Pelvic stabilization
The pelvis is the key to keep the correct posture as it dictates the position of the head, trunk and extremities.
NEO-FLEX
POSTURE
CORRECTION
AND SUPPORT
SYSTEM

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Good posture is characterised by:
- straight position of head,
- physiological curvatures of sagittal plane and straight spine in coronal plane,
- well-formed chest,
- shoulders slightly backward in relation to pelvis,
- symmetrical alignment of pelvis.

Sitting puts the most stress and strain on the spine. Thus it is very important that a person sitting in a wheelchair has proper back support. There are three primary support surfaces: buttocks, back, and lower extremities.

PREVENTION METHODS
• Wheelchair fitted to the individual user.
• Solid backrest and seat.
• Correct backrest height depends on the desired amount of trunk support.
• Seat depth – allows up to 2.5 cm from back of knee to front of seat.
• Seat width – allows 1.3 cm from the outside line of thigh and armrest on either side.
• Correct lateral support for the trunk.
• Correct armrest height to allow for 30° shoulder flexion and 60° elbow flexion.
• Footplate position – allows 5 cm clearance from footplate to floor, feet positioned parallel to seat.
• Stable cushion.
• Achieve balance between support and function.
• Use correct support belts.
Most common posture deformations caused by improper position of the pelvis

**Anterior pelvic tilt**

**ASSESSMENT**
- reduced or reversed thoracic kyphosis,
- ASIS (anterior superior iliac spine) lower than PISI (posterior superior iliac spine),
- increased lumbar lordosis,
- hyperextended trunk,
- retracted shoulder blades.

**CAUSES**
Wheelchair: seat to backrest angle too small. Physical conditions: tight hip flexor, weak abdomen muscles, and lordosis.

**HOW TO USE THE BELT**
Position the belt above the ASIS and attach at 30–45° to the back. Anchor the secondary strap at 60° to 90° to the seat to prevent the belt from lifting up into the abdomen.

**WHY TO USE THE BELT**
The belt is designed to prevent the pelvis from tilting forward.

**Posterior pelvic tilt**

**ASSESSMENT**
- sitting on the sacral bone – most common case,
- ASIS (anterior superior iliac spine) higher than PISI (a posterior superior iliac spine),
- a tendency to slide out of wheelchair,
- extended lumbar spine,
- thoracic kyphosis,
- protracted shoulder blades,
- C-shaped posture.

**CAUSES**
Wheelchair: seat too deep, backrest too short, footplate too low or too far forward. Physical conditions: contractures, weak muscles, kyphosis.

**HOW TO USE THE BELT**
Position the belt anterior and inferior to the ASIS and attach at 90° to the seat.

**WHY TO USE THE BELT**
The belt is designed to prevent sliding.

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**Belt**
- Made from high quality flexible neoprene padded with a pleasant to the touch and easy to clean jersey fabric. Provides great comfort and minimizes pressure thrust.
- Clip buckle, easy to use and effectively prevents self-opening.
- A strap adjusting the pull, enables quick and easy adjustment of the belt to fit the user. Separately each side.
Obliquity and rotation of the pelvis

**ASSESSMENT**
One side of the pelvis is usually higher than the other one. Usually involves rotation. Shoulder on the low side of the pelvis tends to be elevated.

**CAUSES**
Wheelchair: wheelchair too wide, seat too short
Physical conditions: irregular trunk muscle tone, muscle imbalance, scoliosis.

**PURPOSE OF THE BELT AND HOW TO USE IT**
Position the belt over the ASIS and attach at 60° to the seat. When using a four-point belt, anchor the secondary straps to the seat at 45° to 90°.

**NOTE**
Obliquity and rotation of the pelvis usually seen as increased pressure during active movement can often be reduced by an asymmetrical attachment of the belt to the wheelchair. Adjust the position of each anchor point to optimize the pull against each side of the pelvis.

**WHY TO USE THE BELT**
The belt is designed to bring the pelvis down to the seat and back to the backrest.

a 4-point hip and thigh belt

a 2-point hip and thigh belt
How to select a belt: Measure hip width across the greater trochanters with the person seated. Then select a size according to the table below, consider also weight changes and clothing.

Technical specification of a hip belt

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<td>S</td>
<td>(38mm)</td>
<td>(57mm)</td>
<td>(18cm)</td>
<td>(127cm)</td>
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<tr>
<td>M</td>
<td>(38mm)</td>
<td>(64mm)</td>
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<td>(142cm)</td>
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<td>L</td>
<td>(50mm)</td>
<td>(76mm)</td>
<td>(28cm)</td>
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**Attachment angles:**
The angle at which the belt is attached to the chair frame has a direct effect on the angle of pull on the pelvis. The general principle is to imagine the therapist standing in front of the seated person using his/her hands to support or correct the position of the user. The belt should extend the therapist’s arms and should be anchored to the chair frame at the same angle as the therapist’s arms. The belt shall pull into the point where the therapist would push with his/her hands. This principle works as well with pelvis obliquity, rotation, and other asymmetrical postures.

**NOTE**
A 60° angle of attachment – the belt positioned inferior to the ASIS – effectively prevents the user with a posterior pelvic tilt from slipping underneath the belt.
A higher attachment on the backrest assists in positioning the user with an anterior pelvic tilt.
A 30° angle of attachment pulls the back against the top of the pelvis, but is problematic for users with a neutral or posterior pelvic tilt.
The secondary straps of a four-point belt are attached to the frame between 45° and 90° to hold the primary strap in place and to prevent the belt from riding into the abdomen or twisting.

**Tightening the straps**
Always keep the belt tightened properly at adjustment straps during daily use to ensure correct placement.

**Attaching to the frame**
1. A simple system. Allows attachment and adjustment. Readjustment is required after removal and reattachment of the straps.
2. A clip buckle system. Quick and easy attachment to the wheelchair and removal. Allows precise positioning of anchoring points on the frame. This system does not require readjustment after removal.

**Medical terminology used in specification**

ASIS – anterior superior iliac spine
AIIS – anterior inferior iliac spine
PSIS – posterior superior iliac spine
PIIS – posterior inferior iliac spine

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