project, which tracked more than 2,000 people with heart disease who did yoga and made other lifestyle changes for a year, saw similar results in participants who had diabetes, after both 12 weeks and 1 year. [...] researchers at the University College of Medical Sciences in Delhi, India, have found, through various studies, that daily yoga classes can decrease fasting blood glucose, blood glucose after meals, hemoglobin A1C, systolic and diastolic blood pressure, and also improve insulin resistance.

PSYCHOLOGICAL, SOCIAL AND BIOLOGICAL DETERMINANTS OF ILL HEALTH (PSOBID): STUDY PROTOCOL OF A POPULATION-BASED STUDY.
Velupillai YN, Packard CJ, Batty GD et al

BACKGROUND: Disadvantaged communities suffer higher levels of physical and mental ill health than more advantaged communities. The purpose of the present study was to examine the psychosocial, behavioural and biological determinants of ill health within population groups in Glasgow that differed in socioeconomic status and in their propensity to develop chronic disease especially coronary heart disease and Type 2 diabetes mellitus.

METHODS: Participants were selected at random from areas known to be at the extremes of the socioeconomic continuum in Glasgow. Within the categories of least deprived and most deprived, recruitment was stratified by sex and age to achieve an overall sample containing approximately equal numbers of males and females and an even distribution across the age categories 35–44, 45–54 and 55–64 years. Individuals were invited by letter to attend for assessment of their medical history, risk factor status, cognitive function and psychological profile, morbidity, and carotid intima-media thickness and plaque count as indices of atherosclerosis. Anonymised data on study subjects were collected from the General Practice Administration System for Scotland to analyse characteristics of participants and non-participants.

RESULTS: 700 subjects were recruited. The response (active participants per 100 invitation letters) in the least deprived group was 35.1% and in the most deprived group was 20.3%. Lowest response was seen in young males (least deprived 22.4% and most deprived 14.1%).

CONCLUSION: This cross-sectional study recruited the planned sample of subjects from least deprived and most deprived areas within Glasgow. As evident in other studies response differed between the most and least deprived areas. This study brought together researchers/academics from diverse disciplines to build a more sophisticated understanding of the determinants of health inequalities than can be achieved through unidisciplinary approaches. Future analyses will enable an understanding of the relationships between the different types of measure, and of the pathways that link poverty, biology, behaviour and psychology and lead to health inequalities.


THE INFLUENCE OF YOGA-BASED PROGRAMS ON RISK PROFILES IN ADULTS WITH TYPE 2 DIABETES MELLITUS: A SYSTEMATIC REVIEW.

Innes KE, Vincent HK.

There is growing evidence that yoga may offer a safe and cost-effective intervention for Type 2 Diabetes mellitus (DM 2). However, systematic reviews are lacking. This article critically reviews the published literature regarding the effects of yoga-based programs on physiologic and anthropometric risk profiles and related clinical outcomes in adults with DM 2. We performed a comprehensive literature search using four computerized English and Indian scientific databases. The search was restricted to original studies (1970–2006) that evaluated the metabolic and clinical effects of yoga in adults with DM 2. Studies targeting clinical populations with cardiovascular disorders that included adults with comorbid DM were also evaluated. Data were extracted regarding study design, setting, target population, intervention, comparison group or condition, outcome assessment, data analysis and presentation, follow-up, and key results, and the quality of each study was evaluated according to specific predetermined criteria. We identified 25 eligible studies, including 15 uncontrolled trials, 6 non-randomized controlled trials and 4 randomized controlled trials (RCTs). Overall, these studies suggest beneficial changes in several risk indices, including glucose tolerance and insulin sensitivity, lipid profiles, anthropometric characteristics, blood pressure, oxidative stress, coagulation profiles, sympathetic activation and pulmonary function, as well as improvement in specific clinical outcomes. Yoga may improve risk profiles in adults with DM 2, and may have promise for the prevention and management of cardiovascular complications in this population. However, the limitations characterizing most studies preclude drawing firm conclusions. Additional high-quality RCTs are needed to confirm and further elucidate the effects of standardized yoga programs in populations with DM 2.


NATIONAL PATTERNS AND CORRELATES OF COMPLEMENTARY AND ALTERNATIVE MEDICINE USE IN ADULTS WITH DIABETES.

Garrow D, Egede LE.

OBJECTIVE: The aim of this study was to determine national patterns and correlates of complementary and alternative medicine (CAM) use among adults with diabetes. METHODS: The authors compared CAM use in 2474 adults with and 28,625 adults without diabetes who participated in the most comprehensive national survey on CAM use (2002 National Health Interview Survey). Eight CAM use categories were created, including dietary, herbal, chiropractic, yoga, relaxation, vitamin, prayer, and other (acupuncture, Ayurveda, biofeedback, chelation, energy healing or Reiki therapy, hypnosis, massage, naturopathy, and homeopathy). An overall CAM use category also was created that...
excluded vitamins and prayer. Patterns of use were compared with chi-square and independent correlates of CAM use with multiple logistic regression controlling for relevant covariates. STATA was used for analysis to account for the complex survey design. RESULTS: Prevalence of overall use of CAM did not differ significantly by diabetes status (47.6 versus 47.9%, p = 0.81). Diabetes was not an independent predictor of overall use of CAM (OR 0.93, 95% confidence interval [CI] 0.83, 1.05). However, persons with diabetes were more likely to use prayer (OR 1.19, 95% CI 1.05, 1.36), but less likely to use herbs (OR 0.86, 95% CI 0.75, 0.99), yoga (OR 0.56, 95% CI 0.43, 0.72), or vitamins (OR 0.82, 95% CI 0.72, 0.93) than people without diabetes after controlling for relevant covariates. Independent correlates of overall use of CAM differed by age, income, employment, comorbidity, and health status between people with and without diabetes. CONCLUSIONS: This study found that there has been a dramatic increase in overall use of CAM in adults with diabetes; diabetes was not an independent predictor of overall use of CAM; and people with diabetes were more likely to use prayer, but less likely to use herbs, yoga, or vitamins compared to persons without diabetes.


ROLE OF YOGA IN DIABETES.
Sahay BK.

The science of yoga is an ancient one. It is a rich heritage of our culture. Several older books make a mention of the usefulness of yoga in the treatment of certain diseases and preservation of health in normal individuals. The effect of yogic practices on the management of diabetes has not been investigated well. We carried out well designed studies in normal individuals and those with diabetes to assess the role of yogic practices on glycaemic control, insulin kinetics, body composition exercise tolerance and various co-morbidities like hypertension and dyslipidemia. These studies were both short term and long-term. These studies have confirmed the useful role of yoga in the control of diabetes mellitus. Fasting and postprandial blood glucose levels came down significantly. Good glycaemic status can be maintained for long periods of time. There was a lowering of drug requirement and the incidence of acute complications like infection and ketosis was significantly reduced. There were significant changes in the insulin kinetics and those of counter-regulatory hormones like cortisol. There was a decrease in free fatty acids. There was an increase in lean body mass and decrease in body fat percentage. The number of insulin receptors was also increased. There was an improvement in insulin sensitivity and decline in insulin resistance. All these suggest that yogic practices have a role even in the prevention of diabetes. There is a beneficial effect on the co-morbid conditions like hypertension and dyslipidemia.


PERIPHERAL NEUROPATHY: PATHOGENIC MECHANISMS AND ALTERNATIVE THERAPIES.
Head KA.

Peripheral neuropathy (PN), associated with diabetes, neurotoxic chemotherapy, human immunodeficiency virus (HIV)/antiretroviral drugs, alcoholism, nutrient deficiencies, heavy metal toxicity, and other etiologies, results in significant morbidity. Conventional pain medications primarily mask symptoms and have significant side effects and addiction profiles. However, a widening body of research indicates alternative medicine may offer significant benefit to this patient population. Alpha-lipoic acid, acetyl-L-carnitine, benfotiamine, methylcobalamin, and topical capsaicin are among the most well-researched alternative options for the treatment of PN. Other potential nutrient or botanical therapies include vitamin E, glutathione, folate, pyridoxine, biotin, myo-inositol, omega-3 and -6 fatty acids, L-arginine, L-glutamine, taurine, N-acetylcysteine, zinc, magnesium, chromium, and St. John’s wort. In the realm of physical medicine, acupuncture, magnetic therapy, and yoga have been found to provide benefit. New cutting-edge conventional therapies, including dual-action peptides, may also hold promise.


EFFECT OF YOGA BASED LIFESTYLE INTERVENTION ON STATE AND TRAIT ANXIETY.
Gupta N, Khera S, Vempati RP, Sharma R, Bijlani RL.

Considerable evidence exists for the place of mind body medicine in the treatment of anxiety disorders. Excessive anxiety is maladaptive. It is often considered to be the major component of unhealthy lifestyle that contributes significantly to the pathogenesis of not only psychiatric but also many other systemic disorders. Among the approaches to reduce the level of anxiety has been the search for healthy lifestyles. The aim of the study was to study the short-term impact of a comprehensive but brief lifestyle intervention, based on yoga, on anxiety levels in normal and diseased subjects. The study was the result of operational research carried out in the Integral Health Clinic (IHC) at the Department
of Physiology of All India Institute of Medical Sciences. The subjects had history of hypertension, coronary artery disease, diabetes mellitus, obesity, psychiatric disorders (depression, anxiety, ‘stress’), gastrointestinal problems (non ulcer dyspepsia, duodenal ulcers, irritable bowel disease, Crohn’s disease, chronic constipation) and thyroid disorders (hyperthyroidism and hypothyroidism). The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, and lectures and films on philosophy of yoga, the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were anxiety scores, taken on the first and last day of the course. Anxiety scores, both state and trait anxiety were significantly reduced. Among the diseased subjects significant improvement was seen in the anxiety levels of patients of hypertension, coronary artery disease, obesity, cervical spondylitis and those with psychiatric disorders. The observations suggest that a short educational programme for lifestyle modification and stress management leads to remarkable reduction in the anxiety scores within a period of 10 days.

THE BENEFICIAL EFFECT OF YOGA IN DIABETES.
Malhotra V, Singh S, Tandon OP, Sharma SB.
Twenty NIDDM subjects (mild to moderate diabetics) in the age group of 30-60 years were selected from the outpatient clinic of G.T.B. hospital. They were on a 40 days yoga asana regime under the supervision of a yoga expert. 13 specific Yoga asanas < or = done by Type 2 Diabetes Patients included. Surya Namaskar, Trikonasana, Tadasana, Sukhasana, Padmasana, Bhashrika Pranayama, Pashimottanasana, Ardhamatsyendrasana, Pawanmuktasana, Bhujangasana, Vajrasana, Dhanurasana and Shavasana are beneficial for diabetes mellitus. Serum insulin, plasma fasting and one hour postprandial blood glucose levels and anthropometric parameters were measured before and after yoga asanas. The results indicate that there was significant decrease in fasting glucose levels from basal 208.3 +/- 20.0 to 171.7 +/- 19.5 mg/dl and one hour postprandial blood glucose levels decreased from 295.3 +/- 22.0 to 269.7 +/- 19.9 mg/dl. The exact mechanism as to how these postures and controlled breathing interact with somatoendocrine mechanism affecting insulin kinetics was worked out. A significant decrease in waist-hip ratio and changes in insulin levels were also observed, suggesting a positive effect of yoga asanas on glucose utilisation and fat redistribution in NIDDM. Yoga asanas may be used as an adjunct with diet and drugs in the management of Type2 diabetes.

USAGE OF AND COST OF COMPLEMENTARY/ALTERNATIVE MEDICINE IN DIABETIC PATIENTS.
Moolasarn S, Sripa S, Kuessirikiet V et al
The purposes of the present survey research in diabetic patients were 1) to determine characteristics of complementary/alternative medicine (CAM) use, 2) to identify factors related to CAM use such as sociodemographic, adverse effects, and quality of life, and 3) to determine differences between patients who used and did not use CAM. The data was collected through developed questionnaires and SF-36 scale Thai version. Samples were 159 diabetes patients over 18 years of age or older who came for treatment at Suppasitthiprasong Hospital, Ubon Ratchathani Province, Thailand. The results indicated that the prevalence of CAM use was rather high (47.8%). The most common types of CAM used were yoga/exercise (32.8%), unchanged form of herbal medicine (29.9%), and changed form herbal medicine (17.8%). The average expense of CAM use was dollar 8.58 per person per month. Thus, if the percentage of CAM use and the cost were true for other Thai diabetic patients throughout Thailand, CAM use expenditure for the whole country would be about dollar 915,250-1,545,750 per month, which is quite high for a small country like Thailand. Most patients (64.4%) who used CAM did not inform their doctors about their CAM use. Results also indicated that government official patients were more likely to use CAM than those of farmer patients significantly (p-value = 0.03, odds ratio = 12.11). In addition, the present study found that patients who had a higher income were more likely to use CAM than those of lower income patients significantly (p - value = 0.04, odds ratio = 1.01). However, other factors such as age, sex, marital status, level of education, health insurance coverage status, duration of time to treat, occurrence of adverse effects, and quality of life were not different between the patients who used CAM and who did not use CAM. Physicians should pay more attention to the CAM use of patients since they used CAM without informing physicians and some herbal medicines may cause hypoglycemia. However, the study results had some limitations to apply to other Thai populations since the sample were Suppasitthiprasong patients who may be different from other Thai populations in many ways such as their local culture, belief, and CAM use types and cost.
THE ROLE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN DIABETES.

Dham S, Shah V, Hirsch S, Banerji MA.

Complementary and alternative medicine (CAM) describes a diverse group of medical and health care systems, practices, and products not currently considered to be part of conventional medicine. Inadequacies in current treatments for diabetes have led 2 to 3.6 million Americans to use CAM for diabetes treatment, despite limited studies of safety and efficacy of CAM methods. CAM is used mostly by West Indians, Africans, Indians, Latin Americans, or Asians. Prayer, acupuncture, massage, hot tub therapy, biofeedback, and yoga have been used as well as various plant remedies for treating diabetes. Several CAM practices and herbal remedies are promising for diabetes treatment, but further rigorous study is needed in order to establish safety, efficacy, and mechanism of action. In the meantime, it is important to be aware that many patients with diabetes may be using CAM and to consider potential interactions with conventional medicines being used.

AN INVESTIGATION INTO THE ACUTE AND LONG-TERM EFFECTS OF SELECTED YOGIC POSTURES ON FASTING AND POSTPRANDIAL GLYCEMIA AND INSULINEMIA IN HEALTHY YOUNG SUBJECTS.

Manjunatha S, Vempati RP, Ghosh D, Bijlani RL.

The study was conducted to examine the hypothesis that yogasanas help in the treatment of diabetes mellitus by releasing insulin from the pancreas. Twenty healthy young volunteers (17 male, 3 female; age 19-31 years) participated in the study. Each volunteer performed four sets of asanas in random order for 5 consecutive days each with a 2-day gap between consecutive sets of asanas. The four sets of asanas were: (I) dhanurasana + matsyendrasana, (II) halasana + vajrasana, (III) naukasana + bhujangasana, and (IV) setubandhasana + pavanamuktasana. Blood samples were collected on days 4 and 5 of each set of asanas for measurement of glucose and insulin levels before the asanas, within 10 min after performing the asanas, and 30 min after ingestion of 75 g glucose, which in turn was ingested immediately after the second blood sample. A standard 75 g oral glucose tolerance test (OGTT) was also done before and after the study. On the days of the pre-study or post-study OGTT, no asanas were done. The serum insulin levels after the asanas were lower (P<0.05) than those before the asanas. However, the serum insulin level 0.5 h after the post-asana oral 75 g-glucose challenge was higher (P<0.05) in Set IV than the 0.5 h postprandial insulin level in the pre-study OGTT; the same trend was observed in other sets as well although statistically not significant. The observations suggest that the performance of asanas led to increased sensitivity of the B cells of pancreas to the glucose signal. The increased sensitivity seems to be a sustained change resulting from a progressive long-term effect of asanas. The study is significant in that it has for the first time attempted to probe the mechanism by which yogasanas help diabetes mellitus.

ASSOCIATION BETWEEN COMPLEMENTARY AND ALTERNATIVE MEDICINE USE, PREVENTIVE CARE PRACTICES, AND USE OF CONVENTIONAL MEDICAL SERVICES AMONG ADULTS WITH DIABETES.

Garrow D, Egede LE.

OBJECTIVE: To assess the association between complementary and alternative medicine (CAM) use, preventive care practices, and use of conventional medical services among adults with diabetes. RESEARCH DESIGN AND METHODS: We analyzed data on 2,474 adults with diabetes. We created an overall CAM-use category based on use of any of the following: diets, herbs, chiropractic care, yoga, relaxation, acupuncture, ayurveda, biofeedback, chelation, energy healing, Reiki therapy, hypnosis, massage, naturopathy, and homeopathy. We used multiple logistic regression to assess the effect of CAM use on preventive care practices (receipt of influenza and pneumonia vaccines) and use of conventional medical services (number of primary care and emergency department visits). STATA was used for statistical analysis to account for the complex survey design. RESULTS: A total of 48% of adults with diabetes used some form of CAM. CAM use was independently associated with receipt of pneumonia vaccination (odds ratio 1.56 [95% CI 1.26–1.94]) but not significantly associated with receipt of influenza vaccination (1.17 [0.92–1.48]). CAM use was independently associated with visiting the emergency department (1.34 [1.06–1.70]), having six or more primary care visits (1.44 [1.14–1.83]), and having eight or more primary care visits (1.66 [1.22–2.25]). CONCLUSIONS: In contrast to the findings of previous studies, CAM use appears to be associated with increased likelihood of receipt of
preventive care services and increased emergency department and primary care visits. CAM use may not be a barrier to use of conventional medical services in adults with diabetes.

**J Altern Complement Med. 2005 Apr;11(2):267-74.**

**A BRIEF BUT COMPREHENSIVE LIFESTYLE EDUCATION PROGRAM BASED ON YOGA REDUCES RISK FACTORS FOR CARDIOVASCULAR DISEASE AND DIABETES MELLITUS.**

Bijlani RL, Vempati RP, Yadav RK et al

**OBJECTIVES:** The objective of the study was to study the short-term impact of a brief lifestyle intervention based on yoga on some of the biochemical indicators of risk for cardiovascular disease and diabetes mellitus. **DESIGN:** The variables of interest were measured at the beginning (day 1) and end (day 10) of the intervention using a pre-post design. **SETTING:** The study is the result of operational research carried out in our Integral Health Clinic (IHC). The IHC is an outpatient facility which conducts 8-day lifestyle modification programs based on yoga for prevention and management of chronic disease. A new course begins every alternate week of the year. **SUBJECTS:** The study is based on data collected on 98 subjects (67 male, 31 female), ages 20-74 years, who attended one of our programs. The subjects were a heterogeneous group of patients with hypertension, coronary artery disease, diabetes mellitus, and a variety of other illnesses. **INTERVENTION:** The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, lectures and films on philosophy of yoga and the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. **OUTCOME MEASURES:** The outcome measures were fasting plasma glucose and serum lipoprotein profile. **RESULTS:** Fasting plasma glucose, serum total cholesterol, low-density lipoprotein (LDL) cholesterol, very- LDL cholesterol, the ratio of total cholesterol to high density lipoprotein (HDL) cholesterol, and total triglycerides were significantly lower, and HDL cholesterol significantly higher, on the last day of the course compared to the first day of the course. The changes were more marked in subjects with hyperglycemia or hypercholesterolemia. **CONCLUSIONS:** The observations suggest that a short lifestyle modification and stress management education program leads to favorable metabolic effects within a period of 9 days.

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**ROLE OF YOGA IN MODIFYING CERTAIN CARDIOVASCULAR FUNCTIONS IN TYPE 2 DIABETIC PATIENTS.**

Singh S, Malhotra V, Singh KP, Madhu SV, Tandon OP.

**OBJECTIVES:** 1. To study the effect of forty days of Yogic exercises on cardiac functions in Type 2 Diabetics. 2. To study the effect of forty days of Yogic exercises on blood glucose level, glycosylated hemoglobin. **METHODS:** The present study done in twenty-four Type 2 DM cases provides metabolic and clinical evidence of improvement in glycaemic control and autonomic functions. These middle-aged subjects were type II diabetics on antihyperglycaemic and dietary regimen. Their baseline fasting and postprandial blood glucose and glycosylated Hb were monitored along with autonomic function studies. The expert gave these patients training in yoga asanas and they pursued those 30-40 min/day for 40 days under guidance. These asanas consisted of 13 well known postures, done in a sequence. After 40 days of yoga asanas regimen, the parameters were repeated. **RESULTS:** The results indicate that there was significant decrease in fasting blood glucose levels from basal 190.08 +/- 18.54 in mg/dl to 141.5 +/- 16.3 in mg/dl after yoga regimen. The post prandial blood glucose levels decreased from 276.54 +/- 20.62 in mg/dl to 201.75 +/- 21.24 in mg/dl, glycosylated hemoglobin showed a decrease from 9.03 +/- 0.29% to 7.83 +/- 0.53% after yoga regimen. The pulse rate, systolic and diastolic blood pressure decreased significantly (from 86.45 +/- 2.0 to 77.65 +/- 2.5 pulse/min, from 142.0 +/- 3.9 to 126.0 +/- 3.2 mm of Hg and from 86.7 +/- 2.5 mm of Hg to 75.5 +/- 2.1 mm of Hg after yoga regimen respectively). Corrected QT interval (QTc) decreased from 0.42 +/- 0.0 to 0.40 +/- 0.0. **CONCLUSION:** These findings suggest that better glycaemic control and stable autonomic functions can be obtained in Type 2 DM cases with yoga asanas and pranayama. The exact mechanism as to how these postures and controlled breathing interact with somato-neuro-endocrine mechanism affecting metabolic and autonomic functions remains to be worked out.

**Indian J Physiol Pharmacol. 2002 Jul;46(3):313-20.**

**STUDY OF YOGA ASANAS IN ASSESSMENT OF PULMONARY FUNCTION IN NIDDM PATIENTS.**

Malhotra V, Singh S, Singh KP, Gupta P, Sharma SB, Madhu SV, Tandon OP.

Certain yoga asanas if practiced regularly are known to have beneficial effects on human body. These yoga practices
might be interacting with various, somato-neuro-endocrine mechanisms to have therapeutic effects. The present study done in twenty four NIDDM patients of 30 to 60 year old, provides metabolic and clinical evidence of improvement in glycaemic control and pulmonary functions. These middle-aged subjects were type II diabetics on antihyperglycaemic and dietary regimen. Their baseline fasting and postprandial blood glucose and glycosylated Hb were monitored along with pulmonary function studies. The expert gave these patients training in yoga asanas and were pursued 30-40 min/day for 40 days under guidance. These asanas consisted of 13 well known postures, done in a sequence. After 40 days of yoga asanas regimen, the parameters were repeated. The results indicate that there was significant decrease in fasting blood glucose levels (basal 190.08 +/- 90.8 in mg/dl to 141.5 +/- 79.8 in mg/dl). The postprandial blood glucose levels also decreased (276.54 +/- 101.0 in mg/dl to 201.75 +/- 104.1 in mg/dl), glycosylated hemoglobin showed a decrease (9.03 +/- 1.4% to 7.83 +/- 2.6%). The FEV1, FVC, PEFR, MVV increased significantly (1.81 +/- 0.4 lt to 2.08 +/- 0.4 lt, 2.20 +/- 0.6 lt to 2.37 +/- 0.5 lt, 3.30 +/- 1.0 lt/s to 4.43 +/- 1.4 lt/s and 64.59 +/- 25.7 lt/min to 76.28 +/- 28.1 lt/min respectively). FEV1/FVC% improved (85 +/- 0.2% to 89 +/- 0.1%). These findings suggest that better glycaemic control and pulmonary functions can be obtained in NIDDM cases with yoga asanas and pranayama. The exact mechanism as to how these postures and controlled breathing, interact with somato-neuro-endocrine mechanism affecting metabolic and pulmonary functions remains to be worked out.

AYURVEDA FOR DIABETES MELLITUS: A REVIEW OF THE BIOMEDICAL LITERATURE.  
Elder C.

Diabetes mellitus is a condition that is extremely serious from both clinical and public health standpoints. The traditional healthcare system of India, Ayurveda, offers a balanced and holistic multi-modality approach to treating this disorder. Many Ayurvedic modalities have been subjected to empirical scientific evaluation, but most such research has been done in India, receiving little attention in North America. This paper offers a review of the English language literature related to Ayurveda and diabetes care, encompassing herbs, diet, yoga, and meditation as modalities that are accessible and acceptable to Western clinicians and patients. There is a considerable amount of data from both animal and human trials suggesting efficacy of Ayurvedic interventions in managing diabetes. However, the reported human trials generally fall short of contemporary methodological standards. More research is needed in the area of Ayurvedic treatment of diabetes, assessing both whole practice and individual modalities.

EFFECT OF YOGA ASANAS ON NERVE CONDUCTION IN TYPE 2 DIABETES.  
Malhotra V, Singh S, Tandon OP, Madhu SV, Prasad A, Sharma SB.

Twenty Type 2 diabetic subjects between the age group of 30-60 years were studied to see the effect of 40 days of Yoga asanas on the nerve conduction velocity. The duration of diabetes ranged from 0-10 years. Subject suffering from cardiac, renal and proliferative retinal complications were excluded from the study Yoga asanas included Suryanamskar, Tadasan, Konasan, Padmasan Pranayam, Paschimottansan Ardhmatsyendrasan, Shavasan, Pavanmukthasan, Sarpasan and Shavasan. Subjects were called to the cardio-respiratory laboratory in the morning time and were given training by the Yoga expert. The Yoga exercises were performed for 30-40 minutes every day for 40 days in the above sequence. The subjects were prescribed certain medicines and diet. The basal blood glucose, nerve conduction velocity of the median nerve was measured and repeated after 40 days of Yogic regime. Another group of 20 Type 2 diabetes subjects of comparable age and severity, called the control group, were kept on prescribed medication and light physical exercises like walking. Their basal & post 40 days parameters were recorded for comparison. Right hand and left hand median nerve conduction velocity increased from 52.81 +/- 1.1 m/sec to 53.87 +/- 1.1 m/sec and 52.46 +/- 1.0 to 54.75 +/- 1/1 m/sec respectively. Control group nerve function parameters deteriorated over the period of study, indicating that diabetes is a slowly progressive disease involving the nerves. Yoga asanas have a beneficial effect on glycaemic control and improve nerve function in mild to moderate Type 2 diabetes with sub-clinical neuropathy.

A STUDY OF RESPONSE PATTERN OF NON-INSULIN DEPENDENT DIABETICS TO YOGA THERAPY.  
Jain SC, Uppal A, Bhatnagar SO, Talukdar B.

Changes in blood glucose and glucose tolerance by oral glucose tolerance test (OGTT) after 40 days of yoga
therapy in 149 non-insulin-dependent diabetics (NIDDM) were investigated. The response to yoga in these subjects was categorized according to a severity scale index (SSI) based on area under index total (AIT) under OGTT curve. One hundred and four patients showed a fair to good response to the yoga therapy. There was a significant reduction in hyperglycemia and AIT with decrease in oral hypoglycemic drugs required for maintenance of normoglycemia. It is concluded that yoga, a simple and economical therapy, may be considered a beneficial adjuvant for NIDDM patients.


YOGA PRACTICE IN DIABETES IMPROVES PHYSICAL AND PSYCHOLOGICAL OUTCOMES.
Kosuri M, Sridhar GR.

BACKGROUND: The aim of this study was to examine the effect of yoga practice on clinical and psychological outcomes in subjects with type 2 diabetes mellitus (T2DM). METHODS: In a 40-day yoga camp at the Institute of Yoga and Consciousness, ambulatory subjects with T2DM not having significant complications (n = 35) participated in a 40-day yoga camp, where yogic practices were overseen by trained yoga teachers. Clinical, biochemical, and psychological well-being were studied at baseline and at the end of the camp. RESULTS: At the end of the study, there was a reduction of body mass index (BMI) (26.514 +/- 3.355 to 25.771 +/- 3.40; P < 0.001) and anxiety (6.20 +/- 3.72 to 4.29 +/- 4.46; P < 0.05) and an improvement in total general well-being (48.6 +/- 11.13 to 52.66 +/- 12.87; P < 0.05). CONCLUSIONS: Participation of subjects with T2DM in yoga practice for 40 days resulted in reduced BMI, improved well-being, and reduced anxiety.


EFFECT OF YOGA-NIDRA ON BLOOD GLUCOSE LEVEL IN DIABETIC PATIENTS.
Amita S, Prabhakar S, Manoj I, Harminder S, Pavan T.

Diabetes is a metabolic disorder, which has become a major health challenge worldwide. South East Asian countries have a highest burden of diabetes. In India the prevalence of diabetes is rising rapidly especially in the urban population because of increasing obesity and reduced physical activity. An objective of this study is to evaluate the effect of Yoga-Nidra on blood glucose level in diabetic patients. This study was conducted on 41, middle aged, type-2 diabetic patients, who were on oral hypoglycaemic. These patients were divided in to two groups: (a) 20 patients on oral hypoglycaemic with yoga-nidra, and (b) 21 were on oral hypoglycaemic alone. Yoga-nidra practiced for 30 minutes daily up to 90 days, parameters were recorded every 30th day. Results of this study showed that most of the symptoms were subsided (P < 0.004, significant), and fall of mean blood glucose level was significant after 3-month of Yoga-nidra. This fall was 21.3 mg/dl, (from 159 +/- 12.27 to 137.7 +/- 23.15, in fasting and 17.95 mg/dl, (from 255.45 +/- 16.85 to 237.5 +/- 30.54) in post prandial glucose level. Results of this study suggest that subjects on Yoga-nidra with drug regimen had better control in their fluctuating blood glucose and symptoms associated with diabetes, compared to those were on oral hypoglycaemics alone.

Evid Based Complement Alternat Med. 2009 Aug 18

UTILIZATION OF 3-MONTH YOGA PROGRAM FOR ADULTS AT HIGH RISK FOR TYPE 2 DIABETES: A PILOT STUDY.
Yang K, Bernardo LM, Sereika SM, Conroy MB, Balk J, Burke LE.

Various modes of physical activity, combined with dieting, have been widely recommended to prevent or delay type 2 diabetes. Among these, yoga holds promise for reducing risk factors for type 2 diabetes by promoting weight loss, improving glucose levels and reducing blood pressure and lipid levels. This pilot study aimed to assess the feasibility of implementing a 12-week yoga program among adults at high risk for type 2 diabetes. Twenty-three adults (19 Whites and 4 non-Whites) were randomly assigned to the yoga intervention group or the educational group. The yoga group participated in a 3-month yoga intervention with sessions twice per week and the educational group received general health educational materials every 2 weeks. All participants completed questionnaires and had blood tests at baseline and at the end of 3 months. Effect sizes were reported to summarize the efficacy of the intervention. All participants assigned to the yoga intervention completed the yoga program without complication and expressed high satisfaction with the program (99.2%). Their yoga session attendance ranged from 58.3 to 100%. Compared with the education group, the yoga group experienced improvements in weight, blood pressure, insulin, triglycerides and exercise self-efficacy indicated by small to large effect sizes. This preliminary study indicates that a yoga program would be a possible
risk reduction option for adults at high risk for type 2 diabetes. In addition, yoga holds promise as an approach to reducing cardiometabolic risk factors and increasing exercise self-efficacy for this group.

THE NEW WORLD OF MEDICINE: PROSPECTING FOR HEALTH.
Go VL, Champaneria MC.
Throughout past millennia, human beings have shared the common goal of improving health for longevity. However, different cultures around the world have developed their own approaches to achieve this goal. Various traditions have emerged, rendering distinct medical systems such as Ayurveda, Yoga, Chinese-Japanese medicine, shamanism, and Native American healing. Traditional medicine involves a holistic approach to the human body to integrate healing with culture, environment, and tradition. Modern allopathic medicine originated from Greco-Roman Medicine and Northern European traditions and is built on the science of anatomy, physiology, and biochemistry and the structure-function relationship between cells, tissues, and organs. This foundation focuses on diagnosis, treatment, and cure for acute illnesses via potent pharmaceutical drugs, surgery, radiation, and other treatment modalities. Within this past century, we have doubled the life-span of human beings. Genomic medicine, including stem cell research, cloning, and gene therapy, will increase our capability to treat even more diseases. In the new millennium, we face more chronic illnesses related to aging, environment, and lifestyle, such as cancer, diabetes, osteoporosis, and cardiovascular diseases. Thus, health care providers face the challenge of prospecting for health and disease prevention. Modern science and medical advancements provide the rationale for the integration of various traditional healing techniques, which have been termed Alternative and Complementary Medicine, to promote healing, health, and longevity. Advances in medicine must include the holistic approach of traditional medicine to face the current challenges in health care. Therefore, the New World of Medicine must fuse the antiquity of ancient healing with the innovations of modern medicine to increase life-expectancy and improve quality of life throughout the world.

MODULATION OF STRESS INDUCED BY ISOMETRIC HANDGRIP TEST IN HYPERTENSIVE PATIENTS FOLLOWING YOGIC RELAXATION TRAINING.
Vijayalakshmi P, Madanmohan, Bhavanani AB, Patil A, Babu K.
13 essential hypertensive patients aged 41 to 60 years were given yoga training for 60 min daily, Monday through Saturday, for a total duration of 4 weeks. Blood pressure and heart rate (HR) were measured with non-invasive semi-automatic blood pressure monitor. Measurements were recorded before the training and at weekly intervals during the 4 week training period. Results of our study show a significant (P<0.001) reduction in resting HR and rate-pressure-product (RPP) after 2 weeks of yoga training. Systolic pressure (SP), diastolic pressure (DP) (P<0.001) and mean pressure (MP) (P<0.05) showed a significant reduction at 3 weeks of training period. After 4 weeks of training, there was further fall in SP, DP, pulse pressure (PP) (P<0.05), MP (P<0.001), HR and RPP. Isometric handgrip test before yoga training produced a significant rise in SP and MP and insignificant rise in DP, HR and RPP. After yoga training, there was a significant rise in all these parameters. Our results show that yoga training optimises the sympathetic response to stressful stimuli like isometric handgrip test and restores the autonomic regulatory reflex mechanisms in hypertensive patients.

EFFECT OF DEEP BREATHING AT SIX BREATHS PER MINUTE ON THE FREQUENCY OF PREMATURE VENTRICULAR COMPLEXES.
Prakash ES, Ravindra PN, Madanmohan, Anilkumar R, Balachander J.
Although the effect of reflex increase in vagal tone on the frequency of premature ventricular complexes (PVC) is known, the effect of timed deep breathing on the frequency of PVC has not been reported. We serendipitously discovered that deep breathing at six breaths per minute abolished PVC in an 18-year-old female with frequent PVC, anxiety, and palpitations. In five of a series of 10 consecutive patients with frequent (> or = 10/min) unifocal PVC, deep breathing at 6 breaths/min reduced the frequency of PVC by at least 50%. This is possibly due to increased vagal modulation of sinoatrial and atrioventricular node. However, factors predicting the response to deep breathing, and the mechanisms involved need to be studied in a larger number of patients.
EFFECT OF PRANAYAM TRAINING ON CARDIAC FUNCTION IN NORMAL YOUNG VOLUNTEERS.

Udupa K, Madanmohan, Bhavanani AB, Vijayalakshmi P, Krishnamurthy N.

Systolic time intervals (STI) are non-invasive and sensitive tests for measuring the ventricular performance. It has been reported that practice of pranayam modulates cardiac autonomic status and improves cardio-respiratory functions. Keeping this in view, the present study was designed to determine whether pranayam training has any effect on ventricular performance as measured by STI and cardiac autonomic function tests (AFT). Twenty four school children were randomly divided into two groups of twelve each. Group I (pranayam group) subjects were given training in nadishuddhi, mukh-bhastrika, pranav and savitri pranayams and practiced the same for 20 minutes daily for a duration of 3 months. Group II (control group) subjects were not given any pranayam training. STI (QS2, LVET and PEP) and AFT (RRIV and QT/QS2) were measured in both the groups at the beginning and again at the end of three months study period. Pranayam training produced an increase in RRIV and a decrease in QT/QS2, suggesting an enhanced parasympathetic and blunted sympathetic activity respectively. QS2, PEP and PEP/LVET increased significantly, whereas LVET was reduced significantly in pranayam group. In contrast, the changes in STI and AFT were much less marked in the control group. Our study shows that three months of pranayam training modulates ventricular performance by increasing parasympathetic activity and decreasing sympathetic activity. Further studies on a larger sample size may illustrate the underlying mechanism(s) involved in this alteration.

EFFECT OF SLOW AND FAST PRANAYAMS ON REACTION TIME AND CARDIORESPIRATORY VARIABLES.

Madanmohan, Udupa K, Bhavanani AB, Vijayalakshmi P, Surendiran A.

We planned to undertake a comparative study of the effect of short term (three weeks) training in savitri (slow breathing) and bhastrika (fast breathing) pranayams on respiratory pressures and endurance, reaction time, blood pressure, heart rate, rate-pressure product and double product. Thirty student volunteers were divided into two groups of fifteen each. Group I was given training in savitri pranayam that involves slow, rhythmic, and deep breathing. Group II was given training in bhastrika pranayam, which is bellows-type rapid and deep breathing. Parameters were measured before and after three week training period. Savitri pranayam produced a significant increase in respiratory pressures and respiratory endurance. In both the groups, there was an appreciable but statistically insignificant shortening of reaction time. Heart rate, rate-pressure product and double product decreased in savitri pranayam group but increased significantly in bhastrika group. It is concluded that different types of pranayams produce different physiological responses in normal young volunteers.

CARDIOVASCULAR AUTONOMIC REGULATION IN SUBJECTS WITH NORMAL BLOOD PRESSURE, HIGH-NORMAL BLOOD PRESSURE AND RECENT-ONSET HYPERTENSION.

Prakash ES, Madanmohan, Sethuraman KR, Narayan SK.

1. In the present study, we tested the hypothesis that heart rate variability (HRV) is reduced in recent-onset hypertension and that pressor responses to standard autonomic reflex tests are not any different in hypertensives compared with normotensives. We also hypothesized that subjects with high-normal blood pressure (BP) would be distinguishable from normotensives on the basis of short-term HRV indices. 2. Three groups of subjects, each consisting of 15 men and 10 women, were examined. The first group consisted of subjects with recent-onset hypertension who were not taking antihypertensive medication (mean (+/-SD) age 50 +/- 12 years; BP >/= 140/90 mmHg), the second group consisted of subjects with high-normal BP (mean age 46 +/- 13 years; BP 130-139/85-89 mmHg) and the third group consisted of subjects with normal BP (mean age 48 +/- 12 years; BP < 120/80 mmHg). The aim was to characterize the autonomic state in each group. 3. Blood pressure, heart rate (HR), indices of short-term HRV during supine rest and quiet standing, HR variation during timed deep breathing (HRVdb) and pressor responses to the cold pressor test and sustained isometric handgrip were compared between the groups. 4. Although the three groups were comparable (P > 0.1) in terms of mean HR and low-frequency (LF) power expressed in normalized units at rest and during quiet standing, the standard deviation of normal-to-normal RR intervals (SDNN) during supine rest, LF and high-frequency spectral powers during supine rest and HRVdb were lowest in hypertensives (P <= 0.05 for each),
indicating diminished baroreflex modulation of RR intervals in hypertensives. 5. In contrast, LF power was highest in subjects with high-normal BP (P ≤ 0.05) during supine rest and this is possibly because of higher BP variability. 6. The results suggest that HRVdb provides a simple measure of cardiac vagal effects in hypertensives, the rate-pressure product provides a simple measure of overall HRV in hypertensives and, in clinical hypertension, the arterial baroreflex mechanism is reset to maintain a higher BP through diminished vagal modulation of HR and possibly heightened sympathetic outflow to the heart and resistance vessels.


EFFECT OF SHORT-TERM PRACTICE OF BREATHING EXERCISES ON AUTONOMIC FUNCTIONS IN NORMAL HUMAN VOLUNTEERS.

Pal GK, Velkumary S, Madanmohan.

BACKGROUND & OBJECTIVES: Practice of breathing exercises like pranayama is known to improve autonomic function by changing sympathetic or parasympathetic activity. Therefore, in the present study the effect of breathing exercises on autonomic functions was performed in young volunteers in the age group of 17-19 yr. METHODS: A total of 60 male undergraduate medical students were randomly divided into two groups: slow breathing group (that practiced slow breathing exercise) and the fast breathing group (that practiced fast breathing exercise). The breathing exercises were practiced for a period of three months. Autonomic function tests were performed before and after the practice of breathing exercises. RESULTS: The increased parasympathetic activity and decreased sympathetic activity were observed in slow breathing group, whereas no significant change in autonomic functions was observed in the fast breathing group. INTERPRETATION & CONCLUSION: The findings of the present study show that regular practice of slow breathing exercise for three months improves autonomic functions, while practice of fast breathing exercise for the same duration does not affect the autonomic functions.


MODULATION OF COLD PRESSOR-INDUCED STRESS BY SHAVASAN IN NORMAL ADULT VOLUNTEERS.

Madanmohan, Udupa K, Bhavanani AB, Krishnamurthy N, Pal GK.

Shavasan is known to enhance one’s ability to combat stressful situations. The present study was planned to determine if shavasan could modulate the physiological response to stress induced by cold pressor test (CPT) and the possible mechanisms involved. Ten normal adults were taught shavasan and practiced the same for a total duration of seven days. RR interval variation (RRIV), deep breathing difference (DBD), and heart rate, blood pressure & rate-pressure-product (RPP) response to CPT were measured before and immediately after shavasan. Shavasan produced a significant increase in DBD and an appreciable but statistically insignificant increase in RRIV suggesting an enhanced parasympathetic activity. Significant blunting of cold pressor-induced increase in heart rate, blood pressure and RPP by shavasan was seen during and even five minutes after CPT suggesting that shavasan reduces the load on the heart by blunting the sympathetic response. It is concluded that shavasan can enhance one’s ability to withstand stress induced by CPT and this ability can be achieved even with seven days of shavasan training.


MODULATION OF CARDIOVASCULAR RESPONSE TO EXERCISE BY YOGA TRAINING.

Madanmohan, Udupa K, Bhavanani AB, Shatapathy CC, Sahai A.

This study reports the effects of yoga training on cardiovascular response to exercise and the time course of recovery after the exercise. Cardiovascular response to exercise was determined by Harvard step test using a platform of 45 cm height. The subjects were asked to step up and down the platform at a rate of 30/min for a total duration of 5 min or until fatigue, whichever was earlier. Heart rate (HR) and blood pressure response to exercise were measured in supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Rate-pressure product [RPP = (HR x SP)/100] and double product (DoP = HR x MP), which are indices of work done by the heart were also calculated. Exercise produced a significant increase in HR, systolic pressure, RPP & DoP and a significant decrease in diastolic pressure. After two months of yoga training, exercise-induced changes in these parameters were significantly reduced. It is concluded that after yoga training a given level of exercise leads to a milder cardiovascular response, suggesting better exercise tolerance.
EFFECT OF INTEGRATED YOGA ON STRESS AND HEART RATE VARIABILITY IN PREGNANT WOMEN.

Satyapriya M, Nagendra HR, Nagarathna R, Padmalatha V.

OBJECTIVE: To study the effect of integrated yoga practice and guided yogic relaxation on both perceived stress and measured autonomic response in healthy pregnant women. METHOD: The 122 healthy women recruited between the 18th and 20th week of pregnancy at prenatal clinics in Bangalore, India, were randomized to practicing yoga and deep relaxation or standard prenatal exercises 1-hour daily. The results for the 45 participants per group who completed the study were evaluated by repeated measures analysis of variance. RESULTS: Perceived stress decreased by 31.57% in the yoga group and increased by 6.60% in the control group (P=0.001). During a guided relaxation period in the yoga group, compared with values obtained before a practice session, the high-frequency band of the heart rate variability spectrum (parasympathetic) increased by 64% in the 20th week and by 150% in the 36th week, and both the low-frequency band (sympathetic), and the low-frequency to high-frequency ratio were concomitantly reduced (P<0.001 between the 2 groups). Moreover, the low-frequency band remained decreased after deep relaxation in the 36th week in the yoga group. CONCLUSION: Yoga reduces perceived stress and improves adaptive autonomic response to stress in healthy pregnant women.

STRESS MANAGEMENT TECHNIQUES: ARE THEY ALL EQUIVALENT, OR DO THEY HAVE SPECIFIC EFFECTS?

Lehrer PM, Carr R, Sargunaraj D, Woolfolk RL.

This article evaluates the hypothesis that various stress management techniques have specific effects. Studies comparing various techniques are reviewed, as well as previous literature reviews evaluating the effects of individual techniques. There is evidence that cognitively oriented methods have specific cognitive effects, that specific autonomic effects result from autonomically oriented methods, and that specific muscular effects are produced by muscularily oriented methods. Muscle relaxation and/or EMG biofeedback have greater muscular effects and smaller autonomic effects than finger temperature biofeedback and/or autogenic training. EMG biofeedback produces greater effects on particular muscular groups than progressive relaxation, and thermal biofeedback has greater finger temperature effects than autogenic training. Disorders with a predominant muscular component (e.g., tension headaches) are treated more effectively by muscularily oriented methods, while disorders in which autonomic dysfunction predominates (e.g., hypertension, migraine headaches) are more effectively treated by techniques with a strong autonomic component. Anxiety and phobias tend to be most effectively treated by methods with both strong cognitive and behavioral components.

THERAPEUTIC POTENTIAL OF YOGA PRACTICES IN MODIFYING CARDIOVASCULAR RISK PROFILE IN MIDDLE AGED MEN AND WOMEN.


AIMS OF STUDY: To study effect of yoga on the physiological, psychological well being, psychomotor parameter and modifying cardiovascular risk factors in mild to moderate hypertensive patients. METHODS: Twenty patients (16 males, 4 females) in the age group of 35 to 55 years with mild to moderate essential hypertension underwent yogic practices daily for one hour for three months. Biochemical, physiological and psychological parameters were studied prior and following period of three months of yoga practices, biochemical parameters included, blood glucose, lipid profile, catecholamines, MDA, Vit. C cholinesterase and urinary VMA. Psychological evaluation was done by using personal orientation inventory and subjective well being. RESULTS: Results showed decrease in blood pressure and drug score modifying risk factors, i.e. blood glucose, cholesterol and triglycerides decreased overall improvement in subjective well being and quality of life. There was decrease in VMA catecholamine, and decrease MDA level suggestive decrease sympathetic activity and oxidant stress. CONCLUSION: Yoga can play an important role in risk modification for cardiovascular diseases in mild to moderate hypertension.

NON-PHARMACOLOGICAL MANAGEMENT OF ESSENTIAL HYPERTENSION.
Anand MP.

Lifestyle modifications are universally accepted, not only as the first step in the management of hypertension but also a way to prevent hypertension. The INTERSALT study of 52 communities worldwide showed that weight, among all measured characteristics except age, had the strongest, significant, most consistent and independent correlation with blood pressure. INTERSALT epidemiological data had demonstrated a positive association between sodium intake and level of blood pressure. A rigorous analysis of 23 randomly controlled trials showed that 100 mmol/day reduction in sodium intake was associated with a decline of 5-7 mm Hg (systolic)/2.7 mm Hg (diastolic) in hypertensive subjects. Excessive alcohol consumption is another important risk factor for hypertension and has been reported to account for 5-30% of all hypertension. Moderately intense exercise at 40 to 60% of maximum oxygen consumption e.g., 30 to 45 minutes of brisk walking on 4-5 days a week, can lower blood pressure. The incidence of stroke and coronary artery disease in hypertensive patients who smoke is 2-3 times greater than in non-smoking patients with comparable blood pressure and stopping smoking rapidly reduces this risk. There have been several studies showing the stress reduction with various behavioural procedures, such as yoga, relaxation biofeedback, transcendental mediation and psychotherapy benefit hypertensive patients by lowering their blood pressure.

RETRADATION OF CORONARY ATHEROSCLEROSIS WITH YOGA LIFESTYLE INTERVENTION.
BACKGROUND: Yoga has potential for benefit for patients with coronary artery disease though objective, angiographic studies are lacking. MATERIAL AND METHODS: We evaluated possible role of lifestyle modification incorporating yoga, on retardation of coronary atherosclerotic disease. In this prospective, randomized, controlled trial, 42 men with angiographically proven coronary artery disease (CAD) were randomized to control (n = 21) and yoga intervention group (n = 21) and were followed for one year. The active group was treated with a user-friendly program consisting of yoga, control of risk factors, diet control and moderate aerobic exercise. The control group was managed by conventional methods i.e. risk factor control and American Heart Association step I diet. RESULTS: At one year, the yoga groups showed significant reduction in number of anginal episodes per week, improved exercise capacity and decrease in body weight. Serum total cholesterol, LDL cholesterol and triglyceride levels also showed greater reductions as compared with control group. Revascularisation procedures (coronary angioplasty or bypass surgery) were less frequently required in the yoga group (one versus eight patients; relative risk = 5.45; P = 0.01). Coronary angiography repeated at one year showed that significantly more lesions regressed (20% versus 2%) and less lesions progressed (5% versus 37%) in the yoga group (chi-square = 24.9; P < 0.0001). The compliance to the total program was excellent and no side effects were observed. CONCLUSION: Yoga lifestyle intervention retards progression and increases regression of coronary atherosclerosis in patients with severe coronary artery disease. It also improves symptomatic status, functional class and risk factor profile.

RECOVERY FROM STRESS IN TWO DIFFERENT POSTURES AND IN SHAVASANA--A YOGIC RELAXATION POSTURE.
Bera TK, Gore MM, Oak JP.
The recovery from induced physiological stress in Shavasana (a yogic relaxation posture) and two other postures (resting in chair and resting supine posture) was compared. Twenty one males and 6 females (age 21-30 yrs) were allowed to take rest in one of the above postures immediately after completing the scheduled treadmill running. The recovery was assessed in terms of Heart Rate (HR) and Blood pressure (BP). HR and BP were measured before and every two minutes after the treadmill running till they returned to the initial level. The results revealed that the effects of stress was reversed in significantly (P < 0.01) shorter time in Shavasana, compared to the resting posture in chair and a supine posture.

YOGA AND BIOFEEDBACK IN THE MANAGEMENT OF ‘STRESS’ IN HYPERTENSIVE PATIENTS.
Patel C.
Psychophysical relaxation exercises based on yogic principles and reinforced by biofeedback instruments were used for behaviour modification in sixteen hypertensive subjects. Preliminary studies indicated that their pressor response to emotional and physical stimuli became less exaggerated and less protracted compared with controls.

Aviat Space Environ Med 1989 Jul;60(7):684-7
TREATMENT OF ESSENTIAL HYPERTENSION WITH YOGA RELAXATION THERAPY IN A USAF AVIATOR: A CASE REPORT
Brownstein AH, Dembert MI.
A 46-year-old Caucasian male USAF aviator with a 6-year history of mild essential hypertension (medical waiver for flight duty) under unsuccessful treatment with hydrochlorothiazide, dietary modification, and exercise, was subsequently trained in yoga relaxation. After 6 weeks, medication had been discontinued, and his diastolic blood pressure remained within normal levels. The patient was subsequently returned to full flight status without recurrence of diastolic hypertension at followup 6 months later. Relaxation training, of which yoga is one type, has been reported in the medical literature to have wide clinical application. It should be considered as a nonpharmacological therapy adjunct or alternative for medical disorders among personnel in occupations (e.g., aviation) where the side effects from medications are of great concern and could be disqualifying from those duties.

RANDOMISED CONTROLLED TRIAL OF YOGA AND BIO-FEEDBACK IN MANAGEMENT OF HYPERTENSION.
Patel C, North WR.
34 hypertensive patients were assigned at random either to six weeks' treatment by yoga relaxation methods with bio-feedback or to placebo therapy (general relaxation). Both groups showed a reduction in blood-pressure (from 168/100 to 141/84 mm. Hg in the treated group and from 169/101 to 160/96 mm Hg in the control group). The difference was highly significant. The control group was then trained in yoga relaxation, and their blood-pressure fell to that of the other group (now used as controls).

MMW Fortschr Med 2002 May 9;144(19):38-41
ESSENTIAL HYPERTENSION AND STRESS. WHEN DO YOGA, PSYCHOTHERAPY AND AUTGENIC TRAINING HELP?
Herrmann JM.
Psychosocial factors play an important role in the development and course of essential hypertension, although “stress” can account for only 10% of blood pressure variance. A variety of psychotherapeutic interventions, such as relaxation techniques (autogenic training or progressive muscular relaxation), behavioral therapy or biofeedback techniques, can lower elevated blood pressure by an average of 10 mmHg (systolic) and 5 mmHg (diastolic). As a “secondary effect”, such measures may also prompt the hypertensive to adopt a more health-conscious lifestyle.

NON-PHARMACOLOGICAL MANAGEMENT OF ESSENTIAL HYPERTENSION.
Anand MP.
Lifestyle modifications are universally accepted, not only as the first step in the management of hypertension but also a way to prevent hypertension. The INTERSALT study of 52 communities worldwide showed that weight, among all measured characteristics except age, had the strongest, significant, most consistent and independent correlation with blood pressure. INTERSALT epidemiological data had demonstrated a positive association between sodium intake and level of blood pressure. A rigorous analysis of 23 randomly controlled trials showed that 100 mmol/day reduction in sodium intake was associated with a decline of 5-7 mm Hg (systolic)/2.7 mm Hg (diastolic) in hypertensive subjects. Excessive alcohol consumption is another important risk factor for hypertension and has been reported to account for 5-30% of all hypertension. Moderately intense exercise at 40 to 60% of maximum oxygen consumption e.g., 30 to 45 minutes of brisk walking on 4-5 days a week, can lower blood pressure. The incidence of stroke and coronary artery disease in hypertensive patients who smoke is 2-3 times greater than in non-smoking patients with comparable blood pressure and stopping smoking rapidly reduces this risk. There have been several studies showing the stress reduction with various behavioural procedures, such as yoga, relaxation biofeedback, transcendental mediation and psychotherapy
benefit hypertensive patients by lowering their blood pressure.

**J Hypertens Suppl 1990 Sep;8(4):S21-6**

**NON-PHARMACOLOGICAL TREATMENT OF HYPERTENSION.**
Silverberg DS.

Weight reduction, alcohol restriction, mild salt restriction, eating a vegetarian diet and increasing aerobic exercise will generally lower the blood pressure in patients with essential hypertension. Eating a diet rich in potassium and reducing caffeine intake may also be helpful in reducing the pressure, but increasing the fiber or calcium intake will generally be ineffective. Reducing fat intake from the usual 40% of total calories to 25-30% may reduce hypertension directly or by weight reduction. Smoking, when combined with excessive caffeine or alcohol intake may have an additive effect on blood pressure. Monotherapy with such behavioral techniques as self-monitoring of blood pressure, biofeedback, meditation, yoga, progressive muscular relaxation or cognitive therapy may reduce the blood pressure to a variable degree, and combinations of these treatments may be even more successful.

**Lancet 1976 Jan 31;1(7953):223-6**

**TRANSCENDENTAL MEDITATION IN HYPERTENSION. INDIVIDUAL RESPONSE PATTERNS.**

Seven selected hypertensive patients were stabilized on drugs at a research clinic. Subjects learned transcendental meditation (T.M.), were seen weekly, and took their own blood pressure several times daily. After 12 weeks of T.M. six subjects showed psychological changes and reduced anxiety scores. Six subjects also showed significant reductions in home and four in clinic blood-pressures. Six months later four subjects continued to derive psychological benefit and two showed significant blood-pressure reductions attributable to T.M. at home and clinic.

**BMJ 1990 May 26;300(6736):1368-72**

**RELAXATION THERAPY AND CONTINUOUS AMBULATORY BLOOD PRESSURE IN MILD HYPERTENSION: A CONTROLLED STUDY.**
Van Montfrans GA, Karemaker JM, Wieling W, Dunning AJ.

OBJECTIVE--To determine the long term effects of relaxation therapy on 24 hour ambulatory intra-arterial blood pressure in patients with mild untreated and uncomplicated hypertension. DESIGN--Four week screening period followed by randomisation to receive either relaxation therapy or non-specific counselling for one year. Ambulatory intra-arterial blood pressure was measured before and after treatment. SETTING--Outpatient clinic in Amsterdam's university hospital. SUBJECTS--35 Subjects aged 20-60 who were being treated by general practitioners for hypertension but were referred to take part in the study. At three consecutive screening visits all subjects had a diastolic blood pressure without treatment of 95-110 mm Hg. Subjects were excluded if they had damaged target organs, secondary hypertension, diabetes mellitus, a cholesterol concentration greater than 8 mmol/l, or a history of malignant hypertension. INTERVENTIONS--The group allocated to relaxation therapy was trained for eight weeks (one hour a week) in muscle relaxation, yoga exercises, and stress management and continued exercising twice daily for one year with monthly visits to the clinic. The control group had the same attendance schedule but had no training and were requested just to sit and relax twice a day. All subjects were asked not to change their diet or physical activity. MAIN OUTCOME MEASURE--Changes in ambulatory intra-arterial blood pressure after one year of relaxation therapy or non-specific counselling. RESULTS--Mean urinary sodium excretion, serum concentration of cholesterol, and body weight did not change in either group. Diastolic pressures measured by sphygmomanometry were 2 and 3 mm Hg lower in subjects in the relaxation group and control group respectively at treatment of 95-110 mm Hg. Subjects were excluded if they had damaged target organs, secondary hypertension, diabetes mellitus, a cholesterol concentration greater than 8 mmol/l, or a history of malignant hypertension. INTERVENTIONS--The group allocated to relaxation therapy was trained for eight weeks (one hour a week) in muscle relaxation, yoga exercises, and stress management and continued exercising twice daily for one year with monthly visits to the clinic. The control group had the same attendance schedule but had no training and were requested just to sit and relax twice a day. All subjects were asked not to change their diet or physical activity. MAIN OUTCOME MEASURE--Changes in ambulatory intra-arterial blood pressure after one year of relaxation therapy or non-specific counselling. RESULTS--Mean urinary sodium excretion, serum concentration of cholesterol, and body weight did not change in either group. Diastolic pressures measured by sphygmomanometry were 2 and 3 mm Hg lower in subjects in the relaxation group and control group respectively at the one year follow up compared with initial readings. The mean diastolic ambulatory intra-arterial pressure during the daytime had not changed after one year in either group, but small treatment effects could not be excluded: the mean change for the relaxation group was -1 mm Hg (95% confidence interval -6 to 3.9 mm Hg) and for the control group -0.4 mm Hg (-5.3 to 4.6 mm Hg). Mean ambulatory pressure in the evening also had not changed over the year, and in both groups nighttime pressure was 5 mm Hg higher. The variability in blood pressure was the same at both measurements. CONCLUSIONS--Relaxation therapy was an ineffective method of lowering 24 hour blood pressure, being no more beneficial than non-specific advice, support, and reassurance--themselves ineffective as a treatment for hypertension.

**J Assoc Physicians India 2000 Jul;48(7):687-94**
RETARDATION OF CORONARY ATHEROSCLEROSIS WITH YOGA LIFESTYLE INTERVENTION.


BACKGROUND: Yoga has potential for benefit for patients with coronary artery disease though objective, angiographic studies are lacking. MATERIAL AND METHODS: We evaluated possible role of lifestyle modification incorporating yoga, on retardation of coronary atherosclerotic disease. In this prospective, randomized, controlled trial, 42 men with angiographically proven coronary artery disease (CAD) were randomized to control (n = 21) and yoga intervention group (n = 21) and were followed for one year. The active group was treated with a user-friendly program consisting of yoga, control of risk factors, diet control and moderate aerobic exercise. The control group was managed by conventional methods i.e. risk factor control and American Heart Association step I diet. RESULTS: At one year, the yoga groups showed significant reduction in number of anginal episodes per week, improved exercise capacity and decrease in body weight. Serum total cholesterol, LDL cholesterol and triglyceride levels also showed greater reductions as compared with control group. Revascularisation procedures (coronary angioplasty or bypass surgery) were less frequently required in the yoga group (one versus eight patients; relative risk = 5.45; P = 0.01). Coronary angiography repeated at one year showed that significantly more lesions regressed (20% versus 2%) and less lesions progressed (5% versus 37%) in the yoga group (chi-square = 24.9; P < 0.0001). The compliance to the total program was excellent and no side effects were observed. CONCLUSION: Yoga lifestyle intervention retards progression and increases regression of coronary atherosclerosis in patients with severe coronary artery disease. It also improves symptomatic status, functional class and risk factor profile.

Appl Psychophysiol Biofeedback 2000 Dec;25(4):221-7

OXYGEN CONSUMPTION AND RESPIRATION FOLLOWING TWO YOGA RELAXATION TECHNIQUES.

Telles S, Reddy SK, Nagendra HR.

The present study was conducted to evaluate a statement in ancient yoga texts that suggests that a combination of both “calming” and “stimulating” measures may be especially helpful in reaching a state of mental equilibrium. Two yoga practices, one combining “calming and stimulating” measures (cyclic meditation) and the other, a “calming” technique (shavasan), were compared. The oxygen consumption, breath rate, and breath volume of 40 male volunteers (group mean SD, 27.0 ± 5.7 years) were assessed before and after sessions of cyclic meditation (CM) and before and after sessions of shavasan (SH). The 2 sessions (CM, SH) were 1 day apart. Cyclic meditation includes the practice of yoga postures interspersed with periods of supine relaxation. During SH the subject lies in a supine position throughout the practice. There was a significant decrease in the amount of oxygen consumed and in breath rate and an increase in breath volume after both types of sessions (2-factor ANOVA, paired t test). However, the magnitude of change on all 3 measures was greater after CM: (1) Oxygen consumption decreased 32.1% after CM compared with 10.1% after SH; (2) breath rate decreased 18.0% after CM and 15.2% after SH; and (3) breath volume increased 28.8% after CM and 15.9% after SH. These results support the idea that a combination of yoga postures interspersed with relaxation reduces arousal more than relaxation alone does.

Cardiol Clin 2002 May;20(2):249-63

NONDRUG INTERVENTIONS IN HYPERTENSION PREVENTION AND CONTROL.

Labarthe D, Ayala C.

This review was undertaken to address the relation of various factors to HBP and their potential for preventing and controlling this widespread problem. With respect to salt intake and BP, the 1999 Workshop on Sodium and Blood Pressure of the (US) National Heart, Lung, and Blood Institute [5] will serve the reader well as a point of departure. The body of the present review provides more detailed discussion especially of recent epidemiologic research, including the DASH-Sodium trial, published more recently than the proceedings of that workshop. The DASH-Sodium trial demonstrates significant increases in SBP and DBP, with sodium intake greater than 65 mmol/d (= 3.7 g NaCl--see equivalencies in Appendix A) and with the usual American diet (versus the DASH diet). These results provide substantial evidence against current dietary practices in many populations where daily intakes of salt are much higher than recommended. We also have addressed alcohol consumption, micronutrients/macronutrients, physical activity and inactivity, obesity, cigarette smoking, and alternative approaches to treatment such as stress reduction/biofeedback, yoga/meditation, and acupuncture. Evidence for the efficacy of certain nonpharmacologic approaches to preventing and
controlling HBP is strong. This evidence offers a basis for public health policies and clinical approaches that can greatly affect the incidence and consequences of HBP in the population at large. What is needed now is implementation of the policies and practices addressed here. Unless such action is taken on a large scale, we will have made poor use of the knowledge accrued over decades of research. The clinician is referred to the National Heart, Lung and Blood Institute Web site at www.nhlbi.gov/health/prof/heart/index.htm for resource and guideline information for hypertension. Patients and the general public are referred to the sister web page at www.nhlbi.gov/health/public/heart/index.htm for educational fact sheets and general information on hypertension.

J Assoc Physicians India 2002 May; 50 (5):633-40

THERAPEUTIC POTENTIAL OF YOGA PRACTICES IN MODIFYING CARDIOVASCULAR RISK PROFILE IN MIDDLE AGED MEN AND WOMEN.


AIMS OF STUDY: To study effect of yoga on the physiological, psychological well being, psychomotor parameter and modifying cardiovascular risk factors in mild to moderate hypertensive patients. METHODS: Twenty patients (16 males, 4 females) in the age group of 35 to 55 years with mild to moderate essential hypertension underwent yogic practices daily for one hour for three months. Biochemical, physiological and psychological parameters were studied prior and following period of three months of yoga practices, biochemical parameters included, blood glucose, lipid profile, catecholmines, MDA, Vit. C cholinesterase and urinary VMA. Psychological evaluation was done by using personal orientation inventory and subjective well being. RESULTS: Results showed decrease in blood pressure and drug score modifying risk factors, i.e. blood glucose, cholesterol and triglycerides decreased overall improvement in subjective well being and quality of life. There was decrease in VMA catecholamine, and decrease MDA level suggestive decrease sympathetic activity and oxidant stress. CONCLUSION: Yoga can play an important role in risk modification for cardiovascular diseases in mild to moderate hypertension.

J Indian Med Assoc 2001 Sep;99(9):504-8,

STATUS OF LIFESTYLE MODIFICATIONS IN HYPERTENSION.

Chhabra MK, Lal A, Sharma KK.

Hypertension is essentially the elevation of arterial blood pressure beyond an arbitrary cut off point, though the dividing line between normal and elevated BP is lacking. Hypertension can be classified into primary, essential or idiopathic hypertension on one hand, and secondary one due to some disease itself. In treating hypertension, antihypertensives have their role, but attention may be directed towards some lifestyle modifications. As regarding dietary interventions, calorie restriction may influence the minimisation of BP. Body weight reduction, less alcohol consumption; salt restriction, potassium and calcium supplementation can enhance the process of lowering BP. The role of magnesium in hypertension is debatable. Serum cholesterol level is commonly elevated in hypertensive patients and its reduction reduces the risk of non-fatal coronary events. Diet rich in plant fibers either alone or with a low fat, low sodium could lower the BP by about 5 mm Hg in hypertensives. The omega-3-polyunsaturated fatty acids found in highest concentrations in cold water fishes have a modest antihypertensive effect. Caffeine contained in two cups of coffee may raise the BP by 5 mm Hg in infrequent users but in habitual users, caffeine has no role. Deficiency of vitamin C might lead to hypertension. As regarding behavioral changes, stopping smoking, regular physical exercise, relaxation therapies like yoga, etc, have definite beneficial effect on hypertensives. The antihypertensive effect of lifestyle modifications may obviate drug therapy. For this one or more of the lifestyle modifications should be tried initially in all hypertensive patients.


THE PROBLEMS OF HYPERTENSION IN THE ELDERLY.

Arya SN.

The cut off age for elderly person in India is 60-65 years, in the USA is 75-80 years and 6th Joint Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNC-VI) has identified it as above 60 years. Elderly people may have (i) systolic-diastolic hypertension, (ii) isolated systolic hypertension or (iii) pseudohypertension. JNC-VI has classified hypertension in stage 1, stage 2 and stage 3 according to its severity. Hypertension is confirmed when BP measured on three separate occasions over 1-2 weeks and when consistently it is raised above 140/90 mm Hg.
The management includes lifestyle modification and drug treatment. Lifestyle modification includes rationality of diet, regular exercise; stop smoking, stoppage of alcohol or moderation and yoga. Drugs commonly used are diuretics and beta-blockers. Other antihypertensive drugs are calcium channel blockers, ACE-inhibitors, alpha-blockers and vasodilators.

- J Hypertens Suppl 1990 Sep;8(4):S21-6
  **NON-PHARMACOLOGICAL TREATMENT OF HYPERTENSION.**
  Silverberg DS.
  Weight reduction, alcohol restriction, mild salt restriction, eating a vegetarian diet and increasing aerobic exercise will generally lower the blood pressure in patients with essential hypertension. Eating a diet rich in potassium and reducing caffeine intake may also be helpful in reducing the pressure, but increasing the fiber or calcium intake will generally be ineffective. Reducing fat intake from the usual 40% of total calories to 25-30% may reduce hypertension directly or by weight reduction. Smoking, when combined with excessive caffeine or alcohol intake may have an additive effect on blood pressure. Monotherapy with such behavioral techniques as self-monitoring of blood pressure, biofeedback, meditation, yoga, progressive muscular relaxation or cognitive therapy may reduce the blood pressure to a variable degree, and combinations of these treatments may be even more successful.

- Lancet 1976 Jan 31;1(7953):223-6
  **TRANSCENDENTAL MEDITATION IN HYPERTENSION. INDIVIDUAL RESPONSE PATTERNS.**
  Seven selected hypertensive patients were stabilized on drugs at a research clinic. Subjects learned transcendental meditation (T.M.), were seen weekly, and took their own blood pressure several times daily. After 12 weeks of T.M. six subjects showed psychological changes and reduced anxiety scores. Six subjects also showed significant reductions in home and four in clinic blood pressures. Six months later four subjects continued to derive psychological benefit and two showed significant blood-pressure reductions attributable to T.M. at home and clinic.

- Acta Cardiol 1984;39(3):203-8
  **ROLE OF YOGA IN MANAGEMENT OF ESSENTIAL HYPERTENSION.**
  Sundar S, Agrawal SK, Singh VP, Bhattacharya SK, Udupa KN, Vaish SK.
  Twenty five patients of essential hypertension were studied. Of these, 20 patients were not given any antihypertensive drug treatment (Group A); other 5 had to be put on antihypertensive drugs before including them in the study (Group B). These patients were demonstrated “Shavasana” and trained to perform it correctly. Shavasana therapy was continued for six months. There was a statistically significant fall in both mean systolic and diastolic pressure of both groups. Further, there was a significant reduction in doses of antihypertensive drugs, being given to patients of group B. In 65% patients of group A, blood pressure could be controlled with Shavasana only and no drug was needed in them at all. Blood pressure rose significantly to pre-Shavasana levels in patients who left practising yoga. Thus, with use of yoga (Shavasana) in therapy of hypertension, requirement of antihypertensive drugs may be significantly decreased and in some cases may be totally dispensed with and it may be an useful adjunct in treatment of hypertension.

  **HYPERTENSION: COMPARISON OF DRUG AND NON-DRUG TREATMENTS.**
  Andrews G, MacMahon SW, Austin A, Byrne DG.
  Thirty-seven reports of the treatment of hypertension by non-pharmacological means were compared with the results of treatment by standard drug regimens. Treatment by drugs produced the greatest lowering of blood pressure. Treatment by weight reduction, yoga, and muscle relaxation each produced smaller, but appreciable, changes in blood pressure biofeedback, and salt restriction were inferior to those of the other regimens and were not significantly different to the effects of placebo treatment. Large comparative trials of pharmacological and non-pharmacological treatments are needed before definite conclusions can be made.

  **NON PHARMACOLOGIC CONTROL OF ESSENTIAL HYPERTENSION IN MAN: A CRITICAL REVIEW OF THE EXPERIMENTAL LITERATURE.**
Frumkin K, Nathan RJ, Prout MF, Cohen MC.

Many non-pharmacologic (behavioral) techniques are being proposed for the therapy of essential hypertension. The research in this area is reviewed and divided roughly into two categories: the biofeedback and relaxation methodologies. While feedback can be used to lower pressures during laboratory training sessions, studies designed to alter basal blood pressure levels with biofeedback have not yet been reported. The absence of evidence for such changes through biofeedback limits the usefulness of this technique in hypertension control. The various relaxation methods, such as yoga, transcendental meditation, progressive muscle relaxation, and others have shown more promise. With varying degrees of experimental vigor, many of these techniques have been associated with long-lasting changes in blood pressure. The strengths and weaknesses of the various authors’ research designs, data and conclusions are discussed, and suggestions for further experimentation are offered.


HEALING THE HEART: INTEGRATING COMPLEMENTARY THERAPIES AND HEALING PRACTICES INTO THE CARE OF CARDIOVASCULAR PATIENTS.

Kreitzer, M. J., and M. Snyder.

Complementary therapies and healing practices have been found to reduce stress, anxiety, and lifestyle patterns that are known to contribute to cardiovascular disease. Promising therapies include imagery and hypnosis, meditation, yoga, tai chi, prayer, music, exercise, diet, and use of dietary supplements. Many of these approaches have been within nursing’s domain for centuries and can easily be integrated into the care of cardiovascular patients. Although each complementary modality holds significant merit on its own, it is critically important that the basic philosophy underlying all these therapies—caring, holism, and harmony—be understood and honored.


CHANGES IN SPIRITUALITY AND WELL-BEING IN A RETREAT PROGRAM FOR CARDIAC PATIENTS.

Kennedy, J. E., R. A. Abbott, and B. S. Rosenberg.

The purpose of this study was to evaluate whether participation in a retreat program for cardiac patients and their partners would result in changes in spirituality and whether these changes were related to changes in well-being, meaning in life, anger, and confidence in handling problems. 72 participants from cardiac rehabilitation programs filled out questionnaires before and after participating in the 2.5-day retreat, which included discussion and opportunities to experience healthy lifestyle options, exercise, nutrition, stress management techniques, communication skills that enhance social support, and spiritual principles of healing. Experiential practices included Yoga, meditation, visualization, and prayer. 78% of participants reported increased spirituality after the retreat, and these changes were positively associated with increased well-being, meaning in life, confidence in handling problems, and decreased tendency to become angry. Many patients and their families want to integrate the spiritual and health dimensions of their lives, and further work is needed to develop healthcare settings that can support this.


A NEW PHYSIOLOGICAL APPROACH TO CONTROL ESSENTIAL HYPERTENSION.


This study was conducted on 20 male patients of Essential Hypertension (EH) in order to explore the possible role of baroreflex mechanism in the etiology of EH and also to find out whether by restoration of baroreflex sensitivity to normal level either by postural tilt stimulus on a tilt table or by the equivalent yogic postural exercise (Yogic asanas), the EH could be cured or controlled. Patients on therapeutic regime were gradually withdrawn from drug therapy, and later divided into two groups of 10 each. Group-I (age 34 +/- 1.7 years) was subjected to a 3 week course of 70 degrees head-up tilt for 30 min daily, while in group-II (age 50 +/- 3.3 years), specific yogic exercises equivalent to head-up or head-down tilt were administered for the same duration. The progressive autonomic readjustments were assessed by a battery of tests including cardiovascular responses to head up tilt, cold pressor response at 4 degrees C water (CPR), alpha index of EEG (AI), level of blood catecholamines (CA) and plasma renin activity (PRA). At the end of 3 weeks, there was a significant reduction (P < 0.001) in blood pressure in both the groups. Progressive changes in BP and HR response to tilt during 3 weeks course of tilt and yogic exercise clearly indicated gradual improvement in baroreflex sensitivity. Likewise, changes in other indices like CPR, AI, CA and PRA indicated progressive attenuation of sympatho-
adrenal and renin-angiotensin activity. All these changes together with the reduction in BP strongly suggest a close link between the etiology of EH and baroreflexes on the one hand and controlling influence of the latter on sympatho-adrenal and renin-angiotensin systems on the other. It also throws light on the physiological mechanism underlying the effects of selected yogic exercises in the treatment of EH.

Psychosom Med. 2010 Jan 11. [Epub ahead of print]

STRESS, INFLAMMATION, AND YOGA PRACTICE.

Objective: To address the mechanisms underlying hatha yoga's potential stress-reduction benefits, we compared inflammatory and endocrine responses of novice and expert yoga practitioners before, during, and after a restorative hatha yoga session, as well as in two control conditions. Stressors before each of the three conditions provided data on the extent to which yoga speeded an individual's physiological recovery. Methods: A total of 50 healthy women (mean age, 41.32 years; range, 30-65 years), 25 novices and 25 experts, were exposed to each of the conditions (yoga, movement control, and passive-video control) during three separate visits. Results: The yoga session boosted participants' positive affect compared with the control conditions, but no overall differences in inflammatory or endocrine responses were unique to the yoga session. Importantly, even though novices and experts did not differ on key dimensions, including age, abdominal adiposity, and cardiorespiratory fitness, novices' serum interleukin(IL)-6 levels were 41% higher than those of experts across sessions, and the odds of a novice having detectable C-reactive protein (CRP) were 4.75 times as high as that of an expert. Differences in stress responses between experts and novices provided one plausible mechanism for their divergent serum IL-6 data; experts produced less lipopolysaccharide-stimulated IL-6 in response to the stressor than novices, and IL-6 promotes CRP production. Conclusion: The ability to minimize inflammatory responses to stressful encounters influences the burden that stressors place on an individual. If yoga dampens or limits stress-related changes, then regular practice could have substantial health benefits.


EFFECTS OF YOGA ON DEPRESSION AND ANXIETY OF WOMEN.
Javnbakht M, Hejazi Kenari R, Ghasemi M.

Yoga has often been perceived as a method of stress management tool that can assist in alleviating depression and anxiety disorders. This study sought to evaluate the influence of yoga in relieving symptoms of depression and anxiety in women who were referred to a yoga clinic. METHODS: The study involved a convenience sample of women who were referred to a yoga clinic from July 2006 to July 2007. All new cases were evaluated on admission using a personal information questionnaire well as Beck and Spielberger tests. Participants were randomly assigned into an experimental and a control group. The experimental group (n=34) participated in twice weekly yoga classes of 90 min duration for two months. The control group (n=31) was assigned to a waiting list and did not receive yoga. Both groups were evaluated again after the two-month study period. RESULTS: The average prevalence of depression in the experimental group pre and post Yoga intervention was 12.82±7.9 and 10.79±6.04 respectively, a statistically insignificant decrease (p=0.13). However, when the experimental group was compared to the control group, women who participated in yoga classes showed a significant decrease in state anxiety (p=0.03) and trait anxiety (p<0.001). CONCLUSIONS: Participation in a two-month yoga class can lead to significant reduction in perceived levels of anxiety in women who suffer from anxiety disorders. This study suggests that yoga can be considered as a complementary therapy or an alternative method for medical therapy in the treatment of anxiety disorders.


IMMEDIATE EFFECT OF SLOW PACE BHASTRIKA PRANAYAMA ON BLOOD PRESSURE AND HEART RATE.
Pramanik T, Sharma HO, Mishra S, Mishra A, Prajapati R, Singh S.

OBJECTIVES: The objective of this study was to evaluate the immediate effect of slow pace bhashrika pranayama (respiratory rate 6/min) for 5 minutes on heart rate and blood pressure and the effect of the same breathing exercise for the same duration of time (5 minutes) following oral intake of hyoscine-N-butylbromide (Buscopan), a parasympathetic blocker drug. SUBJECTS AND METHODS: Heart rate and blood pressure of volunteers (n = 39, age = 25-40 years) was recorded following standard procedure. First, subjects had to sit comfortably in an easy and steady posture (sukhasana) on a fairly soft seat placed on the floor keeping head, neck, and trunk erect, eyes closed, and the other
muscles reasonably loose. The subject is directed to inhale through both nostrils slowly up to the maximum for about 4 seconds and then exhale slowly up to the maximum through both nostrils for about 6 seconds. The breathing must not be abdominal. These steps complete one cycle of slow pace bhastrika pranayama (respiratory rate 6/min). During the practice the subject is asked not to think much about the inhalation and exhalation time, but rather was requested to imagine the open blue sky. The pranayama was conducted in a cool, well-ventilated room (18-20 degrees C). After 5 minutes of this breathing practice, the blood pressure and heart rate again were recorded in the aforesaid manner using the same instrument. The other group (n = 10) took part in another study where their blood pressure and heart rate were recorded following half an hour of oral intake of hyoscine-N-butylbromide 20 mg. Then they practiced the breathing exercise as stated above, and the abovementioned parameters were recorded again to study the effect of parasympathetic blockade on the same pranayama. RESULTS: It was noted that after slow bhastrika pranayamic breathing (respiratory rate 6/min) for 5 minutes, both the systolic and diastolic blood pressure decreased significantly with a slight fall in heart rate. No significant alteration in both blood pressure and heart rate was observed in volunteers who performed the same breathing exercise for the same duration following oral intake of hyoscine-N-butylbromide. DISCUSSION: Pranayama increases frequency and duration of inhibitory neural impulses by activating pulmonary stretch receptors during above tidal volume inhalation as in Hering Bruer reflex, which bring about withdrawal of sympathetic tone in the skeletal muscle blood vessels, leading to widespread vasodilatation, thus causing decrease in peripheral resistance and thus decreasing the diastolic blood pressure. After hyoscine-N-butylbromide, the parasympathetic blocker, it was observed that blood pressure was not decreased significantly as a result of pranayama, as it was observed when no drug was administered. CONCLUSIONS: Vagal cardiac and pulmonary mechanisms are linked, and improvement in one vagal limb might spill over into the other. Baroreceptor sensitivity can be enhanced significantly by slow breathing (supported by a small reduction in the heart rate observed during slow breathing and by reduction in both systolic and diastolic pressure). Slow pace bhastrika pranayama (respiratory rate 6/min) exercise thus shows a strong tendency to improving the autonomic nervous system through enhanced activation of the parasympathetic system.


EFFECT OF SLOW- AND FAST-BREATHING EXERCISES ON AUTONOMIC FUNCTIONS IN PATIENTS WITH ESSENTIAL HYPERTENSION.
Mourya M, Mahajan AS, Singh NP , Jain AK.

OBJECTIVES: Breathing exercises practiced in various forms of meditations such as yoga may influence autonomic functions. This may be the basis of therapeutic benefit to hypertensive patients. DESIGN: The study design was a randomized, prospective, controlled clinical study using three groups. SUBJECTS: The subjects comprised 60 male and female patients aged 20-60 years with stage 1 essential hypertension. INTERVENTION: Patients were randomly and equally divided into the control and other two intervention groups, who were advised to do 3 months of slow-breathing and fast-breathing exercises, respectively. Baseline and postintervention recording of blood pressure (BP), autonomic function tests such as standing-to-lying ratio (S/L ratio), immediate heart rate response to standing (30:15 ratio), Valsalva ratio, heart rate variation with respiration (E/I ratio), hand-grip test, and cold pressor response were done in all subjects. RESULTS: Slow breathing had a stronger effect than fast breathing. BP decreased longitudinally over a 3-month period with both interventions. S/L ratio, 30:15 ratio, E/I ratio, and BP response in the hand grip and cold pressor test showed significant change only in patients practicing the slow-breathing exercise. CONCLUSIONS: Both types of breathing exercises benefit patients with hypertension. However, improvement in both the sympathetic and parasympathetic reactivity may be the mechanism that is associated in those practicing the slow-breathing exercise.


EFFECT OF A COMPREHENSIVE YOGA-BASED LIFESTYLE MODIFICATION PROGRAM ON LIPID PEROXIDATION.
Yadav RK, Ray RB, Vempati R, Bijlani RL.

Oxidative stress contributes to the process of aging as well as a variety of chronic degenerative diseases. There are indications that psychological stress increases oxidative stress whereas relaxation decreases it. We have measured the concentration of thiobarbituric acid reactive substances (TBARS) in blood as an indicator of oxidative stress at the beginning and at the end of a comprehensive yoga-based lifestyle modification program (YLMP). The data was collected from 104 subjects (59 male, 45 female), 19-71 years of age (mean +/- SD, 41.2 +/- 14.6 years). The YLMP consisted of a nine-day educational out-patient course on the theory and practice of yoga and included, besides a daily
one-hour practice of physical postures (asanas) and breathing exercises (pranayama), lecture and films on yoga, stress management and nutrition, practice of meditation and shavasana (a relaxation technique), and individual counseling. Venous blood samples were collected on the first and last day of the course. The serum concentration of TBARS decreased significantly from 1.72 +/- 0.72 nmoles/ml on day 1 to 1.57 +/- 0.72 nmoles/ml on day 10 (P<0.05). The study suggests that a brief low cost lifestyle intervention based on yoga reduces oxidative stress.

THE EFFECTS OF YOGA ON HYPERTENSIVE PERSONS IN THAILAND.
McCaffrey R, Ruknui P, Hatthakit U, Kasetsonboon P.
To determine the effectiveness of a yoga program on blood pressure and stress, a group of hypertensive patients in Thailand were studied, with the experimental group showing significantly decreased mean stress scores and blood pressure, heart rate, and body mass index levels compared with the control group. Further studies are suggested to determine the effects of yoga on hypertension in Thailand.

EFFECT OF SELECTED YOGIC PRACTICES ON THE MANAGEMENT OF HYPERTENSION.
Murugesan R, Govindarajulu N, Bera TK.
On the basis of medical officers diagnosis, thirty three (N = 33) hypertensives, aged 35-65 years, from Govt. General Hospital, Pondicherry, were examined with four variables viz, systolic and diastolic blood pressure, pulse rate and body weight. The subjects were randomly assigned into three groups. The exp. group-I underwent selected yoga practices, exp. group-II received medical treatment by the physician of the said hospital and the control group did not participate in any of the treatment stimuli. Yoga imparted in the morning and in the evening with 1 hr/session. day-1 for a total period of 11-weeks. Medical treatment comprised drug intake every day for the whole experimental period. The result of pre-post test with ANCOVA revealed that both the treatment stimuli (i.e., yoga and drug) were effective in controlling the variables of hypertension.

Evid Based Complement Alternat Med. 2009 Sep 4. [Epub ahead of print]
IYENGAR YOGA VERSUS ENHANCED USUAL CARE ON BLOOD PRESSURE IN PATIENTS WITH PREHYPERTENSION TO STAGE I HYPERTENSION: A RANDOMIZED CONTROLLED TRIAL.
Cohen DL, Bloedon LT, Rothman RL, Farrar JT, Galantino ML, Volger S, Mayor C, Szapary PO, Townsend RR.
The prevalence of prehypertension and Stage 1 hypertension continues to increase despite being amenable to non-pharmacologic interventions. Iyengar yoga (IY) has been purported to reduce blood pressure (BP) though evidence from randomized trials is lacking. We conducted a randomized controlled trial to assess the effects of 12 weeks of IY versus enhanced usual care (EUC) (based on individual dietary adjustment) on 24-h ambulatory BP in yoga-naive adults with untreated prehypertension or Stage 1 hypertension. In total, 26 and 31 subjects in the IY and EUC arms, respectively, completed the study. There were no differences in BP between the groups at 6 and 12 weeks. In the EUC group, 24-h systolic BP (SBP), diastolic BP (DBP) and mean arterial pressure (MAP) significantly decreased by 5, 3 and 3 mmHg, respectively, from baseline at 6 weeks (P < 0.05), but were no longer significant at 12 weeks. In the IY group, 24 h SBP was reduced by 6 mmHg at 12 weeks compared to baseline (P = 0.05). 24 h DBP (P < 0.01) and MAP (P < 0.05) decreased significantly each by 5 mmHg. No differences were observed in catecholamine or cortisol metabolism to explain the decrease in BP in the IY group at 12 weeks. Twelve weeks of IY produces clinically meaningful improvements in 24 h SBP and DBP. Larger studies are needed to establish the long term efficacy, acceptability, utility and potential mechanisms of IY to control BP.
Modern medical advancements provide the rationale for the integration of various traditional healing techniques including Yoga to promote healing, health, and longevity. It is imperative that advances in medicine include the wholistic approach of Yoga to face the current challenges in health care.

The Centre for Yoga Therapy, Education and Research (CYTER) in MGMC & RI is conducting a scientifically sound Yoga therapy programme through its Yoga Therapy OPD. This is functioning from 9.30 am to 12 noon daily (Monday–Friday). Consultations are offered by Dr. Ananda Balayogi Bhavanani, Deputy Director (Yoga) and Mrs Meena Ramanathan, Coordinator and Yoga Therapist and qualified Yoga instructors are imparting the schedules. Individualised and group Yoga therapy sessions are being conducted for various medical conditions such as diabetes, hypertension, musculoskeletal and psychiatric disorders with excellent feedback from participants. Numerous pilot studies have been completed and major research studies are being planned under guidance of Dr. Madanmohan, Professor and Head, Department of Physiology, MGMC & RI.

**YOGA THERAPY**

More than 3000 patients have benefited from Yoga Therapy consultations and sessions since 2010. Of these around 20% were hypertensive, 10% with musculo-skeletal disorders, 20% with psychiatric disorders, 15% with skin disorders, 10% with breathing disorders and the other had other disorders. The patients who attend the Yoga Therapy unit belong to many walks of life; from poor farmers to highly placed executive, uneducated laborers earning daily wages to the most qualified people, alcohol-dependent addicts, and trans-gender people etc. Those who have attended sessions regularly attained benefits physically and psychologically, enabling them to attain, maintain or regain their health and wellbeing. These satisfied participants also motivate their friends and relatives to start yoga to enjoy all the benefits, which they are enjoying now.
YOGA RESEARCH

As we are getting a regular in-flow of patients and normal volunteers, we have been doing some studies on the effects of Yoga. The following are some of the studies done at CYTER in the past few years.

1. Immediate effects of suryanamaskar on reaction time and heart rate in female volunteers.

Abstract: Suryanamaskar (SN), a yogic technique is composed of dynamic muscular movements synchronised with deep rhythmic breathing. As it may have influence on CNS, this study planned to investigate immediate effects of SN on reaction time (RT) and heart rate (HR). 21 female volunteers attending yoga classes were recruited for study group and 19 female volunteers not participating in yoga were recruited as external-controls. HR, auditory reaction time (ART) and visual reaction time (VRT) were recorded before and after three rounds of SN in study group as well as 5 minutes of quiet sitting in both groups. Performance of SN produced immediate decrease in both VRT and ART (P<0.001). This was significant when compared to self-control period (P<0.001) and compared to external control group, it decreased significantly in ART (P=0.02). This was pronounced when Δ% was compared between groups (P<0.001). HR increased significantly following SN compared with both self-control (P=0.025) and external-control group (P=0.032). Faster reactivity may be due to intermediate level of arousal by conscious synchronisation of dynamic movements with breathing. Rise in HR is attributed to sympathetic arousal and muscular exertion. We suggest that SN may be used as an effective training means to improve neuro-muscular abilities. Status: This research was published in Indian J Physiol Pharmacol 2013; 57(2) : 199–204.

2. Comparative immediate effect of different yoga asanas on heart rate and blood pressure in healthy young volunteers.

Abstract: This study planned to compare immediate cardiovascular effects of different Yoga Asanas in healthy young volunteers. Heart rate (HR), systolic pressure (SP), and diastolic pressure (DP), blood pressure (BP), were recorded using the non invasive blood pressure (NIBP) apparatus in 22 healthy young subjects, before and after the performance of Dhanurasana (DA), Vakrasana (VA) (both sides), Janusirasasana (JSA) (both sides), Matsyasana and Shavasana for 30 s. HR and BP were further recorded during supine recovery at 2, 4, 6, 8, and 10 min. A repeated measure of ANOVA was used for statistical analysis. There were significant changes in HR and BP both immediately after the Asanas as well as during the recovery period. Overall comparisons of Δ% changes immediately after the performance of the Asanas revealed significant differences with regard to HR that increased significantly after DA. In the recovery phase, there were significant intergroup differences from 2 min onward in both SP and DP. The decrease of SP after VA (right side) (VA-R) was significantly greater than Shavasana (4th, 6th, and 8th min) and JSA (left side) (JSA-L) at 6th and 8th min. DP decreased significantly after performing JSA-L compared to VA-R at the 6th and 8th min. The cardiovascular changes immediately after the Asanas and during the recovery phase reveal inherent differences between the selected postures. The rise of HR in DA may be attributed to increased sympathetic response due to the relative difficulty of the posture as well as abdominal compression occurring in it. The effect of supine relaxation is more pronounced after the performance of the Asanas as compared to mere relaxation in Shavasana. This may be attributed to a normalization and resultant homeostatic effect occurring due to a greater, healthier de-activation of the autonomic nervous system occurring owing to the presence of prior activation. There were also subtle differences between the right sided and left sided performance of VA and JSA that may be occurring due to the different internal structures being either compressed or relaxed on either side. Our study provides initial evidence of differential cardiovascular effects of Asanas and subtle differences between right and left sided performance. Further, cardiovascular recovery is greater after the performance of the Asanas as compared to shavasan; thus, implying a better response when effort precedes relaxation. Status: This research has been accepted for publication in International Journal of Yoga.

3. Differential effects of uninostril and alternate nostril pranayamas on cardiovascular parameters and reaction time.

Abstract: Recent studies have reported the differential physiological and psychological effects of yogic uninostril breathing (UNB) and alternate nostril breathing (ANB) techniques. This study aims to determine differential effects of these techniques on reaction time (RT), heart rate (HR), and blood pressure (BP). Twenty yoga-trained subjects came to the lab on six different days and RT, HR, and BP were recorded randomly before and after nine rounds of right UNB (surya nadi [SN]), left UNB (chandra nadi [CN]), right initiated ANB (surya bhedana [SB]), left initiated ANB (chandra bhedana [CB]), nadi shuddhi (NS), and normal breathing (NB). Overall comparison of Δ% changes showed
statistically significant differences between groups for all parameters. There was an overall reduction in HR- and BP-based parameters following CB, CN, and NS with concurrent increases following SB and SN. The differential effects of right nostril initiated (SB and SN) and left nostril initiated (CB, CN, and NS) UNB and ANB techniques were clearly evidenced. Changes following NB were insignificant in all respects. The overall comparison of Δ% changes for RT showed statistically significant differences between groups that were significantly lowered following both SB and SN. Our study provides evidence of sympathomimetic effects of right nostril initiated pranayamas with sympatholytic/parasympathomimetic effect following left nostril initiated pranayamas. We suggest that the main effect of UNB and ANB techniques is determined by the nostril used for inspiration rather than that used for expiration. We conclude that right and left yogic UNB and ANB techniques have differential physiological effects that are in tune with the traditional swara yoga concept that air flow through right nostril (SN and pingala swara) is activatory in nature, whereas the flow through left nostril (CN and ida swara) is relaxatory. Status: This research was presented at the International Yoga conference, Kaivalyadhama, Lonavla in Dec 2012 and full paper has been accepted for publication in International Journal of Yoga.

4. Hematological, biochemical and psychological effects of a yoga training programme in nursing students.

Abstract: We were granted the opportunity to impart a 6 month comprehensive course of yoga training for nursing students. The two goals of this study are to analyse the effects of the training on the participants’ health and quality of life (QoL) and to help the participants better understand the scientific basis of these yoga practices. 60 healthy nursing students (12 M, 48 F) aged 18.60 ± 0.67 (SD) y were recruited, and 60 min of yoga training was given twice weekly, for 6 months. Selected biochemical and hematological parameters were recorded along with Ferrans and Powers QoL index before and after the training period. QoL was also tested at mid term. Post-intervention statistical analysis (repeated measures of ANOVA) revealed highly significant and beneficial changes in most hematological and biochemical parameters. These changes correlated positively with the subjects’ frequency of attendance, as evidenced by Pearson’s linear correlation testing. There were also significant improvements in QoL index and its subscales, both at mid training and post training. These improvements also correlated positively with attendance. The present study provides evidence of the beneficial psycho-physical effects of yoga training. All parameters tested showed positive changes, and most were statistically significant. Major findings are enhanced bone marrow function, reduced allergic tendency, alkalization of urine, metabolic reconditioning (with special emphasis on liver function) and improvement in all QoL indices. This may be attributed to an improved functioning of the body-mind complex, which is facilitated by the breath–body practices of yoga. Because we were not able to establish a separate control group, we correlated changes with the subjects’ frequency of attendance. The majority correlated positively. In conclusion, our study confirms both psychological and physical benefits of yoga training in a graduate course student population. We recommend that yoga be made an integral part of medical and paramedical collegiate education. Status: This has been submitted for publication in Journal of Biomedical Human Kinetics.

5. Immediate cardiovascular effects of a single yoga session in different conditions.

Abstract: This retrospective review of clinical data was done to determine cardiovascular effects of a single yoga session in normal subjects as well as patients of different medical conditions. Data of 1896 patients (1229 female, 633 male and 34 transgender) with mean age of 36.28 ± 12.64 y who attended yoga therapy sessions at CYTER between November 2010 and September 2012 was used for analysis. Heart rate (HR), systolic (SP) and diastolic pressure (DP) had been recorded using non-invasive blood pressure (NIBP) apparatus before and after 60 minute yoga sessions at CYTER and indices like pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (DoP) were derived from recorded parameters. Participants were undergoing appropriate yoga therapy protocols as per their individual condition while normal subjects had a general schedule of practice. Typical yoga sessions included simple warm ups (jathis and surya namaskar), breath body movement coordination practices (kriyas), static stretching postures (asana), breathing techniques (pranayama), relaxation and chanting. There were statistically significant (p < 0.001) reductions in all the studied cardiovascular parameters following the yoga session (Tables 1 & 2). The magnitude of reductions differed in the groups, it being more significant in those having hypertension (n = 505) and less significant in those having endocrine/skin (n = 230) and musculoskeletal (n = 120) conditions. It was moderately significant in the normal subjects (n = 582) as well as patients having psychiatric (n = 302) and respiratory (n = 157) conditions. There is a healthy reduction in HR, BP and derived cardiovascular indices following a single yoga session. The magnitude of this reduction depends on the pre-existing medical condition as well as the yoga therapy protocol adopted. These changes
may be attributed to enhanced harmony of cardiac autonomic function as a result of coordinated breath-body work and mind-body relaxation due to yoga. Status: Submitted for publication in Journal of Alternative & Integrative Medicine.

6. Immediate effect of chandra and suryanadi pranayamas on cardiovascular parameters and reaction time in a geriatric population.

Abstract: Previous studies have reported differential physiological and psychological effects of exclusive right and left nostril breathing. Though potential health benefits have been postulated, further clinical research is required to prove immediate and sustained efficacy of these techniques. This study evaluated immediate effects of exclusive right (SNP) and left (CNP) nostril breathing on cardiovascular (CV) parameters and reaction time (RT) in a geriatric population. 26 subjects attending regular yoga sessions at a senior citizen hospice, were recruited for this self-controlled study. They were instructed to sit in any comfortable posture and relax for 5 min before taking the pre-intervention recordings of Heart rate (HR), blood pressure (BP), auditory and visual RT (ART and VRT respectively). They then performed the selected technique and parameters were recorded immediately after performance of 9 rounds of either SNP or CNP. The entire sequence of recordings was randomised to avoid any bias. Intra and inter group statistical analysis was carried out using Student’s paired t test for data that passed normality testing and Wilcoxon matched-pairs signed-ranks test applied for the others. Overall intra-group comparison of pre-post data and inter-group Δ% comparisons showed statistically significant (p < 0.05) differences for all parameters. There was an overall reduction in HR and BP-based parameters following both SNP and CNP. However, inter-group Δ% comparisons revealed a significantly greater reduction after CNP for all parameters. Inter-group comparisons revealed highly significant decreases (p < 0.001) in VRT and ART after SNP. In conclusion, our study sheds new light on the physiological changes occurring after SNP and CNP in a geriatric population. While both techniques reduce HR and BP, CNP does it more significantly. There is shortening of RT following SNP and this may be attributed to enhance sensory motor function that is of great significance in the elderly. We suggest that Yoga should be part of the health care facilities for the elderly as it can enhance their quality of life and improve their overall health status. Status: This research has been accepted for publication in International Journal of Physiology.

7. Effect of yoga training on cardiorespiratory health in obese subjects.

Abstract: Obesity is a major health challenge worldwide. It is a contributing factor to morbidity and mortality in lifestyle disorders such as diabetes, hypertension, coronary artery disease and premature aging. Yoga is the best lifestyle ever designed for preventive health as it also promotes positive wellbeing. Studies have suggested the beneficial effects of yoga in prevention and management of obesity and its complications. However, the cardiorespiratory health benefits of yoga in obesity have not been studied in detail. The present single blind RCT aims to determine cardiorespiratory health status of obese subjects (BMI 25 - 40) and evaluate the effect of Yoga training in them. 120 obese volunteers (BMI 25 - 40) will be recruited and randomized into yoga group (60) and wait list control group (60). Cardiorespiratory health status will be evaluated by anthropometric indices (Ht, Wt, BMI, WC/HC), physiological parameters (resting HR, BP and HRV, PFT and exercise tolerance), Ferrans and Powers QoL Index and biochemical parameters (HOMA, micronutrients, LFT, lipid and thyroid profiles) before and after the study period and appropriate statistical analysis will be done. 12 weeks of Yoga training consisting of an integrated schedule of asan, pranayam and relaxation techniques along with lifestyle modifications and Yogic counseling will be given to Yoga group. Participants in control group will be treated as wait list control and will be given an opportunity to attend yoga training programme after completion of study period. A significant improvement is expected in cardiorespiratory health status that will be an indicator of the preventive and health promotive effects of Yoga. Status: This proposal has been submitted to CCRYN, Deptt of AYUSH, Ministry of Health & FW, Govt of India after obtaining clearance from IHEC.
CME Committee - Department of Physiology & Centre for Yoga Therapy, Education and Research (CYTER)

Centre for Yoga Therapy, Education and Research Team (CYTER)
PHOTO GALLERY OF CYTER

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