IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Supta Vajrasana: A Comprehensive Anatomical Study From A Rachana Sharir Perspective

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Abstract

A traditional Hatha Yoga pose that builds from the foundational Vajrasana is Supta Vajrasana, also known as the Reclined Thunderbolt Pose. Although it is widely acknowledged for its healing properties and benefits to digestive health, maximizing its therapeutic use and lowering risks require a deeper understanding of anatomy and physiology. An extensive anatomical analysis of Supta Vajrasana from the viewpoint of Rachana Sharir is presented in this article, which breaks down the complex engagement and stretching of different musculoskeletal structures, such as muscles, ligaments, and joints. It also clarifies the physiological effects on the nervous, endocrine, digestive, respiratory, and circulatory systems. This research attempts to provide a thorough framework for Rachana Sharir scholars to understand the profound body-mind integration promoted by this special asana by connecting these anatomical effects with Ayurvedic concepts like Dosha balance, Agni stimulation, and Srotas purification. Its therapeutic precision can be improved by comprehending the biomechanics and physiological reactions, especially in conditions pertaining to digestive issues, metabolic health, and general physical and mental well-being.

Keywords: Supta Vajrasana, Rachana Sharir, Anatomy, Biomechanics, Yoga, Vajrasana, Joints, Muscles, Physiology, Ayurveda

1. Introduction:

Yoga asanas are advanced techniques for balancing the body's fine and gross anatomy, not just physical postures. Supta Vajrasana (Reclined Thunderbolt Pose), which begins with the seated Vajrasana (Thunderbolt Pose), is a potent but frequently understudied back-bending and reclined posture among the many traditional poses. According to Rachana Sharir (Ayurvedic Anatomy), it is critical to have a solid grasp of the complex musculoskeletal interactions and physiological reactions that this pose elicits. This in-depth anatomical analysis goes beyond a cursory description, exploring the precise joint motions, muscle contractions, ligamentous strains, and the resulting effects on different organ systems.

This article's goal is to give a thorough anatomical and physiological analysis of Supta Vajrasana so that scholars of Rachana Sharir can:

Determine which primary and secondary anatomical structures are involved.
Understand the biomechanics of deep knee flexion, hip hyperextension, and spinal extension.
Determine a deeper understanding of its therapeutic potential by using a structural lens to connect traditional yoga knowledge with contemporary anatomical sciences.
Correlate these physical changes with their physiological implications for various systems.

This thorough investigation will shed light on the ways in which Supta Vajrasana affects the body's structural soundness and functional dynamics, providing the groundwork for its accurate therapeutic use in Ayurvedic clinical practice.

2. Description and Execution of Supta Vajrasana

An intermediate to advanced backbend, Supta Vajrasana calls for a great deal of flexibility in the hips, knees, and spine. Usually, it is done after warming up the body, especially the spine and lower limbs.

2.1. Steps to Enter the Pose:

1. **Starting Position (Vajrasana):** Kneel on the floor to start. Allowing the heels to spread outward, bring the big toes together. Make sure your buttocks are on the floor by sitting squarely between your heels. A cushion beneath the buttocks can be used if this is uncomfortable. The hands should rest on the thighs, shoulders should be relaxed, and the spine should be straight.

2. Transition to Recline: Lean back gently while using your hands to support your body.
With the fingers pointing forward, place the palms on the floor next to the feet.
One by one, slowly bring the elbows down to the floor.
Keep reclining slowly until the forearms and then the back of the head are on the ground.
The whole back, from the sacrum to the top of the head, can lie flat on the floor if it is comfortable, creating a deep arch in the lower back.

3. Arm Placement: To provide a deeper stretch in the shoulder girdle and chest, the arms can be placed palms up next to the body or extended overhead on the floor.

4. **Maintaining the Pose**: Hold the pose for a comfortable amount of time, usually 30 to 60 seconds, while taking deep, even breaths.

5. Exiting the Pose: To leave, slowly return to Vajrasana by rolling onto one side, pushing back up with the elbows, or gently engaging the core. Steer clear of sudden movements.

2.2. Key Anatomical Alignments in the Final Pose:

● **Deep Knee Flexion**: The feet and shins are next to the hips, and the knees are completely bent.

● **Hip Hyperextension/Internal Rotation**: The hips are hyperextended in relation to the spine, and the femurs may rotate slightly inside, depending on the individual's anatomy.

● **Spinal Extension (Thoracic and Lumbar):** The thoracic spine extends to allow the head and upper back to rest on the floor, while the lumbar spine is deeply arched (exaggerated lordosis).

● **Shoulder & Chest Opening:** The rib cage is encouraged to expand by the raised and open chest.

● **Neck Extension**: Sometimes a cervical curve is necessary to allow the head to rest by extending the cervical spine.

3. Anatomical Study of Supta Vajrasana

This section describes the precise skeletal elements, ligaments, joints, and muscles that are stretched and used during Supta Vajrasana.

3.1. Adho Bhahu (lower limbs):

- **Janu Sandhi (Knee Joints)**

Movement: Extreme flexion (up to 130-140 degrees) is the movement. The joint is under a lot of strain as a result.
Bones: Tibia, Fibula, Patella, and Femur.
Ligaments Stressed/Stretched: The following ligaments are stressed or stretched: the medial collateral ligament (MCL), the lateral collateral ligament (LCL), the posterior cruciate ligament (PCL), and the anterior cruciate ligament (ACL), albeit less directly than in dynamic movements. The posterior structures are under the most stress.
Menisci: The lateral and medial menisci are stretched anteriorly and compressed posteriorly.
The quadriceps femoris group, which includes the Rectus femoris, Vastus lateralis, Vastus medialis, and Vastus intermedius, is stretched to a great extent because it crosses the hip and knee joints.
Muscles Stretched: Quadriceps femoris group (Rectus femoris, Vastus lateralis, Vastus medialis, Vastus
intermedius) are intensely stretched, as they cross both the hip and knee joint.

- **Gulph & Pada Sandhi (Ankle & Foot Joints)**

Movement: Ankle deep plantarflexion.
Bones: Tarsals, Metatarsals, Phalanges (foot); Tibia, Fibula, Talus (ankle).
Ligaments: calcaneofibular ligament (stretched if ankle rolls outwards) and anterior talofibular ligament.
Muscles Stretched: The tibialis anterior, extensor digitorum longus, and extensor hallucis longus are the muscles that are stretched. Additionally, tension is applied to the plantar fascia.

Shroni Sandhi (hip joint):
Movement: Depending on the feet or knees' resting position, the femur may hyperextend and rotate slightly internally or externally in relation to the acetabulum. The flexors of the hips are long.
Bones: pubis, ischium, ilium, and femur.
Ligaments Stressed/Stretched: The iliofemoral, pubofemoral, and ischiofemoral ligaments—which collectively stabilize the hip in hyperextension—are the stressed/stretched ligaments.
Muscles stretched: The rectus femoris (part of the quadriceps), sartorius, and hip flexors, especially the iliopsoas (Psoas major and iliacus). The anterior aspect of the hip is where these muscles are extended.
Muscles Engaged for Stability:: To stabilize the hip and pelvis, the gluteus maximus and hamstrings (biceps femoris, semitendinosus, and semimembranosus) gently contract.

3.2. Spinal Column (Merudanda) & Torso:

Spinal Movement: Deep extension, especially in the lower thoracic and lumbar areas.
The lumbar spine's inherent lordotic curve is highlighted.
Bones: Vertebrae (lumbar: L1-L5, thoracic: T1-T12, cervical: C1-C7) make up the bones. Coccyx and Sacrum supply the base.
Ligaments Stretched: The Anterior Longitudinal Ligament (ALL), which runs along the front of the vertebral bodies, is considerably stretched. The intervertebral discs stretch anteriorly and are compressed posteriorly.

Muscles Stretched:

Abdominal Muscles: The anterior torso is heavily stretched in the Rectus Abdominis, External and Internal Obliques, and Transversus Abdominis.

Hip Flexors: As previously stated, hip flexors continue to play a role in lumbar lordosis.

Muscles Engaged:

Spinal Extensors: Multifidus, Rotatores, and Erector Spinae group (Iliocostalis, Longissimus, Spinalis) contract eccentrically to stabilize the spine and regulate the backbend.

3.3. Shoulder Girdle (Amsa Sandhi), Chest (Uraha), & Upper Limbs (Urdhva Bhahu):

Chest Opening: The sternum is lifted, and the rib cage expands.

Muscles Stretched: the intercostal muscles (between ribs) and the pectoralis major and minor (anterior chest muscles).

Shoulder Joint (Glenohumeral): The glenohumeral shoulder joint experiences external rotation and flexion when the arms are raised overhead.
Muscles Stretched: the posterior deltoid, Teres Major, and Latissimus Dorsi (if arms are overhead).
Muscles Engaged: The muscles used are the triceps, biceps, and anterior deltoid (for arm stability if overhead).

3.4. Shira (Head) and Griva (Neck)

Cervical Movement: The cervical spine extends, enabling the head to rest on the ground.
Bones : Cervical vertebrae (C1-C7).

Muscles Stretched: The sternocleidomastoid and scalenes (anterior neck muscles) are the muscles that are stretched.
Muscles Engaged: Muscles Involved: To preserve the head's curve and stability, deep cervical extensors (like the Semispinalis Capitis and Splenius Capitis) and flexors (like the Longus Colli) gently contract.

4. Physiological Implications from an Anatomical Standpoint

The profound anatomical changes in Supta Vajrasana translate into significant physiological effects across various bodily systems.

4.1. Pranavaha Srotas (Respiratory System):

Enhanced Lung Capacity: The diaphragm has more room to descend during inhalation due to the deep stretch in the abdominal muscles and the expansion of the rib cage. Deeper diaphragmatic breathing is made easier, which may improve oxygen-carbon dioxide exchange and boost vital capacity.

Alveolar Gas Exchange Stimulation: Better diaphragm excursion and thoracic mobility improve ventilation-perfusion matching, which maximizes gas exchange at the alveolar level.

4.2. Rasa and Rakta Vaha Srotas (Circulatory System):

Enhanced Venous Return: Gravitational support facilitates venous return from the lower extremities, lowering fluid stagnation and leg swelling by raising the lower body in relation to the heart (in the reclined position, if not completely flat).

Lymphatic Drainage: The inguinal and abdominal regions' compression and stretch can gently increase lymphatic flow, which aids in the elimination of waste products from metabolism and boosts immunity.

4.3. Manovaha and Majjavaha Srotas (Nervous System):

Parasympathetic Activation: The parasympathetic nervous system (also known as the "rest and digest" mode) is activated by the pose's restorative qualities, deep stretches, and calming breath-related effects. This promotes relaxation, stress reduction, and overall nervous system balance by lowering sympathetic (fight or flight) tone.

Stretch Reflexes: Proprioceptors are influenced by prolonged stretching of the main muscle groups (abdominals, hip flexors, and quadriceps), which sends signals to the central nervous system that eventually help muscles relax and become more flexible.

4.4. Endocrine System:

Adrenal Glands: The adrenal glands are located in the lumbar region, and their function may be subtly influenced by their gentle compression and subsequent release, which may affect hormone regulation and stress response.

Thyroid and Parathyroid Glands: These glands, which are essential for metabolism and calcium regulation, can be gently stimulated by neck extension.

4.5. Digestive System (Annavaha Srotas):

Visceral Massage & Peristalsis: The deep abdominal stretch gives the stomach, intestines, liver, spleen, and pancreas a mild internal massage. This can support the functions of Jathara Agni (digestive fire), enhance digestion, relieve constipation, and promote peristalsis.

Reduced Bloating/Gas: The pose can lessen flatulence and discomfort in the abdomen by promoting digestive processes.

5. Rachana Sharir Correlation

The anatomical and physiological effects of Supta Vajrasana are deeply resonant with several core principles of Rachana Sharir and general Ayurvedic concepts.

Marma Points or Vital Energy Points:

Nabhi Marma: The Nabhi (navel) Marma, a crucial energy center linked to Agni and vital energy, is directly impacted by the deep abdominal stretch.
Hrudaya Marma: This aspect of Prana Vayu and respiratory/cardiac function is influenced by the opening of the chest.
Amsa Marma & Griva Marma: Energy flow is encouraged by the stimulation of pertinent Marma points in the upper body and neck.

Srotas (Channels): The thorough compression and stretching facilitate the clearance and appropriate operation of different Srotas:
Annavaha Srotas (Digestive Channels): Agni stimulation and increased peristalsis are two benefits of the Annavaha Srotas (digestive channels).
Rasavaha Srotas (Plasma Channels): Better lymphatic drainage and circulation. Via visceral massage.

Mutravaha Srotas (Urinary Channels): Indirectly support kidney function.
Majjavaha Srotas (Nervous Channels): Calming effect on the nervous system.

Agni (Digestive Fire): Jathara Agni, which is essential for metabolism, Ama digestion, and general cellular vitality, is directly supported by the abdominal stretch and visceral stimulation.

Dhatus (body tissues): Mamsa Dhatu (muscular tissue): lengthens and stretches the main muscle groups deeply, increasing their flexibility and decreasing their stiffness.
Asthi Dhatu (Bone Tissue): Long bones in the lower limbs and the spine's gentle alignment and traction support skeletal health.
Meda Dhatu or Adipose tissue: It can be subtly balanced with the help of abdominal compression and enhanced metabolism.

Dosha Balance: Vata Dosha: The stability provided by the reclining position, in conjunction with mild stretching, can calm Vata, thereby promoting groundedness and reducing restlessness and body aches.
Pitta Dosha: The calming effect, enhanced detoxification, and circulation can help balance agitated Pitta.
Kapha Dosha: Agni activation and better circulation help to move stagnant Kapha, which lessens heaviness and lethargy.

6. Precautions and Contraindications (Anatomically Based)

Although Supta Vajrasana has many advantages, its deep stretches and joint demands call for careful consideration of each person's unique anatomical limitations and underlying medical conditions.

Knee Injuries: People with severe arthritis of the knee, meniscal tears, ligamentous tears (particularly ACL/PCL), or knee pain should not take this medication. These conditions may be made worse by the deep flexion.
Ankle Problems: People who have limited dorsiflexion, recent sprains, or ankle pain should exercise caution.
Lower Back Pain/Disc Issues: Because of the extreme lumbar extension, people who have sciatica, herniated discs, or severe lower back pain should stay away from this pose. When exercising caution, it is essential to engage the core muscles properly.
Neck injuries: If you have severe cervical spondylosis or severe neck pain, you should avoid putting your head on the floor. Instead, use props (such as bolsters or blankets) beneath your head and neck to support its natural curve without putting undue strain on it.
Pregnancy: Because of the deep backbend and pressure on the abdomen, it is not advised during pregnancy, particularly in the later trimesters.
High Blood Pressure/Heart Conditions: Because of the inverted nature (if the head is below the hips) and possible circulatory shifts, people with uncontrolled hypertension or severe heart conditions should approach this pose very carefully.
Acid Reflux And Hiatal Hernia: These conditions may be made worse by the abdominal compression.

It is important to stress that, especially for therapeutic purposes, this pose should be done gradually and ideally with the assistance of a trained yoga instructor or Ayurvedic doctor. To lessen the intensity and make the pose more accessible, adjustments can be made with props (bolsters, blankets).

7. Conclusion

A particularly powerful pose, Supta Vajrasana has a profound effect on the human body on several anatomical and physiological levels. According to Rachana Sharir, its complex biomechanics—which include significant lumbar and thoracic spine extension, hyperextension of the hips, and deep flexion of the knee joints—create a cascade of therapeutic effects. Through better circulation and lymphatic drainage, it facilitates systemic detoxification, improves respiratory mechanics through chest expansion, and orchestrates a mild yet effective internal massage to the abdominal viscera. Its ability to stimulate the parasympathetic nervous system and affect important Marma points further highlights its all-encompassing effects on Srotas purification, Agni stimulation, and Dosha balance.

Scholars and practitioners of Rachana Sharir alike must have a thorough anatomical understanding of Supta Vajrasana. It makes it possible to apply the pose precisely, optimizing its deep therapeutic benefits while carefully reducing any risks. Supta Vajrasana is a testament to the advanced anatomical knowledge ingrained in classical yogic traditions, serving as a link between the physical and energetic aspects of healing and providing a potent instrument for overall health and wellbeing.

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