Complete Summary

GUIDELINE TITLE

Carpal tunnel syndrome (acute & chronic).

BIBLIOGRAPHIC SOURCE(S)

Work Loss Data Institute. Carpal tunnel syndrome (acute & chronic). Corpus Christi (TX): Work Loss Data Institute; 2007 Apr 24. 201 p. [275 references]

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

** 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.

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SCOPE

DISEASE/CONDITION(S)

Work-related carpal tunnel syndrome

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Neurology
Orthopedic Surgery

INTENDED USERS

Advanced Practice Nurses
Health Care Providers
Health Plans
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To offer evidence-based step-by-step decision protocols for the assessment and treatment of workers' compensation conditions

TARGET POPULATION

Workers with occupational carpal tunnel syndrome

INTERVENTIONS AND PRACTICES CONSIDERED

The following interventions/procedures were considered and recommended as indicated in the original guideline document:

1. Aerobic exercise
2. Braces/splinting
3. Breaks (microbreaks)
4. Carpal tunnel release surgery (CTR)
5. Cold packs
6. Comorbidities assessment (e.g. depression, diabetes, hypothyroidism, obesity, pregnancy)

7. Continuous cold therapy (CCT) in the postoperative setting
8. Corticosteroid injections
9. Diagnostic assessment of night pain symptoms, nocturnal paresthesias, thumb abduction strength, and hypalgesia
10. Diagnostic ultrasound in difficult cases
11. Diagnostic tests such as Durkan's compression test, Flick sign (shaking hand), Katz hand diagram, Semmes-Weinstein monofilament test
12. Differential diagnosis
13. Electrodiagnostic studies (EDS)
14. Electromyography (EMG) when diagnosis is difficult
15. Endoscopic surgery
16. Hand and wrist exercises
17. Heat therapy after initial cold packs
18. Nerve conduction studies (NCS)
19. Nerve/tendon gliding exercises
20. Nonprescription medications (acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs). NSAIDs are not recommended as first line therapy.
21. Physical therapy/occupational therapy (see original guideline document for specific indications)
22. Psychosocial management
23. Return to work
24. Static 2-point discrimination (>6 millimeters)
25. Thenar atrophy in diagnosis of severe cases
26. Work restrictions/modified duty
27. Yoga

The following interventions/procedures are under study and are not specifically recommended:

1. Arnica
2. Ergonomic interventions
3. Insulin
4. Iontophoresis/phonophoresis
5. Lidocaine patch
6. Ligament stretching device
7. Massage
8. Mobilization (carpal bone)
9. Mouse use
10. Oral corticosteroids
11. Polarized polychromatic light (Bioptron light)
12. Therapeutic ultrasound
13. Traumatic carpal tunnel syndrome (CTS)

The following interventions/procedures were considered, but are not currently recommended:

1. Acupuncture
2. Assessment of wrist pain
3. Astaxanthin
4. Biofeedback
5. Botulinum toxin
6. Closed fist sign

7. Current perception threshold (CPT) testing/neurometer
8. Diuretics
9. Evoked potential studies
10. Gel-padded glove
11. Hypnosis
12. Laser acupuncture
13. Low-level laser therapy (LLLT)
14. Magnets/magnet therapy
15. Magnetic resonance imaging (MRI)
16. Manipulation/chiropractic
17. Multiple extremity testing (unless CTS suspected in each limb)
18. NC-stat nerve conduction studies/NeuroMetrix (unless traditional electrodiagnostic testing is unavailable)
19. NSAIDs as first-line therapy
20. Phalen's test
21. Portable nerve conduction devices
22. Square wrist sign in diagnostic assessment
23. Surface EMG (SEMG)
24. Therapeutic touch
25. Tinel's sign in diagnostic assessment
26. Tourniquet test in diagnostic assessment
27. Transcutaneous electrical neurostimulation (TENS)
28. Vitamin B6 (pyridoxine) supplementation

MAJOR OUTCOMES CONSIDERED

- Sensitivity and specificity of diagnostic tests
- Effectiveness of treatments for relief of pain and symptoms

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Work Loss Data Institute (WLDI) conducted a comprehensive medical literature review (now ongoing) with preference given to high quality systematic reviews, meta-analyses, and clinical trials published since 1993, plus existing nationally recognized treatment guidelines from the leading specialty societies. WLDI primarily searched MEDLINE and the Cochrane Library. In addition, WLDI also reviewed other relevant treatment guidelines, including those in the National Guideline Clearinghouse, as well as state guidelines and proprietary guidelines maintained in the WLDI guideline library. These guidelines were also used to suggest references or search terms that may otherwise have been missed. In addition, WLDI also searched other databases, including MD Consult, eMedicine, CINAHL, and conference proceedings in occupational health (i.e. American College of Occupational and Environmental medicine [ACOEM]) and disability evaluation (i.e. American Academy of Disability Evaluating Physicians [AADEP], American

Board of Independent Medical Examiners [ABIME]). Search terms and questions were diagnosis, treatment, symptom, sign, and/or body-part driven, generated based on new or previously indexed existing evidence, treatment parameters and experience.

In searching the medical literature, answers to the following questions were sought: (1) If the diagnostic criteria for a given condition have changed since 1993, what are the new diagnostic criteria? (2) What occupational exposures or activities are associated causally with the condition? (3) What are the most effective methods and approaches for the early identification and diagnosis of the condition? (4) What historical information, clinical examination findings or ancillary test results (such as laboratory or x-ray studies) are of value in determining whether a condition was caused by the patient's employment? (5) What are the most effective methods and approaches for treating the condition? (6) What are the specific indications, if any, for surgery as a means of treating the condition? (7) What are the relative benefits and harms of the various surgical and non-surgical interventions that may be used to treat the condition? (8) What is the relationship, if any, between a patient's age, gender, socioeconomic status and/or racial or ethnic grouping and specific treatment outcomes for the condition? (9) What instruments or techniques, if any, accurately assess functional limitations in an individual with the condition? (10) What is the natural history of the disorder? (11) Prior to treatment, what are the typical functional limitations for an individual with the condition? (12) Following treatment, what are the typical functional limitations for an individual with the condition? (13) Following treatment, what are the most cost-effective methods for preventing the recurrence of signs or symptoms of the condition, and how does this vary depending upon patient-specific matters such as underlying health problems?

Criteria for Selecting the Evidence

Preference was given to evidence that met the following criteria: (1) The article was written in the English language, and the article had any of the following attributes: (2) It was a systematic review of the relevant medical literature, or (3) The article reported a controlled trial – randomized or controlled, or (4) The article reports a cohort study, whether prospective or retrospective, or (5) The article reports a case control series involving at least 25 subjects, in which the assessment of outcome was determined by a person or entity independent from the persons or institution that performed the intervention the outcome of which is being assessed.

More information about the selection of evidence is available in "Appendix. ODG Treatment in Workers' Comp. Methodology description using the AGREE instrument" (see "Availability of Companion Documents" field).

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Ranking by Type of Evidence

1. Systematic Review/Meta-Analysis
2. Controlled Trial-Randomized (RCT) or Controlled
3. Cohort Study-Prospective or Retrospective
4. Case Control Series
5. Unstructured Review
6. Nationally Recognized Treatment Guideline (from www.guideline.gov)
7. State Treatment Guideline
8. Other Treatment Guideline
9. Textbook
10. Conference Proceedings/Presentation Slides

Ranking by Quality within Type of Evidence

a. High Quality
b. Medium Quality
c. Low Quality

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The Work Loss Data Institute (WLDI) reviewed each article that was relevant to answering the question at issue, with priority given to those that met the following criteria: (1) The article was written in the English language, and the article had any of the following attributes: (2) It was a systematic review of the relevant medical literature, or (3) The article reported a controlled trial – randomized or controlled, or (4) The article reported a cohort study, whether prospective or retrospective, or (5) The article reported a case control series involving at least 25 subjects, in which the assessment of outcome was determined by a person or entity independent from the persons or institution that performed the intervention the outcome of which is being assessed.

Especially, when articles on a specific topic that met the above criteria were limited in number and quality, WLDI also reviewed other articles that did not meet the above criteria, but all evidence was ranked alphanumerically (see the Rating Scheme of the Strength of Evidence field) so that the quality of evidence could be clearly determined when making decisions about what to recommend in the Guidelines. Articles with a Ranking by Type of Evidence of Case Reports and Case Series were not used in the evidence base for the Guidelines. These articles were not included because of their low quality (i.e., they tend to be anecdotal descriptions of what happened with no attempt to control for variables that might effect outcome). Not all the evidence provided by WLDI was eventually listed in the bibliography of the published Guidelines. Only the higher quality references were listed. The criteria for inclusion was a final ranking of 1a to 4b (the original

inclusion criteria suggested the methodology subgroup), or if the Ranking by Type of Evidence was 5 to 10, the quality ranking should be an "a."

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

The guideline developers reviewed published cost analyses.

METHOD OF GUIDELINE VALIDATION

External Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Prior to publication, select organizations and individuals making up a cross-section of medical specialties and typical end-users externally reviewed the guideline.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

Initial Diagnosis

- First visit: with Primary Care Physician MD/DO (100%)
- Determine severity: (see also Severity definitions in the Procedure Summary of the original guideline document)
    - Mild/moderate (*Go to Initial Conservative Treatment*):
        - Symptoms: pain/numbness in hand/wrist/forearm, below the elbow, with tingling that is primarily in thumb, index, and long finger (Katz hand diagram and hypesthesia index finger compared to little finger), with nocturnal awakening, impaired dexterity, and having to shake the hand for relief (the Flick sign has a sensitivity of 93% and specificity 96%)
        - Tests: Phalen's/Tinel's signs not always useful; also consider Semmes Weinstein monofilament test, Durkan's compression test. (See Table, "Sensitivity and Specificity of Diagnostic Tests for Carpal Tunnel Syndrome Measured Against Nerve Conduction Studies" in the original guideline document.)

        - Recommended: findings that best distinguish between patients with electrodiagnostic evidence of carpal tunnel syndrome (CTS) and patients without it are hypalgesia in the median nerve territory, classic or probable Katz hand diagram results, and weak thumb abduction strength. See Table, "Sensitivity and Specificity of Diagnostic Tests for Carpal Tunnel Syndrome Measured Against Nerve Conduction Studies" in the original guideline document.
        - Muscle atrophy: mild weakness of thenar muscles (thumb abduction)
        - History/exam, comorbidities: diabetes, hypothyroidism, rheumatoid arthritis, obesity, hypertension, depression, inactivity, age, work, and hobbies

          Carpal tunnel syndrome seems to be primarily attributable to CTS-prone personal characteristics (e.g., obesity, diabetes, female, smoking), but also possibly in combination with improper work conditions. There is sufficient evidence to conclude that CTS is associated with work, but the studies have neither proven nor disproven whether the association is causal. See "Work" in the Procedure Summary of the original guideline document.

        - Concurrent pregnancy: CTS likely to resolve on its own within 6–12 weeks after delivery
    - Severe (*Go Directly to Electrodiagnostic Testing*)
        - Muscle atrophy: severe weakness of thenar muscles
        - Test: 2-point discrimination over 6 mm
- Rule out diagnoses (See other treatment parameters for each of these):
    - Cervical radiculopathy (refer to the original guideline document for relevant International Classification of Diseases, Ninth Revision [ICD-9] codes for CTS and other diagnoses)
    - Tendonitis
    - Osteoarthritis
    - Thoracic outlet syndrome, brachial plexus disorders

Mild/Moderate -- Initial Conservative Treatment (70% of cases)

- Also first visit (day 1):
    - Prescribe alteration of activity (home and work), frequent breaks, stretching, night and possibly day splint, appropriate analgesia (i.e., acetaminophen) [*Benchmark cost: $14*], back to work--modified duty if condition caused by job, possible ergonomic evaluation of job, patient education

Official Disability Guidelines (ODG) Return-To-Work Pathways

Conservative treatment, modified work (no repetitive use of hand/wrist): 0 days

Conservative treatment, regular work (if not cause of or aggravating to disability/use of splint): 0 to 5 days

(See *ODG Capabilities & Activity Modifications for Restricted Work* under "Work" in the Procedure Summary of the original guideline document)

- Second visit (day 7 to 14--about 2 weeks after first visit, but sooner if the patient is off work)
    - Document progress.
    - If not significantly improved then *may* (approximately 50% of cases) prescribe physical therapy for home exercise training [*Benchmark cost: $250*]: Refer to Physical Therapist (50%) or Occupational Therapist (50%) for 3 visits.
- Third visit (day 20 to 30--about 1 month after first visit, but sooner if patient is off work)
    - Document progress.
    - Corticosteroid injection trial (high likelihood of relief, but may have recurrence of symptoms within several months--initial relief of symptoms good indicator for success of surgery, can assist in confirmation of diagnosis) [*Benchmark cost: $276*]. Should be performed by musculoskeletally trained physician because of nerve injury risk. Recommend only one injection.

ODG Return-To-Work Pathways

Conservative treatment, regular work (if work related): 28 days

Conservative treatment, regular work (with severe nerve impairment): indefinite

- Fourth visit (day 40 to 50--about 6 weeks after first visit)
    - Refer for Electrodiagnostic Testing.

Electrodiagnostic Testing (50% of cases)
[*Benchmark cost: $370*]

- All severe cases, plus mild/moderate cases after Initial Conservative Treatment above; See "Protocols for electrodiagnostic studies" in the original guideline document.
- Refer to Neurologist (70%) or Physical Medicine (30%) specialists certified in electrodiagnostic medicine, for electromyography (EMG)/Nerve Conduction Studies, the "gold standard" tests for the evaluation of CTS.
- Positive test: refer for Carpal Tunnel Release depending on severity
- Note: ODG recommends that nerve conduction studies (NCS) should be done to support the diagnosis of CTS prior to surgery. If an individual has appropriate responses to treatment (i.e. injections, modification of activities, meds) but still has symptoms with normal NCS, surgery may be appropriate on a case-by-case basis and reasonable documentation by the treating physician.

Carpal Tunnel Release (35% of cases)

(See also *ODG Indications for Surgery™ -- Carpal Tunnel Release* in the Procedure Summary in the original guideline document)
[*Benchmark cost: $3,158*]

- Only after the positive diagnosis of CTS is made by history, physical examination, and electrodiagnostic studies

- Performed by Hand Surgeon: Orthopaedic Surgeon (75%), Neurosurgeon (10%), Plastic Surgeon (10%), or General Surgeon (5%)
- On an outpatient basis
- May be open or endoscopic, depending on experience of surgeon (risk of nerve injury, although slight, may be greater with endoscopic, but recovery is faster)
- If bilateral (25% of cases), schedule separate surgeries (usually)
- Expected outcome:
    - Mild/moderate cases: over 90% success with complete recovery after failure of Initial Conservative Treatment (Outcomes in workers' comp cases may not be as good as outcomes overall, but still support surgery.)
    - Severe cases: Complete recovery is unlikely, but 90% will benefit from at least partial recovery.
- Post-surgical treatment:
    - Splint - day and night: not recommended
    - Stitches out in 5 to 10 days
    - Physical/Occupational Therapy: A short course *may* be appropriate; if so, then post-surgical treatment of 3 to 5 visits.

ODG Return-To-Work Pathways

Endoscopic surgery, modified work: 3 to 5 days

Endoscopic surgery, regular work, non-dominant arm: 14 to 28 days

Endoscopic surgery, regular/repetitive/heavy manual work, dominant arm: 28 days to indefinite

Open surgery, mini palm technique, modified work: 3 to 5 days

Open surgery, mini palm technique, regular work, non-dominant arm: 14 to 28 days

Open surgery, mini palm technique, regular/repetitive/heavy manual work, dominant arm: 56 days to indefinite

Open surgery, traditional approach, modified work: 14 days

Open surgery, traditional approach, regular work, non-dominant arm: 42 days

Open surgery, traditional approach, regular/repetitive/heavy manual work, dominant arm: 28 days to indefinite

- Failed Carpal Tunnel Release (4% of cases):
    - Repeat Electrodiagnostic Testing
    - Repeat Carpal Tunnel Release (by fellowship-trained Hand Surgeon)

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

During the comprehensive medical literature review, preference was given to high quality systematic reviews, meta-analyses, and clinical trials over the past ten years, plus existing nationally recognized treatment guidelines from the leading specialty societies.

The heart of each Work Loss Data Institute guideline is the Procedure Summary (see the original guideline document), which provides a concise synopsis of effectiveness, if any, of each treatment method based on existing medical evidence. Each summary and subsequent recommendation is hyper-linked into the studies on which they are based, in abstract form, which have been ranked, highlighted and indexed.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

These guidelines unite evidence-based protocols for medical treatment with normative expectations for disability duration. They also bridge the interests of the many professional groups involved in diagnosing and treating carpal tunnel syndrome.

POTENTIAL HARMS

Endoscopic surgery is associated with greater risk of nerve injury (although slight) than open surgery.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

The Treatment Planning sections outline the most common pathways to recovery, but there is no single approach that is right for every patient and these protocols do not mention every treatment that may be recommended. See the Procedure Summaries (in the original guideline document) for complete lists of the various options that may be available, along with links to the medical evidence.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Patient Resources

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
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Work Loss Data Institute. Carpal tunnel syndrome (acute & chronic). Corpus Christi (TX): Work Loss Data Institute; 2007 Apr 24. 201 p. [275 references]

ADAPTATION

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

DATE RELEASED

2003 (revised 2007 Apr 24)

GUIDELINE DEVELOPER(S)

Work Loss Data Institute - Public For Profit Organization

SOURCE(S) OF FUNDING

Not stated

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Editor-in-Chief, Philip L. Denniston, Jr. and Senior Medical Editor, Charles W. Kennedy, MD, together pilot the group of approximately 80 members. See the ODG *Treatment in Workers Comp* Editorial Advisory Board.

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

There are no conflicts of interest among the guideline development members.

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Available to subscribers from the Work Loss Data Institute Web site.

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Phone: 800-488-5548, 760-753-9992, Fax: 760-753-9995; www.worklossdata.com.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Background information on the development of the Official Disability Guidelines of the Work Loss Data Institute is available from the Work Loss Data Institute Web site.
- Appendix. ODG Treatment in Workers' Comp. Methodology description using the AGREE instrument. Available to subscribers from the Work Loss Data Institute Web site.

PATIENT RESOURCES

The following is available:

- Appendix B. ODG Treatment in Workers' Comp. Patient information resources. 2006.

Electronic copies: Available to subscribers from the Work Loss Data Institute Web site.

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Phone: 800-488-5548, 760-753-9992, Fax: 760-753-9995; www.worklossdata.com.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC STATUS

This summary was completed by ECRI on February 2, 2004. The information was verified by the guideline developer on February 13, 2004. This NGC summary was updated by ECRI on March 24, 2005, January 3, 2006, April 11, 2006, November 9, 2006, March 28, 2007, and August 16, 2007.

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