

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
Ada et al., 2005 PEDro score: 8	8	Positioning (n=18) vs. Control group (n=18)  Treatment program: Positioning in supine with full external rotation and 45° shoulder abduction (30 mins/day) and in sitting with 90° flexion and 90° elbow flexion (30 mins/day), 5 days/week for 4 weeks. Both groups received standard upper limb care and 10 minutes of shoulder exercises 5 days/week for 4 weeks.	<b>At 4 weeks (post-treatment):</b> (+) Passive range of motion (pROM) – external rotation (-) pROM – shoulder flexion (+) Shoulder external rotation contracture (-) Shoulder flexion contracture (-) Pain – visual analogue scale (VAS) (-) Motor Assessment Scale item 6
Ancliffe, 1992 PEDro score: 3	3	Strapping the hemiplegic shoulder (n=4) vs. No strapping (n=4)  Treatment details: Duration of strapping was not specified.	<b>At end of treatment (number of days not specified):</b> (+) Number of days before onset of pain (Ritchie Articular Index)
Cacchio et al., 2009a PEDro score: 7	7	Mirror therapy and conventional rehabilitation (n=24) vs. Conventional rehabilitation alone (n=24)  Treatment details: Mirror therapy: 30 minutes (week 1 and 2) to 1 hour (week 3 and 4) per session of mirror therapy comprising shoulder, elbow and wrist flexion and extension; forearm pronation-supination. Conventional rehabilitation: 1-hour sessions, 5 days a week for 4 weeks.	<b>1 week (post-treatment) and 6 months (follow-up):</b> (+) Pain at rest (VAS) (+) Pain on shoulder flexion (VAS) (+) Tactile allodynia (VAS) (+) Wolf Motor Function Test – Functional Ability (+) Wolf Motor Function Test – Performance Time (+) Motor Activity Log – Quality of Movement

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Cacchio et al., 2009b PEDro score: 5	5	Mirror therapy (n=8) vs. Covered mirror (n=8) vs. Mental Imagery (n=8)  Treatment details: Performing principal (proximal to distal) movements of the affected arm for 30 minutes daily for 4 weeks. Treatment regime for the MI group not specified. After the 4-week period 12 participants crossed over to the mirror therapy group.	<b>At 4 weeks (post-treatment):</b> (+) Pain (VAS)* After cross-over treatment period: (+) Pain (VAS)** In favour of mirror therapy compared to covered mirror and mental imagery groups. ** Results indicate a significant reduction in pain among participants from the covered mirror group and mental imagery group who crossed over to the mirror therapy group.
Chantraine et al., 1999 PEDro score: 4	4	FES and conventional rehabilitation (n=60) vs. Conventional rehabilitation alone (n=60)  Treatment details: FES was administered over 130-140mins/session for 5 weeks Conventional rehabilitation was based on Bobath principles	<b>At 3 months:</b> (+) Pain (VAS) At 6,12, and 24 months: (+) ROM - shoulder antepulsion (+) ROM - abduction (+) Pain (VAS) (+) Subluxation
Church et al., 2006 PEDro score: 9	9	Surface neuromuscular stimulation (sNMES, n=90) vs. Sham stimulation (n=86) Both groups received standard stroke unit care for 4 weeks  Treatment details:	<b>At 4 weeks (post-treatment):</b> (-) Action Research Arm Test -total, grasp, grip, pinch, gross scores (-) Frenchay Arm Test (-) Motricity Index - total, arm, leg scores) (-) Star Cancellation Test (-) Pain (5-point severity scale)

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		Stimulation via surface electrodes to the supraspinatus and posterior deltoid muscles of the affected shoulder at 30Hz for 60 minutes/session, 3 sessions/day for 4 weeks.	(-) Pain (10-point rating scale) (-) Nottingham Extended Activities of Daily Living scale (-) Nottingham Health Profile (-) Oxford Handicap Scale  At 3 months (follow-up): (+) Action Research Arm Test (grasp and gross scores only)* (+) Frenchay Arm Test* (+) Motricity Index (arm score only)* (-) Star Cancellation Test (-) Pain (5-point severity scale) (-) Pain (10-point rating scale) (-) Nottingham Extended Activity of Daily Living scale (-) Nottingham Health Profile (-) Oxford Handicap Scale * Between-group differences in favour of control group vs. sNMES group
de Jong et al., 2006 PEDro score: 7	7	Positioning program and conventional rehabilitation (n=10) vs. Conventional rehabilitation alone (n=9)  Treatment details: 2 x 30- minutes sessions/day, 5 days/week, for 5 weeks.	<b>At 5 weeks (post-treatment):</b> (+) Passive range of motion (pROM) - shoulder abduction (-) pROM – shoulder external rotation (-) pROM – shoulder flexion (-) pROM – elbow extension (-) pROM – forearm supination (-) Ashworth Scale – elbow extension (+) Fugl-Meyer Assessment – upper limb scale

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		Positioning was performed in supine with maximum comfortable shoulder abduction, external rotation, elbow extension and forearm supination.	(-) Barthel Index (-) Pain at end range of each passive movement
Dean et al., 2000 PEDro score: 7	7	Prolonged positioning program (n=10) vs. Usual care (n=13)  Treatment details: 60 mins/day, 5 days/week for 6 weeks, in 3 positions: Supine with maximum tolerable shoulder abduction, full external rotation and elbow flexion (20 mins/day); Supine with 90° shoulder abduction, full external rotation and elbow flexion (20 mins/day); Sitting with 90° shoulder flexion, elbow/wrist extension and web space stretch (20mins/day)	<b>At 6 weeks (post-treatment):</b> (-) Passive ROM – external rotation (-) Active ROM – shoulder abduction (-) Pain at rest (VAS) (-) Pain on dressing (VAS)
Dromerick et al., 2009 PEDro score: 7	7	Standard CIMT (n=19) vs. High-intensity CIMT (n=16) vs. Conventional occupational therapy (n=17)  Treatment details: Standard CIMT: shaping therapy 2 hours/day and constraint 6 hours/day for 2 weeks. High-intensity CIMT: shaping therapy 3 hours/day and restraint 90% of waking hours for 2 weeks. Conventional OT: 1 hour of ADL training + 1 hour of upper extremity bilateral training exercises/day for 2 weeks.	<b>At day 14 (post-treatment) and day 90 (follow-up):</b> Standard CIMT vs. Conventional OT (-) Action Research Arm Test - total, grasp, grip, pinch, gross scores (-) Functional Independence Measure (FIM) - Upper Extremity score (-) Stroke Impact Scale - hand function subscale (-) Wong-Baker Faces Scale (-) Geriatric Depression–15 Scale (GDS-15) Standard CIMT vs. High intensity CIMT (+) Action Research Arm Test (total only)* (-) FIM - Upper Extremity

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
Griffin & Bernhardt, 2006 PEDro score: 7	7	Therapeutic shoulder strapping and standard care (n=10) vs. Placebo shoulder strapping and standard care (n=10) vs. Standard care alone (n=12)  Treatment details: Strapping of the shoulder for 4 weeks.	(-) Stroke Impact Scale - hand function subscale (-) Wong-Baker Faces Scale (-) GDS-15 Conventional OT vs. High intensity CIMT (+) Action Research Arm Test (total only)* (-) FIM - Upper Extremity (-) Stroke Impact Scale - hand function subscale (-) Wong-Baker Faces Scale (-) GDS-15 *In favour of conventional OT and standard CIMT vs. high intensity CIMT  <b>At 4 weeks (post-treatment):</b> (+) Number of pain-free days (Ritchie Articular Index)* (-) Motor Assessment Scale upper arm component (-) Modified Ashworth Scale (-) ROM – shoulder flexion (-) ROM – shoulder abduction (-) ROM – external rotation * Significant between-group difference in favour of therapeutic strapping vs. standard care alone.
Gustafsson & McKenna, 2006 PEDro score: 6	6	Static positional stretching program (n=17) vs. No stretching program (n=15)  Treatment details:	<b>At 4 weeks (post-treatment):</b> (-) Pain-free ROM - external rotation (-) Shoulder pain at rest (modified VAS) (-) Shoulder pain on movement (Ritchie Articular Index)

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		Participants in the stretching program performed 2x 20-minute stretches daily for 4 weeks: supine with 90° abduction, maximal external rotation, elbow flexion and forearm pronation; sitting with 90° abduction, elbow extension and neutral forearm position; and special cushion support in wheelchair/bed.	(-) Motor Assessment Scale (-) Modified Barthel Index
Hanger et al., 2000 PEDro score: 7	7	Therapeutic shoulder strapping (n=49) vs. No strapping (control (n=49))  Treatment details: Therapeutic strapping of the shoulder for 6 weeks OR until discharge OR until patient achieved 90° shoulder abduction against gravity with elbow flexed. Both groups received conventional rehabilitation for 6 weeks.	<b>At 6 weeks (post-treatment) and 14 weeks (follow-up):</b> (-) Shoulder pain (VAS) (-) Shoulder lateral ROM to point of pain (-) Motor Assessment Scale - arm and hand subsections (-) FIM (-) Rankin Disability scale
Kobayashi et al., 1999 PEDro score: 5	5	FES to the supraspinatus muscle (FES-S, n=6) vs. FES to the deltoid muscle (FES-D, n=6) vs. No FES (n=7)  Treatment details: FES: 15 minutes/session, 2 sessions/day, 5 days/week for 6 weeks All groups received conventional physical therapy that comprised neuromuscular facilitation, joint mobilization and muscle stretching.	<b>At 6 weeks (post-treatment):</b> (+) Subluxation* (+) Maximum voluntary abduction force of the shoulder** (-) EMG of supraspinatus and deltoid muscles (-) Pain on abduction (VAS) (-) Modified Ashworth Scale - pectoralis major muscle (-) Rotator cuff tear detected with MRI Significant between-group difference in favour of FES-S and FES-D compared to no FES

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
			** Significant within-group difference in FES-D group only NOTE: Between group analyses were performed for subluxation only
Koyuncu et al., 2010 PEDro score: 4	4	FES and conventional rehabilitation (n=25) vs. Conventional rehabilitation alone (n=25)  Treatment details: FES to supraspinatus and the posterior deltoid muscles for 60 mins, 5x/day for 4 weeks, for a total of 20 sessions.	<b>At 4 weeks (post-treatment):</b> (-) Pain at rest (VAS) (-) Pain on passive ROM – shoulder flexion (VAS) (-) Pain on passive ROM – shoulder abduction (VAS) (-) Pain on active ROM – shoulder flexion (VAS) (-) Pain on active ROM – shoulder abduction (VAS) (+) Shoulder subluxation
Kumar et al., 1990 PEDro score: N/A (quasi-experimental controlled trial)	N/A (quasi-experimental study)	Passive range of motion (n=12) vs. Active-assisted range of motion exercises (n=8) vs. Overhead pulley exercises (n=8)  Treatment details: 5-10 minutes/session, 5 sessions/week for 5 weeks.	<b>At 4, 8 and 12 weeks:</b> (-) Shoulder subluxation (+) Shoulder pain at rest* (+) Shoulder pain on passive ROM * In favour of ROMT vs. OP
Lindfield et al., 2002 PEDro score: N/A (case report)	N/A (case-report)	Acupuncture	<b>Post-treatment:</b> (+) Pain (VAS) (+) Self-reported use of pain relief

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		Treatment details: 5 acupuncture treatments on the affected side over 15 days	(+) Neck rotation NOTE: results reflect non-significant improvements from pre-treatment to the final treatment session. Statistical analysis of data was not performed.
Linn et al., 1999 PEDro score: 5	5	FES and conventional rehabilitation (n=20) vs. Conventional rehabilitation only (n=20).  Treatment details: FES to the supraspinatus and posterior deltoid muscles at 30Hz for 30-60 minutes, 4x/day for 4 weeks.	<b>At 4 weeks (post-treatment) and 3 months (follow-up):</b> (-) Pain (5-point rating scale) (-) Shoulder subluxation (-) Pain-free passive ROM – lateral shoulder rotation (-) Motor Assessment Scale - upper arm section (-) Upper arm girth
Mok & Woo, 2004 PEDro score: 5	5	Slow Stroke Back Massage (SSBM) and routine nursing care (n=51) vs. Routine nursing care alone (n=51)  Treatment details: SSBM for 10 minutes over seven consecutive evening sessions	<b>At 7 days (post-treatment) and 10 days (follow-up):</b> (+) State-Trait Anxiety Inventory – state portion (+) Shoulder pain (VAS) (+) Systolic/diastolic blood pressure (+) Heart rate
Partridge et al., 1990 PEDro score: 5	5	Cryotherapy (n=31) vs. Bobath approach (n=34)  Treatment details:	<b>At 4 weeks (post-treatment):</b> (-) Severity of pain at rest (6-point rating scale) (-) Severity of pain on movement (6-point rating scale) (-) Affective response to pain (4-point scale)



Results Table  
**Shoulder pain**

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		<p>Cryotherapy: ice to the shoulder for 10 minutes followed by simple UL exercise involving active large circular movements.</p> <p>Bobath approach: positioning, support in activities, range of motion.</p> <p>Both groups received treatment daily for five days, then at the physiotherapists' discretion for a total of four weeks.</p>	<p>(+) Frequency of pain (5-point scale)*                      * In favour of the Bobath approach</p>
Shin & Lee, 2007 PEDro score: 6	6	<p>Aromatherapy acupressure (n=15) vs. Acupressure (n=15)</p> <p>Treatment details: Acupressure to the affected shoulder for 20 minutes, 2x/day for 2 weeks. Aromatherapy acupressure involved additional use of lavender, rosemary and peppermint oils.</p>	<p><b>At 2 weeks (post-treatment)</b>                      (+) Shoulder pain (8-point rating scale)                      (-) Shoulder motor power</p>
Tyson & Chissim, 2002 PEDro score: N/A (randomized controlled within-subject comparison design)	N/A (randomized controlled within-subject comparison)	<p>Axilla hold technique vs. Distal hold technique</p> <p>Treatment details: Axilla hold technique: glenohumeral joint supported and held in external rotation, and wrist supported. Distal hold technique: arm held at forearm only, with no shoulder support.</p>	<p><b>Post-treatment:</b>                      (+) Pain-free ROM - shoulder flexion</p>
Underwood et al., 2006 PEDro score: 6	6	<p>Immediate CIMT (n=21) vs.</p>	<p><b>At 2 weeks (post-treatment):</b>                      (-) Wolf Motor Function Test</p>

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
		<p>Delayed CIMT (n=20)</p> <p>Treatment details:                      CIMT for 6 hours/day for 10 days over 2 weeks.                      Immediate CIMT group received treatment 3-9 months after stroke;                      Delayed CIMT group received treatment 1 year after enrollment in the study</p>	<p>(-) Fugl-Meyer Assessment – joint pain subscale                      (-) Pain during treatment (non-standardized scale)                      (-) Fatigue during treatment (non-standardized scale)                      (-) Treatment intensity (minutes)</p>
<p>Wang et al., 2002                      PEDro score: 4</p>	<p>4</p>	<p>Long FES (n=8 acute, n=8 chronic )                      vs.                      Short FES (n=8 acute, n=8 chronic)</p> <p>Treatment details:                      FES to the supraspinatus and posterior deltoid muscles for 6 hours/day, 5 days/week for 6 weeks.                      Long FES comprised an A-B-A study design: (A) FES treatment (B) conventional therapy without FES; (A) FES treatment.                      Short FES comprised 1 cycle of FES only</p>	<p><b>At 6 weeks, 12 weeks and 18 weeks (end of each treatment period):</b>                      (-) Pain-free passive ROM - external rotation                      (+) Fugl-Meyer Assessment*                      (-) Shoulder subluxation                      * Significant between-group differences in patients with acute stroke only</p>