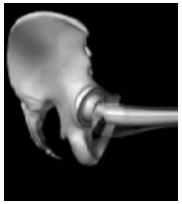
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
PELVIS			
POSTERIOR PELVIC TILT • top of the pelvis is rotated posteriorly 	• low abdominal/trunk tone	• provide support to posterior superior surface of the pelvis to block posterior rotation • anteriorly sloped seat or drop the footrests to allow hip extension • biangular back, PSIS pad	• 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
	• tight hamstrings	• open thigh to back angle and/or decrease thigh to calf angle	
	• depth of wheelchair seat cushion or platform is too long	• provide appropriate seat depth to allow pelvis to be positioned correctly	
	• limited range of motion, particularly limited hip flexion	• accommodate non-reducible limitation in hip flexion by opening seat to back angle to match range limitation • contoured or molded seating system to accommodate asymmetries, as needed	
	• sliding forward on seat	• provide anti-thrust or aggressively contoured seat • stabilize pelvis using appropriately angled pelvic belt (typically 60 degrees) or rigid anterior pelvic stabilizer • change upholstery type	
	• extensor thrust	• provide anti-thrust or aggressively contoured seat • stabilize pelvis using appropriately angled pelvic belt (typically 60 degrees) or rigid pelvic stabilizer • change position in space if caused by reflexive response • increase hip and knee flexion, hip abduction and ankle dorsiflexion • anterior knee supports • dynamic back	• conserve energy • reduce shear forces • maintain alignment with other components

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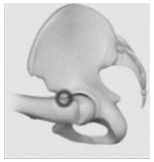
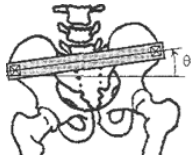
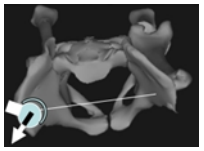
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
ANTERIOR PELVIC TILT • top of the pelvis is tipped forward 	• low trunk tone • muscle weakness • lordosis	• place pelvic positioning belt across ASIS • circumferential support (belly binder, abdominal panel, or corset) • see interventions for lordosis	• reduce lordosis • neutral alignment of the pelvis • promote weight bearing on ischial tuberosities • best alignment for biomechanical function • increase proximal stability for function
PELVIC OBLIQUITY • one side of the pelvis is higher 	• scoliosis • ATNR • surgeries • discomfort / pain	• change angle of pull of pelvic belt, typically at 90 degrees, 4-point belt may be required • wedge: under low side to correct reducible obliquity, under high side to accommodate non-reducible obliquity	• best alignment for biomechanical function (i.e. of trunk musculature) • level head and then pelvis, if possible • equalize pressure under pelvis • prevent subsequent trunk lateral flexion • reduce fixing to increase function
PELVIC ROTATION • one side of the pelvis is forward 	ROM limitations in the hip: • abduction • adduction • hip flexion • windswept posture	• align pelvis in neutral and accommodate asymmetrical lower extremity posture, as needed	• neutral alignment of pelvis • support anatomical curvatures of the spine (prevent spinal rotation) • best alignment for biomechanical function (e.g. of trunk musculature) • prevent subsequent trunk rotation • increase proximal stability for distal function • increase pressure distribution over posterior trunk
	• non-reducible limitations in spine, pelvis, and/or femoral mobility (i.e. rotational scoliosis)	• pelvis may need to assume asymmetrical posture in order to keep head trunk forward facing	
	• unequal femur length • hip dislocation	• 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 non-reducible	
	• asymmetrical surface contract over posterior buttocks and trunk	• create contour back surface to “fill-in”, if non-reducible	
	• discomfort / pain	• identify source and remediate, or refer to physician	

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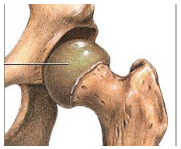
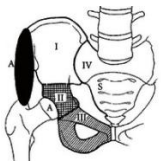
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
	• increased muscle tone and/or reflex activity (ATNR)	• use positioning such as lower extremity abduction with hip, knee flexion, and ankle dorsiflexion to 'break-up' tone • pull pelvic belt back on forward side of pelvis • anterior knee support on forward side • anti-thrust seat • aggressively contoured or molded seat, if non-reducible	
PAINFUL OR DISLOCATED HIP 	• increased muscle tone pulling head of femur out of socket and influencing bony development • shallow socket due to lack of weight bearing • surgeries	• use softer materials under and/or around hip • avoid lateral contact with hip • provide lateral support along distal thigh • determine what positions relieve discomfort / pain	• comfort / reduced pain • reduce excessive hip adduction and internal rotation, as tolerated • work with medical team if surgically reduced
PELVIC AMPUTATION 	• Hemipelvictomy • Sacral Agenesis	• Generally, an orthotic is made • cushion is straight forward as the orthotic is being positioned, rather than the pelvis • if no orthotic, then molded seating system	• neutral alignment of trunk over pelvis • support anatomical curvatures of the spine • pressure distribution • best alignment for biomechanical function • increase proximal stability

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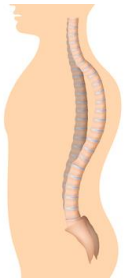
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
TRUNK			

LATERAL TRUNK FLEXION OR SCOLIOSIS
• scoliosis may be C curve, S curve, and/or rotational
 
	• increased tone on one side
	• decreased tone or muscle strength, causing collapse and asymmetrical posture
	• musculature imbalance
	• habitual posturing for functional activity or stability
	• non-reducible scoliosis
		if reducible:
		• 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 below)
		
		if non-reducible:
		• refer to physician to explore medical or surgical procedures, x-rays
		• TLSO
		• aggressively contoured or molded back to provide for support and pressure distribution
		• horizontal tilt under seat to right head, if pressure distribution between ITs is adequate
			• neutral alignment of trunk over pelvis, if reducible
			• minimize subsequent changes in pelvic and lower extremity posture
			• level head over trunk for increased vision, social interaction
			• pressure distribution

FORWARD TRUNK FLEXION OR KYPHOSIS
 
	• flexion at hips
	• flexion at thoracic area
	• flexion at shoulder girdle with gravitational pull downward
	• may occur from increased or decreased tone, muscle weakness, decreased trunk control
	• increased tone (i.e. hamstrings) pulling pelvis back into posterior tilt
	• posterior pelvic tilt
	• habitual seating in an attempt to increase stability
	• non-reducible kyphosis
		if reducible:
		anterior trunk support
		• chest strap
		• shoulder straps
		• butterfly or vest style
		• shoulder retractors
		• TLSO
		• may be a rotational component
		posterior trunk support
		• correct posterior pelvic tilt
		• do not overcorrect limited hip flexion
		• increase trunk extension with biangular back or PSIS pad
		
		if non-reducible:
		• contoured or molded back to distribute
			• prevent spinal changes and subsequent pelvic changes
			• neutral alignment of trunk over pelvis
			• if reducible, anatomical alignment
			• increase head control
			• reduce neck hyperextension
			• promote trunk extension
			• pressure distribution
			• maintain good visual field
			• improve safe swallow
			• improve breathing

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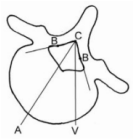
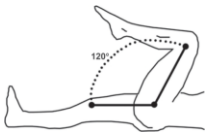
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
		pressure • open seat to back angle until head is over pelvis and/or • tilt until head is over pelvis	

TRUNK EXTENSION OR LORDOSIS
• hyperextension of the lumbar area
• often combined with anterior pelvic tilt
 
	• 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)
		if reducible:
		• provide lower back support, as needed
		• biangular back
		• may need to change seat to back angle
		• do not over correct limited hip extension
		• anterior trunk support (vest style or circumferential support)
		
		if non-reducible:
		• molded back
			• neutral alignment of trunk over pelvis
			• pressure distribution
			• reduce subsequent shoulder retraction and fixing to allow function
			• reduce subsequent anterior pelvic tilt

TRUNK ROTATION
• often seen in combination with lateral trunk flexion and pelvic rotation
 
	• pelvic rotation
	• see lateral trunk flexion causes above
		if reducible:
		• use anterior supports on forward side
		• Y-strap
		
		if non-reducible:
		• consider placing pelvis asymmetrically in seating system so that trunk and head face forward
		• molded back to distribute pressure over posterior trunk
			if reducible:
			• neutral alignment of trunk over pelvis
			• correct pelvic rotation
			
			if non-reducible:
			• pressure distribution
			• forward facing posture

LOWER EXTREMITIES			

HIP FLEXION
 
	• tight hip flexors
	• fixing with hip flexors due to lack of hip extension or stability
	• poor positioning
	• poor range of motion management
		if reducible:
		• strap feet or even thighs
		• padded lap tray (underside)
		
		if non-reducible:
		• do not overcorrect and cause anterior pelvic tilt
		• asymmetric seating surface if hip angles are not symmetrical
			• prevent anterior pelvic tilt
			• prevent lordosis
			• prevent further loss of hip extension

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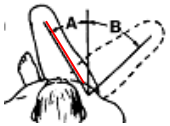
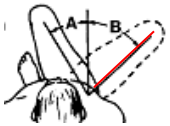
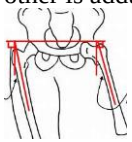
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS

HIP EXTENSION
 
	• increased extensor tone
	• tight hip extensors
	• poor positioning
	• poor range of motion management
		if reducible:
		• dynamic back
		
		if non-reducible:
		• open seat to back angle
		• increase knee flexion, if hamstrings are tight
		• asymmetric seating surface if hip angles are not symmetrical
		• contoured or molded seat
			• prevent further loss of range leading to a more reclined, and less functional, position affecting vision, feeding and breathing
			• prevent posterior pelvic tilt
			• avoid putting extensors on stretch

HIP ADDUCTION Often seen with hip extension and internal rotation 	• extensor tone • tight hip adductors • sling seat • poor positioning • poor range of motion management	• contoured seat • leg troughs • medial knee support • anterior knee support • leg straps	• pressure distribution between knees • anatomical alignment between hips and lower extremities • prevent stimulation of stretch reflex or initiation of extensor tone patterns • limit hip internal rotation • ease ADLs, such as dressing and toileting
HIP ABDUCTION 	• tight hip abductors • initial low tone • surgeries • poor positioning • poor range of motion management	• contoured seat • leg troughs • lateral knee supports • lateral pelvic/thigh supports	• anatomical alignment • pressure distribution (prevent pressure between lower leg and footrest hanger) • prevent further range loss which can lead to an overly wide seating system and impact accessibility
WINDSWEPT POSTURE One leg is abducted/ext. rotated, the other is adducted/int. rotated 	• pelvic rotation • range limitations • destructive sleep positions	• pelvic rotation interventions (see above) • hip adduction and abduction interventions (see above) • sleep positioning interventions	• same as for pelvic rotation (see above)

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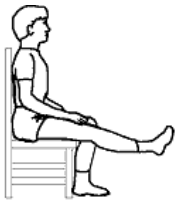
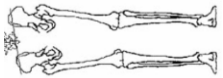
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS

KNEE FLEXION 	• decreased range of motion of hamstrings
	• flexor tone
	• structural knee issues
		if reducible:
		• refer to physician to explore medical or surgical procedures to prevent range loss
		• alternative positioning
		
		if non-reducible:
		• open seat to back angle
		• move footplates back
		• close thigh to lower leg angle
		• anteriorly sloped seat
		• bevel front edge of seat, as needed
		•
			• decrease tension in the hamstrings and thus minimize pull into posterior pelvic tilt
			• comfort / reduced pain
			• clear front castors of wheelchair
			• ease transfers

KNEE EXTENSION 	• extensor tone
	• decreased range in quadriceps
	• over lengthening of the hamstrings
	• structural knee changes
		if reducible:
		• ankle straps
		• anterior knee supports
		• dynamic footrests
		• refer to physician to explore medical or surgical procedures
		
		if non-reducible:
		• move footplates forward
		• appropriately angled footrest hangers
		• elevating legrests
		•
			• alleviate pull on pelvis and lower leg
			• accommodate in extended position, if non-reducible
			• dynamic footrests: reduce active tone, reduce client injury, reduce equipment breakage

LEG LENGTH DISCREPANCY 	• pelvic rotation • hip subluxation / dislocation • surgeries • unequal femur length	• correct any pelvic rotation, if possible • asymmetrical seat depth	• to provide adequate pressure distribution for each leg • to correct any pelvic rotation

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POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
LOWER EXTREMITY EDEMA • fluid retention and/or swelling 	• feet consistently lower than knees • constriction at knees • medical issues (i.e. blood pressure, decreased circulatory function)	• provide alternative positioning out of the chair to elevate the legs above the level of the heart • 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 and lower leg are supported • raise footplates to alleviate pressure on distal thigh • check for pressure areas around proximal lower leg • compression socks (consult medical team)	• reduce edema • minimize potential for constriction, pressure or edema • comfort / reduced pain
ANKLE LIMITATIONS FOOT DISTORTIONS	• tonal patterns • lack of weight bearing • surgery • discomfort / pain	• angle adjustable foot plates (sagittal and frontal planes) • padded foot boxes • molded foot support • specialized shoes (i.e. for Diabetes)	• accommodate non-reducible distortions • prevent pressure to foot • protect feet from injury • comfort / reduced pain
LOWER EXTREMITY AMPUTATION	• congenital • acquired	Below knee • increase pressure distribution along thigh as much as possible • use calf pad or panel to support residual limb • avoid weight bearing on distal end of leg Above knee • ensure pelvis is level • increase pressure distribution for pelvis and thighs, as much as possible	• distribute pressure • comfort / reduced pain • not to interfere with transfers

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POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
UPPER EXTREMITIES			
SHOULDER RETRACTION • often in conjunction with elbow flexion	• 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	• 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	• 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 • often in conjunction with shoulder horizontal abduction	• muscle imbalance • habitual pattern to laterally stabilize trunk • habitual pattern to extend trunk • ATNR • anxiety, startle • effort or stress	• pad attached to back cushion, armpad, or tray to block upper extremity laterally and/or posteriorly (limiting shoulder horizontal abduction) • strap forearms	• neutral alignment for function • reduce risk of injury (arms may get caught in doorways) • minimize orthopedic risks to elbow joint • break-up patterns of movement for function
UNCONTROLLED MOVEMENT OF UPPER EXTREMITIES	• increased tone due to effort • athetosis/dystonia • anxiety	• block or strapping to decrease movement • forearm weights • dynamic strapping to allow some movement but decreasing extraneous movement • distal stabilizer for independent grasp	• stabilization • reduce anxiety • to allow dependent tasks, such as feeding, to proceed • to protect client from injury
SELF-ABUSIVE BEHAVIOR	• self-abuse • self-stimulation	• same as uncontrolled movement interventions above • provide alternate sensory input, if appropriate	• to reduce risk of injury to client or others • to calm / reduce anxiety
SHOULDER SUBLUXATION OR DISLOCATION Usually in conjunction with upper extremity weakness	• decreased shoulder or upper extremity strength • paralysis • decreased muscle control • decreased tone • increased tone • postures that continually pull on humerus	• Upper Extremity Support System (tray) • widened armrests • arm trough • posterior or lateral elbow supports • forearm straps • dual shoulder straps crossing the clavicle and acromian processes • slings or mobile arm supports	• comfort / reduce pain • enhance functional use of arm • prevent further loss of integrity of shoulder girdle

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POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
HEAD			

DECREASED OR NO HEAD CONTROL	• decreased neck strength
	• hyperextension of neck in compensation for poor trunk control
	• forward tonal pull
	• visual impairment
	  • vertical midline shift
	  • cortical visual impairment (CVI)
	  • blindness
		• 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
		
		solutions for little or no head control:
		• forehead strap or pad
		• snug lateral supports
		• collars
		• chin support/orthosis
		• superior head support (Head Pod)
		• refer to behavioral optometrist, if appropriate
			• visual attention to the environment, peers, etc.
			• improved swallow, feeding, breathing
			• increased function
			• elongation of neck extensors (if shortened by neck hyperextension)
			• capital flexion (e.g. “chin tuck”)
			• 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)

LATERAL NECK FLEXION NECK ROTATION	• decreased neck strength • muscle imbalance/tone • ATNR • scoliosis • visual impairment, particularly a horizontal midline shift (lateral flexion) • Torticollis	• address scoliosis • lateral head 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 over both ITs is in acceptable range • refer to behavioral optometrist, if appropriate	• prevent subsequent orthopedic changes to neck and shoulder girdle • right head for vision, feeding and respiratory status

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