Appendix A: Supplementary data

Supplemental method: Search strategy on MEDLINE (Ovid interface, 1946 to present) Last run on May 1, 2016, update from May 1, 2016 to October 31, 2018.

- 1. exp Stroke/
- 2. stroke*.mp.
- 3. exp Cerebrovascular Disorders/
- 4. cerebrovasc*.mp.
- 5. brain vascular accident*.mp.
- 6. 1 or 2 or 3 or 4 or 5
- 7. exp Hemiplegia/
- 8. exp Paresis/
- 9. hemiplegia*.mp.
- 10. hemipares?s*.mp.
- 11. 7 or 8 or 9 or 10
- 12. 6 and 11
- 13. upper extremity/ or arm/ or axilla/ or elbow/ or forearm/ or hand/ or shoulder/
- 14. upper extremit*.mp.
- 15. upper limb*.mp.
- 16. 13 or 14 or 15
- 17. 12 and 16
- 18. exp Biomechanical Phenomena/
- 19. kinematic*.mp.
- 20. motion capture*.mp.
- 21. biomechanic*.mp.
- 22. 18 or 19 or 20 or 21
- 23. 17 and 22
- 24. fugl meyer*.mp.
- 25. FMA.mp.
- 26. Wolf motor function.mp.
- 27. WMFT.mp.
- 28. Action research arm.mp.
- 29. ARAT.mp.
- 30. Chedoke arm and hand activity inventory.mp.
- 31. CAHAI.mp.
- 32. Box and block test*.mp.

33. BBT.mp.

- 34. Motor activity log*.mp.
- 35. 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34
- 36. 23 and 35
- 37. exp randomized controlled trial/
- 38. controlled clinical trial.pt.
- 39. randomi#ed.ab.
- 40. randomi#ed.ti
- 41. placebo.ab.
- 42. trial*.ab.
- 43. trial*.ti.
- 44. groups*.ab.
- 45. exp meta-analysis/
- 46. 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45
- 47. 36 and 46

Supplemental results - Risk of bias in studies

All included studies stated that groups were randomised; however, the risk of bias was unclear for 5 studies [1–5] because of the lack of descriptive method of randomisation. Low-risk studies described methods such as envelopes [6–8], random number tables [5] and computer-randomised schemes [9–11]. Selection bias presented as low risk in studies by de Oliveira Cacho et al. [6] and Lin et al. [8] using sealed envelopes distributed by external personnel, whereas Lima et al. [7] described treating therapist-distributed sealed envelopes indicating selection bias. Other studies [1,4,5,9,12,13] did not provide enough information for judgment of bias.

No study was double-blind owing to the central role of the therapist in rehabilitation. Compensatory blinding strategies were described, such as blinding participants to the study hypothesis by partial information disclosure before randomisation, instructions for nondisclosure, strict intervention protocols, daily records and a priori training of personnel, which may have minimised performance bias [14]. All studies reported blinding of participants to the study hypothesis except for 2 studies lacking information [3,4].

The use of blinded and external outcome assessors to group allocation was reported in nearly all trials; however, the trial by Thielman et al. [3] reported that the investigator was aware of group allocation and Woodbury et al. [4] provided insufficient information for the determination of detection bias.

Absence of protocols was reported in all trials. Therefore, outcomes reported in the methods and the actual outcomes reported in the results were compared. Other potential sources of bias were considered, such as baseline characteristics among groups.

Supplemental results - individual studies meta-analyses

Primary outcomes: kinematic measures

Improvement of smoothness was present across all rehabilitation subgroups in 6 studies [2,4–6,8,9] (n=121) demonstrating moderate statistically significant improvement in pooled effects; however, this was not statistically significant in 4 studies [2,6,9,15] (Fig. A1).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Солг	Std. mean change = He	dges's g [95% Cl]
Michaelsen 2006	TRI	15	4.4	1.9	3.8	2	0.5	H = -1	0.29 [-0.20, 0.78]
Lin, Wu, Wei 2007	CIMT	17	0.66	0.57	0.31	0.2	0.5	⊨∎⊣	0.67 [0.16, 1.17]
Wu, Chen, Tang 2007	CIMT	24	7.06	5.26	0.13	0.11	0.5	⊢■1	1.29 [0.76, 1.82]
Woodbury 2009	CIMT	5	6.6	1.11	5.73	1	0.5		0.66 [-0.15, 1.47]
Woodbury 2009	CIMT+TRT	6	4.72	0.74	3.78	0.81	0.5	⊢	1.02 [0.13, 1.90]
Wu 2011	BAT	22	0.19	0.23	0.11	0.12	0.5	; ∎⊣	0.39 [-0.03, 0.81]
Wu 2011	CIMT	22	0.21	0.12	0.12	0.093	0.5	⊨∎→	0.80 [0.33, 1.26]
de Oliveira Cacho 2015	TRI	10	12.41	9.5	10.11	5.1	0.5	⊢= →	0.26 [-0.32, 0.83]
Random effect model									
Heterogeneity: Tau ^z = 0; Chi ^z =	= 11.88; df = 8 (P = 0.10	95); P (95	%CI] = 43	3% [0 – 86	5]			•	0.64 [0.38, 0.90]
Test for overall effect Z = 4.85	P = 0.000						Unfavorable	Favour intervention	
							-3 -1	1 3 5	

Figure A1. Raw data, meta-analysis data and forest plot with a pre-post correlation 0.5 for smoothness (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Improvements in movement duration (improvement expressed as reduction in time scores) were found in 7 studies [1,3,5,6,8,9,12] (n=131) with 4 studies demonstrating statistically significant improvements [5,8,9,12]. The pooled effect estimate demonstrated moderate statistically significant improvement in post-test scores overall (Fig. A2).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Corr	Std. mean change = l	Hedges's g [95% Cl]
Lin, Wu, Wei 2007	CIMT	17	0.085	0.046	0.049	0.007	0.5	⊢ ∎1	0.80 [0.27, 1.32]
Wu, Chen, Tang 2007	CIMT	24	0.07	0.05	0.04	0.03	0.5	⊨∎⊣	0.67 [0.24, 1.10]
Wu, Lin, Chen 2007	CIMT	15	0.048	0.02	0.038	0.016	0.5		0.52 [0.00, 1.03]
Thielman 2008	TRI	5	1.21	0. 19	1.25	0.4	0.5 ⊢		-0.09 [-0.80, 0.61]
Lin 2010	BAT	16	0.04	0.03	0.03	0.03	0.5	⊨ =-1	0.32 [-0.16, 0.79]
Wu 2011	BAT	22	0.06	0.057	0.039	0.024	0.5		0.41 [-0.01, 0.83]
Wu 2011	CIMT	22	0.057	0.029	0.04	0.018	0.5	⊢∎ -1	0.65 [0.20, 1.09]
de Oliveira Cacho 2015	TRT	10	1.79	0.77	1.67	0.68	0.5	⊢ ∎	0.15 [-0.42, 0.72]
Random effect model									
Heterogeneity: Tau ^z = 0; Chi ^z	² = 7.06; df = 8 (P = 0.4	23); I² (95	%CI] = 0%	[0 - 81]				♦	0.47 [0.30, 0.65]
Test for overall effect: Z = 5.3	35; P = 0.000						Unfavorable	Favour intervention	
							-3 -1	1 3 5	

Figure A2. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for movement duration (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Five studies [5–7,9,13] (n=114) measured peak velocity across all rehabilitation types; 3 demonstrated statistically significant improvement [5,7,9]. The pooled effect estimate indicated statistically significant moderate improvement in post-test scores overall (Fig. A3).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Corr	Std. mean change = H	ledges's g [95% Cl]
Michaelsen 2006	TRT	15	54.13	13.42	55.78	17.2	0.5	⊢ ∎1	0.10[-0.38, 0.58]
Wu, Chen, Tang 2007	CIMT	24	66.32	22.88	76.42	16.17	0.5	+ = -	0.48 [0.07, 0.89]
Wu 2011	BAT	22	67.23	19.32	78.53	18.5	0.5	⊨∎⊣	0.58[0.14, 1.01]
Wu 2011	CIMT	22	67.33	15.95	72.68	14.64	0.5	⊨∎⊣	0.34 [-0.08, 0.75]
Lima 2014	CIMT	11	0.4	0.2	0.8	0_9	0.5	l `−− 1	0.45 [-0.13, 1.03]
Lima 2014	CIMT+TRT	10	0.3	0.1	0.4	0.1	0.5		0.91 [0.22, 1.61]
de Oliveira Cacho 2015	TRT	10	49.7	18.5	53.7	16.3	0.5	⊢ •1	0.21 [-0.37, 0.78]
Random effect model									
Heterogeneity: Tau ^z = 0; Chi	^z = 4.91; df = 7 (P = 0.5	56); P (95	%CI] = 0%	[0 - 80]				•	0.41 [0.23, 0.60]
Test for overall effect Z = 4.3	38; P = 0.000						Unfavorable	Favour intervention	
							-3	-1 1 3 5	

Figure A3. Raw data, meta-analysis data and forest plot with a pre–post correlation = 0.5 for peak velocity (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Data from 5 studies [2,4,6,10,11] (n=96) for CIMT and TR subgroups demonstrated an improvement in shoulder ROM with a statistically significant small to moderate improvement in pooled effect estimate in post-test scores overall (Fig. A4).

Studies	Interventions	n	Pre M	PreSD	PostM	PostSD	Солг	Std. mean change = F	ledges's g [95% Cl]
Michaelsen 2006	TRT	15	27.8	16.4	32.5	15	0.5	⊷	0.28 [-0.21, 0.77]
Woodbury 2009	CIMT	5	53.17	10.45	61.49	21.9	0.5	⊢	0.35 [-0.38, 1.08]
Woodbury 2009	CIMT+TRT	6	55.97	27.29	65.7	22.83	0.5	⊢	0.32 [-0.38, 1.02]
Wu, Chen, Chen 2012	CIMT	10	34.7	12.19	36.06	10.5	0.5	⊢ ∎−1	0.11 [-0.46, 0.68]
Wu, Chen, Chen 2012	CIMT+TRT	11	36.54	12.2	42.39	19.8	0.5	⊢− ■−-1	0.31 [-0.25, 0.87]
Wu, Chen, Lin 2012	CIMT	19	0.14	0.05	0.14	0.06	0.5	H - H	0.00 [-0.43, 0.43]
Wu, Chen, Lin 2012	CIMT+TRT	20	0.14	0.07	0. 19	0.07	0.5	⊢∎ -)	0.69 [0.21, 1.16]
de Oliveira Cacho 2015	TRT	10	22.1	7.2	32.5	12.4	0.5		0.88 [0.20, 1.57]
Random effect model									
Heterogeneity: Tau ² = 0; Ch	i² = 7.55; df = 8 (P = 0.3	374); I² [95	%CI] = 16	% [0 – 76]				•	0.34 [0.12, 0.55]
Test for overall effect: $Z = 3$.	09; P=0.002						Unfavorable	-1 1 3 5	

Figure A4. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for shoulder range of motion (ROM) (CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Seven studies [1,3,6–9,12] (n=128) measured control strategy across all rehabilitation subgroups, with significant improvement in 3 studies [6,8,9]. The pooled effect estimate demonstrated a statistically significant moderate improvement (Fig. A5).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Corr	Std. mean change = Hedges's g [95% CI]
Lin, Wu, Wei 2007	CIMT	17	21.65	8.44	29.2	12.47	0.5	⊢∎→ 0.65 [0.15, 1.16]
Wu, Lin, Chen 2007	CIMT	15	37.08	12.94	44.26	16.24	0.5	-∎ 0.46 [−0.05, 0.96]
Thielman 2008	TRT	5	0.49	0.07	0.52	0.07	0.5	0.34 [-0.39, 1.08]
Lin 2010	BAT	16	36.74	12.72	40.75	15	0.5	
Wu 2011	BAT	22	35.94	14.63	36.26	13.48	0.5	⊢■→ 0.02 [−0.38, 0.42]
Wu 2011	CIMT	22	29.83	9.48	37.4	14.59	0.5	⊢∎⊣ 0.57 [0.13, 1.01]
Lima 2014	CIMT	11	1.4	1	1.4	1.2	0.5	→ 0.00 (−0.55, 0.55)
Lima 2014	CIMT+TRT	10	1.3	1	1.1	0.7	0.5 ⊢	-0.21 [-0.78, 0.37]
de Oliveira Cacho 2015	TRT	10	22.6	14.4	32.4	11.7	0.5	0.68 [0.04, 1.32]
Random effect model								
Heterogeneity: Tau ^z = 0; Chi	P = 11.04; df = 9 (P = 0	. 199); I² [9	5%CI] = 2	9% [0 – 8	1]			♦ 0.30 [0.10, 0.51]
Test for overall effect Z = 2.	91; P = 0.004						Unfavorable	Favour intervention
							-3 -1	1 3 5

Figure A5. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for control strategy (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Data from 7 studies [1,2,5–7,12,15] (n=112) indicated improvement in movement efficiency; expressed as a reduction in the measure, hence a negative value. Two studies demonstrated statistically significant improvement in post-test scores [5,16]. The pooled effect estimate demonstrated a statistically significant moderate improvement (Fig. A6).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Согг	Std. mean change = Hedges's g [95% Cl]
Michaelsen 2006	TRT	15	1.5	0.3	1.4	0.3	0.5	⊷∎→ 0.32 [−0.18, 0.81]
Wu, Chen, Tang 2007	CIMT	24	1.7	0.51	1.32	0.22	0.5	⊢∎⊣ 0.83 [0.38, 1.28]
Wu, Lin, Chen 2007	CIMT	15	1.49	0.43	1.33	0.36	0.5	
Woodbury 2009	CIMT	5	1.48	0.09	1.76	0.28	0.5 ⊢	-0.90 [-1.80, -0.01]
Woodbury 2009	CIMT+TRT	6	1.46	0.17	1. 19	0.04	0.5	⊨ 1.48 [0.40, 2.55]
Lin 2010	BAT	16	1.38	0.46	1.34	0.35	0.5	■→ 0.09 [-0.37, 0.56]
Lima 2014	CIMT	11	0.6	0.2	0.6	0.1	0 .5 ⊢	■→ −0.00 [−0.55, 0.55]
Lima 2014	CIMT+TRT	10	0.7	0.2	0.6	0.1	0.5	∎
de Oliveira Cacho 2015	TRT	10	1.58	0.28	1.55	0.22	0.5 H	■→ 0.11[−0.46, 0.68]
Random effect model								
Heterogeneity: Tau ^z = 0; Chi ^z	= 19.76; df = 9 (P = 0.0	11); P² (95	%CI] = 5	7% [15 - 9	94]			• 0.30 [0.01, 0.60]
Test for overall effect: Z = 2.01	; P = 0.044						Unfavorable	Favour intervention
							-3 -1	1 3 5

Figure A6. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for movement efficiency (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Data from 6 studies (n=107) reported elbow ROM post-CIMT and TRT rehabilitation [3,4,6,7,11,12]. The pooled effect estimate demonstrated a statistically significant small to moderate improvement in post-test scores (Fig. A7).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Солг	Std. mean change = Hedg	es's g [95% Cl]
Thielman 2008	TRI	5	47.43	15.54	56.19	16.27	0.5	• • • • • • • • • • • • • • • • • • • •	44 [-0.31, 1.19]
Woodbury 2009	CIMT	5	0.28	16.8	0.57	16.91	0.5 ⊢	•, O.I	01 [-0.69, 0.72]
Woodbury 2009	CIMT+TRT	6	-5.77	15. 9 4	0.63	10.42	0.5	0.	38 [-0.32, 1.09]
Wu, Chen, Chen 2012	CIMT	10	16.15	17.38	16.44	18.01	0 .5 ⊢	• O.	01 [0.55, 0.58]
Wu, Chen, Chen 2012	CIMT+TRT	11	15.57	14.26	14.99	12.21	0 .5 ⊢	. −0.	04 (0.59, 0.51)
Wu, Chen, Lin 2012	CIMT	19	0.07	0.05	0.08	0.06	0.5	⊢∎ ⊣ 0.	17 [0.26, 0.61]
Wu, Chen, Lin 2012	CIMT+TRT	20	0.07	0.05	0.1	0.07	0.5	-∎- 0.	.46 [0.02, 0.91]
Lima 2014	CIMT	11	28.8	13.5	33.3	16.6	0.5	0.1	27 [-0.29, 0.83]
Lima 2014	CIMT+TRT	10	25.6	11.7	29.8	13.6	0.5	. 0.	30 (0.28, 0.88)
de Oliveira Cacho 2015	TRI	10	38.8	4.3	47.7	0.2	0.5		.94 [0.92, 2.96]
Random effect model									
Heterogeneity: Tau ^z = 0; Chi	P = 13.97; df = 10 (P =	0.123); I² [95%CI] = (0% [0 – 9 [.]	1]			♦ 0	.28 [0.10, 0.46]
Test for overall effect $Z = 3.0$	00; P = 0.003						Unfavorable	Favour intervention	
							-3 -1	1 3 5	

Figure A7. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for elbow ROM (CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Improvement of trunk ROM (expressed as a decrease in ROM representing reduced compensatory trunk movements) was measured in 5 CIMT and TRT rehabilitation studies [3,4,6,7,10] (n=68). The pooled effect estimate demonstrated a statistically significant small to moderate improvement in post-test scores (Fig. A8).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Corr	Std. mean change =	Hedges's g [95% Cl]
Thielman 2008	TRI	5	0.48	0.13	0.32	0.08	0.5	·•	1.13 [0.14, 2.12]
Woodbury 2009	CIMT	5	0.11	0.01	0.14	0.01	0.5-		-2.40 [-4.04, -0.76]
Woodbury 2009	CIMT+TRT	6	0.12	0.01	0.09	0.01	0.5	⊢−−−− 1	2.53 [0.95, 4.11]
Wu, Chen, Chen 2012	CIMT	10	114.54	63.06	120.93	49.25	0.5 ⊢	- 1	-0.10 [-0.67, 0.47]
Wu, Chen, Chen 2012	CIMT+TRT	11	122.76	75.46	92.94	36.8	0.5	— —	0.42 [-0.15, 0.99]
Lima 2014	CIMT	11	72.4	71.8	73.4	76.2	0.5 H	■ -1	-0.01 [-0.56, 0.53]
Lima 2014	CIMT+TRT	10	45.8	33.3	44.5	41.4	0 .5 ⊢	₽ -1	0.03 (-0.54, 0.60)
de Oliveira Cacho 2015	IRI	10	85.1	86	42.1	29.9	0.5	H <mark>₩</mark> 1	0.52 [-0.09, 1.13]
Random effect model	- 24 04- a¥ - 9 70 - 0 0	04)- 12 (05	9 (C)1 - 95	W 165 - 1	201				0 27 [-0 39, 0 94]
Tectoryencity. 180° – 1, GHP Test for overall effect 7 = 0.90	-24.31,ui-8(P-0.00) :P=0.422	o i J. i., [aci	woj – 80	i an Ingi — s	70J		Unfavorable	Essour intervention	
icsciol overal clicul 2 – 0.00	1 - 0.122								
							-3 -1	1 3 5	

Figure A8. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for trunk ROM (CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Nine studies [1,5,7–12,15] (n=217) across all rehabilitation subgroups indicated improvement in post-test measures for the subjective activity measure Motor Activity Log amount of use (MAL-AOU; Fig. A9) and quality of movement (MAL-QOM; Fig. A10) with large effect sizes that were statistically significant.

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Солг	Std. mean change = H	edges's g [95% Cl]
Lin, Wu, Wei 2007	CIMT	17	0.64	0.71	2.04	1.04	0.5	⊢ ∎1	1.45 [0.78, 2.11]
Wu, Chen, Tang 2007	CIMT	24	0.64	0.86	1.85	1.24	0.5	⊢∎ -1	1.06 [0.57, 1.55]
Wu, Lin, Chen 2007	CIMT	15	0.95	0.89	2.32	1.45	0.5	⊢∎	1.02 [0.42, 1.63]
Woodbury 2009	CIMT	5	1.61	1	3.14	1.32	0.5		1.03 [0.08, 1.97]
Woodbury 2009	CIMT+TRT	6	1.43	0.68	2.27	0.79	0.5		0.95 [0.09, 1.82]
Lin 2010	BAT	16	1.06	0.83	1.25	0.92	0 .5 ⊢	-	0.21 [-0.27, 0.68]
Wu 2011	BAT	22	0.9	0.77	1.41	1.06	0.5	⊢∎ -1	0.52 [0.09, 0.95]
Wu 2011	CIMT	22	1.02	0.82	211	1.05	0.5	⊨∎⊣	1.10 [0.58, 1.62]
Wu, Chen, Chen 2012	CIMT	15	1.11	0.74	2.06	0.92	0.5	⊢ ∎1	1.06 [0.45, 1.67]
Wu, Chen, Chen 2012	CIMT+TRT	15	0.97	0.61	1.99	0.85	0.5	⊢ ∎−1	1.27 [0.61, 1.93]
Wu, Chen, Lin 2012	CIMT	19	0.6	0.6	1.5	0.8	0.5	⊢∎⊣	1.20 [0.62, 1.77]
Wu, Chen, Lin 2012	CIMT+TRT	20	0.8	0.7	1.5	0.8	0.5	⊨∎→	0.89 [0.39, 1.39]
Lima 2014	CIMT	11	0.7	0.7	26	0.7	0.5	⊢ •−	2.51 [1.32, 3.69]
Lima 2014	CIMT+TRT	10	1.3	0.6	3.1	1	0.5	└ ─ ∙──1	1.89 [0.88, 2.89]
Random effect model	- 20.00				001				104[0.90.1.29]
Test for overall effect: Z = 8.51;	- ∠a.uo;01 = 14 (P = 0.0 P = 0.000	ina), 1, 18	57#CA] = 5	- 11] 18	80]		Unfavorable	Favour intervention	1.04[0.00, 1.28]
							-3 -1	1 3 5	

Figure A9. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for the MAL-AOU subscale (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Солг	Std. mean change = H	edges's g [95% Cl]
Lin, Wu, Wei 2007	CIMT	17	0.75	0.93	23	1.04	0.5	⊢ ∎	1.49 [0.82, 2.17]
Wu, Chen, Tang 2007	CIMT	24	0.72	1.01	1.85	1.14	0.5	⊢∎→	1.01 [0.53, 1.49]
Wu, Lin, Chen 2007	CIMT	15	1.21	1.24	2.32	1.41	0.5	⊢ ∎-1	0.79 [0.23, 1.34]
Woodbury 2009	CIMT	5	1.23	0.62	2.83	1.27	0.5	·	1.16 [0.16, 2.17]
Woodbury 2009	CIMT+TRT	6	1.52	0.68	2.29	0.85	0.5		0.83 [0.01, 1.65]
Lin 2010	BAT	16	1.18	0.8	1.42	0.97	0.5		0.25 [-0.22, 0.73]
Wu 2011	BAT	22	1.02	0.76	1.52	1.09	0.5	⊨∎⊣	0.50 [0.07, 0.93]
Wu 2011	CIMT	22	1.06	0.83	23	1.01	0.5	⊨∎⊣	1.28 [0.73, 1.83]
Wu, Chen, Chen 2012	CIMT	15	1.32	0.79	2.24	0.88	0.5	⊨∎⊣	1.04 [0.43, 1.64]
Wu, Chen, Chen 2012	CIMT+TRT	15	1	0.65	1.91	0.82	0.5	⊢ ∎(1.15 [0.52, 1.78]
Wu, Chen, Lin 2012	CIMT	19	0.7	0.7	1.7	0.9	0.5	⊨∎⊣	1.17 [0.60, 1.74]
Wu, Chen, Lin 2012	CIMT+TRT	20	0.9	0.8	1.8	1	0.5	⊢∎ -1	0.94 [0.43, 1.45]
Lima 2014	CIMT	11	0.7	0.7	25	0.5	0.5	⊢ •−−1	2.66 [1.42, 3.90]
Lima 2014	CIMT+TRT	10	1.3	0.8	27	1	0.5	⊢	1.40 [0.56, 2.23]
Random effect model									4 00 1 0 70 4 3 31
Heterogeneity: Tau ² = 0; Chr ² = Test for overall effect: Z = 8.65	= 26.52; df = 14 (P = 0.) ; P = 0.000	014); 1* [9	5%CI]=4	18% [6 - 8	6		Unfavorable	 Favour intervention 	1.00[0.78, 1.23]
								:	
							-3 -1	1 3 5	

Figure A10. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for the MAL-QOM subscale (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Data from 6 studies [1,3–6,10] (n=96) for all intervention subgroups demonstrated a statistically significant pooled effect estimate for the Fugl-Meyer Assessment - Upper Extremity (FMA-UE) demonstrating moderate improvement in post-test scores (Fig. A11).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Corr	Std. mean change = h	ledges's g (95% Cl)
Wu, Chen, Tang 2007	CIMT	24	39.5	13.5	45.8	11.6	0.5	÷∎⊣	0.48 [0.07, 0.89]
Thielman 2008	TRT	5	29.8	2.49	36.2	2.39	0.5	·	2.10[0.62, 3.57]
Woodbury 2009	CIMT	5	42	6.8	46	4.6	0.5		0.53 [-0.24, 1.31]
Woodbury 2009	CIMT+TRT	6	38	10.3	49	9.7	0.5		0.93 [0.07, 1.78]
Lin 2010	BAT	16	48	12.4	57.6	1.3	0.5	⊢ ∎1	0.77 [0.24, 1.31]
Wu, Chen, Chen 2012	CIMT	15	46.6	8.96	50.9	7.8	0.5		0.48 [-0.03, 0.99]
Wu, Chen, Chen 2012	CIMT+TRT	15	46.9	5.9	54	5.4	0.5	⊨∎→	1.18 [0.55, 1.82]
de Oliveira Cacho 2015	TRT	10	32.8	18.6	35.7	20.1	0.5	⊨ ∎1	0.14 [-0.43, 0.71]
Random effect model									
Heterogeneity: Tau ^z = 0; Ch	n² = 11.17; df = 8 (P = 0	. 131); P ² [9	5%CI] = 2	5% [0 - 93	2]			•	0.65 [0.39, 0.90]
Test for overall effect $Z = 5$.00; P = 0.000						Unfavorable	Favour intervention	
							[]		
							-3 -1	1 3 5	

Figure A11. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for the FMA-UE (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Data from 3 studies [4,7,9] (n=75) across all rehabilitation types from diverse research groups demonstrated a reduction (improvement) in Wolf Motor Function Test (WFMT) Time scores [4,7,9]. Only one study [9] demonstrated statistically significant improvement. The pooled effect estimate demonstrated a statistically significant moderate improvement in post-test scores (Fig. A12).

Studies	Interventions	n	PreM	PreSD	PostM	PostSD	Солг	Std. mean change = H	ledges's g [95% Cl]
Woodbury 2009	CIMT	5	9.35	3.56	6. 16	2.23	0.5	└──→ ──1	0.82 [-0.05, 1.68]
Woodbury 2009	CIMT+TRT	6	9.41	7.35	5.16	2.78	0.5	⊧ -	0.56 (-0.19, 1.30)
Wu 2011	BAT	22	7.57	8.79	4.25	5.03	0.5	⊨∎⊣	0.42 [-0.00, 0.84]
Wu 2011	CIMT	21	8.77	7.67	4.02	2.49	0.5	⊨∎⊣	0.67 [0.22, 1.13]
Lima 2014	CIMT	11	15.1	12.4	12	10.8	0.5	⊢ ∎1	0.24 [-0.31, 0.80]
Lima 2014	CIMT+TRT	10	17.2	17.4	11.1	10.6	0.5	⊢ = {	0.37 [-0.22, 0.96]
Random effect model									
Heterogeneity: Tau ² = 0; Chi ² =	= 2.23; df = 6 (P = 0.817	7); I² (95%	[CI] = 0%	[0 - 65]				•	0.48 [0.26, 0.71]
Test for overall effect Z = 4.21	P = 0.000						Unfavorable	Favour intervention	
	•								
							-3 -1	1 3 5	

Figure A12. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for the WFMT Time score (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

WMFT Quality data were reported from 2 studies [7,9] (n=64) across TRT, BAT and CIMT. TRT [7] showed no significant improvement between pre-test/post-test, whereas CIMT and BAT [9] demonstrated a significant improvement. The pooled effect estimate demonstrated a statistically significant moderate improvement (Fig. A13).



Figure A13. Raw data, meta-analysis data and forest plot with a pre–post correlation 0.5 for the WFMT Quality score (BAT, Bilateral Arm Therapy; CIMT, Constraint Induced Movement Therapy; TRT, Trunk Restraint Therapy).

Supplemental results – Sensitivity analysis

Table A1. Sensitivity analysis for different correlation values used for computing the pre–post summative effect size (a statistically significant difference for an outcome would correspond to a lack of overlap of confidence intervals [CIs] obtained with different values of r).

Kinematic and	No. participants/	Pooled effect estimates of standardised mean difference calculated by Hedges' g (95% CI)				
clinical outcome	rehab groups/studies	imputing different correlation values				
measures						
		r = 0.0	r = 0.25	r = 0.5	r = 0.75	r = 0.90
MAL AOU	217/3/9	1.00 (0.75; 1.25)	1.02 (0.77; 1.26)	1.04 (0.80; 1.28)	1.04 (0.80; 1.28)	0.98 (0.74; 1.23)
MAL QOM	217/3/9	0.96 (0.72; 1.20)	0.98 (0.75; 1.21)	1.00 (0.78; 1.23)	1.02 (0.79; 1.25)	0.98 (0.75; 1.22)
Smoothness	121/4/8	0.69 (0.37; 1.01)	0.68 (0.38; 0.97)	0.64 (0.38; 0.97)	0.57 (0.37; 0.77)	0.48 (0.31; 0.66)
FMA-UE	96/4/6	0.65 (0.35; 0.96)	0.64 (0.38; 0.90)	0.65 (0.39; 0.90)	0.67 (0.38; 0.97)	0.71 (0.32; 1.09)
WMFT Time	75/3/3	0.53 (0.21; 0.85)	0.51 (0.23; 0.79)	0.48 (0.26; 0.71)	0.42 (0.27; 0.58)	0.33 (0.23; 0.43)
Movement duration	131/3/7	0.51 (0.26; 0.76)	0.50 (0.28; 0.71)	0.47 (0.30; 0.65)	0.42 (0.28; 0.56)	0.33 (0.22; 0.45)
WMFT Quality	64/3/2	0.43 (0.08; 0.78)	0.43 (0.13; 0.73)	0.43 (0.18; 0.67)	0.41 (0.17; 0.65)	0.39 (0.15; 0.63)
Peak velocity	114/4/3	0.43 (0.16; 0.69)	0.42 (0.19; 0.65)	0.41 (0.23; 0.60)	0.40 (0.24; 0.56)	0.38 (0.19; 0.57)
Shoulder ROM	96/3/5	0.34 (0.06; 0.62)	0.34 (0.10; 0.58)	0.34 (0.12; 0.55)	0.33 (0.14; 0.53)	0.31 (0.13; 0.48)
Movement efficiency	112/4/7	0.33 (0.05; 0.62)	0.32 (0.03; 0.61)	0.30 (0.01; 0.60)	0.27 (-0.01; 0.55)	0.22 (0.01; 0.43)
Control strategy	128/4/7	0.31 (0.07; 0.55)	0.31 (0.09; 0.52)	0.30 (0.10; 0.51)	0.30 (0.10; 0.49)	0.27 (0.10; 0.45)
Elbow ROM	107/3/6	0.28 (0.02; 0.54)	0.28 (0.05; 0.51)	0.28 (0.10; 0.46)	0.30 (0.10; 0.50)	0.26 (0.10; 0.42)
Trunk ROM	68/3/5	0.23 (-0.06; 0.58)	0.24 (-0.10; 0.58)	0.27 (-0.39; 0.94)	0.24 (-0.59; 1.07)	0.19 (-0.71, 1.08)

FMA-UE, Fugl-Meyer Motor Assessment of Upper Extremity; MAL AOU, Motor Activity Log amount of use; MAL QOM, Motor Activity Log

quality of movement; ROM, range of motion; r, coefficient of correlation between pre- and post-test paired data; WMFT, Wolf Motor Function

Test.

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