BIOMECHNICS OF POSTURE

Normal Posture

• Normal posture is mostly describe in erect standing position.
• Normally posture is not erect but it has continuous anterior/posterior sway and lateral sway
• Posture is also varies in sitting, kneeling and other fundamental positions of the body.

Postural Sway

• Normal erect standing posture is often compared to the movement of an inverted pendulum in which the base is fixed and the pendulum is free to oscillate over the fixed base.
• The normal sway of the body during quiet standing moves the centre of mass and the centre of pressure of the body anteriorly and posteriorly up to 7 mm.
• Control of standing stability depends on sensory input from the visual, vestibular, and somatosensory systems as well as on motor control. While appropriate sensory integration is essential for normal balance, adequate muscle strength is also required. The specific muscles most important for upright posture

Ideal Posture

Sagittal Plane orientation of the Ideal posture

Joint	Line passing through
Ankle	Lateral Malleolus
Knee	Lateral Epicondyle
Hip	Greater Trochanter
Shoulder	Acromion Process
Head and Neck	External Auditory Meatus

Frontal and Transverse Plane Alignment in Normal Erect Posture:

In the frontal and transverse planes, normal posture suggests a general right–left symmetry, with the head and vertebral column aligned vertically, hips and shoulders at an even height, the knees exhibiting symmetrical genu valgum within normal limits, and symmetrical placement of the upper and lower extremities in the transverse plane

BIOMECHNICS OF POSTURE

Muscular Control of Normal Posture

·**Neck-**Active contraction of cervical extensors maintains upright posture of the head and neck.

·**Abdomen-** The internal oblique muscle, with some activity in the external oblique muscle.

·**Ankle-** During quiet standing the plantar flexor muscles generate a plantar flexion moment to maintain static equilibrium. There is activity of both the soleus and the gastrocnemius during quiet standing

Knee- Reports of slight electrical activity in the quadriceps muscles and hamstrings muscles) are consistent with the use of passive supports to support the extended knee during quiet standing

·**Hip-**The ground reaction force produces an extension moment at the hip, and EMG data reveal activity of the iliacus in quiet standing, exerting a stabilizing flexion moment

·**Spine-** Activity of the erector spinae and multifidus with intermittent bursts of increased activity

·**Shoulder-** Upper trapezius and minimal activity in the upper portion of the serratus anterior during quiet standing suggest that these muscles may provide some upward support for the shoulder girdle and upper extremity.

List of Postural Malalignments

- Forward head, Forward Shoulder
- Excessive Kyphosis
- Flatten Kyphosis
- Excessive Lumbar Lordosis
- Flatten Lumbar Lordosis
- Anterior Pelvic Tilt
- Posterior Pelvic Tilt
- Genu Recurvatum
- Scoliosis
- Lateral Pelvic Tilt
- Genu varum and Valgus
- Foot Pronation, Foot Supination

Important Biomechanics of Posture Questions

1. Describe posture vertical and frontal alignment
2. List abnormal postural alignment
3. Define ideal posture