<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Sample size</th>
<th>Intervention</th>
<th>Outcome and significance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daumuller &amp; Goldenberg, 2010</td>
<td>33 patients with subacute left hemisphere stroke and severe aphasia (apraxia n=unspecified)</td>
<td>Gestural therapy (n=23) vs. No gestural therapy (n=10)</td>
<td>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</td>
</tr>
<tr>
<td>Donkervoort et al., 2001</td>
<td>113 patients with subacute left hemisphere stroke and apraxia</td>
<td>Strategy training integrated into occupational therapy (n=56) vs. Occupational therapy alone (n=57)</td>
<td>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</td>
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**Treatment details:**
- Gestural therapy: 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.
- Strategy training: 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).

* There was a significant between-group difference in unpracticed gestures following week 2, in favour of gestural therapy vs. control.
<table>
<thead>
<tr>
<th>Author, Year</th>
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<tr>
<td>Geusgens et al., 2006 PEDro: 5 Country: The Netherlands</td>
<td>113 patients with subacute left hemisphere stroke and apraxia</td>
<td>Strategy training integrated into occupational therapy (n=56) vs. Occupational therapy alone (n=57)</td>
<td>Occupational therapy: addressed sensory motor, perceptual and cognitive deficits to increase independence for ADLs.</td>
<td>(-) ADL judgement – Occupational Therapist (-) ADL judgement – patient</td>
</tr>
<tr>
<td>Geusgens et al., 2007 PEDro: n/a (non-randomised study) Country: The Netherlands</td>
<td>36 patients with subacute/chronic left hemisphere stroke and apraxia</td>
<td>Strategy training (n=36)</td>
<td>Occupational therapy: 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.</td>
<td>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</td>
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### Results Table

**Apraxia**

| Author, Year, PEDro Score, Country | Sample size | Intervention | Outcome and significance:  
(+): significant  
(-): not significant |
|-----------------------------------|-------------|--------------|-----------------------------|
| **Goldenberg & Hagmann, 1998**  
PEDro: n/a  
Country: Germany | 15 patients with subacute left hemisphere stroke and apraxia | Direct training + explorative training  
(n=15)  
**Treatment details:**  
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).  
**Direct training + explorative training:** 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 | (-) 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 |

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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<tr>
<td>Goldenberg et al., 2001</td>
<td>6 patients with chronic left hemisphere stroke and severe apraxia</td>
<td>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.</td>
<td>Post-treatment (4 weeks) – Direct training: (+) ADLs – Errors (+) ADLs – Assistance Post-treatment (4 weeks) – Explorative training: (-) ADLs – Errors (+) ADLs – Assistance At follow-up (3 months) – Direct training: (-) ADLs – Errors (+) ADLs – Assistance At follow-up (3 months) – Explorative training: (-) ADLs – Errors (+) ADLs – Assistance</td>
</tr>
<tr>
<td>Smania et al., 2000</td>
<td>13 patients with subacute/chronic left hemispheric stroke and apraxia</td>
<td>Gesture training program (n=6) vs. Conventional aphasia treatment (n=7) Treatment details:</td>
<td>At post-treatment (35 sessions): (+) Ideational apraxia (+) Ideational praxic errors – total (+) Ideational praxic errors – awkwardness (+) Ideational praxic errors – omissions</td>
</tr>
<tr>
<td>Author, Year PEDro Score, Country</td>
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<tr>
<td>Smania et al., 2006 PEDro: 4 PEDro: 4 Country: Italy</td>
<td>41 patients with subacute/chronic left Gesture training program (n=21) vs.</td>
<td>50 minutes/session, 3 sessions/week for approximately 12 weeks (35 sessions total). <em>Gesture training program</em> comprised (a) transitive gesture training, (b) intransitive-symbolic gesture training, and (c) intransitive-non-symbolic gesture training. <em>Conventional aphasia treatment</em> was time-matched.</td>
<td>(-) Ideational apraxia errors – inadequate recognition (+) ADL (-) Ideational apraxia errors – sequence error (-) Ideational apraxia errors – substitution (+) Ideational apraxia errors – perplexity (+) Ideational apraxia errors – recognition error (+) De Renzi test of ideomotor apraxia (+) Ideomotor apraxia errors – total (+) Ideomotor apraxia errors – recognizable (+) Ideomotor apraxia errors – intrusions (+) Ideomotor apraxia errors – position (-) Ideomotor apraxia errors – perseveration (-) Ideomotor apraxia errors – omissions (-) Ideomotor apraxia errors – inappropriate sequence (-) Ideomotor apraxia errors – conduit d’approche (-) Ideomotor apraxia 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.</td>
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<td>At post-treatment (30 sessions): (+) ADL (-) Ideational apraxia</td>
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| hemisphere stroke and apraxia and aphasia | Aphasia treatment (n=20)  
*Treatment details:*  
50 minutes/session, 3 sessions/week for 10 weeks (30 sessions total).  
*Gesture training program* comprised (a) transitive gesture training, (b) intransitive-symbolic gesture training, and (c) intransitive-non-symbolic gesture training.  
*Conventional aphasia treatment* was time-matched. | (+) 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 |
| 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 | Strategy training (n=33)  
*Treatment details:*  
Approximately 30 minutes/session, 3-5 sessions/week for 12 weeks (frequency of sessions determined by rehabilitation specialist/institution).  
*Strategy training* 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. | At post-treatment (12 weeks):  
(+) Motor functioning  
(+) Apraxia  
(+) ADL observations  
(+) Barthel Index  
(+) ADL questionnaire (OT) |