
Occupational Therapy Interventions for Shoulder Conditions: A Systematic Review

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KEY WORDS

- bursitis
- evidence-based practice
- occupational therapy
- rotator cuff
- shoulder impingement syndrome
- shoulder pain

The objectives of this systematic review were (1) to identify, evaluate, and synthesize the research literature of relevance to occupational therapy regarding interventions for work-related shoulder conditions and (2) to interpret and apply the research literature to occupational therapy. Twenty-two studies were reviewed for this study—16 of Level I evidence, 2 of Level II evidence, and 4 of Level III evidence. In this systematic review, limited evidence from Level I studies was found to support exercise for shoulder pain; manual therapy and laser for adhesive capsulitis; conservative management of shoulder instability; early intervention without immobilization for specific, nondisplaced proximal humerus fractures; and exercise, joint mobilizations, and laser for patients with shoulder impingement. Further prospective studies are necessary for the delineation of specific surgical and therapeutic variables that facilitate positive outcomes in the treatment of patients with shoulder conditions.

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Focused Clinical Question

What occupational therapy interventions are effective in the rehabilitation of people with work-related injuries or clinical conditions of the shoulder?

Objectives of the Evidence-Based Literature Review

The objectives of this literature review were (1) to identify, evaluate, and synthesize the research literature of relevance to occupational therapy regarding interventions for work-related shoulder conditions of relevance to occupational therapy and (2) to interpret and apply the research literature to occupational therapy.

Statement of Problem and Background

The shoulder complex is an intricate arrangement of bones, joints, nerves, and muscles that facilitate functional range of motion (ROM) of the upper extremity. The shoulder complex comprises four separate articulations, including the glenohumeral, scapulothoracic, acromioclavicular, and sternoclavicular joints. The shoulder complex sacrifices inherent joint stability to allow maximal levels of mobility, thereby optimizing the position of the elbow, wrist, forearm, and hand for activities of daily living (ADLs), instrumental activities of daily living (IADLs), work, education, and leisure. Dynamic stability is afforded to the shoulder complex through the *rotator cuff musculature*—a group of four muscles located in tight approximation to the glenohumeral joint. The positioning of these muscles as it relates to several bony prominences, including the narrow subacromial space, increases the risk for impingement-related syndromes (Oatis, 2009).

Patients with chronic, subacute, acute, and postoperative shoulder diagnoses are commonly referred to occupational therapists working in inpatient,

outpatient, home health, and industrial practice areas. These diagnoses include pain, rotator cuff tears, frozen shoulder (also termed *adhesive capsulitis*), shoulder instability, anterior dislocation, proximal humerus fractures, subacromial impingement syndromes, and thoracic outlet syndrome.

Occupational therapists use various types of interventions to treat conditions of the shoulder complex. Interventions range from preparatory activities, such as modalities and ROM, to occupation-based interventions focusing on client-centered roles and goals. Interventions are implemented both in a preventive fashion and in response to acute, subacute, chronic, and postoperative symptomatology. An occupation-based and client-centered approach to evaluation and treatment, as afforded by an occupational therapist, offers the patient an opportunity to return to valued daily life activities and occupations. These approaches will benefit substantially from the use of evidence to support their effectiveness. The incorporation of evidence-based practice will not only strengthen the profession but also contribute to its longevity and validity.

The purpose of this systematic review, therefore, was to investigate the effectiveness of interventions used by occupational therapists in the rehabilitation of people with work-related injuries and clinical conditions of the shoulder.

Background Literature

Musculoskeletal disorders (MSDs) of the shoulder have been studied extensively as they relate to factors in the workplace. According to the U.S. Bureau of Labor Statistics (2008), in 2007 75,580 shoulder injuries accounted for 6.5% of nonfatal occupational injuries and illnesses involving days away from work. After a systematic review of epidemiological evidence, the National Institute for Occupational Safety and Health (NIOSH; 1997) suggested factors that contribute to shoulder MSDs, including repetition and assumption of postures surpassing 60° of flexion or abduction. The risk for shoulder MSDs is proposed to increase with combined exposure to multiple risk factors, such as working with a tool in an overhead position (NIOSH, 1997). This review did not find evidence to link force or vibration to shoulder MSDs.

Shoulder pain has also been suggested to affect between 7% and 34% of the adult population (Luime et al., 2004) and is often the primary symptom of patients with shoulder MSDs. On presentation to a physician, pain symptoms noted for <6 wk are categorized as acute;

between 6 and 12 wk, as subacute; and for >3 mo, as chronic. In a study by Reilingh, Kuijpers, Tanja-Harfterkamp, and van der Windt (2008), patients with acute pain achieved the most positive outcomes in terms of pain and disability after 6 mo, whereas patients with chronic pain had the least favorable outcomes. Higher baseline pain, lower pain catastrophizing, and lower baseline disability predicted positive outcomes for patients in the study (Reilingh et al., 2008).

Longitudinal studies have also been pursued in an attempt to identify predictive variables. In a study by Siivola et al. (2004), pain and dynamic sports loading during adolescence were associated with pain in early adulthood. Psychosomatic stress symptoms were predictive of pain within 7 yr (Siivola et al., 2004). Psychological factors, including increased worry and decreased vitality, were also found to be associated with poor outcomes in a study by Bot et al. (2005), who noted that duration and previous history of symptoms negatively affected outcomes in patients with neck or shoulder symptoms (Bot et al., 2005).

Occupational therapists have the opportunity to influence the outcomes of patients with shoulder MSDs. Holistic interventions attending to all aspects of reported symptomatology, including pain, function, and psychological factors, can contribute to clients' health-related quality of life. The importance of evidence to support such interventions, however, cannot be understated. This systematic review is intended to contribute to the pursuit of evidence-based practice for patients with shoulder conditions in the practice of occupational therapy.

Method for Conducting the Evidence-Based Review

This systematic review was completed in conjunction with the American Occupational Therapy Association's (AOTA's) Evidence-Based Literature Review Project. As one component of *Occupational Therapy and Clinical Conditions Related to Worker's Compensation*, the specific methodology used to complete this review can be found in "Methodology for the Systematic Reviews on Occupational Therapy for People With Work-Related Injuries and Illnesses" (Arbesman, Lieberman, & Thomas, 2011) in this issue.

Search strategies and terms specific to this review focused on work-related injuries and clinical conditions of the shoulder. Using the workers' compensation compilation of diagnoses, the following terms were searched: *thoracic outlet syndrome*, *DJD* (degenerative joint disease),

adhesive capsulitis, rotator cuff syndrome, shoulder tendonitis, bicipital tendonitis, subacromial bursitis, shoulder impingement, rotator cuff tear, calcific shoulder, shoulder impingement, fracture anatomical neck humerus, fracture greater tuberosity humerus, fracture humerus shaft, sprains and strains rotator cuff, rotator cuff tear, shoulder strain, crushing injury upper arm, complex regional pain syndrome, and reflex sympathetic dystrophy. Other terms included *shoulder, shoulder pain, shoulder joint, axilla, glenohumeral joint, and scapulothoracic articulation.* Searches for interventions and treatments and for outcome measures and assessments were similar to those used for the back, elbow, forearm, wrist, and hand.

Twenty-two studies were reviewed for this study: 16 studies at Level I, 2 studies at Level II, and 4 studies at Level III. Supplemental Table 1 summarizes the studies included in the review and is available online at www.ajot.ajotpress.net (navigate to this article, and click on “supplemental materials”). The table was created through a comprehensive analysis of study objectives, level, and design; the interventions and outcome measures used; and the study results, limitations, and implications for occupational therapy practice. The results of the systematic review are presented in the sections that follow.

Results

Shoulder Pain

Multiple studies have addressed the use of various forms of exercise as interventions for neck pain and shoulder pain. Four Level I randomized control trials (RCTs) and one Level II cluster RCT were reviewed with regard to exercise, whereas one Level I systematic review addressed biopsychosocial rehabilitation and one Level I RCT considered laser treatment.

Randløv et al. (1998) studied the effectiveness of two types of training on patients with chronic neck and shoulder pain. This Level I RCT included a sample of 77 women with chronic pain lasting >6 mo. Patients were randomized into either the intensive training or the lighter program, and both programs were shown to be beneficial in improving function for patients with chronic neck and shoulder pain. The success rate in the study was 50% at the conclusion of treatment and 60% at the 12-mo follow-up.

Waling, Sundelin, Ahlgren, and Järholm (2000) investigated the effectiveness of strength, endurance, and coordination programs on neck and shoulder pain in women with work-related trapezius myalgia. This Level I RCT included 126 women placed in one of four groups: (1) strength, (2) endurance, (3) coordination, or (4) con-

trol. A comparison of exercise groups with the control group showed significant reductions in visual analog scale pain at present and at worst in the exercise groups, offering limited evidence to support the efficacy of exercise programs to reduce pain in work-related trapezius myalgia.

Geraets et al. (2005) compared graded exercise therapy with usual care, including information, recommendations, and pain control on an as-needed basis. The authors described graded exercise therapy as a behavioral program based on graded activity, time contingency, and operant conditioning. A Level I RCT was completed with 176 patients. Graded exercise therapy was shown to have a minimally greater benefit than usual care for patients with chronic shoulder pain.

Using a more specific approach, Lundblad, Elert, and Gerdle (1999) compared Feldenkrais interventions with typical therapeutic interventions for patients with complaints of the neck and shoulder. With a sample of 97 patients, this Level I RCT supported Feldenkrais therapy as a holistic preparatory intervention that facilitates return to occupation.

In 2005, Sjögren et al. studied workplace intervention on headaches, neck and shoulder symptoms, and upper-extremity strength in a sample of 53 office workers. Using a Level II cluster RCT, they compared exercise and resistance intervention with a no-physical-exercise intervention. The study offered limited evidence that daily light resistance training guided by a therapist can decrease head and neck symptoms and increase shoulder extension strength for patients who perform physically light work.

In addition to exercise, biopsychosocial rehabilitation programs and laser have both been researched as interventions that might influence shoulder pain. A systematic review by Karjalainen et al. (2005) was completed with the intent of establishing the effectiveness of multidisciplinary biopsychosocial rehabilitation for adults with neck and shoulder pain. Only two studies were found that met the search criteria, offering little scientific evidence to support multidisciplinary biopsychosocial rehabilitation programs as beneficial for working-age adults with neck and shoulder pain.

Bingöl, Altan, and Yurtkuran (2005) studied the use of laser treatment for shoulder pain in a Level I double-blind RCT. Their sample of 40 was randomized into either an active laser treatment group or a placebo laser treatment group. Both groups exercised after treatment. The use of low-energy laser therapy treatment was not demonstrated as being significantly more efficacious than therapeutic exercise in this study.

The four Level I RCTs and one Level II cluster RCT reviewed here offer limited evidence to support the use

of exercise as an occupational therapy intervention for shoulder pain, including light and intensive training, graded exercise therapy, strength and endurance training, and Feldenkrais therapy. Future studies with larger sample sizes and diversity will contribute to a greater understanding of how exercise can affect neck and shoulder pain. Sufficient evidence to support biopsychosocial rehabilitation programs and the use of laser therapy for shoulder pain is currently lacking.

Rotator Cuff Tears

Many articles have addressed intervention after rotator cuff injuries. Three recent Level I systematic reviews have attended to the results of said research. Grant, Arthur, and Pichora (2004) completed a Level I systematic review of 64 articles to analyze the effectiveness of surgical and conservative treatments for rotator cuff pathologies. The authors concluded that current research on rotator cuff pathology does not strongly support or refute any available intervention for this condition. The evidence to support the conservative techniques of electrotherapy, steroid injections, exercise therapy, and acupuncture was weak. Ejnisman et al. (2005) reviewed the efficacy and safety of common interventions for tears of the rotator cuff in a systematic review of eight studies. These researchers similarly concluded that little evidence supports or refutes conservative or surgical management of rotator cuff tears.

Green, Buchbinder, and Hetrick (2005) completed a Level I systematic review of therapeutic interventions for painful shoulder conditions, including rotator cuff tears. The evidence to support exercise, mobilization, and pulsed electromagnetic field for patients with rotator cuff tears was weak. The authors also noted weak evidence against the use of laser therapy instead of corticosteroid injections.

Because systematic reviews offer the highest level of evidence to guide clinical decision making in occupational therapy, it is noteworthy that no strong evidence supports or refutes any available intervention for patients with rotator cuff tears, including conservative versus surgical management.

Frozen Shoulder (Adhesive Capsulitis)

Interventions for frozen shoulder were reviewed in one Level I systematic review, three Level I RCTs, one Level II quasi-experimental design, and three Level III studies. Clinicians should be cautious in how articles with Level II and Level III evidence are interpreted with regard to clinical decision making around occupational therapy interventions.

Manual Therapy. Joint mobilization and manipulation, interventions based in proper knowledge of arthrokinematics, have been studied for use in patients with frozen shoulder. Whereas joint mobilizations are slow, controlled, passive motions aimed at facilitating typical joint glide, joint mobilizations are a more aggressive technique performed at the end ranges of joint motion.

Guler-Uysal and Kozanoglu (2004) studied the early response of rehabilitation for adhesive capsulitis with attention to clinical efficacy and cost-effectiveness. Their Level I randomized, comparative prospective clinical trial included a sample of 40 patients in two groups: a Cyriax group and a therapy group. The Cyriax method of rehabilitation, which includes deep friction massage and joint manipulation, was shown to produce significantly greater changes in glenohumeral flexion, rotations, and pain in a significantly decreased amount of treatment time compared with standard physical therapy using superficial and deep heat treatments.

Vermeulen, Rozing, Obermann, le Cessie, and Vliet Vleland (2006) considered the effectiveness of high-grade versus low-grade mobilization techniques for patients with adhesive capsulitis of the shoulder. This Level I RCT included 100 participants in either a high-grade or low-grade mobilization group. Both groups were noted to improve significantly over 12 mo; however, the high-grade group was also noted to have a significant change in subjective ratings of pain and disability. These results provide limited evidence to support the efficacy of high-grade mobilization techniques compared with low-grade mobilization for the improvement of shoulder mobility and reduction of self-reported disability in patients with Phase 2 adhesive capsulitis.

The results of the Level I RCTs provide limited evidence to support manual therapy, specifically, the Cyriax method of joint manipulation coupled with friction massage and high-grade mobilization, for patients with adhesive capsulitis.

Exercise. Exercise has been studied as an intervention for frozen shoulder as it relates to timing and intensity of the prescribed program. Diercks and Stevens (2004) compared supervised neglect with an intensive physical therapy regimen in a sample of 77 patients with idiopathic frozen shoulder. The study was a Level II quasi-experimental design using a successive cohort as a control group. Less aggressive therapeutic techniques, such as pendulum exercises, active exercises within the painless range, and tolerable functional activities, were shown to be more effective for patients with idiopathic frozen shoulder than those techniques that surpass the pain threshold. Both treatment groups required ≥ 12 mo to recover pain-free and functional glenohumeral ROM.

In contrast to the work of Diercks and Stevens (2004), Jürgel et al. (2005) promoted exercise therapy of higher intensity and duration to provide more significant changes in patients with frozen shoulder. These authors completed a Level III case-control study on a sample of 20 patients, examining shoulder active range of motion (AROM), shoulder muscle maximal isometric force, and endurance in patients with frozen shoulder in both the involved and the uninvolved extremity. Using a 4-wk program of exercise, massage, and electrical therapy, the researchers found ROM, force, and endurance to be significantly less in the affected shoulder than in the unaffected shoulder and in control participants.

The interpretation of these Level II and III studies must be pursued cautiously because of their lower levels of evidence and lack of randomization. Further investigation is required to support or refute timing and intensity of exercise programs used to treat frozen shoulder.

Invasive Procedures. Occupational therapists often partner with surgeons to provide therapeutic interventions immediately after invasive procedures, such as hydraulic distension and distension arthrographies (DAs). Injections are used during both of these procedures and can also be used to introduce steroids into the glenohumeral joint.

Callinan et al. (2003) completed a Level III pretest–posttest design with a sample of 60 patients with idiopathic adhesive capsulitis. For the purposes of the study, a hydraulic distension technique (hydroplasty) was combined with a therapy program. The researchers suggested that the use of a hydroplasty procedure combined with therapeutic intervention is a safe and effective treatment of idiopathic adhesive capsulitis. Significant increases were noted for all AROM measures both immediately after hydroplasty and at discharge ($p < .001$). The average cost of the hydroplasty protocol was calculated to be 42% less than surgical manipulation with follow-up therapy.

Piotte et al. (2004) designed a study that aimed to analyze the combined effectiveness of repeated DAs with a home exercise program for patients with adhesive capsulitis of the shoulder. This Level III repeated-measures design included a sample of 15 patients. A significant improvement was found with all measures at the conclusion of intervention: The greatest significant effects occurred after the first DA; less marked yet significant effects occurred after the second DA; and minimal effects occurred after the third DA. After intervention, significant differences in ROM were noted compared with the contralateral side. This study used a repeated-measures design with no controls. For this reason, the effectiveness of DA versus home exercise programs cannot be de-

termined, and the individual versus cumulative effects of the subsequent DAs cannot be established.

Ryans, Montgomery, Galway, Kernohan, and McKane (2005) investigated the effectiveness of intra-articular steroid treatment and physiotherapy alone and in combination for patients with adhesive capsulitis. This Level I RCT had a sample of 80 patients placed in one of four groups: (1) injection and physiotherapy, (2) injection and no physiotherapy, (3) physiotherapy, and (4) placebo. At the 16-wk time point, no significant differences were found between interventions in any outcome measure.

The two Level III studies reported here provide weak evidence to support the use of hydraulic distension and DAs coupled with therapeutic exercise to increase ROM in patients with adhesive capsulitis. These studies are limited by sample size and methodological design, decreasing their evidentiary support for occupational therapy intervention planning. Note that the Level I RCT pursued by Ryans et al. (2005) resulted in no significant differences between injections and therapy interventions alone or in combination.

The aforementioned studies reviewed for adhesive capsulitis yielded limited evidence for manual therapy on the basis of two Level I RCTs with moderate sample sizes. In addition to these studies, Green et al. (2005) found weak evidence to support laser therapy for patients with adhesive capsulitis in a systematic review of therapeutic interventions for painful shoulder conditions. Further research is required to determine the effective intensity of therapeutic exercise for this condition.

Shoulder Instability

One Level I systematic review was found that addressed the effectiveness of conservative management as a primary strategy in the treatment of shoulder instability. Gibson, Growse, Korda, Wray, and MacDermid (2004) reviewed 14 randomized, quasirandomized, cohort studies or case series of adults with a history of shoulder instability treated with nonoperative management. The authors indicated that weak evidence supports a conservative program for shoulder instability that includes a 3- to 4-wk immobilization period followed by 12 wk of ROM and stability exercises; neither ROM nor stability exercises used in isolation was recommended. Electromyographic biofeedback was weakly recommended as an adjunctive modality. The authors did not, however, recommend conservative management over surgical intervention for decreasing recurrence of instability.

Proximal Humerus Fractures

One Level I systematic review on various methods of treating proximal humerus fractures was located. Handoll,

Gibson, and Madhok (2003) systematically reviewed 12 studies and suggested that limited evidence supports decision making for the management of proximal humeral fractures. The researchers found minimal evidence that immediate therapy resulted in less pain and both faster and better recovery for patients with nondisplaced two-part fractures, that mobilization at 1 wk alleviated short-term pain, and that patients could achieve a satisfactory outcome without supervised therapy. The researchers concluded that early therapeutic intervention without immobilization might be appropriately pursued by occupational therapists for specific, nondisplaced fractures.

Subacromial Impingement Syndromes

Michener, Walsworth, and Burnet (2004) pursued a Level I systematic review of 12 studies to determine the efficacy of nonsurgical and nonpharmacologic rehabilitation of subacromial impingement syndrome. The authors suggested that limited evidence supports exercise and joint mobilizations for patients with subacromial impingement syndrome. In addition, laser therapy appears to be beneficial when used in isolation, the use of ultrasound for this population was not supported, and acupuncture yielded equivocal results.

Ludewig and Borstad (2003) implemented and evaluated a specific therapeutic exercise program in a sample of 103 construction workers. This program was intended to modify shoulder elevation and muscle activity abnormalities as they related to shoulder impingement. This Level I RCT supported the use of shoulder home exercise programs to improve shoulder function and reductions in symptoms for construction workers who have routine exposure to overhead work.

The results of these two Level I studies provided limited evidence for exercise, joint mobilizations, and laser therapy in isolation for patients with shoulder impingement.

Thoracic Outlet Syndrome

Novak, Collins, and Mackinnon (1995) evaluated long-term subjective outcomes after conservative management of 42 patients with thoracic outlet syndrome. This Level III cross-sectional survey included an asymptomatic control group, a symptomatic control group, and a symptomatic intervention group that used posture modification and a specific physical therapy program. The home exercise program was found to reduce pain in the proximal regions of the body, and the effectiveness of conservative management in treating thoracic outlet syndrome was supported by this study. Because of the

design and level of evidence, applicability of these results to intervention planning is limited.

Synthesis of Level I Evidence

Level I evidence, as characterized by systematic reviews and RCTs, provides the highest level of support for occupational therapy interventions. In this systematic review, limited evidence was found to support exercise for shoulder pain; manual therapy and laser therapy for adhesive capsulitis; conservative management of shoulder instability; early intervention without immobilization for specific, nondisplaced proximal humerus fractures; and exercise, joint mobilizations, and laser therapy for patients with shoulder impingement.

Discussion and Implications for Practice, Education, and Research

Implications for Practice

This systematic review provides support for the use of multiple types of interventions by occupational therapists to treat conditions of the shoulder complex. Most interventions covered in this review are defined as *preparatory activities*, or those that prepare patients for occupational performance. Recognizing that these interventions represent a limited component of the types of interventions used by occupational therapists is of the utmost importance. Purposeful and occupation-based activities should be used to facilitate a holistic treatment plan that focuses on return to ADLs, IADLs, work, education, and leisure.

Preparatory activities supported by this review include ROM and exercise, conservative management, joint mobilization, laser therapy, electromyographic feedback, pulsed electromagnetic field, and the Cyriax and Feldenkrais methods. ROM and exercise are supported for patients with rotator cuff tears, shoulder instability, proximal humerus fractures, subacromial impingement syndrome, trapezius myalgia, chronic neck or shoulder pain, frozen shoulder, and thoracic outlet syndrome. Joint mobilizations are supported for patients with subacromial impingement syndrome and adhesive capsulitis. In this literature review, laser treatments are supported only for patients with adhesive capsulitis; laser treatments were not found to be more effective than alternative methods for treating clients with rotator cuff tears and shoulder pain. Weak evidence was found to support both electromyographic feedback for patients with shoulder instability and pulsed electromagnetic field for patients with

calcific tendonitis and rotator cuff tears. The Cyriax method of deep friction massage and joint manipulations was found to be beneficial in terms of motion, pain, and treatment time for patients with adhesive capsulitis.

When comparing the benefits of surgical and conservative management, the implementation of occupational therapy intervention is supported for patients with shoulder instability, subacromial impingement syndrome, and thoracic outlet syndrome.

Implications for Education

As the impetus toward evidence-based medicine continues, the use of systematic reviews as an educational tool will increase the efficacy of the profession as a whole. Students should be trained to be reflective consumers of the literature, using systematic reviews such as this one to evaluate the effectiveness of their intervention choices. In addition, the compilation of systematic reviews as part of the educational process will contribute to both the literature base in occupational therapy and the pursuit of best practice as part of the greater health care community. Because the future of the profession lies in the hands of students, familiarizing them with the content and construction of systematic reviews will provide lasting benefit.

Implications for Research

The literature reviewed here provides foundational information on which the profession of occupational therapy can build interventions but, more important, suggests direction for continued research. Further prospective studies are necessary to delineate specific surgical and therapeutic variables that facilitate positive outcomes in the treatment of patients with shoulder conditions. Such studies should not be limited to preparatory activities but should instead encompass the holistic nature of occupational therapy practice. More specifically, research pertaining to the efficacy and effectiveness of occupation-based interventions is suggested as a means to promote and validate the profession.

Strengths and Limitations

Most articles reviewed herein were Level I evidence, including seven systematic reviews and nine RCTs. As levels of evidence increase, the confidence with which occupational therapists can consider the results and implications of research increases as well. Limitations of the studies selected for this review included small sample sizes, limited generalization to the greater population, and limited statistical analyses. Some studies used an intervention period that may have been too short to appropriately assess clinical change; others

lacked specificity regarding intervention approaches. Issues in methodological quality included lack of randomization, blinding, control groups, and long-term follow-up data.

Conclusion

This systematic review provides **limited evidence to support multiple preparatory activities that can be implemented by occupational therapists** in the rehabilitation of people with work-related injuries and clinical conditions of the shoulder. Level I evidence was found to offer limited support for exercise, manual therapy, and laser therapy as adjunctive methods, with early intervention and conservative management supported as treatment approaches. **Further research on occupation-based interventions** for clients with conditions of the shoulder complex is suggested. ▲

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