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# Evaluation of muscular involvement in *Yogasana*

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## ABSTRACT

Yoga plays important role in maintaining health and removing morbidity subsequently. All the four components of health i.e., Physical, Psychological, Social and Spiritual enhancement observed through yoga. *Asta Pada* (eight limb) namely *Yama, Niyam, Asana, Pranayama, Pratyahara, Dharana, Dhyan* and *Samadhi* are found in different classics. Even getting *Moksha* or liberation is an ultimate goal yet earlier step like *Yama, Niyama, Asana* and *Pranayama* are extremely beneficial for maintaining normal health. Among all 8 limbs *Yoga Asanas* are mainly related to clinical and therapeutic aspect. Improvement of muscle tone, muscle power and increase range of motion are noted in *Yogasana*. In the present research work an attempt has made to observe the involvement of different muscles in 32 *Asanas* stated by *Gherand Samhita* as well as 20 *Asana* in Common Yoga Protocol 2024, by Ministry of AYUSH.

**Key words:** *Yogasana, Procedure, Group of Muscle, Movement.*

## INTRODUCTION

Yoga plays key role in maintaining health as well as improvement of disease too. A total psychological, physiological and morphological enhancement in morbidity has observed since thousands of years ago. Based on 8 limbs i.e., *Yama, Niyam, Asana, Pranayama, Pratyahara, Dharana, Dhyan* and *Samadhi*, it bears goals to final attainment of life. Over the decade maximum clinical study are carried out based on *Pranayama* and *Asanas*, as these two are prime focus in improvement of quality of health. Still significance lacuna is observed regarding its mechanism or involvement of human body composition. Muscular tissue of all three types i.e., skeletal, visceral and

cardiac are involved in 84 *Asanas* in different way. In *Asana* mostly skeletal muscles get involved while in *Pranayama* visceral and cardiac muscles comes in action. However, the nomenclature of 84 *Asanas* are seems to compilation of different Yoga classics at different time. In this work an attempt has been made to elucidate the muscle involvement in 32 *Asanas* stated by *Gherand Samhita* as well as 20 *Asana* in Common Yoga Protocol 2024, by Ministry of AYUSH.

## AIM AND OBJECTIVE

1. Assessment of muscles involved in *yogasana*.
2. Evaluation of involvement of core muscles during *yogasana* procedure.

## MATERIALS AND METHODS

1. 32 *Asanas* of *Gherand Samhita* and 20 *Asana* mentioned in Common Yoga Protocol, 2024 has taken for study.
2. Different steps of *Yogasana* have been analyzed in the preview of location, action and result.

### 32 *Asana* of *Gherand Samhita*

- |               |              |
|---------------|--------------|
| 1. Siddhasana | 2. Vajrasana |
|---------------|--------------|

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3. Virasana	4. Matsyasnana
5. Utkatasana	6. Padmasana
7. Swastikasana	8. Dhanurasana
9. Matsyendrasana	10. Sankatasana
11. Bhadrasana	12. Sinhasana
13. Mritasana	14. Gorakshasana
15. Mayurasana	16. Muktasana
17. Gomukhasana	18. Guptasana
19. Paschimoutana	20. Kukkutasana
21. Mandukasana	22. Garudasana
23. Vrishasana	24. Salabhasana
25. Makrasana	26. Kurmaasana
27. Uttanakurma	28. Uttanmanduka
29. Vrikshasana	30. Ushtra Asana
31. Bhujang Asana	32. Yoga

## 20 Asana of Yoga Protocol

1. Bhadrasana	2. Makrasana
3. Savasana	4. Vajrasana
5. Bhujangasana	6. Tadasana
7. Ardh Ushtra Asana	8. Salabhasana
9. Vrikshasana	10. Ushtra Asana
11. Setubandhasana	12. Padahastana
13. Sasakasana	14. Uttanapadasana
15. Ardh Chakrasana	16. Uttan Manduk Asana
17. Ardh-halasanana	18. Trikonasan
19. Vakrasana	20. Pawanmuktasana

## RESULTS AND ANALYSIS

The core muscles involvement in different *Yogasana* has elucidated. These are distributed according to 3 poses - Standing, Sitting and Lying.

### A. Standing

SN	Name of Asana	Muscle involvement
1.	<b>Tadasana</b>	Muscles of back- Erector spinae, Trapezius, Psoas major  Muscles of thigh & leg- Quadriceps muscles, Tensor fascia Lata, Gastrocnemius and Soleus
2.	<b>Padahasta Asana</b>	Muscles of Arm, Forearm & Hand- deltoid, biceps brachii, Triceps brachii, coracobrachialis, brachioradialis, Lumbrical, Thenar & hypothenar.  Muscles of Back- Upper- Trapezius, Levator Scapulae, Rhomboideus, erector spinae and lower- quadratus lumbar, Iliopsoas  Muscles of Thigh & Leg- posterior compartment of thigh and leg
3.	<b>Vrikshasana</b>	Muscles of back- erector spinae, Trapezius, Psoas major  Muscles of arm & forearm- Triceps brachii, Biceps brachii, Coracobrachialis, Brachio radialis, Extensor group of muscles in forearm.  Muscles of chest & abdomen- Serratus anterior,

		<p>Pectoralis major, Pectoralis minor, and anterior abdomen wall</p> <p>Muscles of thigh, leg &amp; foot - Anterior, Posterior compartment, Adductor group of muscles, Gastrocnemius, Soleus, Flexor digitorum brevis, adductor hallucis, abductor digiti minimi.</p>
4.	<b>Ardh Chakra Asana</b>	<p>Muscle of Anterior Abdominal wall</p> <p>Muscles of back- Erector Spinae, Multifidous spinae, Quadratus lumborum, Latissimus dorsi</p> <p>Muscles of thigh- Anterior and Posterior compartment.</p> <p>Muscles of Gluteus- Gluteus Maximus, Gluteus Medius, Gluteus Minimi.</p>
5.	<b>Virbhadra Asana</b>	<p>Muscles of neck-muscles of anterior and posterior triangle.</p> <p>Muscles of arm &amp; shoulder - Triceps, Deltoid, biceps, coracobrachialis, brachioradialis and rotator cuff</p> <p>Muscles of anterior abdominal wall- external oblique, Internal oblique, transversus abdominis,</p> <p>Muscles of Thigh &amp; Leg- Hamstring, Gastrocnemius</p>
6.	<b>Garudasana</b>	<p>Muscles of gluteal &amp; medial compartment of thigh</p>

		<p>Muscles of leg- anterior and posterior compartment.</p> <p>Muscles of shoulder and arm- rotator cuff and deltoid, triceps.</p>
7.	<b>Trikonasana</b>	<p>Muscle of Muscles of Shoulder &amp; Arm-Rotator cuff muscles, Deltoid, Triceps brachii</p> <p>Muscles of forearm- anterior and posterior compartment.</p> <p>Muscles of triangle of neck- anterior and posterior</p> <p>Muscles of anterior abdominal wall except rectus</p> <p>Muscles of leg- posterior compartment</p>
8.	<b>Sirsasana</b>	<p>Muscles of Posterior triangle of neck</p> <p>Muscles of Shoulder &amp; Arm-Rotator cuff muscles, Triceps Brachii, Deltoid</p> <p>Muscles of forearm-flexor group of muscles.</p> <p>Muscles of Chest &amp; Abdomen- Serratus anterior, Pectoralis major, Pectoralis minor, Rectus abdominis, Transverse abdominis</p> <p>Muscles of Back- Iliopsoas, spinal extensor</p>
9.	<b>Katichakra Asana</b>	<p>Muscles of lower back and posterior abdominal wall</p> <p>Muscles of arm and forearm- anterior and posterior compartment</p>

		Muscles of neck- posterior triangle including sternocleidomastoid.
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**B. Sitting**

SN	Asana	Involvement of muscles
1.	<b>Sukhasana</b>	As it is meditating pose it relaxes the muscles of body especially pectoral region, head and neck.
2.	<b>Padmasana</b>	Muscles of medial and anterior compartment of thigh. Muscles of posterior compartment of leg Muscles of lower back and anterior abdominal wall
3.	<b>Parvatasana</b>	Muscles of anterior abdominal wall and posterior abdominal wall Muscles of thoracic wall Muscles of triangle of neck Muscle of arm- anterior and posterior compartment Muscles of Thigh & Calf- Hamstrings, Rectus femoris, Gastrocnemius, Soleus
4.	<b>Kukkutasana</b>	Muscles of Shoulder, Arm, Forearm & Hand- Rotator cuff muscles, anterior and posterior compartment. Muscles of anterior abdominal wall Muscles of lower back- Quadratus lumborum, Multifidous spinae

		Muscles of Thigh & Leg- hamstrings, Quadriceps, Gastrocnemius, Soleus, Peroneus longus, Tibialis anterior
5.	<b>Vajra Asana</b>	Muscles of Back- both upper and lower Muscles of Gluteal & Thigh- Gluteus maximus, Gluteus minimus, Gluteus Medius, anterior compartment of thigh Muscles of leg and ankles - flexor group of muscles, peroneus longus and peroneus brevis
6.	<b>Gomukhasana</b>	Muscles of Shoulder & arm- Rotator cuff muscles, posterior compartment. Muscles of back- Trapezius, Erector spinae, Rhomboideus, Subscapularis, Latissimus dorsi Muscles of thigh & Calf- Quadriceps, Hamstrings, Gastrocnemius, Soleus
7.	<b>Paschimutana Asana</b>	Muscles of back- erector spinae Muscles of gluteal- gletus maximus Muscles of thigh & leg- Hamstrings, Quadriceps, posterior compartment of leg Muscles of abdomen- anterior abdominal wall

8.	<b>Mandukasana</b>	<p>Muscles of arm- Deltoid, Triceps brachii</p> <p>Muscles of back- Erector Spinae, Rhomboideus, Latissimus dorsi, Quadratus lumborum, Multifidous spinae.</p> <p>Muscles of abdomen- anterior abdominal wall</p> <p>Muscles of thigh- anterior and medial compartment</p>
9.	<b>Uttan Mandukasana</b>	<p>Muscles of arm and shoulder- triceps and rotator cuff</p> <p>Muscles of back- latissimus dorsi</p> <p>Muscles for extensor of hip</p>
10.	<b>Bhadrasana</b>	<p>Muscles of pelvic floor including muscles of perineum</p> <p>Muscles of thigh- anterior and posterior</p> <p>Muscles of knee joint</p> <p>Muscles of leg- posterior compartment.</p> <p>Muscles of back- upper and lower.</p>
11.	<b>Matsyendrasana</b>	<p>Muscles of neck- Sternocleidomastoids, lateral muscles</p> <p>Muscles of shoulder &amp; Arm- Rotator cuff, Deltoid, Triceps Brachii</p> <p>Muscles of back- Trapezius, Latissimus dorsi, Erector spinae, Quadratus lumborum, Iliopsoas</p>

		<p>Muscles of abdomen- External Oblique, Internal Oblique, Transversus abdominis,</p> <p>Muscle of thigh- Hamstring, Quadriceps</p>
12.	<b>Mayurasana</b>	<p>Muscle of palm- thenar and hypothenar</p> <p>Muscles of arm &amp; forearm- anterior compartment</p> <p>Muscles of shoulder- Rotator cuff muscles</p> <p>Muscles of back- upper and lower</p> <p>Muscles of Gluteal.</p>
13.	<b>Vakrasana</b>	<p>Muscles of neck- Sternocleidomastoid</p> <p>Muscles of shoulder- roator cuff</p> <p>Muscles of back- erector spinae</p> <p>Muscle of abdomen- anterior abdominal wall</p> <p>Muscles of thigh- lateral compartment-</p>
14.	<b>Sasakasana</b>	<p>Muscle of back- Trapezius, Rhomboideus, Levator scapulae, Quadratus lumborum, Iliopsoas.</p> <p>Muscles of gluteal</p> <p>Muscles of thigh - anterior compartment</p> <p>Muscles of leg- posterior compartment</p> <p>Muscles of perineal region</p>

		<p>Muscles of abdomen- anterior abdomen wall</p> <p>Muscles of ankle and plantar extensor</p> <p>Muscles of neck- anterior and posterior triangle</p> <p>Muscle of shoulder, Arm &amp; Forearm-Rotator cuff muscles, anterior and posterior compartment</p>
15.	<b>Muktasana</b>	<p>Muscles of medial and anterior compartment of thigh.</p> <p>Muscles of posterior compartment of leg</p> <p>Muscles of lower back and anterior abdominal</p>
16.	<b>Swastikasana</b>	<p>Muscles of back- Rhomboideus, Latissimus dorsi, Erector spinae, Quadratus lumborum, Multifidous spinae</p> <p>Muscles of Gluteus &amp; thigh- Gluteus Maximus, Gluteus Medius, Tensor fascia Lata, Hamstring Muscles</p>
17.	<b>Sinhasana</b>	<p>Fascial muscles- orbicularis oculi, Masseter, Buccinator</p> <p>Muscles of neck- anterior triangle.</p>
18.	<b>Virasana</b>	<p>Muscles of back-Erector spinae</p> <p>Muscles of Gluteal &amp; thigh- Gluteus maximus, posterior compartment of thigh</p>

		<p>Muscles of leg- posterior compartment</p>
19.	<b>Goraksha Asana</b>	<p>Muscles of pelvic floor- Iliococcygeus, Pubococcygeus, Puborectalis</p> <p>Muscles of hips &amp; gluteal- Gluteus maximus, Gluteus minimus, Obturator externus, Adductor longus, Adductor magnus, Adductor brevis, Pectineus</p>
20.	<b>Sankatasana</b>	<p>Muscles of abdomen- anterior abdomen wall</p> <p>Muscles of thigh- anterior and posterior compartment</p> <p>Muscles of leg- posterior compartment</p>
21.	<b>Kurmasana</b>	<p>Muscles of chest &amp; Abdomen- Serratus anterior, Pectoralis major, Pectoralis minor, anterior abdomen wall.</p> <p>Muscle of back- lower back</p> <p>Muscles of foot, ankle, Leg &amp; thigh- Plantar aspect, Gastrocnemius, soleus, Quadriceps</p>
22.	<b>Uttana Kurmasana</b>	<p>Muscles of neck- posterior triangle</p> <p>Muscles of thigh- posterior aspect</p> <p>Muscles of leg- posterior aspect</p> <p>Muscles of ankle- anterior and posterior</p>

		Muscles of abdomen- anterior abdomen wall Muscles of back- upper and lower
23.	<b>Siddhasana</b>	As it is meditating pose it relaxes the muscles of body special thorax.

**C. Lying**

SN	Asana	Involvement of muscles
1.	<b>Pawanmuktasan</b>	Muscles of neck- anterior and posterior triangle Muscles of hip- flexor group Muscles of thigh- anterior compartment Muscles of back, posterior abdominal wall Muscles of arm0 posterior compartment.
2.	<b>Bhujangasana</b>	Muscles of neck- Platysma, Sternocleido mastoid Muscles of back- Trapezius, Rhomboideus, Latissimus dorsi, Levator scapulae, Erector spinae, Quadratus lumborum Muscles of shoulder & Arm- Rotator cuff, Deltoid, Triceps brachii, Biceps brachii Muscles of chest- Pectoralis major, Pectoralis minor, Serratus anterior Anterior abdominal wall- Oblique externus,

		Transverse abdominis, Rectus abdominis, Muscles of Gluteal & thigh- Gluteus Maximus, Gluteus Medius, Adductor magnus, Semitendinosus, Biceps femoris
3.	<b>Dhanurasana</b>	Muscles of neck- Platysma, Sternocleidomastoid Muscles of arm & forearm- anterior and posterior compartment. Muscles of Chest & abdomen- Pectoralis major, Pectoralis minor, Serratus anterior, anterior abdominal wall Muscles of back- Trapezius, Rhomboideus, Latissimus dorsi, Quadratus lumborum Muscles of pelvic floor Muscles of thigh & Leg - Hamstrings, Quadriceps, Gastrocnemius, Soleus
4.	<b>Halasana</b>	Muscles of back Muscles of pelvic floor Muscles of gluteal Muscles of thigh- posterior compartment.
5.	<b>Ardh Halasana</b>	Muscle of back- Trapezius, Rhomboideus, Quadratus, Iliacus, Psoas Muscles of Gluteal, Thigh & Leg- Gluteus maximus, Gluteus Minims, Gluteus



		Medius, Hamstring, Gastrocnemius, Soleus
6.	<b>Setubandhasana</b>	<p>Muscles of neck - levator scapulae, trapezius, Sternocleidomastoid</p> <p>Muscles of Shoulder &amp; arm-Rotator cuff muscles, Deltoideus medialis, Triceps Brachii</p> <p>Muscles of abdomen- oblique externus, Rectus abdominis, Transverse abdominis, Iliopsoas</p> <p>Muscle of back- Rhomboideus, Latissimus dorsi, Trapezius, erector spinae, Multifidi Spinae</p> <p>Muscles of Gluteal, thigh &amp; Leg-Gluteus Medius, Gluteus Maximus, Rectus femoris, Sartorius, Vastus intermedius, Vastus lateralis, Biceps femoris</p>
7.	<b>Sarvangasana</b>	<p>Muscles of shoulder &amp; Arm- Rotator cuff muscles, Triceps Brachii</p> <p>Muscles of chest &amp; Abdomen-Serratus anterior, Pectoris major, Pectoris minor, Internal oblique, external Oblique, Transverse abdominis, Rectus abdominis</p> <p>Muscles of back- Latissimus dorsi, Quadratus lumborum</p> <p>Muscle of Gluteal &amp; Thigh- Gluteus Maximus,</p>

		Gluteus medius, Sartorius, Vastus Intermedius, Biceps femoris, Rectus femoris.
8.	<b>Ushtrasana</b>	<p>Muscles of back- upper and lower</p> <p>Muscles of neck-anterior and posterior triangle</p> <p>Muscles of thigh- anterior and posterior compartment</p> <p>Muscles of leg- posterior compartment.</p> <p>Muscles of ankle</p> <p>Muscles of Shoulder, arm &amp; forearm-rotator cuff, anterior and posterior compartment</p> <p>Muscles of Chest &amp; abdomen- thoracic wall and anterior abdominal wall.</p>
9.	<b>Ardh Ushtra Asana</b>	<p>Muscles of neck- Platysma, Sternocleidomastoid</p> <p>Muscles of arm, forearm &amp; hand-deltoid, Triceps brachii, Biceps brachii, Brachialis, Brachioradialis, Palmaris longus and lumbricals.</p> <p>Muscles of Chest &amp; abdomen- Pectoralis major, Pectoralis minor, Serratus anterior External Oblique, Internal oblique, Transversus Abdominis, Rectus abdominis</p>

		<p>Muscles of back- Trapezius, Rhomboideus, Latissimus dorsi, Quadratus lumborum</p> <p>Muscles of gluteal, thigh &amp; Leg- Gluteus Maximus, Gluteus Medius, Gluteus Minimi, Hamstrings, Quadriceps, Gastrocnemius, Soleus</p>
10.	<b>Salabhasana</b>	<p>Muscles of Shoulder &amp; Arm- Rotator cuff muscles, Deltoideus posterior, Triceps brachii, Biceps brachii</p> <p>Abdominal muscle- Obliques internus, Obliques externus, Rectus abdominis, Transversalis abdominis</p> <p>Muscles of Back- Rhomboideus, Latissimus dorsi, Erector spinae</p> <p>Muscles of gluteus, Thigh- Gluteus Medius, Gluteus maximus, Quadriceps, Semitendinosus, Soleus</p>
11.	<b>Makarasana</b>	<p>Muscles of chest- Iliocostalis thoracis, Longissimus thoracis, Spinalis thoracis, Multifidus, Semispinalis thoracis</p> <p>Muscles of abdomen anterior abdomen wall</p> <p>Muscles of shoulder- rotator cuff</p> <p>Muscles of arm- posterior aspect.</p>

		<p>Muscles of back- Latissimus dorsi, rhomboid, Levator scapulae, trapezius</p>
12.	<b>Savasana</b>	<p>As it is relaxing posture most of the muscles are in inhibitory phase.</p>

**DISCUSSION**

In the process of performing *Yogasana* involved different group of muscles. Here 8 *Yogasana* found common in Gherand Samhita and common *Yoga* protocol, 2024. Hence total 44 *Asana* have observed in this research work. Here *Yogasana* performed maximum 23 in sitting pose followed by 12 pose in lying and 9 in standing. Instead of single muscle, muscle in group get used ex- extensor of forearm, rotator cuff of shoulder, hamstrings and adductor group of thigh etc. Present work highlighted the core muscles that may involved in different *Asanas*. 32 *Asana* of Gherand Samhita and 20 *Asanas* of Common Yoga Protocol 2024 by ministry of AYUSH has observed and morphological involvement of all those muscles also noted. During the procedure different part of muscle with its functional aspect are applied. Proximal attachment, distal attachment or whole muscle bulk seem to be in actions. Skeletal muscle when involved, mostly extension and flexion are affected although abduction, adduction and rotation are also involved. In Visceral muscles which are involuntary in nature affect through contraction and relaxation while Cardiac muscles facilitate pumping action through contractility. Some *Asanas* involve similar type of muscular involvement ex- *Padmasana, Vajrasana, Sukhasana, Siddhasana & Muktasana*. The muscle involved in above mentioned *Yogasanas* shows synergistic application and their modification also highlighted in this work.

**CONCLUSION**

Study reveals, in standing poses maximum muscles of back (upper and lower) are involved followed by muscles of Arm and Forearm (anterior compartment), Thigh (anterior and medial compartment), Leg

(posterior compartment), Shoulder (rotator cuff), Anterior abdominal wall and triangle of neck.

In 5 identical *Asana* of sitting poses i.e., *Padmasana*, *Sukhasana*, *Muktasana*, *Vajrasana* and *Siddhasana* mostly muscles of pectoral region, head and neck get affected followed by muscles of leg (posterior compartment) and ankle.

In lying poses, anterior abdominal wall, muscles of neck, pelvis, gluteal and thigh (posterior compartment) has observed.

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