

Review Article

Role of Yoga in Preventing and Controlling of Diabetes Mellitus

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A B S T R A C T

Diabetes in Greek means siphon (passing water); Mellitus in Latin means honey (sweet). It is a metabolic syndrome, clinically characterized by polyuria, polyphagia, polydipsia, hyperglycaemias and glycosuria, due to absolute or relative deficiency of the hormone insulin (either by action or by secretion or both), that controls the metabolism of carbohydrate, protein, fat and electrolytes. Yoga is that aids in dipping stress levels of the body. Stress is the key motive for diabetes and by controlling stress. Diabetes can be brought under regulator and benefits in better blood supply to the body that is obligatory for the appropriate functioning of body organs, asana like the surya namaskar forward and backward bend warped poses and inversions can massage the pancreas and endocrine system to arouse insulin secretion. They also decrease the general waist circumference that can have an optimistic effect in regulatory high blood sugars.

Keywords: Diabetes, Metabolic Syndrome, Yoga

Introduction

Diabetes in Greek means siphon (passing water); Mellitus in Latin means honey (sweet). It is a metabolic syndrome, clinically characterized by polyuria, polyphagia, polydipsia, hyperglycaemias and glycosuria, due to absolute or relative deficiency of the hormone insulin (either by action or by secretion or both), that controls the metabolism of carbohydrate, protein, fat and electrolytes. Acute metabolic decompensation leads to immediate death. whereas chronic metabolic decompensating results in damage or dysfunction, ultimately failure of various organs especially brain, eyes, kidneys, nerves, heart and blood vessels resulting in complications like encephalopathy, retinopathy, nephropathy, neuropathy, coronary artery disease, intercurrent infections, etc. leading to irreversible disability and death.¹

Classification of Diabetes Mellitus²

Primary Type 1: Insulin Dependent Diabetes Mellitus (IDDM).

Type 2: Noninsulin dependent diabetes mellitus (NIDDM) (As per the International Expert Committee, the terms IDDM and NIDDM are eliminated).

Table 1. Differences between DM 1 and DM 2

Type 1 DM	Type 2 DM
These are insulin dependent diabetes mellitus (IDDM) (i.e. Absolute deficiency of insulin)	These are noninsulin dependent diabetes mellitus (NIDDM) (Partial or relative deficiency of insulin)
These are called 'Juvenile type' of DM	These are called 'maturity onset'
It is common among young people below 30 years of age	It is common among people above 30 years of age
It is sudden in onset	It is gradually onset
Patients are usually thin built	Patients are usually obese

Obesity is not a 'risk-factor'	Obesity is the risk factor
It is associated with other autoimmune diseases	It is not associated with autoimmune diseases
Acute metabolic decompensation leads to sudden death	Chronic metabolic decompensation leads to complications
Complications are likely to occur suddenly and are fatal	Complications occur slowly resulting in irreversible disability and death
It is not associated with obesity and under activity	It is associated with obesity and under activity
It is common among men	It is common in women
Family history is usually absent	Family history is present

Secondary: Pancreatic Pathology Congenital, Cystic fibrosis Inflammatory, Pancreatitis. Neoplastic, Tumors of pancreas. Surgery, Pancreatectomy. Others, Hemochromatosis, trauma, autoimmunity (Genetic defects.) Excessive production of hormones antagonistic to insulin (called insulin antagonists) such as: Catecholamine in pheochromocytoma Growth hormones in acromegaly Glucagon in glucagonoma Glucocorticoid in Cushing's syndrome Thyroid hormones in hyperthyroidism Placental lactogen in pregnancy (gestational diabetes) Long-term use of drugs like: Corticosteroids Thiazide diuretic Phenytoin Oral contraceptives.

Yogasanas in Diabetes Mellitus

Tadasana (Palm Tree Pose)³

Viewpoint with the organized feet or about 10 cm apart. Arms at your sides. Stable the body and dispense the weight equally on both feet. Increase the arms over the head. Interconnect the fingers and fit the palms upward. Dwelling the hands on topmost of the head. Hit the eyes at a point on the wall somewhat above the level of the head. The eyes should endure fixed on motioned point throughout the practice. Inhale and elasticity the arms, shoulders and chest upward. Elevation the heels coming up onto the toes.

Expanses the entire body from top to bottom, without mislaying balance or moving the feet. Clench the breath and the position for a few seconds. At first, it may be problematic to preserve balance but with practice it becomes calmer. Lesser the heels while breathing out and bring the hands to the topmost of the head.

This is unique round. Reduce for a few seconds before accomplishment the next round. Perform 5 to 10 rounds.

Breathing

The breath should be harmonised with the hovering and dropping of the arms.

Benefits

This asana progresses physical and mental balance. The complete spine is overextended and slackened, assisting to clear up congestion of the spinal nerves at the facts where they arise from the spinal column. Tadasana springs the rectus abdominal muscles and the intestines and is valuable during the first six months of pregnancy to retain the abdominal muscles and nerves toned.

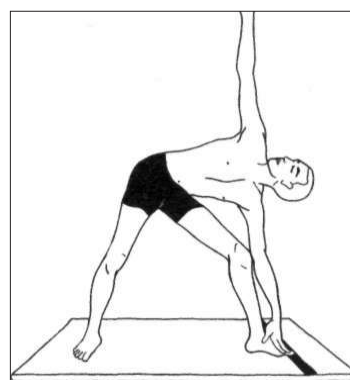


Figure 1

Trikonasana⁴

Stand vertical with the feet about a meter apart. Fit the right foot to the right side. Bounce the arms sideways and elevation them to shoulder level so that they are in one orthodox line. Curve to the right, taking care not to bring the body forward. Concurrently, bend the right knee somewhat. Place the right hand on the right foot, charge the two arms in line with each other. Turn the left palm forward. Look up at the left hand in the last position. Return to the standing position with the arms in a straight line. Recurrence on the conflicting side, bending the left knee marginally. This finishes one round. Practise 5 rounds.

Breathing

Inhale while hovering the arms. Exhale while winding. Hold the breath for a few seconds in the concluding position. Inhale while floating the body to the vertical position.

Practice Note

When this asana can be achieved easily, recap the practice keeping both legs straight.

Contraindications

This asana should not be accomplished by those anguished from back conditions.

Benefits

This series may be achieved every day for a few weeks to

tone the complete body. It moves the muscles on the sides of the trunk, the waist and the back of the legs. It arouses the nervous system and lessens nervous depression. It advances digestion, stimulating the appetite, triggering intestinal peristalsis and lightening constipation. It also reinforces the pelvic area and tones the reproductive organs. Steady practice will aid decrease waistline fat.

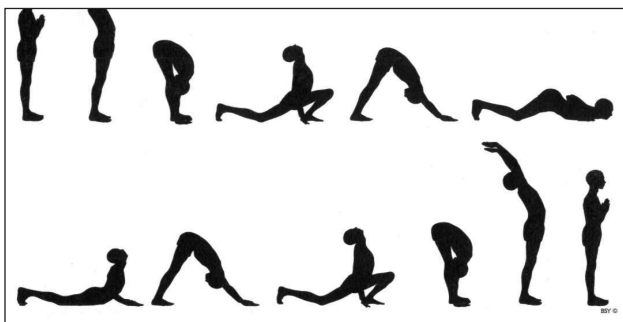


Figure 2

Suryanamaskara⁵

- Pranamasana
- Hasta Utthanasana (raised arms pose)
- Padahasthasana (hand to foot pose)
- Ashwa Sanchalanasana (equestrian pose)
- Parvatasana (mountain pose)
- Ashtanga Namaskara (salute with eight parts or points)
- Bhujangasana (cobra pose)
- Ashwa Sanchalanasana (equestrian pose)
- Padahasthasana (hand to foot pose)
- Hasta Utthanasana (raised arms pose)
- Pranamasana (prayer pose)

Padmasana⁶

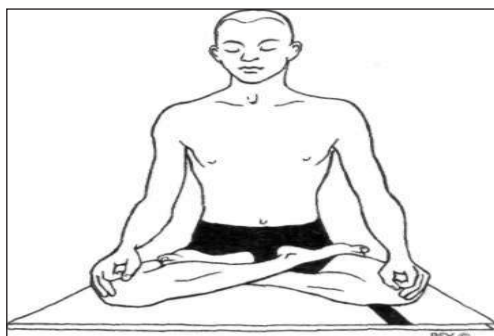


Figure 3

Padmasana (Lotus Pose)

Sit with the legs conservative in front of the body. Slowly and prudently bend one leg and locate the foot on top of the conflicting thigh. The sole should face upward and the heel should be adjacent to the pubic bone. When this feels relaxed, bend the other leg and place the foot on top of the reverse thigh. Both knees should, preferably, dash the ground in the final position. The head and spine should be

held standing and the shoulders unperturbed. Locate the hands on the knees in chin or jnana mudra.

Reduce the arms with the elbows somewhat bent and check that the shoulders are not elevated or hunched. Adjacent the eyes and relax the whole body. Detect the total posture of the body. Make the essential adjustments by moving forward or backward until balance and alignment are practised. Perfect arrangement specifies the accurate posture of padmasana.

Contraindications

Those who agonise from sciatica, sacral infections or weak or injured knees should not do this asana. This asana should not be endeavoured until give of the knees has been advanced through practice of the pre-meditation asanas.

Benefits

Padmasana permits the body to be held totally steady for long periods of time. It grips the trunk and head like a pillar with the legs as the secure foundation. As the body is stabilised the mind becomes calm. This steadiness and calmness is the leading step towards real meditation.

Padmasana guides the flow of prana from mooladhara chakra in the perineum, to sahasrara chakra in the head and amplifying the experience of meditation.

This posture smears pressure to the lower spine which has a calming effect on the nervous system. The breath becomes slow, muscular tension is reduced and blood pressure is condensed. The coccygeal and sacral nerves are toned as the usually large blood flow to the legs is forwarded to the abdominal region. This activity also encourages the digestive process.



Figure 4

Vajrasana (Thunderbolt Pose)⁷

Stoop on the floor. Carry the big toes together and discrete

the heels. Lower the buttocks onto the inside shallow of the feet with the heels moving the sides of the hips.

Place the hands on the knees, palms down. The back and head should be straight but not tense. Evade extreme backward arching of the spine. Adjacent the eyes, relax the arms and the entire body. Breathe generally and fix the consideration on the flow of air passing in and out of the nostrils.

Duration

Perform vajrasana as much as possible, particularly directly after meals, for at least 5 minutes to augment the digestive function. In cases of acute digestive ailment, sit in vajrasana and follow abdominal breathing for 100 breaths before and after food.

Benefits

Vajrasana changes the flow of blood and nervous impulses in the pelvic region and strengthens the pelvic muscles. It is a preventative portion against hernia and also aids to relieve piles. It surges the efficiency of the whole digestive system, relieving stomach diseases such as hyperacidity and peptic ulcer. It lessens the blood flow to the genitals and massages the nerve fibres which feed them, making it convenient in the treatment of dilated testicles and hydrocele in men. It supports women in labour and aids alleviate menstrual disorders.

Vajrasana is a very imperative meditation posture because the body becomes upright and straight with no energy. It is the top meditation asana for people suffering from sciatica and sacral infections. It rouses the vajra nadi, activates prana in sushumna and redirects sexual energy to the brain for spiritual drives.

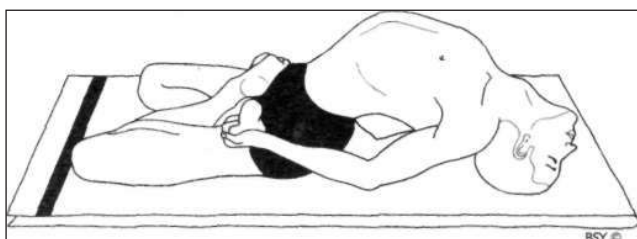


Figure 5

Matsyasana (Fish Pose)

Sit in padmasana and relax the whole body. Prudently bend backward, auxiliary the body with the arms and elbows. Lift the chest somewhat, take the head back and lower the crown of the head to the floor. Clasp the big toes and respite the elbows on the floor. Regulate the position of the head so that the extreme arch of the back is reached. Relax the arms and the complete body, letting the head, buttocks and legs to backing the weight of the body. Adjacent the eyes and breathe gradually and intensely. Return to the

preliminary position, reversing the order of movements. Replication the asana, with the legs crossed the other way.

Duration

The concluding position may be held for up to 5 minutes though 1 to 3 minutes is adequate for general health.

Breathing

Breathe intensely and sluggishly in the final position.

Contraindications

People who agonize from heart disease, peptic ulcers, hernia, back conditions or any grave illness should not perform this asana. Pregnant women should also not effort it.

Benefits

This asana springs the intestines and abdominal organs and is valuable for all the abdominal illnesses. To eliminate constipation, drink 3 glasses of water and then achieve this asana. It also dismisses inflamed and bleeding piles.

This repetition is very decent for asthma and bronchitis as it inspires deep respiration. It recirculates stagnant blood in the back, easing backache and cervical spondylitis. It controls the function of the thyroid gland and inspires the thymus gland, boosting the immune system.

Bhujangasana (Cobra Pose)⁹

Lie flat on the stomach with the legs orthodox, feet organized and the soles of the feet topmost. Locate the palms of the hands flat on the floor, beneath and somewhat to the side of the shoulders.

The fingers should be together and pointing forward. The arms should be situated so that the elbows point backward and are adjacent to the sides of the body. Respite the forehead on the floor and handy the eyes. Relax the complete body, particularly the lower back.

Gradually increase the head, neck and shoulders. Straightening the elbows, elevation the trunk as high as possible. Use the back muscles more than the arm muscles.

Be conscious of using the back muscles first while preliminary to raise the trunk. Then use the arm muscles to advance the trunk further and arch the back. Mildly tilt the head backward, so that the chin points forward and the back of the neck is flattened.

In the final position, the pubic bone remains in contact with the floor and the navel is raised a maximum of 3 cm. If the navel is raised too high, the bend tends to be in the knees and not in the back. The arms may or may not be straight; this will depend on the flexibility of the back. Hold the final position.

To arrival to the starting position, gradually bring the head

forward, release the upper back by twisting the arms, lower the navel, chest, shoulders and lastly the forehead to the floor. Relax the lower back muscles. This is one round.

Benefits

This asana can relocate slipped disc, remove backache and keep the spine supple and healthy. A stiff spine affects with all nervous impulses sent from the brain to the body and vice versa. By arching the spine, refining circulation in the back region and toning the nerves, improved communication between the brain and body results. This asana tones the ovaries and uterus, and aids lessen menstrual and other gynaecological ailments. It stimulates the appetite, alleviates constipation and is useful for all the abdominal organs, particularly the liver and kidneys. The adrenal glands, located on top of the kidneys, are also massaged and stimulated to effort more competently. The secretion of cortisone is preserved and the thyroid gland is controlled. On a pranic level, Bhujangasana has a robust effect on all the organs connected to swadhisthana, manipura, anahata and vishuddhi chakras.

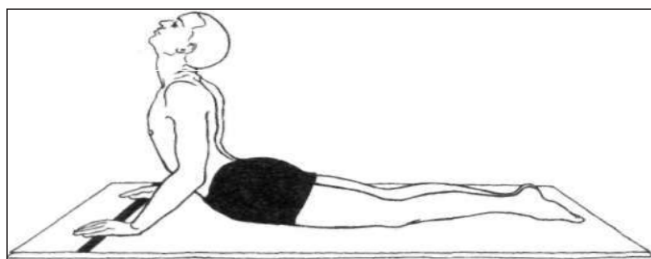


Figure 6

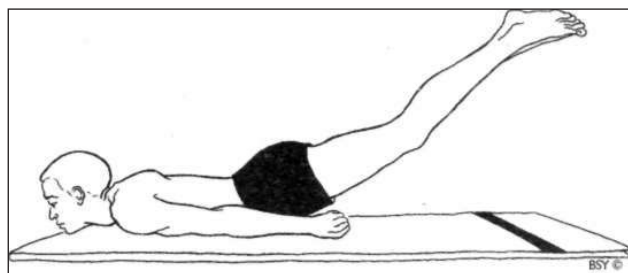


Figure 7

Shalabhasana (Locust Pose)¹⁰

Lie flat on the stomach with the legs and feet together and the soles of the feet upmost.

The arms may be positioned either under the body or by the verges, with the palms downward or the hands flattened. Stretch the chin somewhat forward and disruption it on the floor throughout the exercise.

Adjacent the eyes and relax the body. This is the preliminary position. Gradually raise the legs as high as possible, keeping them straight and together. The altitude of the legs is shaped by applying pressure with the arms against the floor and astringent the lower back muscles. Clasp the final

position for as long as is relaxed without strain. Leisurely lower the legs to the floor. This is one round. Reoccurrence to the starting position and lower the body with the head turned to one side. Permit the respiration and heartbeat to return to normal.

Breathing

Inhale intensely in the starting position. Recollect the breath inside while rising the legs and holding the position. Exhale while dropping the legs. Beginners may find it cooperative to inhale while raising the legs. Advanced practitioners may exhale after recurring to the starting position.

Duration

Up to 5 rounds when achieved dynamically. Up to 3 rounds when accomplished statically.

Contraindications

Shalabhasana needs a great deal of physical exertion, so it should not be experienced by people with a weak heart, coronary thrombosis or high blood pressure. Those anguish from peptic ulcer, hernia, intestinal tuberculosis and other such circumstances are also recommended not to practise this asana.

Benefits

The parasympathetic nerves are mainly protuberant in the regions of the neck and pelvis. Shalabhasana rouses the whole autonomic nervous system, exclusively the parasympathetic outflow. It reinforces the lower back and pelvic organs, and tones the sciatic nerves, providing respite for those with situations such as backache, mild sciatica and slipped disc as long as the condition is not grave. It tones and balances the working of the liver and other abdominal organs, assuages diseases of the stomach and bowels, and fuels the appetite.

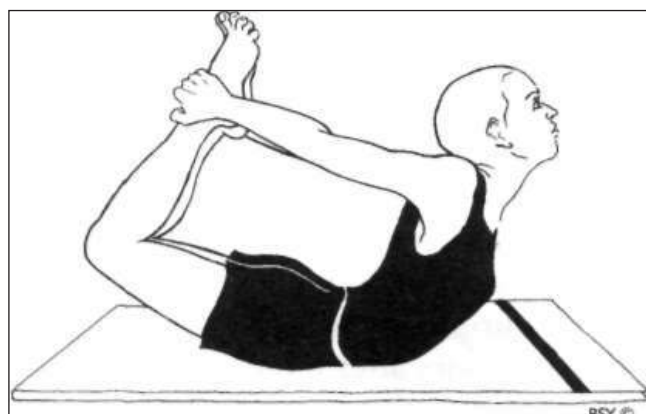


Figure 8

Dhanurasana (Bow Pose)¹¹

Lie flat on the stomach with the legs and feet together, and the arms and hands alongside the body. Bend the knees

and carry the heels adjacent to the buttocks. Clasp the hands around the ankles. Locate the chin on the floor. This is the opening position. Tense the leg muscles and push the feet away from the body. Arch the back, elating the thighs, chest and head together. Retain the arms straight. In the concluding position, the head is tilted back and the abdomen ropes the complete body on the floor. The only muscular contraction is in the legs; the back and arms endure relaxed. Hold the final position for as long as is contented and then, gradually relaxing the leg muscles, lower the legs, chest and head to the preparatory position. Release the pose and relax in the prone location until the respiration yields to normal. This is one round.

Contraindications

People who suffer from a weak heart, high blood pressure, hernia, colitis, peptic or duodenal ulcers should not effort this practice. This asana should not be experienced before sleep at night as it excites the adrenal glands and the sympathetic nervous system.

Benefits

The complete alimentary canal is overhauled by this asana. The liver, abdominal organs and muscles are fiddled. The pancreas and adrenal glands are toned, harmonizing their secretions. The kidneys are massaged and excess weight is abridged around the abdominal area. This leads to enhanced functioning of the digestive, eliminative and reproductive organs and aids to eradicate gastrointestinal disorders, dyspepsia, chronic constipation and sluggishness of the liver.



Figure 9

Gomukhasana (Cow's Face Pose)¹²

Sit in dhyana veerasana so that the right knee is unswervingly above the left knee. Locate the left arm behind the back and the right arm over the right shoulder. The back of the left hand should fib in contact with the spine, while the palm of the right-hand rests in contradiction of the spine. Try to clasp the fingers of both hands behind the back. Bring the raised elbow behind the head so that the head presses

against the inside of the raised arm. The spine should be vertical and the head back. Adjacent the eyes. Stay in this position for up to 2 minutes. Unfasten the hands, straighten the legs and repeat with the left knee topmost and the left arm over the left shoulder.

Benefits

Gomukhasana is an excellent asana for persuading relaxation. If accomplished for 10 minutes or more, it will ease tiredness, tension and anxiety. It excites the kidneys and alleviates mature onset diabetes. It releases backache, sciatica, rheumatism and general stiffness in the shoulders and neck, and recovers posture by opening the chest area. It assuages cramp in the legs and makes the leg muscles supple.

Paschimottasana (Back Stretching Pose)¹³

Sit on the floor with the legs extended, feet together and hands on the knees. This is the preliminary position. Relax the entire body. Gradually bend forward from the hips, sliding the hands down the legs. Try to grip the big toes with the fingers and thumbs. If this is unbearable, hold the heels, ankles or any part of the legs that can be grasped securely. Move leisurely without forcing or jerking. Hold the position for a few seconds. Relax the back and leg muscles permitting them to gently stretch.

Keeping the legs straight and exploiting the arm muscles, not the back muscles, commence to bend the elbows and mildly bring the trunk down towards the legs, continuing a firm grip on the toes, feet or legs. Try to trace the knees with the forehead. Do not strain. This is the concluding position. Hold the position for as long as is relaxed and relax. Gradually return to the preliminary position. This is one round.

Contraindications

People who suffer from slipped disc or sciatica should not perform Paschimottasana.

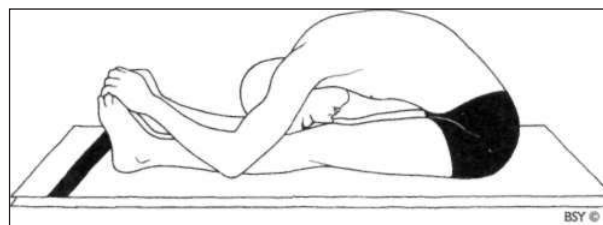


Figure 10

Benefits

This asana stretches the hamstring muscles and upsurges flexibility in the hip joints. It tones and massages the complete abdominal and pelvic region counting the liver, pancreas, spleen, kidneys and adrenal glands. It eliminates excess weight in this area and aids ease disorders of the

uro-genital system. It rouses circulation to the nerves and muscles of the spine. It is used in yoga therapy for the management of prolapse, menstrual disorders, sluggish liver, diabetes, colitis, kidney complaints, bronchitis and eosinophilia.

Ardha Matsyendrasana (Half Spinal Twist)¹⁴

Sit with the legs strained out in front of the body. Bend the right leg and place the right foot flat on the floor on the exterior of the left knee. The toes of the right foot should face forward. Bend the left leg and bring the foot about to the right buttock. The external edge of the foot should be in interaction with the floor. Pass the left arm through the space between the chest and the right knee, and locate it against the outside of the right leg. Hold the right foot or ankle with the left hand, so that the right knee is adjacent to the left armpit. Sit up as orthodox as possible. Increase the right arm in front of the body and gaze at the fingertips. Gradually twist to the right, concurrently moving the arm, trunk and head. Use the left arm as a lever against the right leg to twist the trunk as far as likely without using the back muscles. Follow the tips of the fingers of the right hand with the gaze and look over the right shoulder. Do not tension the back. Bend the right elbow and locate the arm around the back of the waist. The back of the right hand should shawl around the left side of the waist. Otherwise, it can be located as high as possible between the shoulder blades with the fingers pointing up. This arm location imposes the straightness of the spine. Opposite the movements to come out of the posture and recurrence on the other side.

Contraindications

Women more than two or three months pregnant should evade this exercise. People suffering from peptic ulcer, hernia or hyperthyroidism should only perform this pose under expert guidance. People with sciatica or slipped disc may profit from this asana, but great care should be taken.

Benefits

This asana concurrently springs the muscles on one side of the back and abdomen while constricting the muscles on the other side. It tones the nerves of the spine, makes the back muscles supple, dismisses lumbago and muscular spasms, and lessens the tendency of adjoining vertebrae to progress osteophytes. When experienced with care, it has showed helpful for mild cases of slipped disc. Ardha Matsyendrasana massages the abdominal organs, easing digestive ailments. It controls the secretion of adrenaline and bile and is suggested in the yogic management of diabetes. Under special guidance, it is used for the yogic management of sinusitis, hay fever, bronchitis, constipation, colitis, menstrual disorders, urinary tract ailments and cervical spondylitis, as long as it can be achieved without any discomfort.

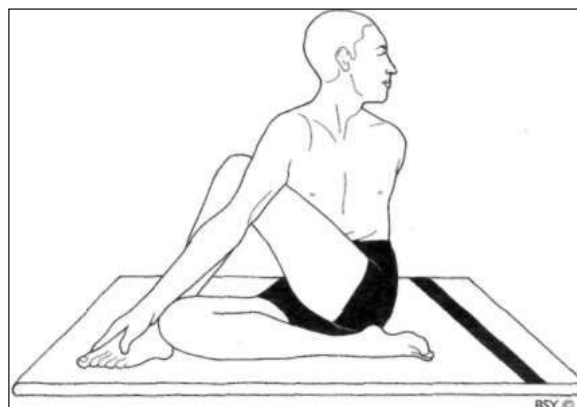


Figure 11

Sarvangasana (Shoulder Stand Pose)¹⁵

Lie on the back on a folded blanket. Check that the head and spine are united and that the legs are orthodox with the feet together. Locate the hands beside the body with the palms facing down. Relax the entire body and mind. Contract the abdominal muscles and, with the support of the arms, gradually increase the legs to the vertical position, keeping them straight. When the legs are perpendicular, press the arms and hands down on the floor. Gradually and effortlessly roll the buttocks and spine off the floor, hovering the trunk to a vertical position. Turn the palms of the hands upward, bend the elbows and locate the hands behind the ribcage, somewhat away from the spine, to support the back. The elbows should be about shoulder width apart. Mildly push the chest forward so that it presses inflexibly against the chin. In the concluding position, the legs are vertical, together and in a straight line with the trunk. The body is supported by the shoulders, nape of the neck and back of the head. The arms deliver stability, the chest rests against the chin and the feet are relaxed. Adjacent the eyes. Relax the whole body in the concluding pose for as long as is relaxed. To return to the starting position, bring the legs forward until the feet are above and behind the back of the head. Keep the legs straight.

Unhurriedly release the position of the hands and place the arms on the floor beside the body with the palms down. Steadily lower each vertebra of the spine to the floor, trailed by the buttocks, so that the legs continue their initial vertical position. Lower the legs to the floor slowly, keeping the knees straight.

Achieve this action without using the arms for support. The whole movement should combine balance with control so that the body contacts the floor leisurely and softly. Relax in shavasana until the respiration and heartbeat return to standard.

Benefits

Sarvangasana is applied in yoga therapy for the treatment of asthma, diabetes, colitis, thyroid disorders and impotence.

Naukasana¹⁶

Lie in the base position, palms down. Possess the eyes open throughout. Breathe in intensely. Hold the breath and then elevation the legs, arms, shoulders, head and trunk off the ground. The shoulders and feet should be no more than 15 cm off the floor. Equilibrium the body on the buttocks and keep the spine orthodox. The arms should be held at the similar level and in line with the toes. The hands should be open with the palms down. Look towards the toes. Continue in the final position and hold the breath. Count to 5 mentally (or for longer if possible). Breathe out and return to the supine position. Be careful not to hurt the back of the head while returning to the floor. Relax the whole body. This is one round. Perform 3 to 5 rounds. Relax in shavasana after each round, mildly pushing out the abdomen with inhalation to lessen the stomach muscles.

Benefits

This asana rouses the muscular, digestive, circulatory, nervous and hormonal systems, tones all the organs and eliminates lethargy. It is particularly useful for removing nervous tension and bringing about deep relaxation. It may be achieved before shavasana in order to reach a deeper state of relaxation. If accomplished upon waking it directly restores freshness.

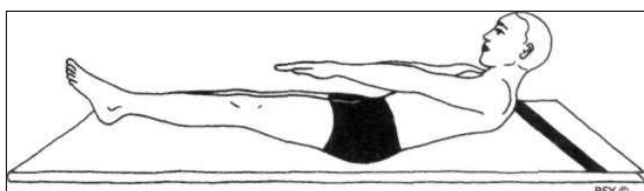


Figure 12

Discussion

The mind and body are not distinct objects although there is a propensity to think and act as though they are. The unrefined form of the mind is the body and the indirect form of the body is the mind. The rehearsal of asana integrates and harmonises the two. Both the body and the mind harbour tensions or knots. Every cerebral knot has a consistent physical, muscular knot and vice versa. The purpose of asana is to relief these knots. Asanas release mental tensions by allocating with them on the physical level, acting somato-psychically, through the body to the mind. Abdominal widening during yoga exercise roots rejuvenation/ regeneration of cells of pancreas snowballing the use and metabolism of glucose in peripheral tissues liver and adipose tissues through enzymatic process. Enhanced blood supply to the muscles and muscular relaxation along with its expansion augments insulin receptor expression causing enlarged glucose uptake and thus plummeting blood sugar.

Conclusion

Yoga supports in dipping stress levels of the body. Stress is the main reason for diabetes and by monitoring stress diabetes can be brought under control and helps in better blood supply to the body that is required for the proper functioning of body organs asanas like the surya namaskar forward and backward bend perverse poses and inversions can massage the pancreas and endocrine system to rouse insulin secretion. They also lessen the general waist circumference that can have a optimistic effect in monitoring high blood sugars.

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