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Title: The functional independence of patients with stroke sequelae: How important is the speed, oxygen consumption and energy cost of walking?

Authors: Maxence COMPAGNAT^{1,2}, Stéphane MANDIGOUT¹, Anaick PERROCHON¹, Justine LACROIX¹, Nicolas VUILLERME³, Jean Yves SALLE^{1,2}, Jean Christophe DAVIET^{1,2}

¹ HAVAE EA6310 (Handicap, Aging, Autonomy, Environment), IFRH, University of Limoges, 87042 Limoges, France

² Department of Physical Medicine and Rehabilitation in the University Hospital Center of Limoges, 87042 Limoges, France

³ AGEIS, University Grenoble Alpes, , Grenoble, 38 041 Grenoble CEDEX 9, France, France

Corresponding Author: Maxence Compagnat M.D

Department of Physical Medicine and Rehabilitation in the
University Hospital Center of Limoges in France,

2 Avenue Martin Luther King, 87000 Limoges

Telephone (+33)5 55 05 55 55

FAX:(+33)5 55 05 65 13

E-mail: maxence.compagnat@unilim.fr

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This manuscript has never previously been presented in any scientific meeting or publication.

1 *The functional independence of patients with stroke sequelae:*

2 *How important is the speed, oxygen consumption and energy cost of walking?*

3 **Abstract**

4 **Objective:** To evaluate the association between walking speed at self-selected comfort pace (S_{free}),
5 oxygen consumption at S_{free} (VO_{2free}), the oxygen cost of walking at S_{free} (C_w), and mobility
6 independence and independence for activities of daily living in post-stroke individuals.

7 **Design:** cross sectional study

8 **Setting:** hospital

9 **Participants:** All individuals with stroke who were able to walk without human assistance were
10 included.

11 **Intervention:** N/A

12 **Main outcome measures:** C_w was captured during walking from measurements of S_{free} and
13 VO_{2free} . Mobility independence was assessed based on the Modified Functional Ambulatory
14 Classification (mFAC) and independence in activities of daily living by the Barthel Index (BI).
15 Multiple linear regression analyses were performed to evaluate the independence of C_w , VO_{2free} and
16 S_{free} on the determination of BI and mFAC among the various characteristics of the population (age,
17 stroke delay, body mass index, motor function, and spasticity).

18 **Results:** We included 90 individuals (age= 63.5 ± 14.0 years). We reported $C_w = 0.36 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{m}^{-1}$;
19 $\text{IQR} = 0.28 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{m}^{-1}$, $S_{free} = 0.60 \pm 0.32 \text{ m} \cdot \text{s}^{-1}$, $VO_{2free} = 11.2 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$; $\text{IQR} = 1.8 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$.
20 The multiple linear regression analyses showed that C_w and S_{free} were independently associated with
21 the BI ($p < 0.01$) and the mFAC ($p < 0.01$) scores. VO_{2free} was not found to be an explanatory variable
22 of functional independence ($p > 0.05$).

23 **Conclusion:** C_w was independently associated with functional independence. This association
24 appears to be primarily determined by S_{free} and not VO_{2free} , underscoring the importance of evaluating
25 and acting on S_{free} to improve the functional independence of individuals with stroke.

26 **Keywords:** stroke, disability, independence score, oxygen cost, walking efficiency

27

28 Full recovery is achieved in only a small proportion of stroke survivors¹. Activity limitations
29 manifest themselves as a reduced ability to perform daily tasks. Forty percent of stroke survivors
30 report difficulties with basic self-care (e.g., getting dressed, eating) at 6 months after stroke. More than
31 30% of stroke survivors report participation restrictions (e.g., difficulty with autonomy, engagement,
32 or fulfilling societal roles) even at 4 years after stroke².

33 The oxygen cost of walking (C_w) is the oxygen consumption per unit of distance travelled. C_w is
34 calculated by dividing the oxygen consumption of the individual at the metabolic plateau during
35 walking at a self-selected speed (VO_{2free}) by the self-selected walking speed (S_{free})³. At S_{free} , post
36 stroke individuals have C_w 2 to 3 times higher than healthy individuals³. In addition, C_w varies
37 greatly from one stroke individual to another.⁴

38 VO_{2free} and S_{free} are profoundly impacted by the sequelae of stroke. Compagnat et al. reported that
39 the VO_{2free} of 35 individuals with stroke was $12.8 \text{ mL.kg}^{-1}.\text{min}^{-1} \pm 2.86 \text{ mL.kg}^{-1}.\text{min}^{-1}$ compared to 7
40 $\text{mL.kg}^{-1}.\text{min}^{-1} \pm 1.9 \text{ mL.kg}^{-1}.\text{min}^{-1}$ for healthy individuals at equivalent speeds⁵. The reasons for the
41 increase in VO_2 during walking are not well known. Some authors incriminate an increase in muscle
42 activity related to spasticity and compensatory motor strategies⁶. The increase in C_w is also explained
43 by the decrease in S_{free} due to various factors. It has been shown that motor impairment, balance
44 disorders, and cognitive disorders, which are common sequelae of stroke, have a negative impact on
45 S_{free} ⁷. The increase in VO_{2free} and the decrease in S_{free} are therefore the components of the increase in
46 C_w . It may thus reflect both metabolic (i.e. VO_{2free}) and biomechanical (i.e. S_{free}) factors that can have
47 a strong impact on the functional independence of stroke individuals.

48 Functional independence is the ability to carry out activities of daily living in a safe and
49 autonomous manner. There are several scales to assess functional independence. Among these, the
50 Modified Functional Ambulation Classification (mFAC) and the Barthel Index (BI) are two scales
51 recommended by scientific societies^{8,9}. The mFAC is a scale that was devised to assess the
52 independence of individuals in terms of their mobility¹⁰, while the BI is a broader scale that is used to
53 assess independence in terms of activities of daily living (e.g., mobility, washing, dressing, eating, and
54 bowel management)¹¹. These scales have been validated for individuals with stroke^{10,11} and they have

55 been used extensively in the literature. The mFAC and the BI are predictive of social participation
56 ^{1,10,12,13}. It is, therefore, essential to explore the factors that determine these scores. Motor impairment
57 and age are major determinants of functional independence ^{14,15}. Balance disorders, cognitive
58 impairments, and sensory impairments are also prognostic factors for the functional abilities of
59 individuals with stroke sequelae ¹⁶⁻¹⁸. The association between Cw and functional independence has
60 not been reported to date in the literature. However, it is highly likely that this association is
61 significant because the two components of Cw (S_{free} and $VO_{2\text{free}}$) appear to be associated with the
62 functional independence of individuals with stroke ^{19,20}. Indeed, S_{free} is strongly correlated with the
63 functional recovery of the lower limbs, which is also associated with functional independence^{21,22}. The
64 metabolic function is also associated with the walking function²³, however its implications for
65 functional independence have never been demonstrated in the stroke population ¹⁹.

66 Thus, the objective of our work was to evaluate the association between Cw and functional
67 independence and to assess whether Cw is an independent determinant of functional independence
68 scores (mFAC and BI) in individuals with stroke. The secondary objective was to evaluate which
69 parameter among $VO_{2\text{free}}$ and S_{free} that make up Cw are associated with the functional independence
70 scores.

71 ***Methods***

72 ***Population***

73 ***Participant selection:***

74 The participants were recruited in a physical and rehabilitation medicine department. The
75 inclusion criteria were the following: a single stroke confirmed by brain imaging, and the ability to
76 walk continuously for 6 minutes with or without mobility aids. The exclusion criteria were the
77 following: acute cardiac or respiratory pathologies or decompensated chronic pathologies. Cardiac
78 disorders were identified using the complementary examinations that were usually carried out in post-

79 stroke assessment, i.e., electrocardiogram and cardiac ultrasound. We did not perform a stress test
80 before the study.

81 The healthcare professional responsible for the protocol informed the patients of the details of the
82 protocol before registering their verbal consent. This consent was transcribed in the database. The
83 research protocol was accepted by a French ethics committee, notice number: xxxxxx

84 ***Stroke individual evaluation***

85 Mobility independence was assessed using the Modified Functional Ambulation Classification
86 (mFAC) ¹⁰. Independence in terms of activities of daily living (ADL) was evaluated using the Barthel
87 Index (BI) ¹¹. Motor function was assessed using the Demeurisse Motricity Index ^{24,25}. Spasticity was
88 evaluated using the modified Ashworth scale (MAS) ²⁶ (see the description of the evaluation of mFAC
89 and Barthel Index and Demeurisse Motricity Index in the appendix).

90 This evaluation was carried out because motor function is one of the main functions associated
91 with Cw and independence scores^{27,28}. All of these assessments were performed by the same examiner
92 for all of the participants.

93 ***Experimental design:***

94 All of the subjects performed the entire test under the same conditions. We performed the VO₂
95 measurement according to the same protocol for each patient. First, we left the patient resting on a
96 chair in order to obtain a stable metabolic resting plateau. This period was applied to avoid starting the
97 test with residual oxygen consumption from a previous activity. The patient was then asked to walk
98 for 6 minutes in a 40 m loop, with no obstacles or U-turns. This 6-minute duration was chosen because
99 approximately 4 minutes are required to achieve metabolic stability in subjects affected with chronic
100 pathologies ^{29,30}. Several studies focusing on the oxygen cost of walking in post-stroke hemiparetic
101 subjects have used a similar duration to obtain a stable metabolic plateau ^{6,27,31}. The main instruction
102 for each patient was to maintain their S_{free} for the duration of the test. The VO₂ measurement was
103 performed with the MetaMax3b (see specifications and calibration protocol in the appendix).

104 ***Calculation of Cw:***

105 Cw was calculated from the patient's VO_{2free} , defined by a variation of VO_2 of less than 2
106 $mL.kg^{-1}.min^{-1}$, as described in previous studies related to the oxygen cost of walking for post-stroke
107 subjects²⁷. In order to estimate Cw, we divided the VO_{2free} value by the S_{free} measured over the 6
108 minutes of walking. Cw was, therefore, expressed in mL of $O_2.kg^{-1}.m^{-1}$.

109 ***Statistical analysis:***

110 We reported the mean and the standard deviation for the quantitative variables with normal
111 distributions, and the median and interquartile range (IQR) for the quantitative variables with non-
112 normal distributions. The normality of the variables was assessed using the Shapiro-Wilk test.

113 We performed a Spearman-type correlation analysis to assess the association between Cw and
114 mFAC and BI. The rule of thumb for interpreting the size of a correlation coefficient was the
115 following: .90 to 1.00, a very high correlation; .70 to .90, a high correlation; .50 to .70, a moderate
116 correlation; .30 to .50, a low correlation; .00 to .30, a negligible correlation³².

117 Secondly, we assessed whether Cw was an independent explanatory variable of functional
118 independence scores among the other population characteristics that were collected (motor function,
119 spasticity, age, Body Mass Index, and stroke delay). For this, we performed a stepwise multiple linear
120 regression between BI and mFAC and these characteristics. We chose this type of analysis because it
121 has been used in many similar studies such as the work by Patterson et al. on the relationship between
122 walking function and the characteristics of the stroke population²³. The stepwise procedure also
123 enabled us to take into account auto-correlations between the variables³³. In addition, Peck et al.
124 described statistical models to allow the use of multiple regression analysis despite variables not
125 following a normal distribution³⁴. Thus, our first type of multiple linear regression analysis model
126 (model 1) included the mFAC scores and BI as the dependent variables. The variables Cw, the
127 Demeurisse Motricity Index, MAS, stroke delay, age, and Body Mass Index were the explanatory
128 variables.

129 To improve our understanding of the determinants of a possible association between Cw and
130 functional independence, we performed a similar statistical analysis by integrating the components of
131 Cw i.e. S_{free} and VO_{2free} . For this purpose, we defined a second model (model 2). Thus, for this model,
132 the mFAC scores and BI were the dependent variables. The variables S_{free} , VO_2 , the Demeurisse
133 Motricity Index, MAS, stroke delay, age, and Body Mass Index were the explanatory variables. In
134 addition, a correlation analysis between VO_{2free} and S_{free} was performed in order to understand how
135 these 2 variables were related to each other.

136 The statistical significance threshold was 0.05 for all of the tests. All of the statistical analyses
137 were performed using RealStats 2016 software (Real Statistics Using Excel© 2012 - 2019, Charles
138 Zaiontz).

139 **Results**

140 We included 90 individuals during the period from November 2015 to September 2018. The
141 participants were primarily individuals in follow-up at the Physical and Rehabilitation Medicine Unit
142 (inpatient or outpatient) following their stroke, with a median post-stroke time of 60 days; IQR=150
143 days. Their levels of impairment and functional independence were moderate and representative of the
144 stroke patients who were able to walk in our unit. The median Cw was at $0.34 \text{ mL.kg}^{-1}.\text{m}^{-1}$, IQR= 0.28
145 $\text{mL.kg}^{-1}.\text{m}^{-1}$. (Table1)

146 Insert table 1

147 For our main objective, the Spearman correlation analysis revealed that Cw, S_{free} and VO_{2free} were
148 significantly correlated with BI (respectively $r=-0.51$, $p<0.01$; $r=0.50$, $p<0.01$, $r=0.35$, $p<0.01$) and
149 mFAC (respectively $r=-0.56$; $p<0.01$; $r=0.55$, $p<0.01$; $r=0.33$, $p<0.01$). (Table 2)

150 Insert table 2

151 For model 1, we showed that Cw was significantly associated with the BI (coeff = -8.31 ; $p<0.01$;
152 Intercept= 98.03) and the mFAC (coeff = -0.73 ; $p<0.01$; Intercept= 8.63) scores. The Demeurisse
153 Motricity Index of the upper limb was also identified as an independent factor for BI (coeff= 0.11 ;

154 p=0.03) and the Demeurisse Motricity Index of the lower limb for mFAC (coeff=0.02; p=0.01). The
155 level of determination for the multiple linear regression was $R^2=0.32$ ($p < 0.01$) for mFAC and
156 $R^2=0.29$ ($p < 0.01$) for BI. (additional figure 1 and 2)

157 For model 2, S_{free} was the parameter most associated with mFAC (coeff = 2.98; intercept = 3.72;
158 $p < 0.01$) and BI (coeff = 26.85; intercept = 76.13; $p < 0.01$), while VO_{2free} was not found as an
159 independent explanatory variable (see table 3 and 4).

160 Correlation analysis between S_{free} and VO_{2free} showed a significant correlation ($r=0.56$, $p < 0.001$).

161 Insert table 3 and table 4

162 *Discussion*

163 This work involving a population of 90 stroke individuals showed a significant correlation
164 between Cw and functional independence scores for ADLs and mobility. In addition, the multiple
165 regression analysis showed that Cw was an independent factor of mFAC and BI when other
166 population characteristics were integrated such as motor function, spasticity, and age. After
167 decomposing Cw into S_{free} and VO_{2free} , the multiple regression analysis reported that S_{free} was the
168 parameter most associated with independence in ADLs and movement.

169 We observed a negative correlation between Cw and mFAC ($r=-0.56$, $p < 0.01$) and BI (-0.51 ,
170 $p < 0.01$). To our knowledge, this is the first time this result has been described in the literature. These
171 results suggest that the individuals who exhibit the most unfavorable Cw are those who have the
172 highest level of dependence. Other works in the literature point in this direction. In particular,
173 Franceschini et al. reported that Cw was associated with social participation as assessed by the
174 Walking Handicap Scale³⁵. In this work, which measured the Cw of individuals with various
175 neurological pathologies (stroke, spinal cord injury, multiple sclerosis), the authors showed that a Cw
176 greater than $0.52\text{mL}\cdot\text{kg}^{-1}\cdot\text{m}^{-1}$ for individuals with stroke was predictive of a restriction of in
177 community ambulation. Since social participation is closely related to functional independence³⁶, our
178 results are consistent with those of Franceschini et al.

179 To improve our understanding of the mechanisms explaining these results, we performed a
180 stepwise multiple regression analysis between population characteristics and functional independence
181 scores. Our results suggest that Cw was thus identified as an independent factor from independence in
182 regard to mobility and ADLs. This is an important result because Cw was not confused with motor
183 function, as could have been assumed ²⁷. It is hence possible that Cw is much more than a direct result
184 of the individual's deficiencies. Our view is that Cw also represents impairments and the
185 compensations engaged by the individual, which is not explored by the impairment scales but taken
186 into account by the functional independence scales such as mFAC and BI. We believe that this is what
187 explains the independence between Cw and the Demeurisse Motricity Index for the determination of
188 mFAC and BI.

189 The linear multiple regression analysis for mFAC and BI highlighted two other independent
190 factors: age and motor function. This result is consistent with the literature as the lower limb motor
191 function has been reported to be one of the functions most correlated with walking ability ⁷. The
192 identification of the motricity function of the upper limb and age as independent factors of BI is
193 consistent with the literature and our clinical experience because independence for ADLs is closely
194 related to the function of the upper limbs, especially in regard to all dressing and grooming activities
195 ^{18,37}. On the other hand, we observed that age was an independent factor of mFAC and BI. This
196 element has been reported several times in the scientific reference work for this population ^{9,38}. It has
197 been shown that function recovery and strategies to compensate for impairments are lower in older
198 individuals, which impacts the level of disability after a stroke ^{14,39}.

199 In our work, spasticity was not associated with the independence scores. This result is reason for
200 further debate regarding the actual impact of spasticity on functional independence. The literature
201 reports that spasticity is correlated with stroke severity and motor impairment severity ⁹. In our
202 situation, the individuals were able to walk and had a moderate level of severity with low MAS scores.
203 It is possible that the lack of a correlation with the independence scores is related to the low median
204 MAS score. Such an association would probably have been significant in individuals with more severe
205 stroke sequelae.

206 To deepen the reflection on the association between Cw and functional independence, we then
207 dissociated Cw into S_{free} and VO_{2free} and performed the same statistical analysis (model 2). We found
208 that S_{free} was independently associated with mFAC and BI. In contrast, VO_{2free} was not found as an
209 independent explanatory variable for mFAC and BI. In addition, VO_{2free} and S_{free} were significantly
210 positively correlated ($r=0.56$, $p<0.001$), meaning that the lower the S_{free} of an individual with stroke,
211 the lower the VO_{2free} . These results provide insight into the complex associations between VO_{2free} , S_{free} ,
212 Cw and functional independence. Thus, we highlight that functional independence scores are strongly
213 associated with S_{free} . This is in agreement with previous knowledge. Indeed, Brun et al. reported that
214 the various levels of this scale were strongly associated with maximum and comfortable walking
215 speeds ($p < 0.001$)¹⁰. This is also what is reported by Potter et al. between S_{free} and BI⁴⁰. The
216 association between VO_{2free} and functional independence scores is less explored in the literature. Ivey
217 et al. reported in their review of the literature that cardiovascular function in individuals with stroke
218 may be a major determinant of functional independence¹⁹. Indeed, in this work, the authors point out
219 the very significant degradation of the cardio respiratory capacities of stroke individuals who present a
220 VO_2 peak between 26 and 87% lower than that of a healthy individual of the same age⁴¹. In addition to
221 this cardiorespiratory deconditioning, individuals with strokes have a higher oxygen consumption to
222 achieve ADLs⁵. Walking, like other ADLs, causes stroke patients to experience levels of metabolic
223 demand close to intense effort, leading to fatigue and intolerance to activity⁴². Our results do not
224 contradict these results because VO_{2free} is not a direct assessment of cardiorespiratory capacity. Indeed,
225 the exploration of the cardiorespiratory capacity should go through the $VO_{2peak/max}$ or the expression of
226 VO_{2free} as a percentage of $VO_{2peak/max}$. Ivey et al. showed that individuals with stroke had a VO_{2free}
227 equivalent to 66%-75% of their $VO_{2peak/max}$ when healthy individuals of the same age had a VO_{2free}
228 equivalent to 27% of their $VO_{2peak/max}$ ¹⁹. In addition, the literature has shown that walking speed
229 determines VO_2 when walking because increased walking speed increases muscle recruitment and thus
230 oxygen consumption⁴³. By this mechanism, an adaptation strategy on the part of individuals with
231 stroke should be seen. Indeed, authors such as Schrack et al.⁴⁴ and Patterson et al.²³ have described
232 that the decrease in walking speed was associated with an individual's decreased cardiorespiratory
233 capacity. The lack of an independent association between functional independence scores and VO_{2free}

234 does not rule out incrimination as a metabolic limiting factor. In order to explore this hypothesis, the
235 $VO_{2max/peak}$ for individuals with stroke should have been included, but unfortunately this exploration
236 was not conducted for practical reasons.

237 ***Limitations***

238 The limitations of this work lie primarily with the lack of completeness in regard to the impairments
239 that were assessed. The choice of focusing mainly on motor impairment was made because motor
240 impairment has been reported to be the main impairment associated with both the variation of the Cw
241 and functional independence^{27,35}. However, cognitive functions, sensitivity, balance, and mood
242 disorders are strongly implicated in patient independence and were not evaluated in our work. This is
243 certainly why the prediction values of our statistical models are moderate (<0.4). In the future, it will
244 be necessary to collect other impairments in order to evaluate their impact on the relationship between
245 Cw and functional independence scores.

246 ***Conclusions***

247 This work involving a population of 90 individuals with stroke sequelae revealed a significant
248 association between Cw and ADLs assessed using BI and mobility independence assessed using
249 mFAC. These results indicate that Cw is an important independent factor for functional independence,
250 as is age and motor function. However, this association appears to be primarily determined by S_{free} and
251 not VO_{2free} , underscoring the importance of evaluating and acting on S_{free} to improve the functional
252 independence of individuals with stroke.

253

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361 **Table & Figure legends:**

362 **Table 1:** Characteristics of the population.

363 **Table 2:** Correlation analysis between the characteristics of stroke individuals and independence
364 scores (Barthel Index, Modified Functional Ambulation Classification).

365 **Table 3:** Stepwise linear regression analysis of mFAC for stroke individuals (n=90).

366 **Table 4:** Stepwise linear regression analysis of Barthel Index for stroke individuals (n=90).

367 **Additional Figure 1:** Distribution of the Modified Functional Ambulation Classification scores
368 depending on the oxygen cost of walking.

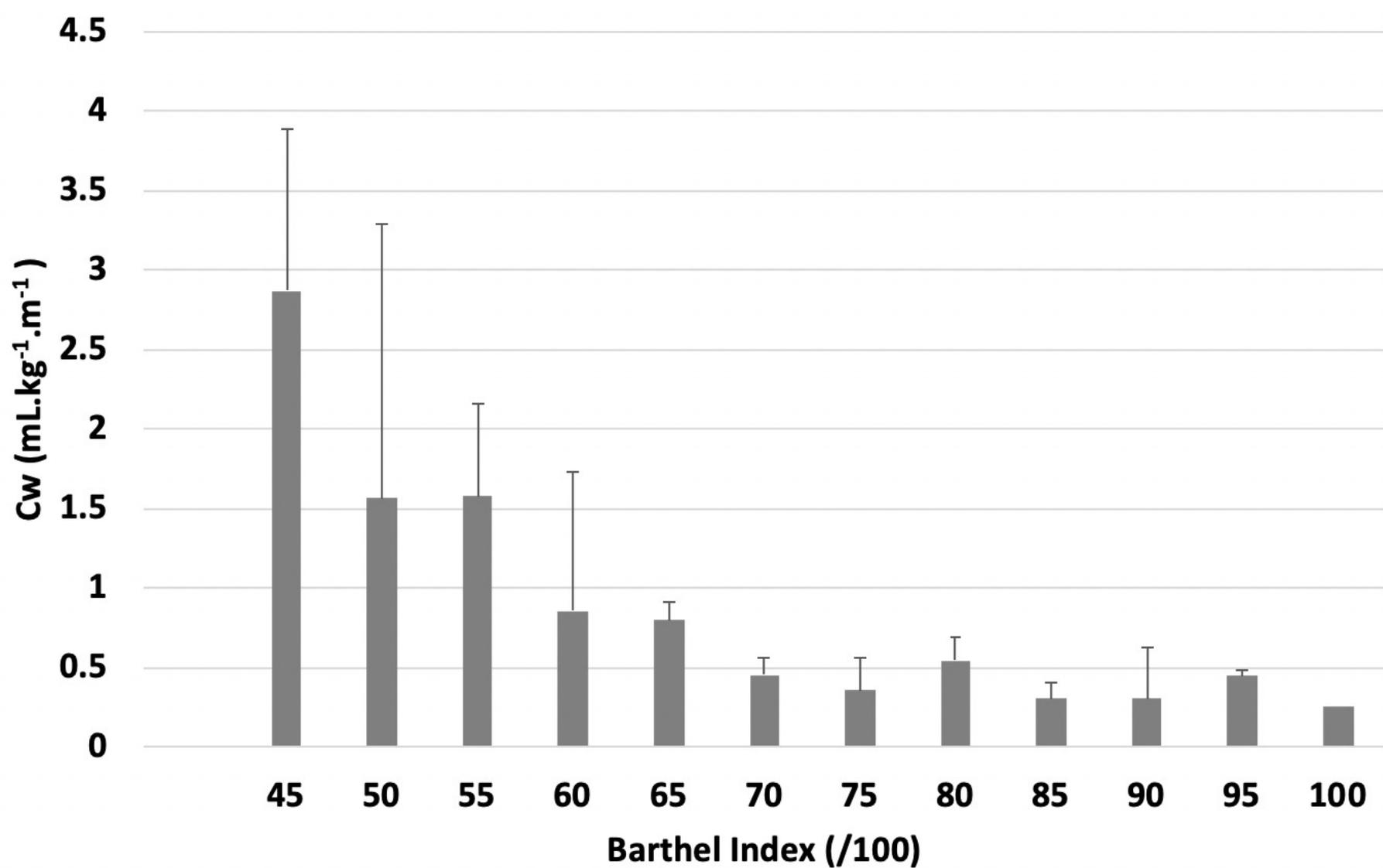
369 mFAC: Modified Functional Ambulation Classification; Cw: oxygen cost of walking

370 **Additional Figure 2:** Distribution of Barthel Index scores depending on the oxygen cost of walking.

371 Cw: oxygen cost of walking

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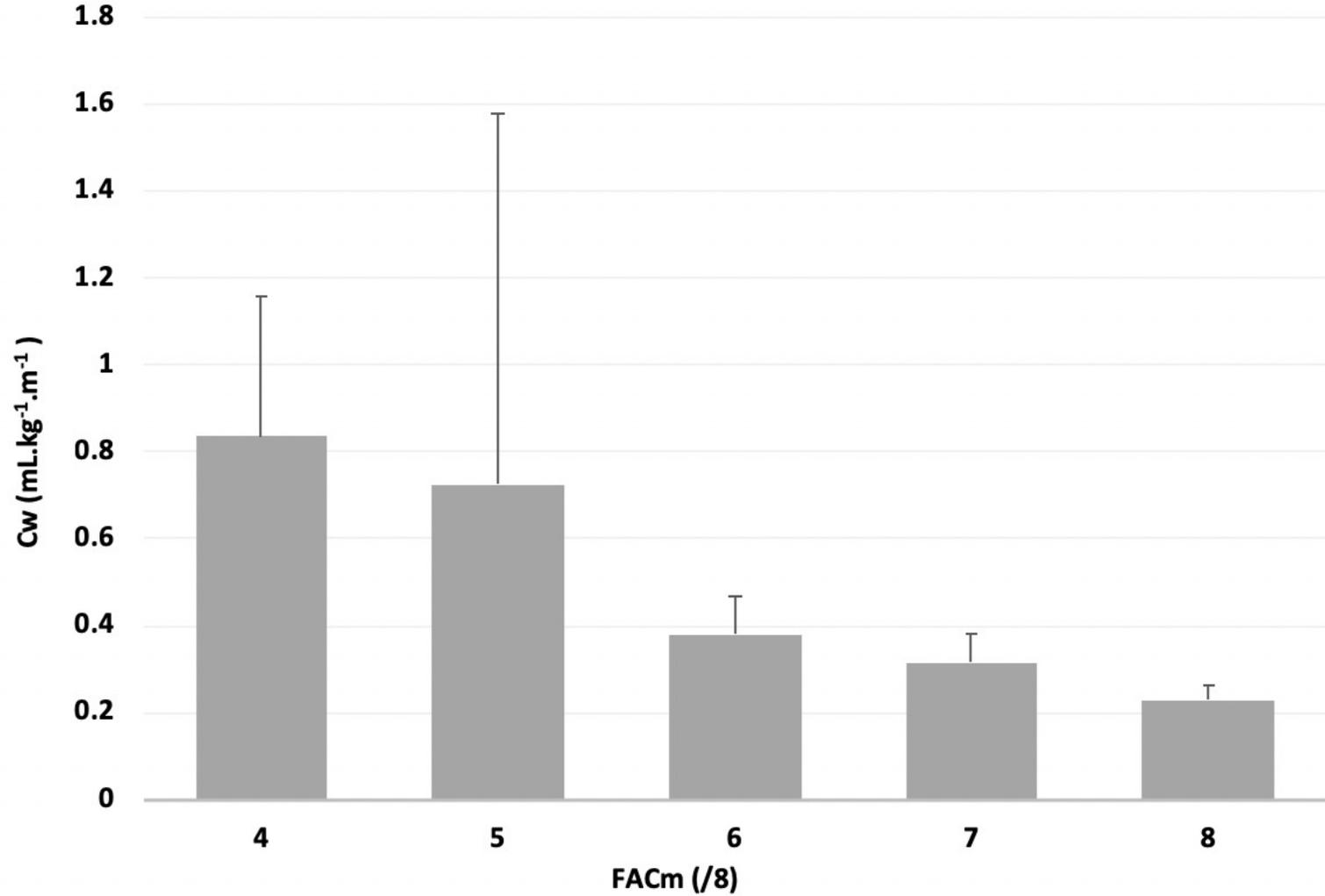


Table 1 : Characteristics of the population.

	Median	IQR
Sex (M/W)	61/29	NA
Age (year) *	63.5	14.0
BMI (kg.m⁻¹)	25.7	6.8
Stroke delay (days)	60	150
Demeurisse upper limb score (/100)	77	50
Demeurisse lower limb score (/100)	76	30
MAS (/4)	0	1
S_{free} (m.s⁻¹) *	0.60	0.32
VO_{2free} (mL.kg⁻¹.min⁻¹)	11.2	1.8
C_w (mL.kg⁻¹.m⁻¹)	0.34	0.28
Barthel Index (/100)	80	27
mFAC (/8)	6	3

* : Age and S_{free} were reported as mean and SD due to a normal distribution ; IQR : Q3-Q1 range ;

BMI: Body Mass Index; MAS: modified Ashworth Scale; S_{free} : self selected walking speed, VO_{2free} oxygen consumption at metabolic plateau at self selected walking speed. mFAC: modified Functional Ambulation Classification; C_w : oxygen cost of walking at S_{free}

Table 2 : correlation analysis between characteristics of stroke individuals and independence scores (Barthel Index, FACm).

	Barthel Index		FACm	
	<i>r</i>	<i>p-value</i>	<i>r</i>	<i>p-value</i>
Age (year)	-0.21	<i>0.05</i>	-0.19	<i>0.07</i>
Stroke delay (days)	0.07	<i>0.51</i>	0.05	<i>0.63</i>
BMI (kg.m⁻¹)	-0.09	<i>0.37</i>	-0.26	<i>0.02</i>
Demeurisse upper limb score (/100)	0.30	<i><0.01</i>	0.23	<i>0.03</i>
Demeurisse lower limb score (/100)	0.32	<i><0.01</i>	0.35	<i><0.01</i>
MAS (/4)	-0.26	<i>0.05</i>	-0.22	<i>0.11</i>
S_{free} (m.s⁻¹)	0.50	<i><0.01</i>	0.55	<i><0.01</i>
VO_{2free} (mL.kg⁻¹.min⁻¹)	0.35	<i><0.01</i>	0.33	<i><0.01</i>
Cw (mL.kg⁻¹.m⁻¹)	-0.51	<i><0.01</i>	-0.56	<i><0.01</i>

BMI: body mass index ; Cw : oxygen cost of walking ; MAS modified Ashworth Scale.

Table 3: stepwise linear regression analysis of FACm for stroke individuals (n=90).

Model 1 et 2 : Dependent Variable : FACm

Explanatory Variables for Model 1: Age, BMI, stroke delay, Demeurisse Lower Limb Score, Demeurisse Upper Limb Score, MAS, Cw

Explanatory Variables for Model 2 : Age, BMI, stroke delay, Demeurisse Lower Limb Score, Demeurisse Upper Limb Score, MAS, Sfree, VO₂free

Model	Stepwise Analysis Model	Coeff	Std	<i>p-value</i>	R Squarre
Model 1	Intercept	8.63	1.19	<0.01	0.32
	Age	-0.04	0.01	<0.01	
	BMI	-0.08	0.03	0.01	
	Demeurisse lower Limb score	0.02	0.01	0.01	
	Cw	-0.73	0.21	<0.01	
Model 2	Intercept	3.72	0.28	<0.01	0.37
	Sfree	2.98	0.41	<0.01	

FACm : Functional Ambulation Classification modified, MAS: modified Ashworth scale, Cw : oxygen cost of walking ; Coeff : coefficient of the explanatory variable in the model ; Std : standard error ; Rsquarre : model determination coefficient ;; Cw : oxygen cost of walking.

Table 4: stepwise linear regression analysis of Barthel Index for stroke individuals (n=90).

Model 1 et 2 : Dependent Variable : BI

Explanatory Variables for Model 1: Age, BMI, stroke delay, Demeurisse Lower Limb Score, Demeurisse Upper Limb Score, MAS, Cw

Explanatory Variables for Model 2 : Age, BMI, stroke delay, Demeurisse Lower Limb Score, Demeurisse Upper Limb Score, MAS, Sfree, VO₂free

Model	Stepwise Analysis Model	Coeff	Std	<i>p-value</i>	R Squarre
Model 1	Intercept	98.03	7.75	<0.01	0.29
	Age	-0.35	0.11	<0.01	
	Demeurisse upper Limb score	0.11	0.05	0.03	
	Cw	-8.31	2.23	<0.01	
Model 2	Intercept	76.13	7.10	<0.01	0.34
	Sfree	26.85	4.28	<0.01	
	Age	-0.21	0.10	0.03	

BI : Barthel Index, MAS: modified Ashworth scale, Cw : oxygen cost of walking ; Coeff : coefficient of the explanatory variable in the model ; Std : standard error ; Rsquarre : model determination coefficient