

# Work-Related Upper-Extremity Disorders and Work Disability: Clinical and Psychosocial Presentation

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*Work-related upper-extremity disorders (WRUEDs) are an increasingly common cause of work-related symptoms and disability. Although most upper-extremity disorders are acute and self-limited, a small percentage of workers with symptoms go on to permanent disability and account for the majority of costs associated with these conditions. Little is known, however, about this progression from symptoms to disability and how it might be prevented. In this study, we evaluate the demographic, vocational, medical, and psychosocial characteristics of patients with WRUEDs and examine several hypotheses regarding the differences between working and work-disabled patients. One hundred twenty-four consecutive patients were evaluated in a clinic specializing in occupational upper-extremity disorders. Patients currently working (n = 55) and work-disabled patients (n = 59) were similar with regard to age, gender, and reported job demands. The work-disabled group reported less time on the job, more surgeries, a higher frequency of acute antecedent trauma, and more commonly had "indeterminate" musculoskeletal diagnoses. They also reported higher pain levels, more anger with their employer, and a greater psychological response or reactivity to pain. These findings, though cross-sectional in nature, suggest that, in addition to medical management, more aggressive approaches to pain control, prevention of unnecessary surgery, directed efforts to improve patients' abilities to manage residual pain and distress, and attention to employer-employee conflicts may be important in preventing the development of prolonged work disability in this population.*

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In recent years, work-related upper-extremity disorders (WRUEDs) have engendered increasing public attention because of their human toll and economic costs to society. According to National Safety Council statistics, there were approximately 960,000 disabling work injuries affecting the neck, arms, hands or fingers in the United States in 1992.<sup>1</sup> These disorders, which include those caused by acute trauma and those resulting from cumulative trauma, accounted for 30% of all disabling work injuries and 19% of workers' compensation costs.<sup>2</sup> The reported incidence of cumulative trauma disorders (CTDs), has been rising rapidly, accounting for over 60% of new cases of occupational illness in the United States in 1991.<sup>3</sup> Studies have shown that the average cumulative trauma claim costs 50% more than the average traumatic injury claim,<sup>4</sup> and the amount of time lost from work for an average CTD case is far longer than that for other musculoskeletal disorders, such as low back pain.<sup>5</sup> As a result of the human and economic toll associated with musculoskeletal disorders in the workplace, the National Institute for Occupational Safety and Health (NIOSH) declared occupational musculoskeletal disorders to be one of the 10 priority work-related conditions.<sup>6</sup> Part of the NIOSH strategy includes development of a better understanding of the occurrence, presentation, treatment, and rehabilitation of these disorders.<sup>7</sup> The prevention of work disability and its negative economic and per-

sonal consequences represent an important aspect of this effort. To develop disability prevention strategies, it is important to understand the characteristics of patients who become work-disabled, identifying factors that are associated with disability, so that early intervention aimed at high-risk patients and work situations can be appropriately directed.

The purpose of the present study was to evaluate the demographic, vocational, medical, and psychosocial characteristics of patients with WRUEDs and to examine several hypotheses regarding differences between working and work-disabled patients.

## Methods

In 1991, the University of Massachusetts Medical Center established the Occupational Upper Extremities Disorders Clinic (OUEDC) as part of a collaborative agreement with NIOSH to develop evaluation, treatment, and rehabilitation protocols for patients with WRUEDs. This report describes a cohort of 124 consecutive patients who completed a baseline evaluation at the OUEDC between August 1, 1991 and June 30, 1993. Patients were referred to the clinic primarily by private physicians (54%), employers (24%) or insurance companies (13%). WRUEDs were broadly defined as symptom complexes characterized by pain, paresthesias, and/or weakness affecting the upper extremities or neck attributed by the patients and/or their physicians to work. To be evaluated by the clinic, patients were screened using the following criteria: (1) the patient had to have been partially or completely disabled for 2 weeks or longer, (2) the patient had to be willing to participate in an extended evaluation, and (3) prior approval of payment for clinical evaluation (non-research) services had to have been authorized by the workers' compensation carrier or private health insurer. Approximately 40% of referred patients were excluded based

on these screening criteria, with the majority of exclusions (90%) due to lack of approval for payment by the insurer. Issues related to clinic design and patient selection are discussed in detail in a previously published paper.<sup>8</sup>

## Measures

Demographic and vocational characteristics, measures of medical status, pain, psychological factors, duration of work disability, perceptions of the work environment, litigation status, and findings on physical examination were collected as part of a 3-hour baseline evaluation on each patient.

### Demographic

Information regarding age, gender, education level, and marital status was collected using a modified version of the Work ReEntry Questionnaire.<sup>9</sup>

### Vocational

Information regarding length of time on the job, current work status, job type, and description of job tasks was collected by questionnaire and supplemented during patient interviews with the research assistant and occupational physician. Patients who reported that they were not working because of their upper-extremity symptoms were classified as work-disabled. With regard to job tasks, patients were asked whether their jobs required repetitive, forceful, or awkward movements of the upper extremities.

### Medical History

Medical information included major symptom location, duration of symptoms, prior surgeries, prior medical and psychiatric diagnoses, and self-reported cause of present symptoms as collected by a structured questionnaire supplemented by the physician interview.

## Physical Findings and Diagnoses

All patients were examined by an Occupational Physician and a Board-Certified Orthopedist specializing in hand surgery. A primary musculoskeletal diagnosis was made by the physicians at the time of the baseline evaluation based on the medical history, symptoms, physical findings, and laboratory data, when available. Diagnoses were classified according to criteria for occupational upper-extremity disorders as described in Millender et al<sup>10</sup> and Steinberg.<sup>11</sup> Patients who had a history, symptoms, and physical findings that were consistent with a specific musculoskeletal diagnosis were categorized as having a "classic" musculoskeletal or neurovascular diagnosis (eg, carpal tunnel syndrome, medial and lateral epicondylitis); all others were classified as "indeterminate." Cases were categorized as acute trauma if the patient attributed their injury to a specific event in the workplace. Given the method used to classify patients, it is possible that some of the cases classified as acute trauma may also have had repetitive injuries to the upper limbs.

### Pain

Pain measures included Visual Analog Scale (VAS) (0–10 ratings) measures of average pain severity, perceived control over pain, and fear of pain.<sup>9</sup>

### Psychological/Behavioral Characteristics

Psychological measures included the Catastrophizing, Coping, and Perceived Control over Pain subscales of the Coping Strategies Questionnaire,<sup>12</sup> and fear of reinjury.<sup>9</sup> The questions used in this part of the questionnaire are reproduced in the Appendix.

### Perception of Work Environment

Measures of work satisfaction and enjoyment of work tasks were

adapted from Bigos et al<sup>13</sup> and self-reported using a VAS (0–10 rating) (see Appendix). Measures included coworker sharing, coworker response, supervisor rapport, and task enjoyment. In addition, a measure of the patient's anger with his or her employer was created (0–10 = strongly agree to strongly disagree). A higher score indicated less anger with employer. All scores for the work environment measures were scaled with higher scores representing a more positive perception of the work environment.

### Litigation

All patients were asked whether they had consulted a lawyer or were involved in any litigation in regard to their WRUED.

### Data Analyses

Chi-square tests for ordinal and categorical variables and analyses of variance for continuous variables were used in making comparisons between patient groups (ie, working vs work-disabled, classic vs indeterminate physical findings, acute and subacute (less than 6 months' duration) vs chronic (greater than 6 months' duration) symptoms. Kruskal-Wallis tests were used when normality assumptions were in doubt. Variables such as duration of symptoms were approximately log-normally distributed, so that analyses were conducted based on the natural log of the response. Medians are reported for variables that were not normally distributed. Statistical tests are used primarily to enhance the descriptive results, so no specific adjustment was made for multiple comparisons. As a result, approximately 5% of the test results would be expected to be statistically significant by chance alone.

## Results

### General Characteristics

The characteristics for the entire cohort of 124 patients are summarized in Table 1.

**TABLE 1**

Demographic, Vocational, and Medical Characteristics of Patients with WRUEDs\*

Demographic	
Age (mean, range in years)	40 yr (19–65 yr)
Gender (% female)	68%
Vocational	
Time on the job (median, range)	48 mo (3 to 336 mo)
Work status	
Full-time	39%
Part-time	9%
Totally disabled	44%
Unemployed	7%
Homemaker	1%
Job tasks-repetitive/forceful/awkward (% yes)	86%
Duration of disability† (median, range)	10 mo (6 d to 68 mo)
Medical	
Major symptom location	
Hand/wrist	60%
Elbow/forearm	22%
Shoulder	11%
Upper back/neck	6%
Duration of symptoms (median, range)	14 mo (1 to 107 mo)
Prior surgery (% yes)	41%
Psychiatric diagnoses from physician (% yes)	15%
Acute traumatic etiology (% yes)	38%
Indeterminate diagnoses (% yes)	47%
Litigation	
Attorney (% yes)	45%
Litigation (% yes)	32%

\* Entire cohort,  $n = 124$ .

† Partial or total disability.

Patients' ages ranged from 19 to 65, with a mean of 40 years. Sixty-eight percent ( $n = 85$ ) of the patients were female. There was no difference in age distribution by gender. Thirty-nine percent ( $n = 48$ ) of patients were working full-time and 9% ( $n = 11$ ) were working part-time at the time of the baseline evaluation. Forty-four percent ( $n = 55$ ) of patients were totally work-disabled (ie, not working because of upper-extremity symptoms), one patient was work-disabled because of an unrelated pre-morbid back injury, 7% ( $n = 9$ ) of patients were currently unemployed, and 1% ( $n = 1$ ) were homemakers. The duration of disability, defined as the length of time the patient was out of work or on modified duty, ranged from 6 days to 68 months (median 10 months).

Sixty percent ( $n = 75$ ) of the patients reported the hand/wrist as

the most symptomatic location. Forty-one percent ( $n = 51$ ) had undergone at least one surgical procedure involving the upper extremity, including one patient who had undergone five separate upper-extremity surgeries.

A total of 15% ( $n = 19$ ) reported one or more current psychiatric diagnoses made by a physician, with the most common diagnosis being depression (15 patients, 12%).

The most common primary upper-extremity diagnoses made by the study physicians at the time of the baseline evaluation were carpal tunnel syndrome in 15% ( $n = 18$ ), ulnar neuritis in 10% ( $n = 12$ ), and lateral epicondylitis in 7% ( $n = 9$ ). Forty-seven percent of patients ( $n = 58$ ) were classified as having "indeterminate" diagnoses.

Thirty-eight percent ( $n = 47$ ) reported acute antecedent trauma (de-

defined as a time-specific traumatic event involving the upper extremities) as the etiology of the upper-extremity disorder. A larger proportion of male patients (54%) reported acute antecedent trauma as compared with female patients (30%). Forty-five percent ( $n = 51$ ) of patients had contacted an attorney, and 32% ( $n = 37$ ) were involved in litigation in relation to their WRUED.

### Work-Disabled Versus Working

Patient characteristics were compared between those working part-time or full-time and those who were work-disabled (Table 2). There were no significant differences between the working group and the work-disabled group with regard to age, gender, time on the job, or type of job (percentage with manual jobs).

Prior surgeries were significantly more common among the work-disabled (51% vs 25%, as was antecedent acute trauma (49% vs 29%). On physical exam, musculoskeletal diagnoses in the work-disabled group tended to be indeterminate (53%) more frequently than in the working group (38%).

The average pain level was significantly higher among the work-disabled (median 7.3 for work-disabled vs 6 for working). Work-disabled subjects scored significantly higher on the Catastrophizing Subscale of the Coping Strategies Questionnaire (7.4 vs 5.1). Indices of the use of coping strategies as measured by the Coping Subscale and the level of perceived control over pain did not differ significantly between the two groups. The work-disabled and working groups were similar in their perceptions of the work environment except that the work-disabled reported more anger toward their employer (4.9 vs 6.4). Work-disabled patients reported having consulted an attorney significantly more often (62% vs 20%) than working patients and were more likely to be involved in litigation (52% vs 8%).

**TABLE 2**

Demographic, Vocational, Medical, and Psychological Characteristics of Patients with WRUEDs by Work Status

	Work Status	
	Work Disabled ( $n = 55$ )	Working ( $n = 59$ )
Demographic		
Age†	40 yr	38 yr
Gender (% female)	69%	68%
Vocational		
Time on job‡	48 mo	57.5 mo*
Job tasks—repetitive/forceful/awkward (% yes)	86%	93%
Medical		
Duration of symptoms‡	14 mo	11 mo
Prior surgeries (% yes)	51%	25%***
Acute trauma (% yes)	49%	29%**
Indeterminate diagnoses (%)	53%	38%*
Pain		
Average pain level‡	7.3	6.0***
Fear of pain‡	5.6	4.5*
Psychological		
Fear of reinjury‡	7.5	7.3
Catastrophizing subscale (CS)†	7.4 (4.8)	5.1** (4.0)
Coping subscale (CoS)†	7.3 (4.3)	6.6 (4.4)
Perceived control over pain†	2.3 (1.7)	2.8* (1.5)
Perception of work environment		
Coworker sharing†§	7.2 (2.5)	6.6 (3.0)
Coworker response†§	7.5 (2.0)	6.7 (2.9)
Supervisor rapport†§	7.8 (2.4)	7.4 (2.8)
Task enjoyment†§	7.7 (2.6)	6.7 (3.0)
Anger with employer†	4.9 (3.7)	6.4* (3.5)
Litigation		
Attorney (% yes)	62%	20%***
Litigation (% yes)	46%	8%***

Work disabled = unable to work because of WRUED; working = full- or part-time.

\*  $P < .1$ .

\*\*  $P < .05$ .

\*\*\*  $P < .01$ .

† Mean.

‡ Median.

§ Higher score = more positive work environment.

|| Higher score = less anger.

Standard deviations in parentheses.

### “Indeterminate” Versus Classic Diagnoses

Because it has been suggested that patients with vague physical findings and indeterminate diagnoses may have longer periods of disability and may be more difficult to rehabilitate, we compared those patients with indeterminate diagnoses with those with classic diagnoses. Results of this comparison are presented in Table 3. There were no significant differences between the two groups with respect to age, gender, prior

surgery, or acute antecedent trauma. There were no significant differences in the type of job (manual vs non-manual) and type of job tasks (repetitive/forceful/awkward) between the two groups. However, there was evidence that patients with indeterminate physical findings had a significantly longer duration of symptoms (median duration 17 months compared with 13 months). Medical characteristics other than duration of symptoms did not differ significantly between the two groups. The indeter-

**TABLE 3**  
 Characteristics of Patients with WRUEDs: Indeterminate versus Classic Physical Findings

	Diagnoses	
	Indeterminate n = 58	Classic n = 65
Demographic		
Age†	38 yr	41 yr
Gender (% female)	69%	69%
Vocational		
Working (% yes)	38%	55%*
Job tasks—repetitive/forceful/ awkward (% yes)	84%	87%
Duration of disability‡	16 mo	13 mo
Medical		
Duration of symptoms‡	17 mo	13 mo**
Prior surgeries (% yes)	45%	38%
Acute trauma (% yes)	38%	38%
Pain		
Average pain level‡	7.2	6.5
Fear of pain‡	4.8	5.0
Psychological		
Fear of reinjury‡	8.5	7.5
Catastrophizing Subscale (CS)†	7.6 (4.6)	5.3** (4.5)
Coping subscale (CoS)†	7.7 (4.0)	6.3* (4.6)
Perceived control over pain†	2.1 (1.5)	2.9** (1.6)
Perception of work environment		
Coworker sharing†§	6.3 (3.2)	7.3* (2.3)
Coworker response†§	6.4 (3.0)	7.5* (2.2)
Supervisor rapport†§	7.5 (2.8)	7.4 (2.7)
Task enjoyment†§	7.1 (2.8)	7.1 (3.0)
Anger with employer†	5.0 (3.7)	6.1 (3.6)
Litigation		
Attorney (% yes)	66%	20%***
Litigation (% yes)	52%	8%***

Indeterminate = history, symptoms and physical findings not consistent with a specific musculoskeletal diagnosis; classic = history, symptoms and physical findings consistent with a specific musculoskeletal diagnosis.

\*  $P < .1$ .

\*\*  $P < .05$ .

\*\*\*  $P < .01$ .

† Mean.

‡ Median.

§ Higher score = more positive work environment.

|| Higher score = less anger.

Standard deviations in parentheses.

minate group had a significantly higher mean Catastrophizing Subscale (7.6 vs 5.3) and a lower average perceived level of control over pain (2.1 vs 2.9).

### Duration of Symptoms

To determine whether patients who varied in duration of symptoms differed on demographic, vocational, medical, pain, psychological, perceived work environment, and litigation measures, we divided the cohort

into those with acute or subacute symptoms (less than 6 months' duration) and those with chronic symptoms (more than 6 months' duration) (Table 4). Those subjects who had experienced upper-extremity symptoms for more than 6 months were older than those with less than 6 months' duration of symptoms (mean 41 years vs 36 years). Subjects with longer duration of symptoms reported less enjoyment of work tasks and higher levels of fear

of pain and reinjury, and catastrophizing.

With regard to perception of the work environment, those with longer duration of symptoms reported less enjoyment of job tasks and more anger toward their employer. Patients with a longer duration of symptoms were significantly more likely to have consulted an attorney, to be involved in litigation, and to be out of work (ie, either totally disabled or unemployed).

### Discussion

This study, using cross-sectional data, identified factors that differentiate individuals who continue to work with WRUEDs from those who are work-disabled. These analyses reveal that those who were work-disabled were more likely to report acute trauma as the cause of their symptoms, to have had prior surgery, to experience higher levels of pain and of catastrophizing suggesting greater psychological reactivity to persistent pain/symptoms, to have higher levels of anger toward their employer, and to be more likely to have an attorney and be involved in litigation with their employer.

Given the design of the present study, it is impossible to determine whether the differences between groups preceded, cooccurred, or were secondary to becoming work-disabled. The findings, however, do suggest that a heightened response to pain/symptoms, where the individual finds it difficult to cope with pain and associated loss of function, may contribute to prolonged disability. Indeed, this response to pain may also help account for the increased level of surgery in the work-disabled group. Request for surgical relief may be triggered by high levels of persistent pain and heightened reactivity to pain (ie, catastrophizing in relation to pain). Surgery, in this group, frequently fails to resolve the patient's persistent symptoms or work disability. An indeterminate diagnosis may also contribute to increased pain and distress (catastroph-

**TABLE 4**  
 Characteristics of Patients with WRUEDs by Duration of Symptoms

	Symptoms	
	Acute/Subacute < 6 months (n = 27)	Chronic > 6 months (n = 97)
Demographic		
Age†	36 yr	41 yr**
Gender (% female)	63%	70%
Vocational		
Working (% yes)	70%	41%**
Job tasks—repetitive/forceful/awkward (% yes)	96%	84%
Medical		
Prior surgeries (% yes)	19%	47%
Acute trauma (% yes)	33%	39%
Physical findings (% indeterminate)	31%	52%
Pain		
Average pain level‡	6.1	6.6
Fear of pain‡	4.0	5.5**
Psychological		
Fear of reinjury‡	5.8	7.0
Catastrophizing subscale (CS)†	4.8 (4.5)	6.9** (4.6)
Coping subscale (CoS)†	5.7 (4.0)	7.4* (4.4)
Perceived control over pain†	3.1 (1.7)	2.4* (1.5)
Perception of work environment		
Coworker sharing†§	6.3 (3.1)	7.0 (2.7)
Coworker response†§	6.2 (3.1)	7.2 (2.4)
Supervisor rapport†§	7.5 (2.5)	7.4 (2.8)
Enjoy work tasks†§	8.5 (1.3)	6.6*** (3.1)
Anger with employer†	5.7 (4.0)	5.5 (3.6)
Litigation		
Attorney (% yes)	15%	54%***
Litigation (% yes)	4%	41%***

Acute/Subacute = unable to work because of WRUED; chronic = full- or part-time.

\*  $P < .1$ .

\*\*  $P < .05$ .

\*\*\*  $P < .01$ .

† Mean.

‡ Median.

§ Higher score = more positive work environment.

|| Higher score = less anger.

Standard deviations in parentheses.

izing). In such a situation, the patient's symptoms are not medically validated, placing the patient in an uncertain condition regarding prognosis, appropriate treatment, expected relief, and receipt of workers' compensation benefits. This experience has been characterized by high levels of distress often associated with attempts to obtain evaluation and treatment.<sup>14</sup> Although it is unlikely that following extensive evaluation patients with indeterminate diagnoses will benefit from any further specific medical or surgical treatment, the workers' compensa-

tion system often demands that workers receiving benefits demonstrate that they are being actively treated for their condition. This may lead to "medicalization" of the disability and surgical procedures with little likelihood of success.

Recent data on CTS patients using Structured Clinical Interview techniques indicated that CTS cases of more than 6 months' duration demonstrated significantly higher rates of anxiety disorders, both current and lifetime, than low back pain patients.<sup>15</sup>

In contrast, both CTS and low back pain patients had similar rates

of depression, current substance abuse, and somatoform pain disorders.<sup>15</sup> These findings suggest, in combination with the observations from the present study, the importance of performing a clinical assessment for the presence of psychological disorders in this patient group. Also, although not specific to work disability, a recent study of psychological correlates of CTS indicate that CTS patients report higher levels of stress (life events, symptoms of distress) and lower levels of lifestyle organization (goal directedness, performance focus and efficiency, timeliness of task completion and organization of physical space) than non-CTS controls.<sup>16</sup> It is important to reemphasize that whether the distress observed in patients is a secondary consequence of the symptoms and concomitant impaired function or was present before symptom onset is presently unknown. Such distress may exacerbate pain and prolong disability. Further research on the specific contribution of distress in the exacerbation and maintenance of work disability represents an important area of inquiry particularly given the potential clinical implications of such findings. For example, brief biobehavioral interventions are available to assist in eliminating, reducing, or more effectively managing distress<sup>17</sup> that could be included in the medical management and rehabilitation of these patients.<sup>18</sup>

Another factor associated with work disability was duration of symptoms. Variables that differed across duration of symptoms (symptoms for less than 6 months; symptoms for more than 6 months) include higher levels of catastrophizing, less enjoyment of work tasks, and greater anger toward employer for the more chronic cases. Patients who had symptoms for more than 6 months were more *distressed* than those with symptoms for less than 6 months. An association between duration of symptoms and involvement with an attorney or litigation was also observed.

The relationship between attorney involvement and litigation, pain, distress, and work-disability status requires further explication, particularly in light of data indicating that litigation is associated with lower levels of distress in low back pain cases, suggesting such activity may serve as a coping strategy for managing what may be perceived as an uncontrollable stressor (ie, involvement in workers' compensation system with persistent pain).<sup>19</sup> Indeed, it has been our clinical experience that a high percentage of patients report significant difficulties obtaining information to make informed decisions regarding their health care and related benefits. Given the frequently adversarial nature of the worker's compensation process, attorney involvement may be seen as one of only a few viable approaches to coping with the stress associated with pain, loss of function, and potential loss of income.

The finding that 47% of the patients in this study had indeterminate diagnoses is consistent with the findings of Sikorski et al,<sup>20</sup> who performed diagnostic studies on 204 subjects in Australia with upper limb or neck pain attributed by the subjects to their occupations. That study found that 42% of the subjects presented with patterns of pain not suggestive of any specific diagnosis and that in only 37% of the cases were the investigators able to make a clear clinical diagnosis with confirmation by objective tests. The ongoing search for a specific diagnosis and treatment may impair the rehabilitation process by delaying the recognition, on the part of the patient, of the importance of functional rehabilitation in the face of ongoing symptoms.

There are a number of limitations in the present study. The cohort is highly selected, due to the clinic's focus on chronic WRUEDs; the nature of the referral base (a limited number of physicians, employers, and workers' compensation insurers); refusal by insurers to allow

evaluation of 40% of those referred; and our facility's expertise in difficult hand surgery problems. This referral bias may have resulted in a higher number of surgical failures, and cases where the insurer wanted a medical end result evaluation for legal rather than treatment purposes, skewing the population toward patients with prolonged disability. Although the present sample represents a small subset of cases who continue to experience work disability, recent data from the Bureau of Labor Statistics (1994) indicates that 39% of all cases with wrist-related upper-extremity disorders experienced 31 or more days off work in 1992.<sup>21</sup> Such findings highlight the significant impact of these disorders on work disability and suggests that the percentages in the present study may indeed be more representative of work disability in general than originally expected. Lastly, as indicated earlier, the cross-sectional design makes it impossible to determine whether those factors associated with work-disability are causes or consequences.

The results of the present study do support a multidimensional conceptualization of work disability that considers medical, workplace, and psychological factors.<sup>22</sup> The findings also suggest that a combination of medical management directed at symptom relief in addition to interventions that can improve the individual's sense of mastery and personal control over symptoms and functional loss should be of benefit. Although the present study did not directly assess ergonomic exposure correlates of prolonged work disability, given their potential role in WRUEDs,<sup>23</sup> ergonomic evaluation from a clinical perspective<sup>24</sup> and intervention directed at elimination or reduction of these factors should also be considered. Such a comprehensive approach should prove helpful in reducing symptoms, functional decrements, and associated work disability. Our group developed an integrated rehabilitation program that

included many of the above components.<sup>25</sup> Although the data from this outcome study support the potential of such an approach in relation to return to work, the study did not measure other important outcomes such as pain, other WRUED related symptoms, distress, or upper-extremity function. Future outcome research that evaluates the effects of such integrated treatment approaches on a number of health outcomes should be conducted.<sup>26</sup>

The present findings also suggest that early interventions to prevent work disability might benefit from a focus on reducing employer-employee and insurer-employee conflicts, improving the medical management of pain and enhancing the ability to cope with residual pain and distress while avoiding unnecessary surgery. Inasmuch as working may significantly contribute to psychological well-being,<sup>27</sup> efforts to maintain postinjury employment through adjusted duty, job modification, or retraining may be crucial to avoiding high pain levels, catastrophic thinking, and anger that characterized many of those who were out of work for prolonged periods. The Occupational Safety and Health Administration's current effort to integrate sound, conservative medical management of WRUEDs with employee-focused ergonomics in the workplace may help to prevent work disability in this population by reducing the need for invasive medical interventions and addressing workplace issues at an early stage.

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**APPENDIX**

## Psychosocial Characteristics Format of Questions

**1. Average pain level**

*For the problem that bothers you the most, how would you describe the pain or discomfort it has caused you during the past 7 days? Put a slash through the line to indicate your answer.*

Measured on visual analogue scale (VAS): 0 = No pain and 10 = very severe pain

**2. Fear of pain**

*In general, how frightened are you of the pain or discomfort?*

Measured on VAS: 0 = Not at all and 10 = Extremely frightened.

**3. Fear of reinjury**

*In general, how frightened are you of re-injuring yourself?*

Measured on VAS: 0 = Not at all and 10 = Extremely frightened.

**4. Catastrophizing Subscale (CS)**

The CS score was a summation of the scores for the following 6 questions:

*Answer each item by circling the response which indicates how often you used the strategy. 0 = not used, 1 = used somewhat, 2 = used quite a bit, 3 = used a great deal*

*It's terrible and I feel it's never going to get any better.*

*It's awful and I feel that it overwhelms me.*

*I feel my life isn't worth living.*

*I worry all of the time about whether it will end.*

*I feel I can't stand it anymore.*

*I feel like I can't go on.*

**5. Coping Subscale (CoS)**

The CoS score was a summation of the scores for the following 6 questions:

*Answer each item by circling the response which indicates how often you used the strategy. 0 = not used; 1 = used somewhat; 2 = used quite a bit; 3 = used a great deal.*

*I leave the house and do something, such as going to the movies or shopping.*

*I read.*

*I try to be around other people.*

*I do anything to get my mind off the pain.*

*I do something I enjoy, such as watching t.v. or listening to music.*

*I do something active, like household chores or projects.*

**6. Perceived control over pain**

*Based on all the things you do to cope, or deal with your symptoms, on an average day, how much control do you feel you have over them? Please circle the appropriate number. Remember, you can circle any number along the scale.*

0 1 2 3 4 5 6

**No Control    Some Control    Complete Control**

**7. Coworker sharing**

*I am satisfied with the way my fellow workers talk things over with me and share problems with me.*

Measured on VAS: 0 = Strongly agree and 10 = Strongly disagree.

**8. Coworker response**

*I am satisfied with the way my fellow workers respond to my emotions, such as anger, sorrow or laughter.*

Measured on VAS: 0 = Strongly agree and 10 = Strongly disagree.

**9. Supervisor rapport**

*I get along well with my closest immediate supervisor.*

Measured on VAS: 0 = Strongly agree and 10 = Strongly disagree.

**10. Enjoyment of work tasks**

*I enjoy the tasks involved in my job.*

Measured on VAS: 0 = Strongly agree and 10 = Strongly disagree.

**11. Anger with employer**

*I am angry about how my employer has treated me since my upper-extremity problem began.*

Measured on VAS: 0 = Strongly agree and 10 = Strongly disagree.

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### A Horse Museum

When the U.S. Postal Service decided to issue a set of stamps commemorating carousel horses, there was only one place to go: Carousel World, in Peddlers' Village outside New Hope, Pennsylvania. This two-year-old museum is the showcase for collector Charlotte Dinger's incredible array of ornately carved horses and merry-go-round art.

Visitors get a walk or a ride into the colorful past. There are bejeweled horses from Coney Island (which once had 24 carousels going simultaneously) ... and there is a real working carousel to ride on, with 48 animals—mostly American, but including two French pigs and two German polar bears.

Three of the four painted ponies featured on the new postage stamps are from Dinger's collection.

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