### Supplemental Table 1. Evidence for Occupational Therapy Interventions for Individuals With Work-Related Low Back Injuries and Illnesses

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<td>French et al. (2006)</td>
<td>To assess the effects of superficial heat and cold therapy for low back pain in adults</td>
<td>Level I Systematic review N = 1,117 participants (9 trials) ≥ age 18 with nonspecific low back pain. The duration of back pain was defined as acute (&lt;6 wk), subacute (6–12 wk), or chronic (&gt;12 wk).</td>
<td><strong>Interventions</strong> Trials in which superficial heat or cold therapy was administered to ≥1 group within the trial. Trials in which cointerventions (e.g., exercise) were given were included only if the cointerventions were similar across comparison groups. Trials were excluded if they could not isolate the effects of heat or cold from the effects of the other therapies delivered.  <strong>Outcome Measures</strong>  - Pain (visual analog scale)  - Strength, flexibility, and changes in quality of life (Oswestry Pain Disability Index)  - Disability and function (Roland–Morris Disability Questionnaire)</td>
<td>2 trials found that heat wrap therapy significantly reduced pain after 5 days compared with oral placebo. 1 trial found that a heated blanket significantly decreased acute low back pain immediately after application. 1 trial found that adding exercise to heat wrap reduced pain after 7 days. Evidence to evaluate the effects of cold for low back pain is insufficient, and evidence regarding differences between heat and cold for low back pain is conflicting.</td>
<td>Many of the studies included in the review were of poor methodological quality.</td>
<td>This study provides weak evidence that occupational therapists can consider using superficial heat modalities as an adjunctive or preparatory intervention to prepare for or facilitate engagement in occupations.</td>
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<td>Guzman et al. (2001)</td>
<td>To assess the effect of multidisciplinary biopsychosocial rehabilitation on clinically relevant outcomes for participants with chronic low back pain</td>
<td>Level I Systematic literature review of RCTs N = 1,964 participants with disabling low back pain of &gt;3 mo (10 trials)</td>
<td><strong>Interventions</strong> Studies fulfilled the following criteria: 1 group of participants received multidisciplinary biopsychosocial rehabilitation, a minimum of the physical dimension and 1 of the other dimensions (psychological or social or occupational) was present, and 1 group of participants received a control treatment that did not fulfill the review's criteria for multidisciplinary rehabilitation. Interventions described as back schools were excluded unless they were part of a</td>
<td>Evidence that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration improved function compared with inpatient or outpatient nonmultidisciplinary rehabilitation is strong. Evidence that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration reduced pain when compared with outpatient nonmultidisciplinary rehabilitation or usual care is moderate.</td>
<td>The review focused on selected clinical outcomes, ignoring data on physical measurements and psychological scales. The studies examined selected participants with severe disabling low back pain treated in well-established multidisciplinary rehabilitation programs. The results might not apply to most clients seen in primary care.</td>
<td>Individuals with disabling back pain benefit from occupation-based interventions described by the study's authors as “functional restoration” with a biopsychosocial approach compared with nonmultidisciplinary rehabilitation or usual care (i.e., without a functional restoration approach).</td>
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</tbody>
</table>
### Author/ Year

Henschke et al. (2005)

### Study Objectives

To determine whether behavioral therapy is more effective than other treatments for chronic low back pain and which type of behavioral treatment is most effective

### Level/Design/Participants

Level I Systematic review of RCTs

N = 21 trials for those with nonspecific low back pain ages <18–>65

*Chronic low back pain* was defined as back pain that persisted for >12 wk; trials with participants with specific low back pain caused by pathological entities (e.g., infection, neoplasm, metastasis, osteoporosis, rheumatoid arthritis, fractures) were excluded.

### Intervention and Outcome Measures

**Interventions**

Behavioral treatment was compared with placebo, no treatment, or waiting-list control. Different behavioral treatments were compared; behavioral treatments were compared with other kinds of treatment; and behavioral treatment in addition to other treatment (e.g., physiotherapy, back education, medical treatment) was compared with the other treatment alone.

Behavioral treatment included respondent (e.g., progressive relaxation, electromyography biofeedback), operant, combined respondent cognitive, cognitive, and cognitive–behavioral therapies.

**Outcome Measures**

- Overall improvement (self-reported or observed)
- Back pain–specific functional status (Roland–Morris Disability Questionnaire, Oswestry

### Results

Evidence regarding vocational outcomes of intensive multidisciplinary biopsychosocial rehabilitation is contradictory.

**Outcome Measures**

- Pain
- Function
- Employment
- Quality of life
- Global assessments

Combined respondent cognitive therapy or progressive relaxation therapy alone was more effective than no treatment for short-term pain relief, but whether this finding was also true for back-specific functional status is unknown.

No significant differences were detected in comparisons among the various types of cognitive–behavioral therapies or in comparisons between behavioral treatment and exercises.

Combined respondent cognitive therapy and progressive relaxation were more effective than no treatment for short-term pain reduction, although this finding was based on several studies of moderate or low quality.

### Study Limitations

The studies were of poor methodological quality; randomization, blinding of participants and outcome assessors, and tracking of cointerventions and compliance were absent in many studies. Many of the trials evaluated programs developed by the authors themselves, a possible source of bias. Statistical pooling of multiple outcome measures within the behavioral domain may have resulted in the lack of an effect in many of the comparisons.

### Implications for Occupational Therapy

This review provides limited evidence that respondent cognitive therapy and progressive relaxation therapy may be effective for short-term chronic low back pain. Thus, psychosocial interventions for clients with chronic low back pain should accompany physical interventions and fit well within the scope of occupational therapy practice.
Heymans et al. (2004) To determine whether back schools were more effective than other treatments or no treatment for participants with nonspecific low back pain

**Level I**

**Interventions**

*Back school* was defined as consisting of an educational and skills acquisition program including exercises given to groups of participants and supervised by a paramedical therapist or medical specialist.

The back school consisted of information on the anatomy of the back, biomechanics, optimal posture, ergonomics, and back exercises. Other treatments included exercise therapy, spinal manipulation, myofascial therapy, oral or written instruction, placebo, or waiting list.

**Outcome Measures**

- Return to work
- Pain
- Global measure of improvement
- Functional status (e.g., Roland–Morris Disability Questionnaire or Oswestry Disability Index)

No strong evidence was found for any particular type of back school treatment. Moderate evidence was found that back schools have better short- and intermediate-term effects on pain and functional status than other treatments for recurrent and chronic low back pain. Evidence that back schools in an occupational setting are more effective than other treatments, placebo, or waiting-list status in terms of chronic low back pain, functional status, and return to work during short- and intermediate-term follow-up was moderate.

Hurwitz et al. (2005) To determine the effectiveness of recreational physical activity and back exercises on low back pain, related disability, and the psychological distress it causes

**Level I**

**Interventions**

- Group 1 received chiropractic care with physical modalities.
- Group 2 received chiropractic care without physical modalities.
- Group 3 received medical care with physical therapy.
- Group 4 received medical care without physical therapy.

Results suggest that participants experienced better outcomes not from specific back exercises, but rather from a focus on nonspecific physical activities to reduce pain and improve psychological health.

Specific back exercises may be counterproductive, and intervention should instead focus on meaning activities as means and ends, take an effective and perhaps even

Because participants were primary care patients, they may not be representative of individuals with low back pain (such as workers' compensation clients) who are treated in clinical settings or who do not seek clinical treatment at all. In addition, researchers did not collect information on specific types of back exercises and relied instead on participants' self-reports of physical activity such as walking or swimming has a more positive impact on decreasing pain for clients with chronic low back injury than back-strengthening exercises alone.

Occupational therapy programs, which focus on meaningful activities as means and ends, take an effective and perhaps even...
## Supplemental Table 1. Evidence for Occupational Therapy Interventions for Individuals With Work-Related Low Back Injuries and Illnesses (cont.)

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| Karjalainen et al. (2003) | To determine the effectiveness of multidisciplinary rehabilitation for subacute low back pain among working-age adults | Level I Systematic review of RCTs  
*N = 233; participants were ages 18–65 with subacute low back pain (>4 wk but <3 mo) whose back pain was not related to acute trauma, neoplasms, or inflammatory or neurological disease (2 trials)* | Participants were enrolled in the study for 3 yr with an additional 18-mo follow-up period.  
**Outcome Measures**  
- Low back disability (Roland–Morris Disability Questionnaire)  
- Pain intensity (Numerical Pain Rating Scale)  
- Distress because of low back pain (Mental Health Index)  
- Metabolic Equivalent Task | emphasize restoration of normal functioning.  
Participants in the intervention groups returned to work significantly sooner than those in other groups and experienced significant improvements in subjective disability and disorder-specific functional status. No effects could be attributed to the intervention in intensity of pain. | The methodological quality of the 2 trials was low; defects included lack of blinding of participants, therapists, and observers and failure to report cointerventions. | This study supports the philosophical underpinnings and client-centered approach of occupational therapy. A holistic or biopsychosocial approach to the rehabilitation of individuals with subacute work-related low back pain includes workplace visits and psychological, behavioral, and social interventions as part of a comprehensive rehabilitation plan. |
The use of cognitive–behavioral assessments and interventions to facilitate a client's engagement or reengagement in occupations is well within the purview of occupational therapists. This study supports the holistic approach of occupational therapy to address a client's chronic pain related to his or her ability to perform work-related occupations.

**Interventions**

Interventions in the 25 studies focused on cognitive therapy with 3 primary types of cognitive therapy identified: (1) biofeedback and relaxation, (2) behavior therapy, and (3) cognitive–behavioral therapy.

**Outcome Measures**

The 25 trials examined in this study reported a total of 221 outcome measures with most of the outcome as patient self-rating (77%), including the domains of pain experience, mood/affect, cognitive coping and appraisal, behavioral activity, biological, social role functioning, and use of health care system.

Results indicate that active psychological treatments based on the principle of cognitive–behavioral therapy are effective. Compared with the waiting-list control conditions, cognitive–behavioral treatments were associated with significant effect sizes on all domains of measurement (median effect sizes across domains = 0.5). Comparison with alternative active treatments revealed that cognitive–behavioral treatments produced significantly greater changes for the domains of pain experience, cognitive coping and appraisal (positive coping measures), and reduced behavioral activity.

Most of the examined trials were of low statistical power. In several of the examined trials, patients assigned to a waiting list in 1 trial may have continued to receive existing treatments (such as physical therapy or pharmacotherapy) that may be equivalent to the treatment control in another trial. The class of treatment controls also varied, from continuing previously ineffective psychological treatments to starting a treatment based on the principle of cognitive–behavioral therapy are effective.

### Schonstein et al. (2003)

To compare the effectiveness of physical conditioning programs with management strategies that do not include traditional physical conditioning programs for workers with back and neck pain in reducing time lost from work and increasing functional status

**Interventions**

Participants underwent work conditioning, work hardening, functional restoration, or exercise programs to improve work capability or functional status.

**Outcome Measures**

- Time lost from work
- Return to work status
- Time between injury and return to preinjury work status
- Time on selected, appropriate, light, or modified duties
- Other reported change in work status
- Other outcomes assessed included functional status, physiological outcomes of physical examinations, functional status in relation to job demands, and physical conditioning programs that include a cognitive–behavioral approach reduced the number of sick days lost at 12-mo follow-up by an average of 45 days compared with usual care.

Minimal evidence was found for or against the effectiveness of specific exercises that were not accompanied by a cognitive–behavioral approach in reducing sick days resulting from back pain for workers with either acute or chronic back pain.

Variations in the content and duration of interventions labeled as physical conditioning, work hardening, or functional restoration may limit the extent to which results could be compared. Variation in the outcome measures used may also limit the comparability of results. Differences among the participants studied, small sample sizes, overall poor methodological quality, and inadequate reporting of results limit the conclusions that can be drawn from this study.

Physical conditioning programs, including work conditioning, combined with a cognitive–behavioral approach, are effective in reducing the number of sick days for a client with work-related back pain. Thus, holistic, occupation-based, and cognitive–behavioral interventions should be considered for individuals with low back pain as part of an occupational intervention plan.

- Physical conditioning programs
- Work hardening
- Functional restoration
- Specific exercises
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<td>Smith, McMurray, &amp; Disler. (2002)</td>
<td>To establish whether the guidelines in current use relating to intervention for acute low back pain are supported by more recently published scientifically rigorous research</td>
<td>Level I Systematic review of RCTs N = 18 trials with acute low back pain</td>
<td>Interventions included bed-rest, drug therapy, traction, spinal manipulation, exercise, back schools, work hardening, work conditioning, vocational intervention, and multidisciplinary pain programs including primarily psychological interventions.</td>
<td>Bedrest was found to not be an effective intervention for low back pain. Limited evidence was found to support traditional exercise-based therapy. The evidence did not support the use of traction and exercise or establish the efficacy of back schools. Work conditioning seems promising, but results are inconclusive.</td>
<td>The authors reported that the studies in this review were fraught with conflicting data and poor methodology. Also, the authors found inconsistency in definitions of acute low back pain, leading to inconclusive results and findings.</td>
<td>Multidisciplinary programs that include a psychological component show a promising trend. Thus, reengaging in occupations (rather than bedrest) and addressing psychological sequelae (rather than solely physical impairments) of acute low back pain, which are within the scope of occupational therapy practice, have limited support.</td>
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<td>Staal et al. (2004)</td>
<td>To determine the effectiveness of a behavior-oriented graded activity program compared with usual care</td>
<td>Level I Single-blind RCT N = 134 participants absent from work because of low back pain randomly assigned to either graded activity or usual care</td>
<td>Interventions Group 1 received 1 session 2 times/wk of graded activity, including physical exercise, application of operant conditioning, behavioral principles, and improved functioning and safe return to work even if pain persisted. The sessions continued until full return to work for a maximum of 3 mo. Group 2 received usual care, including the usual guidance and advice from the occupational physician and treatment from various caregivers.</td>
<td>The median number of days absent from work because of low back pain was 58 days in the graded activity group and 87 days in the usual care group, a statistically significant difference.</td>
<td>This study did not control for potential confounders such as compensation, legal issues, and workplace culture, possibly affecting the results.</td>
<td>Simulated occupational activities that are meaningful to the client are important in rehabilitation and can significantly reduce the number of days absent from work.</td>
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Note. RCTs = randomized controlled trials.

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[List of interventions and outcomes]

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*Note: The table includes various interventions and outcomes used in occupational therapy to address work-related low back injuries and illnesses.*