Positioning- Babies to Adults

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Development of postural alignment

- In Womb- no gravity- flexed
- Baby learn -to extend
- Toddler- extending
- Child- extending
- Adolescent-other factors affect posture
- Young adult- maintaining extensions
- Middle Age- have to work harder to keep extension
- Older Age- more flexed (Everett et al 2010)

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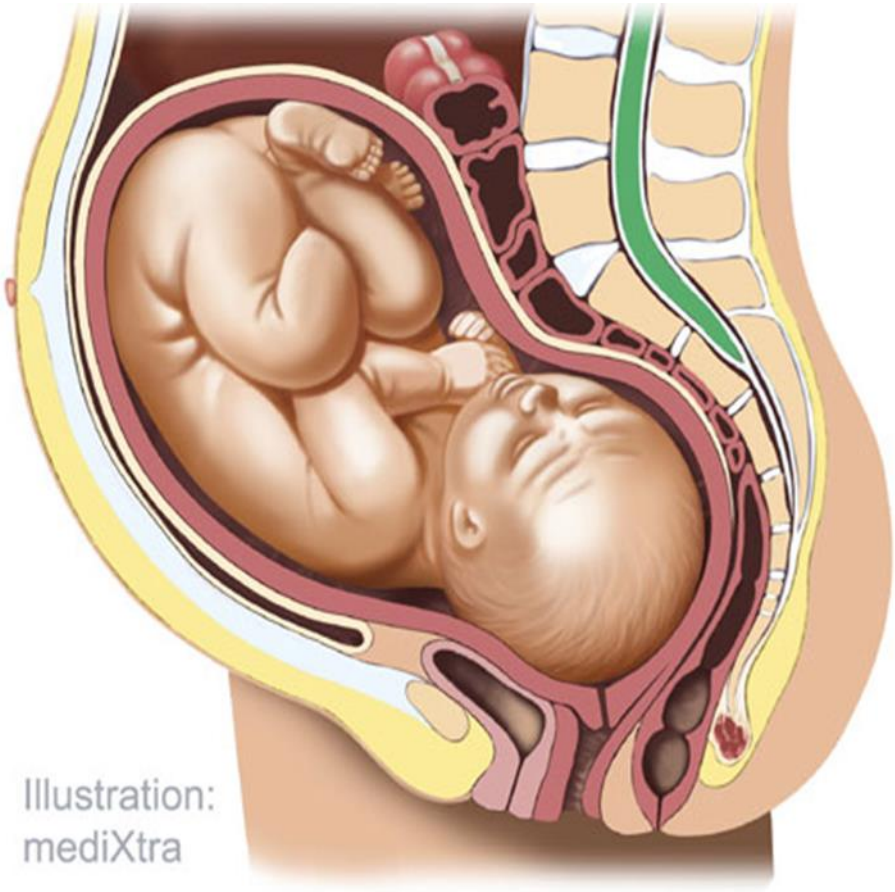
Foetal Position

- Flexed arms and legs
- Knees and elbows tucked to midline
- Curved spine
- Head tucked forwards



A snug, secure, environment!

Muscle Tone

- Active muscle tone develops around 36 weeks gestation, with typical foetal position (Physiological Flexion)

- Over first 2 months of life, ↑ extensor muscle activity → balance between flexion/extension

Prematurity

If pregnancy interrupted before 36 weeks, natural physiological flexion is not experienced

Gravity pulls the hypotonic baby into flattened extension postures

Flexion/Extension balance is harder to achieve

Risk delay in motor milestones

Postures of baby

- Supine
- Prone
- Side Lying

What is a Base of Support (BOS)?

- Uncontoured = high pressure on small contact area

- Contoured = Pressure spread over a large contact area

Developmental Care

- Positioning
- Handling
- Environment

Objectives for positioning

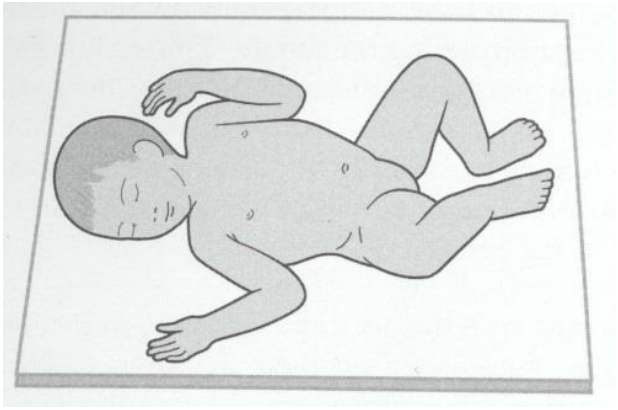
- To enhance comfort, rest and security and decrease energy expenditure
- To encourage a balance between flexion and extension
- To promote a symmetrical posture
- To facilitate smooth anti-gravity limb movement

Objectives

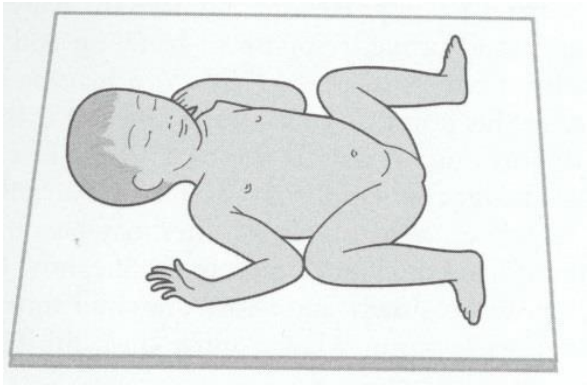
- To stimulate active flexion of the trunk and limbs
- To encourage midline orientation- eye hand co-ordination
- To achieve more rounded heads and active head rotation
- To prevent contractures and deformity

Positioning with gravity

- Supine -Full term



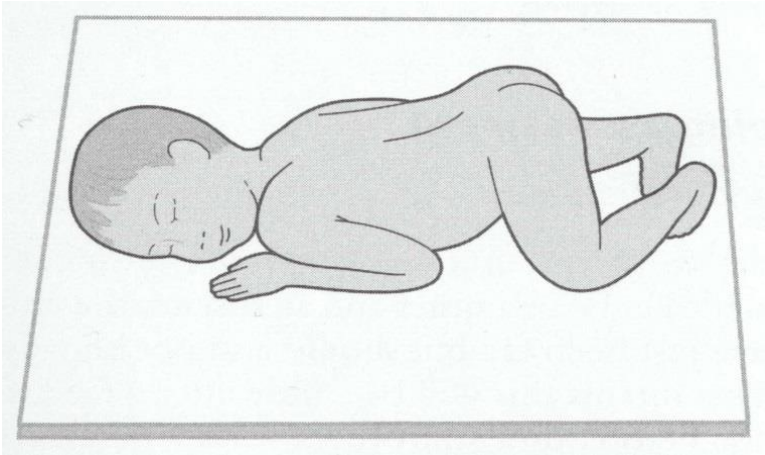
- Supine-Neonate



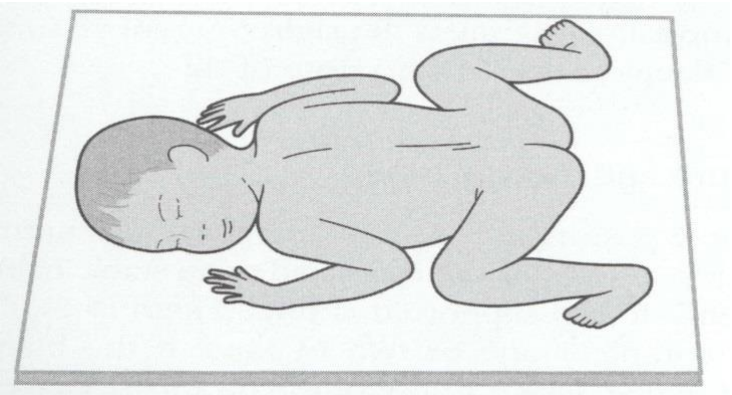
Drawings used by permission, Pountney (2007)

Positioning with gravity

- Prone full term



- Prone neonate



What are the consequences ?

- Hyperextended neck- Shortened neck extensor muscles and increased cervical lordosis, shortened scapular adductor muscles
- Can lead to slower development of midline head position
- Difficulty bringing hands to midline/fine motor skills
- Difficulty weight-bearing on forearms in prone/crawling
- Difficulty achieving sitting balance

Positioning

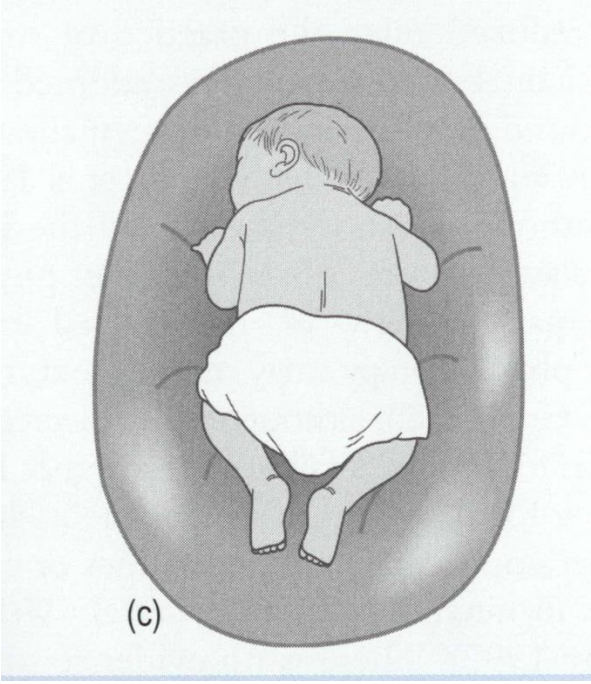
- Nesting

Prone position causes:

  - flattening of the head
  - encourages abduction of arms and hips

  If can achieve flexion at hips:

  - prevent shoulders and hips retracting



‘Frogs legs’

- Shortened hip abductor muscles
- Shortened iliotibial band
- Increased external tibial torsion

Leads to: Poor movement sequencing from prone and sitting

Interferes with crawling

Prolonged wide-based gait with out-toeing

Everted feet

- Muscles that invert the foot are overstretched
- Foot alignment is changed due to muscle imbalance

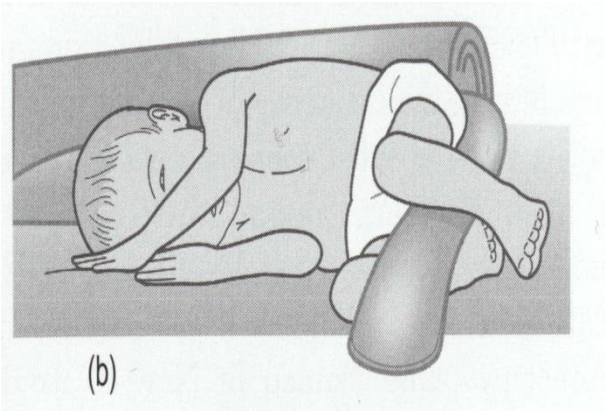
Leads to: Pronated foot position in standing
Excessively pronated foot position delays development of a heel-toe gait pattern
Toe Walker

Positioning

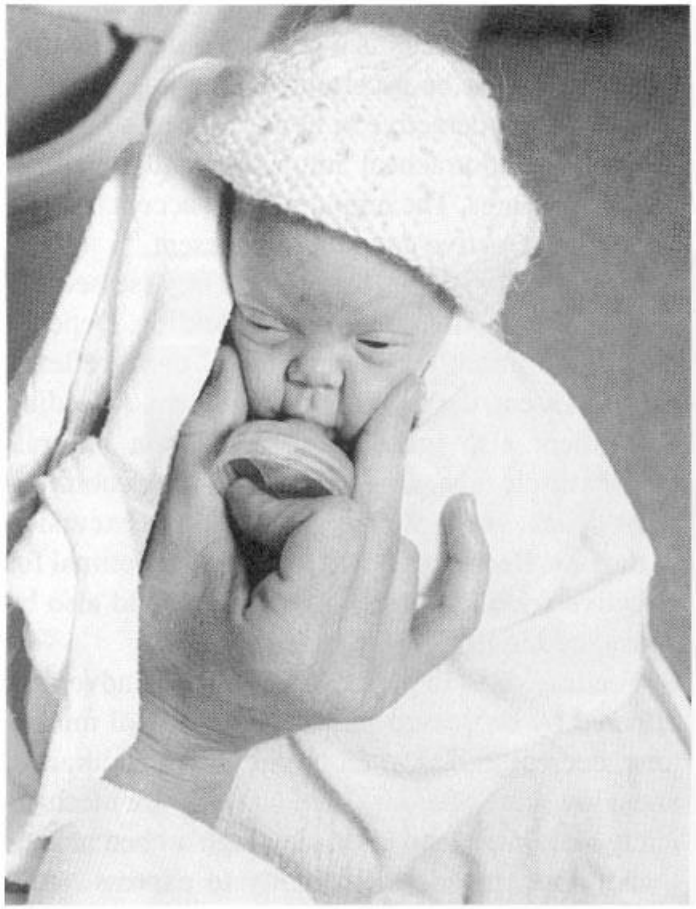
- Supine- Boundaries
  - nesting

Positioning

- Side lying
  - encourages hands together
  - natural flexion



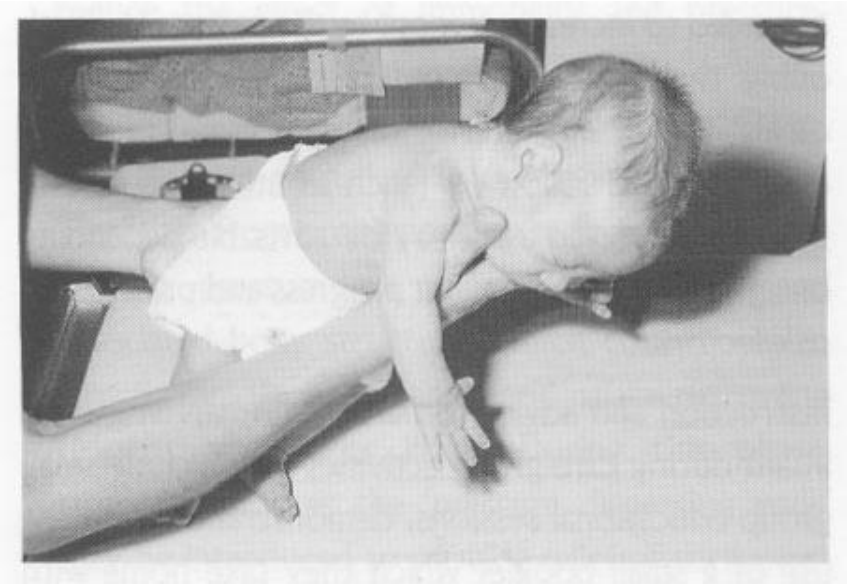
Positioning



- Feeding- jaw support

Handling

- Minimal handling
- Time procedures together to reduce need for regular handling
- Provide rest between stressful events
- Swaddle or contain during procedures
- Movements should be done slowly and confidently, smoothly not jerkily



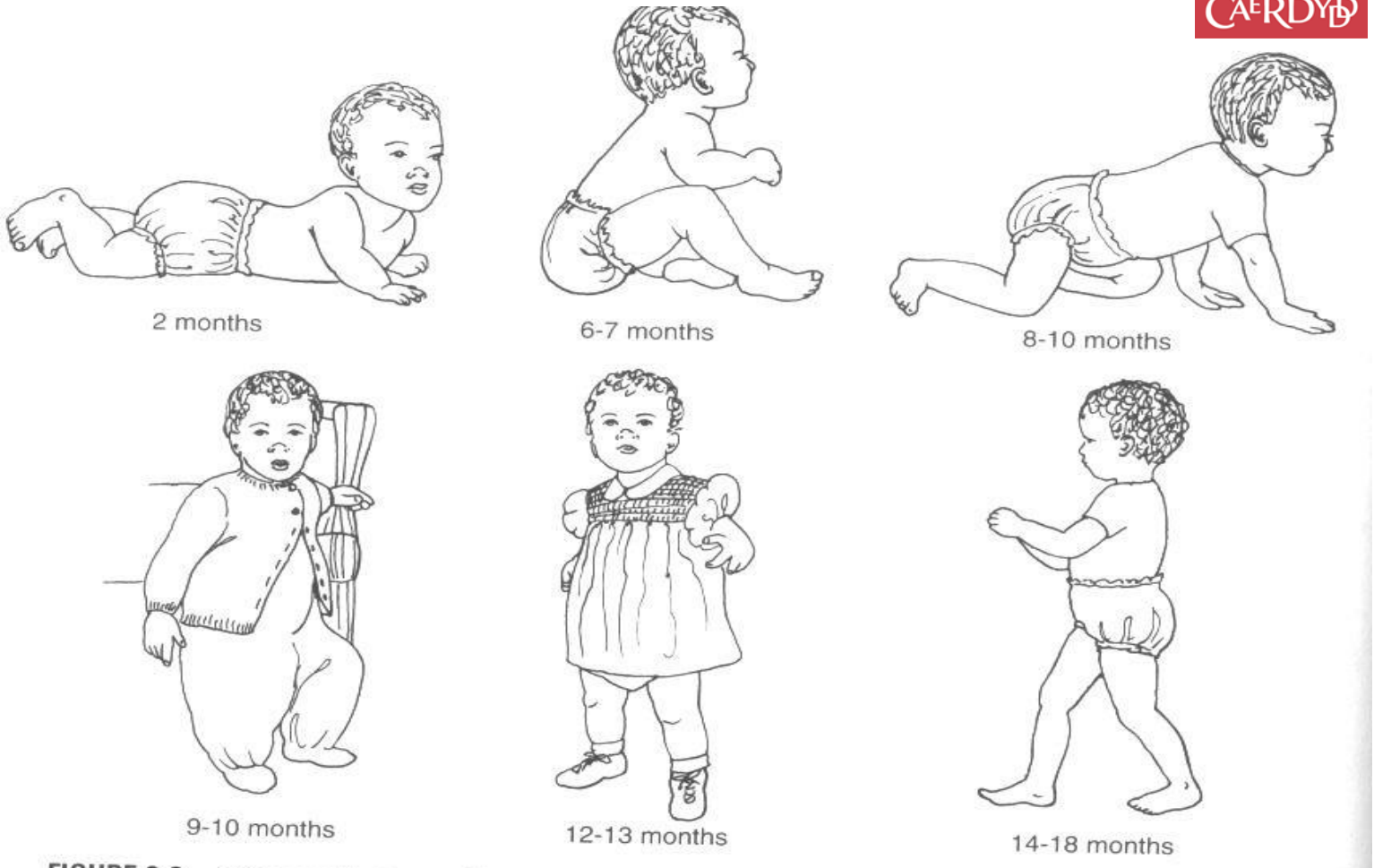


FIGURE 8-2. Motor milestones that emerge with the development of postural control. They include crawling (2 months), sitting (6 to 7 months), creeping (8 to 10 months), pull-to-stand (9 to 10 months), independent stance (12 to 13 months) and walking (14 to 18 months) (Adapted with permission from Shumway-Cook A, Woollacott M. Theoretical issues in assessing postural control. In: Wilhelm I, ed. Physical therapy assessment in early infancy. NY: Churchill Livingstone, 1993:163.)

Facilitation through motor milestones

- Key points of control- hands on using toys to motivate, aiming for optimal alignment
- Rolling
- Crawling
- Sitting
- Kneeling
- Standing
- Stepping
- Walking- sideways, forwards, backwards
- Running
- Hopping
- Jumping

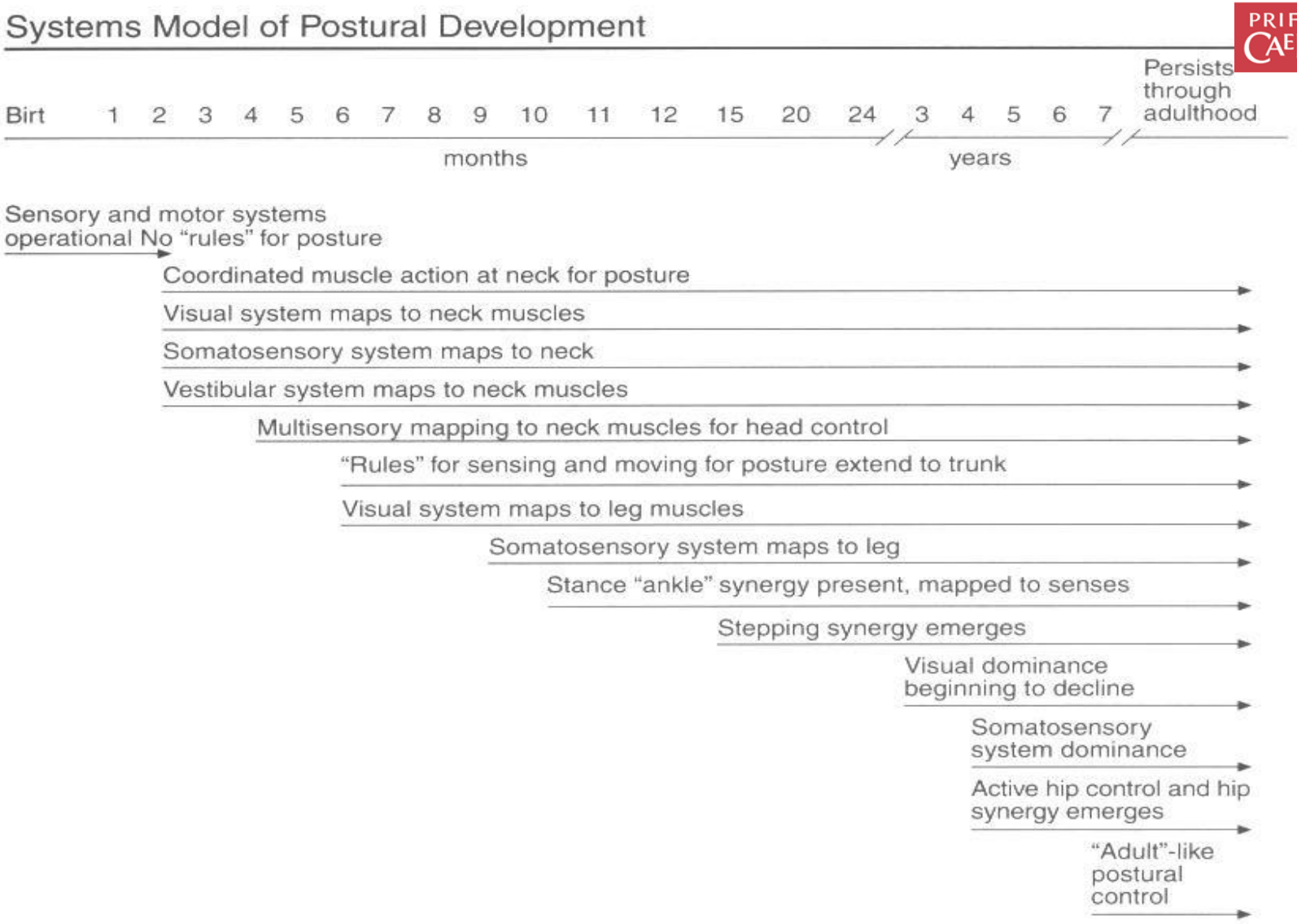
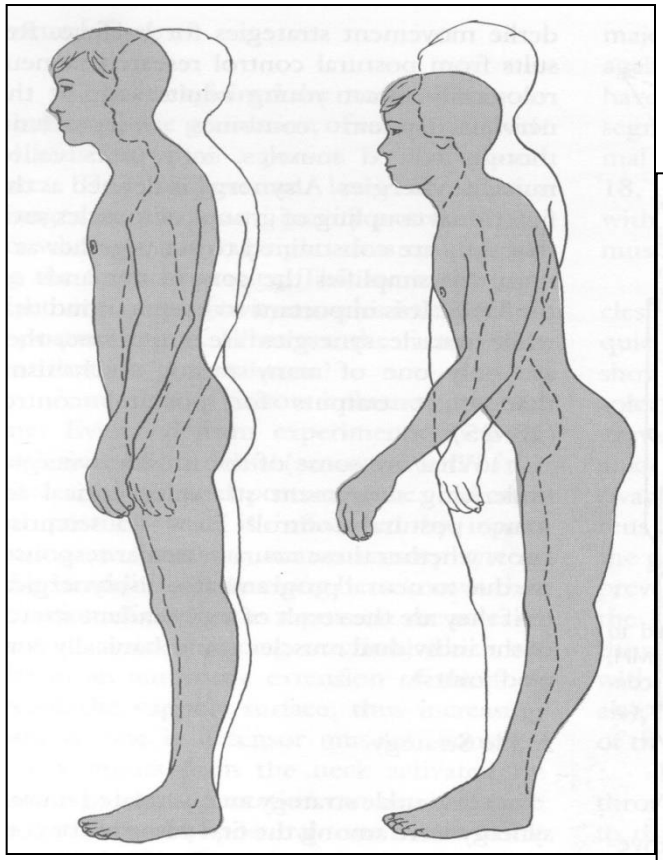
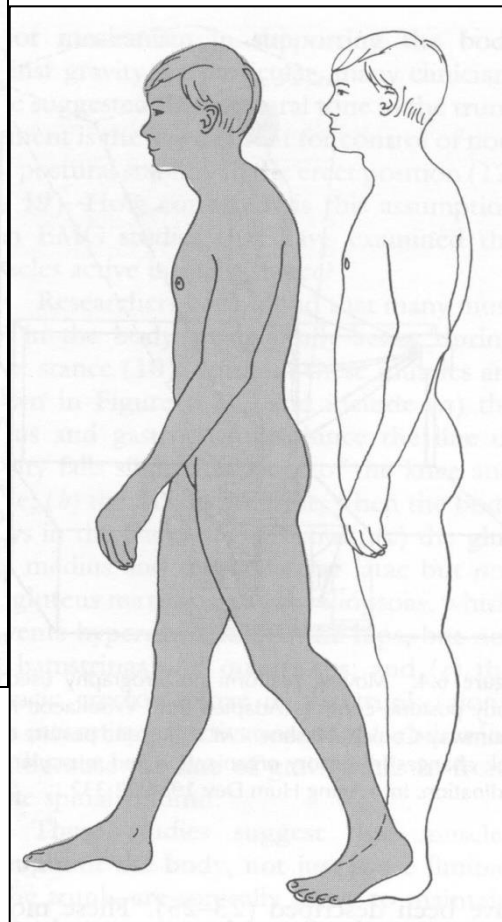


FIGURE 8-21. A systems model of postural development showing the emergence of critical stages in the development of postural control

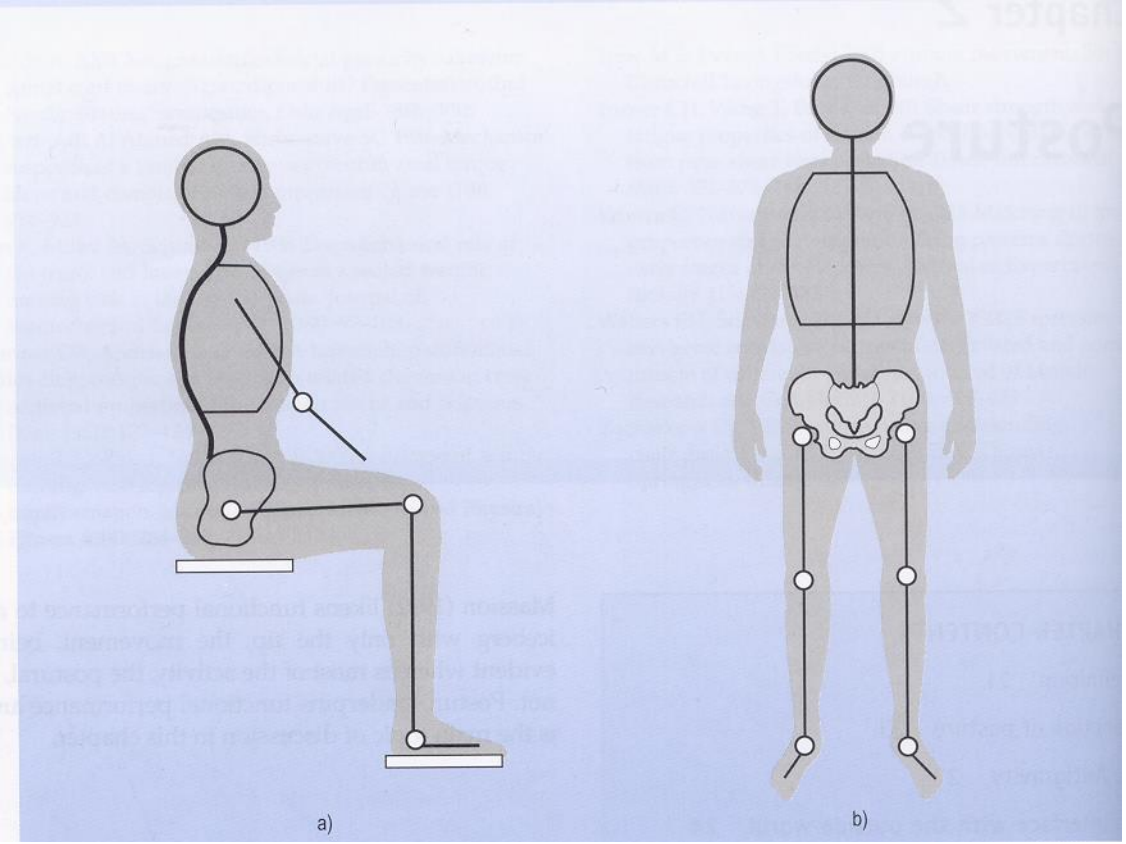
Strategies for controlling balance

- Ankle strategy
  - > 1 year
- Hip Strategy
  - 4 yrs+
- Stepping Strategy
  - 7 yrs+

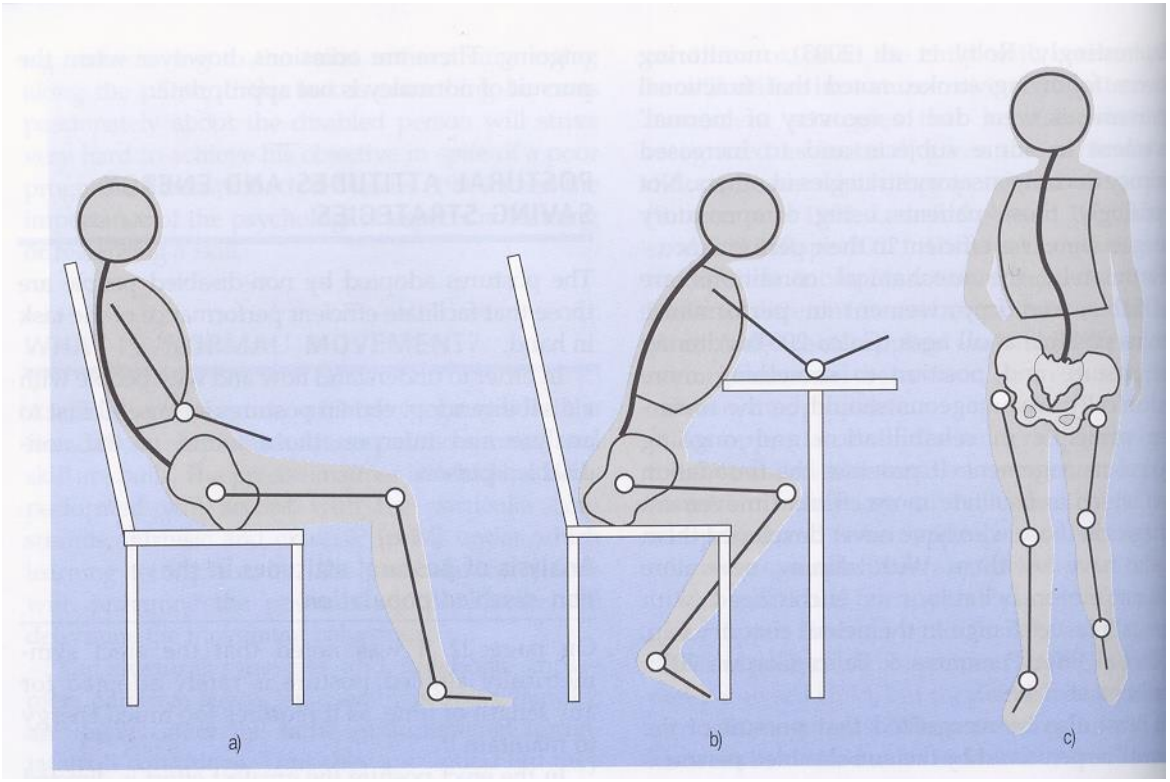




Correct Alignment



Energy Efficient Postures We Adopt



What is Bad Posture?

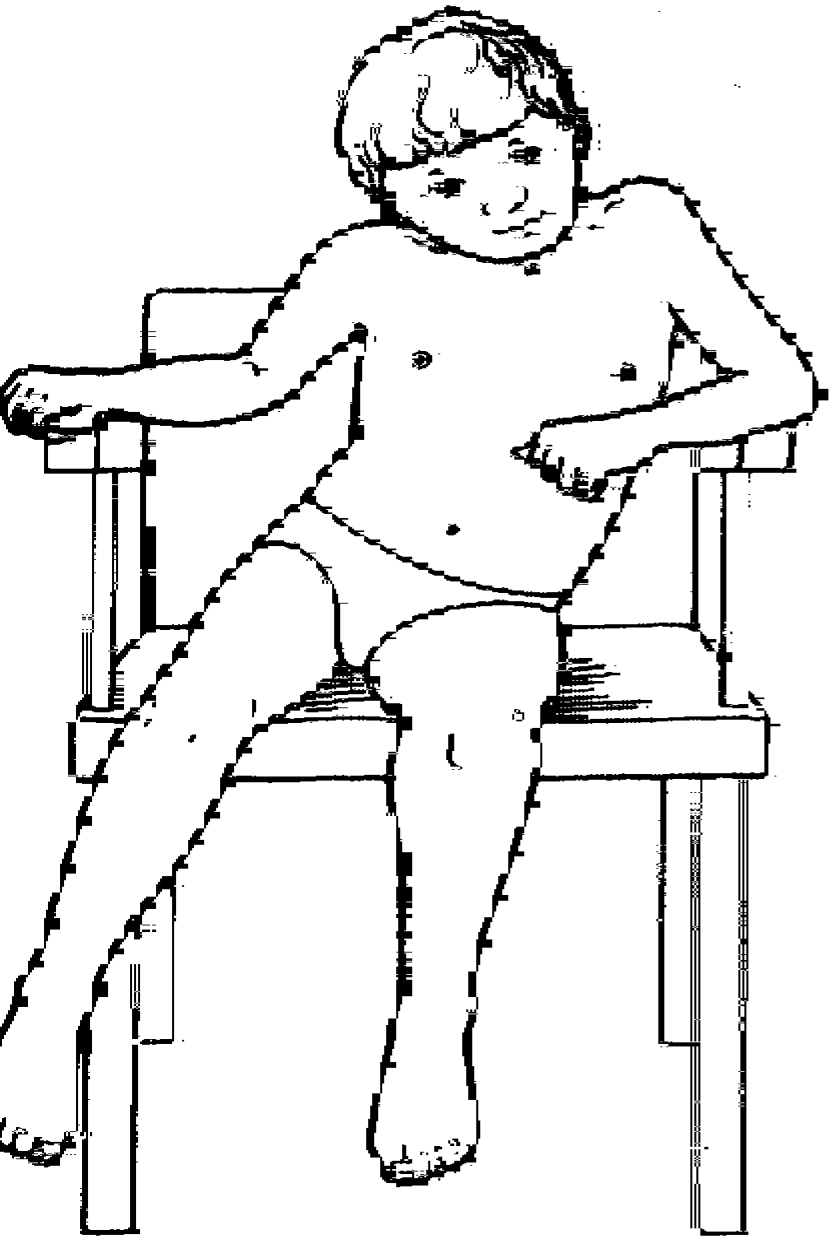
- “that which results in less accuracy, is carried out with increased effort and leads to damage to the body”

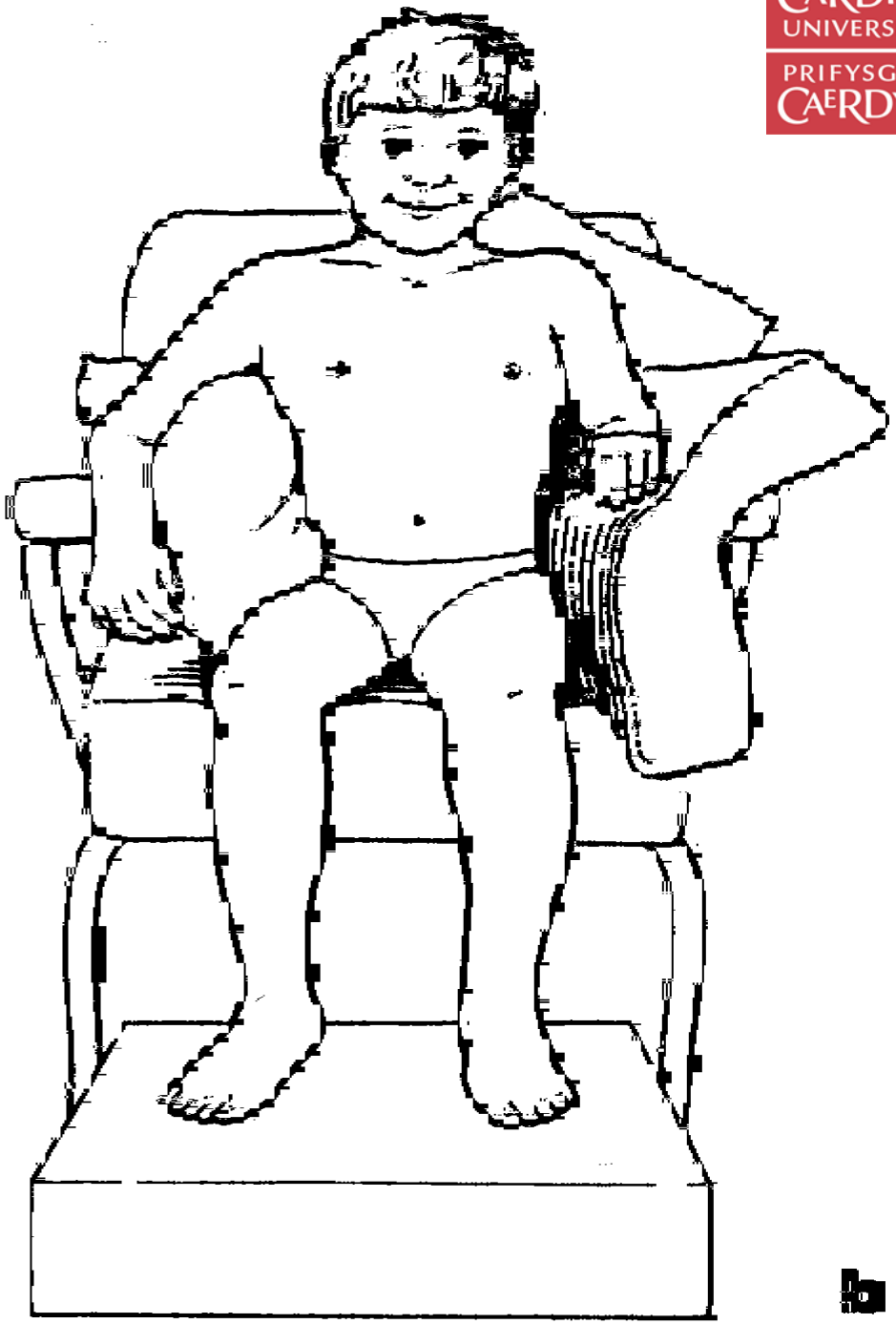
(Pope P, 2007)

Bad posture - Asymmetry

Figure 7.4 Buckling and bending of the spine stabilising

- Pelvis tilted
- shoulders tilted
- spine curved
- head dropped onto shoulder
- hand gripping for support



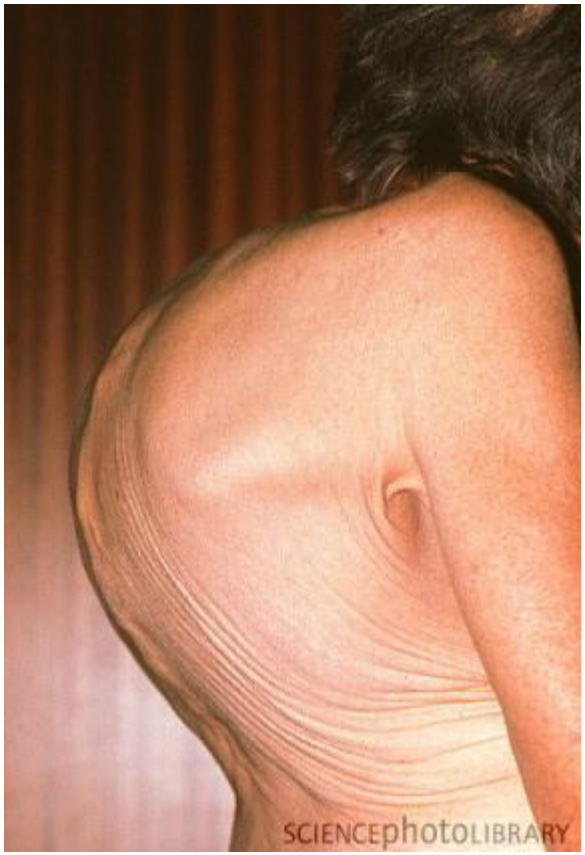


What are Fixed Asymmetric Postures?

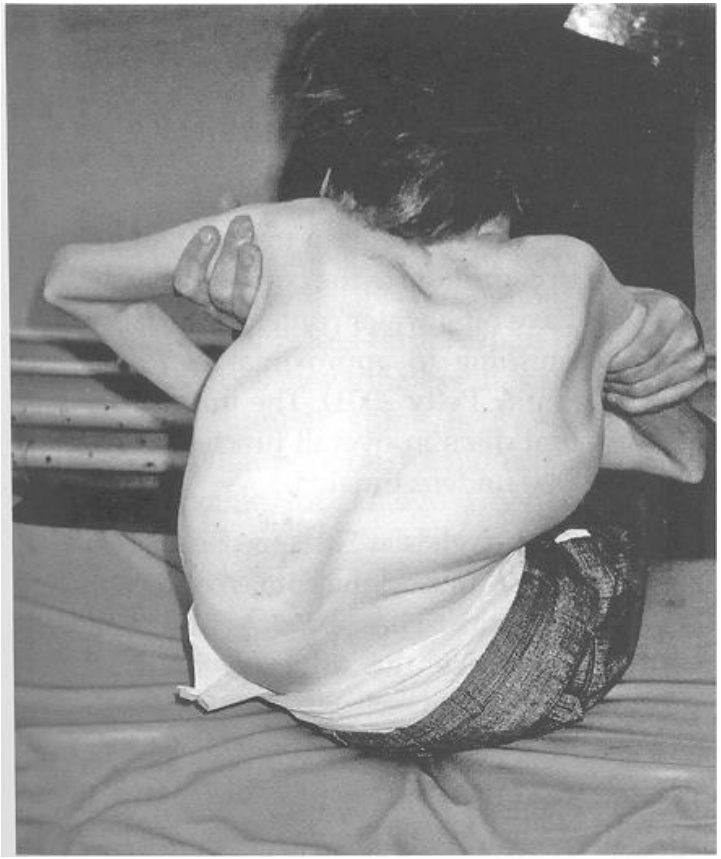
- Scoliosis
- Kyphosis
- Kyphoscoliosis
- Hyperlordosis
- Windsweeping hips
- Fixed flexion contractures
- Reduced range of movement (ROM)
- Joint dislocation

Severe deformity

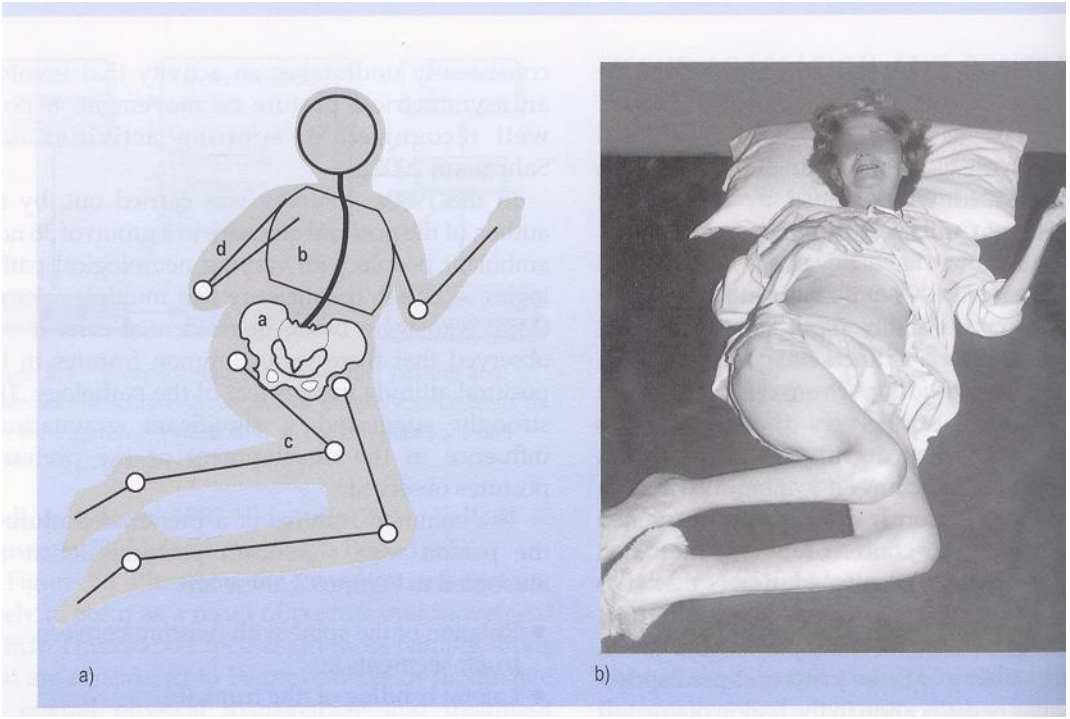
- Kyphosis



- Scoliosis



Windswept Hips



What is the Effect of Dysfunctional Postures?

- Respiratory

Chest infection/ pneumonia, pulmonary hypertension, sleep apnoea and right sided heart failure

- Digestive
- Renal
- Pressure
- Pain/discomfort
- Communication
- Social interaction/participation
- Function
- Mobility
- Degeneration of structure/tissue
- Eating and drinking
- Decreased bone density
- Lower quality of life
- Greater changes in tone
- Death

What should we think about when aiming to improve function and participation?

- Body position
- Eye gaze
- Arm reach
- Contractures
- Fear
- Tiredness
- Behaviour
- Our own position
- Equipment being used e.g., pommel, table height, suitability of armrests, tray, wedge
- Environment e.g., noise, lighting, temperature, distractions
- Is the activity meaningful and / or enjoyable to the individual?

What Can We Do?

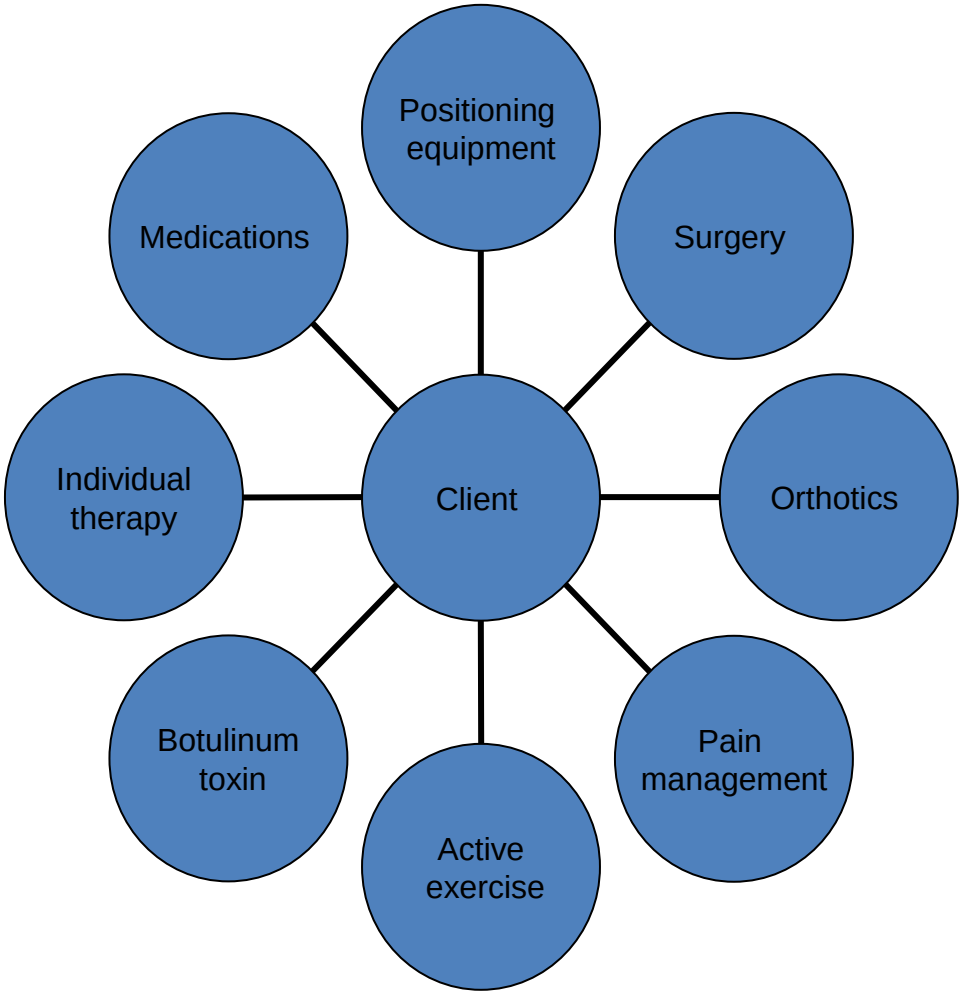
24 hour postural management assessment / programme – this may include:

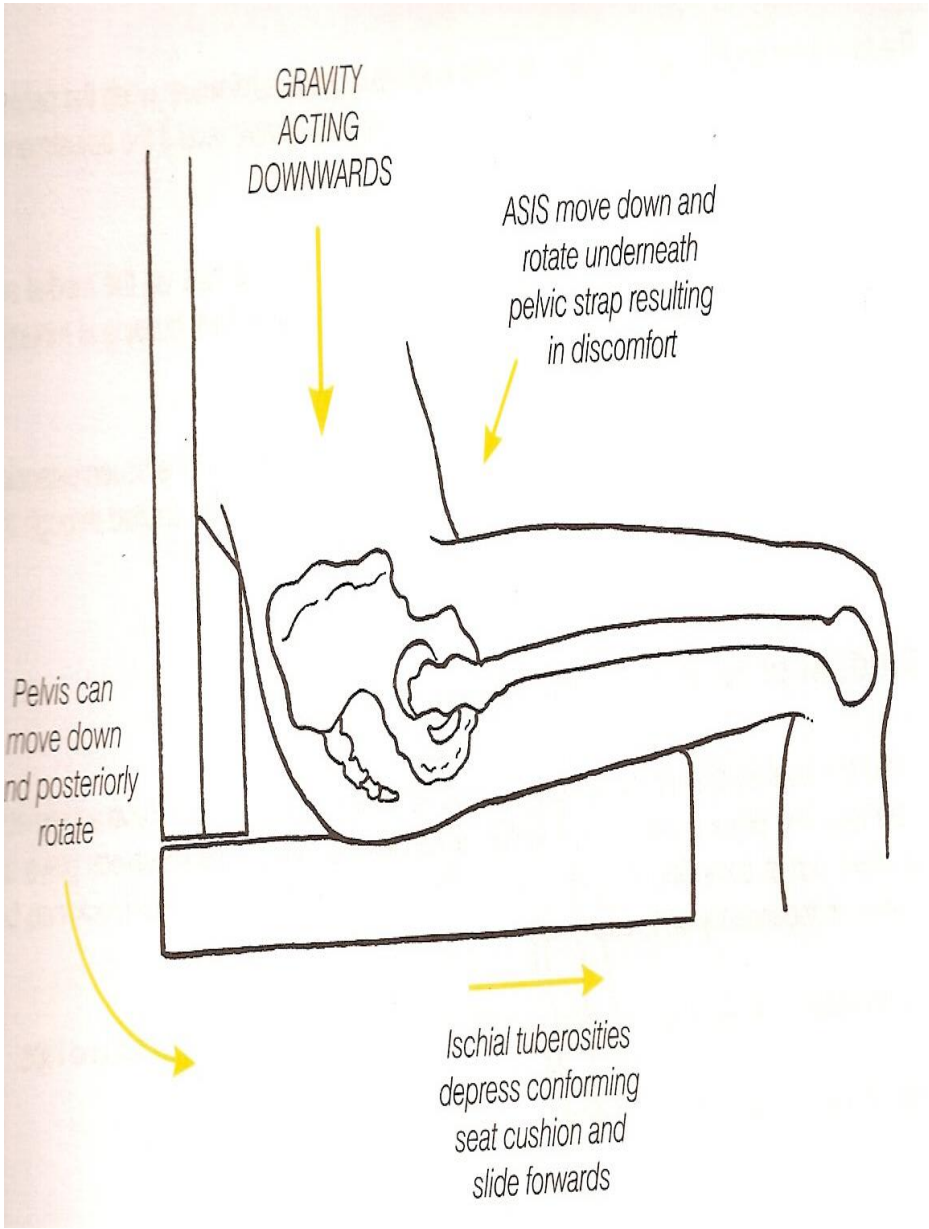
- Regular change of position
- Appropriate wheelchair seating
- Night time positioning
- Armchair
- Other equipment

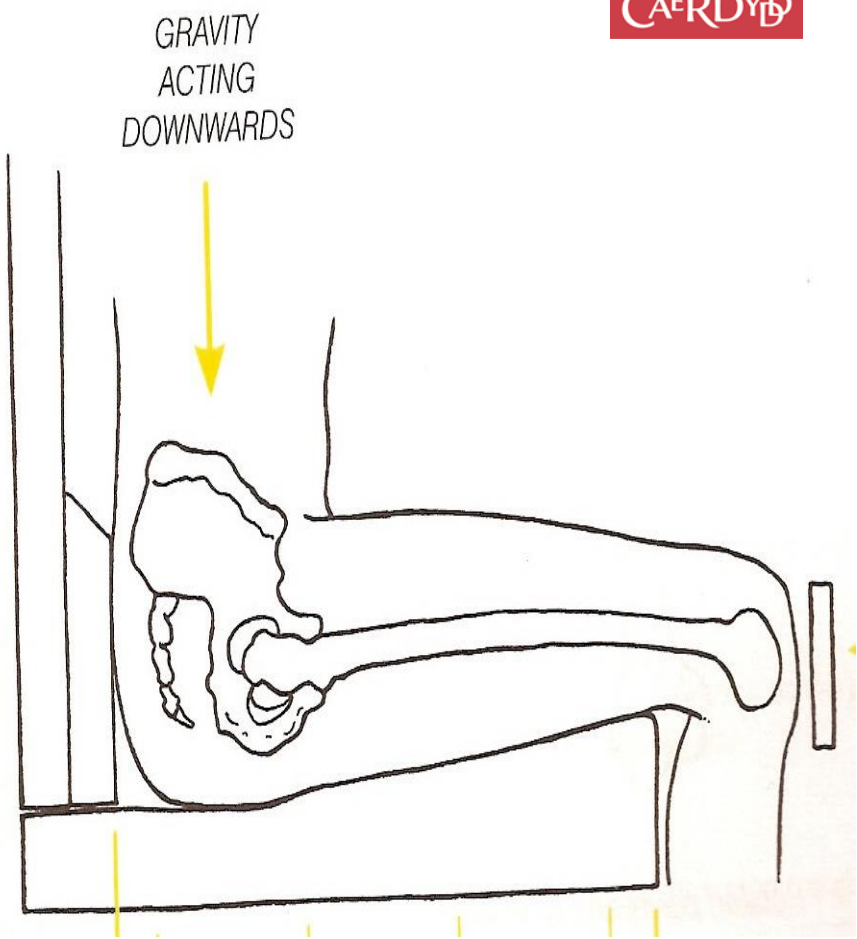
Positions

- Time spent in certain position – 24 hours
- Shear damage – slipping down in chair
- Increase the area of support – spread the load
- Support in different positions – lying, sitting and standing – stability and balance
- Simple means – use of pillows, cushions, T roll, rolled up towels, wedge, bean bag

Components of Postural Management Programme




GRAVITY ACTING DOWNWARDS
ASIS move down and rotate underneath pelvic strap resulting in discomfort
Pelvis can move down and posteriorly rotate
Ischial tuberosities depress conforming seat cushion and slide forwards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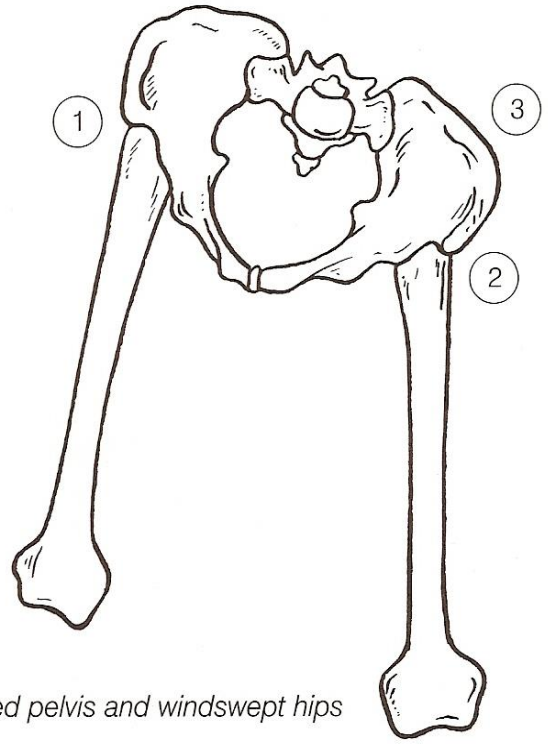
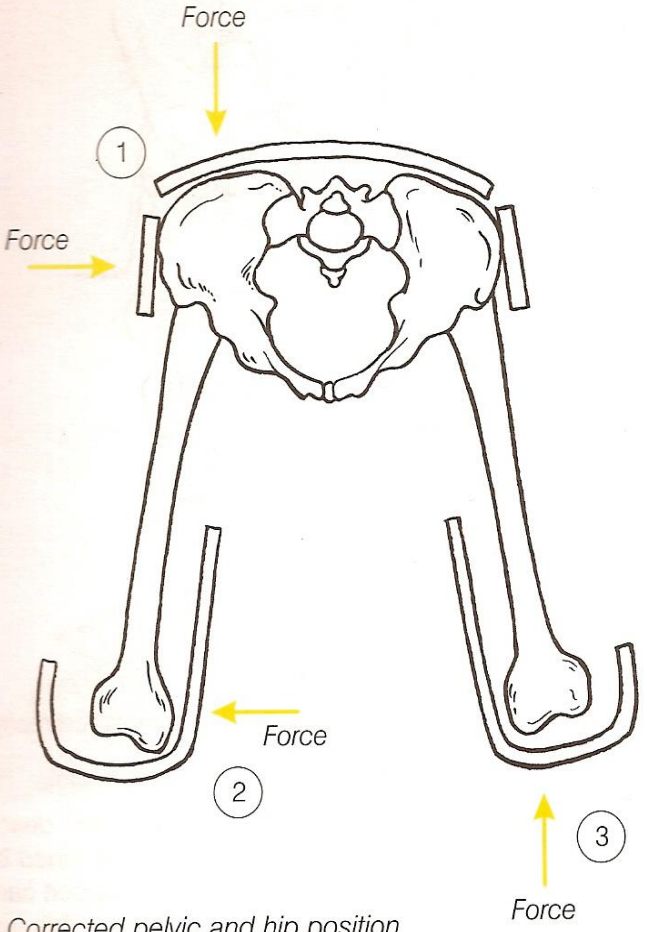


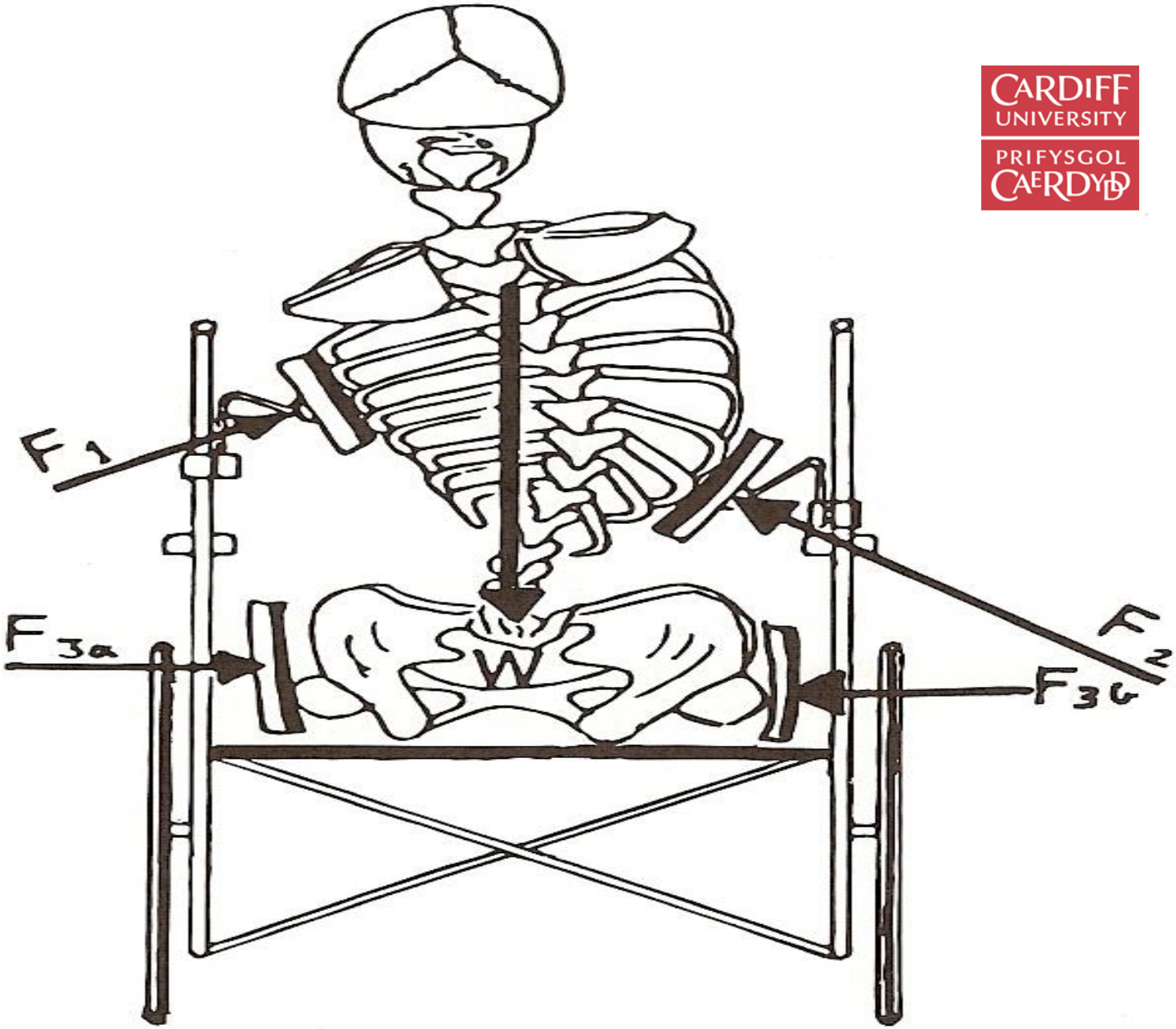
Figure 132 | *Rotated pelvis and windswept hips*

1. *The right hip is adducted and at risk of dislocation.*
2. *The left hip is abducted.*
3. *The pelvis is rotated forward on the abducted side.*

...ext illustration, the kneeblock has been used to correct this position

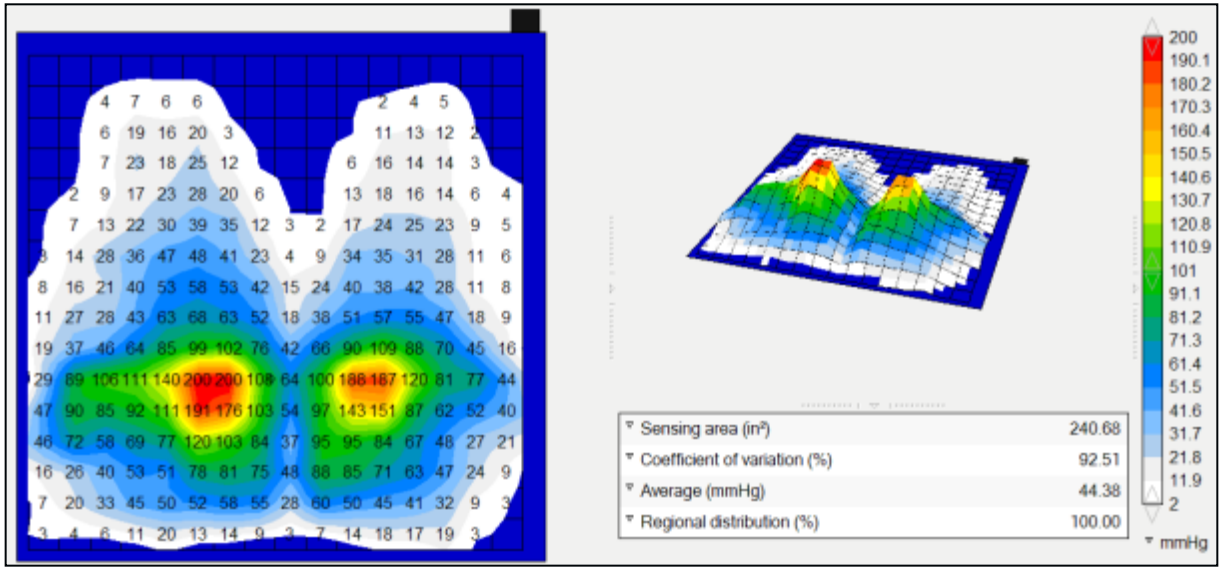


...e 133 | *Corrected pelvic and hip position*

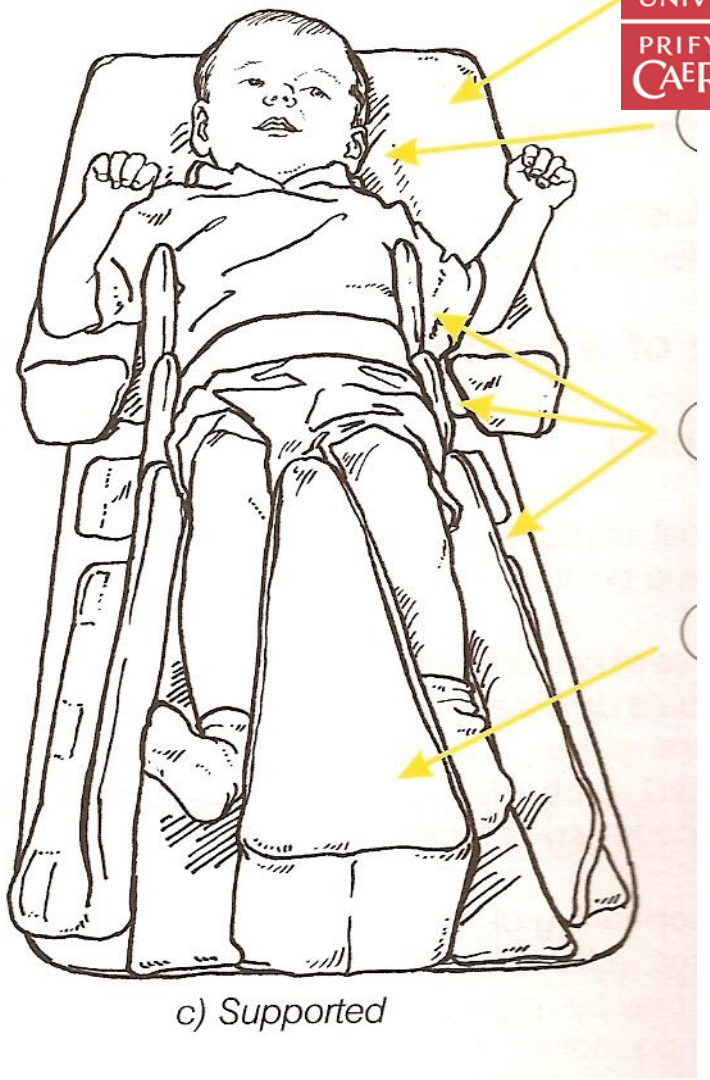

F1
F3a
W
F2
F3b

Wheelchair

Pressure Mapping



b) Unsupported



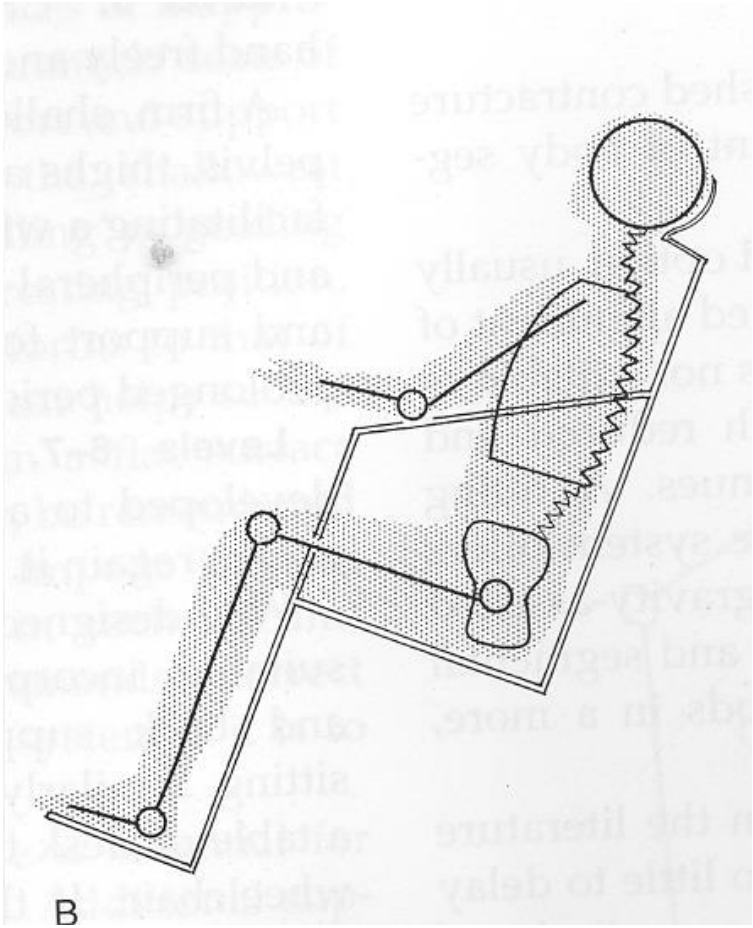
c) Supported

Night time positioning

Postural Alignment

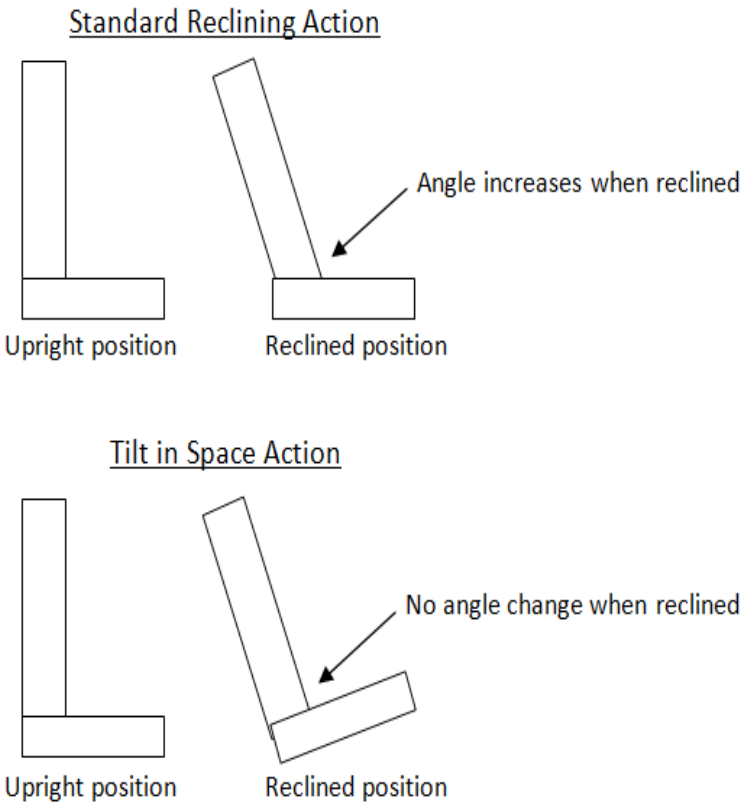
- Provides a stable base of support
- Maximises body contact with supporting surface
- Slowdowns or corrects flexible components of deformity
- Accommodates fixed components of deformity
- Protects and maintains skin integrity
- Facilitates Function- and 'Participation'
  - Activity related function eg feeding , swallowing
  - Physiological function eg breathing, digestion
  - Psychological function eg communication, socialising, self image, relaxation

Tilt in space



- Enables gravity to be used ‘positively’ - allows the weight of the body to fall onto the supporting surface increasing the area of support
- Enables the point of pressure to be varied without having to move the client to another position

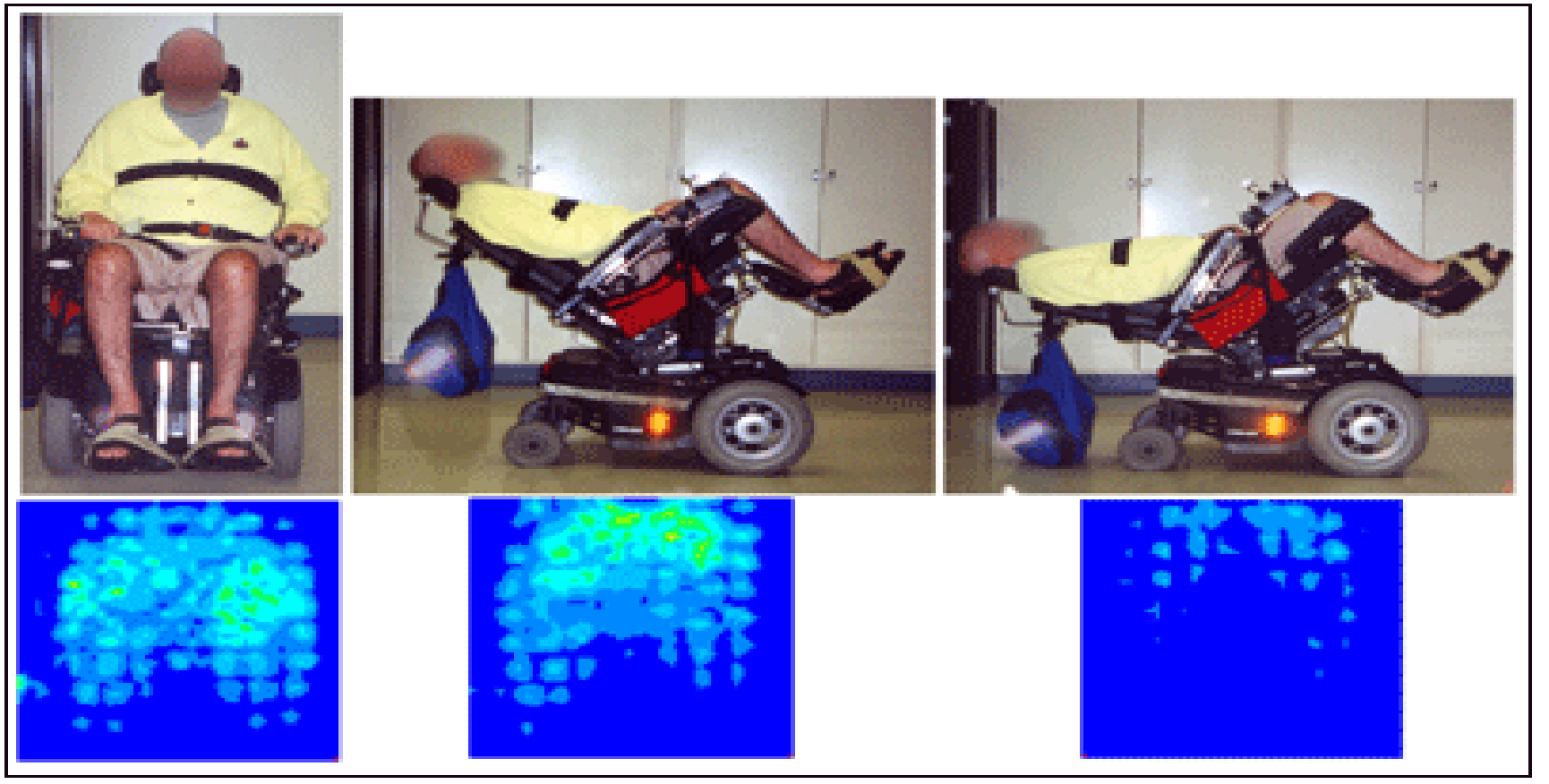
Tilt in Space Vs Recline



- Recline: seat to back angle >90
- Tilt in space: Seat to back angle remains the same

Pressure Mapping

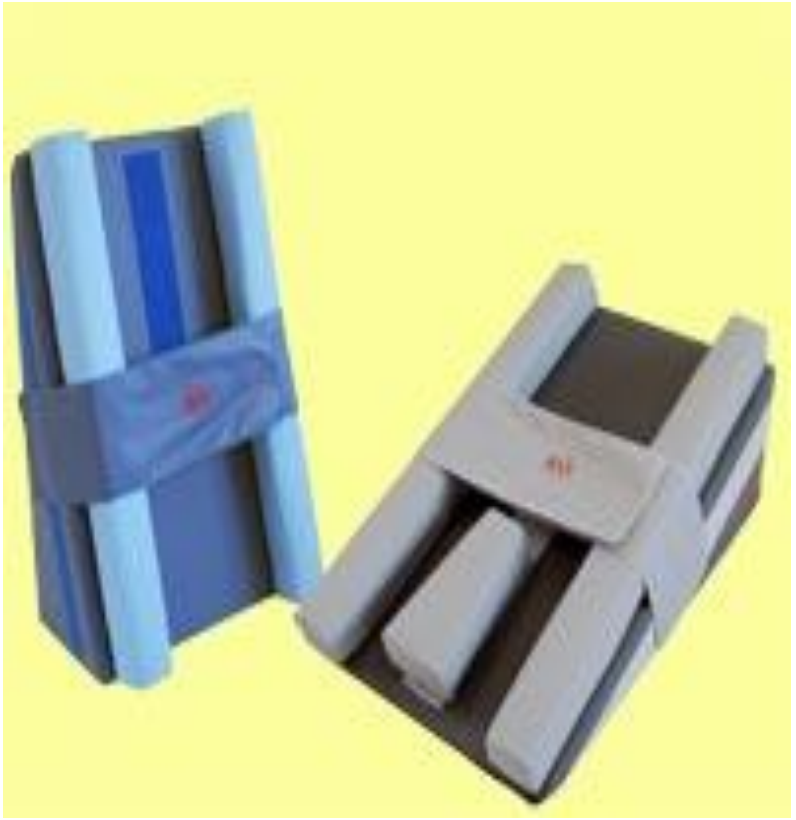
Upright, 45 tilt and 45 tilt with recline



Postural Chairs

Standing frame

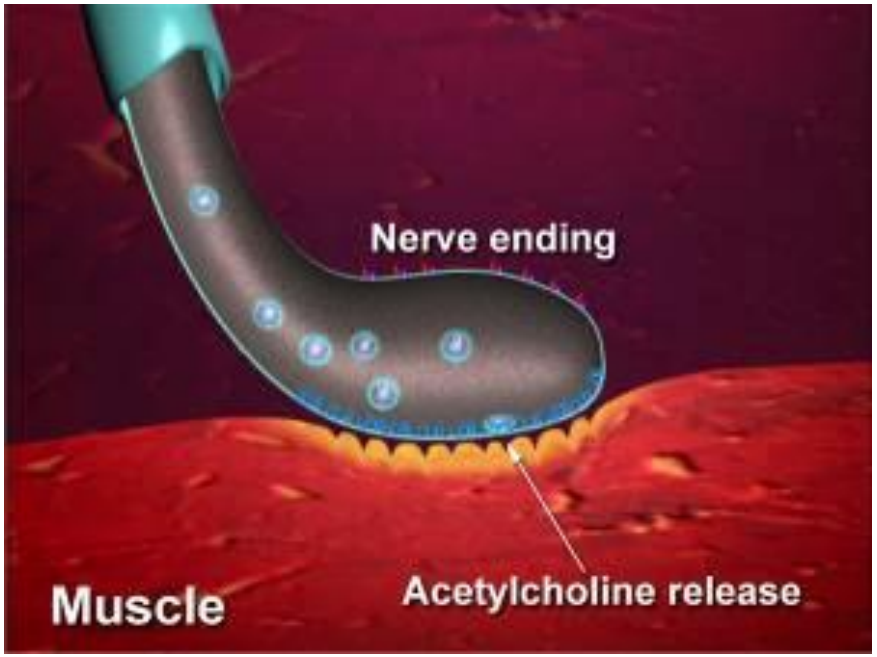
T- Roll & Wedges



Orthotics

Botulinum Toxin Injection

- Botulinum toxin injection directly into spastic muscle
- Blocks the signal from the brain which tells muscle to contract
- Temporary lasting between 3-6 months



Surgery

- Tendon lengthening for contracture release
- Scoliosis correction – spinal rodding
- Osteotomy
- Joint fusions
- Girdlestone's procedure
- Intrathecal baclofen – implant
- Nerve block / severing

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