



## **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 injuries/clinical conditions of the elbow?**

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#### **Clinical Scenario:**

Upper-extremity musculoskeletal disorders often are associated with repetitive and/or forceful work. Epicondylitis is one of the most common work-related elbow disorders. Although there is little agreement on the cause of epicondylitis, clients often present to their primary care physicians with pain (particularly on resisted motion of the wrist) and tenderness over the epicondyle of the humerus. Initially, the physician may treat the symptoms conservatively with rest, ice, and nonsteroidal anti-inflammatory drugs (NSAIDs). When symptoms persist, the client may be referred to occupational therapy for treatment. Occupational therapy practitioners use a variety of interventions that may relieve symptoms and facilitate the client's safe return to work. Interventions may include range of motion exercises, stretching and strengthening exercises, bracing or splinting, forearm strapping (distal to the epicondyle), ergonomic adjustments to work areas, and pain management using therapeutic hot and cold. In some cases, when occupational therapists are properly trained, physical agent modalities such as ultrasound or iontophoresis may be used.

Because the symptoms impact the client's occupations in different ways, it is often difficult to determine the most effective intervention to meet the client's needs. An evidence-based treatment approach allows the occupational therapist to ensure that the client is receiving the best care possible so that he or she is able to return to work and other desirable occupations.

#### **Summary of Key Findings:**

##### Summary of Levels I, II, and III

- There is little consensus on the management of lateral epicondylitis (LE). There have been no studies that have elucidated long-term beneficial effects of any of the commonly prescribed interventions for LE.
  - **SPLINTING:** Conflicting evidence regarding the effectiveness of splinting/orthotics was found. One Level I systematic review cited positive, but not conclusive, support for the effectiveness of splinting for LE (Borkholder, Hill, & Fess, 2004), while a Level II cohort study suggested that the use of splints does not necessarily lead to better outcomes and

may have adverse effects in treating epicondylitis (Derebery, Devenport, Giant, & Fogarty, 2005). One randomized clinical study found that the simple elbow band worn under the lateral epicondyle is as effective as the more elaborately designed Thämert splints (van de Streek, van der Schans, de Greef, & Postema, 2004).

- EXERCISE: Progressive strengthening and stretching programs reduce pain and may increase grip strength. Improvement from eccentric strengthening for wrist extensors in patients with lateral epicondylitis was not statistically different from that achieved with a conservative program (stretching) or a concentric strengthening program, as noted in a Level I randomized controlled trial (Martinez-Slivestrini et al, 2005). There is insufficient evidence to determine the effect of exercise combined with mobilization techniques (Smidt et al, 2003).
- MODALITIES: There was insufficient evidence for most interventions for lateral epicondylitis due to contradicting results, insufficient power, and the lower number of studies per intervention.
  - Only weak evidence for efficacy was found for ultrasound (Smidt et al., 2003, Level I systematic review). Ultrasound and ionization have shown some evidence of short-term benefits (up to 3 months), but there is no evidence of long-term effects raising issues of cost-benefit (Bisset, Paungmali, Vicenino, & Beller, 2005, Level I systematic review). Ultrasound alone or in combination with other treatments can decrease pain.
  - Ionization with diclofenac can significantly reduce pain, as noted in a Level I systematic review (Trudel et al., 2004).
  - There is no evidence to suggest that deep transverse friction massage combined with other physiotherapy modalities reduces tendonitis symptoms (Brosseau et al., 2002, Level I systematic review).
  - There is little evidence to support the use of low level laser therapy as a treatment for LE, as noted in a Level I systematic review (Trudel et al., 2004)
- Those who received early intervention (3 days postsurgery) for cubital tunnel release and medial epicondylectomy were significantly more likely to achieve full active extension and return to work significantly sooner than those whose interventions began 2 weeks after surgery; however, there were no significant differences in grip strength (Warwick & Seradge, 1995).

#### Summary of Levels IV and V

N/A

#### Contributions of Qualitative Studies:

N/A

#### Bottom Line for Occupational Therapy Practice:

There are many methods and approaches to conservative therapeutic management of elbow injuries and disorders. There is inconsistent evidence to support a single preparatory method or approach to conservative therapeutic management of lateral epicondylitis (LE). Studies identified for this review focused only on preparatory activities to minimize symptoms associated with elbow injuries and disorders. Preparatory modalities represent a minor component of a comprehensive occupation-based intervention plan to address the individual's return to activities of daily living (ADL), instrumental activities of daily living (IADL), work,

education, and leisure activities, yet they may provide relief of symptoms that limit the performance of functional activities. Evidence to support or negate the inclusion of preparatory activities in occupational therapy intervention for the elbow is limited. Evidence regarding splinting suggests that there may be some benefit in reducing symptoms associated with LE, but that splints may adversely affect function by restricting motion or altering movement patterns. The use of ultrasound and ionization may decrease pain for some patients so that they can continue with daily activities. Progressive strengthening and stretching programs may reduce pain. The use of deep transverse friction massage and the use of low-level laser therapy are not supported as effective preparatory treatments for LE in the literature.

### Review Process

Procedures for the selection and appraisal of articles

### Inclusion Criteria:

- Intervention approach used in the rehabilitation of work-related injuries and clinical conditions of the elbow
- Addressed an intervention approach within the domain of occupational therapy
- Peer reviewed journal article
- Published after 1986
- Published in an English language journal
- Level I, Level II, and Level III studies

### Exclusion Criteria:

- Studies outside the domain of occupational therapy
- Published before 1986
- Level IV and Level V studies
- Studies included qualitative methods without quantitative methods

### Search Strategy

Categories	Key Search Terms
Patient/Client Population	Elbow, elbow joint, tennis elbow, athletic injuries, amputation—above elbow, brachial plexus injury, wounds and injuries—elbow, cubital tunnel syndrome, arthritis, bicipital tendonitis, medial epicondylitis, lateral epicondylitis, tenosynovitis elbow, biceps tendon rupture, radial head fracture, dislocation, ulnar collateral ligament strain, sprain elbow, sprain radiohumeral joint
Intervention	Treatment, rehabilitation, interventions, therapy, occupational therapy, exercise, physical agent modalities, physical therapy, sports medicine, athletic training, body mechanics, ergonomics, relaxation techniques, biofeedback, prevention, functional training, activities of daily living, adaptive equipment, work hardening, work reconditioning/conditioning, industrial rehabilitation, occupational medicine, energy conservation, social skills training, cognitive behavior therapy, job coaching, job

	modification, job retraining, occupational rehabilitation, preprosthetic and prosthetic training, edema control, limb reshaping, therapeutic management, joint protection
Comparison	
Outcomes	Return to work, disability, level of independence (ADLs, IADLs), absenteeism, physical mobility, functional/ work capacity evaluation, quality of life, coping patterns, prosthetic use, pain, dysfunction/function, sickness, fatigue, endurance, strength, range of motion (ROM), electromyography (EMG), nerve conduction velocity (NCV), sensation, coordination, weakness, volumetric measurement for edema, circumferential measurement for edema, depression, anxiety, psychological distress, fear, symptom magnification, occupational stress

<b>Databases and Sites Searched</b>
Medline, CINAHL, Ergonomics Abstracts, PsychInfo, OT Seeker, Pedro, TRIP, RehabData, BIOSIS Preview, Science Citation Index, Social Work Abstracts, Healthstar, NIOSHTIC-2

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

Advisory group from within and outside occupational therapy reviewed focused questions and search terms (including diagnoses) developed by AOTA consultant and AOTA staff. The review author, AOTA consultant, and AOTA staff, in conjunction with a medical librarian with experience in evidence-based reviews, were responsible for searching the literature, selecting research studies of relevance to occupational therapy, critically appraising the studies, and summarizing the information with emphasis on implications for occupational therapy practitioners.

CAT was developed by review author and reviewed by AOTA consultant and AOTA staff.

**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	10
II	Two groups, nonrandomized studies (e.g., cohort, case-control)	1
III	One group, nonrandomized (e.g., before and after, pretest, and posttest)	0

IV	Descriptive studies that include analysis of outcomes (single subject design, case series)	0
V	Case reports and expert opinion, which include narrative literature reviews and consensus statements	0
	Qualitative studies	0
		<b>TOTAL 11</b>

### Limitations of the Studies Appraised

#### Levels I, II, and III

Limitations of systematic reviews include:

- Heterogeneity of studies limited pooling of data
- Limited follow-up times
- Variability in quality of included studies
- Small number of studies included in review
- Review of articles may have been done by one evaluator

Limitations of other studies include:

- Use of retrospective design and limited recording of splint use
- Lack of supervision of exercise program
- Study that is older may have included surgical and therapy techniques that may have changed over time

#### Levels IV and V

Not included in review

### Articles Selected for Appraisal:

Bisset, L., Paungmali, A, Vicenino, B., & Beller, E. (2005). A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylalgia. *British Journal of Sports Medicine*, 39, 411–422.

Borkholder, C. D., Hill, V. A., & Fess, E. E. (2004). The efficacy of splinting for lateral epicondylitis: A systematic review. *Journal of Hand Therapy*, 17, 181–199.

Brosseau, L., Casimiro, L., Milne, S., Robinson, V. A., Shea, B. J., Tugwell, P., et al. (2002). Deep transverse friction massage for treating tendonitis. *Cochrane Database of Systematic Reviews*, Issue 3. Art. No.: CD003528. DOI: 10.1002/14651858.CD003528

Derebery, V. J., Devenport, J. N., Giang, G. M., & Fogarty, W. T. (2005). The effects of splinting on outcomes for epicondylitis. *Archives of Physical Medicine and Rehabilitation*, 86, 1081–1088.

Martinez-Silvestrini, J. A., Newcomer, K. L., Gay, R. E., Schaefer, M. P., Kortebein, P., & Arendt, K. W. (2005). Chronic lateral epicondylitis: Comparative effectiveness of a home exercise program including stretching alone versus stretching supplemented with eccentric or concentric strengthening. *Journal of Hand Therapy, 18*, 411–419.

Smidt, N., Assendelft, W. J. J., Arola, H., Malmivaara, A., Green, S., Buchbinder, R., et al. (2003). Effectiveness of physiotherapy for lateral epicondylitis: A systematic review. *Annals of Medicine, 35*, 51–62.

Stasinopoulos, D. I., & Johnson, J. I. (2005). Effectiveness of low-level laser therapy for lateral elbow tendinopathy. *Photomedicine and Laser Surgery, 23*, 425–430.

Struijs, P. A., Arola, H., Assendelft, W. J. J., Buchbinder, R., Smidt, N. N., & van Dijk, C. N. (2002). Orthotic devices for the treatment of tennis elbow. *Cochrane Database of Systematic Reviews, 1*, CD001821.

Trudel, D., Duley, J., Zastrow, I., Kerr, E. W., Davidson, R., & MacDermid, J. C. (2004). Rehabilitation for patients with lateral epicondylitis: A systematic review. *Journal of Hand Therapy, 17*, 243–266.

van de Streek, M. D., van der Schans, C. P., de Greef, M. G. H., & Postema, K. (2004). The effect of a forearm/hand splint compared with an elbow band as a treatment for lateral epicondylitis. *Prosthetics and Orthotics International, 28*, 183–189.

Warwick, L., & Seradge, H. (1995). Early versus late range of motion following cubital tunnel surgery. *Journal of Hand Therapy, 8*, 245–248.

This work is based on the evidence-based literature review completed in May 2008 by Paula Bohr, PhD, OTR/L, FAOTA.

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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