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5 **FAILURE TO COMPLETE A FUNCTIONAL RESTORATION PROGRAM**
6 **FOR CHRONIC MUSCULOSKELETAL DISORDERS:**
7 **A PROSPECTIVE ONE-YEAR OUTCOME STUDY**
8

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34 RUNNING HEAD: Functional Restoration Outcomes
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ABSTRACT

Objective: Chronic disabling occupational musculoskeletal disorders (CDOMD) represent the highest medical/indemnity costs and greatest loss of productivity in the universe of occupational injury claims. Although a few studies have attempted to analyze those who fail to complete a “full dose” of rehabilitation, relative to those who do, these studies suffer from small sample size and limited assessment of outcome variables. This is the first large-scale study that comprehensively compares the likelihood of various socioeconomically relevant outcomes between functional restoration completers and non-completers, while simultaneously identifying a number of risk factors for non-completion.

Design: A prospective cohort study of consecutive CDOMD patients (n=1,440). They were divided into two groups based on program completion status. The Non-Completer group (NC; n=303) did not complete the prescribed treatment program, while the Completers (C; n=1,137) achieved program completion.

Setting: Chronic pain management facility.

Patients: CDOMD patients.

Intervention: Interdisciplinary Functional Restoration: Rehabilitation program.

Main Outcome Measures: Validated questionnaires of pain, disability and depression were added to results of a structured one-year post-treatment telephone interview on socioeconomic outcomes covering the dimensions of work status, health utilization, recurrent injury claims and resolution of financial disputes.

Results: The one-year post-treatment socioeconomic outcomes were most striking. The NC group was 7 times more likely to have post-rehab surgery to the same area, and nearly 7 times more likely to have greater than 30 visits to a new health provider in persistent healthcare seeking efforts. The NC group also had only half the rates of work return and work retention, being 9.7 times less likely to have returned to any type of work, and 7 times less likely to have retained work at the end of the year. Regression

1 analysis also revealed that work return, surgery to a compensable, injured area, more
2 health care utilization from a new provider and more overall health care utilization
3 (greater than 30 visits) were the most reliably predicted by rehabilitation completion
4 status.

5 **Conclusions:** This large prospective study determined that non-completers of
6 interdisciplinary tertiary rehabilitation for CDOMDs had comparatively poor
7 socioeconomic outcomes in the year following treatment discharge, especially on work
8 status and health utilization outcomes. These outcomes are of great relevance to societal
9 medical/indemnity costs and future worker productivity. A number of risk factors of
10 potential importance in identifying possible non-completers early in the treatment course
11 were identified that may yield more effective interventions tailored to maintain
12 compliance and decrease the drop-out percentage.

13
14 **Key Words:** functional restoration; tertiary rehabilitation program; interdisciplinary
15 chronic pain management; chronic occupational musculoskeletal disorders;
16 socioeconomic outcomes; compliance; risk factors

INTRODUCTION

The high cost and prevalence of chronic disabling occupational musculoskeletal disorders (CDOMD) in industrialized countries is well established, and disability rates have been increasing over the past 20 years.^{1,2} It is estimated that \$27 billion is spent annually for diagnosis and care of musculoskeletal trauma, and this figure does not include other associated costs such as legal and dispute friction costs, vocational retraining, occupational modifications, Social Security disability payments and lost worker productivity.³ Further, indirect costs associated with musculoskeletal disorders have been estimated to account for over \$800 billion in expenditures, a cost up to 14 times greater than direct costs.⁴⁻⁷ Up to 85% of the adult workforce will miss time and seek professional care for musculoskeletal pain during the course of their careers.⁸ For most individuals who experience musculoskeletal pain, symptoms resolve rapidly, allowing work return with little lost time. In the case of a small number of individuals, however, the pain develops into chronic pain with associated occupational disability.⁹

Functional restoration, as originally developed by Mayer and Gatchel,¹⁰ is a medically-directed, interdisciplinary pain management approach geared specifically for patients who develop CDOMD. This program places a strong emphasis on function, and combines quantitatively-directed exercise progression with disability management and psychosocial interventions such as individual and group therapy. Functional restoration is well-studied, and a wide body of research indicates a high rate of success as measured by socioeconomic outcome variables relevant to cost and worker productivity in occupational settings. These outcomes encompass work return, work retention, recurrent injury rates, new surgery rates, case settlement status, and additional healthcare utilization.¹¹⁻¹⁸ Indeed, in an earlier study,¹⁶ comparably positive outcomes were found for work-related upper extremity disorders and spinal disorders when patients were treated with functional restoration. Replication studies, including a recent randomized

1 controlled trial, demonstrated the generalizability and effectiveness of the functional
2 restoration programs in a variety of settings.¹⁹⁻²¹

3 Failing to complete an effective tertiary rehabilitation program may represent a
4 catastrophic terminal event in medical care for CDOMD leading to a determination of
5 *total and permanent disability*. In a large number of these cases, failure to resolve
6 productivity issues under workers' compensation results in cost shifting of the disability
7 problems from state workers' compensation jurisdictions to the federal government
8 within the United States. Social Security Disability Income (SSDI) and Supplemental
9 Security Income (SSI) have seen remarkable growth in costs from \$40 to \$100 billion
10 (now 5% of U.S. federal budget) per year over the past 15 years after stability through the
11 1980s.²² At the same time, the number of pre-retirement disabled workers on SSDI/SSI
12 has more than doubled from 6 to 13 million workers, now representing a higher
13 percentage of the potential U.S. workforce than the unemployment rate! While the
14 percentage of acceptances for SSDI/SSI for musculoskeletal disorders has dropped over
15 the past 20 years, there has been a corresponding increase in the number accepted for
16 psychiatric conditions (depression, post-traumatic stress, anxiety, etc.), with a large
17 number of CDOMDs persisting in disability creating eligibility based on both types of
18 diagnoses. As such, tertiary rehabilitation represents *tertiary prevention* for younger
19 working-age patients becoming lost to the workforce, with potentially catastrophic costs
20 to the entire national retirement, social and economic systems.

21 While the effectiveness of functional restoration for CDOMD patients is well-
22 examined, few studies have evaluated patients who fail to complete functional restoration
23 relative to program completers. The few studies that have addressed this issue have faced
24 a number of limitations, including very small sample sizes, the exploration of a limited
25 number of variables, and the inclusion of only chronic low back pain patients. Outcomes
26 of work status, health utilization and recurrent injury were assessed in several studies, but
27 with sample sizes too small to draw conclusion on the degree of difference between the

groups, or to investigate a non-spinal disorder population.^{11,12,19} A number of physical and psychosocial variables have been studied, with differences in pre- and post-treatment performance for functional restoration completers and non-completers compared in very small sample size studies.²³⁻²⁵ Physical variables assessed involved measurements of trunk mobility and strength, along with aerobic capacity and various isokinetic and isoinertial lifting tests. Psychosocial studies examined changes on the SF-36 health status inventory and the Structured Clinical Interview for DSM-IV diagnosis (SCID). However, these variables were examined in separate studies. A comprehensive evaluation of all these physical and psychosocial measurements, now extended to a more generalized musculoskeletal disorder population, was the focus of the present large-scale study.

The purpose of the present study was to comprehensively compare functional restoration non-completers to completers on the broadest array of demographic, work adjustment/outlook, physical, psychological and objective one-year outcome variables yet attempted in the scientific literature. As noted, previous studies addressing this issue were associated with a number of limitations. The current study, which utilized a large, diverse, and temporally consistent sample of CDOMD patients sought to replicate the findings of previous small sample-size research evaluating limited variables, while also adding to the current body of knowledge by addressing previously unexamined variables.

MATERIALS AND METHODS

Subjects

Subjects consisted of 1,440 consecutive, prospectively assessed CDOMD patients who consented to, and started, a prescribed course of functional restoration treatment from January 1996 to March 2000. All patients in the study cohort received extensive prior treatment for their injury; however, disability had not resolved at the time of admission to the tertiary rehabilitation program averaging 19 months since injury (Table

1) The participation criteria that had to be met prior to entering this program were: (1) more than 4 months elapsed since a work-related injury; (2) primary and secondary nonoperative care failed to resolve disability and pain; (3) surgery had not produced relief, resolution, or simply was not an option; (4) severe functional limitations remained; and (5) English or Spanish-speaking. This cohort of subjects was divided into the following two groups for purposes of this study:

Non-completer Group (NC). The 303 subjects (21% of entire cohort) in this group began, but did not complete, the functional restoration program. The most frequent primary causes of non-completion were treatment non-compliance (43.6%), treatment refusal (16.5%), failure to develop a work plan (10.9%), failure to progress physically during rehabilitation (6.3%), secondary gain issues (4.3%) or continued substance abuse (2.3%). These categories accounted for 83.5% of NC patients. Almost half of the remaining 15.1% left the program to either return to work (5.3%) or because they were faced with financial issues (2.3%). Similarly, a small group of subjects left the program for reasons related to quality of life (3%), for other medical problems (1%) or denial of insurance pre-certification (3%).

Completer Group (C). The 1,137 subjects in this group successfully completed the functional restoration treatment program (79% of the total cohort).

INSERT TABLE 1 ABOUT HERE

Procedure

After signing an IRB-approved informed consent, all patients received an initial evaluation consisting of a medical history, physical examination, psychological intake interview, medical case management disability assessment interview, and a quantitative functional capacity evaluation. The treatment program consisted of quantitatively-directed exercise progression, supervised by physical and occupational therapists, in

1 conjunction with components of a multimodal disability management approach, which
2 included individual counseling, group therapeutics, stress management, biofeedback,
3 coping skills training, and education focusing on disability management, vocational
4 reintegration, and future fitness maintenance.^{10,26,27}

5 Demographic information was derived from the intake interviews noted above. A
6 number of psychosocial instruments were administered at the initial interview and prior
7 to the beginning of treatment, including: the Quantified Pain Drawing, which
8 incorporates a visual analog scale (VAS) for self-report of perceived pain intensity;²⁸ the
9 Million Visual Analogue Scale (MVAS),^{27,29} which is a visual analog questionnaire of
10 disability; and the Beck Depression Inventory (BDI).³⁰ Finally, as earlier reviewed in the
11 Dersh study,²⁵ the SCID-NP³¹ was administered during the first week of the treatment
12 program.

13 A structured telephone interview was administered at one-year post-discharge,
14 and assessed outcome data including health utilization, recurrent injury, unresolved
15 litigation, and work status. Multiple attempts were made to contact all patients at one
16 year; however, it was not possible to collect outcomes on every individual. For Group C,
17 at least partial outcome data were collected on 1,067 of the 1,137 subjects (94%). For
18 Group NC, at least partial data were collected on 257 of the 303 subjects (85%).

19
20 For the purpose of the present study, statistical analyses of group differences
21 involving percentages were performed using a logistic regression, controlling for the
22 potentially confounding effects of race, years of education, comorbid health conditions
23 and smoking rate. Analysis of covariance (ANCOVA) was utilized with continuous data
24 again controlling for potentially confounding effects of the same variables. A stepwise
25 regression was performed on the data for one-year socioeconomic outcomes in order to
26 determine the variables best predicted by completion status. Finally, in order to control
27 for a potentially inflated Type I error rate, a Bonferroni correction was applied to 36

1 separate between-group comparisons (all the data from Table 1 and Tables 3 through 5
2 but not the demographic data in Table 2). The Bonferroni correction resulted in an alpha-
3 value of .001.

5 RESULTS

6 Basic Demographic/Health Variables

7 The basic demographic data for the C and NC groups are presented in Table 2. A
8 significant difference was found for race, with the NC group having fewer Caucasians
9 and more Hispanics, as compared to the C group, $\chi^2(3)=8.9$, $p=.031$. Educational level
10 also differed significantly ($p=.036$). The NC group (41.2%) was also found to have a
11 higher overall rate of comorbid health conditions (diabetes, cardiovascular condition,
12 hypertension, gastrointestinal condition, cancer, asthma and hyperthyroidism), relative to
13 the C group (32.4%), $\chi^2(1)=7.4$, $OR=1.5(1.1, 1.9)$, $p=.007$. More specifically, the NC
14 group had a significantly higher rates of cardiovascular conditions, $\chi^2(1)=3.9$,
15 $OR=1.8(1.0, 3.3)$, $p=.048$, and gastrointestinal conditions, $\chi^2(1)=14.6$, $OR=2.1(1.4, 3.2)$,
16 $p<.001$.

17 -----
18 INSERT TABLE 2 ABOUT HERE
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20 Pre-Treatment Work/Injury-Related Variables

21 Data for the work/injury-related variables were previously presented in Table 1.
22 The only variable on which the NC group differed from the C group was pre-
23 rehabilitation Case Settlement Status. Those in the NC group were more likely to have
24 unsettled cases, $\chi^2(1) = 27.6$, $OR=2.1(1.6, 2.9)$, $p<.001$. [BOB: WHAT ABOUT
25 COMORBID HEALTH CONDITIONS ON TABLE 2?]

26 Work Adjustment and Outlook Variables

Table 3 presents findings for a number of work adjustment and outlook variables collected on case management interviews as part of the multimodal disability management component of the program during early program participation. As shown, differences were found on each of the four variables that were considered. A lower percentage of the NC group believed they would have a job available following treatment, $\chi^2(1)=16.7$, $OR=2.2(1.4,3.4)$, $p=.001$, to have reported a positive relationship with their employer/supervisor, $\chi^2(1)=18.9$, $OR=2.4(1.8,4.8)$, $p<.001$, to have expressed the desire to return to the same employer, $\chi^2(1)=24.9$, $OR=2.2(1.6,3.0)$, $p<.001$, and expressed a desire to return to the same type of work, $\chi^2(1)=12.6$, $OR=1.8(1.4,2.9)$, $p<.001$.

INSERT TABLE 3 ABOUT HERE

Psychosocial Variables

As shown in Table 4, the NC group displayed higher initial evaluation (PRE) scores on Pain Intensity, Million VAS and BDI. Also in this study, differences between the NC and C groups in terms of DSM Axis I psychiatric disorders (current, lifetime, post-injury, and pre-injury) were analyzed. Axis I comparisons were performed with Pain Disorder excluded from the analyses, as 99% of the subjects in this sample met criteria for the diagnosis. No significant differences in prevalence of DSM disorders between the NC and C groups were found in these assessed diagnostic categories.

INSERT TABLE 4 ABOUT HERE

One-Year Socioeconomic Outcomes

Table 5 presents the findings for the one-year post-rehab socioeconomic outcome variables. These data were divided into the following three sections: Health Utilization;

Dispute Settlement; and Work Status. Table 5 also includes the individual sample sizes (n) utilized in the analyses of each of the one-year socioeconomic outcome variables.

Work Status. The two groups differed significantly on work return, with 90.4% of the C group having worked during the year following treatment in the program, as compared to only 48.7% of the NC group, $\chi^2(1)=100.1$, $OR=9.7(6.3,15.2)$, $p<.001$. The two also differed significantly in terms of work retention, as only 40.6% of the NC group was still working at the time of the follow-up interview, as compared to 84.0% of the C group, $\chi^2(1)=86.6$, $OR=7(4.7,10.5)$, $p<.001$. Post-treatment work status was further explored by examining the work situations that patients in each of the two groups entered into during the year following discharge from functional restoration treatment. A significantly lower percentage of the NC group (14.7%) returned to their original employer when compared to the C group (36.7%), $\chi^2(1)=27.4$, $OR=3.6(2.1,6.1)$, $p<.001$. Similarly, 12.7% of the NC group returned to their identical job, as opposed to 33.5% of the C group, $\chi^2(1)=28.6$, $OR=4.1(2.2,7.4)$, $p<.001$.

Health Utilization. Post-treatment surgery to the original musculoskeletal area of injury was 12.2% of the NC group, as compared to only 2.3% of the C group, $\chi^2(1)=31.3$, $OR=7.1(3.7,13.8)$, $p<.001$. Health care utilization from a new provider was defined as visits to providers that occur in addition to scheduled visits with the treating and rehabilitation supervising doctors. In this study, 40.7% of the NC patients sought health care services from a new provider over one year, as compared to only 20.8% of the C group, $\chi^2(1)=26.5$, $OR=2.3(1.9,3.9)$, $p<.001$. The variable was broken down into the two groups based on number of visits to a new provider: 1 to 30 visits and greater than 30 visits. A remarkable difference was found for the unremitting health utilizers. Indeed, 19.1% of the NC group accrued 30 or more visits to a new health care provider in the year following treatment, compared to only 3.4% in the C group, $\chi^2(1)=38.5$, $OR=6.8(3.8,12.2)$, $p<.001$.

Case Settlement. In this study, a lower percentage of the NC group (89.1%) settled their case (i.e., financial or indemnity award/dispute) at one year, as compared to the C group (96.1%), $\chi^2(1)=11.5$, OR=3.2(1.7, 5.9), $p<.001$.

INSERT TABLE 5 ABOUT HERE

Results of Stepwise Regression. The best model indicated that work return, surgery to compensable area, health utilization from a new provider and healthcare utilization greater than 30 visits were the most reliably predicted by completion status, $F(4,1037)=63.7$, $p<.001$ indicated approximately 20% of the variance accounted for by this model.

DISCUSSION

The present study represents the first large-scale, comprehensive examination of functional restoration completion status in CDOMD patients. The methodology used included the advantage of a large sample of NC subjects from the same temporal cohort as the C subjects. It served to replicate the findings of previous small sample-size studies, while also adding to the current body of knowledge by addressing previously unexamined variables. Results clearly documented that the 21% of patients who fail to complete functional restoration treatment differ from program completers on a number of pre-treatment factors. Overall, a sizeable difference was found between the groups on objective post-rehab socioeconomic outcomes. The NC group displayed greater health utilization, with 7 times greater likelihood of having post-treatment surgery to the area of injury and higher rates of health care utilization from a new provider. It is also remarkable that NC patients were almost 7 times more likely to utilize excessive rates of health care from a new provider (i.e., 30 visits or more), as compared to the C group. In addition, the NC group was more likely to have unresolved financial workers' compensation disputes relative to the C group.

1 Work status findings, which represent one of the most important outcomes of
2 functional restoration treatment, are of particular note. The NC group displayed lower
3 rates of work return and retention. These differences were particularly great, with C
4 patients being almost 10 times more likely to return to work, and 7 times more likely to
5 retain work at one-year. Further analysis of work status revealed that NC subjects were
6 less likely to return to work with the same employer and return to the identical job.
7 These subjects were also less likely to return to modified work, with either the original
8 employer or through some alternative means. It is noteworthy that the NC group had a
9 response rate of about 65% on work status questions, so that if it were assumed that all
10 patients not contacted had never returned to work, then the work return rate would drop
11 to about 32%, and the work retention rate to about 27%. Nonetheless, these would
12 appear to be surprisingly high numbers to those unfamiliar with patient behaviors in
13 work-related injuries. However, in two prior studies, Mayer^{11,12} demonstrated that a
14 comparison group denied functional restoration treatment by virtue of the policy of the
15 insurance carrier that happens to represent the employer, showed about a 40% return to
16 work rate in the same population 20 years ago. These generally represent patients who
17 will return to work once the option of continuous medical treatment for their condition is
18 curtailed, and disability benefits under workers' compensation are discontinued. In the
19 remainder, however, a continued dependence on some type of financial benefit is
20 common, be it from a U.S. federal source (Social Security Disability Income (SSDI),
21 from the employer (long-term disability (LTD)), or from a state/local source
22 (unemployment insurance or welfare benefits).

23 The existence of a premorbid health condition, and in particular cardiovascular
24 and gastrointestinal conditions, was also associated with program non-completion. Evans
25 (1999) earlier found higher rates of premorbid health conditions in recurrent injury
26 CDOMD patients, and speculated that these conditions may lead to a more sedentary
27 lifestyle (which may be either a cause or effect of the health conditions), that ultimately

1 results in the physical deconditioning syndrome originally proposed by Mayer and
2 Gatchel.¹⁰ Evans³² also proposed that patients with comorbid health conditions might
3 begin to adopt a “sick role,” as described by Gatchel.³³ It must also be considered that
4 individuals with comorbid health conditions, as a result of their experience with the
5 illness, are more focused on somatic sensations. No differences, though, were found
6 between the two groups with respect to area of musculoskeletal injury or severity of
7 injury. These findings are important, as they indicate that the differences found in this
8 study were not confounded by an uneven distribution of musculoskeletal injury types or
9 severity. Readers unfamiliar with prior functional restoration studies may be surprised at
10 this extreme average length of disability, and that these levels of work return are possible
11 under these circumstances. Jordan¹³ studied the effect of extent of disability, and
12 demonstrated outcomes were marginally improved at 4-8 months of disability over 18-24
13 months, and that there was a linear decline in socioeconomic outcome quality after 24
14 months. However, return to work rates for those completing treatment even with 5 years
15 of disability were still of high quality, approaching 70% of the completer group. The
16 difference in length of disability between the NC and C groups in this study were
17 unlikely, in and of themselves, to have been a cause of lower work status for the NC
18 group.

19 In terms of work adjustment and outlook variables, it was found that subjects in
20 the NC group were 3 times less likely to report a positive relationship with their
21 employer/supervisor (if employed), relative to the C group. These patients were also less
22 likely to possess the desire to return to work for the same employer or to return to the
23 same type of work, and indicated that they would not have a job available following
24 rehabilitation. These work adjustment/outlook variables are tied to job satisfaction,
25 which is the work-related variable that is most commonly found to be associated with
26 chronic pain, with a large number of studies having reported this relationship.³⁵⁻⁴⁰ A
27 study by Williams et al⁴¹ indicated that job satisfaction may serve a protective role

1 against the development of chronic pain and disability following an initial acute onset of
2 back pain. The findings of the present study indicate that, in CDOMD patients, work
3 adjustment and satisfaction, as well as a positive outlook about future employment, may
4 serve a protective role during rehabilitation as an incentive to follow through with
5 treatment. On the other hand, it appears that poor work adjustment/satisfaction and a
6 negative outlook toward future employment represent risk factors for program non-
7 completion.

8 There were also a number of important psychosocial differences found between
9 the two groups. These were addressed in a number of ways. In each case where
10 differences were found, the NC group displayed higher levels of psychosocial distress.
11 More specifically, the NC group reported higher pre-treatment levels of depression, pain
12 and disability. Obviously, the presence of this somewhat increased level of psychosocial
13 comorbidity is a potential risk for program non-completion that clinicians should be
14 aware of.

15 Finally, in providing a more comprehensive documentation of the consequences
16 of not completing the functional restoration program, a stepwise regression analysis of
17 the socioeconomic outcome variables was conducted. Results produced a model that
18 included the following poor one-year outcomes associated with patient non-completion:
19 low return to work rates; greater healthcare utilization rates (more than 30 visits during
20 the year); greater likelihood of seeking care from a new provider; and higher surgical
21 rates to the compensable body area. Such results strongly argue for better efforts directed
22 at early identification of potential program non-completers in order to provide more
23 tailored interventions. These data, combined with the extreme length of disability for this
24 CDOMD cohort suggests that a program of *earlier recognition and earlier* intervention is
25 likely to result in improved outcomes. We are currently evaluating methods to achieve
26 this important goal.

27

CONCLUSIONS

Taken together, the above findings clearly document the lower level of post-treatment functioning in patients who fail to complete interdisciplinary rehabilitation in the patient setting described herein. NC patients utilize more health care services, are involved in more financial disability disputes, and have poorer work return/retention outcomes. Overall, the present study clearly indicates that functional restoration non-completers do indeed differ from completers. As a group, non-completers differ on a variety of established pre-treatment factors, including psychosocial indices (i.e., self-reported depression, pain and disability). In addition, at the start of treatment, those destined to be NC patients were associated with greater prevalence of the following characteristics: more comorbid health problems; greater rates of smoking; unresolved financial disability disputes; a negative relationship with the employer; a lesser desire to return to work for the same employer or the same type of work; longer pre-referral disability time. These findings may serve as an important base from which to develop an evaluation methodology in future studies, which measures potential risk for program non-completion. A methodology of this type would be extremely valuable, as it would allow clinicians to identify patients who are a risk for non-completion and subsequent deficits in contributing to the social welfare. With this information, it is possible that clinicians could take additional steps during treatment to address the factors that make these patients a risk for non-completion. While many of these factors are already addressed with all patients as part of the functional restoration treatment model, an assessment instrument would lend additional aid in this cause. If successful, this instrument could represent a powerful clinical tool, as well as an excellent measure for use in future research addressing the causes and prevention of treatment non-completion.

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Table 1. Work/Injury Characteristics of the NC and C Groups.

VARIABLE	NC GROUP (n=303)	C GROUP (n=1,137)	OR (95%CI)	p value*
Disability Time Since Injury in Months (SD)	22.3 (19.6)	18.2 (19.8)	NA	NS
Prior Work-Related Injury (%)	41.2	47.2	NS	NS
# of Prior Work-Related Injuries (SD)	1.3 (0.7)	1.4 (0.7)	NA	NS
Pre-Rehab Surgery – Original Area (%)	42.6	35.2	1.4 (1.0, 1.8)	NS
# of Pre-Rehab Surgeries – Orig. Area	1.7 (1.1)	1.7 (1.1)	NA	NS
Musculoskeletal Area of Injury (%)				
Lumbar	40.7	42.7	NA	NS
Cervical/Thoracic	6.6	6.0		
Multiple Spinal	14.2	11.5		
Upper Extremity Only	11.9	14.6		
Lower Extremity Only	5.3	5.5		
Two Areas (at least 1 non-spinal)	10.6	10.4		
Three or More Areas (at least 1 non-spinal)	11.0	9.3		
Weekly Disability Payment (SD)	\$256.88 (186.00)	\$287.41 (191.44)	NA	NS
Weekly salary at time of injury (SD)	\$453.87 (369.92)	\$463.86 (250.12)	NA	NS
Wage Replacement Ratio	.59 (.44)	.63 (.34)	NA	NS
Pre-Rehab Dispute Status (% not settled)	24.8	13.3	2.1 (1.6, 2.9)	<.001
Legal representation Status (% with attorney)	21.7	18.6	NS	NS
Months of Employment – Job of Injury (SD)	55.6 (78.8)	66.5 (76.7)	NA	NS
Job Demand (%)			NA	NS
Sedentary-Light	14.0	15.9		
Light-Medium	26.3	26.1		
Medium-Heavy	34.5	34.7		
Heavy-Very Heavy	25.3	23.3		

*NS=statistically non-significant

Table 2. Basic Demographic/ Health Characteristics of the NC and C Groups (N=1,440).

VARIABLE	NC GROUP (n=303)	C GROUP (n=1,137)	OR (95%CI)	p value*
% of Total Cohort	21	79	NA	NS
Age	42.6 (9.6)	43.5 (9.4)	NA	.065
% Males	54.5	55.6	NS	NS
Race %			NA	.031
Caucasian	53.5	57.2		
African-American	22.6	23.9		
Hispanic	24.0	17.7		
Other	0.0	1.2		
Education (years)	11.4	11.7	NA	.036
Any Comorbid Health Condition (%)	41.2	32.4	1.5 (1.1, 1.9)	.007
Diabetes (%)	4.9	5.6	NS	NS
Cardiovascular Condition (%)	6.4	3.6	1.8 (1.0, 3.3)	.048
Hypertension (%)	17.2	17.1	NS	NS
Gastrointestinal Condition (%)	16.1	8.3	2.1 (1.4, 3.2)	<.001
Cancer	2.6	1.8	NS	NS
Cigarette Smoking (%)	40.8	36.8	NS	NS
Packs of Cigarettes Per Day (For Smokers only)	1.2 (0.6)	1.0 (0.7)	NA	.008

*NS=statistically non-significant

Table 3. Work Adjustment and Outlook Characteristics of the NC and C Groups.

VARIABLE	NC GROUP (n=303)	C GROUP (n=1,137)	OR (95%CI)	p value
Original Job Availability (%)	58.6	73.5	2.2 (1.4, 3.4)	.001
Positive Relationship w/ Employer/Supervisor for Those Employed (%)	57.8	77.0	2.9 (1.8, 4.8)	<.001
Desire to Return to Work for Same Employer (%)	47.1	66.1	2.5 (1.7, 3.7)	<.001
Desire to Return to Same Type of Work (%)	51.5	66.1	2.0 (1.4, 2.9)	<.001

Table 4. Psychosocial Measures Associated with the NC and C Groups*.

VARIABLE	NC GROUP (n=303)	C GROUP (n=1,137)	OR (95% CI)	p value
Pain Intensity (SD) PRE	6.9 (1.9)	6.0 (1.9)	NA	<.001
MVAS (SD) PRE	93.7 (25.5)	80.6 (25/8)	NA	<.001
BDI (SD) PRE	17.2 (10.5)	12.8 (9.3)	NA	<.001
Prevalence (%) of Current Mood Disorder	62.0	53.5	NS	NS
Prevalence (%) of Current Anxiety Disorder	13.1	6.8	NS	NS
Prevalence (%) of Current Substance Abuse Disorder	17.5	10.8	NS	NS

*NA=not applicable

*NS=statistically non-significant

Table 5. One-Year Socioeconomic Outcome Variables of the NC and C Groups (Number of Total Patients in Each Group for Whom Outcome Data Were Collected in Parentheses; Percentages for Each Group Based on that Number).

VARIABLE	NC GROUP (n=303)	C GROUP (n=1137)	OR (95%CI)*	p value*
Work Return % (n)	48.7 (197)	90.4 (1013)	9.7 (6.3, 15.2)	<.001
Work Retention at One-Year % (n)	40.6 (197)	84.0 (1013)	7.0 (4.7, 10.5)	<.001
Return to Same Employer % (n)	14.7 (197)	36.7 (1013)	3.6 (2.1, 6.1)	<.001
Return to Identical Job % (n)	12.7 (197)	33.5 (1013)	4.1 (2.2, 7.4)	<.001
Hours Per Week Working % (n)				
40 or More (Full-time)	31.3 (192)	70.3 (1001)	8.3 (5.3, 13.0)	<.001
20 to 39	4.7 (192)	9.9 (1001)	4.9 (2.2, 10.8)	<.001
20 or Less	2.1 (192)	2.4 (1001)	NS	NS
Surgery to the Compensable Area % (n)	12.3 (246)	23.3 (1065)	7.1 (3.7, 13.8)	<.001
Health Utilization from a New Provider % (n)	40.7 (246)	20.8 (1067)	2.3 (1.9, 3.9)	<.001
Health Utilization-New Provider (by # of visits)				
1 to 5 Visits	11.8 (246)	10.5 (1,067)	NS	NS
>30 Visits	19.1 (246)	3.4 (1037)	6.8 (3.8, 12.2)	<.001
New Injury to the Same Musculoskeletal Area(s) with Lost Work Days % (n)	0.6 (174)	2.6 (1009)	NA	NS
Case Settlement % (n)	89.1 (257)	96.1 (1038)	3.2 (1.7, 5.9)	<.001

*NS=Statistically non-significant