Effective Occupational Therapy Interventions in the Rehabilitation of Individuals With Work-Related Low Back Injuries and Illnesses: A Systematic Review

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A systematic review of the literature related to effective occupational therapy interventions in rehabilitation of individuals with work-related low back injuries and illnesses was carried out as part of the Evidence-Based Literature Review Project of the American Occupational Therapy Association. This review evaluated research on a broad range of occupational therapy–related intervention procedures and approaches. Findings from the review indicate that the evidence is insufficient to support or refute the effectiveness of exercise therapy and other conservative treatments for subacute and chronic low back injuries. The research reviewed strongly suggests that for interventions to be effective, occupational therapy practitioners should use 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 implications for occupational therapy practice, research, and education are also discussed.


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

Objectives of the Evidence-Based Literature Review
The objectives of this literature review were (1) to identify, evaluate, and synthesize the research literature on interventions for low back injuries and illnesses of relevance to occupational therapy and (2) to interpret and apply the research literature to occupational therapy.

Statement of Problem and Background
Work, an important area of occupation for adults, includes tasks and activities needed for engaging in paid employment or volunteer activities (American Occupational Therapy Association [AOTA], 2008). Work-related interventions have always been a central part of occupational therapy practice. The AOTA position statements on work all have illustrated its importance in the scope of occupational therapy practice (AOTA, 1986, 1992, 2005). Occupational therapy views the U.S. workforce in terms of productivity, purpose, social contribution, healthy families, and a healthy economy. Occupational therapists are trained to examine the context in which work occurs and the consequences and possibilities of occupation (Kaskutas & Snodgrass, 2009).
Work injuries and illnesses frequently result in functional loss, disability, and time away from work. In 2007, approximately 3.8 million nonfatal occupational injuries occurred in the United States; 2.1 million of those injuries led to lost work days, job transfer, or restrictions (U.S. Bureau of Labor Statistics [BLS], 2009). According to the BLS (2009), musculoskeletal disorders (MSDs) accounted for 29% of the injuries and illnesses resulting in days away from work. In 2007, the part of the body most affected by work-related incidents was the trunk (including the shoulder and back). The back accounted for 20.4% (one-fifth) of all work-related injuries and illnesses and required a median of 7 days away from work per incident. Moreover, low back pain affects an estimated 80% of the population (World Health Organization, 2003). Low back MSDs that may be work related are the most common problems presented to occupational health and primary care physicians and are disproportionately expensive, accounting for as much as 33% of all workers’ compensation costs (Eccleston, Petrova, & Zhao, 2007).

The systematic review question was, “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. Practice settings include traditional inpatient hospital environments (acute, subacute, rehabilitation), outpatient rehabilitation clinics (freestanding and hospital based), on-site industrial rehabilitation programs, office environments, psychiatric treatment centers, and community settings. Occupational therapy practitioners perform client-centered evaluations, including job analysis and evaluation of contextual factors, using a variety of approaches, and they help clients with low back injuries in the performance of occupations and activities (AOTA, 2005). Approaches include instruction in proper body mechanics and the safe performance of activities; task analysis and use of ergonomic design to modify the environment; use of relaxation techniques; work hardening and reconditioning; and education for pain management, stress reduction, and coping (Grangaard, 2006; Maher & Bear-Lehman, 2008).

A considerable amount of research describes interventions aimed at preventing and managing work-related low back injuries (McCloskey et al., 2005; Schonstein, Kenny, Keating, & Koes, 2003). The profession of occupational therapy, however, lacks evidence-based guidelines for the provision of interventions directed at work-related low back injuries.

Method for Conducting the Evidence-Based Review

Detailed information about the methodology for the entire evidence-based literature review can be found in the article “Methodology for the Systematic Reviews on Occupational Therapy for Individuals With Work-Related Injuries and Illnesses” (Arbesman, Lieberman, & Thomas, 2011) in this issue.

I analyzed the studies (N = 23) by describing and evaluating the study level, study design, number of participants, types of interventions and outcome measures, summary of results, study limitations, and implications of the study for occupational therapy. Supplemental Table 1 (available online at www.ajot.ajotpress.net [navigate to this article, and click on “supplemental materials”]) summarizes a selection of the articles reviewed and includes information about the objectives, design, procedures, findings, and limitations of the review studies. Among the 23 studies reviewed, 21 contained Level I evidence and 2 contained Level III evidence. This systematic review presents a synthesis of the findings.

Results

The studies examined in the review focused on interventions for work-related low back injuries and illnesses and included 7 studies that examined the effects of therapeutic exercise (including studies that fit into more than one category); 2 studies that focused on client education; four that investigated activity, functional restoration, or work reconditioning; 2 studies that investigated the effect of physical agent modalities; 4 studies that examined cognitive–behaviorally oriented approaches; and 5 studies that compared multidisciplinary or biopsychosocial approaches (some studies are included in more than one category).

The review included studies from the occupational therapy literature and related fields and interventions that are within the scope of occupational therapy practice. Review of the evidence revealed that effective interventions directed at individuals with low back injury or illness share some common features. The evidence to support or refute the effectiveness of exercise therapy and other conservative treatments for subacute and chronic low back injuries is insufficient. No significant difference was found in short-term pain relief between exercise therapy and no treatment of acute low back injuries. Exercise therapy compared with other conservative treatments showed no difference in pain relief with acute low back injuries, and exercise therapy did not have a significant effect on functional outcomes for acute low back injuries. The evidence supports a
biopsychosocial approach to work-related low back rehabilitation. The remainder of this section summarizes the main findings of the evidence review.

Filiz, Cakmak, and Ozcan (2005) compared two different exercise programs with a control group for patients undergoing lumbar disc surgery in a Level I randomized controlled study. Participants (N = 60) were between ages 20 and 50 and had a lumbar disc operation (single-level discectomy) for the first time. Participants were randomly assigned into three groups. The first group received an intensive exercise program and back school education, and the second group received a home exercise program and back school education. The third group was the control group and did not receive education or exercise. The results indicated that participants who received intensive exercises and back school education demonstrated a significant decrease in severity of pain and disability, and their time to return to work or daily activities after surgery was significantly quicker than that of other groups. The group who received a home exercise program and back school education demonstrated a significantly shorter time to return to work and daily activities than the control group. Both exercise groups had significantly better results than the control group for perceived low back disability. Only the intensive exercise group had better results than the control group on a self-reported depression inventory.

Hurwitz, Morgenstern, and Chiao (2005) examined the effectiveness of recreational physical activity and back exercises on low back pain, related disability, and psychological distress. They used a Level I randomized controlled trial (RCT) using four groups. Group 1 received chiropractic care with physical modalities. Group 2 received chiropractic care without physical modalities. Group 3 received medical care with physical therapy, and Group 4 received medical care without physical therapy. The authors conducted baseline and follow-up data collection with all four intervention groups to determine longitudinal associations of back exercise and recreational physical activity with low back pain, low back disability, and psychological distress. They found moderate evidence that flexion exercises are not effective in reducing acute pain, strong evidence that extension exercises are not effective in reducing acute pain, no evidence that flexion exercises are effective in reducing chronic pain, no evidence that strengthening exercises are effective in reducing acute pain, and strong evidence that strengthening exercises are not more effective than other types of exercise. Therefore, specific back exercises may be counterproductive, and restoration of normal functioning should instead be emphasized to reduce pain and improve psychological health. The authors found that the odds of clinically significant low back pain and disability decreased as reported physical activity increased. Similarly, the odds of psychological distress decreased as reported physical activity increased. On the basis of the results, the authors recommend low-stress aerobic exercises such as walking and swimming. In fact, brisk walking for ≥3 hr/wk was found to be associated with reduction in low back pain, disability, and psychological distress regardless of treatment group. Because participants were primary care patients, they may not be representative of individuals with low back pain (i.e., those receiving workers’ compensation may differ) or those who do not seek clinic treatment at all. In addition, the authors did not collect information on specific types of back exercises; they relied on participants’ self-reports.

Heymans, van Tulder, Esmail, Bombardier, and Koes (2004) conducted a Level I systematic review to determine whether back schools were more effective than other treatments or no treatment of patients with nonspecific low back pain. The authors were unable to identify strong evidence for any particular type of back school treatment. They found moderate evidence that back schools have better short- and intermediate-term effects than other treatments for recurrent and chronic low back pain in terms of pain level and functional status. Moderate evidence was found that back schools in a work setting are more effective than other treatments, placebo, or waiting-list controls in improving functional status and promoting return to work during short- and intermediate-term follow-up.

Staal et al. (2004) conducted a Level I RCT to determine the effectiveness of a behavior-oriented graded activity program compared with usual care. The study included 134 participants who were workers absent from work because of low back pain. Participants were assigned to either graded activity (physical exercise, application of operant conditioning behavioral principles, and improved functioning for safe return to work) or usual care (guidance and advice from an occupational physician and treatment from various caregivers). The authors found that graded activity for low back pain in an occupational health setting had a statistically significant effect on absence from work. The median total 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. Functional status results showed a tendency toward improvement with graded activity, but it was not statistically significant. Interventions did not have a statistically significant impact on pain severity.

In a Level I systematic review, Schonstein et al. (2003) compared the effectiveness of physical conditioning programs such as work conditioning, work hardening, and functional restoration 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. The authors reviewed 18 RCTs that included adult participants who had experienced disability at work subsequent to back or neck pain. The review found that physical conditioning programs that included a cognitive–behavioral approach could reduce the number of sick days lost at 12-mo follow-up by an average of 45 days compared with general practitioner usual care for workers with chronic back pain. The review found insufficient evidence for or against the effectiveness of specific exercises that are not accompanied by a cognitive–behavioral approach in reducing sick days lost as a result of back pain for workers with either acute or chronic back pain.

Guzman et al. (2001) assessed the effect of multidisciplinary biopsychosocial rehabilitation on clinically relevant outcomes in patients with chronic low back pain by conducting a Level I systematic review of RCTs. The review included 10 trials with a total of 1,964 participants. The reviewed trials provided evidence that intensive (>100 hr of therapy) multidisciplinary biopsychosocial rehabilitation with functional restoration reduces pain and improves function in patients with chronic low back pain compared with inpatient or outpatient nonmultidisciplinary treatments. The authors found moderate evidence that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration reduces pain compared with outpatient nonmultidisciplinary rehabilitation or usual care. Contradictory evidence was found regarding vocational outcomes: Some trials reported improvement in work readiness with biopsychosocial rehabilitation, and others demonstrated no significant reduction in absenteeism.

A Level I systematic review of nine RCTs examined the effects of superficial heat and cold therapy for adults with low back pain. Two of the trials reviewed found that heat wrap therapy significantly reduced pain after 5 days compared with an oral placebo. One trial found that a heated blanket significantly decreased acute low back pain immediately after application. One trial found that adding therapeutic exercises to heat wrap reduced pain after 7 days (French, Cameron, Walker, Reggars, & Esterman, 2006).

Henschke et al. (2005) conducted a systematic review of 21 RCTs 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. The authors found that combined respondent cognitive therapy or progressive relaxation therapy alone was more effective than no treatment or short-term pain relief, but the authors could not determine whether this finding was also true for back-specific functional status. The authors found no significant differences 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 of short-term pain reduction, although this finding was based on a small number of studies of moderate or low quality.

**Discussion and Implications for Practice, Education, and Research**

On the basis of the current literature, occupational therapy practitioners should be prepared to provide interventions that are direct and consultative in nature to successfully address the multifactorial nature of work-related low back injuries. Studies describing interventions directed at the low back 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 the effect of 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. No significant difference in short-term pain relief between exercise therapy and no treatment of acute low back injuries was found. No difference in pain relief with exercise therapy was found compared with other conservative treatments for acute low back injuries, nor did exercise therapy have a significant effect on functional outcomes for acute low back injuries. Thus, additional factors must be considered for interventions to be effective and appropriate within the scope of occupational therapy practice. The research included in this study strongly suggests that for interventions to be effective, occupational therapy practitioners should use 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.

**Implications for Practice**

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 (work site visit, ergonomic modifications)
- Cognitive–behavioral strategies (positive reinforcement, progressive relaxation, biofeedback)
- Physical agent modalities (superficial heat, transcutaneous electrical nerve stimulation) as preparatory or adjunctive interventions.

**Implications for Education**

This review provides valuable evidence to occupational therapy educators for understanding what skills are required, what practice might consist of, and how to incorporate work and industry needs into the occupational therapy curriculum. Moreover, the evidence from this review supports a holistic approach to work-related low back rehabilitation, which educators should find useful to demonstrate to students occupational therapy’s role and the benefits of practicing in the field of work and industry. In addition, the evidence for effective occupational therapy interventions presented in this review should help support the review of the Accreditation Council for Occupational Therapy Education standards for inclusion of work and industry practice in curriculum.

**Implications for Reimbursement and Policy**

Payers and policymakers should find this review valuable for gaining a better understanding of how occupational therapy outcomes are directly related to participation (i.e., return to work) and how effective occupational therapy–related interventions can help close the gap between consumers’ desired outcomes and payers’ desire to minimize costs, length of treatment, and time away from work. The evidence supports the notion that a multidisciplinary, function-based approach that includes occupational therapy interventions facilitates a faster return to work, reduces severity of associated disability, and significantly reduces workers’ compensation costs.

**Implications for Research**

The findings from this evidence-based literature review highlight the need for further research. The review points to the need for the profession of occupational therapy to collect and analyze outcomes data related to the efficacy of occupational therapy interventions and to investigate the cost-effectiveness of a variety of work-related intervention protocols. The following ideas can guide future research efforts:

- Analyze and compare costs and quality of services for clients participating in return-to-work programs with those attending traditional occupational therapy services.
- Design and implement outcome studies to measure the effectiveness of occupational therapy services for clients with work-related injuries.
- Analyze the impact of on-site (employer-based) occupational therapy services on the rate of return to work and prevention of work-related MSDs relative to costs and injury rates.
- Compare outcomes of implementing an on-site occupational therapy–based ergonomics program by analyzing incidence and prevalence of MSDs, workers’ compensation cost, and employee productivity before, during, and after implementation.
- Analyze cost-effectiveness of preemployment postoffer screenings (used to determine whether an applicant is suitable for a job before employment or an offer of employment) related to preventing injuries and reducing absenteeism and turnover.
- Compare and contrast work hardening and conditioning and functional capacity evaluation models (AOTA, 2006).

**Strengths and Limitations**

The evidence-based literature review yielded many high-quality studies. Of the 20 studies included in the review, 18 were at the highest level of evidence (Level I). Strengths of the literature review include a quality-controlled, peer-review process that included a wide variety of sources. Several limitations of the review and of the individual studies need to be considered. The review was broad and included numerous interventions. Most of the studies came from outside the occupational therapy literature and represented 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; as a result, it was difficult to compare two or more clinical trials. In addition, the systematic reviews highlighted variations in the participants studied, generally poor methodological quality, and inadequate reporting of results.
Conclusion

From a programmatic perspective, this systematic review suggests that interventions incorporating a coordinated, case management approach may achieve the best outcomes. Many of the studies reviewed highlighted a fragmented array of workers’ compensation programs with interventions that often failed to sufficiently address the multiple factors affecting patient care. Occupational therapy–related programs should incorporate multidisciplinary, client-centered approaches focusing on clients’ occupational needs to improve their workplace health and performance. The literature review highlights a fragmented U.S. workers’ compensation system that lacks a coordinated, evidence-based case management approach to dealing with work-related injuries (Schonstein et al., 2003). The gaps identified in this systematic review of the literature suggest a need to develop a national work-related injury data management system to collect, analyze, and interpret program outcomes to inform future research, policy, and practice (Linz et al., 2002). For instance, the review of literature revealed significant variation in the outcome measures used; as a result, the comparability of results was limited. Differences among the participants studied, small sample sizes, poor methodological quality, and inadequate reporting of results limit the conclusions that can be drawn from a systematic review of the literature and underscore the need for a national outcomes database to facilitate better clinical and health service research to identify and analyze treatment effects.

On the basis of the literature review, evidence informs and supports the efficacy of occupational therapy interventions that focus on the promotion of health and participation of individuals and populations through engagement in work occupations. ▲

References


*Indicates studies that were reviewed for this article but are not referred to in the text. All studies reviewed are listed in the evidence table available at www.ajot.aotpress.net.


