

Posture

Posture is the attitude assumed by the body either with support during muscular inactivity (or) by means of coordinated action of many @ working to maintain stability.

Types:

- => Static
- => Dynamic
- > Bipedal stance
- > Quadrupedal stance

Postural control:

It is a person's ability to maintain stability of body & body segments in response to force that distributes the body's structural equilibrium.

Postural control depends on the integrity of

- CNS
- Visual
- Vestibular
- Musculoskeletal system

Major goals:

control the body's orientation
main aim body's COG over BOS.

- Stabilize the head vertically.

- Eye gaze is appropriately oriented
[altered (or) absent input]

The absence of normal gravitational force in weightless conditions during space flight.

Decreased sensation in lower limb.

Altered output peripheral nerve damage
inability of @ to respond CNS.

Perturbation:

Any sudden change in condition that displaces the body posture away from the equilibrium.

Sensory

alter visual inputs

mechanical

displacement of body segments / entire body

Reactive response:

- synergies $\left\{ \begin{array}{l} \text{Fixed} \rightarrow \text{Ankle, Hip} \\ \text{change in support} \end{array} \right.$

- Strategy — Head stabilizing strategy

1. Head in relation to space

2. Head in relation to trunk

Kinetic & Kinematics of posture

Internal force



M, ligaments, joints,
tendon & capsules

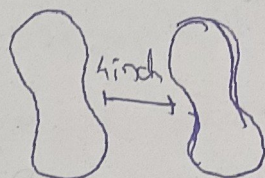
External force



Inertia, gravity,
ground reaction
force (GRF)

Inertia:

Standing with 4 inch with feet



In erect standing posture body undergoes a constant swaying motion called sway envelope (or) postural sway.

12° sagittal plane & 16° frontal plane.

Gravity: LoH pass through COH

GRF: whenever the body contact the ground the ground push upward force.

vertical horizontal

→ medial

→ lateral

- Anter

- poster

- equal in magnitude but opposite to gravity direction in erect standing posture.

coincidence action lines:

GRF vector & LoR travel in same line.

Ideal posture:

An ideal posture is one in which the body segments are aligned vertically and LoR passes through all joint axes.

It is difficult & can be tried to become normal.

Analysis:

Plumb line

- Photograph
- Videograph
- Radiograph
- 3D computer analysis
- EMG
- Electrogoniometry
- Force plates

Lateral view: sagittal plane

Ankle Joint

1. LoR - Anter to the joint axis
2. gravitational moment - Initiates dorsiflexion
3. passive opposing force - nil

4. Active opposing force - soleus

Knee Joint:

1. LOA - Anter to the joint axis
2. CM - Extension
3. POF - poster joint capsule
4. AOF - Nil

Hip Joint

1. LOA - poster to the joint axis
2. CM - Extension
3. POF - Iliofemoral, ischiofemoral, pubofemoral ligaments
4. AOF - Iliopsoas

Lumbosacral Joint

1. LOA - Body of L5 { close to the axis of rotation of LS joint
2. CM - slight extension
3. POF - Anter longitudinal ligament
4. AOF - Nil

Sacro iliac joint:

1. LOH - Anter to the Joint axis
2. AM - Flexion
3. POF - Sacrospinous, sacrotuberous, sacrotuberous ligaments.
4. DOF - Nil

vertebral column: [Lumbar]

1. LOH - Poster to the Joint axis
2. AM - Extension
3. POF - Anter longitudinal ligaments
4. DOF - Nil

Thoracic:

1. LOH - Anter
2. AM - Flexion
3. POF - poster longti ligaments
4. DOF - Extension

cervical

1. LOH - poster
2. AM - Extension
3. POF - Anter longi ligament
4. DOF - Nil

Atlantooccipital joint

1. LOA - Anter to the Joint axis
2. LM - Flexion
3. POF - Ligamentum nuchae, tectorial membrane,
4. DOF - poster neck @ extensors.

Abnormalities:

Lateral: Foot & toes

- claw & Hammer toe

Knee - genu - recurvatum
- Flexed knee posture

Pelvis - Anter pelvic tilt

vertebral column: - Lordosis
Kyphosis
Scoliosis

Head - Forward neck posture

Anteroposterior

Ankle - Talus valgus

Knee - Genu valgum

Genu varum

Squinting (or) crossing patella

crosshopper eye patella

Anterior:

<u>Body segments</u>	<u>Locn</u>
1. Head	middle of the forehead, nose & chin
2. chest	middle of xiphoid process
3. Abdomen	through umbilicus
4. Hip & pelvis	line equidistant from Rt & Lt ASIS & through symphysis pubis.
5. Knees	equidistant from medial femoral condyles
6. Ankle	equidistant from medial malleolus

Posterior:

<u>Posterior segment</u>	<u>Locn</u>
1. Head	middle of head
2. Shoulder & spine	along vertebral column in a straight line in symmetrical way.

3. Hip & Pelvis

cluteal cleft of
butt equidistance
from PSIS

4. Knee

equidistance from
medial femoral condyle

5. Ankle

equidistance from
medial malleolus