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DOI:

[10.1038/s41393-020-00562-9](https://doi.org/10.1038/s41393-020-00562-9)

Document Version

Early version, also known as pre-print

Citation for published version (Harvard):

Martin Ginis, KA, Ubeda-Colomer, J, Alrashidi, A, Nightingale, TE, Au, J, Currie, K, Hubli, M & Krassioukov, A 2020, 'Construct validation of the Leisure Time Physical Activity Questionnaire for people with SCI (LTPAQ-SCI)', *Spinal Cord*. <https://doi.org/10.1038/s41393-020-00562-9>

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Construct Validation of the Leisure Time Physical Activity Questionnaire for People with SCI
(LTPAQ-SCI)

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Abstract

Study design. Cross-sectional construct validation study.

Objectives. To test the construct validity of the Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) by examining associations between the scale responses and cardiorespiratory fitness (CRF) in a sample of adults living with spinal cord injury (SCI).

Setting. Three university-based laboratories in Canada.

Methods. Participants were 39 adults (74% male; M age: 42 ± 11 years) with SCI who completed the LTPAQ-SCI and a graded exercise test to volitional exhaustion using an arm-crank ergometer. One-tailed Pearson's correlation coefficients were computed to examine the association between the LTPAQ-SCI measures of mild-, moderate-, heavy-intensity and total minutes per week of LTPA and CRF (peak oxygen uptake [$\dot{V}O_{2\text{peak}}$] and peak power output [PO_{peak}]).

Results. Minutes per week of mild-, moderate- and heavy-intensity LTPA and total LTPA were all positively correlated with $\dot{V}O_{2\text{peak}}$. The correlation between minutes per week of mild intensity LTPA and $\dot{V}O_{2\text{peak}}$ was small ($r = .231, p = .079$) while all other correlations were medium-sized (r s ranged from .276 to .443, $ps < .05$). Correlations between the LTPAQ-SCI variables and PO_{peak} were also positive but small (r s ranged from .087 to .193, $ps > .05$), except for a medium-sized correlation between heavy-intensity LTPA and PO_{peak} ($r = .294, p = .035$).

Conclusions. People with SCI who report higher levels of LTPA on the LTPAQ-SCI also demonstrate greater levels of CRF. These results provide further support for the construct validity of the LTPAQ-SCI as a measure of LTPA among people with SCI.

1 Introduction

2 Participation in exercise, sports and other forms of leisure-time physical activity (LTPA) has
3 significant positive effects on the fitness, health and well-being of people living with spinal cord
4 injury (SCI)^{1,2,3}. However, the vast majority of people with SCI are insufficiently active to derive
5 these benefits⁴ because they face so many barriers to participation⁵. Consequently, there is a need
6 to develop, test and implement strategies to increase LTPA participation in people living with
7 SCI.

8 Reliable and valid measures of LTPA are required to assess the effectiveness of LTPA-
9 enhancing interventions. Review articles^{6,7,8} have catalogued the measurement properties of
10 wearable and self-report physical activity measures that have been used in SCI research.
11 Although the reliability and validity of wearable measures is improving, a significant limitation
12 of these devices is that they cannot distinguish between LTPA and other types of physical
13 activity (e.g., household, transportation, occupational activity)⁷. Because LTPA is the only form
14 of physical activity that has been shown to significantly improve fitness and health in people
15 with SCI¹, it is crucial that scientists have valid and reliable methods to measure it. Another
16 limitation of wearable devices is that even wrist-worn accelerometers cannot accurately detect
17 and measure strength-training activities (e.g., lifting weights, resistance band exercises)⁹. As
18 strength-training is a key component of the SCI exercise guidelines¹⁰, valid and reliable measures
19 of this activity are required by systems that track SCI exercise guideline adherence. Given these
20 limitations, self-report measures are considered superior to wearable devices for feasibly
21 collecting data on the types and amounts of LTPA performed by people with SCI⁷.

22 Compared to all other measures of PA used in SCI research, the Physical Activity Recall
23 Assessment for People with SCI (PARA-SCI)¹¹ has yielded the strongest evidence of reliability

24 and validity^{7,8,12}. Using a structured, standardized interview format, respondents are cued to
25 recall and rate the intensity of all LTPA and activities of daily living (ADL) that they have
26 performed over the previous 3 days¹³. The PARA-SCI has demonstrated positive evidence of
27 criterion validity (using both indirect calorimetry and doubly-labeled water as criteria), construct
28 validity and test-retest reliability^{11,14,12}. However, because the PARA-SCI was designed to
29 capture the types, frequencies, intensities and durations of *all* physical activities, it can create
30 unnecessary participant and clinician/researcher burden in situations where investigators are
31 interested only in measuring LTPA⁷. In response to these concerns, the Leisure Time Physical
32 Activity Questionnaire for People with SCI (LTPAQ-SCI) was developed¹⁵.

33 The LTPAQ-SCI is an SCI-specific, self-report assessment of LTPA that measures the
34 number of minutes of mild, moderate, and heavy intensity LTPA that a person performed over
35 the previous 7 days¹⁵. It can be self- or interviewer-administered in less than 5 minutes. The
36 reporting format used in the LTPAQ-SCI parallels the reporting structure of one of the most
37 widely used self-report measures of PA in the general population--the International Physical
38 Activity Questionnaire-Short Form¹⁶.

39 Research has produced positive evidence of the LTPAQ-SCI's test-retest reliability.
40 Intraclass correlation coefficients were significant for LTPAQ-SCI measures of mild, moderate,
41 heavy and total LTPA over a one-week test-retest period¹⁵. A recent study of the test-retest
42 reliability of a Canadian-French version of the questionnaire produced similarly strong ICCs¹⁷.
43 Evidence of the measure's criterion validity was shown by significant correlations between
44 LTPAQ-SCI measures of mild, moderate, heavy and total LTPA minutes per week and PARA-
45 SCI measures (i.e., the criterion) LTPA minutes per day at these same intensities¹⁵.

46 Support for the LTPAQ-SCI's construct validity has been generated in hypothesis-testing
47 studies¹⁸. For example, LTPAQ-SCI measures of LTPA have been shown to increase
48 significantly in response to LTPA-enhancing interventions delivered to adults with SCI¹⁹ and
49 multiple sclerosis²⁰. LTPAQ-SCI measures of LTPA have also been shown to differ in predicted
50 directions between adults with SCI with low versus high depressive symptomatology,²¹ and
51 between athletes with disabilities who participate in sport at lower (recreational, developmental)
52 versus higher (provincial, state, national) competitive levels²². It is important to note, however,
53 that construct validation is an ongoing process, and no one single experiment can 'prove'
54 construct validity¹⁸. Rather, each supportive study serves to strengthen the construct's
55 nomological network,²³ by demonstrating that the construct operates predictably within a system
56 of key concepts.

57 Cardiorespiratory fitness (CRF) is a key concept in relation to LTPA. It is well-established
58 that participation in moderate- to heavy-intensity exercise (a specific type of LTPA) imparts
59 significant improvements in the CRF of adults with SCI^{1,24}. If the LTPAQ-SCI is to be used as a
60 measure of LTPA, then its construct validation should include tests of its associations with CRF
61 (these types of tests are sometimes referred to as tests of 'convergent validity'¹⁸). Therefore, the
62 purpose of the present study was to examine the association between the number of minutes per
63 week of mild, moderate, heavy and total LTPA reported by adults with SCI who completed the
64 LTPAQ-SCI, and their CRF. It was hypothesized that number of minutes per week of LTPA
65 would be positively correlated with participants' CRF.

66 **Method**

67 **Participants**

68 Participants were 51 individuals who completed the LTPAQ-SCI and CRF assessment during
69 baseline testing for CHOICES (NCT01718977), a multicentre, randomized controlled clinical
70 trial assessing the effects of two different exercise interventions on cardiovascular health
71 outcomes in adults with SCI²⁵. This construct validation study was planned *a priori*, as a sub-
72 study within CHOICES, when the trial protocol was designed. CHOICES study inclusion criteria
73 were: male or female; 18-60 years of age; chronic (>1 year since injury), traumatic, motor-
74 complete SCI [American Spinal Injury Association Impairment Scale (AIS) A and B]; and
75 neurological level of injuries (NLI) between the cervical fourth and thoracic sixth vertebrae (C4-
76 T6). AIS and NLI were determined using the International Standards for neurological
77 Classification of SCI²⁶. Participants were excluded if they had: any medical history of symptoms
78 of cardiovascular disease; major trauma or surgery in the last six months; fracture within the
79 previous 12 months; or any psychological or cognitive dysfunction that prevented understanding
80 English instructions. All study procedures were approved by the research ethics board at each
81 trial site and all participants provided written informed consent prior to any of the study
82 procedures.

83 **Measures**

84 *LTPAQ-SCI*. The LTPAQ-SCI was administered during an interview conducted by a
85 research assistant (face-to-face interview at two sites and telephone interview at one site).
86 Consistent with the LTPAQ-SCI administration instructions,¹⁵ participants were first presented
87 with a standardized definition of LTPA: “physical activity that you choose to do during your free
88 time, such as exercising, playing sports, gardening, and taking the dog for a walk (necessary
89 physical activities such as physiotherapy, grocery shopping, pushing/wheeling for transportation
90 are not considered LTPA).” Next, participants were given a validated,¹¹ SCI-specific definition

91 of mild-intensity LTPA and were asked to recall a) the number of days, over the past 7 days, that
92 they did mild-intensity LTPA and b) on those days, how many minutes they usually spent doing
93 mild-intensity LTPA. These steps were repeated for moderate-intensity and heavy-intensity
94 LTPA. The number of minutes per week of LTPA performed at each intensity (mild, moderate
95 and heavy) was calculated by multiplying the days of activity by the minutes of activity. Total
96 LTPA was calculated as a sum of LTPA at each intensity, thus yielding the total number of
97 minutes of LTPA undertaken in the past week.

98 *Cardiorespiratory fitness (CRF)*. All participants underwent an incremental exercise test
99 using an electronically braked arm-crank ergometer (Lode BV, Groningen, The Netherlands;
100 Vancouver site, Monark 881E, Monark Exercise AB, Vansbro, Sweden; Toronto and Hamilton
101 sites) until the point of volitional exhaustion. Heart rate was recorded continuously using a chest
102 strap HR monitor (T31; Polar Electro Inc., Woodbury, NY, USA). Respiratory gases were
103 collected using a metabolic cart that was calibrated, prior to each use, according to the
104 manufacturer's instructions (Parvomedics Truemax 2400, Sandy, Utah, USA; Vancouver site:
105 Vmax Encore, SensorMedics, California, USA; Toronto site: Moxus Metabolic System, AEI
106 Technologies, Illinois, USA; Hamilton site).

107 Participants were asked to empty their bladders prior to the test to minimize the influence
108 of autonomic dysreflexia. The test protocol began with a warm-up of arm cranking at 0 Watts for
109 two minutes. Afterwards, the protocol continued with 1-minute stages, with a resistance
110 increment of 5-10 Watts per stage depending on the participant's neurological level of injury²⁷.
111 Participants were instructed to maintain a cycling cadence of 50 revolutions per minute (rpm)
112 throughout the duration of the test with continuous motivation delivered by the assessor. The test
113 continued to the point of volitional exhaustion or when the cadence dropped below 30 rpm.

114 Borg's rating of perceived exertion (RPE) 6-20 was administered at the end of every stage²⁸.
115 The highest $\dot{V}O_2$ of 20-second averaging during the test was recorded as peak oxygen uptake
116 ($\dot{V}O_{2\text{peak}}$). The highest power output maintained for at least 20 seconds was recorded as peak
117 power output (PO_{peak}).

118 **Procedure**

119 At two sites (Hamilton and Vancouver), the LTPAQ-SCI was administered during the
120 baseline testing session, prior to the CRF test. At one site (Toronto), the LTPAQ-SCI was
121 administered 8 days after the fitness test but before starting exercise in the CHOICES trial. This
122 timing was deliberate to avoid participants reporting any LTPA that was performed as part of the
123 CHOICES baseline testing or training protocols.

124 *Data Management and Analyses*

125 The respiratory exchange ratio (RER) was used to corroborate attainment of $\dot{V}O_{2\text{peak}}$
126 during the fitness test. Analyses were conducted only on participants who exhibited an RER \geq
127 1.00. People with tetraplegia cannot achieve the same $\dot{V}O_{2\text{peak}}$ and PO_{peak} as people with
128 paraplegia due to more severe autonomic and upper-body motor impairments²⁹. Consequently,
129 the distributions of these values differ for people with tetraplegia versus paraplegia²⁹. Therefore,
130 the measures of CRF (i.e. $\dot{V}O_{2\text{peak}}$ and PO_{peak}) were standardized for lesion level (i.e., paraplegia
131 or tetraplegia) through transformations to z-scores prior to analysis.

132 Descriptive statistics were calculated as means, standard deviations, medians and
133 minimum-maximum for continuous variables, and as percentages for the categorical variables.
134 Shapiro Wilk tests were used to check the normality assumption. Because the LTPAQ-SCI
135 variables presented significant deviations from the normal distribution, a square root
136 transformation was carried out on these variables. Using the transformed variables, one-tailed

137 Pearson correlation coefficients were calculated between the LTPAQ-SCI measures of mild,
138 moderate, heavy and total LTPA and the measures of CRF (i.e. $\dot{V}O_{2\text{peak}}$ and PO_{peak}). One-tailed
139 tests were used given the directionality of the hypotheses. All analyses were conducted using
140 IBM SPSS Statistics v. 26. Alpha was set at .05 for all analyses given the *a priori* nature of the
141 hypotheses. Cohen's conventions were used to interpret the magnitude of the correlations (i.e., *rs*
142 of .10, .30, .50 constitute small, medium and large correlations, respectively)³⁰.

143 **Results**

144 **Preliminary analyses**

145 After excluding data from 12 participants who did not achieve $RER \geq 1.00$, 39
146 participants remained for the main analyses. Excluded participants presented significantly lower
147 PO_{peak} and $VO_{2\text{peak}}$ values than the included ones. In addition, all excluded participants had
148 tetraplegia. No significant differences were found between excluded and included participants
149 regarding sex, age, age at injury, time since injury, body mass or height, or LTPAQ-SCI values.
150 Subsequent analyses were conducted with data from the remaining 39 participants. Table 1
151 shows the demographic data for both the full sample and the final sample, as well as the *p*-values
152 of the tests performed to detect potential differences between included and excluded participants

153 **Correlations between the LTPAQ-SCI measures of LTPA and aerobic fitness**

154 Table 2 presents the full correlation matrix. Minutes per week of mild-, moderate- and
155 heavy-intensity LTPA and total LTPA were all positively correlated with $\dot{V}O_{2\text{peak}}$. The
156 correlation between minutes per week of mild intensity LTPA and $\dot{V}O_{2\text{peak}}$ was small ($r = .231$, p
157 $= .079$) while all other correlations were medium-sized (*rs* ranged from .276 to .443, $ps < .05$).

158 Correlations between the LTPAQ-SCI variables and PO_{peak} were also positive. However, the
159 correlations were generally trivial to small (r s ranged from .087 to .193, p s > .05) except for the
160 correlation between heavy-intensity LTPA and PO_{peak} ($r = .294, p = .035$).

161 **Discussion**

162 The purpose of this study was to conduct a test of the construct validity of the LTPAQ-SCI.
163 As hypothesized, minutes per week of LTPA reported on the LTPAQ-SCI were positively
164 correlated with participants' CRF. Correlations tended to be stronger for heavy versus mild-
165 intensity LTPA and for $\dot{V}O_{2peak}$ than for PO_{peak} .

166 Overall, the pattern and size of the correlations were similar to correlations reported between
167 CRF and other self-report measures of PA for people with and without SCI. For instance, in tests
168 of the PARA-SCI's construct validity,¹⁴ correlations between CRF and moderate- and heavy-
169 intensity LTPA were medium-sized, while the correlation between CRF and mild-intensity
170 LTPA was small. These findings align with research demonstrating that in order to produce
171 significant CRF benefits, adults with SCI must exercise at a moderate- to heavy-intensity¹.
172 Exercise of a mild intensity is insufficient³¹. Our results show that the LTPAQ-SCI does indeed
173 capture CRF-enhancing LTPA in adults with SCI.

174 Our results are also similar to the medium-sized correlations reported in validation studies of
175 the IPAQ-SF, one of the most widely-used self-report measures of PA for the general population.
176 For instance, across three studies that reported correlations between the IPAQ-SF measure of
177 total minutes per week of PA and $\dot{V}O_{2max}$, the median correlation was $r = .30$ ³². We found a
178 correlation of $r = .33$ between LTPAQ-SCI total LTPA and $\dot{V}O_{2peak}$. It is worth noting that only
179 ~50% of the variance in CRF can be explained by environmental factors, such as physical
180 activity, with the rest attributed to hereditary/genetic factors³³. Furthermore, additional variance

181 in CRF within the SCI population can be attributed to the severity and exact level of neurological
182 injury sustained, contributing to the degree of autonomic and functional impairment³⁴. Thus, it is
183 encouraging to observe similar, if not slightly better, associations between LTPA and $\dot{V}O_{2peak}$ in
184 individuals with high-level SCI, supporting the construct validity of the LTPAQ-SCI in the
185 context of other well-used self-report measures of PA.

186 Our analyses suggested that LTPA was more strongly correlated with $\dot{V}O_{2peak}$ than PO_{peak} .
187 This finding differs from results from the PARA-SCI validation studies in which CRF tended to
188 be more strongly correlated with PO_{peak} than $\dot{V}O_{2peak}$ ¹⁴. These discrepancies are likely a statistical
189 artefact. There was greater variability in PO_{peak} values in the PARA-SCI validation study than in
190 the present study. When data variability is reduced, correlations may be lower than expected³⁵.
191 Nevertheless, as the correlations with PO_{peak} were all positive, and stronger for moderate- and
192 heavy-intensity LTPA than mild-intensity LTPA, we take this as further support for the construct
193 validation of the LTPAQ-SCI as a measure of CRF-enhancing LTPA.

194 Importantly, scale validation studies do not confirm that the scale itself is valid. No study can
195 ‘validate’ a scale. Rather, validation studies substantiate the inferences that can be made about
196 people based on their scale scores (e.g., the amount of LTPA they do each week)¹⁸ and that the
197 scale is valid for use with a particular group of people in a particular context¹⁸. The present study
198 was conducted with a sample of men and women with chronic, motor complete cervical or high
199 thoracic injuries. Although we would expect the results to generalize to individuals with
200 incomplete, lower-level injuries,¹⁴ this hypothesis should be tested in heterogenous samples.

201 There is also a need to conduct LTPAQ-SCI validation studies in countries other than
202 Canada, because definitions of LTPA may differ across cultural contexts³⁶. For instance, the
203 instructions for completing the LTPAQ-SCI stipulate that physiotherapy should not be counted.

204 This stipulation is included because during development of the PARA-SCI and LTPAQ-SCI,
205 many of the physiotherapy activities reported by Canadians with SCI, were neither leisure-time
206 nor fitness-enhancing activities (e.g., passive stretching, practicing transfers, practicing using
207 mobility equipment)¹³. However, in other countries or contexts, physiotherapy may routinely
208 include exercise or sport activities and may therefore be counted as LTPA. In a similar vein,
209 active transportation is uncommon among Canadians with SCI³⁷ because climate, terrain and
210 long distances are significant barriers. In some countries, however, it may be more common for
211 people with SCI to use active forms of transportation (e.g., handcycling in European countries³⁸)
212 in order to get exercise. In these circumstances, it may make sense to report such activities on the
213 LTPAQ-SCI. By testing the relationships between CRF and LTPAQ-SCI scores, including and
214 excluding physiotherapy and active transportation activities, users of the LTPAQ-SCI can better
215 define and measure LTPA in their contexts.

216 Strengths of this study include standardized administrations of the LTPAQ-SCI and the
217 CRF test, as well as multi-site data collection to maximize participant enrolment. A limitation is
218 that only one aspect of physical fitness was measured. Muscular strength and endurance are two
219 additional physical fitness aspects that should correlate positively with LTPAQ-SCI scores¹⁴ and
220 should be examined in future construct validation studies. Furthermore, if study participants
221 engaged primarily in strength-training LTPA (e.g., lifting weights), the correlation between their
222 LTPAQ-SCI measure of minutes per week of LTPA and their CRF may have been attenuated
223 relative to individuals who engaged primarily in CRF-enhancing LTPA (e.g., arm cycling).

224 Another study limitation is that data collected from nearly half of the tetraplegic
225 participants (12 out of 27) could not be used because they terminated the CRF test before
226 achieving criteria indicative of a peak exercise test (i.e., $RER \geq 1.00$). Because of arm fatigue

227 during exercise testing, peripheral ratings of perceived exertion increase much faster in those
228 with tetraplegia than paraplegia³⁹ prompting participants to terminate the test before achieving
229 peak. Given this challenge, researchers should consider other feasible, valid measures of CRF
230 that could be used in LTPAQ-SCI construct validation studies involving participants with
231 tetraplegia. An alternative construct validation approach may be to assess associations between
232 LTPAQ-SCI scores and 7-day overall physical activity levels measured via wearable devices.
233 While limitations of accelerometers attached to a single anatomical location or wheelchair have
234 been noted in people with SCI^{7,9}, the estimation of physical activity intensity can be improved by
235 utilising multi-sensor devices that incorporate physiological signals (such as galvanic skin
236 responses or heart rate) and utilising complex or individualised modelling approaches^{40,41}.
237 Combined with the use of diaries or logs to distinguish periods of LTPA from other physical
238 activity types, assessing the associations between outputs from multi-sensor wearable devices
239 and the LTPAQ-SCI may be a way to test the validity of this measure while overcoming some of
240 the challenges noted with assessing CRF in individuals with tetraplegia.

241 In conclusion, the results of the present study demonstrate that self-reported LTPA, as
242 measured by the LTPAQ-SCI, is positively correlated with CRF in adults with chronic, motor
243 complete cervical or high thoracic SCI. When considered with previous research showing that
244 LTPAQ-SCI scores vary in predictable ways across meaningful groups and in response to
245 behavioural interventions^{15,17-22}, these results provide further support for the construct validity of
246 the LTPAQ-SCI as a measure of LTPA for adults with SCI. Further construct validation studies
247 are needed to demonstrate the validity of the LTPAQ-SCI for use as a measure of LTPA in more
248 heterogeneous samples of people with SCI and in other countries and contexts.

249 **Data archiving:** The datasets generated during and/or analysed during the current study
250 are available from the corresponding author on reasonable request.

251 **Acknowledgements:** We thank Adrienne Sinden for her assistance with manuscript
252 preparation.

253 **Ethics:** Ethics approval was obtained from the University of British Columbia (H12-
254 02945-11), McMaster University (12-672) and Toronto Rehabilitation Institute – University
255 Health Network (12-5797).

256 **Conflict of interest:** The authors declare that they have no conflict of interest.

257 **Author contributions:** KAMG was responsible for conceptualizing and designing the
258 study, interpreting results and writing the report. JU-C was responsible for analyzing the data,
259 writing the results, creating tables and providing feedback on the report. AAA was responsible
260 for collecting and cleaning the data, drafting the methods section and providing feedback on the
261 report. TEN was responsible for assisting during data collection, drafting the methods section,
262 assisting with data interpretation, and providing feedback on the report. JSA was responsible for
263 assisting in the design of the study protocol, drafting the methods section, assisting with data
264 interpretation, and providing feedback on the report. KDC was responsible for assisting during
265 data collection and providing feedback on the report. MH was responsible for assisting during
266 data collection and providing feedback on the report. AK is the Principal Investigator for the
267 CHOICES study and was responsible for designing and overseeing implementation of all aspects
268 of the CHOICES protocol and providing feedback on the report.

269 **Funding:** This study was funded by a project grant from the Canadian Institutes of
270 Health Research (CIHR) with the funding reference number (TCA 118348). The first author
271 holds the Reichwald Family Southern Medical Program Chair in Chronic Disease Prevention.

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Table 1. Characteristics of Participants in the Full Sample and the Analyzed Sample and p-values of Tests to Detect Differences Between Included and Excluded Participants.

	Full Sample (n=51)	Analyzed Sample (n=39)	p-value
	n (% total); M \pm SD; Median, min-max	n (% total); M \pm SD; Median, min-max	
Sex			.964
Male	38 (74%)	29 (74%)	
Female	13 (26%)	10 (26%)	
Age (years)	42 \pm 10 43, 22-60	42 \pm 10 43, 22-60	.638
Age at injury (years)	28 \pm 13 24, 3-57	29 \pm 14 25, 3-57	.252
Years post-injury	14 \pm 11 10, 1-42	13 \pm 11 10, 1-42	.502
Level and severity of injury			<0.001
Tetraplegia AIS A	16 (31%)	8 (21%)	
Tetraplegia AIS B	11 (22%)	7 (18%)	
Paraplegia AIS A	24 (47%)	24 (61%)	
Body mass (kg)	78.5 \pm 17.6 78.2, 44.9-135.7	79.2 \pm 17.3 78.5, 44.9-135.7	.764
Height (cm)	176 \pm 10 177, 158-200	175 \pm 8 176, 158-188	.201
VO _{2peak}	12.53 \pm 5.48 11.24, 5.49-29.84	13.93 \pm 5.49 13.60, 6.07-29.84	<.001
PO _{peak}	52 \pm 29 50, 10-130	60 \pm 28 60, 10-130	.001
Mild LTPA	204 \pm 278 120, 0-1680	221 \pm 308 135, 0-1680	.555
Moderate LTPA	102 \pm 118 60, 0-480	115 \pm 124 60, 0-480	.093
Heavy LTPA	56 \pm 100 15, 0-480	60 \pm 96 20, 0-480	.260
Total LTPA	363 \pm 395 240, 0-2405	395 \pm 431 240, 0-2405	.291

AIS: ASIA Impairment Scale

Table 2. Correlation Matrix Showing Pearson Correlation Coefficients for Cardiorespiratory Fitness and LTPAQ-SCI Measures of Mild, Moderate, Heavy and Total Leisure-Time Physical Activity (LTPA)

<i>Measure</i>	VO _{2peak}	PO _{peak}	Mild LTPA	Moderate LTPA	Heavy LTPA	Total LTPA
VO _{2peak} (mL/kg/min)	1					
PO _{peak} (Watts)	.773**	1				
Mild LTPA (min/wk)	.231	.087	1			
Moderate LTPA (min/wk)	.276*	.193	.315*	1		
Heavy LTPA (min/wk)	.443**	.294*	.225	.499**	1	
Total LTPA (min/wk)	.330*	.176	.815**	.729**	.591**	1

Note. *p<0.05; **p<0.01 (one-tailed).

LTPAQ-SCI is the Leisure Time Physical Activity Questionnaire-Spinal Cord Injury. VO_{2peak} is peak volume of oxygen consumption and PO_{peak} is peak power output during the cardiorespiratory fitness test.