

Pelvic & Spinal Postures

POTENTIAL CLINICAL CAUSES

POTENTIAL TECHNICAL (EQUIPMENT) CAUSES

PELVIS & LOWER EXTREMITIES

PELVIS & SPINE



+ SAGITTAL PELVIC ANGLE (Posterior Pelvic Tilt)

Low or absent tone in the trunk muscles/low tone/muscle control in pelvis or trunk
Abnormal (high, low, or fluctuating) tone in trunk and/or lower extremities
Pathological reflexes in lower extremities or trunk/abnormal reflexes in trunk/lower extremities
Limited hip flexion
Decreased lordosis
Decreased pelvic/lumbar spine range of motion
Decreased hamstring ROM

Seat depth too long
Footplate position relative to knee does not accommodate tight hamstring
Front end angle/hanger angle doesn't accommodate hamstring range
Footplates too high (thighs not loaded sufficiently)
Footplates too low (feet not loaded sufficiently)
Lack of posterior pelvis/sacral support
Back support too upright
Seat-to-floor height too high for foot propulsion
Armrests too low



- SAGITTAL PELVIC ANGLE (Anterior Pelvic Tilt)

Increased lumbar lordosis
Tightened paraspinals
Weakened abdominals
Tight quadriceps
Tight hip flexors
Obesity

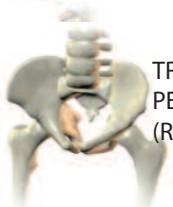
Anterior femoral angle (knees lower than hips)
Excessive lumbar contour
Trunk not supported
Back support too upright



FRONTAL PELVIC ANGLE (Obliquity)

Scoliosis
Abnormal reflexes in trunk or lower limbs
Asymmetrical muscle tone (trunk and/or lower extremities)
Asymmetrical trunk muscle strength
Asymmetrical soft tissue or muscle mass
Asymmetrical pelvis/femur bone structure
Asymmetrical hip flexion range of motion
Limited hip abduction and/or adduction
Limited hip internal or external rotation

Poor base of support - i.e. sling upholstery
Footplates, position and/or seat-to-back angle or front end angle may not match client's available range of motion
Seat shape does not support trochanters
Wheelchair too wide
Seat and/or back does not provide enough lateral pelvic support
Joystick and/or wheel location inappropriate
Armrests too low (upper extremities not supported)



TRANSVERSE PELVIC ANGLE (Rotation)

Scoliosis or roto scoliosis
Asymmetrical hip flexion
Asymmetrical muscle tone (trunk and/or lower leg length discrepancy)
Posterior dislocated or subluxed hip
Limited hip abduction and/or adduction range of motion
Asymmetrical muscle mass in the posterior pelvis
Unilateral foot propeller (extremities)

Trunk not fully supported
Lack of posterior pelvis/sacral support
Seat and/or backrest contours too narrow
Seat-to-floor height too high for foot propulsion
Wheel set up incorrect for hand propulsion



SAGITTAL STERNAL ANGLE (Upper Kyphosis)

Low/absent muscle tone in the trunk muscles
Compensation for posterior pelvic tilt
Diminished head control
Postural deterioration over time
Extreme hyper mobility
Hyper extended cervical spine
Diminished disc space in upper thoracic spine

Seat-to-back angle too closed
Back support too low
Arm support too low
Back does not match shape of posterior trunk
Head support mounted too far forward or too low
Wheel set up incorrect for hand propulsion



SAGITTAL TRUNK ANGLE (Kyphosis)

Low tone/poor muscle control in pelvis or trunk
Compensation for posterior pelvic tilt
Structural spinal deformity
Diminished head control
Compensation for visual impairment

Back does not match shape of posterior trunk
Seat-to-back angle too open or closed
Lack of adequate posterior pelvis/sacral support/back does not support posterior pelvis
Back support too vertical
Back support too low
Head support mounted too far forward or too low
Arm supports too low



SAGITTAL ABDOMINAL ANGLE (Lordosis)

Low or absent muscle tone in the trunk muscles
Tightened paraspinals
Hypermobility of lumbar spine
Compensation for anterior tilted pelvis
Compensation for lumbar instability
Obesity
Fixed structural deformity

Anterior femoral angle (knees lower than hips)
Back too vertical
Excessive lumbar contour
Back does not match shape of posterior trunk
Posterior pelvic support too high
Back support too low
Orientation in space not optimal (system too upright)



SCOLIOSIS

Compensation for pelvic obliquity and/or pelvic rotation
Asymmetrical muscle tone or strength in the trunk muscles
Decreased trunk balance
Structural spinal deformity
Asymmetrical upper extremity strength during manual wheelchair propulsion
Inability to hold the head in midline

Back does not match shape of posterior trunk
Back does not support posterior pelvis
Back does not provide enough lateral support
Wheelchair does not provide solid base (sling upholstery)
Seat cushion does not provide pelvic stability
Upper extremity support is too low, too high, or too wide
Joystick or wheel location inappropriate

Clinical Assessment Goals:

- ✓ Identify posture/orthopedic asymmetries at each body segment.
- ✓ Is asymmetry reducible or non-reducible?
- ✓ Measure angles in frontal, sagittal, and transverse plane.
- ✓ Absolute angles measure angles between a line connecting 2 points of reference on the body and a neutral/plumb line.
- ✓ Angles which have moved clockwise from neutral axis are (-).
- ✓ Angles which have moved counter-clockwise from neutral axis are (+).

REFERENCES:

Waugh, K. and Crane, B. (2013). A clinical application guide to standardized wheelchair seating measures of the body and seating support surfaces (rev. Ed.). Denver, CO. University of Colorado Denver. Available from: <http://www.ucdenver.edu/academics/AssistiveTechnologyPartners/resources/WheelchairSeating/Pages/WheelchairGuideForm.aspx>

Waugh, K. and Crane, B. (2013). Glossary of wheelchair terms and definitions. Denver, CO. University of Colorado Denver. Available from: <https://www.ncart.us/uploads/userfiles/files/glossary-of-wheelchair-terms.pdf>

Zwick, D. (2014). How Posture Goes Wrong: Body Shape Distortion in Cerebral Palsy. Available from: <https://www.omicsonline.org/open-access/how-posture-goes-wrong-body-shape-distortion-in-cerebral-palsy-2157-7595.1000e115.php?aid=25348>

DISCLAIMER: FOR PROFESSIONAL USE ONLY. THIS DOCUMENT (AND THE WEBSITE REFERENCED HEREIN) DO NOT PROVIDE MEDICAL ADVICE. Sunrise Medical (US) LLC does not provide clinician services. The information contained on this document (and the website referenced herein), including, but not limited to, the text, graphics, images, and descriptions, are for informational purposes only and should be utilized as a general resource for clinicians and suppliers to then use clinical reasoning skills to determine optimal seating and mobility solutions for individual patients. No material on this document (or on the website) is intended to be used as (or a substitute for) professional medical advice, diagnosis or treatment. Clinicians should adhere to their professional medical training and their institution's or practice's recommended guidelines. Reliance on this document (and the information contained herein) is solely at your own risk.