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PHYSIOANATOMICAL ASPECTS OF KURMASANA: - A REVIEW STUDY

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Abstract-

Asana are not just physical exercises, they have biochemical, psychophysiological and psychospiritual effects. The study of anatomy is integral to the proper practice of *Asana*. Additionally, for *Yoga* practitioner's anatomical awareness is a powerful tool for keeping their body free from all sorts of jerks, injury and pain. Knowledge of anatomy of *Asana* enables everyone to adopt and practice suitable *Asana* based on physical or skeletal structure. Practice of *Kurmasana* can activate the Moola Bandha.

Key words:-Anatomy, Asana, Kurmasana

INTRODUCTION

Yoga occupied in the cultural history of India from time immemorial an unparalleled and distinct recognizance as the one and only practical system of

physical, mental, moral and spiritual culture.

The name of this *Asana* comes from the *Sanskrit* words Kurma meaning "turtle" or "tortoise" and *Asana* meaning "posture" or "seat" It is so called because the *Asana* resembles the shape of a tortoise in the full pose. *Kurmasana* may also be known as tortoise pose. Place the right ankle on the left side of anus, and the left ankle on the right side of it, *Yogis* call this *Kurmasana*[1]. Since ancient times, the *Asana*have been defined in terms of relatively precise forms; by mastering these forms, an individual demonstrates his or her mastery of certain basic principles of movement. Yet, it was also generally understood that the practical application of these principles must be based on each individual's actual condition. An individual's way of doing each posture was therefore worked out between teacher and student. In this sense, the transformational value of a posture was always seen in relation to its function, not to its form.Yogasanas assume new significance in modern times. The Western system of exercises, aimed at developing the bulk and the power of the muscle masses, is the most commonly used system all over the world. This system is primarily, if not entirely, based on processes generating great tensions in the muscles. There is no corresponding relaxation of any group of muscles. The exertion in performing these exercises is harmful to the osteo-articular surfaces which are utilised in these movements. To deepen mind's interface with body's anatomy, we should apply the study of anatomy to understanding how muscles move joints and create function[2].

ANATOMICAL FACTS OF *KURMASANA*-

Muscles and Ligaments involve in *Kurmasana*

The Ankle and Foot region

Ankle joint plantar flexed. Flexion of metacarpophalangeal and Interphalangeal joints

In *Kurmasana* the position of ankle joint is similar to *Vajrasana* but they are crossed. The ankles are plantarflexed and both lower limbs are crossed at ankle joint. The left ankle which is situated inferior will be stretched the most and the right ankle placed above it has much less stretch on it. The body rests on the heels forcing full plantar flexion of the ankle joint. Muscles which produce plantar flexion are gastrocnemius, soleus and it is assisted by the Plantaris, tibialis posterior, flexor hallucis longus and flexor digitorum longus. Feet are inverted by tibialis anterior and posterior. Extensor digitorum longus, extensor hallucis longus, tibialis anterior and peroneus tertius belongs to anterior compartment of leg. Extensor digitorum brevis and extensor hallucis brevis belongs to the dorsum of foot.

Table 1. Muscles stretched at ankle joint and foot in *Kurmasana*

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)

Extensor digitorum brevis	Dorsum of foot	Terminal branches of the deep peroneal nerve (S1-S2)
Extensor hallucis brevis	Dorsum of foot	Terminal branches of the deep peroneal nerve (S1-S2)

Knee Joint

Knee joint is flexed

In *Kurmasana* the position of knees are flexed and they are similar to the position of knees in *Vajrasana*. There is no lateral rotation of knee, hence less stress on ligaments. The Extensor compartment or anterior compartment of thigh is stretched. The main extensor of knee joint is quadriceps femoris which includes rectus femoris, vastus lateralis, medialis and intermedialis. These muscles are supplied by femoral nerve.

Table 2. Muscles stretched at knee jointin *Kurmasana*

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)

Ligaments of knee joint

Knee joint is flexed

In this position the maximum pressure is on the following ligaments

- Medial and lateral meniscus

Hip and Pelvic region

Hip joint if flexed and adducted

In *Kurmasana* the hip is flexed and adducted. Hence the abductors are stretched and similarly the extensors of hip. The primary abductors are gluteus medius, gluteus minimus and tensor fasciae lata. Semi tendinosus, semimembranosus biceps femoris and gluteus maximus are the extensor of hip joint. Extensor of hip are strected in this position. Less stretched muscles include gluteus maximus and posterior gluteus medius

Table 3. Muscles stretched at hip jointin *Kurmasana*

Muscle	Location	Nerve supply
Gluteus maximus	Gluteal region	Inferior gluteal nerve (L5-S2)
Gluteus medius	Gluteal region	Superior gluteal nerve (L4-S1)
Gluteus minimus	Gluteal region	Superior gluteal nerve (L4-S1)
Tensor fascia lata	Gluteal region	Superior gluteal nerve (L4-S1)
Semitendinosus	Posterior compartment of thigh	Sciatic nerve (L5-S2)
Semimembranosus	Posterior compartment of thigh	Sciatic nerve (L5-S2)

Biceps femoris	Posterior compartment of thigh	Sciatic nerve (L5-S2)

Ligaments of hip joint

The hips are flexed and abducted. The ligaments more stretched is

- Pubofemoral ligament

The Spine: Thoracic and Lumbar

The lumbar and thoracic spines are erect. The position of spine in *Kurmasana* is similar to *Vajrasana*. It exerts less pressure on the spine and it is in a comfortable position. The erector muscles contract to extend the spine. Quadratus lamborum act as synergist to the function of erector spinae and helps in maintaining lumbar lordosis

.

Table 4. Muscle in contraction at thoracic and lumbar spinein *Kurmasana*

Muscle	Location	Nerve supply
Erector spinae	Back	Lateral 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.

Cervical Region

Cervical spine erect

In *Kurmasana* the head is also kept straight. The cervical spine is also in normal position like the thoracic and lumbar spines. To maintain this position the extensors of cervical region are contracted. Theses muscles include the longissimus Capitis, longissimus cervicis, semispinalis capitis, semispinalis cervicis, splenius capitis and splenius cervicis

.

Table 5. Muscle in contraction at cervical regionin *Kurmasana*.

Muscle	Location	Nerve supply
Longissimus Capitis	Cervical	Dorsal primary rami of C3 to C8
Longissimus Cervicis	Cervical	Dorsal primary rami of C4 to C8
Semispinalis Capitis	Cervical	Greater occipital nerve (C2) and the thirdCervical nerve (C3)
Semispinalis cervicis	Cervical	Dorsal primary rami of C3 to C5
Splenius Capitis	Cervical	Dorsal rami of C2 and C3
Splenius Cervicis	Cervical	Dorsal primary rami of C5 to C7

The Shoulder region

The shoulders are flexed, adducted and internally rotated.

In *Kurmasana* the position of shoulder is similar to *Vajrasana*. The upper limb is kept straight and the palms are rested at the

knees. The shoulder joint is almost at ease and there isn't much stress at shoulder joint. The position of shoulder joint is in flexion, adduction and slight internal rotation. But as the hands rests at knees the muscles are relaxed in this position. Even though the shoulder is in flexed, adducted and internally rotated, there isn't much deviation from the resting position of shoulder joint. The extensors and adductors are slightly stretched in this position. 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

Table 6. Muscles stretched at shoulder jointin *Kurmasana*

Muscle	Location	Nerve supply
Latissimus dorsi	Back	Thoracodorsal nerve (C6-C8)
Teres major	Shoulder	Axillary nerve (C5, C6)
Pectoralis major	Pectoral	Medial and lateral pectoral nerves

Elbow region

Elbow extended and Forearm pronated

In *Kurmasana* the upper limb is kept straight and the elbow is extended. The forearm is in pronated position and the forearm is in a relaxed state. To maintain the extension of elbow joint the triceps brachii is actively contracted.

Table 7. Muscles contracting in Elbow jointin *Kurmasana*

Muscle	Location	Nerve supply
Triceps brachii	Posterior compartment of arm	Radial nerve (C6-C8)

As the elbow is flexed and forearm is pronated, the flexors are stretched in this position. The primary flexor of elbow joint is brachialis muscle which is supplied by musculocutaneous nerve. Since the forearm is supinated there is not much stress in the biceps brachii muscle.

Table 8. Muscles stretched at Elbow jointin *Kurmasana*

Muscle	Location	Nerve supply
Brachialis	Anterior compartment of arm	Musculocutaneous nerve (C5,C6)
Brachioradialis	Posterior compartment of forearm	Radial nerve (C5-C6)

Wrist and Hand

The palms of the hands are placed over the knees. The wrist and fingers rests on the knees and there is no active contraction of muscles to maintain that position. Muscles moving the wrist and fingers are also not stretched in this position as the joints are in resting position.

DISCUSSION

Basic joint positions in *Kurmasana* are ankles plantar flexed, Flexion of

metacarpophalangeal and Interphalangeal joints, knees flexed, and hip joint are flexed and abducted, spine erect, shoulder internally rotated and adducted and the Elbow joints are extended. In *Kurmasana* the position of right ankle is on left side of anus and left ankle is on the right side of anus. In this asana both ankle put pressure at the perineum and at the both sides of anus. Levator ani, Bulbospongiosus muscle, External anal sphincter muscle and External urethral sphincter muscle fibres gets stretch while doing *Kurmasana*. Superficial and deep transverse perineal muscles contracts while doing this.

In the male body the *MoolaBandha* is situated between the anus and the scrotum. *MoolaBandha* is known as the 'perineal lock', Activation of *MoolaBandha* can be done by the *Kurmasana*, contraction of the muscles around the perineal body in the male and the cervix in the female. While practicing the *Kurmasana* we can utilize the *MoolaBandha*.

MoolaBandha (perineal contraction) stimulates both the sensory-motor and the autonomic nervous systems in the pelvic region. *MoolaBandha* directly influences the gonads and the perineal body or cervix.This is also a very good method for curing piles and nocturnal discharge. If women practice this *Asana*, affliction of the uterus and of menstrual disturbance will be cured. The stretch and sprain provided by the *Kurmasana* helps to regulate and freedom from acute pain causes by the body.

Moola Bandha stretches the muscles of the pelvic floor, increases circulation in that area, balances, stimulates, and rejuvenates the area through techniques that increase awareness and circulation. As a result, exercises that utilize *Moola Bandha* may be helpful in aiding people who lack sexual vitality and have poor sexual functioning.

CONCLUSION-

In *Kurmasana* place the heels below the perineum by crossing each other. Keep the spine and head erect. Place the upper limb on the knees and keep them straight. The muscles of the dorsum of foot, anterior compartment of leg, anterior and medial compartment of thigh are stretched most in lower limb. The muscles of trunk and upper limb are not in that much stretch. In *Kurmasana* the position of right ankle is on left side of anus and left ankle is on the right side of anus. Kurmasana activates the Moola Bandha. Moola Bandha directly influences the gonads and the perineal body or cervix. In Kurmasana, pubofemoral ligament of hip joint medial and lateral meniscus are under some sort of pressure.Most Stretched Structures in *Kurmasana*Superior Extensor Retinaculum, Tibialis Anterior, Extensor Digitorum longus.

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