Pelvic & Spinal Postures

	POTENTIAL CLINICAL CAUSES	POTENTIAL TECHNICAL (EQUIPMENT) CAUSES
PELVIS & LOWER EXTREMITIES		
+ 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 pelvic/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/or backrest contours too narrow Seat-to-floor height too high for foot propulsion Wheel set up incorrect for hand propulsion
PELVIS & SPINE		
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 (+).*

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