

Spinal Anatomy & Movement

Prepared by Angela Young, DC RYT 200

angelayoungdc@gmail.com

thrivechiropracticboise.com

- * Skeletal System - 206 bones and approximately 900 ligaments
- * Musculoskeletal System - approximately 700 muscles and 4,000 tendons
- * Nervous System - brain, spinal cord & nerves
- * Circulatory System - Heart & blood vessels
- * Respiratory System
- * Digestive System
- * Endocrine System
- * Immune System
- * Lymphatic System
- * Reproductive System

Eastern Cultures & Western Cultures agree that there are physiologically, psychologically and energetic benefits to practicing yoga

What does my spine consist of?

Passive Bony Structures (sthira) and Active Structures - Discs, Facet joints, Ligaments (sukha)

Cervical- Lordosis (created during infancy, crawling)

Thoracic - Kyphosis (created in womb)

Ribs - true 1-7, False - 8 - 12, Floating 11-12

Lumbar - Lordosis (created during standing & walking)

Sacrum - Kyphosis

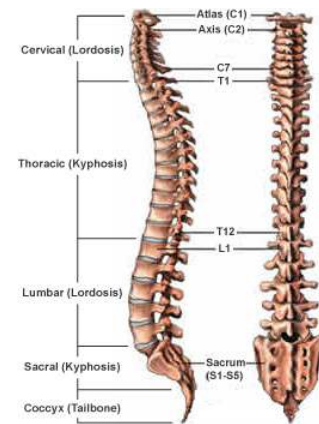
Coccyx Vertebrae- Kyphosis

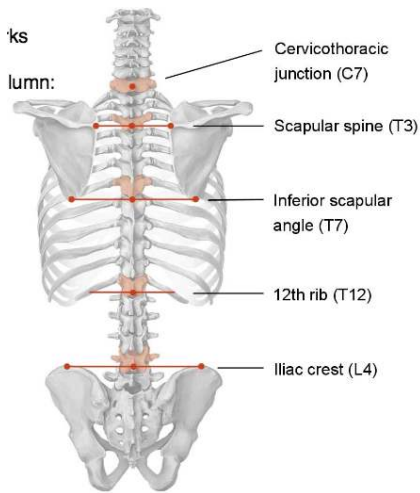
Discs - DJD

Nerves

Bone Stacking in Postures - Dandasana (Staff Pose), Tadasana (Mountain Pose), High Plank (Utthita Chaturanga Dandasana),

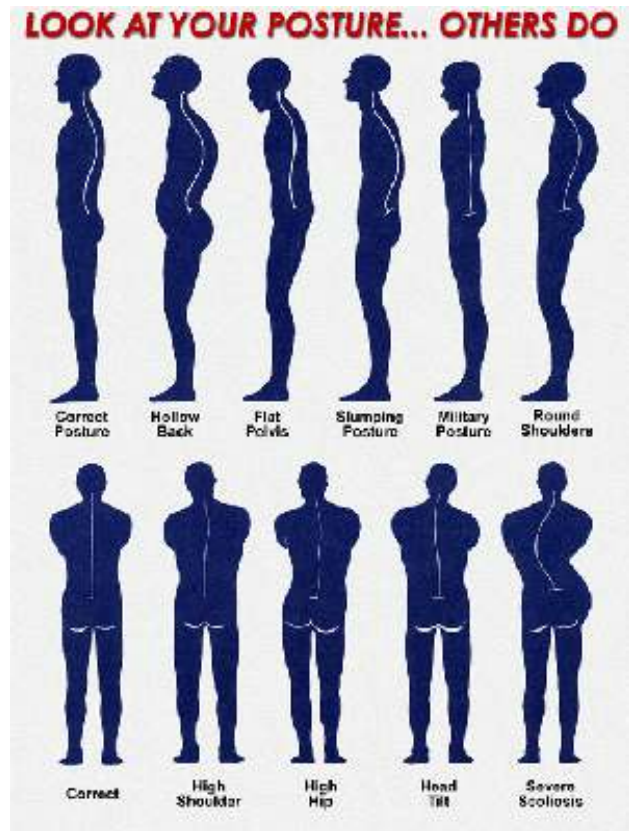
Posture Assessment - Ideal Posture





Landmarks

Spinal



Spinal Motion- 1. Is primarily dependent on the facet joints 2. Secondly, dependent on the sizes of IVD, shape of vertebra, local muscle actions, attachment of ribs or ligaments

Muscles- 700 muscles

3 types - Cardiac, smooth, skeletal

Concentric - angle of joint decreases -

Agonist Vs Antagonist = Flexors vs Extensors, or Adductors vs Abductors

Agonist = mover and Antagonist = one that is responsible for returning a limb to its initial position

Eccentric - angle of joint increases

Isometric Contraction - no movement of joint angle

Flexion - Movement in the sagittal or frontal plane that brings the anterior surfaces toward each other Standing Forward Bend, Cat Pose - Agonist muscles - Rectus abdominus, SCM

Extension - Movement in the sagittal or frontal plane that brings the anterior body away from each other think - Cow - (Agonist muscles Erector Spinae, QL, Cobra, Bridge, Camel & Wheel

Lateral Flexion - Movement in the vertical or coronal plane that bends the spine to one side or the other - Seated Side Bend - (QL, Levator Scapulae), Side angle, Triangle, Half Moon, and Seated Wide- Angle

Rotation - Movement in the horizontal or transverse plane, around the vertical axis of the spine - Ardha Matsyendrasana - half lord of the fishes pose, (SCM, Internal Obliques, External Obliques)

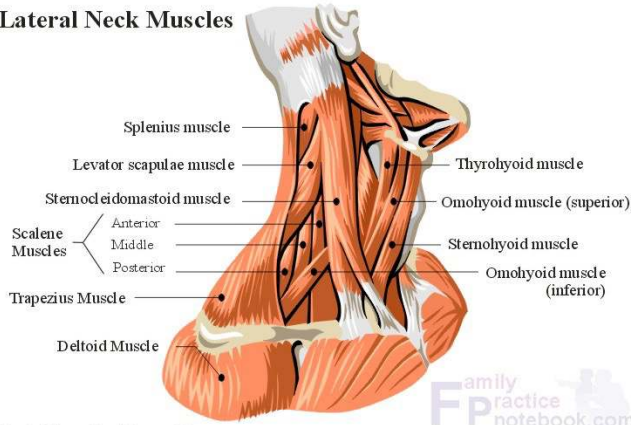
Axial Extension - or removal of sagittal curves- lengthening upward - bandhas potentially in mountain pose.

	Flexion	Extension	Lateral Flexion	Rotation
Cervical	75	75	35	50
Thoracic	25	25	20	35
Lumbar	35	35	20	5

*Physiology of the Joints Volume 3: The Vertebral Column, Pelvic Girdle, and Head, 6th Edition - A.I. Kapandji

Major Muscles of the Cervical Spine	Flexion	Extension	Rotation	Lateral Flexion
Sternocleidomastoid	Yes		All	All
Scalene	Yes		All	All
Longissimus Capitis		Yes	All	All
Semispinalis Capitis		Yes	All	All
Splenius Capitis		Yes	All	All
Trapezius		Yes	All	All

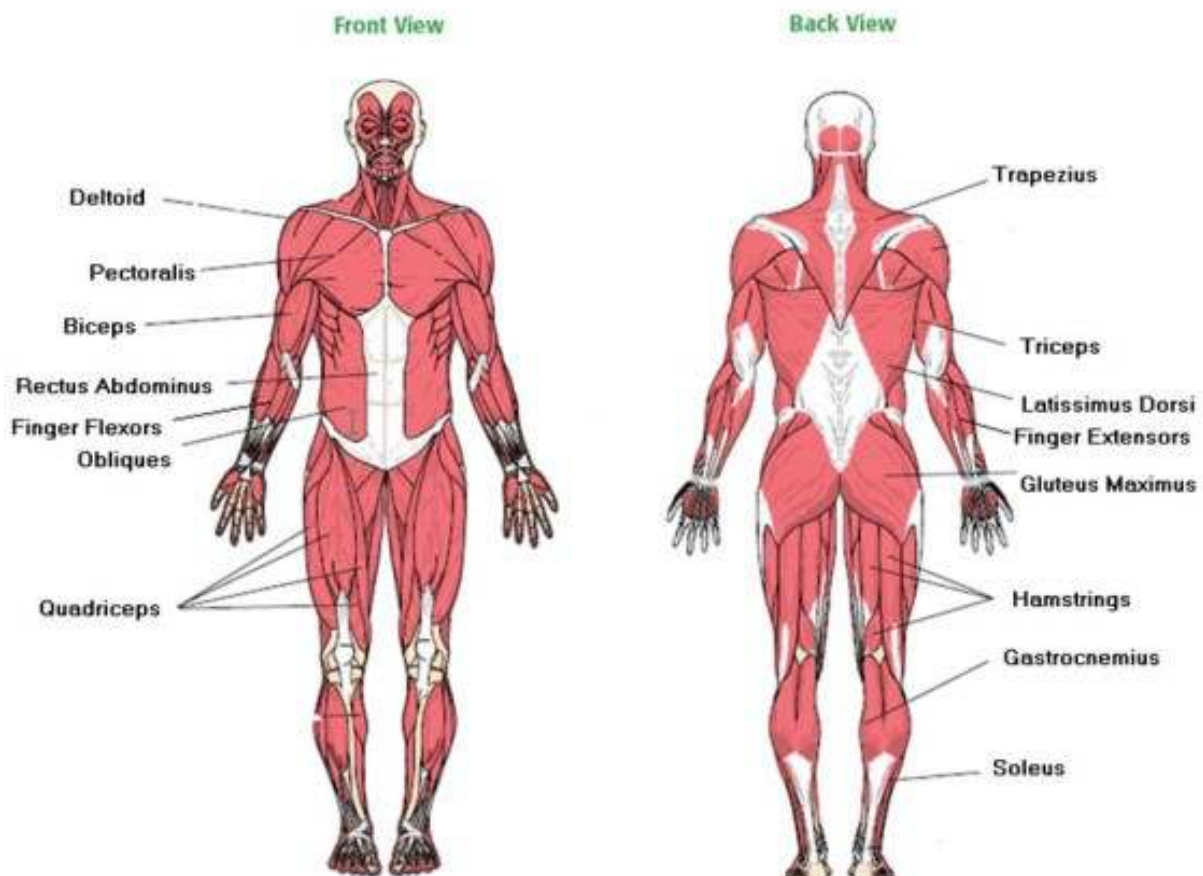
Lateral Neck Muscles



Adapted from Corel Draw 9.0

Muscles of Midback & Chest	Scapular Elevation	Scapular Depression	Scapular Protraction	Scapular Retraction
Serratus anterior "Boxer's Muscle"	Yes		Yes	
Levator Scapulae	Yes		Yes	
Trapezius	Yes			Yes
Rhomboids				Yes
Latissimus Dorsi "Broadest Muscle"		Yes		Yes
Pec Minor		Yes	Yes	
Pec Major		Yes		

Major Muscles of Lower Trunk	Extension	Flexion	Lateral Flexion
External Oblique		Yes	Yes
Iliacus		Yes	
Internal Oblique		Yes	Yes
Psoas Major		Yes	
Quadratus lumborum		Yes	
Rectus Abdominus		Yes	
Iliocostalis Lumborum	Yes		
Interspinales	Yes		
Longissimus thoracis	Yes		
Multifidus	Yes		Yes
Rotatores	Yes		Yes
Spinales Thoracis	Yes		
Intertransversi			Yes



Flexor Dominance

Yoga & The Spine

Sacroiliac joint (SI Joint) - 3-5mm of sagittal movement - Nutation - anterior flexion of the sacrum (ilium moves with it), Counternutation - posterior flexion of the sacrum (ilium moves with it)

The function of the spine is largely to protect the Central Nervous System. The Central Nervous system consists of the brain and spinal cord

The Peripheral Nervous system consists of

1. Somatic - Spinal Nerves & Cranial Nerves - Voluntary
2. Autonomic - Sympathetic/ Parasympathetic - Involuntary (Not necessarily true for yogis)

Scoliosis - Generally in women, generally a right convexity,

Concavity

Convexity

Teaching a Spinal Class

References

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The Perfect Chaturanga by Jennilee Toner

The Key Poses of Yoga by Ray Long

Yoga Anatomy - Leslie Kaminoff & Amy Matthews

Atlas of Human Anatomy - Frank H. Netter, MD

Gray's Anatomy