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RESEARCH ARTICLE

AN ANATOMICAL EXPLORATION OF VAJRASANA

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ABSTRACT

Yoga is a form of physical activity which may assist in achieving recommended levels of physical activity. Anatomy education of *Asana* is an important part. The study of human anatomy encompasses the placement of the body's bones, muscles and nerve supply. Since every aspect of *Hatha Yoga* involves the mind and body, the study of anatomy makes sense for a well-rounded *Yoga* education. It is important for to understand what is occurring within the body to increase the blood flow to each muscle, and how this will affect the body, while performing *Vajrasana*. Knowledge of anatomy will help to reassure people and guide them towards rehabilitation and a better lifestyle.

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INTRODUCTION

Yoga is almost two thousand years old and one of the six *Saddarsanas*. The word "Yoga" means union. The word means 'unity' or 'oneness' and is derived from the *Sanskrit* word *yuj*, which means 'to join'. This unity or joining is described in spiritual terms as the union of the individual consciousness with the universal consciousness. In recent years *Yoga* has become decontextualized, commercialized and transformed into a mass movement in Western culture, where it has been made into a practice to enhance physical fitness and beauty, often labeled as *Hathayoga*. *Yoga* is recognized as a form of mind-body medicine that integrates an individual's physical, mental and spiritual components to improve aspects of health, particularly stress related illnesses. This Western approach to *Yoga* has in turn influenced the way in which *Yoga* is now taught and practiced in India. *Asana* is the most important and often the only constituent of modern *Yoga* systems. Many practitioners believe that these postures derive from an ancient original set of eighty-four *Asana*. *Vajrasana* is a combination of two words, *Vajra* and *Asana*. *Vajra* means thunderbolt or diamond. The word *Asana* translates as 'pose'. This *Asana* resembles more or less the *Namaz* pose in which Muslims sit for prayer. *Vajrasana* is also a meditative pose. Meditative poses are of the highest value of spiritual culture.

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They establish in the body such physiological conditions that the mind ceases to be disturbed by any stimuli received from the body. In fact the body stops entering into consciousness altogether. The physical exercise may increase patient's physical flexibility, coordination, and strength, while the breathing practices and meditation may calm and focus the mind to develop greater awareness and diminish anxiety¹.

Need of study: In the contemporary time, everybody has conviction about *Asana* practices towards the preservation, maintenance and promotion of health. But the lacuna of anatomical explanation of structures involved and their role in benefit achieved is still persisting. The knowledge of anatomy will also help the *asana* practitioners, to avoid injuries.

Aims and objective

- To generalize a scientific view on the anatomical structures involved in *Vajrasana*.
- To explore the neuro-musculoskeletal aspects of *Vajrasana* on the basis of contemporary anatomical knowledge.
- To understand *Vajrasana* in a scientific way with their anatomical explanation to explore its health benefits.
- To avoid possibilities of injuries while performing *Vajrasana* by understanding the anatomical structures involved in *Vajrasana*.

How to Dovajrasana: According to *GherandaSamhita*, Place the heels on either side of the anal region and make the thighs tight like adamant like the *Vajra*. This *Asana* is known as *Vajrasana*, which provides *Siddhi* to the *Yogi*¹.

- Kneel on the floor. Keep the knees together.
- Rest the buttocks on the heels. Keep the toes pointing back and touching the floor.
- Keep the neck and head straight
- Keep the wrists on the knees, palms facing downwards.

Importance and uses: *Vajrasana* is a very important meditation posture because the body becomes upright and straight with no effort. It is the best meditation *asana* for people suffering from sciatica. It stimulates the *Vajranadi*, activates *Prana* in *Sushumna*. *Vajrasana* alters the flow of blood and nervous impulses in the pelvic region and strengthens the pelvic muscles³.

DISCUSSION

Basic joint positions in Vajrasana

- The ankles plantar flexed.
- The knees flexed
- The hips are flexed.
- The spine erect.
- The shoulder flexed, adducted and internally rotated
- The elbow extended and forearm pronated

Muscles and ligaments involved in Vajrasana

The Ankle and Foot region

Ankle joint plantarflexed: The position of ankle and foot in *Vajrasana* is similar to *Bhadrasana*. The body rests on the heels forcing full dorsiflexion of the ankle joint. Extensor digitorum longus, extensor hallucis longus, tibialis anterior and peroneus tertius belongs to anterior compartment of leg. While extensor digitorum brevis and extensor hallucis brevis belongs to the dorsum of foot.

Knee Joint

Knee joint is flexed: The positions of knees in *Vajrasana* are similar to *Bhadrasana*. In *Vajrasana* the knees are together in the front. In *Vajrasana* there is no lateral rotation of knee and hence less stress on ligaments. The Extensor compartment or anterior compartment of thigh is stretched in *Bhadrasana*. This compartment consists of quadriceps femoris which includes rectus femoris, vastus lateralis, medialis and intermedius.

Ligaments of knee joint

Knee joint is flexed: In this position the maximum pressure is on the following ligaments

Medial and lateral meniscus: Sitting for longer duration may strain ligaments in the knee that are not accustomed to prolonged tension. Circulation may be cut off in the legs as a result of the extreme flexion of the knees, causing a pins-and-needles sensation. *Vajrasana* places pressure directly on a superficial branch of the common peroneal nerve, which is subcutaneous just lateral to the head of the fibula and which

supplies several muscles on the anterior side of the leg. If that nerve is traumatized by prolonged sitting, the muscles it supplies can be temporarily paralyzed.

Hip and Pelvic region

Hip joint if flexed: *Vajrasana* is an easier *asana* to perform and the main advantage is that there is no much muscular tension associated with cross-legged postures like *Siddh asana* and *Padmasana*. In *Vajrasana* the hip is flexed and the extensors of hip are stretched here. Since there isn't a complete flexion of hip the stretching is also mild. Gluteus maximus is the primary extensor of hip and it's stretched in here. The secondary flexors include hamstring muscles and a part of adductor magnus. The hamstring also crosses the knee joint which is flexed in *Vajrasana*. So there minimal stretch of hamstrings and the adductor magnus. The hip joint is flexed in *Vajrasana* and the primary hip flexor is the iliopsoas. Psoas major is supplied by lumbar spinal nerve (L2-L3) and iliacus by femoral nerve (L2-L3). It is easy for the iliopsoas muscles to tilt the back of the pelvis up and forward to create a strain-free lumbar lordosis in *Vajrasana*. The secondary flexors like Sartorius, rectus femoris and pectineus also help in the flexion of the hip joint. Sartorius and rectus femoris crosses the knee joint also which is flexed in *Vajrasana*. These muscles are stretched at knee joint. The primary function of pectineus is adduction and since the hip joint is neither abducted nor adducted it helps in flexion of hip.

Ligaments of hip joint: The hips are flexed and abducted. The ligaments more stretched are

- Ischiofemoral ligament

The Spine: Thoracic and Lumbar

The lumbar and thoracic spines are erect: Compared to all other sitting *Asana* *Vajrasana* exerts less pressure on the spine and it is in a comfortable position. To maintain an upright shape, the erector muscles contract to extend the spine, and the psoas major and minor contract to pull the anterior lumbar spine forward to restore the lumbar curve. It is easy for the iliopsoas muscles to tilt the back of the pelvis up and forward to create a strain-free lumbar lordosis, even for those with severe restrictions in hip flexibility. The pelvis is automatically placed in a forward tilt defined by the angle of the seat

Cervical Region

Cervical spine erect: In *Vajrasana* the extensors of cervical region are contracted to maintain the upright position of the cervical spine. These muscles include the longissimus Capitis, longissimus cervicis, semispinalis capitis, semispinalis cervicis, splenius capitis and splenius cervicis.

The Shoulder region: The shoulders are flexed, adducted and internally rotated. 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 internal rotation. But as the hands rest 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.

Table 1. Muscles stretched passively at ankle and foot region in *Vajrasana*

Muscle	Location	Nerve supply
Tibialis anterior	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Extensor digitorumlongus	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Extensor hallucislongus	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Peroneus tertius	Anterior compartment of leg	Deep peroneal nerve (L4-S1)
Extensor digitorumbrevis	Dorsum of foot	Terminal branches of the deep peroneal nerve (S1-S2)
Extensor hallucisbrevis	Dorsum of foot	Terminal branches of the deep peroneal nerve (S1-S2)

Table 2. Muscles Stretched at knee joint in *Vajrasana*

Muscle	Location	Nerve supply
Vastusmedialis	Anterior compartment of thigh	Femoral nerve (L2-L4)
Vastusintermedius	Anterior compartment of thigh	Femoral nerve (L2-L4)
Vastuslateralis	Anterior compartment of thigh	Femoral nerve (L2-L4)
Rectus femoris	Anterior compartment of thigh	Femoral nerve (L2-L4)

Table 3. Muscles Stretched passively at hip joint in *Vajrasana*

Muscle	Location	Nerve supply
Gluteus maximus	Gluteal region	Inferior gluteal nerve (L4-S2)

Table 4. Muscle in contraction at hip joint in *Vajrasana*

Muscle	Location	Nerve supply
Psoas major	Iliac Region	Ventral rami of the lumbar spinal nerves (L1, L2)
Iliacus	Iliac Region	Femoral nerve (L2, L3)
Pectineus	Medial compartment of thigh	Femoral nerve(L2,L3)

Table 5. Muscle in contraction at thoracic and lumbar spine in *Vajrasana*.

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

Table 6. Muscles in contraction at cervical region in *Vajrasana*

Muscle	Location	Nerve supply
LongissimusCapitis	Cervical	Dorsal primary rami of C3 to C8
LongissimusCervicis	Cervical	Dorsal primary rami of C4 to C8
SemispinalisCapitis	Cervical	Greater occipital nerve (C2) and the third Cervical nerve (C3)
Semispinaliscervicis	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

Table 6. Muscles stretched at shoulder joint in *Vajrasana*

Muscle	Location	Nerve supply
Latissimusdorsi	Back	Thoracodorsal nerve (C6-C8)
Teres major	Shoulder	Axillary nerve (C5, C6)

Table 7. Muscles contracting at elbow joint in *Vajrasana*

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

Table 8. Muscles stretched at elbow joint in *Vajrasana*

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

The extensors are slightly stretched in this position. The extensors include the latissimusdorsi and teres major. Latissimusdorsi is the extensor, adductor and medial rotator of shoulder joint. Teres major is an extensor and also an medial rotator.

Elbow region

Elbow extended and Forearm pronated: In *Vajrasana* 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. 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.

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.

Conclusion

In *Vajrasana* bend the knees and place the gluteal region on the heels. The back and head are kept straight.

The palms rest on knees. *Vajrasana* is one of the easiest sitting *asanas* as there is lesser muscular tension. Muscles of dorsum of foot, anterior compartment of leg and anterior compartment of thigh are stretched the most. Sitting for longer duration may strain ligaments in the knee. Extreme flexion of the knees can cause a pins-and-needles sensation and may injure superficial branch of the common peroneal nerve.

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