Agenda

3pm- 3:15pm:
Welcome & Agenda Review
Centering Practice

3:15pm-4:55pm
Discussion: Exploring Human Skeletal & Muscular Systems
Movement Lecture: Examining & Experiencing Postures
Breakout Room Movement Workshop
Group Discussion
Break (5 Minutes)

5:00pm-6:30pm
Discussion: A Closer Look at the Respiratory System & Pranayama(breathing) practices
Break Out Discussion
Group Discussion
Session Closing & Weekly Assignment Offering

6:30pm-8pm
**Optional After class meet-ups*
Since we are not sharing space in person and we do not have the option to chat in the parking lot after class, each week I will leave the Zoom space open for individuals who may want to continue conversations.

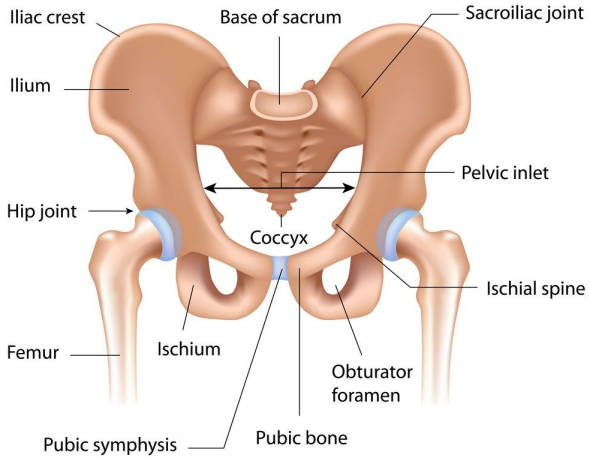
Movement & Breath

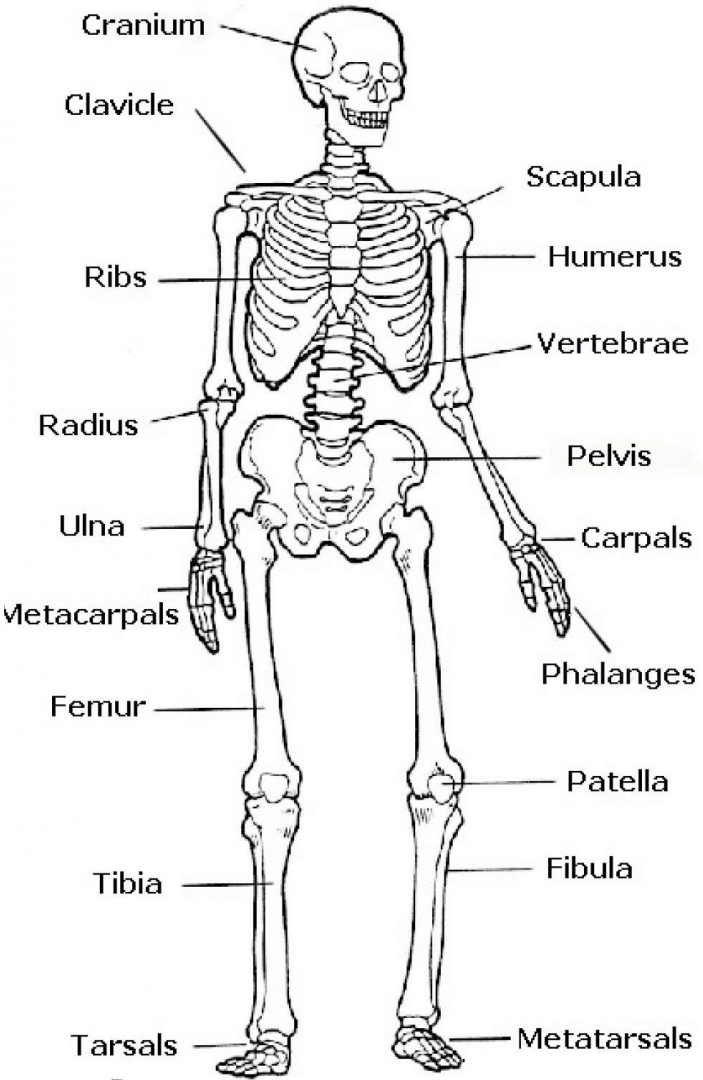
Exploring Anatomy for Yoga Practice

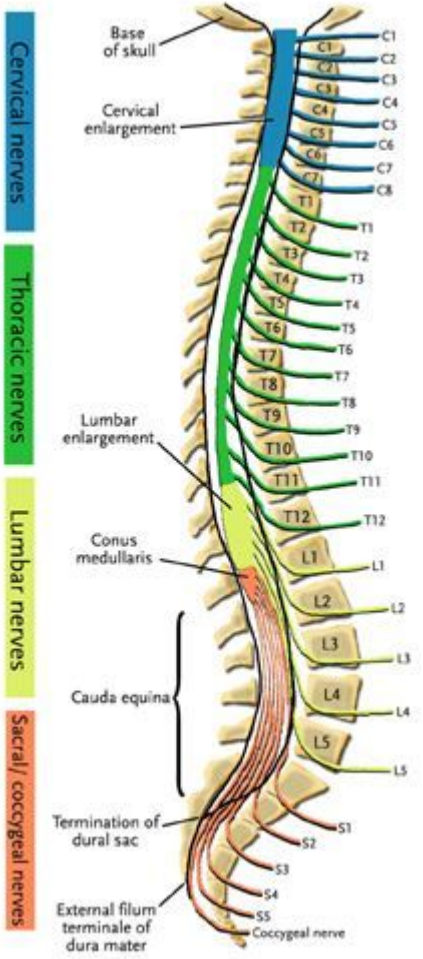
Skeletal System

[Skeleton Yoga Video]

The Pelvic Girdle

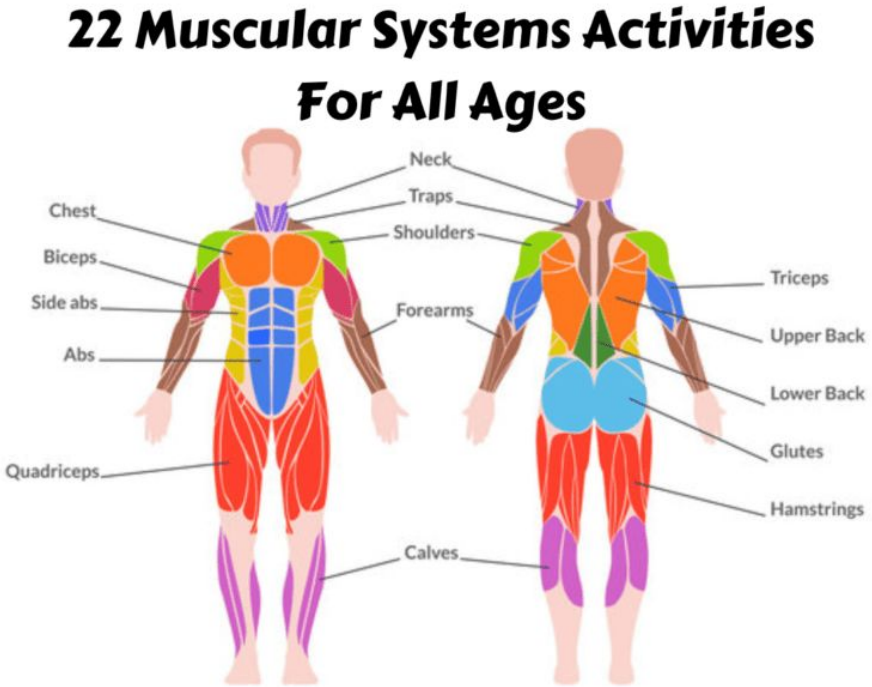


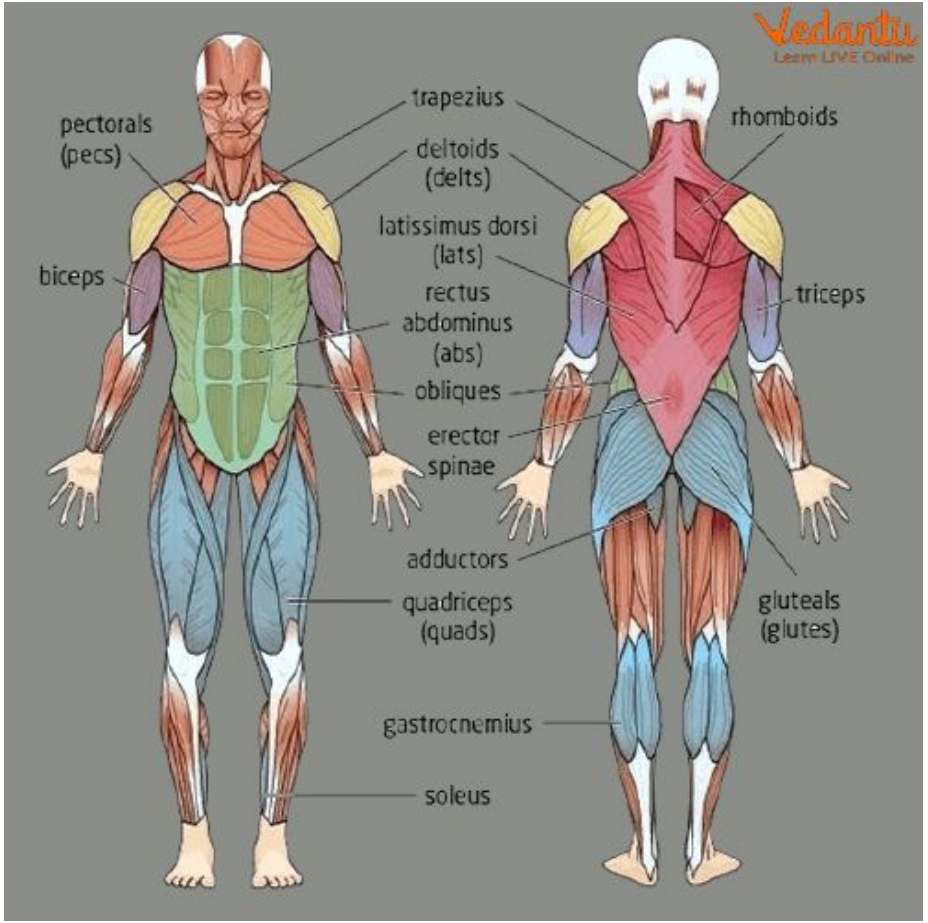




Muscular System

[Muscular System Video]





Antagonistic muscle pairs:

When we bend the elbow (flexion) the biceps contract and the triceps relax

Agonist = Biceps

Antagonist = Triceps

E.g. upward phase of a bicep curl

When we straighten the elbow (extension) the triceps contract and the biceps relax

Agonist = Triceps

Antagonist = Biceps

E.g. Straightening the arm to punch

Other antagonistic pairs include:

- Quadriceps & Hamstrings
- Hip flexors & Gluteus Maximus
- Gastrocnemius & Tibialis Anterior

Muscular contractions:

Isotonic muscle contractions are those that result in movement e.g. running and jumping

Isometric muscle contractions are when the muscle contracts but no movement e.g. holding a balance

Concentric & eccentric isotonic contractions:

Concentric muscle contraction is when the muscle shortens during the contraction (positive/upward phase)

Eccentric muscle contraction is when the muscle lengthens during the contraction (negative/downward phase)

<u>Upward phase of a bicep curl</u>

biceps are contracting concentrically

<u>Downward phase of a bicep curl</u>

biceps are contracting eccentrically

Muscles and their function:

Muscle	Location	Function	Sporting Example
Deltoid 	muscle on the upper arm and top of shoulder	Move the upper arm (shoulder) in all directions	Serve in tennis Front Crawl Cricket Bowling
Latissimus Dorsi 	Back muscle from the lower spine to the upper arm.	Adducts and extends the arm at the shoulder	Butterfly stroke Pull ups Rowing stroke
Rotator Cuff 	On the scapula in the shoulder	Rotation of the shoulder	Bowling in cricket Swimming front crawl
Pectoralis Major 	Muscle covering the chest	Adducts the arm at the shoulder	Forehand shot Hand off in rugby Boxing hook
Abdominals 	Side of the abdomen	Pulls the chest downwards Flexion of spinal column	Crunches
Biceps 	Front of Upper Arm	Elbow flexion (bending)	Boxing Uppercut Preparing to Throw a javelin
Triceps 	Back of Upper Arm	Elbow extension (straightening)	Throwing a javelin Hand off in rugby Boxing Jab

Muscle	Location	Function	Sporting Example
Gluteus Maximus 	Form the buttocks	Adducts & extends the hips pulling the leg backwards	Pull leg back before kicking a ball
Hip Flexors 	Front of the hip	Flexes the hip, moves the hip upwards	Lifting knees when sprinting
Quadriceps 	Front of Upper Leg	Knee extension (straightening)	Kicking a ball Jumping upwards on a lay-up shot
Hamstrings 	Back of Upper Leg	Knee flexion (bending)	Bending knee before kicking a ball
Gastrocnemius 	Calf muscle, attached by the Achilles tendon	Plantar flexion, points the toes	Running Diving and gymnastics
Tibialis Anterior 	Muscle that runs down the shin	Dorsi flexion, pulls toes upwards	Ski jumping Hurdling

The Motor Homunculus

The nervous system allocates brain power according to need. Regions of the body requiring high levels of conscious dexterity have larger representations in the brain, with more ciruitry and a greater number of neurons per muscle group. The hands and tongue are examples of such regions. The postural muscles, such as the psoas and gluteus maximus have a much smaller representation.

Scientists have mapped the areas of the brain devoted to given regions of the body, creating what is called a homunculus or "little man". This map is drawn from the motor cortex of the brain (highlighted in blue on the previous page). A similar map exists for sensory function.

Examining the homunculus reveals that the amount of brain power allocated to, the thumb is greater than that for the entire pelvic region. The brain is dynamic and malleable. Although the number of individual neurons does not increase, circuitry is rapidly formed between existing neurons to meet new demands. This is the basis for muscle awakening and body clairvoyance in yoga. As our practice progresses, our body consciousness expands.

Psoas and Quadriceps Stretch

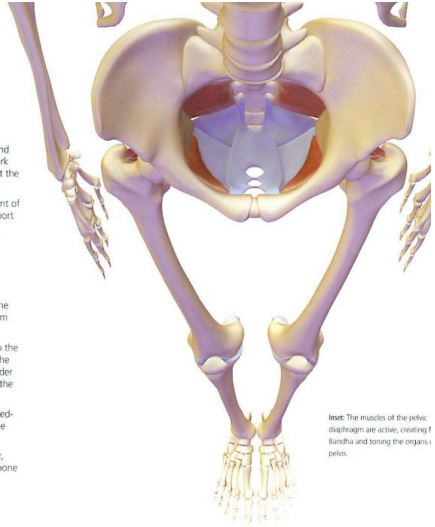
part two: practice

Use Part Two to learn about the specific poses. Muscles that are activating (contracting) are colored blue and muscles that are stretching are red. Most poses also have an inset image detailing some aspect of the musculoskeletal system in that particular pose.

Figure 7: The back hip extends and the knees flex, stretching the psoas, pectineus, rectus femoris, sartorius and adductors longus and magnus. Contracting the back leg gluteals intensifies the stretch of the hip flexors. Bending the front knee, flexing the front hip, and lifting the torso also intensifies the stretch. Attempting to draw the back knee toward the front foot for a few moments creates a facilitated stretch, stimulating the Golgi tendon organs of the muscles that are stretching.

Tadasana: Mountain Pose

Tadasana is the pose that precedes and follows the other standing poses. It is as though we have climbed to a plateau to gauge the transformative effects of our practice and collect our muscle-thoughts before continuing our ascent.



Inset: The muscles of the pelvic diaphragm are active, creating t Bandha and toning the organs pelvis.

Synergizing/Activating

Pelvis and Legs

1. The muscles that keep the pelvis upright, like a bowl, are located front and back. At the front of the pelvis is the psoas and at the back, the glutei or buttock muscles. The pelvis is kept balanced because the psoas flexes the thigh, and the glutei make the thigh lengthen, or extend. These two muscles balance each other.
2. If the legs tend to turn outward, the tensor fascia lata and the front part of the gluteus medius muscles at the front and highest point of the hip bones work to turn them inward.
3. The quadriceps muscles down the front of the thighs shorten to straighten the knees.
4. The calf muscles are working quietly to balance the ankles on the feet, the bedrock of the mountain pose.
5. And all this time, the muscles on the top and bottom of the foot balance each other, grounding the pose.

Trunk

1. The erector spinae (deeper back muscles) extend from the skull to the base of the spine and work with the muscles in the small of the back to lift the spine and hold you upright.
2. The abdominal muscles (running down the front of the trunk) work with the back muscles to support and balance the torso. Together, they create a tube around the torso and draw the rib cage downward.

Shoulders and Arms

1. The lower part of the trapezius, which spans the back, draws the shoulders down and away from the ears, lifting the chest.
2. The muscles connecting the shoulder blades to the spinal column, the rhomboids, combine with the middle part of the trapezius to draw the shoulder blades towards the midline. This action opens the front of the chest.
3. The pectoralis minor muscle contracts in a closed-chain fashion to lift the lower ribs and open the chest.
4. Two muscles, the infraspinatus and teres minor, connect the shoulder blade to the upper arm bone and roll the arms outward.
5. The triceps straighten the elbows.

Uttanasana: Intense Forward-Bending Pose

Uttanasana is a symmetrical pose, offering the opportunity to identify asymmetry and imbalances between the two sides of the body. It is also a form of inversion, since it takes the head below the heart and is used during periods of rest in the practice.

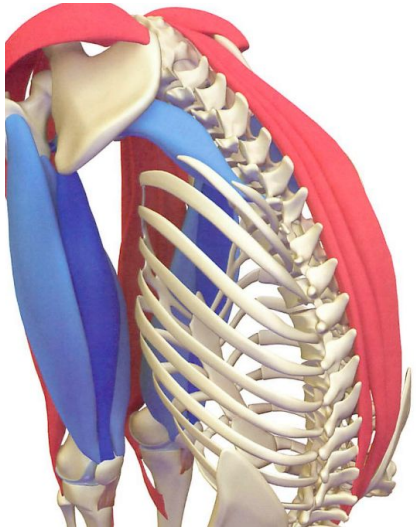
Synergizing/Activating

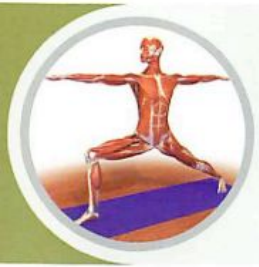
Pelvis and legs

1. The psoas, pectineus, and rectus femoris flex the hips and tilt the pelvis slightly forward.
2. The front part of the gluteus medius and the tensor fascia lata combine to turn the hips slightly inward so the kneecaps face directly forward.
3. The quadriceps, the large muscles down the front of the thighs, contract to straighten the knees. This action creates reciprocal inhibition, relaxing the muscles on the back of the thigh (the hamstrings).
4. The thighs are drawn together by the adductor muscles on the inside of each thigh.

Trunk and Shoulders and Arms

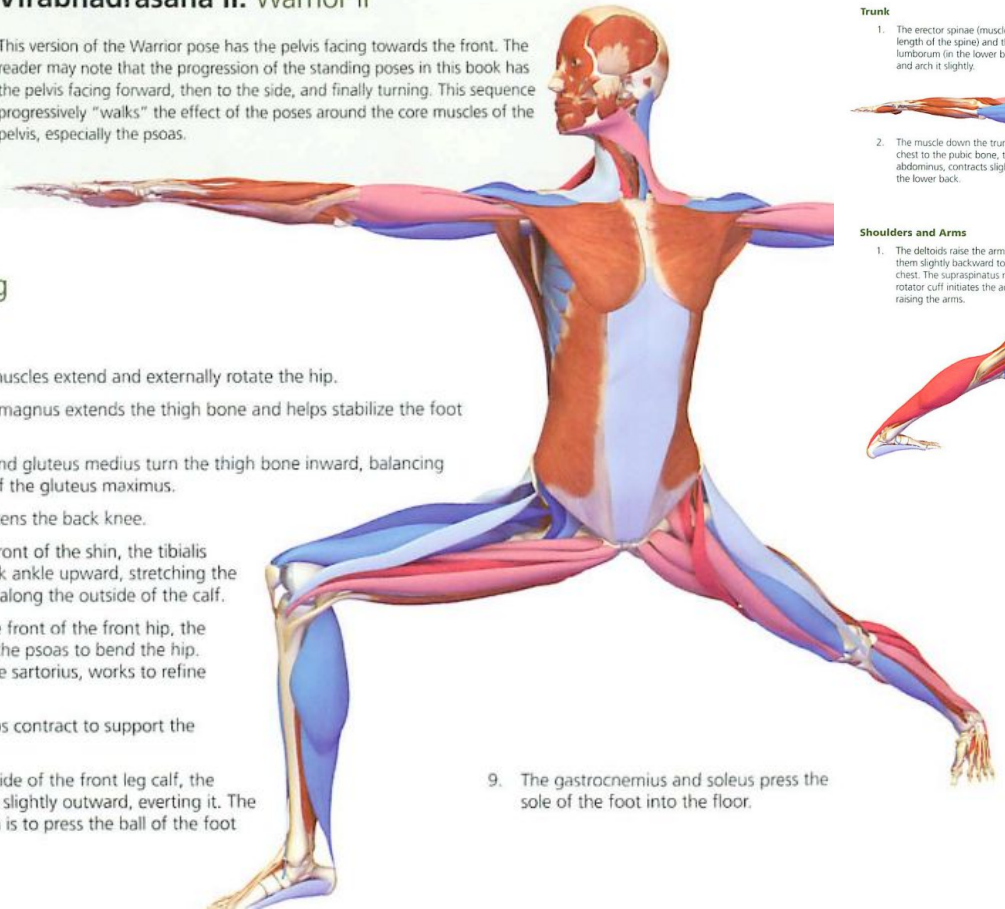
1. The large band-like muscle on the front of the abdomen, the rectus abdominus, contracts to bend the trunk forward.
2. The lower part of the trapezius, which spans the back, draws the shoulders away from the neck.
3. The front part of the deltoids moves the shoulders forward. The biceps bend the elbows. When the hands are fixed on the ground, these actions push the trunk deeper into the pose.





Virabhadrasana II: Warrior II

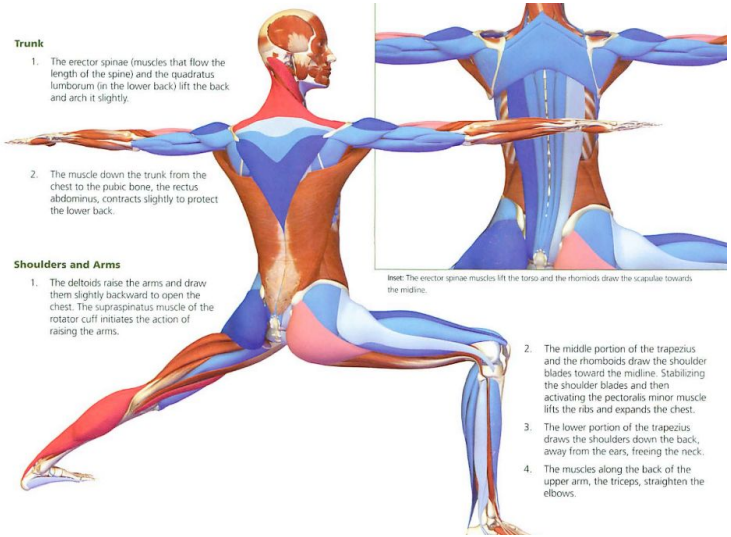
This version of the Warrior pose has the pelvis facing towards the front. The reader may note that the progression of the standing poses in this book has the pelvis facing forward, then to the side, and finally turning. This sequence progressively "walks" the effect of the poses around the core muscles of the pelvis, especially the psoas.



Synergizing/Activating

Pelvis and Legs

1. The back-leg buttock muscles extend and externally rotate the hip.
2. The back-leg adductor magnus extends the thigh bone and helps stabilize the foot on the floor.
3. The tensor fascia lata and gluteus medius turn the thigh bone inward, balancing the turning-out force of the gluteus maximus.
4. The quadriceps straightens the back knee.
5. The muscle along the front of the shin, the tibialis anterior, bends the back ankle upward, stretching the calf muscles and those along the outside of the calf.
6. The muscle high on the front of the front hip, the pectineus, works with the psoas to bend the hip. A muscle mid-thigh, the sartorius, works to refine this action.
7. The front leg quadriceps contract to support the body weight.
8. Muscles along the outside of the front leg calf, the peronei, turn the ankle slightly outward, everting it. The net effect of this action is to press the ball of the foot down.
9. The gastrocnemius and soleus press the sole of the foot into the floor.



Trunk

1. The erector spinae (muscles that flow the length of the spine) and the quadratus lumborum (in the lower back) lift the back and arch it slightly.
2. The muscle down the trunk from the chest to the pubic bone, the rectus abdominus, contracts slightly to protect the lower back.

Shoulders and Arms

1. The deltoids raise the arms and draw them slightly backward to open the chest. The supraspinatus muscle of the rotator cuff initiates the action of raising the arms.
2. The middle portion of the trapezius and the rhomboids draw the shoulder blades toward the midline. Stabilizing the shoulder blades and then activating the pectoralis minor muscle lifts the ribs and expands the chest.
3. The lower portion of the trapezius draws the shoulders down the back, away from the ears, freeing the neck.
4. The muscles along the back of the upper arm, the triceps, straighten the elbows.

Inset: The erector spinae muscles lift the torso and the rhomboids draw the scapulae towards the midline.

Virabhadrasana I: Warrior I

This fundamental standing pose is a type of lunge with the torso extending and the chest opening upward. Though still, it suggests disciplined muscle energy, waiting to be unleashed.

Synergizing/Activating

Pelvis and Legs

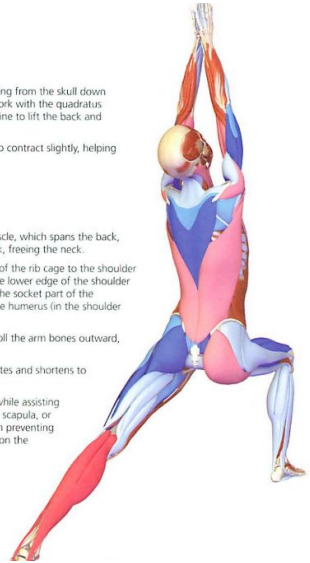
1. The buttock muscle of the back leg extends and turns the hip outward.
2. The tensor fascia lata works with the gluteus medius to move the femur away from the center line (abduction). At the same time, they offset the action of the buttock muscle in turning the hip, in its socket, outward by rotating the thigh bone inward.
3. The large muscle along the inside of the thigh, the adductor magnus, extends and moves the thigh bone toward the center line.
4. The quadriceps straightens the knee.
5. The muscle along the front of the shin, the tibialis anterior, shortens to allow the ankle to bend and stretches the back leg calf muscles, as well as those along the outside of the shin, the peroneus longus and brevis.
6. At the same time, the front leg bends at the hip, aided by the shortening of the psoas and the pectineus. Balance is assisted by the sartorius bending the hip and turning the thigh outward.
7. The front leg quadriceps muscles contract to support the body weight.
8. Muscles along the outer aspect of the shin, the peroneus longus and brevis, turn the ankle and the front foot slightly outward, pressing the ball of the foot into the floor.
9. The calf muscle presses the sole of the foot into the floor.

Trunk

1. The erector spinae muscles, stretching from the skull down to the backbone near the pelvis, work with the quadratus lumborum muscle in the lumbar spine to lift the back and arch it slightly.
2. The rectus abdominus is engaged to contract slightly, helping protect the lower back.

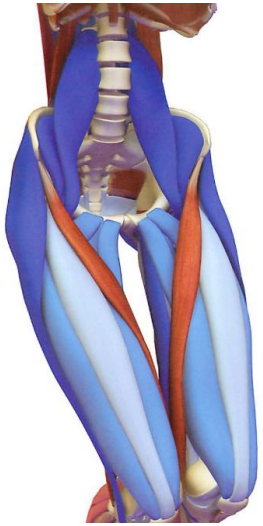
Shoulders and Arms

1. The lower part of the trapezius muscle, which spans the back, draws the shoulders down the back, freeing the neck.
2. The muscles running from the side of the rib cage to the shoulder blade, the serratus anterior, turn the lower edge of the shoulder blade outward. This action moves the socket part of the shoulder joint under the head of the humerus (in the shoulder joint).
3. The infraspinatus and teres minor roll the arm bones outward, opening the chest.
4. The front part of the deltoids activates and shortens to raise the arms.
5. The triceps straighten the elbows, while assisting the serratus anterior in rotating the scapula, or shoulder blade. This action assists in preventing impingement of the humeral head on the acromion process of the scapula.



Utkatasana: Chair Pose

Utkatasana is one of the symmetrical standing poses and is a natural progression from the Mountain Pose, Tadasana. It suggests potential energy to be unleashed. Utkatasana strengthens a number of the core muscle groups including the muscles that flex the pelvis, the quadriceps and the lower back muscles.



Synergizing/Activating

Pelvis and Legs

1. The hip flexors, including the psoas, pectineus, rectus femoris and sartorius hold the femurs in a slightly flexed position. The gluteus maximus counters this action. This combination of flexion and extension of the pelvis stabilizes the pose.
2. The quadriceps are active, holding the knees in partial flexion.
3. The adductor group draws the knees together.
4. The tibialis anterior muscles draw the top of the feet towards the shin.
5. The gastrocnemius and soleus muscles eccentrically contract to ground the sole of the feet on the floor.

Trunk

1. The quadratus lumborum activates to arch the lower back. The erector spinae muscles synergize this action.
2. The psoas provides a counterbalance to the lower back muscles, aiding to protect the lumbar spine.
3. The rectus abdominus is active, tethering the ribcage to the pelvis and preventing the ribs from bulging forward in the pose.

Shoulder and Arms

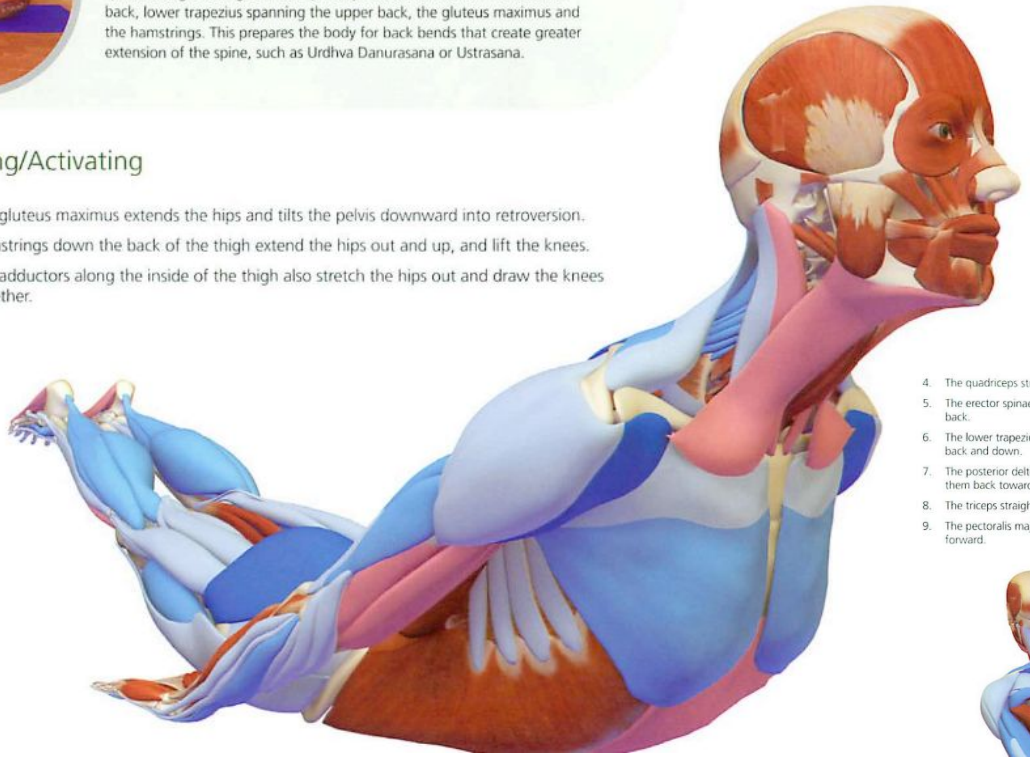
1. The middle trapezius and rhomboids combine to draw the scapula towards the mid-line of the back and open the chest.
2. The lower portion of the trapezius draws the shoulders away from the neck, freeing the cervical spine to extend.
3. The infraspinatus turns the shoulders outward.
4. The anterior deltoids activate to lift the arms over the head.
5. The triceps extend the elbows.

Salabhasana: Locust Pose

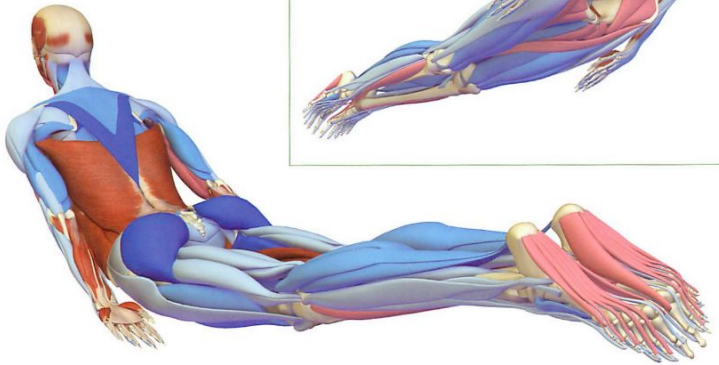
Salabhasana strengthens the muscles that arch the back, including the erector spinae along the length of the spine, quadratus lumborum in the lower back, lower trapezius spanning the upper back, the gluteus maximus and the hamstrings. This prepares the body for back bends that create greater extension of the spine, such as Urdhva Danurasana or Ustrasana.

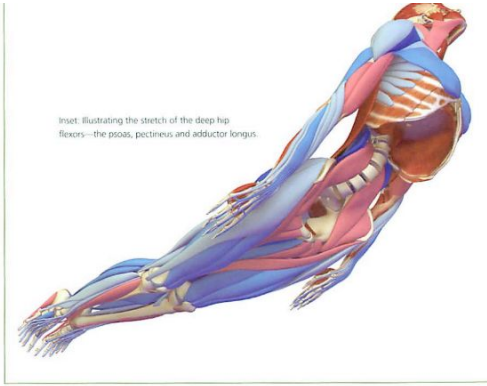
Synergizing/Activating

1. The gluteus maximus extends the hips and tilts the pelvis downward into retroversion.
2. Hamstrings down the back of the thigh extend the hips out and up, and lift the knees.
3. The adductors along the inside of the thigh also stretch the hips out and draw the knees together.



4. The quadriceps straighten the knees.
5. The erector spinae along the length of the spine arch the back.
6. The lower trapezius, spanning the back, draws the shoulders back and down.
7. The posterior deltoids across the back of the shoulders stretch them back toward the spine.
8. The triceps straighten the elbows.
9. The pectoralis major and minor aid to open the chest forward.





Inset: Illustrating the stretch of the deep hip flexors—the psoas, pectineus and adductor longus.

Balasana: Child's Pose

Balasana is a resting pose that can be used at any time one feels fatigue during practice. It gently relaxes the muscles on the front of the body while passively stretching the muscles of the back. This action releases the internal organs forward and opens the back of the thorax and lungs.

Savasana

Savasana, or Corpse pose, completes the cycle. The Sun Salutations have reset the muscle lengths in the brain and heated the body. The specific poses have lengthened the muscles surrounding the various joints, stimulating nerve conduction and illuminating the Chakras. The inversions have re-connected us to the parasympathetic nervous system. Now we are ready for deep relaxation.

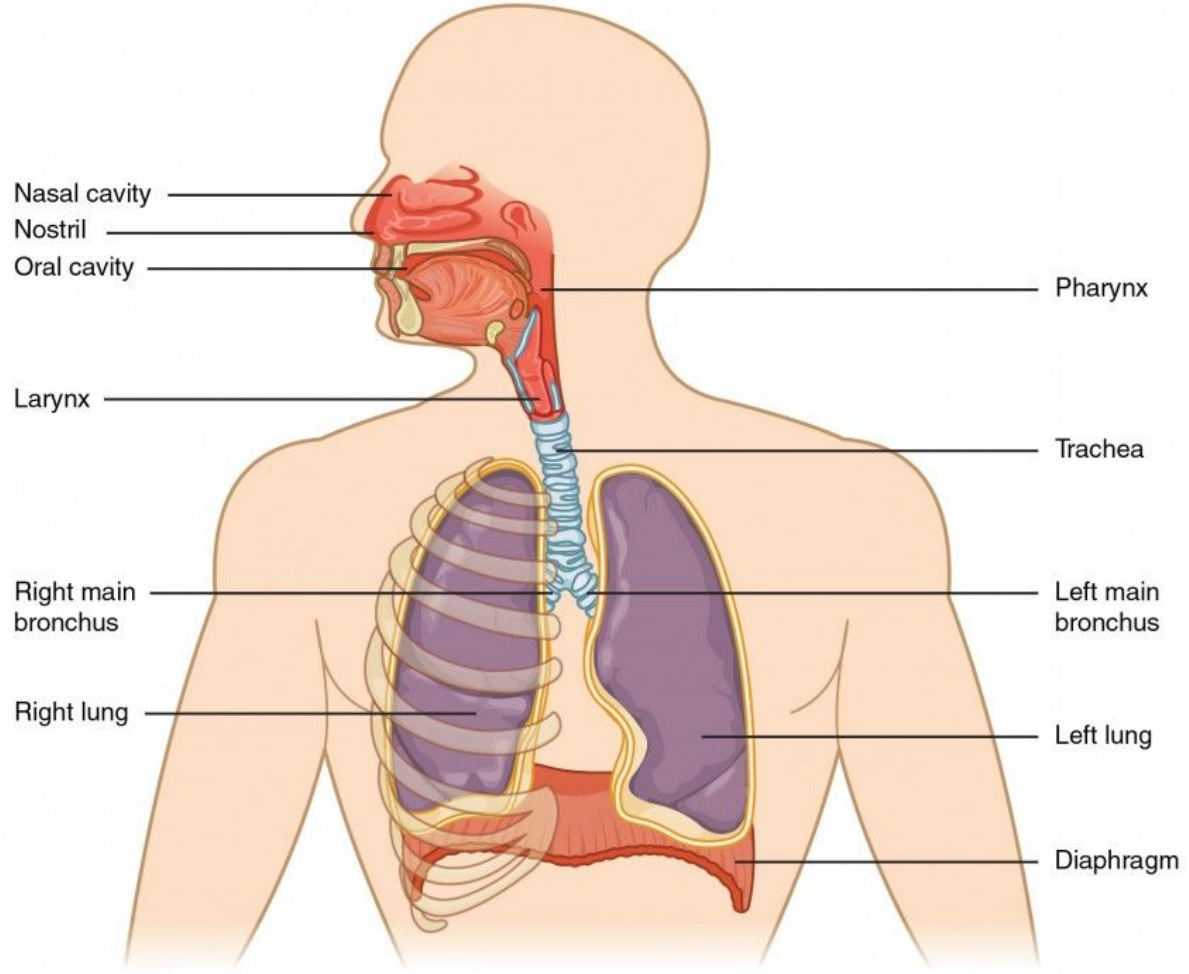
Theta brain wave patterns predominate in Savasana, with electrical activity oscillating and vibrating at a frequency of 4-8 Hz. This state of brain function engages the intuitive unconscious mind, accessing deep seated memories and connecting to the collective unconscious. Healing occurs in this state. Deeper states of Savasana take the brain wave pattern into Delta (0.5-2 Hz frequency). This is the brain wave state of dreaming.

Passively look inside during Savasana and see the subtle energetic body, illustrated here floating above the physical body.

Respiratory System

[Respiratory System Video]

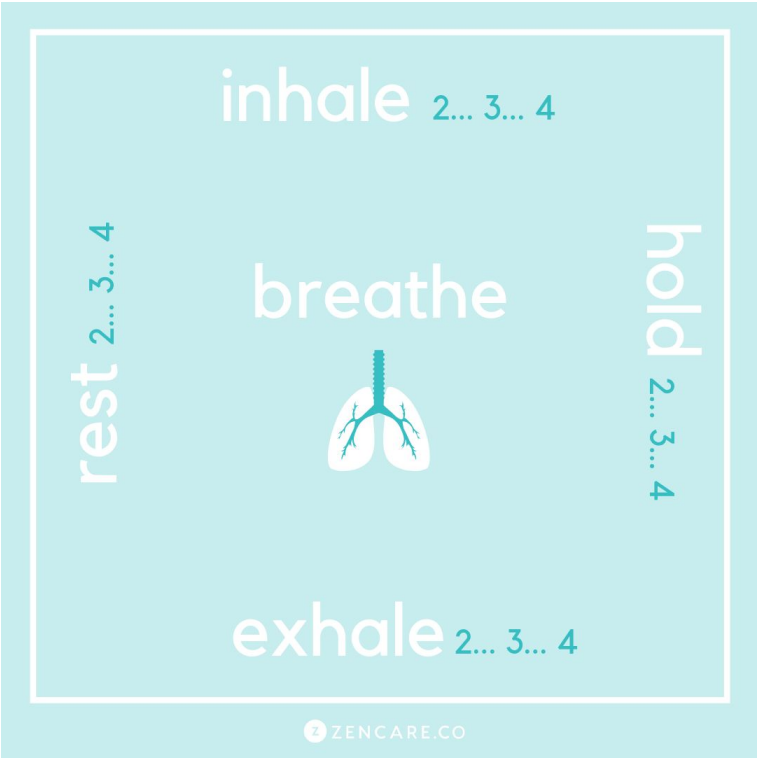
[Breath Animation Video]



4 Part Breath - Kumbhaka Pranayama

Supports Respiratory System & Circulation

Boosts Creativity, concentration, & Cognitive Function



Victorious Breath - Ujjayi Pranayama

Builds heat in the body

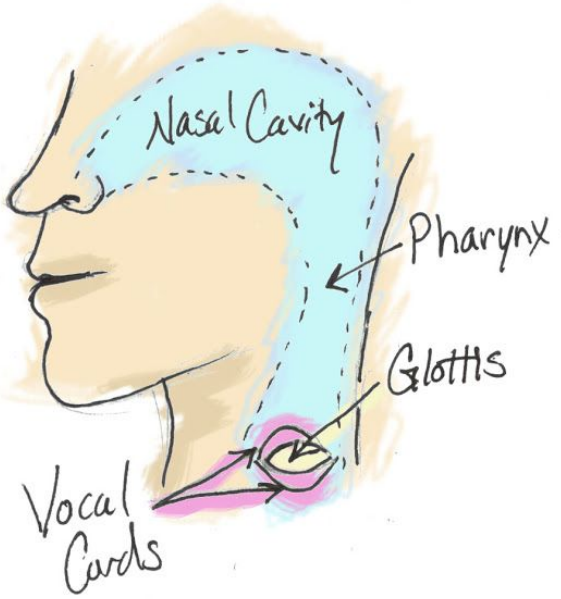
Increases Awareness / Presence

Decreases Blood Pressure & Calming

Supports lung capacity & oxygenation of blood

Reduces phlegm & relieves coughing

Supports digestion (Nervous System Calibration)



Alternate Nostril Breath - Nadi Shodhana

Supports Oxygenation of the blood

Supports clear & balanced respiratory channels

Calms Nervous System

Supports mental clarity/function

Lion’s Breath - Simhasana Pranayama

Relieves tension in head, face, & chest

Supports throat/voice

Theraputic for asthma, sore throat, & respiratory ailments

Supports treatment of bad breath

Bee Breath - Bhramari Pranayama

Relieves cerebral tension

Stimulates Pituitary & pineal glands

Supports throat ailments & voice

Supports mental clarity

Supports quality of sleep

Supports nervous system

Dissapates anger

Breath of Fire - Kapalabhati Pranayama

Rapid increases of Alertness

Balances Energy

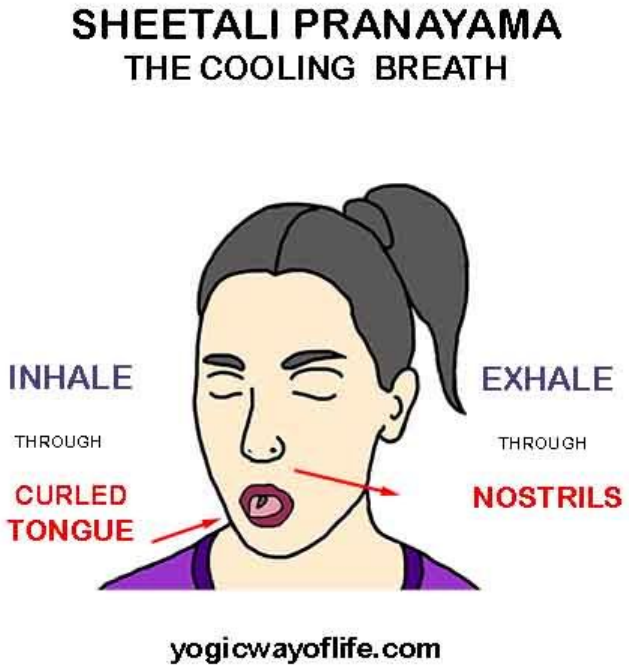
Stimulates Solar Plexus, supporting digestion

Cooling Breath - Sheetali Pranayama

Cools Physical Body

Encourages free flow of Energy

Cools and Calms the Mind



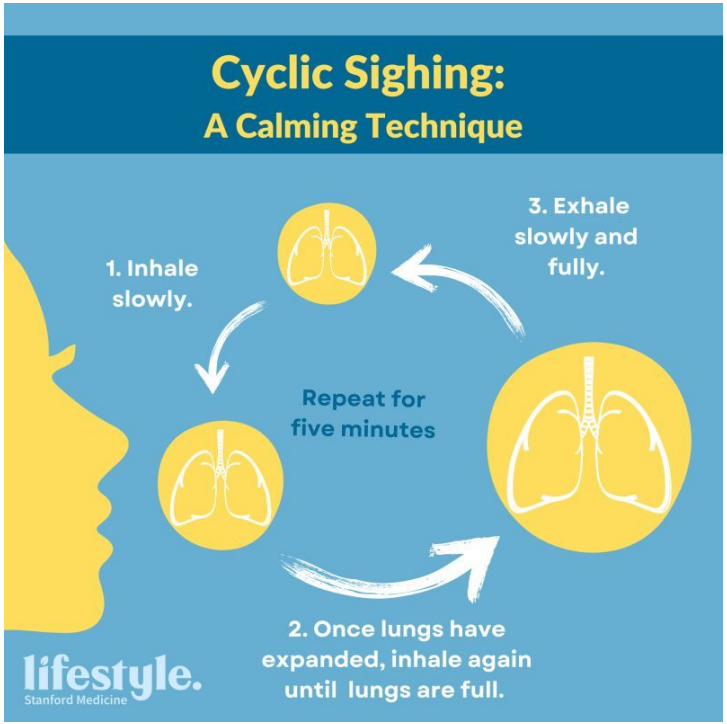
Cyclic Sighing

Decrease Anxiety

Supports Mood

Supports Rest Response

Increases Overall Body Calmness



Laughter

Supports Mood

Strengthens immune system

Supports pain reduction

Decreases stress

Supports relaxation

Releases endorphins