POSTURE

PTA1010

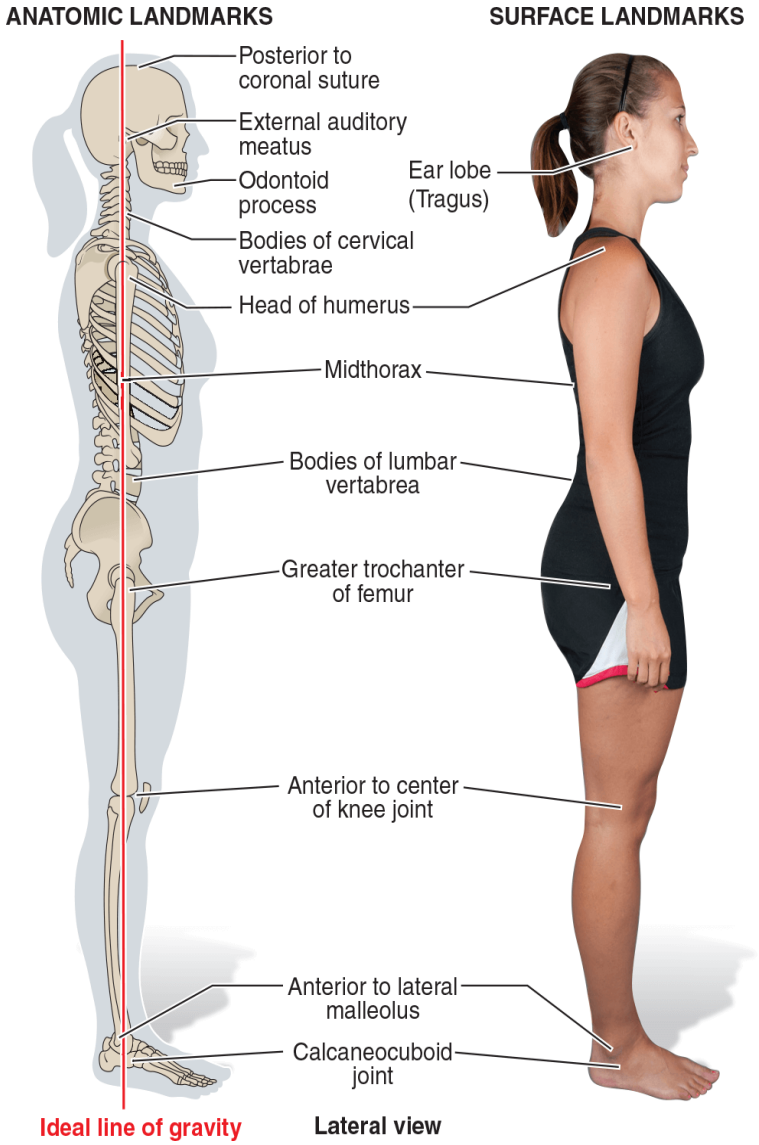
Following this lecture the student will be able to:

- Identify the normal curves of the spine.
- Identify abnormal curves of the spine.
- Discuss postural alignment from a lateral view using a plume line.
- Discuss postural alignment from an anterior, posterior, and lateral view using a plume line.
- Identify static and dynamic balance assessment tools
- Record balance and posture information accurately in SOAP note.

What is posture?

- The alignment and positioning of the body in relation to **gravity, center of mass** and **base of support**

- Posture tests and measures assess structural abnormalities and the ability to right the body against gravity.



Why is optimal posture important?

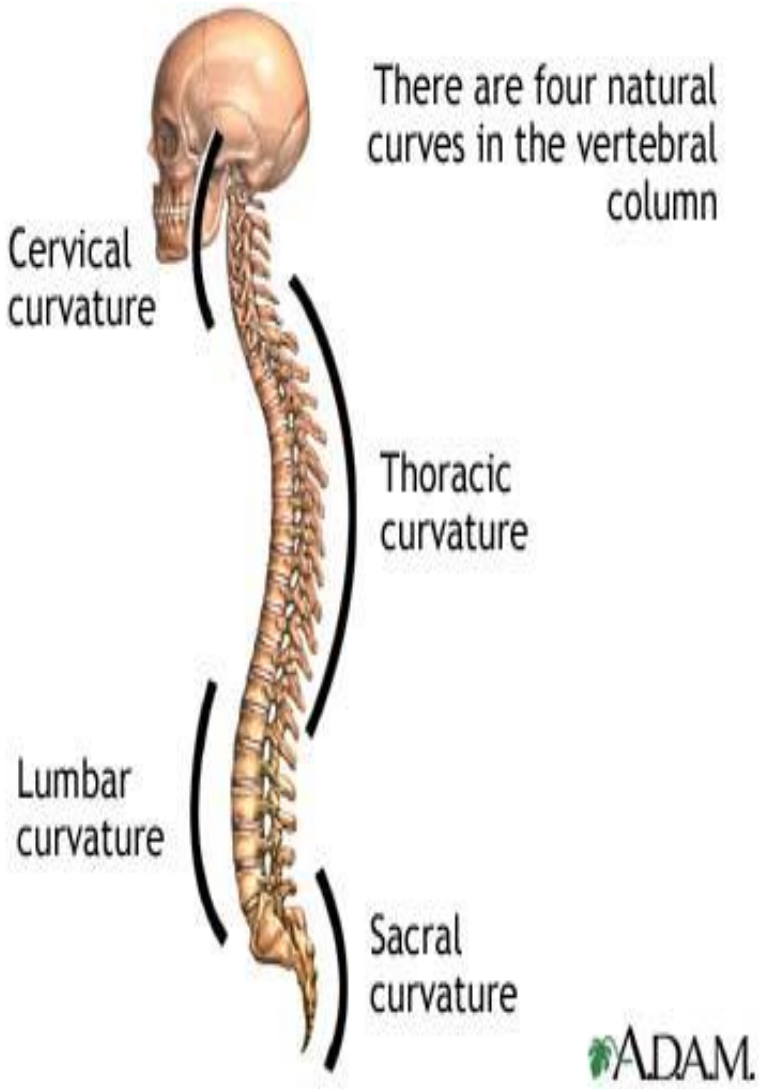
- Maximal physiological and biomechanical efficiency
- Minimize stress and strains
- Balanced strength and length of muscles
- Decreases energy/effort to keep body upright
- Balance is based on a force couple

Causes of Incorrect Posture

- Habitual

  example: carrying baby on hip
- Congenital Malformation
- Paralysis or Weakness of Key Postural Muscles
- Tightness of Soft Tissue
- Result From Prolonged Functional Activities

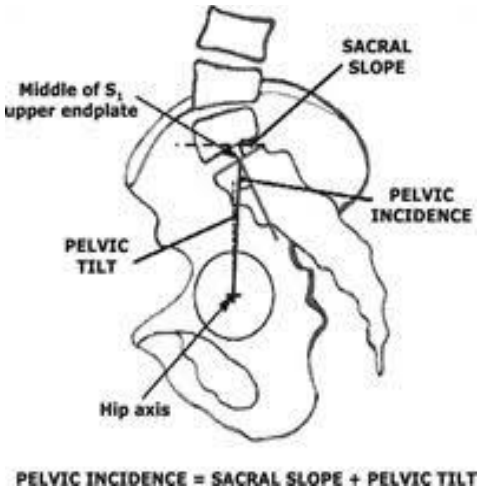
- "Rodin was known to use models with diseases and deformities"
- https://med.stanford.edu/news/all-news/2014/04/rodins-hand-sculptures-diagnosed-as-part-of-exhibit.html



- **Increased lumbar curve is usually associated with an increase in thoracic curve**

Development of Postural Curves

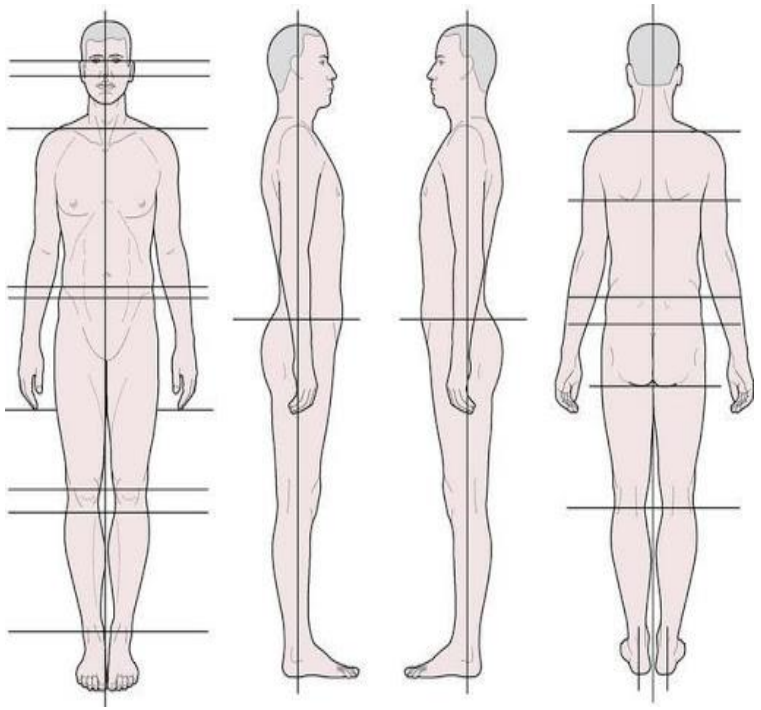
- Neutral pelvis = ASIS and PSIS level (transverse plane)
- Neutral= ASIS and pubis symphysis (vertical plane)



- **Primary** curve: newborn
- **Secondary** curve caused by antigravity activity, and extension in the cervical and lumbar regions.

Postural Assessment

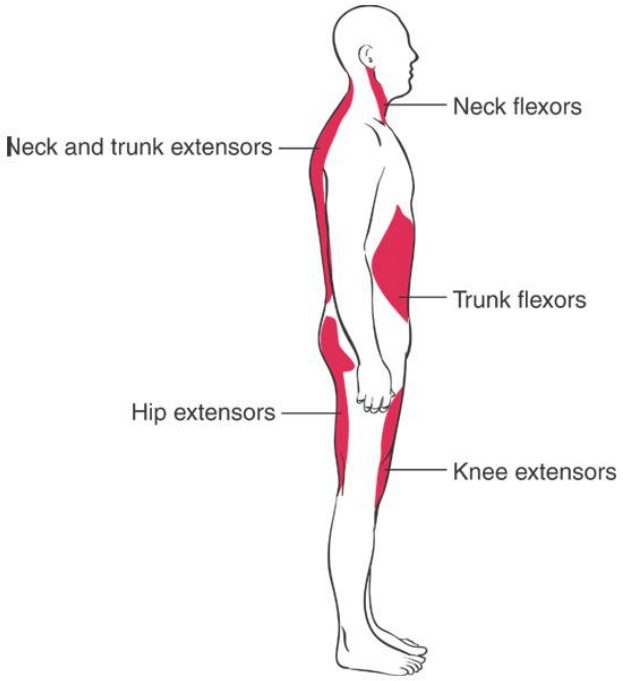
- View from different positions
- Use dominant eye
- Identify bony landmarks
- Assess with and without orthotic devices and shoe wear
- Assess in ideal and real-life postures



Clinical Indications for Postural Tests and Measurements

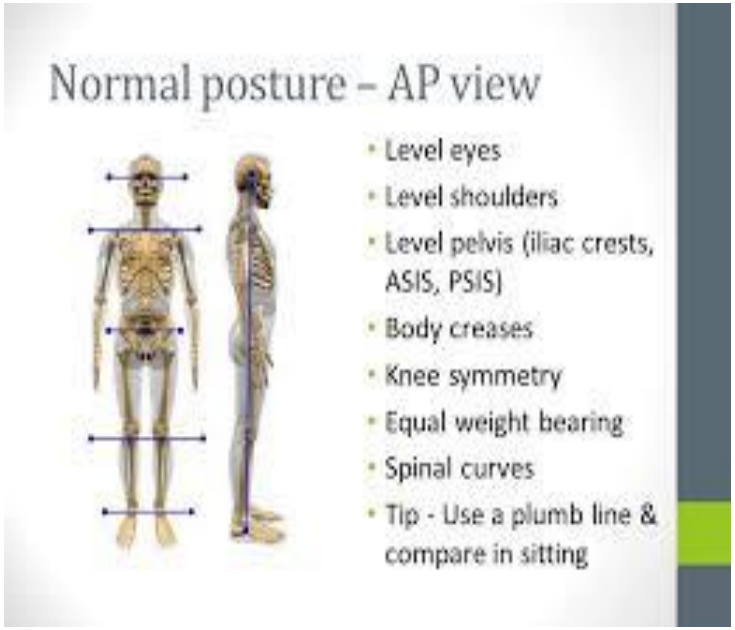
- Abnormal bony alignment
- Impaired aerobic capacity
- Impaired joint integrity/mobility
- Impaired motor function
- Impaired muscle performance
- Impaired sensory integrity
- Pain

Antigravity Muscles

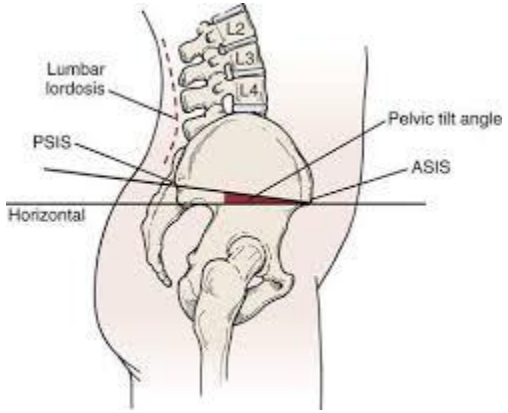


- Neck Flexors
- Trunk Flexors
- Neck and Trunk Extensors
- Hip Extensors
- Knee Extensors

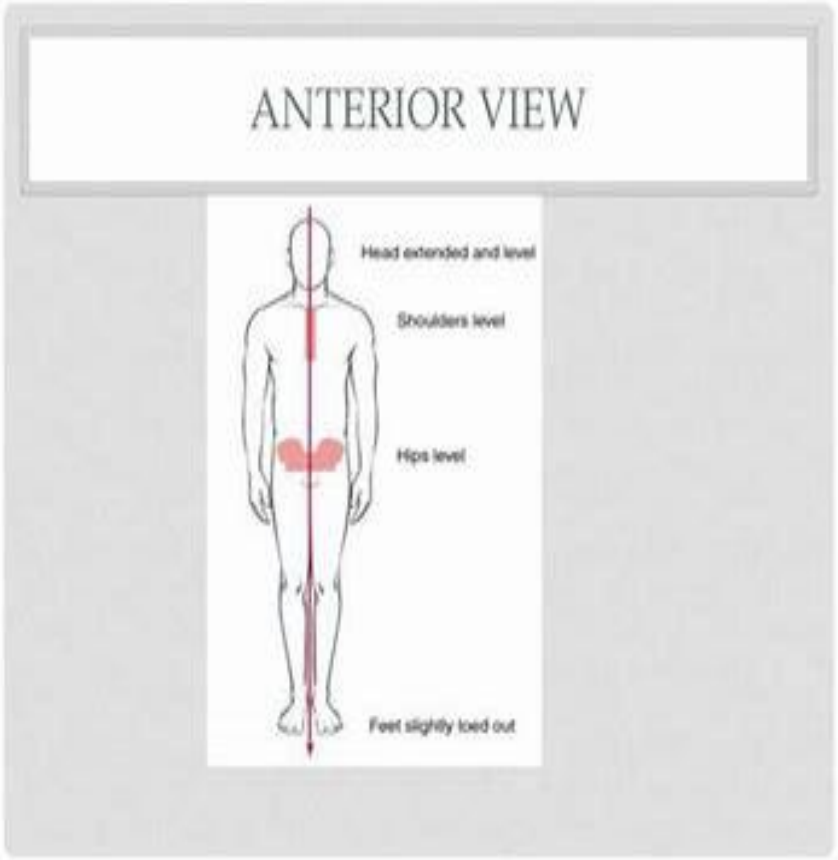
Ideal Static Standing Posture

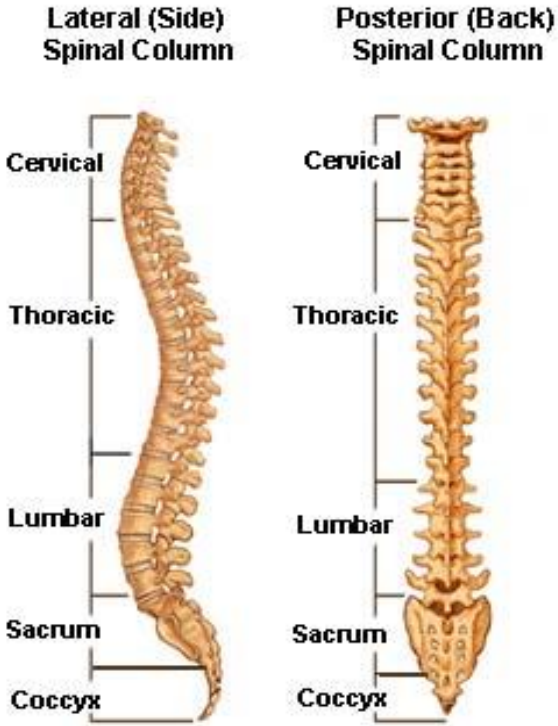


- **ASIS and PSIS are level in the transverse plane**
- **ASIS in same vertical plane as symphysis pubis**



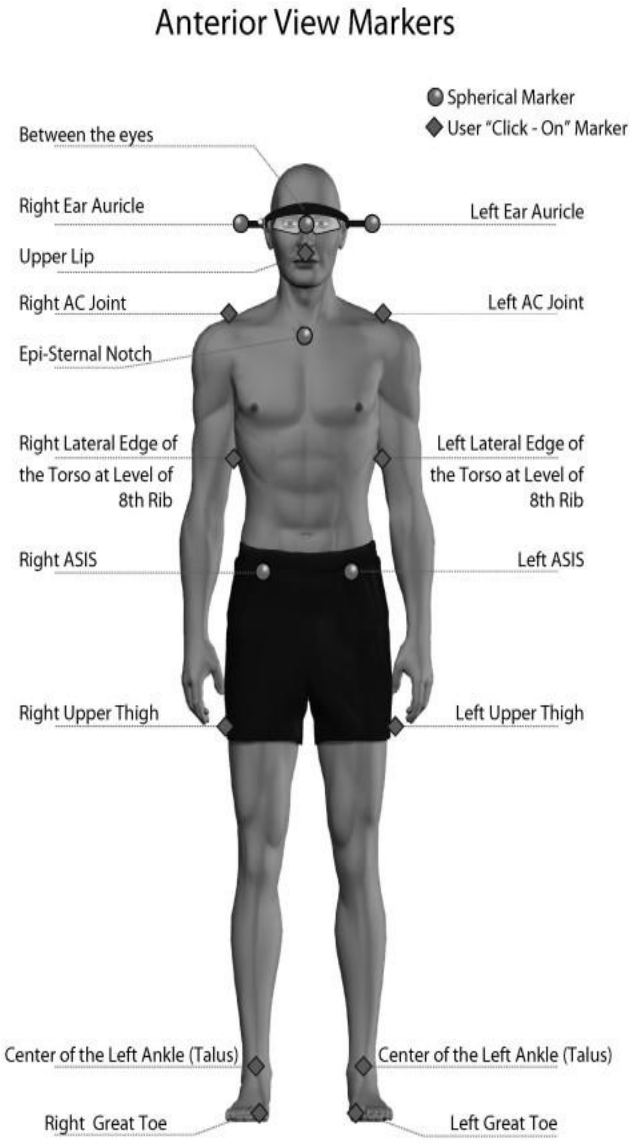
Postural views -Anterior





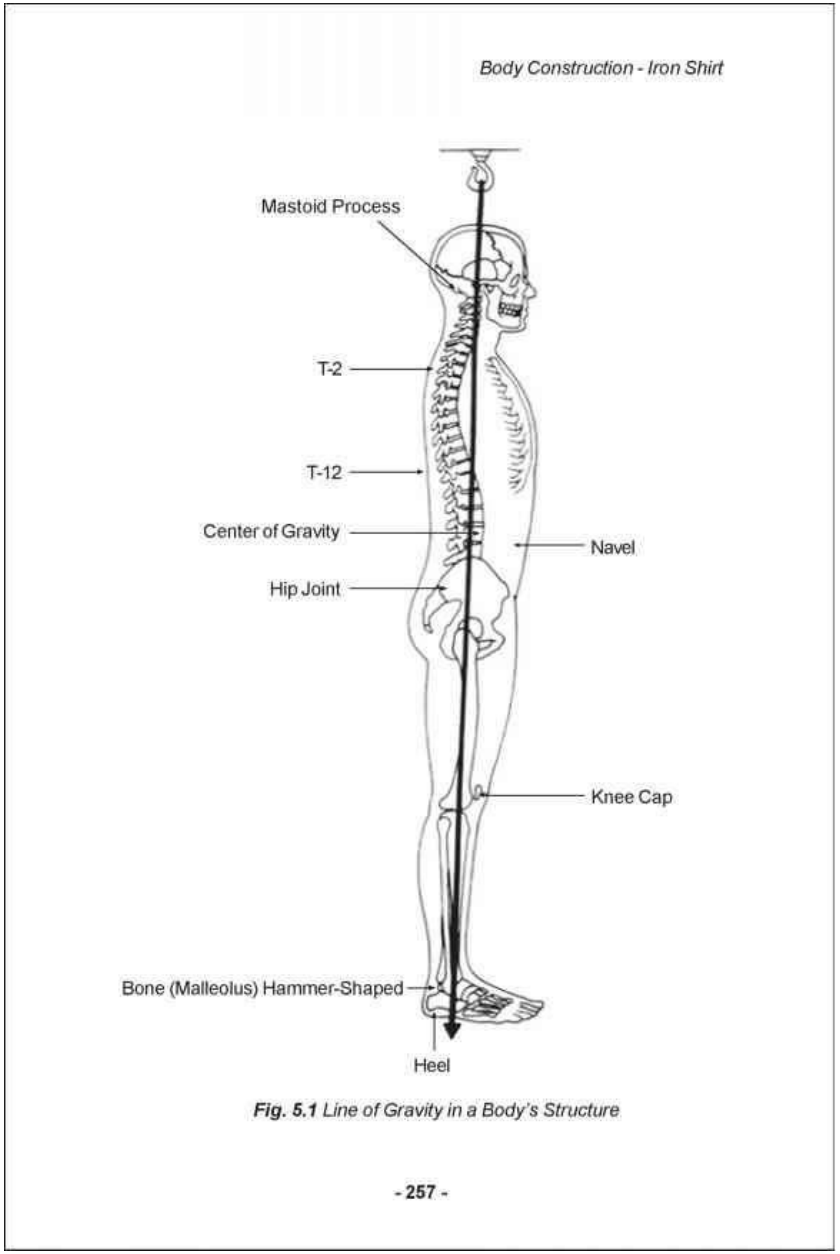
Anterior View

- Plumb line through midsagittal plane
- Head extended and level – eyes level
- Shoulders level
- Sternum midline
- ASIS in same plane
- Greater trochanter of femur
- Patella
- Medial malleoli

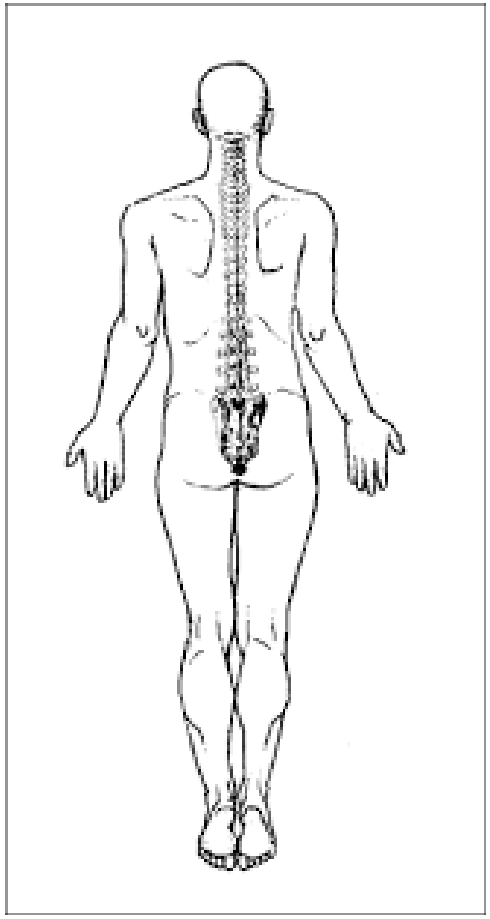


Lateral View

- Bisects earlobe
- Tip of the acromion
- Mid trunk
- Lumbar bodies/sacral promontory
- Greater trochanter
- Slightly anterior to knee axis/slightly posterior to patella
- Slightly anterior to lateral malleolus



Posterior View



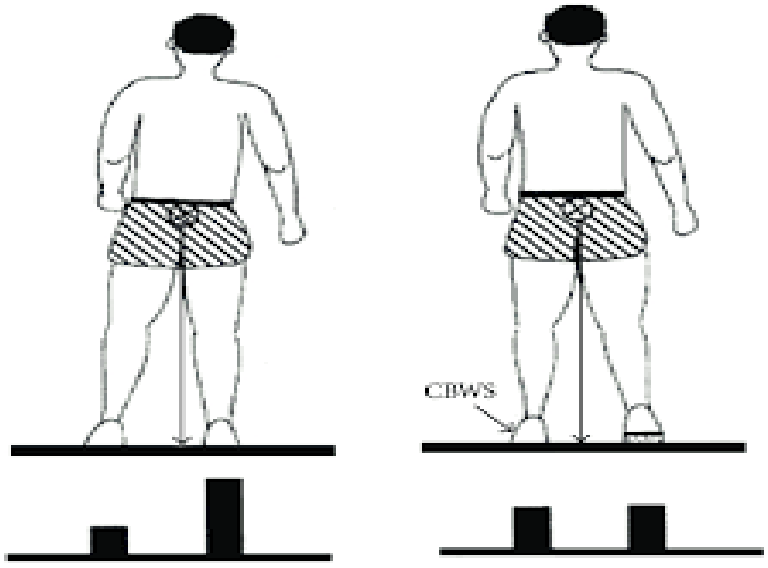
- Head extended
- Shoulders level
- Inferior scapular angles level
- Spinous processes midline
- Iliac crests level
- PSIS level
- Gluteal folds level
- Fibular heads level
- Knees not excessive valgum or varus
- Calcaneus midline with calcaneal tendon

Postural Alignment and Weight Distribution

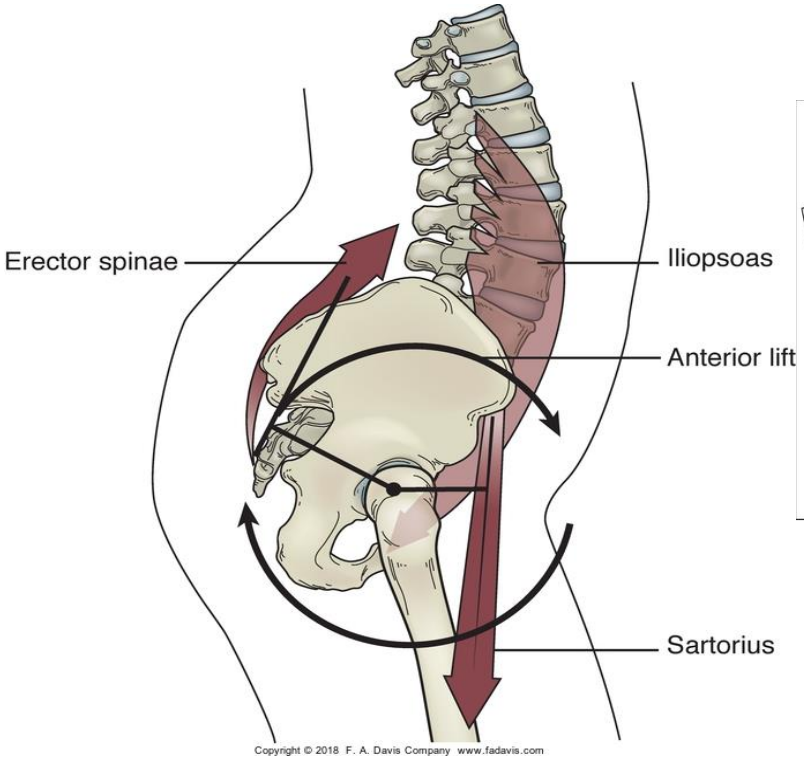
- Balance is based on 3 system inputs:
- Visual input
- Vestibular input
- Somatosensory input

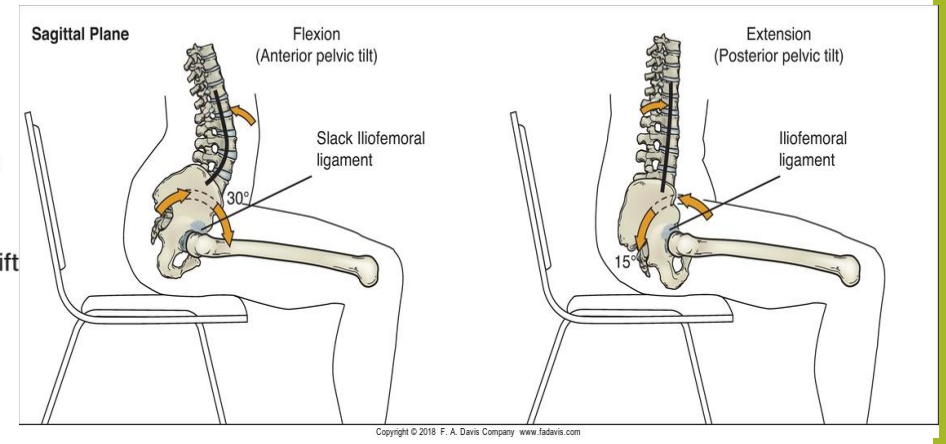
Equal Weight Bearing:

- Maintains body's plumb line.
- Equal strength requirements
- Helps maintain static and dynamic balance control

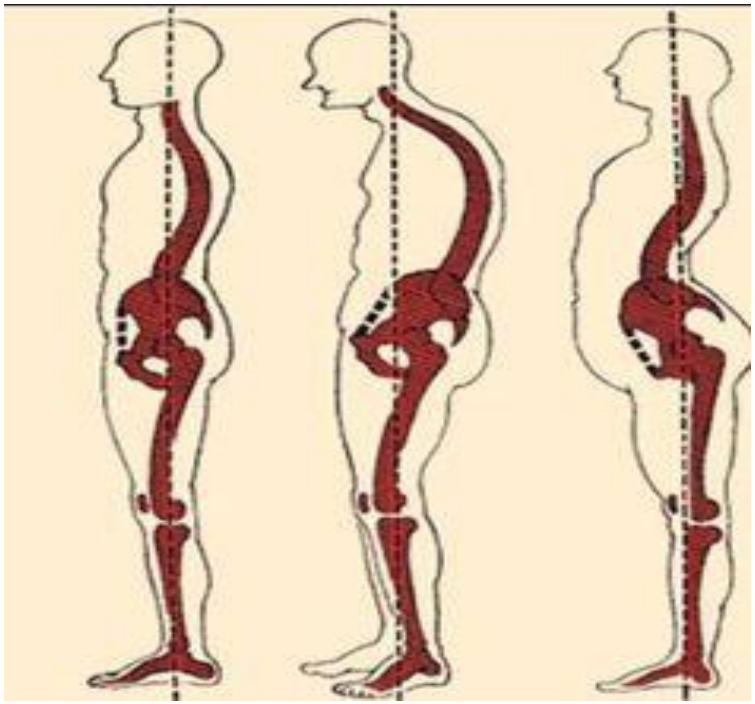


Anterior and Posterior Pelvis Tilt



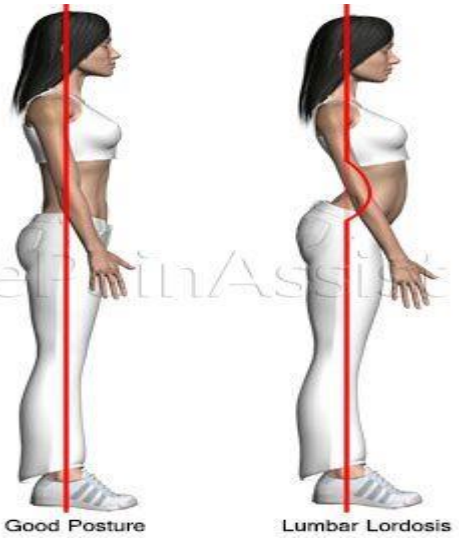


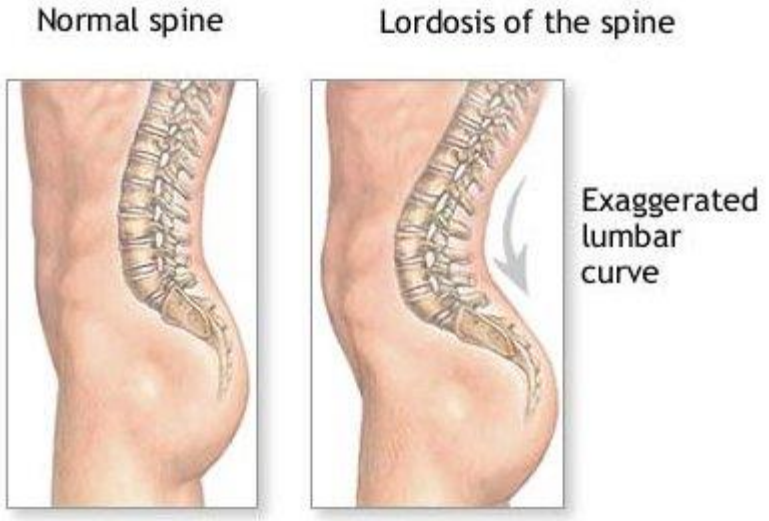
Common Deviations – Pelvis position



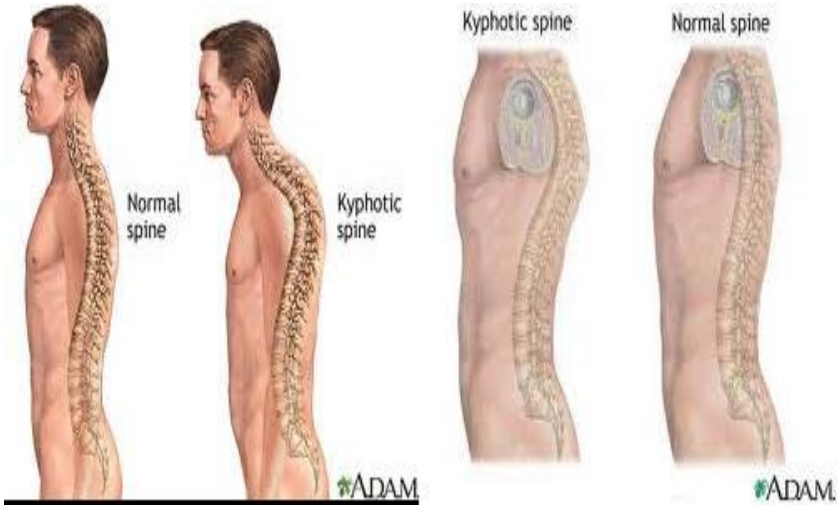
Lordosis:

- Head: forward
- Scapulae: abducted
- T spine:↑ flexion
- L spine: hyperextended
- Pelvis: anterior tilt
- Hips: flexed
- Knees: slightly hyperextended
- Ankles: slight plantar flexion





Kyphosis: exaggerated outward curve



Flat Back:

Head: forward

T spine:↑ flexion upper, lower straight

L spine: flexed, straight

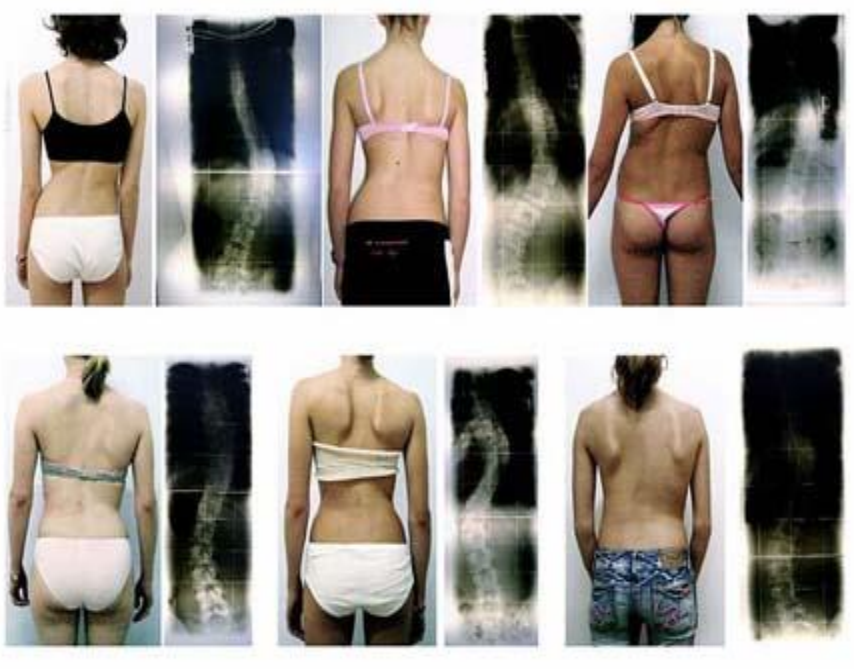
Pelvis: posterior tilt

Hips: extended

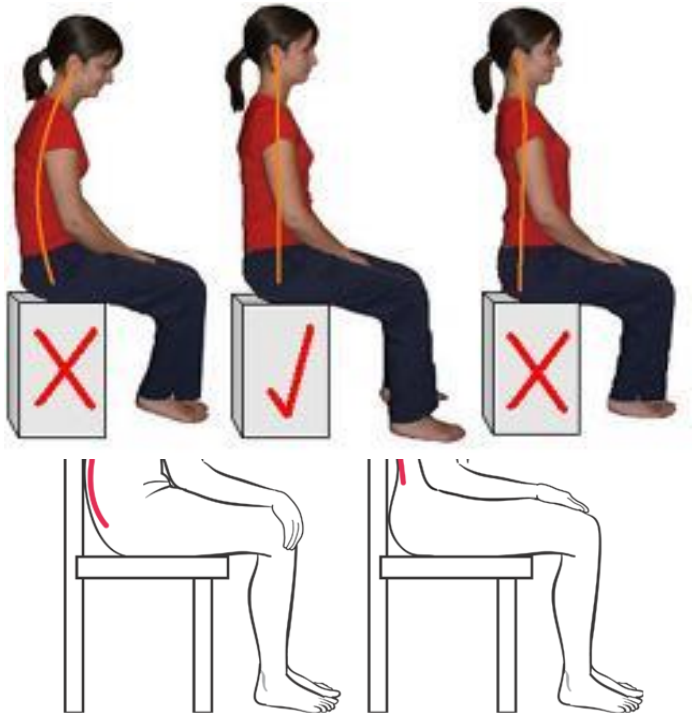
Knees: extended

Ankles: slight plantar

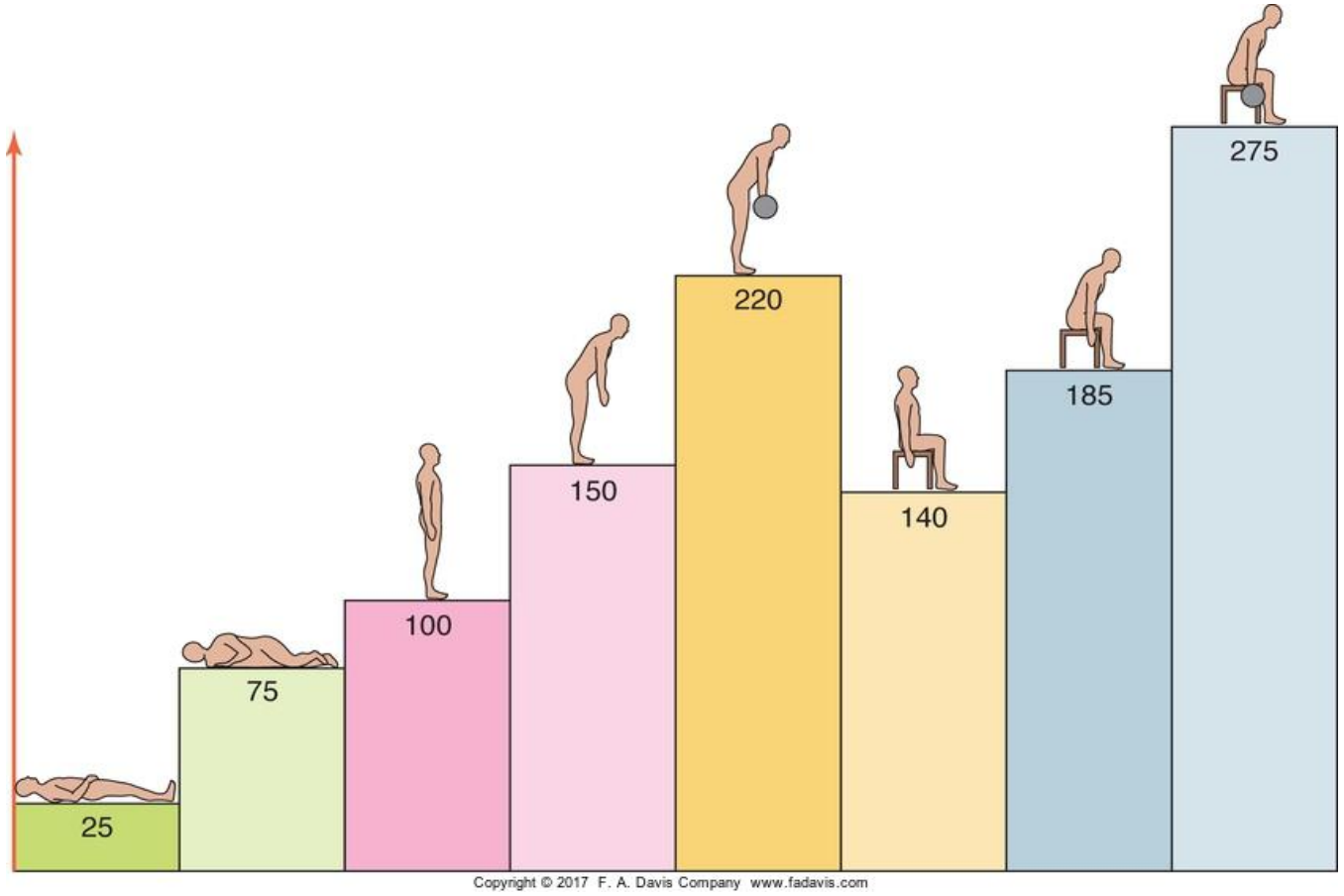
Scoliosis: abnormal curving of the spine to the R or L, usually in the thoracic spine (named for convex curve)



Sitting Posture



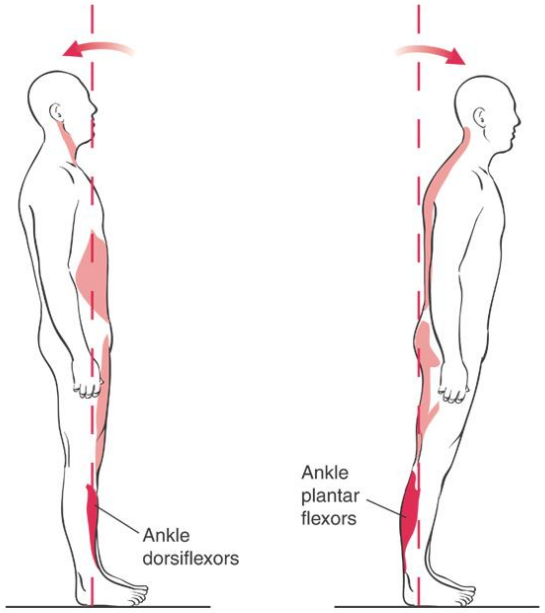
Disk Pressures in various positions



Postural Sway- BALANCE

- Ankle Dorsiflexors
- Ankle Plantar-flexors
- Increased Sway with Decreased **BOS** and Increased Height **COG**

- LOS- Limits of Stability



Sway Recovery Strategies: pg. 204 O'Sullivan

- **Ankle:**

postural control initiated at the ankle

preferred strategy is small

- **Hip:**

control from the hip, pelvis and trunk

preferred strategy when challenge is large and fast

- **Stepping Strategy:**

- used for large and rapid changes to COG

one step to regain balance and prevent falling

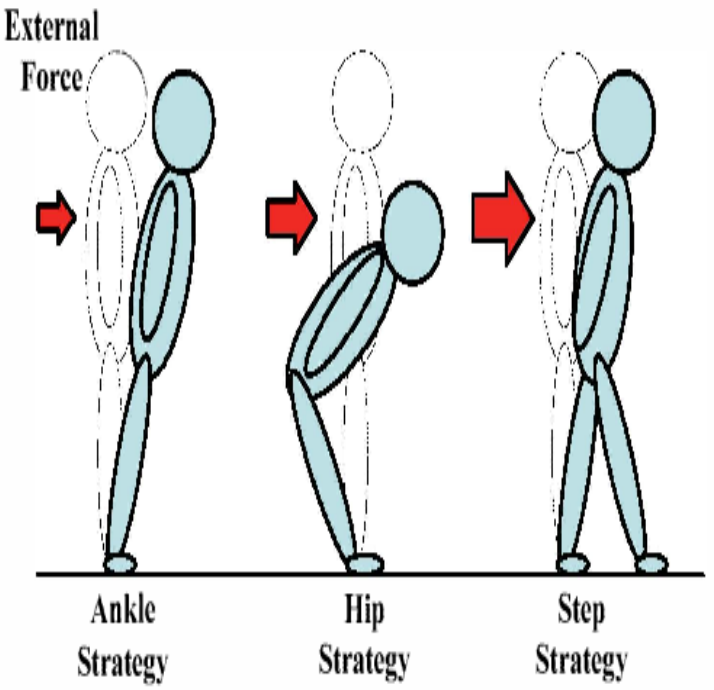


Fig. 1 Three basic balancing strategies

ABC Balance Confidence Scale

- The ABC 16-item scale (ABC-16) is a valid and reliable measure of balance confidence and has relationship to balance impairment and falls in older adults.
- Detects the loss of balance confidence
- Recorded in the “S” section of the SOAP note.
- It is the **patient’s subjective measure** of balance confidence.

Objective Balance Tests

- **Romberg Tests: Static Balance**
- Balance test to determine sensory motor control in static balance
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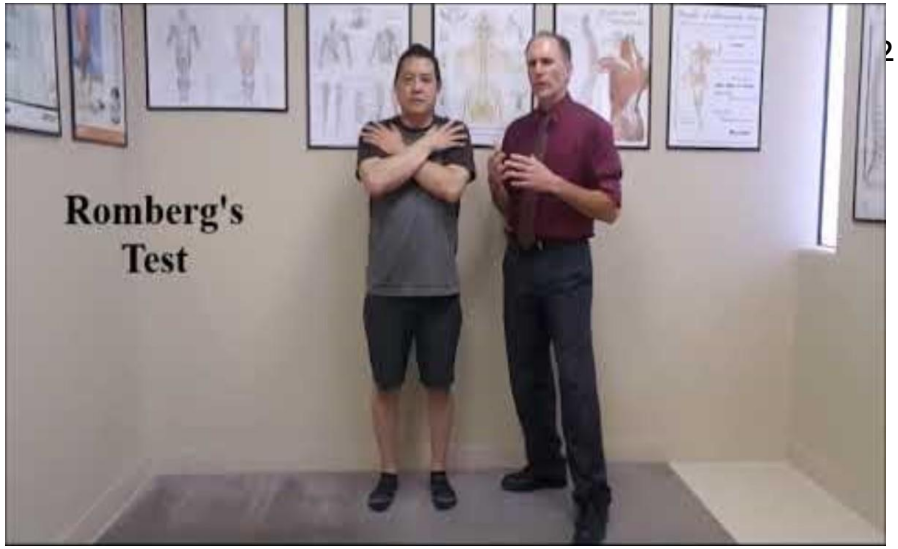


- **Functional Reach Test: Dynamic Balance**
- Provides a quick screen of balance in older adults., in dynamic balance.

Single Leg Stance

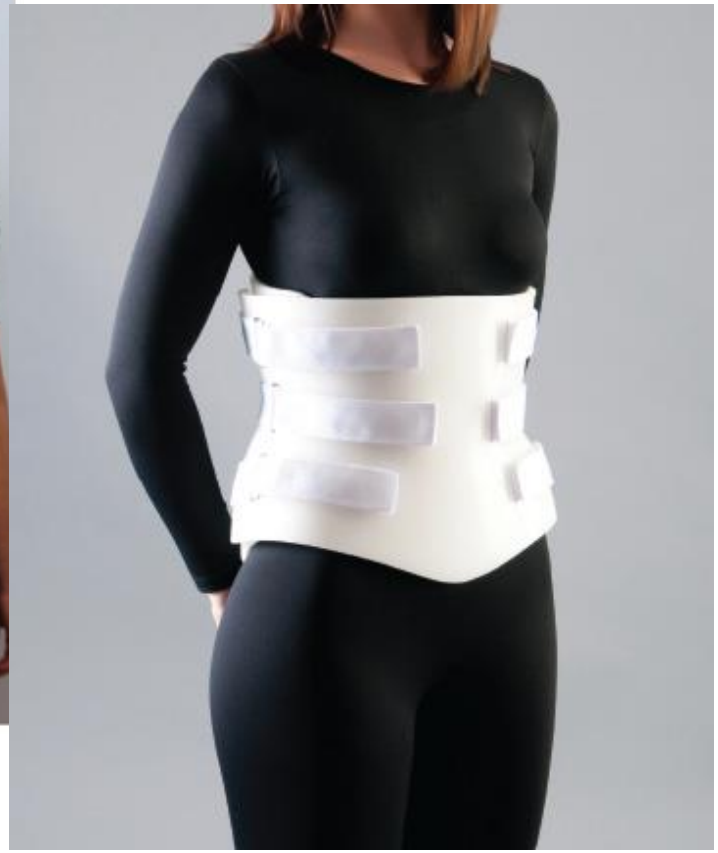
Benefits of Single leg Stance:

Therapeutic Intervention

- **Strengthen** Weak Over Stretched Musculature
- **Stretch** Tight Musculature
- **Correct** Misalignment with Orthotics/External

Therapeutic intervention:

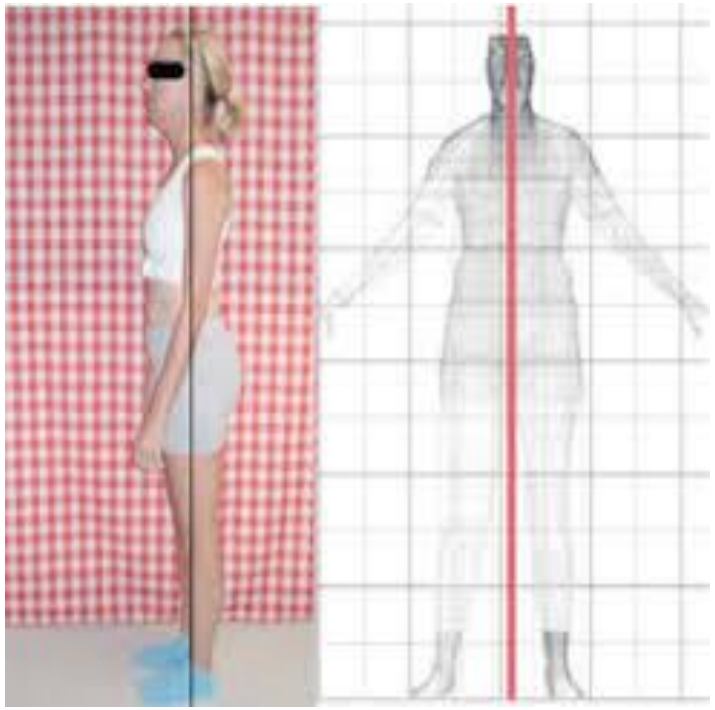
Corrective bracing: TLSO or LSO



Correct Posture Not About Looking Better, it is **about Living Better**…

- Decreases Pain
- Decreases Abnormal Pressure on Structures
- Allows Proper Movement and Function of Extremities
- Decreases Energy Expenditure
- Increases Balance and Stability
- Increases Lung Expansion/Cardiac
- Increases Internal Organ Space

What structures are overstretched or weak?



Questions?