Occupational Therapy Goal Achievement for Persons With Postacute Cerebrovascular Accident in an On-Campus Student Clinic

Patsy Lavelle, George S. Tomlin

Key Words: cerebrovascular disorders
• outcome assessment (health care)
• rehabilitation

Objectives. A retrospective study was conducted to determine to what extent persons with postacute cerebrovascular accident (CVA) made progress toward rehabilitation goals during occupational therapy treatment and whether age and time since CVA onset affected the rate of goal achievement.

Method. Data were collected from the admission and discharge records of persons with CVA who had received occupational therapy at a university clinic, who were at least 8 months post CVA, and who had not received therapy in the community for at least 6 months. The treatment was provided by occupational therapy students under supervision and had a mean length of 12 1-hr sessions over one semester. A sample size of 85 was obtained from 13 years of clinic records.

Results. All patients in the sample except one made progress toward at least one of their selected rehabilitation goals. The group mean score for goal progress indicated that as a whole, the patients made significant gains. In addition, independent t tests showed no significant differences in mean scores between younger and older patients, between longer and shorter times since onset, between men and women, or between right and left CVA. There was no significant linear association between mean score and the number of treatments received.

Conclusion. Patients with CVA showed progress toward rehabilitation goals during postacute treatment. Patients with recent CVA onset or of younger age did not achieve goals at a significantly higher rate than those with less recent onset or of greater age.


The number of cerebrovascular accidents (CVAs) in the United States in 1995 was estimated to be 750,000 (Williams, Jiang, Matchar, & Samsa, 1999), and over time, nearly 3 million Americans with CVA have been left with some degree of disability (Werner & Kessler, 1996). After a stroke, patients may receive rehabilitation up to 6 months after onset, during which time the majority of their neurological and functional recovery will typically occur (Jorgensen et al., 1995). Studies of early recovery from stroke indicate improvement in function during the first 3 months after onset, with rehabilitation facilitating progress (Sivenius, Pyorala, Heinonen, Salonen, & Riekkinen, 1985; Taub, Wolfe, Richardson, & Burney, 1994). Studies of late recovery have found that patients receiving postacute treatment (i.e., > 6 months after CVA onset) have improved for up to 1 year (Smith, Macko, Silver, & Goldberg, 1998; Tangeman, Banaitis, & Williams, 1990; Wade, Collen, Robb, & Warlow, 1992) and even up to 4 years post stroke (Yekutiel & Guttman, 1993).
Rehabilitation for CVA is usually discontinued after the acute phase because of lack of funding or lack of documented progress (Tangeman et al., 1990), leaving many patients short of their full potential, inadequately prepared for the ongoing challenges of independent community living, and with lifelong disabilities (Clark, Collins, & Gladman, 1995; Evans, Bishop, & Haselkorn, 1991; Kojima et al., 1990). The reimbursement limitation of acute care settings, however, does not apply to university-sponsored, free training clinics where postacute CVA rehabilitation can be provided and studied.

**Background and Importance**

**Recovery and Rehabilitation**

The course of CVA recovery varies with severity and individual differences, but Jorgensen et al. (1995) found that 80% of 1,197 patients reached a plateau in neurological recovery within 4 weeks, and 95% reached a plateau within 11 weeks. Some researchers have maintained that most persons with CVA have a spontaneous recovery up to 6 months post stroke, even without treatment (Dombovy & Bach-y-Rita, 1988; Werner & Kessler, 1996). The spontaneous neurological recovery is attributed to the reabsorption of edema and necrotic tissue and the development of adequate collateral circulation in the area surrounding the ischemia (Dombovy & Bach-y-Rita, 1988). Jorgensen et al. also noted that plateaus were reached in the performance of activities of daily living (ADL) skills in 80% of patients within 6 weeks and in 95% within 12.5 weeks. Taub et al. (1994) saw little change in disability levels between 3 months and 12 months post acute CVA without treatment, whereas Sivenius et al. (1985) found the same result even after postacute treatment.

One early rehabilitation outcome study (Skilbeck, Wade, Hewer, & Wood, 1983) found that most recovery had occurred within 3 months of CVA onset. The limited time of improvement was attributed to clinical measure insensitivity and variability of performance along with the counterbalancing effect of gradual physical deterioration due to aging and cerebrovascular disease itself. Later studies have reported a decline in function when rehabilitation was discontinued (Wade et al., 1992; Walker, Drummond, & Lincoln, 1996; Werner & Kessler, 1996).

Improvement in functional ability during rehabilitation 6 months or more after CVA has been demonstrated (Davidoff, Keren, Ring, & Solzi, 1991; Lehmann et al., 1975; Walker et al., 1996). The classic study by Lehmann et al. (1975) of 114 patients with a mean age of 59 years who were 6 months to 12 months (M = 10 months) post CVA onset revealed that significant gains were made in dressing, functional mobility, and living arrangements after postacute rehabilitation treatment. The percentage of institutionalized patients dropped from 63% to 27%, and the authors concluded that improvement had occurred as a direct result of treatment and not from spontaneous recovery. In a random crossover study with 15 patients who were 6 months post CVA onset, Walker et al. (1996) found significant improvements in dressing skills after 3 months of occupational therapy treatment at home. At a recheck 3 months later, the skills were maintained.

A study of the effects of physical therapy provided at least 1 year after CVA revealed a significant improvement in ADL, balance, and weight shifting among 40 patients (Tangeman et al., 1990). Patients related that the stress of the acute phase had not allowed some of them to benefit completely from their initial rehabilitation experience, and they believed that a period of adjustment at home helped them to realize their deficits and gave them a renewed interest in improving their function in the postacute stage. In a repertoire study, Moseley (1996) found that 801 “long-term” nursing home residents with CVA who had received physical therapy services for varying lengths of time demonstrated increased independence in eating, transferring, and dressing. Smith et al. (1998) demonstrated increased lower-extremity muscle strength in the hemiparetic limbs of 14 persons with postacute (> 6 months) CVA after 3 months of aerobic exercise.

Yekutiel and Guttmann’s (1993) study of patients 44 years to 81 years of age (M = 64 years) with hemiplegia and somatosensory deficits 2 years to 18 years (M = 6.2 years) after CVA revealed that after 6 weeks of treatment, the 20 persons in the experimental group showed significant gains in scores on four sensory tests, whereas the 19 in the control group did not. These results indicate that sensory deficits had not spontaneously improved in persons with postacute CVA but had improved after treatment.

Before 1980, it was uncommon for inpatient rehabilitation to exceed 6 months (Skilbeck et al., 1983; Wade, Skillbeck, Hewer, & Wood, 1984). Feigenson, McDowell, Meese, McCarthy, and Greenberg (1977) found the average length of stay in a stroke rehabilitation unit at that time to be 43 days. By 1992, the average length of stay of patients with CVA in one hospital rehabilitation unit was 19 days (Khader & Tomlin, 1994) and only 10 days 2 years later (Martin, 1995), indicating a long-standing trend toward shorter rehabilitation. Today, the total amount of rehabilitation is severely restricted by insurance reimbursement policies and the lack of private funds. After therapy is terminated, recovery is no longer recorded when it takes place.

**Side of Lesion, Age, and Rehabilitation Outcome**

Although many reports of maintained or gained skills after CVA treatment exist, many patients are left with severe disability (Kojima et al., 1990). Early studies have found that age is a limiting factor for progress after CVA (Ahliso, Britton, Murray, & Theorell, 1984; Feigenson et al., 1977; Kojima et al., 1990; Kotila, Waltimo, Niemi, Laaksonen, & Lempinen, 1984; Novack et al., 1984; Wade & Hewer,
Eligible patients were those who had not received therapy for persons with CVA who received postacute services. The criteria for entry can be more liberal than those of other health care entities. The care is in free university clinics where student therapists deliver supervised services. The criteria for entry can be more liberal than those of other health care entities. The University of Puget Sound in Tacoma, Washington, has operated a supervised, student-staffed occupational therapy clinic for more than 25 years, yielding ample records of persons with CVA who received postacute services. The purpose of the current study was to determine to what extent persons at least 8 months post CVA showed progress during performance areas (ADL, etc.). Another factor in post–CVA functional recovery is that due to the necessary psychological adjustment to CVA, patients may be better prepared for intervention to increase role performance after they have spent time at home (Sabari, 1998).

With the limited availability of rehabilitation services for persons with postacute CVA, whether through outpatient facilities, skilled nursing facilities, or home health care agencies (Somers, 1991), it is difficult to investigate whether such treatment is accompanied by positive outcomes. One setting where persons could receive postacute care is in free university clinics where student therapists deliver supervised services. The criteria for entry can be more liberal than those of other health care entities. The University of Puget Sound in Tacoma, Washington, has operated a supervised, student-staffed occupational therapy clinic for more than 25 years, yielding ample records of persons with CVA who received postacute services. The purpose of the current study was to determine to what extent persons at least 8 months post CVA showed progress toward occupational therapy goals after 10 weeks of clinical treatment. Several factors, including age, time since onset, gender, side of CVA, and type of goal (performance area vs. performance component, disability vs. impairment), were examined for their association with progress during postacute treatment.

Method

Sample

In this retrospective study, records of persons with postacute CVA who were treated in the University of Puget Sound student occupational therapy clinic were reviewed. Eligible patients were those who had not received therapy in the community for at least 6 months before clinic admission and who were not receiving concurrent therapy (although they may have been referred immediately after treatment in the student physical therapy clinic). From the available records of 13 clinic years, beginning with 1996 and working backward, a sample size of 85 was obtained.

Admission requirements for the occupational therapy clinic were (a) medical stability, (b) written physician permission, and (c) at least two occupational therapy goals determined by an informal screening process with the clinic coordinator, an occupational therapy faculty member.

Instrument and Procedure

Before data collection, 12 charts of persons with CVA who had attended the spring 1996 clinic were reviewed to determine whether the required information could be reliably extracted from existing records. This review yielded information on the documentation of goals and results and demonstrated the nonuniformity of evaluation and outcome measures due to the variety of measurement tools used, preventing numeric comparisons of corresponding standardized scores. Enough goals were consistently addressed in both evaluation and discharge summaries, however, to ensure the feasibility of the study.

Approval for the study was received from the Institutional Review Board. Goal achievement levels were extracted from the records according to a simplified version of the goal attainment scaling method of Kiresuk and Sherman as reported by Ottenbacher and Cusick (1990). The level of progress, as documented in the discharge summary, for each goal was coded 2 if the goal was fully met, 1 if the goal was partially met, and 0 if no progress was made. Levels from all goals of each patient were averaged and designated the goal achievement score (henceforth referred to as “score”). For example, a patient who had four treatment goals and scored 0 (no progress) on two goals and 1 (some progress) on two goals, would have a score of .5, denoting, on average, less than “some” progress on all goals. With this scoring scheme for two samples of 10 records each, interrater reliability for the extraction of goals and rating of progress was 71% exact agreement before consultation between two raters (the coauthors) and 82% after 3 hr of consultation.

To facilitate analysis, goals were designated as performance area (disability level) or performance component (impairment level). Examples of performance area goal categories were functional mobility, ADL skills (dressing, bathing, grooming), and instrumental ADL. Examples of performance component goal categories were active and passive range of motion, normalization of tone, grasp, release, balance, and strength.

Data Analysis

Data were analyzed with the Statistical Package for the Social Sciences for Macintosh program (SPSS, 1994). Descriptive statistics were calculated on demographic data.
to characterize the sample and to calculate the mean scores on the dependent variable for the entire group and for subgroups. One-sample *t* tests were performed to determine whether the actual mean score was significantly greater than either of two assumed population mean scores: 0 (no progress) and 1 (some progress). Independent *t* tests were performed to determine whether patients with earlier onset, younger age, certain gender, or side of CVA had higher ratings on goal achievement. Finally, a Pearson product-moment correlation was performed to detect linear association between mean score and number of treatments received.

**Results**

Of the 108 CVA patient records found, 23 did not meet the criteria of the current study (i.e., goal progress explicitly addressed in the discharge summary). Demographics of the remaining 85 are shown in Table 1. The patients’ records contained usable data for scoring 232 occupational therapy goals (*M* = 2.7 goals per person).

Patients’ goals were sorted into 63 categories of which 33 (52%) were performance area goals and 30 (48%) were performance component goals. The 10 most frequently reported goal categories are shown in Table 2. Goal achievement results are shown in Table 3. The mean score for all patients was 1.19 (slightly more than “some” progress, on average, per goal), with a standard deviation of .467 and a range of 0 to 2.0. Using a one-sample *t* test (Ferguson & Takane, 1989), the mean score of 1.19 is significantly different from an assumed population mean average score of 0 (no progress), *t*(83) = 23.34, *p* < .001. Even assuming a population mean of 1, indicating a mean average score of 0 (no progress), *t*(8) = 1.19, *p* < .001, and significantly greater than 1 (some progress). Independent *t* tests demonstrated no significant differences in mean scores between younger and older patients (divided at median age), between longer and shorter times since onset (median split), between men (68%) and women (32%), or between right (47%) and left (49%) CVA. In other words, patients with greater age and patients with less recent onsets achieved goals at the same rate as patients who were younger or with more recent onsets. Gender and side of CVA also were not associated with the goal progress made. Mean scores were also nearly identical for performance area goals (*M* = 1.14, *SD* = .72) and performance component goals (*M* = 1.17, *SD* = .74). In addition, the Pearson product-moment correlation calculation revealed no significant linear association between mean score and the number of treatments received in the student occupational therapy clinic.

**Discussion**

The results of the current study show that persons with CVA make progress toward achieving occupational therapy goals in both performance areas and performance components long beyond the 3-month to 6-month time frame often projected for final recovery. All patients except one achieved some progress toward at least one goal. Because the mean time since CVA onset was just over 3 years (longest individual time was more than 22 years), the results support the possibility of improvement during postacute treatment (Lehmann et al., 1975; Walker et al.,

### Table 1

**Demographic Characteristics and Clinical History of the Sample**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>%</th>
<th>M</th>
<th>Range</th>
<th>SD</th>
</tr>
</thead>
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<tr>
<td>Age (years)</td>
<td>66</td>
<td>36–87</td>
<td>10.6</td>
<td></td>
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</tr>
<tr>
<td>Months since onset</td>
<td>37</td>
<td>8–272</td>
<td>44.5</td>
<td></td>
<td></td>
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<tr>
<td>Number of student</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>OT treatments*</td>
<td>12</td>
<td>5–22</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>58</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>27</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVA type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>40</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>42</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilateral</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With spouse</td>
<td>63</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>8</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other*</td>
<td>13</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 85. OT = occupational therapy; CVA = cerebrovascular accident. *Treatments were 50 min each. *Congregate care facility or with family members.

### Table 2

**Top 10 (of 63) Goal Categories**

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Type of Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional mobility</td>
<td>27</td>
<td>A</td>
</tr>
<tr>
<td>UE dressing</td>
<td>19</td>
<td>A</td>
</tr>
<tr>
<td>LUE function</td>
<td>17</td>
<td>A</td>
</tr>
<tr>
<td>Leisure</td>
<td>17</td>
<td>A</td>
</tr>
<tr>
<td>Cooking</td>
<td>14</td>
<td>A</td>
</tr>
<tr>
<td>RUE AROM</td>
<td>12</td>
<td>A</td>
</tr>
<tr>
<td>RUE function</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td>LUE AROM</td>
<td>8</td>
<td>C</td>
</tr>
<tr>
<td>LE dressing</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>Bathing</td>
<td>6</td>
<td>A</td>
</tr>
</tbody>
</table>

*Note. A = performance area; C = performance component; UE = upper extremity; LUE = left upper extremity; RUE = right upper extremity; AROM = active range of motion; LE = lower extremity. *Shoes, socks, ankle–foot orthosis.

### Table 3

**Achievement of Occupational Therapy Goals**

<table>
<thead>
<tr>
<th>Results</th>
<th>Frequency</th>
<th>%</th>
<th>Mean Score</th>
<th>Range</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>85</td>
<td>100</td>
<td>1.19*</td>
<td>0–2</td>
<td>.47</td>
</tr>
<tr>
<td>Performance area goals</td>
<td>162</td>
<td>70</td>
<td>1.14*</td>
<td>0–2</td>
<td>.72</td>
</tr>
<tr>
<td>No progress (0)</td>
<td>32</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partially met (1)</td>
<td>75</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully met (2)</td>
<td>55</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance component goals</td>
<td>70</td>
<td>30</td>
<td>1.17*</td>
<td>0–2</td>
<td>.74</td>
</tr>
<tr>
<td>No progress (0)</td>
<td>14</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partially met (1)</td>
<td>30</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully met (2)</td>
<td>26</td>
<td>37</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Note. N = 85. Total goals, all patients = 232. *Mean of patients’ goal achievement mean scores, with 1.19 significantly greater than 0 (no progress), *t* = 23.34, *p* < .001, and significantly greater than 1 (some improvement), *t* = 3.73, *p* < .001. *Mean of performance area goal scores. *Mean of performance component goal scores, with no significant difference between performance area goal and performance component goal scores.
Given the conventional opinion that recovery stops within 6 months after CVA onset (Jorgensen et al., 1995; Taub et al., 1994), it is not surprising that postacute rehabilitation is considered by some researchers to be futile (Walker et al., 1996; Werner & Kessler, 1996). This situation may create a self-fulfilling prophecy by denying patients a chance to improve functional and role performance through therapy (Sabari, 1998).

This group of patients evaluated and treated by occupational therapy students under the supervision of practicing clinicians demonstrated widespread significant progress toward rehabilitation goals over the 10 weeks of treatment. Indeed, these patients’ progress, facilitated by relatively inexperienced students, may be an underestimate of what would be possible with more accomplished therapists.

In contrast to much of the reviewed literature, goal achievement scores were not significantly affected by any of the independent variables (demographic or clinical). Unlike previous studies (Ahlsio et al., 1984; Kojima et al., 1990; Wade & Hewer, 1987), the current study did not find that age affected goal achievement. This finding may have been due to the formulation of individualized goals posing the appropriate level of challenge for each patient, regardless of age. Ferrucci et al. (1993) attributed younger patients’ recovery to changes in neurological function and older patients’ recovery to functional or compensatory strategies, but they did not find a significant difference in the amount of progress due to age. The current study found no significant difference in goal achievement between performance area goals and performance component goals, although the interaction between this factor and age was not examined.

The current study also did not reveal a difference in the rate of goal achievement in persons with left CVA and persons with right CVA. Although some studies have been unable to show significant outcome differences between those with right and left CVA (Khader & Tomlin, 1994; Mills & DiGenio, 1983), others have found that persons with left CVA performed better after rehabilitation in certain ADL and in mobility than persons with right CVA (Campbell et al., 1991; Denes et al., 1982; Martin, 1995). Finally, the current study revealed that men and women exhibited the same level of goal achievement.

The lack of a correlation between mean goal achievement score and number of treatment sessions could be due to goal selection factors. Student occupational therapy providers were directed to focus on a few goals at a time, but the selection and formulation of goals were the students’ choice after consultation with the clinical supervisor. The lack of uniform difficulty of goals across patients meant that some goals would naturally be achieved in fewer sessions. All goals, however, were given the same weight statistically in the analysis. Thus, this factor would work to attenuate any correlation between the number of treatment sessions and the goal achievement score.

**Limitations and Recommendations**

The retrospective interpretation of records, the design chosen because it provided access to a large number of patients, has the limitation of lacking inferential rigor. Additionally, the fact that each patient was evaluated by a different occupational therapy student reduced consistency in the data, although this limitation may have been partly mitigated by close supervision of students by experienced clinicians. The variety of tests used for evaluations, and the occasional absence of a readministration report, made it difficult to compare standardized scores and, in some cases, to locate matching pretreatment and posttreatment performance levels for selected goals. Indeed, 21% of the originally selected records had to be discarded because of a lack of explicit information.

The terminology used for goals, objectives, short-term goals, and long-term goals has changed over the 13 years reviewed as well as the style of record keeping. Without a consistent framework in the records, it was difficult in some cases to determine precisely which goals were consistently addressed.

The sample was drawn from the metropolitan area around one city, thereby limiting the geographic generalizability of the study. Similarly, clinic inclusion criteria eliminated persons who were medically unstable or who were determined not to have at least two feasible occupational therapy goals. Thus, the results cannot be generalized to all persons who are postacute CVA. Finally, no judgment was made during the study about the importance, feasibility, difficulty, or meaningfulness of the occupational therapy goals the students chose. Supervising therapists presumably screened out inappropriate goals. This equal weighting of goals is a simplified model of reality that may mask relationships between demographics and treatment outcomes.

**Implications for Occupational Therapy**

The results further support findings on late improvement after intervention for persons with CVA and should assist occupational therapists in advocating for treatment for patients with performance deficits more than 6 months after CVA onset. These results, enhanced with those from prospective studies, may become useful in establishing the benefit of occupational therapy for selected persons with postacute CVA and contribute to current outcome reports of postacute treatment for this population. In some cases, despite advanced age and decades since the original CVA, patients achieved progress toward occupational therapy goals chosen to promote performance area or performance component functioning. Although the efficacy of the occupational therapy treatment itself is not demonstrable by a retrospective methodology, it seems unlikely that the...
patients would have discovered on their own how to achieve these rehabilitation goals. Future research on this topic could include the study of records with uniform evaluation and discharge data in order to achieve more precise quantification of treatment outcomes; the examination of goal difficulty and the impact of achieving these goals on the person's occupational role status; and the continued comparison between performance area goals and performance component goals.

**Conclusion**

Through retrospective review, the current study demonstrated that 85 patients with postacute CVA who were seen in an student occupational therapy clinic made significant progress toward therapy goals during 10 weeks of treatment. Despite a mean time since CVA onset of 3 years, the sample made, on average, more than “some” progress toward each designated occupational therapy goal. Each demographic and clinical subgroup achieved goals at the same rate as other subgroups, as no significant mean score differences were found between younger and older patients, longer and shorter times since onset, men and women, or right and left CVA. There was also no relationship found between the number of treatments received in the student clinic and goal achievement score perhaps because of variation in goal difficulty. These findings suggest that persons with postacute CVA may benefit from occupational therapy intervention beyond the 6-month timeframe often predicted for improvement. ▲

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