

YOGA For Repetitive Use Injury

Stacey Pierce-Talsma DO, MS, RYT
Spiercetalsma@une.edu
University of New England College of
Osteopathic Medicine



Objectives



**“Words fail to convey
the total value of yoga.
It has to be
experienced.”**

- B.K.S Iyengar

- Define yoga and identify the 8 limbs that make up its practice
- Discuss the pathophysiology of repetitive use syndromes and understand their healing process
- Compare and contrast yogic asana practice to Osteopathic concepts
- Review yoga literature on the application of yoga to chronic repetitive use injuries
- Apply and participate in yogic pranayama and asana

My Personal Journey as a YOGI

- Introduced to Yoga during my Holistic Health graduate degree at Western Michigan University
- Became a regular practitioner several years later
- Completed 200 hr YTT Course at Well Heart Yoga
- Have been implementing yogic concepts into my NMM/OMM specialty practice
- Real connection between yoga and Osteopathic practice as a link to mind body and spirit



Introduction to Yoga



Yoga for Every Body!

5 Reasons for starting yoga ⁽¹⁾

- Flexibility
- General conditioning
- Stress relief
- Overall health
- Physical fitness



15 million Americans

- practicing yoga more than 3 times a week in 2003

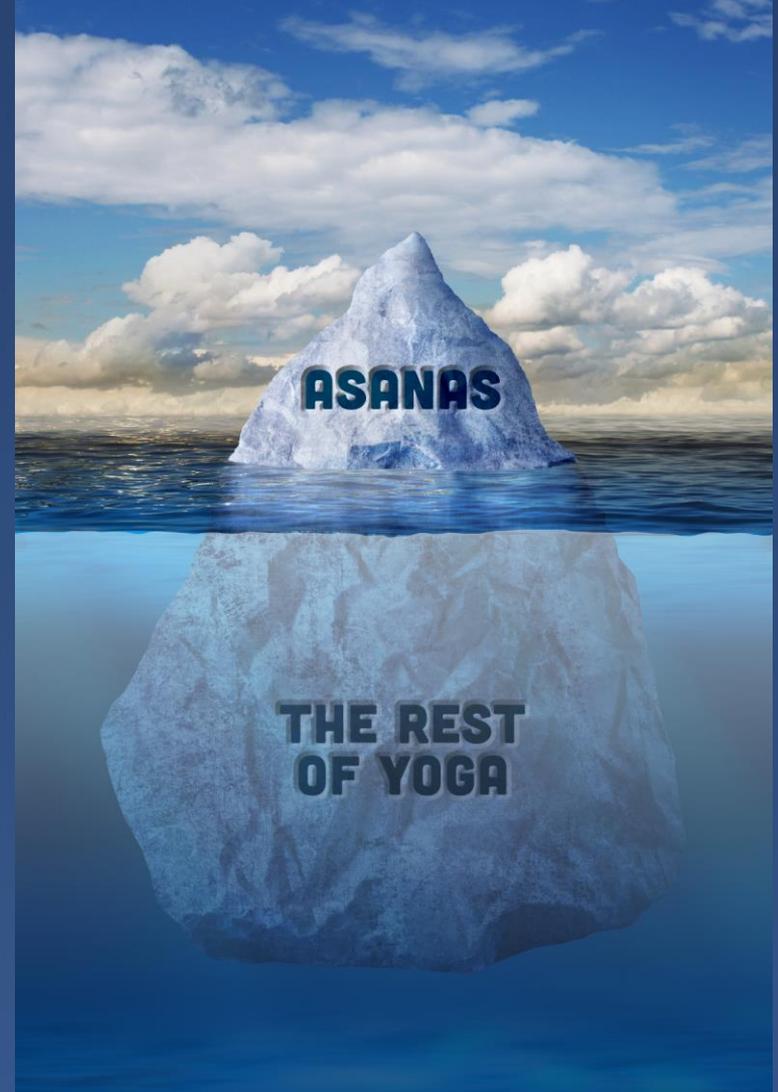
2012 study- 20.4 million Americans ⁽¹⁾

- practice yoga- increase of 29 percent!
- Spend an average of \$10.3 Billion a year on yoga classes and products
- 8.7 percent of U.S Adults
- 44.4% of non practioners are “interested in trying yoga”
- 82.2% of women, 17.8% men
- 38.4% one year or less, 28.9% 1-3 years, 32.7% 3 years or longer
- 44.8% beginners, 39.6% intermediate, 15.6% expert/advanced

(1) “Yoga in America Market study” 2012- *Yoga Journal*

What is Yoga?

- “To Yoke”- Union of the mind, body, and spirit
- A “systematic technology to improve the body, understand the mind, and free the spirit”
- A collection of methods to attain Samadhi
- Sanskrit word for HEALTH
 - SVASTHA
 - “Established in the self”
- “The light that yoga sheds on Life is something special. It is transformative. It does not just change the way we see things; it transforms the person who sees.”
 - B.K. S. Iyengar



The Eight Limbs of YOGA

1. Yama- external attitudes for guiding conduct within society

1. Nonviolence (Ahimsa)
2. Truthfulness (satya)
3. Abstaining from stealing (asteya)
4. Non excess (Brahmacharya)
5. Non-coveting (aparigraha)

2. Niyama- internal attitudes for personal discipline

1. Purity (sauca)
2. Contentment (santosa)
3. Discipline (tapas)
4. Study of the self (svadhaya)
5. Devotion (Ishvara Pranidhana)

3. Asana- Yoga Postures

4. Pranayama- Breath Work

5. Pratyahara-Withdrawl of the senses from their objects

6. Dharana- Contemplation of one's true nature

7. Dhyana- Meditation

8. Samadhi- Absorption in the self

- **Prana- “primary or vital air”**

“The Breath is intimately connected to the mind. It is said, “if the breath is agitated, so is the mind.” Therefore, to quiet the mind in order to direct its attention, we first learn to regulate the breath”

- Assists in distinguishing yoga from regular physical fitness

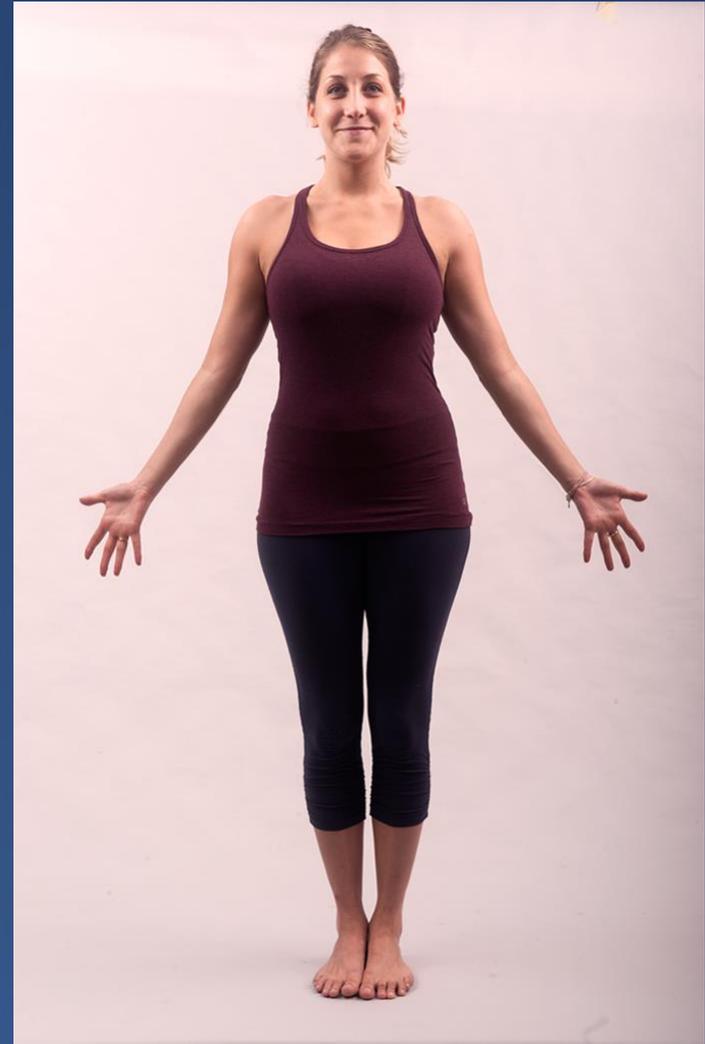
- “If you can learn to control your breath, you can learn to control, or at least influence, how you feel both emotionally and physically”

Pranayama- Breath Work

- **Observe your Breath**
- **Nadi Shodhana Breathing**
- **Ujjaye Pranayama**
 - Uj- upward
 - Jayi- victorious
 - “Helps the mind rise victoriously above its usually restless nature to experience the self”

Pranayama- Activity

- We will start in **Tadasana (mountain pose)**
- Feet parallel, hip width apart
- Lift the toes and press the four corners into the earth
- Engage the quadriceps by lifting the kneecaps
- Engage the core- navel to spine, posterior pelvic tilt- sacrum down
- Lift the ribcage up
- Lift the armpits and then relax the scapula down
- Widen the shoulders and open the clavicles
- Activate the arms and point fingertips towards the earth
- Lift the chin and activate with a slight chin tuck



Pranayama Activity

1. Warm hands together-
one hand on chest-
other on back- partner
breaths into hands-
expanding the ribcage
in an A-P diameter



Pranayama Activity

2. Massage the trapezius to help draw the scapula down

3. Lift the ribcage upwards and out of the pelvis



Pranayama Activity

4. Make sure the scapula are engaged- hands over scapula draw down and Inferior angle slightly anterior towards the heart- partners chest pushes forward



Pranayama Activity

5. External Rotation of the
humerous and lift upwards

6. Hands on their arms with a
slight pressure- have partner
breathe into hands to expand
out!



MEDITATION

- OM- AUM (aaahh, ooh, mmm, silence)

- The sound of the universe

- Gathers and focuses the mind into a more contemplative state

- IJOY study

- OM vs ssssss on MRI

- Potential for vagus nerve stimulation through auricular branches

- Found deactivation of the Limbic system
 - Autonomic and endocrine function in response to stimulus
 - Arousal, reinforcing behaviors and memory



Encouraging you to go Deeper.....

- **Restorative Yoga**

- Goal is to achieve physical, mental and emotional relaxation
- Use blocks, straps, bolsters and other props to promote relaxation and allow for surrender into the pose
- Focus on where/how you hold tension and use the breath to let it go

- **Yoga Nidra**

- Yogic sleep- a deep state of relaxation while still maintaining full consciousness

- **Yin Yoga**

- Slow yoga with poses that are held for longer periods of time- 5 minutes or longer
- Passive postures that target deep connective tissue stretching
- More meditative- focus is on going deeper





Exploring the Common Pathway of Yoga and Osteopathy

Philosophy

The Beautiful Comparison....



Osteopathic Medicine

- Mind, Body, Spirit Philosophy
- Structure and Function are reciprocally interrelated
- The Still Point
- Autonomic Balancing
- Innate self healing
- “The more we know of the architecture of the God of Nature, and the closer we follow it, the better we will be pleased with the results of our work.”

—A. T. Still, *Osteopathy Research and Practice*

Yoga

- Mind, Body, Spirit Philosophy
- Structure and function are reciprocally interrelated
- The Still Point
- Autonomic balancing
- Yoga uses the body to heal itself
- “To know the subtle workings of the body is to appreciate and respect the indwelling Being that remains changeless as our appearance changes from infancy to childhood to adulthood to old age”



Yogasanas-

The Physical Postures of Yoga

Primary Benefit

- Creates Space
 - Space for breath
 - Space for consciousness
 - Stilling of the mind
 - “lessening of the natural tendency for restlessness, and identification of oneself as living within the infinite stream of life”

Secondary Benefit

- Affects the physiology
 - Flexibility, strength, endurance
 - Cardiovascular and respiratory improvement
 - Can affect pain levels
 - From an Osteopathic perspective may assist in self improvement of somatic dysfunction and muscle imbalance

Yoga as OMT performed by yourself!

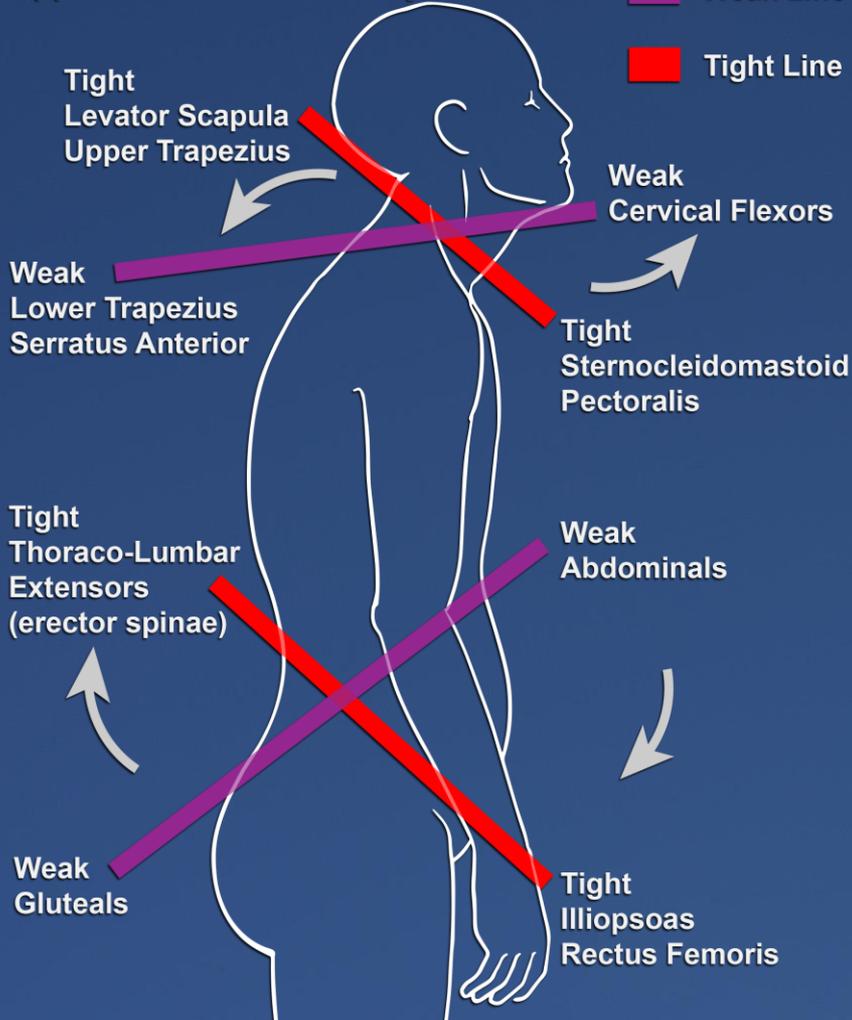
- Myofascial Release
- Low Velocity Low Amplitude
- Muscle energy
- Activation forces
 - respiration
- Articulatory
- Addresses factors contributing to trigger points
- Exercise prescription
- Sympathetic and parasympathetic balancing
- Agonist/antagonist muscular relaxation
- Conscious/subconscious action
- Attention to posture
- Attention to correct firing patterns

**“The success of Yoga
does not lie in the ability
to perform postures but in
how it positively changes
the way we live our life
and our relationships.”**

–T.K. V Deśikachar



Upper & Lower Crossed Syndrome



Upper and Lower Crossed Syndromes

- “Faulty posture results in alteration of the center of gravity, which initiates mechanical responses requiring muscle adaptation, Change in a joints mechanical behavior causes neuroreflexive alteration in muscle function through aberrant afferent mechanoreceptor stimulation of articular reflexes. Long term activation of abnormal articular reflexes causes change in cord memory from a normal to an abnormal adaptive program resulting in muscle imbalance.”

—Greenman, *Principles of Manual Medicine 3rd edition*

- Theoretical causes of muscle imbalance:

- Postural adaptation to gravity.
- Neuroreflexive due to joint blockage
- Central nervous system malregulation.
- Response to painful or noxious stimuli.
- Response to physical demands.
- Habitual movement patterns.
- Psychological influences.

- Other dysfunctions:

- Trigger points and tendonitis develop in muscles that tend to be weak and inhibited.
- Tears and ruptures develop in muscles that tend to tightness.
- Avulsion fractures and apophysitis common at attachments of muscles that tend to tightness.

Exercise Prescription

Restore length, strength and control of muscle function

- 1. Proprioceptive Retraining**

- a. Short foot, Balance

- 2. Stretch what is tight**

- 1. Strengthen what is weak**

- a. Improving muscle firing patterns

Comparing Yoga and Exercise Prescription

GREENMAN

“Exercise is a powerful tool in the management of patients with chronic musculoskeletal disorders and enhances the effectiveness of manual medicine interventions. The principles enumerated here focusing on centrally mediated and controlled motor balance, followed by stretching and subsequently with strengthening (retraining), have been most effective.”

YOGA

- “Yoga asanas involve isometric contraction of agonists and stretching of antagonists. Holding poses leads to increase in joint stability, lengthening of tight muscles improving their excursion on joints, thus overall improvement in function and reduction of pain.”
- Headstand for Rotator cuff Tear: shirshasana or Surgery- Fishman



Pathophysiology and Treatment

Overuse Syndromes

Epidemiology/ Pathophysiology of Overuse

- Due to
 - Repetitive movements
 - Awkward postures
 - Sustained forces
- Associated with
 - Psychosocial workplace factors
 - Psychological distress
 - Monotonous work
 - Poor relationships within the work place
 - Physical risk factors
 - Repetitive motions
 - Poor posture
 - Inadequate strength
- Several countries report 5-10% prevalence for nonspecific complaints of strain
- Approximately 50% of all sports injuries due to overuse
- Overuse accounts for approximately 7% of all physician office visits
- High economic burden
 - Absence from work
 - Workers compensation claims
 - 6.5 Billion every year in the USA
- Many hypothesis- though none strongly supported by evidence
 - Mechanical
 - Physiological
- Continuous Contraction with static load
 - Decreased circulation
 - Muscle fatigue
 - Pain sensors hypersensitive
 - Decreased elasticity
 - Friction
 - Tendon fatigue
 - Rate of injury exceeds rate of adaptation
 - Rat models with overuse show up regulation of genes associated with cartilage and down regulation of genes associated with tendon

The Tendon

- Healthy Tendon
 - Transmits force
 - Collagen with type 1 collagen, elastin
 - Healthy matrix allows for resistance of mechanical forces and self repair
- Tendon Injury
 - Inflammation, repair with collagen production, remodeling
 - Overuse- increase in type III collagen, collagen disarray
 - Increase in cellularity
 - neovascularization



Overuse Injury Treatment

- Best Treatments aimed at:
 - OMT
 - Activity Modification
 - Biomechanical Modification
 - Eccentric and heavy load exercises
 - Slow, Controlled, Progressive
 - Stimulates tissue remodeling and normalization of tendon structures
 - Stretching
- Yoga addresses these issues and:
 - Posture
 - Body awareness
 - Psychological well-being
 - Non gripping
 - Breath
 - Total body
 - Self healing

The Application of YOGA For Overuse Injuries

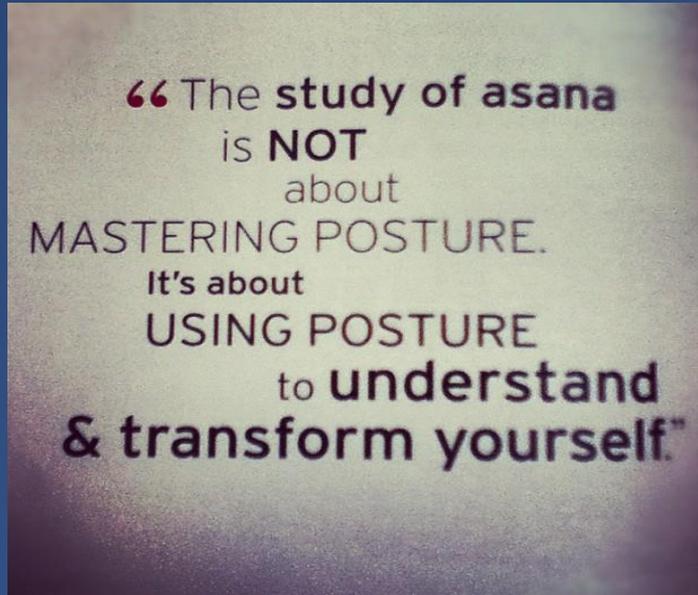


Possible Yoga Mechanisms of Action



- Endocrine system:
 - Decreased Cortisol
 - Enhanced Serotonin, Melatonin, Testosterone
- Nervous system:
 - Direct influence on the sympathetic and parasympathetic nervous system
 - Increased GABA
- Metabolism:
 - Better glycemic control
- Circulatory:
 - Decreases blood pressure
- Behavioral
 - Improved sleep
- Antioxidant
 - Increase in total levels of antioxidants
- Inflammation
 - Reduces pro-inflammatory cytokines
- Psychology
 - Improved satisfaction, self confidence and self control
- Musculoskeletal
 - Improves flexibility

“A critical shift in medicine has been the recognition that many of the damaging diseases of slow accumulation can be either caused or made far worse by stress” -Sapolsky



- “Practicing yoga has been shown to reduce pain, relieve tension, reduce risks of injury, improve posture, improve communication, increase energy and attention span, and enhance feelings of overall wellness and well-being”
- Improve function of ANS
- Increases awareness of body positioning
- Improves posture
- Decreases pain
- Increase flexibility
- Strengthen muscles
- Improve balance
- Increase oxygenation of tissues
- Improve joint health
- Improve function of the feet
- Improve proprioception
- Releases unconscious muscular gripping
- Encourages involvement in one’s own healing

How does Yoga do all that?

Asana

Pranayama

Tapas

Svadhya

Ishvara

Pranidhana

- Yoga addresses the human capacity for transformation
- Yoga acknowledges trauma, whether emotional or traumatic can create postural change
- Stress related conditions cause muscle tension
- Posture affects every system of the body
- “With the relief of chronic tension often comes insights into other aspects of your life that need change”
- Yoga is a balance of flexibility and strength- agonist and antagonist



Yoga Recommendations for patients with Overuse Injuries

- A balanced yoga practice
 - Asana
 - Pratyahara (withdrawal of the senses)
 - Meditation
 - Breathing techniques
 - Consider restorative yoga and yoga nidra
- All work to:
 - reduce anxiety
 - increase self awareness
 - focus on what they CAN do
 - look at lifestyle patterns leading to injury and re-injury
- Breathing practices
- Meditation
- Ahimsa- nonviolence
- Total body strong and flexible
- Attention to day to day practice
- Consider private rather than group classes
- Yoga as medicine vs taking a yoga class

Yoga For Carpal Tunnel⁽²⁾

- 22 treatment group, 20 control
 - Wrist splints vs yoga
 - (11 postures, relaxation- 1-1.5 hours twice weekly for 8 weeks)
 - “In this preliminary study, a yoga-based regimen was more effective than wrist splinting or no treatment in relieving some symptoms and signs of carpal tunnel syndrome.”
 - Improvement in grip strength
 - Pain reduction
 - Decrease in Phalen sign
- Osteopathic Considerations for carpal tunnel
 - Forearm- pronator teres, flexor digitorum
 - Wrist- transverse carpal ligament, hamate, scaphoid, lunate
 - Chest- Pectoralis
 - Thoracic inlet- scalenes, clavicle, first rib
 - Cervical Spine- Median nerve C 5,6,7,8 T1
 - Thoracic spine T1-4 Sympathetics

2. Garfinkel et al. “Yoga- Based Intervention for Carpal Tunnel Syndrome”. JAMA 1998;280:1601-1603

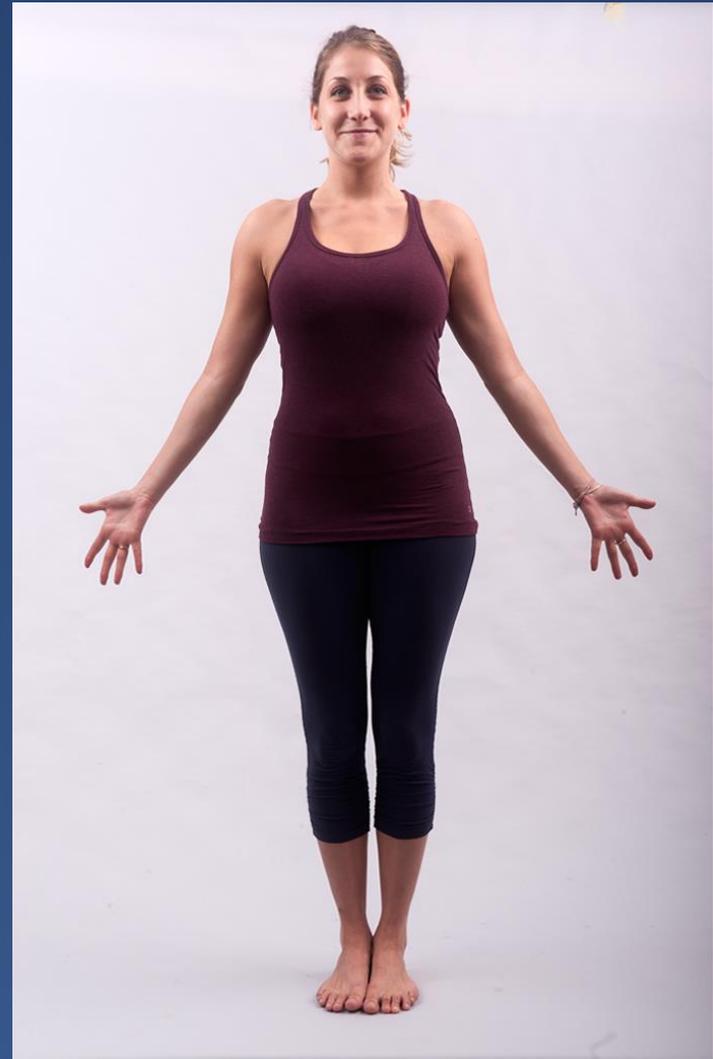
All posture descriptions adapted from:
(2), (3) B.K.S Iyengar “Light on Yoga”, (4) Joseph and Lilian Le Page “Yoga Toolbox for teachers and students Yoga Posture Cards for integrating Mind, Body and Spirit”

WARM UP

Tadasana

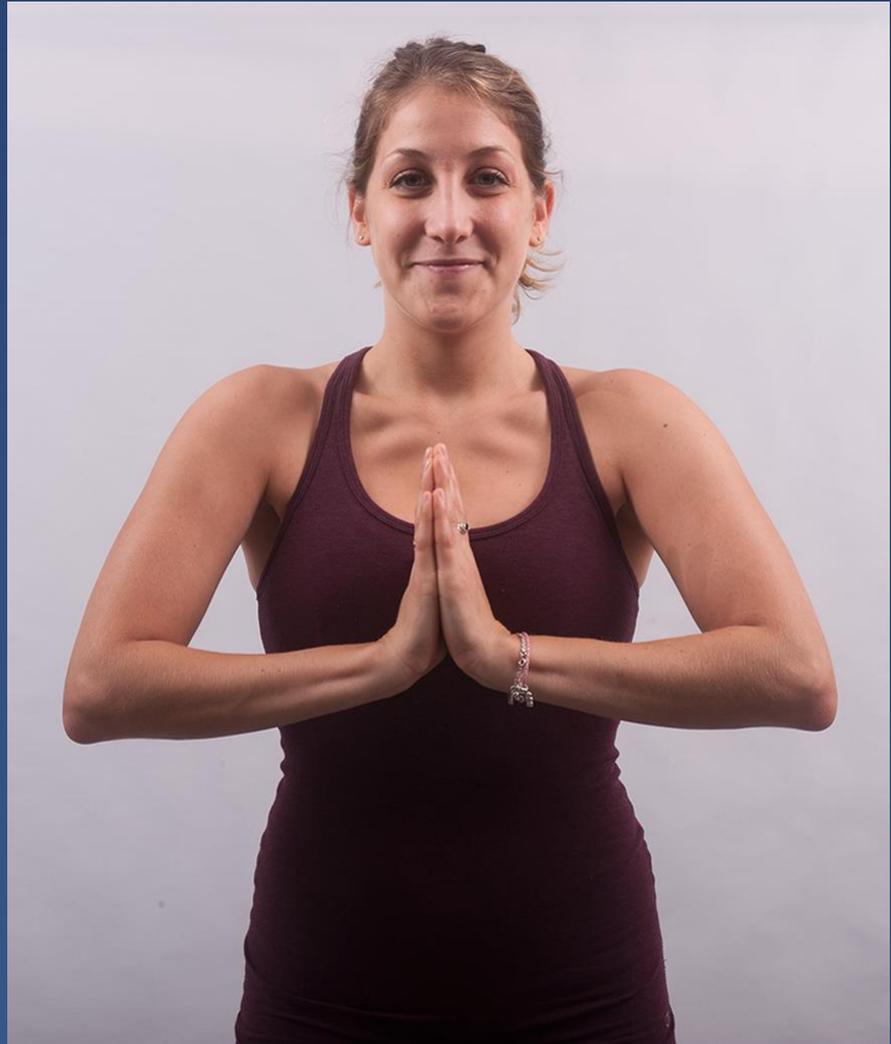
- Standing, Mountain Pose

- Feet parallel, hip width apart
- Lift the toes and press the four corners into the earth
- Engage the quadriceps by lifting the kneecaps
- Engage the core- navel to spine, posterior pelvic tilt- sacrum down
- Lift the ribcage up
- Lift the armpits and then relax the scapula down
- Widen the shoulders and open the clavicles
- Activate the arms and point fingertips towards the earth
- Lift the chin and activate with a slight chin tuck



Namaste Hands - Prayer Position

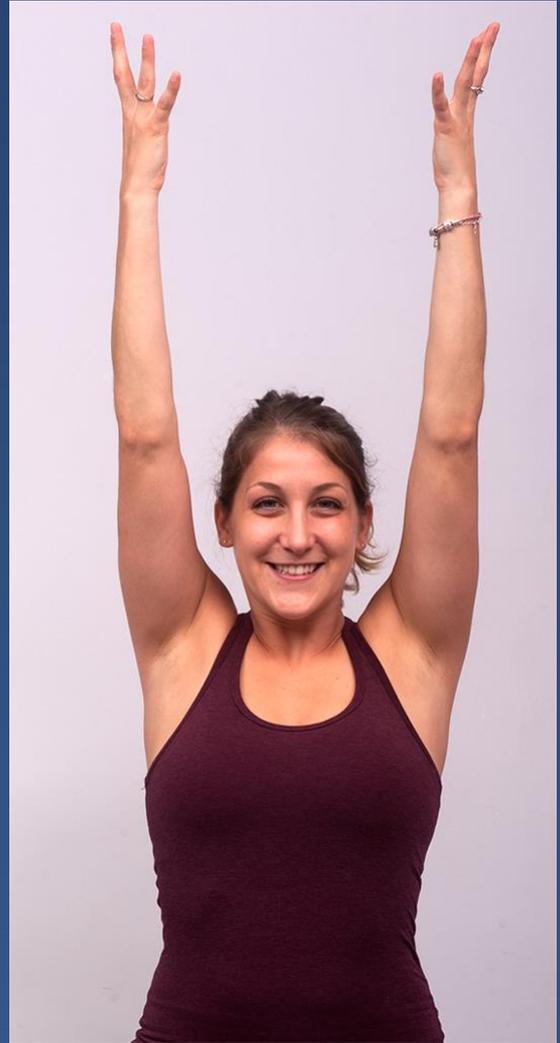
- Begin with hands in prayer position
- in front of your heart
 1. Press Palms and fingers together
 2. Press palms together fingers wide
 3. Press metacarpals together, hyperextend fingers



Urdhva Hastasana

- Arms Extended Overhead

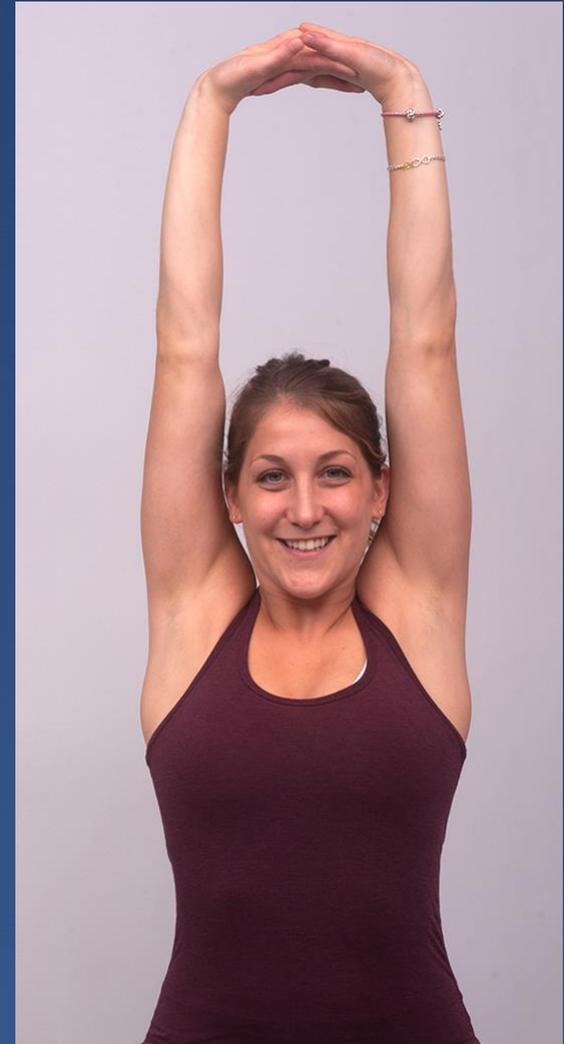
- Find your tadasana
 - Extend toes, contract quads, posterior pelvic tilt, engage the abs, ribcage lifts, shoulders draw back, arms ER, chin lifts and tucks
- Lift the arms overhead
 - Press fingers together
 - Draw the scapula down



Parvatasana

-Arms extended overhead
fingers interlocked

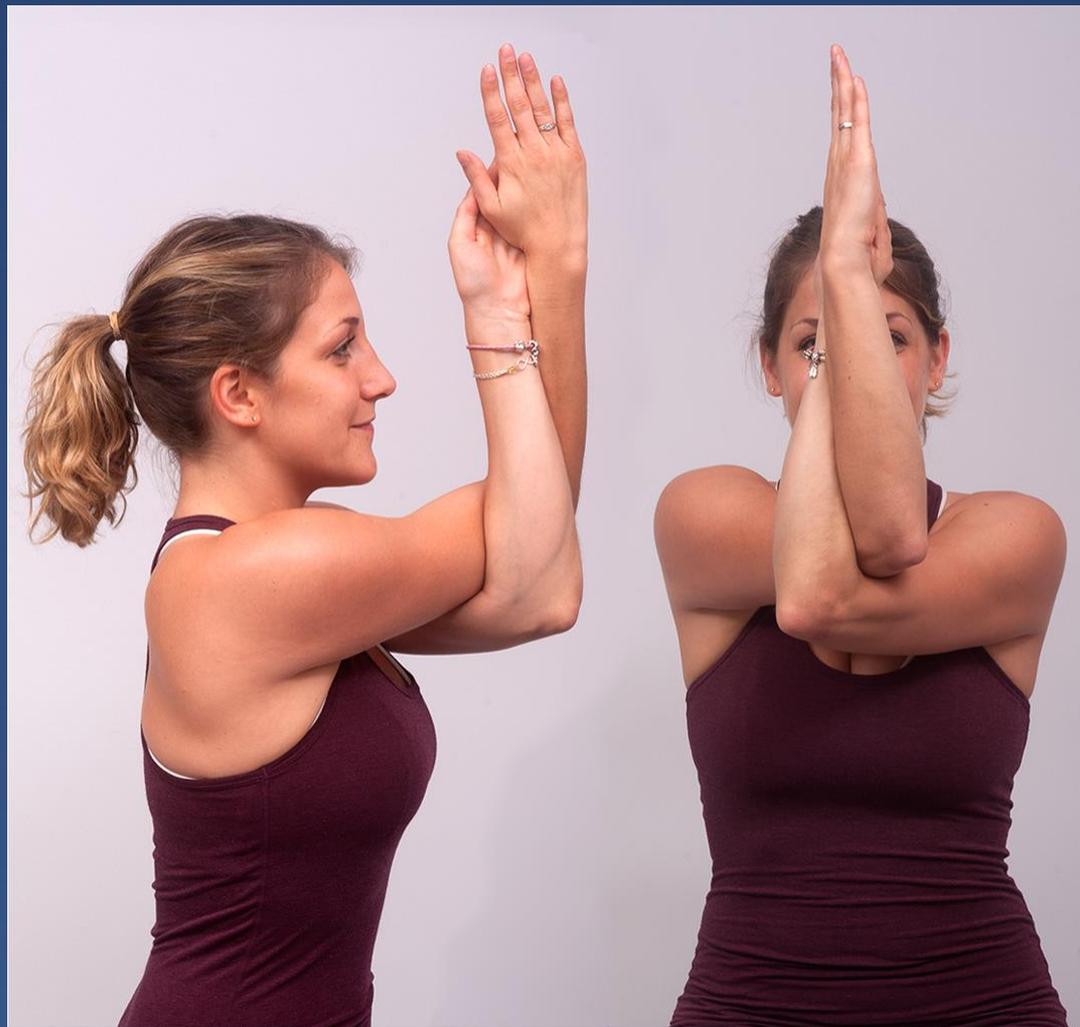
- Find your Tadasana
- Stretch your arms out in front of you and interlace your fingers with right thumb over left
- Reach overhead
- Draw the scapula down
- Lift the ribcage upward
- Lower the arms back out in front of you
- Repeat with left thumb over right



Garudasana

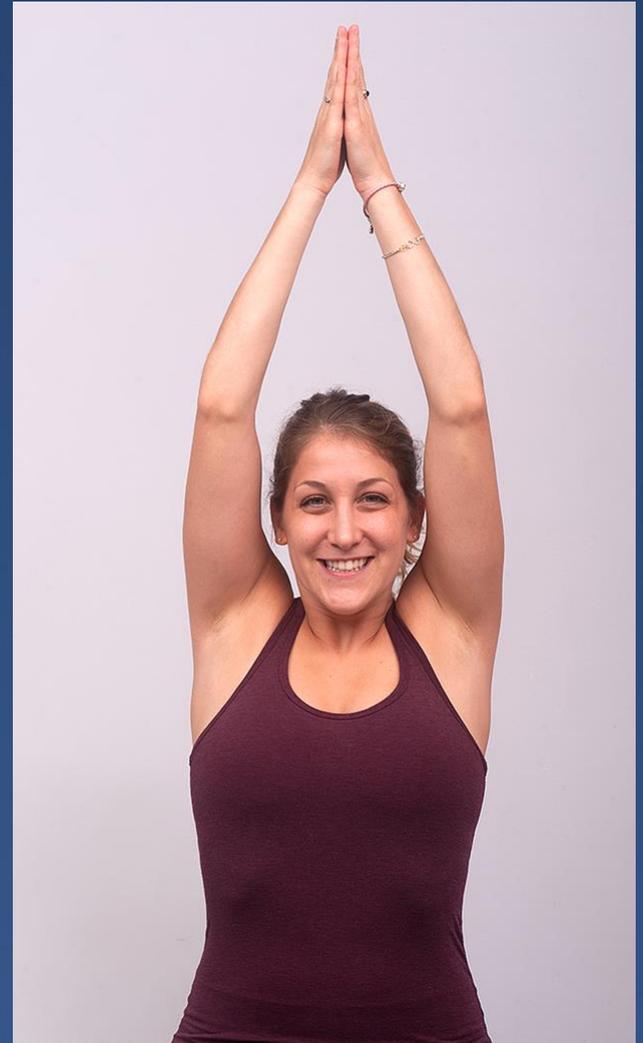
-Arms interlocked in front of body

- Find your Tadasana
- Bring your arms into a T out to the sides
- Draw your arms in front of you placing the right elbow under the left elbow
- Flex the elbows- rotate the palms to face each other and interlace the fingers
- Press the palms together, fingers straighten, push the elbows together pull the elbows down towards your chest and away from your chest
- Keep your thorax lifted, and the shoulder blades drawing down
- Raise elbows to shoulder height



Virabhadrasana 1—arms only -arms extended overhead palms together

- Raise the arms overhead, interlace the fingers and press the arms behind the ears
- Draw the head of the humerus back and scapula down
- Keep the pinky fingers turned slightly in
- If the shoulders raise up towards the ears separate the arms so that the shoulders can rest in a neutral position
- Allow the neck to lengthen, chin parallel to the earth



Half Uttanasana -90° forward Bend to the Wall

- Stand with feet hip width distance apart- lengthen through the spine
- Bring the arms overhead- relax the scapula
- Bend forward from the hips
- Hands touch the wall (can have palms rest on the wall) or rest on the knees
- Stretch
- Return to stand and repeat on the other side



Namaste

-hands joined in prayer position behind the back

- Stand in Tadasana
- Arms reach behind back
- Palms press together pointing down
- Turn towards the back and then up
- Palms press together pointing up
- Try to bring them up as far as you can behind your back
- Press shoulders back and down
- Modifications
 - arms behind back- grasp opposing elbows



Urdhva Mukha Svanasana

- Upward Dog pose—supported
emphasis on hand placement

- **Chair or Table**

- Stand hip width, bend forward and place palms on chair shoulder width apart
- Straighten your arms and lift pelvis- Pull your chest through your hands- lifting with your arms- knees and hips are straight- extension into the spine
- Draw the scapula onto the back, shoulders down, slight bend in the elbow
- Engage the glutes, draw the sacrum down (posterior pelvic tilt) engage the quads
- Raise sternum and ribs- hold shoulders back
- Look up- chin tuck

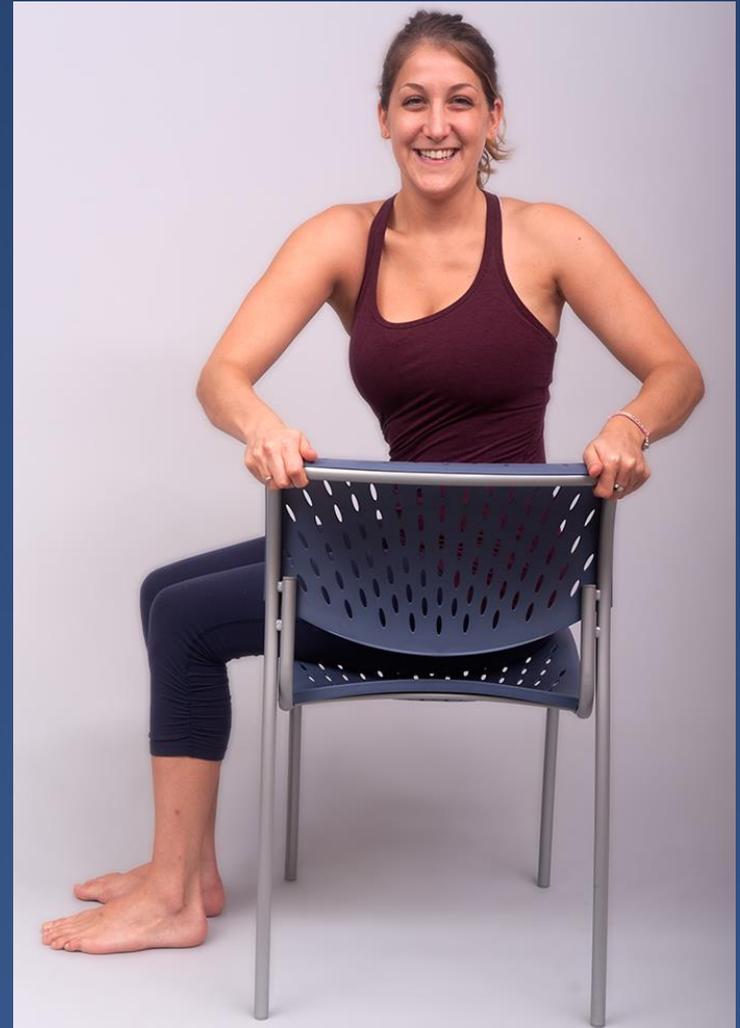
- **Against the Wall**

- Same as above except your hands are placed against the wall



Bharadvajasana - Chair Twists

- Sitting in a chair sideways, place the right hip against the back of the chair
- Raise the arms overhead
- Twist to the right and place the hands on the back of the chair
- Push with the right hand and pull with the left hand to deepen the twist (pushing- scapular protraction, pulling scapular retraction)
- Inhale lengthen, exhale twist
- Release
- Repeat on the other side



Dandasana

- sitting with extension of the trunk

- Begin seated- dorsiflex the feet, contract the quads, palms on the floor by the hips, stretch the hand straight
- Lift the arms up overhead
- Draw the sacrum down, tilting the pelvis up, engaging the core
- Keep the rib cage in line with the pelvis
- Stretch through the fingertips while also drawing the scapula downward
- Keep the chin parallel with a slight chin tuck
- Keep the legs engaged



Relaxation



- Lie flat on your back
- Release the shoulders and tuck the scapula under your back
- Stretch through the arms and place them palm up
- Lengthen the legs and allow them to fall out to the side
- Consciously soften and melt from your toes to your nose
- Allow the body- mind connection to deepen—feel for a deep sense of stillness

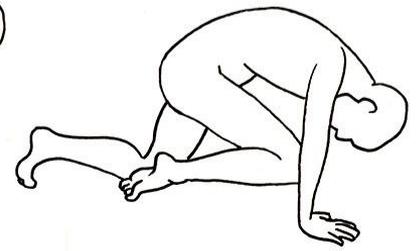
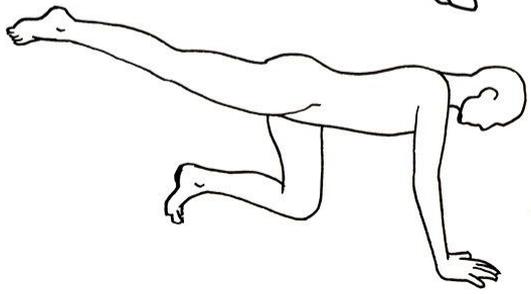
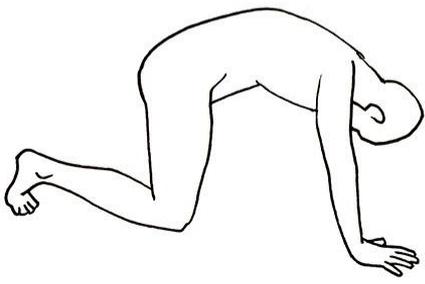
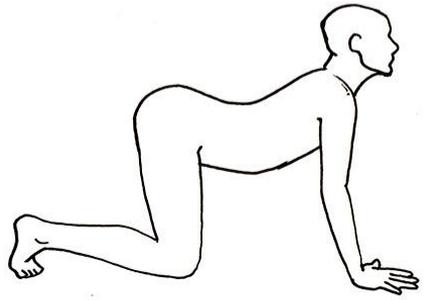
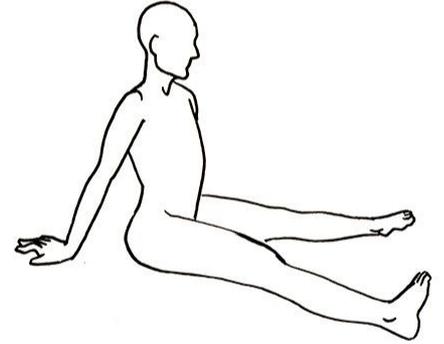
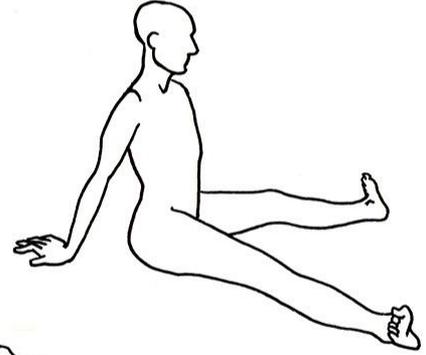
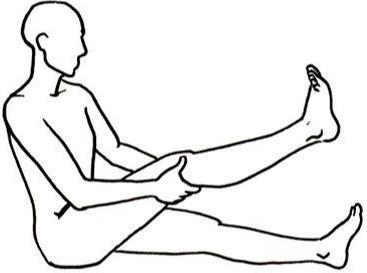
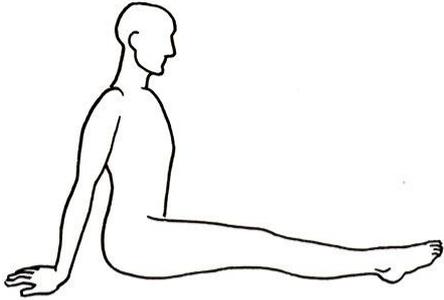
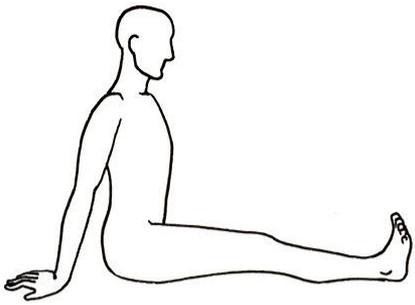


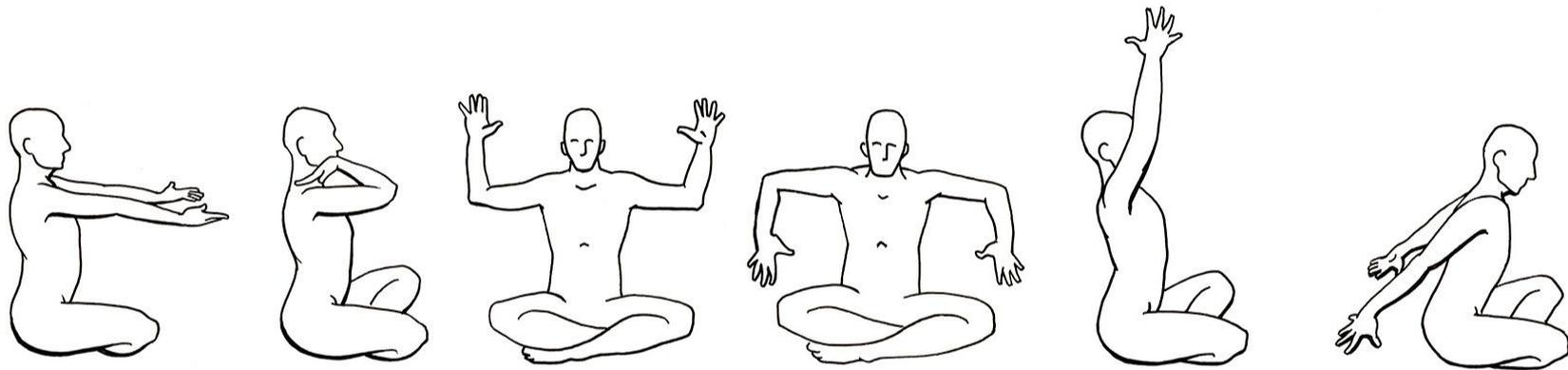
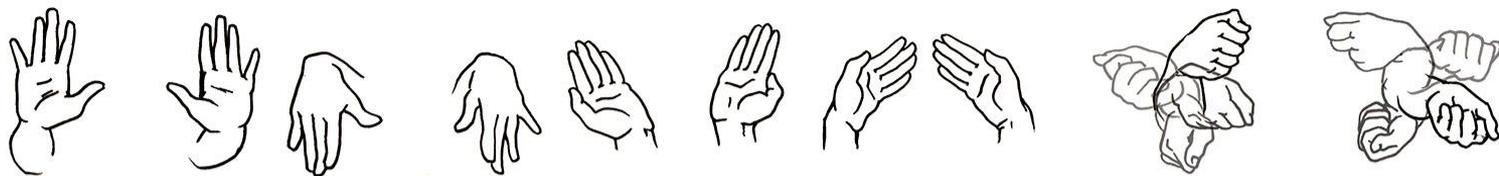
Joint Freeing Series-
Pavanmuktasana

Yoga for Overuse Injuries

Joint Freeing Series- Pavanmuktasana

- “energy-freeing practices”
- Coordinated breathing
- Enhances awareness of body physiology
- Heightens awareness of stretching and contracting
- Moves joints through a ROM
- Observe and diagnose areas for comparative freedom
- Isolates muscles and compares for strength and stamina
- Good for those with limited ROM
- Repeat each motion 6 times
- Go at your own rate
- Ujjaye Breath Pattern
- Inhale when extending or straightening the joint
- exhale when flexing or contracting





Yoga Injuries

- 2010- 7,369 yoga related injuries requiring medical attention
 - Back (herniations), shoulder, knee, neck, fractures, dislocations, heart problems, stroke
- Repetitive use injuries
- Malalignment
- “getting to the next thing”- the malady that yoga is supposed to help heal
- Sedentary Population
- Vigorous vs gentle and restorative
- Caution with Neck extension
 - Compression of vertebral arteries
- Ahimsa
- “if you don't force things you are going to avoid 99% of yoga injuries”
- People who are flexible at greater risk of injury

• How to Avoid Injuries

- Adopt a Beginner's mind
- Learn to listen to your body
- Do your own pose not your neighbors
- Look for your intelligent edge
- Pick the right teacher and the right approach

–Eva Norlyk Smith, PhD
YogaUOnline.com



Certification For Yoga Teachers

- Yoga Alliance www.yogaalliance.org
 - Directory
 - Listing of teachers whose training and teaching experience meet Yoga Alliance Minimum Standards
 - RYS (Registered Yoga School)
 - 200 Hour Standards
 - 300 Hour Standards
 - 500 Hour Standards
 - RYT (Registered Yoga Teacher)
 - RYT-200, RYT-500, E-RYT 200, E-RYT-500, RCYT (Children's yoga Teacher), RPYT (Prenatal Yoga Teacher)
 - Continuing Education
- No regulatory Body for Yoga Therapy



Pick a teacher by:

- Training
- Experience
- Reputation
- Flexibility of approach
- They practice what they preach
- They motivate you to practice



“The part can never be well unless the whole is well” - PLATO

“When every part of the machine is correctly adjusted and in perfect harmony, health will hold dominion over the human organism by laws as natural and immutable as the laws of gravity.”

—A.T. Still DO

“Go In and In. Be the space between two cells, the vast resounding silence in which the spirit dwells.”

-Danna Faulds

A Special Thanks to:

Leanna Garbus OMS IV
- Yoga photo model



Joel Talsma
Heather Ferrill DO
Steven Edwards
DO

For their
assistance with
Oran Suta,
table training,
for Artwork,
Photography &
PowerPoint
assistance

NAMASTE



I Honor the place in you in which the entire universe dwells. I honor the place in you which is of love, of truth, of light and of peace. When you are in that place in you and I am in that place in me, we are one.

References

1. Yoga in America Market study 2012- *Yoga Journal* accessed May 2014
2. Garfinkel et al. "Yoga- Based Intervention for Carpal Tunnel Syndrome". *JAMA* 1998;280:1601-1603
3. B.K.S. Iyengar "Light on Yoga" Schocken Books 1979
4. Le Page, J. L. "Yoga Toolbox for Teachers and Students Yoga Posture Cards for Integrating Mind, Body, & Spirit" Integrative Yoga Therapy 2005
5. Laker, et al "Overuse Injury" Medscape Reference updated Nov. 11, 2013
6. Quilter, D "Yoga for People with Repetitive Strain Injury (RSI)" *IJYT* No.17 (2007) 89-94
7. DeAvilla, N "Case studies of Yoga Therapy with Focused Downward Release and Scapular Stabilization in shoulder Injuries" *IJYT* No. 17 (2007) 65-73
8. Khan, et al "overview of the management of overuse (chronic) Tendinopathy" UpToDate- last updated 1/30/2014- accessed 7/25/2014
9. Telles, et al "Effect of yoga on musculoskeletal discomfort and motor functions in professional computer users" *Work*, 33 (2009) 297-306
10. Rodenberg, R. Bowman, E. Ravindran, R. "Overuse injuries" *Prim Care Clin Office Prac* 40 (2013) 435-473
11. McCall, M "How Might yoga work? An overview of potential underlying mechanisms" *J Yoga Phys Ther* 2013, 3: 1
12. Bussing, A. et al "effect of yoga interventions on pain and pain associated disability: a Meta-analysis" *The Journal of Pain* vol 13, 1 (January), 2012 pp 1-9
13. Gura, S. "Yoga for stress reduction and injury prevention at work" *Work* 19 (2002) 3-7
14. Garfinkel, M. et al "Evaluation of a yoga based regimen for treatment of osteoarthritis of the hands" *The Journal of Rheumatology*, 1994, 21;(12): 2341-2343
15. Fishman, L. Et al "Headstand for rotator cuff tear: Shirshasana or surgery" *IJYT* No 16 (2006) pg 39-47
16. Tulder, M. Malmivaara, A. Koes, B. "Repetitive Strain Injury" *The Lancet* 2007; 369:1815-22
17. Ross, A. et al "National survey of yoga practitioners: Mental and physical health benefits" *Complementary Therapies in Medicine* (2013)
18. Yoga Alliance WWW.yogaalliance.org
19. Stiles, M. *Structural Yoga Therapy* 2013 Red Wheel/Weiser, LLC
20. McCall, T. *Yoga as medicine the yogic prescription for health and healing* 2007 Bantam Dell
21. Greenman, P. *Principles of manual medicine 3rd edition* 2003 Lippincott Williams and Wilkins
22. Broad, W. *The Science of Yoga The risks and the rewards*. 2012 Simon & Schuster Paperbacks NY, NY.
23. Ward et al. *Foundations for Osteopathic Medicine 2nd Edition* 2003 Lippincott Williams and Wilkins
24. Robin M. *A physiological handbook for teachers of yogasana*. 2002 Fenestra Books
25. Blaine, S *Yoga for Computer users healthy necks, shoulders, wrists and hands in the postmodern age*. Rodmell Press, Berkeley, CA 2008