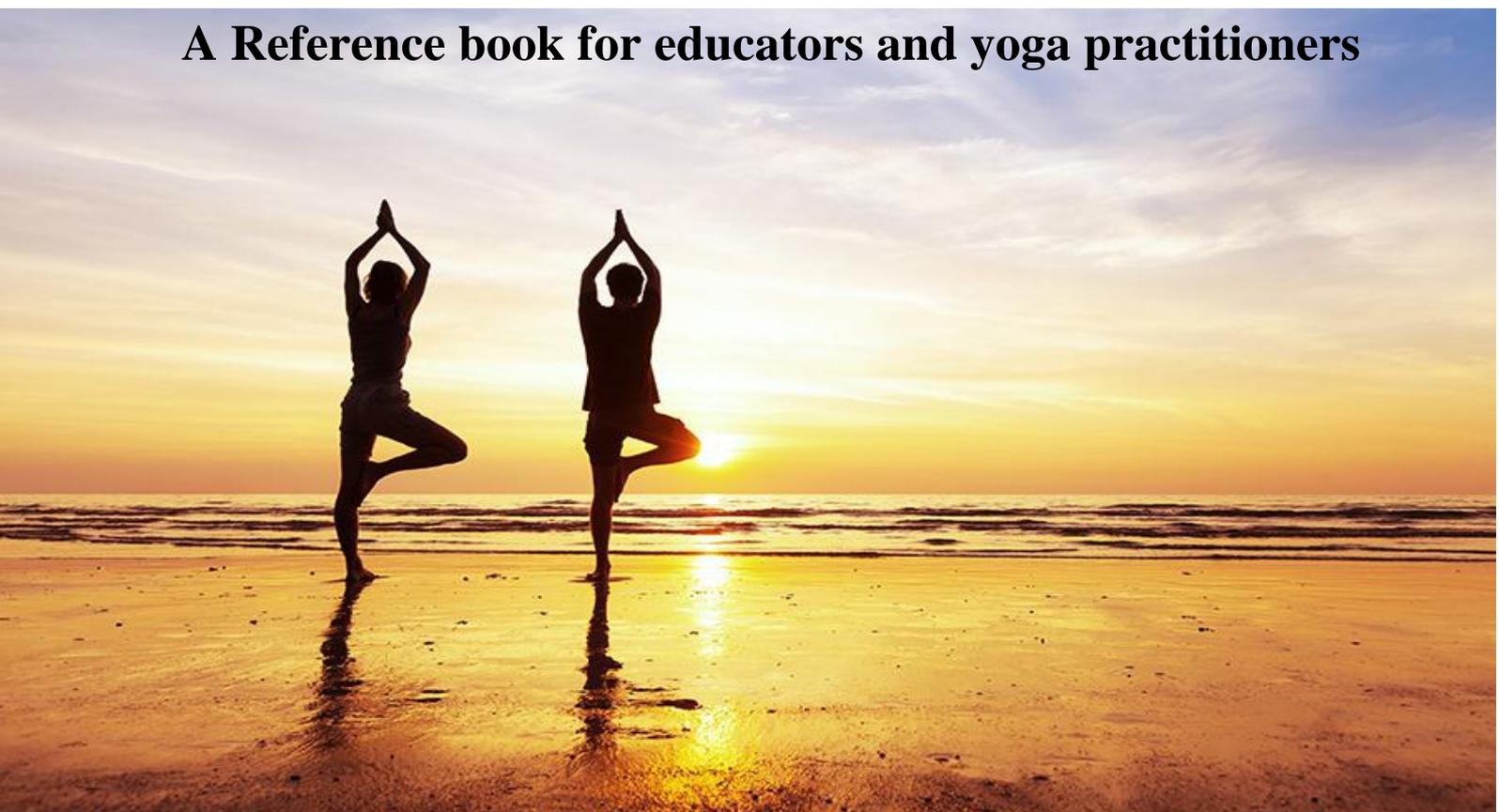


# Contemporary Yoga Education: Transforming the Body, Mind & Soul

**A Reference book for educators and yoga practitioners**



**Nirmaljit Kaur Rathee**

**Sudesh Bhardwaj**

**Nirmaljit K. Rathee    Sudesh Bhardwaj**

**CONTEMPORARY YOGA EDUCATION: TRANSFORMING THE BODY, MIND & SOUL**



*Nirmaljit K. Rathee    Sudesh Bhardwaj*

**CONTEMPORARY YOGA EDUCATION: TRANSFORMING THE BODY, MIND & SOUL**

**European Scientific Institute, ESI    [www.euinstitute.net](http://www.euinstitute.net) publishing**

## ***Impressum***

Bibliographic information published by the National and University Library "St. Kliment Ohridski" in Skopje; detailed bibliographic data are available in the internet at <http://www.nubsk.edu.mk/>;

CIP - 233-852.5(035)

COBISS.MK-ID [103977226](#)

Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and trademarks or registered trademarks of their respective holders. The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this works is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

Publisher: EUROPEAN SCIENTIFIC INSTITUTE (ESI)

Offices: Portugal, Macedonia and Argentina

Address: Street: "203", number "1", 2300 Kocani, Republic of Macedonia

Email: [contact@eujournal.org](mailto:contact@eujournal.org)

**ISBN: 978-608-4642-60-2**

Copyright © 2017 by the author, EUROPEAN SCIENTIFIC INSTITUTE (ESI) and licensors

All rights reserved. 2017

# **Contemporary Yoga Education: Transforming the Body, Mind & Soul**

*A Reference book for Educators and Yoga Practitioners*



**Nirmaljit K. Rathee, Ph.D.**

Director, Education Graduate Program  
Associate Professor  
Education Department  
Delaware State University  
Dover, Delaware, USA.

**Sudesh Bhardwaj, Ph.D.**

Assistant Professor, Physical Education  
Department of Physical Education  
D. A. V. College, Sector – 10  
Chandigarh, India.

# CONTENTS

❖ PREFACE

❖ ACKNOWLEDGEMENT

<b>CHAPTERS</b>	<b>PAGES</b>
I. Tracing the Origin of Yoga.....	1
II. Mechanics of Yoga.....	7
III. Yoga: A Gateway to Healthy Living.....	34
IV. Yoga: Arthritis and Flexibility.....	49
V. Yoga Practices: Shatkarmas.....	61
VI. International day of Yoga.....	72
VII. Yoga vs. Modern Exercise.....	75
VIII. Research Practices in Yoga.....	87
BIBLIOGRAPHY.....	93

## PREFACE

With the blessing of almighty God, we are beginning this noble work of scripting the book “*Contemporary Yoga Education: Transforming the Body, Mind & Soul*” to make our readers realize that we human beings, the most powerful and beautiful creatures of God, have an ultimate desire to lead a life full of harmony, liberation and self-actualization. If we start viewing ourselves as a part of the divine self, our entire perspective of looking at life will change. Amongst all the creations of the universal spirit, it is man alone who has been blessed with the magnificent known and unknown profundity of hidden artistry and innovative strengths to discover the unknown realities of life. Since evolution, human beings have continually realized their competencies, which in turn have globalized the whole of mankind. Now they have extended their powers so much so that they are at the verge of dwelling on other planets. Yes, we can undoubtedly say that this results from the contribution of science. Nevertheless, it is the man who explored science itself that is ultimately responsible for its advances. It is an undeniable fact that man with his indefinable spiritual entity can obtain the revelation of the universal spirit as well.

In today’s globalized era, advanced scientific technologies have almost touched every aspect of human life and the corporate world. Scientific research has spread its web in all directions and caught human life at every end. These inventions have enticed mankind at each step with an abundance of electronic gadgets, appliances, automated machineries and unbelievable bio-technologies that claim to be able to clone human life. As a result of these scientific innovations, people are undoubtedly enjoying their comfort and performing multiple tasks in less time with little or no physical and mental effort. But at the same time, due to this fast paced life, man has overloaded his mind, body and soul beyond his psychosomatic efficiency.

We are stepping forward here by accepting the fact that with proper use and care, life grows. However, lack of use and negligence leads it to lose its valuable grace and becomes rustic. Unfortunately, this is what plagues human beings today. Man is living a life according to a predetermined, programmed pattern, like a robot, without any personal space for self-realization and consciousness. His life has become so hypersensitive that it is like a water bubble which seems colorful and very beautiful superficially but which with a little prick bursts in no time and becomes inexistent. Such delicate personality of a man is the most dangerous state of his being, and it constantly affects his health in the form of hypertension, hypoxia, anxiety, fear, depression and other critical ailments. Man has been using his own power to such an extent that his personal, family and social life is degrading. All such problems can be avoided by fostering the awareness and by diving deep into the infinite depth of the mind through meditation and by regulating the psychosomatic processes of the body and mind through the yogic practices, which will restore the holistic health for a harmonious and quality existence.

Yoga is an art and science that heals each loophole, internally and externally, and refines the human soul comprehensively by working on the human body and mind. It is the natural medicine that forms a protective aura around man.

Yoga can be effectively utilized to unite man's scattered life and bring it in harmony with the self, the society, nature and the universe. The word 'yoga' literally means to join broken man individually at first, and universally in the end to seek an eternal bliss.

The prime purpose of this book is to provide a source of information to help man to groom and achieve the integration of his personality, and ultimately to form a healthy, ethical and coherent society. This book also aims to enlighten the students of yoga engaged in various courses as a source of literature and help them with the knowledge they seek for their academic success. Though each chapter of this book has its own objectives, they are all complimentary to one another.

*Dr. Nirmaljit K Rathee*

*Dr. Sudesh Bhardwaj*

## ACKNOWLEDGEMENTS

Scripting a book is a task that involves assimilating academic knowledge, capturing the ideas gathered over the years and assimilating the suggestions and developments from experts and personal experiences which are still not in the light. Finally, carving the entire accumulated material in an ever living shape of words for spreading knowledge and transforming the minds in the field of knowledge was indeed a daunting task.

There are many who deserve appreciation for their motivations and support from the beginning of this project to the end. These beloved have earned a right to be here as a part of the acknowledgements in this book and to have respected frames in this book and in our hearts.

First and foremost, the almighty **GOD** has always touched us with the blessings of wisdom and innumerable versatility for writing this book. Therefore, we surrender ourselves in almighty's praise for nurturing us to write this book.

We would like to thank the **community of teachers** who are in our direct or indirect contact for their suggestions and updating us for covering the areas written in this book and to be written in the next edition.

We owe our hearty and sincere gratitude to respected **Ms. Safi** and **Ms. Seema** for their love and care and for prompting our minds towards the completion of this book.

We express our indebted thanks to **Ms. Anema Amar Soren**, Principal, St. Paul's School, Hazaribaag, Jharkhand, India for providing guidelines in writing, keeping in view the level and diversity of the student's mind.

A special thanks is also due to our loving and caring family members. This book may not have been completed without their encouragement and support.

Without the selfless involvement of **Mr. Varinder**, this book would not have been completed. He always gave his cooperation in all required ways despite his busy schedule. We heartily thank him for his generosity to be as a part of our team.

Dr. Nirmaljit K. Rathee

Dr. Sudesh Bhardwaj

# CHAPTER-I

## TRACING THE ORIGIN OF YOGA

अथ योगानुशासनम् ।

*atha yogānuśāsanam*

(Yoga Sūtra 1.1)

*Now, an exposition of Yoga is to be made.*

- Patanjali

### Gist of the Chapter

This chapter tells the origin of yoga and chronologically describes its historical development up until this day. The inception of yoga is documented from different primary and secondary sources, which trace the authentic foundations of yoga and its comprehensive body of knowledge, comprising changes and era-wise developments.

In today's fast paced technological cyber era, almost everything is automated and mechanically programmed to meet human needs. No doubt, the scientific prosperity we have attained has brought us far from our historic root to today's advanced, modernized world. The world is enjoying the modern scientific technological advancement just to make their lives easy, more useful and efficient to multitask. But as much as human beings are hooked to the technologies and fast paced workloads, their minds have become preoccupied, overburdened and overstressed. This overdose of work often results in health problems that influence our body and mind. Artificially created environments manifest various health hazards that give rise to psychosomatic disorders.

It is a great irony that in our race to attain scientific advancements, we are unable to comprehend its long lasting adverse impact on our health. Can we not control the manifestation of dangerous diseases and health ailments so as to live a stress free, healthy and happy personal, family and social life? If we are to ask people if they would like to lead such life, there would be hardly anyone who will say no to such a harmonious life. But can we transform this desire into reality? Yes, we can, and we do not have to search any further for the answer. We simply have to adopt yoga as a way of life, specifically to be well prepared for the post-modern era.

Incorporating yoga in our life can illuminate the whole existence of a human being. The aim of the yoga practices is to obtain physiological, psychological and spiritual benefits. Yoga can provide mental peace, inner strength and a mind body awareness to help us relax, energize and improve our attention focus. The purpose of yoga is to train the body and mind to self-observe and become self-aware to achieve higher consciousness. Yoga is the art of attaining the

harmony of human body, mind and spirit. It works as an antidote to all of our everyday life problems and acts as a safeguard and rehabilitates the person with everlasting peace and contentment. It can lead us towards eternal enlightenment. Yoga can also help us to get rid of the many health problems like high cholesterol, high blood pressure, osteoporosis, obesity, anxiety, depression and other cardiovascular diseases.

## The Origin of Yoga

The origin of yoga is shrouded in antiquity. The science of yoga traces its origin to thousands of years ago, long before the first religions or belief systems were born. Yoga is the oldest practical Hindu philosophy that believes in a universal spirit (GOD) that can be experienced by an individual spirit. It also believes that one can attain salvation through final enlightenment and union. Tracing the origin of yoga, it is found that there is not much clarity for the evolvment or inception of this great art but as per the available literature and the anthropological and archaeological evidences, the beginning of yoga goes back to 5000 BC and even much earlier than that. Let us unfold the historical background with the passage of eras:

**Pre-Vedic Period (Before 5000 BC to 3500 BC):** According to the available ancient resources, such as texts on Tantras and mythical traditions, even before than the existence of ‘Vedas’ and Upnishads’, yoga has been sought. Mythically speaking, ‘Lord Shiva’ is considered to be the founder of yoga. He is the symbol of Supreme Consciousness to whom supreme knowledge ‘Parvati’ unites as Kundalini Shakti (the cosmic force), and this union of Shiva and Shakti at “Sehsarara Chakra” is called yoga.

During the existence of the Dravidian Civilization (3500-1500 BC), several seals were discovered / excavated from the remains of the Indus Valley Civilization at Harappa and Mohenjodaro in the mid of 3000 BC. These seals depicted the deities’ figure resembling lord Shiva and Parvati in positions resembling a common yoga or meditation pose.



Picture-1



Picture-2

*(Seals from Mohenjo-daro)*

*(Pashupati seals from Indus Valley Civilization depicting yoga meditative pose by Lord Shiva)*

On the basis of discovered archaeological evidences, it can be authentically said that the knowledge and the prevalence of yoga has existed from at least 3000 BC. Some historians believe that yoga originated around 5000 BC or even much earlier than that.

**Pre-Classical Era (1500-800 & after 800 BC) or Vedic Period:** The evidences of the existence of yoga have also been found in the oldest Hindu scriptures of ‘Vedas’ (in the verses of four Hindu Vedas: the Rig-Veda, Sama-Veda, Yajur-Veda and Atharva-Veda). According to Saraswati (2008) “although the Vedas do not give specific practices, they allude to yoga symbolically. In fact, the verses of the Vedas were heard by the rishis and seers in states of deep yogic meditation or Samadhi, and are regarded as revealed scriptures”.

Yoga is one among the six orthodox philosophies of Hinduism that is based on or a practical form of Samkhya or the Sankhya philosophy of Kapila (a great sage of 800 BC). Later on, it was Katha Upanishad, where the word yoga first appeared in the Hindu scripture and the definable shape of yoga started as the steady control of the senses, which along with cessation of mental activity, reaches to the supreme state. Further, the clear evidences of yoga have been given in the 2<sup>nd</sup> and 6<sup>th</sup> chapter of the Bhagawad Gita. However, these are only discussions of traditional yoga practices; much emphasis has been given to Karma, Bhakti and Jnana yoga. Even the existence of yoga has been clearly seen in epics like the Ramayana and Mahabharata.

**Classical Era (500-200 BC):** The classical era between the Mauryan and Gupta periods has been noted for the emergence of yoga where the philosophical schools of Hinduism, Buddhism and Jainism were conceiving and indicating yoga as a strong core conception among these philosophical traditions. Yoga has been mentioned among these three philosophical schools, and apart from their own thought and belief, all three of these philosophies have the common ground of yoga. They agree with one another that the practice of yogic meditation gives liberation.

‘Pali Canon’, an early Buddhist text, describes a systematic and comprehensive yoga discipline that talks about Buddhist meditative practices and specially states meditative absorption with liberation cognition.

It is believed that sometime during the 2<sup>nd</sup> century BC, Maharishi Patanjali, an Indian spiritual saint, authored the first treatise on Yoga, titled “Patanjali Yoga Sutra”. ‘Samkhya’ one of the Hindu philosophical school that became the basis for the systematization of yoga, was very carefully compiled by sage Patanjali in “196 Yoga Sutras”. There is an intimate relationship between ‘Samkhya Philosophy’ and ‘Patanjali’s yoga Sutras’. As by believing the metaphysics of Samkhya, Patanjali yoga moved on to the practical form of yoga to unite with the universal existence of God. Patanjali describes yoga as a mentally active, disciplined and dutiful living action rather than just a theoretical basis of the knowledge of liberation. Patanjali clarified that the diseases and disturbances of the mind are considered as an obstacle to this spiritual practice. Therefore, Samkhya (Sankhya) has provided a theoretical base of knowledge and keeping that knowledge in view, Patanjali yoga followed practical utilisation for gaining liberation. Patanjali compiled his whole system of yoga ‘into 196 sutras comprising: Samadhi Pada-51, Sadheva Pada-55, Vibhuti Pada-56 and Kaivalya Pada 34. This way Patanjali formed a formal yoga philosophy in classical period, which is also famously known as Ashtanga Yoga (eight limbs of Patanjali) and Raja Yoga (the Royal path of Yoga) for absolute freedom.

An old Jain philosophical text called Tattvartha Sutra describes yoga as the sum total of all the activities of mind, speech and body. There is a resemblance between the five vows of Jainism and the five Yamas of Patanjali yoga sutra. Jain philosophy also believes the path of liberation to be yoga.

So, the classical era had laid up a strong philosophical and practical foundation of classical yoga, which is available in the Hindu, Buddhist and Jainism philosophies. In fact, yoga is one of the six Orthodox Hindu philosophies among six philosophical schools.

**Post Classical Era (850 AD – 16<sup>th</sup> Century) or Middle Ages:** The middle ages or Post Classical era can be considered as the rejuvenation era, and it synthesizes the practice pattern in yoga with the strong philosophical base of Samkhya Yoga. It was in the 900 AD when Swami Matsyendranath founded Hatha yoga “the practical yoga of different postures (Asanas) and breathing exercises (Pranayamas)” that emphasized on body-mind purification instead of mind only. The Hatha Yoga was entirely practical as compared to Patanjali’s Raja Yoga/Ashtanga’s Shatkarma Yoga. The six body cleansing processes, after purifying, leads the body to strengthening through Asanas that further refine and strengthen the mind with the practice of pranayama and eventually prepares the mind for a higher stage of meditation. The sages of this period worked tremendously on Hatha Yoga viz: ‘Matsyendranath’, ‘Gorakhnath’, ‘Siddha Sect’ and ‘Dutta Treya’. It was Swami Swatmarama in 15<sup>th</sup> century who compiled the famous yogic text “Hatha Yoga Pradipika” and clearly elaborated this modern modified art of Hatha yoga, and thus raised the practical popularity of Hatha Yoga in the east and west. Many other Hatha Yogic texts originated during the post classical era which explained Hatha-yoga and its elements. The “Yoga Yajnavalkya”, a classical text on Hatha yoga, evolved in the 13<sup>th</sup> century CE. “Gheranda Samhita” was written by Maharishi (Sage) Gheranda and “Hatha Ratnawali” also came into existence during the middle ages.

Evidence indicates that Sikhism also embraced yoga in Punjab during the 15<sup>th</sup> and 16<sup>th</sup> century. The clear visibility of yoga can be traced in the composition of Guru Nanak. The founder of Sikhism considered the value of yoga, then modified and proposed it into the path of Sahaja or Nama Yoga i.e., Meditation on the name of the Divine (God). After the middle ages, the itinerary of this ancient art yoga entered into the modern era and bore scientism.

**Modern Era (Mid-19<sup>th</sup> Century):** The yogic philosophy amongst the six Hindu philosophies has been the most practical truth ever, since the classical past, which acclaims to unite individual spirits to the universal spirit. The paradox of yogic philosophy at one side is the physical and mental cleansing and strengthening the self, whereas the other side of yogic theme inculcates spiritual path, which is the eventual outcome of yoga. Since yoga is not having a single thought, rather talking practically, it has been identified that different thoughts of yoga schools have been practising it since its inception and are still practicing it even till today, in both the Eastern and the Western parts of the world. The incorporation of yoga is on rise across the world because its spiritual theme really purifies us and the physical exercises have gained

tremendous popularity because of their tangible benefits on our body and mind, which is remarkable in itself.

There is no doubt that the popularity of yoga and its acceptance has obtained unequal respect in eastern and western countries. The art of yoga is a powerful living tool having different mechanics that operate individually and collectively to work comprehensively on the overall health and wellbeing of the individual and society; this is the reason that despite being an ancient art, yoga is still being accepted in modern society as an integral part of life. It is an influential art, having a truthful past, surviving the present, and acclaiming to design a truthful future.

After the evolvement of Hatha yoga, which is nowadays also known as the psycho-physical yoga, it began to rise at a fast pace in the early 19<sup>th</sup> century. The prevalence of this modernized art took place in aspirants' life at large in the 19<sup>th</sup> century, although the other ancient practices of yoga have also been practised, but as per the requirement of the aspirants and public interest, Hatha yoga has proved to be most useful, preventive and curative in human's life. Therefore, till mid-19<sup>th</sup> century, the majority of practitioner across the world were attracted towards Hatha Yoga and started growing into it. During this phase, the Hatha Yogis of modern eras i.e. Swami Kewalyanand, Sri Yogendra, Sri Tirumalai Krishnamacharya, Swami Shivananda Saraswati, Swami Satyananda, Swami Niranjand, Maharishi Mahesh Yogi and others have imparted the Hatha-yoga knowledge, its usefulness and benefits, in almost every part of India and the world.

Yoga influenced the western people in the mid-19<sup>th</sup> century. In the 1890s, the great Hindu philosopher Swami Vivekananda visited Europe and the United States and created awareness among people about yoga. He highlighted yoga along with other Hindu philosophies and enlightened the western audience about the power of yoga. Thereafter, Hindu philosophies gained acceptance by western societies and yoga came to be accepted. It gained immense popularity in the western countries during the 1960s and 1980s. Swami Vishnudevananda was another renowned master of yoga who propagated the classical art of Raja Yoga and Hatha Yoga in the west. He founded the International Sivananda Yoga Vedanta Centre in 1957 and established the first Sivananda Yoga Vedanta Centre in Montreal, Canada in 1959. At present there are around 60 Sivananda Yoga Vedanta affiliated Centres around the world. Among different school of Yoga, Hatha Yoga became the most popular among the western public for its static and dynamic postures (Asanas), breathing exercises (Pranayama), followed by meditation (the higher stage of Raja Yoga). The extension of Hatha yoga has formed an important part of life of modern people for its simplicity, ease and beneficial exercises. Even numerous researches have been carried out in USA, UK, UAE etc. on yoga and its techniques in relation to human health and wellness. A vast number of research has been carried out on yoga, and it has proved the benefits of yoga and its exercises for heart diseases, postural problems, backaches, several psychological problems and other psychosomatic ailments etc.

Yoga, especially the yogic Asanas, has made its permanent place in western societies. It has been noticed that Asanas have even superseded modern exercises from as far back as the 19<sup>th</sup> and early 20<sup>th</sup> century in some parts of the western world. But the irony is that the spiritual aspects of yoga i.e. of Kundalini shakti and other spiritual thoughts are yet to be fully accepted in western countries. Although, the physical popularity of yoga has been increasing constantly in USA as yoga practitioners have grown from 4 million in 2001 to 20 million in 2011, still yoga masters like Padma Vibhushan BKS Iyengar and Yogi Baba Ramdev are transforming yogic education throughout the world by educating people about the power of practical yoga in getting rid of many common health problems. The yoga revolution is transforming the world and will continue to serve mankind and the world.

A glance through the history of yoga shows that the journey of yoga has been quite long; its progression has been gradual but continuous. Because of the simple and practical magic of philosophy, yoga is growing today in every society and in every part of the world. Its future looks bright.

## CHAPTER-II

### MECHANICS OF YOGA

#### Epitome

This chapter acquaints the readers, yoga aspirants and the students on the classification of yoga. The chapter incorporates the explanation of different branches of yoga and their working mechanisms and the yoga style. Each type of yoga has its particular mechanics, which is specialized in its own way to lead the yoga practitioners towards completing the final goal of yoga, the yoga of union.

It is the yogic belief that in this universe, everything, from biggest to subtle, visible to invisible and vice-versa, has a predetermined mechanism of operation which existed since the inception of the earth. The organisms start functioning even before their birth as per their natural tendencies and then cater to groom after the birth. Both human beings and other living organisms grow and flourish in naturalism, but at the same time both can be molded or altered to achieve the best of their lives, and whatsoever is desired can happen realistically by following the naturalistic approach of growth and development with positive motivational inputs.

It would not be incorrect to say that the general phenomenon of ‘Anabolism’ and ‘Catabolism’ has direct application to human beings since it is the reason behind the emergence of the world we live in. It seems that the mechanism or function of the world is to unite and separate or to join and breakdown. In fact, this combination of joining and separation is the real mechanism behind the creation and existence of the entire universe and each of its worldly and spiritual activities. Scientifically, both union and separation or attraction and detraction are the two sides of a coin that are required for the existence of the world and its growth.

When we talk about human life, there is no doubt that unity can be the universal strength to counteract the consequences and ill effects of the dispersed life in every context and aspect of human life. Even the supreme father formed each creature and nature individually, and then united or inter-connected them to work together for the harmonious existence. The phenomena of anabolism and catabolism, thus, continues and goes on in order to create the unique balance for human survival. Somewhere, one has to breakdown and somewhere one has to bind, and both are equally important for carrying on life. This universal mechanism of human existence has been followed by human beings as an ancient tradition, and today’s modern science, called “YOGA”, is catering to our needs and harmonizing human life by adopting this holistic approach.

The worldly temptation of running after materialism for quality living is well accepted, but it has scattered, shortened and made the human life weak. Even the advanced scientific technologies and medical science are limited in their abilities to solve the complicated mysteries of man’s life. The point that we need to realize is, why the isolation and deterioration of human ties is perforating our family life in this modern, facilitating world. Despite having everything in

their lives, people are not satisfied by their day to day living. They keep searching for the eternal happiness and end their quest with unhappiness.

Yoga, the great ancient Indian art and currently an evolving modern science, has much to offer. Its ultimate aim is to harmonize the body, mind and spirit, and then lead us towards the attainment of ‘liberation’ or ‘moksha’ (an eternal life with unending joy) by working on every aspect of human life. It has its natural mechanism/functions that operate in one’s life so as to open, clean and strengthen each part or faculty of the human body and strengthen every aspect of life for smooth functioning, until the attainment of final goal. Thus, yoga has a lot to offer; and to reap its boundless fruits, the only thing that is required is the deliberate surrender of oneself to yoga. Let us adopt it for a complete living and bind worldly temptations and seduction. The different mechanics of yoga comprehensively integrates and harmonizes our personality for wholesome living with absolute contentment and transcendence in life. Let us grab the opportunity and give a chance to the mechanism of yoga to work on us and transform our lives.

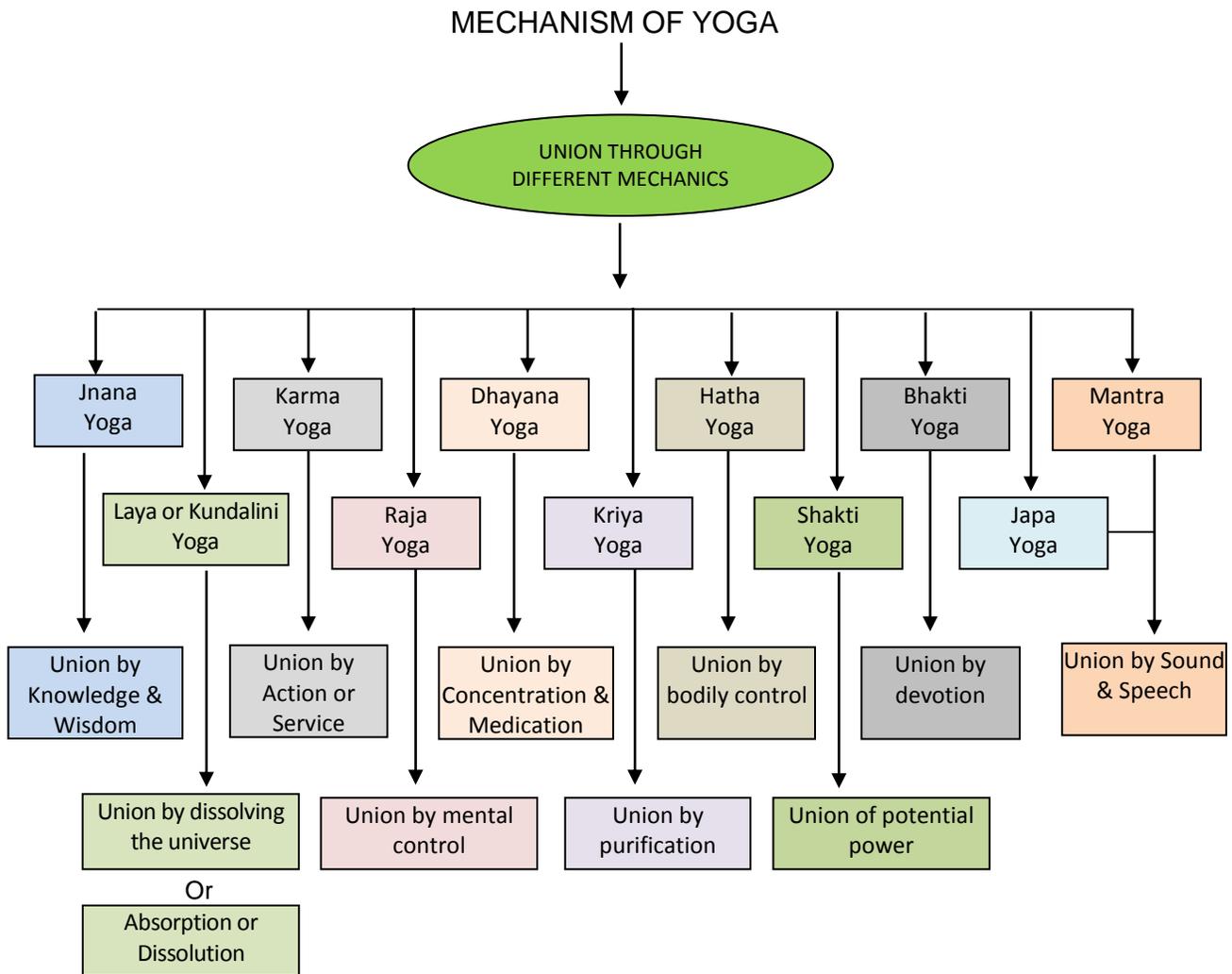
## **MECHANICS OF YOGA**

The function or the functional process of anything, or its way of operation, is called its “mechanism” and the factor or tools essential for performing that mechanism are called its mechanics. Thus, the mechanism of yoga is carried out or operated by its various mechanics in order for us to attain its aims and objectives, which are broad and absolutely focused.

Yoga works on the entirety of human beings, from the top to the bottom, internal to external, tangible to intangible, physical to mental, worldly to spiritual, humanity to cosmos, finally leading us from bondage to eternal freedom. Yogic mechanism specifically works on each entity of the human being separately and also in unity. Yoga uses its different mechanics to work on each and every aspect, and the functional body entity of human beings as per the requirement and nature of the personality.

The mechanism of yoga influences an aspirant’s life by implementing its varied practical, disciplined and ethical mechanics so as to break the initial restraints or bondages and attain the freedom by bestowing upon us contentment and transcendence, finally leading us to self-realization.

Yoga utilizes its versatile and specified mechanics (which have been evolved and are based on sound philosophical thoughts) to repair, nourish and conjoin the human body, mind and spirit that eventually lead the yoga practitioners to the transcendental reality of a holistic living with an absolute harmony between the internal and external environment.



The wide and deep mechanism of yoga touches the human life from the core; it works on the different layers and then inserts its profundity by forming an attractive aura around the yoga aspirant. Each mechanics of yoga comprises different modes of its operation so as to work on our body as a whole as well as on the different bodily parts individually to meet the needs of each individual's personality and its unique requirements.

The mechanism or function of yoga in general catabolizes aspirants on the one hand and anabolizes on the other. It seeks to synthesis congenial chemistry according to an individual's personality and then propels him to follow the complete path of yogic self-transcendence by transforming the personality. It turns him into a specialized-self that automatically reflects from and spontaneously comes into effect through the wisdom, thought and behavior of an individual. It provides him a distinct edge over others.

Let us see the mechanism of yoga and operation of its different mechanics that work amazingly on the lives of aspirants. Although these mechanics are not mutually exclusive, each one has its own values and the objectives that particularly emphasize on any one mode or the

procedure by admitting and retaining the value of each other. All have unique patterns to follow, but aim for the same goal under the universal roof of yoga independently. Therefore, the person who wishes to adopt yoga as a way of life is just one step away from choosing any one of the types of yoga mentioned below that may be most suited to his/her personality and personal requirements.

### **Jnana Yoga (The Mechanic of ‘Knowledge’ & ‘Wisdom’)**

The literal meaning of “Jnana” indicates “knowledge” or “wisdom” that operates within every individual. Spiritually, it can be understood as “intuition” that expect or anticipate any event with no explanation for that. Jnana yoga traces its origin to Bhagavad Gita in relation to the teaching imparted by Lord Krishna to his disciple Arjuna.

The basis of Jnana yoga is “wisdom” that uses the principles of “will power” and “inspired reason” for enlightenment. The disciplined practice of Jnana yoga in one’s life helps to bring self-realization through the exercise of knowledge and wisdom that leads an aspirant from ‘the unreal’ to ‘the real’ for attaining emancipation. Here, intuition is simultaneously working with the power of knowledge and wisdom, especially at higher stages.

### **Laya/Kundalini Yoga (The Mechanic of Absorption & Dissolution)**

The word ‘Laya’ literally means “to become dissolved or to vanish” on one hand and “stick” or “hold” on other hand, as it derives from the root word “li”.

Laya yoga is concerned chiefly with the methods of acquiring the mastery over the “mind”, more particularly over the “will power”. It seeks to meditatively ‘dissolve’ the aspirant/practitioner by clinging solely to the transcendental self. It strives to transcend all the memory traces and the sensory experiences of aspirants by dissolving the microcosm, the mind, into the transcendental being – the consciousness-bliss. Also, Laya yoga progressively dismantles the inner universe of the aspirant through intense contemplation until only the transcendental reality of the self remains. Thus, Laya yoga seeks to attain self-realization and liberation by achieving mind control by awakening Kundalini. Kundalini is a hidden power that rests in the “Mooladhara”, which is at the base of the vertebrae. It is like a serpent having three and a half coils. In the ignorant state of the person, this serpent is asleep with its head down. As long as it sleeps, the person is immersed in worldly activities and pleasures, has no taste for the God’s name, and even dislikes the praise and worship of the God (the Satsang). When it is awakened, the person aspires for a spiritual life and eternal happiness. The arousal and manipulation of Kundalini Shakti (the Serpent Power) is very much central to Laya yoga which represents the universal life force as manifested in the human body. It is said that as the awakened Kundalini Shakti (force) ascends from the psycho-energetic center at the base of the spine to the crown of the head, it absorbs a portion of the life energy in the limbs and the trunk. This is esoterically explained as the reabsorption of the five material elements into their subtle counterparts. The body temperature drops measurably in those parts, whereas the crown feels as if it is on the fire and is very warm to the touch. The physiology of this process is not yet well

understood. Moreover, the arousal of Kundalini Shakti is one of the principles of Hatha yoga, and thus, Laya Yoga can be understood as the higher meditative phase of Hatha yoga.

According to Goswami (1980), Laya yoga is that form of yoga in which yoga, i.e. the Samadhi, is attained. Through Laya yoga, a deep concentrate is achieved, causing the absorption of cosmic principles, stage by stage, into the spiritual aspect of the supreme power-consciousness. It is the process of absorption of cosmic principles in deep concentration, thus freeing the consciousness from all that is not spiritual. This consciousness holds within itself the divine luminous coiled power, termed Kundalini.

Laya yoga propounds that “the ‘non-remembering of objects’ is not a temporary lapse of memory but is the state of objectlessness or trans-conceptual ecstasy. In yogic literature, memory is explained as a network of subliminal impression which keeps us imprisoned in the world of change. Because they are highly dynamic forces, which continually give rise to mental activity, they are also known as activators. In the highest ecstatic state of Laya yoga, these subliminal forces are neutralized and prepare the mind for its own dissolutions (i.e. transcendence) in the state of enlightenment” (Feuerstein, 1998).

The practitioners of Laya yoga are gradually and progressively cut off from the external world and are unified with one’s inner environment for subtle absorption. Laya yoga stresses the transcending Karmic patterns within the mind to the point at which inner cosmos becomes dissolved. That’s why Laya-Yoga pays special attention to the psycho-energetic aspects, especially the subtle body (Sukshma Sharir) and its psycho-energetic centers called “Chakras” and currents, “Nadis”, that are linked with the Kundalini Shakti (serpent power).

### **Karma Yoga (The Mechanic of ‘Action’ or ‘Service’)**

Karma yoga is universal in its nature as its name implies “Action” or “Service”. Whatsoever is being done by a person is karma and that will finally predict his or her emancipation. “Karma yoga” came into existence over two thousand years ago when Indian sages realized the value of karma in one’s life. Since that time, the karma yoga has been prevalent till this date.

It is the simplest of all yogic approaches as it is based on the principle of ‘inaction in action’, which means the actor performs the right action or renders the right service with full responsibility and moral intention, with no interference of ego, and with no personal or material gain or reward.

Therefore, karma yoga is the yoga of action and even includes the actual action of inner-self, which in itself is the real form of action. It works without any egoistic motivation or with the self-offering (the surrender of ego). Thus, karma yoga is about freedom in action that transcends the egoist motivations of a person so that the work becomes spontaneous or a selfless service without any attachment or desire for the reward/fruit of his/her action.

Karma yoga not only asks aspirants to assume responsibility for appropriate action but also asks them to offer their works and its fruits to the divine person. It infers that the action is performed in the spirit of self-surrender and it has its benign invisible effects. It improves the quality of our being and makes us a source of spiritual uplifting for others (Feuerstein, 1998).

Karma yoga seeks the transcendence of worldliness and the materialistic world in order to reach self-realization with the power of action/service without any ego and expectations of the fruit of action.

### **Raja Yoga (Mechanic of Mind or Mental Control)**

The evolvement of Raja Yoga goes back to the second century, the Common Era, and it came into prominence (vogue) in the sixteenth century. In the yogic context, the word “Raja” stands for ‘best’, ‘royal’ or ‘highest’. Therefore, Raja Yoga means “the best of yoga” or “the royal path of yoga”. In a more spiritual context, the term ‘Raja’ denotes the ‘Lord’ or ‘God’, who is recognized and accepted as a special self among the countless transcendental selves, said the Sage Patanjali.

Raja yoga is a science of mind control and mental discipline. It works directly on mastering consciousness and instilling the thought process. Raja Yoga seeks or emphasizes on the sacred ordeal of meditative practice and the renunciation for self-realization. It is centered for training the mind; it works upon the mind’s refinement and perfection that practice meditation, and finally leads to the ecstasy for complete transcendence and freedom.

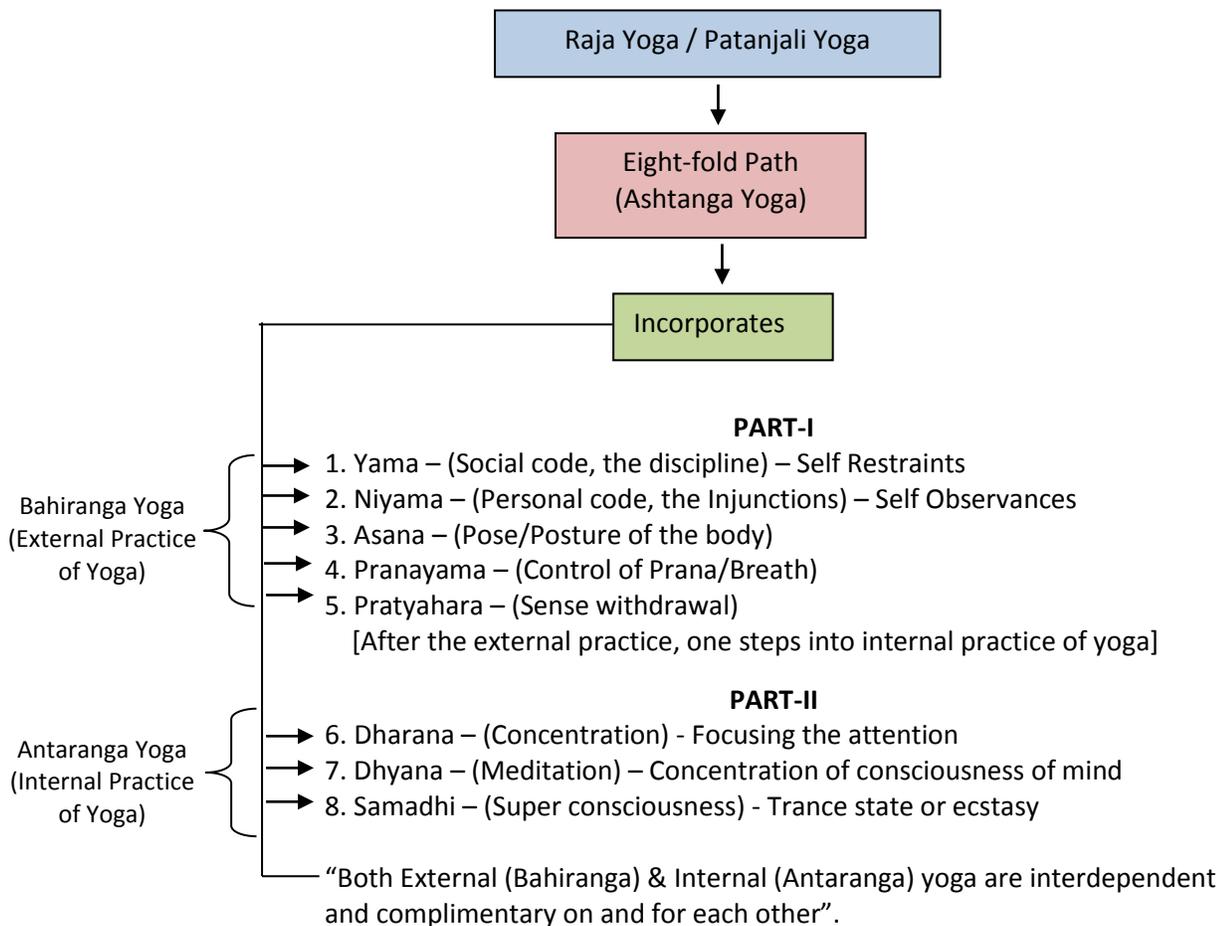
A special function of Raja Yoga is that after controlling and contemplating the mind, it then works upon the body. Raja Yoga postulates that self-realization and liberation can be attained only by controlling one’s mind, i.e. if the mind is controlled, then automatically the body will also be controlled. Instead of exploring the outer world, Raja Yoga is focused on the search of the inner world for the power and knowledge disguised within the hidden inner world.

Raja yoga is a way of meditation and contemplation to attain its aim of ‘transcendental reality’ beyond the thought and images, beyond worship and prayer, beyond ritual and fantasy. To be more specific, the goal of Raja yoga is the self-realization and salvation of the whole man by following and applying the teaching of Patanjali’s eight-fold path.

Patanjali Yoga is widely identified as being the same as Raja Yoga (the royal path of yoga), thus the Raja Yoga includes Patanjali yoga, or vice versa. The Patanjali Yoga is considered as a specified system of Raja Yoga. It is indeed correct when we say that Raja Yoga and Patanjali Yoga are one and the same way for enlightenment through meditation. It is also known as classical yoga based on 196 sutras of Patanjali and works as eight fold path called Ashtanga yoga. According to Patanjali, the ‘Raja Yoga’, (Patanjali yoga or Classical yoga) works as “Elimination of mental fluctuation”.

It is now a well acknowledged fact that the back bone of yoga is provided by Patanjali Yoga sutra (196 Sutras). Therefore, sage Patanjali is rightly called the father of yoga. Around

200 B.C., he compiled, synthesized, modified, systematized and refined yoga into a metaphysical whole based on the Samkhya philosophy he grafted or laid down through the eight-fold path on which the whole system of Patanjali Yoga or Raja Yoga is based. These eight-fold path or eight stages are the ways to enter into Patanjali Yoga (Raja Yoga). It is notable here that this eight-fold path is arranged into a particular sequence and anyone who aspires to join Patanjali/Raja Yoga has to follow these stages one step after another according to given sequence in order to attain the optimum benefit of Patanjali's or Raja Yoga. Raja or Patanjali Yoga is a bit harder and more rigid in its operation and action as it advocates its aspirants or practitioners to come through the right path or stage. One cannot enter directly into the 3<sup>rd</sup> stage or fold without practicing or entering the 1<sup>st</sup> & 2<sup>nd</sup> stages. Thus, all eight stages of Patanjali or Raja Yoga are interdependent and complimentary to one another. These eight stages of Patanjali/Raja Yoga, as given below, are further sub-divided into two parts:



Let us discuss each stage of Patanjali's Astanga Yoga to know their operational values in one's life and how each of them influences or turns life towards harmony and longevity.

Bahiranga (external practice of yoga) means the practice of yoga with external objects in relation to the body, mind, society and many other relevant things beyond one's control—it helps detach and make oneself sufficient in himself/herself.

The first five stages of Patanjali Yoga i.e. **(1) YAMA, (2) NIYAMA, (3) ASANA, (4) PRANAYAMA & (5) PRATYAHARA** form a systematically interlocked chain that one has to wear to adapt to Raja or Patanjali Yoga for its given purposes.

**(1) YAMA:** The word “Yama” literally means, the ‘Self-discipline or the Moral discipline’, and the ‘Self-restraints’. This is the social code of yoga that introduces a person with the society and makes his/her external action or deed disciplined. In other words, we can say that the yamas have been designed to make oneself disciplined as per the moral integrity in the social manner by restraining all the senses, temptations and social seductions. Basically, yamas, by following ethical integrity, controls our instinctual fluctuations, thus, morality is a base of successful yogic practice.

Sage Patanjali has further given five yamas which nourish and refine a person socially. These are:

**i) Ahimsa (Non-violence):** The word ‘Ahimsa’ inculcates ‘love’, ‘harmlessness’, ‘non-killing’ and ‘non-violence’ in action and even in thought. Ahimsa destroys enmity and inhibits hostility and harm to another and within oneself. Ahimsa is the apex and most valuable principle among the five Yamas; he who grows in Ahimsa leads an evil free life with absolute peace and happiness.

**ii) Satya (Truthfulness):** The word ‘Satya’ denotes to sow the seed of truthfulness and to cultivate the plant of true speech. Thus, Satya means: ‘always speak truth and never tell/speak a lie’. In yoga, truthfulness fosters upon the aspirant a wonder and miraculous effect, and if an aspirant develops and becomes established in truthfulness then his/her wisdom attains a divine power. Whatever he/she speaks comes true and whatever action/result he/she wishes, follows his/her will.

**iii) Asteya (Honesty):** Asteya firmly stands to mean, never ever dupe and ditch anybody and oneself too. The one who establishes himself in honesty, generates and develops the powerful cognitive abilities and his/her intuition becomes aware and sound. The virtue of honesty reflects a transparent physical and mental personality, and absolute richness of all kind comes automatically.

**iv) Brahmacharya (Sexual control / abstinences):** Brahmcharya generally means having sexual control and a control over sexual desires. It means not to marry, but to live alone and not be in touch with people of the opposite or same sex. It means not to let one's sexual fluid, i.e. semen or vaginal fluid, flow out. In other words, Brahmacharya is considered as the abstention from sexual involvement or relationship. But this is in fact not the absolute feature of Brahmacharya, though it includes these disciplines at its prime level. However, it has much more to do with control and experience. Literally, the word Bharmacharya is a grouping of two words i.e. Brahma and Charya that means:



**(v) Aparigraha (Non-Possessiveness):** The word Aparigraha means “to abandon”, “to leave”, “to break the attachment” or “to give up the tendency to possess physical & mental objects of utility and enjoyments”. In other words, it can be stated that Aparigraha directly and indirectly sets an individual free from selfishness, materialistic greed, miserliness, pride or boasting of riches, and it also frees people from personal possessiveness. According to yoga texts, by practicing and establishing Aparigraha, the aspirant comes to realize the precious birth, its kind, time and reason, and he/she is also enabled to feel or foresee the upcoming birth. This relies so much on spirituality.

After adopting the first stage of ‘Yamas’, an aspirant has to go through the second stage i.e. the ‘Niyamas’, which have their own purposes in life.

**2. NIYAMA:** The word Niyama means: “the injunctions” or “self-observances” and “fixed rules strictly to be followed”. It is the personal code of a person that is evolved and is designed in such a way that it harmonizes one’s inner feeling and personal entities and brings internal peace by going through daily fixed routine, which are shaped up by Patanjali as given in the five Niyamas:

**(i) Shaucha (cleanliness):** The meaning of the word ‘Shaucha’ reflects “Body” and “Mind” cleanliness and internal and external purity.

Yogic texts propound that by practicing body cleanliness, one develops a kind of indifference towards his/her own body that creates self-love for the body. This physical cleanliness of body concomitantly inculcates or develops non-attachments to others. Beside body cleanliness, mind or mental cleanliness, the purity practices induce a person to practice cheerfulness, maintain a stress free life and a tensionless internal mental environment that helps a person to move towards the practice of concentration and experience the sense control. Mind cleanliness and purity eventually focuses an individual to see his/her own vision with no place for any distractions.

**(ii) Santosha (contentment):** The literal meaning of Santosha is “satisfaction” and “absolute fulfillment” with no further desire for anything. In other words, Santosha avoids dissatisfaction and emphasizes on being satisfied with oneself and with other things. Contentment is one of the important fixed rules that are to be practiced for the higher stages of yoga. Without satisfaction with oneself and anything that is pertinent to the aspirant, realization of higher consciousness is impossible. Dissatisfaction leads to various mental complexes, temptations and disturbances, thus, the aspirant becomes ineligible or unfit for meditation in such an unstable condition of mind. Therefore, by practicing the Santosha, happiness comes with no further desire and wants, whether successful or unsuccessful.

**(iii) Tapah (Austerity):** Tapah embraces two meanings. The first comes for “Meditation”, which is traditionally a prolonged immobilized standing or sitting body position, bearing hunger, thirst, cold, heat and an emphasis on formal silence and fasting with full control over body, mind and senses. Secondly, the word ‘Tapah’ means “glow” or “heat” that comes as an intense or great psychosomatic energy through asceticism that feels like heat and blushes/glows over body. The practice of austerity brings about purity and perfection in body and sense organs.

**(iv) Swadhyaya (Self-study):** The niyama of Swadhyaya means: “observing one’s own self” and “introspection”. Very often, it is practiced with closed eyes and then the aspirant is instructed to study one-self internally and closely. The practice of Swadhyaya improves all human faculties and develops personality, and its practice heightens the deep concentration towards a particular deity.

**(v) Ishwara Pranidhana (Self-surrender to the God):** Ishwara pranidhana means the ‘full devotion to Lord’ or the “complete offering to God”. It is a kind of flow in trance, where an aspirant loses his/her body awareness, connects with a deeper awareness, and remains in a state of complete tranquility and union with God Almighty. The practice of Ishwara Pranidhana opens the doors towards anointment, salvation and, finally, liberation.

**Important Note:** *(Both ‘YAMAS’ & ‘NIYAMAS’ are employed in “Raja / Patanjali Yoga” generally to attain their particular purposes and specifically or mainly for removing hindrances from the body and mind so that spiritual awareness of meditation can be practiced. Furthermore, the adoption of Yamas and Niyamas hone aspirants to shift on to the next stages of Raja or Patanjali Yoga).*

**(3) ASANA:** Asana is the third path of Ashtanga Yoga, which is more physical in its action, visible, and artistically practical in nature among all eight paths. This is the most famous unit of yoga since before time. In today’s world, most of the people misconstrue the ‘asana’ to be the only form of yoga.

The word ‘Asana’ is derived from Sanskrit language which means; ‘pose’ or ‘posture of the body’. Thus, Asana can be elaborated as ‘holding the body in a particular posture to bring stability to the body and poise to mind’. In other words, “Asana is a state of being in which one can remain steady, calm, quiet and comfortable, physically and mentally”. Further, asanas can be defined in many other ways as per the use of this competent tool or stage of yoga, but as we are within the realm of Raja or Patanjali Yoga, it is pertinent to unfold asana within the domain of Raja or Patanjali Yoga.

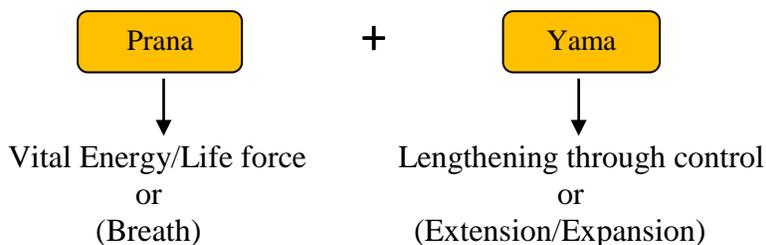
‘Asana’ according to “Yoga Sutra of Patanjali” is “Sthiram, Sukham, Aasanam” – which means, the position that is comfortable and steady. In Patanjali’s context, asanas are practiced to develop the ability to sit comfortably in one position for an extended period of time for meditation.

As the practice of Raja/Patanjali Yoga lays stress upon controlling the mind through meditation, so also the approach of this classical art for yoga asanas was to remain focused, to tame the mind by utilizing the sitting postures or poses of body. Thus, in Patanjali Yoga, the asanas were the sittings, oriented in order to practice meditation. During the classical span of Patanjali, the asanas were basically designed for meditative purposes to which most suited were the sitting asanas like Padama Asana, Vajra Asana, Sukha Asana, Sidha Asana and Siddha Yoni Asana. Asanas are practiced in Raja/Patanjali Yoga to create a balance in different nerve impulses, endure the feeling of pain and to neutralize the pleasure, heat, cold and all other internal and external opposite sensations. Through the practice of asanas, an aspirant’s body

becomes balanced and the mind becomes harmonized and gets turned on for the practice of meditation, especially with Ashtanga Yoga.

After sufficiently attaining adaptation and perfection in asanas the aspirant should enter into the next stage of pranayama.

**(4) PRANAYAMA:** The word Pranayama has a deep and ageless meaning hidden within one's biological construct. It is a summation of two different words i.e. "Prana" and "Yama".



Thus, the combined meaning of pranayama is the lengthening or expansion of life force (vital energy) or breath through its control. Therefore, the pranayama is generally practiced for the extension of the parameter/dimension of prana as long as it is possible within an individual's practice capacity.

Prana (the vital energy or life force), without which the life is not possible, seems similar to the air (oxygen) we breath, but in fact, this life giver is much more subtle than anything of its sources like air, water and food. But, more profoundly, prana is misconstrued and is considered to be associated merely with air (oxygen) by the common people, which, in fact, is only the half fact or one side of the coin of the process of pranayama.

In a physiological context, "It is a cessation followed by inhalation and exhalation so as to retain breath for proper absorption and supplement". Actually, breath retention is the most important part in the practice of panayama that is the yogic term called "Kumbhaka". So in the practice of pranayama, cessation of movement of inspiration and expiration takes place in order to retain breath which is the foundation of this technique. The practices of pranayama give longevity to the aspirants' life as its practice induces higher stages of vibratory energy by activating and regulating breath (life force) beyond an aspirant's normal capacity and efficiency. The regular practice of pranayama implies the prana to flow into the Nadis, which in turn, activate, regulate and purify them. This results into the positive rise of physical and mental strength, stability and efficiency. The impact of pranayama is mostly felt upon a person's nervous system, which enriches the brain with the optimum supply of oxygen and, thus, helps it to work actively. Therefore, pranayama enables an aspirant to join meditation with patience and longevity.

**(5) PRATYAHARA:** Pratyahara has a controlling effect, meaning that it masters or tames the six senses. This is the last external practice of Ashtanga Yoga that enables the aspirants to withdraw their mind from the objects of senses experiences so that the senses work according to

the mind but not by their objects. This is one of the intense and sensitive stages that detach the ruling of senses over mind and reciprocate it. Here, the senses turn from extroverts into introverts and the senses of touch, smell, sight, hearing, and taste are withdrawn from their objects of activation because of the control of the mind over them. The result is that the senses begin to follow the mind from within and reflect the outward object attraction. Thus, senses work according to the mind instead of their objects of experience and satisfaction.

After successfully progressing through the first five stages of Bahiranga (external practice) Yoga, an aspirant is ready to enter into internal practice (Antaranga) of yoga for higher attainments of Raja / Patanjali Yoga. This is the actual time when the aspirant is not attached or influenced by any external pull, here the aspirant is sufficient in one's self only and this is what the next three internal stages of Ashtanga Yoga seeks to achieve from an aspirant.

Antaranga (internal practice of yoga) is that practice of yoga where there is no place for the objects outside or worldly activities; here the aspirant turns him/herself off from external objects and contemplate within him/herself to attain self-realization through meditation and the stage of super consciousness.

**The last three paths are DHARANA, DHYANA and SAMADHI.** These are the subsequent stages that begin to initiate meditation.

**Dharana:** The word Dharana means “Continuous focusing of the Mind” or “Concentration”. Dharana confines an aspirant's mind to remain focused/concentrated at one point, place, object or area. The main purpose behind this is not to let the mind wander here and there, but to direct or fixate the attention of the mind toward one point or direction. This concentration would lead aspirants towards the next stage, which is Dhyana.

**Dhyana:** The term “Dhyana” is related to the words concentration and consciousness that actually mean “Meditation”, which is a continuous and uninterrupted flow of consciousness so that the concentration of consciousness gradually turns into meditation. While practicing Dhyana, the aspirants must know that they are under an unbroken continuous flow of consciousness of a single object (concentration) and must also be aware that Dhyana (Meditation), the unbroken concentration of consciousness, is being performed. Ultimately, the meditation turns into the last stage of Samadhi.

**Samadhi:** The word “Samadhi” is traditionally rare, prime and foundational in its meaning. This is the apex being of the aspirants in Ashtanga Yoga. It means “super consciousness” which is above all the stages of Raja/Patanjali Yoga. In fact, this is the accumulation or result of all the previous stages being practiced. Samadhi is a trance state where an aspirant, his consciousness and the object of concentration assimilate and become one. In Samadhi, the aspirant experiences absolute bliss, his mind seems not to be functioning, but the aspirant is not in a condition of trace in his/her mind. During Samadhi, a strong and intense connection emerges between the object of meditation and an aspirant's consciousness. As the aspirant goes deeper and deeper in the Samadhi, the object of meditation becomes much clearer

and clearer and shines alone. Even the aspirant does not remain aware of his/her existence nor of the concentration and meditation being practiced. There is a complete oneness here among Dharana, Dhyana and Samadhi. This is the state beyond time, space, causation, where an aspirant's body and mind are transcended and emancipated, where a complete unity exists between an individual's spirit (aspirant) and the universal spirit (God), and thus, liberation is attained.

Raja Yoga, which has also been known as Patanjali or classical yoga is much intensive in the degree of its external and internal practices. This means that they are hierarchically linked in a set order to be practiced. The former (external practice) progressively prepares the aspirant's body and mind for the latter (internal practices). Failing to prepare or progress successfully in the early stages, results in failure at the advanced stages. Raja Yoga strictly emphasizes on adopting the eight-fold path in the same sequence as given in Ashtanga Yoga. Therefore, it is imperative to follow the instructions of Patanjali Yoga and start from 'Yamas' and 'Niyamas' of Bahiranga and then move further as per recommended practices or given sequence in order to get optimum benefits and to reach liberation.

It would be necessary to acquaint all the readers here that Ashtanga Yoga (Raja/Patanjali Yoga) is based more on the moral-spiritual meditation ground i.e. much to see and feel with its experience. Until and unless one gets into its actual practices, it is difficult to prove its mechanism in today's advanced technological lifestyle. But the hidden grace and deep benefits can be brought into light and in scientific testing through its actual and practical adaptation, which is a wonderful and often unexplainable experience.

**THE HATHA YOGA (The Mechanic of Body or Body mind control):** The great art and science of Hatha Yoga has been prevalent since the beginning, since the time of "Upanishads" and "Puranas" around the 6<sup>th</sup> century B.C. (even long before that as indicated in the Upanishads). Various texts available on Hatha Yoga that were written during 6<sup>th</sup> to 15<sup>th</sup> century A.D. give the whole, purposive description of this ancient art. Now, gradually, it has turned into a systematic form and emerged as a science of Hatha Yoga and the art of physical body purification and spiritual awakening (functional awakening of potential energy).

The ancient rishis and sages designed Hatha Yoga practices and during that time (around 6<sup>th</sup> century A.D.) it was practiced as a preparation for higher stages of consciousness (Meditation). It was Swami Matsyendranath who traditionally understood Hatha Yoga and then with some other great yogis separated Hatha Yoga and Raja Yoga. Subsequently, the school of Hatha Yoga came into its separate existence. Swami Matsyendranath culled the practices that form the vast system of yoga and carefully selected the useful, practical, feasible and noble practices of yoga from the tantric system. In this way, the art or science of Hatha Yoga was founded or established by the supreme of the Nath cult, Swami Matsyendranath, who is known as the founder of Hatha Yoga. The followers of this cult believed that before controlling the mind and practicing the meditation, one must control the body by purifying the whole body and its elements. Thus, the science of Hatha Yoga has kept its ancient theme alive to go for

meditation (attain higher/super state of consciousness), only through body and mind. As earlier discussed in Raja Yoga, the ultimate aim of yoga is to attain self-realization, and by going through the stages of Dharana, Dhayana and Samadhi, an individual unites with the universal spirit. But Hatha Yoga proponents believe that before taking to the practices of meditation, one must purify and strengthen the body and its elements, i.e., the purpose of Hatha Yoga is to clean, purify, strengthen and control the human body through different practices (practical therapies), before proceeding on to the meditation. But now-a-days, people have ignored the mental or meditative aspect/practice of yoga. They generally practice the physical part of it. Nevertheless, they still get its therapeutic benefits. In fact, Hatha Yoga is a hierarchical practice which must go on as per its designed and formulated stages for absolute benefits and to reach the ultimate aims of the yoga of salvation. Therefore, the mechanism of Hatha Yoga is a long continuation of its different stages or practices which are done in a given order and it has to be followed like this only for the attainment of the final goal of yogic life. Mechanism of this ancient art, and now a sophisticated science of health, illuminates the spiritual awakening and rehabilitates human beings from various diseases, disorders and defects through its dual function; the mechanism of body mind integration.

Hatha Yoga works contrary to Raja Yoga without ignoring the main aim/goal of yoga i.e. spiritual accomplishment. Examining the Raja Yoga critically, the Hatha Yoga believes or advocates that self-control and self-discipline should commence with the tangibility of the body rather than the intangible function or process of mind.

Simply by keeping into consideration the nature of the human body and mind, Hatha Yoga concludes that instead of starting to control and discipline the mind, one should start with the control and discipline of body. It believes that this is the easiest way to tame the mind rather than to dominate and forcefully suppress it. Since all are not born saints, normal human beings possess a general body and mind tendency, and if it is said to control and discipline the mind in this illusory world, then for a normal man it is not less than fighting a battle. Therefore, Hatha Yoga has purposefully been designed as the easiest path to control the mind and finally to achieve spiritual awakening by controlling and disciplining one's body.

Hatha Yoga begins working on human body from gross to subtle, external to internal, tangible to intangible and worldly to spiritual. Beside the tangibility of the body, Hatha Yoga considers subtle elements (Tattwas) and the energy channels (Nadis) as bodies that must be purified, which generally remain unpurified, blocked and deactivated in most human beings. Along with flushing the inner impurities of the body, the flow of vital force (prana), the entire nervous systems and the various secretions in the body should also be properly maintained and harmonized for proper functioning of the whole body as a unit without the physical and mental distractions of inner and outer environment.

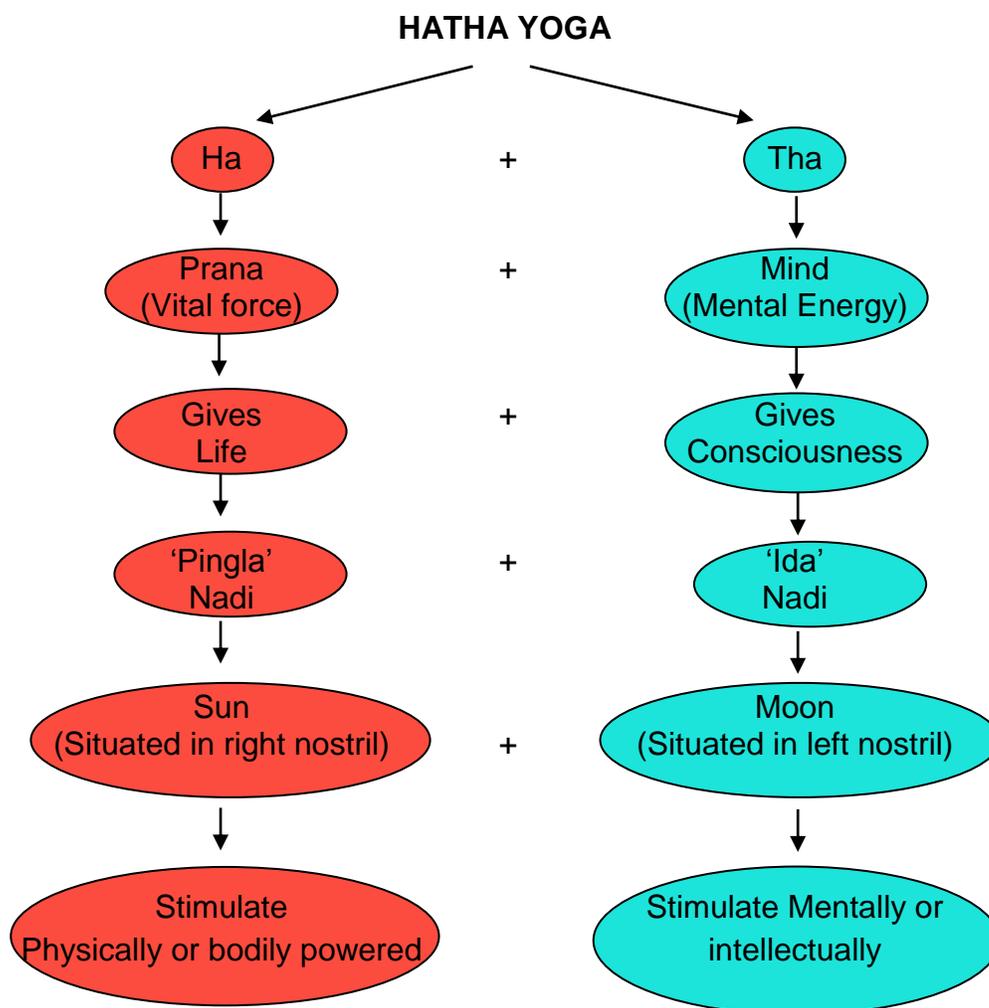
Hatha Yoga texts acquaint us on this science of physical and mental harmony as it has emerged from medieval periods to the present, including its development with new researches and unfolding secret of human entities. The word 'Hatha' derives from two beeja mantras i.e.

‘Ha’ and ‘Tha’, where ‘Ha’ stands for ‘Prana’ (the vital force) and ‘Tha’ denotes “Mind” (the mental energy). Therefore, the literal meaning of Hatha Yoga is the union of the pranic and mental forces. Prana in Hatha Yoga is much more than the ordinary perception of oxygen, rather, besides providing life, prana strengthens the human body and mind as a whole to experience and live life to the fullest, full of energy, charm and vigor. In fact, while practicing Hatha Yoga, we will find that its meaning embraces few other features that help the aspirants to rise up in this artful and aesthetic science. As the word ‘yoga’ represents ‘union’, when Hatha Yoga enables pranic and mental forces to unite, the resultant awakening of higher consciousness begins, and simultaneously, the potential energy starts to work and tend to move towards a revelation of the higher enlightenment.

Basically, it is objectified by Hatha Yoga to optimally utilize human beings’ superficial (recognizable) and profound (unrecognizable) energies, the qualities and the potentials, and to bring out the best for human living. Hatha Yoga explores the different layers of human beings, refines it and finally awakes the dormant energy or power that empowers the aspirants from their normal ways of life, providing them with the higher state or way of living by removing all illusions from their lives.

According to Hatha Yoga Pradipika, “The main objective of Hatha Yoga is to create an absolute balance of the interacting activities and processes of the physical body, mind and energy. When this balance is created, the impulses generated give a call of awakening to the central forces (Sushumna nadi) which is responsible for the evolution of human consciousness”. Thus, awakening the potential energy is the main objective of Hatha Yoga and if it is not done, the mechanism of Hatha yoga is impaired or unjustified.

The yogic philosophy accepts the law of physics that all matter and even the smallest atom are alive and having energy and consciousness. Thus, yoga philosophy turns “life” and “consciousness” as “Prakriti” and “Purusha” which is responsible for balancing the human course of life. Hatha Yoga also approves the natural phenomena of life and consciousness. In fact, the literal meaning of Hatha Yoga is actually based upon the concept of life and consciousness, which can be understood as:-



Therefore, in Hatha Yoga, the life (Prana or vital force) and consciousness (mind or mental energy) are represented as ‘Ida’ (mental energy or consciousness) and ‘Pingla’ (vital force or life). In the easiest way we can directly say, ‘ha’ possess ‘Pingla’ and ‘tha’ possess ‘Ida’, and both work together for the quality life progression with harmony between them.

It is very interesting to know how Hatha Yoga regulates the entire human body through its mechanism or how the body functions in Hatha Yoga. Since there are always positives and negatives in every creature, perfect is the one who created all creatures i.e. God. We are exemplifying the positive and negative aspects within the human being itself. The positivity of man is that he/she is alive, conscious and supreme among the living beings, but unfortunately, within the functions of the human body there are lots of many other functional negative effects that can be detrimental along with the functions of the body. Talking optimistically, the human body has been designed in such a way that these positive and negative features of the body are neutralized and harmonized in order to work in a balanced way. No doubt the fluctuations are always there in human body functions due to different environment conditions, life styles and

apparently genetics; even sometimes, hypo- and hyper-functions occur. These all are the main causes of human illness and functional retardation or malfunctioning, but fortunately, there are always remedies and preventions to lead us or sustain us in harmony in order to resist and counteract these problems.

Hatha Yoga is the mechanics which claims to bring harmony within the body and stands out for the scientific testing of its authenticity. The subject of Hatha Yoga foresees that there are two kinds of subtle energies working in the human body i.e. prana energy (life force or Pingla) and mental energy (Consciousness or Ida). It is well understood that human beings are not always physically and mentally energized, and they don't always work at the optimum level or behave in a balanced way. This is because these two energies normally dominate each other and remain in an unbalanced and disharmonized form. However, it has also been seen that sometimes automatic balance between these two energies occur and the balance between physical and mental faculties come for the best of these functions with harmony; but this automatic harmony occurs for no reason and sustains longer and the super-compensation of the body and mind ends up in a day, hour, minute or in seconds and human being turns up in his or her usual normal form. Thus, Hatha Yoga has been mainly evolved to work for the unification of these two forces and to create and sustain the balance between them and to attain the long lasting or unending harmony for smooth and optimum functioning of the body.

Hatha Yoga starts working with the purification of internal and external body and then shifts on to the subtle anatomy of the body to lay up the magical effect of its mechanism and finally immerse in the spiritual. Hatha Yoga, in the beginning, do not lay emphasis on self-control and self-discipline, rather it concentrates on the cleansing and purification of the whole body. It advocates that when an aspirant progresses in Hatha Yoga, then the self-control and self-discipline automatically comes and for this, the Hatha Yoga in the very beginning touches the human body with its cleansing and purification therapies called Shatkarmas/Shatkriyas. Shatkarmas consist of a battery of 6 kriyas or therapies i.e. Neti, Dhauti, Nauli, Basti, Kapalbhata and Trataka. These are the 6 body purification processes that have been designed by the Hatha Yogis to flush out impurities and the waste materials or the byproducts of the body to fully clean up the whole body so that the body can be well prepared for next stages of Hatha Yoga. It is pertinent to mention here that without or unless and until one purifies his/her body, the subsequent stages of Hatha Yoga are more or less of no use. If one actually wants to complete the whole circle of Hatha Yoga, then he/she must adopt or start with Shatkarmas.

**Please Note:** *These six purification processes have been discussed in detail in following chapters of this book.*

After Shatkarma, the next to follow, adopt or practice are the Asana and Pranayama. Both the asana and pranayama bring about self-control and self-discipline in the body as asana and pranayama are disciplines where one has to remain stabilized and act in a particular fashion for a particular time. Kumbhaka (retention of breath) in pranayama is a form of self-control where one has to hold and release the normal breath or the body functions for a given period of time. In this

way, the asana and pranayama in Hatha Yoga control, discipline and strengthen the body and tend to gain control over the mind instead of directly controlling the mind. It is recommended by Hatha Yoga that without purifying and controlling the whole body, it is difficult to control the mind for a normal common person.

After the stages or mechanisms of asana and pranayama, Hatha Yoga functions to follow some specific Mudras which are the aesthetic gestures and attitude that bring balance in body and senses. Such Mudras are Vajroli, Sahajoli, Khechhari, Shambhavi etc. After going through this way of Hatha Yoga, it induces pratyahara (sense withdraw) and leads aspirants into Dharana (concentration), Dhayana (Meditation) and Samadhi (super consciousness) which are the internal practices of Raja Yoga and eventually take on to the attainment of the goal of yoga i.e. self-transcendence and universal enlightenment to attain the salvation.

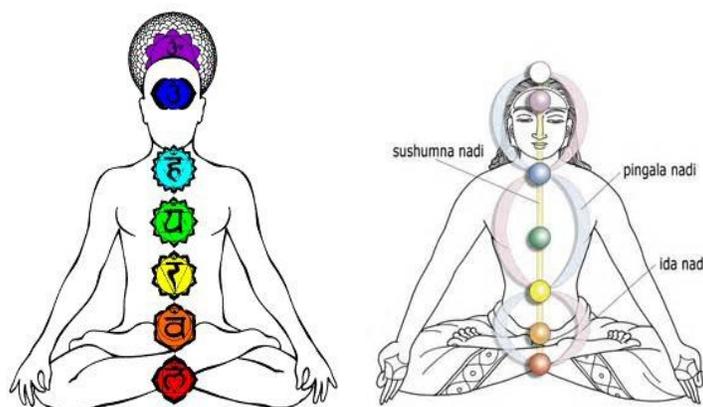
*Important Note: It must be remembered that Hatha Yoga is a practice that eventually prepares an aspirant for Raja Yoga, thus, Hatha Yoga works complementary to Raja Yoga.*

Physical practices of Hatha Yoga influence the whole body patterns and maintain the body for the experience of higher realms of yoga. After going through and maintaining the superficial external and internal bodily practices and functions of Hatha Yoga, it has become imperative to know the sole function of Hatha Yoga i.e. the wonderful mechanism of its subtle anatomy that harmonizes the positive and negative forces within human beings.

In the context of Hatha Yoga, there are three kinds of subtle nadis (channels) in human nostrils, i.e. Ida, Pingla and Sushumna, which stretches the entire length of the human spine to the base or end of spine. Actually these nadis don't have physical channels or existences. They are a kind of flow that keeps working alternatively in a positive and negative manner, often superseding each other in an unbalanced way. Thus, in the left and right nostrils there are two nadis called 'Ida' and 'Pingla' and in the center of these two (nostrils) there lies the third nadi called 'Sushumna'. The left nostril's Ida nadi represents the negative force (the flow of mental energy; consciousness), the right nostril's pingla nadi represents the positive force (the flow of vital energy; prana) and the center part of these two (left and right) contains Sushumna nadi that represents neutral forces (the flow of spirital energy and potential energy). Here, it is noted down that generally the flow of Sushumna nadi remain dormant (blocked) and inactive and subjectively the harmony and balance between Ida and Pingla is created in order to activate or awake Sushumna nadi.

"Hatha Yoga Pradipika" a text on Hatha Yoga interprets the notion of Ida, Pingla and Sushumna in a much traditional form. It projects 'Ida' as a "Chandra or the moon nadi" (representing the Shakti Parvati that remains cool), which is situated in the left nostril, and breath taken through this nostril stimulates Ida/moon nadi to flow; this is called moon breath. The nature or flow of Ida is passive, introvert and feminine, and induces intellectual activation in individuals. On the other hand, 'Pingla' is known as 'Surya or the Sun nadi' (representing Shiva that has a hot tendency). It is situated in the right nostril, and when a breath is taken through this

nostril, it stimulates Pingla (Sun nadi) to flow and this is called sun breath. The flow of Pingla is active, extrovert and masculine in nature and the activation of Pingla nadi activates the individual physically. Contrary to these two alternate flowing nadis, the third nadi i.e. the Sushumna nadi, normally remains inactive and its flow is inhibited and needs to be activated through the harmonies and balanced flow of the previous two nadis (Ida and Pingla) by practicing pranayama. During pranayama, when the two nadis, Idla and Pingla, get stimulated and flow together then the union of this two breath {(Moon (Ida) + Sun (Pingla))} takes place at “Agya Chakra”, the important chakra between the eyebrows. This union tends to stimulate Sushumna nadi and activate it to flow. This flow of Sushumna nadi makes the mind calm by relaxing Agya Chakra. This harmony that flows through the trio-nadis i.e. Ida, Pingla and followed by Sushumna, enables an individual’s body and mind to function at utmost level.



*Subtle Nadis and Chakras of human body*

In this way the subtle anatomy of Hatha Yoga functions but this is not the whole mechanism. This has much to do with the body’s potential energy. Let us advance with the secret of such energetic flows and unfold the hidden layers of human potential.

It is universally accepted that everybody, whether animate or inanimate, organic or inorganic, has some potential and if one explores and exploits these hidden potentials, then the same can come out and energize the life at least to some extent that has never been expected. The main aim of Hatha Yoga is to awaken this hidden potential energy in human beings. This potential energy in Hatha Yoga is known as “Kundalini Shakti” (primal energy) which is seated on the ‘Mooladhara Chakakra’ that lies at the base of the spine.

The subtle physiology of Hatha Yoga works with the activations of subtle nadis (channels that flows) and chakras (the circuits or junctions that conduct energy or through which energy flows). These nadis and chakras work complementary to each other to activate the potential energy called “Kundalini Shakti’, and when Kundalini Shakti (primal energy) awakens, then the

new realm of human body and mind opens up and the individual's body and mind functions connectively at the optimum level. It can withstand the onslaught of transcendental realization and finally lead to the universal enlightenment and union. Let us examine how this potential energy is to be awaked or how this process occurs in Hatha Yoga.

There is a proper hierarchical sequence in Hatha Yoga to awaken Kundalini Shakti. Before the Kundalini, the Sushumna nadi should be activated so that it flows through all the chakras of the body. Therefore, before Sushumna stimulation takes place, all the chakras must be activated and opened to let the flowing energies pass through or penetrate the chakras. But if the chakras are blocked, then the flow of Sushumna is not possible. Thus, the Sushumna nadi is a trigger point for Kundalini Shakti, as through its flow it awakens the kundalini and gives way within itself to Kundalini to rise up and flow from the base of the spine (from Mooladhara Chakra) to top of the head (Sahasrara Chakra). Primarily, the Sushumna nadi is awakened to flow by the harmonious flow of Ida and Pingla nadis. When the Ida and Pingla equally and simultaneously flow, then it stimulates Sushumna nadi to flow. Sushumna activates and begins to flow from the Mooladhara chakra (the lowest circuit) to Ajna Chakra (the highest circuit). As the union of these three important flows Ida, Pingla and Sushumna takes place at Ajna Chakra, there is a sudden and instant activation or awakening of the Mooladhara chakra. Since Mooladhara chakra is a seat on which kundalini shakti (primal potential energy) is situated, it is also activated with the awakening of Mooladhara chakra, and when fully awakened, it arises towards Sahasrara chakra, head towards Kundalini, passing through Sushumna by penetrating all chakras and unites with Ida and Pingla at the Ajna chakra between eyebrows. This is the first union where Ida, Pingla, Sushumna and Kundalini unite and this union is called "Hatha Yoga". At this point, the human being is in a complete state of physical and mental wellbeing and at utmost function and finally ready to proceed to attain the spiritual experiences. This is the goal of Hatha Yoga we discussed earlier. After this comprehensive first union (the fulfillment of the goal of Hatha Yoga), the Kundalini rises ahead and forges with the Sahasrara chakra at the top of the head, and this unites the yogi with the supreme conscious (Shiva), which is called the ultimate union, so called 'YOGA', where Kundalini (Shakti: Parvati) unites with supreme consciousness (Shiva). This is the enlightened state of the human being where the individual soul unites with the universal soul and the salvation (moksha) is attained. Thus, the Hatha Yoga unites the individuals to the goal of Raja Yoga or Yoga; Hatha yoga fulfills its objective to experience yoga and at this state body, mind and spirit are no more separate entities; in fact, these all exist as one which is the truest definition of Yoga.

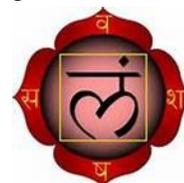
For very clear reasons, Hatha Yoga, which is so called the science of body-mind health and wellness, works from the gross to the subtle part of the body so as to exercise control over mind by controlling body. The ultimate aim of Hatha Yoga is to attain the state of yoga after harmonious activation of Ida, Pingla and Sushumna nadis, all chakras, and to awaken Kundalini shakti and their final union to super-consciousness at Sahasrara chakra. This whole process of awakening in Hatha Yoga starts with the purification of the body as the higher stages of yoga, i.e. concentration (Dharana) and meditation (Dhyana), are not possible without the cleaning and

purifying of the body and channelizing energy patterns. These are all ‘must to do’ to avoid any further distraction. After purifying the body through Shatkarmas comes the Pranayama that expands the dimension of prana within the body. Pranayama is the main activator of nadis and chakras. It stimulates Ida, pingla and eventually Sushumna; actually what happens before advancement in Hatha Yoga is that Ida sometimes flows and dominates or surpasses pingla and pingla sometimes flows and dominates Ida. Hatha Yoga works to make these two flows occur equally and simultaneously together. Although it is a bit difficult but it is possible through Hatha Yoga (Shatkarma, Pranayama and Asana) when both Ida and Pingla flow equally that activates Sushumna to flow and that leads to the awakening of Sushumna nadi.

As we proceed on to Pranayama and Asana, with the activation of nadis, our body channel circuits (Chakras) also start opening or activating and give way to Sushumna to flow and pass on.

According to ancient Hatha Yoga texts, in order to attain the state of yoga’s higher and super consciousness, subtle body parts must be triggered i.e. the three channels (nadis), all circuit centers/junctions (chakras) that tend to awake potential energy must be clear and activated (Kundalini Shakti), which is itself a subtle power that illuminates the physical body. For this, shatkarmas cleans and purifies the gross body part and prepares the physical body for Pranayamas; then Pranayamas clears and activates subtle body elements i.e. energy channels (Nadis); these nadis activate and remove the blockages of subtle body centers circuits (chakras) so that the energy can flow and pass on via these circuits and circulate throughout the body. Pranas through Ida and Pingla pass on through each chakra/center of the body and accumulates in these chakras which usually remains blocked in a common man and in inactivated state starts activating and moving in a circling motion. Activation of Ida and Pingla and all chakras lead to the activation of Sushumna nadi and gives way to flow it towards Mooladhara chakra to activate it and then awake Kundalini shakti. Kundalini arises as the Mooladhara chakra activates and begins to rise towards Ajana Chakra for first union (Hatha yoga) and then to Sahasrara chakra for ultimate union (yoga). So, the subtle parts like nadis and chakras awakening is the main or basic theme of Hatha Yoga so as to transform the flowing energy (Ida, Pingla, Sushumna and Kundalini Shakti) throughout the human body for complete attainment of yoga.

There are various circuits (Chakras) in the subtle anatomy of the human being, but as per Hatha Yoga text, there are seven main chakras that are situated along the spinal column and are conjoined with Sushumna nadi. Ida and Pinglanadis also bisect and pass through these chakras. In other words, the chakras are the junction point of nadis (energy channels) from where energy penetrates and passes on to the next part of the body. These seven subtle chakras run along the spine from the base or bottom of the spine to the top of the spine and head. These chakras influence the gross function of the human body. The lowest chakra of the body is situated at the base of the spinal column; it is called Mooladhara chakra. It is assumed that Mooladhara chakra is associated with the function of excretory and



(1) Mooladhara Chakra (for life & survival)



(2) Swadisthana Chakra (for order & Sexuality)

reproductive organs, and it also influences the secretion of hormones through reproductive glands (gonads). Mooladhara chakra is a seating site of Kundalini shakti that awakens when the chakra is fully stimulated. The sense of smell is also related to this chakra. Just slightly above the Mooladhara chakra, there is the Swadhisthana chakra at the sacral plexus; its relation has been given in yogic text with the tongue and the sense of taste. Human egoism is also impacted by this chakra. Then comes the next chakra called Manipura, which is situated parallel to the navel by spinal column. The Manipura chakra has its connection with the digestion process and eyesight. This is also generalized with the senses, aspirations and temptation of human beings. Above the Manipura chakra lies the Anahata chakra at the proximity of the heart and lungs. It is functionally associated with heart, respiration and functioning of the thymus gland. It functions for the senses of touch and emotionally for the feeling of affection, hatred, pity, anger, cruelty, sadness etc. The next chakra is Vishuddhi that is located within the cervical plexus. It is responsible to maintain the purity of body and mind. It functions for the auditory senses and speech, thus connected to the ears and throat. Ascending to Vishuddhi chakra there after comes Ajna Chakra located at the top of the spine in conjunction with the medulla oblongata. Ajna chakra is considered as the command or the regulatory center of the body. It is the center through which the whole subtle world (elements, channels and centers) can be seen. As the Kundalini passes across Ajna chakra, the human self-realization is achieved, and the person becomes one in his/her real reality; the dual and multiple personality comes to an end and ego withdraws. At last, above the spinal column at the crown of the head comes Sahasrara Chakra that has its link with the master pituitary gland. Kundalini shakti beyond Ajna chakra ascends and embeds in Sahasrara chakra and activates it. In yogic text this union of Kundalini (the potential energy) and Shiva (supreme consciousness) who is situated at Sahasrara chakra is called the absolute yoga that brings the highest evolution of man and liberation to him.



(3) Manipura Chakra  
(for wisdom & Power)



(4) Anahata Chakra  
(for love)



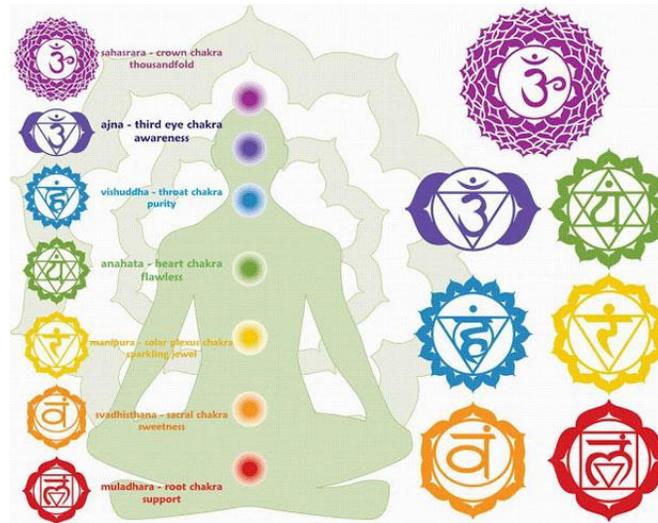
(5) Vishuddhi Chakra  
(for purity & communication)



(6) Ajna Chakra  
(for awareness & Intuition)



(7) Sahasrara Chakra  
(for spirituality)



Seven Important Subtle Chakras (Circuits) and their location in body

Therefore, the science of Hatha Yoga is attached with the human being from the superficial to the profundity of human body. It functions subtly and intangibly within the deeper layer of the body and grossly functions with the different body organs and systematic capacities to optimize human beings towards the final goal of life after all fulfillment of worldly life.

To sum up, the Hatha Yoga, with the cleaning of gross body parts, stimulates subtle channels and then activates and strengthens the subtle circuits with pranas and awakens the third subtle channel Sushumna that further awakens the Kundalini Shakti and the Kundalini by completely illuminating all circuits (Chakras), finally activating Sahasrara chakra and uniting with super consciousness (Shiva) for complete realization and salvation.

In the present century, Hatha Yoga has emerged as the most latest and renowned body-mind and physical psycho-spiritual activity that is being practised by millions of people across the world as a body-mind oriented therapy. Aspirants benefit profoundly from its wonder therapies for prevention and cure. Even the modification of Hatha Yoga such as ‘Pilates’ and small extracted branch like power yoga have emerged and are growing well; but it should not be forgotten that all these are the sub-parts of the deep rooted art termed ‘Hatha Yoga’.

**Important Note:** *It is very much pertinent to state here that after going through the relevant texts of yoga and practicing the tangible to intangible and simple to complex therapies of yoga, it becomes imperative to declare that there are many subtle experiences and functions of yoga which are beyond explanations and visible evidences. These are the illuminations that can be experienced at a particular higher level of state in yoga; such kind of magnificent experiences must have been experienced by the yogis long ago in past, and that is why we have a vast literature of yoga extending since hundreds of centuries. But those yogis of ancient times were not that much equipped to prove their divine experience through scientific basis. Thus, yoga still is a challenge for modern science to bring out its unbelievable functioning and miraculous psycho-somatic-spiritual mechanism before the world.*

## **BHAKTI YOGA: (The Mechanics of the Devotion of Transcendent love)**

The mechanic of Bhakti has the same aim as Hatha Yoga, i.e. to attain enlightenment, but it has a direct mode to unite with the Universal Soul. Bhakti means rendering one's 'devotion' or 'love' with full and utmost dedication to the divine, the God. In the mechanism of Bhakti Yoga, the pure heart gets attached with supreme Lord and there is no egoistic existence of the man.

Bhakti is universal in all the religions and the devotees of Bhakti Yoga are enchanted with the progressive passion for the Lord. As the devotee gets closer to supreme power, he/she feels contentment and has much desire to grow in Lord and feel the deep contact with the Lord. This closeness or union between devotee and divine person breaks all the worldly, inter- and intra-personal bondages of human personality and leads the devotee to self-realization. Bhakti Yoga touches the devotee's core emotional drives, controls it, purifies it and finally channelizes these powerful emotional forces towards the God, which in turn wholesomely transcends all the aspects of personality, and eventually leads toward enlightenment.

In close conjunction to Bhakti Yoga, there are two sub-yogic parts that can be practiced under Bhakti as adjoining forms or correlated practices and also be practiced as separate mechanics of yoga. These mechanics are **(i) Mantra yoga and (ii) Japa yoga.**

- (i) Mantra Yoga (Mechanics of Sacred Sound):** Among all the yogic mechanics, Mantra Yoga has gained the easiest popularization of self-realization. The concentrated chanting or recitation through the mind leads to enlightenment or absolute bliss. In Mantra Yoga, the mind is to be specially sacrificed for full attentional concentration on mantra repetitions. Mindless repetition is futile and it is of no use to merely learn and recite the mantras.

The beginning of Mantra Yoga goes back to the era of the Vedas, but actually is a product of the same philosophical and cultural forces that propped up the Tantras in medieval India. Originally, the Hymn of the 'Vedas' were traditionally referred to as "Mantras" and it has been the principal aspect of the Tantric approach for spiritual belongings of Tantra Yoga. Mantra is derived from various root words which have several meanings. However, most appropriate and suited for this discuss is "Mind". According to an esoteric interpretation, it stands for the word "Trana" which means "Saving". Therefore, a mantra is that which saves the mind from itself, or recitation of which through the concentrated mind leads to the salvation (Feuerstein, 1998).

Mantra Yoga is based on the pronounced ritualistic spiritual orientation that works with its sacred utterance or recited sound which is having psycho-spiritual power or energy. A mantra is a sacred sound that initially works into mind and then becomes empowered by the mind. Mantra has its influence upon the human body and the mind, and in its higher stages the repetition of mantras gives contentment or absolute bliss to the mental and emotional forces and unites man with the universal divine consciousness by altering individual consciousness.

- (ii) Japa Yoga (Mechanics of remembrance/rotation):** Like all other mechanics of yoga, Japa Yoga induces the attainment of enlightenment with the union of individual consciousness to universal consciousness. Japa Yoga, which stands for the union of

the self with the highest existence through the rotation of consciousness, is, in fact, like the Mantra yoga in which a Mantra that is given by a Guru (teacher) is recited, keeping as per the requirement of the personality and leads to the whole fulfillment and yoke to God. Sometimes mantras are given to the devotee even in dreams, which is of a much higher spiritual context to know. There seems to be an interconnectedness and similarity in mantra and Japa Yoga as both systems are based on chanting or recitation, but there is a minute variation as per their names, beginning and the practice style. As mantra has an earlier origin and Japa came on later, the Mantra itself is a tool to practice through utterance for different purposes whereas Japa requires a mantra for recitation. Japa is bit modified and formal which is practiced with mantra continuously by its rotation, and in most type of Japas, a rosary is also needed which is also rotated along with mantra. In fact, the word Japa means to “rotate”, thus the accepted mantra is to be rotated in Japa Yoga. It is not wrong to say that Mantra Yoga is the initial or prime part of Japa Yoga which gives a strong traditional spiritual base to Japa Yoga. Similar to Mantra Yoga, Japa Yoga is also the easiest and the physically safest to practice anywhere in any condition while resting or working. In Japa Yoga, the recitation of mantra impresses the mind, and its verbal and mental recitation creates a certain vibration from inside the human body that has a psycho-somatic effect on human beings.

There are four ways to practice Japa:

- 1) **Baikhari Japa** (Audible): Mantra is recited by producing sound. It is good for beginners and for the initial stage of meditation.
- 2) **Upanshu Japa** (Whispering): Mantra is practiced in such a way that there is only lip movement and no sound is produced to be heard by anyone; only the practitioner can hear the recitation of sound. This leads to mansik japa.
- 3) **Manasik Japa** (Mental): For this japa, the mantra is recited mentally. It is practiced after attaining mastery over Baikhari (Audible) and Upanshu (whispering) Japa. This is the most subtle type of Japa which is enough to lead the aspirant to the enlightenment.
- 4) **Likhit Japa** (Written): After succeeding in other three japas, one can practice likhit japa when mantra is written with its simultaneous mental repetition with concentration.

The practice of Japa Yoga brings mental purification that is much needed for spiritual life. Japa removes the certain obstructions i.e. impurity, ignorance and distraction of mind which creates hindrance in self-realization. A continuous and relaxed Japa practice automatically establishes into our natural being and spiritual state (Saraswati, 2005).

Unknowingly, we do Japa Yoga in our daily life but without specific adoption of any mantra, we speak, whisper, mentally repeat and write things. In psychology, these are called mental practice, self-talk, recapitulation etc. Japa Yoga is being practiced by all without awareness. Some people practice it with pure intention i.e. for the spiritual purpose and realization, whereas others practice it in the psychological contexts for daily task and preparation.

**MODERN SYNTHESSES OF YOGA:** When we look from the ancient, medieval to pre-modern phase of yoga, we would find that on the basis of previous phases of yoga was rejuvenation with modifications and also synthesis of other practices that work with the base of traditional yoga practices and with their own independent philosophy as per the set goal and requirement of the aspirant. The design of the new yogic practices and modification or fusion in traditional practices is perhaps due to the changing cultural conditions and adoption of new or modern lifestyles across the world.

The ancient or traditional yoga was a prolonged spiritual practice with step by step adoption and progression of its practices. But keeping in view the daily need of human beings in a fast paced modern era, whether spiritual or not, various forms of yogic bases and yogic catabolized mini schools of yoga practices have emerged since the beginning of the 21<sup>st</sup> century. Most of the modern synthesis is based on the traditional forms of yoga with minor modifications, and few have their own philosophy to work on along the critical notion for traditional yoga.

Among the modern emergence are Integral Yoga, Power Yoga, Hot Yoga, Kundalini Yoga, Shivananda Yoga, Anusara Yoga, Bikram Yoga, Pilates, Laughter Yoga etc. All these are synthesized, modified and derived yogic forms and are similar or parallel to yogic practices which are being practiced worldwide for gaining daily benefits. These practices are fully based on the particular need of the individual in his/her day to day life in this modern era.

In this modern era, Sri Aurobindo, an eminent philosopher and sage, synthesized and developed the Integral Yoga to bring reformation in changing cultural conditions in the society. Integral Yoga says, “do not cut off the world through ecstasy to attain self-realization, rather be in the world, live it and self-actualize without any technique of all other yoga”. (Aurobindo, 1949). Therefore, the modern synthesized yogic practices have their own particular function to carry on like. For example, the Power Yoga is being practiced specifically for developing flexibility and strength and Kundalini yoga, which bears the traditional name used in the higher practice of Hatha Yoga, is now-a-days attracting people worldwide for its subtle benefits on the body-mind empowerment. Similarly, other schools of yoga that are functioning in the names of many elite yoga practitioners are also emancipating people from their daily hassles. Pilates is another modern form of exercise which has yogic base for its dynamic workout patterns.

The essence of yoga is the spiritual awakening of human beings through a wholesome development of the human body and mind and to transcend the egoistic consciousness to realize the self or divine reality, and thus attain enlightenment. But unfortunately, in modern era both in east and west people do not fully and practically accept and respect the spiritual and ethical foundations of yoga and generally use or practice it as a mere physical exercise and therapy for prevention, management and rehabilitation. Fortunately, it is a boon for the people that yoga is working to serve people with its wide range of physical, mental and spiritual faculties, irrespective of the religious practices across the world. Yogic practices continue to transcend the religious, racial and the cultural barriers. It has the potential to serve the world as a universally acceptable bond.

## CHAPTER-III

### YOGA: A GATEWAY TO HEALTHY LIVING

#### Summary of the Chapter

The present chapter imparts knowledge about the use of yoga and its different benefits for human health and wellness. By going through this chapter, the reader will come to know the unknown and hidden health benefits as well as the tested facts that provide all healthy living beings in terms of fitness, health, wellness, freedom from diseases and quality living in relation to body's internal and external environment and functions in a natural and adjunct ways.

In the 21<sup>st</sup> century, empowerment has come across the comfort zone through advancement in science, technology, education, living style and standard of living etc. World has made some remarkable attainments in various fields and activities which are serving human beings to secure their lives with longevity. There is hardly any second opinion that a secure and empowered nation gives birth to a powerful generation and vice versa.

Along with the most vital issues facing the United Nations Organization (UNO) in the 21<sup>st</sup> century such as to ensure peace across the world, uprooting the global terrorism, suppressing the threat of use of nuclear weapon, saving children from malnourishment and ending poverty, catering to the needs of human health has also been a serious matter of concern. In fact, one of the goals of the World Health Organization (WHO) is “to improve equity in health, reduce health risks, promote healthy lifestyles and settings, and respond to the underlying determinants of health” across the world. Practically speaking, human health is a perishable phenomenon which has to be maintained and preserved on a day-to-day basis to deflect harmful agents in order to nourish the total health of a person and to fight the numerous health hazards which play harmful and deteriorating role in human life. Although, there have been some wonderful achievement in the area of medical sciences and its claim to protect the life of a person from various deadly diseases, but the threat is still looming large. “Modern medicine is very effective in controlling infections, performing surgeries and managing diseases” (Trakroo and Bhavanani, 2016), but how long is it justifiable to depend only upon medicines to sustain life and promote wellness? Above all, it seems unhealthy to begin life with medicines, remain dependent upon these pharmacological substances to remain healthy, and finally to prolong life with these medical sustaining facilities. It is an undeniable fact that medical sciences give protection to life instantly when required, but how long can a body remain healthy if it is to run along with medicines to remain well and healthy? Often we hear the words like “I can't have medicine anymore now”; people do want to get rid of routine checkups and medicines that are becoming a long lasting daily feature of life. In today's fast moving life, it has become a big challenge to remain healthy by natural ways so that holistically an individual may live a disease free and healthy life.

Evidently, speaking on the philosophical truth, there is hardly any philosophy which talks about human being's personal physical and mental health and overall health from beginning to end except the Hindu yogic philosophy. It is only the yoga philosophy which emphasizes on a person's overall health system, and it works practically on the physical, mental and spiritual health of the person. Carl Jung (1978) rightly said that yoga is "one of the greatest phenomena that the human mind has created". Yoga actually gives us an absolute way of life with complete healthy living and with the total body refinement through the most natural ways. It has different doors that welcome individuals to live immunized in sound health till the end of life and beyond that sustains eternal spiritual health with the yoke of the Supreme. Living healthy in today's busy, stressed and hustle-bustle world has now become an accessory which requires time, efforts and money. Healthy living is a wider phenomenon that needs to be acquired to lead a free flow physical and mental life. Healthy living begins with physical wellness, coincides with total health, and total health further runs along the whole span of life for optimum function and perfection in life. Therefore, healthy living embraces the integral aspect of life, utilizes and progressively sustains these healthy aspects for a blissful living. Healthy living is a spectrum of physical fitness and wellness i.e. sound body, sound mind, mental alertness and emotional balance, social adjustments, personal grooming like following health practices; cleanliness, hygienic way of living, well mannered, aesthetically maintained, physical and mental wellbeing i.e. absence of physical and mental diseases and spiritually devoted, healthy thoughts etc. The paradox of healthy living seems not to be easy, but it is not impossible to develop the holistic healthcare system that provides a disciplined practice to sprout, grow and develop in a comprehensive manner.

Yoga, since the ancient times and even presently as an experiential scientific art, is a master key that can enable us to open the door of human entities (physical, mental & spiritual), to live a healthy life by removing all kind of hindrances and fluctuations that blocks person's overall growth and development. As can be inferred from the name 'yoga', it is a powerful binder force that reflects how one can enter, accept and flourish in a healthy way of living. The meaning of yoga itself starts with the strengthening sound as the word yoga is derived from the Sanskrit word "YUJ" which means "TO JOIN" or "UNION". In traditional terminology or spiritual terms, yoga is the union/joining of the individual consciousness or spirit with the universal consciousness (spirit) after all refinement and self-realization with absolute bliss in body, mind and spirit. The meaning and definition of yoga has changed along with the changing span of time. It has expanded its nature by maintaining its prime ancient soul meaning. Historically, yoga has been regarded since inception as the sole benefiter of soul.

**According to "Vedas":**

"Yoga is defined as the union of personal spirit with GOD". Veda here acquaints that the one (individual soul) who lives in yog unites in "universal soul".

### **Sage Patanjali' enlightened Yoga as:**

Yogah, Chitta, Vrtti and Nirodhah i.e. yoga is a process of gaining control over the mind; so by controlling the mind, we reach our original state.

Sage Patanjali has given the whole theme of yoga in four Sanskrit words that stand for:

Yogah----- yoga (union)

Chitta----- Conciousness

Vrtti----- Circular pattern

Nirodhah----- Blocking (stopping)

### **“The Gita” Proclaims Yoga as:**

“Yoga is dexterity in action”, the dexterity is in maintaining relaxation and awareness in action.

### **In the words of “Swami Sivananda”**

“Yoga refers to the integration and harmony among thought, words and deeds or integration among head, heart and mind”.

### **According to current scenario, we can say:**

Yoga is a systematic process of all-round human development by means of balancing and harmonizing the body, mind and spirit. After understanding the name of yoga through different views, one comes to know that it is a living art that adds living life to lives and joins the individuals with distracted faculties to a united quality of lasting life with no internal and external realm hindrances. Yoga, by bridging the gaps within human being, enables the different aspects of the body to work together in a harmony so as to live humorous, cheerful and a healthy psycho-physical-spiritual life. It is appropriate to present yoga as a process of accumulating an individual for self-realization and final enlightenment by emancipation for everlasting liberation. Considering yoga as a pioneer for health and wellbeing, its action of joining thought and deed illuminates the whole aspect of a being be it the physical, mental, emotional, ethical, social, or spiritual etc. The art and science of this practical philosophy has much to beautify an individual's life and enforce to go natural and develop a healthy body and mind by body potential and reserves. Yoga follows the truth of “Purusha” and “Prakriti” and by harmony, balance and co-ordination between these two, yoga manifests total health which is free from all myth, ignorance and sophisticated impairments.

Speaking about the effects of yoga on total human health; it seems that as the everyday bath has a rejuvenating and refreshing effect upon human body, likewise the yoga gives a deep internal as well as external bath to the body that along with physical refreshment gives a clinical cleaning to the mental and spiritual being of a person. Yoga, with its profound working, touches each layer of human being such as the tangible aspect of body i.e. soft and hard tissues and intangible cognitive and spiritual operations; all of the applications finally paving way towards the attainment of ultimate goal of yoga by satisfying and transcending a healthy body, mind and

spirit with no ailments. The aim of yogic health is not attained unless and until the whole aspect of human being is fully transcendent and feels the absolute contentment and bliss. Thus, after reaching the main objectives of bringing harmony among body, mind and spirit yoga steps towards the aim of salvation of the ultimate goal where there are no health stigmas at all; and human beings get liberation from the conflicts of body-mind duality and this state is beyond worldly and personal inhibitions.

Yoga proclaims that when the body is balanced, mind is controlled and spirit is purified and realized. Then by living yogic life, a person manifests wellbeing of outer and inner health that nourishes and enriches individuals with:

- ❖ Well-groomed and fit body
- ❖ Aesthetic and attractive appearance
- ❖ Controlled and purified mind & thought
- ❖ Pure heart and real peace
- ❖ Simplicity, innocence and faith in oneself & God
- ❖ Self-purification
- ❖ Divine acceptance and believe etc.

Further, by practicing the Yamas and Niyamas of Raja yoga, an individual gets a wholesome positive change to his or her health and overall personality, which reflects through the person's thoughts, appearance and deeds.

Since yoga is an integral art, with the passage of time, it is now being operated on the scientific basis. According to Raghuwanshi (2011), yoga acquired the status of scientific discipline only in 21<sup>st</sup> century, supported and authenticated by the inquires of almost 100 years, especially in the past four decades because of the interest shown by some devotees lending a new life to yoga. Sage 'Patanjali' systematized the knowledge of yoga; making it a scientific discipline almost 2500 years ago. In 1893, Sawmi Vivekananda declared yoga as a scientific discipline, when he said "the aphorisms of Patanjali are the key source of Raja Yoga and forms its text books. Yoga is one of the most important sciences". The various aspect i.e. the physical, mental and spiritual, have specific spheres of functions and benefits that are being utilized/practiced across the world in their required form with necessary modifications due to changing lifestyles in new scenario; basically western people are opting for physical yoga (Hatha Yoga with its new modified names like Power Yoga, Dynamic Yoga, Hot Yoga etc.) for its tangible appeal and readily/fast effects that establish a bodily culture and lead to the development of well balanced and poise body. On the other side, in the eastern countries, mainly in India, as due to its historical and cultural inception in the country, it is being utilized as a whole for its different spheres with much stress upon its spiritual and physical gains. In fact, the whole hearted and the united practice of yoga's various aspects or branches bring absolute benefits in making healthy human and healthy environment that ultimately prolongs human life and brings the individual near the cosmos.

The practicality of this art believes in “Karma”, the action that one has to perform. Duke (1960) states “yoga seeks to enable us to live our life, short or long, to the fullest purpose and benefit to ourselves and those around us. It is, however, true to say that with this view physical yoga does aim at prolonging youth and extending the prime of life - it’s most important period – well beyond what is customarily regarded as the normal retiring age”. Further, practically accepting the benefits of yoga, Sir Paul Dukes said that like the medicine, Hatha Yoga can be abused, but when properly practiced, it convincingly has curative virtues which may sometimes seem miraculous. Whatever is the form of yoga being adopted or practiced in east or west, it reveals the usefulness and worth of this historical art that reviving its heritage has in today’s modernized delicate world just because of its profound and superficial qualities, usefulness and benefits. Highlighting the benefits of yoga, the ancient classical text states that the one who advances in yoga, achieves and experiences remarkable gross and often subtle changes in himself, which reflects through a person’s appearance, presence, thoughts and deeds; generally, these can be defined as the potentials and hidden powers of the body and mind which are unveiled. With the practice of yoga, a new horizon of the trio, the body, mind and soul open up; as the experience in yoga widens, internal and external vision becomes more vivid and broader, attention is more focused and concentration gets intense, hearing gets more subtle and acute, sensitivity of the nervous system gets more intense and the body becomes sound. Even the spiritual gain of yoga leads us to know the unbelievable aspects such as knowledge of past and future, knowledge of the cosmos, prediction of the day and time of death etc.

Now-a-days, yoga and its different practices have been widely practiced and well accepted as health and wellness promotion tool globally in our society. Modern researches have also shown the superiority and benefits of this art for catering human health. Raub (2002) discussed yoga practices for health benefits as similar to alternative medicinal (herbal) treatments and compliment to more conventional medical therapy. Goyal et al. (2014) in their study found that meditation appeared to provide as much relief from some anxiety and depression symptoms as what other studies have found from antidepressants. Even several other researchers have tested benefits of yoga practices on human health in curbing blood pressure, insomnia and alleviating other mental and physical illnesses. Apart from physical and physiological benefits of yoga over human body, scientific studies also agree to its invisible psychological gains which are the evidence of the working of yoga over our nervous system that is involved in every field of activity. The number of research studies show that the yogic practices affect the nervous system (CNS and ANS) and bring improvements in cognitive processes such as awareness of stimulus, perception, comprehension of ideas, focus on problems, reasoning, thinking, remembering, making decisions, reaching the logical conclusions and carry out any task. In a study “The acute effects of yoga on executive function” Gothe et al. (2013) examined the effect of an acute yoga exercise session, relative to aerobic exercise on cognitive performance and found that the cognitive performance after the yoga exercise bout was significantly superior (i.e. shorter reaction time and increased accuracy) as compared with the aerobic and baseline conditions for both inhibition and working memory task. Parallel findings of Madanmohan et al. (1992),

Malathi and Parulkar (1989) and Bhavanani et al. (2003) have revealed that yoga practice or the yoga training improves visual and auditory reaction time (i.e. reduction in reaction timing) which is an indicator of improved afferent and efferent nerve impulses performance and enhanced processing ability of central nervous system (CNS). Thus, yoga practicing or exercising has proven results on the part of improved mental process.

Further, elaborating the psychic function relative to yoga practice as per yoga literature, it can be well said that yoga is a commonly practiced body-mind approach that has components centering on meditation, breathing and activity or posture. There appears to be two mechanisms by which the practice of yoga or exercises improves the cognitive abilities. Lowered mood is associated with a decline in cognitive function and Hatha Yoga has been reported to produce improvement in mood comparable to aerobic exercise (Berger & Owen, 1988) as Hatha Yoga balances psychophysical energies in the body by causing a beneficial influence on the nervous and endocrine control systems (Raub, 2002) by linking body and mind through breathing (pranayamas). Thus, bringing change in mood disorders towards pleasant feeling and improving cognitive functions.

Despite several psychological benefits, yoga may have positive effect on an individual's attention and concentration as its nature is focusing like the practice of yoga emphasized body awareness and involves focusing one's attention on breathing or specific muscles or part of body. Therefore, it is possible that yoga may improve more general attentional abilities. In connection to the attentiveness, Sarang (2006) and Telles (2007) works proved that yoga based relaxation techniques (i.e. savasana and meditation) improves the task which requires selective attention, concentration, visual scanning abilities and repetitive motor response. Further, going deep into the functioning of nervous system in relation to yoga, several scientific studies reveal that yogic practices, specifically the meditation, have tremendous impact on the functioning of the nervous system. The practice of meditation affects the different regions of the brain and their activities and brings about numerous changes and improvements in cognitive domain. Several Electroencephalographic (EEG) studies have brought in the light that the practice of yogic meditation significantly increased the 'Alpha rhythm', Inter-hemispheric coherence and Homogeneity in the brain activity. Khare and Nigam (2000) found that the percentage of alpha waves and hemispheric coherence was higher in individuals who practiced meditation which shows the good homogeneity, uniformity and increased orderliness of brain. Similarly, Sharma et al. (2007) also found an increase in alpha activity in healthy subjects after 2 months practice of Sahaj yoga meditation. Stancak and Kuna (1994) report on Electroencephalographic (EEG) found that 10 minutes of forced alternate nostril yoga breathing among trained yoga practitioners increased mean power of beta band and partially alpha band of EEG. And also, there was decrease in hemisphere asymmetry in the beta 1 band. This shows that forced alternate nostril breathing has a balancing effect on the functional activity of the left and right brain hemispheres. Even some Positron Emission Tomography (PET) studies show that yoga meditation practice alters brain blood flow and metabolism. A PET scanned technique study by Lou et al. (1999) found the impact of yog nidra on cerebral blood flow and reported a regional alteration "increase

of blood flow” in posterior and associative cortices (involve in imagery task during meditation). Herzog et al. (1990) measured regional cerebral metabolic rate of glucose (rCMRGlc) to delineate cerebral metabolic responses to external or mental stimulation by PET and found that ratios of frontal vs. occipital rCMRGlc were significantly elevated during meditation. These altered ratios were caused by a slight increase of frontal rCMRGlc and a pronounced reduction in primary and secondary visual centers.

In addition to beneficial effects on the cognitive abilities or brain functions/activities, meditation has positive effects on the structural alteration of the brain thereby raising its functional activities. It has been shown by the research studies that meditation increases the gray matter concentration in different regions of the brain and boosts up the regional activities and functions of that particular region of the brain for which they are involved and responsible for. Holzel et al. (2008) and Luders et al. (2009) long term studies on meditation with regard to anatomical structures of brain (gray matter concentration/ volume) relevant to the different regions of the brain and their functional activities shows that people performing meditation (regardless of any specific meditation techniques) were having greater gray matter concentration in the right anterior insula, left inferior temporal gyrus and right hippocampus. Similarly, a significant larger gray matter volume was found in the right orbito-frontal cortex, right thalamus, left inferior temporal gyrus and right hippocampus (Luders et al., 2009). These studies further elaborated that these brain regions are deeply involved and activated in/during meditation, thus meditation is associated with the increase in the concentration and volume of gray matter in these regions and their structural changes and ultimately enhances their functions/activities, e.g., both orbito-frontal and hippocampus regions of brain are functionally involved for emotional regulation and response control. Therefore, larger volumes of gray matter in these regions might account for meditation practitioner’s abilities and habits to cultivate positive emotions, retain emotional stability, and engage in mindful behavior. Another study reported that yoga asana and meditation can be a treatment for depression and anxiety disorders as the yoga asana practices increases the brain GABA levels which are found low in depression and anxiety disorders (Streeter et al., 2007). By this way working on human brain cognitive activities meditation brings clarity of thought, reduces mental distractions, improves concentration, balances the right and left hemisphere activities, improves the quality of sleep and alleviates depression and anxiety etc. to have healthy brain and mind.

Acknowledging the yoga as a panacea for all, India’s first Vice President Dr. Sarvepalli Radhakrishnan (1957) wrote: “Patanjali’s yoga assumes that we all have inexhaustible reservoirs of life that we draw from. It formulates the methods of attaining our deeper functional levels. The yoga discipline is concerned with the purification of the body, mind and soul, and preparing them for the life mission. Since the human life depends on the nature of citta (mind-stuff), it is always in our reach to transform our nature by controlling citta. With devotion and concentration we can even overcome our ills. The normal limits of the human vision are not the limits of the Universe. There are other worlds than that which our senses reveal to us, other senses than those which we share with the lower animals, other forces than those of material nature. If we have

faith in ourselves, than “supernatural” is also a part of the natural. Many people go through life with eyes half closed, with dull minds and heavy hearts, even those who have had moments of awakening fall back into somnolence.”

“Application of yoga along with the modern medicine has given excellent results” Raghuwanshi, (2011). In an article “The power of yoga”, Richard Corliss (2001) mentions: “In 1998, Ornish published a new study in the American journal of cardiology, stating that 80% of the 194 patients in the experimental group were able to avoid bypass or angioplasty by adhering to lifestyle changes including yoga”. Thus yoga counteracts and reduces the risk factors (such as; increased body weight, altered blood lipid profile, elevated blood pressure and lipid risk factors i.e. increased levels of serum cholesterol and triglycerides, increased low-density lipoprotein (LDL) cholesterol, decreased high-density lipoprotein (HDL) cholesterol, and increased concentration of apoB-carrying lipoproteins) leading to cardiovascular diseases (CVD). Therefore yoga has a potential benefit to patients with cardiovascular diseases (Raub, 2002) and has curative and lowering risk factors of CVD by changing to a yoga lifestyle (Mahajan et al., 1999; Manchanda et al., 2000 and Schmidt et al., 1997). The yogic lifestyle may bring many changes in the daily life routine, by meditation, yoga based aerobic exercise, altered diet intake and control, cessation of smoking etc. which brings improvement in cardiovascular disease (CVD) patients and protect people having high risk factors to manifest cardiovascular diseases.

Similarly, appreciating the use of yoga in daily life and “analyzing the role of yoga in mental health, Sharma (2004) states that the last four limbs of Patanjali’s yoga i.e. Pratyahara (sense withdrawal), Dharana (concentration), Dhyana (meditation) and Samadhi (enlightenment) have direct relation with the cognitive process. Pratyahara is the stage where the channeling of the psychic energy takes place. By concentration on the supreme self while connecting the body and mind sources, individual integrates sleep energy flows”. According to Gharote (1990), yoga and meditation have been investigated mainly for their effects on psychosomatic disorders and can be used as significant instrument for lowering hypertension and treatment of Asthma. “Many studies done on the effect of yoga techniques practice have proved effective in reducing heart disorders, normalization of the blood pressure, hypertension, reduction of advent of gastric ulcers, hyperacidity and headaches. In several countries, drug addicts and alcoholics have also been positively helped to free themselves of their addictions through a combination of techniques of meditation, techniques of breathing and Asanas” (Raghuwanshi, 2011).

Yoga practices affect and help the whole body system to improve its functions. Many medical studies continue to show that regular meditation works magically in reducing blood pressure and stress-related illness, comprising heart diseases. Brain images show that regular practicing of asanas, meditation and breathing techniques help to calm the most actively sensually assaulted part of the brain (Raghuwanshi, 2011). Beneficial effects of meditation on cholesterol level have been observed by Cooper and Aygen (1979), Anand (1991), Calderon et al. (1999) and Vyas and Dikshit (2002).

Regarding the problem of the cholesterol level, which is another major health threat after hypertension, a research undertaken by Vyas and Dikshit (2002) concluded that the level of physical activity in the examinees was similar but those who meditated had significantly lower cholesterol level. Udupa (1976) “infers that the practice of kundalini yoga is mainly directed towards the improvement of the nervous system. Regular practicing of yoga exercises improves the function of the brain, spinal cord and autonomic nervous system which will be greatly helpful in maintaining good health and also improving the level of consciousness”. Holzel et al. (2008) compared MRI brain images of meditators and non-meditators demonstrated that meditators had greater gray matter concentration in their right anterior insula which involve in interceptive awareness. Udupa and Prasad (1985) states that “The human body maintains a constant environment, even though our environment continually undergoes changes. All the homeostatic mechanisms are regulated by body hormones, secreted by various endocrine glands. However, even this function is further regulated by the two parts of the autonomous nervous system: sympathetic and parasympathetic. Since the entire nervous system and the endocrine system is controlled by the anterior and the posterior parts of the hypothalamus, it can be stated that the entire mechanism is controlled by this region of the brain. Hypothalamic region is further supported by the limbic system including amygdala, hippocampus and several other minor structures. It is this limbic system which is predominantly responsible for the regulation of homeostatic (self-regulating), mechanism. This system carries on its regulatory functions through the hypothalamic region. Among the various functions conducted by the hypothalamus the regulation of temperature, eating and drinking are very important ones. This area also regulates our emotions such as anger and fear. A particular emotional state is further regulated by the amygdala, which is part of the limbic system”. Yoga practicing stimulates work of endocrine system which is directly connected with activities of the energy centers/circuits (Chakras) and energy pathways (Channels-Nadis) correct functioning of Ida, Pingla and Sushumna nadies directly influence the limbic system and mechanism of homeostasis. Limbic system is responsible for the regulation of homeostatic mechanism since this system carries out its regulatory functions through the hypothalamic region. Therefore, nervous (autonomic balance) and hormonal balance can be restored and maintained through regular practice of yoga techniques.

A number of studies have shown that yoga practices have beneficial effects over neuro-endocrine system and regulate the whole body functions for a healthy organic and holistic life. Impacting adversely on stress, yoga meditation (Sahaj yoga meditation) practice found effects on lipid peroxidation with significant decrease in malonyl di aldehyde levels, increase in RBC count, packet cell volume, total leucocyte count and mean corpuscular fragility showing that yoga practice (Sahaj Yoga) leads to decrease in stress and lipid peroxidation (Maini, 2000). In another study, Yadav et. al. (2005) project that even a brief (nine days) practice of yogic lifestyle modification significantly reduces oxidative stress and promotes healthy life as yoga based lifestyle modification program decreases serum concentration of thiobarbituric acid in blood which is an indicator of oxidative stress. Besides working on stress hormones to gain relief and

attain good mental health, yoga practices also work on other organic hormones to maintain and neutralize the proper functioning of the human body. Chaya et al. (2008) reported significant decrease in fasting plasma insulin in the yoga practitioners. Manjunatha et al. (2005) observed that performance of asanas led to increased sensitivity of B cells of pancreas to the glucose signal. Schmidt et al. (1997) found a reduction in urinary excretion of adrenaline, norepinephrine, dopamine and aldosterone, a decrease in serum testosterone and luteinizing hormone levels and an increase in cortisol excretion, indicating optimal changes in hormones as a result of yoga practices. Kamei et al. (2000) found changes in brain waves and blood levels of serum cortisol during yoga exercise and found that alpha waves increased and serum cortisol significantly decreased. Tooley et al. (2000) found significantly higher plasma melatonin levels in experienced meditators which show the health promoting effect of meditation on endocrinal-physiological activities and a sign of improved psychological wellbeing. The practices of Hatha Yoga and meditation have been tested by Harinath et al. (2004) on melatonin secretion in healthy people and it was found that after three month of yoga practices (asana, pranayama and meditation) the level of plasma melatonin secretion increased which showed a significant correlation with psychological wellbeing. Thus, these studies prove that the triggering of endogenous secretion by yoga practices ultimately leads the individual to healthy psychophysiological wellbeing.

Keeping in mind the effect of yoga on human body especially on elder people Kovacic et al. (2013) conducted a study to check the effect of practicing yoga on the quality of life of elderly people. Kovacic's team of researchers compared the group of elders that practiced a system of physical and breathing techniques of yoga in daily life with the control group treated with classical rehabilitation exercise and techniques. The yoga practitioners proved significantly better flexibility and the pulmonary capacity than those of non-yoga practitioners. This study revealed that the elderly people of experimental group were given the treatment of yoga exercises for the flexibility of joints and the muscular elasticity of the whole body, yogic breathing exercises, relaxation and meditation techniques. These yogic physical exercises, breathing techniques, relaxation and meditation caused several positive effects on the elderly people. Some effects of yoga on the elderly were improvement in self-confidence and self-image, high motivation for active living, improvement of sleep as well as removing stress and tension. Also, elderly people reported and researchers have noticed positive effects on their body and state of mind after a few weeks of regular yogic workout. Study mentioned improved flexibility of spine and limbs, improved walking, better sleep and a sense of wellbeing. Beside these benefits, by practicing yoga, the elderly people were able to prevent several diseases, claimed numerous studies. The Center for Disease Control and Prevention has investigated several researches with regard to the question of whether or not practicing yoga can reduce the risk for cardiovascular complications and death. In this regard several researches confirmed positive effects of yoga on insulin resistance, blood pressure and the profile of blood lipids like cholesterol (Innes et al., 2005). Another study by Gregg et al. (2000) projected that regular yoga

workout helps in reducing the risk of bone fractures by slowing down the process of muscular strength decrease in elders.

It has been proved that practicing yoga even relieves the symptoms of Osteoarthritis. In this support, a research of the medical school in Pennsylvania established the relief of Osteoarthritis symptoms after 8 weeks of yoga workout carried out once a week. All persons with clinically diagnosed Osteoarthritis who took part in the research reported improved knee mobility (Clay et al., 2005).

Yoga has become the boon for the common modern health problem and disease called 'blood pressure', "it has been proven that yoga workout has a positive influence on blood pressure regulation. More than 37 different research projects have shown that in 75% of people regularly practicing yoga their blood pressure had been improved" (Kovacic et al., 2013). A substantial reduction of blood pressure values ranging from 10 to 15 mm/hg were tested among the people practicing yoga (Clay et al. 2005). Research studies on the yoga intervention for hypertension by Chaudhary et al., 1988 and Mogra and Singh, 1986 have found the value of total body relaxation postures (mainly "Savasana") over high blood pressure (BP) and stated that reduction in blood pressure was similar to what was obtained by drug therapy/biofeedback. Recent researches brought to light that yoga exercises are equally beneficial as pharmaceutical drugs (antihypertensive medical treatments) for hypertensive health conditions. The yogic exercises, lifestyle and diet modification and relaxation alone, in combination with medical treatments, work wondrously in regulating, controlling and reducing the hypertensive readings of blood pressure and its different parameters. For treating high blood pressure, Datey et al. (1969) and Patel and North (1975) proved that Shavasana alone is effective in the treatment and control of hypertension as it is attributed to a decreased frequency and intensity of proprioceptive and enteroceptive impulse traffic reaching the hypothalamus. Murugesan et al. (2000) reported that yoga exercises twice a day for 11 weeks were found to be as effective as standard medical treatment in controlling measured variables of hypertension (Raub, 2002). Likewise, Selvamurthy et al. (1998) treated hypertensive patients with yoga asana (postural tilt stimulus) to restore normal baroreflex sensitivity. After 3 weeks of yoga asana (head-up and head-down tilt asanas) intervention there were significant reductions in blood pressure and improvement in baroreflex sensitivity among the treated patients. These improvements in commonly found blood pressure problems in developed and developing nations have made people more aware of practice yoga and include yoga as a part of their treatment to reduce hypertension (HBP), essential hypertension (EH) or regulate blood pressure on a daily basis for restoration or better cardiovascular functions. In addition to this, for a healthy heart and keeping away the bane of a healthy lifestyle, such as coronary heart disease, disproportionate BMI, obesity and hypertension etc., scientific studies have well documented evidences to believe that yoga modifies coronary artery disease risk factors and have potentials to prevent and manage these diseases. Schmidt et al. (1997) found out significant reduction in cardiovascular risk factors (i.e. increased levels of Body mass index, total serum and LDL cholesterol, fibrinogen, and blood pressure) after 3 months of residential yoga and meditation training program that included low fat lacto-

vegetarian diet. Obesity is an independent risk factor for coronary artery disease (Tani et al., 2009). Bera and Rajapurkar (1993) reported that after 1 year of yoga practice, obese students of 12-15 years significantly improved their ideal body weight, body density, cardiovascular endurance and anaerobic power. Similarly, Mahajan et al. (1999) traced improvement i.e. decrease in all lipid parameters except HDL in ischemic heart disease patients and in the healthy people who practiced yoga. Thus, the yogic practices and adopted lifestyle have preventive and therapeutic beneficial effects on the risk factors observed in coronary artery disease.

Stating the alleviating effect of yoga on health problems, Giovannucci et al., (1998) investigated that yoga can also reduce the risk of prostate cancer in men. Due to the charismatic effects of yoga on human health, Kovacic et al. (2013) writes that during the recent decades, yoga has been successfully as well as effectively integrated in general medical practice on a global level mostly because of its preventive role regarding many health problems. Yoga has been accepted as complementary therapy by many health care associations, thus affecting its place in their institutions. Yoga exercises do not treat the disease directly, but were proven to play an important role in disease prevention and to serve as support for standard medical treatment.

The physical aspect of yoga is tremendous for healthy living. Perhaps, this is the reason that western people are connecting with Hatha Yoga. The physical manipulation of yoga in the form of Hatha Yoga provides a complete balanced, attractive and symmetrical well proportionate body structure and also prevents and rehabilitates deformities. It improves overall cardiovascular fitness, increases muscle suppleness, tones it up, improves joints and muscular flexibility, dexterity, strength and musculoskeletal coordination and relaxes the whole body. Targeting cardio and pulmonary function into consideration as a basis for healthy life, several researches revealed the fact that Hatha Yoga exercises improve lung and heart functions and ultimately improve overall cardiovascular status in healthy individuals. Ray et al. (2001) found increased aerobic capacity (increased  $VO_2$  max.) with the training of Hatha Yoga practices in young adults. Madanmohan et al. (1992) and Madanmohan et al. (2008) reported that 12 and 6 weeks of yoga practice resulted in a significant increase in respiratory pressures and endurance in 40 mm Hg test in both male and female and also significantly increased the level of maximum expiratory pressure, maximum inspiratory pressure, breath holding time after expiration, breath holding time after inspiration and hand grip strength. Joshi et al. (1992) have also demonstrated that six weeks of pranayam breathing course resulted in improved ventilatory functions in the form of lowered respiratory rate, and increase in the forced vital capacity, forced expiratory volume at the end of 1st second, maximum voluntary ventilation, peak expiratory flow rate and prolongation of breath holding time. A study by Rai and Ram (1993) and Rai et al. (1994) found that an active Hatha Yoga posture (Virasana and Siddhasana) as compared to a sitting, resting and supine posture (Savasana) induces a hyper metabolic state and increases minute ventilation (MV), heart rate (HR) and oxygen consumption ( $VO_2$ ). Researchers reported that it is the yoga activity which is important for cardiovascular conditioning and not the body posture. For the improvement in cardiopulmonary efficiencies Konar et al. (2000) positively tested that practice

of Sarvangasana (shoulder stand) twice in a day for two weeks significantly reduced resting heart rate and left ventricular end-diastolic volume in healthy men. This shows the strengthening of heart and its increased efficiency. Similarly, the lungs efficiency has also been positively altered and improved by a combination of Hatha Yoga exercises. Birkel and Edgren (2000) significantly found improvements in forced vital capacity (FVC) among healthy males and females, who practiced yoga postures, breathe control and relaxation exercises for 15 weeks in two 50-minutes classes. The physical Hatha Yoga in which asana has prime function, play an important role for muscular efficiencies to elevate the skeletal muscles endurance and cardio-respiratory efficiencies. The stationary Hatha Yoga asanas are isometric muscle contraction and an activity which strengthens the skeletal muscles and increases the working efficiency of the muscles by increasing the glycolytic enzymes lactate dehydrogenase (LDH) which provides energy to working muscles and increases the duration of activity. This enzyme (LDH) normally increases after a long duration sub-maximal exercise but Pansare et al. (1989) found that 6 week yoga training significantly raised the level of serum lactate dehydrogenase (LDH) in male and female students and increased their working endurance. Similarly, pranayama which is one of the specific techniques of Hatha yoga and are practiced in different forms involving breath control as inhalation, exhalation, retention/suspension strengthens the respiratory muscles which improve ventilation (Raub, 2002). The benefits of yoga-pranayama over ventilator function were also observed by Makwana et al. (1988). The increase in the inspiratory and expiratory (ventilation) pressure of lungs shows that yoga training particularly pranayama improves the expiratory and inspiratory muscles strength, increases lungs volume and breath holding time which in turn raises the level of cardio-respiratory function by increasing the respiratory muscles efficiency. Continuous pranayama practice increases the lung volume which in turn decreases the frequency and amplitude of involuntary contractions of respiratory muscles which results in lowering the discomfort of breath holding and extends the breath holding time. In pranayama exercises, the practitioner consciously and continuously repeats and over-rides the stimuli to respiratory center (medulla) which results in acquiring control over the respiration and result in improved cardio-respiratory performance and prolongation of breath holding time (Madanmohan et al., 1992; Trakroo & Bhavanani, 2016). Showing the improved effect of pranayama on aerobic capacity of the trained athletes, Raju et al. (1994) reported that practice of pranayama for two years significantly achieved higher work rate with reduced oxygen consumption per unit work without any increase in blood lactate levels. They also demonstrated that the blood lactate level was significantly low at rest in athletes after the practice of pranayama which indicates that pranayama practice neutralizes lactic acid accumulation in blood along with increasing the anaerobic capacity.

It is often said by the medical experts that physical health is dependent upon respiration, circulation, alimentation, elimination and relaxation. Thus keeping these natural functional properties in consideration yoga seems to be a congenial practice which targets human health by triggering, activating, and neutralizing the whole systems and in particular organs of the body; thus yoga affects the different cells and tissues of the body and integrally increases the optimum

functioning of all organ systems in a harmonious way. Yoga practices such as Pranayama, Kriya and Meditation are having healthy applications and treatments for above said basic systemic functions, which must work to their optimum level to maintain healthy individual. Pranayama alters respiration and blood circulation process in different ways, Kriyas and yogic diet affects alimentation and elimination process and likely Asana and Meditation gives relaxation to the whole body: replenish the internal chemical activities and rejuvenates the energy systems. It is imperative here to notice that “Yoga”, a single art, has a comprehensive influence upon the whole body in making a healthy body that possesses healthy living. By focusing on the entirety of the human body, yoga enters into human body as antigens and antidotes to block and counteract invasions of harmful microbes and also resist unhealthy lifestyles. Yoga brings the individual towards man’s originality, simplicity and close to the nature from where humankind started their journey of life. This multilateral art realizes that the human itinerary of long span and has brought human beings away from the nature and their natural being; it also realizes that the originality of the human being is deteriorating day by day, which ultimately is deterring the health status of human beings. This is indeed accepted that the rush of work and overload in modern time makes man physically and mentally inactive and weak which is not at all established for man by birth. Seeking the visible and invisible mobility of body, yoga tends to make a person dynamic in self and radiant in society thus unveiling the secret of being healthy by becoming dynamic and evoking. Man keeps going on to maintain the body’s natural health as it was since inception. Yoga cares for the needs of the body by intervening simple practices which one can even perform in less time, during work and without going to any particular health club with no requirement of any sort of machine equipment, except the need to remain motivated and determined towards one’s health; this, too, yoga will induce through its philosophy. Therefore, just do it and remove all the physical, mental and emotional disabilities and explore latent potentials for more joyful unfolding of the soul which seems unbelievable for many but the experienced yogis who dwell in YOGA.

A special combination of whole body activity designed to bring about a specific effect upon the body and mind and develop total health and personality in an integrated and holistic manner is known as yoga. Today we live in a very special and sophisticated time, where technologies have raised the living standards and made human life comfortable. However, the ease has drawn out human beings from nature and naturally required bodily activities to be performed to maintain inborn tendencies and improve bio-motor abilities. In the hypnosis of modern advancement, the normal homeostasis of a man is degrading as a result of many mental, physical and physiological disturbances. Weaknesses and ailments are piling up thus making man inefficient and scattered. Now it is the challenge of the time to reassure human beings and provide complete healing and integrate human culture and knowledge. It is well said that healing is a matter of unification that leads to unified health. Thus, yoga is an eternal system that has the power to integrate human body, mind and spirit as its basis lies in the spiritual knowledge and experiences of the ancient seers of India and the cosmic consciousness in which they lived. Yoga is a healthy culture of India that through its deep and superficial application of activities and

therapies have become popular across the world for living healthy life; although some of its profound and spiritual practices are yet to be accepted in western countries. Yoga looks at the human body with the paradox of both Ayurvedic and modern anatomical and physiological perspectives. It caters for the body by keeping the Ayurvedic basis of human body constitution into consideration and has designed its various physical exercises and therapeutic modalities on the basis of anatomical and physiological regimes.

While studying the constitution of the human body, it is found that the base of yoga is Ayurveda which is all-time the oldest medical system. In fact, the old texts of Ayurveda medicine defines yoga as one of the neo-branch of it and the same (yoga) is considered and utilized as Ayurvedic medicine in the form of meditation and exercise. Yoga is one of the curative processes working over illness; it studies human body constitution and functions on the basis of Ayurveda. Not only body constitution, but also all of its functions related to healthy and unhealthy body and also dietary nutritional pattern are based on Ayurveda. Thus, yoga believes that the human being is a microtome of the universe and an individual is made up of nine basic substances including the Panchmahabhutas (i.e. the five primordial elements that include Air, Water, Space, Fire, Earth); Atama (soul), Manah (mind), Kala (time) and Disa (direction).

As per yoga, the human body is constituted by Panchmahabhuta and life is related to balance among these above mentioned nine substances. There are three Doshas which are the functional projection of our five elements (constitutions; Panchmahabhutas) i.e. Vata, Pitta and Kapha. Each of this has its own function in body wellness and disease and is a result of union, balance and misbalance among these Doshas. Yoga operates for body health by considering these five constitutional elements along with the functions of three Doshas and constitutes a happy, healthy and well balanced (internal and external) and disease free individual. When these body constitutions, which give human beings an internal and external characteristics and manifest a complete personality, work together in its utmost balanced threshold, then the whole physical, physiological and emotional operations of the body work properly in a balanced way with good production. Whereas the imbalance of constitutional and functional elements and their aggravated state beyond their normal threshold lay upon ill effects on the whole aspects of human body, yoga keeping these Ayurvedic constitutional theory in its domain neutralizes and maintains balance and harmony among these constitutions through its practices (i.e. Asana, Pranayama, Kriyas Mudras and Bandhas and its personal and social disciplinary actions) to keep the body healthy and normal for its utmost productive functions keeping illness at bay. Basically, the practice of yoga induces proper functioning of Vata, Pitta and Kapha and regulates their functions in the body that leads to the wellbeing and excretion of excess toxicants and unwanted quantity of these functional constitutions that finally strengthen Panchmahabhutas; the basic structural constitutions of our body which finally lead to attain healthy functions and balanced flow of all hormones and enzymes of the systemic organs of the body and the smallest compartment, the cell. Therefore, yoga comprehensively is an all-time solution for all purpose practical art and science which provide healthy attitude, peaceful and calm mind and physical, mental and spiritual wellbeing with absolute contentment for living a healthier life.

## CHAPTER-IV

### YOGA PRACTICES: SHATKARMAS

#### Summary of the Chapter

Readings of this chapter will reveal that the yogic practice of Shatkarmas (the six purification processes) are the natural ways to cleanse the whole body specifically the alimentary canal and nasal cavity. These practices remove the metabolic chemical impurities, residual waste and wash out the whole internal body, thus, detoxifying the body, bringing purity and preparing the aspirant for further practices of yoga.

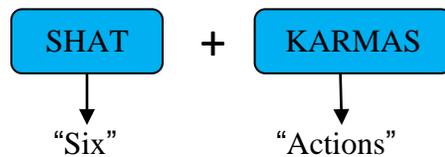
In the previous chapter “Yoga: A gateway to healthy living” readers or yoga aspirants must have come across the fast and slow, and visible and invisible benefits of yoga through its different practices. Although the last chapter demonstrated the usefulness of yoga in the day to day living and its healthy secrets, it did not present the practices that actually lead towards the adoption of physical yoga and manifestation of a healthy living. In this chapter, one of the most important leaf of Hatha Yoga called “Shatkarmas or Shatkriyas” have been defined and opened up to practice which gives initial start to the physical art of Hatha Yoga. In other words, we can say that the practices of Shatkarmas fulfills the purpose of Hatha Yoga to clean, purify and strengthen one’s body and mind and finally have self-control and self-discipline all over human body.

Generally, people take care of the body by keeping personal hygiene, doing exercises, getting relaxations and adopting recommended guidelines to take care of their body. After becoming aware of healthy living, people become conscious, develop habits, bring changes in their attitudes and begin practicing and experiencing healthy and hygienic ways and methods for clean and purified life. But if we look from the view point of yoga, despite adopting such health practices in day to day living what yoga brings to realization is that still 90% of the population is practicing only external cleanliness and personal hygiene which is, in fact, a partial care of the human body. Usually, every day a common man goes through the same daily routine for personal hygienic care; every day in the morning he goes through the process of defecation, cleans his mouth and takes his bath once or twice a day, feels fresh and gears up for the whole day’s activity. In fact, this is the common practice across the world that people do every day. But here it raises the question, “are we actually cleaning and purifying our body by doing so?” and “is our body actually efficient through these daily practices?” Then the answer may be “yes...” from the perspective of a common man. But for the same question yoga has different and unmatched concepts, means and methods for personal cleanliness, purification and hygienic health. As yoga is a deep art which touches human life deep into the core of human body and mind, it believes that the cleaning and purification process should not merely be external. The internal cleaning and purification is more important because all the major physiological activities

are operated internally and yoga advocates that the internal environmental conditions of the human body reflects outside on the human body and mind. Therefore, internal environmental balance inside the body must be maintained well with its proper cleansing and purifications. Most of us are taking care of our external body which is still not fully practical for complete cleansing and purification of the human body's healthy and hygienic living. Yoga drives us towards the most important internal cleaning process which not only gives fresh life but also ends up gets rid of common health ailments too viz. cough, cold, breathing and bronchitis problems, common stomach problems, voice and speech problems, bowel problems etc. The internal cleaning balances the three Doshas i.e. Kapha (mucus), Pitta (bile/heat) and Vata (air/wind) which if not balanced according to Ayurveda is responsible for human ailments. Therefore, by balancing these three vital Doshas of human body, the internal organs become healthier and free from disease. This internal cleaning adds on quality to the individual's physical and mental entities and transforms a radiant and vibrant personality.

The practices of Shatkarmas has been traced down from the early yoga Upanishads as Shudhikriyas which became the prime and inseparable part of Hatha Yoga just to make the human body clean and purified internally as well as externally. Hatha Yoga believes that without purification of body there would be no control and discipline over body and the flow of energy inside the body will be disrupted and finally the wandering mind could not be focused towards Samadhi or absolute meditation. Hence, all impurities should be flushed out initially before the practice or attaining of higher stages/states of yoga. Therefore, Hatha Yoga emphasizes that after purification of body and mind there will not be any disturbances or lapse that arises or occurs inside the body while going for higher stages of yoga because body control and discipline are mandatory to enter the higher stages of Hatha and Raja Yoga. Thus, Shudhikiriya or Shatkarmas is the first practice or stage that enables individuals to make one's body ready to take up yogic practices and enter into different layers/practices of yoga. Generally it is easy to take external bath and clean human body but internal bath is not as easy, even people are unable to do it after guidance but expert guidance is needed to practice this internal bathing art. Hatha yoga provides total internal cleansing with its six purifying kriyas known as Shatkarmas.

Defining Shatkarmas, it comes to the knowledge that “the first step/stage of Hatha Yoga incorporates six techniques and methods which flushes out the impurities and toxicants from inside the body is termed as Shatkarmas”. In other words it can be said that Shatkarmas is a union of two Sanskrit words which means:-



Therefore, Shatkarmas may be defined as a group of six purification practices or actions that clean or wash and purifies internal body organs and passages to detoxify the human body and mind.

## **Why Shatkarmas to start Yoga?**

The human body is wondrously made and matrixes with uncountable, varied living cells which give the body a shape, size and color and enables it to work under different mechanical systems. The human body is capable of performing life giving functions which is a source of its survival. But apart from general body physiology there are a number of chemical reactions which take place inside the body and in its different organs. Such chemical reactions are metabolic, anabolic and catabolic reactions. They govern and give assistance in human survival so these balanced chemical reactions are important for the specific working and activities of body organs and organelles within the cell. Due to the internal body functions and activities within the cells, a number of chain reactions takes place and work for body but at the same time some by-product, residuals and harmful elements also synthesize with the body which if not drawn out from the body can harm. As a result of internal body organic and inorganic reactions and functional activities, a harmful molecule is produced within the body called "Free Radicals". It is an extremely intensive free electron molecule which is highly reactive in nature and damages the body in many ways. This is unstoppable and automatically produces molecules, and in order to stabilize its free electron it devours electrons from other molecules which results in damaging cells and causes degenerative diseases. The formation of these unstable free radicals takes place naturally inside the body, which is in fact also due to the accumulation of toxins inside the body and the cells. The accumulation of toxins in the body is natural and cannot be controlled or avoided but the quantity of its accumulation or the presence of its amount can be minimized by flushing it out through medical therapies and by the body's natural process. As a result of accumulation of toxins in human body, particularly at sites inside the cells, toxins disturbs or destroys the normal functions of the cell. This tends to create more free radicals and these free radicals further manifest as health disorders and life threatening diseases. Most of the degenerative diseases such as Hypertension, Arthritis, Diabetes, Immunity Disorders, Ageing, Arteriosclerosis, and heart diseases are the results of the presence of free radicals in the human body caused by an accumulation of toxic substances inside the body.

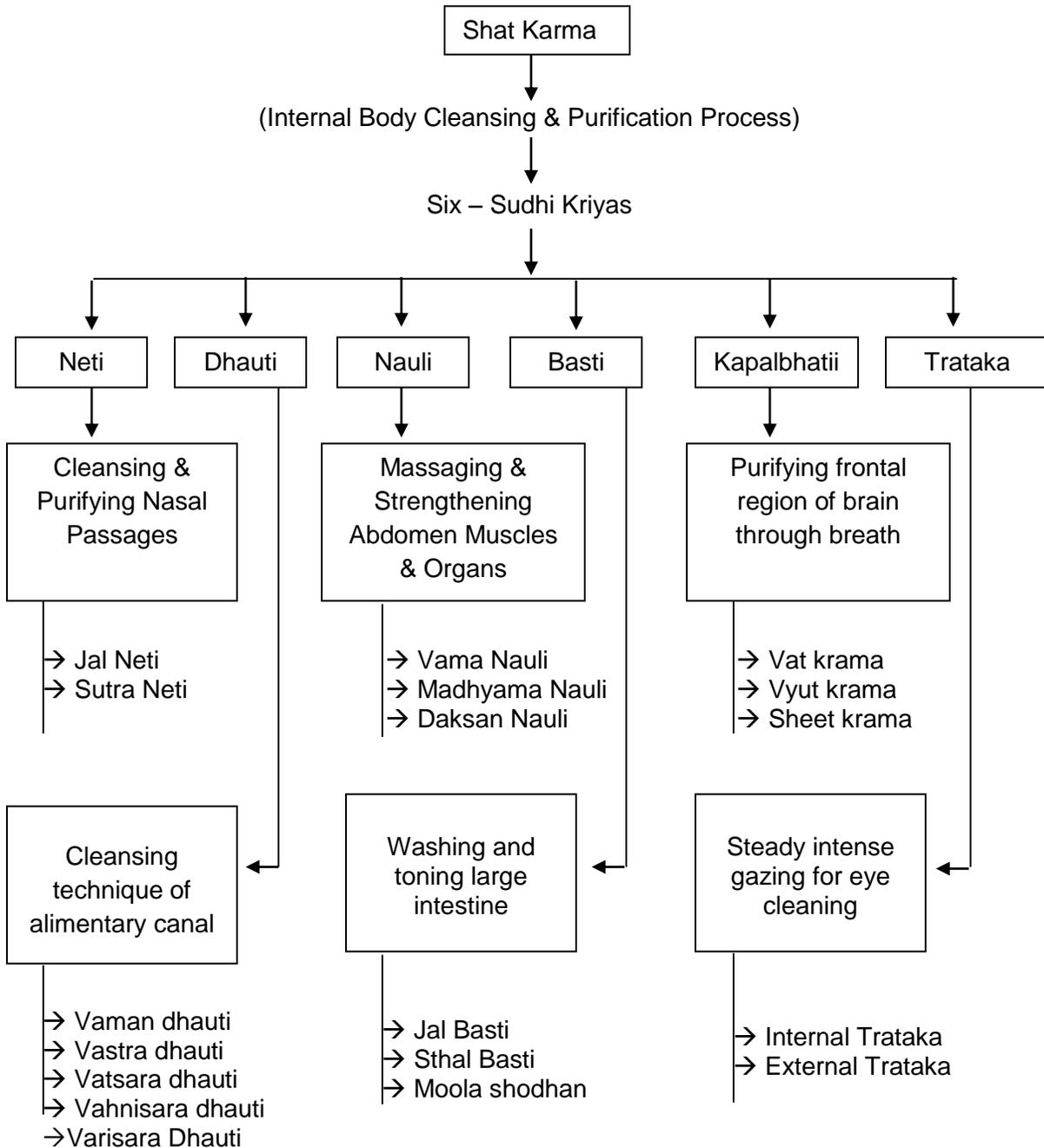
Yoga is one of the ways to reduce the effect of free radicals by detoxifying and neutralizing toxins inside the body. The yoga therapy of shatkarmas has detoxifying, flushing out effects upon toxins inside the body. The different therapies of shatkarmas flush out the residual and toxins substances from the body and reduce their accumulation inside the body that finally reduces the effects of free radicals in the body. This saves the human body and counteracts against the free radicals not to generate diseases and lowers harmful and damaging effects by natural means.

The natural art of yoga very well knows the human body and the harmful accumulation inside the body which can damage the body at large if not neutralized. The shatkarmas therapies concentrate to clean and purify the human body and mind. As per Hindu mythology, there is always the purification of bad or evil elements before beginning any work. This term of purification is also known as Shuddhi Kriyas which are to be performed before every

commencement for optimum benefit and successful accomplishments. The Hindu philosophy states that anything which is not purified and is polluted or not refined cannot bring optimum results and achieve success. Thus, it is believed that it first starts with purity and then followed by functioning. Following the same concept for body which is prime subject in yoga, yoga believes to purify body and mind so that towards the higher stages of yoga there should not be any hindrance and obstructions in its practices and the real goal of life is achieved. It is experienced in yoga that after purifying and detoxifying body and mind the body becomes more controlled and disciplined and the mind becomes more focused to practice other stages of yoga.

The aim of Shatkarmas is to purify and refine the body and mind so that the body starts experiencing new folds of life which is subtle and not generally realized by all. With the practice of Shatkarmas Ida and Pingla nadis start activating and balancing which give rise or activation to Sushumana nadi and through which awakening and enlightenment begins with absolute contentment in thoughts and actions. Therefore, the value of Shatkarmas or Shudhikriyas in yoga prior to any other practice is like opening the door for pure and healthy life in a natural way which has prompt effects on human body. Another important function of Shatkarmas is to balance the three Doshas i.e. vata, kapha and pitta, which are the cause to manifest diseases. Balance in three Doshas prevents numerous acute and chronic illnesses. Shatkarmas not merely induces attitudinal changes, rather these prevent the body from such harmful effects that take place within the body functional activities.

Yoga with practice of Shatkarmas “the six actions of purifications” practically helps in detoxifying the body and mind and lay upon a positive impact on human body and health. The benefits of Shatkarmas are both visible as well as invisible as the therapies of Shatkarmas develop immunity by eliminating the toxins, stimulates mind and remove lethargy, washes the alimentary canal, respiratory or sinus tract, massages the internal organs and is effective in the most important problem in today’s life. It also leads to a retarding or delaying of the ageing process. These are a few common benefits of Shatkarmas therapy. Let us see each technique or therapy of Shatkarmas and their benefits individually through its classification in detail:



Although for detoxification and flushing out impurities or harmful chemical substances the human body has normal systemic process of breathing, sweating, defecation, circulation etc., but these general physiological processes do not remove or neutralize the waste completely. Besides the set mechanism of their natural systemic activities, there are still lots of residual waste of bodily activities, hormonal chemicals, inorganic substances housed or accumulated inside the human body. The great sages of Bharata understood the human body and identified these waste

toxins accumulations and evolved some natural techniques in the form of Shatkarmas to induce internal body cleansing and purification.

The Shatkarmas techniques given in the above table are having the new exploring values in one's life, if done carefully under expert guidance. The purpose of these therapies here in this chapter is not to make you learn these techniques through illustration and theoretical framework as these are to be learned or practiced through expert teacher of yoga or yoga therapist. These techniques require practical supervision, learning and practice of these techniques. Here we are unfolding the magical benefits of these techniques with their actual meaning and purpose so that if one feels its requirement in following the yogic path, one can practice it under the guidance of proficient experts.

### **The Shatkarmas Therapy or Techniques**

**Neti:** Neti is a technique or therapy of cleaning and purifying the nasal passages. Nose orifices or nasal cavity is one of the prominent open passages of the body which contain impurities like mucus, dust particles etc. Since the nasal passages have a lot to function for human body, therefore it has to be cleaned up well for its proper functioning, and for its cleaning and purification neti is the best technique.

There are two types of Neti Therapy for nasal passage cleansing. One is "Jala Neti" (Cleaning of nasal passage through water) and the other is "Sutra Neti" (Cleaning of nasal passage with the help of thread/catheter). Both these therapies wash and clean nasal passages and cavity completely and remove all impurities through it.

In Jala Neti, the whole nasal passage and cavity is cleaned with the help of water pouring into nasal passages one by one and washing the passages. This is done with recommended method given by Yoga experts and under their supervision and directions for its practice.

While in Sutra Neti instead of water a thread or rubber catheter is used to clean the nasal passage. In this therapy recommended thread/rubber catheter is gently inserted into the nasal passage then to the nasal cavity. Keeping its one end outside, the inserted end comes out through the mouth via the whole nasal passage and cavity. Then the gentle forward and backward movement of the thread/catheter is done by holding both the ends of the thread/catheter. This is done for both the nostrils as per guidelines given or under supervision of yoga experts. This technique completely purifies the nasal passage and removes all the impurities blocking or accumulating into nasal passages forming internal layer and constricting nostrils.

**Benefits:** Both techniques/therapies have a high efficiency in cleaning and purifying nasal passages. Both Jala and Sutra Neti flush out mucus and pollution deposits from the nostrils. It relaxes facial muscular tensions and refreshes the face. These techniques make the air flow free from nasal passages and increase quality and quantity of inhalations. These techniques are helpful in managing ENT (Eye, Nose and Throat) problems. Also avoids respiratory tract diseases. Apart from these benefits Sutra Neti helps in opening nasal blockages occurred due to

degeneration of diseases. Both the techniques alleviate sinuses problems and are having relaxing effect overhead.

**Dhauti:** Dhauti is a set of different techniques which cleans the entire Alimentary canal from mouth (buccal cavity) to large intestine. Dhauti comprises five therapies or techniques which are having mild, moderate and high cleansing effects over Alimentary canal. Different techniques use different medium agents for cleaning processes such as water, air and cloth. The techniques of Dhauti are as:-

**Varisara Dhauti (Shankhprakashalana):** Varisara Dhauti is also known as Shankhprakashalana which cleans the entire digestive tract by using lukewarm water. It is a technique gushing water into the stomach and readily flushing it out through anal canal several times. The movement of bowels is induced by gushing at least two glasses of water as quickly as possible, followed by a recommended set of five asanas, and then go for toilet. Again repeat the same, drink 2 glasses of water, perform asanas and go to the toilet until the solid and liquid bowels expel out and continue the process until the clean water seems to come out. The main purpose of this technique is to build up pressure for bowels and let the entire solid, semi-solid stool expels out of the large intestine and it becomes thoroughly clean. This technique requires 16-20 glasses of water to complete the entire process of cleaning. While going for toilet, do not strain or apply physical or mental pressure. Be relaxed and let the bowel movement occur naturally in a relaxed way. This process of cleansing takes around one hour for complete cleaning and the entire repeated process of drinking water, performing asanas and going to toilet will be around 5-8 times or may vary from person to person. Take full rest after this therapy and have recommended yogic meal after this. There are variations in this technique known as Laghoo Shankhprakashalana (short intestinal wash) which is milder than this practice.

**Benefits:** Varisara Dhauti or Shankhprakashalana and its variations are helpful in alleviating digestive problems and for normal functioning of entire Alimentary Canal. It flushes out the solid and liquid impurities and deposits from the body. It purifies the blood and internal excretory system, gives internal stability and peace to body and mind.

**Vatsara Dhauti:** Vatsara Dhauti is a technique or therapy of cleaning intestines with air. In this technique air is sucked or drawn into the stomach through open mouth. The practitioner has to fill the stomach with mouth inhalation of air as much as possible. Take in maximum air into the stomach and do not exhale/expel the air, relax completely. The air will automatically come out through the large intestine withdrawing gases within its own time.

**Benefits:** Vatsara Dhauti improves gas expulsion, stimulates digestive efficiency and appetite, removes stale gasses and increases the outflow of wind.

**Vahnisara Dhauti or Agnisar Kriya:** This practice or therapy has cleansing effects on the stomach and abdominal region. Through this technique, digestive heat/fire stimulates and no food stuff, semi-digested or digested, remains in the stomach. This technique completely burns the food out and there is no residue left; the stomach is left empty for the next chemical

mastication. Under this technique, one must sit in the recommended asana (i.e. padma or bhadra asana) and first inhale into the lungs deeply and then exhale completely as much as possible to emptying the lungs. Then, slightly lean forward, putting palm hands on knees keeping elbow straight and execute Jalandhar bandha. Now contract and relax abdominal muscles rhythmically as fast as you can, for as long as you can hold the exhalation. Do not forcefully stress the body for holding breath outside. When unable to bear or continue it, relax and breathe in and relax the body. This is one set. Other sets can be repeated with recommendation.

**Benefits:** This technique improves digestion, stimulates appetite and strengthens abdominal muscles and the inner wall of the stomach. Gives massage to abdominal organs.

**Vaman Dhauti:** Vaman Dhauti comprises the practices or therapy techniques to wash and clean stomach and give massage to the internal abdominal organs. Under this technique lukewarm salty water is the agent and vomiting is induced to occur intentionally. There are three different techniques to practice Vaman Dhauti i.e. Kunjal Kriya, Gaja Karma Kriya and Vyaghra Kriya. These techniques are more or less similar in its function, purpose and benefits: -

**Kunjal Kriya:** This is a simple practice of vomiting water which cleans stomach and removes impurities deposited inside. In this technique, drink lukewarm salty water as quickly as you can until you feel your stomach is fully loaded with water and you can't drink any more. Six to eight glasses is sufficient but it varies from person to person. In some cases the urge to vomit occurs automatically but this is not in case of every one. Now lean forward and keep trunk parallel to the ground surface as it is comfortable in horizontal position. Now put the index and middle fingers at the back end of the tongue and gently press it this will result in vomit out the water, when water is gushing out, remove your fingers and let the water come out in a relaxed way. When vomit stops do it again and continue until the entire water comes out and stomach is fully empty.

**Gaja Karma Kriya:** This therapy is based on elephant action to drink plenty of water and then contract stomach/abdomen muscle and with exhalation of breathe gush out water automatically from the mouth. In this technique a finger is not used to induce vomiting, rather due to the abdomen muscle contraction and compression over water it pushes the water to come out of the mouth. To practice this technique drink lukewarm salty water until you can't hold more water inside then take a relaxed deep breath in and contract abdominal muscles then exhale the breath and do not loose contraction. This will put compression on the water into the stomach, and water will come out of the mouth in a gush.

**Vyaghra Kriya:** This practice follows the practice of tiger to expel the undigested food out of the stomach. Again, in this technique, 3-4 hours after eating the food, drink lukewarm salty water, at least 6 glasses or according to full capacity. Induce vomiting by following the technique of Kunjal Kriya and let the undigested food gush out of the mouth. This is bit intensive cleaning process with many benefits:-

**Benefits of Vaman Dhauti:** The benefits of these three techniques/therapies are alike and most useful for stomach cleaning. These techniques give massage to the abdominal organs and remove the excess mucus deposits in stomach and esophagus, avoid stomach and intestine bulk loading due to overeating and give mental relaxations.

**Vastra Dhauti:** Vastra Dhauti is a therapy in which a strip of long cloth (specifically cotton cloth) is used to clean the impurities and mucus from food pipe and stomach. In this technique a recommended long strip of cloth is swallowed through the mouth inside the stomach and then churning (rotate abdominal) (left and right nauli) is performed and eventually the cloth strip is gently withdrawn out of the mouth which removes the impure waste accumulation from the stomach and food passages.

**Benefits:** Removes excess mucus from stomach and food passages. It improves respiratory functions.

**Nauli:** Nauli is a yogic therapy. This gives massage to the entire abdominal region and its internal organs to make them relaxed and optimally functional. There are four kinds of techniques or methods to perform complete Nauli massaging. It is simply muscle contraction at different sides:-

**Madhyama Nauli:** Madhyama nauli is a middle or central abdominal muscle contraction. While breathing out or holding exhalation, hold the muscle contraction inward-centrally so that there appears a central abdominal arc. Hold the contraction and breathe as much as you can, relax the body and start taking normal breath in and out. This is one complete round.

**Vama Nauli:** Vama nauli is left side abdominal contraction. While bending forward and exhaling breath, hold the exhalation. It is similar as to madhyama nauli but as the contraction takes place at the left side so the arc of the left abdominal muscles will appear. Initially madhyama nauli is to be performed, then shift the whole muscle contraction towards left side; hold the position as long as one can hold then return to madhyama nauli and eventually relax and start breathing in and out. This is one round.

**Dakshina Nauli:** Follow the same technique as performed in Vama Nauli (left contraction) but after madhyama nauli, shift the muscle contraction towards right side and right abdominal arc will appear. Holding process is the same as the left contraction (vama nauli).

**Abdominal Rotation (Churning):** This is a combination of madhyama, vama and dakshina nauli which gives abdominal muscles full rotation, from side to side (left to right and right to left and vice versa). In this technique, simply either vama (left) or right (dakshina) nauli is practiced and then from left, muscle contraction is shifted or rotated towards right and then right to again left; keep holding the contraction and breath exhalation. This can be performed starting from both the sides either right or left and then rotate muscle contraction from side to side accordingly as per recommended rounds.

**Benefits:** This therapy or technique strengthens and massages the rectus abdominal muscles and the lower belly muscles (lower abdominal muscles). It massages and tones intestines, kidneys, genital parts, helps in digestion, absorption and excretion process. Removes gas and wind, and improves appetite.

**Basti:** Basti is a technique or therapy which cleans up large intestinal colon, rectum and anal region of the body. As these are the sites in large intestine where waste residual (stool) gets stored prior to expiration and this must be purified to avoid any sort of infections and to remove waste load. Basti has three different techniques or methods to clean colon and anal region.

**Jala Basti:** As its name implies, this is the technique which has to be performed or practiced under water. The most suitable is the flowing river water or any fresh stored water up to naval point so that the whole lower body is dipped into water. In this technique as directed by the yoga expert, while standing in water in a recommended body position (mostly lean forward placing hands on the knees), anal sphincter muscles are expanded and Uddiyana Bandha and Madhyama Nauli are performed simultaneously so that the water is sucked up and fills into the bowels. Retain the water into bowels for a couple of minutes and then push it to expel it out from the anus.

**Sthal Basti:** This technique is simply sucking air into bowels. Hold it for some time and then push it out to expel it through the anus. This process is to be performed in paschimottanasana (sit, keeping both the legs outstretched in front).

**Moola Shodhan:** Moola Shodhan is a process which emphasizes anal cleansing. The literal meaning of moola shodhan is moola, which means “root/base” and shodhan, which means “purification”. In this process, a soft turmeric (haldi) root or index/middle fingers are inserted into the anus and then rotated in the haldi root or finger 10 times clock wise and 10 times anti clock wise. After this, remove the root or finger and wash the anus with fresh cold water. This technique may also be practiced sitting under clean, fresh water.

**Benefits:** These three techniques of basti have purification value for large intestinal colon, rectum and anal region. Jala basti helps in removing accumulated old stool. Sthal basti removes stale gas and free flow wind and moola shodhan thoroughly cleans the anal region and gives massage to anus muscles.

**Kapalbhati:** Kapalbhati is a therapy or process which cleans up the frontal region of head or frontal lobe of the brain. It consists of three different methods or techniques which makes the brain fresh and purified.

**Vatkrama Kapalbhati:** Vatkrama means air process; this is the purification of frontal region of brain/head with air. In this practice while sitting in a comfortable or recommended meditative asana with closed eyes and relaxed body position keeping spine, neck and head straight and hands extending and resting on the knees execute a forceful exhalation through both nostrils so that the abdomen muscles contract. Let the inhalation process take place spontaneously and passively after exhalation that will allow the abdominal muscle to relax.

Continue this exhalation rhythmically for several rounds as recommended by the yoga teacher or expert.

**Vyutkrama Kapalbhati:** This process cleans sinus orifices. Pure warm salty water is used to remove the impurities. In this technique water is sniffed into the nostrils in a recommended direction and body position. After entering the water into nostrils let it come down into the mouth from back end of the nasals then expel it out from the mouth. This is a complete one round. Dry the nostrils.

**Sheetkrama Kapalbhati:** Sheetkrama removes mucus from the nostrils. In this practice, take the warm salty water in the mouth and instead of swallowing it, push it up-side and expel it through the nostrils. This leads to excess mucus coming out of the nose. Practice it as many times as per the recommended guidance.

**Benefits:** These techniques of Kapalbhati clean up frontal portion of the forehead and frontal lobe of the brain. It brings mood lightness, helps in removing sinus problems, gives massage and relaxation to facial or cranial muscles and is good for eye sights and respiratory tract functioning.

**Trataka:** Trataka is a therapy in which a continuous concentrated gazing on a candle flame or any external dot mark is done without eye blinking and eyeball movement. This is also known as intensive gazing because flame/dot has to be gazed until the water appears in eyes and eyes themselves feel tired. In these techniques a trimmed wick candle is lit in a dark room and place it one meter away from the practitioner, right at the stable place at the parallel level of eyes so that the back, neck, face and eyes be straight in normal position. While gazing over the flame/dot, sit in any recommended comfortable meditative asana and start gazing over the flame with fully opened and relaxed eyes. This can be started initially sitting with closed eyes to adjust the eyes, and body stability and balance and then after some minutes, open the eyes and start gazing the flame. While gazing, put your awareness on the flame only and forget about your body and do not wander anywhere. Keep the body steady and eyes concentrated on flame only. There should not be eyeballs movement. Remain in same gazing position until the water appears into the eyes and automatic strain occurs. On happening this, close the eyes gently and focus/gaze at the after image of the flame in front of you as long as it does not disappears and eyes feel relaxed again. Then, open the eyes and repeat the practice again. This can be done 2-3 times or as recommended by the experts. This completes the practice.

**Benefits:** This therapy cleans and purifies the eyes and makes them clean and bright. It is helpful in nervous system relaxation and balance. It develops concentration, willpower and improves cognitive abilities. Finally prepares or trains for meditation.

**Important Note:** *In the present chapter the purpose of the authors is just to acquaint the readers or people/aspirants with these therapies and not to give practical methods (stages, sequence, illustrations etc.) for its practice. It is very important to know that every practice of Shatkarma has different methods, techniques, instructions, precautions, materials or agents, time of practice, sequence, contraindication etc. which are to be strictly followed. It is strongly recommended here that these practices are to be learned and practice under expert*

*guidance, supervision and proper direction of a yoga expert, therapist or teacher. These practices are not as easy to practice only by reading the books and guidance given in the books. Aspirants by reading this chapter can come to know and get willingness to practice these therapies and experience their benefits. Failing to practice these therapies under expert guidance can lead to side effects which can be detrimental, therefore, it is strongly recommended that, please seek an expert guidance or practice it under the supervision of an expert.*

It is authentic to say that the practices of yoga are vast which have different folds for different aspects of human body apart from Asana, Pranayama and Meditation etc. It is revealed here that the Shatkarma are indispensable practical therapies which lay upon cleansing and purifying effects on impurities of body and gives inner yogic bath prior to any of its practices.

Today, in most part of the world, we know that the people are surviving in adulterated world and there is hardly anything pure to eat. Science has increased the productions as per the demands and the increased production is not fully natural. So, the impurities are housing in our body and the toxins are accumulating continuously. No doubt, there are medical facilities and treatments to remove these impurities and toxins but the natural way is only yoga which increases the durability of life through its natural practices.

## CHAPTER-V

### YOGA, ARTHRITIS & FLEXIBILITY

#### Synopsis of the Chapter

After going through this chapter, the reader will get to know the functions of yoga over one of the most common health problem and degenerative diseases: arthritis. This chapter elaborates the protective and rehabilitative nature of yoga working upon various Rheumatic diseases and restoring the normal functions of bones, joints and muscles. Flexibility of the whole body structures has also been elasticized by the practice of yogic exercises, which shows the flexibility dominating nature of this art for all age people.

Human body is a wonderful creation which is miraculously woven and sculptured and finally made alive by the flow of “Prana” (life energy) into it. Prana in yoga is beyond air or oxygen which flows throughout the human body and keeps it alive. In modern scientific terms, it is simply air or oxygen that flows in and out of the body through respiratory process. Human body is a paradox of strong and delicate qualities such as the stronger side has proved man’s visit to the moon and mars and contrarily the manifestation of/and vulnerability towards common and chronic disorders and diseases have well proved the delicate side of human body. By knowing both these phases of the human body, it is entirely in the favor of man to choose and go toward either stronger side or delicate side of the body. Man can have control over body and can develop its entities and unite it for disease free strong living. It is up to man whether to let the disease overpower one’s body or not. There are numerous reasons, causes and daily activities that play havoc with our body, with a large number of diseases to manifest. No doubt we can avoid these daily activities, routines and habits which are often known or more often unknown to us that make us vulnerable to different health hazard, disorders and diseases. Large numbers of population even don’t know that they already have some kind of diseases in their body. As some diseases show signs and symptoms immediately whereas some diseases are having disguised nature and start degenerating and show the signs and symptoms after a long time. Although the human body has the quality to fight against the harmful invaders like bacteria, virus and fungus etc., which lead to diseases, the body too needs to be naturally immunized with proper care by balanced food, nourishments, good developed habits and healthy attitude which saves and provide power to the safety guards (i.e. WBC, Platelets and Antigens etc.) of the body to fight well with these outsiders attacks and also maintain the good internal functions of the body and its organs to avoid degenerations. After all, it is more or less in human hand to avoid diseases, there are a number of diseases which roots up or develop naturally within the body as a result of inside chemistry with the influence of heredity and environment and unhealthy life practices etc. which are beyond one’s control. But it is sure that we can always have preventive lifestyle and manage such kind of diseases not to badly affect our body, and yoga is one of the panaceas to prevent and

manage such diseases. Trakroo and Bhavanani (2016) attributes yoga is a non-pharmacological therapeutic and safe modality which has promotive, preventive as well as curative potentials. Thus, it helps in the prevention of musculoskeletal degenerations and stimulates recover from diseases like osteoporosis and arthritis.

When we look at the skeletal structure of the human body, it is a skeletal system; a bony cage structure comprising of 206 bones which gives human body a frame or base and shapes up the body of human being. Under skeletal system different bones are articulated with each other at a site of joint which with the help of muscles enables human body to move around. Joints play a very important role for human survival. The science of Arthrology explains that there are various joints in human body that forms a complete skeletal system and according to the structure of the joints a particular movement takes place. These joints are strong enough to hold and stabilize the body segments together and produce movements along with ligaments, tendons and skeletal muscles. These joints provide flexibility to the body and help the body to perform different tasks with lesser consumption of energy. Different joints have different structure and functional qualities by which body is able to perform simple to complex movements with elasticity. Sometimes, even the movements beyond the elastic limits of the joint takes place and joint neutralizes those movements. But it is harmful to go beyond the limit of the joint for movement. Very often, we get complaints of joint pain, stiffness and lack of movement or movement inhibition especially in middle or old ages. Like other parts and organs of the body joints also sustain working problem, disabilities or injuries which lead to pain, stiffness, movement restriction and inflammatory symptoms. There are so many factors behind the retardation of joint functioning among which common are overuse of the joints, wear and tear of the joints and their attached tissues, old or severe injuries, degeneration and due to heredity causes. Concerning joints, arthritis is a most heard of and common disability or rheumatic disease which affects normal functioning of the joint. It is basically an inflammation in the moveable joints and most vulnerable to synovial joint which retards function of the joint causing pain, swelling, immobility, stiffness and eventually paralysis. There are more than 100 types of arthritis which occur and degenerate from early ages to old age. However it is more prone in older ages and occurs frequently in women than men. According to a survey in United States 50 million adults and 300,000 children are suffering from some form of arthritis and this is the leading cause of disability in America. Therefore, it can be evidently said that people of all ages, sex, races, culture, region etc. can have arthritis. The different forms of arthritis are well diagnosed but some are still unknown to get a clinical name to this rheumatic disease. Apart from a common constant pain, which varies in its severity, in almost all types of arthritis, it has also been found that in advance stages of arthritis due to insufficiency of movements and exercise the muscles of the body gets weak, joints, ligaments and skeletal muscles loose flexibility, decrease in aerobic ability and also sometimes other diseases (i.e. obesity, high cholesterol level, heart diseases, skin problems, depression, fear etc.) manifest in the body; hence, inability and low efficiency manifests in the body and the overall quality of life goes down.

Among different rheumatic diseases, Osteoarthritis (degenerative arthritis), Rheumatoid and Psoriatic arthritis (Inflammatory arthritis), Gout (metabolic arthritis) and infectious arthritis are often reportedly commonly found in people suffering from the affliction. Osteoarthritis is the most common form of arthritis found among elders. It can affect both the larger and the smaller joints of the body, including the hands, wrists, feet, back, hip, and knees. The disease is essentially one acquired from daily wear and tear of the joint; when the cartilage, the slick, cushioning surface on the ends of bones wears away, bone rubs against bone, causing pain, swelling and stiffness. Over time, joints can lose strength and pain may become chronic. So Osteoarthritis begins in the cartilage and eventually causes the two opposing bones to erode into each other. The condition starts with minor pain during physical activity, but soon the pain can be continuous and even occur while in a state of rest. The pain can be debilitating and prevent one from doing some activities. Osteoarthritis typically affects the weight-bearing joints, such as the back, knees and hips. More than 30 percent of women have some degree of Osteoarthritis by age of 65. Risk factors for Osteoarthritis include previous joint trauma and injury, ligament tear, obesity, sedentary lifestyle, family history and also degeneration from the long term deformities in some cases.

Rheumatoid arthritis is an inflammatory arthritis caused by person's own immune system. A healthy immune system is protective and acts against infection and diseases to save our body. But sometimes the immune system can go awry and start attacking its own body tissues as a result of a disorder. The attack is mainly on the synovial joints causing uncontrolled inflammation and damage to the joint lining and cartilage leading to joint erosion (erosion of two opposing bones). Rheumatoid arthritis is not only directed at the joint but it also damages internal organs, eyes and other parts of the body. Rheumatoid arthritis often affects joints in the fingers, wrists, knees and elbows in symmetrical order i.e. It affects both sides or a pair of the body and can lead to severe deformity in a few years, if not treated. Rheumatoid Arthritis occurs mostly in people aged 20 and above. But in children, the disorder can be present in form of a skin rash, fever, pain, disability and limitations in daily activities.

Psoriatic arthritis is another form of inflammatory arthritis. With psoriatic arthritis, most individuals develop the skin problem first and then the arthritis. The typical features are continuous joint pain, stiffness and swelling. A small percentage develops a severe painful and destructive form of arthritis which destroys the small joints in the hands and can lead to permanent disability and loss of hand function.

Gout is a metabolic arthritis which is caused by deposition of uric acid crystals in the joint, causing inflammation. During metabolic process Uric acid is formed as the body breaks down 'purines', a substance found in human cells and in many foods. Some people have high levels of uric acid because they naturally produce more than is needed or because the body can't get rid of the uric acid quickly enough. In some people the uric acid builds up and forms needle-like crystals in the joint, resulting in sudden spikes of extreme joint pain, or a gout attack. In the early stages, the gouty arthritis usually occurs in one joint, but with time if uric acid levels aren't

reduced, it can occur in many joints and becomes chronic, causing ongoing pain and eventually disability occurs which is quite crippling. The joints in gout can often become swollen and lose function. Gouty arthritis can become particularly painful and potentially debilitating when gout cannot be treated successfully.

Infectious arthritis is another severe form of arthritis which usually appears with sudden onset of chills, fever and joint pain. The infectious arthritis is caused by bacteria, virus and fungus elsewhere in the body (due to other infectious diseases like Hepatitis C, food poisoning and sexual transmitted diseases STD etc.) that enters the joint and triggers inflammation that causes pain and if ignored that can damage joint. Therefore Infectious arthritis must be rapidly diagnosed and treated promptly to prevent irreversible joint damage.

### **Contributory factors for Arthritis and medical treatment**

There are a number of factors which give inception to arthritis. Some are primary factors which directly cause injury and severe damage to the hard and soft tissues, heredity transfer cause, infections, old or sudden onset of diseases, hormonal and neural imbalance etc. and other contributors add on to degeneration, such as consistent mental stress for a long time, poor or faulty lifestyle, unhealthy or imbalance diet and other environmental factors etc. which gradually degenerates and gives form or incubation to arthritis over a period of time.

Modern medical sciences has advanced to a point that properly diagnose different types of arthritis through different sophisticated methods and techniques and thereafter with the help of medicines, advanced technologies and modalities, medical science give treatment to rheumatic diseases. But it is unsure to give full alleviation because these diseases are having remissions and not proper rehabilitations or cure. No doubt prevention is always better than cure so one should be careful if there is vulnerability to develop arthritis due to any of the reasons then proper preventive measure is itself a cure for it. Generally, the rheumatic physicians and surgeons are prescribing and curbing the pain and counteracting the inflammation with medicines like Aspirins, acetaminophen (Paracetamol), ibuprofen (NSAIDs: non-steroidal anti-inflammatory drugs), Opioids, Idomethacin, Phenylbutazone, Corticosteroids and Methotrexate (DMARDS: disease modifying anti-rheumatic drugs) etc. Although these drugs produce relieving effects, the body has to adapt to tolerate these drugs which have mild or strong side effects alongside strongly affecting the mental state of the person. Apart from medication, physical therapies and modalities are one of the best treatments for remission, which provide different body exercises to strengthen muscles and improve the movement and flexibility of the affected joints. There are different occupational therapies which assist the rheumatic person with certain kinds of equipment to move around and regain movements. These equipment are sophisticatedly designed that brace up the person and give balance to the body or affected part and assist them for independent movement which also gives them mental strengthening and confidence. In most of the complicated and worse cases of arthritis, the last treatment is to give artificial replacement to the joints by surgery and enable the person to live easy life but that too requires prevention and

care and after a period of time (particular life of the artificial joint) again replacements in the joints are needed which is again not safe and complicated due to older age weakness.

Therefore, the full cure and rehabilitation from arthritis is not possible. The remission from arthritis is the goal in treatment as well as to preserve the affected person's life from pain, immobility and hard living.

### **Yogic thought and life in Arthritis**

Yogic philosophy for Arthritis is pragmatic and full of optimism. The arthritic patient does not merely need physical support and care rather than the mental conditioning is equally important to deal with stress and pressure generated through the physical joint pain and immobility. As harmony among physical, mental and spiritual entities are one of the aims of yoga, therefore this is the best physical and mental art or activity which is a boon for rheumatic patients. There are so many anecdotes of its benefits and also misconceptions regarding the application of yoga on arthritis. Some feel that yoga is not useful for arthritic patient, whereas researches have claimed significant results of yoga therapy and programs over arthritic persons for improvement with their latest findings.

Generally, people with different forms of arthritis are physically inactive or not doing enough exercise and physical activities. They are afraid of doing activity that aggravate their arthritic condition or problem. Even along with physical disability they are psychologically stressed, feel anxiety and have fear of causing harm by doing physical activities. But the fact is that "physical activity is an essential part of the effective treatment of Osteoarthritis (OA) and Rheumatoid arthritis (RA), according to treatment guidelines published by the American College of Rheumatology" (Hochberg et al., 1995; Griffin et al., 1995 and Newsome, 2002). Several clinical research studies and a controlled trial of yoga program over arthritic person at Johns Hopkins Arthritis Centre (most recent and largest, rigorously conducted and randomized trial to date) have shown that yoga is a safe and effective way to increase physical activity that also has important psychological benefits due to its meditative nature. "As with other forms of exercise, yoga can increase muscle strength, improve flexibility, enhance respiratory endurance, and promote balance" (Madanmohan et al., 1992; Schell et al., 1994 and Gauchard et al., 1999). Wood (1993) and Miller et al. (1995) stated that "yoga is also associated with increased energy and fewer bodily aches and pains. Finally, yoga is associated with increased mental energy as well as positive feelings (such as alertness and enthusiasm), fewer negative feelings (reduced excitability, anxiety, and aggressiveness) and somatic complaints". Thus, the number of studies that tested yogic association with arthritis showed positive physical and psychological outcomes for patients affected by different forms of arthritis.

For the persons with arthritis, "exercise is safe and does not exacerbate pain or worsen disease" (Minor, 1999; Bearne et al., 2002; O'Grady et al., 2000; and Ettinger et al., 1997). In fact, "the exercise may play a key role in promoting joint health" (Forrest & Rynes, 1994). Nordemar and Ekblom (1981) stated "those who do not exercise often suffer more joint discomfort than those who do". Keeping in view the relation of health and physical activities for

prevention of diseases, the general surgeon of Department of Health and Human Services, US, Atlanta reported in 1996 that exercises have physical and psychological benefits in order to cure chronic diseases and to keep the health of the patient well (US, D.H.H.S, 1996). Another recommendation given by Pate et al. (1995) from the Centers for Disease Control and Prevention and the American College of Sports Medicine stated that physical activity and public health are positively connected and those who indulge in different exercises or physical activities are staying physically and mentally healthy.

The benefits of physical activities can never be ignored as “regular physical activity is especially important for people with arthritis, who often have decreased muscle strength, physical energy, and endurance (Lyngberg et al., 1988); in part due to their arthritis and the tendency to be sedentary” (Eichner, 1990). Being sedentary can begin a downward spiral where pain increases, leading to more inactivity which leads to greater pain and disability. “The psychological benefits of exercise such as stress reduction, fewer depressive symptoms, improved coping and well-being and enhanced immune functioning and also contribute to greater overall health” (Paluska & Schwenk, 2000; Fox, 1999; Scully et al., 1998; Taylor et al., 1985).

Therefore, keeping in view the recommendation of the experts and importance of physical activities for arthritic persons and the requirement of appropriate physical activities yoga can be a meaningful, enjoyable, soothing and more useful physical and mental activity for arthritis person’s overall health. Garfinkel et al. (1994 and 1998) used different yoga postures (asanas) for treating Osteoarthritis (OA) of hands and Carpal–tunnel syndrome and found significant improvement in pain during activity, tenderness and finger range of motion thus providing relief in hand osteoarthritis, and also a significant improvement in grip strength, phalen sign and pain reduction found in carpal-tunnel syndrome patients. In the treatment of both cases of osteoarthritis (OA-hands) and carpal-tunnel syndrome, the authors intervened with the appropriate yoga postures/asanas (i.e. Namaste- front and back, Dandasana, Urdhva Hastasana, Parsvottanasana, Garudasana, Bharadvajasana, Tadasana, half Uttanasana, Virabhadrasana-arms only, Urdhvamukha Svanasana, and Savasana). The yogic exercise treatment for both these cases brought relieving and improving effects in the musculoskeletal status of the patients with osteoarthritis and carpal tunnel syndrome, thus proving that the practice of appropriate selective yoga asanas are having curative potentials and benefits for these patients.

In a recently conducted clinical trial on yoga with arthritic persons by Moonaz et al. (2015) at John Hopkins Arthritis Centre, it has been proved that “in people with arthritis who are sedentary, yoga appears to be safe, feasible, and enjoyable for people with both Rheumatoid arthritis and Osteoarthritis, and that it results in important physical and mental health benefits for people who practice it regularly. In the study Participants practiced specially designed yoga program (designed and conducted by concerned health professional experts) that used an Integral Yoga approach. Participants came to classes twice a week for 8 weeks to practice under the close supervision of a yoga therapist. They were also asked to practice once a week at home. Each class began with questions/comments (5 min.), breathing exercises and chanting (5 min.), a

warm-up and moving sequence (surya namaskara; 15 min.), and isometric poses (asanas) (20 min.) to increase strength, flexibility, and balance. Classes ended with deep relaxation (savasana; 10 min.), a closing chant, and meditation (5 min.). The poses (asanas) that were used in the study program included gentle forward bends, backbends, twists, balances, standing, sitting and lying poses. These poses were modified based on concerns for the individual participant (modified with recommendations of experts as per individual's health, joint conditions, requirements and efficiency to perform). Blocks, straps, blankets, and chairs were used as props to modify poses. The intensity poses and intensity was standardized to allow gradual progression. Eight weeks were selected for the intervention to give sufficient time to introduce independent practice and is a common duration of introductory classes. Instructions with pictures for home practice and selected readings that described potential benefits of yoga components (breathing, meditation, mindfulness) had also been given to the participants. In the study participants were asked to keep their arthritis medications constant if they were taking”.

“Importantly, almost all benefits that were seen in patients after they completed an 8-week program were still evident 9 months later. The study provided new critical evidences of health benefits of yoga for Rheumatoid and Osteoarthritis persons, study also gave recommendations for how to begin practicing yoga safely if person have arthritis. This is the largest, most rigorously conducted, randomized, controlled trial of yoga to date. It was designed and conducted by health professionals including experts in Rheumatology, Psychology, Public health, and Yoga therapy. This study is very important for rheumatic concerns because the medical community in Western countries as a whole remains concerned that yoga may not be appropriate for people with vulnerable joints” (Moonaz et al., 2015).

Advancement in modern medical treatments has brought remission in arthritis patients up to a limited degree. The medications for arthritis especially Rheumatoid and Osteoarthritis even could give for a short period of time relief from chronic pain and inflammation. The research evidences shows that “there is a great need for additional activities patients can do to reduce pain, disability, and take control of the overall impact arthritis may have on their lives. Thus, the evidence suggests that, when combined with a program of good medical care, yoga may provide important additional physical and psychological health benefits for arthritis patients” (Moonaz et al., 2015).

A number of other related studies over yoga and its managerial effect on arthritis have shown that yoga is a psychosomatic activity which gives a boost to arthritic patient and bring them closer to their normal life. Regarding yoga and its usefulness for arthritis Karmananda, Dr. Lee Bradley (2008), an Australian MBBS turned yogi, said that all medicinal treatments through which an arthritic goes in are pain and inflammation suppressive and tolerant processes and not to treat and correct its underlying causes; which is not practical for a long run and lay serious side effects upon patient's body. He further stated “yoga will never advocate drug management of symptoms in isolation, while neglecting to correct the underlying deficiencies of diet, exercise, life style and so on”. In fact for arthritic persons yoga should be a part of their daily

living as “Karma” (Action). Swami Karmananda proposed a well-rounded programme of yoga therapy for arthritis which includes: a set of Asanas, Shatkarmas, Pranayamas, Meditation, Diet recommendations, Amaroli (Urine therapy), rest, emphasis on or value of exercise, heat and massage application (form of Naturopathy) and keeping positive mental attitude and resilience to counteract arthritis and manage their life with ease.

Rheumatologist and orthopedicians are recommending physical exercises for improvement in arthritis persons, although the nature of modern physical activities such as jogging, running treadmill, and other isotonic and Isokinetic exercises and traditional form of exercises i.e. swimming, running, aerobic etc. are more repetitive and intensive which are not suitable for arthritic persons. These exercises are vigorous in nature and are mostly sympathetic which also put psychological pressure. A rheumatic disease affected person cannot do these exercises. No doubt, some mild rotation and flexibility exercises are there but that is not sufficient for the patient. In fact, there is a requirement which can give multiple benefits with easy adaptation and without onset of feeling tired for both body and mind and give both physical and mental benefits and relaxation. As the art of yoga has several goals such as improving physical health (correct postural alignment, improving strength, respiratory endurance, flexibility and balance), enhancing mental wellbeing (reduce stress, tension, depression, relaxation) and emotional balance (happiness, tolerance, self-realization) therefore yoga is the best physical and mental activity which brings improvement in arthritis patient and make their life painless and moving thus providing freedom from physical and mental disability by harmonizing body, mind and soul.

### **Arthritis and Yogic Flexibility**

Flexibility is one of the most important components of general or health related physical fitness which implies a wide range or amplitude of motion at/around the joints. Flexibility is required to do normal daily routine task and for mobility to avoid pressure on hard tissues and other organs of the body. This is not the bio-motor ability rather the quality of anatomical articulation called joints in our body which are having varied movement to perform as per their formed structure. Thus, flexibility depends upon to a particular joint, for example the knee or hinge joint enables forward and backward movements only. whereas shoulder or ball and socket joint have multiple movements to produce such as flexion, extension, rotation, circumduction etc. Likewise other different joints have different flexible movements to produce. Beside the structure and shapes of the joints there are other bodily related structures and tissues that assist and promote on which flexibility depends upon. These are ligaments, tendons, muscles fascia, and the grounded substance of the connective tissues and skeletal muscles of the body. The quality of these soft or connective tissues which are directly or indirectly attached to the joints affect the flexibility of the joint and limits the range of movement or motion. It is generally said that a well-developed muscular body is less flexible as the muscles, tendons and ligaments are stiff which retards or inhibits the amplitude around the joints. But this concept is not much practical as the training process sets the limits of flexibility of the joints. A well-toned muscular

body can be much flexible as desired to be under a scientific planned and systematic training schedule. For example, a yogic body is well toned, muscular and flexible. It is a fact that there are so many other factors which affect the range of flexibility, and flexibility which is a developing component can be developed by adopting a right method of training and practice. No doubt, training flexibility will not bring improvement in its development of elasticity in one or two days, but gradually maintaining consistency in its practice brings visible changes in one's range of movements and motion. Thus, improving one's general working efficiency or specific desire of elastic body is one of the features of flexibility. Hence, flexibility requires regular maintenance through its training and if muscles and other connective tissues are not stretched regularly then these structures become shortened and stiff, thus, losing flexibility at the joints and elasticity of the muscles. Also if the body is getting out of shape due to overweight, that too results in the minimization of flexibility. Body flexibility and muscular strength has cohesive interrelationships as the later one gives required suppleness to the muscles and other connective tissues and the former develops to utmost limits. If there is lack in muscular strength then the stretch of flexibility will be limited because the muscular resistive ability to stress will be less. Further, while stretching the particular segment of the body, the body part will have limited elasticity and beyond an average or limited minimum elasticity that part becomes painful which can result in injury to soft or connective tissues (i.e. muscle fascia tear, tendon and ligament sprain and strain etc.). Therefore, to improve the flexibility of the body, it is necessary to develop muscular strength simultaneously. This is because the strength will condition the muscles and other connective tissues and increase their suppleness which tends to stretch muscles, tendons and ligaments with much stress beyond bearable limits and resulting in greater amplitude or a wide range of movement and motion around the joints.

Connecting flexibility to arthritis and yoga, it has been realized that arthritis is a joint disease mainly of moveable joints that retards joint mobility and flexibility. The arthritic symptoms of inflammation, infection and pain make the joint stiff causing deterioration in joint flexibility and in chronic condition mobility of the joints disappear; eventually, the bone and the joint become twisted. Several researches and the clinical trials have found that detected arthritic conditions require physical activities to restore or maintain the normal or minimum possible range of movement and joint flexibility. Research proclaimed that yogic exercises are the safest, easiest and beneficial means to provide physical activities to arthritic patients and manage the movement problems.

Generally, we understand that yoga is an art for flexible people only but this misconception has been erased by the asanas itself when it turns a non-flexible body into a flexible one with its different poses (asana). In fact, yoga asana is one of the best exercises not only for our muscular flexibility; rather its condition strengthens and affects all other soft and connective tissues anchored with the joints or bones. The asana not similar to any other modern exercise work gradually builds upon human body as per the body's formed structure and gives slow mobility to each layer of the body's structure. Asana targets particular body segment which is assisted or united with the whole body; it increases the core strength of the muscles (including

muscle fascia, fibers and tendons), ligaments and provide suppleness to increase the flexibility of the joints, muscles and ligaments with psychological awareness to these tissues. Since there are different divisions of asanas which are to be adopted as per progressive advancement in yoga but limited to the problem of arthritis, beginners' group of asanas or mild asanas or as per experts recommendations and modification; these are to be picked up for practice under supervision of yoga therapist/experts. The degree of intensity, its hold, duration, recovery and its repetitions again are to be set in conjunction with the arthritic and yogic experts who are dealing with or treating the patients. The best part of asanas is that these are available in "Ardh" (half) and "Puran" (full) form and can be modified as per the requirement of arthritic person, the affected problems or symptoms, and even by using props for those who are unable to perform even half part of the asanas.

Asanas is parasympathetic in nature. It does not increase breathing, heart rate and blood pressure with increasing levels as exertion as does general exercise. It gives a kind of massage to the joints and muscles of the arthritic patient and alters the flexibility and mobility of these structures simultaneously in a very slow manner. There are no jerky movements in asanas which can hurt the stiff joints. Instead, it follows a gradual rhythmic flow of slow movement which is suitable for affected joints; thus, increases flexibility and gives movement to the joints. The movements and holds in asana are very much systematic. There is a set pattern of breath in and out and holding it while performing asana. The process of breathing-in keeps muscles stiff and limits flexibility and breathing out relaxes the muscles and let them stretch out at maximum range; during breathing, holding in or out trains the muscles in both the ways for gaining strength and flexibility, resistance. Each of the asanas brings elasticity in body and increases flexibility. For arthritic persons, asanas work magically in a relaxing and smoothening way for bringing flexibility and movements, or restoring joints, muscles and connective tissues. Yoga asanas act in a proactive nature for managing arthritic symptoms, as the asanas are not fast repetitive in nature; it follows the sequence of relaxation, stretching and hold, simultaneous breathing pattern and vice versa. It is somewhat similar to the modern isometric exercise but not that much intensive, tiring and locally benefitting to a particular part of the body. Rather, asana incorporates the whole body, mind and spirit awareness in its practice. That is why it is holistic in nature which makes it different from other ways of exercising and for its visible benefits for arthritic persons, it has been well accepted globally now for its holistic approach to treat rheumatic diseases and positive outcomes.

On the whole, yoga and its practices give unification to arthritic body mind and soul which gives a total physical, mental and spiritual strength to the person to have positive thoughts and deeds for life and counteract the havoc of arthritis and live life with confidence, control and contentment with physical and mental freedom.

**Important Note:** *It is imperative to acquaint our readers here that for yogic treatment of arthritis, it is very much essential to have the yogic programs within the consent and recommendations of concerned experts (i.e. rheumatologist, Orthopedic, and yoga therapist etc.). Without seeking the experts advise, recommendation and collaborating discussions of the experts, the effects can be detrimental that can further worsen the patient's condition. It is also important to give the yogic program individualistically as the health condition of all the patients is not similar, so one who is going under program should get the prior overall health checkups and seek precautionary recommendation from experts dealing with treatment. This will help the yoga therapist to give correct directions to the treatment without any mistake.*

## CHAPTER-VI

### INTERNATIONAL DAY OF YOGA



*(The June 21<sup>st</sup>)*

#### Abstract of the Chapter

The present chapter will make the reader to understand the value of yoga and why it has been accepted to observe an International day of Yoga. This will show the all-time health benefits of yoga regardless of any particular acclamation to any religion. The Indian heritage has been supported by the whole world and welcomed by the UNGA for transforming human health with natural working of yoga.

According to the international calendar, Before the Common Era (B.C.E.), each day of the week is special in itself, speaking theologically there are so many connections for people with each day for its value and meaning in life. The eastern theology of Hinduism has various folds for each day according to Indian Panchang (the old Indian calendar). Across the world there are some common issues regarding man and his environment and significant life aspects, which need to be an awareness for everyone. These are the things for which we either are aware or unaware, but are very important for human beings in order to preserve creation and creatures and to know which is unknown by many but has special concern to each and every one of us for global cause of unity and safety. The existing smallest to smallest unit in this world has paradox of being useful and harmful to the man and environment, to the land and the nature, to the life and death. Therefore, such existing unit which has extreme value in our overall existence on the motherland should be given care of by realizing its importance in our life.

There are such vital and essential events and issues which are to be spread across the world so that their value in human lives and their awareness can touch every life on earth. Among these important issues, many are being observed globally every year, such as World Cancer Day, World Wildlife Day, World Water Day, International day of Sport for development and peace, World Health Day, World No Tobacco Day, World day against Child Labor, World AIDS Day, Human Rights Day, World Environment Day, International day of Friendship, World Humanitarian Day, World Teachers Day, United Nations Day, World Labor Day etc. to realize

their importance in our lives. These observed days for different areas give awareness either to save one's life or environment or to be aware of these vital and sensitive issues which are directly or indirectly related to the parts of our lives, to unite internationally against ills and for the cause of humanism.

The United Nations in collaboration with their whole members and co-sponsors, from time to time recognizes such important issues which are either beneficial, harmful or has significant value in human lives; gives considerations and observes it globally in an official way under a resolution to keep the whole world aware of it. Similarly 21<sup>st</sup> June 2015 has a special mark for Indian history and a holistic healthier day for the whole world, as the old Indian art and emerging science of Yoga got international recognition to be celebrated as "International day of Yoga". It was an initiative by Indian Prime Minister, Narendra Modi, who presented a proposal of holding international yoga day in his address during the opening of the 69th session of the United Nations General Assembly on September 27, 2014. Modi in his speech regarding yoga at United Nations General Assembly (UNGA, 69<sup>th</sup> session, 2014) stated that: "Yoga is an invaluable gift of India's ancient tradition. It embodies unity of mind and body; thought and action; restraint and fulfilment; harmony between man and nature; a holistic approach to health and well-being. It is not about exercise but to discover the sense of oneness with oneself, the world and the nature. By changing our lifestyle and creating consciousness, it can help us deal with climate change. Let us work towards adopting an International Yoga Day." Further, highlighting and appreciating yoga he said "Yoga embodies unity of mind and body; thought and action; restraint and fulfilment; harmony between man and nature; a holistic approach to health and wellbeing." In suggesting June 21, which is the Summer Solstice, as the International Day of Yoga, Narendra Modi had said that the date is the longest day of the year in the Northern Hemisphere and has special significance in many parts of the world.

Regarding observing International Yoga Day, Sam Kutesa the president, of the 69<sup>th</sup> session of the UN General Assembly, before voting on the resolution said: "For centuries, people from all walks of life have practiced yoga, recognizing its unique embodiment of unity between mind and body. Yoga brings thought and action together in harmony." In a statement, the UN Secretary-General Ban Ki-Moon also pointed out the global benefits of Yoga: "Yoga is a sport that can contribute to development and peace. Yoga can even help people in emergency situations to find relief from stress."

The proposal establishing the International day of yoga got global support; 170 countries including USA, Russia, China, Britain, Syria, Philippines, Canada, etc. supported the proposal of Modi. The member state to initiate support was Nepal, led by the Prime Minister Sushil Koirala. This draft resolution had highest number of 175 nation co-sponsors, which is more than any other UNGA resolution till date. Finally, on December 11, 2014, all 193 UN General Assembly members approved the consensus of establishing June 21 as "International Day of Yoga" under resolution A/RES/69/131 of United nations General Assembly. The aim of the "International Day of Yoga" is to raise awareness worldwide about the many benefits of practicing yoga.

Since 2015, the 1<sup>st</sup> observance of “International day of yoga” on June 21<sup>st</sup> has been celebrated worldwide every year. On the 2<sup>nd</sup> occasion of “International day of yoga” in year 2016, 139 countries across the world had registered with United Nations to participate in the event. In India only one lakh functions were organized across the country. Thirty thousand people participated with Prime Minister Narendra Modi at the celebration venue, Capitol Complex, Chandigarh, India. Fifty seven (57) top political leaders led yoga programs in various parts of the country. Even Indian Army celebrated the occasion by performing yoga in the extreme weather of Siachen Glacier. Internationally, on the second edition of international yoga day, “thousands of yoga enthusiasts participated in mass yoga session all through the day at New York’s iconic Time Square in Unites States, for yoga session in front of Eiffel Tower in Paris (France), mass yoga participation at the European Union parliament and even atop Sydney Harbor Bridge and Sydney Opera House. An Indian youth delegation to China celebrated the occasion in the south Chinese city of Guilin, South Korea performed yoga on the occasion on board an Indian Navy vessel in Busan” (The Tribune, 2016), while other nations belonging to the major continents celebrated the 2<sup>nd</sup> International day of Yoga 2016 in their own enthusiastic ways. Such a massive participation in yoga shows the wide spreading popularity of yoga across the globe. While addressing the people in Capitol Complex, Chandigarh, India on the occasion, Indian Prime Minister Narendra Modi evoked people saying that “just as the mobile phone is now a part of your life, make yoga too a part of your life. Yoga helps control the mind and maintains a healthy body. It helps people to lead a disciplined life”. He extended yoga as a guarantee for wellness not just fitness. “Yoga binds body, mind, intelligence and soul. It provides a balance to mind and body”. For the promotion of yoga he also announced to institute two annual yoga awards to be given from next year for doing significant and exceptional work in promoting yoga at the international and national levels. These awards will be named as International Yoga Award and National Yoga award.

This has been a remarkable episode in yogic history that people have embraced yoga like anything in their lives across the world. And the wave of this practical art will go on forever from east to west to transform human lives with its holistic approach towards the complete union of man, nature and the world.

## CHAPTER-VII

### YOGA VS MODERN EXERCISES

#### Summary of the Chapter

This chapter unfolds the differences and provides a comparison between yoga and modern exercises. The reading of this chapter imparts the basic or general mechanism of yoga practices and their benefits in contrast to modern exercise world. The reader will experience a new avenue in this old art, comprising the exercises for a fit and healthy body. Therefore, acceptance of yoga is entirely a different form of exercise than any other modern exercise.

Exercises are the physical and mental exertion of the body. In the field of fitness there are varied forms of exercises we do daily. In fact the human body is an active structure and is made to perform various physical and mental activities to sustain life. In modern era, the current 21<sup>st</sup> century is acknowledged as the world of fitness and perfecting body. Everyone wants to be fit and have perfect body and the evidences can be seen by the start of the day as parks, gyms, swimming pools etc. are flooded with people conscious of their health and fitness. People can be seen doing the easiest exercise of walking and increasing the limits by joining specific regime of different exercises viz. Cardio-training, Weight training, Cycling, Pilates, Plyometric, Cross-training, Aerobics, Swimming and Yoga etc. Individuals go for exercises as per their personal expectation and need in their lives.

Generally, all exercises exert body and mind and fulfill the desires of the practitioners which is usually focused on reducing the weight, strengthening the muscles, increasing the stamina, flexibility, and keeping the body toned and active. Every exercise has its own way to train and benefit the body. Often, young people hit gyms and join vigorous exercises, children are engaged in playful activities and middle aged and old people keep on walking and practicing yoga. People of all ages do consider all exercises in one bowl of keeping body fit by one or the other way, but yogic exercises are distinct in nature among all the forms of exercises. We studied in previous chapters that yoga is not merely an exercise rather an art of body, mind and spirit. It is much more than just an exercise; it fulfills the physical, mental and emotional requirements of the body through its practices but not the way like other exercises work. It has different mechanism and pattern to work and besides training body it trains and improves mind and connect individual with his/her soul which other modern exercises are unable to do. Modern exercises or training targets one or the other particular body abilities one by one and train them well at hyper levels but those exercise are not recommended for or can be done by all. Whereas yogic exercises welcome all and can be performed by all age groups starting right from the childhood to old age as the art of yoga is not merely an exercise rather it is a holistic approach which is comprehensively working all over the external and internal body and mind with a

curative nature. Let us have a look at how the yogic and modern exercises are working on human body and why yoga is different for its charismatic effects which have been accepted across the world for which yoga have now become an international tradition.

### **The art of Yogic Exercise in comparison to Modern Exercise & Training**

Every exercise has its own way to work upon body and it depends how a particular exercise is being practiced with its intensity, density and volume. As much as these degrees of exercises are manipulated the effect of exercises will be more or less exertive in nature thus targeting the stipulated affect. Mostly it has been seen that all modern exercises are sympathetic in nature and are practiced starting with above average pace which pulls up human body temperature and seems to give accelerating effect of sweating. If it is not done that way, then people often consider that these exercises are useless or perhaps, they have not exercised well.

In the present scenario of exercise, yoga is also considered as one kind of exercise and is practiced across the world for its all-round implications, health benefits and a way of leading a quality life. There is no any doubt of considering yoga as one of the exercises but its meaning is more than that of doing yoga mere as an exercise. Yoga is a traditional art which comprises different forms of physical, mental and spiritual practices governing human body, mind and soul as a whole and develop over all personality of the individual which takes yoga far high from the general or modern exercises in its function and nature. Therefore, before taking up yoga into practice, it is very much vital for a practitioner to first understand the meaning of yoga and the kind of its practices he/she is going to start. Because, if one understands the real meaning of yoga then the practice of this art becomes more meaningful and beneficial rather practicing it as a mere exercise. Actually, yoga touches the human body superficially in the beginning and penetrates deep into the core of a person physically, mentally and spiritually. As one advances in it and experiences the wonderful life which he or she never had experienced before, yoga becomes a part of life, you live into it rather you practice it and make it a habit as any other modern exercise. Yoga implies everlasting effect as it gives a new way of life whereas the modern exercises are working for maintaining the body until you practice them. Once you leave the practice, then your body starts coming back to its initial phase from where you had started. Thus, yoga does not have any comparison to modern exercises as both are having different aims but yes, if now-a-days majority of the people are practicing yoga as a form of physical exercise then the nature of yogic exercises and modern exercises can be studied in varied forms which will clear the difference between yogic and modern exercises.

### **Working pattern of Yoga and Modern Exercise**

There are various forms of yoga comprising different exercises aimed at a set spiritual goals of union of an individual with the Supreme and harmonious development of an individual's personality. As per its name, yoga has a holistic approach to life which works on each entity of a person. It masters body through Kriyas, Asanas, Pranayamas, Mudra and Bandhas and trains the mind through Dharana, Dhayana and Samadhi. Beyond physical and mental development exercises, yoga leads to self-realization and connects one with one's soul. All these practices or

exercises of yoga work gradually and take a long time to shape up a complete all-round personality for harmonious development because these exercises are having a set sequence of its practice. But it has been seen that in the present scenario the set sequence given in Raja and Hatha Yoga are not being followed. This is due to the lack of proper knowledge of yoga's working pattern or due to the lure of instant gain of its exercises and also having a short aim of training a particular unit of body or mind. Surely, the act of this half-hearted practice of yoga's exercises too will benefit in one or the other way without any harm and almost satisfy you for your needs but actually you are still untouched with the holistic wonder of this great art. Yoga and yogic exercises work gradually on each entity of a person starting from its purification, strengthening, increasing the capacity and overall efficiency of both body and mind. This way yoga and its different practices and exercises bring harmonious growth and development in one's personality.

On the other hand, if we talk about modern exercises, contrary to yoga, it is unlike the system of yoga and seems entirely different from the point of view of working patterns and their effects on the body. Modern exercises are having fast working nature and lay upon instant effects on body organs. They do not understand the actual state of body and its micro nature. Various forms of exercises are done under strict regime just to burn calories, gain lean body mass, increase strength, endurance and flexibility etc. Thus, the main aim of all modern exercises viz. Cardio, Aerobics, Weight training, Cross training, Plyometric, Pilates, Fartlek etc. is to put excessive pressure on the body organs and the mind. If done without knowledge by a layman, it can be harmful in different ways. These exercises are intensive in nature and must be done after reaching a particular fitness level and should be performed under an expert guidance and supervision. Most of the people are having fitness below average level so their body organs and mind are not in a condition to uptake the intensity of these modern exercises at once and in the lack of knowledge, they start doing exercises and often get themselves injured and even some time lose their life. Modern exercises target a particular organ or efficiency to train like lungs, heart, muscles and increase the capacities of efficiencies/components like strength, endurance and flexibility etc. by altering their functional capacities. These kind of modern exercises are giving suddenly, a training stress to the mind which some people bears and some people are unable to bear and then discontinue. It is not a pleasant or relaxant experience for mind, like in yoga. Often, the youth and adolescents are able to perform modern intensive exercises and other age groups are only walking, slow running/jogging and doing light stretching exercises. They cannot practice the whole of these exercises because of their accelerating and intensive nature and working patterns. Modern exercises are not for all as their nature is not curative; rather sometimes the wrong exercises aggravate the problem and put risk to life. A novice starts exercising randomly with sudden twists and fast movements and gives various bends to the body without knowing anything about exercises. This practice brings uneven changes in body like an increase in the heart rate, fast breathing, one sided muscle development, and excessive pressure on some organs; the result is that just for a short while gain, long term degeneration begins. These unknown dangers are certainly not found in yogic exercises because the exercises in yoga

have a set pattern to work and are designed in such a way that without harming or hurting body organs and structures, it will benefit the whole body with pleasant experience.

### **Yoga Asana and Modern Exercise**

As one performs the exercises, the body is affected. It depends on how one performs the exercises, whether it is yogic or any other exercise. The degree of difficulties can be raised in both at higher stages but certainly, the yoga exercises do not give difficulty and any stress on body and mind. Though some modern exercises can be of yogic nature, but these are surely different from yoga exercises in its nature and function over the human body. When we talk about the asana in comparison to any other modern exercise, then the following differences can be seen and experienced:

1. **Nature differences:** Asanas are slow and rhythmic in nature as these stimulate parasympathetic nervous system. Whereas, the modern physical exercises are fast and quick and act as a stimulator to the sympathetic nervous system. Hence, asanas are practiced in a relaxing way with deep breathing in, out and hold cycles and modern physical exercises in a tiring way. In other context yoga asanas are not competitive in nature whereas generally the modern exercises are competitive in nature for its practices especially if these are done in a group or with a partner.
2. **Endocrinal affects:** Asanas harmonize the endocrinal secretions, three Doshas (vata, pitta, kapha), internal fluids in the body, and balance the emotional dominations while modern exercises are not that much effective in this regard. Asana dominates sub-cortical regions of brain whereas modern exercises dominate cortical regions. The adrenaline goes down in yoga asana while it rises up in modern exercises.
3. **Respiration regulation:** Due to slow nature, oxygen consumption in the practice of asana reduces thus the respiration rate falls in asana whereas in physical exercises, the pace of exercise tends to consume more oxygen which increases the respiration rate. Also, the quick nature of modern physical exercises puts heavy pressure on the respiratory system which results in a heavy and fast breathing while yoga asanas maintain a consistent, controlled and harmonious flow of breathing throughout the practice. Madanmohan et al. (1983) study found significant decrease in oxygen consumption in trained subjects practicing yoga asana and pranayama for more than one year.
4. **Blood flow regulation:** The parasympathetic nature of asanas tend to decrease the heart rate and blood pressure during its practice whereas sympathetic nature of exercises pumps the heart harder thus increases the heart rate and blood pressure. Study conducted by Madanmohan et al. (2004) proved that the two months of yoga training decreased the basal heart rate and the blood pressure

5. **Body temperature:** While performing asanas, the body temperature usually remains the same as normal or decreased. While in physical modern exercises, the temperature of the body usually rises, which results in loss of water from the body.
6. **Body toxins:** The modern physical exercises result in the production of various toxins as byproducts of exercises, whereas asanas remove or eliminate the waste and toxin produced in the body.
7. **Joints function and degenerations:** Asanas give optimum and curative mobility to the body joints and strengthen the connective tissues. On the other hand, modern physical exercises generally have fast and quick repetitive movements which over use the joints and often lead to the wear and tear of the connective tissues and disfiguring the joints in later stage due to over depreciation and can often degenerate into rheumatism and other joint or bone problems. Whereas, yoga asana works in later stages (middle and old age) as one of the best exercise for the body and joints and for the curative and rehabilitation purposes. Yoga asana improves orthostatic tolerance because in asana, the body weight is itself used to provide load to the muscles and bones. This load bearing strengthens the bones and prevents age-related weakening, thus helping in prevention of osteoporosis. A properly selected set of exercises stretches nearly all joints and joint capsules without much danger of injuries and exhaustion (Trakroo and Bhavanani, 2016).
8. **Muscles energy consumptions:** In the practice of asana muscles consume less or low energy (nutrition and oxygen) and other body organs receive more energy. But in general exercises the case is opposite, where muscles are intensively involved in movement or exertion and mostly large muscles are developed which requires a greater amount of energy (moderate or high calorie) consumption (nutrition and oxygen) at the expense of other body organs. In later stages of life, if exercise is not done, these developed muscles become flabby as the muscle tissue accumulates fat or turn to fat.
9. **Food requirements and weight control:** Yoga asana practices do not force the need for more food; rather, it requires low or sufficient amount of food, whereas the modern physical exercises induce the intake of more food, and often the scheduled training recommends special diet which is high in protein. The physical exercises trigger hunger to have more calories and burn it. If for some reason one stops exercising, it often results in hunger pangs that put excessive fat body mass. But in case of yoga, the regime of yogic exercises recommends yogic diet which manages body weight and maintains it, and with the regularity, self-consciousness results in

permanent weight control. Supporting this fact, Bera and Rajapurkar (1993) have noticed significant improvement in the ideal body weight (BMI) and body density as a result of one year yoga training among 12-15 year old children.

10. **Fitness components developments:** Practicing asana dominantly leads to developing an overall flexibility. It encourages the flexibility of muscles, joints, and other soft tissues i.e. tendon, ligaments and muscle fascia etc. Asana also develops the muscles, general and core strength, and if performed regularly and properly, it raises the level of endurance up to some extent. Contrary to this, all modern physical exercises have particular training methods to develop different components of physical fitness. There is no single exercise or training method to develop all the components together. Even for improving the flexibility and strength, modern exercises incorporates exercises similar to that of yoga asana. A number of studies have reported that yoga practices, including asana, develop overall physical fitness and its components. Sharma et al. (2008) explored the yogic lifestyle intervention among normal healthy and diseased people, and reported that within a period of ten days significant improvements were sought in wellbeing, overall performance and working capacity in healthy and diseased people group. Trakroo and Bhavanani, (2016) writes “series of asans involve assumption of the pose followed by counter pose i.e. it involves coordinated action of synergistic and antagonistic muscles which bring increased steadiness, strength, stamina, flexibility, endurance, anaerobic power and better neuro-muscular coordination”. Pertaining to promotion of physical fitness Oken et al. (2006) found that Hatha Yoga practices resulted in significant improvement in quality of life and physical measures compared to walking exercise and wait-list control groups among seniors of 65-85 years. There are several other scientific evidences which proved that yoga practices including asana develops cardio-respiratory endurance, skeletal, respiratory and myocardial muscular strength and raises their working efficiencies and capacities which are an indicator of improved physical fitness.
11. **Muscular effect:** Yoga asanas are having relaxation-tension-relaxation effect on muscles by its practice and over all emit or reduce muscle tension/tiredness, whereas modern exercises are done with an increased muscle tension, and if the body is not cooled down properly, the muscles retain tension and carry tiredness. Madanmohan et al. (1983) attributed that the practice of savasana and pranayama leads to achieve a state of deep psychosomatic relaxation.
12. **Way of practice:** Asanas are practiced or performed slowly in a synchronized way. There is a set pattern to start or get ready for the asana: begin asana, hold it or be still for some time then come in initial position/normal position and then relax the body. While performing asana, breathing is also regulated as per the nature of asana.

Generally, asanas are practiced with relaxation and inner awareness and/or awareness at a particular point or portion of body, which brings balance and coordination between body and mind. Whereas, if we talk about modern physical exercises, these exert sudden pressure on body organs as people put a lot of efforts while doing fast, quick, jerky and heavy movements in different manners which provide non-adaptive effects on human body and mind. No synchronized patterns in modern exercises are necessarily found which could harmonize the whole body. Although there are advanced dynamic asanas in yoga, but that too is as fast or rapid, repetitive and forceful as the activities in modern physical exercises. Those dynamic asanas are also practiced in a smooth and rhythmic way.

13. **Metabolism:** Metabolic rate and Basal Metabolic Rate decreases with the practice of asanas, whereas it increases with the practice of modern physical exercises. Supporting this notion, Chaya et al. (2006) reported that yogic practices, including asana (minimum 6-months), significantly lowered the Basal Metabolic Rate (BMR).
14. **Risk of injury:** The nature of yagasana makes it less prone to sustain soft and hard tissues injury while modern exercises have high risk of sustaining injuries to muscles, tendons, ligaments and bones because of their fast working nature. Numerous scientific studies support that yoga asana practice improves coordination of agonist, antagonist, stabilizer and synergist muscles and brings steadiness and better neuromuscular coordination and improves orthostatic tolerance and refines locomotion system, thus avoiding injuries.
15. **Self-awareness:** While performing asana, the practitioner is internally aware of a particular muscle movement or movement of an organ. There is an infinite growth of self-awareness to bring stability, steadiness, balance, co-ordination, peace and calmness in body and mind through yogasanas, whereas this concept is missing in the modern physical exercises as those only target external awareness of performing the right exercise and improvement in physical efficiencies to reach or maintain the fitness levels.

### **Breathing in Yoga and Modern Physical Exercises**

Breathing, in which the inhalation and exhalation process is involved, is one of the active and passive survival activity carried on by the respiratory system of the human body. Breathing is the process which gives fresh oxygen to the body tissues to carry on their functions. Generally, an adult takes in and emits 3-5 liters air per respiration cycle. Breathing plays a very important role in physical and mental activities; as we start exerting physically, breathing rate begins to increase, causing the lungs to suck in more air at fast rate to fulfill the increased demand for oxygen by the working muscles of the body. As much as the physical activity is vigorous so will

be the expense of breathing. Analyzing the process of breathing, comparatively it comes to the knowledge that breathing in yoga and modern physical exercises is entirely different as under:

1. **Role of Breathing:** In yoga the practice of breathing is itself an exercise known as Pranayama. Different breathing exercises are done in Pranayama in different manner to enrich the body and mind with oxygen and raise the breathing capacities. Retaining and releasing process of breathing in pranayamas induces oxygen to the blocked capillaries and opens them up for delivering oxygen to the tissues through proper infusion and exchange of gasses. On the other hand, in modern physical exercises there are no particular breathing exercises correlated with the physical exercises.
2. **Difference in breathing:** In yogic exercises, breathing is entirely different from modern physical exercises. In yoga, the breathing is slow, deep, controlled, rhythmic in flow, fully focused and self-regulated, whereas modern exercises involve healthy breathing but it is not controlled and self-regulated; automatic free flow breathing is a part of modern physical exercise.
3. **Increase in partial pressure of oxygen:** Regular practice of pranayamas in yoga increases the partial pressure of oxygen in internal respiration which supplies more oxygen to the organic tissues as compared to the supply of oxygen during modern physical exercises.
4. **Breathing awareness:** All yogic exercises are practiced with awareness of breathing whereas there is no such concept of breath awareness in modern physical exercises.
5. **Improves cardio-respiratory efficiency:** Yogic breathing (techniques of pranayama) strengthens respiratory muscles and increases the overall lung capacities which not only raises the respiratory efficiency of the lungs but also improves the function of heart and its efficiencies.

### **Mechanism/Sequence of Yogic Exercise and Modern Exercise**

Yoga has a set pattern, sequence and mechanism to work on body and mind through its different practices of Shatkarmas, Asanas, Pranayam, Mudra, Bandhas and Meditation. Whereas, other modern exercises do not have an all-time set pattern and are performed randomly except in the case of planned training regime and designed training schedules. There are various forms of yoga and among those Raja Yoga and Hatha Yoga is much accepted and prevalent in present scenario. The former one is designed to exercise mainly the mind and have control over it, whereas the latter one is more a physical art which works on the body and with its help, tames the mind. Both Raja and Hatha Yoga have a set sequence for their practices which are to be followed to gain maximum benefits. In Raja Yoga we begin in a sequential practice of Yama, Niyamas, Asana, Pranayama, Pratyahara, Dharana, Dhayana, and Samadhi. This sequence has a deep rooted mechanism to work over the mind. On the other hand, in Hatha Yoga we start with

the practice of Shatkarmas and then practice the Asanas, Pranayamas, Mudras and Bandhas. The mechanism of this sequence has been established. Initially, one has to clean and purify his body through shatkriyas practice then the body becomes stable to exercise or perform Asanas, thereafter, once the body is stabilized by Asanas, the practice or exercise of Pranayamas, Mudras and Bandhas can easily be done for their benefits over body. Even each of these parts or exercises of yoga have their own particular set pattern and sequence of its practices, e.g. after practicing or attaining mastery over each asana individually that incorporates Suryanamaskara, then only one can go for full Suryanamaskara practice/exercise. There are also 'ardh' (half) and 'purna' (full) asanas, one should practice half asana first and then go for the full asana. Similarly, in Pranayama, the breathing exercises are to be practiced one after the other, as prescribed for the maximum benefits. For example, after the practice of 'Anulom Vilom', one should go for the practice of 'Bhastrika'. And even before any of the specific Pranayama practice, one has to learn the basics of 'Inhalation-Retention-Exhalation' (both internal and external) breathing techniques of Pranayamas. In the same way, while practicing meditation (Dhayana and Samadhi) one has to master concentration (Dharana) first. Therefore, the mechanism and sequence of yogic exercises are well connected or designed for obtaining holistic benefits.

Contrary to this, if we talk about modern physical exercises, then except expertly planned and systematically designed exercise regimes or schedules, there is no set sequence of exercising, and the general population is engaged in unsystematic exercises with much misconception, and they have their own belief and explanations for doing the exercises. This unsystematic practice of exercising is, more or less, of no use to them, and sometimes harms the body as a result of injury and gaining the over fat mass. There is no doubt that after getting involved in different random exercises, people feel good about their body and feel physically and mentally efficient. This may look pleasant to the people with sedentary living style, but if you are conscious about your health and fitness, then this is not sufficient and you need to seek some systematic exercise for better outcomes. Today, a large numbers of health and fitness centers are opened up where experts make people workout following systematic training schedules. In such cases, if the modern exercises are planned and scheduled by some expert or done under supervision that gives protective workout with a proper sequence to follow e.g. shorter muscles are toned first then larger or bigger muscles are worked out, exercise or training starts with proper warming up and ends with cooling down. This affects the body in a desired way and results in a beautiful external sculptured appearance of an individual, and he or she becomes the reason to be adored. A sound body raises the confidence of the person and exhibits a positive body language. But yogic philosophy believes that mere aesthetic body is not the whole reflection of personality of a person, the connectivity of body mind and soul is essential to complete a groomed, overall personality which is not possible through the modern physical exercises, these can illuminate or make you attractive physically, but the aura of a holistic illumination is only possible through the art and emerging science of yoga. Because of the non-substitution of yoga and its practices, modern physical exercises training schedules, regimes,

modules and patterns are now accepting yoga and its different exercises in their working patterns and mechanisms as a part of their schedules and trainings.

### **Yoga and Modern Exercise Training**

If we talk about physical training for body, then it is totally a different concept of exercising where we find the general exercises are merely playing a warm up role for the body. Actually, training is a professional term which is focused for a particular aim and follows rigorous, systematic, planned, scheduled, and scientific ways/methods of working out. This is far away from the concept of exercises we do generally in our daily life. There are different physical training systems which people undergo for their physical fitness, health and aesthetic body requirements. Often, it has been seen that yoga exercises are also a part of modern physical exercise training regime, module and training schedules. People achieve their targets by intermingling both yoga and general physical exercises. It is very important for trainers to plan and design the physical training schedules, keeping the health and fitness level of the individual into consideration so that the desired goal can be reached. With the increasing popularity of yoga in 21<sup>st</sup> century across the world, yoga is also emerging as a particular training for the whole body health and fitness and has different training modules to train a person. Originally, yoga is itself a set training regime which one has to plan and bring in one's schedule for desired ends. Both yoga training and modern physical training work fantastically on individuals by working on their body toning, flexibility, muscles strengthening, endurance, balance, co-ordination etc., but the difference between both these trainings is that modern exercises are mainly a physical process whereas the scientific art of yoga is a holistic process.

### **Benefits of Yoga and Modern Exercise**

Benefits of modern physical exercises are more physical and less mental whereas yogic exercises are designed in such a way that these unite the body, mind and soul for holistic benefits.

### **Yoga, Modern Physical Exercise and Fitness**

Generally, for a layman the fitness means a wellness to do work efficiently. The concept of fitness as per fitness experts has different divisions and aims. The domain of fitness comprises of physical fitness, health related physical fitness, motor fitness and mental fitness. Among these, the first thing that comes to the mind of people is physical fitness that we often hear in daily life. Physical fitness means human body's working efficiencies, which is a basic requirement in today's overloaded and fast working environment. Irrespective of one's daily routine of work, most people feel fatigued by the end of the day, which shows their inability and inefficiency to carry out a day's tasks. Medical consultants recommend at least 30 minutes walking or exercise per day to keep the body active and preserve working stamina for a normal work routine. But specifically, if we talk about the physical fitness ability, then it has a different meaning for different people of different occupations. Regarding the physical fitness, the experts of physical education are of the opinion that physical fitness is a variable related to one's

working capacities and efficiencies to perform the normal daily routine tasks and meet emergencies without any undue fatigue. The modern physical exercise programs are capable of enhancing the physical fitness of an individual by exploiting the bio-motor abilities i.e. strength, endurance, flexibility and provide an individual a well physically fit body. But the question arises, is mere physical fitness sufficient for a person to become fit for life? The answer, of course, will be no! The individual also needs to work on his/her health related fitness, motor fitness, and the mental fitness, which all have different protocols to follow and one has to undergo various other trainings and practical experience to become a fit individual.

Testing yoga on the parameter of fitness, researches proclaimed that yoga and its different exercise practices not only maintain a person physically fit rather it inculcates mental stability and peace thus enduring mental health and fitness, the practice of different asanas with controlled breathing refine motor fitness abilities such as balance and co-ordination. On the whole, overall yogic practices work wondrously on health related physical fitness so as to maintain Body Mass Index (BMI) and avoid obesity and maintain a healthy, well proportionate and balanced body composition. Tran et al. (2001) stated regular 75 minutes Hatha Yoga supervised practice (pranayamas 10-minutes, warm up exercise 15-minutes and asanas 50-minutes) 4 times for 8 weeks significantly increase the components of health related physical fitness (i.e. muscular strength and endurance, general flexibility and cardiopulmonary endurance) of healthy untrained adults (18-27 years). Hence, yoga is a comprehensive physical and mental fitness regime to work on all kind of fitness i.e. physical fitness, health related fitness, motor fitness and mental fitness, which is not at all possible by the modern physical exercises.

### **Yogic and Modern Exercise Food**

Yoga is a set old tradition of Asana, Pranayama, Mudra, Bandhas, Kriyas and Meditation. Yoga recommends its traditional diet as a part of its training which not only fulfills the body's need of energy but also regulates and governs functions of body and behavioral tendencies. Yoga recommends the moderate eating of "Sattvic" diet or food which is pure, fresh, essential, natural, vital, energy-containing, clean and conscious. Sattvic diet contains seasonal foods, dairy products, nuts, seeds, oils, ripe vegetables and fruits, legumes, whole grains and vegetarian sources of proteins. Sattvic yogic diet avoids spices as it is considered as stimulants in nature, however some spices like Haldi (turmeric) have been a part of yogic diet for its Ayurvedic benefits. Contrary to this, modern exercises are targeted towards building up the muscles, therefore, insist on instant energy providing food such as high protein concentrated diet and boosting of solid and liquid carbohydrates, which usually includes non-vegetarian food (meat, sea food and fertile and non-fertile eggs) and extra supplements and energy drinks. Beside this, a huge stuffing's of overload diet or skipping of the meals, are practiced for reaching a set fitness goal which is rather more harmful for the body. Yogic diet is planned as per the requirement of body needs and keeping in view the nature of the body and the gross and subtle functions of body and mind, while the modern exercises are altogether planned for the growth and development of muscles and to gain lean body mass. Often, the food for modern exercise is eaten

in advance for next day practice requirements as energy reserve. According to Ayurveda and yogic diet, the food is usually recommended for modern physical exercises have Rajasic (stimulant) and Tamasic (sedative) food tendencies and qualities which have more or less, harmful effects on body and mind.

**Important Note:** *This chapter presented a brief sketch of the differences between Yoga and Modern Physical Exercises, but yet there are numerous unexplained differences which the researchers are trying to find out. Even otherwise, the yogic experience in itself is a new and different experience of life and the hidden wonders of yoga are beyond explanation.*

## CHAPTER-VIII

### RESEARCH PRACTISES IN YOGA

#### Gist of the Chapter

This chapter will inform the reader that although yoga is an old art, it has been developed into a science, and the experiences of its practices are being tested by the research. The myth and the anecdote of the benefits of this art are now being accepted scientifically across the world through research validation, making this art more popular among the masses of the world. The potentials and overall strengths of yoga are coming into light through various research innovations.

The progression in the art of yoga has been a long journey recorded back to almost 5000 years. The ancient yogis and philosophers from time to time uplifted the values of yoga by acknowledging its benefits for people and the society. The health benefits of yoga are gross and subtle, many of which are explicit and yet few remain unseen. For the acceptance of yogic health related benefits for body and mind, yoga has been challenged by the advances being made in research.

Currently, the people have become advanced and conscious for their all-round development; their thinking is no more speculative, rather they live a practical life. They won't believe anything in vague without its cause and tested results. Even the advancement has come so far that people don't want to listen and practice anything which has no proven facts and benefit for them. Now the system of education has become fully practical and based on research which has successful results and recommendations. The functions of research have created new scientific knowledge which has now become a base for the acceptance of any practice in any field. The area of physical education, movement science, motor development and exercise physiology etc. has been researched for the last many decades. Similarly, research has not left the yoga untouched relating to its technique, methods of analysis and testing, and the findings have proved yoga as a scientific art which has several beneficial effects on human health for attaining overall health wellness, peace and harmony.

In the recent decades, the research practices in yoga and its different elements have geared up extensively, which has resulted in yoga's acceptance by an increasing number of people across the world. Proclamation of observing International Day of Yoga on 21<sup>st</sup> June of every year by the United Nations General Assembly (UNGA) is the mark of worldwide acceptance of this holistic art.

“According to a recent study conducted by Yoga Journal and Yoga Alliance, approximately 36.7 million Americans practice yoga and the estimated annual turnover of yoga

industry is \$16.8 billion including amount spent on classes, yoga clothing, equipment and accessories. Yoga expenditure has increased by \$6.1 billion since 2012. These trends are not only specific to USA, across globe people are adopting yoga as a life style for one or the other reason” (Satish, 2016). Because of the increased popularity and health benefits, yoga has made India a hub for yogic studies for international students. People and students across the world are coming to India for studying, learning and practicing yoga and exploring its roots as the purity of this art, which is preserved in the land of Bharat (India).

The usefulness and effectiveness of yoga have been tested by a number of research studies in India and across the world, which are fostering the reliability of yoga and its practices for different health benefits, either physical or mental. Although the practices of yogic exercises are individual specific, people are practicing its different exercises as per their personal requirements and recommendations given by yoga experts and clinicians. The impact of yoga practices on the masses is well acknowledged and the research practices are continuously unfolding its gross and subtle benefits. Multiple researches are being conducted on different areas such as physical, mental, spiritual, psychological and physiological effects of yoga exercises on the human body, yogic testing on diseases, rehabilitation testing, research on yoga and personality, effects of yoga on daily living, quality of life and yogic testing with regard to age and genders etc. These researches are testing the philosophy and yogic benefits written in ancient texts and turning the anecdote into tested facts regarding yoga in modern era.

They are proving the fact that exercise is considered an acceptable method for improving and maintaining physical and emotional health; and yogic exercises are benefiting physical and mental health via down regulation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system (SNS). In this regard, Ross and Thomas, (2010) scholarly reviewed the literature regarding research studies comparing the effects of yoga and exercise on a variety of health outcomes and health conditions and found that the studies comparing the effects of yoga and exercise seem to indicate that, in both healthy and diseased populations, yoga may be as effective as or better than exercise at improving a variety of health-related outcome measures. The evidences of such literary reviews and research testing are unfolding the benefits of yoga on human health, and that is the reason that people are actively embracing yoga.

Though general health benefits of yogic exercises are well documented, keeping in focus the psychological parameters which influence psycho-cognitive harmony, an experimental research done by Rathee (2012) exposed that selected yogic activities boosted the emotional competence and concentration ability of adolescent girls in benefiting ways. Similarly, various researches have illuminated the benefits of meditation over mental health and curving the psycho-somatic disorders and helped in attaining easy going life, which is in fact a need of the hour and daily living where almost everyone seems to have some sort of mental stress and have one mild or intense mental disorder or the other. Centre for Accelerated Language Acquisition published an article that demonstrates the benefits of yoga on stress management and achieving the optimal performance. The researchers at Johns Hopkins University surveyed over 19,000

studies on meditation and used stringent criteria to identify 47 of the most rigorously controlled studies to perform a meta-analysis on the clinical benefits of meditation. The analysis revealed that these programs lowered stress, anxiety and depression and that “clinicians should be prepared to talk with their patients about the role that a meditation program could have in addressing psychological stress” (Goyal et al., 2014). A pilot study by Sharma et al. (2016) at the University of Pennsylvania suggested that Sudarshan Kriya Yoga (SKY) is feasible as an adjunctive intervention for the treatment of patients with major depressive disorder (MDD) who had not responded to antidepressants.

Several yoga research centers in India and abroad are unfolding the usefulness of yoga and its practices for overall human health benefits. Ministry of AYUSH, Patanjali Yogpeeth, Vivekananda Kendra Yoga Research Foundation, Yoga Centre, Lonawala etc. are some of the leading Indian institutes and organizations expanding the value of yoga and research. With the expansion of these institutions in India and abroad, different conferences and workshops are being organized to highlight the immense value of the old and the new concepts of yoga towards health related issues and for attaining a healthy quality living.

Testing the effects of various yogic exercises on the quality life of elderly people who are chronologically and physiologically mature and are not enough active in their psycho-somatic functions, the ageing having decreased their wellbeing and overall health, a number of research studies have demonstrated that the intervention of yogic programs can improve wellbeing, take care of the health related issues of the elderly people and bring them a quality living. Chen et al. (2010) developed the yoga exercise intervention program for the elderly people that brought improvement in the overall sleep quality, reduced depression, sleep disturbance, and daytime dysfunction as compared to the people who were not subjected to such interventions. In another experimental research conducted by Oken et al. (2006), it was observed that the elderly men and women (65-85 years) improved with the physical measure of timed 1-legged standing, forward flexibility and quality of life measures of sense of well-being, energy and fatigue after 6 months’ randomized and controlled trial of Hather Yoga intervention on the healthy seniors when compared with the walking exercise class and the wait list control group. Benefiting the ageing population, yoga helps inactive older adults to stay physically active and healthy (Vogler et al., 2011).

The charismatic breathing exercises of pranayama have been taken up by research to find out its wonderful subtle benefits which have raised the oxygen consumption among the masses and aspirants. A number of researches have been carried out on Pranayama (breathing exercises) in relation to pulmonary functions, senses efficacy and other important physiological activities within the body. A research conducted at Vivekananda Kendra Yoga Research Foundation, Bangalore, India, summarizes that breathing through a particular nostril can alter metabolism and autonomic activities towards positive body functions and health attainments (Telles et al., 1994). Similarly, yogic breathing have numerous health benefits for heart functioning, memory sensitization, senses trigger and clear pathways, increased vital capacity and diffusion

oxygenations and much more, proclaims research. Yogic exercises and lifestyle modification intervention among the general population having hypertension (High Blood Pressure) work as antihypertensive medical treatment in the prevention of cardiovascular complications like heart stroke, congestive heart failure and other cardiovascular diseases (CVD) (Kannel, 2000 and Lloyd-Jones et al., 2000). Proving the improved effect of yoga breathing exercises on blood pressure patients with stable chronic heart failure, Bernardi et al. (1998 and 2002) reported that slow and deep yogic breathing significantly improves ventilation, increases resting oxygen saturation, improves exercise tolerance, increase in vagal activity, decreases sympathetic activity and reduction in systolic and diastolic blood pressures, even improvement in baroreflex sensitivity was significantly recorded, which shows the improved heart function.

Several researches proved that yogic breathing is a boon for asthmatic patients in curving and improving patients' difficulties. Singh et al. (2012), working on the effects of yoga (pranayama) on asthmatic patients, proved the anecdote significantly that Prana is the energy, when the self-energizing force embraces the body with extension and expansion and control, it is pranayama. It may affect the milieu at the bronchioles and the alveoli particularly at the alveolo-capillary membrane to facilitate diffusion and transport of gases. It may also increase oxygenation at tissue level, the experimental results of their study showed that after the intervention of two month yoga practices including breathing exercises, significant improvements were recorded in patients' transfer factor of the lung for carbon monoxide (TLCO), forced vital capacity (FVC), forced expiratory volume in 1st sec (FEV<sub>1</sub>), peak expiratory flow rate (PEFR), maximum voluntary ventilation (MVV), and slow vital capacity (SVC) of the patients after the yoga practice. Quality of life also increased significantly. Researchers concluded that pranayama or yoga breathing and stretching postures are used to increase respiratory stamina, relax the chest muscles, expand the lungs, raise energy levels and calm the body. Likewise, several other researches proved that yoga breathing exercises (pranayama) not only increases the lung capacities but also brings improvements in pulmonary functional efficiencies among healthy and persons with pulmonary diseases. Studies by Joshi et al. (1992), Makwana et al. (1988) and Yadav and Dass (2001) reported that breath control exercises for 6 weeks and 1 hour yoga practice every day for 12 weeks significantly improved lung functions by improving or increasing the forced vital capacity (FVC), forced expiratory volume in 1 second (FEV<sub>1</sub>), peak expiratory flow rate (PEFR) and maximum voluntary ventilation (MVV) and a significant decrease in breathing frequency ( $f_B$ ) as well in 75 males and females of average age 18.5 years and 60 healthy young women of age group 17 to 28 years.

Raub (2002) writes that a number of other published research studies have significantly proved that a varying period of yoga training (months to year) brought improvement in overall cardiovascular endurance of young people as compared to a similar group who performed other types of exercises (Bera & Rajapurkar, 1993; Pansare et al., 1989; Raju et al., 1986, 1994, 1997; Ray et al., 2001; Tran et al., 2001). In most of the studies, the variables of cardiopulmonary functions like oxygen consumption and endurance measures such as work output, anaerobic threshold and blood lactate were tested during sub maximal and maximal exercise. It was found

that maximum aerobic power (AP) and maximum oxygen consumption ( $VO_2\max$ ) were raised when the exercising muscles reached stagnation (plateau) after maximal exercise load. It proved that the yogic exercises, particularly the pranayama training (breath control training), strengthens the lung muscles, improves ventilation and in combination with other yogic exercises, increases the cardiovascular endurance as similar to other endurance training. Supporting this fact, Pansare et al. (1989) study proved that the serum lactate dehydrogenase (LDH) level increased significantly in male and female students after 6 weeks of yoga training. This increased LDH (Glycolytic Enzymes) provides energy to exercising muscles and increases the long working duration of sub-maximal exercise, which is ultimately an enduring accomplishment that yoga is achieving through its exercises.

In another research by Sodhi et al. (2009), it was found that the yoga breathing exercises used adjunctively with standard pharmacological treatment significantly improves pulmonary functions in patients with bronchial asthma. Thus, the breathing exercises (pranayama) significantly showed its effects on the pulmonary and other interrelated body functions, which bring rehabilitation and improvement in hyper/hypo function of bodily units.

Now-a-days, medical science and research in yoga are working in both qualitative and quantitative collaborations for curing and rehabilitating diseases by designing and forming reliable and valid yogic modules that assist in detection of problems and intervention of therapeutics for treatment in both mental and physical dysfunctioning and other psycho-somatic ailments. A brief review by Trakroo and Bhavanani, (2016) on the physiological benefits of yogic practices elaborated that yoga affects every system of the body for optimum function of all organ-systems and brings better neuro-effector communication, improves strength of the body, increases resistance against stress and diseases and brings tranquility, balance, positive attitude and equanimity in the practitioner, which enables him to lead a purposeful and healthier life. They advocate further “research needs to look at the expansive intra-and interpersonal mind-body-spirit aspects of Yoga through the adoption of qualitative research methods. This is vital in developing a broader understanding of how Yoga can affect the individual, family, society and the universe. At the same time, we also need to continue a deeper exploration of the trans-cellular and intra-cellular mechanisms through quantitative research studies” (Trakroo & Bhavanani, 2016).

Therefore, research in yoga has given a scientific and objective base to this Indian traditional or philosophical art by exploring its subjectivity in the present modern world. In fact, the comprehensive potentials of yoga had been experienced for a long time by the yogis and yogic gurus (teachers) but could not be highlighted due to scientific and technological limits in India in earlier times. Later, the country’s economic development and revolution in different areas has brought prime focus on health and wellness issues of the nation. This has provided the country an opportunity to become more sensitive, conscious, focused and concerned for adopting finer health practices towards overall wellness for the people of the country. Moving ahead in 21<sup>st</sup> century with the resolution to make India free of several impaired and deadly diseases and to

counteract the environmental hazards and bring people close to the nature, researches in yoga and collaborative efforts of Yoga, Naturopathy and Ayurveda are working wondrously to preserve the human race. Even modern medical and Ayurvedic sciences are also adopting the yogic techniques and therapies for new outcomes in curing patients and keeping the disease at bay. This is bringing a new horizon in the field of yoga while working in tandem with different fields for various purposes and ultimately attaining its objectives and goals by bringing harmony in body, mind and spirit and preserving human race through its global services.

## BIBLIOGRAPHY

- Anand, B. K. (1991). Yoga and medical science. *Indian Journal of Physiology and Pharmacology*, 35 (2), pp. 84-87.
- Aurobindo, S. (1949). *Essay on thr Geeta*. Shri Aurobindo Ashram: Pondicherry, India.
- Bearne, L. M., Scott, D. L. and Hurley, M. V. (2002). Exercise can reverse quadriceps sensorimotor dysfunction that is associated with rheumatoid arthritis without exacerbating disease activity. *Rheumatology (Oxford, England)*, 41 (2), pp. 157-166.
- Bera, T. K. and Rajapurkar, M. V. (1993). Body composition, cardiovascular endurance and anaerobic power of yogic practitioner. *Indian Journal of Physiology and Pharmacology*, 37 (3), pp. 225-228.
- Berger, B.G. and Owen, D.R. (1988). Stress reduction and mood enhancement in four exercise modes: swimming, body conditioning, hatha yoga and fencing. *Research quarterly exercise sport*, Volume 59 (2), pp. 148-159.
- Bernardi, L., Porta, C., Spicuzza, L., Bellwon, J., Spadacini, G., Frey, A. W., Yeung, L.Y.C., Sanderson, J. E., Pedretti, R. and Tramarin, R. (2002). Slow breathing increases arterial baroreflex sensitivity in patients with chronic heart failure. *Circulation*, 105, pp. 143–145.
- Bernardi, L., Spadacini, G., Bellwon, J., Hajric, R., Roskamm, H. and Frey, A. W. (1998). Effect of breathing rate on oxygen saturation and exercise performance in chronic heart failure. *Lancet*, 351, pp. 1308–1311.
- Bhavanani, A. B., Madanmohan and Udupa, K. (2003). Acute effect of Mukh bhastrika (a yogic bellows type breathing) on reaction time. *Indian Journal of Physiology and Pharmacology*, 47 (3), pp. 297-300.
- Birkel, D. A. and Edgren, L. (2000). Hatha yoga: Improved vital capacity of college students. *Alternative Therapies in Health and Medicine*, 6, pp. 55–63.
- Calderon, R. Jr., Schneider, R. H., Alexander, C. N., Myers, H. F., Nidich, S. I. and Haney, C. (1999). Stress, Stress reduction and hypercholesterolemia in African Americans: a review. *Ethnicity and Disease*, 9 (3), pp. 451-462.
- Clay, C. C., Lloyd, L. K., Walker, J. L., Sharp, K. R. and Pankey, R. B. (2005). The metabolic cost of hatha yoga. *Journal of Strength and Conditioning Research*, 19 (3), pp. 604-610.
- Chaudhary, A. K., Bhatnagar, H. N., Bhatnagar, L. K. and Chaudhary, K. (1988). Comparative study of the effect of drugs and relaxation exercise (yoga *shavasana*) in hypertension. *Journal-Association of Physicians of India*, 36, pp. 721–723.
- Chaya, M. S., Kurpad, A. V., Nagendra, H. R. and Nagarathna, R. (2006). The effect of long term combined yoga practice on the basal metabolic rate of healthy adults. *BMC Complementary and Alternative Medicine*, 31, pp. 6: 28

- Chaya, M. S., Ramakrishnan, G., Shastri, S., Kishore, R. P., Nagendra, H., Nagarathna, R., Raj, T., Thomas, T., Vaz, M. and Kurpad, A. V. (2008). Insulin sensitivity and cardiac autonomic function in young male practitioners of yoga. *The National Medical Journal of India*, 21 (5), pp. 217-221.
- Chen, K. M., Chen, M. H., Fan, J. T., Lin, H. S. and Li, C. H. (2010). Effects of yoga on sleep quality and depression in elders in assisted living facilities. *The Journal of Nursing Research*, 18 (1), pp. 53-61.
- Cooper, M. J. and Aygen, M. M. (1979). A relaxation technique in the management of hypercholesterolemia. *Journal of Human Stress*, 5 (4), pp. 24-27.
- Corliss, R. (2001). The power of yoga. Cover story on yoga, *Time magazine*, Monday, April-23, 2001. USA.
- Datey, K. K., Deshmukh, S. N., Dalvi, C. P. and Vinekar, S. L. (1969). "Shavasana": A yogic exercise in the management of hypertension". *Angiology*, 20, pp. 325-333.
- Dukes, P. (1960). *The yoga of health, youth and joy*. Cassell, London.
- Eichner, E. R. (1990). Exercise and arthritis. The hematology of inactivity. *Rheumatic Diseases Clinics of North America*, 16 (4), pp. 815-825.
- Ettinger, W. H. Jr., Burns, R., Messier, S. P., Applegate, W., Rejeski, W. J., Morgan, T., Shumaker, S., Berry, M. J., O'Toole, M., Monu, J. and Craven, T. (1997). A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). *JAMA*, 277 (1), pp. 25-31.
- Feuerstein, G. (1998). *The yoga tradition: Its, history, literature, philosophy and practice*. Hohm press, Prescott, Arizona.
- Forrest, G. and Rynes, R. I. (1994). Exercise for rheumatoid arthritis. *Contemporary Internal Medicine*, 6 (11), pp. 23-28.
- Fox, K. R. (1999). The influence of physical activity on mental well-being. *Public Health Nutrition*, 2 (3A), pp. 411-418.
- Garfinkel, M. S., Schumacher, H. R. Jr., Husain, A., Levy, M. and Reshetar, R. A. (1994). Evaluation of a yoga based regimen for treatment of osteoarthritis of the hands. *Journal of Rheumatology*, 21, pp. 2341-2343.
- Garfinkel, M. S., Singhal, A., Katz, W. A., Allan, D. A., Reshetar, R. and Schumacher, H. R. Jr. (1998). Yoga-based intervention for carpal tunnel syndrome: A randomized trial. *JAMA*, 280, pp. 1601-1603.
- Gauchard, G. C., Jeandel, C., Tessier, A. and Perrin, P. P. (1999). Beneficial effect of proprioceptive physical activities on balance control in elderly human subjects. *Neuroscience Letters*, 273 (2), pp. 81-84.

- Gharote, M. L. (1990). *Applied yoga*. Kaivalyadham, Lonavala, India, pp.78.
- Giovannucci, E., Leitzmann, M., Spiegelman, D., Rimm, E. B., Colditz, G. A., Stampfer, M. J. and Willett, W. C. (1998). A prospective study of physical activity and prostate cancer in male health professionals. *Cancer Research*, Volume 58, pp. 5117-5122.
- Goswami, S.S. (1980). *Laya yoga: An advance method of concentration*. London: Routledge & Kegan.
- Gothe, N., Pontifex, M.B., Hillman, C. and Mc Auley, E. (2013). The acute effect of yoga on executive function. *Journal of physical activity and health*, Volume: 10, pp. 488-495.
- Goyal, M., Singh, S., Sibinga, E. M. S., Gould, N. F., Rowland- Seymour, A., Sharma, R., Berger, Z., Sleicher, D., Maron, D. D., Shihab, H. M., Ranasinghe, P. D., Linn, S., Saha, S., Bass, E. B., Haythornthwaite, J. A. (2014). Meditation programs for psychological stress and well-being: A systematic review and meta-analysis. *JAMA Internal Medicine*, 174 (3), 357-368.
- Gregg, E., Pereira, M. and Caspersen, C. J. (2000). Physical activity, falls and fractures among older adults. *Journal of the American Geriatric Society*, 48, pp. 883-893.
- Harinath, K., Malhotra, A. S., Pal, K., Prasad, R., Kumar, R., Kain, T. C., Rai, L. and Sawhney, R. C. (2004). Effects of Hatha yoga and Omkar meditation on cardiorespiratory performance, psychologic profile, and melatonin secretion. *The Journal of Alternative and Complementary Medicine*, 10 (2), pp. 261-268.
- Herzog, H., Lele, V. R., Kuwert, T., Langen, K. J., Rota Kops, E. and Feinendegen, L. E. (1990). Changed pattern of regional glucose metabolism during yoga meditative relaxation. *Neuropsychobiology*, 23 (4), pp. 182-187.
- Hochberg, M. C., Altman, R. D., Brandt, K. D., Clark, B. M., Dieppe, P. A., Griffin, M. R., Moskowitz, R. W., and Schnitzer, T. J. (1995). Guidelines for the medical management of osteoarthritis. Part II. Osteoarthritis of the knee. American College of Rheumatology. *Arthritis and Rheumatism*, 38 (11), pp. 1541-1546.
- Holzel, B. K., Ott, U., Gard, T., Hempel, H., Weygandt, M., Morgen, K. and Vaitl, D. (2008). Investigation of mindfulness meditation practitioners with voxel-based morphometry. *Social Cognitive and Affective Neuroscience*, 3 (1), pp. 55-61.
- Innes, K. E., Bourguignon, C., and Taylor, A. G. (2005). Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: A systematic review. *Journal of the American Board of Family Practitioners*, 18 (6), pp. 491-519.
- Joshi, L. N., Joshi, V. D. and Gokhale, L. V. (1992). Effect of short term 'Pranayam' practice on breathing rate and ventilator functions of lung. *Indian Journal of Physiology and Pharmacology*, 36 (2), pp. 105-108.

- Jung, C. G. (1978). *Psychology and the East*. Princeton University Press, pp.85.
- Kamei, T., Toriumi, Y., Kimura, H., Ohno, S., Kumano, H. and Kimura, K. (2000). Decrease in serum cortisol during yoga exercise is correlated with alpha wave activation. *Perceptual and Motor Skills*, 90 (3.1), pp. 1027-1032.
- Kannel, W. B. (2000). Review of recent Framingham study hypertension research. *Current Hypertension Reports*, 2, pp. 239–240.
- Karmananda, S. (2008). *Yogic management of common diseases*. Yoga publications trust, Munger, Bihar, India.
- Khare, K. C. and Nigam, S. K. (2000). A study of electroencephalogram in meditators. *Indian Journal of Physiology and Pharmacology*, 44 (2), pp. 173-178.
- Konar, D., Latha, R. and Bhuvaneshwaran, J. S. (2000). Cardiovascular responses to head-down-body-up postural exercise (Sarvangasana). *Indian Journal of Physiology and Pharmacology*, 44 (4), pp. 392–400.
- Kovacic, V., Bruher, K., Dinevski, D. (2013). The effects of practicing yoga on the quality of life of elderly people. *The Quest for happiness*, Str. 15.
- Lloyd-Jones, D. M., Evans, J. C., Larson, M. G., O'Donnell, C. J., Rocella, E. J. and Levy, D. (2000). Differential control of systolic and diastolic blood pressure: Factors associated with lack of blood pressure control in the community. *Hypertension*, 36, pp. 594–599.
- Lou, H. C., Kjaer, T. W., Friberg, L., Wildschiodtz, G., Holm, S. and Nowak, M. (1999). A 15O-H<sub>2</sub>O PET study of meditation and the resting state of normal consciousness. *Human Brain Mapping*, 7 (2), pp. 98-105.
- Luders, E., Toga, A. W., Lepore, N. and Gaser, C. (2009). The underlying anatomical correlates of long-term meditation: larger hippocampal and frontal volumes of gray matter. *Neuroimage*, 45 (3), pp. 672-678.
- Lyngberg, K., Danneskiold-Samsøe, B. and Halskov, O. (1988). The effect of physical training on patients with rheumatoid arthritis: changes in disease activity, muscle strength and aerobic capacity. A clinically controlled minimized cross-over study. *Clinical and Experimental Rheumatology*, 6 (3), pp. 253-260.
- Madanmohan, Mahadevan, S. K., Balakrishnan, S., Gopalakrishnan, M. and Prakash, E. S. (2008). Effect of six weeks yoga training on weight loss following step test, respiratory pressures, handgrip strength and handgrip endurance in young healthy subjects. *Indian Journal of Physiology and Pharmacology*, 52 (2), pp. 164-170.
- Madanmohan, Rai, U. C., Balavittal, V., Thombre, D. P., and Gitananda, S. (1983). Cardiorespiratory changes during savitri pranayama and shavasana. *The Yoga Review*, 3, pp. 25-34.

- Madanmohan, Udupa, K., Bhavanani, A. B., Shathapathy, C. C. and Sahai, A. (2004). Modulation of cardiovascular response to exercise by yoga training. *Indian Journal of Physiology and Pharmacology*, 48 (4), pp. 461-465.
- Madanmohan, Thombre, D. P., Balakumar, B., Nambinarayanan, T. K., Thakur, S., Krishnamurthy, N. and Chandrabose, A. (1992). Effect of yoga training on reaction time, respiratory endurance and muscle strength. *Indian Journal of Physiology and Pharmacology*, 36 (4), pp. 229-233.
- Mahajan, A. S., Reddy, K. S. and Sachdeva, U. (1999). Lipid profile of coronary risk subjects following yogic lifestyle intervention. *Indian Heart Journal*, 51 (1), pp. 37-40.
- Maini S. (2000). *The effect of Sahaja Yoga on Lipid Peroxidation*. MD Thesis. Delhi University, Delhi, India.
- Makwana, K., Khirwadkar, N. and Gupta, H. C. (1988). Effect of short term yoga practice on ventilatory function tests. *Indian Journal of Physiology and Pharmacology*, 32 (3), pp. 202-208.
- Malathi, A. and Parulkar, V. G. (1989). Effect of yogasanas on the visual and auditory reaction time. *Indian Journal of Physiology and Pharmacology*, 33 (2), pp. 110-112.
- Manchanda, S. C., Narang, R., Reddy, K. S., Sachdeva, U., Prabhakaran, D., Dharmanand, S., Rajani, M. and Bijlani, R. (2000). Retardation of coronary atherosclerosis with yoga lifestyle intervention. *Journal-Association of Physicians of India*, 48, pp. 687-694.
- Manjunatha, S., Vempati, R. P., Ghosh, D. and Bijlani, R. L. (2005). An investigation into the acute and long-term effects of selected yogic postures on fasting and postprandial glycemia and insulinemia in healthy young subjects. *Indian Journal of Physiology and Pharmacology*, 49 (3), pp. 319-324.
- Miller, J. J., Fletcher, K. and Kabat-Zinn J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry* 1995, 17 (3), pp. 192-200.
- Minor, M. A. (1999). Exercise in the treatment of osteoarthritis. *Rheumatic Diseases Clinics of North America*, 25 (2), 397-415, viii.
- Mogra, A. L. and Singh, G. (1986). Effect of biofeedback and yogic relaxation exercise on the blood pressure levels of hypertensives: A preliminary study. *Aviation Medicine*, 30, pp. 68-75.
- Moonaz, S. H., Bingham, C. O. 3<sup>rd</sup>., Wissow, L. and Bartlett, S. J. (2015). Yoga in Sedentary Adults with Arthritis: Effects of a Randomized Controlled Pragmatic Trial. *The Journal of Rheumatology*, 42 (7), pp. 1194-1202.
- Moonaz, S., Bartlett, S.J., and Bingham, C.O. (2015). *Yoga for Arthrities*. Article update: 9/25/2015. Retrieved June 5, 2016, from <http://www.hopkinsarthrities III>.

- Muktibodhananda, S. (2008). *Hatha yoga Pradipika: Light on hatha yoga*. Yoga publications trust, Munger, Bihar, India.
- Murugesan, R., Govindarajulu, N. and Bera, T. K. (2000). Effect of selected yogic practices on the management of hypertension. *Indian Journal of Physiology and Pharmacology*, 44 (2), pp. 207–210.
- Newsome, G. (2002). Guidelines for the management of rheumatoid arthritis: 2002 update. *Journal of the American Academy of Nurse Practitioners*, 14 (10), pp. 432-437.
- Nordemar, R. and Ekblom, B. (1981). Effects of long-term physical therapy in rheumatoid arthritis. *Lakartidningen*, 78 (15), pp. 1561-1564.
- O’Grady, M., Fletcher J. and Ortiz, S. (2000). Therapeutic and physical fitness exercise prescription for older adults with joint disease: an evidence-based approach. *Rheumatic Diseases Clinics of North America*, 26 (3), pp. 617-646.
- Oken, B. S., Zajdel, D., Kishiyama, S., Flegal, K., Dehen, C., Haas, M., Kraemer, D. F., Lawrence, J. and Leyva, J. (2006). Randomized, controlled, six-month trial of yoga in healthy seniors: effects on cognition and quality of life. *Alternative Therapies in Health Medicine*, 12 (1), pp. 40-47.
- Paluska, S. A. and Schwenk, T. L. (2000). Physical activity and mental health: current concepts. *Sports Medicine (Auckland, N.Z.)*, 29 (3), pp. 167-180.
- Pansare, M. S., Kulkarni, A. N. and Pendse, U. B. (1989). Effect of yogic training on serum LDH levels. *Journal of Sports Medicine and Physical Fitness*, 29, pp. 177–178.
- Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., Macera, C. A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G. W., King, A. C., Kriska, A., Leon, A. S., Marcus, B. H., Morris, J., Paffenbarger, R. S. Jr., Patrick, K., Pollock, M. L., Rippe, J. M., Sallis, J. and Wilmore, J. H. (1995). Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA*, 273 (5), pp. 402-407.
- Patel, C. and North, W. R. S. (1975). Randomised controlled trial of yoga and biofeedback in management of hypertension. *Lancet*, 19, pp. 93-95.
- Raghuwanshi, A. (2011). Studies on Neuro-Endocrinological Correlates of Yogic Pathways. In: P. Nikic, ed. *Proceedings “Yoga – the Light of Microuniverse” of the International Interdisciplinary Scientific Conference “Yoga in Science – Future and Perspectives”, September 23-24, 2010, Belgrade, Serbia*. Belgrade: Yoga Federation of Serbia, pp. 10-18.
- Rai, L. and Ram, K. (1993). Energy expenditure and ventilatory responses during Virasana-A yogic standing posture. *Indian Journal of Physiology and Pharmacology*, 37 (1), pp. 45–50.

- Rai, L., Ram, K., Kant, U., Madan, S. K. and Sharma, S. K. (1994). Energy expenditure and ventilatory responses during Siddhasana-A yogic seated posture. *Indian Journal of Physiology and Pharmacology*, 38 (1), pp. 29–33.
- Raju, P. S., Kumar, K. A., Reddy, S. S., Madhavi, S., Gnanakumari, K., Bhaskaracharyulu, C., Reddy, M. V., Annapurna, N., Reddy, M. E. and Girijakumari, D. (1986). Effect of yoga on exercise tolerance in normal healthy volunteers. *Indian Journal of Physiology and Pharmacology*, 30 (2), pp. 121–132.
- Raju, P. S., Madhavi, S., Prasad, K. V., Reddy, M. V., Reddy, M. E., Sahay, B. K. and Murthy, K. J. (1994). Comparison of effects of yoga & physical exercise in athletes. *The Indian Journal of Medical Research*, 100, pp. 81-86.
- Raju, P. S., Prasad, K. V., Venkata, R. Y., Murthy, K. J. and Reddy, M. V. (1997). Influence of intensive yoga training on physiological changes in 6 adult women: A case report. *The Journal of Alternative and Complementary Medicine*, 3, pp. 291–295.
- Rathee, N. K. (2012). Achieving psycho-cognitive harmony through traditional training program: an experiential approach. *Proceedings of 5th Annual International Conference Physical Education Sport and Health*, 16 (1/ 2012), pp. 16-19, Series Publication Title: Scientific report Physical Education and Sport.
- Raub, J. A. (2002). Psychophysiologic Effects of Hatha Yoga on Musculoskeletal and Cardiopulmonary Function: A Literature Review. *The Journal of Alternative and Complementary Medicine*, 8 (6), pp. 797–812.
- Ray, U. S., Mukhopadhyaya, S., Purkayastha, S. S., Asnani, V., Tomer, O. S., Prashad, R., Thakur, L. and Selvamurthy, W. (2001). Effect of yogic exercises on physical and mental health of young fellowship course trainees. *Indian Journal of Physiology and Pharmacology*, 45 (1), pp. 37–53.
- Ross, A. and Thomas, S. (2010). The Health Benefits of Yoga and Exercise: A Review of Comparison Studies. *The journal of alternative and complementary medicine*, 16 (1), pp. 3–12.
- Sarang, S. P. and Telles, S. (2006). Changes in p300 following two yoga-based relaxation techniques. *The International Journal of Neuroscience*, 116 (12), pp. 1419-1430.
- Sarang, S. P. and Telles, S. (2007). Immediate effect of two yoga-based relaxation techniques on performance in a letter cancellation task. *Perceptual and Motor Skills*, 105 (2), pp. 379-385.
- Saraswati, S. S. (2005). *Meditations from the tantras*. Yoga publications trust, Munger, Bihar, India.
- Saraswati, S. S. (2008). *Asana Pranayama Mudra Bandha*. Yoga publications trust, Munger, Bihar, India.

- Satish, L. (2016). Yoga in India. Editorial. *Employment News*, 18-24 June 2016, pp. 45.
- Schell, F. J., Allolio, B. and Schonecke, O. W. (1994). Physiological and psychological effects of Hatha-Yoga exercise in healthy women. *International Journal of Psychosomatics*, 41(1-4), pp. 46-52.
- Schmidt, T., Wijga, A., Von Zur Muhlen, A., Brabant, G. and Wagner, T. O. (1997). Changes in cardiovascular risk factors and hormones during a comprehensive residential three month kriya yoga training and vegetarian nutrition. *Acta Physiologica Scandinavica Supplementum*, 640, pp. 158–162.
- Scully, D., Kremer, J., Meade, M. M., Graham, R. and Dudgeon, K. (1998). Physical exercise and psychological well being: a critical review. *British Journal of Sports Medicine*, 32 (2), pp. 111-120.
- Selvamurthy, W., Sridharan, K., Ray, U. S., Tiwary, R. S., Hegde, K. S., Radhakrishnan, U. and Sinha, K. C. (1998). A new physiological approach to control essential hypertension. *Indian Journal of Physiology and Pharmacology*, 42 (2), pp. 205–213.
- Sharma, A., Barrett, M. S., Cucchiara, A. J., Gooneratne, N. S. and Thase, M. E. (2016). A breathing-based meditation intervention for patients with major depressive disorder following inadequate response to antidepressants: A randomized pilot study *The Journal of Clinical Psychiatry*, Online article, November 22, 216, PMID: 27898207.
- Sharma, R. (2004). *Hindu Techniques of Mental Health*. Spring Books, pp.150.
- Sharma, V. K., Das, S., Mondal, S. and Goswami, U. (2008). Effect of sahaj yoga on autonomic patients in healthy subjects and patients of major depression. *Biomedicine*, 28, pp. 139-141.14.
- Sharma, V. K., Das, S., Mondal, S., Goswami, U. and Gandhi, A. (2007). Comparative effect of sahaj yoga on EEG in patients of major depression and healthy subjects. *Biomedicine Journal*, 27, pp. 95-99.
- Singh, S., Soni, R., Singh, K. P. and Tandon, O. P. (2012). Effect of yoga practices on pulmonary function tests including transfer factor of lung for carbon monoxide (TLCO) in asthma patients. *Indian Journal of Physiology and Pharmacology*, 56 (1), pp. 63-68.
- Sodhi, C., Singh, S. and Dandona, P. K. (2009). A study of the effect of yoga training on pulmonary functions in patients with bronchial asthma. *Indian Journal of Physiology and Pharmacology*, 53 (2), pp. 169-174.
- Stancak, A. Jr. and Kuna, M. (1994). EEG changes during forced alternate nostril breathing. *International Journal of Psychophysiology*, 18 (1), 75-79.
- Streeter, C. C., Jensen, J. E., Perlmutter, R. M., Cabral, H. J., Tian, H., Terhune, D. B., Ciraulo, D. A. and Renshaw, P. F. (2007). Yoga asana sessions increase brain GABA levels: a pilot

- study. *Journal of Alternative and Complementary Medicine (New York, NY.)*, 13 (4), pp. 419-426.
- Tani, S., Nagao, K., Anazawa, T., Kawamata, H., Furuya, S., Takahashi, H., Iida, K., Matsumoto, M., Washio, T., Kumabe, N. and Hirayama, A. (2009). Association of body mass index with coronary plaque regression: 6-month prospective study. *Journal of Atherosclerosis and Thrombosis*, 16 (3), pp. 275-282.
- Taylor, C. B., Sallis, J. F. and Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public Health Reports (Washington, D. C., 1975)*, 100 (2), pp. 195-202.
- Telles, S., Nagarathna, R. and Nagendra, H. R. (1994). Breathing through a particular nostril can alter metabolism and autonomic activities. *Indian Journal of Physiology and Pharmacology*, 38 (2), pp. 133-137.
- Tooley, G. A., Armstrong, S. M., Norman, T. R. and Sali, A. (2000). Acute increases in night-time plasma melatonin levels following a period of meditation. *Biological Psychology*, 53 (1), pp. 69-78.
- Trakroo, M. and Bhavanani, A. B. (2016). Physiological Benefits of Yogic Practices: a Brief Review. *International Journal of Traditional and Complementary Medicine*, 1(1), pp. 0031-0043.
- Tran, M. D., Holly, R. G., Lashbrook, J. and Amsterdam, E. A. (2001). Effects of hatha yoga practice on the health-related aspects of physical fitness. *Preventive Cardiology*, 4, pp. 165–170.
- Tribune News Service. (2016.) Yoga here, there everywhere-news report on International yoga day. *The Tribune*, 22, June. 2016, pp.1, 15 and 18.
- Udupa, K. N. (1976). A manual of science and philosophy of Yoga. *Journal of Research in Indian Medicine, Yoga and Homeopathy*, 2 (1), pp. 1-103.
- Udupa, K. N. and Prasad, R. C. (1985). *Stress and its management by yoga*. 2<sup>nd</sup> Revised and enlarged edition. Motilal Banarsidass, Delhi, India.
- US Department of Health and Human Services. (1996). *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA, US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Vogler, J., O'Hara, L., Gregg, J. and Burnell, F. (2011). The impact of a short-term iyengar yoga program on the health and well-being of physically inactive older adults. *International Journal of Yoga Therapy*, 21, pp. 61-72.
- Vyas, R. and Dikshit, N. (2002). Effect of meditation on respiratory system, cardiovascular system and lipid profile. *Indian Journal of Physiology and Pharmacology*, 46 (4), pp. 487-491.

- Wood, C. (1993). Mood change and perceptions of vitality: a comparison of the effects of relaxation, visualization and yoga. *Journal of the Royal Society of Medicine*, 1993; 86 (5), pp. 254-258.
- Yadav, R. K. and Das, S. (2001). Effect of yogic practice on pulmonary functions in young females. *Indian Journal of Physiology and Pharmacology*, 45 (4), pp. 493–496.
- Yadav, R. K., Ray, R. B., Vempati, R. and Bijlani, R. L. (2005). Effect of a comprehensive yoga-based lifestyle modification program on lipid peroxidation. *Indian Journal of Physiology and Pharmacology*, 49 (3), 358-362.