

Question 34 evidence tables

Question 34: Does constraint-induced movement therapy improve arm function after a stroke?

NB Any discrepancies between reviewers in evidence quality and comment were discussed at the corresponding evidence review meeting

OT = occupational therapy, UL = upper limb, mCIMT = modified constraint induced movement therapy, CIMT = constraint-induced movement therapy, ITT = intention to treat, MCID = minimum clinically important difference, LL = lower limb, PET = Positron Emission Tomography, PRWHE = Patient rated wrist hand evaluation score, MAL = Motor Activity Log Quality of Movement, WMFT = Wolf Motor Function Test, ARAT = action research arm test, tDCS = transcranial direct current stimulation, PT = physiotherapy, PROSHS = persons-reported outcomes of health status, UPSET = upper limb self efficacy test, SR = systematic review, MA = meta-analysis, RCT = randomised controlled trial, IPDMA = individual patient data meta-analysis, MDT = multidisciplinary team, PICO = patient/population, intervention, comparison and outcomes, OR = odds ratio, CI = confidence interval, QoL = quality of life, ADL = activities of daily living, OR = odds ratio, RR = relative risk, aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval, RoB = risk of bias, I2 = heterogeneity statistic.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
203	K. A. Wattchow et al. (2018). Rehabilitation Interventions for Upper Limb Function in the First Four Weeks Following Stroke: A Systematic Review and Meta-Analysis of the Evidence. <i>Archives of Physical Medicine and Rehabilitation</i> , 99:2 367-382	Systematic review and meta analysis to investigate therapeutic interventions and synthesise their effectiveness in improving upper limb function in the first 4 weeks after stroke. Included randomised controlled trials, controlled trials and interventional studies with pre/posttest design. Included 104 trials (83 RCTs, 21 nonrandomised studies) involving 5225 participants. Meta analyses of RCTs only (n=20) and narrative synthesis completed. Participant inclusion: adults within 4 weeks of stroke with UL impairment. Review used Cochrane Risk of Bias tool.	Any physiotherapy or OT technique designed to address impairment or activity of the affected UL, compared with usual care, sham or another technique. mCIMT defined as a variant of the CIMT protocol with components of constraint of nonparetic UL in padded mitt glove/splint with intensive graded practice varying from 30 minutes to 6 hours per session, 2-7 sessions	Any measure of UL impairment or activity. Primary outcome: list of therapeutic interventions reported in lit for improvement of UL. Secondary outcome: effect size for therapeutic intervention in any measure of UL impairment or activity	21 interventions reported. Pooling of data possible for 11 interventions. Pooling of 2 RCTs resulted in nonsignificant effects for UL impairment motor and sensory outcomes but a significant effect on UL activity from combining 6 studies (SMD=1.09, CI, 0.21-1.97)	- Small element covering CIMT, range of intervention delivery This review covered a wide range of different therapeutic interventions of which 9 investigated CIMT and 6 included in meta analysis.

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			per week, for 2-12 weeks.			
203	K. A. Wattchow et al. (2018). Rehabilitation Interventions for Upper Limb Function in the First Four Weeks Following Stroke: A Systematic Review and Meta-Analysis of the Evidence. <i>Archives of Physical Medicine and Rehabilitation</i> , 99:2 367-382	Meta-analysis. Adults <28 days of stroke (first or recurrent). RCTs, case series and any pre/post design. 9 modified CIMT RCTs (275 patients).	Any physical or occupational therapy technique to address impairment and/or activity of the affected UL. Interventions analysed separately, but study features e.g. bias, were evaluated across all interventions. Modified CIMT (mCIMT) reported separately. Comparator was "usual care" (not defined)	Any measure of UL impairment or activity. For mCIMT: 2 studies used impairment outcomes; 6 studies used activity - ARAT, WMFT total score and WMFT functional ability mean score.	Significant positive effect of modified CIMT reported for UL activity, outcome ARAT across 2 studies: SMD 1.60 [0.89, 2.31], Z=4.41, P<0.0001. No effect in different studies on WMFT scores. Overall effect across 6 studies reported as positive, but significant heterogeneity. 2 studies with impairment outcomes showed no effect.	- Low quality.
207	L. V. Gauthier et al. (2022). Video game rehabilitation for outpatient stroke (VIGorous): A multi-site randomized controlled trial of in-home, self-managed, upper-extremity therapy. <i>eClinicalMedicine</i> , 43:	US multicenter RCT involving 193 participants, four treatment arms with the aim of determining effectiveness of modifying CIMT by reducing therapists time and using gaming technology for self-managed task practice, therapists time focused on behavioural coaching. Stroke patients > 6 months post onset, criteria as usual for CIMT – active ROM >10° in at least 2 fingers, thumb and wrist, >45° shoulder abduction and flexion, able to provide informed consent and willing to commit to	Intervention duration 3 weeks Groups: 1)Self gaming 15 hours self-gaming with 5 hours in clinic behavioural focus 2)Tele-gaming:15 hours self-gaming with 5 hours in clinic behavioural focus, plus 6 brief behavioural video-consultations 3)In clinic CIMT: 35 hours behavioural and motor focus	Primary outcomes Motor activity log: everyday arm use (Motor Activity Log Quality of Movement, MAL) and motor speed/function Wolf Motor Function Test, WMFT) Assessments immediately before treatment, immediately after treatment, and 6 months later.	Tele-Gaming and Self-Gaming produced clinically meaningful MAL gains that were 10 points (95% CI 08 to 103) and 08 points (95% CI 05 to 10) larger than Traditional care, respectively. Self-Gaming was less effective than CI therapy (-04 points, 95% CI -06 to -02), whereas Tele-Gaming was not (-02 points, 95% CI -04 to 01). Six-month retention of MAL gains across all groups was 57%. All had similar clinically-meaningful WMFT gains; six-	++ High quality RCT. Very well conducted. With the four treatment arms balancing the amount or prescribed practice and the therapist's focus on behavioural aspects, the study was able provide evidence of effectiveness of using gaming to provide the movement practice while with reduced therapists' time to promote adherence and behaviour change that was

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		whichever treatment they were allocated.	4)Traditional – in clinic 5) hours motor focus All groups also had 5 hrs task practice at home. In lieu of the CI therapy restraint mitt, the gaming groups were issued with a smartwatch worn on the paretic arm provided vibration feedback and a “please use me” notification when more than 10 min of inactivity was detected.		month retention of WMFT gains was 92%. The authors concluded that self managed gaming with behavioural tele-consultations with the therapist were as good as conventional	equivalent to conventional US CIMT.
207	L. V. Gauthier et al. (2022). Video game rehabilitation for outpatient stroke (VIGoROUS): A multi-site randomized controlled trial of in-home, self-managed, upper-extremity therapy. <i>eClinicalMedicine</i> , 43:	Design: parallel, pragmatic, single-blind RCT with 4 groups and 6-month follow up. Setting: 5 sites: sociogeographically-diverse outpatient neurorehabilitation settings at 3 academic medical centers and 2 community rehabilitation clinics throughout the USA. Participants: N=193 (target: N=224) community-dwelling adults post-stroke (~ 5 years), mild/moderate upper extremity hemiparesis. Active range of motion criteria: > 10° in at least 2 fingers, thumb, and wrist; > 45° shoulder abduction and flexion; > 20° elbow extension.	Four different interventions over a 3-week period: 1)Self-Gaming: 5 h of behaviorally-focused intervention: 1-1 therapist- delivered in-clinic, plus gaming self-management Participants also practised goal-directed tasks, 30 min. per session, 10 separate days between therapy visits (15h). Instead of the CI mitt: smart watch on paretic arm providing vibration	Primary outcomes: Everyday arm use (Motor Activity Log Quality of Movement, MAL) Motor speed/function (Wolf Motor Function Test, WMFT). Exploratory outcomes: Quality of Life in Neurological Disorders (Neuro-QoL) 9-Hole Peg Test, Tactile sense measured with the Semmes-Weinstein Monofilament test, Accelerometry Time points: -Immediately before treatment,	Of 193 enrolled participants: - 167 began treatment and were analyzed, - 150 (90%) completed treatment, - 115 (69%) completed follow-up. MAL: % of participants achieving a clinically meaningful improvement: CIMT (92%), Tele-gaming (80%), Self-gaming (70%), Traditional (24%). MAL: Tele-Gaming was not significantly different from CIMT (-0.2 points, 95% CI -0.4 to 0.1).	+ Study was underpowered (Target N=224). ITT was modified.

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			<p>feedback after > 10 min. of inactivity.</p> <p>2)Tele-Gaming: As above with 6 additional behaviorally-focused brief video consultations (2.6 h) between visits.</p> <p>3. 5 h of Traditional motor-focused rehabilitation.</p> <p>Intensity target: intensity of 4 (somewhat hard) on the Borg CR10 Rating of Perceived Exertion Scale, plus 15 min of strengthening exercises 2x pd on the first 10 non-treatment days (15 h).</p> <p>35 h of CIMT therapy: 10, 3.5 hour in-clinic sessions including 1.5 h of active motor practice (15 h). Padded mitt.</p>	<p>-immediately after treatment,</p> <p>-6 months later.</p>	<p>Tele-Gaming and Self-Gaming produced clinically meaningful gains that were 1.0 points (95% CI 0.8 to 1.3) and 0.8 points (95% CI 0.5 to 1.0) larger than Traditional care, resp.</p> <p>Self-Gaming was less effective than CIMT (-0.4 points, 95% CI -0.6 to -0.2). [f1]</p> <p>WMFT: % of participants achieving a clinically meaningful improvement: CIMT (70%), Tele-gaming (53%), Self-gaming (47%), Traditional (45%).</p> <p>Tele-Gaming was not significantly different from CIMT (-0.2 points, 95% CI -0.4 to 0.1).</p> <p>Tele-Gaming was not significantly different from CIMT (0.13, 95% CI -0.05 to 0.32) 0.71, s/task</p> <p>No serious study-related adverse events. Two minor study-related adverse events (unclear which groups).</p>	
208	A. Abdullahi (2018). Effects of Number of Repetitions and Number of Hours of Shaping Practice during Constraint-Induced Movement Therapy: A Randomized	Single site (Nigeria). RCT - 4 groups each receiving different amounts of CIMT and varying amounts of shaping practice (reps) plus a traditional therapy control group. All had treatment 5 times a week for 4 weeks with supervision. 48 participants (from	Group A (control) had 3 hours of traditional therapy (passive movement, therapeutic positioning weight bearing on the	Outcomes were measured at baseline, 2 and 4 weeks. Primary outcome: motor function subscale of upper limb Fugl-Meyer (FM) assessment, secondary outcomes WMFT, motor activity log	48 participants participated. No drop outs. Primary outcome (FM): There was no significant difference between effectiveness of different reps of shaping activities, but all groups significantly improved from baseline. The changes in three CIMT groups exceeded	++ Blinding evident, consideration of allocation concealment. No drop outs so no ITT. Limitation: single site and unclear if groups were underpowered (but likely to be

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	Controlled Trial. <i>Neurology research international</i> , 2018: 5496408	174) were recruited within 4 weeks of stroke. No drop outs.	affected limb). Group B (the mCIMT) received modified CIMT consisting of 3 hours of shaping practice per session per day and constraint for 90% of the waking hours. Group C received 300 repetitions of shaping practice in 3 sessions per day (100 repetitions per session) and constraint for 90% of the waking hours. Group D received 600 repetitions of shaping practice in 3 sessions per day (200 repetitions per session) and constraint for 90% of the waking hours. Each of 5 shaping tasks was carried out 20 and 40 times per session in groups C and D and for 3 hours in group B.	(MAL), and upper limb self efficacy test (UPSET).	MCID on the FM. Secondary outcomes: No significant difference between treatment groups but all (except control) showed significant improvement from baseline at 4 weeks.	as over 70 participants were indicated to be needed from a priori sample size calculation.
208	A. Abdullahi (2018). Effects of Number of Repetitions and Number of Hours of Shaping Practice during Constraint-Induced Movement	RCT comparing use of number of practice repetitions and number of practice hours during CIMT in people early after stroke (within four weeks of onset) recruited from a specialist hospital setting.	Group A, Control= 3 hours traditional therapy Group B= modifies CIMT 3 hours session shaping practice per	Primary= Fugl Meyer Upper Limb Secondary= Wolf Motor Function test, Motor Activity log, coordination scale for hand and wrist,	Randomised n=48, a priori sample size calculation suggested n=73 required, and authors aimed for n=76. 12control, 13, group A, 12 group B, 11 group C.	++ Although further information on site used could have been given. Study under-powered.

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	Therapy: A Randomized Controlled Trial. <i>Neurology research international</i> , 2018: 5496408	No 'very severe' upper limb impairment (1-3 on NIHSS, 3 or more on MAS). Consecutive recruitment with simple random sampling.	day, constraint 90% waking hours Group C=300 reps shaping practice in 3 hours per day, constraint 90% waking hours Group D= 600 reps shaping practice in three sessions per day, constraint 90% waking hours.	PSET- upper limb self-efficacy. Baseline, two weeks and four weeks	No dropouts. On Primary outcome, all groups improved significantly from baseline but no between group differences. Change exceeded MCID in CIMT groups.	
209	A. Abdullahi et al. (2021). Effect of constraint-induced movement therapy on persons-reported outcomes of health status after stroke: a systematic review and meta-analysis. <i>International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation</i> , 44:1 15-23	Systematic review and meta-analysis to investigate effect of Constraint Induced Movement Therapy (CIMT) on persons-reported outcomes of health status (PROsHS). Included 9 studies with 558 participants. Protocol registered in PROSPERO. Quality of studies assessed using PEDro scale. Qualitative synthesis summarised characteristics and methodological quality. Quantitative synthesis involved meta-analysis of the mean and SD scores on outcomes of interest and sample size postintervention and at follow up.	Included reviews of CIMT for upper and lower limb. Participants ranged from 9.7 days to 8 years after stroke, with participants with mild to moderate disability, score of 3-5 on Brunnstrom stages of recovery, or 20 degrees active wrist extension and 10 degrees metacarpophalangeal and interphalangeal joint extension, at least 15 on motor arm subscale of upper limb fugle-meyer or upper limb paresis with minimal distal control. All studies included participants with minimal cognitive impairment.	Persons-reported outcomes of health status. Motor function Amount of use of upper limb Quality of upper limb use Activities of daily living Pre and post intervention compared to control	All included studies (9 RCT's) have high methodological quality. Improvement in PROsHS and secondary outcomes post intervention and at follow up. No statistically significant difference between groups (control and intervention) post intervention for upper limb or lower limb PROsHS. Pooled UL and LL data showed no statistical significance between groups for PROsHS. Motor function – no statistically significant difference between groups for upper limb. Significant difference between groups when upper and lower limb studies were pooled in favour of CIMT. Amount of UL use showed statistically significant difference between groups in favour of CIMT.	Adequate

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					Quality of use of UL showed statistically significant difference between groups in favour of CIMT. Activities of daily living showed no statistically significant difference between groups post intervention.	
209	A. Abdullahi et al. (2021). Effect of constraint-induced movement therapy on persons-reported outcomes of health status after stroke: a systematic review and meta-analysis. <i>International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation</i> , 44:1 15-23	Systematic review & Meta-analysis. Assessing CIMT effect on Health Status. Included 9 studies (n=558) up to Oct 2019. PROSPERO Registered. PEDro rated. Inclusion criteria: RCTs, comparing UL or LL CIMT vs usual care, stroke, over 18y.o, all studies needed to include "health-status" as an outcome. Subjects across the studies were defined as having mild to moderate disability. Time since stroke varied from 9.7 days to 8 years.	CIMT of upper or lower limb	-Primary outcome was PROSHS (persons-reported outcomes of health status) which often included SIS or SSQoL -Secondary outcomes were listed as: motor function (often WMFT, ARAT,FMA, BBS, MI, gait tests), real-world arm use (MAL), other functional outcomes (FIM)	For upper limb, there was no statistical significance between groups. This pooled data of 224 subjects with CI approaching zero but favouring CIMT	+ Acceptable. However, the primary outcome influenced the studies selected reducing the relevance to Question 34
210	A. F. Anjum et al. (2021). Effect of Wii-habilitation" and constraint induced movement therapy on improving quality of life in stroke survivors". <i>Rawal</i>	Setting: Single hospital site, Pakistan. Design: randomise controlled trial (although how allocated is unclear). Participants: 40 first ever stroke patients, age range 30-60 years, within 4 months of stroke and who had hemiparesis of the UL with ability to handle gaming equipment and	Intervention group (n=20) received 4 20 minute sessions each week for 4 weeks during which they wore a mitt on the unaffected side and completed arm movements within a	Upper limb items on the Barthel Index were collected before the study and after 4 weeks. UL items were: feeding, toilet use, dressing and grooming.	There were no data on drop outs. Adherence or missed sessions. The study reports a significant improvement in all groups from before the study to post intervention. There were no significant differences between groups at baseline. After the intervention, the	0 Unacceptable. There was no mention of blinding, allocation concealment, drop outs, ITT. The CIMT offered was not recognisable as CIMT other than wearing the mitt (n o

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	<i>Medical Journal</i> , 46:1 220-223	comprehend game (no details on how determined).	game using the Nintendo Wii. Control: (n=20). Same frequency and duration but received traditional therapy.		scores for the intervention group on the UL BI were reported to be significantly better than the control group.	shaping, only 20 minutes a day).
210	A. F. Anjum et al. (2021). Effect of Wii-habilitation" and constraint induced movement therapy on improving quality of life in stroke survivors". <i>Rawal Medical Journal</i> , 46:1 220-223	RCT Physiotherapy department in Pakistan. Participant inclusion: people within four months stroke onset, 30-60 years old, upper limb weakness but could 'comprehend and handle' video gaming equipment.	N= 40 participants, 20 control 20 intervention. Intervention group: Four weeks intervention, 4 sessions per week of 20 mins. Used Wii games involving arm movement. Weighted mitten on unaffected arm. Control group= traditional physiotherapy of same frequency and duration.	10-point modified Barthel (BI) at study outset and post- four weeks of intervention.	Improvement in BI in both groups at end of intervention period.	0 Unacceptable. Serious methodological flaws as reported with no mention of blinding, insufficient detail of allocation method, insufficient detail of intervention, no 'shaping' programme, no information on drop-outs.
211	A. A. Bani-Ahmed (2019). Post-stroke motor recovery and cortical organization following Constraint-Induced Movement Therapies: a literature review. <i>Journal of physical therapy science</i> , 31:11 950-959	Literature review, aiming to compare CIMT and mCIMT protocols, and their impacts on motor recovery and cortical reorganisation. Qualitative review process used to appraise each study + aimed to synthesize findings on effects of CIMT on cortical reorganisation.	Review included RCTs involving adults with stroke, where the experimental intervention met the definition of CIMT or mCIMT; outcomes measured post intervention +/- at follow up; published I English language.		Concludes that there is a lack of understanding of the association between changes in motor recovery and the underlying neural mechanisms for this.	- Poor quality. Limited detail on search strategy/methods, how papers were selected for inclusion etc. Doesn't follow PROSPERO guidance. Review and discussion is predominantly narrative.
211	A. A. Bani-Ahmed (2019). Post-stroke motor recovery and	Unversity of Tabuk:KSA. Literature reviewing studies evaluating CIMT and mCIMT. The	4 articles CIMT 4 articles mCIMT in patients with chronic	Outcomes used: MAL, FMA, MAS, WMFT.	In the CIMT studies significant improvement in all outcome	Poor literature review. Difficulty ascertaining if two people selected papers. There

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	cortical organization following Constraint-Induced Movement Therapies: a literature review. <i>Journal of physical therapy science</i> , 31:11 950-959	search limited to articles written in English. Lit between Jan 2000-Oct 2018. Only one relevant electronic sources- MEDLINE. Chronic stroke patients. Critical appraisal criteria used (Sackett's 1991). Inclusion criteria: Adult patients, stroke, level 1 evidence, Level II small RCT, experimental intervention, outcomes measured post intervention and /or follow up. Articles in English only.	stroke that met the criteria. Total number of participants in each study varied from 7 to 222 and from 17 to 35 in CIMT and mCIMT respectively. In CIMT treatment protocol varied 10 days to 3 weeks with daily sessions by restraining the affected arm for 6 hours per day, 90% waking time. mCIMT protocol varied 3 to 10 weeks. Level of evidence II. . restraining the unaffected for 5-6 hours a day.		measures (RCT large sample size 222 subjects) mCIMT Small sample sizes 13-35 participants and no follow up data. Studying the cortical reorganisation associated with CIMT using methods: fMRI, TMS, Positron Emission Tomography (PET). 6 studies results following CIMT and on study following mCIMT. Number of participants in each study varied 1 to 16 in CIMT and mCIMT- requires more consideration.	should be a consensus process to resolve any differences. Only one relevant electronic source –MEDLINE. One larger RCT significant improvement in all outcomes MCID. Limited number of participants in the literature review of cortical organization following CIMT (1 to 16 participants)
212	A. Barzel et al. (2015). Home-based constraint-induced movement therapy for patients with upper limb dysfunction after stroke (HOMECIMT): A cluster-randomised, controlled trial. <i>The Lancet Neurology</i> , 14:9 893-902	Country: Germany Setting: Home Design: Parallel, cluster randomised controlled Trial 71 practices randomised: 37 CIMT & 34 standard rehab Subjects: 85 CIMT 71 standard rehab >6/12 post stroke + friend / family coach.	Standard: 5 hours professional therapy contact over 4 weeks. CIMT: 5 hours professional therapy contact over 4 weeks - during this session, participant and coach are trained to undertake 2 hours exercise 5/7 and 2-4 hours of wearing the glove daily.	Baseline, 4/52 & 6/12 Assessor & statistician masked to group allocation -Wolf Motor Function Test (WMFT) -Motor Activity Log (MAL)	4 dropped out of CIMT group MAL improved in both groups (change from baseline 0.56, 95% CI 0.41–0.71, p<0.0001 for home CIMT vs 0.31, 0.15–0.46, p=0.0003 for standard therapy). CIMT group improved more than the standard therapy group (between-group difference 0.26, 95% CI 0.05–0.46; p=0.0156). WMFT improved in both groups (WMFT change from baseline –25.60%, 95% CI –36.75 to –12.49, p=0.0006 for CIMT vs –27.52%, –38.94 to –	++ High quality. Limitation related to the intervention in question & acknowledged by author: Not dose matched (CIMT group are instructed to undertake 2-hour daily exercises and wear glove for 2-4 hours a day) Baseline - CIMT group 10/12 more chronic than standard, otherwise matched

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					13-94, p=0.0004 for standard), but the extent of improvement did not differ between groups (2.65%, -17.94 to 28.40; p=0.8152). 9 adverse events (6 serious) in CIMT group 10 adverse events (7 serious) in standard group none deemed related to study.	Comparable to UK stroke population and resources
212	A. Barzel et al. (2015). Home-based constraint-induced movement therapy for patients with upper limb dysfunction after stroke (HOMECIMT): A cluster-randomised, controlled trial. <i>The Lancet Neurology</i> , 14:9 893-902	Community therapy practices Northern Germany- CIMT in person's home environment. Parallel, cluster randomised, single blind controlled intervention trial. Block randomisation per community practice. Adults 6 months or more after stroke, mild to moderate arm function impairment, minimal hand function (10° active wrist extension, 10° active thumb abduction or extension, 10° extension two other fingers), had a care giver to act as non-professional coach.	Home-based CIMT: home training for 2 hours each day with non-professional coach (caregiver), individually tailored goals and exercises supported with five home visits/ training in CIMT from therapists. versus Standard care: typical stroke therapy according to therapists' assessments.	Coprimary outcomes were changes in activity and motor function of stroke-affected arm four weeks post intervention, assessed by the MAL-QOM (Motor Activity Log Quality of movement, self-reported) and the WMFT-PT (Wolf Motor Function Test- Performance Time). Secondary outcomes MAL-AOU (Motor Activity Log Amount Arm Usage) and WMFT-FA (Wolf Motor Function Test, functional ability); and Stroke Impact Scale, SIS; Nine Hole Peg Test, NHPT; Barthel Index, BI; instrumented Activities Daily Living (iADL).ITT analysis.	156 eligible patients. 85= home CIMT and 71= standard therapy; 96% home CIMT completed treatment and 100% standard therapy group completed treatment. After four weeks intervention, both groups increased quality of movement (MAL-QOM), with greater improvement in CIMT group than standard care group, and both groups increased performance time (WMFT-PT) relative to baseline but with no between-group differences. Amount of arm use (MAL-AOU) significantly higher in CIMT group at six months. No differences on other measures at this timepoint.	+ Acceptable. Well-designed study. No specific adherence reporting re two-hour therapy target-fidelity not clear. Minimal consideration of implication of 'non-professional coach' for CIMT group, a considerable difference to the standard therapy group aside from the CIMT itself.
213	P. Bhardwaj et al. (2021). Effect of mcimt with and without	Two rehabilitation centres in India (unclear if in-patient and out-patients at both centres).	Intervention six days per week for two weeks.	Box and block test, and patient-rated wrist hand evaluation score (PRWHE)	Challenging to interpret results as analysed and presented, text did not always	0 Unacceptable.

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	interval on hand in patient suffering from stroke. <i>Romanian Journal of Neurology/ Revista Romana de Neurologie</i> , 20:1 57-65	Single blind, three-group RCT. Included people unable to do activities of daily living due to stroke and with family member able to supervise. Criteria on balance and stability not clear. Specific upper limb movement criteria not reported.	Three groups: Modified CIMT without any interval (six hours continuous including two hours therapy) Modified CIMT with intervals (two hours of therapy with constraint, four other hours of constraint with intervals at the convenience of the patient) Control ROM/stretching exercises for two hours, no constraint.		match tables. Analysis plan did not match some of the reported tests as presented. Some improvement within groups for intervention, both interval and non-interval, on Box and Block and PRWHE.	The study reporting is of unfortunately of insufficient quality for findings to be trustworthy and to have any influence on practice. The question itself was not clearly stated; the lack of detail in key areas (such as participant inclusion criteria, study sites, randomisation) leaves the work open to considerable biases in key areas.
213	P. Bhardwaj et al. (2021). Effect of mcimt with and without interval on hand in patient suffering from stroke. <i>Romanian Journal of Neurology/ Revista Romana de Neurologie</i> , 20:1 57-65	Country: India Setting: Outpatients Design: Single blind RCT on 2 sites Subjects: 44 participants in 3 arms: -Interval mCIMT n=16 -non-interval mCIMT n=18 -Control n=10	6 days a week for 2 weeks Interval mCIMT: 6 hours with intervals including 2 hours therapy. Non interval mCIMT: 6 hours including 2 of therapy. Control - 2 hours stretches & ROM exercises unclear if same therapy as the mCIMT did.	Pre and post intervention: Assessment of outcomes not blinded -Box and block -Patient rated wrist hand evaluation score (PRWHE)	Significant improvements reported in both mCIMT groups for both measures.	0 Unacceptable – reject. "Patients were blinded" Assessor not blinded (Clinicians involved in treatment) No details about allocation Limited details about intervention - not replicable small sample size Control group didn't appear to control for usual care but not enough details no comparison of different sites results

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214	L. J. Christie et al. (2019). Constraint-induced movement therapy for upper limb recovery in adult neurorehabilitation: An international survey of current knowledge and experience. <i>Australian occupational therapy journal</i> , 66:3 401-412	Cross sectional survey conducted online across 11 countries.	Online survey between May to December 2016. Distributed to OT and PT associations and neurological interest groups. Passive snowball sampling. Respondents had to be working in adult neurology and used CIMT in the last two years.	Most common outcomes were nine hole peg test and motor activity log. Descriptive and inferential statistics were used for analysis.	169 complete surveys were eligible and analysed. Respondents (64.5% OT 34.3% PT and 1.2% other. Most respondents were from the UK – 36.1% and modified CIMT was used most often – 74.6%. CIMT programmes were most often delivered for one hour a day with the mitt being worn for a mean of 5.6 hours per day.	Unable to score using SIGN checklist. CIMT being provided across multiple countries and most led by OT. Frequency of CIMT programmes appears low in practice.
215	A. Doussoulin et al. (2017). Recovering functional independence after a stroke through Modified Constraint-Induced Therapy. <i>NeuroRehabilitation</i> , 40:2 243-249	South American RCT small sample n=36, comparing group CIMT (n=24) vs individual CIMT (n=12) In patients from a single community rehabilitation centre. Inclusion criteria: single stroke event, age 30-80 years, >6 months post stroke, score 4-14 on NIH stroke scale, <2 points Ashworth scale, able to extend wrist 20° and fingers 10°, excluded if presenting with impaired vision, hearing (no specification given) or if there was orthopaedic limitation eg walking with a stick	Modified CIMT 3 hours a day over 10 days. Group CIMT (groups of 6 patients) vs individual CIMT	Functional Independence Measure	Table 3 Effects of treatment means and SDs look similar between groups and p values show no significant differences. However, the abstract and reported results in the paper claim positive results.	0 This is a poorly detailed report of a small randomized controlled trial. No details are given of the sample size required to determine a treatment effect, The results reported in the text are seeing changes that are not borne out by the probability values in the statistics. No confidence intervals are presented.
215	A. Doussoulin et al. (2017). Recovering functional independence after a stroke through Modified Constraint-	Design: RCT, comparing group-format with individual format modified CIMT (no control group). Setting: community rehabilitation centre, Chile.	Content: mCIMT. Three main elements: repetitive, task-oriented training, induction in the use of the affected upper	Functional Independence Measure (FIM) scale before and at end of intervention.	Total score: significant difference in favour of the group format ($\eta^2 p = 0.72, p < 0.001.$)	- Low quality. - Randomisation unclear - Allocation unclear

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	Induced Therapy. <i>NeuroRehabilitation</i> , 40:2 243-249	Participants: > 6 months post stroke. Inclusion criteria: age 30-80 years, single stroke event confirmed by computed tomography Participants had to be able to sit independently; have a score of 5 to 14 points on the NIH Stroke Scale; less than 2 points on the Modified Ashworth Scale; less than 4 points on the Visual Analogue Scale (pain), be capable of a functional test of 20° wrist extension and 10° finger extension. Exclusion criteria: sensory (visual- auditory) impairments and orthopaedic conditions (use of a stick). - Intervention (group format): N=24 (6x4), 18M:6F, mean age (±SD) 58.33 (10.38) y. - Intervention (individual format): N=12, 4M:8F. Mean age (±SD) 48.75 (18.60) y Type of stroke reported. Stroke severity not reported.	extremity and a transfer packet. Dose: 3 hours per day over 10 days =30 hours.		Motor sub-scale: significant difference in favour of the individual format ($\eta^2p = 0.70$, $p < 0.001$.) Cognitive sub-scale: significant difference in favour of the group format ($\eta^2p = 0.73$, $p < 0.001$.) Clinical importance of significant between-group differences not discussed.	- Concomitant treatment unclear. -Differences in groups at baseline
216	M. R. El-Helow et al. (2015). Efficacy of modified constraint-induced movement therapy in acute stroke. <i>European journal of physical and rehabilitation medicine</i> , 51:4 371-9	Country: Egypt Setting: Outpatient Design: Single blinded RCT (Described as prospective comparative) Subjects: 60 (30 in each group) 4-12/7 post stroke Mean age 53 Community dwelling	Intervention mCIMT: -2 /52 x 7/7 Padded mitt & sling x min 6hr -5/7 x 2 hr 1:1 shaping 7/7 -additional practice in hospital or at home Control: -2/52 x 5/7 Usual care (2 hrs 1:1 OT / PT)	Base line & 2/52 (Assessor blinded) -Fugl-Meyer Motor Assessment (FMA) -Action Research Arm Test (ARAT) -Resting Motor Threshold (RMT) -Motor Evoked Potential (MEP)	Significant improvement in both FMA & ARAT for mCIMT (between group differences) Small non-significant changes in RMT & MEP for control but significant changes in mCIMT group.	+ Acceptable. However limitations: Unable to blind participants, small sample size. Not dose matched: mCIMT additional 4 hours (min) + weekend Additional practice 7/7 Young cohort - all community

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
						dwelling at 4-12/7 post stroke and able to attend for 2 hours (+practice time) daily for 2/52 not sure this is representative of UK stroke survivors or the resources currently available.
216	M. R. El-Helow et al. (2015). Efficacy of modified constraint-induced movement therapy in acute stroke. <i>European journal of physical and rehabilitation medicine</i> , 51:4 371-9	Prospective comparative study. (n=60) Acute stroke (within 2 weeks onset). Neurology department of hospital in Cairo, Egypt. MCA stroke only. NIHSS arm score of 1 or 2 and 10 deg finger ext + 20 deg wrist ext. Randomised to CIMT or conventional rehab (CRP)	CRP (n=30) = Therapy 5 days per week, 2 hours per day for 2 weeks CIMT (n=30) = constraint of unaffected arm for 7 days per week 6 hours per day and Therapy 5 days per week, 2 hours per day for 2 weeks Therapists delivering the treatment do not appear to have been blinded to group allocation.	Blinded assessor recorded outcomes prior and after the end of rehabilitation FMA-UL ARAT TMS used to evaluate resting motor threshold, MEPs and central motor conduction time.	Groups were similar at baseline No reported dropout CIMT group: FMA score improved by 17.46±1.93 ARAT score improved by 18.09±5.75 Both improvements were statistically significant CRP group: FMA improved by 1.08±0.21 ARAT improved by 3.50±1.22	+ Acceptable. Reported efforts to ensure adherence to the protocol however does not state what group adherence was at the end of the intervention period. Like many CIMT studies, this study does not compare like for like and sits outside of the “comparison for superiority” analysis undertaken in the SR by Lin et al 2019.
217	G. C. B. Gama et al. (2021). Constraint Induced Movement Therapy Increases Functionality and Quality of Life after Stroke. <i>Journal of Cerebrovascular Diseases</i> , 30:6 105774	RCT blinded (n=30). Repeated measures (pre, 12 th session, 24 th session). CIMT vs Conventional rehab. Physio department of University. City of Para, Brazil. Inclusion: Chronic 6 months or more, age 45 to 80 years old, clinical diagnosis of stroke, hemiparesis with brachial predominance	Total intervention time of 24 sessions (three weekly 60 min sessions on alternate days) for both groups Conventional rehab (CR): stretching, strengthening and /	FMA – Physical Performance Scale is used (reporting a maximal score of 100 points). The reference for this version of the FMA is missing from the reference list, I have located it however it is in Portuguese. Unclear if this version is validated. Values contradict the conventional FMA UL	The scores for all FMA variables in the CIMT Group improved until the 24 th session, compared to baseline In the usual care group (CG), the scores increased for pain, coordination/ speed and sensitivity, but not for motor function.	- Low quality. Description of randomisation adequate, no description of concealment - No evidence of assessors blinded to treatment. Motor function of UL at baseline differs by 9 points between groups.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			or mobilization of the same muscle groups (10 repetitions and 3 sets) and functional training of the affected muscles.	(66points) which is not referenced. SS-QOL Functional Reach test MAS	The groups appear to differ notably at baseline.	Missing “demographics” table to compare groups at baseline. Unclear how volunteers were identified.
217	G. C. B. Gama et al. (2021). Constraint Induced Movement Therapy Increases Functionality and Quality of Life after Stroke. <i>Journal of Stroke and Cerebrovascular Diseases</i> , 30:6 105774	Country: Brazil Setting: Outpatient clinic community dwelling participants Design: Blind randomized clinical trial Subjects: 30 into 2 groups -CIMT -Control	A total intervention time of 24 sessions (three weekly 60 min sessions on alternate days) CIMT: -protocol as per Rocha (not the same as Control) 1:1 60 min sessions Control: -conventional physiotherapy described in detail. 1:1 60 min sessions	Baseline, after 12th & 24th session -Fugl-Meyer Motor Assessment (FMA) -Modified Ashworth, -Stroke Specific Quality Of Life (SSQOL) -Functional Reach Test (FRT).	Overall improvements across a number of domains for both CIMT & CG. In the intergroup analysis, a difference was observed only in the 24th session (p = 0.004), in which the CIMT showed a more evident decrease in muscle tone than the CG. Not sure the inferential stats are warranted for the sample size.	Low quality. No mention of assessors being blinded. Does this reflect true CIMT - no wearing of glove / practice opportunities outside of the 3 x 60 mins weekly sessions. No limitations acknowledged
218	G. M. Hansen et al. (2018). Predicting shoulder function after constraint-induced movement therapy: a retrospective cohort study. <i>Topics in Stroke Rehabilitation</i> , 25:4 281-287	Setting: Neuro unit in Denmark. Design: prospective cohort study. N=40 (age range 44-82 years; stroke between 4 and 17 months ago) Participants were adults, had a stroke more than 3 months but less than 24 months ago and had impairment of the UL but could extend the wrist, 2 fingers and thumb. They had to be able to transfer and place their hand on a 20cm high box on a table.	Intervention not very detailed – 10 days of 6 hours of CIMT (total of 60 hours) but no detail as to the content of shaping exercises. No control intervention (as prospective cohort study).	Outcomes were measured pre CIMT, post CIMT and three months follow-up. Primary outcome was kinematics of the shoulder girdle, specifically: primary kinematic measure was change in ROM of scapula upward rotation during a reach low task (item 5 on WMFT) and reach high (item 6 on WMFT). Clinical outcomes were: scores on the WMFT-for task 5 and	37 participants completed the study. 3 (from 40) were excluded for ‘technical issues’ 1 lost to follow-up. Kinematics: very few significant differences pre-post and pre to follow up but there were significant changes in shoulder flexion (during low task), upward rotation of scapula during high task, scapula tilt during low (at follow up only) and movement time during low and high tasks. WMFT (task 5 showed	+ Absence of rater blinding could confound and no control means that improvement seen could be related to natural recovery (acknowledged by authors).

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
				task 6 which were each dichotomised as 0–4 = impaired shoulder function and 5 = normal shoulder function. Patient reported outcome measures : Shoulder Pain and Disability Index (SPADI) and Patient Global Impression of Change (PGIC).	significant improvement after CIMT but not a follow up, scores on WMFT on task 5 and 6 showed improvement at both time points. SPADI scores were all significant changed at both time points.	
218	G. M. Hansen et al. (2018). Predicting shoulder function after constraint-induced movement therapy: a retrospective cohort study. <i>Topics in Stroke Rehabilitation</i> , 25:4 281-287	Single cohort, prospective design, pre and post testing. Danish rehabilitation center. Adults, three months or greater since stroke onset, upper limb impairment but able to extend affected wrist, two fingers and thumb greater than 10· three times within one minute. Had to be able to lift hand on to a 20cm high box.	Unclear on detail of intervention. - six hours per day of CIMT for 10 days. No specific detail on exercises undertaken. Adherence defined as sufficient if participation 80% time. No control, single group pre and post testing only.	Kinematic evaluation: Primary outcome = ROM upwards scapula rotation on 'reach high' and 'reach low' task Secondary outcomes= Nine other upper limb kinematic variables. Clinical measures= Wolf Motor Function Test (WMFT), Shoulder pain and disability index (SPADI) and patient global impression change (PGIC) Tested pre, post and at three month follow up.	N= 37 participants completed, + three lost due to 'technical' issues, one lost to follow up. All adhered according to predefined measure. Kinematic measures: Significant reduction in scapula upward rotation (high task) pre to post and post to follow up intervention. Shoulder flexion (low task) and trunk lat flexion (high task) showed significant reduction post intervention. Movement time both high and low tasks showed significant improvement pre to post and post to follow up. Clinical measures: WMFT task 5 demonstrated significant improvement post CIMT but not at follow up, WMFT on task 5 and 6 showed improvement at both time points. SPADI scores all demonstrated significant	Acceptable but many areas of tool not applicable due to use of single group only; intervention insufficiently described. Confounding issues acknowledged by authors.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					change at both post and follow up.	
219	G. M. Hansen et al. (2021). Shoulder function after constraint-induced movement therapy assessed with 3D kinematics and clinical and patient reported outcomes: A prospective cohort study. <i>Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology</i> , 58: 102547	Retrospective cohort study. Observational with sub-group analysis. Patients who participated in CIMT (n=175) from Dec2008-Oct2015 were analysed. Chronic patients (3months or more) Neurorehab hospital in Denmark. Included patient data was evaluated to identify factors which predicted satisfactory shoulder function (SF), these were: High distal SF, high proximal SF, age, time	CIMT was conducted in a hospital as a "treatment-package" with 6 h of training per day over 10 consecutive weekdays in an inpatient setting. This was a retrospective analysis and non-comparative	WMFT used to assess upper limb outcome (proximal/distal sum-scores of WMFT were used to stratify patient's shoulder function. Grip strength. There were no follow-up measurements or review of long term outcomes (nature of being retrospective)	High distal function (WMFTdist4 >12) and high proximal function (WMFTprox4 >12) prior to CIMT training were the only predictors significantly associated with the probability of reaching satisfactory level of shoulder function after CIMT	Unacceptable. Due to the nature of design, there is limited confidence derived from the association presented by the researchers between baseline proximal/distal upper limb function and the intrinsic properties of CIMT as an intervention.
219	G. M. Hansen et al. (2021). Shoulder function after constraint-induced movement therapy assessed with 3D kinematics and clinical and patient reported outcomes: A prospective cohort study. <i>Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological</i>	Design: Retrospective cohort study Setting: specialized Neurorehabilitation hospital in Denmark Participants: N=175 Inclusion criteria: Aged ≥18 years; diagnosis of stroke; reduced function in the most affected UE, but able to execute following movements: 10° active extension of the wrist, 10° active extension and abduction of the thumb, 10° active extension of additional two fingers. Exclusion criteria: Not able to independently	CIMT: 6 h of training per day over 10 consecutive weekdays = 60 hours. Group format (N=4). During the 10 training days, participants were encouraged to use the constraint (mitt) on the less affected UE 90% of waking hours.	The primary outcome measure to assess motor function: WMFT Functional Ability Scale: sum-score of task 1, 2, 5 and 6 in WMFT to evaluate proximal function. Satisfactory proximal function = score 17–20. Assessments before and at end of intervention.	High distal function and high proximal function prior to CIMT training were the only predictors significantly associated with the probability of reaching satisfactory level of shoulder function after CIMT. Age and time since stroke were not significantly associate with satisfactory shoulder function after CIMT. After CIMTtraining	Unacceptable: study undertaken in the context of routine practice; no measures in place to minimise blinding.

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	<i>Kinesiology</i> , 58: 102547	transfer to/from toilet; not able to understand instructions or cooperate with staff while performing CIMT training, satisfactory shoulder function prior to CIMT (= sum-score 17–20 on four Wolf Motor Function test (WMFT) items defining proximal function); non-completion of CIMT training (participation of <80% of the program); no post-test registration of shoulder function. Clinical-demographic data provided but not for cohort as a whole (Table 1). Stroke type reported Stroke severity not reported.				
220	J. Huai et al. (2017). Constraint-induced movement therapy in treatment of acute and sub-acute stroke: A meta-analysis of 16 randomized controlled trials. <i>Neural Regeneration Research</i> , 12:9 1443-1450	Meta-analysis of 16 RCTs, 738 participants. Stroke in adults, <6 months after stroke.	CIMT or mCIMT with “traditional rehabilitation therapy” control (not defined). Therapy intensity differed, sometimes substantially. Length of therapy differed somewhat.	A range of impairment and functional measures. Weighted mean difference for each measure was analysed separately.	ARAT: Heterogenous results from 5 studies. Separating high intensity (HI) from low intensity (LI) CIMT found favourable effect of LI CIMT. mBI: Heterogeneous, but both HI and LI CIMT showed beneficial effects. FMA (impairment): Larger WMD for LI than HI CIMT. MAL: Significant benefit of both HI and LI CIMT on amount of use and quality of movement. WMFT: No significant effect.	+ Acceptable.
220	J. Huai et al. (2017). Constraint-induced movement therapy in treatment of acute and	Meta analysis to evaluate clinical efficacy of CIMT in acute and sub acute stroke. Included 16 RCT’s (379 participants in CIMT, 359 in	CIMT in treatment of acute or sub-acute stroke with traditional rehabilitation therapy.	Effects measured using ARAT, mBI, FMA, MAL	ARAT: Five studies assessed CIMT using ARAT, significant heterogeneity. Two studies using high intensity CIMT	++ CIMT or mCIMT may be more beneficial than traditional

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	sub-acute stroke: A meta-analysis of 16 randomized controlled trials. <i>Neural Regeneration Research</i> , 12:9 1443-1450	control). Article quality assessed using PEDro. For each outcome variable, results pooled using weighted mean difference and 95% confidence intervals. Random effects model used to calculate pooled outcome variables. Subgroup analyses conducted according to degree of mCIMT (high or low intensity) Participants less than 6 months since stroke.	Divided into high and low intensity CIMT based on VECTORS study.		<p>demonstrated a non significant difference in favour of contro. 4 studies using low intensity CIMT showed significant WMD in favour of CIMT (11.49, 95%CI 5.61-17.37).</p> <p>mBI: Used in 6 studies. Significant heterogeneity. Both high and low intensity CIMT yielded significantly better values than the control.</p> <p>FMA: 13 studies with significant heterogeneity for SMD. High and low intensity CIMT demonstrated significant differences</p> <p>MAL: 4 studies. Significant differences in favour of experimental group</p>	<p>rehabilitation therapy in acute and sub acute stroke. Low intensity may be more beneficial than traditional rehabilitation therapy in acute and sub acute stroke.</p>
221	K. M. Kelly et al. (2018). Improved quality of life following constraint-induced movement therapy is associated with gains in arm use, but not motor improvement. <i>Topics in Stroke Rehabilitation</i> , 25:7 467-474	<p>Retrospective cohort analysis (n=45). It combines two cohorts of patients who received CIMT either in person (n=29) or via video gaming (n=16) from two separate studies., both of which were undertaken between 2012-2016.</p> <p>Chronic stroke (6+months) patients 14-84y.o, community dwelling, with some baseline arm function.</p>	The in-person CI therapy protocol involved 30 h (3 h/day, 10 weekdays over a 2-week period) of intensive motor training focusing on both functional tasks and shaping, plus behavioural techniques for 0.5 h/day (transfer package) that promote	<p>Association between the following outcomes was explored post intervention:</p> <p>-ARAT -WMFT -MAL -SSQoL</p> <p>The defined end-point for assessment was not clearly defined, it is likely to have been in the original trials.</p>	<p>Baseline values for age, sensation, ARAT and WFT scores vary widely between the combined cohorts. As does the mode of CIMT delivery</p> <p>improved arm use during everyday activities is integral to maximizing self-reported quality of life</p>	<p>+ but unacceptable if there is no reference for (n=29) study</p> <p>The paper is not directly relevant to key question.</p> <p>The overall sample is very small and made of a heterogenous population with intervention varied.</p> <p>There are missing pre (n=8)18% and post (n=11)24% values for SSQoL which is one</p>

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
		Could not locate a reference for the main study (n=29)?	<p>carryover of therapeutic gains into everyday activities.</p> <p>The gaming CI therapy protocol involved a target of 30 h in-home game play over 2 weeks. Patients received four in-home visits totalling 5 h to deliver the transfer package.</p> <p>Compliance to dose is not explicitly defined.</p>			of the primary outcomes contributing to the observed results.
221	K. M. Kelly et al. (2018). Improved quality of life following constraint-induced movement therapy is associated with gains in arm use, but not motor improvement. <i>Topics in Stroke Rehabilitation</i> , 25:7 467-474	<p>Country: USA</p> <p>Setting: Home</p> <p>Design: Retrospective analysis of outcomes of 2 studies</p> <p>Subjects: Community dwelling chronic stroke survivors n=29 CI & n=16 Gaming.</p>	<p>All participants -4 x 1.25 hr home visits to set up & advised to wear a mitt for 90% of waking hours (monitored by tracking device in mitt).</p> <p>Additionally, In-person CI: 30 hrs (3 hr/day, 10 weekdays over a 2-week period) of intensive motor training focusing on both functional tasks and shaping, plus behavioural techniques for 0.5 hr/day.</p>	<p>Pre & Post intervention. Independent assessors & attempts to blind.</p> <p>Wolf Motor Function Test (WMFT)</p> <p>-Motor Activity Log (MAL)</p> <p>-Action Research Arm Test (ARAT)</p> <p>-Stroke-Specific Quality of Life Scale (SSQoL).</p>	<p>Participants showed significant gains in both motor function and arm use during daily activities after the intervention.</p> <p>minimal detectable change were exceeded for the MAL (1.07 points mean change) and WMFT (7.08 s mean change). However, neither the minimal detectable change nor minimally clinical important differences were reached for the ARAT (2.41 points mean change). The mean change in total SSQoL was 16.60 points. These are mean scores - not separated for intervention.</p> <p>ARAT and MAL scores differ significantly for patients in the</p>	<p>+ Acceptable for its original aim but study aim is not aligned with this review (whether motor function or daily use of UL has a greater influence on quality of life).</p> <p>Small participant numbers & missing data.</p>

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			<p>Gaming: -a target of 30 h in-home game play over 2 weeks.</p> <p>AIM: identify whether motor function or daily use of a hemiparetic arm has a greater influence on quality of life after CI therapy</p>		<p>gaming study relative to the traditional CI therapy protocol (negatively).</p> <p>Missing data - assumptions made that random but additional complete case analysis in supplementary files</p>	
222	<p>S. H. Kim (2021). Effects of Dual Transcranial Direct Current Stimulation and Modified Constraint-Induced Movement Therapy to Improve Upper-Limb Function after Stroke: A Double-Blinded, Pilot Randomized Controlled Trial. <i>Journal of Stroke and Cerebrovascular Diseases</i>, 30:9 105928</p>	<p>Double-blind RCT. OT Dept. Korea. Chronic Stroke patients age range 20-90 years old. Recruited from rehabilitation hospital; patients with no cognitive impairment (>MMSE-K 24). 30 pts selected from 120 stroke pts. Randomly allocated via number generation program. 15 subjects in the tDCS and mCIMT groups, 15 subjects in the sham-tDCS and mCIMT groups.</p>	<p>The experimental group performed mCIMT immediately after applying dual tDCS for 20ins. Control group: mCIMT immediately after applying sham tDCS for 20 mins. Total intervention was 30 mins mCIMT per session 5 times a week for 4 weeks. (mCIDT 30 mins repetitive task training 6 tasks). All participants wear gloves on unaffected side for 5 hours a day (except for the time washing, eating, receiving OT/PT) NB: in addition all subjects received physical therapy, bobath training, pain</p>	<p>Outcomes: FMA. The Motor Activity Log (MAL) was used to evaluate quantitatively and qualitatively how much the affected upper limb is used in real life. Results divided into -Amount of use (AOU) and Quality of Movement (QOM). An accelerometer was used to find out the actual usage of upper limbs in daily life. The tool used was life 45 (Fit-meter). Participant wears this on their wrist. Wearing before and after the intervention, excluding meal time, bath time, and other rehab treatment time.</p>	<p>Data analysed using SPSS. There was no significant difference in FMA, MAL and QOM between experimental and the control group. Patients in both the experimental and control groups who received mCIMT showed significant improvement.</p>	<p>+ Acceptable.</p> <p>No change in recommending tDCS during mCIMT. Number of patients was small.</p>

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			management, occupational therapy such as hand manipulation skills, hand dexterity training twice a day for 30 mins each.			
222	S. H. Kim (2021). Effects of Dual Transcranial Direct Current Stimulation and Modified Constraint-Induced Movement Therapy to Improve Upper-Limb Function after Stroke: A Double-Blinded, Pilot Randomized Controlled Trial. <i>Journal of Stroke and Cerebrovascular Diseases</i> , 30:9 105928	Double blinded, Pilot Randomized Controlled trial study in Korea of 30 stroke patients. Patients were admitted to Young Gwang Rehabilitation Hospital in Wonju, aged 20 to 90 years of age less than 180 days from stroke onset and with no cognitive impairment.	Experimental group underwent dual transcranial direct current stimulation (dual tDCS) and modified constraint modified therapy and control group performed modified constraint modified therapy after applying sham tDCS for 20 minutes. Total intervention was performed five times a week for four weeks.	Fugle-Meyer Assessment (FMA), Motor Activity Log (MAL) was divided into two types – amount of use (AOU) and quality of movement (QOM). Accelerometer was used to find out the actual usage of upper limbs in daily practice.	Experimental group and the control group showed significant improvement in FMA and AOU of MAL, use of unaffected side and use of affected side, excluding QOM of MAL.	+ Acceptable study. Number of participants was very small. Modified constraint movement therapy was the control group and only the accelerometer was used as a quantitative evaluation. Constraint movement therapy was for only thirty minutes in the study.
223	G. Kwakkel et al. (2016). Effects of Unilateral Upper Limb Training in Two Distinct Prognostic Groups Early After Stroke: The EXPLICIT-Stroke Randomized Clinical Trial. <i>Neurorehabilitation and neural repair</i> , 30:9 804-16	RCT study in the Netherlands. 159 ischaemic stroke patients were included.	58 patients with a favourable prognosis (return of voluntary finger extension early after stroke) randomly allocated to 3 weeks of modified constraint induced movement therapy or usual care only, 101 patients with an unfavourable prognosis were allocated to 3 week	Upper limb capacity measured using the Action Research Arm Test (ARAT), assessed weekly within the first five weeks post stroke and at 8, 12 and 26 weeks. FuglMeyer assessment was also completed.	Differences found in ARAT in favour of modified CIMT at 5, 8 and 12 weeks but not after 26 weeks. No statistically significant differences between modified CIMT and usual care as measured on the Fugl-Meyer assessment. EMG-NMS did not demonstrate any significant differences.	+ Acceptable study. Unclear criteria of chronic stroke. Unclear what usual care was in the study. Unable to answer if the modified constraint modified therapy was completely due to this type of therapy or partly due to the higher dose of therapy applied.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			EMG-NMS or usual care only. Interventions started within 14 days poststroke and lasted up until five weeks.			
223	G. Kwakkel et al. (2016). Effects of Unilateral Upper Limb Training in Two Distinct Prognostic Groups Early After Stroke: The EXPLICIT-Stroke Randomized Clinical Trial. <i>Neurorehabilitation and neural repair</i> , 30:9804-16	Four medical centres participating in original EXPLICIT trial, Netherlands. Stratified, multi-center observer blinded RCT with repeated measures. Participants- adults with first stroke, upper limb paresis according to NIHSS, ARAT score 53 or less. Stratified according to ability to voluntarily extend thumb and/or two or more fingers 10° or more to mCIMT trial if able (n=58), and EMG neuromuscular stimulation if unable (n=101).	For Q34, review here considers mCIMT trial only (n=58): Interventions began within 14 days of stroke. mCIMT group = 60 minutes of supervised intense practice focussed on task-specific use of affected hand. One session or split into 2x30minutes. Padded mitt worn 3 hours per working day during three consecutive weeks. Control= usual therapy based on Dutch guidelines, face to face for 30 minute per day for 3 consecutive weeks. Content recorded by therapists. Amounts of therapy NOT dose matched.	Primary outcome= Action Research Arm test (ARAT). Secondary outcomes Fugl Meyer assessment upper extremity (FMA-UE), Wolf Motor Function Test (WMFT), Motricity Index upper extremity (MI-UE), Nottingham sensory assessment upper extremity (EmNSA-UE), Nine Hole Peg test (NHPT), Frenchay Arm test (FAT), Motor Activity Log (MAL) and Hand domains Stroke Impact Scale (SIS-Hand).	On primary outcome, ARAT, significant time x group interaction effect in favour of mCIMT over usual care after 5, 8 and 12 weeks post-stroke (p=0.11, p=0.002, p=0.23 respectively). Clinical meaningful effect (>=/6 point on ARAT) but was not maintained at 26 weeks, mainly due to functional improvement in usual care group (favourable prognosis arm of original trial)	+ Acceptable. A well-designed study. This particular report did not clearly define randomisation processes, but block randomisation via number tables and according to medical centre was reported in the protocol paper https://bmcneurol.biomedcentral.com/articles/10.1186/1471-2377-8-49 Authors are clear in limitations that dose matching with usual care group was not carried out, a definite limitation here. Comparison of results at different sites not reported.
224	Y. Lee et al. (2017). Comparison of the effects of bilateral and unilateral training after	Meta analysis to compare the effectiveness of bilateral and unilateral training on upper	Comparison of 1) bilateral training with functional unilateral training, (4 studies) 2)	Most common measures: Wolf Motor Function Test (WMFT), Motor Activity Log (MAL), Action	UE impairment: No significant difference shown comparing functional unilateral training and CIMT.	- Adequate/ low due to low quality studies.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	stroke: A meta-analysis. <i>NeuroRehabilitation</i> , 40:3 301-313	extremity (UE) function and activities of daily living. Includes 11 RCT's of which 8 included in meta analysis. Included 445 participants divided into bilateral (223) and unilateral (222) training groups. 7 studies were in chronic, and 1 in acute stroke.	bilateral training with CIMT groups (4 studies) Intervention duration varied from 20 mins to 6 hours per day and 6-30 week periods. Equal intervention provided to intervention and control in all studies. Except in mCIMT or forced use where participants were encouraged to perform a restraint period outside of therapy unsupervised for a minimum of 6 hours per day.	Research Arm Test (ARAT) and Fugl-Meyer Arm Assessment (FMA). For effect size these were classified in 3 categories: UE impairment, UE capacity and activities of daily living. Standard mean difference applied for all of the meta analyses.	UE capacity: No significant difference comparing bilateral training with functional unilateral training. Statistically significant difference in favour of CIMT interpreted with small effect size. Activities of daily living: Beneficial (but not statistically significant) effect favouring bilateral over unilateral training. Beneficial (but not statistically significant) effect favouring CIMT.	Quality of individual studies not necessarily commented on in significance of results (PEDro score varying 5-8).
224	Y. Lee et al. (2017). Comparison of the effects of bilateral and unilateral training after stroke: A meta-analysis. <i>NeuroRehabilitation</i> , 40:3 301-313	Meta-analysis of 8 RCTs (445 patients) comparing unilateral UL training with bilateral UL training. Separated CIMT unilateral studies from other UL training. Chronic phase post-stroke. Adults.	Unilateral UL training. (CIMT), Bilateral UL training.	Impairment (FMA-UL); Function; ADL Standard Mean Difference (SMD) used for combining outcome measures. Negative score favours unilateral training.	Impairment: SMD= -0.07. Test for overall effect, Z=0.46, P=0.64. UE capacity: SMD= -0.34. Z=2.55, P=0.05. Activities of daily living: SMD= -0.2, Z=1.44, P=0.15.	- Low quality.
225	Y.-Y. Lee et al. (2015). Proximal Fugl-Meyer Assessment Scores Predict Clinically Important Upper Limb Improvement After 3 Stroke Rehabilitative Interventions. <i>Archives of physical medicine</i>	Observational cohort study. Setting is outpatient rehabilitation clinics. This study was a secondary analysis of data from 174 individuals diagnosed with stroke who were involved in multiple intervention programs from previous RCTs. Chronic stroke pts >6 months, baseline	All participants received 30 hours of training distributed across 3 to 4 weeks. CIMT – received individualised 2-hour training sessions, 5d/wk for 3 wks. Non paretic hand	Primary outcome score =UE-FMA (assessed before and after by blinded raters. ARAT another predicting favourable.	Crossing points bet the regression line and the line of UE-FMA MCID to categorise patients potential responders. -Proximal UE-FMA effectively determine patients who respond to interventions. -Crossing point analysis CIMT and robot-assisted therapy	+ Acceptable. Limitations participants who had low or high UE_FMA not recruited.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	<i>and rehabilitation,</i> 96:12 2137-44	UE-FMA of >16, ability to follow instructions, no other neuro – disorder. Participants were recruited from multiple clinical settings. Similar characteristics (disease severity and years after stroke). 56 patients received CIMT, 54 received robot assisted therapy and 64 received MT intervention.	restrained in mitt. The functional tasks selected ADL task. Also Mitt was used for another 5-6 hours at home. Of 56 CIMT participants =20 practiced with trunk restraint during therapy. Other 36 did not have trunk restraint. (No significant gp diff in FMA after 2 types of CIMT so merged all the data). Robot –assisted therapy 1.5 hours training 5d/wk for 4 wks. The participants practiced pronation – supination, wrist flexion-extension with Bi-Manu-Track robotic. 25 participants practiced bilateral arm movements in 3 modes (passive-passive, active-passive, active-active) 29 participants received unilateral UE practice. After 70 to 80 mins of robot assisted therapy all participants received 10-20 mins of functional task		=more effective for individuals UE-FMA <30. -MT UE-FMA 21-35 -baseline UE-FMA & ARAT scores cannot significantly predict UE-FMA improvement after robot assisted therapy.	

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			training. 2 approaches merged)unilateral and bilateral) no sig difference in UE-FMA between the groups. MT 1.5 h/session 5d/wk-4wks. 60mins of MT and 30min functional task training. Of 64 -20 received MT alone, 28 MT with mesh glove stim, 16 MT combined with sham MG. No sig diff in FMA.			
225	Y.-Y. Lee et al. (2015). Proximal Fugl-Meyer Assessment Scores Predict Clinically Important Upper Limb Improvement After 3 Stroke Rehabilitative Interventions. <i>Archives of physical medicine and rehabilitation</i> , 96:12 2137-44	Observational cohort study in Taiwan with 174 individuals with chronic stroke. 56 participants in the CIMT group.	Three treatment approaches- CIMT, robot assisted therapy or mirror therapy over three to four weeks. CIMT group received individualised two hour training five days a week for three weeks. Wore a mitt on the non paretic upper extremity during therapy and for five to six hours a day at home.	Upper extremity Fugl-Meyer assessment used as the main outcome measure. ARAT was also used.	UE-FMA proximal score is a reasonable variable for clinicians to determine whether a patient with stroke may benefit from CIMT or robot assisted therapy.	+ Acceptable study. Limited numbers of CIMT patients. Unclear criteria of chronic stroke.
226	K. P. Y. Liu et al. (2016). A randomized controlled trial of self-regulated modified constraint-induced movement therapy in sub-acute stroke	RCT; inpatient setting in Hong Kong. Inclusion – ischaemic stroke in primary motor cortex, <3/12 post stroke, 60yo+, 10deg active PCP and IP ext, 20deg active wrist ext.	Group 1: Self-Regulated modified CIMT (n=29) Group 2: modified CIMT	ARAT Fugl Meyer Instrumental Activities of Daily Living Scale Motor Activity Log	Self-regulated CIMT and CIMT groups showed significant improvements across OCM compared with control. Combination of self-regulated with CIMT enhanced arm	+ Acceptable quality trial. Overall well designed. Limited detail about the SR aspect of the intervention and would

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	patients. <i>European journal of neurology</i> , 23:8 1351-60	Exclusion – mAshworth Scale >2, pain limiting participation, MMSE<19, diagnosis of depression.	Group 3: standard care Both Group 1 and 2 – 10 x 1 hour session, 1:1 with an OT, plus wearing mitt for 4 hours per day. SR = based on social cognitive theory; supporting patients to engage with reflective learning and problem solving in relation to the CIMT and their UL function.		function – specifically in coordination, daily task performance and perceived upper limb functional use.	therefore be difficult to replicate. Interesting and promising results, but not compelling enough to change guidance.
226	K. P. Y. Liu et al. (2016). A randomized controlled trial of self-regulated modified constraint-induced movement therapy in sub-acute stroke patients. <i>European journal of neurology</i> , 23:8 1351-60	RCT n=90 Two inpatient rehab centres Subacute stroke (<3 months), +60, 10 ^o MCP and IP jt ext, 20 ^o wrist extn. MAS < 2, Pain <4 VAS, MMSE 19+, no depression.	1. Self-regulation + modified CIMT (SR-mCIMT). SR = self-regulation on activities, problem solving, video review of performance. mCIMT = mitt 4 hrs incl 1 hr therapist training of 10 daily tasks 2. mCIMT as above 3. Control – conventional fx rehab using both UL	Primary outcome measures: 1. ARAT 2. FMA 3. Lawton iADL Secondary OM 1. MAL Outcome measures complete at baseline, post intervention and 1 month post intervention. Adequately powered.	Post Intervention: ARAT: SR-mCIMT (p=0.006) and mCIMT (p=0.007) superior to control. No significant diff between SR-mCIMT and mCIMT FMA: self-regulated-mCIMT (p<0.001) and mCIMT (p=0.002) superior to control. Self-regulated-mCIMT superior than mCIMT (p=0.011) 1 month follow up. No significant difference between groups at 1 month follow up based on total scores but some items within the ARAT and FMA have	- Low quality. Insufficient evidence to support interventions at 1 month follow up. No ITT analysis, concealment not outlined, no site-specific data.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					significant difference in favour of the intervention groups.	
227	M. Nasb et al. (2019). Comparison of the effects of modified constraint-induced movement therapy and intensive conventional therapy with a botulinum-a toxin injection on upper limb motor function recovery in patients with stroke. <i>The Libyan journal of medicine</i> , 14:1 1609304	Participants recruited from rehabilitation department of University Hospital in China. People aged 10-70 years, unilateral stroke one year or less since onset, actively extend wrist 20° and finger joint extension 10° or more, modified Ashworth score (MAS) of one or more. Randomized evaluator blinded trial.	BOTOX injection administered to all appropriate muscles then subjects began programme of mCIMT (n=32) or intensive conventional therapy (n=32) one day after injections. CIMT group wore padded mitt on unaffected arm for three hours daily and received massed practice for one hour per day for six days per week for four weeks. Intensive usual therapy group focused on decreasing hypertonia and movement practice for one hour per day for six days per week for four weeks.	Modified Ashworth Scale (MAS) as primary, not entirely clear. Fugl meyer upper extremity (FMA), Barthel Index (BI).	10 people 'excluded' due to inability to continue the protocol. Mean time from onset 4.45 months but no SD given? No statistically significant difference between groups on MAS. Significant between groups differences on BI and FMA.	- Low quality. Not clear if excluded 10 people were drop-outs per se and if so, from which trial arm? No CONSORT diagram to assess this against. No baseline data table.
227	M. Nasb et al. (2019). Comparison of the effects of modified constraint-induced movement therapy and intensive conventional therapy with a botulinum-a toxin injection on upper limb motor	Randomised controlled trial comparing botulinum-A toxin injection with high dose conventional therapy and botulinum-A toxin injection with modified constraint -induced movement therapy for improving motor function and a person's ability to perform in activities of	Botulinium injection was administered to all subjects using ultrasound-guided, single dose injection according to WHO guidelines. A trained physician chose the muscles that required Botulinium injection.	Modified Ashworth Scale (MAS), Fugl-Meyer assessment (FMA), Barthel (BI).	No significant differences were detected between the two groups in terms of their MAS, BI and FMA scores at the baseline assessment. Both groups showed a relatively significant improvement for all involved muscles after four weeks of treatment as measured on the MAS.	+ Acceptable study. Small study population was used to elucidate the benefit of botulinium toxin and modified constraint induced movement therapy. Botulinium toxin dose was not fixed for all patients.

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	function recovery in patients with stroke. <i>The Libyan journal of medicine</i> , 14:1 1609304	daily living. Study in China, 64 subjects.	Subjects were treated with either modified constraint-induced movement therapy or intensive conventional therapy one day after receiving the injection. Participants in the modified constraint-induced movement therapy group wore a padded mitten (glove) on the healthy upper extremity for three hours daily including during the therapeutic session and the home programme. Practised tasks including reaching, placing, lifting and grasping and received massed practice for one hour per day, six times per week for four weeks. Subjects in the individual intensive conventional treatment consisted of neurodevelopmental techniques for one hour a day , six times per week for four weeks.		Both groups showed a relatively high sub-standard improvement in the BI scores. BI scores demonstrated the greater improvement in the Botulinium Toxin and modified constraint induced movement therapy group.	
228	M. Nasb et al. (2021). Constraint-Induced Movement Therapy Combined With	Country: China Setting: Design: Systematic Review & Meta-analysis (includes 2 RCTs)	Nasb: - Control n=32 -200 units x 2 into BicepBrach + 150 into	Heterogenous participants & outcomes at different time points.	Not statistically significant results	- No blinding - no discussion of

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Botulinum Toxin for Post-stroke Spasticity: A Systematic Review and Meta-Analysis. <i>Cureus</i> , 13:9 e17645	Subjects: 93 (64 in Nasb & 32 in Sun - drop outs)	<p>other sites + Conventional PT</p> <p>-Intervention n=32 200 units x 2 into BicepBrach + 150 into other sites +mCIMT 1hr/day x 6 days, 4 week duration</p> <p>Sun: -Control n=16 -200 units x 2 into BB + 150 into other sites + Conventional PT (1hr OT 1 hr PT 3/7 x 3/12)</p> <p>-Intervention n=16 -200 units x 2 into BB + 150 into other sites -mCIMT2 hr/day x 3/7 + 5 hr a day restraint x 3/12</p> <p>-Control therapies not described as similar. Units described in similar numerical terms but different preparation of BTX-A therefore different strengths.</p>	Modified Ashworth Scale is only shared outcome measure between studies, and these are defined / used differently by each study		<p>ITT and unclear bias in reporting.</p> <p>Randomly includes another study (of questionable quality) Levy et al despite this not resulting from the original search strategy.</p> <p>Author of SR appears to be same as one of the RCT.</p>
228	M. Nasb et al. (2021). Constraint-Induced Movement Therapy Combined With Botulinum Toxin for Post-stroke Spasticity:	Systematic review & Meta-analysis. Assessing CIMT with Botox vs conventional care. Included 2 studies (n=93) up to 2020. PEDro rated. Inclusion criteria: RCTs and quasi-	CIMT combined with Botox. Rehabilitation started one day after Botox injection.	Primary outcome: Spasticity as measured using MAS.	Outcome does not favour treatment when analysed for the elbow, wrist or fingers.	+ Acceptable. However the analysis included a total of two studies with notable heterogeneity.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	A Systematic Review and Meta-Analysis. <i>Cureus</i> , 13:9 e17645	experimental studies only, comparing CIMT with Botox vs usual care, stroke diagnosis, adolescent and adults with post-stroke spasticity in elbow, wrist or fingers. Age ranges 10 to 80years. Subjects were chronic stroke patients (One study classified spasticity as MAS of ≥ 1 the other ≥ 3).		Secondary outcome: UL functional improvement using MAL, FMA, BI Follow-up measures were completed at four weeks in one study, and at 6months in the second		
229	J. H. Park (2015). The effects of modified constraint-induced therapy combined with mental practice on patients with chronic stroke. <i>Journal of physical therapy science</i> , 27:5 1585-8	Randomised trial investigating CIMT vs CIMT+MP (mental practice). Chronic (~15.9/14.4 months) 6months post stroke patients (n=26). Rehabilitation hospital, Korea. Some motor function at baseline but with MAL score <2.5 Typo in abstract incorrectly defines one of the groups	Both groups: Each subject began a regimen of 30-min sessions of individualized therapy administered 5 times/week for 6 weeks by the same therapist.the subject's unaffected hands and wrists were restrained every weekday for 4 hours CIMT+MP group: In addition, 30-minute MP sessions were held directly after CIMT. Self-Administered with audiotapes the content of the tapes covered ADLs that subjects were also practicing during CIMT	ARAT FMA K-MBI (Korean modified Barthel) Measures were completed at baseline and repeated immediately after the 6 week intervention period	Both groups improved performance on ARAT, FMA and K-MBI, however the effect was greater in the CIMT+MP group	- Low quality. Small study with limited description of how volunteers were recruited and could not see IRB approval Randomization and blinded assessors. Did not note evidence of concealment of the therapist providing input Limited description of baseline demographics is provided Compliance with the self-administered MP was self reported.
229	J. H. Park (2015). The effects of modified constraint-induced	Country: Korea Setting: Rehabilitation hospital (? community dwelling)	Control mCIMT (n=13): -30min 1:1 session 5/7	Pre & Post intervention ARAT (Action Research Arm Test)	mCIMT + MP group revealed a significant improvement at the postintervention	-

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	therapy combined with mental practice on patients with chronic stroke. <i>Journal of physical therapy science</i> , 27:5 1585-8	Design: RCT (allocated using random number table) Subjects: 26 chronic stroke survivors (10/12+) Excluded if excessive pain or spasticity - not quantified	x 6/52 -4 hours hand and wrist restraint x 5/7 Intervention mCIT + MP (n=13): -a/a with 30 min sessions after mCIT (audio tape guided MP of specific task)	FM (Fugl-Meyer Assessment of Motor Recovery after stroke) K-MBI (Korean version of Barthel Index) Assessed by researcher blind to intervention	assessments with regard to the ARAT (p<0.05), FM (p<0.05), and K-MBI (p<0.05). The control group also showed significant improvement in the ARAT (p<0.05), FM (p<0.05), and K-MBI (p<0.05). There were statistically significant differences in the changes in the ARAT (p<0.05), FM (p<0.05), and K-MBI (p<0.05) between the groups.	Low quality. No drop out, no information about fidelity of restraint or MP. Allocation rather than true randomisation (no details regarding consecutive recruitment etc.).
230	M. H. Rafiei et al. (2019). Predicting Improved Daily Use of the More Affected Arm Poststroke Following Constraint-Induced Movement Therapy. <i>Physical therapy</i> , 99:12 1667-1678	Retrospective cohort study carried out in US, n=47 all >6months post stroke, 2 groups (n=29;n=18 with different CIMT protocols and therapists), assessor masked. Participants with usual threshold active 2 ROM criteria for CIMT. Analysis using computational modelling based on novel machine learning that can capture non-linear relationships between predictors.	CIMT – 30 hrs (3 hours a day, 10 weekdays over a 3-week period). Intensive training comprising wearing a mitt ofn the unaffected hand and training focusing on functional tasks for the affected limb, plus behavioural measures to promote adherence called a transfer package.	Motor Activity Log before and after exposure, within 1 week prior to and following completion of CIMT.	Motor ability and tactile sense + predicted improvement in arm use for daily activities. touch sensation was the most influential predictor: participants with poor sensation were the best responders. Those with relatively intact sensation and milder motor impairment did well (not surprising), and that those with intact sensation but poor motor function did not respond well.	This is a retrospective study so cannot score higher on the SIGN checklist. The study rated reasonably well on the checklist. However, On the surface this looks impressive to me, but I am not familiar with the analysis and cannot comment with confidence on the findings.
230	M. H. Rafiei et al. (2019). Predicting Improved Daily Use of the More Affected Arm Poststroke Following Constraint-Induced Movement Therapy. <i>Physical therapy</i> , 99:12 1667-1678	Design: Retrospective analysis of 47 participants with chronic stroke (> 6 months) and mild to moderate upper extremity hemiparesis, consecutively enrolled in two CIMT RCTs Setting: not reported Participants: mean age (mean±SD) study 1 (N=29): 58.84±12.71 y; study 2 (N=18): 61.28±17.23 y. Male (%) study 1:	CIMT: 30 hours (3 h/d, 10 weekdays, over a 3-week period) of intensive motor training focusing on functional tasks and shaping, plus behavioral techniques (Transfer Package), for 0.5 hour per day (5 hours total).	Motor Activity Log (MAL): before and at end of intervention.	1)those with the poorest sensation were moderate or best responders; 2) those with relatively intact sensation and motor ability were moderate or best responders; 3) in the presence of relatively intact sensation, those with the poorest gross motor ability were poor responders.	Unable to score; require reference to original study. Main limitations: small study, only selected parameters included in hypothesis testing

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		76%, study 2: 72%. Time post stroke (mean±SD) study 1: 3.05±3.76 y, study 2: 2.60±3.31 y. Stroke type: not reported. Stroke severity: not reported. UL active and passive ROM reported.	Participants were encouraged to wear a padded mitt on their less affected hand during waking hours. Control group not reported in this analysis-> refer to original papers			
231	S. Rocha et al. (2016). The impact of transcranial direct current stimulation (tDCS) combined with modified constraint-induced movement therapy (mCIMT) on upper limb function in chronic stroke: a double-blind randomized controlled trial. <i>Disability and rehabilitation</i> , 38:7 653-60	Country: Brazil Setting: Community dwelling Design: Pilot Double-blind Randomised Sham Controlled Trial Subjects: 21 Chronic patients. 3 arms: 7 in the mCIMT alone group 6-46/12 post stroke, 46-70yrs.	12 sessions of mCIMT + either: - Anodal tDCS - Cathodal tDCS - Sham tDCS (mCIMT alone) mCIMT = immobilised UL all day except 10 mins for stretching. Intensive training of paretic UL -6 continuous hours 7/7 for 4 weeks.	Baseline, post treatment and 1/12 post treatment Double blind -Fugl-Meyer (FMA) -Motor Activity Log (MAL) -Grip Strength.	No significant difference in FMA, but significant before and after (Hand grip) and at 1/12 MAL.	- Low quality. n=7 in mCIMT alone group & 2 lost to follow up Selection bias - resulting from technique (also 96 excluded for "other reasons") Large variety of chronicity and multiple strokes Ongoing "standard rehabilitation".
231	S. Rocha et al. (2016). The impact of transcranial direct current stimulation (tDCS) combined with modified constraint-induced movement therapy (mCIMT) on upper limb function in chronic stroke: a double-blind	Double blind Pilot RCT (n=21). Department of Physical Therapy (?university setting), Brazil. Chronic stroke (6-67 months). Patients recruited using flyers sent to hospitals and outpatient departments and by advertising on university website and the radio. Incl. criteria: 40-75y.o, anti-gravity wrist mvt, MAS scores lower than 3.	All patients given CIMT and a standardized rehab program: For six continuous hours, each day over a 4-week period, including weekends, the non-paretic upper limb of all patients was completely	Primary: FMA total (138point) FMA-UL (66point) Secondary: MAL-Brazil Grip strength	Improvement observed for active tDCS groups.	+ Acceptable (bordered Low quality). Method for sample selection seemed to select for a non-representative sample. Small sample with 3 x groups (n=7 per group).

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	randomized controlled trial. <i>Disability and rehabilitation</i> , 38:7 653-60		immobilized. All patients attended a gross motor and fine motor activities program performed for 1 h per day, three times per week. 3 tDCS protocols were compared: -Anodal tDCS -Cathodal tDCS -Sham tDCS			At baseline the Anodal group had a FMA-UL score at least ~6 points lower than other groups (and made the greatest improvement). Use of ANOVA on such small samples is questionable (as variances appeared unequal). Drop out was 29% 2/7 participants per group.
232	M. A. Smith et al. (2020). Combined effects of Telehealth and Modified Constraint-Induced Movement Therapy for Individuals with Chronic Hemiparesis. <i>International journal of telerehabilitation</i> , 12:1 51-62	Setting: American university Lab. Design: pre-post uncontrolled study – ‘pre-experimental’ Participants: n=32 recruited, n=28 completed. Split into two groups (higher and lower performing, based on timed WMFT scores - Higher function (HF): n= 15; Lower functioning (LF): n=13 All were at least 6 months post stroke, were not receiving OT, had persistent hemiparesis, could follow 2 step instructions and living in their won home with internet access.	Both groups received in person and telehealth modified CIMT. Internet sessions were 2 x week for 1 hour each. In person sessions were 1 x week and lasted between 1 and 1.5 hours. Both completed gross and fine motor exercises during sessions and wore a mitt on the unaffected arm for ‘about’ 4 hours a day. The intervention lasted for 6 weeks.	Outcomes included the Wolf Motor Function Test, the Fugl Meyer UL Assessment, Motor Activity Log, and Functional Independence measure (self care section). These were reported for n=28 (who completed the study).	Benjamini-Hochberg tests (BH) were used to correct for multiple comparisons. Both groups showed significant improvement for all outcome measures except for the timed WMFT and the grip strength sub-test of the WMFT for Group 1 (High function). There appeared to be better adherence (attendance) to the internet sessions compared to face to face.	0 Assumed to be a cohort study (as not an RCT). There is paucity of data to make judgement possible (e.g. who took measurements, what therapy was received ‘about 4 hours’, reasons for drop outs, ITT etc).
232	M. A. Smith et al. (2020). Combined effects of Telehealth and Modified Constraint-Induced Movement Therapy for	University laboratory. Pre-experimental study with six-week intervention. Convenience sampling using advertising, flyer, phone calls, letters emails.	Participants divided into two groups according to score on Wolf Motor Function test (WMFT). Cut-off at 38 points, high	Assessments at baseline after six weeks intervention period. WMFT, Motor Activity Log (MAL), Fugl Meyer upper limb (FMA-UE), FIM.	28 people completed study, 2 withdrew after pre-testing and two had ‘extenuating circumstances’ Both groups showed significant improvement all	0 Very difficult to interpret due to lack of detail in report as presented. Impact of in person and telerehab delivery not

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Individuals with Chronic Hemiparesis. <i>International journal of telerehabilitation</i> , 12:1 51-62	Included people 18-75 years at least six months post stroke, hemiparesis with impaired function, independent transfers, 15° shoulder flex and abd, 5-10° active wrist ext, 5-10° flex thumb and/or digits, living own home with internet access.	(n=15) and low (n=13) functioning. Both groups received in-person and internet enabled sessions. Internet sessions were twice weekly, one hour each. In person were three times weekly, one to one ½ hours. Both focused on gross and fine motor skill upper limb. Additionally, mitt worn on unaffected limb 4 hours per day.		measure, except timed WMFT and grip test subset on WMFT for group 1 and hand to box subset WMFT for group 2.	differentiated. Insufficient detail of who measured participants. Drop-out reasons not transparent. Justification for balance of in person and online delivery unclear.
233	R. Stock et al. (2015). Norwegian constraint-induced therapy multisite trial: adherence to treatment protocol applied early after stroke. <i>Journal of rehabilitation medicine</i> , 47:9 816-23	Country: Norway Setting: Community dwelling stroke survivors Design: Previous RCT - Analysis of adherence in the intervention arm of study Subjects: 24 stroke survivors within 28 days of stroke	This prospective study assessed patient adherence to the treatment applied in the intervention group of the NORCIMT trial. Details about this single-blinded, multi-centre, randomized controlled trial have been reported previously 180 min of treatment/day for 10 days	-Treatment time -Pure activity during shaping -Progression parameters -Quality of Movement -Borg scale -Mitt use -Home skill assignment	Overall adherence was good; however, time spent in motor activity was only one-third of total treatment time.	The impact of adherence and motivation warrant further investigated. However, this is not aligned to the question under review.
233	R. Stock et al. (2015). Norwegian constraint-induced therapy	Observational single group evaluation of CIMT protocol adherence. (n=24). participants	CIMT was the intervention delivered however not under	Adherence to CIMT:	The participants spent a mean of 91.3% of the intended time for treatment. Of	N/A

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	multisite trial: adherence to treatment protocol applied early after stroke. <i>Journal of rehabilitation medicine</i> , 47:9 816-23	were recruited from 5 Norwegian hospitals. Acute: stroke more than 5 days and less than 26 days before enrolment.	scrutiny in this output, which evaluated adherence to the intervention only. The patients took part in a daily 3 h programme over 10 consecutive working days. Up to 150 min of the treatment was allocated to task training, i.e. shaping (120 min) and standard task practice (30 min).	Quality of Movement, number of trials, duration (sec) Adherence to limb restraint (patient reported)	the time spent in shaping, 33% was spent in pure activity. The remainder was used on feedback, task set-up, and rests. Adherence was positively associated with treatment progression (r=0.74) and negatively associated with age (r=-0.65). Women were less likely to use the mitt (r=-0.55)	Using the SIGN algorithm, this study is classified as an observational single group analysis and not for checklist scrutiny.
234	E. Taub et al. (2021). Tele-rehabilitation of upper-extremity hemiparesis after stroke: Proof-of-concept randomized controlled trial of in-home Constraint-Induced Movement therapy. <i>Restorative Neurology and Neuroscience</i> , 39:4 303-318	Proof of concept RCT. (n=24). Chronic (1yr+) stroke with mild to moderate motor impairment. Comparing delivery of CIMT in different locations. Participants received input in an outpatient basis (clinical research facility), or via tele-link remotely in their home.	Participants in both groups received the same amount of input (3.5 hours of treatment per day for 10 consecutive weekdays with one-on-one supervision from a trainer for the entirety of each treatment session. The amount, intensity, and organization of the motor training in the two group was the same. Three hours of each treatment session were committed to	Primary outcome was MAL Arm Use scale	MAL Arm Use change was 2.6 points for all participants tested (both groups) at post-treatment suggesting a large overall improvement in UL This was sustained to 1.9 points for participants available for testing at 1 year.	+ Acceptable in the context of a feasibility RCT The drop out at the primary end point (post treatment) was 2/12 per group (17%) The drop out of patients was 5/12 per group at 1 year (41.6%) Concealment not defined. Blinding not defined.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			motor training following shaping principles).			
234	E. Taub et al. (2021). Tele-rehabilitation of upper-extremity hemiparesis after stroke: Proof-of-concept randomized controlled trial of in-home Constraint-Induced Movement therapy. <i>Restorative Neurology and Neuroscience</i> , 39:4 303-318	Participants recruited via news story, and in and out-patient referral services, Alabama, USA. University laboratory and home settings. Adults, one year or more after stroke, mild to moderate affected upper limb impairment. Pilot RCT comparing automated, telerehab delivery of CIMT to standard CIMT in a clinical research lab with face-to-face supervision.	Random assignment to standard (face to face in lab) or telerehab CIMT (in-home, tele-health protocol using Tele-AutoCITE system with remote supervision). Both groups 3.5 hours treatment per day for 10 days. Three hour of motor training plus 30 minutes of procedures to promote change in motor behaviour beyond the setting.	Pre-and post testing first weekday before and after intervention period, and at one-year from completion. Outcomes= Motor Activity Log (MAL) and Wolf Motor Function Test (WMFT) WMFT not available as too many people in each arm not able to reattend lab for testing- so data here from MAL only. Also used participant opinion survey.	Improvements in both groups immediately after treatment, regardless of delivery method. Mean improvement in each group similar at 1-year follow up. Due to pilot design and very small numbers, further details from results not extracted by this reviewer.	This was a well-designed, small proof-of-concept study with 12 people in each arm (7 in each completing the programme and primary outcome at 1-year), and as such its findings would not be expected to influence practice guidelines at this stage. Aim was centred on exploring mode of delivery rather efficacy of CIMT.
235	T. T. Terranova et al. (2021). Robot-Assisted Therapy and Constraint-Induced Movement Therapy for Motor Recovery in Stroke: Results From a Randomized Clinical Trial. <i>Frontiers in neurorobotics</i> , 15: 684019	Randomised clinical trial, conducted in Brazil in outpatient rehab setting. Subjects – 18yr+, 6-36m post confirmed stroke, Brunnstrom stage III or IV, 20deg active wrist ext and 10deg active MCP ext. Exclusion: MMSE < 20, pain, injury etc limiting participation.	Group 1: CIMT 2 weeks of CIMT – 6 hrs per day for 10 days, + wearing of mitt at home 90% of time (=60 hours) Group 2: Robot therapy (InMotion Robotics), 3 x 60 minute session per week for 12 weeks (=36 hours) Both groups also continue with conventional therapy.	Collected at baseline, immediately after intervention period, 3 months and 12 months post stroke. FM UL Wolf Motor Function Test	Both groups showed improvements in all measures. No between group differences.	- Low quality. Differences in dose between groups. No control group. High drop out rate – 23-28% Did not recruit sufficient number to come close to that required from sample size calc.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
			No control group.			
235	T. T. Terranova et al. (2021). Robot-Assisted Therapy and Constraint-Induced Movement Therapy for Motor Recovery in Stroke: Results From a Randomized Clinical Trial. <i>Frontiers in neurorobotics</i> , 15: 684019	RCT clinical trial. Conducted in two different outpatient rehab unit in Brazil. Pts 18yrs + 6-36 months post stroke. Brunnstrom stage III, 20 degrees wrist ext. 10 degrees MCP active ext. Exclusion joint pain, MMSE below 20 or previous treatment with robotic therapy. 51 subjects enrolled and randomised into one of the groups (computer generated).	Group1: CIMT. 10 days of CIMT -6 hours per day . Mitt restraint for 90% of the day. CIMT protocol shaping, task practice, behavioural techniques. Group 2: Robot therapy 3 x 60 mins session per week for 12 weeks. =36 hours. Conventional therapy in both groups.	Primary out come WMFT and FMA. Collected at baseline, after intervention at 12 weeks and 12 months.	Improvements in WMFT and FMA. MCID in FMA- CIMT group but not RT. No statistically significant difference between the groups. Different doses of treatment intervention.	- Low quality. No control group. High drop out (13 patients). Small sample size.
236	R. K. Yadav et al. (2016). Efficacy of Modified Constraint Induced Movement Therapy in the Treatment of Hemiparetic Upper Limb in Stroke Patients: A Randomized Controlled Trial. <i>Journal of clinical and diagnostic research : JCDR</i> , 10:11 YC01-YC05	Prospective single blind, parallel randomized controlled trail of 30 patients receiving conventional rehabilitation programme and 30 patients participated in a modified constraint movement therapy programme in addition to the conventional rehabilitation programme. Study took place between October 2020 to April 2012. Post stroke hemiparetic patients of two months to two years duration with spasticity less than Grade -3 on modified Ashworth and those patients capable of extension of at least 10 degrees each at MCP, PIP and DIP joints and 20 degree at wrist joint were recruited.	Modified constraint movement therapy group received three hours therapy sessions emphasizing the affected arm in general functional tasks, three times a week for four weeks. Their normal arm was also constrained for five hours per day over five days per week.	All patients were assessed at baseline, one month and three months after completion of therapy using Fugl-Meyer Assessment (FMA) for upper extremity and Motor Activity Log scale comprising of Amount of Use (AOU) score and Quality of Use (QOU) score.	All the three scores improved significantly in both the groups at each follow-up. Post-hoc analysis demonstrated that compared to the conventional group, the modified constraint movement therapy group showed significantly better scores at one month on FMA1, AOU1, QOU1 and three months on FMA3, AOU3 and QOU3.	+ Acceptable study. Study did not examine the long-term efficacy of modified constraint due to limited time and resources.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
236	R. K. Yadav et al. (2016). Efficacy of Modified Constraint Induced Movement Therapy in the Treatment of Hemiparetic Upper Limb in Stroke Patients: A Randomized Controlled Trial. <i>Journal of clinical and diagnostic research : JCDR</i> , 10:11 YC01-YC05	RCT n=65 Two outpatient stroke clinics Subacute stroke (Pts 2 months -> 2 years). Spasticity MAS < -3, 10 ⁰ MCP. PIP, DIP extn. 20 ⁰ wrist extn.	Intervention: mCIMT 3 hour sessions focusing on affected UL fx. This was complete on alternate days, 3/7 with the control intervention being provided the alternate days. Unaffected arm constrained for 5 hrs per day, 5/7. Control: 3 hrs daily conventional rehab incl ADL training, ROM, stretching, strengthening, endurance, gait training, education. The intervention was 4/52.	Fugl-Meyer Ax (FMA) for UL Motor Activity Log (MAL) amount of use (AOU) and quality of use (QOU). OMs were complete at baseline, at completion at one month and three months after completion.	Intervention group showed significantly better scores at 1 month -FMA p<0.0001 -AOU p=0.0007 -QOU p=0.0015 And at 3 months -FMA p<0.0001 -QOU p=0.0008	- Small study but adequately powered supporting mCIMT. May however be some elements of bias, no information regarding concealment of allocation, standardisation among assessors, inter site differences, who delivered the intervention. Delivery of 3hrs of outpatient UL therapy for 5/7 may not be feasible.
237	C. Yu et al. (2017). The Effects of Modified Constraint-Induced Movement Therapy in Acute Subcortical Cerebral Infarction. <i>Frontiers in human neuroscience</i> , 11: 265	Chinese RCT, small sample n=26. Participants with sub-cortical infarcts within preceding 14 days. Comparing modified CIMT with same duration of occupational therapy/ physiotherapy.	Modified CIMT 3 hours a day over 10 days. Using a mitt for 30% of waking hours.	WMFT, MAL Secondary outcome measures of silent period response to transcranial magnetic stimulation.	statistical difference in immediate post treatment outcomes between groups on the WMFT in favour of the intervention group, no differences in MAL. Significant difference in cortical excitability in the ipsilateral hemisphere in the intervention group immediately after treatment. None of the differences in outcome were sustained at 3 months.	- No details are given of the sample size required to determine a treatment effect however the study is too small to determine a treatment effect on the primary outcomes with confidence. Bias is not adequately minimized.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
237	C. Yu et al. (2017). The Effects of Modified Constraint-Induced Movement Therapy in Acute Subcortical Cerebral Infarction. <i>Frontiers in human neuroscience</i> , 11: 265	<p>Design: single-centre RCT, comparing mCIMT with standard therapy.</p> <p>Setting: Inpatient setting, China</p> <p>Participants:</p> <p>Inclusion criteria:</p> <ol style="list-style-type: none"> 1)stroke within 2 weeks of onset; 2)MRI showing subcortical ischemic stroke; 3)ability to raise two fingers with the forearm pronated on the table or lift the wrist 10° or more starting from a fully bent position; 4)respond to a 2-step command; and 5)a Mini Mental State Examination score exceeding 20. <p>Exclusion criteria :</p> <ol style="list-style-type: none"> 1)inability to provide informed consent; 2)a history of stroke; 3)a deviation greater than 2 cm on the line bisection test; 4)morbidity of the affected upper extremity resulting in functional limitation prior to stroke; 5)life expectancy less than 1 year; or 6)other neurological conditions affecting motor function or assessment. <p>-mCIT group (N=25) age (mean ±SD) 58.54 ±9.61 y; 11M:14F, NIHSS at admission 3.85 ±1.63,</p> <p>-Control group (N=14) age (mean ±SD) 56.15± 11.91 y. NHSS at admission 3.77 ± 1.59</p>	<p>mCIMT group was treated with adaptive task practice and task training daily for 3 h over 10 consecutive working days, using a mitt on the unaffected arm for up to 30% of waking hours.</p> <p>The control group was treated with an equal dose of occupational therapy and physical therapy: bimanual tasks for the upper limbs, compensatory techniques for ADLs, strength and range of motion, positioning and mobility training.</p>	<p>WMFT MAL</p> <p>Change of cortical excitability, at baseline, at end of intervention and 3-month follow-up:</p> <p>Motor-evoked potentials (MEPs) - cortical silent period (SP)</p>	<p>At end of intervention a greater improvement was observed in the CIMT group than in the standard therapy group:</p> <ul style="list-style-type: none"> - Mean WMFT scores increased by 1.18 (P < 0.001), - MAL amount of use (P = 0.038). Between-group difference not reported. <p>In mCIT group, ipsilesional SP declined significantly compared with the standard therapy group (P = 0.029). No other differences at end of intervention.</p> <p>No between-group differences at 3-month follow up.</p> <p>Clinical importance of significant between-group differences not discussed.</p>	<p>+</p> <p>Acceptable.</p> <p>Main limitations:</p> <ul style="list-style-type: none"> - Assessor blinding not reported - Concomitant treatment not reported - TMS was non-navigated

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
238	M. M. Zarantonello et al. (2017). Electromyographic analysis of constraint-induced movement therapy effects in patients after stroke in chronic course. <i>Journal of physical therapy science</i> , 29:11 1883-1888	Country: Brazil Setting: Outpatient therapy Design: Case report Subjects: n=5 already attending rehab, 63-84yrs old & 12-192/12 post stroke	CIMT: -Restriction glove for 90% of waking day -3hrs limb training (shaping) 5/7/ x 2/52 -Home tasks	Pre & Post intervention. No mention of blinding -Motor Activity Log (MAL) -Functional Independence Measure (FIM) -Wolf Motor Function Test (WMFT) -Surface EMG	"Statistically significant" reduction in spasticity - no details regarding analysis used. Claims made on basis of descriptive stats from 5 patients	0 Unacceptable reject. Small sample with poorly described probable selection bias. Participants 12- 192 months post stroke and already attending rehabilitation. Claims made on descriptive level stats.
238	M. M. Zarantonello et al. (2017). Electromyographic analysis of constraint-induced movement therapy effects in patients after stroke in chronic course. <i>Journal of physical therapy science</i> , 29:11 1883-1888	Quasi-experimental. (n=5) No control. Set within Physiotherapy school within a community college. Brazil. Known patients invited to take part: 40-85y.o, 180 days or more since stroke (chronic), MAS of 2 or less, Hemiparetic limb with some shoulder, elbow, wrist and finger movement	CIMT: 90% restrain of unaffected limb during waking hours. UL training for 3 hours per day for 10 consecutive days. Patients recorded activity journal	MAL FIM WMFT Electromyographic measures of biceps from surface electrodes	Improved electromyographic performance Improved MAL*, WFMT*, FIM* scores *Inferential statistics were used which should be treated with caution considering the sample size and lack of control	0 Unacceptable. This is a non-comparative study and does not require a checklist according to the SIGN checklist algorithm. Sample is small, no control.