**Classification of Occupational Therapy Intervention for Inpatient Stroke Rehabilitation**

Stacy Smallfield, Joy Karges

**OBJECTIVE.** We investigated the specific type of occupational therapy intervention used by occupational therapists during inpatient stroke rehabilitation in one midwestern U.S. hospital to determine the frequency of prefunctional versus functional activity use.

**METHOD.** A retrospective chart analysis was conducted of clients who received inpatient stroke rehabilitation between January 2003 and June 2004. Type of intervention, intervention strategies, and adaptive equipment use were recorded for each session provided.

**RESULTS.** The majority of sessions (65.77%, n = 1,022) consisted of activities that were prefunctional in nature compared with 48.26% (n = 750) that focused on activities of daily living. Musculoskeletal intervention strategies were used in more than half (52.25%) of the sessions.

**CONCLUSION.** More sessions were spent on prefunctional than on functional activities, and musculoskeletal intervention strategies were most common. Future research studies are warranted to determine the most effective intervention for this client population.


---

**Stoke is the leading cause of disability in the United States (Centers for Disease Control and Prevention, 2007) and the most common diagnosis seen by entry-level occupational therapy practitioners (National Board for Certification in Occupational Therapy, 2004). Scientific evidence regarding the effectiveness of specific intervention methods should guide occupational therapy intervention for these clients. However, evidence to support specific occupational therapy intervention methods for clients with stroke is limited. Because occupational therapists who use limited evidence-based strategies frequently customize and combine multiple treatments to meet the goals of individual clients, it is often difficult to characterize interventions and to determine which strategy has the best outcome. Until recently, most research indicated that occupational therapy in general is beneficial for post-stroke clients (Landi et al., 2006; Ma & Trombly, 2002; Steultjens et al., 2003; Trombly & Ma, 2002; Unsworth & Cunningham, 2002) but did not provide insight into the nature of the interventions that contributed to that result. In an attempt to provide an evidence base for stroke rehabilitation, recent research has focused on specific interventions.

In their synthesis of literature related to occupational therapy for clients with stroke, Trombly and Ma (2002) recommended that occupational therapy intervention include task-specific training using familiar materials and contexts that increase the intervention’s occupation-based nature. However, results from recent studies have suggested that occupational therapy intervention with clients who have sustained stroke often consists of therapeutic activities that are preparatory in nature.
rather than activities focused on the occupation itself (Latham et al., 2006; Richards et al., 2005). Latham et al. (2006) stated that “the most commonly used interventions were neuromuscular interventions, especially balance training, postural awareness, and motor learning; however, adaptive approaches, such as teaching one-handed skills for activities of daily living (ADL) tasks, were also reported frequently” (p. 375). This study further indicated that occupational therapists place increased focus on improving body function and motor skills rather than on tasks designed to improve participation in both ADLs and instrumental activities of daily living (IADLs). Activities that addressed upper-extremity control and dressing tasks were those most frequently used during therapy sessions. Latham et al. also reported that only 5% of therapy time was dedicated to community integration and leisure activities. Therefore, beyond dressing and other basic ADL tasks, it appears that little occupation-based intervention is reported in occupational therapy for clients with stroke.

Richards et al. (2005) examined a subset of the Latham et al. (2006) sample in which participants received ≥ 24 hr of occupational therapy intervention during their inpatient rehabilitation stay. Consistent with Latham et al.’s findings, Richards et al. also found that little attention was paid to community integration and leisure activities for most clients, but they determined that the majority of occupational therapy sessions for this subset of the sample population involved ADL training, specifically upper-extremity control and dressing. In addition, Richards et al. found that occupational therapy sessions typically involved impairment-focused rather than function-focused activities. Bode, Heinemann, Semik, and Mallinson (2004) supported these conclusions.

Certainly, the findings of any study, including the aforementioned studies, may be limited by the classification system used in data collection. In the absence of a standardized classification system, however, the taxonomy used by Latham et al. (2006) and Richards et al. (2005) is a launching point to additional research in this area. Because of the limited research regarding the specific strategies that occupational therapists use during inpatient stroke rehabilitation, our purpose in this study was to investigate the specific type of occupational therapy intervention and intervention strategies in this practice setting. We investigated whether occupational therapists use primarily prefunctional activities or other more functional activities such as ADLs, IADLs, and social and leisure activities in therapy sessions. The results offer a better understanding of the types of occupational therapy interventions used for stroke rehabilitation and lead to future research regarding the efficiency and effectiveness of these interventions.

Method

Participants and Design

This study was a nonexperimental, retrospective record review of the occupational therapy services provided during inpatient stroke rehabilitation. Charts reviewed were from all patients (who were assigned an International Classification of Functioning, Disability and Health [9th rev.; World Health Organization, 2001] code for stroke, including codes 342, 430–434, 436, and 438) who received inpatient rehabilitation in a large teaching hospital with ≥ 400 beds and an accredited inpatient rehabilitation unit in the upper midwestern United States between January 2003 and June 2004. A chart was included in the study if the patient was between the ages of 18 and 85, had evidence of a cortical or subcortical stroke as documented with diagnostic imaging (magnetic resonance imaging or computed tomography scan), received occupational and physical therapy inpatient rehabilitation intervention (as evidenced by an established plan of care and any number of therapy minutes), had initial and discharge FIM™ (Uniform Data System for Medical Rehabilitation, 1999) scores, and had a complete rehabilitation stay in the hospital. A chart was excluded if the patient had congestive heart failure, myocardial infarction, unremitting cardiac arrhythmia, pneumonia, hip fracture, or deep venous thrombosis during the hospital stay or if the patient was admitted to the hospital for another medical condition.

Instruments

We used the Occupational Therapy Practice Framework: Domain and Process (American Occupational Therapy Association [AOTA], 2002) and the data collection form reported by Latham et al. (2006) and Richards et al. (2005) to guide the development of a data collection tool because no standardized data collection tool existed for recording the type of occupational therapy intervention provided in an intervention session. We categorized interventions according to the “performance areas of occupation” (AOTA, 2002, p. 611) as outlined in the Framework, including ADLs, IADLs, leisure activities, and social participation. In addition to these categories, we included a general category of prefunctional activities for those interventions that did not consist of an actual occupation. Prefunctional activities involved interventions that included sitting balance, trunk and upper-extremity control, upper-extremity therapeutic exercises, and wheelchair management as defined by Latham et al. (2006). Because ADLs are a commonly used intervention in inpatient stroke rehabilitation, we further divided the ADL intervention category into the specific activities in this category according to the Framework. These activities include bathing

The American Journal of Occupational Therapy

Downloaded From: http://ajot.aota.org/ on 11/16/2018 Terms of Use: http://AOTA.org/terms
or showering; bowel and bladder management; dressing, eating, and feeding; functional mobility; personal device care; personal hygiene and grooming; sexual activity; sleep or rest; and toilet hygiene (AOTA, 2002).

The data collection tool also included a place for recording the specific intervention strategy for each session as well as any adaptive equipment used in the session. The intervention strategy categories were those developed and reported by Latham et al. (2006) and Richards et al. (2005) and included adaptive and compensatory; cardiopulmonary; cognitive, perceptual, and sensory; musculoskeletal; neuromuscular; physical agent modality; and education and training interventions.

**Procedures**

After institutional review board approval, data collection was conducted from September to December 2006. Three graduate student investigators analyzed occupational therapy intervention notes to collect data regarding the type of intervention provided in each session, the intervention strategy, and the adaptive equipment used during each session. These investigators initially reviewed each chart and recorded the information on the data collection sheet. Subsequently, either Stacy Smallfield or Joy Karges reviewed each chart a second time to reduce the likelihood of error.

For sessions that contained a combination of two or more intervention types (e.g., when one intervention session contained both ADLs and prefunctional activities), record was made of each. All intervention strategies used in a session were recorded. When the type of strategy was not evident from the occupational therapy records, the session strategy was designated “not specified” on the data collection form. Finally, any adaptive equipment used during the intervention was also recorded.

**Data Analysis**

We used SPSS (version 14.0; SPSS, Inc., Chicago) in data analysis. We used descriptive statistics, specifically frequency statistics, to classify the occupational therapy intervention provided. These data included the frequency of the types of occupational therapy interventions, specific ADLs, and intervention strategies. We also calculated the frequency of the most commonly used pieces of adaptive equipment.

**Results**

A total of 205 charts were originally reviewed for this study. Of those, 80 charts met the inclusion and exclusion criteria and received a full review. Patients’ ages ranged from 36 to 85 years with a mean of 70.28 ± 11.35 years. All patients were White, and 51% were male. The results of their FIM scores were 71.90 ± 21.47 at admission and 92.23 ± 24.43 at discharge, which was statistically significant (t(79) = -12.163, p = .000). The mean length of stay on the inpatient rehabilitation unit was 15.19 ± 11.69 days. The sample consisted of 66 patients (82.50%) who had ischemic stroke and 14 patients (17.50%) who had hemorrhagic stroke. At discharge, 62.5% of the sample (n = 50) returned home, 27.5% (n = 22) were transferred to a nursing home, 3.75% (n = 3) transitioned to assisted living facilities, and 6.25% (n = 5) were discharged to other locations.

A total of 1,738 occupational therapy sessions were provided, with a mean of 21.73 sessions per client. Of the total sessions, 1,554 contained at least a portion of occupational therapy intervention, and the remaining sessions consisted only of occupational therapy evaluation. Table 1 shows the frequency of the types of occupational therapy intervention provided. When analyzing the type of intervention session provided, we found that 1,022 sessions (65.77%) consisted of activities that were prefunctional in nature. Comparatively, 750 of the 1,554 intervention sessions (48.26%) addressed ADLs. The remaining types of intervention occurred in <3% of total sessions.

When specifically analyzing the types of ADLs addressed during inpatient stroke rehabilitation, we found dressing skills to be the most common intervention. Dressing tasks were addressed in 532 of the 1,554 total intervention sessions (34.23%), functional mobility was a part of 363 sessions (23.36%), and grooming activities occurred in 359 (23.10%) sessions. Occupational therapists worked on other ADLs in <10% of total sessions. Refer to Table 2 for a complete listing of the frequency of sessions that contained ADLs.

In addition to classifying each type of intervention session, the intervention strategies used during each session were recorded, when available. When the intervention strategy used was not clear from the documentation, the intervention session was recorded as “intervention strategy not specified.” In 615 intervention sessions (39.58%), the intervention strategy was not specified. However, for the

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefunctional activity</td>
<td>65.77</td>
<td>1,022</td>
</tr>
<tr>
<td>ADLs</td>
<td>48.26</td>
<td>750</td>
</tr>
<tr>
<td>IADLs</td>
<td>2.83</td>
<td>44</td>
</tr>
<tr>
<td>Leisure participation</td>
<td>0.13</td>
<td>2</td>
</tr>
<tr>
<td>Social participation</td>
<td>0.00</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. ADLs = activities of daily living; IADLs = instrumental activities of daily living. Percentages for interventions are >100% and more than the total number of intervention sessions because more than one intervention type could occur in each intervention session.

July/August 2009, Volume 63, Number 4

410
remaining intervention sessions, musculoskeletal strategies were used in 812 sessions (52.25%); neuromuscular strategies were used in 309 sessions (19.88%); cognitive, perceptual, and sensory strategies were used in 285 sessions (18.34%); and adaptive or compensatory strategies were used in 180 sessions (11.58%). Table 3 lists the frequency of the various occupational therapy intervention strategies.

The use of adaptive equipment during intervention was also recorded to gain an understanding of the adaptive equipment most commonly used by the patients in the study. As indicated in Table 4, occupational therapy documentation noted that 29 of the 80 patients (36.25%) used grab bars; 25 (31.25%) used shower chairs, and 6 (7.50%) used toilet risers. Dressing equipment was not commonly used during therapy intervention; only 4 patients (5.00%) used a reacher, and only 3 patients (3.75%) used a sock aid, long shoehorn, or elastic shoelaces.

### Table 2. Type and Frequency of Activities of Daily Living (ADLS) Intervention

<table>
<thead>
<tr>
<th>ADL Intervention Type</th>
<th>Intervention Sessions (N = 1,554)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Dressing</td>
<td>34.23</td>
</tr>
<tr>
<td>Functional mobility</td>
<td>23.36</td>
</tr>
<tr>
<td>Grooming</td>
<td>23.10</td>
</tr>
<tr>
<td>Eating and feeding</td>
<td>4.25</td>
</tr>
<tr>
<td>Toilet hygiene</td>
<td>3.35</td>
</tr>
<tr>
<td>Bathing</td>
<td>2.38</td>
</tr>
<tr>
<td>ADL not specified</td>
<td>0.26</td>
</tr>
<tr>
<td>Bowel and bladder</td>
<td>0.06</td>
</tr>
<tr>
<td>Personal device care</td>
<td>0.06</td>
</tr>
</tbody>
</table>

**Note.** This table illustrates only the ADL interventions; the percentage of intervention sessions is <100% because each intervention session did not include ADLs.

### Table 4. Most Commonly Used Adaptive Equipment

<table>
<thead>
<tr>
<th>Type of Adaptive Equipment</th>
<th>Total Clients (N = 80)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Grab bars</td>
<td>36.25</td>
</tr>
<tr>
<td>Shower chair</td>
<td>31.25</td>
</tr>
<tr>
<td>Other piece of adaptive equipment</td>
<td>10.00</td>
</tr>
<tr>
<td>Toilet riser</td>
<td>7.50</td>
</tr>
<tr>
<td>Adaptive equipment used but not specified</td>
<td>6.25</td>
</tr>
<tr>
<td>Reacher</td>
<td>5.00</td>
</tr>
<tr>
<td>Sock aid</td>
<td>3.75</td>
</tr>
<tr>
<td>Long shoehorn</td>
<td>3.75</td>
</tr>
<tr>
<td>Elastic shoelaces</td>
<td>3.75</td>
</tr>
</tbody>
</table>

**Note.** Percentages of adaptive equipment are >100% and more than the total number of clients because each client could use more than one piece of adaptive equipment.

### Discussion

This study’s results indicate that prefunctional activities were used most frequently (65.77% of all sessions) for stroke rehabilitation. Prefunctional activities aim to improve body function and structure to prepare the client to participate in a more functional activity, but they rarely involve a meaningful component. Examples of prefunctional activities include range-of-motion exercises and the application of physical agent modalities. The results of this study are consistent with the research findings of Ballinger, Ashburn, Low, and Roderick (1999); Latham et al. (2006); and Richards et al. (2005), who reported that occupational therapists spend a large portion of therapy time addressing areas of physical function through impairment-focused activities. The philosophy of occupational therapy includes the premise that meaningful activity is essential to occupational therapy intervention because occupation is the power of intervention. If occupational therapists believe in the use of occupation-based activities, it is contradictory for them to use prefunctional activities more often than functional activities with this diagnostic group.

The findings presented here also indicate that therapists included ADLs in nearly half of all therapy sessions. These findings are also consistent with Latham et al. (2006) and Richards et al. (2005), who reported that occupational therapists address ADLs in about half of all intervention sessions. Unlike Latham et al., however, our findings suggest that inpatient stroke rehabilitation in this facility included many more sessions addressing basic ADLs than IADLs; Latham et al. found that 40.2% of therapy time was spent addressing daily life activities, but only 28.1% of the time was spent on basic ADLs. Although Latham et al. found that dressing
was one of the most frequently used activities, their findings indicated that it made up 14.2% of the total treatment time compared with the more than 34% of the sessions in this study. Our results also contradict those of Ballinger et al. (1999) that occupational therapists spend a relatively small amount of time addressing ADLs. Differences in the severity of stroke among the various study populations may be one explanation for the slight variations in the frequency of sessions addressing ADLs. Because mastery of basic ADLs is essential for completion of other life tasks, it is logical that a significant portion of therapy is spent addressing these life tasks. Basic ADLs make up a very small percentage of all daily life tasks; therefore, concentrating specifically on this area of occupation diminishes the importance of other, perhaps more meaningful occupations.

Musculoskeletal interventions were used in 52.25% of therapy sessions, whereas neuromuscular interventions were implemented in 19.88% of sessions. This finding is contradictory to those reported by Latham et al. (2006) and is interesting in light of the fact that stroke involves the neuromuscular system rather than solely the musculoskeletal system. Because of the study’s retrospective nature, 39.58% of sessions did not include documentation of the intervention strategy used. It is difficult to ascertain whether the unspecified intervention sessions would be consistent across all intervention strategies or would be weighted toward neuromuscular strategies, creating a more even distribution of strategy types. Future prospective research of provided intervention strategies may clarify this finding.

According to this chart review, only 0.13% of occupational therapy sessions included leisure activities, and no sessions included social activities. Although this finding is unfortunate, one possible explanation is that documentation focused more on physical activities, which tend to be more objective or procedural in nature than the socioemotional aspects of therapy, which may not be as readily reimbursable by third-party payers or considered to be a valuable component of intervention. Thus, social and leisure activities may occur “underground” (Fleming, 1991, p. 1010). Additionally, in this particular facility, recreational therapists are part of the rehabilitation team and may, therefore, be more responsible for social and leisure activities than are occupational therapists.

Cognitive, perceptual, and sensory intervention strategies occurred in 18.34% of all therapy sessions. This percentage is smaller than the percentage of total sessions indicated in previous literature (Latham et al., 2006). Again, however, this finding may relate to the overlapping nature of this area of intervention with that of other professionals. Speech–language pathologists also frequently address cognition, which may be one reason why occupational therapists did not address cognitive components more frequently.

Our findings indicate that occupational therapists use prefunctional activities that aim to improve performance skills and body structures more often than occupation-based activities that incorporate meaningful activities into therapy sessions. Past research, however, has shown that client-centered, goal-directed therapy increases motivation and participation (Ma & Trombly, 2002; Trombly & Ma, 2002). This increase in motivation may lead to an increase in the client’s activity participation and ultimately to a better outcome than impairment-focused treatments (Trombly, 1995). Although the patients in this chart review demonstrated significant improvement in function as measured by the FIM, it is unclear whether these results could have been better if the total occupational therapy sessions provided had included more occupation-based interventions.

Limitations and Future Directions
Several limitations may have influenced this study’s results. The data presented here were collected from one facility, which limits their generalizability to other settings. Therefore, one cannot assume that all inpatient facilities primarily use prefunctional activities in occupational therapy intervention for inpatient stroke rehabilitation. Future research should focus on multicenter, prospective studies rather than on observational, retrospective analysis. Second, many intervention sessions lacked enough documentation to specify the intervention strategies used. Future studies including training of therapists in completing a data collection tool made up of standardized intervention definitions, such as that presented by Bürger et al. (2008), would eliminate this gap in data collection. Third, interventions may have been provided but not clearly documented because they occurred concurrently with other aspects of intervention (e.g., the development of therapeutic rapport). Again, prospective studies may increase the ability to capture such intervention strategies. Finally, addressing interventions used by other disciplines may have provided us with more conclusive results regarding the interventions that were not frequently used by occupational therapists and should therefore be included in future research efforts.

Summary
In conclusion, the patients in this study received occupational therapy intervention that used slightly more preparatory activities than occupation-based activity. Implementing interventions that target impairments in body structure and
function can lead to improvements in component performance; however, occupational therapy was founded on the use of occupations to promote optimal participation in daily life. Therefore, it is important that future research examine the effectiveness of inpatient stroke rehabilitation interventions to verify that treatment strategies provide clients with the maximum benefit for return to daily life poststroke.

Acknowledgments
We acknowledge Amy Kuenzi, Amber Hauschildt, and Kimberly Van Loan, graduate students in occupational therapy at the time of this study, for their contributions to this work. Additionally, we thank the facility for allowing us to conduct this research. This article was presented on April 10, 2008, at AOTA’s 88th Annual Conference & Expo, Long Beach, CA.

References