Factors Associated With Success in an Occupational Rehabilitation Program for Work-Related Musculoskeletal Disorders

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Work-related musculoskeletal disorders are a significant burden; however, no consensus has been reached on how to maximize occupational rehabilitation programs for people with these disorders, and the impact of simulating work tasks as a mode of intervention has not been well examined. In this retrospective cohort study, the authors used logistic regression to identify client and program factors predicting success for 95 clients in a general occupational rehabilitation program and 71 clients in a comprehensive occupational rehabilitation program. The final predictive model for general rehabilitation included gender, number of sessions completed, and performance of work simulation activities. Maximum hours per session was the only significant predictor of success in the comprehensive rehabilitation program. This study identifies new factors associated with success in occupational rehabilitation, specifically highlighting the importance of intensity (i.e., session length and number of sessions) of therapy and occupation-based activities for this population.

Hardison, M. E., & Roll, S. C. (2017). Factors associated with success in an occupational rehabilitation program for work-related musculoskeletal disorders. *American Journal of Occupational Therapy*, 71, 7101190040. <https://doi.org/10.5014/ajot.2016.023200>

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Work-related musculoskeletal disorders (WRMSDs) affect more than 365,000 workers in the United States every year, leading to a median of 13 days of lost work time, primarily for professionals in health care and social assistance, manufacturing, and retail trade occupations (U.S. Bureau of Labor Statistics, 2015). Average medical costs per lost-time claim have been approximated at \$29,400 (Antonello, 2015), leading individual state workers' compensation programs to spend upward of \$3 billion/yr for musculoskeletal injuries to the hand and wrist, shoulder, cervical spine, lumbar spine, and knee (Davis, Dunning, Jewell, & Lockey, 2014). Although the societal burden is substantial, WRMSDs can also lead to great personal financial burden and can disrupt family life (Boden, 2005). The negative consequences of WRMSDs are especially salient for clients who plateau in their focused outpatient care but have residual physical or medical problems or other limitations in being able to return to work. These people experience significant delays in returning to work, sometimes years, and are typically referred to occupational rehabilitation programs for additional treatment.

Occupational rehabilitation programs are postacute, comprehensive therapy interventions that have as goals improving physical capacities, enhancing client safety, and addressing psychological outcomes for people with work-related injuries so that they can tolerate a return to gainful employment (Commission on Accreditation of Rehabilitation Facilities [CARF] International, 2016). Occupational rehabilitation programs provide therapy to increase overall tolerances for work tasks and involve a multimodal or multidisciplinary approach or both (Łukaszczik et al., 2011). Patients are primarily referred for treatment of a physical injury (Poiraudau, Rannou, & Revel, 2007); however, occupational rehabilitation programs also contribute to positive improvement in psychosocial factors and quality of life (Bethge, Herbold,

Trowitzsch, & Jacobi, 2011; Niemeyer, Jacobs, Reynolds-Lynch, Bettencourt, & Lang, 1994; Tschernetzki-Neilson, Brintnell, Haws, & Graham, 2007). Unfortunately, evidence for the use of occupational rehabilitation programs to promote return to work for clients with WRMSDs is mixed (Meijer, Sluiter, & Frings-Dresen, 2005).

Multiple studies have sought to identify the client and program qualities that improve return-to-work outcomes in occupational rehabilitation programs. Several key factors have emerged, including severity of symptomatology, type of injury, length of time since injury, age and gender, and physical demands of the job (Beissner, Saunders, & McManis, 1996; Kenny, 2000; Lydell, Grahn, Månsson, Baigi, & Marklund, 2009; Niemeyer et al., 1994; Sjöström, Asplund, & Alricsson, 2010). Because of the complex nature of work-related injuries, confounding historical factors (e.g., the job market), variability of treatment protocols across studies, heterogeneity in the intervention populations, and small study samples, there is little consensus regarding the level to which these factors are associated with positive outcomes in occupational rehabilitation (Tschernetzki-Neilson et al., 2007). The importance of occupations and activities as a therapy intervention (American Occupational Therapy Association [AOTA], 2014) for people with WRMSDs has been reported (Marois & Durand, 2009; Muenchberger, Kendall, Grimbeek, & Gee, 2008). However, the contribution of occupation-based interventions—specifically, simulated work tasks—in occupational rehabilitation programs has not been well evaluated.

In this article, we describe a retrospective analysis of 9 consecutive years of outcome data gathered from a CARF-accredited facility providing occupational rehabilitation. The aim of this analysis was to explore client and program factors related to success in both general occupational rehabilitation and comprehensive occupational rehabilitation programs. In addition to evaluating predictors identified in previous literature, we assessed the contribution of occupations and activities intervention strategies provided through simulated work tasks (AOTA, 2014). The two research questions were (1) whether a set of client factors previously reported in the literature would significantly predict successful program outcome and (2) whether the presence of interventions in the area of occupations and activities via simulated work tasks would be associated with successful outcomes.

Method

Design and Participants

This retrospective cohort study was conducted with data obtained from clients who had received either general or

comprehensive occupational rehabilitation at a CARF-accredited outpatient facility in the midwestern United States. Data were gathered for all clients consecutively referred to the facility between 2003 and 2011. For clients who had multiple referrals to the program within this timeframe, only data from the first episode of care were used. All clients had a WRMSD in one or more body regions and no longer required targeted occupational or physical therapy, but they were unable to tolerate returning to work. A state-funded workers' compensation system provided payment for all services, and the majority of clients received rehabilitation as part of a comprehensive vocational rehabilitation plan. Analysis of the deidentified dataset was deemed exempt by the university's institutional review board.

Occupational Rehabilitation Programs

The clinic provided both general and comprehensive occupational rehabilitation programs (i.e., work conditioning and work hardening, respectively). The general occupational rehabilitation program was primarily provided by one discipline (e.g., occupational therapy) with a goal of improving general physical tolerance and endurance necessary for a client to be successful in returning to part-time work, that is, up to 20 hr/wk. In contrast, the comprehensive occupational rehabilitation program was an individually tailored program provided to clients with complex cases who required interdisciplinary care (e.g., occupational therapy, physical therapy, psychology, dietetics, nursing) and individualized, intensive rehabilitation to improve tolerance for returning to full-time work at 40 hr/week. Both programs were directed by the same occupational therapist across the 9-yr data collection timeframe. The general program was initiated at a minimum session duration of 2 hr, 3 days/week, and progressed to a maximum of 4–5 hr, 5 days/week, as tolerated, whereas participants in the comprehensive program were typically initiated at a higher duration and frequency with a goal of progressing to a maximum of 8 hr, 5 days/week.

Both programs included five core components: (1) a progressive whole-body flexibility routine, (2) cardiovascular endurance training, (3) strengthening exercises, (4) core-stability exercises, and (5) general work simulation (i.e., occupation-based activities). Although core components were similar across both programs, activities were either general or tailored depending on the goals of the program. The number of activities, as well as the duration, repetition, and frequency of activities within each component, were regularly progressed on the basis of each client's abilities. In addition to the core components, clients in the comprehensive program received counseling

with a psychologist, participated in hour-long educational seminars (e.g., stress management, comprehensive body mechanics training), and received consultations with other team members as indicated (e.g., dietary consultation, medication management). A detailed description and comparison of each program is provided in Table 1.

Primary Outcome

Return to work is the gold-standard outcome for the rehabilitation of work-related injuries; however, it was common for clients referred to this facility to have been off work for numerous months, even years, resulting in no immediate return-to-work option. Therefore, the primary outcome for this study decoupled actual return to work from adequate improvements in physical capacities marking preparedness for gainful employment. As such, the primary outcome of *success* was determined when, at discharge, clients met one or more of the following three criteria: (1) returned to work at any job, (2) were cleared by a physician to return to work and initiated a job search process, or (3) progressed to additional services within a vocational rehabilitation plan meant to support obtaining

employment (e.g., vocational counseling, specialized technical training). A client was considered *unsuccessful* if any of the following three conditions existed: (1) The client had increased medical needs that required a higher level of care; (2) the client elected for early retirement or dropped out of or failed to complete the program; or (3) the client was unable to tolerate sustained activities required for part-time work.

Predictor Variables

We reviewed all measurements available in the dataset. Independent variables were selected for analysis on the basis of factors identified in previously published literature and our own clinical expertise. Seven client factors were identified: (1) age, (2) gender, (3) marital status, (4) labor type, (5) number of diagnoses, (6) length of time since last worked, and (7) pain with activity at time of admission.

Labor type was coded as skilled if postsecondary training or specialized certification was required (e.g., physician, accountant, police officer, electrician) or unskilled if the occupation required no specialized training (e.g., fast food, factory work, garbage collector, mail carrier). Number

Table 1. Comparison of Characteristics and Components of the Two Occupational Rehabilitation Programs

Characteristic or Component	General Occupational Rehabilitation	Comprehensive Occupational Rehabilitation
Professionals	Occupational therapist, occupational therapy assistant	Occupational therapist, occupational therapy assistant, physical therapist, psychologist, dietitian, nurse, case manager
Initial intensity	3×/wk 2 hr/session	3–5×/wk 2–4 hr/session
Maximum intensity	5×/wk 4–5 hr/session	5×/wk 8 hr/session
Maximum length	6 wk	No maximum
Flexibility routine ^a	Whole-body stretching (30–45 min) and injury-site-specific flexibility (15 min)	Whole-body stretching (30–45 min) and injury-site-specific flexibility (15 min)
Cardiovascular endurance	10 min progressing to 20 min each of <ul style="list-style-type: none">Treadmill walking on level surfaceRecumbent bike at low resistanceUpper-body ergometer at low resistance.	15 min progressing to 20 min each of <ul style="list-style-type: none">Treadmill walking on an incline and progressive programRecumbent bike at moderate resistanceUpper-body ergometer at moderate resistanceStair climber and outdoor walking.
Strengthening	Low weight at moderate repetition for <ul style="list-style-type: none">Lower-extremity strengthening using pulley weight machinesUpper-extremity strengthening using free weights.	<ul style="list-style-type: none">Lower-extremity strengthening using pulley weight machines at low weight, high sets/repetitionsUpper-extremity progressive resistive exercise routine with free weights
Core stability	<ul style="list-style-type: none">Scapular stability exercises using exercise tubingSpinal stabilization exercises (e.g., straight-leg raises)	<ul style="list-style-type: none">Scapular stability exercises using exercise tubingSpinal stabilization exercises (e.g., straight-leg raises)Rebounder ball toss, balance board, and other stability exercises
Work simulation	30–60 min of general work-related tasks, including <ul style="list-style-type: none">Lifting and carrying with standard lifting boxPushing and pulling using a weighted sled or rolling cartStanding tolerance with upper-extremity tasks (Valpar 9).	General work-related tasks as necessary to establish tolerance and job-specific task circuits based on essential job functions, progressed weekly up to 6–7 total hours per session
Other activities	N/A	<ul style="list-style-type: none">Psychology consultation with weekly follow-upEducation classes (weekly to every other week)Consultations, as indicated, with dietitian, nurse, or physician

Note. N/A = not applicable.
^aThe flexibility routine was always completed at each session across both programs, whereas other program components were incorporated as tolerated, removed as time dedicated to work simulation progressed in the comprehensive program, or both.

of diagnoses was calculated as the count of individual *International Classification of Diseases* (9th ed.; World Health Organization, 1979) codes identified on the initial evaluation as part of the client's workers' compensation claim. Many clients had returned to work since their date of injury; therefore, time since injury was not used because it was not necessarily representative of the amount of time elapsed since the most recent exacerbation that led to referral to the program. Instead, length of time since last worked was deemed more relevant and was calculated in weeks from the most recent date that lost time from work began to the date of admission into the program. Similarly, use of a client's rating of current pain could misrepresent the severity of pain experienced when performing tasks that would be required to tolerate gainful employment. Therefore, the client's report at time of admission of the worst pain experienced within the past month on a scale ranging from 0 to 10 was selected to represent pain with activity. Pain data were tested for normality and, being normally distributed, were entered into the analysis as continuous data.

In addition to client factors, three program factors were included: (1) number of sessions, (2) inclusion of work simulation activities, and (3) maximum number of hours per session. The total number of sessions and maximum number of hours per session were primarily influenced by the individual client's attendance pattern and the client's tolerance for increasing frequency and duration throughout his or her program. Because the majority of clients were participating in a vocational rehabilitation program with liberal policies for program advancement to client tolerances, insurance coverage restrictions were not noted to have limited these values. Work simulation was coded as a dichotomous variable on the basis of whether a client did or did not complete work simulation activities during the course of his or her program.

Statistical Analysis

Descriptive statistics were calculated for each variable, and clients with successful versus unsuccessful outcomes were compared on all variables using χ^2 or t tests. For each program, we conducted an exploratory multiple logistic regression analysis using a forward stepwise selection method to explore possible predictors of success among the 10 variables. Before initiating regression analyses, we assessed multicollinearity to ensure no predictor variables were highly correlated (i.e., $\rho > .5$) before we entered them into the regression analysis. Significance level to enter either model was set at .05, and the significance level to exit the model was set at .10 for each step. Iterations of the model were continued until only significant variables remained. Odds ratios and 95% confidence

intervals were calculated for each selected predictor variable that remained in the final model.

Results

The database contained a total of 201 consecutive clients referred to the clinic for occupational rehabilitation services. Of these clients, 95 were identified as receiving their first episode of care in the general occupational rehabilitation program, and 71 were identified as entering the comprehensive occupational rehabilitation program for the first time. The clients included as part of both programs were predominantly male, unskilled laborers with an average age of 42.6 yr (standard deviation [SD] = 10.3, range = 20–68), an average reported worst pain of 6.4 out of 10.0 (SD = 2.5, range = 0–10), an average of 3.3 diagnoses (SD = 2.0, range = 1–16), and an average length of lost time from work of 69.9 wk (SD = 63.2, range = 0–452.3).

The most common location of injury in both programs was spinal (i.e., cervical through lumbar), followed by upper-extremity injuries and lower-extremity injuries. Significant differences in descriptive data between the programs included fewer numbers of sessions in the general program: 18.6 sessions (SD = 6.2, range = 4–33), compared with 22.9 (SD = 11.4, range = 3–57) in the comprehensive program. Average session length was significantly longer in the comprehensive program at 5.1 hr, on average (SD = 1.5), versus 3.8 hr (SD = 0.6) in the general program. The percentage of women was higher in the general program, and nearly all clients in the comprehensive program received work simulation (94%), compared with 78% in the general program. Participants in the comprehensive program who did not receive work simulation were noted to have the briefest program lengths, exiting the program before the sessions had progressed to include work simulation.

In the general occupational rehabilitation program, 77 of 95 clients were successful. No difference was found in gender, labor type, marital status, injury type, age, number of diagnoses, lost time from work, or pain between clients with different program success outcomes (Table 2). The frequency of success was higher for participants who received work simulation and attended more, and longer, sessions ($p < .001$). Session length was highly correlated with work simulation ($\rho = .690$, $p < .001$), moderately correlated with number of sessions ($\rho = .394$, $p < .001$), and highly skewed toward 4 hr. Therefore, we dropped this variable from consideration in the regression analysis for the general program. The remaining nine predictors were evaluated using a forward stepwise selection process.

Table 2. Client and Program Factors by Program Outcome

Program or Client Factor	Unsuccessful, Frequency or <i>M</i> (<i>SD</i>)	Successful, Frequency or <i>M</i> (<i>SD</i>)	<i>p</i>
General occupational rehabilitation ^a			
Gender, male:female	10:8	52:25	.337
Labor type, unskilled:skilled	16:2	67:10	.829
Work simulation, no:yes	12:6	9:68	<.001
Marital status, single:married:divorced	5:10:3	22:45:10	.919
Injury type, UE:LE:spine:multiple	6:2:9:1	17:16:42:2	.584
Age, yr	42.0 (9.6)	42.2 (10.3)	.950
No. of sessions	12.3 (5.0)	20.1 (5.6)	<.001
No. of diagnoses	4.3 (3.8)	3.3 (1.7)	.236
Maximum session length, hr	3.2 (0.8)	3.9 (0.5)	.001
Lost time, wk	58.0 (39.9)	72.9 (57.5)	.301
Pain, 0–10	7.6 (2.0)	6.4 (2.6)	.067
Comprehensive occupational rehabilitation ^b			
Gender, male:female	18:5	39:9	.767
Labor type, unskilled:skilled	22:1	43:5	.390
Work simulation, no:yes	4:19	0:48	.003
Marital status, single: married:divorced	7:11:5	11:32:5	.236
Injury type, UE:LE:spine:multiple	4:3:15:1	14:11:23:0	.263
Age, yr	40.6 (8.3)	44.6 (11.4)	.136
No. of sessions	16.7 (8.4)	25.9 (11.5)	.001
No. of diagnoses	3.3 (1.4)	2.9 (1.5)	.389
Maximum session length, hr	3.9 (0.8)	5.6 (1.4)	<.001
Lost time, wk	90.4 (105.5)	59.5 (50.0)	.193
Pain, 0–10	6.7 (2.1)	6.0 (2.3)	.239

Note. *p* values were calculated using χ^2 analysis for categorical data and independent *t* tests for continuous data. LE = lower extremity; *M* = mean; *SD* = standard deviation; UE = upper extremity.

^aUnsuccessful, *n* = 18; successful, *n* = 77. ^bUnsuccessful, *n* = 23; successful, *n* = 48.

The unadjusted odds ratios for the preliminary model that included all variables are included in Table 3. Application of the stepwise regression using the a priori decision factors (i.e., $p < .05$ to enter and $p > .10$ to leave) resulted in three iterations that reduced the model to the final set of predictor variables. These included gender, number of sessions, and work simulation (Table 4). The final model correctly predicted outcomes in 89.5% of cases and accounted for 54.1% of the variance in successful outcome ($p < .001$). Given the final model, female clients were less likely to succeed in work conditioning than male clients (odds ratio = 0.186, $p = .033$), and each additional session attended increased the chance of success by 29% ($p = .001$). Clients who received work simulation as a part of rehabilitation were 6.4 times as likely to succeed than those who did not receive work simulation ($p = .014$).

Successful discharge status was noted for 68% of clients who received the comprehensive occupational rehabilitation program (*n* = 48), a significantly lower success rate than the general program ($p = .047$). As with the general program, successful clients in the comprehensive program attended more and longer sessions (see Table 2). No variables were found to be highly correlated, and all 10 predictor variables were considered in the exploratory

regression model (see Table 3). Only one iteration was required to reduce the model, which included maximum session length (see Table 4). This final model successfully predicted outcomes in 77.5% of cases, accounting for 43.7% of the variance in successful outcomes ($p < .001$). For each 1-hr increase in maximum session length, clients were 3.5 times as likely to succeed ($p < .001$).

Discussion

The aim of this analysis was to explore factors predictive of success in both general and comprehensive occupational rehabilitation programs. Overall, clients were more successful in the general program; the lower rate of success in the comprehensive program is likely due to increased case complexity that led to a referral to this program and is potentially related to factors that were not captured in our dataset (e.g., psychosocial comorbidities). In our analysis we were interested in the contribution of factors identified in the literature, as well as the impact of occupation-based activities (i.e., work simulation), which has not been closely evaluated. With the exception of gender, none of the previously reported client factors were significant predictors of either program's success in this cohort. In addition to

Table 3. Unadjusted Odds Ratios for Predicting Positive Outcomes of General and Comprehensive Occupational Rehabilitation on the Basis of All Independent Variables

Variable	OR	<i>p</i>
General Occupational Rehabilitation (<i>n</i> = 95)		
Age	0.004	.949
Gender: female	0.923	.337
Marital status		
Married vs. single	0.050	.823
Divorced vs. single	0.167	.683
Labor type: unskilled	0.047	.829
No. of diagnoses	3.565	.059
Worst level of pain	3.373	.066
Lost time	1.093	.296
No. of sessions	23.311	<.001
Work simulation: yes	25.611	<.001
Comprehensive Occupational Rehabilitation (<i>n</i> = 71)		
Age	2.267	.132
Gender: female	0.088	.767
Marital status		
Married vs. single	2.311	.128
Divorced vs. single	1.647	.199
Labor type: unskilled	0.740	.390
No. of diagnoses	0.765	.382
Worst level of pain	1.424	.233
Lost time	2.794	.095
No. of sessions	10.367	.001
Maximum session length	21.410	<.001

Note. OR = odds ratio.

gender, therapeutic intensity was a predictor of success for both programs, and participating in occupation-based activities was an important predictor of success in the general occupational rehabilitation program.

In previous research, indicators of disorder severity, such as intensity of pain and delay to treatment, were important factors that predicted success, yet these factors were only weakly associated with success in the programs in this study. In addition to these previously examined

measures of severity, number of diagnoses evaluated in this analysis was also not a predictor of success in either program. Our finding that men were more likely to succeed in the general occupational rehabilitation program stands in contrast to previous evidence that women were up to 10 times more likely to be successful in occupational rehabilitation (Jang, Li, Hwang, & Chang, 1998). A reexamination of the data did not indicate any strong associations between gender and the other variables, leaving the explanation for this outcome unknown. It is possible that other factors related to life roles, job types, or general level of physical abilities varied between men and women. Further exploration of factors related to gender as a predictor of success in occupational rehabilitation is warranted to better understand these findings.

In contrast to a challenging interpretation, the significance of program intensity as a predictor for successful outcomes in each program is logical. Because programs continuously progressed in frequencies per week and duration per session as clients gained improved tolerance, both total number of sessions (general program) and maximum session length (comprehensive program) are excellent proxies for improved physical abilities. In the general program, successful clients attended an average of 20.1 sessions. Given that the program was typically limited to 6 wk, this finding suggests that success is maximized when clients have a session frequency of more than three times per week. Similarly, for the comprehensive program, successful clients achieved a maximum session length of 5.6 hr, on average, suggesting that comprehensive programs are likely more successful when provided in durations beyond 4 hr as may be otherwise recommended. Together these findings highlight the importance of maximizing therapeutic intensity in the treatment of WRMSDs within occupational rehabilitation programs.

Finally, the results of this study indicate that completing occupation-based activities was an important predictor of success in occupational rehabilitation; specifically, participating in work simulation activities increased the odds of success by more than 6 times for clients in the general rehabilitation program. Work simulation is not required by CARF as part of a general occupational rehabilitation program, potentially making the program at this facility unique. Occupation-based interventions have been discussed as an important component of the rehabilitation process for musculoskeletal disorders (Earley & Shannon, 2006; Wolf, Chuh, Floyd, McInnis, & Williams, 2015), and research has established that work-related interventions can outperform generalized treatments in therapy (Wählin, Ekberg, Persson, Bernfort, & Öberg, 2012). Inclusion of occupation-based activities in rehabilitation programs specifically focused on an outcome of returning to work are highly relevant and likely very important.

Table 4. Final Stepwise Binary Logistic Regression Odds Ratio for Variables Predicting Positive Outcomes of General and Comprehensive Occupational Rehabilitation

Variable	OR	SE	<i>p</i>	95% CI
General Occupational Rehabilitation				
Gender: female	0.186	0.791	.033	[0.039, 0.875]
No. of sessions	1.292	0.079	.001	[1.108, 1.507]
Work simulation	6.369	0.750	.014	[1.465, 27.580]
Comprehensive Occupational Rehabilitation				
Session length	3.491	0.325	<.001	[1.848, 6.596]

Note. The final models for both general and comprehensive occupational rehabilitation programs were statistically significant (Nagelkerke R^2 s = .541 and .437, ps < .001, respectively). CI = confidence interval; OR = odds ratio.

We note that the timing for incorporation of work simulation activities in this cohort was not standardized; thus, the addition of work simulation activities may have been a proxy for the therapist's appraisal of a client's adequate progress. However, because number of sessions was also a significant contributor to the model, the addition of work simulation activities potentially created an even more effective intervention regardless of a client's progress or the program's intensity. The effect of work simulation was not observed in the comprehensive program because work simulation was considered an essential component of that program and was included for nearly all clients. Given these results, future prospective trials are necessary to substantiate the positive contribution of work simulation activities to general occupational rehabilitation programs.

This study has several limitations, which are primarily due to the retrospective design and the sample size. The primary limitation with a retrospective analysis is that one is restricted to a certain set of data that may not include a robust or diverse set of variables to develop the best-fitting predictive model, thus restricting analyses to an exploratory model to identify potential predictors. Additional variables that could strengthen the model include psychological factors, U.S. Department of Labor strength level classifications (National Academy of Sciences, 1971), socioeconomic descriptors, and other information about the client's clinical status. Significant missing variables in our dataset were knowledge regarding actual return to work and no follow-up data to assess the rate of recidivism—a common problem for people with WRMSDs. Although the sample size met minimum expectations for exploratory logistic regression, it was not large enough for us to stratify the results by type or location of diagnoses, and the sample may not have been heterogeneous enough to let us fully evaluate variables of severity. This limits our ability to further interpret null findings or further examine factors that may have had a moderating effect. Finally, these data were not robust enough to explore interactive effects within the model; specifically, although poor tolerance is a potential explanation for decreased intensity and poor program success, the impact of participants who were successful in fewer, or shorter, sessions because of extremely high tolerance is not known. Evaluation of larger databases or prospective studies is needed to further evaluate both person factors and program protocols and dosages to explore in more detail the factors identified in this exploratory study.

Implications for Occupational Therapy Practice and Research

The findings of this study indicate that intensity is important and occupations and activities intervention strategies

may be a strong, active component related to success in occupational rehabilitation. Occupational therapy practitioners are uniquely trained to focus on occupation in its various forms. This occupational focus should not merely be part of the evaluation process; instead, practitioners should incorporate occupation-based approaches into their interventions (AOTA, 2014; Gillen, 2013). Given the centrality of the occupation of work as a life role and its contribution to people's purpose and sense of meaning, occupational (i.e., work) rehabilitation is a natural match for occupational therapy practitioners. Although often eclipsed by a focus on activities of daily living within physical rehabilitation research, the use of work-related occupation-based activities warrants further exploration. This inquiry is especially vital given that it can support the distinct value of occupational therapy practitioners within musculoskeletal and occupational rehabilitation. We offer the following specific recommendations for practice and research:

- Occupational therapy practitioners should provide an intensive, multicomponent rehabilitation program that supports recovery for people with WRMSDs who are unable to return to work after traditional, injury-focused therapy services.
- Participation in simulated work activities is a strong predictor of successful occupational rehabilitation and supports the need to use an occupational perspective not only when providing a comprehensive rehabilitation program but also in a general occupational rehabilitation program.
- Intensity of participation in therapy is an important consideration in the success of occupational rehabilitation programs, indicating that clients in these programs should be allowed to progress in both frequency of sessions per week and hours per session as tolerated.
- Additional large-scale prospective research and evaluation of client success through qualitative inquiry is needed to better understand the nuances of predictors for success in occupational rehabilitation. ▲

Acknowledgments

Shawn C. Roll was funded by the National Institutes of Health Rehabilitation Research Career Development Program (Grant K12 HD055929) at the time this article was prepared. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health. We thank Gabe Messenger for his assistance in preparing the dataset for analysis.

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