



Posture Management

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Overview

- ▶ Basic mechanics and biomechanics
- ▶ Posture
 - ▶ Control components
 - ▶ Regions vulnerable to deviation
 - ▶ Manifestation of postural impairment
 - ▶ Principles used in lying and sitting
 - ▶ Common postural problems in sitting
- ▶ Secondary complications
- ▶ Customised support

What is postural management?

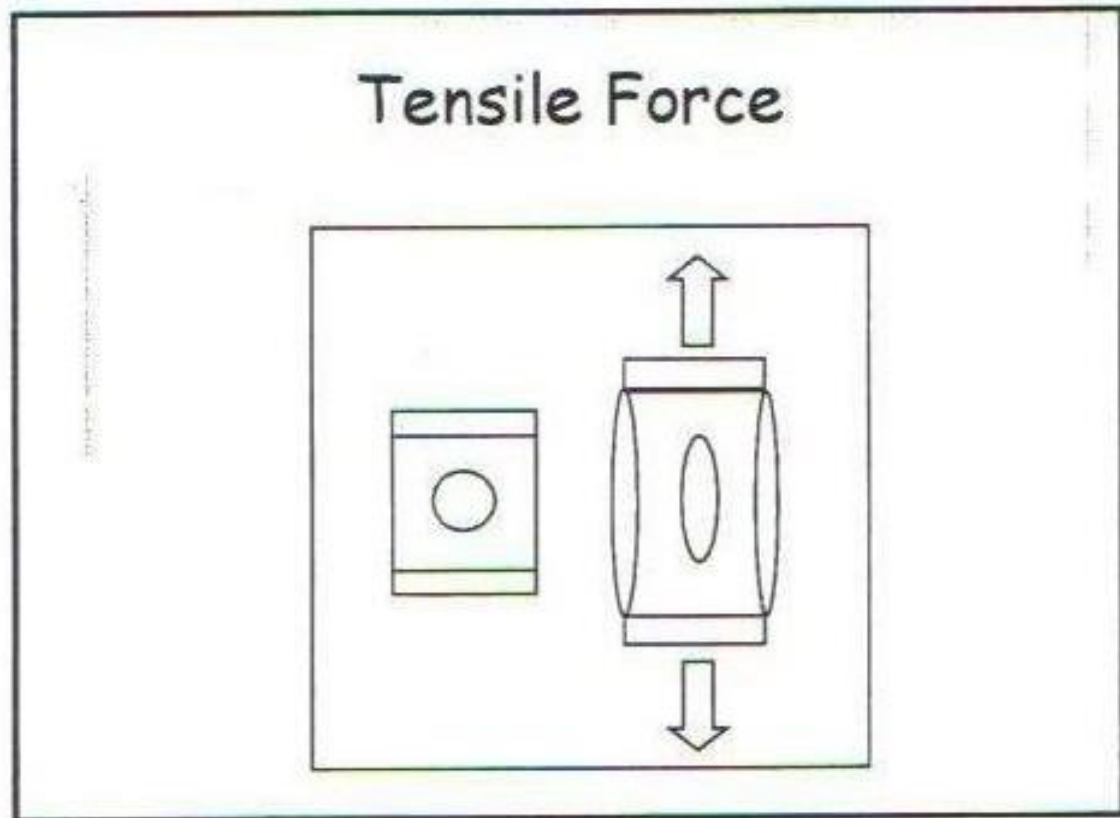
- ▶ 24 hour management approach.
- ▶ Involves multi-disciplinary team (nursing staff are key to successful management of posture).
- ▶ It can enable improved function and independence.
- ▶ It can be used to manage someone's disability and prevent deterioration.
- ▶ It affects all systems (respiratory, gastric, circulatory, bladder/bowels).

Why is it important for patients at HxH?

- ▶ Most complex patient groups and have very high needs.
- ▶ They are often unable to communicate their needs/discomfort.
- ▶ Can help prevent infections/sores and other medical complications.
- ▶ Enables them to have access to the wider community, trips out with (Selsey).
- ▶ Prevents deterioration in posture which can lead to further complications (i.e. Scoliosis can affect breathing).
- ▶ Improves quality of life and independence.

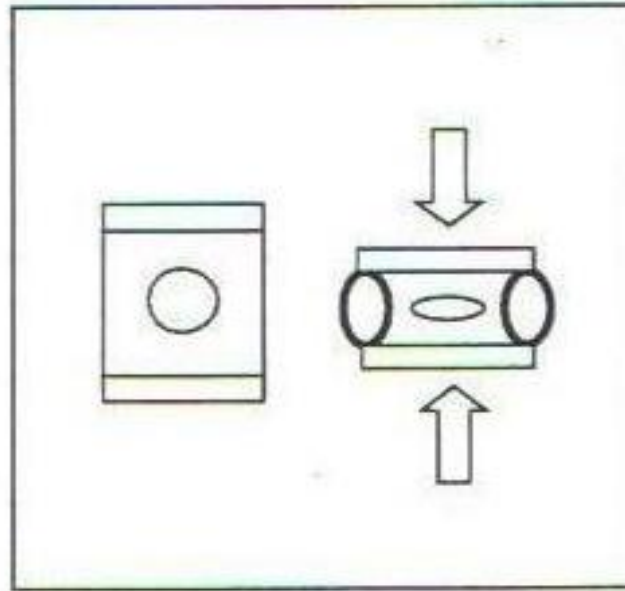
Basic Mechanics

► Forces.

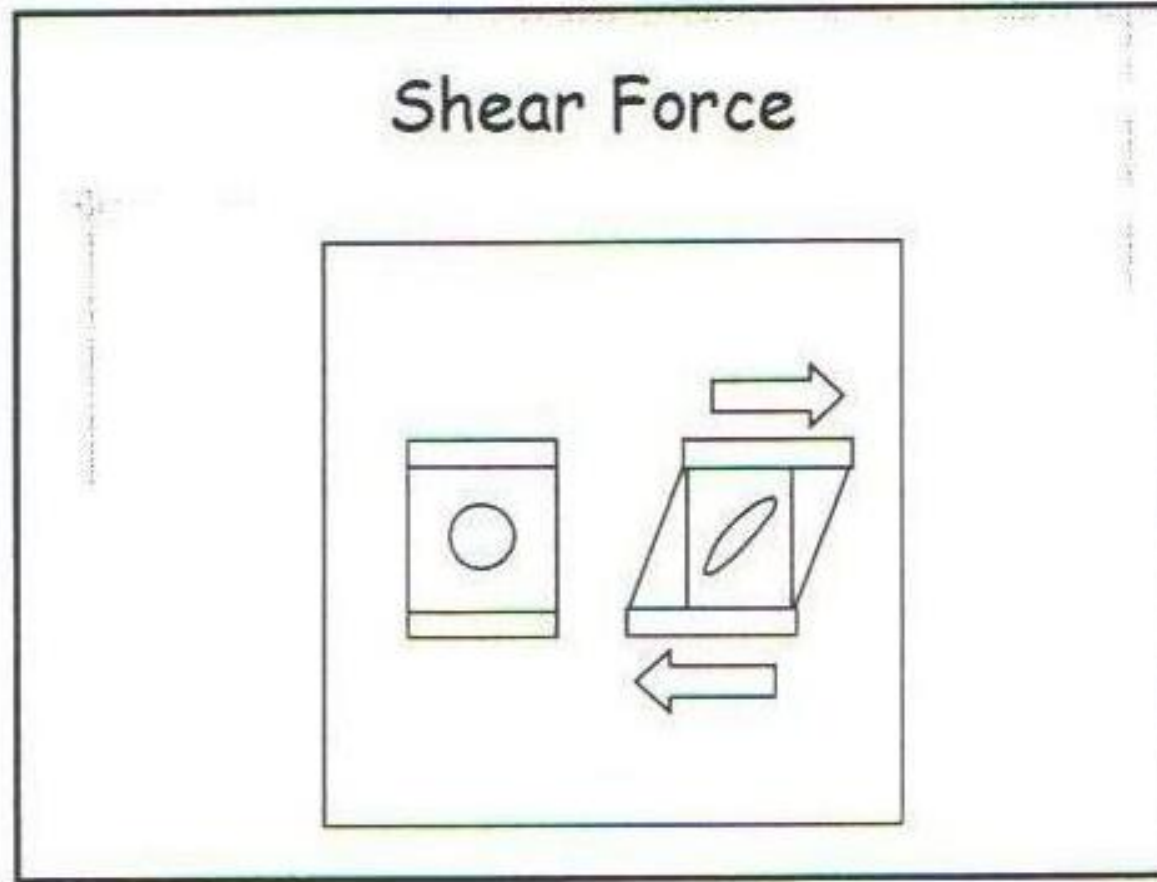


Basic mechanics

Compressive Force

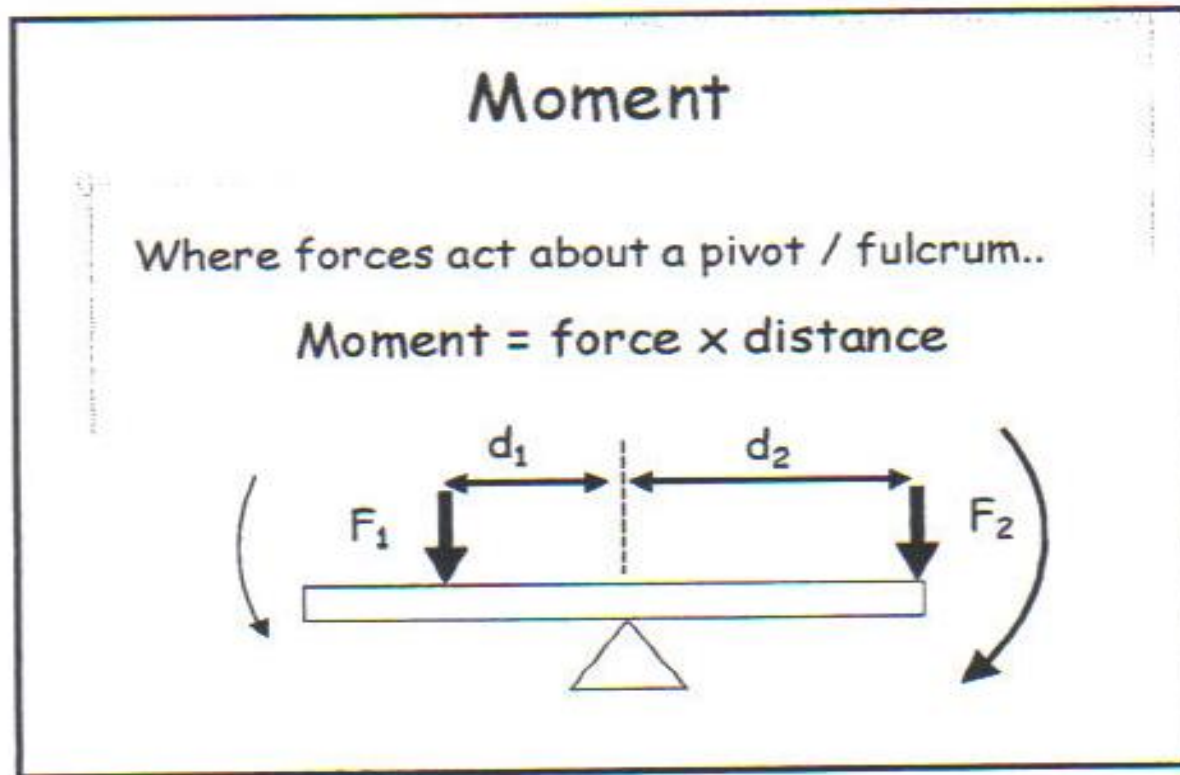


Basic mechanics

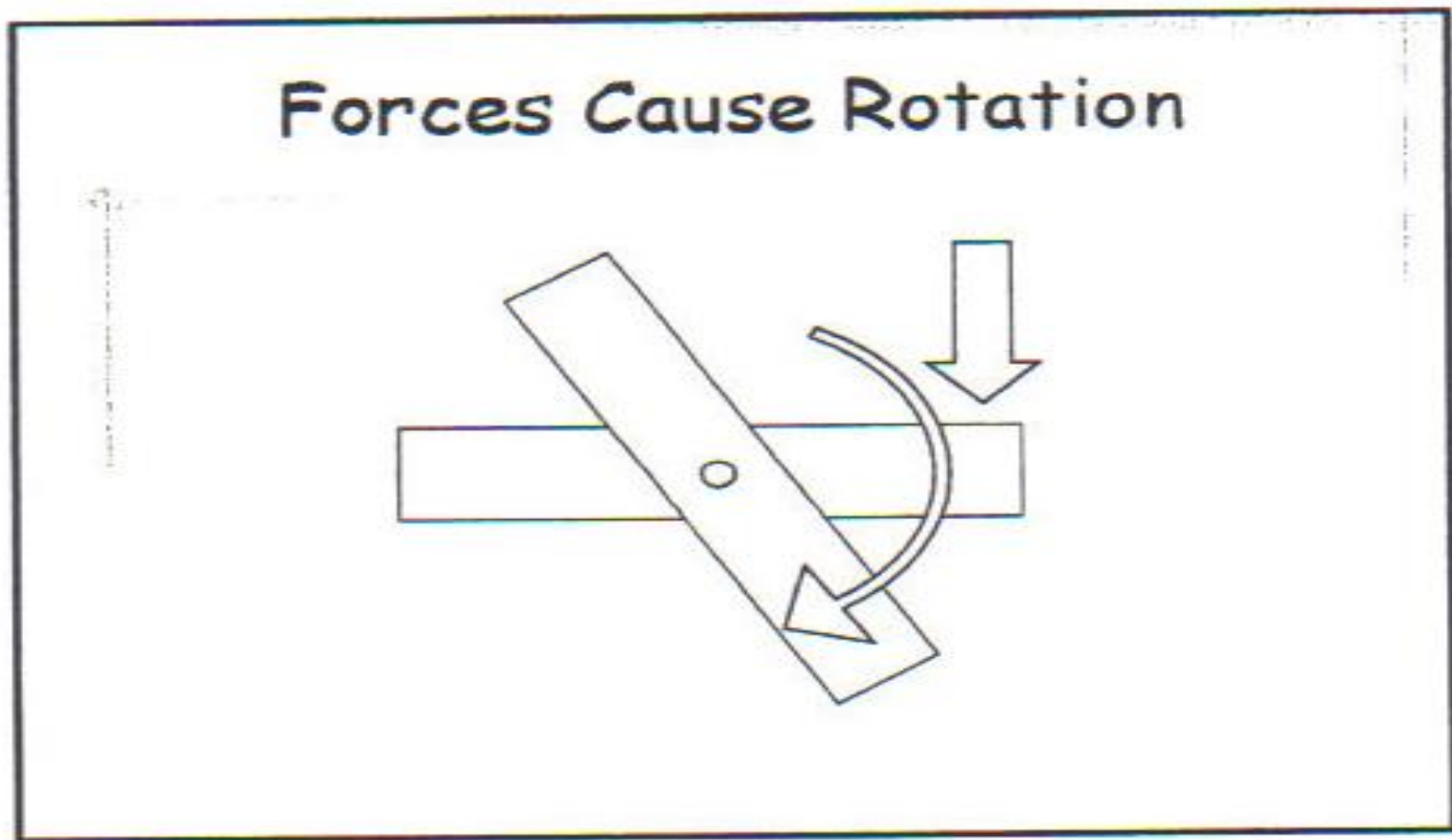


Moment

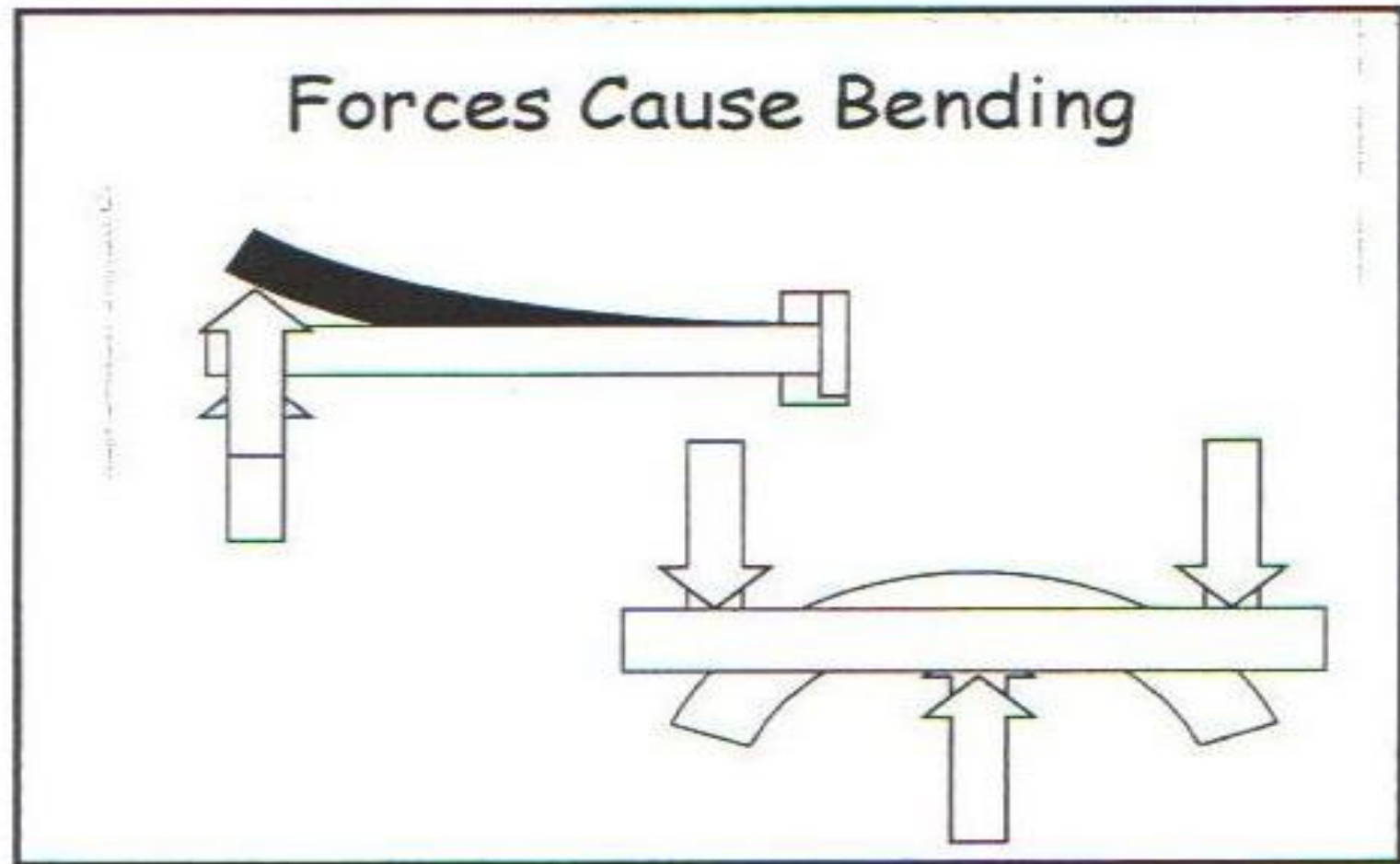
- ▶ Moment = force x distance



Moment

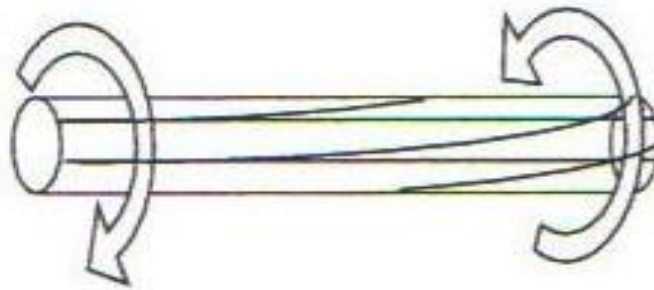


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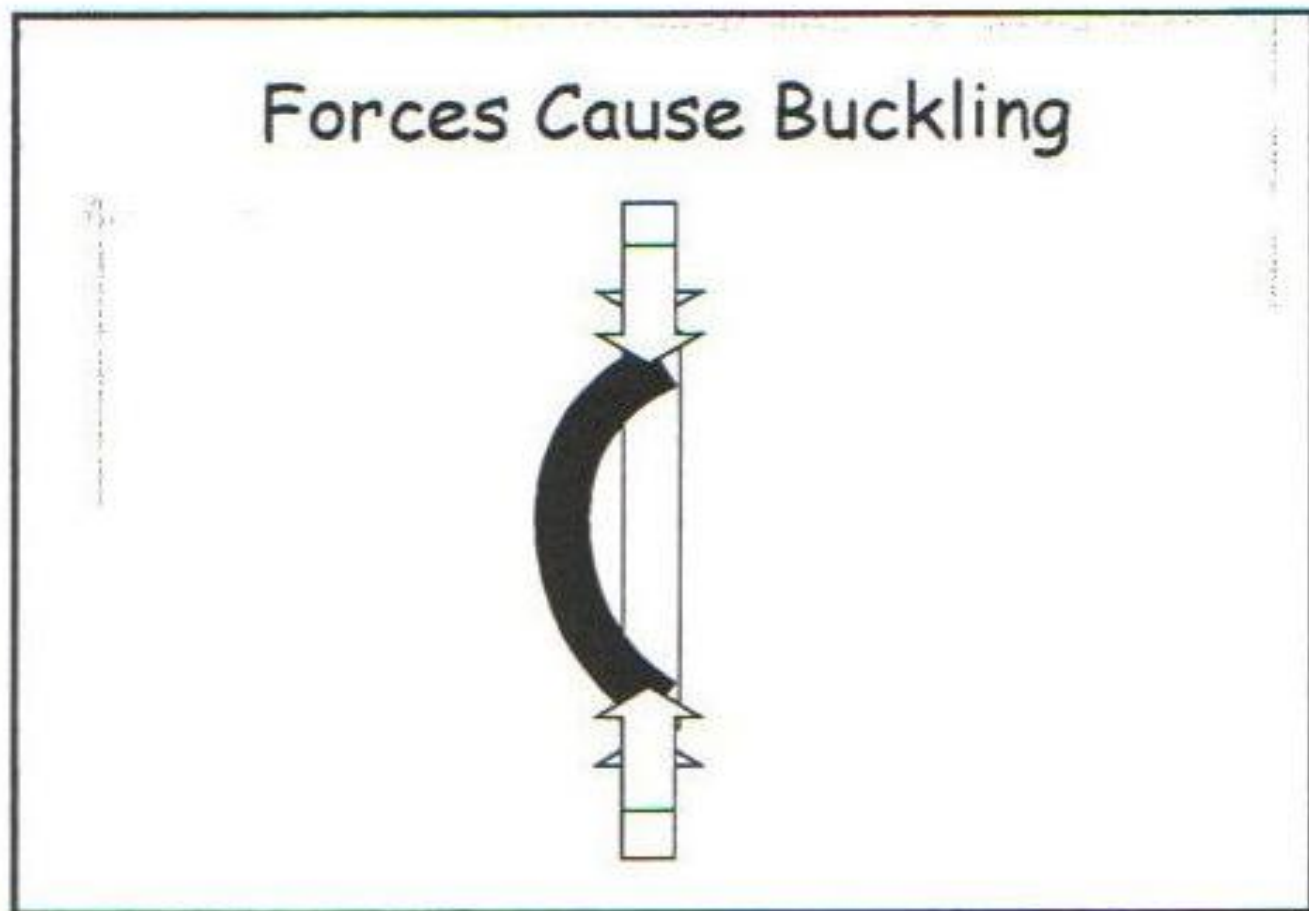


Moment

Forces Cause Torsion

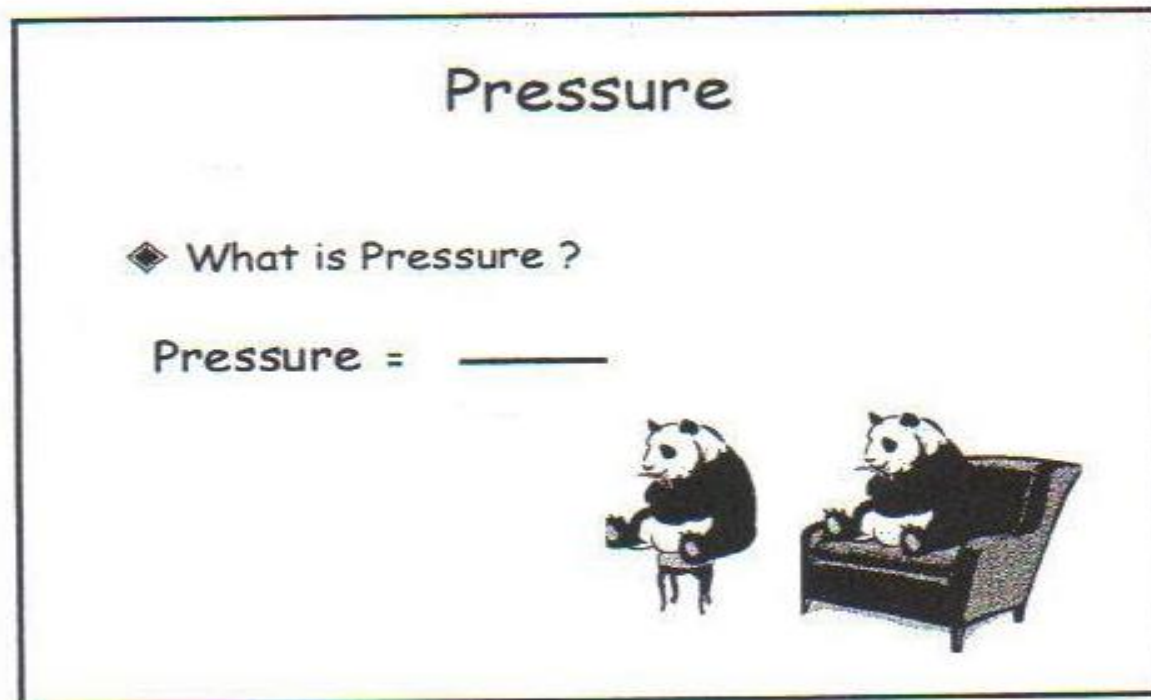


Moment



Pressure

- What is pressure?



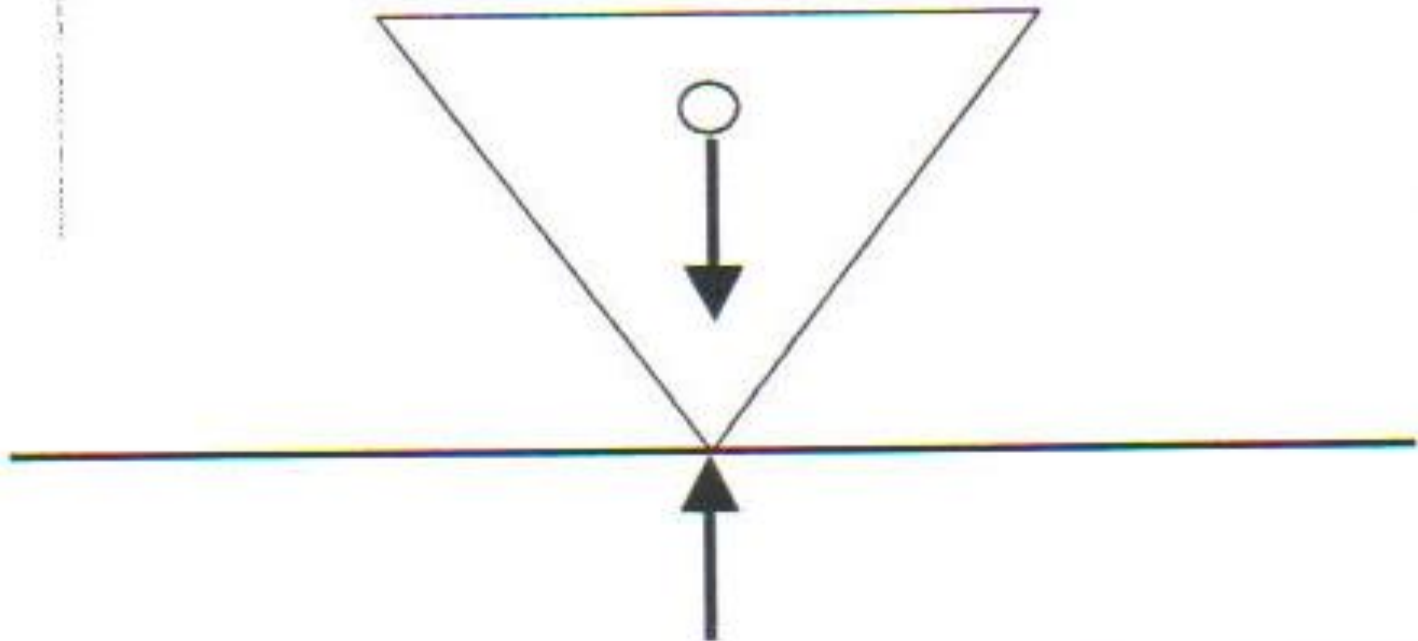
Static Equilibrium

All the forces are balanced

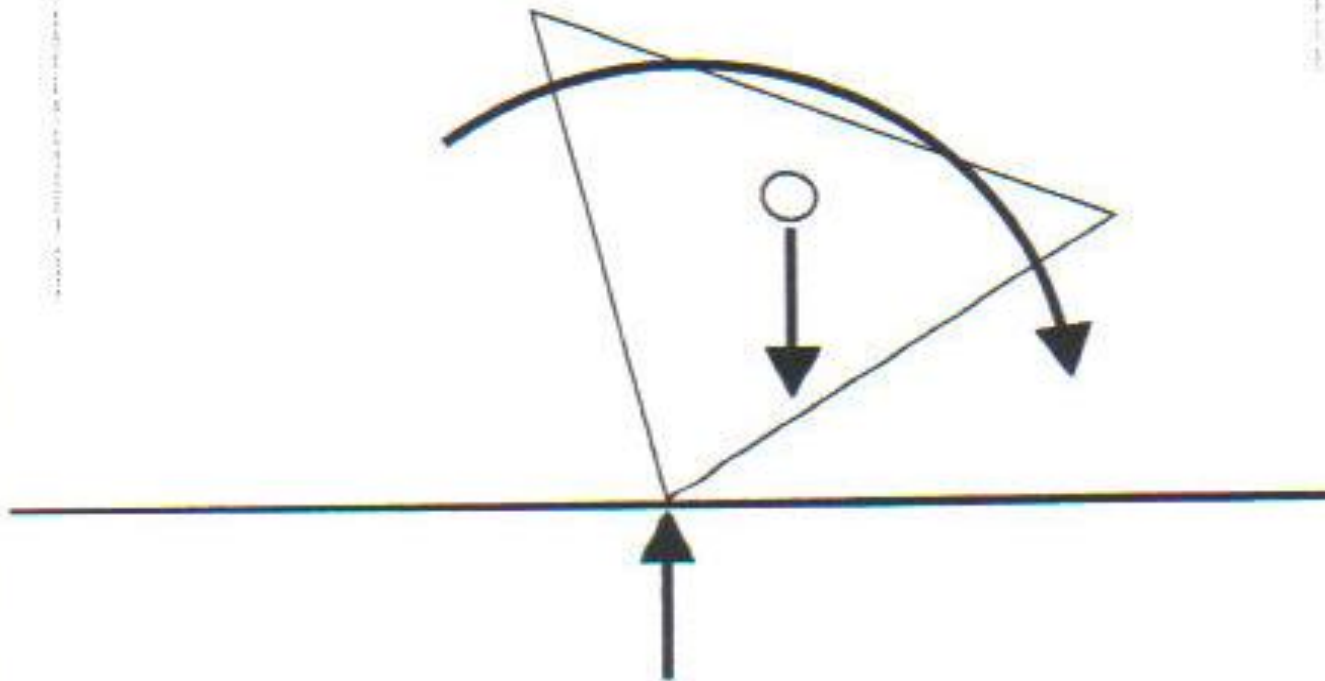


Sum of all forces and turning moments = 0

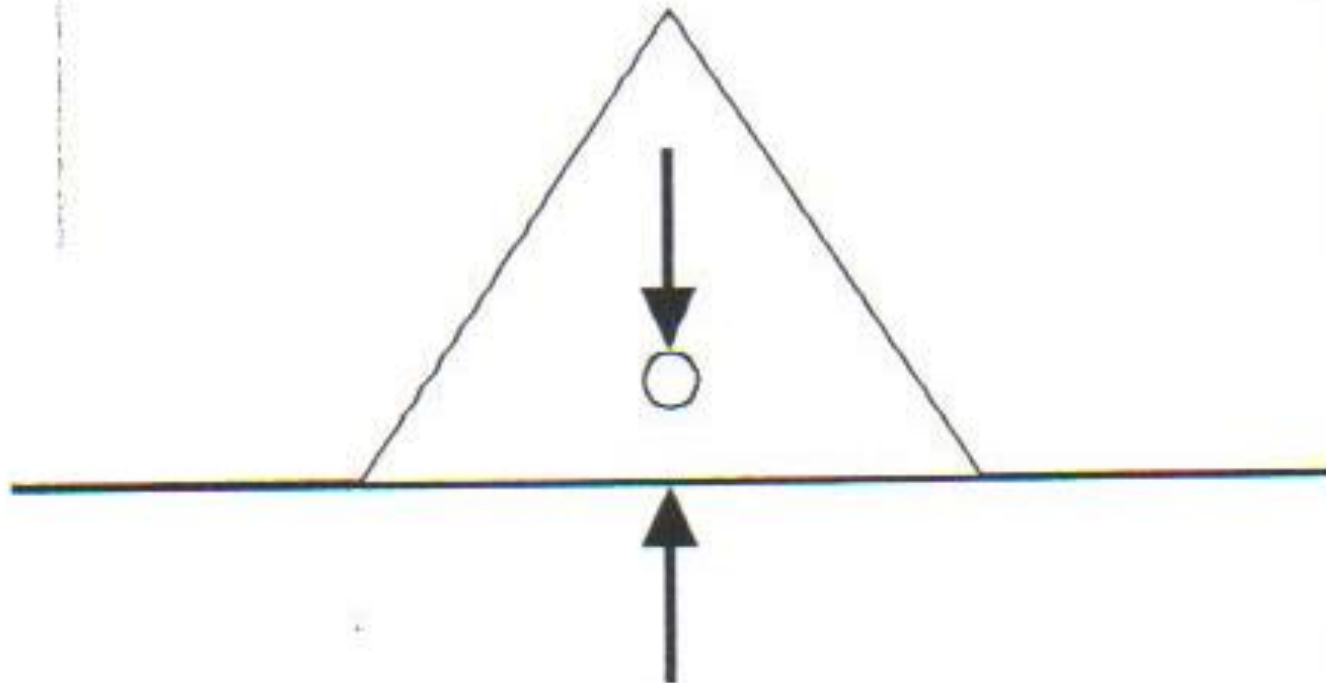
Stability



Stability



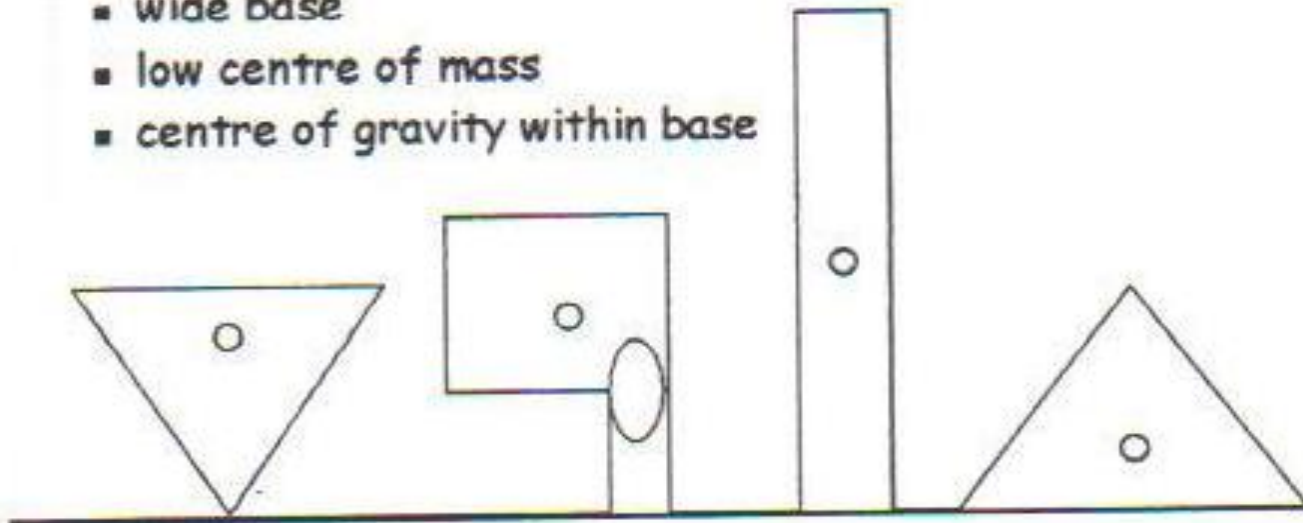
Stability



Stability

Characteristics:

- wide base
- low centre of mass
- centre of gravity within base



Biomechanics

- ▶ Understanding it is helpful
- ▶ Strategies for applying postural control
- ▶ Body – not a mechanical structure
- ▶ Neurophysiological responses – difficult to predict

What is posture?

► Posture is

What is posture?

- ▶ Posture is
 - ▶ A position
 - ▶ An attitude
 - ▶ Noun 'the way a person sits, stands or walks'
 - ▶ Verb 'assume a posture especially for effect'

What is posture? – Therapeutic

- ▶ Posture is the ability to conform to the supporting surface.
- ▶ The constant struggle to remain erect against the forces of gravity
- ▶ A series of positions that we use from which to function.

Equilibrium is disturbed by:

- ▶ Forces produced by muscle contraction.
- ▶ Change in body geometry.
- ▶ Change in position of COG.

Stability is preserved by:

- ▶ Feedback reactions

e.g. Postural reactions.

- ▶ Feed forward reactions

Anticipatory adjustments which

- minimise disturbance.
- prepare posture for movement.
- assist movements

Good Posture is...

- ▶ “That body attitude which facilitates maximum performance for minimum energy consumption and without causing damage to the body system”

(Pope 1996)

Bad Posture is...

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

(Pope 1996)

Functions of Posture

Functions of Posture

- ▶ Antigravity:
 - ▶ To provide stiffness i.e. muscle tone.
 - ▶ To maintain balance i.e. maintaining COG within the area of support.



Preferred body configuration

- ▶ “The preferred posture”







Control components of Posture



Control components of Posture

► Bones

Control components of Posture

- ▶ Bones
- ▶ Ligaments

Control components of Posture

- ▶ Bones
- ▶ Ligaments
- ▶ Muscles

Control components of Posture

- ▶ Bones
- ▶ Ligaments
- ▶ Muscles
- ▶ Abdominal pressure

Regions Vulnerable to deviation

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- ▶ Cervical spine

Regions Vulnerable to deviation

- ▶ Cervical spine
- ▶ Mid thoracic Region

Regions Vulnerable to deviation

- ▶ Cervical spine
- ▶ Mid thoracic Region
- ▶ Pelvis

Regions Vulnerable to deviation

- ▶ Cervical spine
- ▶ Mid thoracic Region
- ▶ Pelvis
- ▶ Feet

Manifestations of posture impairment

- ▶ Spine flexes or extends
- ▶ Trunk rolls to one side
- ▶ Pelvis rotates relative to thorax
- ▶ Head falls in the direction of forces acting on it

Aims

► To?

► To?

Objectives

- ▶ Minimise forces likely to cause damage to the body

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- ▶ Provide a functional posture (if the patient is able)

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- ▶ Align and stabilise body segments relative to each other and to the supporting surface.

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- ▶ Provide a functional posture.
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- ▶ Comfort

Objectives

- ▶ Minimise forces likely to cause damage to the body
- ▶ Provide a functional posture
- ▶ Align and stabilise body segments relative to each other and to the supporting surface
- ▶ Comfort
- ▶ Reduce energy expenditure
- ▶ Ease the care load

The Principles

- ▶ The ***pelvis is the keystone*** of the structure as it determines the attitude of the body above and below

(Reynolds 1978 NASA ref publ. 1024)

- ▶ ***Gravity*** is used to secure a position rather than attempting to act against it

The Principles

- ▶ ***Direction of bending and axial rotations*** occurring within the 'preferred' posture must be correctly analysed and their significance understood
- ▶ ***Function*** generally takes precedence over posture alignment

All Postures

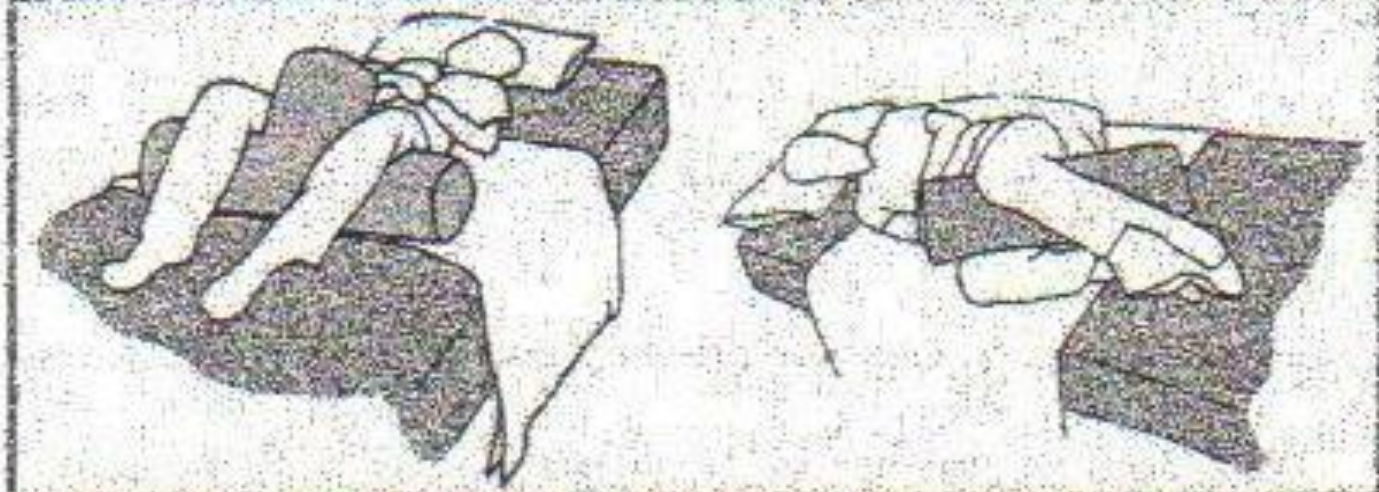
- ▶ Identify what can and what cannot be corrected
- ▶ Control and align by considering the body segments
- ▶ Start with the base
- ▶ Support/ off load the regions vulnerable to deviation



Lying

Supported Posture For Sleep

Control of Posture in Lying



supine lying

T- roll

side lying

Log roll

Unsupported



0905

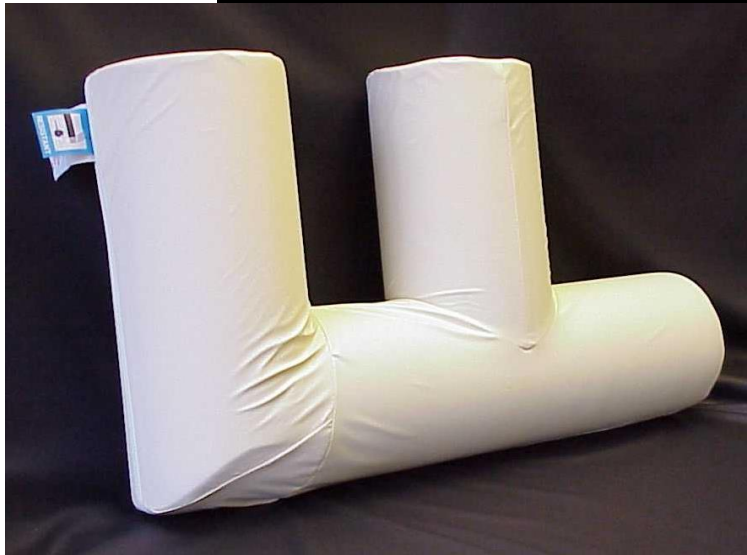
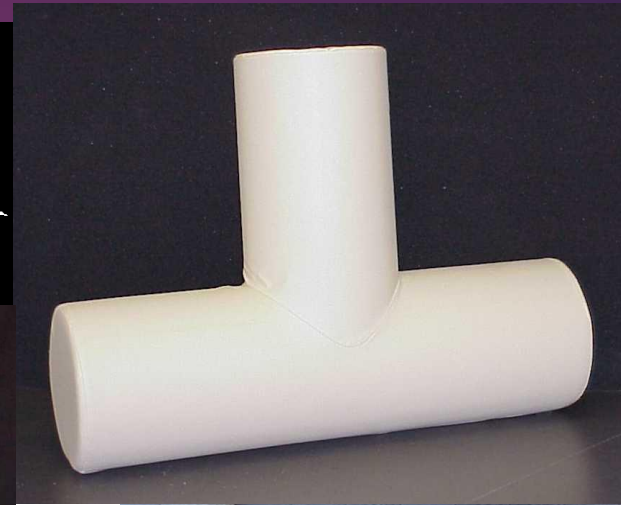
Supported

using T - roll



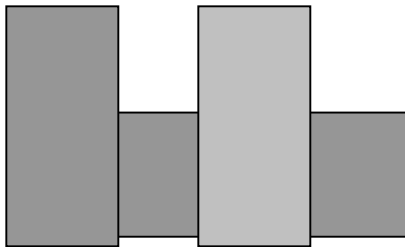
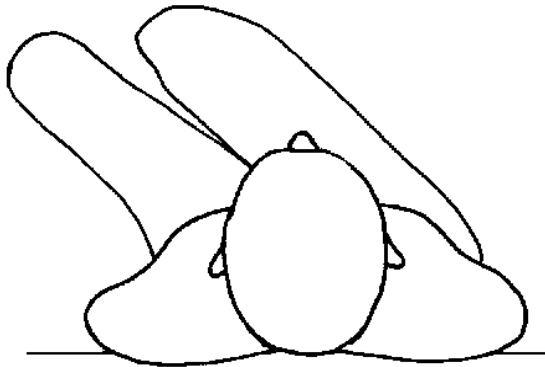
PMPOPE Stable Posture

Types of Equipment used: T, F and E rolls



Bed Wedges

- ▶ Custom made to individual requirements



Postural Supports in bed



Dreama Sleep System



- ▶ The mattress is replaced completely by pressure relieving foam strips that are secured to a slatted base.
- ▶ The brackets slide into the slots in the base and lock into place
- ▶ Offers firmer positioning than symmetrisleep
- ▶ For further info go to: <http://www.jenx.com>

Symmetrisleap





Sitting

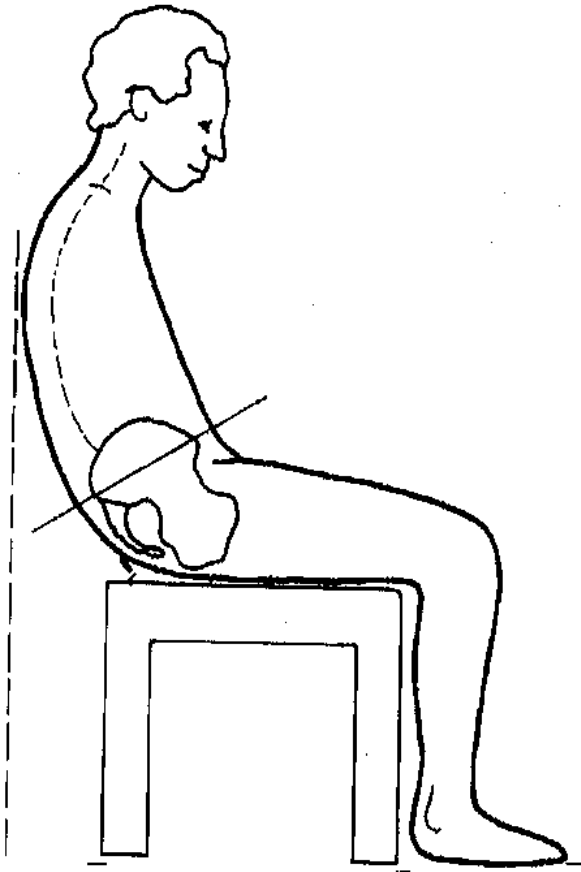
Sitting

- ▶ Common postural problems in sitting

Sitting

- ▶ Common postural problems in sitting
 - ▶ Posterior Pelvic tilt

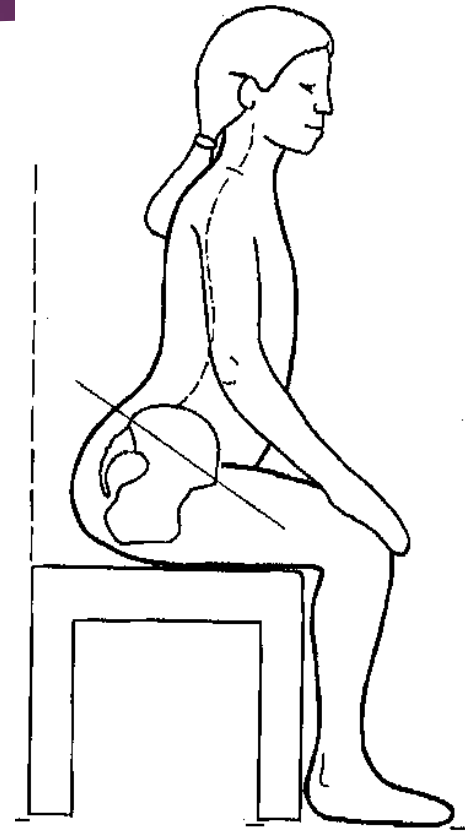
Posterior pelvic tilt



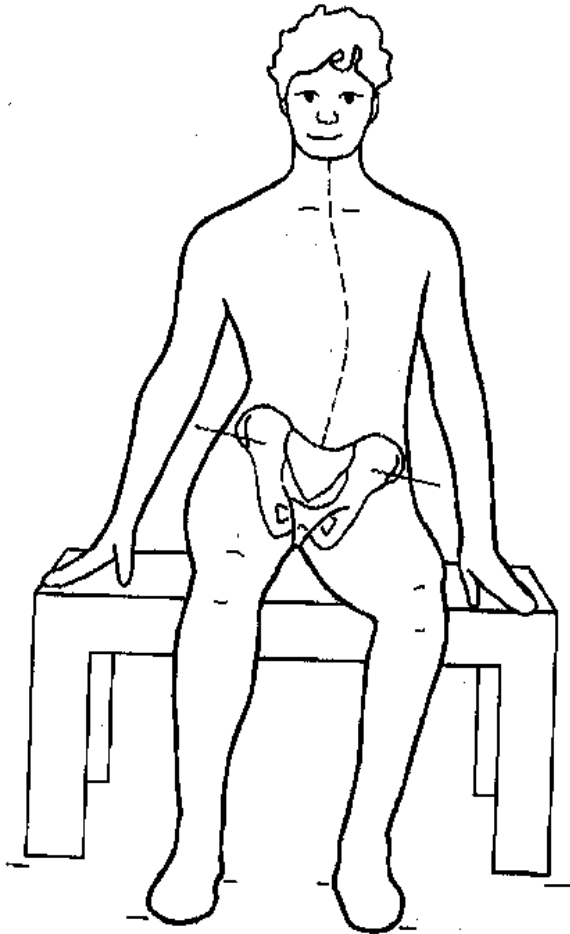
- ▶ Trunk flexes
- ▶ ASIS are higher than the PSIS
- ▶ How do you manage a patient in posterior pelvic tilt?

Anterior pelvic tilt

- ▶ Trunk extends
- ▶ ASIS are lower than PSIS and in severe cases can be resting on the Femurs



Pelvic obliquity

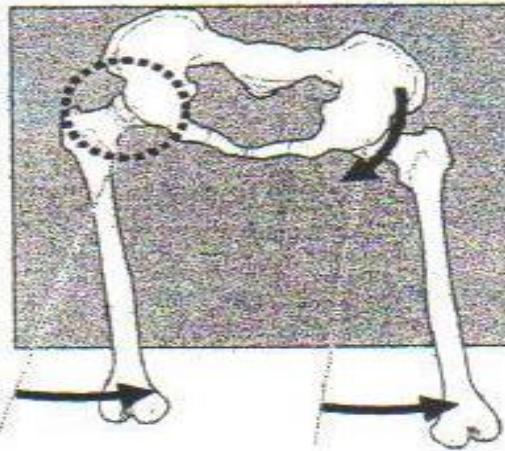


- ▶ Pelvis is raised on one side, causing uneven weight bearing and spinal curvature.
- ▶ The ASIS will feel higher on one side.

Common postural problems in sitting

► Pelvic Rotation

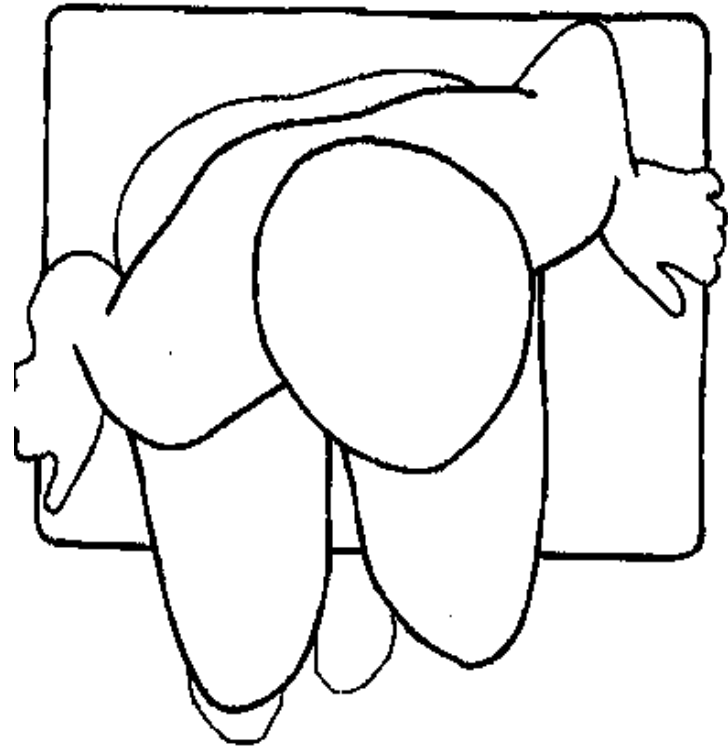
Pelvic Rotation / Windsweeping



Rotation of pelvis
and
"windswept" hips

Rotated pelvis

- ▶ One side of the pelvis is forwards, affecting the position of the legs and spine
- ▶ One ASIS will be further forward than the other



Common postural problems in sitting

- ▶ Posterior Pelvic tilt
- ▶ Pelvic Rotation
- ▶ Pelvic Obliquity

Common postural problems in sitting

Scoliosis



Scoliosis

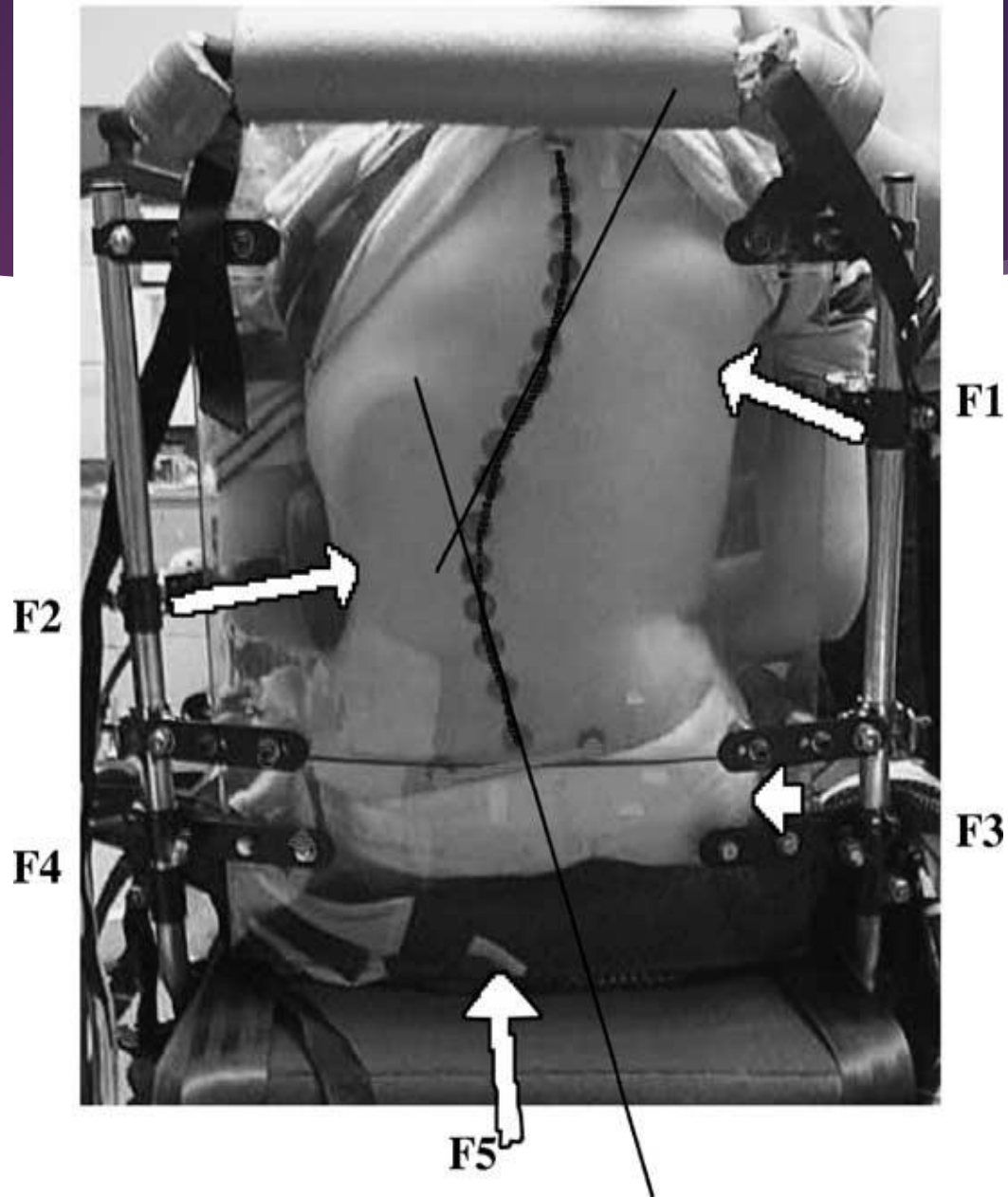


- ▶ A sideways curvature of the spine
- ▶ Frequently, there are two curves in opposite directions that counterbalance in order to keep the head upright

Sitting

- ▶ Common postural problems in sitting
 - ▶ Posterior Pelvic tilt
 - ▶ Pelvic Rotation
 - ▶ Pelvic Obliquity
 - ▶ Scoliosis

48 °

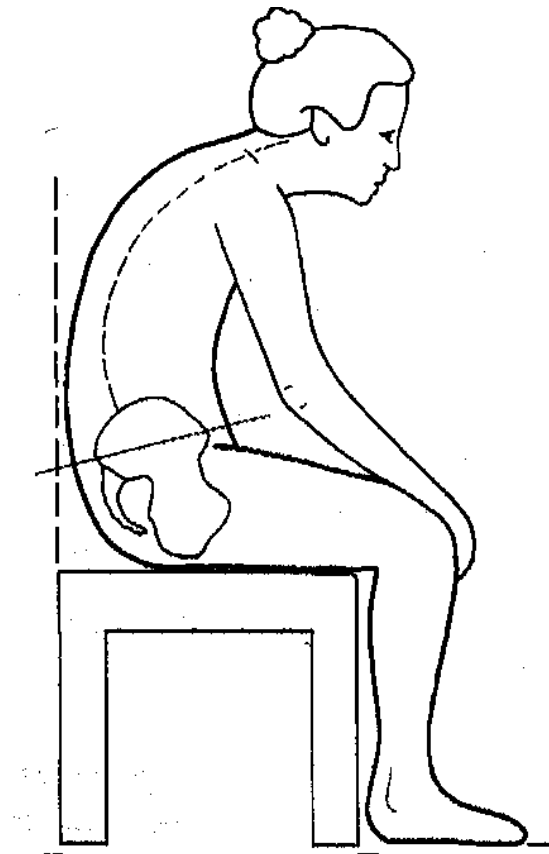


Sitting

- ▶ Common postural problems in sitting
 - ▶ Posterior Pelvic tilt
 - ▶ Pelvic Rotation
 - ▶ Pelvic Obliquity
 - ▶ Scoliosis
 - ▶ Kyphosis

Kyphosis

- ▶ A round shouldered, slumped posture
- ▶ Pelvis is usually in posterior pelvic tilt, thoracic spine is flexed and cervical spine is extended



In Sitting

- ▶ Start with base and proceed distally:

In Sitting

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Pelvis – mid position

In Sitting

- ▶ Start with base and proceed distally:

Pelvis – mid position

Thighs – separated for wide
base

In Sitting

- ▶ Start with base and proceed distally:

Pelvis – mid position

Thighs – separated for wide
base

Knees – mid position
(Hamstrings)

In Sitting

- ▶ Start with base and proceed distally:

Pelvis – mid position

Thighs – separated for wide
base

Knees – mid position
(Hamstrings)

Feet – mid position

In sitting

Lower Trunk – support lumbar curve

In sitting

Lower Trunk – support lumbar curve

Thorax – Allow space to breath

In sitting

Lower Trunk – support lumbar curve

Thorax – Allow space to breath

Upper limbs – relieve drag on shoulder

In sitting

Lower Trunk – support lumbar curve

Thorax – Allow space to breath

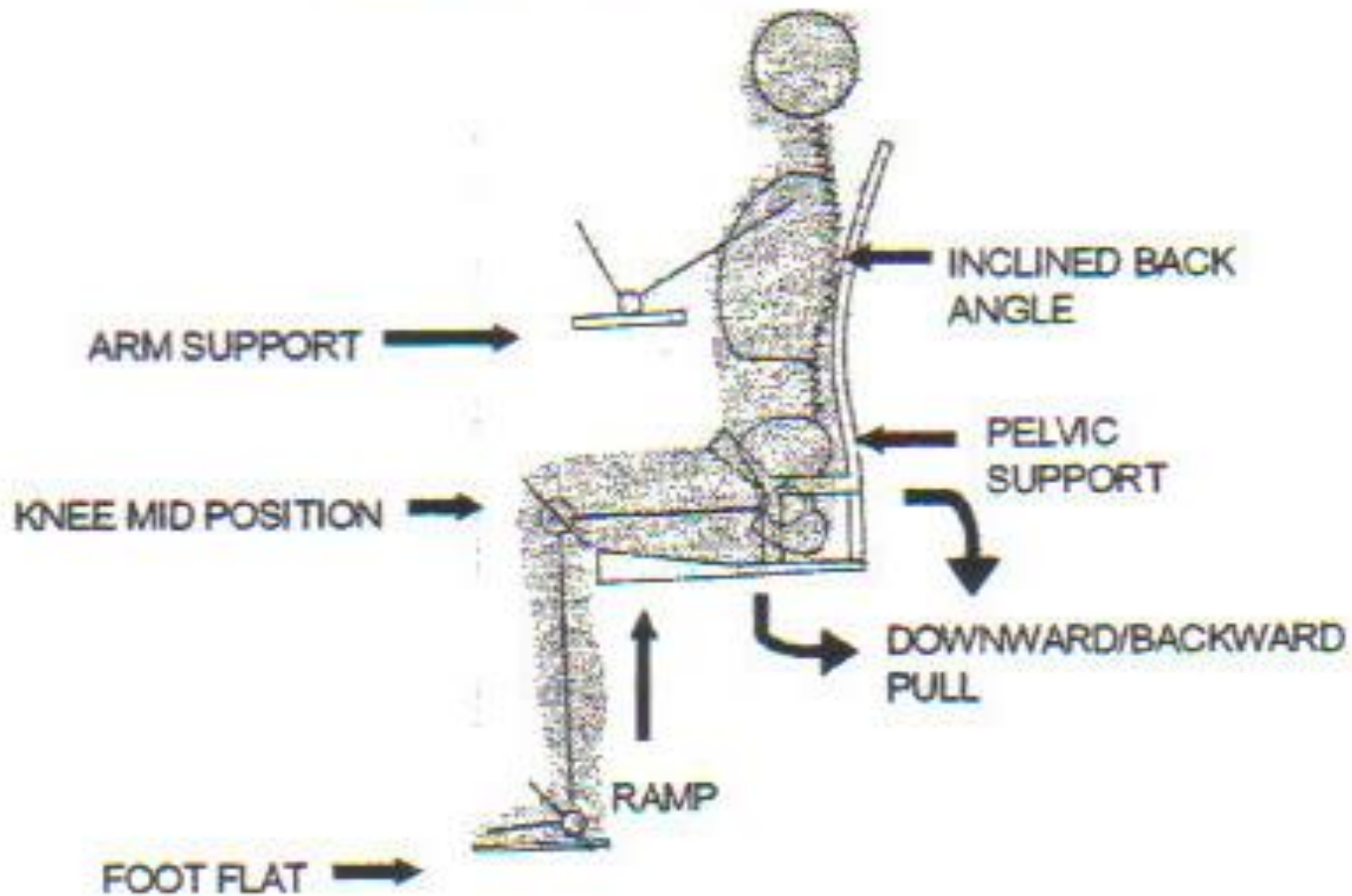
Upper limbs – relieve drag on shoulder

Head – Horizontal visual field

Control of foot position



Points Of Support



POINTS 14/12/00

Rea Azalea



Rea Dahlia



Self-propelling wheelchairs



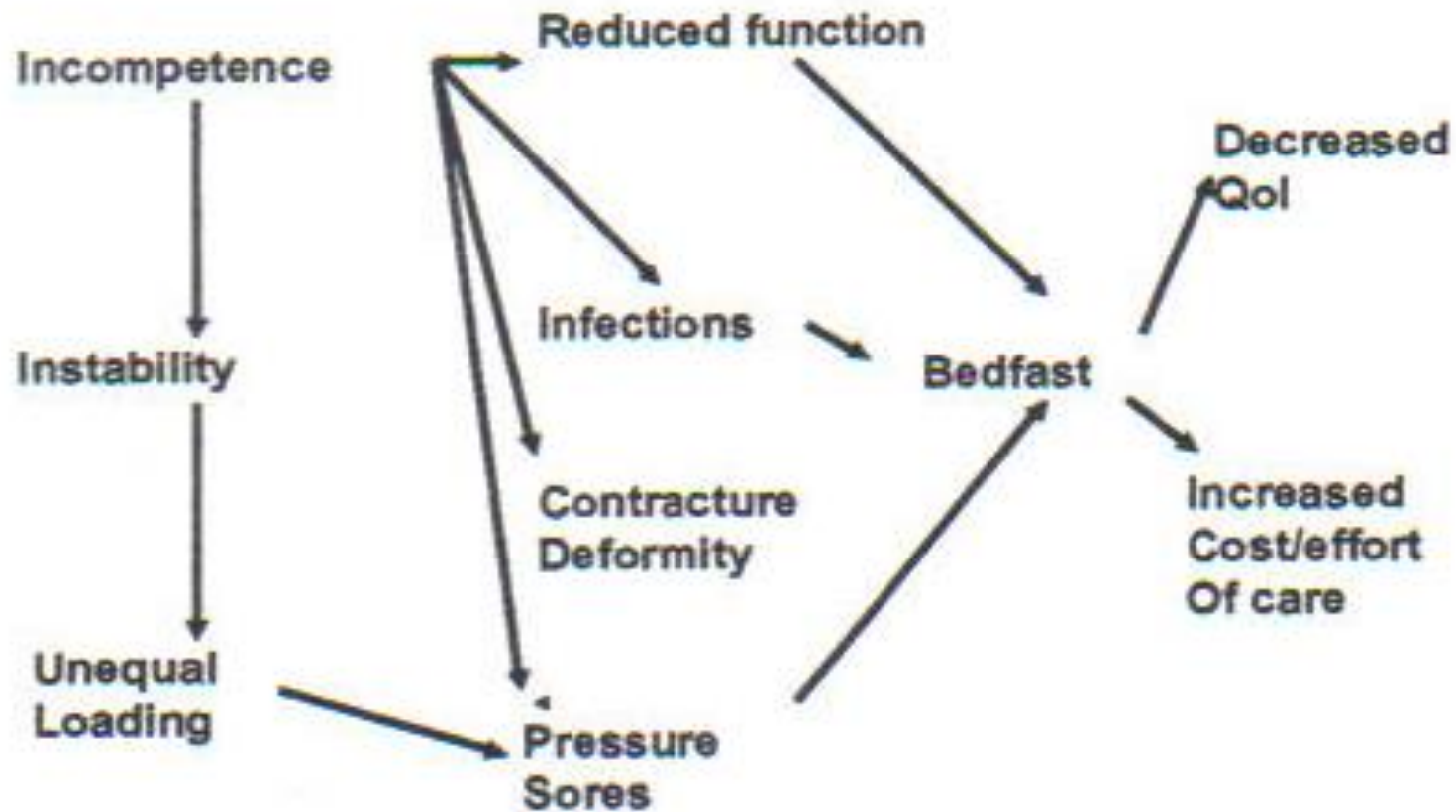
Powered wheelchairs





Secondary Complications

Complications of posture deficit



Secondary complications

- ▶ Contractures/ deformity
- ▶ Pain
- ▶ Discomfort
- ▶ Infection
- ▶ Constipation
- ▶ Osteoporosis
- ▶ Tissue damage
- ▶ Heterotopic ossification
- ▶ Neurological symptoms

Contracture

- ▶ Prolonged posture →
- ▶ Tissue adaptation →
- ▶ Contracture →
- ▶ Deformity

Which tissues are affected?

- ▶ ?
- ?
- ?
- ?

What is the effect of immobility on:

- ▶ Bone
- ▶ Muscles
- ▶ Tendons
- ▶ Cartilage

How are the joints affected by immobility?

- ▶ Cartilage loses fluid and biochemistry alters
- ▶ Reduced ability to resist compression
- ▶ Synovial membrane becomes thickened and forms Adhesions

Osteoporosis

- ▶ Non weight bearing
- ▶ Immobility
- ▶ Implications – Handling



Customised
support



What is customised
support?



What is customised support?

CUSTOM MOULDED SYSTEMS!

Criteria for use

- ▶ When standard systems fail to give adequate support as in:
 - ▶ Established asymmetry/ kyphosis
 - ▶ Severe restricted hip flexion
 - ▶ Unilateral movement
 - ▶ Severe postural deficit
 - ▶ Occasionally, high risk of tissue damage

Materials used

- ▶ Thermoplastics
- ▶ Vacuum bead systems
- ▶ Carved foam
- ▶ Interlocking systems

Understanding direction of bendings and rotations



03/10/2005

PRO/CUSTOMISE



Simulating the support

- Selection of appropriate configuration.
- Identification of areas to be used for support.
- Accommodation where necessary.



Ensure contours are compatible
Incompatible *Compatible*



Customised seating



- ▶ Motor operated vacuum bean bags
- ▶ 2 sections
 - ▶ Back rest
 - ▶ Seat

Customised seating



- Can be moulded as 1 piece or seat and back rest

Customised seating



- ▶ Mould can be made with interlocking systems
 - ▶ Matrix
 - ▶ Lynx
- ▶ Foam carves
- ▶ Thermoplastic with foam covers

Special seating

- Custom moulded using different material





- Needs careful review as patients might change e.g. Improved/ worsening of deformity, loosening/ putting on weight

Soft Chairs



- ▶ Kirton chairs
- ▶ Used mainly for people who have uncontrolled voluntary movements e.g. Huntington's Disease
- ▶ People unsafe to be seated in a wheelchair
- ▶ Small wheels/ castors a major disadvantage for outdoor use

Other Key areas of Physiotherapy in neurology:

- ▶ Respiratory management
 - ▶ Manual chest clearance/ cough assist
- ▶ Spasticity management
 - ▶ General spasticity Mx
 - ▶ Focal spasticity Mx
 - ▶ Severe (ITB)
- ▶ Splinting – different types/rationale
- ▶ Hydrotherapy: rationale/ adjunct to physio



Any questions?



Thank you