

Lifting and Separating

Implementing a 24 - hour Posture Management Program

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Posture Management

Learning Objectives

1. Identify **3 physiological side effects** of immobility common in children with disabilities.
2. List **3 benefits of 24-hour positioning programs** for children throughout their childhood supported by evidence.
3. Identify **parameters for 24 hour posture management** positioning programs that are supported by evidence from the literature and how to introduce them into practice.

24-Hour Posture Management

- ✓ **Lying**
- ✓ **Sitting**
- ✓ **Standing**

Learning Objective #1

Identify 3 physiological side effects of immobility common in children with disabilities.

Negative Effects of Poor Posture

Secondary Complications

- Asymmetry
- Pain
- Limited function (internal / external)
- Financial \$\$\$\$

EFFECTS OF IMMOBILITY

- . Low Bone Density
- . Joint Contractures
- . Constipation
- . Abnormal Bone Growth
- . Urinary Tract Infections

COMMON PEDIATRIC ISSUES

- . Hip subluxation
- . Spasticity
- . Joint contractures
- . Bowel and Bladder

Secondary Complications

- ✓ Contracture
- ✓ Deformity
- ✓ Pain
- ✓ Discomfort
- ✓ Internal Compression
- ✓ Pressure Injuries



- ✓ Constipation
- ✓ Respiration
- ✓ Heterotopic ossification (H.O)
- ✓ Psychological impact
- ✓ Infections
- ✓ Decreased Stamina/Endurance

How?

CHEST

- ✓ Sterno-Costal Bridge
- ✓ Vulnerable to distortion
- ✓ Rotation of the chest will occur in unsupported lying.
- ✓ **SSL**

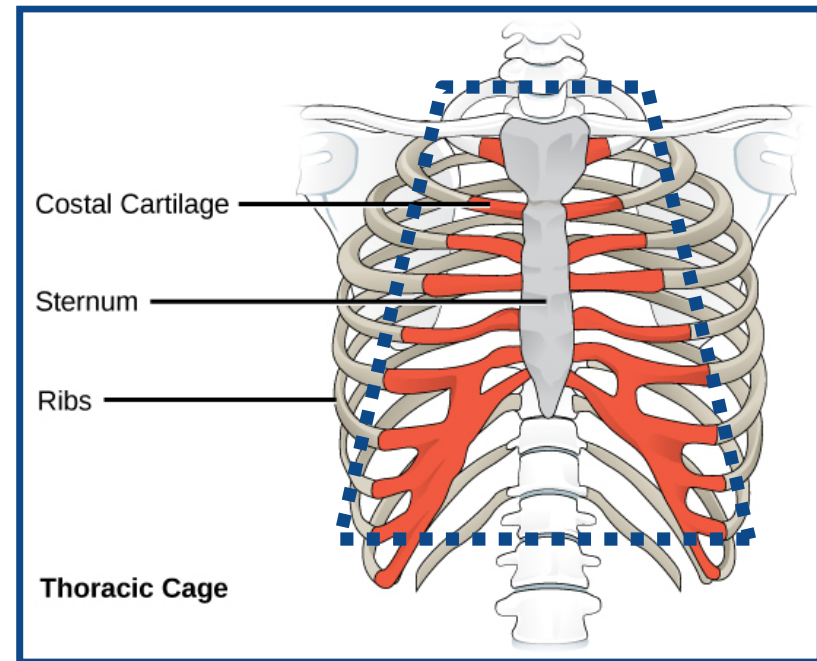


Image from Boundless.com

How?

Pelvis / Hips

- ✓ Rotation pelvis
- ✓ Unsupported
- ✓ Ligaments stretch
- ✓ Joint will fall...
 - ✓ Towards midline –
Posterior dislocation
 - ✓ Away from midline –
Anterior dislocation



HIP DISLOCATION

- . 2.6%-34%
- . Shallow acetabulum
- . Hip flexion/adduction contractures
- . Spasticity
- . Largest risk in GMFCS IV-V
- . Children who walk 10 steps alone by 30 months no risk

Clarke & Redden, 1992; Gordon & Simkiss, 2006;
Pountney et al., 2009; Wynter et al., 2011

ABDUCTION

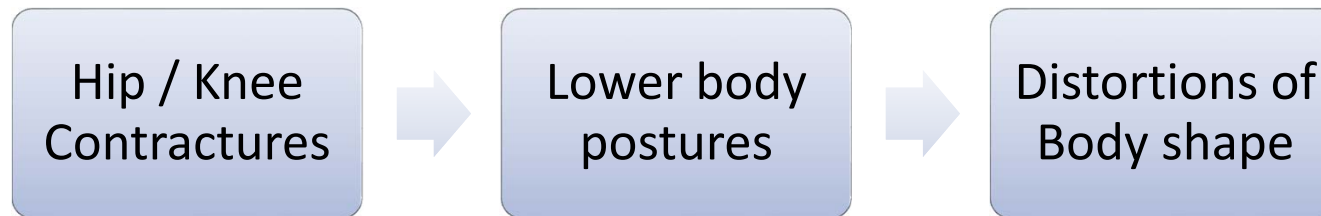
- . Early use of positioning in sitting, standing, and lying
- . Some benefit to weight bearing abduction
- . Maintain passive hip abduction
- . Prevent migration percentage increase

Macias-Merlo et al 2016; Macias-Merlo et al 2015; Martinsson & Himmelmann, 2011; Poutney et al, 2009

Link Between Lying and Sitting

- ✓ **Best Practice:** mat evaluation in supine and in sitting.
- ✓ **Experienced assessor:** similarities between lying and sitting evaluation.

Link



- ✓ Chest rotation / flattening
- ✓ Scoliosis
- ✓ Pelvic Obliquity / rotation
- ✓ Hip dislocation

Postural Care

- ✓ Careful **analysis and understanding** of destructive postures
- ✓ Aim for the **SSL line** and **level pelvis** (supine) = **forces of gravity** are **equal bilaterally** on the body

Postural Care

- ✓ We must **protect** body shape
- ✓ Body shape distortion is **dehumanizing**
- ✓ **Avoidable**

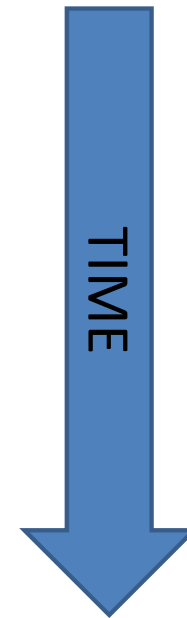
Gravity and the Sequence of Deformity.

Prolonged Posture

Tissue Adaptation

Contracture

Deformity



LYING

- . Prone, Supine, Side
- . Side Lyers
- . Bolsters
- . Pillows
- . Wedges

LYING-GOALS

- . Safety
- . Positioning
- . Improve breathing
- . Decrease reflux

SITTING

- . Wheelchairs
- . Floor Sitters
- . Feeding Chairs

SITTING-GOALS

- . Positioning
- . Support
- . Function

STANDING

- . Supine
- . Prone
- . Sit-to-Stand
- . Upright
- . Multi-Positional
- . Mobile

STANDING-GOALS

- . Low load stretch over extended time
- . Decrease spasticity
- . Improved bone density
- . Decrease constipation
- . Protect hips?

Gravity... continues to influence the position of the unsupported body

Same gravity that has an influence in *sitting and standing*

—

Still has an influence in *lying*

Learning Objective #2

List 3 benefits of 24-hour positioning programs for children throughout their childhood supported by evidence

3 AIMS of 24 hour Posture Management

- ✓ Improve **Function**
- ✓ Improve **Comfort**
- ✓ Prevent/Reduce **Secondary Complications**

3 Principles for Good Posture

- ✓ Facilitates **Maximum** Performance
- ✓ For **Minimum** Energy Consumption
- ✓ **Without** Causing Damage To The Body

Pope 2007

Slide Number: 27

3 Principles for Poor Posture

- ✓ That Which Results In **Less** Accuracy
- ✓ Is Carried Out With **Increased** Effort
- ✓ Leads To **Damage** of The Body

Why Do We Need a Stable Posture 24 Hours a Day?

Posture for Function

- ✓ Align & stabilize each body segment relevant to each other & the supporting surface.
- ✓ Provide support *without* compromising function or restricting development.

IMPROVE BONE DENSITY

- . Standing frames allow 68%-85% body weight
- . Significant increases in femur bone mineral density in children
- . Increase in vertebral BMD
- . Decrease fractures

Bernhardt et al., 2012; Herman, May, Vogel, Johnson, & Henderson, 2007;
Kecskemethy et al., 2008; Caulton et al, 2004; Gudjonsdottir & Mercer, 2002;
Stuberg, 1992

BOWEL FUNCTION

- . Improve voluntary sphincter control
- . Improve regularity
- . Decrease constipation

Dunn et al, 1998; Hoenig et al, 2001;Netz et al., 2007

Learning Objective #3

Identify parameters for 24 hour posture management positioning programs that are supported by evidence from the literature and how to introduce them into practice.

5 Principles of Application

- ✓ **Contours compatible** between body and supporting surface
- ✓ **Organize** a stable posture
- ✓ Ensure the supporting surface is **appropriate**
- ✓ Promote and maintain **symmetry** wherever possible
- ✓ **Equal distribution** of body on supporting surfaces

Always Important

- Is it **comfortable**?
- Needed/ wanted?
- Is the application and use clear?
- Is the individual/ support team able to use it appropriately?
- Is this equipment compatible with their lifestyle?

Assessment

(Pope 2002)

International Classification of
Functioning, Disability and Health
(ICF)

World Health Organization
(WHO 2001 /7)

Data Collection

- ✓ Medical
- ✓ Social
- ✓ Environmental
- ✓ Physiological
- ✓ Physical

<http://naep.org.uk/members/documents/NAEPALLABOUTSEATING-24HourPosturalManagementIssue1June2015.pdf>

Scroll to end of document for assessment form

Posture and Postural Ability Scale

Quality

Quantity

<http://journals.sagepub.com/doi/pdf/10.1177/0269215512465423>

Contraindications to Use of Lying Supports

- ✓ Reduce functional ability
- ✓ Wiggle-factor
- ✓ Multiple care providers
- ✓ Family Dynamics

Contraindications for Supine Lying

- ✓ Risk of Aspiration
- ✓ Severe Opisthotonus
- ✓ Severe Kypho-scoliosis
- ✓ Side sleeping preference

Contraindications for Side Lying

- ✓ Reduced body contact area with support surface.
- ✓ Asymmetrical force of Gravity.

Stable Posture in Lying

Precautions

- ✓ Overheating
- ✓ Suffocation risk
- ✓ Friction
- ✓ Incorrect application

Sitting

Bye - Bye

90 -90 -90

Three Planes of Motion

- Obliquity
- Rotation
- Tilt

Pelvic Tilt

- Sagittal plane
- PSIS – ASIS
- Direction
 - Forwards: accompanied by hyper lumbar lordosis
 - Backwards: associated with flattened lumbar spine

Seating Principles

- Facilitate postural stability while allowing purposeful movement
- Respect 3 dimensional anatomical shapes
- Where ever possible, support postures from within the contours of the seating system

Seating Principles

- The pelvis is the primary point of control where posterior support at the PSIS is key.
- Respect the affect that overall posture has on breathing and swallowing should be a primary concern.

Seating Principles

- Comprehensive evaluation
- Fixed or flexible
- Respect that the position of the pelvis directly impacts the spine, which in turn influences the position of the head and extremities.

Seating Principles

- The effect of long term sitting on discomfort and secondary complications
- The opportunity to trial seating solutions in static and dynamic situations is important for identifying the most effective overall seating solution.

HOW LONG?

- Minimum
 - 60 minutes for bone density and hip stability
 - 45 minutes for range of motion improvements
 - 30 minutes for spasticity and pressure relief

WHY STAND IN SCHOOL?

- . Need 45 minutes to 2 hours a day
- . Families busy
- . Multiple children in household
- . Not enough hours in the day
- . Socialization/Play

EQUIPMENT FOR SCHOOL

- . Easy to adjust
- . Appropriate for many children
- . Multi-Positional
- . Sit-to-Stand

EQUIPMENT FOR HOME

- . Medically appropriate
- . Easy to use
- . Able to be moved through home
- . Tray for activity and school work

JUSTIFICATION

- . Clear picture of child
- . Justify all accessories
- . Use research
- . Pictures/Videos

SUPINE

- . Low level
- . No head control
- . Child placed in supine
- . Can be hard to use with joint contractures
- . Least weight bearing

PRONE

- . Interactive child
- . Good head control
- . Child placed into unit in standing

SIT-TO-STAND

- . Interactive child
- . Good head control
- . Placed into device in sitting
- . Can be used in sitting
- . Can accommodate contractures
- . Good weight bearing

UPRIGHT

- . Mild to moderate impairments
- . Good head control
- . Good weight bearing
- . Place into stander fully upright

MULTI POSITIONAL

- . Prone/Supine
- . Emerging head control
- . Rest head/neck in supine
- . Progressive disorders

MOBILE

- . Prone or upright
- . Large wheels
- . Some dynamic loading

Summary

- ✓ 24-Hour Posture Management
- ✓ Posture for Function
- ✓ Sufficient Resources are rarely available.
- ✓ MDT + Family / Support Network

TEAMWORK

- . Child
- . School therapist
- . Clinic therapist
- . Teacher
- . Aid
- . Parent

Further Reading and Resources

Bower, E. (2009) *Finnie's Handling the Young Child with Cerebral Palsy at Home (Fourth Edition)*, Butterworth-Heinemann, Edinburgh. ISBN 9780750688109.

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