
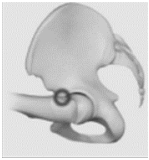
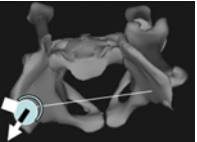


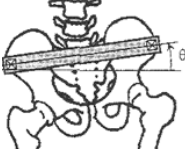

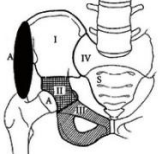
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
PELVIS			
<p>POSTERIOR PELVIC TILT</p> <ul style="list-style-type: none"> top of the pelvis is tipped backward 	<ul style="list-style-type: none"> low abdominal/trunk tone 	<ul style="list-style-type: none"> provide support to posterior superior surface of the pelvis to block rearward movement anteriorly sloped seat drop the footrests to allow hip extension biangular back, PSIS pad 	<ul style="list-style-type: none"> neutral alignment of the pelvis support anatomical curvatures of the spine (i.e. prevent kyphosis) promote weight bearing on ischial tuberosities, reduce pressure risks best alignment for biomechanical function (e.g. of trunk musculature) increase proximal stability for function
	<ul style="list-style-type: none"> tight hamstrings 	<ul style="list-style-type: none"> open thigh to back angle and/or decrease thigh to calf angle 	
	<ul style="list-style-type: none"> depth of wheelchair seat cushion or platform is too long 	<ul style="list-style-type: none"> provide appropriate seat depth to allow hip and knee flexion 	
	<ul style="list-style-type: none"> limited range of motion, particularly limited hip flexion 	<ul style="list-style-type: none"> accommodate fixed limitation in hip flexion by opening seat to back angle greater than 90 degrees contoured or molded seating system 	
	<ul style="list-style-type: none"> sliding forward on seat 	<ul style="list-style-type: none"> provide anti-thrust or aggressively contoured seat stabilize pelvis using appropriately angled pelvic belt (typically 60 degrees) or anterior pelvic stabilizer (e.g. subASIS bar) change upholstery type 	
	<ul style="list-style-type: none"> extensor thrust 	<ul style="list-style-type: none"> pelvic stabilization using appropriately angled pelvic positioning belt (typically 60 degrees) or rigid anterior pelvic support anti-thrust seat or aggressively contoured seat change position in space if thrust is caused by tonic labyrinthine reflex increase hip and knee flexion, hip abduction and ankle dorsiflexion anterior knee blocks 	


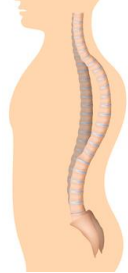
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
<p>ANTERIOR PELVIC TILT</p> <ul style="list-style-type: none"> • top of the pelvis is tipped forward 	<ul style="list-style-type: none"> • low trunk tone • muscle weakness • lordosis 	<ul style="list-style-type: none"> • place pelvic positioning belt across ASIS • belly binder or corset • see interventions for lordosis 	<ul style="list-style-type: none"> • reduce lordosis • neutral alignment of the pelvis • promote weight bearing on ischial tuberosities • best alignment for biomechanical function • increase proximal stability for function
<p>PELVIC ELEVATION</p> <ul style="list-style-type: none"> • pelvis moves upward off seating surface 	<ul style="list-style-type: none"> • extensor tone • discomfort 	<ul style="list-style-type: none"> • extensor thrust interventions • 4 point seatbelt • dynamic footrest hangers or footplates 	<ul style="list-style-type: none"> • conserve energy • reduce shear • maintain alignment with other components • provide consistent positioning for access
<p>PELVIC ROTATION</p> <ul style="list-style-type: none"> • one side of the pelvis is forward 	<p>ROM limitation in the hip:</p> <ul style="list-style-type: none"> • abduction • adduction • hip flexion • windswept posture 	<ul style="list-style-type: none"> • align pelvis in neutral and accommodate asymmetrical lower extremity posture 	<ul style="list-style-type: none"> • neutral alignment of pelvis • support anatomical curvatures of the spine (i.e. prevent kyphosis) • promote weightbearing on ischial tuberosities, reduce pressure risks
	<ul style="list-style-type: none"> • fixed limitations in spine, pelvis, and/or femoral mobility (i.e. rotational scoliosis) 	<ul style="list-style-type: none"> • pelvis may need to assume asymmetrical posture in order to keep head and shoulders in neutral position 	<ul style="list-style-type: none"> • best alignment for biomechanical function (e.g. of trunk musculature) • prevent subsequent trunk rotation
	<ul style="list-style-type: none"> • unequal thigh length • hip dislocation 	<ul style="list-style-type: none"> • check measurement from the pelvis to the plane of the popliteal fossa with the pelvis in neutral position, if possible • create an appropriate seat surface depth for each limb, if fixed 	<ul style="list-style-type: none"> • increase proximal stability for distal function • increase pressure distribution over posterior trunk
	<ul style="list-style-type: none"> • asymmetrical surface contact over posterior buttocks and trunk 	<ul style="list-style-type: none"> • create contour back surface to “fill-in”, if fixed 	
	<ul style="list-style-type: none"> • discomfort 	<ul style="list-style-type: none"> • identify source and remediate, or refer to physician 	


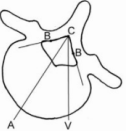
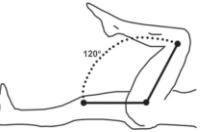

POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
	<ul style="list-style-type: none"> • tone and/or reflex activity • ATNR 	<ul style="list-style-type: none"> • use positioning such as lower extremity abduction with hip, knee flexion, and ankle dorsiflexion • pull pelvic belt back on forward side of pelvis • anterior knee block on forward side • anti-thrust seat • aggressively contoured, if fixed 	
<p>PELVIC OBLIQUITY</p> <ul style="list-style-type: none"> • one side of the pelvis is higher 	<ul style="list-style-type: none"> • scoliosis • ATNR • surgeries • discomfort 	<ul style="list-style-type: none"> • change angle of pull of pelvic belt • wedge: under low side to correct, under high side to accommodate 	<ul style="list-style-type: none"> • best alignment for biomechanical function (e.g. of trunk musculature) • level pelvis • equalize pressure under pelvis • prevent subsequent trunk lateral flexion • reduce fixing to increase function
<p>PAINFUL OR DISLOCATED HIP</p> 	<ul style="list-style-type: none"> • increased muscle tone • poorly formed socket due to lack of weight bearing • surgeries 	<ul style="list-style-type: none"> • use softer materials under and/or around hip • avoid lateral contact with hip • provide lateral support along distal thigh • determine what positions relieve discomfort 	<ul style="list-style-type: none"> • comfort
<p>PELVIC AMPUTATION</p> 	<ul style="list-style-type: none"> • Hemipelvectomy • Sacral Agenesis 	<ul style="list-style-type: none"> • generally an orthotic is made • cushion is straight forward as the orthotic is being positioned • if no orthotic, then molded seating system 	<ul style="list-style-type: none"> • neutral alignment of trunk over pelvis • support anatomical curvatures of the spine • pressure distribution • best alignment for biomechanical function • increase proximal stability

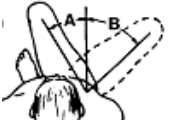
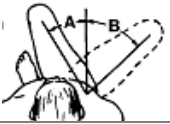
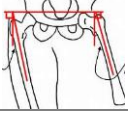


POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
TRUNK			
<p>LATERAL TRUNK FLEXION OR SCOLIOSIS</p> <ul style="list-style-type: none"> • scoliosis may be C curve, S curve, and/or rotational 	<ul style="list-style-type: none"> • increased tone on one side • musculature imbalance, may have pelvic involvement • decreased trunk strength or decreased tone, causing asymmetrical posture • habitual posturing for functional activity or stability • fixed scoliosis 	<p>if flexible:</p> <ul style="list-style-type: none"> • generic contoured back • lateral trunk supports (may need to be asymmetrically placed, one lower at the apex of lateral convexity) • anterior trunk supports to correct any rotation (see forward trunk flexion interventions) <p>if fixed:</p> <ul style="list-style-type: none"> • refer to physician to explore medical or surgical procedures, x-rays • TLSO • aggressively contoured or molded back to allow for fixed curvature of spine and/or rib cage • horizontal tilt under seat to right head, if pressure distribution is good 	<ul style="list-style-type: none"> • neutral alignment of trunk over pelvis, if flexible • minimize subsequent changes in pelvic and lower extremity posture • level head over trunk for increased vision, social interaction • pressure distribution
<p>FORWARD TRUNK FLEXION OR KYPHOSIS</p> 	<ul style="list-style-type: none"> • flexion at hips • flexion at thoracic area • flexion at shoulder girdle with gravitational pull downward • may occur from increased or floppy tone, abdominal weakness, poor trunk control, weak back extensors • increased tone (i.e. hamstrings) pulling pelvis back into posterior tilt • posterior pelvic tilt • habitual seating in an attempt to increase stability • fixed kyphosis 	<p>if flexible:</p> <p>anterior trunk support</p> <ul style="list-style-type: none"> • chest strap • shoulder straps • shoulder retractors • TLSO • may be a rotational component <p>posterior trunk support</p> <ul style="list-style-type: none"> • correct posterior pelvic tilt • increase trunk extension with biangular back, PSIS pad, etc. <p>if fixed:</p> <ul style="list-style-type: none"> • open seat to back angle to match pelvis angle • contoured back • tilt seating system to allow upright head 	<ul style="list-style-type: none"> • prevent spinal changes and subsequent pelvic changes • neutral alignment of trunk over pelvis • if flexible, anatomical alignment • increase head control • trunk extension • pressure distribution • maintain good visual field

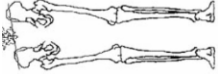
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
<p>TRUNK EXTENSION OR LORDOSIS</p> <ul style="list-style-type: none"> hyperextension of the lumbar area often combined with anterior pelvic tilt 	<ul style="list-style-type: none"> tight hip flexors or overcorrection of tight hip flexors increased tone pulling pelvis forward into an anterior tilt habitual posturing in an attempt to lean forward for functional activities “fixing” pattern to extend trunk against gravity (e.g. in conjunction with shoulder retraction, etc.) 	<p>if flexible:</p> <ul style="list-style-type: none"> provide lower back support as needed biangular back may need to change seat to back angle do not over correct limited hip flexion anterior trunk support (vest or belly binder) <p>if fixed:</p> <ul style="list-style-type: none"> molded seating system 	<ul style="list-style-type: none"> neutral alignment of trunk over pelvis pressure distribution reduce subsequent shoulder retraction and fixing to allow function reduce subsequent anterior pelvic tilt
<p>TRUNK ROTATION</p> <ul style="list-style-type: none"> often seen in combination with lateral trunk flexion and pelvic rotation 	<ul style="list-style-type: none"> pelvic rotation see lateral flexion causes 	<p>if flexible:</p> <ul style="list-style-type: none"> use anterior supports on forward side <p>if fixed:</p> <ul style="list-style-type: none"> consider placing pelvis asymmetrically in seating system so that trunk and head face forward molded back to distribute pressure 	<p>if flexible:</p> <ul style="list-style-type: none"> neutral alignment of trunk over pelvis correct pelvic rotation <p>if fixed:</p> <ul style="list-style-type: none"> pressure distribution forward facing posture
LOWER EXTREMITIES			
<p>HIP FLEXION</p> 	<ul style="list-style-type: none"> decreased range of motion of hip flexors fixing with hip flexors due to lack of hip extension or stability poor positioning poor range of motion management 	<p>if flexible:</p> <ul style="list-style-type: none"> superior thigh pads or strapping thighs or feet superiorly padded lap tray (underside) <p>if fixed:</p> <ul style="list-style-type: none"> do not overcorrect and cause anterior pelvic tilt 	<ul style="list-style-type: none"> prevent anterior pelvic tilt prevent lordosis
<p>HIP EXTENSION</p> 	<ul style="list-style-type: none"> decreased range of motion of hip extensors increased extensor tone poor positioning poor range of motion management 	<p>if flexible:</p> <ul style="list-style-type: none"> dynamic options <p>if fixed:</p> <ul style="list-style-type: none"> open seat to back angle increase knee flexion, if hamstrings are tight contoured seating system 	<ul style="list-style-type: none"> prevent further loss of range leading to a more reclined, and less functional, position affecting vision, feeding and respiratory avoid putting extensors on stretch

POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
<p>HIP ADDUCTION</p> 	<ul style="list-style-type: none"> • extensor tone • decreased range of motion of hip adductors 	<ul style="list-style-type: none"> • medial knee blocks • anterior knee blocks • leg troughs • contoured seat 	<ul style="list-style-type: none"> • pressure distribution • anatomical alignment • prevent stimulation of stretch reflex or initiation of extensor tone patterns • prevent hip internal rotation • ease ADLs
<p>HIP ABDUCTION</p> 	<ul style="list-style-type: none"> • decreased range of motion of hip abductors • initial low tone • surgeries 	<ul style="list-style-type: none"> • lateral knee blocks • lateral pelvic/thigh supports • leg troughs • contoured seat 	<ul style="list-style-type: none"> • anatomical alignment • pressure distribution
<p>WINDSWEPT POSTURE</p> <p>One leg is abducted, the other is adducted</p> 	<ul style="list-style-type: none"> • pelvic rotation • range limitations 	<ul style="list-style-type: none"> • pelvic rotation interventions • hip adduction and abduction interventions • sleep positioning 	<ul style="list-style-type: none"> • same as for pelvic rotation
<p>KNEE FLEXION</p> 	<ul style="list-style-type: none"> • decreased range of motion of hamstrings • flexor tone • structural knee issues 	<p>if flexible:</p> <ul style="list-style-type: none"> • refer to physician to explore medical or surgical procedures <p>if fixed:</p> <ul style="list-style-type: none"> • open seat to back angle • anteriorly sloped seat • move footrests back • bevel front edge of seat 	<ul style="list-style-type: none"> • decrease tension in the hamstrings and thus minimize pull into posterior pelvic tilt • comfort • clear front castors of wheelchair • ease transfers
<p>KNEE EXTENSION</p> 	<ul style="list-style-type: none"> • extensor tone • decreased range in quadriceps • over lengthening of the hamstrings • structural knee changes 	<p>if flexible:</p> <ul style="list-style-type: none"> • dynamic options • refer to physician to explore medical or surgical procedures • provide alternative positioning to stretch quadriceps <p>if fixed:</p> <ul style="list-style-type: none"> • elevating legrests 	<ul style="list-style-type: none"> • alleviate pull on pelvis and lower leg • accommodate in extended position, if fixed

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PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
LEG LENGTH DISCREPANCY 	<ul style="list-style-type: none"> • pelvic rotation • hip dislocation • surgeries • unequal femur length 	<ul style="list-style-type: none"> • correct any pelvic rotation, if possible • asymmetrical seat depth 	<ul style="list-style-type: none"> • to provide adequate pressure distribution for each leg • to correct any pelvic rotation
LOWER EXTREMITY EXTENSOR TONE	<ul style="list-style-type: none"> • extensor tone • total extensor patterns • reflex activity (i.e. pressure under ball of foot) • spasms • using stable surface at feet to initiate movement 	<p>minimize hip extension:</p> <ul style="list-style-type: none"> • see extensor thrust strategies under pelvic posterior tilt • dynamic options <p>minimize knee extension:</p> <ul style="list-style-type: none"> • shoeholders with ankle straps • anterior lower leg blocks • dynamic options 	<ul style="list-style-type: none"> • prevent initiation of total extensor pattern • prevent pelvic elevation • increase endurance • reduce shear • reduce wear and tear on equipment
LOWER EXTREMITY EDEMA <ul style="list-style-type: none"> • fluid retention and/or swelling 	<ul style="list-style-type: none"> • feet consistently lower than knees • constriction at knees • medical issues (i.e. blood pressure, decreased circulatory function) 	<ul style="list-style-type: none"> • provide alternative positioning out of the chair to elevate the legs • open the thigh to calf angle if ROM is possible and hamstrings are not put on stretch; must evaluate pull on pelvis • check that feet are supported • raise footrests to alleviate pressure on distal thigh • check for pressure areas around proximal lower leg 	<ul style="list-style-type: none"> • minimize potential for constriction, pressure or edema • comfort
ANKLE LIMITATIONS	<ul style="list-style-type: none"> • tonal patterns • lack of weight bearing • surgery • discomfort 	<ul style="list-style-type: none"> • angle adjustable foot plates (sagittal and frontal planes) • padded foot boxes • molded foot support 	<ul style="list-style-type: none"> • accommodate fixed distortions • prevent pressure to foot • protect feet from injury • comfort
FOOT DISTORTIONS	<ul style="list-style-type: none"> • tonal patterns • lack of weight bearing • surgery 	<ul style="list-style-type: none"> • angle adjustable footplates (sagittal and frontal planes) • padded foot boxes • molded foot support • adaptive foot wear to pad feet 	<ul style="list-style-type: none"> • prevent pressure to foot • protect feet from injury • comfort

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LOWER EXTREMITY AMPUTATION	<ul style="list-style-type: none"> • congenital • acquired 	<p>Below knee</p> <ul style="list-style-type: none"> • increase pressure distribution along thigh as much as possible • use calf pad or panel to support lower leg • avoid weight bearing on distal end of leg <p>Above knee</p> <ul style="list-style-type: none"> • ensure pelvis is level 	<ul style="list-style-type: none"> • distribute pressure • comfort • not to interfere with transfers
UPPER EXTREMITIES			
SHOULDER RETRACTION <ul style="list-style-type: none"> • often in conjunction with elbow flexion 	<ul style="list-style-type: none"> • increased tone in scapular adductors or retractors • weakness of muscles in shoulder girdle with decreased ability to protract shoulder • “fixing” pattern to extend trunk against gravity, stabilize, or as a righting response • anxiety, startle 	<ul style="list-style-type: none"> • build up posterior back support with wedges or increased foam behind scapular area • adjust tilt-in-space • strap forearms (trunk must be anteriorly supported) • provide stability elsewhere to break-up fixing pattern 	<ul style="list-style-type: none"> • neutral alignment for function • reduce risk of injury (arms may get caught in doorways) • break-up fixing patterns for function • reduce neck hyperextension often seen in conjunction with scapular retraction • protect integrity of shoulder girdle
ELBOW EXTENSION <ul style="list-style-type: none"> • often in conjunction with shoulder horizontal abduction 	<ul style="list-style-type: none"> • muscle imbalance • habitual pattern to laterally stabilize trunk • habitual pattern to extend trunk • ATNR • anxiety, startle • effort or stress 	<ul style="list-style-type: none"> • pad attached to back cushion or tray to block upper extremity laterally and/or posteriorly • strap forearms 	<ul style="list-style-type: none"> • neutral alignment for function • reduce risk of injury (arms may get caught in doorways) • minimize orthopedic risks to elbow joint • break-up muscle tone patterns for function
UNCONTROLLED MOVEMENT OF UPPER EXTREMITIES	<ul style="list-style-type: none"> • increased tone due to effort • athetosis/dystonia • anxiety 	<ul style="list-style-type: none"> • block or strapping to decrease movement • forearm weights • dynamic strapping to allow some movement but decreasing extraneous movement • distal stabilizer for independent grasp 	<ul style="list-style-type: none"> • stabilization • reduce anxiety • to allow dependent tasks, such as feeding, to proceed
SELF-ABUSIVE BEHAVIOR	<ul style="list-style-type: none"> • self-abuse • self-stimulation 	<ul style="list-style-type: none"> • same as uncontrolled movement interventions • provide alternate sensory input, if appropriate 	<ul style="list-style-type: none"> • to reduce risk of injury to user or others • to calm

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<p>SHOULDER SUBLUXATION OR DISLOCATION Usually in conjunction with upper extremity weakness</p>	<ul style="list-style-type: none"> • decreased shoulder or upper extremity strength • paralysis • decreased muscle control • decreased tone • increased tone • postures that continually pull humerus 	<ul style="list-style-type: none"> • Upper Extremity Support System (tray) • widened armrests • arm trough • posterior or lateral elbow blocks • forearm straps • dual shoulder straps crossing the clavicle and acromian processes • slings 	<ul style="list-style-type: none"> • comfort • enhance functional use of arm • prevent further loss of integrity of shoulder girdle
HEAD			
<p>DECREASED OR NO HEAD CONTROL</p>	<ul style="list-style-type: none"> • decreased neck strength • hyperextension of neck in compensation for poor trunk control • forward tonal pull • visual impairment, particularly a vertical midline shift 	<ul style="list-style-type: none"> • posterior head support • providing only support at the neck may elicit increased neck extension and may not provide adequate surface area support, particularly in tilt • change pull of gravity against head by reclining or tilting seating system <p>solutions for little or no head control:</p> <ul style="list-style-type: none"> • collars • forehead strap or pad • snug lateral supports • chin support/orthosis • superior head support (Head Pod) • refer to behavioral optometrist, if appropriate 	<ul style="list-style-type: none"> • elongation of neck extensors (if shortened by neck hyperextension) • capital flexion (e.g. “chin tuck”) • visual attention to the environment, peers, etc. • increased function • improved swallow, feeding, breathing • prevent subsequent orthopedic changes to neck and shoulder girdle • prevent overstretching of neck extensors and shortening of neck flexors (if head is usually hanging down)
<p>LATERAL NECK FLEXION</p>	<ul style="list-style-type: none"> • decreased neck strength • muscle imbalance/tone • ATNR • scoliosis • visual impairment, particularly a horizontal midline shift 	<ul style="list-style-type: none"> • address scoliosis • headrest with lateral support • posterior support with 3 point lateral control; either side of head and along jawline that is deviated laterally • custom molded headrest • horizontal tilt, if severe and if pressure ok • refer to behavioral optometrist, if appropriate 	<ul style="list-style-type: none"> • prevent subsequent orthopedic changes to neck and shoulder girdle • right head for vision, feeding and respiratory status