

Research Summary – Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) – Community Reintegration

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Gee et al. 2025</p> <p>Psychometric study to evaluate the content validity, construct validity, and test-retest reliability of a revised version of the Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury [LTPAQ-SCI(R)]</p>	<p>Content validity study: N=10 participants with SCI 6M, 4F</p> <p>Construct validity and test-retest reliability study: N=23 participants with SCI 18M, 5F Mean (SD) age: 50 (14) years</p> <p>Level of injury: Tetraplegia (n = 10), paraplegia (n = 13)</p> <p>Completeness of injury: AIS A (n = 9), AIS B (n = 4), AIS C (n = 7), and AIS D (n = 3)</p> <p>Mean time since injury: 17 years</p>	<p>Content validity: User interviews provided information to refine the questionnaire and support content validity.</p> <p>Construct validity:</p> <ul style="list-style-type: none"> LTPAQ-SCI(R) measures of minutes per week aerobic LTPA and MVPA had large, positive, and significant correlations with all other questionnaire measures of LTPA and MVPA (r = 0.542 to 0.679, Ps < .01; Table 1). After controlling for age, aerobic LTPA 	<p>Test-retest reliability: All variables measured by the LTPAQ-SCI(R) demonstrated good-to-excellent test-retest reliability (intraclass correlations = 0.854 to 1.000, Ps < .001). See table 3.</p>	

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		<p>shared a medium-sized, significant, positive partial correlation with relative VO_{2peak} ($r = 0.393, P = .048$); however, MVPA had a small, nonsignificant partial correlation with relative V_{O2peak} ($r = 0.177, P > .05$) (Table 1).</p> <ul style="list-style-type: none"> • LTPAQ-SCI(R) measures of days per week and minutes per week strength training shared a large correlation with the BRFSS-SQ (both $r_s \geq 0.704, P < .001$) and small-medium, albeit not significant, partial correlations with PO_{peak} and predicted 1RM on 		

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		<p>the seated row (Table 2).</p> <ul style="list-style-type: none"> LTPAQ-SCI(R) measure of minutes per week all LTPA (i.e., combined aerobic and strength-training LTPA) shared large positive significant correlations with all other questionnaire measures of LTPA and MVPA ($P_s < .001$; Table 1) and the BRFSS-SQ ($r = 0.582, P < .002$). All minutes of LTPA, measured by the LTPAQ-SCI(R), had a significant medium-sized, positive partial correlation with VO_{2peak} ($r = 0.406, P = .042$). 		

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<p>Table 1. Correlations between ITPAQ-SCI(R) measures of aerobic LTPA, aerobic MVPA, and all ITPA with other questionnaire measures of LTPA and cardiorespiratory fitness</p> <table border="1"> <thead> <tr> <th rowspan="2">Measure</th> <th colspan="3">LTPAQ-SCI(R)</th> </tr> <tr> <th>Aerobic LTPA</th> <th>Aerobic MVPA</th> <th>All LTPA</th> </tr> </thead> <tbody> <tr> <td>PASIPD, MET h/day</td> <td>0.679 (p < 0.001)</td> <td>0.542 (p < 0.01)</td> <td>0.687 (p < 0.001)</td> </tr> <tr> <td>PARA-SCI LTPA, min/day</td> <td>0.645 (p < 0.001)</td> <td>0.600 (p < 0.01)</td> <td>0.664 (p < 0.001)</td> </tr> <tr> <td>PARA-SCI MVPA, min/day</td> <td>0.630 (p < 0.001)</td> <td>0.552 (p < 0.01)</td> <td>(p < 0.001)</td> </tr> <tr> <td>VO_{2peak}, mL/kg/min</td> <td>0.393 (p < 0.05)</td> <td>0.177</td> <td>0.406 (p < 0.05)</td> </tr> </tbody> </table> <p>Table 2. Correlations between LTPAQ-SCI(R) measures of strength-training LTPA, the BRFSS-SQ measure of strength training, and strength tests</p> <table border="1"> <thead> <tr> <th rowspan="2">Measure</th> <th colspan="2">LTPAQ-SCI(R)</th> </tr> <tr> <th>Strength training (days/wk)</th> <th>Strength training (min/wk)</th> </tr> </thead> <tbody> <tr> <td>BRFSS-SQ, days/wk</td> <td>0.722 (p < 0.001)</td> <td>0.704 (p < 0.001)</td> </tr> <tr> <td>PO_{peak}, watts</td> <td>0.237</td> <td>0.167</td> </tr> <tr> <td>Seated row predicted 1RM, kg</td> <td>0.211</td> <td>0.355</td> </tr> <tr> <td>Chest press predicted 1RM, kg</td> <td>-0.146</td> <td>-0.061</td> </tr> <tr> <td>Grip strength dominant, kg</td> <td>-0.384</td> <td>-0.488</td> </tr> <tr> <td>Grip strength nondominant, kg</td> <td>-0.227</td> <td>0.252</td> </tr> </tbody> </table> <p>Table 3. Test-retest reliability of the LTPAQ-SCI(R)</p>					Measure	LTPAQ-SCI(R)			Aerobic LTPA	Aerobic MVPA	All LTPA	PASIPD, MET h/day	0.679 (p < 0.001)	0.542 (p < 0.01)	0.687 (p < 0.001)	PARA-SCI LTPA, min/day	0.645 (p < 0.001)	0.600 (p < 0.01)	0.664 (p < 0.001)	PARA-SCI MVPA, min/day	0.630 (p < 0.001)	0.552 (p < 0.01)	(p < 0.001)	VO _{2peak} , mL/kg/min	0.393 (p < 0.05)	0.177	0.406 (p < 0.05)	Measure	LTPAQ-SCI(R)		Strength training (days/wk)	Strength training (min/wk)	BRFSS-SQ, days/wk	0.722 (p < 0.001)	0.704 (p < 0.001)	PO _{peak} , watts	0.237	0.167	Seated row predicted 1RM, kg	0.211	0.355	Chest press predicted 1RM, kg	-0.146	-0.061	Grip strength dominant, kg	-0.384	-0.488	Grip strength nondominant, kg	-0.227	0.252
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All p < 0.001		<p>*1RM = one repetition maximum; BRFSS-SQ = Behavioral Risk Factor Surveillance System Strength Training Questionnaire; PO_{peak} = peak power output; MET = metabolic equivalent; MVPA = moderate to vigorous leisure time intensity physical activity; PARA-SCI = Physical Activity Recall Assessment for Persons with Spinal Cord Injury; PASIPD = Physical Activity Scale for Individuals with Physical Disabilities; VO_{2peak} = peak oxygen consumption.</p>																														

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<p>Gee et al. 2024</p> <p>Study to adapting the LTPAQ-SCI for use in individuals with disabilities (i.e., the LTPAQ-D) and performing a preliminary evaluation of its content validity, construct validity, and same-day test-retest reliability in people with disabilities.</p> <p>Canada</p>	<p>Content validity study: N=5 participants who identified as having a physical and/or sensory disability</p> <p>Construct validity and same-day test-retest reliability study: N=27 participants who identified as having a physical and/or sensory disability 14M, 13F Mean (SD) age: 45 (21) years Participants had impairments including cerebral palsy, multiple sclerosis, chronic pain, osteoarthritis, hearing impairment, and visual impairment Living with a disability for 14 ± 8 years</p>	<p>Construct validity:</p> <ul style="list-style-type: none"> Aerobic LTPA: LTPAQ-D measures of aerobic LTPA and MVPA participation were positively and significantly correlated with all other questionnaire measures of LTPA and MVPA ($r = 0.458$ to 0.744, all $p < 0.01$; Table 2). Both min/week of aerobic LTPA and aerobic MVPA shared medium-sized partial correlations with VO_{2peak} ($r = 0.341$ and 0.356, respectively); however, these did not reach significance ($ps \geq 0.088$). 	<p>Test-retest Reliability: All variables measured by the LTPAQ-D exhibited good-to-excellent test-retest reliability ($ps < 0.001$; Table 3).</p> <ul style="list-style-type: none"> ICCs for measures of aerobic LTPA ranged from 0.709 to 0.923 ICCs for strength training LTPA ranged from 0.775 to 0.948 The ICC for all LTPA was equal to 0.751 	

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		<ul style="list-style-type: none"> Strength Training LTPA: LTPAQ-D measures of strength training, both in day/week and min/week, shared large correlations with the BRFSS-SQ strength training questionnaire ($r_s \geq 0.861$, $p_s < 0.001$; Table 3), but were not significantly correlated with PO_{peak} or measures of muscular strength (see Table 4). After controlling for age, strength training LTPA shared large, positive, and significant partial correlations with predicted 1RM on the chest press ($r_s \geq 0.514$, $p_s < 0.01$). 		

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		<p>Measures of strength training LTPA shared medium-sized ($r = 0.254-0.429$), albeit not significant, partial correlations with predicted 1RM on the seated row ($ps \geq 0.063$)</p> <ul style="list-style-type: none"> • Combined Aerobic and Strength Training LTPA: All LTPA, measured by the LTPAQ-D in min/week (i.e., aerobic + strength training LTPA), shared large, positive, and significant correlations with all other questionnaire measures of LTPA and MVPA participation ($ps < 0.001$; Table 2). 		

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		After controlling for age, all LTPA had a medium-sized positive, albeit not significant, partial correlation with VO_{2peak} ($r = 0.387$, $p = 0.069$).																										
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<p>min/week of strength training LTPA. Abbreviations: LTPA, leisure time physical activity; LTPAQ-D Leisure Time Physical Activity Questionnaire for People with Disabilities; MET, metabolic equivalent; MVPA, moderate to vigorous leisure time intensity physical activity; IPAQ-SF, International Physical Activity Questionnaire—Short Form; PADS, Physical Activity Disability Survey; PASIPD, Physical Activity Scale for Individuals with Physical Disabilities; VO_{2peak}, peak oxygen consumption</p> <p>Table 3. Correlations between LTPAQ-D measures of strength training LTPA, the BRFSS-SQ measure of strength training, and strength tests.</p> <table border="1"> <thead> <tr> <th>Measure</th> <th>LTPAQ-D Strength Training (day/week)</th> <th>LTPAQ-D Strength Training (min/week)</th> </tr> </thead> <tbody> <tr> <td>BRFSS-SQ (day/week)</td> <td>0.942 (p < 0.001 [one-tailed])</td> <td>0.861 (p < 0.01 [one-tailed])</td> </tr> <tr> <td>PO_{peak} (Watts)</td> <td>0.182</td> <td>0.201</td> </tr> <tr> <td>Seated Row Predicted 1RM (kg)</td> <td>0.254</td> <td>0.429</td> </tr> <tr> <td>Chest Press Predicted 1RM (kg)</td> <td>0.514 (p < 0.01 [one-tailed])</td> <td>0.621 (p < 0.01 [one-tailed])</td> </tr> <tr> <td>Grip Strength Dominant (kg)</td> <td>0.351</td> <td>0.390</td> </tr> <tr> <td>Grip Strength Non-Dominant (kg)</td> <td>0.065</td> <td>0.240</td> </tr> </tbody> </table> <p>* indicates p < 0.01 (one-tailed); † indicates p < 0.001 (one-tailed). Correlations with non-questionnaire-based measures are partial correlations. Abbreviations: 1RM, one-repetition maximum; BRFSS-SQ, behavioral risk factor surveillance system strength training questionnaire; LTPAQ-D, Leisure Time Physical Activity Questionnaire for People with Disabilities; PO_{peak}, peak power output.</p> <p>Table 4. Test-retest reliability of the revised Leisure Time Physical Activity Questionnaire for</p>					Measure	LTPAQ-D Strength Training (day/week)	LTPAQ-D Strength Training (min/week)	BRFSS-SQ (day/week)	0.942 (p < 0.001 [one-tailed])	0.861 (p < 0.01 [one-tailed])	PO _{peak} (Watts)	0.182	0.201	Seated Row Predicted 1RM (kg)	0.254	0.429	Chest Press Predicted 1RM (kg)	0.514 (p < 0.01 [one-tailed])	0.621 (p < 0.01 [one-tailed])	Grip Strength Dominant (kg)	0.351	0.390	Grip Strength Non-Dominant (kg)	0.065	0.240
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	<table border="1"> <thead> <tr> <th>Measure</th> <th>Intraclass Correlation (95% CI)</th> </tr> </thead> <tbody> <tr> <td colspan="2">Measures of aerobic LTPA</td> </tr> <tr> <td>Mild-intensity aerobic (min/week)</td> <td>0.709 (0.454–0.857)</td> </tr> <tr> <td>Moderate-intensity aerobic (min/week)</td> <td>0.885 (0.764–0.946)</td> </tr> <tr> <td>Vigorous-intensity aerobic (min/week)</td> <td>0.814 (0.681–0.924)</td> </tr> <tr> <td>Aerobic LTPA (min/week)</td> <td>0.792 (0.592–0.899)</td> </tr> <tr> <td>Aerobic MVPA (min/week)</td> <td>0.923 (0.838–0.964)</td> </tr> <tr> <td colspan="2">Strength training LTPA</td> </tr> <tr> <td>Strength training (day/week)</td> <td>0.908 (0.808–0.957)</td> </tr> <tr> <td>^aStrength training (min/week)</td> <td>0.836 (0.675–0.921)</td> </tr> <tr> <td>^bStrength training total time (min/week)</td> <td>0.948 (0.890–0.976)</td> </tr> <tr> <td>^cStrength training resting time (min/week)</td> <td>0.775 (0.568–0.891)</td> </tr> <tr> <td colspan="2">Combined aerobic + strength training LTPA</td> </tr> <tr> <td>All LTPA (min/week)</td> <td>0.751 (0.522–0.878)</td> </tr> </tbody> </table>	Measure	Intraclass Correlation (95% CI)	Measures of aerobic LTPA		Mild-intensity aerobic (min/week)	0.709 (0.454–0.857)	Moderate-intensity aerobic (min/week)	0.885 (0.764–0.946)	Vigorous-intensity aerobic (min/week)	0.814 (0.681–0.924)	Aerobic LTPA (min/week)	0.792 (0.592–0.899)	Aerobic MVPA (min/week)	0.923 (0.838–0.964)	Strength training LTPA		Strength training (day/week)	0.908 (0.808–0.957)	^a Strength training (min/week)	0.836 (0.675–0.921)	^b Strength training total time (min/week)	0.948 (0.890–0.976)	^c Strength training resting time (min/week)	0.775 (0.568–0.891)	Combined aerobic + strength training LTPA		All LTPA (min/week)	0.751 (0.522–0.878)			
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Martin Ginis et al. 2021	N=39 participants with traumatic, chronic, and motor-complete SCI 29M, 10F	Minutes per week of mild-, moderate- and heavy-intensity LTPA and total LTPA were all positively																														

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Cross-sectional construct validation study</p> <p>Three university-based laboratories in Canada</p>	<p>Mean (SD) age: 42 (10) years Mean(SD) time since injury: 13 (11) years Level and severity of injury: Tetraplegia AIS A (n = 8), tetraplegia AIS B (n = 7), and paraplegia AIS A (n = 24)</p>	<p>correlated with VO_{2peak}. The correlation between min/week of mild intensity LTPA and VO_{2peak} was small- medium (r = 0.231, p = 0.079), while all other correlations were medium-large (rs ranged from 0.276 to 0.443, p < 0.05). Correlations between LTPAQ-SCI variables and peak power output (PO_{peak}) were positive but small (rs ranged from 0.087 to 0.193, p > 0.05), except for a medium-sized correlation between heavy-intensity LTPA and PO_{peak} (r = 0.294, p = 0.035)</p>		
<p>Martin-Ginis et al. 2012</p>	<p>Validity Study: N=103 (75% male, 25% female)</p>	<p>With the exception of mild intensity activity, there were moderate to strong correlations between Leisure Time</p>	<p>Test-retest reliability: All 4 intraclass correlation coefficients were</p>	<p>Interpretability: Mean (SD) LTPAQ-SCI (min/week):</p> <ul style="list-style-type: none"> Mild: 205.68 (325.33)

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Survey with a 1-week follow-up</p> <p>General community</p>	<p>Mean age: 48.10±12.70y</p> <p>Mean years postinjury: 17.9±11.9y</p> <p>54% tetraplegic 46% paraplegic</p> <p>40% complete 60% incomplete</p> <p>Test-Retest Reliability Study: N=35 (77% male, 23% female)</p> <p>Mean age: 48.51±13.24y</p> <p>Mean years postinjury: 14.20±12.42y</p> <p>60% tetraplegic 40% paraplegic</p> <p>25% complete 75% incomplete</p> <p>Patients with SCI who used a wheelchair as</p>	<p>Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) & PARA-SCI measures of Leisure Time Physical Activity (LTPA).</p> <p>All correlations between the PARA-SCI and LTPAQ-SCI measures of LTPA were positive and statistically significant (P<.01).</p> <p>The strongest correlation was between the measures of heavy LTPA (ρ=.54), followed by the measures of total (ρ=.46) and moderate LTPA (ρ=.43).</p> <p>The weakest correlation was between the</p>	<p>significant across the test-retest period:</p> <ul style="list-style-type: none"> • Mild intensity: ICC (95% CI) = 0.74 (0.51-0.86) • Moderate intensity: ICC (95% CI) = 0.62 (0.36-0.79) • Heavy intensity: ICC (95% CI) = 0.93 (0.87-0.97) • Total: ICC (95% CI) = 0.83 (0.69-0.91) 	<ul style="list-style-type: none"> • Moderate: 115.35 (242.94) • Heavy: 54.97 (161.34) • Total: 376.00 (602.10)

Reviewer ID: Carlos L. Cano Herrera, Matthew Querée, Janice Eng

Last updated: December 31, 2024

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
	the primary mode of mobility	measures of mild intensity LTPA ($p=.27$).		

Research Summary – Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) – Community Reintegration – Cross-cultural Validation Studies

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
<p>Cummings et al. 2019</p> <p>Study to translate the LTPAQ-SCI into Canadian-French and to evaluate the content validity and its test-retest reliability in people with physical disabilities.</p> <p>Canada</p>	<p>Content validity study: N=9 adults with physical disabilities 6M, 3F Mean (age): 54.9 (10.6) years Diagnosis: SCI (n = 1), stroke (n = 2), arthritis (n = 0), multiple sclerosis (n = 4), traumatic brain injury (n = 2), cerebral palsy (n = 0), and fibromyalgia (n = 0) Mean (SD) duration since disability onset: 17.3 (10.3) years</p> <p>Test-retest reliability study: N=37 adults with physical disabilities completed the questionnaire</p>		<p>Test-retest reliability: Total LTPAQ-CF scores between T1-T2 and T1-T3 featured strong ICCs, 0.90 and 0.75 (P ≤ 0.01).</p>	

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
	2 or 3 times at T1 (baseline), T2 (2 days from baseline) and T3 (7 days from baseline). 18M, 19F Mean (age): 58.7 (11.6) years Diagnosis: SCI (n = 7), stroke (n = 9), arthritis (n = 8), multiple sclerosis (n = 4), traumatic brain injury (n = 4), cerebral palsy (n = 3), and fibromyalgia (n = 2) Mean (SD) duration since disability onset: 17.8 (15.6) years			