

Author Year Country Research Design Score Total Sample Size	Methods	Outcome
Shields & Cook 1992 USA Prospective Controlled Trial N=36	<p>Population: <i>SCI group:</i> Age range: 21-38 yr; Gender: males=13, females=5; Weight range: 45-66 yr; Height range: 158-177 cm; Level of injury: paraplegia=12, tetraplegia=6; Chronicity=chronic; <i>Control group:</i> Age range: 21-52 yr; Gender: males=7, females=11; Weight range: 51-71 kg; Height range: 156-178 cm.</p> <p>Intervention: Lumbar support thickness adjustment (0, 2.5, 5, 7.5cm).</p> <p>Outcome Measures: Highest and lowest seated buttock pressure, Hip angle.</p>	<ol style="list-style-type: none"> 1. In the able-bodied group, only the 5 cm and 7.5 cm lumbar support thicknesses caused a decrease in highest seated buttock pressure. 2. The adjustment of lumbar support thickness did not influence highest seated buttock pressure in the SCI group. 3. The area of highest seated buttock pressure was significantly higher in SCI than control group. 4. SCI had a reduced pelvifemoral angle for all lumbar thickness adjustments.
Hobson 1992 USA Prospective Controlled Trial N=22	<p>Population: <i>SCI group:</i> Mean age:40.9 yr; Gender: males=10, females=2; Mean weight=59.8 kg; Level of injury: paraplegia=7, tetraplegia=5; Severity of injury: complete=12; Mean time since injury=19.5 yr; <i>Able-Bodied group:</i> Mean age: 39.2 yr; Gender: males=6, females=4.</p> <p>Intervention: Nine typical wheelchair sitting postures.</p> <p>Outcome Measures: Tangentially induced shear, Pressure distribution-Oxford Pressure Monitor Device.</p>	<ol style="list-style-type: none"> 1. Mean maximum pressure was on average 26% higher in the SCI group versus the able-bodied group. 2. Forward trunk flexion reduced the average pressure for both groups; however, SCI group encountered a 10% increase in pressure at the initial 30° of forward flex before a reduction occurred. 3. SCI subjects had a mean peak pressure gradient that was 1.5-2.5 higher than able-bodied subjects. Maximum decrease of pressure gradient from a neutral position happened after the backrest reclined to 120°. 4. When a sitting position change occurred, a similar shift to the anterior/posterior midline location of maximum pressure was experienced in both groups. From neutral, a forward trunk flexion at 30° and 50° produced a 2.4 and 2.7cm posterior shift. When the backrest reclined to 120°, the greatest posterior shift occurred at 6cm.
Hobson & Tooms 1992 USA Prospective Controlled Trial N=22	<p>Population: <i>SCI (n=12):</i> Level of injury: paraplegia=7, tetraplegia=5; <i>Able-bodied (n=10).</i></p> <p>Intervention: Three standardized sitting postures: P1M, neutral position; P1R, trunk bending; P2, forward trunk flexion.</p> <p>Outcome Measures: Spinal and pelvic alignment.</p>	<ol style="list-style-type: none"> 1. Disabled group on average has more lumbar lordosis in upright sitting position compared to the normal group. 2. Person with a SCI will sit in neutral posture with posteriorly tilted pelvis (- tilted on average 15° more than non-injured), forward trunk flexion (30° from neutral posture), forward rotation

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		<p>of the pelvis (8° normal and 12° SCI).</p> <ol style="list-style-type: none"> 3. In neutral seated posture posterior pelvic tilt causes ITs of SCI to be displaced anteriorly on average 4cm. 4. Kyphotic spinal deformity occurs mainly in thoracolumbar/thoracic spine with compensation in cervical spine - implications for backrest height and lumbar pads. 5. Changes in angle of pelvis and IT location have implications for tissue distortion and/or mechanical abrasion of buttock tissue.
Janssen-Potten et al. 2001 Netherlands Case Control N=30	<p>Population: High SCI (T2-8, n=10), Low SCI (T9-12, n=10), Able-bodied controls (n=10). Age range: 25-53 yr; Gender: males=28, females=2; Height range: 1.7-1.9 m; Weight range: 52.1-87.3 kg.</p> <p>Intervention: Standard chair and chair with 10° forward seat incline.</p> <p>Outcome Measures: Pelvic tilt, Center of pressure displacement (COP), Muscle activity, Reaching task.</p>	<ol style="list-style-type: none"> 1. There was no significant influence of incline on pelvic tilt in any group. 2. Able-bodied controls had a significantly larger reaching position than the SCI groups (p<0.001). 3. The COP was not significantly different between the two chairs, or the groups.
Mao et al. 2006 Taiwan Pre-Post N=17	<p>Population: Mean age: 35.4 yr; Gender: males=10, females=7; Level of injury: C5-T11; Chronicity=chronic.</p> <p>Intervention: Adjustable seating system with lateral trunk supports (LTS).</p> <p>Outcome Measures: Spine radiographs, Cobb angles, Relative change in angle.</p>	<ol style="list-style-type: none"> 1. LTS improved spinal alignment in frontal plane. 2. LTS reduced lumbar angle in sagittal plane resulting in more erect posture.
Alm et al. 2003 Sweden Pre-Post N=30	<p>Population: Mean age: 25.8 yr; Gender: males=30, females=0; Injury etiology: complete C5-C6 tetraplegia.</p> <p>Intervention: Documentation and evaluation of wheelchair sitting (i.e., type of wheelchair, seat angle, backrest height, type and height of cushion).</p> <p>Outcome Measures: Pelvo-femoral angle (deg), Pelvic tilt (deg), Upper body height. Frontal trunk alignment, Pelvic obliquity.</p>	<ol style="list-style-type: none"> 1. In SCI subjects, the pelvo-femoral angle was statistically significantly smaller in the wheelchair as compared to the standardized surface in relaxed (p<0.001) and upright (p=0.005) sitting positions. 2. In the relaxed sitting position, there were no significant differences among SCI patients in the pelvic anterior tilt between the standardized surface and wheelchair, regardless of seat angle. In the upright sitting position, the pelvic anterior tile was statistically significantly less (p=0.004). 3. In SCI patients, the mean vertical acromion-trochanter major distance in the sagittal plane was statistically significantly larger in upright than in

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		<p>the relaxed sitting position on both the standardized surface (mean increase: 5%, $p<0.001$) and in the wheelchair (mean increase: 4% $p=0.001$).</p> <ol style="list-style-type: none"> Results showed a statistically significant decrease in mean heights in wheel chair for both relaxed ($p<0.001$) and upright ($p<0.001$) sitting positions. For SCI patients, there were no significant differences observed in the horizontal C7 deviation in the frontal plane between relaxed and upright sitting positions, for either the standardized surface or in wheelchair.
<p>Bolin et al. 2000 Sweden Pre-Post N=4</p>	<p>Population: Mean age: 25.8 yr; Gender: males=4, females=0; Injury etiology: complete thoracic spinal cord injury (SCI), Mean time since injury: ≥ 2 yr. Intervention: A new wheelchair prescription with features to support sitting, stability, and improve balance, pelvic posterior tilt. Outcome Measures: Modified Functional Reach Test (MFRT), Functional Independence Measurement (FIM), Ashworth Scale (AS).</p>	<ol style="list-style-type: none"> There were no changes in the level of spasticity observed for $\frac{3}{4}$ participants. One participant perceived a decrease in his level of spasticity. Except for improved balance in one participant, the MFRT did not show any significant differences in $\frac{3}{4}$ participants' balance. Two self-perceived an improvement in balance and one expressed a further deterioration in balance. No changes were observed in respiration for two participants; two perceived an improvement and one perceived deterioration. Two participants stated their wheelchair propulsion improve, even though this was not supported by Cooper's test or uphill slope propulsion. Wheelchair skills improved for one participant and remained unchanged for two participants. Three participants perceived their wheelchair skills to be improved.