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A CRITICAL REVIEW STUDY ON ANATOMICAL ASPECTS OF GUPTASANA

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Abstract-

Yoga is one of the most powerful drugless system of treatment. It is having its own concept of wellness which has been scientifically understood and presented by many. Yoga can be adopted as lifestyle for promoting our physical and mental health.Yoga helps in the development of strength, stamina, endurance and high energy at physical level. It also empowers oneself with increased concentration, calm, peace and contentment at mental level leading to inner and outer harmony.*Guptasana* is a seated *Yoga* posture that stretches several parts of the body simultaneously. Knowledge of anatomy will help to reassure people and guide them towards rehabilitation and a better lifestyle.

Keywords:- Anatomy ,*Guptasana. Yoga.*

INTRODUCTION

Yoga is an ancient discipline designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual. Yoga is often depicted metaphorically as a tree and comprises eight aspects, or ‘‘limbs:’’ yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (breath control), pratyahara (control of the senses), dharana (concentration), dyana (meditation), and samadhi (bliss) [1].Yoga is a spiritual science for the integrated and holistic enlargement and magnification of our physical, mental as well as moral-spiritual facets. Yoga is based on the philosophy that is practical and useful for our daily lives.In this age of competition, life is so hard and stressful that man is unable to cope up and hence suffering from various psychological and mental disorders. Yoga provides the best solution of these problems to which modern man is the sufferer. No other exercise, except Yoga, can deal with these problems all together. Yoga manages all problems simultaneously in a brilliant way. To compare with other games and exercises which provide only muscular and cardio-vascular fitness, Yoga gives an all-round development.*Guptasana* is considered a variant of the *Siddhasana*. *'Gupta'* means concealed or secret in *Sanskrit*. It can be translated as secret pose or concealed pose in English. The *asana* may have been termed as such because it conceals the feet. *Guptasana* is described in *Gheranda Samhita*. In *Hathayoapradipika* it is mentioned as a variation of *Siddhasana*.

Technique of *Guptasana*

Place the feet between the knee and thighs i.e. calves and the thighs in such a manner that they are concealed. Place the anal region on top of the feet. This is known as *Guptasana*.[2]

Importance and benefits of Guptasana

Guptasana helps in subduing the sexual urge[3]. Practice of *Guptasana* cures seminal disorders and diseases of urethral system. It stimulates Chitrakhya *nadi* which improves circulation in the genital organs. Not only the feet is concealed but its qualities and virtues are also concealed. Because of this it is named *Guptasana* by the *Yogi*s.[4]

DISCUSSION

Anatomy of *Guptasana*

Joint positions

- The ankles plantar flexed.
- The feet are inverted.
- The knees flexed.
- The hips are flexed, abducted and externally rotate.
- The spine erect.
- The Cervical spine flexed
- The shoulders flexed, abducted and externally rotated
- The elbows extended
- The forearm supinated.

Muscles and ligaments involved in *Guptasana*

Ankle and foot region

Ankle is plantarflexed and the foot is inverted.

Guptasana is very similar to *Siddhasana*. The difference is in the positioning of the heels. In *Guptasana* both the heels are together and the perineum rests over it. The positions of ankles are in plantarflexion and inversion. This passively stretches the muscles of anterior and lateral compartment of leg which are flexors and everters respectively. Among these muscles extensor digitorum longus, extensor hallucis longus, tibialis anterior and peroneus tertius belongs to anterior compartment of leg. Peroneus longus and brevis belong to lateral compartment of leg.

Table 1. Muscles stretched at ankle jointin *Guptasana*

Muscle	Location	Nerve supply
Tibialis anterior	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Extensor digitorum longus	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Extensor hallucis longus	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Peroneus tertius	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Peroneus longus	Lateral Compartment of leg	Superficial peroneal nerve (L5,S1,S2).
Peroneus brevis	Lateral Compartment of leg	Superficial peroneal nerve (L5,S1,S2).

Ligaments of ankle joint

Foot is inverted hence the lateral collateral ligaments are stretched here these includes

- Anterior talofibular ligaments (ATFL)
- Posterior talofibular ligaments (PTFL)
- Calcaneofibular ligament

Knee Joint

Knee joint is flexed and Leg laterally rotated

Many consider *Guptasana* as a variation of *Siddhasana* and the position of many joints are similar. In *Guptasana* the position of legs are similar to *Swasthikasana*. Same is the case of knee joint which is flexed and laterally rotated. The Extensor compartment or anterior compartment of thigh is stretched when the knee is flexed and the medial rotators of knee and are stretched when it is laterally rotated. This compartment consists of quadriceps femoris which includes rectus femoris, vastus lateralis, medialis and intermedialis. Semitendinosus and Semimembranosus are a part of hamstring and belong to posterior compartment of thigh.

Table 2. Muscles stretched at knee jointin *Guptasana*

Muscle	Location	Nerve supply
Vastus medialis	Anterior compartment of thigh	Femoral nerve (L2-L4)

Vastus intermedius	Anterior compartment of thigh	Femoral nerve (L2-L4)
Vastus lateralis	Anterior compartment of thigh	Femoral nerve (L2-L4)
Rectus femoris	Anterior compartment of thigh	Femoral nerve (L2-L4)
Semitendinosus	Posterior compartment of thigh	Sciatic nerve (L5-S2)
Semimembranosus	Posterior compartment of thigh	Sciatic nerve (L5-S2)

Ligaments of knee joint

Knee joint is flexed and Leg laterally rotated. In this position the maximum pressure is on the following ligaments

- Lateral collateral or fibular collateral ligament. (LCL)
- anterior collateral ligament (ACL)
- Medial meniscus

Similar to *Siddhasana* and *Swastikasana*, here the ligaments can be strained if performed without proper preparations.

Pelvis and Hip region

The hips are flexed, abducted and externally rotated

The position of limbs in *Guptasana* is similar to *Swastikasana*. So there is less stretch on adductors. The adductor compartment or medial compartment of thigh is stretched when hip is abducted. The adductor muscles are stretched as it resists flexion and external rotation also. This compartment comprises of gracilis, adductor longus, magnus and brevis. The pectineus is the proximal muscle in the adductor group. It adducts, and internally rotates the hip. Hence it's stretched in this pose.

Table 3. Muscles stretched at hip jointin *Guptasana.*

Muscle	Location	Nerve supply
Adductor Longus	Medial compartment of thigh	Obturator nerve (L2-L4)
Adductor Magnus	Medial compartment of thigh	Obturator nerve (L2-L4) Sciatic nerve (L4)
Adductor Brevis	Medial compartment of thigh	Obturator nerve (L2-L4)
Pectineus	Medial compartment of thigh	Femoral nerve(L2,L3)
Gracilis	Medial compartment of thigh	Obturator nerve (L2-L4)

Similar to *Swastikasana* the flexors, abductors and external rotators are contracted to maintain the position of lower limbs and trunk in *Guptasana*. Tensor fascia lata is a muscle of the gluteal region, which helps in extension of knee and lateral rotation of leg. It's supplied by superior gluteal nerve.Gluteus medius and minimus are abductors and helps in medial rotation.. The six small lateral rotators of the hip are piriformis, gemellus superior, gemellus inferior, obturator externus, obturator internus, and quadratus femoris. These muscles help in abduct the flexed thigh. The psoas major along with iliacus helps in flexing and external rotation of hip.

Table 4. Muscle in contraction at hip jointin *Guptasana.*

Muscle	Location	Nerve supply
Tensor fascia lata	Gluteal region	Superior gluteal nerve (L4-S1)
Gluteus medius	Gluteal region	Superior gluteal nerve (L4-S1)
Gluteus minimus	Gluteal region	Superior gluteal nerve (L4-S1)
Piriformis	Gluteal region	Branches from S1 and S2
Gemellus superior	Gluteal region	Nerve to obturator internus (L5, S1)
Gemellus inferior	Gluteal region	Nerve to quadratus femoris (L5, S1)
Obturator externus	Gluteal region	Obturator nerve (L3, L4)
Obturator internus	Gluteal region	Nerve to obturator internus (L5, S1)
Quadratus femoris	Gluteal region	Nerve to quadratus femoris (L5, S1)
Psoas major	Iliac Region	Ventral rami of the lumbar spinal nerves (L1, L2)
Iliacus	Iliac Region	Femoral nerve (L2, L3)

Ligaments

The hips are flexed, abducted and externally rotate.The ligaments more stretched are

- Ischiofemoral ligament
- Pubofemoral ligament

The Spine: Thoracic and Lumbar

The lumbar and thoracic spines are erect.

As *Guptasana* is an asana resembling the *Swastikasana*, almost all the joints are in similar position except the position of foot. Similar to other sitting *asanas*the erector spinaemaintain an upright shape.The psoas major muscle contracts to pull the anterior lumbar spine forward. Quadratus lamborum helps the function of erector spinae.

Table 5. Muscle in contraction at thoracic and lumbar spinein *Guptasana*.

Muscle	Location	Nerve supply
Erector spinae	Back	**L**ateral branches of the Dorsal rami of the cervical, thoracic and lumbar spinal nerves
Quadratus lamborum	Posterior abdominal wall	Ventral rami of the twelfth thoracic and upper three or four lumbar spinal nerves

The Shoulder region

The shoulders flexed, abducted and externally rotated

The position of shoulder joint in *Guptasana* is similar to that of *Siddhasana*. The shoulder joint is in a position of flexed, abducted and externally rotated. Since the wrist rest at the knees the flexors and abductors are not contracted to maintain that position. But the external rotators are contracted so that the shoulder joint maintains that position. Externally rotation of the shoulders is by the infraspinatus and

teres minor muscles of the rotator cuff. The posterior deltoids synergize this action.

Table 6. Muscles contracting at shoulder jointin *Guptasana*

Muscle	Location	Nerve supply
Infraspinatus	Shoulder	Suprascapular nerve (C5, C6)
Teres minor	Shoulder	Axillary nerve (C5, C6)
Posterior fibres of Deltoid	Shoulder	Axillary nerve (C5, C6)

Since the shoulder joint is flexed, abducted and externally rotated there will be minor stretching of the antagonist muscles. The extensors include the latissimus dorsi and teres major. Latissimus dorsi is the extensor, adductor and medial rotator of shoulder joint. Teres major is an extensor and also a medial rotator. Pectoralis major is an adductor and medial rotator of shoulder joint. Suscapularis and the anterior fibres of deltoid is the medial rotator of shoulder joint.

Table 7. Muscles Stretched at shoulder jointin *Guptasana*

Muscle	Location	Nerve supply
Subscapularis	Shoulder	Upper and lower subscapular nerves (C5, C6)
Latissimus dorsi	Back	Thoracodorsal nerve (C6-C8)
Teres major	Shoulder	Axillary nerve (C5, C6)
Anterior fibers of the deltoid	Shoulder	Axillary nerve (C5, C6)
Long head of triceps brachii	Arm	Radial nerve (C7)
Pectoralis major	Pectoral	Medial and lateral pectoral nerves

Elbow region

Elbow extended and Forearm supinated

The position of elbow and forearm in *Guptasana* is similar to that of *Siddhasana*. The upper limb is kept straight, hence the elbow is extended. To maintain this position Triceps brachii is actively contracted. Since the forearm is also supinated, the supinators are actively contracted. Biceps brachii supplied bt musculocutaneous nerve and supinator supplied by posterior interosseous nerve are actively contracted.

Table 8. Muscles contracting at elbow joint and forearmin *Guptasana*

Muscle	Location	Nerve supply
Triceps brachii	Posterior compartment of arm	Radial nerve (C6-C8)
Supinator	Posterior compartment of forearm	Posterior interosseous nerve (C6,C7)
Biceps brachii	Anterior compartment of arm	Musculocutaneous nerve (C5,C6)

As the elbow is flexed and forearm is supinated, the flexors and pronators are stretched in this position. The primary flexor of elbow joint is brachialis muscle which is supplied by musculocutaneous nerve. The pronators are pronator teres and pronator quadratus presnt in the anterior compartment of forearm and both are supplied by median nerve.

Table 9. Muscles stretched at elbow joint and forearmin *Guptasana*

Muscle	Location	Nerve supply
Brachialis	Anterior compartment of arm	Musculocutaneous nerve (C5,C6)
Brachioradialis	Posterior compartment of forearm	Radial nerve (C5-C6)
Pronator teres	Anterior compartment of forearm	Median nerve (C6,C7)
Pronator quadratus	Anterior compartment of forearm	Median nerve (C7,C8)

CONCLUSION-

In *Guptasana* the feet are placed between thighs and calves of opposite leg and the anal region is placed on the heels. In *Guptasana* the spine and head kept erect and the hands placed on knees in *Jnana mudra*. The muscles being stretched maximum are present in the lower limb. The muscles in the dorsum of foot, anterior compartment of leg, medial and anterior compartment of thigh are stretched. The ankle, knee and hip joints are under more stress in *Guptasana* and there are chances of injuries to ligaments in these joints. The lateral collateral ligaments of ankle, fibular collateral ligament, anterior cruciate ligament and medial meniscus are being held under stress.

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