

A CONCEPTUAL STUDY ON SCIENTIFIC ANATOMICAL APPROACH TOWARDS YOGA AASANA

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ABSTRACT

Yoga is an art and science of healthy living which is an ancient art based on an extremely subtle science that of body, psyche and Spirit. Today yoga is very popular because of its efficacy in the management of psychosomatic disorders. Yoga improves the overall functioning of the organs and circulation of blood in the body. It acts as an efficient stress buster. It brings about a better neuromuscular coordination and also strengthens the immunity. It decreases overall work load to organ. It provides psychological well-being. Yoga enhances the endurance to face abnormal situations. Anatomy is one of the basic essential sciences of medicine that studies the structure of an organism. Yoga has the potential to heal & prevent injury. Rachana sharira describes structural aspect of body where person can understand the joints, bones, muscle, organs, positions of body and structural facts. Present article aimed to find out the answer about anatomical effect and involvement of related anatomical structures in yoga aasana.

KEYWORDS: Anatomy, Yoga aasana, Chakara, Nadi, Kosha, Posture

INTRODUCTION

Yoga is originated in India before thousands of year ago. Yoga is an essential part of today's life within India and worldwide both. Yoga is appreciated by modern treatment method and medicine specialists because yoga enhances immunity, provide disease free life and it reduces the stress of modern fast life. Yoga is a scientific method by which a person can develop his own inner power within self. In Sanskrit, yoga defines for adduction, means the method which add the soul of human from the God. Yoga is not the subject of fact but it is a spiritual, holistic and scientific

approach of ancient knowledge which interacts and enhances the mental and physical health. Yoga is for moral and spiritual development but it is also beneficial to prevent physical and mental disease, to reduce the stress by secreting some hormones e.g. Serotonin and endorphin¹. Yoga aasana also influence the physiology of important anatomical structures during procedure and steps². In this paper discussion will be done about anatomical scientific aspect of yoga and aasana and try to find the answer that how actually it works on body and mind as well. Yoga and aasana increase the immunity; provide a healthy life

by control on autonomic nervous system. This control develops after a long time practice of Yoga and aasana.

Ayurveda Review

Ayurveda Rachana sharira has typical, sacred and hidden knowledge about body its organ and function. Yoga aasana is not complete without involvement of following anatomical structures³–

(A) SHARIRA AND KOSHA³

These are sthoola sharira (gross body), annamaya kosha (physical sheath), sookshma sharira (subtle body), pranamaya kosha (vitalsheath), manomaya kosha (mental sheath), vijnanamaya kosha (intellectual sheath), karana shareer (causal body), anandamaya kosha (blissful sheath).

How yoga works on these anatomical structures–

1) Annamaya Kosha (Physical Sheath)- Affected by Physical Problems due to wrong postural habits, sedentary lifestyle rectified by Yoga aasana.

2) Pranamaya Kosha (Vital Sheath)- Affected by wrong breathing pattern rectified by Pranayama.

3) Manomaya Kosha (Mental Sheath)- Affected by Mental afflictions & occupational mental stressors. Rectified by Yama, Niyama, Dharana and Dhyana.

4) Vijnanamaya kosha (Intellectual Sheath)- Affected by work load and overstress. Rectified by Pranava Japa and Dhyana.

5) Anandamaya Kosha (Blissful Sheath)- Affected by Psychosomatic ailments. Rectified by Abhyasa and Vairagya leading to samapati (ending) state and later samadhi.

(B) CHAKRS AND NADI

According to yoga Shastra ida, pingala and shushamana naadis occupy the pranavyau

and perform all other activities of body. These naadis form six chakras which lie middle of the body from lower part of the body to head⁴ According to modern anatomy these six chakras are autonomic nervous system. Correlations of these chakras are⁵:

(1) Muladhara chakra- Muladhara (root of support) is the lowest among the chakras (wheel) and it's located at the base of the spine in between the penis and anus. It can be correlated with Pelvic plexus and coccygeum.

(2) Swadhisthan chakra- Svadhishtana (seat of vital force) chakra is the second of chakras; it's also called Jalamandala and is situated at the base of the Lingamula (genital organ orgin). It can be correlated with Hypo gastric plexus.

(3) Manipur chakra- This is the third chakra and it is called Manipura (city of gem), it is in Nabhisthana (navel region). It can be correlated with Solar plexus.

(4) Anahat chakra – This is the fourth chakra called Anahata (unbeaten ever), and is in the Center of vayumandal (Place of Air). It can be correlated with Hypogastric plexus or Cardiac plexus.

(5) Vishuddha chakra- This is the fifth chakra called visuddha Chakra (divine place) and it is situated within the sushuna nadi (spinal cord) and at the base of the throat. It is the Center of akasha tatva (ether). It can be correlated with Cervical or carotid plexus.

(1) Aagya chakra- This is the sixth chakra known as aagya chakra and it is situated within sushumna nadi (spinal cord) in between the two eyebrows and it's said as the dwelling place of our mind. It can be correlated with cavernous plexus and optic

thalamus. Sushmana is spinal cord which lies in the vertebral canal and attached with spinal nerves which are related with autonomic nervous system. Yoga will stimulate the nervous system.

(C) MUDRAS & BANDHAS

The practice of mudras is a very powerful tool of holding hands and fingers in positions to stimulate and signify the chakras and flow of pranas through the nadis. The practice is most applied during pranayama and meditation. The following mudras are listed in order of difficulty and importance-

(1) Chin Mudra and Nastrika Mudra: Beginner hand postures for practice in pranayama.

(2) Bhairavi Mudra: Balance the feminine with masculine and the Ida and Pingala nadis but must be practice for longer periods of time to feel results.

(3) Yoni Mudra: Balances ida and pingala and the hemispheres of the brain, intensifies flow of prana and develops concentration, awareness, and relaxation.

(4) Hridaya Mudra: Nourishes and enriches the heart with flow of prana from hands. Helpful with emotional instability, heart ailments and increasing awareness of breathe on the chest and anahata chakra.

(5) Uddiyana Bandha: Although the bandha is harder to enter into from a sitting position, it is practiced from a sitting meditative position such as vajrasana so as not to aggravate and create tension in the neck or heart. This is a very powerful tool to strengthen abdominal organs and the breathing system but it can put stress on the heart and should be practiced slowly and carefully for short amount of time.

(D) KRIYAS

Kriyas are cleansing techniques to purify the body and mind to continue clearing out the pathways called nadis and keeping the chakras engaged⁶. The advanced techniques are difficult on the body and include a healing crisis of sorts and lots of internal reflection because all toxins are eliminated from the body. This technique is a variation of uddiyana bandha and will continue to stimulate the nervous system and improve digestive system. This also helps greatly with depression and feelings of lethargy which most of the patients will have.

Anatomical Effect of Some Aasana^{7,8,9}

1) PADANGUSTHASANA (Big toe Stretch): Works all muscles of the body for a head to toe stretch. This aasana helps to lower blood pressure and lower heart rate in the most effective way so we will be repeating it through the sequence.

2) VAJRASANA (Diamond Shape): Strengthens digestive problems, very energizing and makes line of body and legs feel lighter. The vajra-aasana is a versatile posture well suited for meditation; rest in between other seated postures, or as an aid to digestion. The vajra-aasana is the position in various other yoga postures such as the anjaneya-aasana (salutation posture) and the ushtra-aasana (the camel).

3) ANJANEYASANA (Crescent Moon Or Low Lunge): Start from vajrasana and do a variation of keeping the hands on the bent knee and gaze forward so as not to strain the neck. Creates balance and mind, body, breath awareness. Strengthens legs, hips, quads and hamstrings. The anjaney aasana combines several postures and mudras (gestures) in a fluid, evolving flow that

combines motion, stretching and holds. It delivers great benefits for the back, arms, chest, legs and hips. Regular practice will strengthen concentration and improve balance. Perform this posture with a sense of reverence and praise.

4) **VYAGRA SWASA (Tiger Breathing):** Depending on the person's condition neck movement can be incorporated but ask the person not to push too hard. Great aasana for breath and body awareness, and releasing tension in the spine and back muscles from previous aasana.

5) **TADASANA (Stable Mountain / Wall Variation):** Creates body awareness and strengthens alignment of the spine for all standing aasana. Practice with person against the wall to eliminate curvature of the lumbar and make more comfortable and strong in the pose. Many common ailments and discomforts can be traced to poor posture. If the spine is not properly aligned or if there is tightness or stiffness in the back, the result is often an imbalance in the body. When this imbalance becomes chronic many kinds of disorders arise in the organs, glands and nervous system. Performing the tada aasana allows one to observe one's posture closely and clearly recognize those problems which get masked or ignored by day-to-day activities. As the posture is held and the breath, mind and body are quieted various effects will surface to indicate difficulties with the spine. Favoring one foot over the other, shifting back and forth, drooped shoulders, tightness in the neck and upper or lower back, and various other physiological disturbances may appear indicating the need for further yoga practice. The proper execution and continual practice

of the tada aasana along with other postures helps to re train the body to stand correctly and reverse the negative effects of poor posture. When the tada asana is performed properly and the mind is focused and free of distraction, the body is experienced as being rooted firmly to the earth and as steady and motionless as a mountain.

6) **SURYA NAMASKARA (Sun Salutation):** Active meditation to bring awareness to mind, body and breath. Energizes the body, works all parts of the body, flexibility, and lung capacity. Most importantly it reduces stress and balances the ida and pingala nadis to alleviate symptoms such as hypertension¹⁰. Start with 6 rounds of both sides. Continue increasing rounds of as the student becomes stronger.

7) **VRIKSHASANA (Tree):** Work with a variation of placing the foot below knee if needed or holding the foot in place. Great pose for concentration and to strengthen the physical body and the nervous system. To keep the neck tension free place hands at center of chest in Namaskar Mudra.

8) **GARUDASANA (Eagle):** Work with a beginner variation of keeping both feet on Ground and elbows crossed but on top of each other while holding shoulders with hands if necessary. This aasana will improve concentration and create lightness in the body while gaining strength in legs and shoulders. The Garuda aasana will strengthen the legs, knees and ankles. It stretches and tones muscles of the leg and can help relieve cramps of the legs.

9) **TRIKONASANA (Triangle Classical):** Strengthens the back and reduces pain to a lot of areas of the upper body but most importantly it creates lightness and

freshness. Arms will feel lighter and stronger which will keep person from feeling the symptoms of muscle weakness and from giving up emotionally. Trikon aasana aids all abdominal organs without turning of the neck, which can be hard for some. The trikon aasana is an excellent posture to do early in routine. The forward bending and lifting stimulates blood flow and helps to stretch and relax the back, shoulders, legs and arms as well as increases the flow of blood to the head. The muscles of the thighs and calves as well as the hamstrings are stretched¹¹. The slight twist of the spine creates suppleness in the spinal discs and relieves lower back discomforts. The posture can be held longer by breathing gently through the nostrils rather than holding the breath. Another variation is to perform the trikon aasana rapidly thereby giving it a slightly aerobic effect.

10) PARSHVOTTANASANA (Side Intense Stretch): Great pose to work abdominal organs and increase flexibility in hamstrings and hips while keeping the body from inverting all the way down. This aasana is especially useful because it helps with high blood pressure and heart problems.

11) VIRABHADRASANA (A Warrior): At this point the person has practiced repeatedly anjaney aasana and has done some stretches on the ankles/hips to prepare virabhadra aasana. If any tension persists continue with anjaneya aasana to build more confidence. Variations can be used and make sure person does not tense the neck by looking too far up. This aasana creates a presence of physical strength increasing courage and determination. Increased focus allows person to hold the pose for longer.

12) ADHO MUKHA VIRASANA (Downward facing hero): This pose creates coolness, calmness, rest, and soothes the nervous system. It will quiet the mind, elongate breath, reduce high blood pressure, aid in headache relief, help with menstrual pain and stretch the spine while massaging the abdominal organs. The vira aasana is an alternative to the padma aasana, siddha-aasana, as well as other seated postures, for mediation and pranayama.

13) BHUJANGASANA (Cobra Breathing): This aasana is beneficial to breathing awareness and coordination as well as helps with menstruation disorders and problems with pancreas, spleen and liver. Great gentle back bend without over stimulating the thyroid gland from being upside down or tilting neck back.

14) DHANURASANA (Bow Variation): Perform a variation of the aasana by lifting the legs off the ground but not upper body. This will ensure there is no tension in the neck. Aasana will strengthen abdominals, relieve any digestive problems and help with gastro intestinal problems. Also improves circulation to the pelvic region for improved menstruation. The most obvious benefit of the dhanura aasana is that it restores flexibility to the spine. Regular practice will relieve lower back pain and release tension and strain in the upper back and neck area. The alternating stretching and releasing of the abdominal muscles increases blood flow to this area and aids all sorts of digestive disorders and discomforts. Strain or fatigue in the legs is also released after a few repetitions. Extended practice will help develop upper-body strength.

15) SUPTA VIRASANA (Lying down hero): Will relax the person after the exertion of previous aasana while working all the digestive organs and increasing breathing capacity. This aasana is helpful for high blood pressure, headache and insomnia. It is a gentle back bend that stretched the psoas muscle. A variation of ardhaveera aasana is available to most.

16) DANDASANA (Staff/Rod): This aasana improves circulation to the pelvic region for reproductive organs, helps to calm the mind and create body awareness, strengthens the trunk and creates length in spine and works the digestive system.

17) PASCHIMOTTANASANA (Intense Stretch): This aasana will stretch out the spine after backbends and is excellent in improving high blood pressure and heart problems. But the focus must be not to get your neck down. Otherwise this aasana will calm the student and relax them after standing aasana and backbends.

18) BADDHAKONA AASANA (Caught Angle): Straight spine lifted up variation without bending forward. Regular practice of the baddhakona aasana stretches the knees and stimulates circulation in the legs. It should be practiced frequently until one is comfortable sitting in the padma aasana. The main areas of the body that are stimulated, besides the legs, are the stomach, pelvis and lower back. It is said to keep the kidneys, prostate and bladder healthy. The baddhakona aasana is one of the few postures that can be practiced comfortably soon after eating.

19) GOMUKHASANA (Cow face): Improves circulation to the pelvic region for problems with menstruation. A subtle twist

will also work on digestion and compression of the abdominal organs while increasing body and breathe awareness. Hold ankles with hands variation will prevent straining the neck. This posture stretches the arms, upper back, chest and the sides of the chest and abdomen. As the shoulder blades are stretched backward the lungs are expanded and as the abdominal muscles are lifted the stomach is toned. It helps to relieve neck strain, backache and tight shoulders. The hands, fingers and wrists are strengthened.

20) URDHVA PRASARITA PADASANA (Supine leg rising): Improves heart and head circulation. This asana strengthens pelvic region to help menstruation. This aasana is truly beneficial for heart conditions such as heart disease.

21) JATHARA PARIVARTANASANA (Stomach Turn): This is a nice gentle abdominal twist to stretch the spine, upper back and abdominal organs while keeping your neck free.

22) ANANDA BALASANA (Happy Baby): Good stretch for hips and your back. This aasana relieves remaining tension, stress and fatigue to prepare for the most important asana, savaasana.

23) SHAVASANA (Corpse): Remind person to let breath happen naturally and relax and pay attention to their body. Shavaasana for hyperthyroidism therapy should take anywhere between 15-25 minutes. While many consider this a simple posture at first, its simplicity eventually proves to be deceiving. Not only should the body be motionless and at ease, but the mind as well should be quiet, like the surface of a still lake. The result will be a deep and stable relaxation that will extend into your

meditation or be felt through the activities of daily circumstances. It goes without saying that the shava aasana will take some time to perfect. We will find the simple exercise of focusing our attention on each part of our body and consciously directing the breath there to be a great help with this posture. There are two common obstacles that can prevent us from fully benefitting from this posture: sleepiness and a restless mind. If our mind is restless or wondering focus our attention on all of the bodily sensations we are experiencing. Bring our mind to the sensation of the floor beneath you or on the rhythm of our breath. While practicing Yoga aasana routine we should always begin and end each session with the sava aasana.

24) **ARDHA MATSYENDRAASANA** – (The Half Spinal Twist Pose) The half spinal twist is one of the best yoga postures for cultivating flexibility and strength in the spine. It smoothes stiff necks and upper back tension caused by stress, poor posture, or prolonged periods of sitting in one position. The alternating compression and release of the abdominal region flushes this area with blood and massages the internal organs. Muscles of the stomach and hips are also toned from repeated practice of the half spinal twist.

26) **HALA ASANA** – (The Plow pose) the benefits of this posture, like the sarvanga aasana, are numerous. All of the muscles and ligaments in the calves and thighs are stretched resulting in greater leg flexibility. People suffering from leg cramps will find great relief from the hala aasana. Since the abdominal area is contracted, blood compressed out of this area releases toxins and when the contraction is released the area

is flooded with richly oxygenated blood. The contraction also helps to relieve gas and stimulates a sluggish digestive system. Similar effects take place effecting the throat, thyroid, hyperthyroid and lungs. Upper and lower back pain or as the neck and chest area is compress discomfort is relieved due to the forward stretching of the spine. It is highly recommended that this posture be accompanied by the sarvanga aasana. In fact, many of the benefits of the sarvanga aasana apply to the hala aasana as well with the added benefits detailed above. The hala aasana is an excellent morning posture although some might find it more difficult then. During sleep the spine can become somewhat compressed resulting in the experience of tightness or stiffness in the back. A few repetitions of the halaasana will quickly restore flexibility to the spine as well as promote alertness.

Modern Review

(a) BIOCHEMICAL EFFECTS

Yoga helps to decrease the level of glucose, sodium, cholesterol, triglycerides. It will increase HDL cholesterol but will decrease the LDL & VLDL cholesterol¹². Catecholamine decreases but haematocrit increases. Haemoglobin increases, lymphocyte count increases, total white blood cell count decreases. It will increase the thyroxin, vitamin-C, and total serum protein.

(b) PSYCHOLOGICAL EFFECTS

Yoga will increase somatic & kinetic awareness, social adjustment, self-acceptance; self-actualization. It will improve mood and subjective well-being, it will decrease anxiety and depression and hostility¹³.

(c) PHYSIOLOGICAL EFFECTS

Yoga Stable ANS with a tendency towards PNS dominance, pulse rate & Respiratory rate and Galvanic Skin Response (GSR), EEG - alpha waves, Cardiovascular efficiency, Musculoskeletal flexibility & joint range of motion, immunity, endurance, energy level increase¹⁴. EMG activity, blood pressure and pain decrease, gastrointestinal and endocrine function normalizes.

(d) EFFECT OF MEDITATION

Meditation and Mindfulness calms amygdale, an area of the brain associated with the fear response that is a factor in anxiety and stress disorders¹⁵. Meditation helps in balancing neurotransmitters. e.g increase in Serotonin (Mood Elevating Neurotransmitter). A study on brain scan of Buddhists practicing meditation regularly indicated a heightened activity in left prefrontal lobe of the brain - an area associated with positive emotions, self-control and calm temperament¹⁶.

(e) EFFECT OF PRANAYAMA

The Oxygen intake is reduced to less than one fourth in Pranayamic breathing compared to Normal Breathing. The diffusion gradient of various gases is not much affected during the phase of kumbhaka. The free acid radical content in the blood reduces because of reduced oxidation process. Better neuro-endocrinal coordination is established. Studies on nostril dominance have confirmed the effect of regulated breathing on specific areas of the brain. Pranayama reduce the secretions of Stress hormones and decrease in Basal Metabolic Rate¹⁷. It also cause control on autonomic nervous system and respiration process.

DISCUSSION

The ancient yogis held the view that we actually possess three bodies: physical, astral, and causal. From this perspective, yoga anatomy is the study of the subtle currents of energy that move through the layers, or “sheaths,” of those three bodies. The purpose of this work is to neither support nor refute this view. The reason for this mutually illuminating relationship between yoga and anatomy is simple: The deepest principles of yoga are based on a subtle and profound appreciation of how the human system is constructed. The subject of the study of yoga is the self, and the self is dwelling in a physical body. There is an important role of endocrine, exocrine gland, organs, muscle, ligament, joints, circulatory system and nervous system in yoga asana. During yoga, asana, mudra, and bandha there will be involvement of above structures. Posture will influence and stimulate hormone secretion that will maintain the homeostasis of body.

CONCLUSION

Regular practice of yoga and asana and pranayama with patience and belief will result as proper and pure blood supply to heart, lungs, liver, pancreas, kidney, intestine, ligaments, muscles, tissues, and glands of human body. It also enhances the digestive capacity and control power on sense organs and consciousness. Ultimately yoga and asana will give vitality, power and along, disease stress free healthy life. A key element that distinguishes yoga practice from gymnastics or calisthenics is the intentional integration of breath, posture, and movement. Anatomical structures are involved during breath as lungs, muscles,

ligaments during posture and bones, joints, ligaments, tendon and muscles during movement. Anatomical structures and their functions are behind the scientific benefit of yoga and asana.

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