

Author Year Country Research Design Total Sample Size	Methods	Outcome
Kamper et al. 1999 USA Prospective Controlled Trial N=13	Population: Age range: 27-44 yr; Gender: males=13, females=0; Height range: 160-191 cm; Level of injury: paraplegia=4, tetraplegia=4, able-bodied=5; Time since injury range: 3-29 yr; Chronicity=chronic. Intervention: Controlled perturbation applied while in wheelchair. Outcome Measures: Use of upper extremities to stabilize; Instability onset time; Center of pressure movement (COP), $COP_{state + position + velocity}$ (DFLCOP); Body segment movements.	1. Able-bodied subjects sustained stability for all perturbations. 2. Platform angles where stability was initially lost was lowest for subjects with tetraplegia ($p<0.001$). 3. When instability occurred, the time to attain DFLCOP threshold was related to the onset of instability ($r=0.95$). The sequential relationship between threshold and instability was not as strong ($r=0.90$). 4. Lower and upper torso rotation was significantly more common in the SCI group, as compared to the able-bodied group ($p<0.05$). When imbalance occurred, SCI patients tended to rotate the pelvis and lower torso in the direction of the fall before the rest of the body.
Janssen-Potten et al. 2002 Netherlands Case Control N=30	Population: Mean age: 39.4 yr; Gender: males=27, females=3; Mean height: 177 cm; Mean weight: 73.5 kg; Level of injury: thoracic=10, lumbar=10; Able-bodied=10. Intervention: Perform balance changing reaching movements with a solid footrest or an elastic footrest. Outcome Measures: Reaching distance, Time to performing reaching task, Center of pressure displacement (COP), Muscle activity, Center of mass (COM).	1. SCI subjects reached slower with the elastic footrest ($p<0.01$) than the able-bodied group. 2. In SCI subgroups, reaching task technique differed between two footrests ($p<0.05$). Solid footrests worked better for the lumbar SCI group, indicated by a 4% decrease in backward COP displacement. Elastic footrests gave thoracic SCI group better balance, indicated by a 46% increase in initial COP background movement. 3. Able-bodied and lumbar SCI groups experienced a decrease in forward acceleration of COM with elastic footrest. 4. Able-bodied subjects experienced muscle activity alterations when footrests were switched, but SCI subjects did not.
Janssen-Potten et al. 2000 Netherlands Case Control N=30	Population: <i>High SCI group:</i> Age range: 24-43 yr; Gender: males=10, females=0; Level of injury: paraplegia=10; <i>Low SCI group:</i> Age range: 23-55 yr; Gender: males=9, females=1; Level of injury: paraplegia=10; <i>Able-bodied group:</i> Age range =27-41 yr; Gender: males=10, females=0. Intervention: Four different configured chairs: 7° (T7) and 12° (T12) tilt angle, 22° back recline (R22) and 10° standard	1. No significant difference in actively controllable reach in control group or in low SCI group with tilting the chair or reclining the backrest. 2. The low SCI and able-bodied groups had a significant increase in center of pressure displacement when the standard chair was compared to the other chairs. 3. The high SCI group did not experience a change in centre of pressure displacement. High SCI

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	chair configuration (S). Outcome Measures: Maximal unsupported reaching distance; Muscle activity using an Electromyography (EMG) (serratus anterior, pectoralis major, oblique abdominal); Center of pressure displacement (COP).	were unable to control shift in body mass larger than one induced by arm movement.
Hastings et al. 2003 USA Pre-Post N _{Initial} =17, N _{Final} =14	Population: Mean age: 42 yr; Gender: males=12, females=2; Mean weight: 78 kg; Mean height: 178 cm; Level of injury: paraplegia=4, thoracic=10; Severity of injury: AIS: A=12, B=2; Chronicity: chronic. Intervention: Three manual wheelchairs with different configurations: (S1) EandJ Premier, (S2) Quickie Breezy, (T) Test configuration chair Quickie TNT, with posterior seat incline and low backrest perpendicular to the floor. Outcome Measures: Shoulder and neck alignment; Pelvic tilt. All determined via digital photos at rest and vertical reach.	1. There was less forward head position measurement with T than with S1 (p=0.008) and S2 (p=0.036). 2. Humeral flexion ability was significantly higher in T compared to S2 (p=0.036), but not S1. In the T chair, subjects could reach a significantly greater height above the wheelchair seat base than in the S1 (p=0.005) and S2 (p=0.002). 3. Wheelchair with a positive seat slope of 14°, acute inside backrest angle, and relatively low back rest (meets lowest rib) superior to standard wheelchairs in supporting more vertical postural alignment and greater reach.
Gabison et al. 2017 Canada Post-Test N _{initial} =17 N _{final} =15	Population: <i>Reachers Group (n=8):</i> Mean age= 46.5 yr; Gender: males=5, females=3; Level of injury: C5-T12; Mean time since injury= N/R. <i>Non-Reachers Group (n=9):</i> Mean age= 40.0 yr; Gender: males=9, females=0; Level of injury: C4-L4; Mean time since injury= N/R. Intervention: To compare trunk function and offloading of ischial tuberosities of participants who were divided into two groups depending on their ability to engage in multidirectional reach test (MDRT): Reachers, or Non-Reachers. A sensimat™ pressure mat was placed under wheelchair cushion to evaluate pressure offloading during sitting and usual activities for 2 hr period. Outcome Measures: isometric Trunk strength using hand held dynamometer; offloading time measured using Sensimat™ interface pressure mapping system.	1. The Reachers had significantly higher trunk strength compared to the Non-Reachers (p<0.05). 2. Offloading times over the left and right ischial tuberosities were lower in Non-Reachers when compared with Reachers, however the results were statistically significant only for offloading over the right ischial tuberosity (p=0.029). 3. There was no correlation between trunk strength and pressure offloading times for both groups (p>0.05).
May et al. 2004 Canada Post-Test N=27	Population: Mean age: 30.3 yr; Gender: males=21, females=6; Time since injury range: 1-22 mo. Intervention: Three different wheelchair back supports: sling upholstery-standard back support (SB), Jay J2-replacement of standard back support (RSB), Pindot	1. Only reaching on the forward vertical reach task was found to differ significantly between back supports (p=0.01). Subjects reached higher with using the RSB, as compared to the SB (p=0.015).

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	PaxBac - attachment to standard back support (ASB). Outcome Measures: Satisfaction Questionnaire, Mean scores of four functional tasks performed twice each: Time forward wheeling, Forward vertical reach, ramp ascent, 1-stroke push.	2. Subjects were most satisfied with the RSB ($p=0.017$), and least satisfied with the ASB. 3. RSB was rated most comfortable and as having the best appearance ($p=0.018$).
Sprigle et al. 2003 USA Post-test $N_{Initial}=22$, $N_{Final}=20$	Population: Age range: 18-64 yr; Gender: males=19, females=1; Chronicity: sub-acute, chronic. Intervention: Six configurations containing 3 types of cushions (segmented air, contoured viscous fluid/foam and air/foam), and 2 of 3 backrests (T12, inferior scapular angle and scapular spine). Outcome Measures: Reaching tasks: functional reach task, bilateral reach task, unilateral reach task; Seated posture.	1. Cushion type and backrest height did not significantly influence reach or posture.