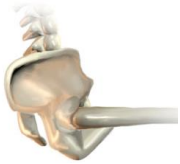
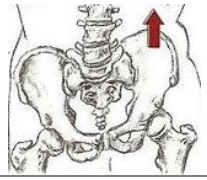
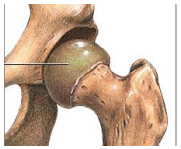
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
PELVIS			
POSTERIOR PELVIC TILT • top of the pelvis is tipped backward 	• low abdominal/trunk tone	• 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	• 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
	• tight hamstrings	• open thigh to back angle and/or decrease thigh to calf angle	(e.g. of trunk musculature) • 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 • contoured or molded seating system	
	• sliding forward on seat	• 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	
	• extensor thrust	• 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	• conserve energy • reduce friction • maintain alignment with other components

POSITIONING CHART

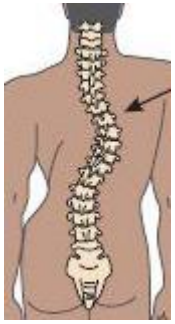
PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
ANTERIOR PELVIC TILT • top of the pelvis is tipped forward 	• low trunk tone • muscle weakness • lordosis	• place pelvic positioning belt across ASIS • belly binder or corset • see interventions for lordosis	• reduce lordosis • neutral alignment of the pelvis • promote weight bearing on ischial tuberosities • best alignment for biomechanical function • increase proximal stability for function
PELVIC ELEVATION • pelvis moves upward off seating surface	• extensor tone • discomfort	• extensor thrust interventions • 4 point seatbelt • dynamic footrest hangers or footplates	• conserve energy • reduce shear • maintain alignment with other components • provide consistent positioning for access
PELVIC ROTATION • one side of the pelvis is forward 	ROM limitation in the hip: • abduction • adduction • hip flexion • windswept posture	• align pelvis in neutral and accommodate asymmetrical lower extremity posture	• neutral alignment of pelvis • support anatomical curvatures of the spine (i.e. prevent kyphosis) • 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) • prevent subsequent trunk rotation
	• unequal thigh 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 fixed	• increase proximal stability for distal function • 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	

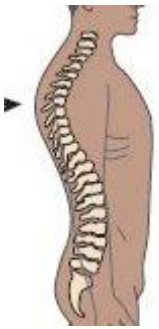
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
	• tone and/or reflex activity • ATNR	• 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	
PELVIC OBLIQUITY • one side of the pelvis is higher 	• scoliosis • ATNR • surgeries • discomfort	• change angle of pull of pelvic belt • wedge: under low side to correct, under high side to accommodate	• 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
PAINFUL OR DISLOCATED HIP 	• increased muscle tone • poorly formed 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	• comfort
PELVIC AMPUTATION	• Hemipelvictomy • Sacral Agenesis	• generally an orthotic is made • cushion is straight forward as the orthotic is being positioned • 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

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
	• musculature imbalance, may have pelvic involvement
	• decreased trunk strength or decreased tone, causing asymmetrical posture
	• habitual posturing for functional activity or stability
	• fixed scoliosis
		if flexible:
		• 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)
		if fixed:
		• 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
			• 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

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 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
		if flexible:
		anterior trunk support
		• chest strap
		• shoulder straps
		• shoulder retractors
		• TLSO
		• may be a rotational component
		posterior trunk support
		• correct posterior pelvic tilt
		• increase trunk extension with biangular back, PSIS pad, etc.
		if fixed:
		• open seat to back angle to match pelvis angle
		• contoured back
		• tilt seating system to allow upright head
			• 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

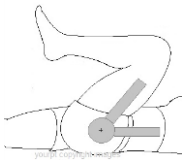
POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS

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, etc.)
		if flexible:
		• 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)
		if fixed:
		• molded seating system
			• neutral alignment of trunk over pelvis
			• pressure distribution
			• reduce subsequent shoulder retraction and fixing to allow function
			• reduce subsequent anterior pelvic tilt

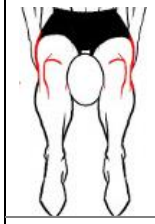
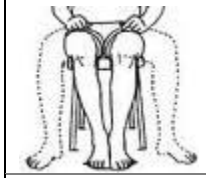
TRUNK ROTATION
• often seen in combination with lateral trunk flexion and pelvic rotation
	• pelvic rotation
	• see lateral flexion causes
		if flexible:
		• use anterior supports on forward side
		if fixed:
		• consider placing pelvis asymmetrically in seating system so that trunk and head face forward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

LOWER EXTREMITIES			

HIP FLEXION
 
	• 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
		if flexible:
		• superior thigh pads or strapping thighs or feet superiorly
		• padded lap tray (underside)
		
		if fixed:
		• do not overcorrect and cause anterior pelvic tilt
			• prevent anterior pelvic tilt
			• prevent lordosis

HIP EXTENSION
 
	• decreased range of motion of hip extensors
	• increased extensor tone
	• poor positioning
	• poor range of motion management
		if flexible:
		• dynamic options
		
		if fixed:
		• open seat to back angle
		• increase knee flexion, if hamstrings are tight
		• contoured seating system
			• 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
HIP ADDUCTION 	• extensor tone • decreased range of motion of hip adductors	• medial knee blocks • anterior knee blocks • leg troughs • contoured seat	• pressure distribution • anatomical alignment • prevent stimulation of stretch reflex or initiation of extensor tone patterns • prevent hip internal rotation • ease ADLs
HIP ABDUCTION 	• decreased range of motion of hip abductors • initial low tone • surgeries	• lateral knee blocks • lateral pelvic/thigh supports • leg troughs • contoured seat	• anatomical alignment • pressure distribution
WINDSWEPT POSTURE One leg is abducted, the other is adducted	• pelvic rotation • range limitations	• pelvic rotation interventions • hip adduction and abduction interventions • sleep positioning	• same as for pelvic rotation

KNEE FLEXION
 
	• decreased range of motion of hamstrings
	• flexor tone
	• structural knee issues
		if flexible:
		• refer to physician to explore medical or surgical procedures
		
		if fixed:
		• open seat to back angle
		• anteriorly sloped seat
		• move footrests back
		• bevel front edge of seat
			• decrease tension in the hamstrings and thus minimize pull into posterior pelvic tilt
			• comfort
			• clear front castors of wheelchair
			• ease transfers

KNEE EXTENSION
 
	• extensor tone
	• decreased range in quadriceps
	• over lengthening of the hamstrings
	• structural knee changes
		if flexible:
		• dynamic options
		• refer to physician to explore medical or surgical procedures
		• provide alternative positioning to stretch quadriceps
		
		if fixed:
		• elevating legrests
			• alleviate pull on pelvis and lower leg
			• accommodate in extended position, if fixed

POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
LEG LENGTH DISCREPANCY	• pelvic rotation • hip 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
LOWER EXTREMITY EXTENSOR TONE	• extensor tone • total extensor patterns • reflex activity (i.e. pressure under ball of foot) • spasms • using stable surface at feet to initiate movement	minimize hip extension: • see extensor thrust strategies under pelvic posterior tilt • dynamic options minimize knee extension: • shoeholders with ankle straps • anterior lower leg blocks • dynamic options	• prevent initiation of total extensor pattern • prevent pelvic elevation • increase endurance • reduce shear • reduce wear and tear on equipment
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 • 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	• minimize potential for constriction, pressure or edema • comfort
ANKLE LIMITATIONS	• tonal patterns • lack of weight bearing • surgery • discomfort	• angle adjustable foot plates (sagittal and frontal planes) • padded foot boxes • molded foot support	• accommodate fixed distortions • prevent pressure to foot • protect feet from injury • comfort
FOOT DISTORTIONS	• tonal patterns • lack of weight bearing • surgery	• angle adjustable footplates (sagittal and frontal planes) • padded foot boxes • molded foot support • adaptive foot wear to pad feet	• prevent pressure to foot • protect feet from injury • comfort

POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
LOWER EXTREMITY AMPUTATION	• congenital • acquired	Below knee • 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 Above knee • ensure pelvis is level	• distribute pressure • comfort • not to interfere with transfers
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 or tray to block upper extremity laterally and/or posteriorly • strap forearms	• 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	• 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
SELF-ABUSIVE BEHAVIOR	• self-abuse • self-stimulation	• same as uncontrolled movement interventions • provide alternate sensory input, if appropriate	• to reduce risk of injury to user or others • to calm

POSITIONING CHART

PROBLEM	POSSIBLE CAUSE	SUGGESTIONS FOR INTERVENTION	GOALS
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 humerus	• 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	• comfort • enhance functional use of arm • prevent further loss of integrity of shoulder girdle
HEAD			
DECREASED OR NO HEAD CONTROL	• decreased neck strength • hyperextension of neck in compensation for poor trunk control • forward tonal pull • visual impairment, particularly a vertical midline shift	• 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: • collars • forehead strap or pad • snug lateral supports • chin support/orthosis • superior head support (Head Pod) • refer to behavioral optometrist, if appropriate	• 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)
LATERAL NECK FLEXION	• decreased neck strength • muscle imbalance/tone • ATNR • scoliosis • visual impairment, particularly a horizontal midline shift	• 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	• prevent subsequent orthopedic changes to neck and shoulder girdle • right head for vision, feeding and respiratory status