Supplementary Material

Supplementary Table S1: Complete search strategy in the electronic database PubMed structured according to the PICO (Population Intervention Comparison Outcome) method

Search	PICO	Query
1	P	Search ((((((((((("Stroke" [MeSH]) OR "Stroke") OR "Strokes") OR "Post-Stroke") OR "Poststroke") OR "Cerebrovascular Accident") OR "Cerebrovascular Accidents") OR "CVA") OR "CVAs") OR "Apoplexy") OR "Brain Vascular Accident") OR "Brain Vascular Accidents")
2	I	Search (((((((((("Gait" [MeSH]) OR "Gait") OR "Walking" [MeSH]) OR "Walking") OR "Walk") OR "Ambulation") OR "Ambulating") OR "Ambulate") OR "Locomotion") OR "Stepping") OR "Step") OR "March"
3	O	Search (((((((((((((((((((((("Oxygen consumption" [MeSH]) OR "Oxygen consumption") OR "Oxygen cost") OR "Oxygen demand") OR "Oxygen expenditure") OR "Oxygen utilization") OR "Oxygen utilisation") OR "Energy metabolism" [MeSH]) OR "Energy metabolism") OR "Energy consumption") OR "Energy cost") OR "Energy demand") OR "Energy expenditure") OR "Energy utilization") OR "Energy utilisation") OR "Metabolic equivalent" [MeSH]) OR "Metabolic equivalent") OR "Metabolic equivalents") OR "Metabolic equivalent of task") OR "Metabolic equivalent of tasks") OR "MET") OR "Metabolic consumption") OR "Metabolic cost") OR "Metabolic demand") OR "Metabolic expenditure") OR "VO2"
4	PIO	Search ((#1) AND #2) AND #3

Search 4 was used to find eligible records

Supplementary Table S2: Complete search strategy in the electronic database Web of Science structured according to the PICO (Population Intervention Comparison Outcome) method

Search	PICO	Query
1	P	TOPIC: (Stroke) OR TOPIC: (Strokes) OR TOPIC: (Post-Stroke) OR TOPIC: (Poststroke) OR TOPIC: (Post stroke) OR TOPIC: (Subacute stroke) OR TOPIC: (Subacute strokes) OR TOPIC: (Cerebrovascular Accident) OR TOPIC: (Cerebrovascular Accidents) OR TOPIC: (CVA) OR TOPIC: (CVAs) OR TOPIC: (Apoplexy) OR TOPIC: (Brain Vascular Accident) OR TOPIC: (Brain Vascular Accidents)
2	I	TOPIC: (Gait) OR TOPIC: (Walking) OR TOPIC: (Walk) OR TOPIC: (Ambulation) OR TOPIC: (Ambulate) OR TOPIC: (Locomotion) OR TOPIC: (Stepping) OR TOPIC: (Step) OR TOPIC: (March)
3	O	TOPIC: (Oxygen consumption) OR TOPIC: (Oxygen cost) OR TOPIC: (Oxygen demand) OR TOPIC: (Oxygen expenditure) OR TOPIC: (Oxygen utilisation) OR TOPIC: (Oxygen utilization) OR TOPIC: (Energy metabolism) OR TOPIC: (Energy consumption) OR TOPIC: (Energy cost) OR TOPIC: (Energy demand) OR TOPIC: (Energy expenditure) OR TOPIC: (Energy utilisation) OR TOPIC: (Energy utilization) OR TOPIC: (Metabolic equivalent) OR TOPIC: (Metabolic equivalents) OR TOPIC: (Metabolic equivalent of task) OR TOPIC: (Metabolic equivalent of tasks) OR TOPIC: (MET) OR TOPIC: (Metabolic consumption) OR TOPIC: (Metabolic cost) OR TOPIC: (Metabolic demand) OR TOPIC: (Metabolic expenditure) OR TOPIC: (VO2)
4	PIO	#3 AND #2 AND #1

Settings: search (all databases), time span (all years) and search language (auto).

Search 4 was used to find eligible records.

Supplementary Table S3: Complete search strategy in the electronic Cochrane Central Register of Controlled Trials according to the PICO (Population Intervention Comparison Outcome) method

Search	PICO	Query
1	P	MeSH descriptor: [Stroke] explode all trees
2	P	"Stroke"
3	P	"Strokes"
4	P	"Post-Stroke"
5	P	"Poststroke"
6	P	"Post Stroke"
7	P	"Cerebrovascular Accident"
8	P	"CVA"
9	P	"CVAs"
10	P	"Apoplexy"
11	P	"Brain Vascular Accident"
12	P	"Brain Vascular Accidents"
13	P	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12
14	I	MeSH descriptor: [Gait] explode all trees
15	I	"Gait"
16	I	MeSH descriptor: [Walking] explode all trees
17	I	"Walking"
18	I	"Walk"
19	I	"Ambulation"
20	I	"Ambulating"
21	I	"Ambulate"
22	I	"Locomotion"
23	I	"Stepping"
24	I	"Step"
25	I	"March"
26	I	#14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25
27	O	MeSH descriptor: [Oxygen Consumption] explode all trees
28	O	"Oxygen Consumption"
29	O	"Oxygen Cost"
30	O	"Oxygen Demand"
31	O	"Oxygen Expenditure"
32	O	"Oxygen Utilization"
33	O	"Oxygen Utilisation"
34	O	MeSH descriptor: [Energy Metabolism] explode all trees
35	O	"Energy Consumption"
36	O	"Energy Cost"
37	O	"Energy Demand"
38	O	"Energy Expenditure"
39	O	"Energy Utilization"
40	O	"Energy Utilisation"
41	O	MeSH descriptor: [Metabolic Equivalent] explode all trees
42	O	"Metabolic Equivalent of Task"
43	O	"Metabolic Equivalent of Tasks"
44	O	"Metabolic Consumption"
45	O	"Metabolic Demand"
46	O	"Metabolic Expenditure"
47	O	"VO2"
48	O	#27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47
49	PIO	#13 AND #26 AND #48

Search 49 was used to find eligible records.

Supplementary Table S4: Complete search strategy in the electronic database Embase according to the PICO (Population Intervention Comparison Outcome) method

Search	PICO	Query
1	P	('stroke' OR 'strokes' OR 'post-stroke' OR 'poststroke' OR 'cerebrovascular accident' OR 'cerebrovascular accidents' OR 'cva' OR 'cvas' OR 'apoplexy' OR 'brain vascular accident' OR 'brain vascular accidents')
2	I	('gait' OR 'walking' OR 'walk' OR 'ambulation' OR 'ambulating' OR 'ambulate' OR 'locomotion' OR 'stepping' OR 'step' OR 'march')
3	O	('oxygen consumption' OR 'oxygen cost' OR 'oxygen demand' OR 'oxygen expenditure' OR 'oxygen utilization' OR 'oxygen utilisation' OR 'energy metabolism' OR 'energy consumption' OR 'energy cost' OR 'energy demand' OR 'energy expenditure' OR 'energy utilization' OR 'energy utilisation' OR 'metabolic equivalent' OR 'metabolic equivalents' OR 'metabolic equivalent of task' OR 'metabolic consumption' OR 'metabolic cost' OR 'metabolic demand' OR 'metabolic expenditure' OR vo2)
4	PIO	#1 AND #2 AND #3

Search 4 was used to find eligible records.

Supplementary Table S5: Criteria for judging risk of bias

Domain	Risk	Judgement Criteria
Sampling bias	High	Recruitment of volunteers, patients in only one centre, a specific target population within the eligibility criteria of this systematic review, or patients with health problems other than stroke that could affect the rate of energy consumption or cost during walking
	Unclear	Recruitment of the sample was not addressed, or insufficient reporting to permit judgement
	Low	Recruitment of a random sample of the population
Performance bias	High	Order of the walking sessions is not randomized and/or insufficient rest is provided between sessions to rule out order effects (crossover studies)
		The intake of food, caffeine, nicotine or alcohol, or activities prior to the walking tests, are not restricted
	Unclear	Restrictions of food, caffeine, nicotine or alcohol intake, or activities prior to the walking tests, are not addressed, or insufficient reporting to permit judgement
	Low	Order of the walking sessions is adequately randomized and/or sufficient rest is provided between sessions to rule out order effects (crossover studies)
		The intake of food, caffeine, nicotine or alcohol, or activities prior to the walking tests, are restricted
		Only the pre- or first assessment data is of interest for this systematic review (randomized controlled trials, before-after trials, reliability studies)
Detection bias	High	Outcome assessor is not blinded to the intervention or exposure status of participants and this is likely to influence the results
	Unclear	Blinding is not addressed, or insufficient reporting to permit judgement
	Low	Outcome assessor is blinded to the intervention or exposure status of the participants
		Outcome assessor is not blinded to the intervention or exposure status of participants, but this is unlikely to influence the result
Attrition bias	High	Missing data are likely to have relevant impact on observed effect or related to true outcome
	Unclear	Missing data are not addressed, or insufficient reporting to permit judgement
	Low	No missing data or missing data are not likely to have relevant impact on the observed effect
Reporting bias	High	A pre-specified protocol is not available and not all specified outcomes of interest for this systematic review that are listed in the method section, are listed in the results section
	Unclear	A pre-specified protocol is not available, but all specified outcomes of interest for this systematic review that are listed in the method section, are listed in the results section
	Low	A pre-specified registered protocol is available and all pre-specified outcomes of interest for this systematic review are listed in the results section

Supplementary Formula S1: Formulas used to compute summary mean, standard error of the summary mean and variance of the summary mean of multiple correlated variables ([56])

Summary mean ($\overline{M}$)

$$\overline{M} = \frac{1}{k}\left(\sum_{i=1}^{k} M_i\right)$$

Variance of the summary mean ($var\left(\overline{M}\right)$)

$$var\left(\overline{M}\right) = \left(\frac{1}{k}\right)^2 \left(\sum_{i=1}^{k} V_i + \sum_{i \neq j}\left(r_{ij}\ \sqrt{V_i}\ \sqrt{V_j}\right)\right)$$

Standard error of the summary mean ($SE_{\overline{M}}$)

$$SE_{\overline{M}} = \frac{\sqrt{var\left(\overline{M}\right)}}{\sqrt{n}}$$

k, number of walking interventions; *r,* Pearson's correlation between each pair of walking interventions

Supplementary Table S6: Post-stroke gross energy consumption in ml/kg/min: the impact of increasing the correlation coefficient (*r*) in the calculation of the summary standard error on the pooled mean, the pooled 95% confidence interval (CI) and the presence of heterogeneity (I^2 and *p*-value Chi^2)

Assistance modality	Subgroup analysis		*r*	Pooled mean	Pooled 95%CI	I^2	*p* value Chi^2
Unassisted overground walking	No		0.5	11.67	10.04 – 13.29	93%	< 0.00001
			0.7	11.67	10.01 – 13.13	93%	< 0.00001
			0.9	11.67	9.98 – 13.36	93%	< 0.00001
	Time after stroke	Subacute	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Chronic	0.5	11.95	9.69 – 14.21	95%	< 0.00001
			0.7	11.96	9.63 – 14.28	95%	< 0.00001
			0.9	11.96	9.58 – 14.35	95%	< 0.00001
		Mixed	0.5	11.08	10.03 – 12.13	0%	0.97
			0.7	11.08	10.03 – 12.13	0%	0.97
			0.9	11.08	10.03 – 12.13	0%	0.97
	Type of speed	Comfortable walking speed	0.5	10.55	9.93 – 11.16	0%	0.57
			0.7	10.57	9.94 – 11.19	0%	0.59
			0.9	10.58	9.95 – 11.21	0%	0.60
		Maximal walking speed	0.5	19.90	18.08 – 21.72	n/a	n/a
			0.7	19.90	18.08 – 21.72	n/a	n/a
			0.9	19.90	18.08 – 21.72	n/a	n/a
		Imposed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed walking speed	0.5	11.80	10.29 – 13.31	n/a	n/a
			0.7	11.80	10.19 – 13.41	n/a	n/a
			0.9	11.80	10.09 – 13.51	n/a	n/a
Unassisted treadmill walking	No		0.5	9.76	8.98 – 10.54	87%	< 0.00001
			0.7	9.71	8.96 – 10.47	86%	< 0.00001
			0.9	9.67	8.94 – 10.41	84%	< 0.00001
	Time after stroke	Subacute	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Chronic	0.5	9.76	8.98 – 10.54	87%	< 0.00001
			0.7	9.71	8.96 – 10.47	86%	< 0.00001
			0.9	9.67	8.94 – 10.41	84%	< 0.00001
		Mixed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	8.60	7.82 – 9.38	n/a	n/a
			0.7	8.60	7.82 – 9.38	n/a	n/a
			0.9	8.60	7.82 – 9.38	n/a	n/a
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	9.18	8.60 – 9.77	72%	0.03
			0.7	9.18	8.60 - 9.77	72%	0.03
			0.9	9.18	8.60 – 9.77	72%	0.03
		Mixed walking speed	0.5	11.60	10.24 – 12.95	59%	0.12
			0.7	11.57	10.22 – 12.92	52%	0.15
			0.9	11.55	10.21 – 12.88	45%	0.18
Treadmill walking with assistive devices and/or lower limb orthoses	No		0.5	9.69	8.97 – 10.41	70%	0.002
			0.7	9.70	8.98 – 10.42	69%	0.002
			0.9	9.71	8.98 – 10.43	69%	0.002
	Time after stroke	Subacute	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Chronic	0.5	9.69	8.97 – 10.41	70%	0.002

			0.7	9.70	8.98 – 10.42	69%	0.002
			0.9	9.71	8.98 – 10.43	69%	0.002
		Mixed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	9.70	8.82 – 10.57	71%	0.002
			0.7	9.70	8.82 – 10.59	71%	0.002
			0.9	9.72	8.82 – 10.62	70%	0.02
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	9.90	9.29 – 10.51	n/a	n/a
			0.7	9.90	9.29 – 10.51	n/a	n/a
			0.9	9.90	9.29 – 10.51	n/a	n/a
		Mixed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
Treadmill walking with rigid exoskeleton assistance	No		0.5	7.08	6.52 – 7.65	49%	0.14
			0.7	7.11	6.53 – 7.68	44%	0.17
			0.9	7.13	6.54 – 7.71	41%	0.18
	Time after stroke	Subacute	0.5	7.15	5.86 – 8.44	73%	0.05
			0.7	7.18	5.89 – 8.47	69%	0.07
			0.9	7.21	5.92 – 8.49	65%	0.09
		Chronic	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed	0.5	7.01	6.70 – 7.32	n/a	n/a
			0.7	7.01	6.66 – 7.36	n/a	n/a
			0.9	7.01	6.62 – 7.40	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	7.80	6.88 – 8.72	n/a	n/a
			0.7	7.80	6.88 – 8.72	n/a	n/a
			0.9	7.80	6.88 – 8.72	n/a	n/a
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	6.96	6.64 – 7.27	2%	0.31
			0.7	6.96	6.63 – 7.30	0%	0.38
			0.9	6.96	6.59 – 7.34	0%	0.42
		Mixed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
Footplate walking with end-effector assistance	No		0.5	7.14	3.17 – 11.10	90%	0.001
			0.7	7.12	3.15 – 11.09	88%	0.003
			0.9	7.10	3.14 – 11.06	86%	0.007
	Time after stroke	Subacute	0.5	9.23	7.19 – 11.27	n/a	n/a
			0.7	9.23	7.00 – 11.46	n/a	n/a
			0.9	9.23	6.80 – 11.66	n/a	n/a
		Chronic	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed	0.5	5.18	3.75 – 6.61	n/a	n/a
			0.7	5.18	3.65 – 6.71	n/a	n/a
			0.9	5.18	3.55 – 6.81	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	7.14	3.17 – 11.10	90%	0.001
			0.7	7.12	3.15 – 11.09	88%	0.003
			0.9	7.10	3.14 – 11.06	86%	0.007
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a

Supplementary Table S7: Post-stroke gross energy cost in ml/kg/m: the impact of increasing the correlation coefficient (r) in the calculation of the summary standard error on the pooled mean, the pooled 95% confidence interval (CI) and the presence of heterogeneity (I^2 and p-value Chi^2)

Assistance modality	Subgroup analysis		r	Pooled mean	Pooled 95%CI	I^2	p value Chi^2
Treadmill walking with assistive devices and/or lower limb orthoses	No		0.5	0.37	0.31 – 0.43	90%	< 0.00001
			0.7	0.37	0.31 – 0.44	90%	< 0.00001
			0.9	0.37	0.31 – 0.43	88%	< 0.00001
	Time after stroke	Subacute	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Chronic	0.5	0.37	0.31 – 0.43	90%	< 0.00001
			0.7	0.37	0.31 – 0.44	90%	< 0.00001
			0.9	0.37	0.31 – 0.43	88%	< 0.00001
		Mixed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	0.39	0.30 – 0.48	93%	< 0.00001
			0.7	0.39	0.30 – 0.48	93%	< 0.00001
			0.9	0.39	0.30 – 0.48	91%	< 0.00001
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed walking speed	0.5	0.33	0.27 – 0.38	67%	0.03
			0.7	0.32	0.26 – 0.38	58%	0.07
			0.9	0.32	0.26 – 0.37	52%	0.10

Supplementary Table S8: Post-stroke net energy cost in J/kg/m: the impact of increasing the correlation coefficient (r) in the calculation of the summary standard error on the pooled mean, the pooled 95% confidence interval (CI) and the presence of heterogeneity (I^2 and p-value Chi^2)

Assistance modality	Subgroup analysis		r	Pooled mean	Pooled 95%CI	I^2	p value Chi^2
Treadmill walking with assistive devices and/or lower limb orthoses	No		0.5	0.37	0.31 – 0.43	90%	< 0.00001
			0.7	0.37	0.31 – 0.44	90%	< 0.00001
			0.9	0.37	0.31 – 0.43	88%	< 0.00001
	Time after stroke	Subacute	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Chronic	0.5	0.37	0.31 – 0.43	90%	< 0.00001
			0.7	0.37	0.31 – 0.44	90%	< 0.00001
			0.9	0.37	0.31 – 0.43	88%	< 0.00001
		Mixed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
	Type of speed	Comfortable walking speed	0.5	0.39	0.30 – 0.48	93%	< 0.00001
			0.7	0.39	0.30 – 0.48	93%	< 0.00001
			0.9	0.39	0.30 – 0.48	91%	< 0.00001
		Maximal walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Imposed walking speed	0.5	n/a	n/a	n/a	n/a
			0.7	n/a	n/a	n/a	n/a
			0.9	n/a	n/a	n/a	n/a
		Mixed walking speed	0.5	0.33	0.27 – 0.38	67%	0.03
			0.7	0.32	0.26 – 0.38	58%	0.07
			0.9	0.32	0.26 – 0.37	52%	0.10