

ANATOMICAL UNDERSTANDING OF BHUJANGASANA IN INITIAL STAGES OF LUMBAR SPONDYLOSIS

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ABSTRACT

Lumbar spondylosis, a degenerative condition affecting the intervertebral discs and facet joints of the lower spine, commonly presents with chronic low back pain, stiffness, and restricted mobility. In Ayurvedic and yogic rehabilitation, Bhujangāsana (Cobra Pose) is widely recommended as a therapeutic posture due to its spinal extension and strengthening effects. This asana gently mobilizes the lumbar vertebrae, stretches the anterior spinal structures, and strengthens the paraspinal and gluteal muscles, thereby improving lumbar stability. Regular practice helps to enhance inter vertebral space, reduce nerve root compression, and promote better postural alignment. Additionally, Bhujangasana increases blood circulation to the lumbosacral region, supports disc nutrition, and reduces muscular spasm. It's mindful

breathing component further decreases pain perception by reducing stress-related muscle tension. Overall, Bhujangasana serves as an effective, non-invasive adjunct in the conservative management of lumbar spondylosis, contributing to pain reduction, improved flexibility, and enhanced functional outcomes. This article focuses on the anatomy and pathophysiology of lumbar spondylosis, its symptomatology and role of bhujangasana in its management.

KEYWORDS: Lumbar spondylosis, Bhujangasana, Anatomy of lumbar spine.

INTRODUCTION

Yoga, an ancient mind body discipline, has gained global recognition for its role in musculoskeletal disorders. Bhujangasana in particular which involves the lower back muscles when practiced regularly makes the spine stronger and more flexible thus improving the symptoms of lumbar spondylosis.^[1]

Bhujangasana affects on different body parts. Bhujanga means serpent. It's practice makes vertebral column flexible. Removes spinal pains and disorders. Removes menstrual disorders, activates abdominal organs and develops the chest and neck portion of the body. It is useful in leucorrhea, strengthens lung tissues and strengthens digestion and removes abdominal gas.^[2]

According to Gheranda Samhita.^[3]

Angushtanabhiparyanthamdhabhoomau vininyaset

Karatalaabhyam dharam dhritva urdhwashersha phaneeva hi

Dehaagnivardhate nityam sarvarogavonaashanam

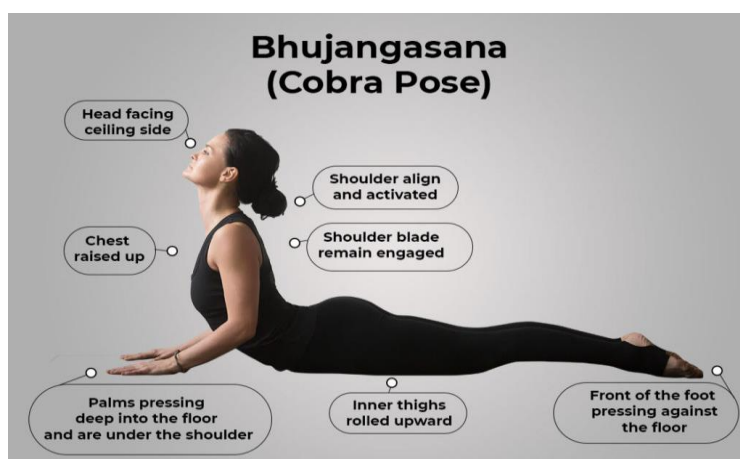
Jaagarti bhujagi devi bhujangasanaadhaanaat (Ghe.Sam.2/42-43)

This shloka explains the procedure and benefits of Bhujangasana and also tells that when this asana is performed the power of bhujaga devi is evoked.^[4]

Procedure^[5]

1. Lie flat on the stomach with legs straight and soles of the feet uppermost.
2. Place the palms of the hands flat on the floor below and slightly to one side of the shoulders; the fingers should point forwards and the arms should be bent with the elbows facing backwards.
3. Rest the forehead on the ground.
4. Close the eyes. Relax the whole body, especially the lower back. This is the starting position. Breathe out slowly and deeply.
5. Then as you breathe in raise the body in the way we will describe.
6. Slowly bend your head backwards such that the chin eventually points forwards and the back of the neck is compressed. Feel the stretch of the front part of the neck.
7. Now the arms must be brought into play. Slowly raise the head and shoulders of the ground by progressively straightening the arms.

8. Feel the flexion of the back roll down the spine starting from the neck region and working towards the lower back; try to feel the flexion of each individual vertebra throughout the movement. Remember, it is the arms that execute the movement.
9. Keep the back and legs as relaxed as possible.
10. Try to keep the navel in contact with the ground.
11. Continue slowly to arch the back as far as flexibility will allow.
12. In this position the back of your head should point towards your feet. Your arms may or may not be straight it depends on the flexibility of your back.
13. You will feel a pleasantly painful sensation in the lower back; this is good sign that you are doing the asana correctly. Hold this final pose as long as comfortable.
14. On exhalation return to the starting position.



Benefits^[6]

- This Asana increases the flexibility of back and massages the abdominal organs. In particular it influences the kidneys and the adrenal glands.
- It makes the spine stronger and more flexible.
- It stimulates the digestive system and thus relieves the constipation.
- It is useful in sciatica, neck stiffness, neck pain back ache and slipped disc.
- It massages the organs of the abdomen and pelvis such as stomach, pancreas, liver gall bladder and sexual and eliminative organs.
- It particularly tones the ovaries and uterus thus helps in leucorrhea, dysmenorrhea and amenorrhea as well.
- Thyroid gland is also stimulated.

- It helps in expanding the chest, which improves one's breathing habits thus it is helpful in bronchial asthma.

Anatomy of vertebral column and in specific lumbar vertebrae^[7]

The vertebral column possesses two basic functions.

- a. Provides protection to the spinal cord.
- b. Supports the trunk and transmits body weight to the lower extremities.

The entire vertebral column is composed of 33 vertebrae and their vertebral disc. Total length of the vertebral column in adult male is about 70cm and in adult female is about 60cm. Four-fifth of the total length is contributed by the vertebral bodies and one-fifth by the intervertebral discs. The vertebrae are arranged as follows.

- Cervical -7
- Thoracic-12
- Lumbar-5
- Sacral-5
- Coccygeal-4(may vary from 3 to 5)

Cervical, thoracic and lumbar vertebrae are free and each of them present individual entity. Sacral and coccygeal vertebrae are fixed. Five sacral segments unite to form the sacrum and four rudimentary segments unite to form the coccyx.

Lumbar vertebrae

Lumbar vertebrae are 5 in number. They possess massive reniform bodies, fairly conspicuous vertebral notches above and below the pedicles, non-overlapping laminae, quadrangular and horizontally directed spinous process, triangular and roomy vertebral foramina, pairs of transverse processes projecting laterally from the junction of pedicles and laminae with accessory tubercles on the postero-inferior part of the roots of transverse process, and pairs of superior and inferior articular processes projecting respectively above and below from the junctions of the pedicles and laminae. The superior articular facets are concave facing backwards and medially and inferior articular facets are convex facing forwards and laterally. The intervertebral discs between the vertebral bodies are thick in the lumbar region. The ventral convexity of the lumbar curve (secondary curvature) is produced more by the intervertebral discs than the intervertebral bodies.

Intervetebal disc

The intervetebral disc connect the upper and lower surfaces of the adjacent vertebral bodies and extend from the axis vertebrae to the sacrum (except between the C1 and C2 vertebrae). Each disc intervenes between the plates of hyaline cartilages which cover the surfaces of adjacent vertebral bodies and consists of annulus fibrosus at the periphery and nucleus pulposus in the central region.

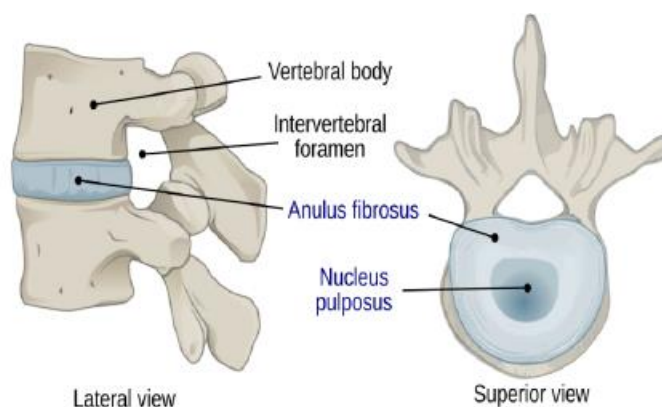
Annulus fibrosus-is composed of series of concentric laminae and fibres in alternate layers. Peripheral fibres consists of collagenous tissue and inner fibres are made of fibro-cartilages and blend with the nucleus pulposus without demarcation. In front and behind, the annulus blends with longitudinal ligaments.

Nucleus pulposus-is a gelatinous mucoid mass containing abundant water. The water content of the discs diminishes with the advancement of age. The nucleus pulposus is central in position in cervical and thoracic regions, but shifts somewhat posteriorly in the lumbar region.

Nutrition of the discs-Most of the disc is avascular, except the peripheral part which is supplied directly by the plexus of blood vessels. Therefore with the ageing process the disc undergoes gradual degeneration. Nuclear degeneration is more marked and it becomes desiccated.

Functions of the discs

- They impart resiliency to the vertebral column.
- Offer resistance to compression and act as shock-absorber.
- Ensure even distribution of compressive forces to the upper and lower surfaces of the vertebral bodies.



Spondylosis^[8]

Low back pain affects approximately 60-85% of adults during some point in their lives. Fortunately, for the large majority of individuals, symptoms are mild and transient, with 90% subsiding within 6 weeks. Chronic low back pain, defined as pain symptoms persisting beyond 3 months, affects an estimated 15-45% of the population. For the minority with intractable symptoms, the impact on quality of life and economic implications are considerable. Despite the high prevalence of low back pain within the general population, the diagnostic approach and therapeutic options are diverse and often inconsistent, resulting in rising costs and variability in management throughout the country. Lumbar spondylosis is one among the leading cause of low back pain.

Lumbar spondylosis is a degenerative disorder of the lumbar spine characterised by an insidious onset of pain and stiffness and radiologically by osteophytes formation.^[2] Bad posture and chronic back strain is the commonest cause, other causes are previous spine injury, disease of the spine, birth defects and old intervertebral disc prolapse. Conventional management of lumbar spondylosis primarily includes analgesics, non-steroidal anti inflammatory drugs, physiotherapy and in severe cases surgical intervention.^[3] Hence there is growing need for safe, cost-effective and holistic therapeutic approaches that address both physical and functional aspects of the disease.

Epidemiology^[9]

Degenerative spine changes are remarkably common in population studies. Symmon's et al. study of individuals aged 45-64 years identified 85.5% of participants to demonstrate osteophytes within the lumbar spine. O'Neill et al. explored osteophytosis within a UK adult population over age 50 years, finding 84% of men and 74% of women to demonstrate at least one vertebral osteophyte, with increased incidence among individuals with more physical activity, self reported back pain, or higher BMI scores. Despite marked variability within the population, men appear to have more significant degenerative changes than women, both with regard to number and severity of osteophyte formation.

Pathophysiology^[10]

The lumbar complex has always been a seat of degenerative changes due to excessive mobility over this area of spine. The annulus fibres undergo fibrillation, which predisposes annulus tears. The area of maximum mobility and stress L4-L5 and L5-S1 interspaces are common sites of such annulus tears. Dehydration sets in at the intervertebral disc resulting in

reduction of the disc space. The reduced disc space brings about approximation of the zygapophyseal and facet joints resulting in slackening in the posterior longitudinal ligament. The slackening of the posterior longitudinal ligament detaches it from the periosteum due to increased intradiscal pressure and disc extrusion results. The extruded disc material becomes fibrous and eventually gets calcified into a spur.

Intervertebral discs are believed to undergo what Kirkaldy Willis and Bernard first coined a "degenerative cascade" of three overlapping phases that may occur over the course of decades.

- Phase1 (Dysfunction phase) - describes the initial effects of repetitive microtrauma with the development of circumferential painful tears of the outer, innervated annulus, and associated end-plate separation that may compromise disc nutritional supply and waste removal. Such tears may coalesce to become radial tears, more prone to protrusion, and impact the disc's capacity to maintain water, resulting in desiccation and reduced disc height. Fissures may become ingrown by vascular tissue and nerve endings, increasing innervation and disc's capacity for pain signal transmission.

- Phase 2(instability phase)- is characterized by the loss of mechanical integrity, with progressive disc changes of resorption, internal disruption and additional annular tears, combined with further facet degeneration that may induce subluxation and instability.

- Phase 3(stabilization phase)-continued disc space narrowing and fibrosis occurs along with the formation of osteo-phytes and transdiscal bridging.

This gives rise to the following symptoms.^[6]

- Tenderness over the lower facet joints.
- Restriction of movements in all directions.
- Early morning stiffness.
- Generalised backache.
- Intermittent acute attacks of pain with periods of total relief.
- Radiological evidence of segmental scoliosis at L4-L5 or L5-S1 levels with facet degeneration.asymmetrical disc degeneration may also occur.

Treatment^[11]

- Non-steroidal anti-inflammatory medication.
- Local injection of anaesthetic agent or steroid preparation may be indicated in severe pain.
- Cryotherapy for the acute pain.
- Diapulse, ultrasound, TENS may be useful.
- Gentle spinal mobility exercises are initiated at the earliest.
- Gentle flexion rotatory manipulation is beneficial.

As the problem is mechanical in origin, prevention of its recurrence is difficult Therefore ergonomics advice on back care is extremely important.

DISCUSSION

Bhujangasana has the following actions on joints-spine extension, sacrum counternutation, hip extension, internal rotation, knee extension, ankle plantarflexion, glenoheumeral joint external rotation, elbow extension. forearm pronation.

Bhujangasana is a spinal extension posture that may be beneficial in lumbar spondylosis by improving spinal mobility, strengthening the paraspinal musculature, and reducing stiffness and pain. The posture produces controlled extension of the lumbar spine, which may help maintain functional range of motion and improve flexibility of the surrounding muscles and soft tissues. Regular practice may also enhance muscular endurance and postural stability, thereby reducing mechanical stress on the lumbar spine.

The improvement in pain and functional ability observed after Bhujangasana may be attributed to muscle strengthening, improved spinal mobility, increased local circulation, and reduction of muscular stiffness.

CONCLUSION

Thus, Bhujangasana may serve as a simple, low-cost adjunctive yogic intervention for improving pain, mobility and functional status in patients with initial stages of lumbar spondylosis, when practiced appropriately under guidance.

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