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# Occupational Therapy Outcomes for Clients With Traumatic Brain Injury and Stroke Using the Canadian Occupational Performance Measure

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## KEY WORDS

- Canadian Occupational Performance Measure (COPM)
- home management
- outcomes
- self-care
- stroke
- traumatic brain injury (TBI)

The purpose of this study was to determine whether 155 ethnically diverse clients with traumatic brain injury (TBI) and stroke (cerebrovascular accident; CVA) who received occupational therapy services perceived that they reached self-identified goals related to tasks of daily life as measured by the Canadian Occupational Performance Measure (COPM).

This study found that a statistically and clinically significant change in self-perceived performance and satisfaction with tasks of daily life occurred at the end of a client-centered occupational therapy program ( $p < .001$ ). There were no significant differences in performance and satisfaction between the TBI and CVA groups. However, the group with right CVA reported a higher level of satisfaction with performance in daily activities than the group with left CVA ( $p = .03$ ).

The COPM process can effectively assist clients with neurological impairments in identifying meaningful occupational performance goals. The occupational therapist also can use the COPM to design occupation-based and client-centered intervention programs and measure occupational therapy outcomes.

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The use of client-identified occupational performance goals to guide occupational therapy treatment and to measure clinical outcomes is receiving increased attention in the occupational therapy literature (Baum & Law, 1997; Law et al., 2005). Client-centered intervention, consisting of client-identified goals and a collaborative relationship between the therapist and the client, is compatible with the core occupational therapy domain and process (American Occupational Therapy Association, 2002; Maitra & Erway, 2006; McColl et al., 2003). The Canadian Association of Occupational Therapists defines *client-centered occupational therapy* as all “collaborative approaches aimed at enabling occupation with clients. Occupational therapists demonstrate respect for clients, involve clients in decision making, advocate with and for clients in meeting clients’ needs, and otherwise recognize clients’ experience and knowledge” (Law, 1998, p. 3).

Within the neurorehabilitation context, outcomes typically have been measured by objective performance-based assessments, and client input into the assessment and goal-setting process has been limited owing to the challenge of providing client-centered care to clients with cognitive and psychosocial impairments (Burleigh, Farber, & Gillard, 1998; Wilkins, Pollock, Rochon, & Law, 2001). However, attention to client priorities and needs in goal setting and intervention can lead to greater engagement and motivation on the part of the client and improve client satisfaction and intervention outcomes (Guidetti & Tham, 2002;

Law et al., 2005; Radomski, 2000; Rosa & Hasselkus, 2005; Sumsion & Smyth, 2000). The importance of establishing client-identified goals also is highlighted in the accreditation criteria for the Joint Commission on Accreditation of Healthcare Organizations (1991) and the Commission on Accreditation of Rehabilitation Facilities (2006).

Several studies have demonstrated that a client-centered goal-setting process can result in increases in both perceived performance efficacy and client satisfaction in the neurorehabilitation context (Bodiam, 1999; Chen, Rodger, & Polatajko, 2002; Gagne & Hoppes, 2003; Jansa, Sicherl, Angleitner, & Law, 2004; Melville, Baltic, Bettcher, & Nelson, 2002; Trombly, Radomski, & Davis, 1998; Trombly, Radomski, Trexel, & Burnett-Smith, 2002; Wressle, Eeg-Olofsson, Marcusson, & Henriksson, 2002; Wressle, Lindstrand, Neher, Marcusson, & Henriksson, 2003). The current study looks at a larger, more ethnically diverse group of clients to determine whether a client-centered goal-setting approach was related to improved outcomes in client performance and satisfaction.

This study sought to determine whether people with traumatic brain injury (TBI) and cerebrovascular accident (CVA) who received outpatient occupational therapy reported increased levels of performance and satisfaction with daily life activities as measured by the Canadian Occupational Performance Measure (COPM; Law et al., 2005). TBI and right CVA have been associated more with impairments in self-awareness and insight than left CVA (Arnadottir, 1990; Fleming & Strong, 1999). Therefore, another objective of this study was to determine differences in performance and satisfaction between clients with TBI, right CVA, and left CVA. In addition, the study investigated how frequently client-identified goals in the occupational performance areas of self-care, home management, community reintegration, vocational skills, academic skills, leisure skills, functional mobility, and written communication were specifically addressed in the occupational therapy program.

## Method

This retrospective study included 155 adult participants between ages 19 and 82 years who received outpatient occupational therapy services at a large, urban rehabilitation facility. Thirty-eight participants had received a neurological diagnosis of TBI and 117 participants had a diagnosis of CVA, with 53 having a right CVA and 64 a left CVA. Demographic characteristics of the sample are presented in Table 1.

Data collection focused on clients who successfully participated in the process of identifying and scoring self-

**Table 1. Demographic Characteristics of the Participants**

Demographic Characteristics	TBI ( <i>n</i> = 38)	Right CVA ( <i>n</i> = 53)	Left CVA ( <i>n</i> = 64)	Total ( <i>N</i> = 155)
Age, Mean ( <i>SD</i> )	33.1 (2.0)	52.3 (2.0)	52.4 (1.2)	47.6 (1.2)
Range, in Years	19.0–68.0	22.0–82.0	21.0–71.0	19.0–82.0
	%	%	%	%
Gender				
Men	84.2	47.2	59.4	61.3
Women	15.8	52.8	40.6	38.7
Ethnicity				
Latino	57.9	45.3	46.9	49.0
Black	21.1	24.5	26.6	24.6
White	15.7	15.1	12.5	14.2
Asian	5.3	13.2	10.9	10.3
Middle Eastern	0.0	1.9	3.1	1.9
Primary Language				
English	84.2	69.8	63.5	70.8
Spanish	15.8	26.4	33.2	26.6
Other	0.0	3.8	3.3	2.6
Translator Required To Complete COPM	13.2	9.8	10.3	10.0
Vocational Status*				
Employed	63.9	40.4	50.9	50.7
Student	11.1	0.0	1.8	3.6
Retired	2.8	21.3	12.8	13.0
Homemaker	0.0	10.6	18.2	10.9
Unemployed	19.4	21.3	12.7	17.4
Other	2.8	6.4	3.6	4.4

\*Before onset of disability.

Note. TBI = traumatic brain injury; CVA = cerebrovascular accident; COPM = Canadian Occupational Performance Measure (Law et al., 2005).

identified goals using the COPM. Clients who were not able to participate in the COPM process because of severe cognitive, language, or psychological impairments were excluded from the study. This study received approval from the institutional review boards of San Jose State University and from the rehabilitation facility.

## Instrumentation

The COPM (Law et al., 2005) is based on a client-centered approach for the purpose of establishing treatment goals and assessing changes in perceived performance and satisfaction with occupational performance over time (Pollock, 1993). The COPM has demonstrated acceptable test–retest and interrater reliability (Bosch, 1995; Cup, Scholte op Reimer, Thijssen, & van Kuyk-Minis, 2003; Sanford, Law, Swanson, & Guyatt, 1994) and also has demonstrated acceptable content, criterion, and construct validity (Cup et al., 2003; McColl, Paterson, Davies, Doubt, & Law, 1999). Several studies demonstrating the efficacy of occupational therapy in improving occupational performance for clients with physical and cognitive disabilities have used the COPM as both a measure of change in performance and satisfaction and a client-centered process of obtaining meaningful goals related to activities of daily living (ADLs), instrumental ADLs, work, education, leisure, and play occupations (Bodiam, 1999; Chen et al., 2002; Jansa et al.,

2004; Trombly et al., 1998; Trombly et al., 2002; Wressle et al., 2002; Wressle et al., 2003). These studies used client-identified goals to guide occupational therapy intervention based on the specific needs of the clients. Therefore, each occupational therapy program was unique and based on the goals identified by the client and the family rather than the therapist. The COPM is a practical assessment that can be incorporated into the initial evaluation and improves efficiencies throughout the treatment program for the therapist by focusing on the client's primary goals.

### Setting

The data were collected in an outpatient occupational therapy clinic at a freestanding rehabilitation center in Los Angeles County. This county facility serves an ethnically diverse population with complex socioeconomic conditions and with a variety of neurological and orthopedic diagnoses. The largest diagnostic groups seen are clients with stroke and brain injury.

Most clients received two 45- to 90-min sessions of outpatient occupational therapy per week for 4–12 weeks. The duration and frequency of occupational therapy treatment was determined based on the client's individualized goals, developed using the COPM, and the severity of their physical and cognitive disability. Many clients also received outpatient services from other rehabilitation disciplines, including physical therapy and speech therapy. The mean time from onset of disability to outpatient occupational therapy admission was 9.2 months for the study sample. The mean number of days from admission to outpatient occupational therapy discharge was 108 days for the study sample. Table 2 shows the average number of months from onset of disability to admission to outpatient occupational therapy and the average number of days that participants were treated in outpatient occupational therapy from admission to discharge, with ranges in time for the study population. Some study participants were placed on a waiting list for up to 2 months after their initial evaluation, so time from admission to discharge does not always represent total duration of treatment.

The outpatient occupational therapy program examined in this study focused on restoring functional abilities in occupational performance areas. The occupational ther-

apy program was based on the treatment goals each client identified using the COPM (Law et al., 2005). Each program was uniquely focused on those occupations that the client identified as higher in importance and lower in performance and satisfaction. Various intervention approaches were used, including functional training in self-care, home management, community reintegration, vocational skills, academic skills, and leisure skills. Clients were treated in the clinic, in a home-like environment adjacent to the clinic, or in the community. After discharge, many clients were referred to driving programs, vocational programs, community college programs, and community support groups.

### Procedures

The first author retrospectively analyzed all the COPM data by chart review method. Data from March 1998 through October 2002 were reviewed and analyzed. Five registered occupational therapists worked in the outpatient occupational therapy clinic during this time. The therapists, each with more than 3 years of clinical experience, had received extensive training on the administration of the COPM and had been assessed for competency on the COPM by clinical specialists before initiating use of the COPM as a clinical assessment. The staff of the occupational therapy department also had obtained permission of the test authors to modify the three-page COPM form to a one-page form for greater ease of completion before initiating its use.

The COPM was administered to participants at the initiation of the outpatient occupational therapy program and again at discharge. The data collection included a semistructured interview in which clients were asked to describe a typical day in order to document their daily routines and participation in occupations before the onset of disability and after the onset of disability. The participants then identified occupational performance problems in the areas of self-care, productivity, and leisure and rated the importance of each activity on a scale of 1 (*low level of importance*) to 10 (*high level of importance*). Each client identified and prioritized the specific activities he or she wanted or needed to work on in the outpatient occupational therapy program, based on the occupational performance goals identified as important on the COPM. Participants then rated their performance and satisfaction with

**Table 2. Treatment Timelines for the Study Participants**

Neurological Diagnosis	Time From Onset to Admission, in Months		Range in Months	Time From Admission to Discharge, in Days		Range in Days
	<i>M</i>	( <i>SD</i> )		<i>M</i>	( <i>SD</i> )	
TBI ( <i>n</i> = 38)	20.82	(34.11)	1.5–134	141.26	(85.10)	14–345
Right CVA ( <i>n</i> = 53)	5.83	(6.69)	1.0–36.5	97.45	(72.99)	10–356
Left CVA ( <i>n</i> = 64)	4.51	(4.40)	1.0–26	96.47	(65.97)	4.5–295

*Note.* TBI = traumatic brain injury; CVA = cerebrovascular accident.

each activity using a scale of 1 (*lowest*) to 10 (*highest*). If the client did not speak English, a translator was used. If the client was unable to identify activities or to rate importance, performance, or satisfaction, a family member or significant other did so.

The mean time to administer the COPM at admission was 26 min. Eighty-eight percent of the study participants completed the COPM interview and assessment process during one treatment session, and 12% completed the process during two treatment sessions.

At discharge, the therapist documented the discharge importance, performance, and satisfaction scores from the client using the COPM. If a translator or family member was used to obtain COPM data on admission, this also was done at discharge. The occupational therapist also documented each goal that was directly addressed in the client's intervention program on the data collection form. Only occupational performance goals that were identified on the COPM, included in the intervention plan, directly addressed in the intervention program, and reassessed at discharge using the COPM were included in the data analysis.

### Data Analysis

To prepare the data for analysis, each goal identified on the COPM was coded under a category that best represented the occupational performance area it addressed. The COPM categorizes three general areas of occupation: self-care, productivity, and leisure (Law et al., 2005). For this study, these three categories were expanded to seven: self-care, home management, community reintegration, vocational skills, academic skills, leisure skills, and functional mobility. These exclusive categories were more descriptive for the types of occupational performance goals identified by this sample. In addition, a category titled *written communication* was created that included goals related to handwriting, typewriting, and computer skills.

The Statistical Package for the Social Sciences (SPSS), Version 10.0, was used for data analysis. The significance level was set at  $\alpha = .05$  for all analyses, reflecting conven-

tional statistical procedures. Descriptive statistics were used to summarize demographic information and to calculate the overall change in performance and satisfaction from admission to discharge.

The paired samples *t*-test statistic was used to analyze the change in client-rated scores for performance and satisfaction from admission to discharge. One-way analysis of variance was used to determine whether there were differences in scores for performance and satisfaction on the COPM between the groups with TBI and stroke. A Tukey post hoc analysis was conducted to identify sources of differences between diagnostic groups.

### Results

The mean number of occupational performance goals identified using the COPM was 5.82, with a range of 1.00–14.00. A total of 901 occupational performance goals were analyzed. Table 3 describes the frequency and overall percentages of each occupational performance area identified on the COPM and addressed in the outpatient occupational therapy program.

There was a mean change in performance from admission to discharge of 3.29 points ( $SD = .17$ ) and a mean change in satisfaction from admission to discharge of 3.53 points ( $SD = .19$ ) across all diagnostic groups. Previous studies show that a change of 2 or more points on the COPM usually represents at least .75 of a standard deviation, which is considered a moderate-to-large change and a clinically important difference as judged by clients and families (Law et al., 1994; Sanford et al., 1994). In this study, all change scores for performance and satisfaction for the overall sample and within each diagnostic group were well above 2 points, ranging from 2.85 to 4.07 points.

Table 4 and Table 5 summarize the differences between the mean scores for performance and satisfaction on the COPM at admission and discharge. There was a significant difference ( $p < .001$  for all groups) between pre- and post-intervention scores for the entire sample and for each diagnostic group.

**Table 3. Frequency of Occupational Performance Goals Identified and Addressed**

Goals	TBI ( <i>n</i> = 38)		Right CVA ( <i>n</i> = 53)		Left CVA ( <i>n</i> = 64)		Total ( <i>N</i> = 155)	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
Self-care	99	(44.40)	107	(35.55)	129	(34.22)	335	(37.18)
Home management	31	(13.90)	125	(41.53)	143	(37.93)	299	(33.19)
Leisure skills	26	(11.66)	16	(5.32)	27	(7.16)	69	(7.66)
Functional mobility	9	(4.04)	28	(9.30)	32	(8.49)	69	(7.66)
Written communication	20	(8.97)	6	(1.99)	24	(6.37)	50	(5.55)
Community reintegration	17	(7.62)	6	(1.99)	11	(2.92)	34	(3.77)
Vocational skills	16	(7.17)	12	(3.99)	11	(2.92)	39	(4.33)
Academic skills	5	(2.24)	1	(.33)	0	(0)	6	(0.66)
Total	223	(24.75)	301	(33.41)	377	(41.84)	901	(100)

Note. TBI = traumatic brain injury; CVA = cerebrovascular accident.

**Table 4. Change in Performance Ratings From Admission to Discharge**

Neurological Diagnosis	Mean	SD	t	df	p
TBI (n = 38)	3.45	1.97	10.78	37.00	.00*
Right CVA (n = 53)	3.71	2.12	12.75	52.00	.00*
Left CVA (n = 64)	2.85	2.14	10.62	63.00	.00*
Total (N = 155)	3.29	2.12	19.35	154.00	.00*

\* = significant difference ( $\alpha = .05$ ).

Note. TBI = traumatic brain injury; CVA = cerebrovascular accident.

There was no significant difference between the pre- and post-intervention scores for performance between each of the diagnostic groups ( $p = .08$ ). However, there was a significant difference between the pre- and post-intervention scores for satisfaction between the right CVA group and the left CVA group ( $p = .03$ ). Overall, the right CVA group reported a greater increase in satisfaction from admission to discharge than the left CVA group.

## Discussion

All diagnostic groups identified the greatest number of goals in the occupational performance areas of self-care and home management. There were clear differences in the types of occupational performance goals identified and addressed for the group with TBI and the group with CVA. The group with CVA identified a higher frequency of home management and functional mobility goals than the group with TBI. The group with CVA had a higher percentage of older participants who were retired from employment or who were homemakers. Their goals were more centered on managing their home environments because the home was the primary context for their occupational performance. The group with TBI identified a higher frequency of goals related to leisure, community reintegration, vocational skills, academic skills, and written communication skills. The group with TBI, approximately 20 years younger and with a higher percentage of students than the group with CVA, reflected the primary occupational roles of worker, student, and player.

The group with left CVA identified a higher percentage of written communication goals than the group with right CVA. This finding may be related to the receptive and expressive language impairments commonly found with cerebral insults to the left hemisphere of the brain, as well as to problems with functional use of the dominant right extremity as a result of left-hemisphere brain damage.

For the overall sample, there was a significant increase in self-perceived performance and satisfaction with the occupational performance goals identified by the participants. In addition, each diagnostic group showed signifi-

**Table 5. Change in Satisfaction Ratings From Admission to Discharge**

Neurological Diagnosis	Mean	SD	t	df	p
TBI (n = 38)	3.68	1.99	11.36	37.00	.00*
Right CVA (n = 53)	4.07	2.41	12.32	52.00	.00*
Left CVA (n = 64)	3.00	2.31	10.37	63.00	.00*
Total (N = 155)	3.53	2.31	19.05	154.00	.00*

\* = significant difference ( $\alpha = .05$ ).

Note. TBI = traumatic brain injury; CVA = cerebrovascular accident.

cant increases in performance and satisfaction. These results are similar to previous studies investigating outpatient occupational therapy outcomes for clients with brain injury, although the participants in the present study demonstrated more significant changes in performance and satisfaction scores (Trombly et al., 1998, 2002). This study also had a larger and more ethnically diverse number of participants than previous studies.

Spontaneous recovery is an unlikely explanation for the changes in self-perceived performance and satisfaction for the TBI group because the average time from onset to admission to outpatient occupational therapy was 20.82 months ( $SD = 34.11$ ). However, the right CVA and left CVA groups were seen at 5.83 months ( $SD = 6.69$ ) and 4.51 months ( $SD = 4.40$ ), respectively, which falls into the spontaneous recovery period.

There were no significant differences between the TBI, right CVA, and left CVA groups for performance change scores. Because of the small sample size within each group, the study also may have been underpowered to detect this subgroup difference.

However, there was a significant difference between the right CVA and left CVA groups for change in satisfaction. The right CVA group reported a higher level of satisfaction than the left CVA group after treatment. One explanation for this difference may be related to self-awareness. Right CVA has been associated more with impairments in self-awareness and insight than has left CVA (Arnadottir, 1990). Significant impairments with self-awareness have been associated with TBI, but this study did not show any significant differences in performance or satisfaction between the TBI and CVA groups (Fleming & Strong, 1999). Left CVA also has been more associated with depression than right CVA, which may explain why the left CVA group reported lower levels of satisfaction with their occupational performance than the right CVA group (Arnadottir, 1990).

## Limitations

Because this study used a retrospective descriptive methodology and consisted of patients from a specific geographical location who had diverse ethnic and cultural backgrounds,

the ability to generalize the results or assign causality to the outcomes is limited. There were no controls for spontaneous recovery, premorbid characteristics, nature and locus of brain damage, occupational therapy treatment protocol, time from original onset to evaluation, duration and frequency of treatment, concurrent services from other disciplines, and whether the evaluator held a potential bias of assisting the client in identifying goals the therapist believed easier to achieve. This study also did not have a control group, a wide range of interventions was provided, and the interrater reliability of the five evaluators was not assessed. In addition, the study did not include goals that were identified but not directly addressed in outpatient occupational therapy.

### Suggestions for Future Research

Future studies should examine the use of the COPM with populations who have had TBI and stroke using a controlled, randomized, multisite methodology with a large sample size. In addition, current cognitive level should be objectively assessed. The effect of family and therapist involvement in the goal-setting process also should be evaluated. Additionally, future studies should analyze the occupational performance goals not directly addressed in treatment to assess whether differences exist in performance and satisfaction between goals that are directly addressed and those not addressed in treatment. Future studies should compare the outcomes for each occupational performance area to determine whether differences in performance and satisfaction exist between occupational performance categories. Longitudinal data also should be gathered to study whether gains in self-perceived performance and satisfaction are maintained after discharge.

This study demonstrated significant improvements in client perceptions of performance and satisfaction after an outpatient occupational therapy program that used a client-centered and occupation-based approach with an ethnically diverse sample in a large, urban rehabilitation facility. The COPM process can effectively assist clients with neurological impairments in identifying meaningful occupational performance goals. The occupational therapist also can use the COPM to design occupation-based and client-centered intervention programs and measure occupational therapy outcomes. ▲

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