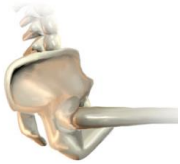
# POSITIONING CHART

| PROBLEM | POSSIBLE CAUSE | SUGGESTIONS FOR INTERVENTION | GOALS |
|---|---|---|---|
| **PELVIS** | | | |
| POSTERIOR PELVIC TILT<br>• top of the pelvis is tipped backward<br>  | • low abdominal/trunk tone | • provide support to posterior superior surface of the pelvis to block rearward movement<br>• anteriorly sloped seat<br>• drop the footrests to allow hip extension<br>• biangular back, PSIS pad | • neutral alignment of the pelvis<br>• support anatomical curvatures of the spine (i.e. prevent kyphosis)<br>• promote weight bearing on ischial tuberosities, reduce pressure risks<br>• best alignment for biomechanical function |
| | • tight hamstrings | • open thigh to back angle and/or decrease thigh to calf angle | (e.g. of trunk musculature)<br>• increase proximal stability for function |
| | • depth of wheelchair seat cushion or platform is too long | • provide appropriate seat depth to allow hip and knee flexion | |
| | • limited range of motion, particularly limited hip flexion | • accommodate fixed limitation in hip flexion by opening seat to back angle greater than 90 degrees<br>• contoured or molded seating system | |
| | • sliding forward on seat | • provide anti-thrust or aggressively contoured seat<br>• stabilize pelvis using appropriately angled pelvic belt (typically 60 degrees) or anterior pelvic stabilizer (e.g. subASIS bar)<br>• change upholstery type | |
| | • extensor thrust | • pelvic stabilization using appropriately angled pelvic positioning belt (typically 60 degrees) or rigid anterior pelvic support<br>• anti-thrust seat or aggressively contoured seat<br>• change position in space if thrust is caused by tonic labyrinthine reflex<br>• increase hip and knee flexion, hip abduction and ankle dorsiflexion<br>• anterior knee blocks | • conserve energy<br>• reduce friction<br>• maintain alignment with other components |

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# POSITIONING CHART

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|---|---|---|---|
| ANTERIOR PELVIC TILT<br>• top of the pelvis is tipped forward<br>  | • low trunk tone<br>• muscle weakness<br>• lordosis | • place pelvic positioning belt across ASIS<br>• belly binder or corset<br>• see interventions for lordosis | • reduce lordosis<br>• neutral alignment of the pelvis<br>• promote weight bearing on ischial tuberosities<br>• best alignment for biomechanical function<br>• increase proximal stability for function |
| PELVIC ELEVATION<br>• pelvis moves upward off seating surface | • extensor tone<br>• discomfort | • extensor thrust interventions<br>• 4 point seatbelt<br>• dynamic footrest hangers or footplates | • conserve energy<br>• reduce shear<br>• maintain alignment with other components<br>• provide consistent positioning for access |
| PELVIC ROTATION<br>• one side of the pelvis is forward<br>  | ROM limitation in the hip:<br>• abduction<br>• adduction<br>• hip flexion<br>• windswept posture | • align pelvis in neutral and accommodate asymmetrical lower extremity posture | • neutral alignment of pelvis<br>• support anatomical curvatures of the spine (i.e. prevent kyphosis)<br>• promote weightbearing on ischial tuberosities, reduce pressure risks |
| | • fixed limitations in spine, pelvis, and/or femoral mobility (i.e. rotational scoliosis) | • pelvis may need to assume asymmetrical posture in order to keep head and shoulders in neutral position | • best alignment for biomechanical function (e.g. of trunk musculature)<br>• prevent subsequent trunk rotation |
| | • unequal thigh length<br>• hip dislocation | • check measurement from the pelvis to the plane of the popliteal fossa with the pelvis in neutral position, if possible<br>• create an appropriate seat surface depth for each limb, if fixed | • increase proximal stability for distal function<br>• increase pressure distribution over posterior trunk |
| | • asymmetrical surface contract over posterior buttocks and trunk | • create contour back surface to “fill-in”, if fixed | |
| | • discomfort | • identify source and remediate, or refer to physician | |

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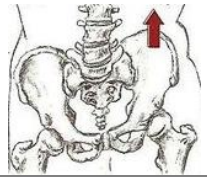
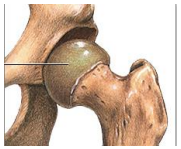
|---|---|---|---|
| | • tone and/or reflex activity<br>• ATNR | • use positioning such as lower extremity abduction with hip, knee flexion, and ankle dorsiflexion<br>• pull pelvic belt back on forward side of pelvis<br>• anterior knee block on forward side<br>• anti-thrust seat<br>• aggressively contoured, if fixed | |
| PELVIC OBLIQUITY<br>• one side of the pelvis is higher<br>  | • scoliosis<br>• ATNR<br>• surgeries<br>• discomfort | • change angle of pull of pelvic belt<br>• wedge: under low side to correct, under high side to accommodate | • best alignment for biomechanical function (e.g. of trunk musculature)<br>• level pelvis<br>• equalize pressure under pelvis<br>• prevent subsequent trunk lateral flexion<br>• reduce fixing to increase function |
| PAINFUL OR DISLOCATED HIP<br>  | • increased muscle tone<br>• poorly formed socket due to lack of weight bearing<br>• surgeries | • use softer materials under and/or around hip<br>• avoid lateral contact with hip<br>• provide lateral support along distal thigh<br>• determine what positions relieve discomfort | • comfort |
| PELVIC AMPUTATION | • Hemipelvictomy<br>• Sacral Agenesis | • generally an orthotic is made<br>• cushion is straight forward as the orthotic is being positioned<br>• if no orthotic, then molded seating system | • neutral alignment of trunk over pelvis<br>• support anatomical curvatures of the spine<br>• pressure distribution<br>• best alignment for biomechanical function<br>• increase proximal stability |

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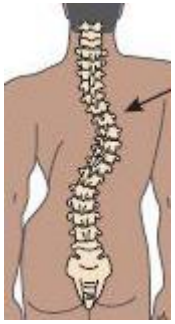
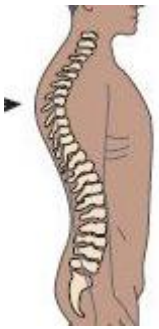
| PROBLEM | POSSIBLE CAUSE | SUGGESTIONS FOR INTERVENTION | GOALS |
|---|---|---|---|
| **TRUNK** | | | |
| LATERAL TRUNK FLEXION OR SCOLIOSIS<br>• scoliosis may be C curve, S curve, and/or rotational<br>  | • increased tone on one side<br>• musculature imbalance, may have pelvic involvement<br>• decreased trunk strength or decreased tone, causing asymmetrical posture<br>• habitual posturing for functional activity or stability<br>• fixed scoliosis | if flexible:<br>• generic contoured back<br>• lateral trunk supports (may need to be asymmetrically placed, one lower at the apex of lateral convexity)<br>• anterior trunk supports to correct any rotation (see forward trunk flexion interventions)<br>if fixed:<br>• refer to physician to explore medical or surgical procedures, x-rays<br>• TLSO<br>• aggressively contoured or molded back to allow for fixed curvature of spine and/or rib cage<br>• horizontal tilt under seat to right head, if pressure distribution is good | • neutral alignment of trunk over pelvis, if flexible<br>• minimize subsequent changes in pelvic and lower extremity posture<br>• level head over trunk for increased vision, social interaction<br>• pressure distribution |
| FORWARD TRUNK FLEXION OR KYPHOSIS<br>  | • flexion at hips<br>• flexion at thoracic area<br>• flexion at shoulder girdle with gravitational pull downward<br>• may occur from increased or floppy tone, abdominal weakness, poor trunk control, weak back extensors<br>• increased tone (i.e. hamstrings) pulling pelvis back into posterior tilt<br>• posterior pelvic tilt<br>• habitual seating in an attempt to increase stability<br>• fixed kyphosis | if flexible:<br>anterior trunk support<br>• chest strap<br>• shoulder straps<br>• shoulder retractors<br>• TLSO<br>• may be a rotational component<br>posterior trunk support<br>• correct posterior pelvic tilt<br>• increase trunk extension with biangular back, PSIS pad, etc.<br>if fixed:<br>• open seat to back angle to match pelvis angle<br>• contoured back<br>• tilt seating system to allow upright head | • prevent spinal changes and subsequent pelvic changes<br>• neutral alignment of trunk over pelvis<br>• if flexible, anatomical alignment<br>• increase head control<br>• trunk extension<br>• pressure distribution<br>• maintain good visual field |

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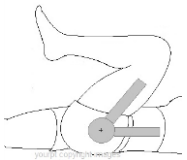
|---|---|---|---|
| TRUNK EXTENSION OR LORDOSIS<br>• hyperextension of the lumbar area<br>• often combined with anterior pelvic tilt<br>  | • tight hip flexors or overcorrection of tight hip flexors<br>• increased tone pulling pelvis forward into an anterior tilt<br>• habitual posturing in an attempt to lean forward for functional activities<br>• "fixing" pattern to extend trunk against gravity (e.g. in conjunction with shoulder retraction, etc.) | if flexible:<br>• provide lower back support as needed<br>• biangular back<br>• may need to change seat to back angle<br>• do not over correct limited hip flexion<br>• anterior trunk support (vest or belly binder)<br>if fixed:<br>• molded seating system | • neutral alignment of trunk over pelvis<br>• pressure distribution<br>• reduce subsequent shoulder retraction and fixing to allow function<br>• reduce subsequent anterior pelvic tilt |
| TRUNK ROTATION<br>• often seen in combination with lateral trunk flexion and pelvic rotation | • pelvic rotation<br>• see lateral flexion causes | if flexible:<br>• use anterior supports on forward side<br>if fixed:<br>• consider placing pelvis asymmetrically in seating system so that trunk and head face forward<br>• molded back to distribute pressure | if flexible:<br>• neutral alignment of trunk over pelvis<br>• correct pelvic rotation<br>if fixed:<br>• pressure distribution<br>• forward facing posture |
| **LOWER EXTREMITIES** | | | |
| HIP FLEXION<br>  | • decreased range of motion of hip flexors<br>• fixing with hip flexors due to lack of hip extension or stability<br>• poor positioning<br>• poor range of motion management | if flexible:<br>• superior thigh pads or strapping thighs or feet superiorly<br>• padded lap tray (underside)<br><br>if fixed:<br>• do not overcorrect and cause anterior pelvic tilt | • prevent anterior pelvic tilt<br>• prevent lordosis |
| HIP EXTENSION<br>  | • decreased range of motion of hip extensors<br>• increased extensor tone<br>• poor positioning<br>• poor range of motion management | if flexible:<br>• dynamic options<br><br>if fixed:<br>• open seat to back angle<br>• increase knee flexion, if hamstrings are tight<br>• contoured seating system | • prevent further loss of range leading to a more reclined, and less functional, position affecting vision, feeding and respiratory<br>• avoid putting extensors on stretch |

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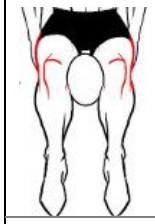
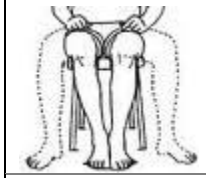
|---|---|---|---|
| HIP ADDUCTION<br>  | • extensor tone<br>• decreased range of motion of hip adductors | • medial knee blocks<br>• anterior knee blocks<br>• leg troughs<br>• contoured seat | • pressure distribution<br>• anatomical alignment<br>• prevent stimulation of stretch reflex or initiation of extensor tone patterns<br>• prevent hip internal rotation<br>• ease ADLs |
| HIP ABDUCTION<br>  | • decreased range of motion of hip abductors<br>• initial low tone<br>• surgeries | • lateral knee blocks<br>• lateral pelvic/thigh supports<br>• leg troughs<br>• contoured seat | • anatomical alignment<br>• pressure distribution |
| WINDSWEPT POSTURE<br>One leg is abducted, the other is adducted | • pelvic rotation<br>• range limitations | • pelvic rotation interventions<br>• hip adduction and abduction interventions<br>• sleep positioning | • same as for pelvic rotation |
| KNEE FLEXION<br>  | • decreased range of motion of hamstrings<br>• flexor tone<br>• structural knee issues | if flexible:<br>• refer to physician to explore medical or surgical procedures<br><br>if fixed:<br>• open seat to back angle<br>• anteriorly sloped seat<br>• move footrests back<br>• bevel front edge of seat | • decrease tension in the hamstrings and thus minimize pull into posterior pelvic tilt<br>• comfort<br>• clear front castors of wheelchair<br>• ease transfers |
| KNEE EXTENSION<br>  | • extensor tone<br>• decreased range in quadriceps<br>• over lengthening of the hamstrings<br>• structural knee changes | if flexible:<br>• dynamic options<br>• refer to physician to explore medical or surgical procedures<br>• provide alternative positioning to stretch quadriceps<br><br>if fixed:<br>• elevating legrests | • alleviate pull on pelvis and lower leg<br>• accommodate in extended position, if fixed |

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|---|---|---|---|
| LEG LENGTH DISCREPANCY | • pelvic rotation<br>• hip dislocation<br>• surgeries<br>• unequal femur length | • correct any pelvic rotation, if possible<br>• asymmetrical seat depth | • to provide adequate pressure distribution for each leg<br>• to correct any pelvic rotation |
| LOWER EXTREMITY EXTENSOR TONE | • extensor tone<br>• total extensor patterns<br>• reflex activity (i.e. pressure under ball of foot)<br>• spasms<br>• using stable surface at feet to initiate movement | minimize hip extension:<br>• see extensor thrust strategies under pelvic posterior tilt<br>• dynamic options<br><br>minimize knee extension:<br>• shoeholders with ankle straps<br>• anterior lower leg blocks<br>• dynamic options | • prevent initiation of total extensor pattern<br>• prevent pelvic elevation<br>• increase endurance<br>• reduce shear<br>• reduce wear and tear on equipment |
| LOWER EXTREMITY EDEMA<br>• fluid retention and/or swelling | • feet consistently lower than knees<br>• constriction at knees<br>• medical issues (i.e. blood pressure, decreased circulatory function) | • provide alternative positioning out of the chair to elevate the legs<br>• open the thigh to calf angle if ROM is possible and hamstrings are not put on stretch; must evaluate pull on pelvis<br>• check that feet are supported<br>• raise footrests to alleviate pressure on distal thigh<br>• check for pressure areas around proximal lower leg | • minimize potential for constriction, pressure or edema<br>• comfort |
| ANKLE LIMITATIONS | • tonal patterns<br>• lack of weight bearing<br>• surgery<br>• discomfort | • angle adjustable foot plates (sagittal and frontal planes)<br>• padded foot boxes<br>• molded foot support | • accommodate fixed distortions<br>• prevent pressure to foot<br>• protect feet from injury<br>• comfort |
| FOOT DISTORTIONS | • tonal patterns<br>• lack of weight bearing<br>• surgery | • angle adjustable footplates (sagittal and frontal planes)<br>• padded foot boxes<br>• molded foot support<br>• adaptive foot wear to pad feet | • prevent pressure to foot<br>• protect feet from injury<br>• comfort |

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|---|---|---|---|
| LOWER EXTREMITY AMPUTATION | • congenital<br>• acquired | Below knee<br>• increase pressure distribution along thigh as much as possible<br>• use calf pad or panel to support lower leg<br>• avoid weight bearing on distal end of leg<br><br>Above knee<br>• ensure pelvis is level | • distribute pressure<br>• comfort<br>• not to interfere with transfers |
| **UPPER EXTREMITIES** | | | |
| SHOULDER RETRACTION<br>• often in conjunction with elbow flexion | • increased tone in scapular adductors or retractors<br>• weakness of muscles in shoulder girdle with decreased ability to protract shoulder<br>• "fixing" pattern to extend trunk against gravity, stabilize, or as a righting response<br>• anxiety, startle | • build up posterior back support with wedges or increased foam behind scapular area<br>• adjust tilt-in-space<br>• strap forearms (trunk must be anteriorly supported)<br>• provide stability elsewhere to break-up fixing pattern | • neutral alignment for function<br>• reduce risk of injury (arms may get caught in doorways)<br>• break-up fixing patterns for function<br>• reduce neck hyperextension often seen in conjunction with scapular retraction<br>• protect integrity of shoulder girdle |
| ELBOW EXTENSION<br>• often in conjunction with shoulder horizontal abduction | • muscle imbalance<br>• habitual pattern to laterally stabilize trunk<br>• habitual pattern to extend trunk<br>• ATNR<br>• anxiety, startle<br>• effort or stress | • pad attached to back cushion or tray to block upper extremity laterally and/or posteriorly<br>• strap forearms | • neutral alignment for function<br>• reduce risk of injury (arms may get caught in doorways)<br>• minimize orthopedic risks to elbow joint<br>• break-up muscle tone patterns for function |
| UNCONTROLLED MOVEMENT OF UPPER EXTREMITIES | • increased tone due to effort<br>• athetosis/dystonia<br>• anxiety | • block or strapping to decrease movement<br>• forearm weights<br>• dynamic strapping to allow some movement but decreasing extraneous movement<br>• distal stabilizer for independent grasp | • stabilization<br>• reduce anxiety<br>• to allow dependent tasks, such as feeding, to proceed |
| SELF-ABUSIVE BEHAVIOR | • self-abuse<br>• self-stimulation | • same as uncontrolled movement interventions<br>• provide alternate sensory input, if appropriate | • to reduce risk of injury to user or others<br>• to calm |

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|---|---|---|---|
| SHOULDER SUBLUXATION OR DISLOCATION<br>Usually in conjunction with upper extremity weakness | • decreased shoulder or upper extremity strength<br>• paralysis<br>• decreased muscle control<br>• decreased tone<br>• increased tone<br>• postures that continually pull humerus | • Upper Extremity Support System (tray)<br>• widened armrests<br>• arm trough<br>• posterior or lateral elbow blocks<br>• forearm straps<br>• dual shoulder straps crossing the clavicle and acromian processes<br>• slings | • comfort<br>• enhance functional use of arm<br>• prevent further loss of integrity of shoulder girdle |
| **HEAD** | | | |
| DECREASED OR NO HEAD CONTROL | • decreased neck strength<br>• hyperextension of neck in compensation for poor trunk control<br>• forward tonal pull<br>• visual impairment, particularly a vertical midline shift | • posterior head support<br>• providing only support at the neck may elicit increased neck extension and may not provide adequate surface area support, particularly in tilt<br>• change pull of gravity against head by reclining or tilting seating system<br><br>solutions for little or no head control:<br>• collars<br>• forehead strap or pad<br>• snug lateral supports<br>• chin support/orthosis<br>• superior head support (Head Pod)<br>• refer to behavioral optometrist, if appropriate | • elongation of neck extensors (if shortened by neck hyperextension)<br>• capital flexion (e.g. “chin tuck”)<br>• visual attention to the environment, peers, etc.<br>• increased function<br>• improved swallow, feeding, breathing<br>• prevent subsequent orthopedic changes to neck and shoulder girdle<br>• prevent overstretching of neck extensors and shortening of neck flexors (if head is usually hanging down) |
| LATERAL NECK FLEXION | • decreased neck strength<br>• muscle imbalance/tone<br>• ATNR<br>• scoliosis<br>• visual impairment, particularly a horizontal midline shift | • address scoliosis<br>• headrest with lateral support<br>• posterior support with 3 point lateral control; either side of head and along jawline that is deviated laterally<br>• custom molded headrest<br>• horizontal tilt, if severe and if pressure ok<br>• refer to behavioral optometrist, if appropriate | • prevent subsequent orthopedic changes to neck and shoulder girdle<br>• right head for vision, feeding and respiratory status |

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