

<b>Author Year</b> <b>Country</b> <b>Score</b> <b>Research Design</b> <b>Total Sample Size</b>	<b>Methods</b>	<b>Outcome</b>
<p>Hicks et al. 2003 Canada PEDro=5 RCT Initial N=43; Final N=34</p>	<p><b>Population:</b> Intervention group: Mean age: 36.9 yrs; Level of injury: Tetraplegia (11), Paraplegia (10); Mean time post-injury: 7.7 yrs. Control group: Mean age: 43.2 yrs; Level of injury: Tetraplegia (7), Paraplegia (6); Mean time post-injury: 12.1 yrs. <b>Treatment:</b> Intervention group: A progressive exercise training program 2d/wk for 9 mo, alternate days, 90-120 min/d, consisting of warm up, upper extremity stretching &amp; 15-30 min of aerobic training. As the rate of perceived exertion ↓, workload was ↑. Some resistance training took place. Control group: Offered an education session, 2d/mo (with exercisers) on various topics. <b>Outcome Measures:</b> Perceived Quality of Life Scale (PQOL).</p>	<ol style="list-style-type: none"> <li>1. Exercisers reported a trend of ↓ stress, ↓ depressive symptoms, ↑ satisfaction with their physical functioning than the controls (p=0.06).</li> <li>2. Exercisers reported ↓ pain (p&lt;0.01) and ↑ QOL (p&lt;0.05).</li> </ol>
<p>Latimer et al. 2004 Canada PEDro=6 RCT Initial N=34; Final N=21</p>	<p><b>Population:</b> Intervention group: Mean age: 38.27 yrs; Gender: 3 males, 8 females; Level of injury: Tetraplegia (7), Paraplegia (4); Severity of injury: ASIA A (5), B (1), C (3), D (1); Mean time post-injury: 10.54 yrs; Control group: Mean age: 43.08 yrs; Gender: 2 males, 8 females; Level of injury: Tetraplegia (3), Paraplegia (7); Severity of injury: ASIA A (3), B (1), C (3), D (3); Mean time post-injury: 14.58 yrs <b>Treatment:</b> Intervention group: 9 mo exercise program - 2d/wk, small group exercise sessions, 60-90 min duration consisting of stretching, arm ergometry &amp; resistance exercise with student volunteer personal trainers. Control group: Asked to continue normal daily activities and not begin an exercise routine within 9 mo although provided with an opportunity for education. <b>Outcome Measures:</b> Pain perception (two items from the Short Form Health Survey - SF-36); Perceived stress scale, Center for Epidemiological Studies Depression Scale (CES-D)</p>	<ol style="list-style-type: none"> <li>1. Exercise group had lower stress, pain, and depression and greater life satisfaction than the control group.</li> <li>2. The effects of exercise on depression were mediated by changes in stress.</li> </ol>
<p>Martin Ginis et al. 2003 Canada PEDro=6 RCT Initial N=34; Final N=34</p>	<p><b>Population:</b> Mean age= 8.6 yrs; Gender: 23 males, 11 females; Mean time post-injury: 10.4 yrs <b>Treatment:</b> Intervention group: 5 min of stretching, 15-30 min of aerobic arm ergometry exercise &amp; 45-60 min of resistance exercise, 2d/wk, in small groups. Control group: Asked to continue normal daily activities and not begin an exercise routine for 3 mo <b>Outcome Measures:</b> Perceived Quality of Life scale (PQOL); Centre for Epidemiological Studies Depression Scale (CES-D).</p>	<ol style="list-style-type: none"> <li>1. After 3 months, when compared to controls, exercisers had: <ul style="list-style-type: none"> <li>• ↑ QOL (p=0.007)</li> <li>• ↑ satisfaction with physical function (p&lt;0.01)</li> <li>• ↑ satisfaction with physical appearance (p=0.007).</li> <li>• ↓ depression (p=0.02).</li> </ul> </li> </ol>

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Latimer et al. 2005 Canada PEDro=1 RCT N=33	<p><b>Population:</b> Intervention group: Mean age:37.54 yrs; Gender: 9 males, 4 females; Level of injury: Tetraplegia (7), Paraplegia (6); Mean time post-injury: 9.23 yrs Control group: Mean age:43.30 yrs; Gender: 5 males, 5 females; Level of injury: Tetraplegia (4), Paraplegia (6); Mean time post-injury:15.70 yrs</p> <p><b>Treatment:</b> Intervention group: A 6 mo exercise program 2d/wk in small groups (avg 3-5 people), ran by student volunteer personal trainers. Control group: Asked to continue normal daily activities and not begin an exercise routine within 6 mo</p> <p><b>Outcome Measures:</b> Perceived Stress Scale (PSS); Centre of Epidemiological Studies Depression Scale (CES-D); Perceived Quality of Life (PQOL); measured at @ baseline, 3 &amp; 6 mo</p>	<ol style="list-style-type: none"> <li>1. At baseline, ↑ stress levels were related to ↑ depression rates (p&lt;0.05). At 6 mos, the exercise group's stress and depression association had ↓ but remained significant in the control group (p&lt;0.05).</li> <li>2. At baseline, ↑ stress levels were associated to ↓perceived QOL (p&lt;0.05). At 3 &amp; 6 mos, the exercise group's stress and QOL association ↓, but remained ↑ across all time points for the control group (p&lt;0.05).</li> <li>3. Exercise was found to buffer the effects of stress on QOL &amp; depression.</li> </ol>
Alexeeva et al. 2011 USA PEDro=7 RCT N=35	<p><b>Population:</b>            Fixed Track Group: Mean age: 37.3± 13 yrs ; Gender: 12 males, 2 females; Level of injury: ASIA C (17%), ASIA D (83%); Cause of injury: traumatic (100%)            Treadmill Group: Mean age: 36.4±12.9 yrs ; Gender: 8 males, 1 female; Level of injury: ASIA C (36%), ASIA D (64%); Cause of injury: traumatic (100%)            Physical Therapy Group: Mean age: 43.3±15.8 yrs ; Gender: 10 males, 2 females; Level of injury: ASIA C (11%), ASIA D (89%); Cause of injury: traumatic (75%), non-traumatic (25%)</p> <p><b>Treatment:</b> Patients participated in a body weight supported training program (TRK or TM) or comprehensive physical therapy for 1hour/day, 3 d/wk for 13 wks.</p> <p><b>Outcome Measures:</b> Satisfaction with Abilities and Well-Being Scale (SAWS); Short Form Health Survey (SF-36)</p>	<ol style="list-style-type: none"> <li>1. Immediately post-training 80% of the participants reported increased satisfaction with abilities and well-being and this was significant across groups (p&lt;0.05).</li> <li>2. There were no significant changes in the four items from the SF-36 within groups or between groups after training.</li> </ol>
Anneken et al. 2010 Germany Retrospective Cross-Sectional; Observational N=277	<p><b>Population:</b> Mean age: 41.7 ± 12.7yrs; Gender: 219 males, 58 females; Level of injury: Paraplegia (78.3%); Severity of injury: Complete (62.9%); Cause of injury: traumatic (79%), non-traumatic (21%);</p> <p><b>Treatment:</b> Questionnaire</p> <p><b>Outcome Measures:</b> QOL Feedback</p>	<ol style="list-style-type: none"> <li>1. The most prominent differences between the physically active and physically inactive individuals occurred in the single scales of physical domain (physical capacity in everyday life, physical activity, and mobility); all p&lt;0.001. In the single scales of the psychological domain, prominent differences were found in remedial exercises, energy, and self-confidence; all p&lt;0.001. In this study, physical exercise and sport were identified as the main influencing determinants of QOL .</li> </ol>
Mulroy et al. 2011 USA PEDro=7	<p><b>Population:</b> Exercise/Movement Optimization group: Mean age: 47±9 yrs; Gender: 31 males, 9 females; Level of</p>	<ol style="list-style-type: none"> <li>1. All of the SF-36 subscales except for general health and vitality demonstrated a statistically</li> </ol>

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RCT N=80	injury: ASIA A (62%), ASIA B (23%), ASIA C (8%), ASIA D (2%), Unknown (5%) Control Group: Mean age: 47±12 yrs; Gender: 26 males, 14 females; Level of injury: ASIA A (62%), ASIA B (13%), ASIA C (13%), ASIA D (2%), UNKNOWN (10%) <b>Treatment:</b> Patients received a shoulder home exercise program 3d/wk for 12 wks. Stretching, warm-up, and resistive shoulder exercises were included. <b>Outcome Measures:</b> Short Form Health Survey (SF-36); Subjective Quality of Life Scale (SQOL)	significant ( $p<0.05$ ) improvement in scores for participants in the exercise/movement optimization group and no change for the control group. 2. Overall SQOL scores increased 10% following the intervention for the exercise/movement optimization group ( $p<0.05$ ), but were unchanged for those in the control group.
Chen et al. 2006 USA Score Pre-Post N=16	<b>Population:</b> Mean age: 43.8 years (range: 21-66); Gender: 9 males, 7 females; Level of injury: tetraplegia (25%), paraplegia (75%); Severity of injury: ASIA A (56%), C (19%), D (25%); Cause of injury: traumatic (93.75%), non-traumatic (6.25%); <b>Treatment:</b> 12 wk of a weight management program (e.g., nutrition, exercise, behaviour modification training) + 1-30-min exercise session/wk for 6 wks <b>Outcome Measures:</b> General Well-Being Schedule	1. Although there were small increases in general well-being schedule scores from baseline to 12 weeks and baseline to 24 weeks, they did not reach statistical significance ( $p=0.12$ ).
Hicks et al. 2005 Canada Downs & Black score=18 Pre-post N=14	<b>Population:</b> Chronic incomplete SCI: Age (range): 20-53 yrs; Gender: 11 males, 3 females; Level of injury: Tetraplegia (11), Paraplegia (3); Severity of injury: ASIA B (2), C (12); Mean time post-injury: 7.4 yrs <b>Treatment:</b> RoboticBody weight supported treadmill training (BWSTT) – up to 45 min, 3d/week, 144 sessions (12 mo) <b>Outcome measures:</b> Centre for Epidemiological Studies of Depression Scale (CES-D); Satisfaction with Life Scale (SWLS); Short-Form Health Survey (SF-36); all questionnaires administered every 36 sessions.	1. ↑ life satisfaction & ↑ physical function satisfaction ( $p<0.05$ ), after BWSTT. 2. No change in depression or perceived health.
Semerjian et al. 2005 USA Downs & Black score=15 Pre-post N=12	<b>Population:</b> Mean age: 34 yrs; Gender: 8 males, 4 females; Level of injury: Tetraplegia (7), Paraplegia (5); Time post-injury (range): 1-30 yrs <b>Treatment:</b> 10 wk individualized exercise program, 2d/wk, using the Bowflex Versatrainer, the Active-Passive Trainer, the EasyStand 6000 Glider, and the Body Weight Support System treadmill trainer (BWST). <b>Outcome Measures:</b> Quality of Life Index-Spinal Cord Injury Version III (QLI-SCI III) – 4 subscales: Health & Functioning, Psychological, Social & Economic and Family; the Body Satisfaction Questionnaire (BSQ); Semi-structured interview; Field notes taken during each session;	1. QOL: <ul style="list-style-type: none"> <li>• ↑ health &amp; functioning (<math>p&lt;0.001</math>)</li> <li>• ↑ psychological (<math>p&lt;0.05</math>)</li> <li>• ↑ social &amp; economic (<math>p&lt;0.05</math>)</li> <li>• ↑ overall QOL (<math>p&lt;0.001</math>)</li> <li>• No change in family.</li> </ul> 2. Body Satisfaction: <ul style="list-style-type: none"> <li>• ↑ body functioning (<math>p&lt;0.001</math>)</li> <li>• ↑ body attractiveness (<math>p&lt;0.05</math>)</li> </ul> 3. Interview & Field notes key themes: <ul style="list-style-type: none"> <li>• Perceived health &amp; physical ability improvement</li> <li>• Perceived ↑ in strength, endurance and attractiveness</li> <li>• Improved outlook on life</li> </ul>

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	Questionnaires done pre & post intervention, interview done post intervention.	<ul style="list-style-type: none"> <li>• Psychological gains of standing exercise &amp; BWST</li> <li>• Perceived recovery of function</li> <li>• Assistive device frustration</li> <li>• Independence importance</li> </ul>
Ditor et al. 2003 Canada Downs & Black score=14 Pre-Post N=7	<p><b>Population:</b> Mean age: 43.3 yrs; Gender: 5 males, 2 females; Time post-injury (range): 3-23 yrs</p> <p><b>Treatment:</b> Patients who previously took part in a 9 mo exercise training program were given 3 mo (2 sessions/wk) of continued supervised exercise training in a laboratory setting.</p> <p><b>Outcome Measures:</b> Exercise adherence (% of available sessions that were attended [max. 2/wk]), PQOL (11-item Perceived Quality of Life Scale with four additional SCI-relevant items), Pain (2 pain items from the Short-form Health Survey [SF-36]), Perceived Stress Scale</p>	<ol style="list-style-type: none"> <li>1. ↓ exercise adherence over the 3-mos follow-up period in comparison to the 9-mos adherence rate (42.7% versus 80.65%, respectively; <math>p&lt;0.01</math>).</li> <li>2. At 3 mos follow-up, ↓ in PQOL (<math>p&lt;0.05</math>).</li> <li>3. Also, a trend was found for increased pain (<math>p=0.07</math>) and stress (<math>p=0.12</math>).</li> <li>4. A significant negative correlation was found between pain scores at 9 mos and adherence during the 3 mos (<math>r=-0.91</math>; <math>P&lt;0.01</math>).</li> </ol>
Warms et al. 2004 USA Downs & Black score=14 Pre-Post Initial N=17; Final N=16	<p><b>Population:</b> Mean age: 43.2 yrs; Gender: 13 males, 3 females; Mean time post-injury: 14.4 yrs</p> <p><b>Treatment:</b> “Be Active in Life” program: included educational materials (2 pamphlets, 2 handouts), a home visit with a nurse (90 min scripted motivational interview, goal and personal action plan establishment), and follow up calls at day 4, 7, 11 &amp; 28 (approx. 8 min each). Program lasted for 6 wks, and had a final follow up 2 wks post-completion.</p> <p><b>Outcome Measures:</b> Physical activity (wrist-worn actigraph); Self-rated Abilities for Health Practices Scale (includes Exercise Self-efficacy subscale); Self-rated Health Scale (SRHS); Centre for Epidemiologic Studies Depression Scale (CES-D); @ baseline, 6 wk completion; 2 wks post-completion.</p>	<ol style="list-style-type: none"> <li>1. Physical activity: Counts/day ↑ in 60% of subjects and self-reported activity ↑ in 69% of subjects, but both were not significant.</li> <li>2. Self-rated abilities: no change. Exercise self-efficacy: ↑ (<math>p=0.01</math>).</li> <li>3. Self-rated health: ↑ (<math>p=0.04</math>).</li> <li>4. Depression: no change.</li> </ol>
Effing et al. 2006 The Netherlands Downs & Black score=13 Case study N=3	<p><b>Population:</b> Chronic incomplete SCI; Age range: 45-51 yrs; Gender: 3 males; Severity of injury: ASIA C (2), D (1); Time post-injury (range): 29-168 mo;</p> <p><b>Treatment:</b> Body weight-supported treadmill training 5d/wk for 30 min for 12 wks, each session personalized to physical abilities.</p> <p><b>Outcome Measures:</b> Perceived QOL: SEIQOL.</p>	<ol style="list-style-type: none"> <li>1. QOL: ↑ in only one subject (<math>p&lt;0.05</math>).</li> </ol>
Guest et al. 1997 USA Downs & Black score=13 Pre-post N=15	<p><b>Population:</b> Traumatic complete paraplegia; Mean age: 28.8 yrs; Gender: 12 males, 3 females; Mean time post-injury: 3.8 yrs</p> <p><b>Treatment:</b> Electrically stimulated walking program - 32 sessions, using the Parastep® FNS ambulation system.</p>	<ol style="list-style-type: none"> <li>1. Physical Self-Concept: ↓ after electrically stimulated walking (<math>p&lt;0.05</math>). Those with lower baseline score had the most significant improvements.</li> <li>2. Depression: ↓ after electrically stimulated walking (<math>p&lt;0.05</math>).</li> </ol>

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	<b>Outcome Measures:</b> The Tennessee Self-Concept Scale (TSCS) - Physical Self subscale only; Beck Depression Inventory (BDI); measurements @ baseline & completion of program.	
Kennedy et al. 2006 UK Downs & Black score=11 Pre-Post N=35	<b>Population:</b> Age (range): 18-61yrs; Gender: 30 males, 5 females; Level of injury: Paraplegia (20), Tetraplegia (15) <b>Treatment:</b> Back-Up: a one wk single or multi-activity course in an integrated, residential environment. Activities include skiing, horseback riding, waterskiing, canoeing, rappelling and gliding. <b>Outcome Measures:</b> Life Satisfaction Questionnaire, Hospital Anxiety and Depression Scale (HADS), Generalized Self-Efficacy Scale completed at baseline and end of 1 wk activity courses.	<ol style="list-style-type: none"> <li>1. Significant improvement (p=0.016) in life satisfaction and satisfaction with leisure (p=0.007)</li> <li>2. HADS scores demonstrated significant (p&lt;0.01) improvement in anxiety but not depression levels over the duration of the course.</li> <li>3. No overall improvement in perceived manageability however some difference (p=0.016) post test was observed for engage “in what happens around me” indicating some use of Perceived Manageability strategy.</li> <li>4. Self-efficacy scores improved post test (p=0.012).</li> </ol>
Bradley 1994 USA Downs & Black score=10 Cohort N=37	<b>Population:</b> Mean age: 32.03 yrs; Gender: 24 males, 13 females; Level of injury: Tetraplegia (12), Paraplegia (25); Mean time post-injury: 6.51 yrs <b>Treatment:</b> Intervention group: 3 mo FES exercise program <b>Outcome Measures:</b> Multiple Affect Adjective Check List Revised state form (MAACL-R) - Negative affect: anxiety, depression, hostility; Positive affect: positive affect, sensation seeking; Expectations of program recorded; all at baseline & post intervention.	<ol style="list-style-type: none"> <li>1. ↑ in depression &amp; hostility for those who had unrealistic expectations of the FES program (p&lt;0.01 &amp; p&lt;0.05, respectively).</li> <li>2. No other significant effects were found.</li> </ol>