Complete Summary

GUIDELINE TITLE

Elbow disorders.

BIBLIOGRAPHIC SOURCE(S)

American College of Occupational and Environmental Medicine (ACOEM). Elbow disorders. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2007. 67 p. [122 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Elbow complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004. 25 p.

The *Guidelines* are currently being updated on a 3-year rolling process.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory information has been released.

- June 15, 2005, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): U.S. Food and Drug Administration (FDA) recommended proposed labeling for both the prescription and over the counter (OTC) NSAIDs and a medication guide for the entire class of prescription products.
- April 7, 2005, Non-steroidal anti-inflammatory drugs (NSAIDS) (prescription and OTC, including ibuprofen and naproxen): FDA asked manufacturers of prescription and non-prescription (OTC) non-steroidal anti-inflammatory drugs (NSAIDs) to revise their labeling to include more specific information about potential gastrointestinal (GI) and cardiovascular (CV) risks.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Elbow disorders

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Orthopedic Surgery
Physical Medicine and Rehabilitation
Preventive Medicine
Sports Medicine
Surgery

INTENDED USERS

Advanced Practice Nurses
Nurses
Occupational Therapists
Physical Therapists
Physician Assistants
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

- To update the 2004 American College of Occupational and Environmental Medicine's (ACOEM's) Guidelines on Elbow Complaints
- To help improve or restore the health of those workers who incur occupationally related illnesses or injuries
- To present essential evidence-based information to address the injured worker's functional impairment and safely return him or her to work

TARGET POPULATION

Adults with potentially work-related elbow complaints seen in primary care settings

INTERVENTIONS AND PRACTICES CONSIDERED

Note from the National Guideline Clearinghouse (NGC): The following general clinical measures were considered. Refer to the original guideline document for information regarding which specific interventions and practices under these general headings are recommended, recommended against, or for which there is no recommendation by the American College of Occupational and Environmental Medicine (ACOEM).

1. History and physical exam
2. Patient education
3. Medication
4. Physical treatment methods
5. Injections
6. Orthotics and immobilization
7. Activity and exercise
8. Detection of neurologic abnormalities
9. Radiography and other imaging studies
10. Surgical considerations

MAJOR OUTCOMES CONSIDERED

- Validity of diagnostic tests
- Effectiveness of treatment in terms of pain/symptom relief, return of function, and return to work
- Cost of treatment
- Side effects of treatment

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The process begins with the identification of high-quality original research studies on a topic, as well as high- and intermediate-quality systematic reviews and meta-analyses relevant to each topic. Only evidence with the highest available rating (e.g., randomized controlled trials [RCTs]) is selected for critical appraisal.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus
Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Strength of Evidence Ratings

A: Strong evidence-base: One or more well-conducted systematic reviews or meta-analyses, or two or more high-quality studies.[1]

B: Moderate evidence-base: At least one high-quality study, a well-conducted systematic review or meta-analysis of lower quality studies,[2] or multiple lower-quality studies relevant to the topic and the working population.

C: Limited evidence-base: At least one study of intermediate quality.

I: Insufficient evidence: Evidence is insufficient or irreconcilable.

[1]For therapy and prevention - randomized controlled trials (RCTs) with narrow confidence intervals and minimal heterogeneity.

For diagnosis and screening - cross sectional studies using independent gold standards.

For prognosis - etiology or harms, prospective cohort studies with minimal heterogeneity.

[2]For therapy and prevention - a well-conducted review of cohort studies.

For prognosis - etiology or harms, a well-conducted review of retrospective cohort studies or untreated control arms of RCTs.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

As part of the update process, American College of Occupational and Environmental Medicine (ACOEM) adopted a new more meticulous strength-of-evidence rating methodology. The enhanced methodology incorporates the highest scientific standards for reviewing evidence-based literature, thus ensuring the most rigorous, reproducible, and transparent occupational health guidelines available.

Each article that meets the inclusion criteria is reviewed and critically appraised. Randomized controlled trials (RCTs) that meet inclusion criteria are scored on 11 criteria (see table below). Each criterion is scored 0.0, 0.5 or 1.0. These individual ratings are summed up, resulting in an overall rating that ranges from 0 to 11.

Criteria	Rating Description

Criteria	Rating Description
Randomization	Assessment of the degree that randomization was both reported to have been performed and successfully achieved through analyses of comparisons of variables between the two groups.
Treatment Allocation Concealed	Concealment of the allocation scheme from all involved, not just the patient.
Baseline Comparability	Measurement of how well the baseline groups are comparable (e.g., age, gender, prior treatment).
Patient Blinded	Blinding of the patient/subject to the treatment administered.
Provider Blinded	Blinding of the provider to the treatment administered.
Assessor Blinded	Blinding of the assessor to the treatment administered.
Controlled for Co-intervention	The degree to which the study design controlled for multiple interventions (e.g., a combination of stretching exercises and anti-inflammatory medication or mention of not using other treatments during the study).
Compliance Acceptable	Measurement of the degree of non-compliance.
Dropout Rate	Measurement of the drop-out rate.
Timing of Assessments	Assessment of whether the timing of measurements of effects is the same between treatment groups.
Analyzed by Intention to Treat	Ascertainment of whether the study was analyzed with an intent-to-treat analysis.

The rating is then converted into a quality grade—low quality (0-3.5), intermediate quality (4.0-7.5), or high quality (8.0-11.0). Critique of meta-analyses and systematic reviews is based on standardized, acceptable techniques; search methods reported; comprehensiveness of the search; reporting of inclusion criteria; intervention; avoidance of selection bias; reporting and appropriate assessment of validity criteria; and, for meta-analyses only, documentation regarding methods used to combine studies and the degree to which findings are appropriately combined. Studies are abstracted into evidence tables that include details of study methods, outcomes, and statistical analyses. Panels of experts (Evidence-based Practice Panels) then use the tables to grade the strength of evidence in order to develop the evidence-based guidelines. Evidence is drawn from individual studies, systematic reviews, and meta-analyses. Strength-of-evidence ratings are categorized as A, B, C, or I (Refer to the Rating Scheme for the Strength of the Evidence field).

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Development of Recommendations

In formulating recommendations, the expert Panels begin by reviewing the articles and evidence tables, followed by discussions to agree on the strength-of-the-evidence ratings (A, B, C, or I). Panels then draft recommendations with citation of references for each recommendation. "First principles" are observed in formulating recommendations as follows:

- Imaging or testing should generally be done to confirm a clinical impression.
- Tests should affect the course of treatment.
- Treatments should improve on the natural history of the disorder, which in many cases is recovery without treatment.
- Invasive treatment should be preceded by adequate conservative treatment and may be performed if conservative treatment does not improve the health problem.
- The more invasive and permanent, the more caution should be exerted in considering invasive tests or treatments and the stronger should be the evidence of efficacy.
- The more costly the test or intervention, the more caution should be generally exerted prior to ordering the test or treatment and the stronger should be the evidence of efficacy.
- Testing/treatment decisions should be a collaboration between the clinician and patient with full disclosure of benefits and risks.
- Treatment should not create dependence or functional disability.

Health benefits, side effects, and risks are explicitly considered and discussed in formulating recommendations. Benefits should significantly exceed risks. Each recommendation specifies to which clinical problem it relates and is linked to the evidence. Recommendations not based on expert consensus are linked to a list of references.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The criteria for American College of Occupational and Environmental Medicine (ACOEM) evidence-based recommendations are as follows:

Recommendation Category	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves important health and functional outcomes based on high quality evidence, and the Evidence-based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately	B	The intervention is recommended for appropriate

Recommendation Category	Evidence Rating	Description of Category
Recommended		patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and low potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, and/or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs/high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is ineffective, or that harms or costs outweigh benefits.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Several organizations and their representatives served as reviewers of the elbow chapter, including the Academy of Organizational & Occupational Psychiatry, American Association of Occupational Health Nurses, American Occupational Therapy Association, American Physical Therapy Association. The chapter was approved by the American College of Occupational and Environmental Medicines' Board of Directors on April 9, 2007.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the strength of evidence ratings (A, B, C, and I) and the criteria for evidence-based recommendations are presented at the end of the "Major Recommendations" field.

General Summary of Recommendation

Recommendations for Assessing and Treating Patients with Elbow Disorders

- The initial assessment of patients with acute and subacute elbow problems should focus on detecting clinical indications of potentially serious disease, termed red flags, and determining an accurate diagnosis.
- In the absence of red flags, health care providers can safely and effectively manage work-related elbow disorders. Management should focus on monitoring patients for complications, facilitating the healing process, and returning the individual to modified, alternative, or full-duty work.
- One role of the physician or other health care provider (e.g., physical therapist, occupational therapist, nurse, etc.) is to identify and correct or modify the offending or aggravating activity. Consultation with a qualified professional trained in ergonomic analyses can be helpful. Equipment may need to be serviced or adjusted to reduce the force required to accomplish a job task or to reduce vibration. Posture and work technique may need to be changed to address, for example, excessive grip force, contact pressure, or sustained wrist extension. Ergonomic biomechanical advice on the efficient use of the elbow is helpful. For example, with lateral epicondylalgia/epicondylitis/tendinosis, it is generally correct to lift with palm up and not palm down to reduce stress on the lateral elbow (caused by resisted wrist extension). For medial epicondylalgia/epicondylitis/tendinosis, it is generally correct to lift palm down to avoid stress on the medial elbow (caused by resisted wrist flexion).

- Relieving discomfort can be accomplished most safely by temporarily decreasing or modifying the offending activities and by prescribing systemic or topical non-prescription analgesics along with an adjustable, properly fitted elbow support. Patients recovering from acute and subacute elbow problems should be encouraged to continue working. Modified duty may be recommended if appropriate.
- In general, immobilization should be avoided. An exception is immediately after surgery where brief immobilization may be required. Wrist splinting is sometimes utilized. However, some experts believe splinting potentially contributes to elbow pain. When immobilization is utilized, range-of-motion exercises should involve the elbow, wrist, as well as the shoulder, to avoid frozen shoulder ("adhesive capsulitis").
- If significant symptoms causing self-limitations or restrictions persist beyond 4 to 6 weeks, referral for specialty evaluation (e.g., occupational medicine, physical medicine and rehabilitation, or orthopaedic surgery) may be indicated to assist in the confirmation of the provisional diagnosis and in the determination of further management.
- A careful search for regional or systemic symptoms, signs, and disorders should be undertaken particularly in cases of chronic or persistent problems. As there is not scientific consensus on categorization of symptoms, for purposes of discussion, acute symptoms are defined as those presenting for less than 1 month; subacute symptoms, 1 to 3 months; and chronic symptoms, greater than 3 months.
- Non-physical factors (i.e., psychiatric, psychosocial, workplace, or socioeconomic issues) should be investigated and addressed, particularly in cases of delayed recovery or delayed return to work. These factors are often not overt and specific inquiries are required to identify these issues.

It is important to note that many of these conditions, particularly lateral epicondylalgia or epicondylitis and other tendinoses, tend to resolve spontaneously (e.g., see "wait and see" groups within studies of corticosteroid injections in the original guideline document). Thus, in evaluating research studies, including prospective studies that do not include a placebo control, caution should be exerted as results may be interpreted as showing benefit even when there is not true improvement from the therapy beyond normal spontaneous resolution.

Summary of Recommendations for Evaluating and Managing Elbow Disorders (refer to the original guideline document for more detailed information)

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
History/physical exam	Occupational and non-occupational activity history (**C**) Basic history and exam --(search for red flags for tumor,		

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	infection, systemic disease) (**I**)		
Patient education	Patient education regarding diagnosis, prognosis, expectations of treatment, and return to work. (**I**).		
Medication	Oral nonsteroidal anti-inflammatory drugs (NSAIDs) (Rosenthal, 1984; Adelaar, Maddy, & Emroch, 1987; Stull & Jokl, 1986; Labelle & Guibert, 1997) (**B**) Topical NSAIDs (Ritchie, 1996; Saggini et al., 1996; Baskurt, Ozcan, & Algun, 2003; Burnham et al., 1998; Schapira, Linn, & Scharf, 1991; Kroll, Wiseman, Guttadauria, 1989; Spacca et al., 2005) (**B**) Acetaminophen (**I**) Aspirin (**I**) Ketamine gel for neuropathic pain (**I**) NSAIDs for ulnar neuropathies (**I**) Systemic antibiotics and aspiration/drainage for infected bursa (**I**)		Opioids are not recommended for routine use. However, they may be used in an acute elbow injury or inflammation with redness, heat, swelling concurrently with an antiinflammatory, ice, and rest and tapered off after 2 to 3 days (**I**)
Physical treatment methods	Ultrasound treatment for epicondylalgia (Nimgade, Sullivan, & Goldman, 2005; Trudel et al., 2004; Bisset et al., 2005;	Manipulation (**I**) Massage (**I**) Friction massage (**I**)	Extracorporeal shock wave therapy (Bisset et al., 2005; Chung & Wiley, 2004; Speed et al., 2002; Melikyan et al, 2003;

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	Pienimaki et al., 1996; Halle, Franklin, & Karalfa, 1986; Klaiman et al., 1998; Lundeberg, Abrahamsson, & Haker, 1988; D'Vaz et al., 2006; Binder et al., 1985; Haker & Lundeberg "Pulsed ultrasound treatment", 1991; Smidt et al., 2003; van der Windt et al., 1999) (**B**) Iontophoresis for epicondylalgia with either glucocorticoid or diclofenac (Nirschl et al., 2003; Runeson & Haker, 2002; Demirtas & Oner, 1998) (**C**) At-home applications of heat or cold packs for comfort (**I**) Acupuncture for epicondylalgia (**I**)	Soft tissue mobilization (**I**) TENS (**I**) Biofeedback (**I**) Electrical stimulation (**I**) Magnets (**I**) Diathermy (**I**)	Haake et al., 2002; Melegati et al., 2004; Crowther et al., 2002; Rompe et al., 1996; Rompe et al., 2004; Mehra, Zaman, & Jenkin, 2003; Pettrone & McCall, 2005; Buchbinder et al., 2005) (**A**) Low-level laser therapy (Bisset et al., 2005; Haker & Lundeberg, 1990; Haker & Lundeberg, "Lateral epicondylalgia", 1991; Krasheninnikiff et al., 1994; Vasseljen et al., 1992; Basford, Sheffield, & Cieslak, 2000; Simunovic, Trobonjaca, & Trobonjaca, 1998; Haker & Lundeberg, "Is low-energy laser treatment," 1991; Vasseljen, 1992; Stasinopoulos & Johnson, 2005) (**A**) Phonophoresis (Baskurt, Ozcan, & Algun, 2003; Klaiman et al., 1998; Stratford et al., 1989) (**C**)
Injections	Local corticosteroid injections for medial and lateral epicondylalgia have evidence of short-term efficacy while simultaneously having	Corticosteroid injection into olecranon bursa only after failure of initial care (**I**) Botulinum toxin	Autologous blood injection (**I**)

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	no demonstrated long-term efficacy. Should only be considered after 3–4 weeks of conservative treatment has failed. (Smidt et al., 2002; Bisset et al., 2006; Price et al., 1991; Lewis et al., 2005; Verhaar et al., 1995; Altay, Gunal, & Ozturk, 2002; Newcomer et al., 2001; Hay et al., 1999; Saartok & Eriksson, 1986; Solveborn et al., 1995; Nimgade, Sullivan , & Goldman, 2005; Trudel et al., 2004) (**B**) Bupivacaine is superior to lidocaine when combined with corticosteroid in lateral epicondylar injections (Solveborn et al., 1995) (**C**)	injection for lateral epicondylalgia (**I**)	
Orthotics and Immobilization	Protection, rest, ice, compression, elevation, and mobilization for contusion (**I**) Limited (i.e., sling or posterior elbow splint) and then early mobilization for non-displaced radial head fracture (**I**) Epicondylalgia supports for epicondylalgia (**I**) Dynamic extensor		Trial of casting for severe recalcitrant epicondylalgia (**I**)

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	brace for lateral epicondylalgia (**I**) Wrist splinting for epicondylalgia (**I**) Wrist splinting for radial tunnel syndrome (**I**) Nocturnal elbow splinting for ulnar neuropathy (**I**) Daytime padding for ulnar neuropathies at the elbow (**I**) Avoidance of leaning on the ulnar nerve at the elbow for ulnar neuropathies (**I**) Avoidance of prolonged hyperflexion of the elbow for ulnar neuropathies (**I**) Padding the elbow for sterile effusion of the olecranon bursa (**I**) Posterior splint for elbow dislocation (**I**) Shoulder sling for elbow sprain (**I**) Wrist brace for pronator syndrome (**I**)		
Activity/Exercise	Exercise instruction by a therapist for epicondylalgia (**I**) Physician recommendations for range-of-motion		

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	instruction and strengthening exercises in epicondylalgia patients (**I**) Stretching (**I**) Aerobic exercise (**I**) Activity modification (**I**) Workstation modifications (**I**)		
Detection of Neurologic Abnormalities	Nerve conduction studies (NCS) to confirm ulnar nerve entrapment if conservative treatment fails (**I**) NCS to distinguish radial entrapment from lateral epicondylitis if history and physical exam are equivocal and conservative treatment fails (**I**)		
Radiography/Other imaging Studies	Magnetic resonance imaging (MRI) for suspected ulnar collateral ligament tears (**C**) Plain-film radiography for red-flag cases (**I**)		Repeat plain-film radiography for readings with "fat pad sign" (**I**) MRI for suspected epicondylalgia (**I**)
Surgical Considerations	Simple decompression for ulnar nerve entrapment (Nabhan et al., 2005; Bartels et al., 2005; Biggs & Curtis, 2006; Gervasio et al., 2005) (**C**) Simple ulnar nerve release for patients		Submuscular transposition of the ulnar nerve at the elbow (Biggs & Curtis, 2006; Gervasio et al., 2005) (**C**) Excision of olecranon bursa due to

Clinical Measure	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	with significant activity limitation and delayed NCS (**C**) Anterior transposition for ulnar nerve entrapment in patients with significant activity limitation and delayed NCS or failed simple release (**I**) Excision for infected olecranon bursitis if not responsive to intravenous (IV) antibiotics, aspiration and drainage (**I**) Radial tunnel decompression for failure of conservative treatment and positive electrodiagnostic studies (**I**) Debridement of inflammatory or scarred tissue for patients with epicondylalgia if conservative treatment fails (**I**) Surgery for biceps rupture (**I**) Surgery after at least 6 months of conservative treatment with failure to show signs of improvement (at least 3 months in unusual circumstances) (**I**)		metabolic arthritis before appropriate medical treatment (**I**) Medical epicondylectomy for ulnar neuropathy (**I**) Ulnar nerve surgery in the presence of normal electrical studies (**I**)

Summary of Recommendations by Elbow Condition (refer to the original guideline document for more detailed information)

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
Contusion	Protection, rest, ice, compression, elevation, and mobilization (**I**)		
Olecranon Bursitis (Aseptic)	Soft padding of the elbow (**I**) Modifying activities to avoid direct pressure over the olecranon (**I**) Surgery if after at least 6 weeks of conservative treatment with failure to show signs of improvement (**I**)	Corticosteroid injection for persistent symptoms (**I**)	Corticosteroid injection as part of initial care (**I**)
Olecranon Bursitis (Septic)	Elbow padding (**I**) Avoid direct pressure (**I**) Aspiration and antibiotics(**I**) Surgery (**I**)		
Non-displaced Radial Head Fracture	Sling/splint for 7 days followed by gentle range of motion exercises then progressive mobilization. Range-of-motion exercises should involve the elbow, but also the shoulder and wrist. A shorter immobilization period of as little as 3 days may be used for non-displaced fractures that are clinically present but not visible on x-ray. (**I**)		
Dislocation of the Elbow	Post-reduction x-rays and examination necessary (**I**) Posterior splint for 10		

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	days (**I**) Range-of-motion exercises after immobilization. Range-of-motion exercises should involve the elbow, but also the shoulder and wrist. (**I**) Nonsteroidal antiinflammatory drugs (NSAIDs) (**I**)		
Sprain of the Elbow	NSAIDs (**I**) Shoulder sling may be used for up to 1 week (**I**) Gentle range-of-motion exercises of the elbow, but including the shoulder and wrist (**I**)		
Biceps Tendinosis	Sling for severe cases with gentle range-of-motion exercises of the elbow, but including the shoulder and wrist (**I**) NSAIDs (**I**) Activity limitations (**I**)		
Ulnar Nerve Entrapment (including Cubital Tunnel Syndrome)	Avoid prolonged hyperflexion of elbow (**I**) Elbow padding (**I**) Avoid leaning on elbow (**I**) NSAIDs (**I**) Simple decompression (Nabhan et al., 2005; Bartels et al., 2005; Biggs & Curtis, 2006;		Submuscular transposition (Biggs & Curtis, 2006; Gervasio et al., 2005) (C) Medial epicondylectomy for ulnar neuropathy (**I**)

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	Gervasio et al., 2005) (**C**) Anterior transposition after 3 to 6 months (rare cases) (**I**)		
Radial Nerve Entrapment (including Radial Tunnel Syndrome)	NSAIDs (**I**) Confirmatory electro-diagnostic study helpful (**I**) Wrist splint for periodic daytime use (**I**) Surgery after at least 6 months of conservative treatment with failure to show signs of improvement (at least 3 months in unusual circumstances) (**I**)		
Pronator Syndrome	NSAIDs (**I**) Activity modifications (**I**) Confirmatory electrodiagnostic study helpful (**I**) Wrist brace (**I**) Surgery after at least 6 months of conservative treatment with failure to show signs of improvement (at least 3 months in unusual circumstances) (**I**)		
Lateral Epicondylalgia (Lateral Epicondylitis)	Acetaminophen (**I**) Aspirin (**I**) Heat or cold packs (**I**) Topical NSAIDs	Botulinum toxin injection (**I**) Massage (**I**) Friction massage (**I**)	Extracorporeal shock wave therapy (Bisset et al., 2005; Chung & Wiley, 2004; Speed et al., 2002; Melikyan et al, 2003; Haake et al., 2002; Melegati et al.,

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	(Ritchie, 1996; Saggini et al., 1996; Baskurt, Ozcan, & Algun, 2003; Burnham et al., 1998; Schapira, Linn, & Scharf, 1991; Kroll, Wiseman, & Guttadauria, 1989; Spacca et al., 2005) (**B**) Oral NSAIDs (Rosenthal, 1984; Adelaar, Maddy, & Emroch, 1987; Stull & Jokl, 1986; Labelle & Guibert, 1997) (**B**) Home exercise (**I**) Epicondylalgia supports (**I**) Activity modification (**I**) Workstation modifications (**I**) Ultrasound (Nimgade, Sullivan, & Goldman, 2005; Trudel et al., 2004; Bisset et al., 2005; Pienimaki et al., 1996; Halle, Franklin, & Karalfa, 1986; Klaiman et al., 1998; Lundeberg, Abrahamsson, & Haker, 1988; D'Vaz et al., 2006; Binder et al., 1985; Haker & Lundeberg "Pulsed ultrasound treatment", 1991; Smidt et al., 2003; van der Windt et al., 1999) (**B**) Iontophoresis (Nirschl	Soft tissue mobilization (**I**) Biofeedback (**I**) Transcutaneous electrical neurostimulation (TENS) (**I**) Electrical stimulation (**I**) Magnets (**I**) Diathermy (**I**) Manipulation (**I**)	2004; Crowther et al., 2002; Rompe et al., 1996; Rompe et al., 2004; Mehra, Zaman, & Jenkin, 2003; Pettrone & McCall, 2005; Buchbinder et al., 2005) (**A**) Low level laser therapy (Bisset et al., 2005; Haker & Lundeberg, 1990; Haker & Lundeberg, "Lateral epicondylalgia", 1991; Krasheninnikiff et al., 1994; Vasseljen et al., 1992; Basford, Sheffield, & Cieslak, 2000; Simunovic, Trobonjaca, & Trobonjaca, 1998; Haker & Lundeberg, "Is low-energy laser treatment," 1991; Vasseljen, 1992; Stasinopoulos & Johnson, 2005) (**A**) Phonophoresis (Baskurt, Ozcan, & Algun, 2003; Klaiman et al., 1998; Stratford et al., 1989) (**C**) Autologous blood injections (**I**) Opioids (other than acute, severe conditions) (**I**)

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	et al., 2003; Runeson & Haker, 2002; Demirtas & Oner, 1998) (**C**) Acupuncture (**I**) Cortisone with bupivacaine (Solveborn et al., 1995) (**C**) Local corticosteroid injections (Smidt et al., 2002; Bisset et al., 2006; Price et al., 1991; Lewis et al., 2005; Verhaar et al., 1995; Altay, Gunal, & Ozturk, 2002; Newcomer et al., 2001; Hay et al., 1999; Saartok & Eriksson, 1986; Solveborn et al., 1995; Nimgade, Sullivan, & Goldman, 2005; Trudel et al., 2004) (**B**) Surgery after at least 6 months of conservative treatment with failure to show signs of improvement (at least 3 months in unusual circumstances) (**I**)		
Medial Epicondylalgia (Medial Epicondylitis)	Same recommendations as lateral epicondylalgia above Activity modification (**I**) Workstation modification (**I**) Iontophoresis (Nirschl et al., 2003) (**C**)	Same recommendations as lateral epicondylalgia above	Same recommendations as lateral epicondylalgia above

Elbow Condition	Treatment with Evidence Rating/Recommendation Level		
	Recommended	**No Recommendation**	**Not Recommended**
	Corticosteroid injections (Stahl & Kaufman, 1997) (**B**) Surgery after at least 6 months of conservative treatment with failure to show signs of improvement (at least 3 months in unusual circumstances) (**I**)		
Biceps Rupture	Surgery (**I**)		

Definitions:

Strength of Evidence Ratings

A: Strong evidence-base: One or more well-conducted systematic reviews or meta-analyses, or two or more high-quality studies.[1]

B: Moderate evidence-base: At least one high-quality study, a well-conducted systematic review or meta-analysis of lower quality studies,[2] or multiple lower-quality studies relevant to the topic and the working population.

C: Limited evidence-base: At least one study of intermediate quality.

I: Insufficient evidence: Evidence is insufficient or irreconcilable.

[1]For therapy and prevention - randomized controlled trials (RCTs) with narrow confidence intervals and minimal heterogeneity.

For diagnosis and screening - cross sectional studies using independent gold standards.

For prognosis, etiology or harms, prospective cohort studies with minimal heterogeneity.

[2]For therapy and prevention - a well-conducted review of cohort studies.

For prognosis - etiology or harms, a well-conducted review of retrospective cohort studies or untreated control arms of RCTs.

Categories of Evidence-based Recommendations

Recommendation Category	Evidence Rating	Description of Category
Strongly Recommended	A	The intervention is strongly recommended for appropriate patients. The intervention improves

Recommendation Category	Evidence Rating	Description of Category
		important health and functional outcomes based on high quality evidence, and the Evidence-based Practice Panel (EBPP) concludes that benefits substantially outweigh harms and costs.
Moderately Recommended	B	The intervention is recommended for appropriate patients. The intervention improves important health and functional outcomes based on intermediate quality evidence that benefits substantially outweigh harms and costs.
Recommended	C	The intervention is recommended for appropriate patients. There is limited evidence that the intervention may improve important health and functional benefits.
Insufficient - Recommended (Consensus-based)	I	The intervention is recommended for appropriate patients and has nominal costs and low potential for harm. The EBPP feels that the intervention constitutes best medical practice to acquire or provide information in order to best diagnose and treat a health condition and restore function in an expeditious manner. The EBPP believes based on the body of evidence, first principles, and/or collective experience that patients are best served by these practices, although the evidence is insufficient for an evidence-based recommendation.
Insufficient - No Recommendation (Consensus-based)	I	The evidence is insufficient to recommend for or against routinely providing the intervention. The EBPP makes no recommendation. Evidence that the intervention is effective is lacking, of poor quality, or conflicting and the balance of benefits, harms, and costs cannot be determined.
Insufficient - Not Recommended (Consensus-based)	I	The evidence is insufficient for an evidence-based recommendation. The intervention is not recommended for appropriate patients because of high costs/high potential for harm to the patient.
Not Recommended	C	Recommendation against routinely providing the intervention. The EBPP found at least intermediate evidence that harms and costs exceed benefits based on limited evidence.
Moderately Not Recommended	B	Recommendation against routinely providing the intervention to eligible patients. The EBPP found at least intermediate evidence that the intervention is ineffective, or that harms or costs outweigh benefits.
Strongly Not Recommended	A	Strong recommendation against providing the intervention to eligible patients. The EBPP found high quality evidence that the intervention is

Recommendation Category	Evidence Rating	Description of Category
		ineffective, or that harms or costs outweigh benefits.

CLINICAL ALGORITHM(S)

The following clinical algorithms are provided in the original guideline document:

- American College of Occupational and Environmental Medicine (ACOEM) Guidelines for care of acute and subacute occupational elbow disorders
- Initial evaluation of occupational elbow disorders
- Initial and follow-up management of occupational elbow disorders
- Evaluation of slow-to-recover patients with occupational elbow disorders (symptoms >4 weeks)
- Surgical considerations for patients with anatomic and physiologic evidence of nerve compression coupled with persistent elbow disorders
- Further management of occupational elbow disorders

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Improved efficiency of the diagnostic process
- Effective treatment resulting in symptom alleviation and cure
- Reduced over utilization of unproductive and harmful procedures
- Timely return of the employee to work, usually within 90 days of injury or illness

POTENTIAL HARMS

- Risks and complications of surgical procedures and imaging studies (e.g., infection, radiation)
- Adverse effects of medications:
    - Glucocorticoid injections have some risks. For example, with a large volume in a small space there is a risk of tendon fraying and even rupture, although the underlying pathogenesis is thought to frequently

entail those processes. Injections can also cause an inflammatory reaction causing pain lasting for several hours, and rarely infection.

CONTRAINDICATIONS

CONTRAINDICATIONS

Patients with positive findings of non-localized pain, non-localized tenderness, and psychological or psychiatric issues, have relative, but not absolute, contraindications to invasive testing or procedures.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The American College of Occupational and Environmental Medicine (ACOEM) provides this segment of guidelines for practitioners and notes that decisions to adopt particular courses of actions must be made by trained practitioners on the basis of the available resources and the particular circumstances presented by the individual patient. Accordingly, the ACOEM disclaims responsibility for any injury or damage resulting from actions taken by practitioners after considering these guidelines.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American College of Occupational and Environmental Medicine (ACOEM). Elbow disorders. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2007. 67 p. [122 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

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1997 (revised 2007)

GUIDELINE DEVELOPER(S)

American College of Occupational and Environmental Medicine - Medical Specialty Society

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GUIDELINE COMMITTEE

American College of Occupational and Environmental Medicine Practice Guidelines Committee

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Research Grants/Other Support—None

Financial/Non-Financial Conflict of Interest—None

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Elbow complaints. Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM); 2004. 25 p.

The *Guidelines* are currently being updated on a 3-year rolling process.

GUIDELINE AVAILABILITY

Print copies are available from ACOEM, 25 Northwest Point Boulevard, Suite 700, Elk Grove Village, IL 60007; Phone: 847-818-1800 x399. To order a subscription to the online version, call 800-441-9674 or visit http://www.acoempracguides.org/.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

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