Positioning for Function: the Lower and Upper Extremities

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Introductions

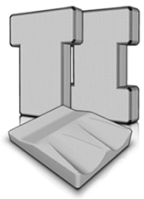
- Who I am
- Who are you?
  - Current AT use and experience
  - Goals for today

What we will be covering:

- What is positioning?
- Why is it important?
- What is the relation to function?
- Common positioning challenges
- Suggested positioning strategies

What we will be covering:

- Pelvis
- Trunk
- Lower Extremities
- Head
- Upper Extremities



Positioning: definition

- Positioning is the practice of determining an optimal body position and supporting it in a static or dynamic means
- Seating refers to the seating system used to maintain that body position

Positioning: why is it important?

- We position ourselves to best support the task at hand … and this varies quite a bit!
- Our clients often must perform multiple tasks from one primary position

General Principles

- Add in stability for function
- Modify positioning, as needed, to allow access

Stable, but not functional

Positioning Strategies

- Not a cookbook approach
- Can't really look at challenges in isolation
- Always keep in mind the possible causes and your goals
- Goals can be used as justifications for funding
- Positioning Chart
  - www.atilange.com under Resources

A word about Assessment…

THE LOWER EXTREMITIES

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Positioning Strategies: Lower Extremities

- Hip flexion
- Hip extension
- Hip adduction
- Hip abduction
- Windswept posture
- Knee flexion
- Knee extension

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Positioning Strategies: Lower Extremities, cont.

- Ankle limitations
- Foot deformities

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Hip Flexion

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Hip Flexion

- Possible Causes:
  - 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

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Hip Flexion

- Interventions:
  - 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

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Ankle Huggers

Bodypoint

Shoeholders

Therafin

Hip Flexion

- Goals:
  - prevent anterior pelvic tilt
  - prevent lordosis

Hip Extension

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Hip Extension

- Possible causes:
  - decreased range of motion of hip extensors
  - increased extensor tone
  - **poor positioning**
  - poor range of motion management

Hip Extension

- Possible Cause:
  - Discomfort

With a New Position

- He needed to be placed in pelvic rotation to ease hip discomfort

Gayle Scaramuzi, ATG Rehab

Joe Bieganek, Aspen Seating

Hip Extension

- Interventions:
  - if flexible:
    - open seat to back angle
  - if fixed:
    - open seat to back angle
    - increase knee flexion, if hamstrings are tight
    - contoured seating system

Open seat to back angle

Hip flexion and extension asymmetries

- If one hip needs to be flexed and one extended,this can be accommodated

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Hip Extension

- Goals:
  - prevent further loss of range leading to a more reclined, and less functional, position affecting vision, feeding and respiratory
  - avoid putting extensors on stretch

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Hip Adduction

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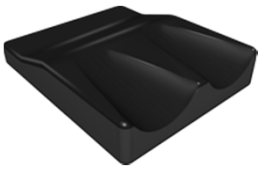
Hip Adduction

- Possible Causes:
  - extensor tone
  - decreased range of motion of hip adductors

Hip Adduction

- Interventions:
  - contoured seat
  - leg troughs
  - medial knee blocks
  - anterior knee blocks
  - strapping



Stealth contoured seat

Medial Knee Block

The groin is not a weight bearing surface!

A Little Too Big…

Medial thigh support

Stealth

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Hip Adduction

- Leg Harness can be used to maintain legs in neutral alignment with hips. Strap placement may be different than with pelvic control.

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Hip Adduction

- Goals:
  - pressure distribution
  - anatomical alignment
  - prevent stimulation of stretch reflex or initiation of extensor tone patterns
  - prevent hip internal rotation
  - ease ADLs

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Hip Abduction

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Hip Abduction

- Possible Causes:
  - decreased range of motion of hip abductors
  - initial low tone
  - surgeries

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Hip Abduction

- Interventions:
  - contoured seat
  - leg troughs
  - lateral knee blocks
  - lateral pelvic/thigh supports

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Lateral Knee Blocks

AEL

Stealth

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Lateral Pelvic supports

Stealth
removable

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Hip Abduction

- Goals:
  - anatomical alignment
  - pressure distribution

Hips: Windswept Posture

Hips: Windswept Posture

- One leg is abducted and the other is adducted
- Possible Cause:
  - pelvic rotation
  - range limitations
  - Sleep positioning

Windswept Posture

- Typically a result of sleep positioning

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Hips: Windswept Posture

- Interventions:
  - pelvic rotation interventions
  - hip adduction and abduction interventions

Hips: Windswept Posture

- Goals:
  - same as for pelvic rotation

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Knee Flexion

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Knee Flexion

- Possible Cause:
  - **decreased range of motion of hamstrings**
  - flexor tone
  - structural knee issues

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Knee Flexion

- Interventions:
  - if flexible:
    - refer to physician to explore medical or surgical procedures
    - Posterior strapping
  - if fixed:
    - open seat to back angle
    - anteriorly sloped seat
    - place footrests posterior to front edge of seat
    - bevel front edge of seat

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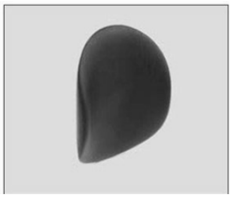
Calf Pads



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Posterior Calf Strap

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Placing footrests rearward

- Various footplate options are available to bring feet back to accommodate limited knee extension

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Knee Flexion

- Goals:
  - decrease tension in the hamstrings and thus minimize pull into posterior pelvic tilt
  - comfort
  - clear front castors of wheelchair
  - ease transfers

Knee extension

Knee extension

- Possible causes:
  - decreased range in quadriceps
  - over lengthening of the hamstrings
  - structural knee changes
  - **extensor tone**

Knee extension

- Interventions
  - if flexible:
    - refer to physician to explore medical or surgical procedures
    - provide alternative positioning to stretch the quadriceps (outside of the chair)
    - Dynamic options
  - if fixed:
    - elevating legrests
    - custom foot support

Dynamic Options

- Miller's Adaptive Technologies

Different Footrest Hanger Angle

Elevating legrests

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Knee extension

- Goals:
  - alleviate pull on pelvis and lower leg
  - accommodate in extended position, if fixed

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Ankle Limitations

- Interventions:
  - angle adjustable footplates (sagittal and frontal planes)
  - padded foot boxes
  - molded foot support

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Angle Adjustable Footplates

- Accommodate fixed deformities of the foot or ankle
- Capable of inversion/eversion, plantar/dorsiflexion & depth adjustments

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Ankle Limitations

- Goals:
  - accommodate fixed deformities
  - prevent pressure to foot
  - protect feet from injury
  - comfort

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Foot Deformities

- Possible Causes:
  - tonal patterns
  - lack of weight bearing
  - surgery

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Foot Deformities

- Interventions:
  - angle adjustable footplates (sagittal and frontal planes)
  - padded foot boxes
  - molded foot support
  - adaptive foot wear to pad feet

Foot Deformities

Padded Foot Box

Therafin

Foot Box

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Flexsure Feet

- Therafin

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Foot Deformities

- Goals:
  - prevent pressure to foot
  - protect feet from injury
  - comfort

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Questions?

THE UPPER EXTREMITIES

Positioning Strategies: Upper Extremities

- Challenges fall into 4 main categories:
  - Need for additional support
  - Addressing destructive postures
  - Addressing extraneous movements
  - Addressing self-abusive movements

Providing More Support

- Many clients require more UE support due to risk or presence of subluxed or dislocated shoulders

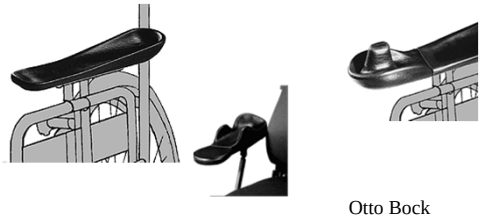
Subluxed or Dislocated Shoulders

- Possible Causes:
  - decreased shoulder or upper extremity strength
  - paralysis
  - decreased muscle control
  - decreased tone
  - increased tone
  - postures that continually pull humerus

Subluxed or Dislocated Shoulders

- Interventions:
  - Upper Extremity Support System (tray)
  - Widened armrests
  - Arm trough
  - posterior or lateral elbow blocks
  - forearm straps
  - dual shoulder straps crossing clavicle and acromian processes
  - Slings and mobile arm supports

Arm troughs



Otto Bock

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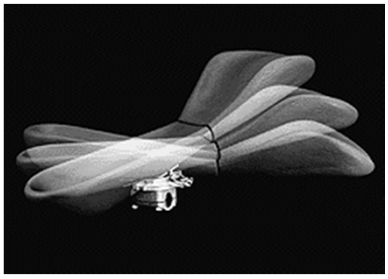
Swivel Arm Troughs



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Mobile Arm Supports

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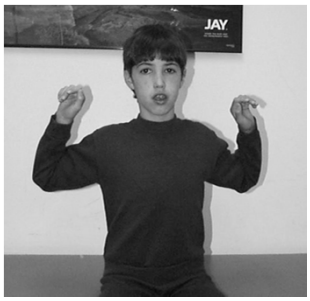
Subluxed or Dislocated Shoulders

- Goals:
  - comfort
  - enhance functional use of arm
  - prevent further loss of integrity of shoulder girdle

Destructive Postures

- Shoulder Retraction
- Shoulder Protraction
- Elbow Extension

Shoulder Retraction



Shoulder Retraction

- Often in conjunction with elbow flexion
- Possible Causes:
  - 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

Shoulder Retraction

- Interventions:
  - build-up posterior back support with wedges or increased foam behind scapular area
  - adjust tilt in space if due to reflexes
  - restrain forearms (trunk must be anteriorly supported)
    - Advance for Occupational Therapy Practitioners Archives - Lange
  - provide stability elsewhere to break-up fixing pattern

Elbow Blocks

Stealth elbow block

Elbow Blocks

- AEL pad behind Otto Bock Armtrough

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Forearm strapping

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Forearm strapping

- Accommodating limited wrist extension and shoulder internal rotation

Aspen Seating

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Forearm Strapping

- To maintain alignment with switch in combination with elbow block

Forearm Strapping

AEL

Shoulder Retraction

- Goals:
  - 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

Shoulder Protraction

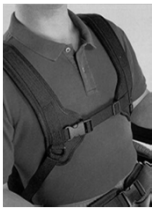
- Shoulders may round forward, leading to trunk and neck flexion
- Causes:
  - Muscle tightness (pectoralis)
  - Gravity
  - Trunk flexion

Shoulder Protraction

- Interventions:
  - Increase trunk extension
  - Anterior trunk support
  - Shoulder straps
  - Shoulder pads

Shoulder Straps

- Angle is critical to retract scapulas



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Shoulder Straps

- Some straps block the head of the humerus to increase retraction

Stylite Designs

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Shoulder Pads

- Aspen Seating custom shoulder pads

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Shoulder Pads

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Elbow Extension

Elbow Extension

- Often in conjunction with shoulder horizontal abduction
- Possible Causes:
  - muscle imbalance
  - habitual pattern to laterally stabilize trunk
  - habitual pattern to extend trunk
  - ATNR
  - anxiety, startle
  - effort or stress

Elbow Extension

- Interventions:
  - restrain forearms
  - splinting or orthotics

Elbow Extension

- Goals:
  - 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

Extraneous Movement

- Flailing, uncontrolled movements
- Possible Causes:
  - increased tone due to effort
  - athetosis
  - an attempt to stabilize
  - may worsen with anxiety

Uncontrolled Movement of Upper Extremities

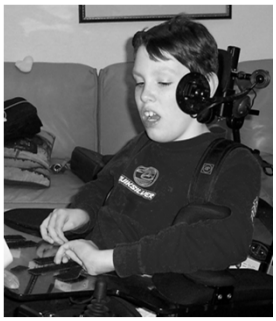
- Interventions:
  - block or strapping to decrease movement
  - forearm/wrist weights
  - splinting or orthotics (i.e. to keep elbows extended)

Uncontrolled Movement of Upper Extremities

- Interventions:
  - dynamic strapping to allow some movement but decreasing range of movement
    - i.e. Skylar

Uncontrolled Movement of Upper Extremities

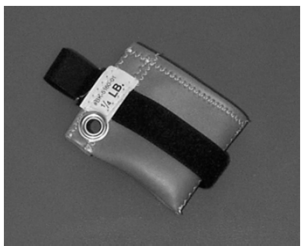
- Interventions, cont.:
  - distal stabilizer for independent grasp
    - Towel rack
    - Posts
    - Cuffs - Mark



Uncontrolled Movement of Upper Extremities

- Interventions, cont.:
  - custom tray to allow arms to be placed under tray surface (padded)
    - Juan

Weights



Distal Stabilizer (Post)

Vertical post

Horizontal post

Uncontrolled Movement of Upper Extremities

- Goals:
  - to reduce risk of injury to client or others
  - to allow dependent tasks, such as feeding, to proceed
  - provide stability for independent function
  - to reduce anxiety

Self-Abusive Behavior

- Possible Causes:
  - self-stimulation
  - anxiety
  - Lesch-Nyhan syndrome
  - Cornelia deLange syndrome

Self-Abusive Behavior

- Interventions:
  - Same as for uncontrolled movement
  - look at providing alternative sensory input, if needed

Self-Abusive Behavior

- Goals:
  - to reduce risk of injury to client or others
  - to reduce anxiety

Questions?

Thank you!

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