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A Review on Effect of *Halasana* in Type 2 Diabetes Mellitus

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ABSTRACT:

Siddha system is one of the traditional systems of medicine in the world. It has many special branches. *Siddhar Yogam* is one among them. Yoga is the science of right living and, as such, is intended to be incorporated in daily life. It works on all aspects of the person: the physical, vital, mental, emotional, psychic and spiritual. The word yoga means 'unity' or 'oneness'. On a more practical level, yoga is a means of balancing and harmonizing the body, mind and emotions. Diabetes mellitus is a metabolic disorder characterized by high blood glucose level, associated with other manifestations. Type 2 diabetes mellitus is due to insulin resistance. So, the body is unable to use insulin. About 90% of diabetic patients have type 2 diabetes mellitus. Yoga practice is useful in the management of various lifestyle diseases, including type 2 diabetes mellitus. Psycho-neuro-endocrine and immune mechanisms are involved in the beneficial effects of yoga on diabetes. Through *Halasana* the pancreatic cells are rejuvenated and pancreatic β-cell sensitivity is increased. Improved blood supply to muscles by this Asana may enhance insulin receptor expression in the muscles, causing increased glucose uptake.

Key words: Siddha, Yoga, Type 2 Diabetes mellitus, Asana, *Halasana*.

INTRODUCTION:

Siddha system is one of the traditional systems of medicine in the world. It is mainly practiced in southern parts of India especially in Tamilnadu. It has many special branches. *Siddhar Yogam* is one among them. Many Siddhars have dealt with Yoga like, Agathiyar, Thirumoolar, Bogar, etc.

Yoga is the science of right living and, as such, is intended to be incorporated in daily life. It works on all aspects of the person: the physical, vital, mental, emotional, psychic and spiritual. The word yoga means 'unity' or 'oneness'. This unity or joining is described in spiritual terms as the union of the individual consciousness with the universal consciousness. On a more practical level, yoga is a means of balancing and harmonizing the body, mind and emotions [1].

Diabetes mellitus is a metabolic disorder characterized by high blood glucose level, associated with other manifestations. 'Diabetes' means 'polyuria' and 'mellitus' means 'honey'. Type II diabetes mellitus is due to insulin resistance. So, the body is unable to use insulin. About 90% of diabetic patients have type II diabetes mellitus. It usually occurs after 40 years [2].

Asanas emphasize the relationship of body, mind, and awareness, focusing on the synchronization of breathing and movement. They involve stretching movements and relaxation. *Halasana* massages and pressurizes the pancreas, stimulating insulin secretion and Improve blood circulation to the abdomen [3]. In patients with diabetes, pancreatic cells may be rejuvenated and pancreatic β-cell sensitivity may be increased by the alternating abdominal contractions and relaxations involved in Asanas like *Halasana*. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake [4].

TYPE 2 DIABETES MELLITUS:

Diabetes mellitus is a clinical syndrome with many causes, which is characterized by the presence of hyperglycemia. Type 2 diabetes accounts for around 90% of cases, while type 1 diabetes accounts for most of the remainder. In type 1 diabetes, there is an absolute deficiency of insulin because of an immune-mediated destruction of insulin-producing β cells in the pancreatic islets of Langerhans. In contrast, in type 2 diabetes, concentrations of circulating insulin are typically elevated, but there is a relative deficiency of insulin because there is reduced sensitivity to insulin in peripheral tissues and the β cells cannot make sufficient insulin to overcome this 'insulin resistance' [5].

RISK FACTORS FOR TYPE 2 DM [6]:

- Family history of type 2 DM
- Obesity

- Habitual physical inactivity
- Race and ethnicity (Blacks, Asians, Pacific Islanders)
- Previous identification of impaired fasting glucose or impaired glucose tolerance
- History of gestational DM or delivery of baby heavier than 4 kg
- Hypertension
- Dyslipidemia (HDL level < 35 mg/dl or triglycerides > 250 mg/dl)
- Polycystic ovary disease and acanthosis nigricans
- History of vascular disease.

PATHOGENESIS OF TYPE 2 DM [6]:

The basic metabolic defect in type 2 DM is either a delayed insulin secretion relative to glucose load (impaired insulin secretion), or the peripheral tissues are unable to respond to insulin (insulin resistance).

1. Genetic factors: Genetic component has a stronger basis for type 2 DM than type 1A DM. No definite and consistent genes have been identified.

2. Constitutional factors: Certain environmental factors such as obesity, hypertension, and level of physical activity play contributory role and modulate the phenotyping of the disease.

3. Insulin resistance: One of the most prominent metabolic features of type 2 DM is the lack of responsiveness of peripheral tissues to insulin, especially of the skeletal muscle and liver. Obesity, in particular, is strongly associated with insulin resistance and hence type 2 DM. Mechanism of hyperglycemia in these cases is explained as under:

i) Resistance to action of insulin impairs glucose utilization and hence hyperglycemia.

ii) There is increased hepatic synthesis of glucose.

iii) Hyperglycemia in obesity is related to high levels of free fatty acids and cytokines (e.g. TNF-α and adiponectin) affect peripheral tissue sensitivity to respond to insulin.

4. Impaired insulin secretion: In type 2 DM, insulin resistance and insulin secretion are interlinked:

i) Early in the course of disease, in response to insulin resistance there is compensatory increased secretion of insulin (hyperinsulinaemia) in an attempt to maintain normal blood glucose level.

ii) Eventually, however, there is failure of β-cell function to secrete adequate insulin, although there is some secretion of insulin i.e. cases of type 2 DM have mild to moderate deficiency of insulin but not its total absence.

5. Increased hepatic glucose synthesis: One of the normal roles played by insulin is to promote hepatic storage of glucose as glycogen and suppress gluconeogenesis. In type 2 DM, as a part of insulin resistance by peripheral tissues, the liver also shows insulin resistance i.e. in spite of hyperinsulinaemia in the early stage of disease, gluconeogenesis in the liver is not suppressed. This results in increased hepatic synthesis of glucose which contributes to hyperglycaemia in these cases.

MATERIALS AND METHODS:

***Halasana* (plough pose):**

Hala means a plough, the shape of which this posture resembles, hence the name [7].

Classification [8]: Inverted supine forward bend.

Steps [1]:

- Lie flat on the back with the legs and feet together. Place the arms beside the body with the palms facing down. Relax the whole body.
- Raise both legs to the vertical position, keeping them straight and together, using only the abdominal muscles.
- Press down on the arms and lift the buttocks, rolling the back away from the floor. Lower the legs over the head.
- Bring the toes towards the floor behind the head without straining, but do not force the toes to touch the floor.
- Turn the palms up, bend the elbows and place the hands behind the ribcage to support the back, as in sarvangasana.

- ❖ Relax and hold the final pose for as long as is comfortable.
- ❖ Return to the starting position by lowering the arms with the palms facing down, then gradually lower each vertebrae of the spine to the floor, followed by the buttocks, so that the legs resume their initial vertical position.
- ❖ Using the abdominal muscles, lower the legs to the starting position, keeping the knees straight.

Breathing [1]:

- Inhale while in the lying position.
- Retain the breath inside while assuming the final pose.
- Breathe slowly and deeply in the final pose.
- Retain the breath inside while returning to the starting position.

Duration [1]:

Beginners should hold the pose for 15 seconds, gradually adding a few seconds per week until it can be held for one minute. Adepts may hold the final pose up to 10 minutes or longer.

Awareness [1]:

- ❖ Physical - on the abdomen, relaxation of the back muscles and neck, the respiration, or the thyroid.
- ❖ Spiritual - on manipura or vishuddhi chakra.

Sequence [1]:

If possible, perform this asana immediately after sarvangasana. Follow *halasana* with matsyasana, ushtrasana or supta vajrasana as a counter pose, practiced for half the combined duration of sarvangasana and *halasana*. *Halasana* is a good preparatory practice for paschimottanasana.

Contra-indications [1]:

This asana should not be practiced by those who suffer from hernia, slipped disc, sciatica, high blood pressure or any serious back problem, especially arthritis of the neck.

Benefits [1]:

The movement of the diaphragm which takes place during the practice of *halasana* massages all the internal organs, activates the digestion, relieving constipation and dyspepsia, revitalizes the spleen and the suprarenal glands, promotes the production of insulin by the pancreas and improves liver and kidney function. It strengthens the abdominal muscles, relieves spasms in the back muscles, tones the spinal nerves and increases blood circulation to the whole area. It regulates the activities of the thyroid gland, which balances the body's metabolic rate. It also improves the immune system.

DISCUSSION:

As per the WHO, diabetes mellitus (DM) is defined as a heterogeneous metabolic disorder characterized by common feature of chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism. DM is a leading cause of morbidity and mortality world over. It is expected to continue as a major health problem owing to its serious complications, especially end-stage renal disease, IHD, gangrene of the lower extremities, and blindness in the adults [6].

Yoga, which originated in India more than 5,000 years ago, aims at balancing and harmonizing the body, mind, and emotions. Increasing evidence suggests that yoga practice tackles the pathophysiologic mechanisms of diabetes and helps in controlling diabetes and its complications. Psycho-neuro-endocrine and immune mechanisms are involved in the beneficial effects of yoga on diabetes. Incorporation of yoga practice in daily life helps to attain glycemic control and reduces the risk of complications in people with diabetes [3].

Halasana massages and pressurizes the pancreas, stimulating insulin secretion and Improve blood circulation to the abdomen. In patients with diabetes, pancreatic cells may be rejuvenated and pancreatic β-cell sensitivity may be increased by the alternating abdominal contractions and relaxations involved in Asanas like *Halasana*. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake [4].

CONCLUSION:

Diabetes is a chronic metabolic disease that adversely affects quality of life [9]. Stress increases the risk and severity of diabetes by stimulating the hypothalamic-pituitary-adrenal (HPA) and sympathetic axes and parasympathetic withdrawal, resulting in increases in the level of stress hormones [10].

Chronic activation of the HPA axis is associated with poor control of diabetes and complications such as diabetic neuropathy. Yoga effectively reduces stress, thereby helping diabetes control [11]. Abdominal stretching during *Halasana* is believed to result in the regeneration of pancreatic cells. *Halasana* massages and pressurizes the pancreas, stimulating insulin secretion and Improve blood circulation to the abdomen. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake. Hence, *Halasana* has proven effects in preventing complications of type 2 Diabetes mellitus by reducing blood glucose levels.

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