The Impact of Seated Posture on Function

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Consequences of poor posture in individuals with mobility impairments

Specifics of normal posture

- Normal spinal curves
- Upright trunk
- Stable, supported pelvis
- Adequate support for feet
- Upright midline head posture
- Balanced!

Balancing the body

- Inherent desire to be balanced
- Body will accommodate/compensate to achieve stability
- Function limited if not balanced or supported
- Effects of gravity

Effects of gravity on the body

- Gravity is always a factor, whether standing, sitting, or lying down
- In sitting:
  - Increased kyphosis
  - Posterior pelvic tilt (slumped posture)
  - Forward head position
  - Potential lateral lean
  - Impaired reach
  - Postural fatigue

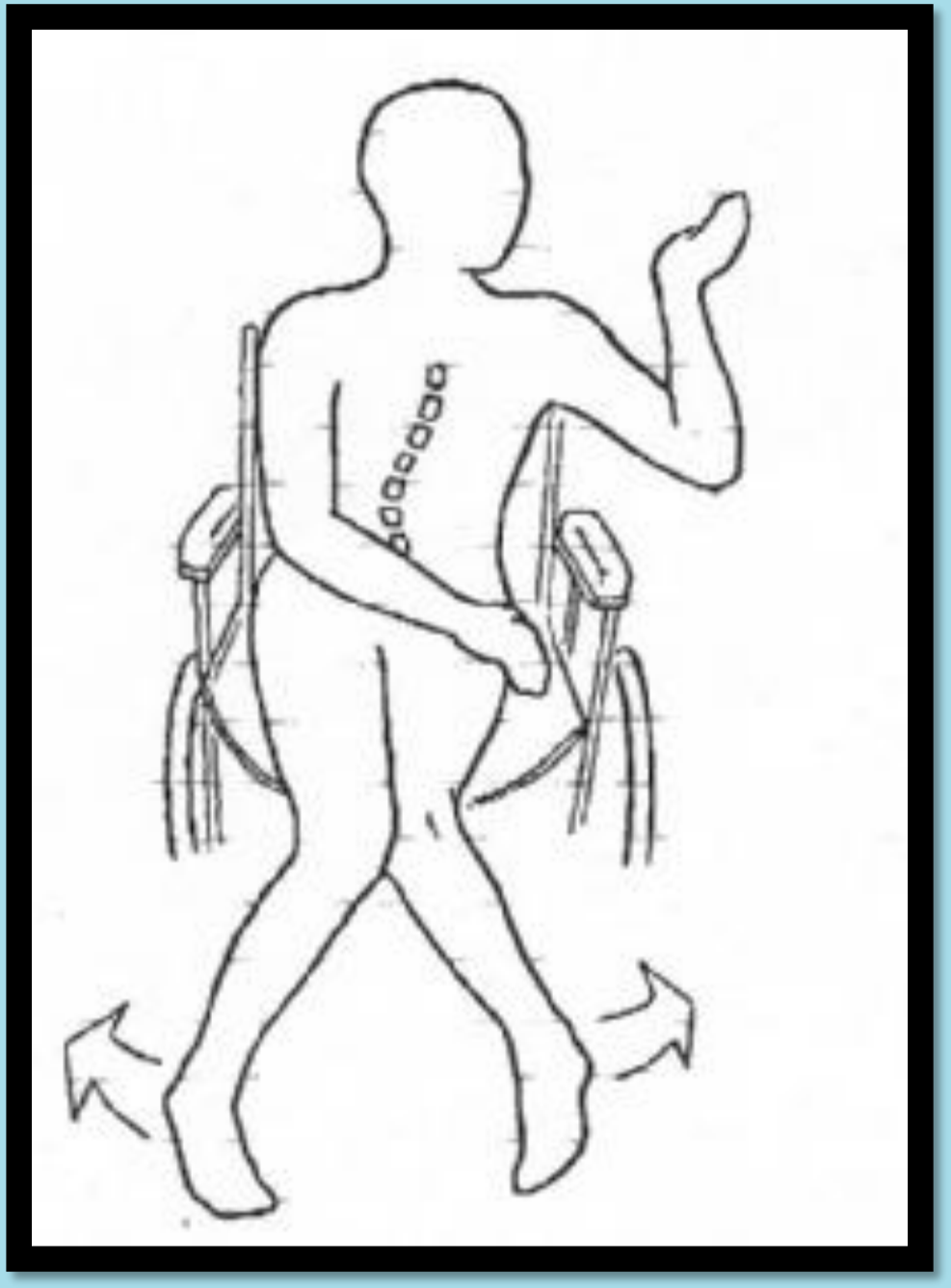
- **The human body seeks balance**
- **Inadequate support leads to acquired distortions of body shape**
- **Stability precedes mobility—the quality of a person’s posture plays a role in determining motor skill capabilities**

Support for function

- Stability is necessary for function
- Even normally developing bodies fatigue

Consequences of poor posture

- **Deformity—fixed contractures; acquired**
- **Uneven pressure distribution**
- **Limited functional capabilities—reach, visual acuity, balance**
- **Impacts ALL body systems**
- **Also impacts lying/sleeping posture**



- **Sitting on a standard sling upholstery leads to increased postural deformities**
- **Limits function due to instability and poor alignment**
- **Can lead to fixed acquired deformities**

Impact on vital functions

- Respiration
- Swallowing
- Digestion
- Cardiovascular function (BP, heart rate, ability to “pump” fluids)
- Skin integrity
- Tone/reflexes
- Cognitive/psychosocial function
- Pain
- Vision
- communication

Poor posture results in impairments of functional skills

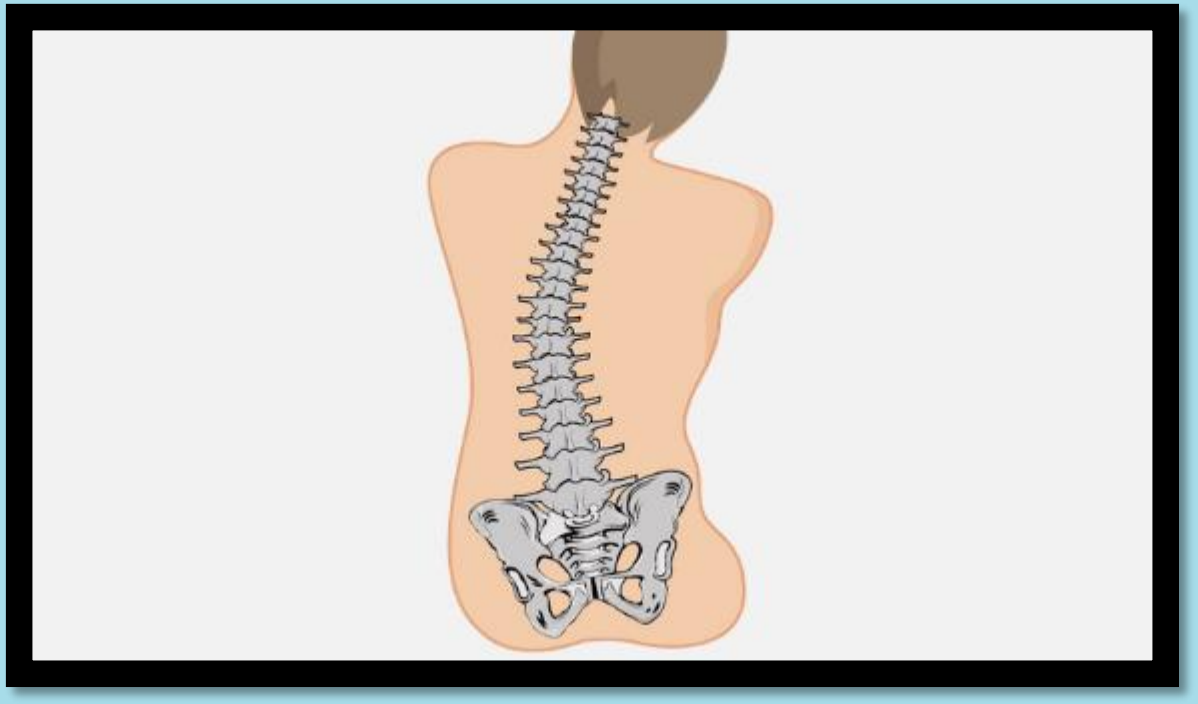
- Eating/feeding
- Hygiene
- Dressing
- Home management tasks
- Leisure pursuits
- Interaction with others and the environment

Common Postural Distortions

- Pelvic obliquity
- Pelvic tilt
- Pelvic rotation
- Scoliosis
- Kyphosis
- Lordosis

What is pelvic obliquity?

Pelvic obliquity is a postural abnormality that occurs when the pelvis is tilted to one side. Sometimes, this condition is referred to as having an 'asymmetrical pelvis'. You can get left or right pelvic obliquity. It depends on which way the pelvis is tilted.

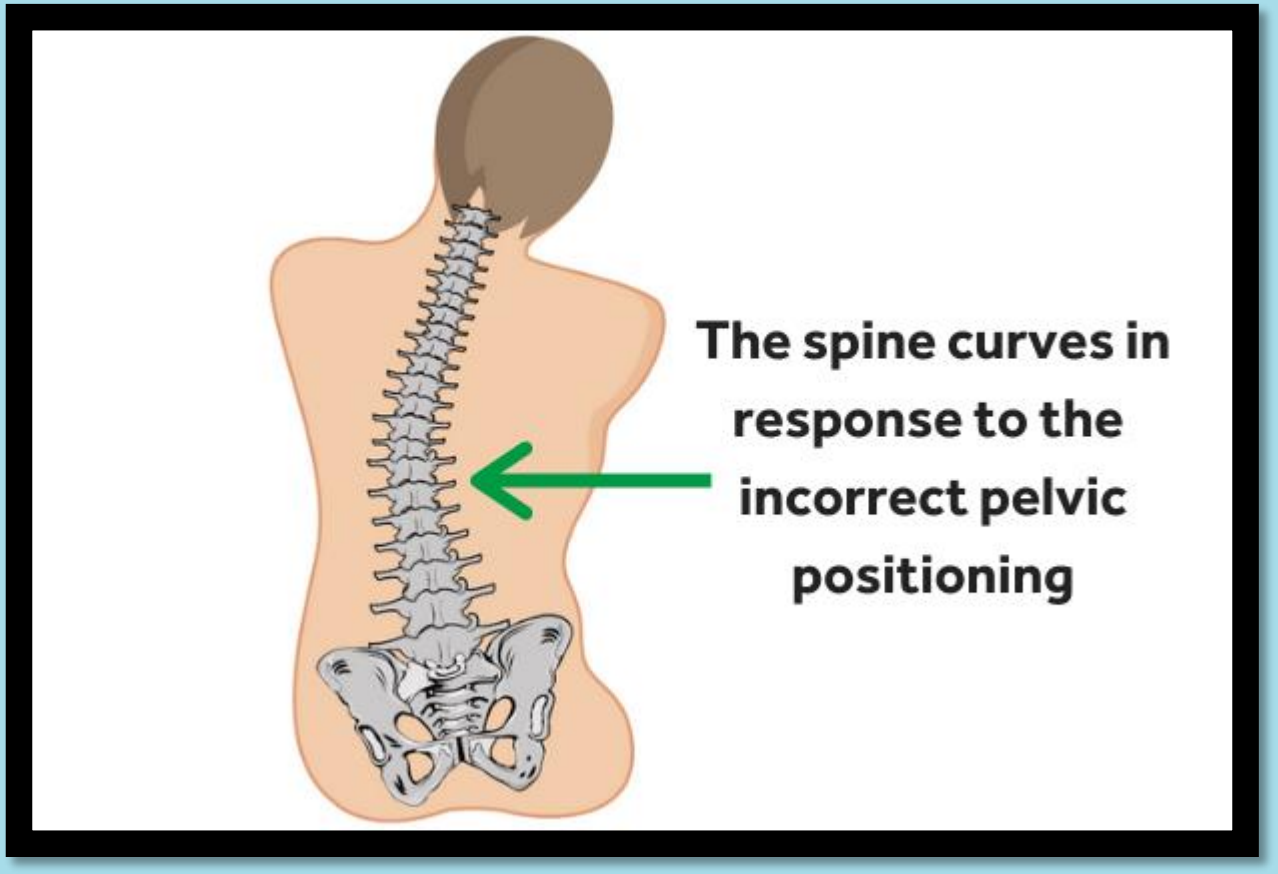


The pelvis is the "holy grail" of seating—as the pelvis goes, so goes the rest of the body in response!

Issues due to pelvic obliquity

- Increased potential for pressure/skin breakdown
- Impaired balance—need to stabilize self, decreased use of hands
- Formation of scoliosis

When sitting, if one side of the pelvis is raised higher than the other, the body tries to correct its positioning. The spine will naturally try to move back to midline. This causes the thoracic spine on the lower side to curve back towards the midline.



Possible causes of pelvic obliquity

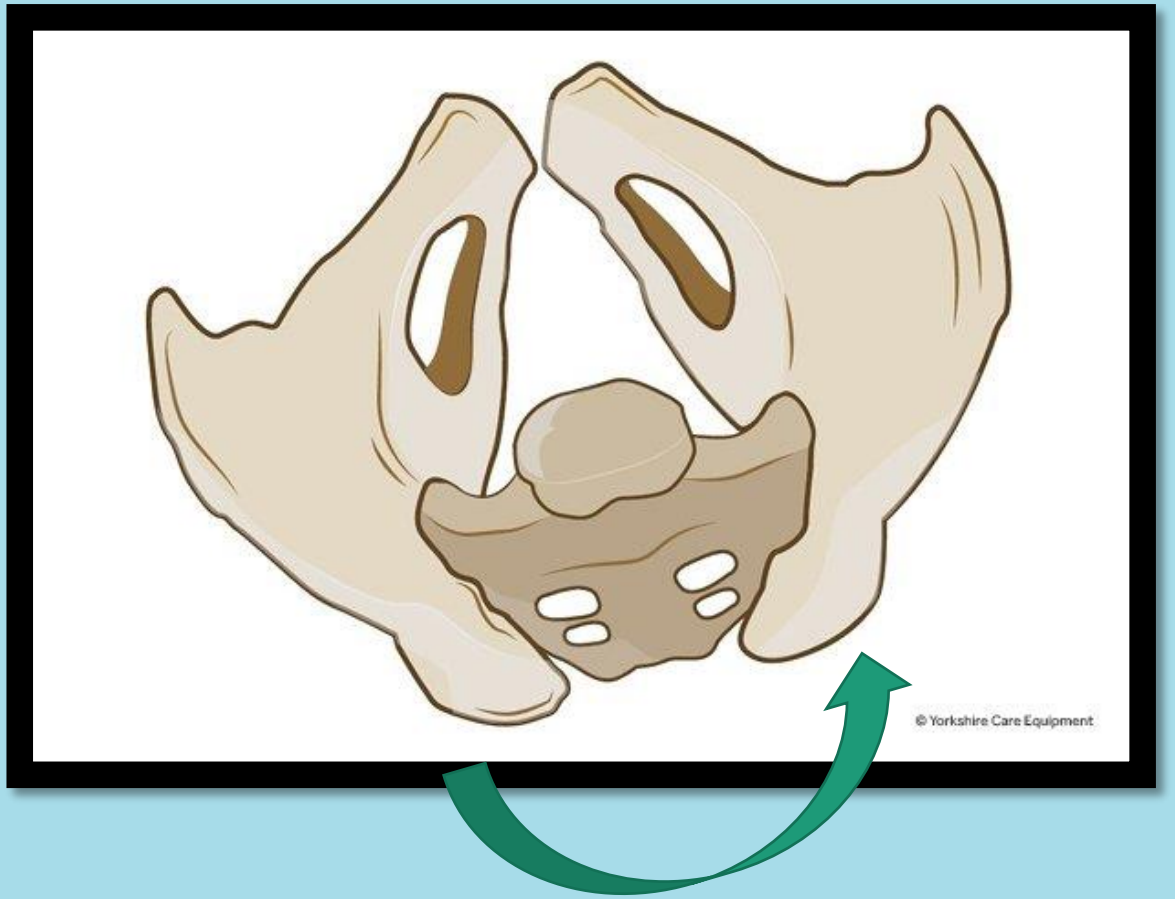
- Underlying medical condition (i.e. dislocated hip or natural leg length discrepancy)

- Abnormal muscle tone (increased or decreased)
- Decreased core strength (unable to maintain or bring body back to midline when it gets out of position)

- unsuitable seating/poorly fitted chair

What is pelvic rotation?

Pelvic rotation is a postural problem in which one side of the pelvis is further forward than the other. It's important to note that this means that one hip is further forward, not necessarily higher or lower than the other (this is pelvic obliquity although the two conditions often go hand-in-hand).



Issues due to pelvic rotation

- Decreased support (decreased contact with backrest)
- Skin integrity risk (increased pressure on certain aspects of body)
- Spinal rotation (roto-scoliosis) resulting from body's need to "balance"

Possible causes of pelvic rotation

- **Underlying medical condition (i.e. dislocated hip, hip flexion, hip adduction, or natural leg length discrepancy)**
- **Poor seating/lack of support-- lack of backrest support or an overly wide seat width (leads to twisting/rotation of pelvis to find a more supported position)**
- **Abnormal tone**

What is posterior tilt?

- Posterior tilt is a postural abnormality that occurs when the pelvis tilts backwards.
- Healthcare professionals sometimes call it “sacral sitting”.
- That’s because people with posterior tilt end up sitting with their weight going through their lower back (sacrum) rather than their bottom.
- DIAGNOSIS TIP: You may notice someone with posterior tilt has a C-shaped spine with rounded shoulders and their eyes looking downwards (Kyphosis)

Issues due to posterior pelvic tilt

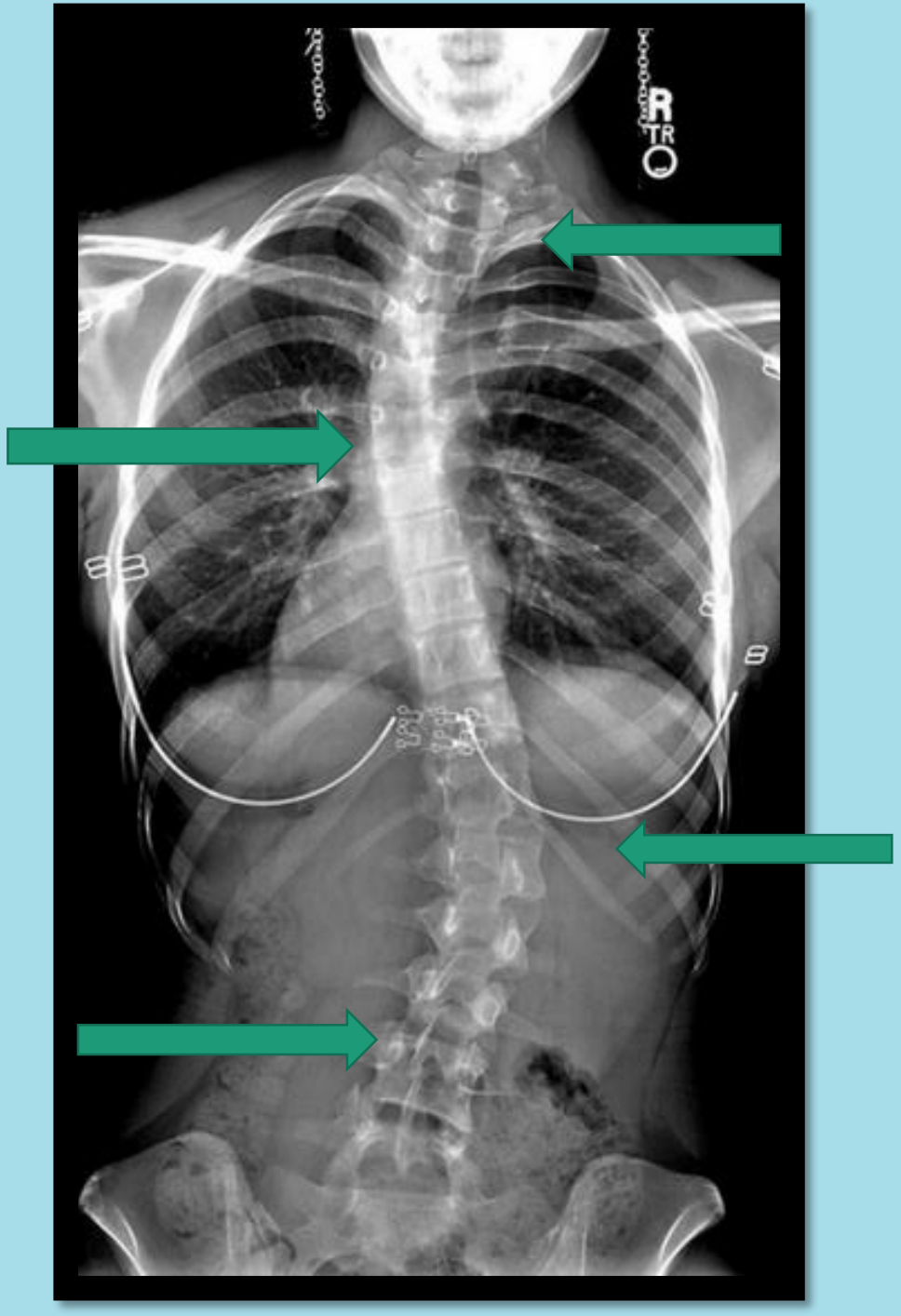
- Impaired skin integrity—shearing, pressure
- Kyphosis formation
- Impaired functional use of upper extremities
- Impaired vision
- Sliding—potential for falls

Possible causes of posterior pelvic tilt

- Low muscle tone
- Decreased core strength
- Incorrect seat depth (too long or too short)--sliding forward.
- Seat is too high (slouching/sliding to contact floor for foot propulsion or stability)
- Incorrect armrest height (slouching to get comfortable)

What is a Scoliosis?

- Scoliosis is when the spine twists and curves to the side (making the spine appear C- or S-shaped)
- Can be related to abnormal muscle tone (high or low)
- Effects of gravity
- Body has need to “balance” itself



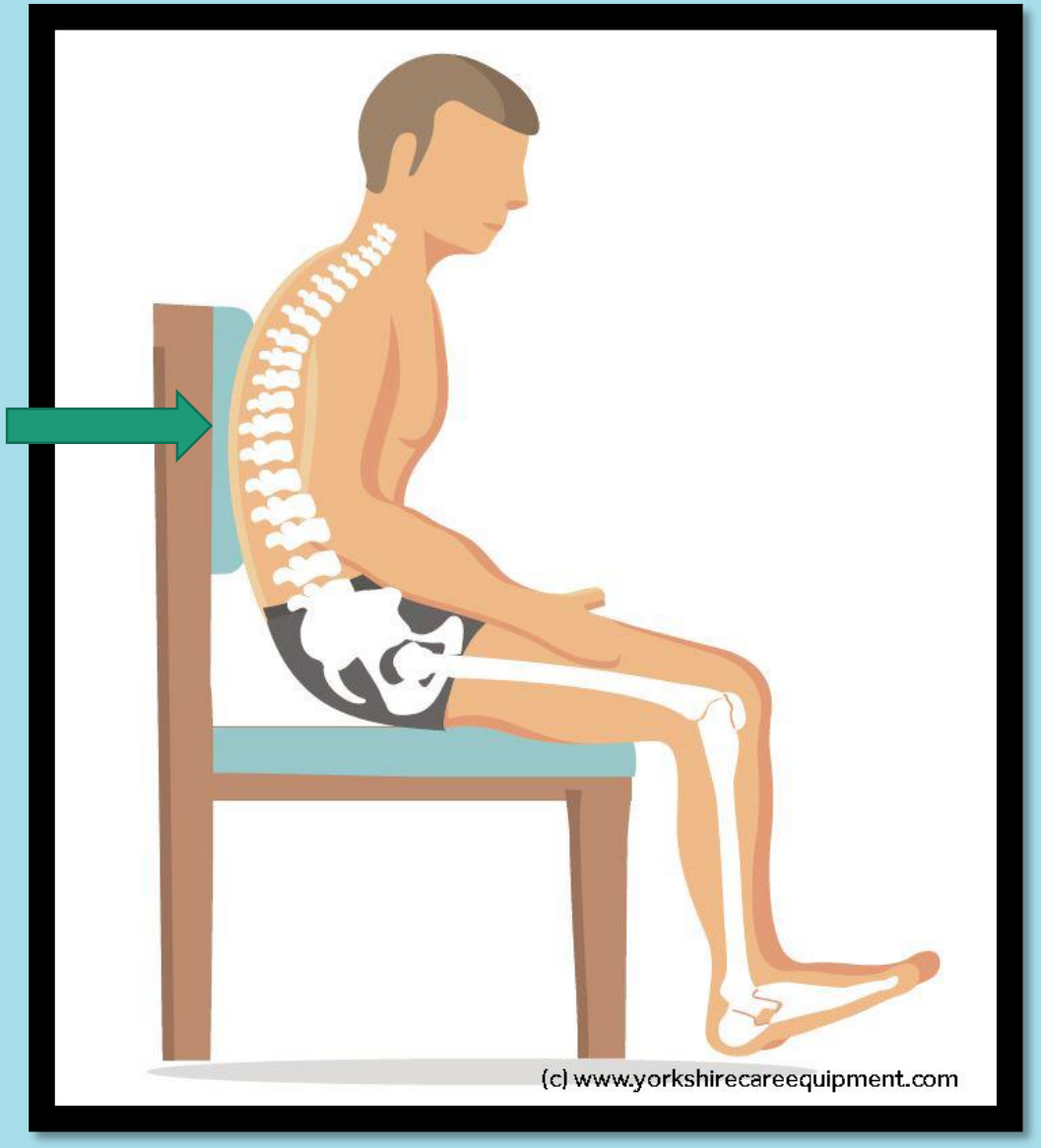
Issues due to scoliosis

- Impingement of internal organs
- Impaired respiratory status
- Skin integrity
- Decreased balance (leaning)

What Is Kyphosis?

- Spinal with pronounced forward-facing curvature of the thoracic back bones (vertebrae), giving an abnormally rounded upper back appearance.

- Kyphosis is diagnosed if the natural curves in your thoracic spine are more than 50 degrees.

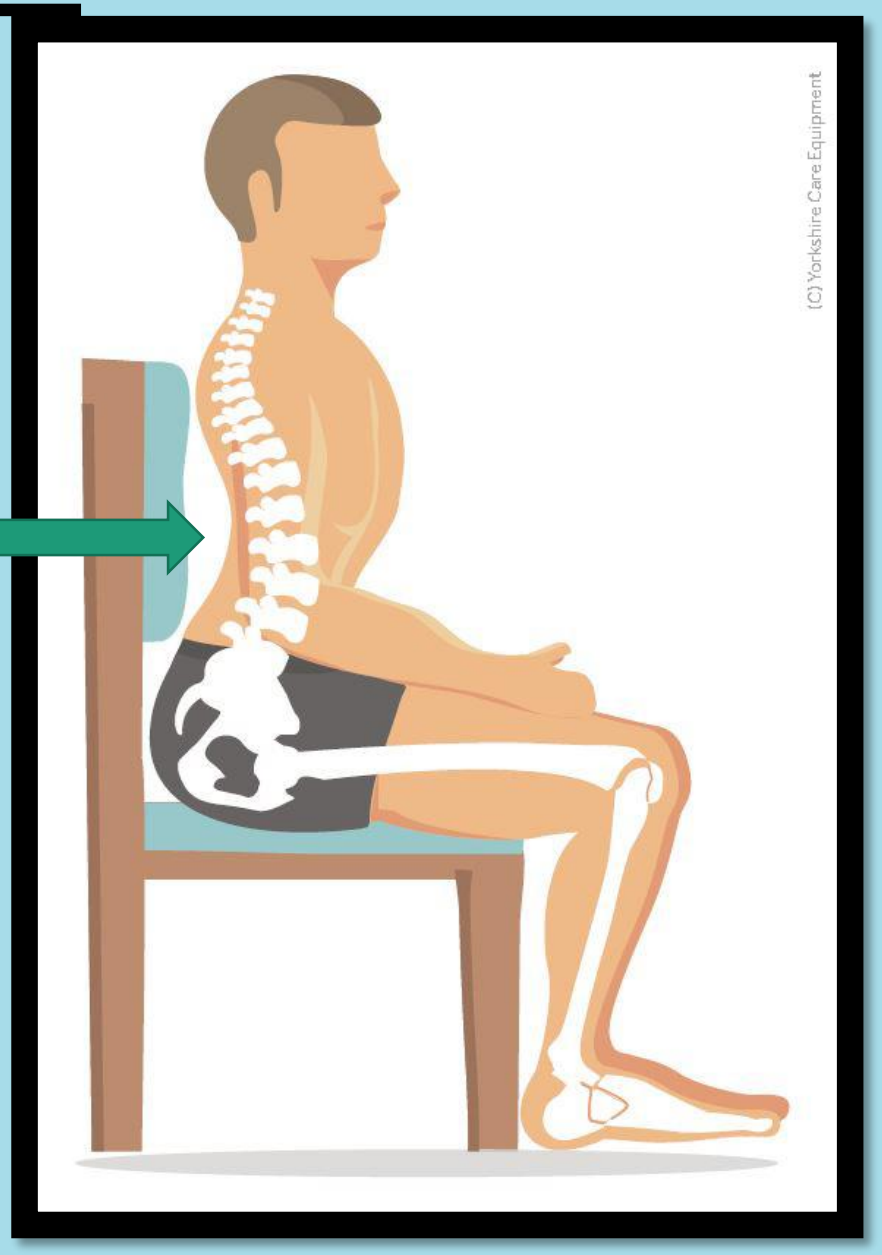


Issues due to kyphosis

- Posterior pelvic tilt
- Back pain, nerve problems and numbness
- Problems with breathing
- Pressure/shearing on areas of the spine that are in contact with the backrest of chair.
- Decreased vision (neck flexion)
- Decreased functional use of arms

What is lordosis?

- Pronounced curve in lumbar spine (“sway back”)
- May be caused by poor core strength
- “Stacking” for stability
- Anterior tilt of pelvis



Identification of individual needs

- Practical issues (environment, tolerance, endurance etc.)
- Decisions based on body distortions (correct vs. accommodate)
- Focus on aligned posture and upper extremity function
- Limit further acquired deformities

In Sitting: it is important to facilitate posture for activity participation and protection of vital functions such as breathing, swallowing, digestion, and elimination

So…What is a wheelchair?

- **“A wheelchair is truly a mobility orthosis. An orthosis is a device used to provide support or to straighten or correct a deformity. It is typically a brace made of metal or plastic that increases or maintains a person’s level of function. If properly prescribed, a wheelchair will provide sufficient support to help deter the effect of deforming forces or weakened structures on function of the system. In simpler terms, it should support the user as needed to allow maximum function. Inasmuch as it is on wheels, the system can be called a *mobility orthosis*, providing appropriate support to allow maximum functional mobility.”**
  --Adrienne Falk-Bergen, PT

“The unprescribed wheelchair is potentially as harmful and as hazardous as the self-prescribed drug. It can cause trauma secondary to deformities and disabilities, and other complications that may be irreversible”—U.S. Department of Health, Education and Welfare Public Service

“The consequences of poorly fitted equipment can cause an accelerated decline in function, pain, and fatigue from poor posture, and increase in need for caregiver assistance or alternate mobility devices…”

(Requejo, P.S., et al., 2015, p.15)

The prescriptive wheelchair

mobility base

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postural support system

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dynamic seated environment

Addressing support in the seated position

- The pelvis is the foundation for posture
- Create a stable base for a improved balance and function
- Support body contours as needed
- Improve line of sight
- “Ahh” factor—reduce tension on body structures to improve tolerance and function
- Best practice is to accommodate contractures with a focus on well-aligned upper body posture and function

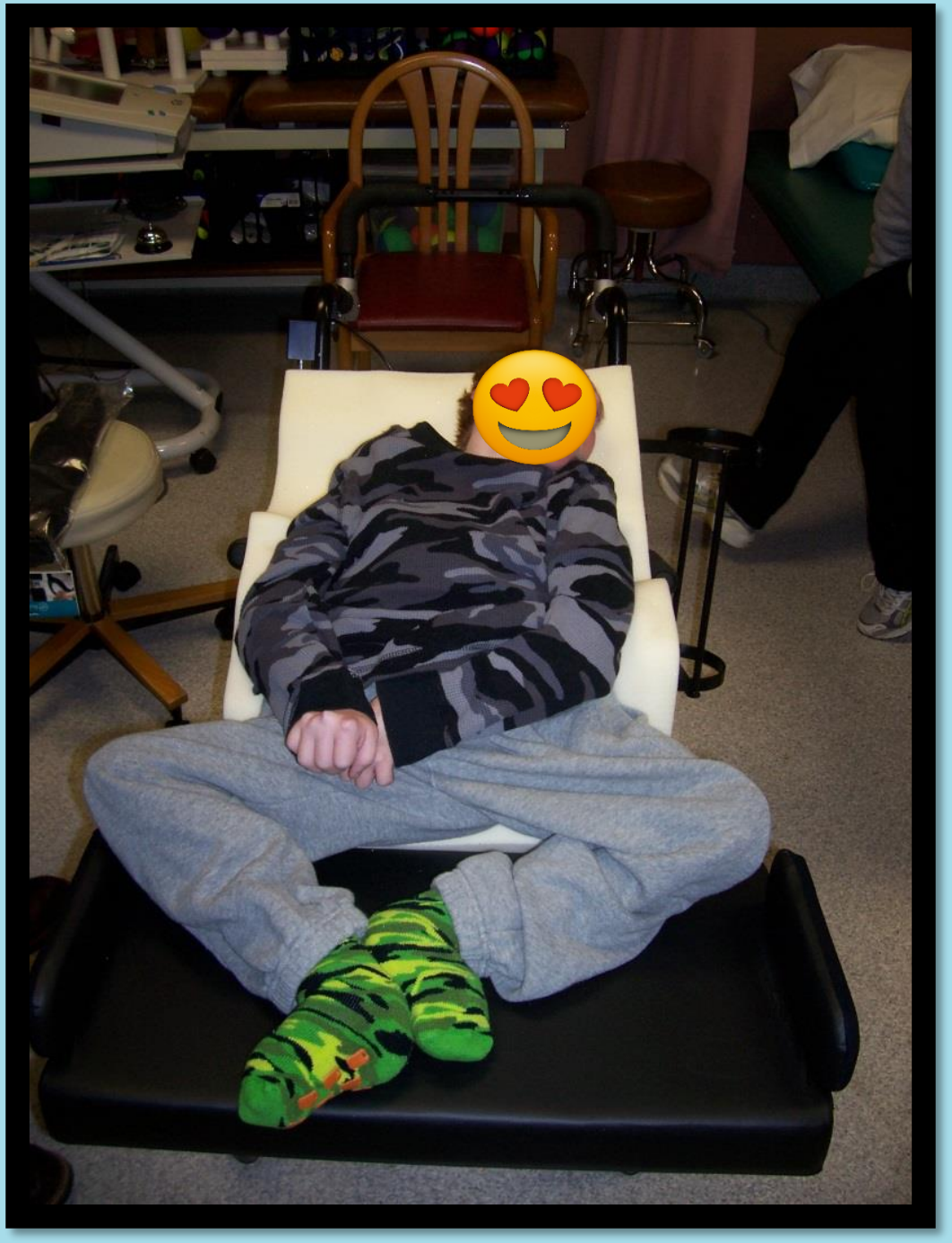
“What happens at the lips and finger tips begins at the hips”—Sammie Wakefield OTR/L

- **Deformities from lack of support (family did not put in wheelchair)**
- **Body conformed to how she was held**
- **Severe impingement of internal organs**
- **Limited ability to participate in <u>anything</u>**

- Contoured support to increase pressure distribution and provide stability
- Able to participate in activities (school, leisure, ADL’s)

Poor back support

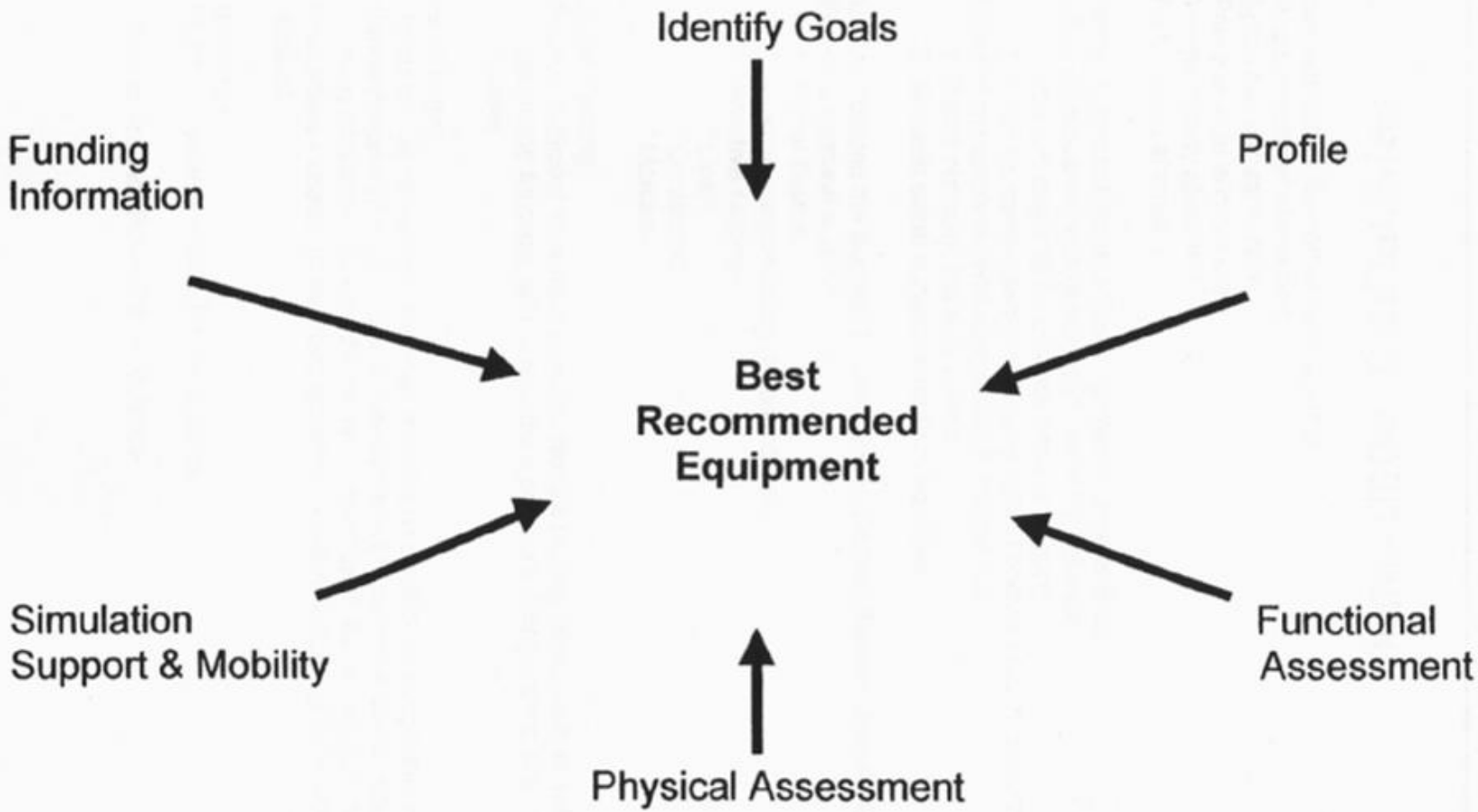
Improved contact/support



Not all custom molded systems are created equal

- Bulkiness affects maneuverability and effort to push for caregivers
- Bulk under arms
- Contact and control

THE EVALUATION PROCESS



Why it impacts function

- **“Without the use of a power wheelchair, this client is unable to participate in mobility-related ADLs (MR-ADLs) within the home safely, in a timely manner and without medical compromise”**
- **Funding sources must be given a reason client “can’t live without it”**
- **Remain in current level of care vs. increased level of care environment**

- Pronounced kyphosis and downward gaze
- Postural instability
- Unable to sit without assistance or use hands functionally

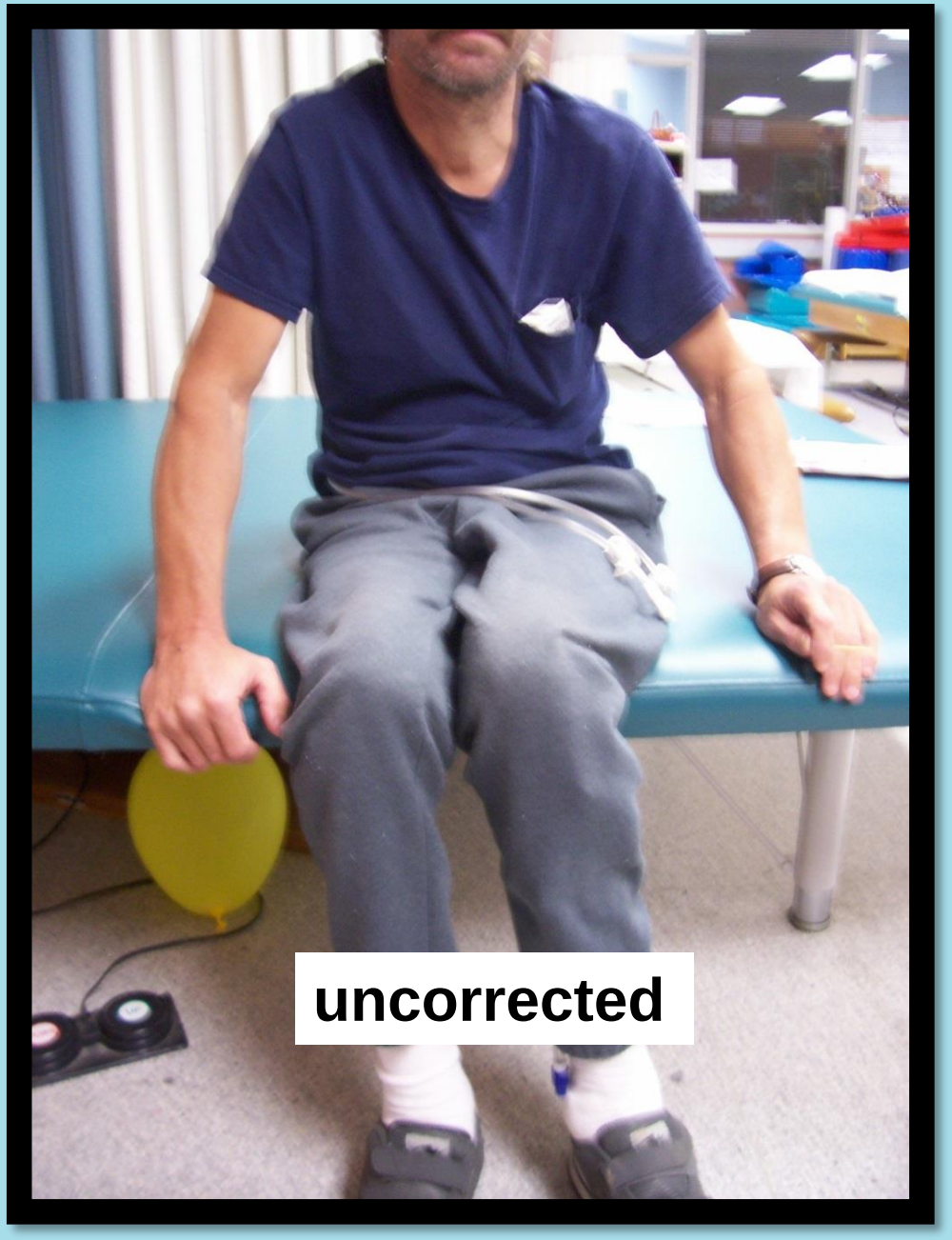
Inadequate support in chair leads to body “conforming” to the shape he’s been in

Hands-dependent sitting

Unable to reach functionally

Pressure area due to leaning

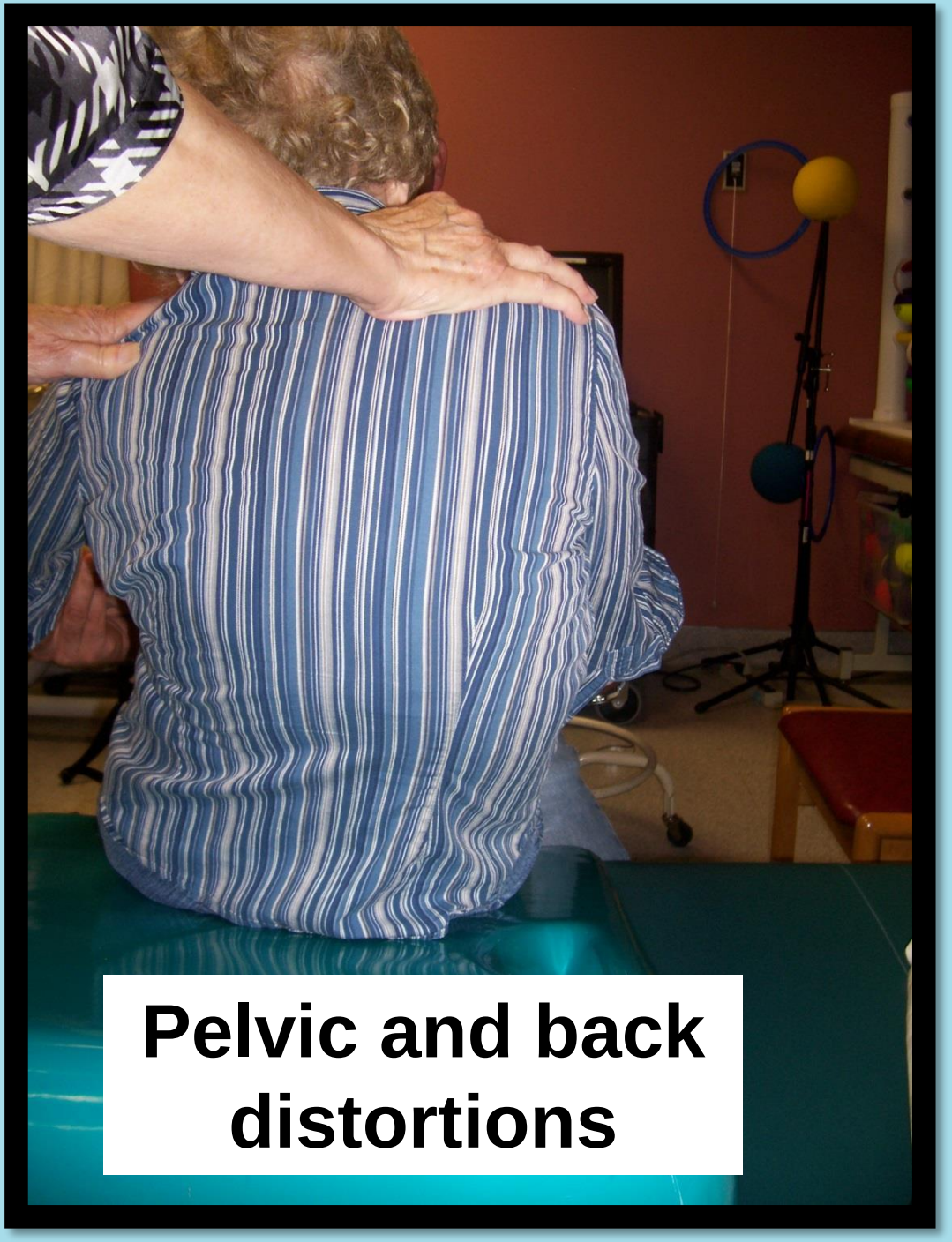
Pelvic obliquity



- **Upright trunk with good support**
- **Improved lower extremity alignment**
- **Improved visual field**
- **Translates to improved function with daily living activities**

- **Fixed hip contractures**
- **Impaired reach**
- **Sliding out of seat**


Hip angle tolerated


Pelvic and back distortions

Hemi height

vs.

Standard height

Big difference for foot propulsion!

If not you, then who?

Questions/ comments?