



**AOTA Critically Appraised Topics and Papers Series**  
**Occupational Therapy and  
Clinical Conditions Related to  
Workers' Compensation**

*\*A product of the American Occupational Therapy Association's  
Evidence-Based Literature Review Project*

**CRITICALLY APPRAISED TOPIC (CAT)**

***Focused Question***

What occupational therapy interventions are effective in the rehabilitation of individuals with work-related low back injuries and illnesses?

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**Clinical Scenario:**

Work is an important area of occupation for adults. Work-related interventions always have been at the core of occupational therapy practice. Occupational therapy views our nation's workforce in terms of productivity, purpose, social contribution, healthy families, and a healthy economy. Occupational therapy practitioners are trained to examine the context in which work occurs, as well as the consequences and possibilities of occupation (Kornblau & Jacobs, 2000).

According to the Bureau of Labor Statistics ([BLS], 2007), musculoskeletal disorders (MSDs) accounted for 30% of the injuries and illnesses resulting in days away from work in 2006. In 2006, the part of the body most affected by work-related incidents was the trunk (including the shoulder and back), accounting for 34% of all cases. The BLS reported that injuries and illnesses to the back made up 62% of the days-away-from-work cases involving the trunk. Furthermore, low back pain affects an estimated 80% of the population (World Health Organization, 2003).

The systematic review question asked, "What occupational therapy interventions are effective in the rehabilitation of individuals with work-related low back injuries and illnesses?" This question is relevant for many practice settings in which occupational therapy practitioners provide direct and indirect interventions for clients with work-related low back injuries and illnesses. This can include traditional inpatient hospital environments (acute, subacute, rehabilitation), outpatient rehabilitation clinics (freestanding and hospital-based), on-site industrial rehabilitation programs, and ergonomic consulting. Occupational therapy practitioners perform client-centered evaluations and, using a variety of approaches, help clients with low back injuries in the performance of occupations and activities. Approaches include instruction in proper body mechanics and how to perform activities safely; task analysis and use of ergonomic design to modify the environment; use of relaxations techniques; work hardening and reconditioning; and education for pain management, stress reduction, and coping (Grangaard, 2006; Maher & Bear-Lehman, 2008).

## **Summary of Key Findings:**

The studies included in the review focus on interventions for work-related low back injuries and illnesses, and examined the effects of therapeutic exercise, client education, activity, functional restoration/work reconditioning, physical agent modalities, cognitive-behavioral-oriented approaches, and multidisciplinary/biopsychosocial approaches.

Although the studies were not limited to occupational therapy publications, all the studies selected included interventions that were within the scope of occupational therapy practice. The following is a summary of key findings based on the aforementioned categories.

### **Therapeutic Exercises**

- Therapeutic exercise programs designed to meet the individual's specific symptoms are more effective than general muscle reconditioning exercises (Hayden, van Tulder, Malmivaar, & Koes, 2005).
- Subacute low back pain ([LBP], pain lasting 6 to 12 weeks): Evidence is insufficient to support or refute the effectiveness of exercise therapy in subacute low back pain for reducing pain intensity and improving function (Hayden, et al., 2005).
- Chronic LBP (pain lasting >12 weeks): Evidence is insufficient to support or refute the effectiveness of exercise therapy and other conservative treatments (Hayden, et al., 2005).
- Acute LBP (pain lasting <6 weeks): No significant difference in short-term pain relief between exercise therapy and no treatment. No difference in pain relief with exercise therapy when compared with other conservative treatments. Exercise therapy did not have a statistically significant effect in functional outcomes (Hayden, et al., 2005).
- General back and abdominal exercises are more beneficial than specific muscle stabilization exercises for clients with subacute or chronic nonspecific back pain (Koumantakis, Watson, & Oldham, 2005).
- Treatment comprised of supervised intensive back exercise programs and back school education demonstrated significant improvements for perceived disability, depression, and pain as compared with control groups that did not receive intensive back exercise programs (Filiz, Cakmak, & Ozcan, 2005).
- Back education combined with therapist-directed exercises improves return to work, back endurance, abdominal endurance, pain reduction, and depression reduction, and decreases disability (Filiz, Cakmak, & Ozcan, 2005).

### **Client Education**

- There was a lack of strong evidence for any particular type of back school/education intervention (as noted by the results of a systematic review including 19 randomized controlled trials [RCTs]). 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 LBP (Heymans, van Tulder, Bombadier, & Koes, 2004).
- There was moderate evidence that back schools in an occupational setting are more effective than other treatments, placebo, or waiting list controls for chronic LBP, functional status, and return to work during short- and intermediate-term follow-up (Heymans, et al., 2004).
- Bed rest has been shown to be ineffective in alleviating low back pain, with less functional recovery than those advised to stay active (Hagen, Hilde, Jamtvedt, & Winnem, 2004).
- There is limited evidence to support the efficacy back schools as sole treatment. Limited long-term benefits were found in using back education as a primary treatment modality (Heymans, et al., 2004).

- Back education programs alone did not reduce the rate of low back injury, the median cost per injury, the time off from work per injury, the rate of related musculoskeletal injuries, or the rate of the repeated injury after return to work (Daltroy et al., 1997).

### **Activity, Functional Restoration/Work Reconditioning**

- Clients with low back pain should refrain from specific back exercises and instead focus on nonspecific physical activities to reduce pain and improve psychological health (Hurwitz, Morgenstern, & Chiao, 2005).
- As noted by an RCT that included 681 participants, moderate evidence supports the assertion that flexion exercises are not effective in reducing acute pain; strong evidence exists that extension exercises are not effective in reducing acute pain; no evidence was found to support the notion that flexion exercises are effective in reducing chronic pain; no evidence was found that strengthening exercises are effective in reducing acute pain; and strong evidence exists that strengthening exercises are not more effective than other types of exercise (Hurwitz, Morgenstern, & Chiao, 2005).
- Specific back exercises may be counterproductive and the restoration of normal functioning instead should be emphasized (Hurwitz, Morgenstern, & Chiao, 2005).
- Persons with low back pain who are advised to rest in bed have a little more pain and a less functional recovery than those advised to stay active. For patients with sciatica, high quality evidence suggests that there is minimal or no difference in pain or functional status between bed rest and staying active (Hagen, et al., 2004).
- For patients with acute low back pain, there is moderate quality evidence (as noted by a systematic review of 11 RCTs) of little or no difference in pain intensity or functional status between bed rest and exercises. For patients with sciatica, there is moderate quality evidence of little or no difference in pain intensity between bed rest and physical therapy, but small improvements in functional status with physical therapy (Hagen, et al., 2006).
- There is moderate quality evidence of little or no difference in pain intensity or functional status between 2 to 3 days and 7 days of rest (Hagen, et al., 2004).
- Evidence suggests that graded activity for low back pain reduces absenteeism and increases return to work in the presence of pain (Staal, et al., 2004).
- Evidence supports meaningful simulated occupational activities reducing the number of days absent from work (Staal, et al., 2004).

### **Physical Agent Modalities (PAMs)**

- There is moderate evidence (as noted by a systematic review of 9 RCTs) that continuous heat wrap therapy produces a short-term reduction in pain and disability, and the addition of exercise heat wrap therapy further reduces pain and improves function (French, Cameron, Walker, Reggars, & Esterman, 2006).
- There is limited and inconsistent evidence (as noted by a systemic review of 2 RCTs) to support the use of transcutaneous electrical nerve stimulation (TENS) as the only intervention in the management of chronic low back pain (Khadilkar et al., 2005).

### **Cognitive and Behavioral-Oriented Approaches**

- Limited evidence (as noted by a systematic review of 7 RCTs) supports cognitive-respondent therapy and progressive relaxation therapy as isolated interventions to be effective for short-term chronic low back pain. No significant differences were detected between behavioral treatment and exercises (Ostelo et al., 2005).

- Actively involving clients with low back pain in interventions focusing on modifying behaviors to safely reengage in occupations is more effective than exercise interventions alone (Schonstein, Kenny, Keating, & Koes, 2003).
- Cognitive-behavioral therapy (CBT), when used in conjunction with therapeutic exercises, has been shown to decrease absenteeism when compared to the use of therapeutic exercises alone for either acute or chronic low back pain (Schonstein, et al., 2003).
- Physical conditioning programs for workers with chronic back pain that include a cognitive-behavioral approach can reduce the number of sick days lost at 12 months' follow-up by an average of 45 days when compared to general practitioner usual care (Schonstein, et al., 2003).
- There is minimal evidence (as noted by a systematic review of 18 RCTs) for or against the effectiveness in reducing sick days lost due to back pain of workers with either acute or chronic back pain of specific exercises that are not accompanied by a cognitive-behavioral approach (Schonstein, et al., 2003).

**Multiple Disciplinary—Biopsychosocial**

- Multiple disciplinary treatment, including a workplace visit, enabled working-age adults a faster return-to-work status (Karjalainen et al., 2003).
- Multiple disciplinary treatment improved subjective disability and disorder-specific functional status (Guerrero, Rajwani, Gray, Platnick, & Da Re, 1999).
- Intensive biopsychosocial rehabilitation with functional restoration improves function when compared with inpatient or outpatient non-multidisciplinary rehabilitation (Guzman et al., 2001).

Summary of Levels IV and V

N/A

**Contributions of Qualitative Studies:**

N/A

**Bottom Line for Occupational Therapy Practice:**

Based on the current literature, occupational therapy practitioners should be prepared to provide interventions that are direct in nature in order to successfully address the many factors of work-related low back injuries. Studies examined the effects of therapeutic exercises, the efficacy of client education, the importance of activity and functional restoration, the effect of physical agent modalities, the impact of cognitive-behavioral therapy, and multidisciplinary and biopsychosocial approaches.

Review of the evidence under discussion reveals that effective interventions directed at the person with low back injury or illness share some common features. The evidence is insufficient to support or refute the effectiveness of exercise therapy and other conservative treatments for subacute and chronic low back injuries. There was no significant difference in short-term pain relief between exercise therapy and no treatment for acute low back injuries. No difference in pain relief with exercise therapy was found when compared with other conservative treatments for acute low back injuries, nor did exercise therapy have a significant effect in functional outcomes for acute low back injuries. Thus, additional factors must be

considered in order for interventions to be effective and appropriate within the scope of occupational therapy practice. The research included within this study strongly suggests that for interventions to be effective, occupational therapy practitioners should take a holistic, client-centered approach. The research supports the need for occupational therapy practitioners to consider multiple strategies for addressing clients' needs. Specifically, interventions for individuals with low back injuries and illnesses should incorporate a biopsychosocial, client-centered approach that includes actively involving the client in the rehabilitation process at the beginning of the intervention process and addressing the client's psychosocial needs in addition to his or her physical impairments.

The research supports a biopsychosocial approach to work-related low back rehabilitation with the following recommendations for occupational therapy-related interventions:

- Therapist-directed and supervised therapeutic exercises targeting the individual client's symptoms (stretching, range of motion, flexibility, endurance, and strengthening)
- Client education (proper body mechanics, back education)
- Graded functional activity (work reconditioning, on-site interventions, graduated return to work)
- Environmental modifications (worksite visit, ergonomic modifications)
- Cognitive-behavioral strategies (positive reinforcement, progressive relaxation, biofeedback)
- Physical agent modalities (superficial heat, TENS) as preparatory or adjunctive interventions.

From a programmatic perspective, the literature suggests that a coordinated, case management approach to this population achieves the best outcomes. Occupational therapy-related programs should incorporate a multidisciplinary approach focusing on the client's individual needs (physical, psychological, and social), performance contexts, and work activity demands. Outcome assessment data need to be collected in order to plan for future actions with the client and to evaluate the program.

From a population-based perspective, occupational therapy practitioners have a role to educate policymakers about evidence-based interventions for this population, as well as the financial, physical, and emotional impact of work-related low back injuries. The literature review highlights a fragmented workers' compensation system in the United States that lacks a coordinated, evidence-based case management approach to dealing with work-related injuries (Schonstein, et al., 2006). The literature suggests that there is a need to develop a national work-related injury outcome data management system to collect, analyze, and interpret program outcomes to inform future research, policy, and practice (Linz, Shepherd, Ford, Ringley, Klekamp, & Duncan, 2002). Occupational therapy practitioners have a role in raising key stakeholders' awareness regarding the development of an evidence-based case management and rehabilitative approach by participating in outcome data collection and empirical research, and working with sympathetic legislators at the federal and state levels to promote and develop common sense policy that targets the issues.

## **Review Process:**

Procedures for the selection and appraisal of articles

**Inclusion Criteria:**

- Intervention and/or methods that were within the scope of practice of occupational therapy
- Years searched: 1997–2006
- Only peer-reviewed Level I study designs were included, except for two Level III study designs
- Work-related low back pain
- Intervention(s):
  - Therapeutic exercises
  - Back schools/education
  - Functional restoration
  - Physical agent modalities to include TENS, massage, superficial heat and cold therapy
  - Cognitive–behavioral therapy
  - Multidisciplinary approaches

**Exclusion Criteria:**

- Articles with evidence levels of IV and V were excluded
- Interventions outside the scope of occupational therapy practice
- Articles that specifically excluded worker’s compensation clients within the sample population
- Articles published prior to 1997

<b>Databases and Sites Searched</b>
PubMed, CINAHL, Cochrane Collaboration, PsycInfo, Health Source: Nursing/Academic Edition, Ovid, ProQuest, Health Reference Center Academic, OT Search.

***Quality Control/Peer Review Process:***

AOTA staff and project consultant provided consultation, guidance, and review of all work included in the review.

**Results of Search:**

***Summary of Study Designs of Articles Selected for Appraisal***

<b>Level of Evidence</b>	<b>Study Design/Methodology of Selected Articles</b>	<b>Number of Articles Selected</b>
I	Systematic reviews, meta-analysis, randomized controlled trials	19
II	Two groups, nonrandomized studies (e.g., cohort, case-control)	0
III	One group, nonrandomized (e.g., before and after, pretest–posttest)	1
IV	Descriptive studies that include analysis of outcomes (single subject design, case series)	0
V	Case reports and expert opinion, which include	0

	narrative literature reviews and consensus statements	
	Qualitative studies	0
	<b>TOTAL</b>	<b>20</b>

### Limitations of the Studies Appraised

Levels I, II, and III

The evidence-based literature review yielded many high quality studies. Nineteen of the 20 studies included in the review were at the highest level of evidence (Level I). Strengths of the literature review include a quality control, peer-review process, which included a wide variety of sources. Several limitations of the review and of the individual studies need to be kept in mind. The review was very broad and included numerous interventions. The majority of the studies came from outside of the occupational therapy literature, representing many disciplines such as physical therapy, medicine, and psychology; however, all of the studies included were within the occupational therapy scope of practice. The systematic reviews included in this literature review frequently identified variations in the types of outcome assessments used in clinical trials, which made it difficult to compare two or more clinical trials. In addition, variations in the subjects studied, overall poor methodological quality, and inadequate reporting of results were reported in the systematic reviews.

Levels IV and V

N/A

### Articles Selected for Appraisal

Bekkering, G., van Tulder, M., Hendriks, E., Koopmanschap, M., Knol, D., Bouter, L., et al. (2005). Implementation of clinical guidelines on physical therapy for patients with low back pain: Randomized trial comparing patient outcomes after a standard and active implementation strategy. *Journal of Physical Therapy*, 85, 544–555.

Daltroy, L., Iverson, M., Larson, M., Lew, R., Wright, E. Ryan, J. et al. (1997). A controlled trial of an educational program to prevent low back injuries. *New England Journal of Medicine*, 333, 322–327.

Fairbank, J., Frost, H., Wilson-MacDonald, J., Yu, L. M., Barker, K., & Collins, R [Spine Stabilisation Group]. (2005). Randomised controlled trial to compare surgical stabilisation of the lumbar spine with an intensive rehabilitation programme for patients with chronic low back pain: The MRC spine stabilisation trial. *British Medical Journal*, 330(7502), 1233.

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French, S. D., Cameron, M., Walker, B. F., Reggars, J. W., Esterman, A. J. (2006). Superficial heat or cold for low back pain. *Cochrane Database of Systematic Reviews* 2006, Issue 1. Art. No.: CD004750. DOI: 10.1002/14651858.CD004750.pub2

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- Khadilkar, A., Milne, S., Brosseau, L., Robinson, V., Saginur, M., Shea, B., et al. (2005). Transcutaneous electrical nerve stimulation (TENS) for chronic low-back pain. *Cochrane Database of Systematic Reviews* 2005, Issue 2. Art. No.: CD003008. DOI: 10.1002/14651858.CD003008.pub2
- Koumantakis, G., Watson, P., & Oldham, J. (2005). Trunk muscle stabilization training plus general exercise versus general exercise only: Randomized controlled trial of patients with recurrent low back pain. *Physical Therapy*, 85, 209–223.
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Schonstein, E., Kenny, D. T., Keating, J. & Koes, B. W. (2003). Work conditioning, work hardening and functional restoration for workers with back and neck pain. *Cochrane Database of Systematic Review* 2003, Issue 2. Art. No.: CD001822. DOI: 10.1002/14651858.CD001822

Smith, D., McMurray, N., & Disler, P. (2002). Early intervention for acute back injury: Can we finally develop an evidence-based approach? *Clinical Rehabilitation*, 16, 1–11.

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CAT format adapted from a template provided by Dr. Annie McCluskey and freely available for use on the OT-CATS website (<http://otcats.com>).

For more information about the Evidence-Based Literature Review Project, contact the American Occupational Therapy Association, 301-652-6611, x 2052.



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