

Author Year Country Research Design Score Total Sample Size	Methods	Outcome
Freixes et al. 2010 Argentina Post-test N=8	Population: Mean age: 32.4 yr; Gender: males=8, females=0; Level of injury: C6=8; Level of severity: AIS A=8; Mean time since injury: 37.4 mo. Intervention: Propulsion during four wheelchair axle positions (P1 -up and forward, P2-down and forward, P3-down and backward, P4-up and backward). Outcome Measures: Speed, Acceleration, Stroke frequency, Shoulder range of motion.	1. P1 demonstrated the highest propulsion speed and P3 the slowest ($p<0.05$). 2. Stroke frequency was significantly higher in P1 than P2 and P3 ($p=0.05$). 3. A lower range of motion was observed in P1 compared to P2 and P3 ($p<0.05$); the range of motion in P4 was less than P3 in the transversal plane ($p<0.05$). 4. No significant shoulder range of motion differences in the coronal and sagittal planes.
Mulroy et al. 2005 USA Post-test N=13	Population: Mean age:37.2yr; Gender: males=13, females=0; Level of injury: paraplegia=13; Time post injury: 3-37yr; Chronicity=chronic. Intervention: Propulsion of a test wheelchair with two different seat positions [posterior (SP) or anterior (SA)] during free, fast and 8% graded condition. Outcome Measures: Hand force and torque on pushrim; 3D motion of upper extremities and trunk during propulsion; Peak force (posterior and superior).	1. During free propulsion, peak superior force was low, but increased during fast and 8% graded propulsion. The superior force was lower in the SP position than in the SA position for all conditions. During free propulsion, the superior force was a negative distraction force in SP (-4.2N) and a positive distraction force in SA (3.2N). 2. During free and fast propulsion, peak posterior force was unaltered, but increased in the SP position during 8% graded propulsion. Posterior force was higher during fast and graded propulsion, as compared to free propulsion. 3. The SA position had a significantly lower internal rotation effect than the SP position. 4. A significantly greater transverse plane power was generated in the SA condition, as compared to the SP condition.
Samuelsson et al. 2004 Sweden Post-test N _{Initial} =13; N _{Final} =12	Population: Mean age: 48.0 yr; Gender: males=10, females=2; Level of injury: paraplegia; Level of severity: Frankel A=7, D=5; Mean time in w/c/day: 11.6 hr. Intervention: Two different rear-wheel position wheelchairs [5° seat incline (P1) and 12° seat incline (P2)], while on a treadmill or a computer for 30 min/activity. Outcome Measures: Oxygen consumption, Respiratory exchange, Power output, Heart rate, Pulmonary ventilation, Freely chosen push frequency, Stoke angle, Pelvic lateral tilt,	1. Changing the rear wheel position from P1 to P2 produced a change in the weight distribution ($p<0.001$). 2. Changing from P1 to P2 also influenced stroke angle and push frequency during propulsion ($p<0.05$). 3. Trends were not found for the remaining parameters studied.

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	Pelvic sagittal rotation, Estimated seating comfort, Estimated activity performance.	
Boninger et al. 2000 USA Post-test N=40	Population: Age range: 20.6-64.6 yr; Gender: males=28, females=12; Weight range: 43.2-106.0 kg. Height range: 154.9-203 cm; Level of injury: paraplegia=40; Range of time since injury: 1.3-25.2 yr; Chronicity=chronic. Intervention: Propulsion of personal wheelchair on a dynamometer at two different stable speeds (0.9 m/sec-SP1; 1.8 m/sec-SP2) and starting from a still stop to the fastest possible speed (PTU). Outcome Measures: Axle position relative to the shoulder at rest (horizontal and vertical), Pushrim mechanical variables: Frequency of propulsion, Peak and rate of rise of resultant force, Planar movement and push angle.	1. Frequency of propulsion was positively correlated with axle position at SP1 ($p<0.05$) and SP2 ($p<0.01$). 2. The push angle was decreased in all conditions when the axle position was behind the position of the shoulder (SP1, $p=0.05$; SP2, $p<0.05$; PTU, $p<0.05$). 3. A larger distance between the axle and shoulder also reduced the push angle in SP1 and SP2 ($p<0.05$). 4. The largest distance between the axle and the shoulder correlated with faster loading of the pushrim at SP2 ($p<0.05$).