


Orthopedic Examination of the Spine, Pelvis, and Extremities DX 611 Postural Assessment

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Orthopedics

What is posture?

- *Posture comprises an accumulation of adaptations and compensations from injuries and habits to allow the body to balance and function effectively.*

Steven P. Weiniger, DC




Orthopedics

What is posture?


- *The posture of homo sapiens is a complex biomechanical continuum, which involves the function of muscles, ligaments, fascia, nerves, osseous structures, neuromuscular control, the habits, and psyche of the human.*

James J. Lehman, DC




Orthopedics

Postural Assessment

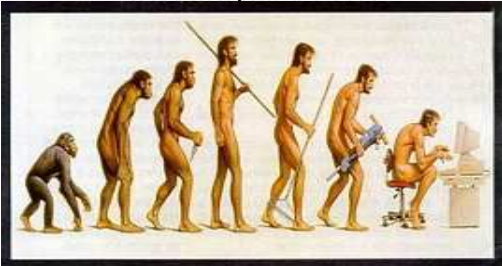



- Why is posture important to you, the chiropractic physician?



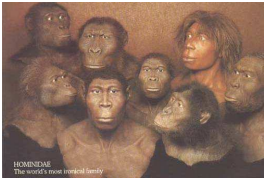
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Let us discuss postural evolution






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Postural Evolution of Man




The human family is defined as hominids.





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Postural Evolution of Man





chimpanzee



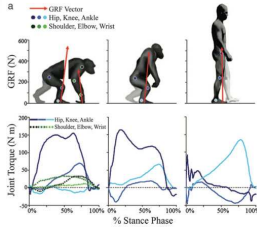
a. afarensis

- Hominids are characterized by several features, such as their manner of movement (locomotion).






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Postural Evolution of Man




- We have an upright position (which is known as bipedal).






Orthopedics

Postural Evolution of Man




- Who would win a foot race between a quadruped and a biped?
 - Sprint?
 - Marathon?
 - Why?






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Postural Evolution of Man

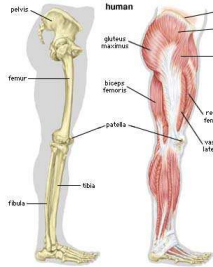


- 27 MPH Human
- 35 MPH Brown Bear

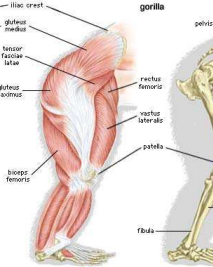



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Postural Evolution of Man





human




gorilla

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Orthopedics

Postural Evolution of Man



- A large reorganized brain is another feature, along with a diminished face and teeth.

Orthopedics
Postural Evolution of Man

Proconsul, Dryopithecus, Ramapithecus, Australopithecus, Homo erectus
Neanderthal Man, Cro-Magnon, Homo sapiens

Use and construction of tools are notable characteristics of Hominids. (Wicander and Monroe 1993)

Orthopedics
Postural Assessment

■ Why is posture important to you and your patients?

Orthopedics
Postural Assessment

Orthopedics
Postural Assessment

Posture is the position from which the musculoskeletal system functions most efficiently.

Chris White CSCS, PES, CHEK II
http://www.test.recports.ufl.edu/udocs/strength_posture.pdf


Optimal Instantaneous Axis of Rotation

Ideal posture encourages maintenance of an optimal instantaneous axis of rotation (OIAr)

Chris White CSCS, PES, CHEK II

Optimal Instantaneous Axis of Rotation

- A indicates concentric motion, which is normal
- B indicates eccentric motion (rotation), which is abnormal




Optimal Instantaneous Axis of Rotation (OIAR)

- As an eccentric motion (rotation) is produced secondary to the failure of respective dynamic stabilizers (muscles), the joint's ligamentous and capsular are progressively challenged. Without joint restoration of dynamic stability, joint derangement is likely.

Paul Chek


<http://www.chekinstitute.com/articles.cfm?select=27>



Proprioceptive Deficits and Loss of Neuromusculoskeletal Control

- As the capsule and articular ligaments become progressively imbalanced (tight in some areas relative to other areas), there is progressive dysfunction in the proprioceptive messages being sent to the central nervous system with regard to where the joint is in space. This produces what is called a "proprioceptive deficit."


Paul Chek




Orthopedics Ideal Posture

The ability for any joint complex in the human body to function without internal derangement during normal human activities

Chris White CSCS, PES, CHEK II




Orthopedics Ideal Posture

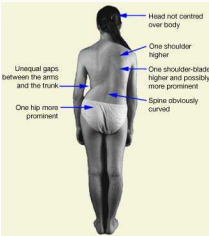


Normal neuro-mechanical function allows pain free motion about a joint

Chris White CSCS, PES, CHEK II




Orthopedics Postural Assessment




Loss of optimal instantaneous axis of rotation results in pain, injury, and a poor response to exercise



Chris White CSCS, PES, CHEK II



Postural Assessment Architectural v. Adaptive Postural Changes





Posture may be a cause and/or an effect of a clinical problem
Please give some examples...

Postural Assessment

Architectural v. Adaptive Postural Changes



Anatomical short-leg is an architectural or structural problem, which causes scoliosis (adaptive) and cervicogenic headaches due to lateral head tilt (adaptive) and resultant myofascial trigger points in the upper trapezius.

Postural Assessment

Architectural v. Adaptive Postural Changes

- There is no one normal posture
- “Perfect posture” is a rarity
- Joints should move in their mid range
- Efficient posture maximizes function and reduces injury






Postural Assessment

Architectural v. Adaptive Postural Changes

Habits affect posture

- Good habits enhance efficient posture
 - Sit up straight
 - Lighten the load in purses and briefcases
 - Use chairs that provide good support
 - Stand erect
 - Sleep on side or back with pillows






Postural Assessment

Architectural v. Adaptive Postural Changes

Habits affect posture

- Bad habits create eccentric movements and dysfunction
 - Excessive sitting
 - Heavy backpack
 - Slouching
 - One-sided activities






Postural Assessment

Posture Evaluation: Methods and Observations

- Postural evaluation mindset

1. Stack of blocks
 1. Balanced blocks = stability
 2. Unbalanced blocks = instability
2. Correction begins at the inferior block





Postural Assessment

Posture Evaluation: Methods and Observations

Postural Muscle Weakness v. Inhibited

1. Disuse muscle weakness requires exercise to strengthen
2. Inhibited muscles due to neurologic reciprocal inhibition, which is caused by the antagonistic postural muscle requires correction of the postural deficit and neuromusculoskeletal re-education




Postural Assessment

Posture Evaluation: Methods and Observations

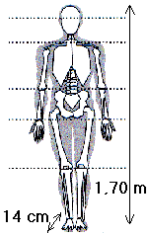
Differentiate unilateral myospasia v. hypertrophy

1. Chronic muscle hypertrophy will not be painful upon palpation
2. Acute myospasia will react with pain upon palpation




Postural Inspection

Observe for vertical alignment

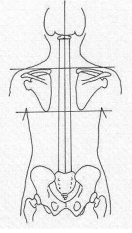


1. Occipital protuberance
2. Spinous processes
3. Coccyx
4. Gluteal folds




Postural Assessment

Posterior View



1. Mastoid processes
2. Acromia and scapulae
3. Inferior margins of 12th ribs
4. Iliac crests and posterior superior iliac spines
5. Ischial tuberosities




Postural Assessment

Posterior View

Observe for:

- Arms hanging equally
- Small amount of palms visible and symmetrical
- Symmetrical alignment of lower extremities
- No signs of eversion or inversion of feet




Postural Assessment

Posterior View

Note:

- It is common for a slight postural distortion due to handedness
- Ipsilateral superior iliac crest and inferior shoulder with mild convexity of thoracic spine




Postural Assessment

Lateral View

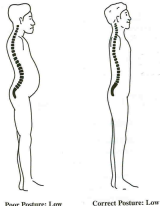
Perform bilateral side view inspection for alignment of:

- External auditory canal
- Acromion process and axillary line
- Midpoint of iliac crest greater trochanter
- Lateral condyles of femur and tibia
- Slightly anterior to lateral malleolus




Postural Assessment

Lateral View



- Head posture (neutral, anterior, or posterior)
- Lordotic cervical and lumbar curves and kyphotic thoracic curve


Poor Posture: Low back is too arched
 Correct Posture: Low back has slight arch



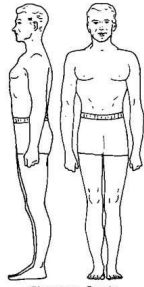
Postural Assessment

Anterior View

- Inspect for alignment of:
- Bridge of nose and center of chin
- Episternal notch and xiphoid process
- Umbilicus and pubes
- Arms hanging equally
- Alignment of lower extremities

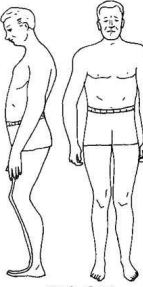


Good posture




Strong feet

Poor posture




Weak feet



Postural Assessment

Balanced posture demonstrates equality and levelness of:

1. Eyes
2. Clavicles and lower margins of ribcage
3. ASIS and femoral trochanters
4. Knees and ankles




Postural Assessment

Posture Types and Muscle Weaknesses

Military Posture

- Tight lower back and hip flexors
- Weak anterior abdominals initially, hamstrings lengthen, then adaptively shorten





Postural Assessment

Posture Types and Muscle Weaknesses

Kypholordotic Posture

- Tight suboccipital neck extensors, hip flexors, serratus anterior, pectorals, and upper trapezius (if scapulae are abducted)
- Weak cervical flexors, upper thoracic spinae, external abdominal oblique, and mid and lower trapezii (if scapulae are abducted)






Postural Assessment

Posture Types and Muscle Weaknesses

Swayback Posture

- Tight hamstrings, internal abdominal obliques, lumbar erector spinae, and ipsilateral tensor fascia lata (if lateral pelvic distortion)
- Weak hip joint flexors (unilateral), external abdominal obliques, lower and mid trapezii, deep cervical flexors, and ipsilateral gluteus medius (if lateral pelvic distortion)



Postural Assessment

Posture Types and Muscle Weaknesses

Flat Back Posture

Tight hamstrings and abdominals

Weak hip flexors (unilateral)






Postural Assessment

Postural Syndromes

Upper Cross Posture

1. Forward head position
2. Loss of cervical lordosis
3. Shoulder rolled in and forward
4. Hyperkyphotic thoracic spine



Postural Assessment

Postural Syndromes

Upper Cross Posture

Tight short muscles

1. Suboccipitals
2. Pectorals, anterior shoulder
3. Upper trapezius



Postural Assessment

Postural Syndromes

Upper Cross Posture

Weak long muscles

1. Mid and lower trapezii
2. Serratus anterior





Postural Assessment

Postural Syndromes

Lower Cross Posture

1. Anterior pelvis
2. Protruding abdomen
3. Increased lumbar lordosis
4. Eversion of feet




Postural Assessment
Postural Syndromes

Lower Cross Posture

Tight short muscles

1. Psoas
2. Lumbar erector spinae
3. Hip adductors




Postural Assessment
Postural Syndromes

Lower Cross Posture

Weak long muscles


1. Hip extensors, gluteus maximus
2. Abdominals
3. Gluteus medius and minimus



Postural Assessment
Postural Distortions

Forward Head Posture


For every inch of FHP the weight carried by the lower neck increases by the weight of the head.



Postural Assessment
Postural Distortions: Forward Head Posture

May cause any of the following:


1. Neck, shoulder, or arm pain
2. Headaches
3. Biomechanical stress



Postural Assessment
Postural Distortions: Forward Head Posture

Observations


- External auditory meatus anterior to the acromion
- Hypertrophy of the sternocleidomastoideus



Postural Assessment
Postural Distortions: Forward Head Posture

Tight or overactive muscles:

1. SCM and/or suboccipital muscles
2. Anterior cervical muscles
3. Upper trapezius
4. Levator scapulae
5. Pectoral




Postural Assessment

Postural Distortions: Forward Head Posture

Weak or underactive muscles:

1. Cervical extensors
2. Lower and mid trapezii
3. Serratus anterior




Postural Assessment

Postural Distortions: Forward Head Posture

Clinical Correlate

- Palpate the suboccipital muscles while seated and standing
- Reduced muscle tension with sitting indicates pelvic postural stress is contributing to FHP




Postural Assessment

Postural Distortions: Head Tilt and/or Rotation

Observation

- Head tilt presents unlevel mastoid processes
- Rotation of the head presents asymmetry with one occiput posterior in relation to the opposite occiput.




Postural Assessment

Postural Distortions: Head Tilt and/or Rotation

Tight overactive muscles

- Ipsilateral lateral neck flexors
- Contralateral scalene or intrinsic rotators
- Sternocleidomastoideus
- Upper trapezii




Postural Assessment

Postural Distortions: Head Tilt and/or Rotation

Weak underactive muscles


- Contralateral lateral neck flexors
- Ipsilateral intrinsic rotator muscles



Postural Assessment

Postural Distortions: Unlevel Shoulders

- Observe the horizontal line between acromia is unlevel




Postural Assessment

Postural Distortions: Head Tilt and/or Rotation

Tight overactive muscles

- Ipsilateral high shoulder upper trapezius and/or levator scapulae muscles
- Ipsilateral low shoulder lower trapezius and pectoralis minor muscles




Postural Assessment

Postural Distortions: Head Tilt and/or Rotation

Weak underactive muscles

- Ipsilateral high shoulder lower and mid trapezii
- Ipsilateral low shoulder upper trapezius




Postural Assessment

Postural Distortions: Scapular Winging

Observations

- Medial borders of scapulae are lifted posteriorly from the ribs
- Tight overactive rhomboids
- Weak underactive serratus anterior muscle
- Perform pushup test and inspect for increased winging

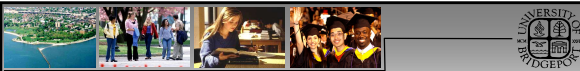


Postural Assessment

Postural Distortions: Scapular Rotation

Observations

1. Scapulae unlevelled
2. Asymmetrical abduction (lateral) and adduction (medial)
3. Scoliosis and handedness




Postural Assessment

Postural Distortions: Scapular Rotation

Tight overactive muscles

- Ipsilateral abduction = serratus anterior
- Ipsilateral adduction = rhomboid





Postural Assessment

Postural Distortions: Scapular Rotation

Weak underactive muscles

1. Ipsilateral abducted = rhomboid and middle trapezius
2. Ipsilateral adducted = pectoralis major and minor






Postural Assessment

Postural Distortions: Rounded Shoulders

Observations



1. Rounding of shoulders or internal rotation of the upper extremities
2. Extensor aspect of hands visible from anterior view and palms with posterior

Postural Assessment

Postural Distortions: Rounded Shoulders



- Tight overactive muscles = latissimus dorsi and/or pectorals
- Weak underactive muscles = Mid trapezius
- Clinical Correlate:
- Usually observed with FHP

Postural Assessment

Postural Distortions: Scoliosis

- A lateral curvature of the spine
- Acquired (adaptive/idiopathic) or congenital (structural or architectural)
- Architectural asymmetry
 - Wedge vertebra or hemivertebra

Straighten Up America Becomes National Public Education Program on World Spine Day

- http://www.cocsa.org/pubs/resources/88_1958_13552.cfm
- http://www.cocsa.org/pubs/uploads/Straighten_Up_America.ppt