

Author, Year PEDro Score, Country	Sample size	Intervention	Outcome and significance: (+) significant (-) not significant
Daumuller & Goldenberg, 2010 PEDro: n/a (controlled clinical trial) Country: Germany	33 patients with subacute left hemisphere stroke and severe aphasia (apraxia n=unspecified)	Gestural therapy (n=23) vs. No gestural therapy (n=10) <u>Treatment details:</u> 50 minutes/session, 3 sessions/week (individual or group sessions) for 3 weeks. <i>Gestural therapy:</i> aimed to teach communicative function of gestures and to improve spatial precision of gestures; training started with actual use of object - dissociated use of object - mimed repetition of the action after real use - mimed use on sight of the object - mimed use on sight of picture of the object - gesture used in communication; non-object specific gestures started with imitation - in response to questions - in communication.	At week 1 (n=23): (+) Gesture production – unpracticed gestures (+) Gesture production – practiced gestures At week 2 (n=15): (+) Gesture production – unpracticed gestures* (+) Gesture production – practiced gestures At week 3 (n=9): (-) Gesture production – unpracticed gestures (+) Gesture production – practiced gestures Note: results reflect within-group improvements following gestural therapy. * There was a significant between-group difference in unpracticed gestures following week 2, in favour of gestural therapy vs. control.
Donkervoort et al., 2001 PEDro: 8 Country: The Netherlands	113 patients with subacute left hemisphere stroke and apraxia	Strategy training integrated into occupational therapy (n=56) vs. Occupational therapy alone (n=57) <u>Treatment details:</u> 25-27 sessions for 8 weeks (15-19 hours total; frequency and intensity of sessions not specified). <i>Strategy training:</i> based on program by Van Heugten et al. (1998); use of internal (e.g. self-verbalisation) and/or external strategies to compensate for the apraxic impairment during the performance of activities of daily living (ADLs).	At post-treatment (8 weeks): (-) Apraxia (-) Motricity Index (-) Functional Motor Test (+) Barthel Index (+) Standardised ADL observations (-) ADL judgement – Occupational Therapist (-) ADL judgement – patient At follow-up (20 weeks): (-) Apraxia (-) Motricity Index (-) Functional Motor Test (-) Barthel Index (-) Standardised ADL observations

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		<i>Occupational therapy</i> : addressed sensory motor, perceptual and cognitive deficits to increase independence for ADLs.	(-) ADL judgement – Occupational Therapist (-) ADL judgement – patient
Geusgens et al., 2006 PEDro: 5 Country: The Netherlands	113 patients with subacute left hemisphere stroke and apraxia	Strategy training integrated into occupational therapy (n=56) vs. Occupational therapy alone (n=57) <u>Treatment details:</u> 25-27 sessions for 8 weeks (15-19 hours total; frequency and intensity of sessions not specified). <i>Strategy training</i> : based on treatment protocol by Van Heugten et al. (1998), teaching strategies to compensate for the presence of apraxia to maximise independence by improving ADL functioning. <i>Occupational therapy</i> : increasing independent functioning in ADL tasks by addressing (sensory) motor impairments (e.g., muscle tone, reflexes, controlled movements, muscle strength, contractures), perceptual and cognitive deficits.	At post-treatment (8 weeks): (-) ADL observations – trained tasks (+) ADL observations – untrained tasks At follow-up (20 weeks): (-) ADL observations – trained tasks (-) ADL observations – untrained tasks Note: results reflect change scores
Geusgens et al., 2007 PEDro: n/a (non-randomised study) Country: The Netherlands	36 patients with subacute/chronic left hemisphere stroke and apraxia	Strategy training (n=36) <u>Treatment details:</u> 8 weeks (frequency of training sessions was based on clinical judgment of the occupational therapist and rehabilitation team). <i>Strategy training</i> : based on treatment protocol by Van Heugten et al. (1998), teaching strategies to compensate	At post-treatment (8 weeks): (+) ADL observations – trained tasks (+) ADL observations – non-trained tasks (+) ADL observations – total (-) Functional Motor Test (+) Barthel Index (+) Apraxia Test (-) Transfer effects (trained to non-trained tasks) – rehab

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		for the presence of apraxia to maximise independence by improving ADL functioning.	(-) Transfer effects (trained to non-trained tasks) – home (-) Transfer effects – ADL total score (rehab to home) (-) Transfer effects – ADL trained tasks (rehab to home) (-) Transfer effects – ADL non-trained tasks (rehab to home) Note: results reflect significant improvement from baseline to post-treatment. At follow-up (20 weeks): (-) ADL observations – trained tasks (-) ADL observations – non-trained tasks (-) ADL observations – total (+) Lasting transfer effects (trained to non-trained tasks) – rehab (+) Lasting transfer effects (trained to non-trained tasks) – home
Goldenberg & Hagmann, 1998 PEDro: n/a Country: Germany	15 patients with subacute left hemisphere stroke and apraxia	Direct training + explorative training (n=15) <u>Treatment details:</u> 20-40 mins/session, 5 sessions/week until no major errors occurred (2-5 weeks of intervention for 10 participants who made no fatal errors at end of therapy; 3-5 weeks of intervention for 5 participants who continued to make fatal errors). <i>Direct training + explorative training:</i> Participants were trained in three ADL tasks over three weeks – participants were trained in one task for one week and received no therapeutic advice for the other two ADL tasks; a different	At post-treatment (2-5 weeks): (+) ADLs – fatal errors (-) ADLs – reparable errors At follow-up (6-30 months): (-) ADLs – fatal errors Note: participants who continued to practice activities at home showed fewer fatal errors at follow-up.

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		ADL task was trained each week; the intervention was provided for 3 weeks; the cycle was repeated for participants who continued to demonstrate fatal errors.	
Goldenberg et al., 2001 PEDro: n/a (crossover trial) Country: Germany	6 patients with chronic left hemisphere stroke and severe apraxia	<p>Direct training (n=6) vs. Explorative training (n=6)</p> <p><u>Treatment details:</u> 60 minutes/session, 3 times/week for 4 weeks; participants then crossed over to receive the comparison intervention.</p> <p><i>Direct training:</i> The patient was required to carry out the entire activity with a minimum of errors. Support was given at all critical stages and was reduced only as the patient's competence increased. Actions and objects contained in the activity were used for training.</p> <p><i>Explorative training:</i> aimed at restoring the ability to infer function from structure and solve the mechanical problems embedded in the tasks. Patients were encouraged to feel and draw the objects with particular emphasis on critical details, and the objects were compared with other objects used for either the same or different purposes.</p>	<p>Post-treatment (4 weeks) – Direct training: (+) ADLs – Errors (+) ADLs – Assistance</p> <p>Post-treatment (4 weeks) – Explorative training: (-) ADLs – Errors (-) ADLs – Assistance</p> <p>At follow-up (3 months) – Direct training: (-) ADLs – Errors (+) ADLs – Assistance</p> <p>At follow-up (3 months) – Explorative training: (-) ADLs – Errors (+) ADLs – Assistance</p>
Smania et al., 2000 PEDro: 5 Country: Italy	13 patients with subacute/chronic left hemispheric stroke and apraxia	<p>Gesture training program (n=6) vs. Conventional aphasia treatment (n=7)</p> <p><u>Treatment details:</u></p>	<p>At post-treatment (35 sessions): (+) Ideational apraxia (+) Ideational praxic errors – total (+) Ideational praxic errors – awkwardness (+) Ideational praxic errors – omissions</p>

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		<p>50 minutes/session, 3 sessions/week for approximately 12 weeks (35 sessions total).  <i>Gesture training program</i> comprised (a) transitive gesture training, (b) intransitive-symbolic gesture training, and (c) intransitive-non-symbolic gesture training.  <i>Conventional aphasia treatment</i> was time-matched.</p>	<p>(-) Ideational praxic errors – inadequate 5nrecogniza  (-) Ideational praxic errors – sequence error  (-) Ideational praxic errors – substitution  (+) Ideational praxic errors – perplexity  (+) Ideational praxic errors – 5nrecognizab error  (+) De Renzi test of ideomotor apraxia  (+) Ideomotor praxic errors – total  (+) Ideomotor praxic errors – 5nrecognizable  (+) Ideomotor praxic errors – intrusions  (+) Ideomotor praxic errors – position  (-) Ideomotor praxic errors – perseveration  (-) Ideomotor praxic errors – omissions  (-) Ideomotor praxic errors – inappropriate sequence  (-) Ideomotor praxic errors – conduit d’approche  (-) Ideomotor praxic errors – substitution  (-) Token Test  (-) Raven’s Coloured Progressive Matrices  (-) Oral apraxia  (-) Construction apraxia  (-) Gesture comprehension test  Note: between-group differences were not reported; results indicate significant improvement within treatment group.</p>
Smania et al., 2006 PEDro: 4 Country: Italy	41 patients with subacute/chronic left	Gesture training program (n=21) vs.	At post-treatment (30 sessions): (+) ADL (-) Ideational apraxia

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	hemisphere stroke and apraxia and aphasia	<p>Aphasia treatment (n=20)</p> <p><u>Treatment details:</u> 50 minutes/session, 3 sessions/week for 10 weeks (30 sessions total).</p> <p><i>Gesture training program</i> comprised (a) transitive gesture training, (b) intransitive-symbolic gesture training, and (c) intransitive-non-symbolic gesture training.</p> <p><i>Conventional aphasia treatment</i> was time-matched.</p>	<p>(+) Ideomotor apraxia (+) Gesture comprehension (-) Oral apraxia (-) Token Test (-) Raven's Coloured Progressive Matrices (-) Construction apraxia At follow-up (2 months post-treatment): (-) ADL (-) Ideational apraxia (-) Ideomotor apraxia (-) Gesture comprehension</p>
van Heugten et al., 1998 and van Heugten et al., 2000 PEDro: n/a (non-randomised study) Country: The Netherlands	33 patients with acute/subacute left hemisphere stroke and apraxia	<p>Strategy training (n=33)</p> <p><u>Treatment details:</u> Approximately 30 minutes/session, 3-5 sessions/week for 12 weeks (frequency of sessions determined by rehabilitation specialist/institution).</p> <p><i>Strategy training</i> was intended to improve functioning using compensatory techniques to facilitate task initiation, task execution or control; the patient and occupational therapist determined relevant activities to train; new treatment goals and activities were devised every 2 weeks.</p>	<p>At post-treatment (12 weeks): (+) Motor functioning (+) Apraxia (+) ADL observations (+) Barthel Index (+) ADL questionnaire (OT)</p>