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Positioning the Pelvis

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Course Objectives:
The participants will be able to:
1. describe pelvic tilt and seating interventions to address this concern.
2. describe pelvic rotation and seating interventions to address this concern.
3. describe pelvic obliquity and seating interventions to address this concern.

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.atillange.com under Resources
  - See handouts

A word about Assessment…

- We are not going into Seating Assessment today
- We are jumping into common seating challenges and interventions
- But… don’t forget that Mat Evaluation!
Positioning Challenges: the Pelvis

- Posterior pelvic tilt
- Anterior pelvic tilt
- Pelvic rotation
- Pelvic obliquity

Posterior Pelvic Tilt

- Top of pelvis is tipped posteriorly

Posterior Pelvic Tilt

- Let's try it!
- Sit up straight
- Sit on your hands, find those ITs
- Assume a posterior tilt
- Where did those ITs go?
- What is your spine doing?

Possible Causes:
- Low abdominal/trunk tone
- Tight hamstrings
- Seat depth too long
- Limited range of motion, particularly limited hip flexion
- Sliding forward on seat
- Extensor thrust
- Sling seat and back

Posterior Pelvic Tilt

- Cause:
  - Low abdominal/trunk tone

Interventions:
- Provide support to posterior superior surface of pelvis to block backward movement
- Biangular back or PSIS pad
- Anteriorly sloped seat or drop footrests to allow hip extension
- Pulls pelvis into anterior tilt

Biangular Back

- The lower portion ends at the PSIS
- Posterior superior iliac spine
- The upper portion extends slightly beyond the angle of the lower portion
  - Fixed – typically 7 degrees
  - Adjustable angle available
PSIS Pad
- Posterior, superior, iliac support

Posterior Pelvic Tilt
- Cause:
  - Tight hamstrings
- Interventions:
  - Open seat to back angle
  - Decrease thigh to calf angle

Seat to Back Angle
90 degrees
Open 100 degrees
Closed 85 degrees

Posterior Pelvic Tilt
- Cause:
  - Seat depth is too long
- Intervention:
  - Provide appropriate seat depth for hip and knee flexion

Posterior Pelvic Tilt
- Cause:
  - Sliding forward on seat.
- Interventions:
  - Provide anti-thrust or aggressively contoured seat
  - Stabilize pelvis using appropriately angled pelvic belt or anterior pelvic stabilizer
  - Change upholstery type
Anti-thrust cushion

- Curb doesn’t need to be high
- Too high can unweight I.Ts and close seat to back angle

Combining Positioning and Pressure Relief

- Many off the shelf cushions combine materials to provide both pressure relief and positioning
- Most incorporate an anti-thrust design

Posterior Pelvic Tilt Hip Belt Position

- 60 degree angle maintains neutral pelvic tilt

Posterior Pelvic Tilt Hip Belt Position

- 60 degree angle maintains neutral pelvic tilt
- *videos

Hip Belt Position

30 degrees pulls the pelvis into a posterior tilt
45 degrees allows the pelvis to slide under the belt

Is he all the way back?

- The hip belt is at 60 degrees, but it is not snug
Posterior Pelvic Tilt

- Pelvic positioning belt at 45 degree angle, allowing pelvis to slide under it into posterior tilt

Sub ASIS bar

- Rigid anterior stabilizer
- Positioned “sub” or under ASIS
- Has to be in the exact position to close
- Aggressive positioning

Posterior Pelvic Tilt

- Leg Harness can be used to prevent pelvis from sliding into posterior pelvic tilt
  - Contra-indicated for dislocated hip

Posterior Pelvic Tilt

- Goals:
  - Neutral alignment of the pelvis
  - Support anatomical curvatures of the spine
  - Promote weight bearing on ischial tuberosities to reduce pressure risks
  - Best alignment for biomechanical function
  - Increase proximal stability for function

Posterior Pelvic Tilt

- Cause:
  - Extensor Thrust
- Interventions:
  - Pelvic stabilization using appropriately angled pelvic positioning belt or rigid anterior pelvic support
  - Anti-thrust seat or aggressively contoured seat

Posterior Pelvic Tilt

- Cause:
  - Extensor Thrust
- Interventions:
  - Anterior knee blocks
  - Change position in space if thrust is caused by tonic labyrinthine reflex
  - Increase hip and knee flexion, hip abduction and ankle dorsiflexion
  - Dynamic back
Anterior Knee Blocks
- Placed anterior to lower legs
- Make sure this is below the patella tendon
- Contraindicated with dislocated hips

Dynamic Backs
- Movement occurs only at the back
- Can often be combined with other dynamic options to provide movement in other areas

Miller’s Dynamic Backrest Interface
- Extends at level of biangular back
- Video

Seating Dynamics Dynamic Back
- Seating Dynamics
  - Dynamic rocker back
  - Resistance is adjustable through a set of elastomers
  - Video

Stealth Products Dynamic Back
- Stealth Dynamic Backrest Mounting Hardware
  - Encased to protect mechanism

Stealth Products Dynamic Back
- Tarta back
- Off the shelf, can customize
- Similar to the Ortho Flex back
  - Made in Italy, but available in the USA
  - Goal: to assist movement to improve function
  - Video
Sunrise Medical Dynamic Back

- Mono Back or Dual Cane
- Available on Quickie manual wheelchairs
- Locks out
- Dynamic option

Posterior Pelvic Tilt

- Goals of controlling extensor thrust:
  - previous goals of controlling posterior pelvic tilt
  - conserve energy
  - reduce friction
  - maintain alignment with other positioning components

Anterior Pelvic Tilt

- Let’s try it!
- Sit up straight
- Sit on your hands, find those ITs
- Assume an anterior tilt
- Where did those ITs go?
- What is your spine doing?

Anterior Pelvic Tilt

- Possible causes:
  - low trunk tone
  - muscle weakness
  - lordosis

Anterior Tilt Interventions

- Place pelvic positioning belt across ASIS
  - Anterior superior iliac spine

45 degree placement to limit anterior pelvic tilt
Anterior Tilt Interventions

- Belly binder
  - Also called abdominal panel or corset
- Spans the lower rib cage and upper pelvis
- Must fit closely to lateral trunk
- Custom made

Anterior Pelvic Tilt

- Goals:
  - Reduce lordosis
  - Neutral alignment of the pelvis
  - Promote weight bearing on ischial tuberosities
  - Best alignment for biomechanical function
  - Increase proximal stability for function

Pelvic Rotation

- Let's try it!
- Sit up straight
- Sit on your hands, find those ITs
- Put one knee forward of the other
- Where did those ITs go?
- What is your spine doing?

Pelvic Rotation

- Cause:
  - Range of motion limitations in hip:
    - Abduction
    - Adduction
    - Hip flexion
    - Windswept posture
- Intervention:
  - Align pelvis in neutral and accommodate any residual asymmetrical lower extremity posture

Pelvic Rotation

- Cause:
  - Fixed limitations in spine, pelvis and/or femoral mobility (i.e. rotational scoliosis)
- Intervention:
  - Pelvis may need to assume asymmetrical posture in order to keep head and shoulders in neutral position (facing forward)

Pelvic Rotation

- Causes:
  - Unequal thigh length
  - Hip dislocation
- Interventions:
  - Check measurement to confirm leg length discrepancy vs. Pelvic rotation
  - Asymmetrical seat depth, if fixed
Pelvic Rotation

- **Cause:**
  - Discomfort
- **Intervention:**
  - Identify source and remediate, or refer to physician

Pelvic Rotation

- **Causes:**
  - Tone and/or reflex activity
  - ATNR
- **Interventions:**
  - Lower extremity abduction, hip and knee flexion, ankle dorsiflexion
  - To “break up” tone
  - Pull pelvic belt back on forward side of pelvis

Pelvic Obliquity

- **Goals:**
  - Neutral alignment of pelvis
  - Support anatomical curvatures of the spine
  - Promote weight bearing on ischial tuberosities
  - Best alignment for biomechanical function
  - Increase proximal stability for function
  - Prevent trunk rotation
  - Increase pressure distribution over posterior trunk

Pelvic Obliquity

- **Let's try it!**
- Sit up straight
- Sit on your hands, find those ITs
- Cross one leg over the other
- Where did those ITs go?
- What is your spine doing?

Pelvic Obliquity

- **Causes:**
  - Scoliosis
  - ATNR
  - Surgeries
  - Discomfort
  - Cushion tipped on sling seat

Pelvic Obliquity

- **Interventions:**
  - Flexible
    - Change angle of pull of pelvic belt
    - Wedge under low side
**Pelvic Obliquity**

- Best pelvic positioning placement is over the lap, just in front of the ASIS, to pull the leg down on the high side, which in turn pulls the pelvis down
- Contra-indicated for dislocated hip
- If rotation or posterior tilt are also present, a 4 point belt may be indicated

**Interventions:**
- Flexible
  - Wedge
    - Under low side to accommodate

**Wedging a fixed pelvic obliquity**

- Level pelvis
- Fixed obliquity, 1/2" wedge
- Fixed obliquity, 1" wedge

Goal: to fill in space and distribute pressure

**Lateral tilt to level fixed pelvic obliquity**

Goal: the first wedge fills in space to distribute pressure. The second wedge, or lateral tilt, levels the pelvis for equal pressure distribution on the ITs – Make sure the head is level

**Goals:**
- Best alignment for biomechanical function
- Level head
- Level pelvis, if possible while leveling head
- Equalize pressure under pelvis
- Prevent subsequent trunk lateral flexion
- Reduce fixing to increase function
Questions?

Thanks!

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