

# Diagnosis Determination Guidelines Detail

## Overview

BWC relies on Managed Care Organizations to gather pertinent medical documentation from all treating providers to support the allowance determination. To perform this function efficiently, BWC, MCOs and providers need to know the guidelines and criteria for diagnosis determination essential to substantiate diagnoses in claims. The medical documentation contained in the claim file is critical as evidence for the claims determination especially when this evidence is presented for a hearing.

The primary objective of the Diagnosis Determination Guidelines is implementation of consistent criteria for diagnosis determination/coding decisions between BWC and the MCOs. These documents are to be utilized as reference tools. The document “BWC Diagnosis Determination Guidelines” is the detailed expanded version to be utilized as a reference manual if a guideline is unclear in the abbreviated document. The document “Diagnosis Determination-Quick Reference”, listing the BWC Guidelines for Diagnosis Determination is the abbreviated version of the first document “BWC Diagnosis Determination Guidelines”. This lists the ICD-9 code with the diagnosis narrative description, subjective and objective exam findings, diagnostic tests and findings for diagnosis substantiation. The medical reports, documentation and diagnostic tests are submitted to the customer service team to assist in the claim determination.

This first edition contains the top 30 most frequently utilized diagnoses/ICD-9 codes at BWC. Future releases addressing additional diagnoses will be forthcoming.

These documents are not intended to direct medical care or to be utilized in authorization of medical treatment. In determination of allowed diagnoses in a claim it is appropriate to perform diagnostic studies to determine or rule out those conditions which have specific diagnostic requirements.

***If you have any questions regarding either document, please email the Infostation email box.***

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## **Acknowledgements**

We would like to thank all of the people who assisted in the development of this project. Robert Duran, M.D., BWC Consultant contributed to the upper extremity section of the project. Ernest Johnson, M.D., Professor of Physical Medicine and Rehabilitation, The Ohio State University and Gregory M. Jewell, M.D., M.S., BWC Medical Consultant provided their medical expertise. Finally we would like to express gratitude to the members of the Health Care Provider Quality Assurance Advisory Committee for their review and feedback.

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November, 1998

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## Sprain and Strain

For sprain and strain there are usually no specific diagnostic tests though a plain x-ray may be appropriate. Establish causal relationship utilizing mechanism of injury, injured worker history and complaints to substantiate sprain/strain diagnosis. Some possible subjective/objective findings: pain, tenderness, swelling, bruising, decreased ROM (see medical evidence policy). It may be appropriate to utilize these diagnoses to establish the workers' compensation claim while treating and performing other diagnostic studies to meet more definitive diagnostic criteria.

840.0 - 840.9	Sprains and strains of shoulder and upper arm
841.0 - 841.9	Sprains and strains of elbow and forearm
842.00 - 842.09	Sprains and strains of wrist
842.10 - 842.19	Sprains and strains of hand
843.0 - 843.9	Sprains and strains of hip and thigh
844.0 - 844.9	Sprains and strains of knee and leg
845.00 - 845.09	Sprains and strains of ankle
845.10 - 845.19	Sprains and strains of foot

## Carpal Tunnel Syndrome

**Diagnosis:** Carpal Tunnel Syndrome

**ICD-9-CM:** 354.0

**Definition:**

Compression of median nerve in the carpal tunnel. There is an extensive list of medical causes for Carpal Tunnel Syndrome along with work related causes.

**Note:**

This is a common and potentially overused diagnosis. May suggest performing electrodiagnostics to support this condition. Please code condition under tenosynovitis of wrist or hand, 727.05 or sprain-strain of wrist, 842.00 and treat appropriately (see medical evidence policy).

**Physical Examination Findings:**

**Subjective:**

- Numbness and tingling in the median sensory distribution and this is frequently at night.
- Aching volar hand and wrist at the carpal tunnel.
- Grasp activities such as driving the car, holding the telephone or newspaper aggravate the symptoms.
- Clumsiness (dropping objects) and weakness of grip are common.

**Objective:**

- Positive wrist flexion test (Phalen test)
- Positive Tinel sign over the median nerve at the wrist.
- Positive Median Nerve Compression Test.
- Weakness of the thenar muscles is generally an 'early sign'.
- Atrophy of the thenar muscles is generally a 'late sign'.
- Loss or deviation in 2 point discrimination, greater than 5-6 mm.

**Note:**

It is not necessary to have all the symptoms listed above to make diagnosis of Carpal Tunnel Syndrome.

**Diagnostic Test:**

- **NCV**
  - Examine the sensory and motor conduction of the median nerve.
- **Imaging**
  - Cervical spine x-rays may be necessary to rule out peripheral cervical nerve root signs and symptoms.
  - Wrist x-rays may be indicated if there is a need to rule-out bony wrist injury or pathology. A Carpal Tunnel view may be included.

**Diagnostic Test Findings:**

- Combined positive Phalen test and Tinel sign has high predictive value in diagnosis of CTS.
- Wrist shape - a square wrist dimension is a known risk factor for development of CTS.

**Resources:**

- North, ER  
Kaul, M.P.  
Compression Neuropathies - Median  
In Peimer, C. (ed) Surgery  
Of the Hand and Upper Extremity  
McGraw-Hill (1996)  
pp. 1307-1326
- Omer G.  
Median Nerve Compression at the wrist  
In Ragan, G. (ed)  
Nerve Compression Syndromes  
Hand Clinics  
W. B. Saunders Co. (1992)  
pp. 317-323



- Hennessey, W.J.  
Johnson, E.W.  
Carpal Tunnel Syndrome  
Johnson, E.W. and Pease, W.S. (eds)  
Practical Electromyography - Third Edition  
Williams and Wilkins (1997)  
pp. 195 – 215

## Cervical Disc Displacement

**Diagnosis:** Herniated Cervical Disc

**ICD-9-CM:** 722.0

### Definition:

Displacement of cervical intervertebral disc without myelopathy, C1-7 with or without cervical radiculopathy or radiculitis due to displaced, ruptured, herniated, extruded, sequestered or prolapsed cervical intervertebral disc.

### Note:

In the BWC system this code does not include bulging or protrusion of the cervical disc absent neurological findings. Confirmed presence of cervical radiculopathy requires coding of 723.4 plus 722.0.

### Physical Examination Findings:

#### Subjective:

- Neck pain
- Referred pain
  - Posterior shoulder
  - Upper limb
- Limited range of motion
- Paresthesia in a dermatomal pattern

#### Objective:

- Decreased range of motion of neck; Positive Spurling Sign
- Neurologic findings including one or more of the following:
  - Decreased or absent upper limb muscle stretch reflexes
    - ❑ C-6 Biceps brachia
    - ❑ C-7 Triceps brachia
  - Muscle weakness in a radicular pattern
  - Muscle atrophy
    - ❑ Forearm (greatest circumference)
    - ❑ Arm (greatest circumference)
  - Decreased sensation in a dermatomal pattern

### **Diagnostic Tests:**

- Imaging
  - X-rays
  - MRI (MRI Preferred)
  - CT Scan
  - Myelogram/CT Scan (Rarely used)
- EMG (supports cervical radiculopathy)

### **Diagnostic Test Findings:**

- Imaging
  - X-rays: test of exclusion.
  - MRI, CT Scan, or Myelogram/CT:
    - Herniated, displaced, ruptured, prolapsed, sequestered, or extruded cervical disc, with identifying the disc number(s).
- EMG
  - Needle EMG positive for cervical radiculopathy
  - H Reflex Latency (flex c.r) C-7
  - Non-diagnostic for cervical radiculopathy: SSEP, F wave and NCV; motor and sensory

### **Resources:**

- ICD-9 CM, 1997.
- Milliman & Robertson, Inc. , Volume 7, 1996.

## Lumbar Disc Displacement

**Diagnosis:** Herniated Lumbar Disc

**ICD-9-CM:** 722.10

### Definition:

Displacement of lumbar intervertebral disc, L 1-5 with or without lumbar radiculopathy.” Includes herniated nucleus pulposus of the intervertebral disc, displaced, ruptured, herniated extruded, sequestered or prolapsed lumbar intervertebral disc.

*Note:* in the BWC system this code does not include bulging or protrusion of the lumbar disc absent neurological findings. Confirmed presence of lumbar radiculopathy requires coding of 724.4 plus 722.10.

### Physical Examination Findings:

#### Subjective:

- Low back pain
- Referred pain
  - Buttock
  - Thigh
  - Calf/shin
  - Heel and ankle

#### Objective:

- Neurologic findings indicating one or more of the following:
  - Decreased or absent muscle stretch reflexes:
 

☐ S-1	Gastroc soleus	Ankle jerk
☐ L-5	Biceps femoris	Hamstring jerk (lateral)
☐ L-4	Quadriceps	Knee jerk
☐ L-3	Gracilis	Hamstring jerk (medial)
  - Muscle weakness in radicular pattern
  - Muscle atrophy
    - ☐ Calf measured at greatest circumference
    - ☐ Thigh circumference at a measured distance above patella
  - Decreased sensation in a dermatomal pattern
  - Positive straight leg raising (SLR) verified by an aggravating maneuver
  - Foot drop, weakness dorsiflexor muscles, L5 involvement

### Diagnostic Tests:

- Imaging
  - X-ray
  - MRI (MRI preferred)
  - CT scan
  - Myelogram/CT Scan (Rarely used)
- EMG (supports lumbar radiculopathy)

### Diagnostic Test Findings:

- Imaging
  - X-ray: test of exclusion
  - MRI, CT Scan or Myelogram/CT:
    - Herniated, displaced, ruptured, prolapsed, sequestered or extruded lumbar disc, identifying the disc number (s).
- EMG
  - Needle EMG positive lumbar radiculopathy
  - Increased H Reflex latency: S-1
  - Non-diagnostic for lumbar radiculopathy: SSEP, F wave, and NCV; motor and sensory

### Resources:

- ICD-9 CM, 1997.
- Milliman & Robertson, Inc. Vol. 7, 1996.
- AHCPR, Acute Low Back Problems in Adults: Assessment and Treatment, 1994
- Low Back Pain: Medical Diagnosis and Comprehensive Management, 1995.
- Turk's Orthopaedics: Principles and Their Application, 1994

## Thoracic Disc Displacement

**Diagnosis:** Herniated Thoracic Disc

**ICD-9-CM:** 722.11

**Definition:**

Displacement of thoracic intervertebral disc without myelopathy, T 1-12 with or without thoracic radiculopathy. Included are displaced, ruptured, herniated, extruded, sequestered or prolapsed thoracic intervertebral discs.

**Note:**

In the BWC system this code does not include bulging or protrusion of the thoracic disc absent neurological findings. Confirmed presence of thoracic radiculopathy requires coding of 724.4 plus 722.11.

**Physical Examination Findings:**

**Subjective:**

- Thoracic back pain exacerbated by flexion, extension or rotation of spine
- Referred pain
  - Rib area

**Objective:**

- EMG abnormal in intercostals
- Tenderness and pain in intercostals


**Diagnostic Tests:**

- Imaging
  - X-ray
  - MRI (Preferred)
  - CT Scan
  - Myelogram/CT Scan (Rarely used)
- EMG (supports Thoracic Radiculopathy)

**Diagnostic Test Findings:**

- Imaging
  - X-ray: test of exclusion
  - MRI, CT Scan, or Myelogram/CT:
    - Herniated, displaced, ruptured, prolapsed, sequestered, or extruded intervertebral thoracic disc with identifying disc number(s)
- EMG
  - Positive needle EMG thoracic radiculopathy, intercostal abnormality.
  - Non-diagnostic for thoracic radiculopathy: SSEP, F wave and NCV; motor and sensory

**Resources:**

- ICD-9 CM, 1997.
  - Campbell's Operative Orthopaedics, 1992
- 

## Disc Displacement NOS

**Diagnosis:** Bulging Disc  
Discogenic Syndrome

**ICD-9-CM:** 722.2

**Definition:** Displacement of intervertebral disc, site unspecified, without myelopathy or radiculopathy. This code is utilized by BWC to code a bulging or protruded disc or Discogenic Syndrome in the absence of neurologic findings.

**Note:** This diagnosis is *not* considered eligible for surgical intervention.

### Physical Examination Findings:

**Subjective:**

- History pain consistent with level(s) affected

**Objective:**

- Normal neurologic examination.

### Diagnostic Tests:

- Imaging
  - X-ray
  - MRI (MRI Preferred)
  - CT Scan
  - Myelogram/CT Scan
- EMG (supports radiculopathy)

### Diagnostic Tests Findings:

- Imaging
  - X-ray: a test of exclusion.
  - MRI, CT or Myelogram/CT:
    - Bulging or protruded disc without nerve root impingement, identifying the disc level(s) and number(s).
- EMG
  - Needle EMG negative for findings of radiculopathy



**Resources:**

- ICD-9 CM, 1997.
- Milliman & Robertson, Inc., Volume 7, 1996.

## Cervicalgia

**Diagnosis:** Cervicalgia

**ICD-9-CM:** 723.1

**Definition:**

Pain in neck. Refers to pain in neck usually greater than 3 months duration without more specific diagnosis. BWC does not consider this diagnosis as eligible for allowance in claim, however, reimbursement may be eligible in selected situations.

**Note:**

This diagnosis/symptom is not eligible for BWC coding guidelines but may be eligible for reimbursement in selected cases.

**Physical Examination Findings:**

**Subjective:**

- Complaints of pain localized to neck

**Objective:**

- Complaints of pain on palpation or movement
- Normal neurologic examination.

**Diagnostic Tests:**

- None (Most individuals may have had imaging or EMG to rule out other pathology of pain such as disc lesions)

**Diagnostic Test Findings:**

- None

**Resources:**

- ICD-9 CM, 1997.

## Cervical Radiculopathy

**Diagnosis:** Cervical Radiculopathy  
Cervical Neuritis or Radiculitis

**ICD-9-CM:** 723.4

**Definition:**

Inflammation and/or compression of nerve root producing symptoms of pain, tingling, numbness, or neurological deficit along the distribution of the involved spinal nerve or root.

**Note:**

This diagnosis/symptom is not eligible for BWC coding guidelines absent the corresponding pathology diagnosis.

**Physical Examination Findings:**

**Subjective:**

- Complaints of sclerotomal pain
- Paresthesia in a dermatomal pattern
- Referred pain
  - Posterior shoulder
  - Upper limb

**Objective:**

- Neurologic findings indicating one or more of the following:
  - Decreased or absent upper limb muscle stretch reflexes
    - C-6 Biceps brachis
    - C-7 Triceps brachia
  - Muscle weakness in a radicular pattern
  - Muscle atrophy
    - Forearm (greatest circumference)
    - Arm (greatest circumference)
  - Decreased sensation in a dermatomal pattern

### **Diagnostic Tests:**

- Imaging
  - X-rays
  - MRI (MRI Preferred)
  - CT Scan
  - Myelogram/CT Scan (Rarely used)
- EMG (supports cervical radiculopathy)

### **Diagnostic Test Findings:**

- Imaging
  - X-rays: test of exclusion.
  - MRI, CT Scan, or Myelogram/CT:
    - Herniated, displaced, ruptured, prolapsed, sequestered, degenerative, or extruded cervical disc, with identifying the disc number(s).
- EMG
  - Needle EMG positive for cervical radiculopathy
  - H Reflex Latency (flex c.r) C-7
  - Non-diagnostic for cervical radiculopathy: SSEP, F wave and NCV; motor and sensory

### **Resources:**

- ICD-9 CM, 1997.
- Milliman & Robertson, Inc. , Volume 7, 1996.

**Lumbago**

**Diagnosis:** Lumbago

**ICD-9-CM:** 724.2

**Definition:**

Low back pain frequently referring to or including “low back pain”, “low back syndrome”, and “lumbalgia”. Usually used when another diagnosis does not apply and for chronic or recurrent lumbar pain.

**Note:**

This diagnosis/symptom is not eligible for BWC coding guidelines but may be eligible for reimbursement in selected cases.

**Physical Examination Findings:****Subjective:**

- Complaints of low back pain without radicular symptoms usually greater than 3 months duration

**Objective:**

- May have tenderness or complaints of pain with palpation.
- Normal neurologic examination.

**Diagnostic Tests:**

- None (Most individuals may have had imaging and/or EMG to rule out other pathology of pain such as disc lesions)

**Diagnostic Test Findings:**

- None

## Lumbosacral Radiculopathy

**Diagnosis:** Lumbar Radiculopathy.  
Lumbosacral Neuritis or Radiculitis.

**ICD-9-CM:** 724.4

### Definition:

Inflammation and/or compression of nerve root producing symptoms of pain, tingling, numbness, or neurological deficit along the distribution of the involved spinal nerve or root.

**Note:** This diagnosis/symptom is not eligible for BWC coding guidelines absent the corresponding pathology diagnosis.

### Physical Examination Findings:

#### Subjective:

- Complaints of sclerotomal pain
- Pain exacerbation with Valsalva
- Paresthesia in a dermatomal pattern

#### Objective:

- Neurologic findings indicating one or more of the following:
  - Decreased or absent muscle stretch reflex:
 

□ S-1	Gastroc soles	Ankle jerk
□ L-5	Biceps femurs	Hamstring jerk (lateral)
□ L-4	Quadriceps	Knee jerk
□ L-3	Gracilis	Hamstring jerk (medial)
  - Muscle atrophy
  - Impaired bowel and bladder function, Cauda Equina involvement
  - Foot drop, weakness of dorsiflexor muscles, L5 involvement.

### Diagnostic Tests:

- Imaging
  - X-ray
  - MRI
  - CT Scan
  - Myelogram/CT Scan
- EMG (supports lumbar radiculopathy)

### Diagnostic Test Findings:

- Imaging
  - X-ray: test of exclusion
  - MRI, CT Scan, Myelogram/CT:
    - herniated, degenerative, or bulging disc with significant nerve root impingement at the level of the Physical Examination findings, identifying the disc level and number(s).
- EMG
  - Positive needle EMG lumbar radiculopathy consistent with disc lesion
  - Increased H Reflex latency: S-1
  - Non-diagnostic for radiculopathy: SSEP, F wave and NCV; motor and sensory

**Resources:**

- ICD-9 CM, 1997.
- Milliman & Robertson, Inc. Volume 7, 1996.

## Rotator Cuff Syndrome

**Diagnosis:** Rotator Cuff Syndrome

**ICD-9-CM:** 726.10

### Definition:

Rotator cuff syndrome is defined as pain localized to the rotator cuff and subacromial bursa as they are compromised between the humeral head and the undersurface of the coracoacromial arch. The etiology is a combination of extrinsic (coracoacromial arch impingement) and intrinsic factors (such as a cuff degeneration) or a combination of the two.

### Physical Examination Findings:

#### Subjective:

- Shoulder pain
- Acute versus gradual onset of pain may differentiate a macrotraumatic event such as fracture, dislocation, etc. from a microtraumatic event such as an overuse or impingement syndrome.
- Pain location is generally described as upper lateral and anterior arm pain down to the deltoid insertion.
- Pain extending below the proximal forearm, suggests other possibilities such as cervical radiculopathy.
- Pain is worse with activity but can also be present at rest.
- Nocturnal pain is common as is the complaint of difficulty sleeping on the affected side.
- Rotator cuff pain is worse with overhead activity.

#### Objective:

- Inspection - muscle atrophy or deformity
- Palpation - pain or deformity
- Range of Motion - active, passive for limitation of motion and strength testing for weakness.
- Neurovascular Exam - Rule out thoracic outlet syndrome.



- Instability testing - test generalized ligamentous laxity. Test for sulcus and apprehension signs.
- Hawkins Impingement sign
- Neer Impingement sign
- Drop Arm Test may be positive in full thickness tears. The Drop Arm test is when the arm is placed passively in 90 degree of shoulder abduction, which cannot be maintained and may slowly descend.

### **Diagnostic Test:**

- Impingement injection test - injection of lidocaine into the subacromial space will relieve the pain in Stage I and II of rotator cuff syndrome and allow resumption of shoulder function. Candidates for this test are patients with a positive impingement sign.
- Speeds test isolates the long head of the biceps. The Speeds Test is performed when the examiner resists elevation against the supinated straight arm at 30 degree elevation. This position isolates the long head of the bicep muscle and weakness or pain is consistent with proximal bicep tendinopathy.
  - **Imaging**
    - **X-rays**
      - ❑ AP view in internal rotation
      - ❑ Axillary view
      - ❑ Scapular-Y view

### **Diagnostic Test Findings:**

#### **Some x-ray findings are listed below:**

- AP view in lateral rotation - may show superior migration of humeral head under the acromium, calcific tendinitis of the cuff, degenerative changes in A-C joint, narrowing of the acromiohumeral interval.

- Axillary view - provides visualization of the glenoid and humeral head and delineates the spatial relationship of the two structures.
- Scapular-Y view - to visualize acromial shape and subacromial spurs that are often associated with rotator cuff disease.

**Resources:**

- Hawkins, R.J.  
Bokor, D.J.  
Clinical Evaluation of Shoulder Problems  
in Rockwood Jr., C.A. and  
Matsen III, F.A. (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 149 - 177
- Rockwood Jr., C.A. (et al)  
X-ray Evaluation of shoulder problems  
in Rockwood Jr., C.A. and  
Matsen III, F.A. (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 178 - 200
- Smolinski, R.J.  
Leddy, J.L.  
Stegemann, P.M.  
Rotator Cuff Disease  
in Peimer, C. (ed)  
Surgery of the Hand and Upper Extremity  
McGraw-Hill (1996)  
pp. 321 - 349

## Impingement Syndrome

**Diagnosis:** Impingement Syndrome

**ICD-9-DM:** 726.2

### Definition:

Impingement syndrome is defined as pain localized to the rotator cuff caused by a compromise between the humeral head and the undersurface of the coracoacromial arch during forward elevation and rotation of the shoulder.

### Physical Examination Findings:

#### Subjective:

- Shoulder pain in the upper lateral and anterior arm.
- Pain extending below the proximal forearm suggests other possibilities such as cervical radiculopathy.
- Night pain is common and either interrupts sleep or does not allow the patient to lie on the involved side.
- Pain can be dull, toothache like which lingers for long periods or sharp, burning type which is not well tolerated.
- May experience weakness and loss of function.

#### Objective:

- Palpable tenderness about the shoulder, usually centered around the greater tuberosity, but the location varies.
- Most reliable physical sign is the Neer impingement sign or the Hawkins impingement sign. Neer impingement sign is performed when the examiner stabilizes the scapula with one hand and with the other grasps the patient's elbow and passively elevates it fully with the arm in full internal rotation. Pain is produced by the greater tuberosity impinging the rotator cuff against the acromium. Hawkins impingement sign is performed when the examiner forcibly internally rotates the 90 degree forward flexed arm, impinging the rotator cuff against the coracoacromial ligament.

## Diagnostic Test:

- Impingement injection test (injection of lidocaine into the subacromial space) will relieve the pain in Stage I and II of rotator cuff syndrome and allow resumption of shoulder function. Persistent pain after the impingement test requires checking for another cause for the pain, such as cervical radiculopathy.
- On x-ray listed below, check for proliferative spur formation at the anterior inferior margin of the acromium and under surface of the acromioclavicular joint. These are often associated with rotator cuff disease.
- **Imaging**
  - **X-rays**
    - AP view in internal rotation
    - Axillary view
    - Scapular-Y view

## Diagnostic Test Findings:

### Some x-ray findings are listed below:

- AP view in internal rotation - may show superior migration of humeral head under the acromium, calcific tendinitis of the cuff, degenerative changes in A-C joint, narrowing of the acromiohumeral interval.
- Axillary view - provides visualization of the glenoid and humeral head and delineates the spatial relationship of the two structures.
- Scapular-Y view - to visualize acromial shape and subacromial spurs that are often associated with rotator cuff disease.

### Resources:

- Matsen III, F.A.  
Arntz, C.T.  
Subacromial Impingement  
in Rockwood Jr., C.A.  
and Matsen III, F.A., (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 623 - 646

- Rockwood Jr., C.A. (et al)  
X-ray Evaluation of shoulder problems  
in Rockwood Jr., C.A.  
Matsen III, F.A. (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 178 - 200
- Smolinski, R.J.  
Leddy, J.L.  
Stegemann, P.M.  
Rotator Cuff Disease  
in Peimer, C. (ed)  
Surgery of the Hand and Upper Extremity  
McGraw-Hill (1996)  
pp. 321 - 349

**Medial Epicondylitis**

**Diagnosis:** Medial Epicondylitis

**ICD-9-CM:** 726.31

**Definition:**

Inflammation of the medial epicondyle of the humerus and surrounding tissues. Medial epicondylitis occurs less commonly than lateral epicondylitis; the symptoms of localized pain and weakness are similar but are located at the flexor pronator tendinous origin.

**Physical Examination Findings:****Subjective:**

- Aching in proximal volar forearm.

**Objective:**

- Resisted wrist flexion and pronation will often reproduce symptoms
- Weakness in proximal volar forearm muscles.
- Repetitive valgus stress can result in medial elbow symptoms including medial epicondylitis. The differential diagnosis includes medial collateral ligament injury or insufficiency, ulnar nerve tension-neuropraxia and intraarticular elbow pathology or any combination of these.
- To differentiate chronic medial collateral ligament injury from medial epicondylitis apply a valgus stress to the slightly flexed elbow while the wrist is flexed and the forearm pronated. This eliminates the symptoms of medial epicondylitis and results in a painless valgus stress test when the medial collateral ligament is normal.
- Medial epicondylitis and ulnar neuropraxia often occur together.

**Diagnostic Test:**

- **Imaging**
  - X-rays of the elbow

**Diagnostic Test Findings:**

- **Imaging**
  - X-rays of the elbow are helpful in determining if bone or elbow joint pathology is present as is the evaluation of valgus stability of the elbow.

**Resource:**

- Field, L. D.  
Altchek, D.W.  
Chronic elbow pain, overuse and tendonitis  
In Peimer, C. (ed)  
Surgery of the hand and upper extremity  
McGraw-Hill (1996)  
pp. 499-503

**Lateral Epicondylitis**

**Diagnosis:** Lateral Epicondylitis

**ICD-9-CM:** 726.32

**Definition:**

Inflammation of the lateral epicondyle of the humerus and surrounding tissues. Lateral epicondylitis also known as Tennis Elbow represents a pathologic condition at the common extensor origin of the lateral humeral epicondyle and is characterized by pain at the epicondyle. It is one of the most common injuries among workers, musicians, and racquet sport athletes. Age of onset is generally after 30 years of age and most often around 40 years of age.

**Physical Examination Findings:****Subjective:**

- Aching in proximal forearm exacerbated by participation in any activity that requires resisted wrist extension.
- Morning stiffness along with aching throughout the day is common.
- Rest will usually improve the symptoms but the pain returns with activity.

**Objective:**

- Maximum tenderness is directly over or slightly distal to the lateral epicondyle.
- Application of an axial load on the forearm combined with gentle passive forearm rotation may aid in differentiating lateral epicondylitis from radiocapitellar joint degenerative changes. This test often causes pain when articular degeneration is responsible for symptoms. (If the wrist is kept in neutral position it will not exacerbate the lateral epicondylitis).
- Typically, symptoms increase as wrist or finger extension is resisted with increasing extension of the elbow.



- Lateral elbow symptoms due to compression neuropathy of the radial nerve may simulate lateral epicondylitis and careful evaluation is necessary to rule out radial tunnel syndrome. A patient with radial tunnel syndrome complains of aching pain at the extensor-supinator muscle mass in the proximal forearm that may radiate into the distal arm and forearm. In radial tunnel syndrome maximal tenderness is distal to the epicondyle (over the radial neck) and is more diffuse and aching in character.

### **Diagnostic Tests:**

- **Imaging**
  - Standard x-rays of the elbow.

### **Diagnostic Test Findings:**

- **Imaging**
  - X-rays will help to rule out calcified deposits or other lesions in the area. Degenerative changes in the radiocapitellar joint can simulate lateral epicondylitis and any significant radial head or distal humeral osteophytes could be seen in the x-ray.

### **Resource:**

- Field, L.  
Altchek, D  
Chronic Elbow Pain, Overuse, and Tendonitis  
In Peimer, C. (ed)  
Surgery of the Hand and Upper Extremity  
McGraw - Hill (1996)  
pp. 496-499

**Radial Styloid Tenosynovitis (De Quervain's Tenosynovitis)**

**Diagnoses:** Radial Styloid Tenosynovitis  
(De Quervain's Tenosynovitis)

**ICD-9-CM:** 727.04

**Definition:**

Radial Styloid Tenosynovitis is defined as Tenosynovitis of the tendons in the first dorsal compartment, the abductor pollicis longus and extensor pollicis brevis. When friction develops between the tendon and the sheath, the natural consequence is tenosynovitis.

**Physical Examination Findings:****Subjective:**

- Visible swelling and aching at the radial styloid in the distal forearm.
- Thumb extension is particularly painful at the radial styloid.

**Objective:**

- Tenderness at the radial styloid.
- There may be crepitation over the sheath.
- Occasional "locking" similar to triggering that occurs with Tenosynovitis of a digital flexor sheath.
- When Tenosynovitis of the first dorsal compartment is severe, tendon excursion becomes restricted, limiting active extension of the thumb.
- Finkelstein Test

**Diagnostic Test:**

- None

**Diagnostic Test Findings:**

- Finkelstein Test is positive when the thumb is clenched firmly within the fist and then the wrist is forced into ulnar deviation producing pain. The resulting pain will be over the radial styloid. The physician should avoid sudden deviation because of possible excruciating pain.
- It is necessary to rule out Trapeziometacarpal Arthritis as the cause of the pain. The tenderness in these cases will be over the trapeziometacarpal joint rather than the radial styloid. An X-ray and a positive “grind test” confirms this diagnosis.
- Rule out Intersection Syndrome - this represents swelling, pain, and tenderness about 4-6 cm proximal to Lister’s tubercle and is a tenosynovitis of the extensor carpi radialis longus and brevis (second dorsal compartment) presenting proximal to the compartment.

**Resource:**

- Posner, M.  
Differential Diagnosis of Wrist Pain and Tendinitis, Ganglia and Other Syndromes  
In Peimer, C. (ed)  
Surgery of the Hand and Upper Extremity  
McGraw - Hill (1996)  
pp 838 - 839

## Tenosynovitis of Hand and Wrist

**Diagnosis:** Tenosynovitis of hand and wrist, NEC

**ICD-9-CM:** 727.05

### Definition:

Tenosynovitis, or irritation of the synovial sheath of a tendon may result from inflammation or infection. Here, the discussion will address inflammation of the tendon sheath and not infection. The overuse syndrome may be involved in the development of tenosynovitis. This definition applies to all examples listed below.

Tenosynovitis at the wrist (both flexor and extensor tendons) is not uncommon.

### Examples are:

#### Extensor Carpi Ulnaris Tenosynovitis

##### Subjective:

- Pain on the ulnar side of the wrist.

##### Objective:

- Tenderness where the tendon passes through its sheath at its insertion or along its entire length.
- Patients frequently complain of pain with resisted ulnar deviation.

#### Extensor Pollicis Longus Tenosynovitis

##### Subjective:

- Pain, which may be vague, dorsum of wrist (third dorsal compartment).
- Active motions of the interphalangeal joint of the thumb may be limited and painful.
- Chronic Tenosynovitis may result in rupture of the extensor pollicis longus tendon.

**Objective:**

- Tenderness and swelling over the tendon just distal to Lister's Tubercle.
- Triggering may occur.

**Flexor Carpi Radialis Tenosynovitis**

**Subjective:**

- Pain over the flexor carpi radialis tendon just proximal to the wrist flexor crease. Condition is relatively common.

**Objective:**

- Slight swelling and tenderness over the tendon at the wrist.
- Pain produced on resisted wrist flexion and sometimes with resisted forearm pronation.

**Flexor Carpi Ulnaris Tenosynovitis**

Flexor Carpi Ulnaris Tenosynovitis is often bilateral and results from chronic repetitive trauma.

**Subjective:**

- Pain in the region of the pisiform or proximal to the pisiform over the flexor carpi ulnaris tendon.

**Objective:**

- Pain is exacerbated by resisted wrist flexion.
- Tenderness of the flexor carpi ulnaris just proximal to the pisiform.
- To rule out pisotriquetral arthritis or instability, translocating the pisiform radially or ulnarly, pain or even crepitation may result.

**Diagnostic Test:**

- **Imaging**
  - Lateral x-ray.

**Diagnostic Test Findings:**

- X-ray may show calcific deposit along the tendon.
- In advanced stages, x-ray will reveal narrowing of the pisotriquetral joint and subchondral sclerosis.

### **Flexor tenosynovitis of the wrist**

Inflammation of the digital flexors as they pass through the carpal canal.

#### **Subjective:**

- Stabbing or burning pain proximal to the carpal tunnel which may extend up to the forearm.

#### **Objective:**

- Tenderness and swelling just proximal to the wrist flexor creases.
- Median nerve compression may be co-existent as evidenced by positive Phalen Test and Tinel sign.

#### **Diagnostic Test:**

- Electrodiagnostic studies may or may not confirm co-existent carpal tunnel syndrome. This will depend on clinical signs and symptoms of median nerve compression.

#### **Resources:**

- Failla, Joseph M.  
Differential Diagnosis of Hand Pain: Tendonitis, Ganglia and other Syndromes  
in Peimer, C. (ed) Surgery of the  
Hand and Upper Extremity  
McGraw - Hill (1996)  
pp. 1223-1249
- Stern, P.J.  
Tendinitis, Overuse Syndromes and Tendon Injuries  
In Amadio, P. C. (ed)  
Hand Injuries in Sports and Performing Arts  
Hand Clinics  
W.B. Saunders Co. (Aug. 1990)  
pp. 467-476

## Myalgia & Myositis

**Diagnosis:** Myalgia and Myositis, Unspecified  
 Myofascial Pain syndrome  
 Fibromyalgia  
 Fibromyositis  
 Post Traumatic Fibromyalgia  
 Muscle Strain, third degree

**ICD-9-CM:** 729.1

### Definition:

Pain and/or inflammation of muscle tissue. In general, condition of pain of several months duration in a given muscle or group of muscles and connective tissues.

### Physical Examination Findings:

#### Subjective:

- Painful muscles
- Fatigue

#### Objective:

- Tenderness on palpation of a given muscle or muscle group
- Increased consistency of muscle on palpation
- Definitive Fibromyalgia with positive findings in 11/18 points of palpation
- Normal neurologic and joint examinations

### Diagnostic Tests:

- None

### Diagnostic Test Findings:

- None

### Resources:

- ICD-9-CM, 1997.
- Occupational Injuries: Evaluation, Management and Prevention, 1995.
- Fibromyalgia: 1995 A Perspective for Patients, George Waylonis, M.D.
- A Profile of Fibromyalgia in Occupational Environments, Dr. George Waylonis, M.D., Patrick Ronan, M.D., Chrisanne Gordon, M.D.

## Nonallopathic Lesions

**Diagnosis:** Nonallopathic Lesions  
Intersegmental Dysfunction  
Subluxation

**ICD-9 Code:** 739.0 - 739.9

### Definition:

The injury/chiropractic condition of segmental dysfunction (chiropractic subluxation) is defined as an alteration in joint function in spinal segments and joints of the body which affects the neuro-musculoskeletal system as diagnosed by chiropractors.

### Physical Examination Findings:

#### Subjective:

- Localized pain and tenderness identified through observation/percussion and palpation.

#### Objective:

- Asymmetry of joint function noted during examination (observational/palpation).
- Range of motion - restriction/change in normal joint function (i.e. motion palpation). Specific level of restriction should be identified.
- Localized soft tissue changes - (i.e. spasm, edema, tenderness) identified during general examination.

### Diagnostic Tests:

None

### Diagnostic Test Findings:

None

### Resources:

- Philip E. Greenman, D.O., F.A.A.O.  
Principles of Manual Medicine (1989)



- Meridel I. Gatterman, D.C.  
Chiropractic Management of Spine Related Disorders (1990)
- Meridel I. Gatterman, D.C.  
Foundations of Chiropractic - Subluxation (1995)
- Topics in Clinical Chiropractic - Journal  
Back to Basics: Technology Assessment of the Chiropractic Subluxation'  
Osterbauer  
March 1996, Vol. 3, Number 1

## Tear of Medial Meniscus of Knee

**Diagnosis:** Tear of Medial Cartilage or Meniscus of knee, current

**ICD-9-CM:** 836.0

### Definition:

Injury to cartilage attached to the medial articular surface of the tibia usually referred to as a “tear” since the cartilage is pulled away from the tibia. This diagnosis is a “current or acute injury” includes bucket handle tear.

### Physical Examination Findings:

#### Subjective:

- Painful popping in knee with motion
- History of twisting injury

#### Objective:

- Positive McMurrays test
- Locking of knee
- Tenderness along anteromedial joint line of knee

#### Diagnostic Tests:

- Arthroscopy
- Imaging
  - MRI
  - X-rays

#### Diagnostic Tests:

- Arthroscopy
  - tear medial meniscus

#### **Note:**

Arthroscopy originally authorized for diagnostic reasons may result in necessary surgical repair which requires submission of operative report for additional coding guideline consideration.

- Imaging
  - MRI: “Bright signals” within the meniscus which should reach the surface of the meniscus or report of deformity or amputation of meniscus
  - X-ray: test of exclusion

**Resources:**

- Turek’s Orthopaedics: Principles and Their Application, 1994.
- Primary Care Orthopaedics, 1996.
- Milliman & Robertson, Inc., Volume 7, 1996.
- ICD-9-CM, 1997.

## Rotator Cuff Tear

**Diagnosis:** Rotator Cuff Tear

**ICD-9-CM:** 840.4

### Definition:

Rotator cuff tears represents an end stage in the development of impingement syndrome. The tears occur most often between 45 and 65 years of age from trivial trauma to a degenerative rotator cuff, but when it occurs at a young age the trauma is usually more severe and the tear more significant.

### Physical Examination Findings:

#### Subjective:

- Shoulder pain over the insertion of the rotator muscles.
- Report daily activity that is producing the pain.
- Pain may be nocturnal often interfering with normal sleep.

#### Objective:

- Muscle atrophy, and tenderness over the insertion of rotator muscles usually the supraspinatus over the greater tuberosity.
- Pain can be reproduced by resisting elevation of the arm, and of the shoulder as well as resisting external rotation if the tear is in the supraspinatus tendon.
- Patients with a chronic partial tear may abduct or externally rotate the arm but it is weaker when compared to the opposite normal shoulder.
- Atrophy of the muscle is present if the tear is chronic.
- No evidence of a complete tear (drop arm test), and yet the symptoms and disability persist or are greater than anticipated, the question of a partial tear may be considered:
  - Pain is not a determining factor but active motion is.
  - Weakness or inability to abduct the first 15 to 20 degrees from the side implies a total tear.

- If active abduction is not elicited, the arm may then be passively abducted to 90 degrees, and if it slowly descends there is a total tear. ***This is a positive drop arm test.*** This is seen in association with massive tears, usually involving more than just a single tendon of the rotator cuff.

### **Diagnostic Test:**

- **Imaging**
  - AP view in internal rotation
  - Axillary view
  - Scapular-Y view
  - MRI
  - Arthrography

### **Diagnostic Test Findings:**

#### **Some imaging findings are listed below:**

- AP view in internal rotation - may show superior migration of humeral head under the acromium, calcific tendinitis of the cuff, degenerative changes in A-C joint, narrowing of the acromiohumeral interval.
- Axillary view - provides visualization of the glenoid and humeral head and delineates the spatial relationship of the two structures.
- Scapular-Y view - to visualize acromial shape and subacromial spurs that are often associated with rotator cuff disease.
- MRI - is preferable in determining if a rotator cuff tear is present.
- Arthrography - If MRI is not available, then arthrography has been shown to be effective in making the diagnosis of full thickness rotator cuff tear, but is less effective for diagnosing partial thickness tears.

**Resources:**

- Matsen III, F.A.  
Arntz, C.T.  
Rotator Cuff Tendon Failure  
in Rockwood Jr., C.A.  
and Matsen III, F.A., (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 647 - 677
- Rockwood Jr., C.A. (et al)  
X-ray Evaluation of shoulder problems  
in Rockwood Jr., C.A.  
Matsen III, F.A. (eds)  
The Shoulder  
Philadelphia, W.B. Saunders Company (1990)  
pp. 178 - 200
- Smolinski, R.J.  
Leddy, J.L.  
Stegemann, P.M.  
Rotator Cuff Disease  
in Peimer, C. (ed)  
Surgery of the Hand and Upper Extremity  
McGraw-Hill (1996)  
pp. 321 - 349

## Tear Anterior Cruciate Ligament

**Diagnosis:** Tear of Cruciate Ligament of knee

**ICD-9-CM:** 844.2

**Definition:**

Disruption or tearing of the anterior or posterior cruciate ligaments, the major stabilizers of the knee joint.

*Note:* For BWC operations this code can designate a sprain/strain or a complete tear. BWC, through the V3 computer system, has the capability of distinguishing through narrative description the definitive diagnosis.

**Physical Examination Findings:**

**Subjective:**

- History of experiencing an injury with “pop”
- Knee instability
- Knee pain

**Objective:**

- Knee effusion
- Instability of knee joint with positive Drawer sign or
- Positive Lachmans sign

**Diagnostic Tests:**

- Imaging
  - MRI
  - X-ray
- Arthroscopy

**Diagnostic Test Findings:**

- Imaging
  - MRI
    - Disruption or tear cruciate ligament
  - X-ray
    - Test of exclusion

- Arthroscopy
  - Disruption or tear cruciate ligament

**Note:**

Arthroscopy originally authorized for diagnostic reasons, may result in necessary surgical repair which requires submission of operative report for additional coding guideline consideration.

**Resources:**

- Primary Care Orthopaedics, 1996
- Turek's Othopaedics: Principles and Their Application, 1994
- Milliman & Robertson, Inc., Volume 7, 1997
- ICD-9-CM, 1997



## Repetitive Motion Syndrome

**Diagnoses:** Repetitive Motion Syndrome  
Cumulative Trauma Disorder  
Overuse Syndrome

**ICD-9-CM:** No specific code assigned.

### Definition:

Repetitive motion syndrome does not represent a new entity or type of disorder but it acknowledges that overuse may be a causative factor in many clinical problems that fall under the category of repetitive motion syndrome. Although repetitive motion syndrome can occur in nearly all tissues, the nerves, tendons, tendon sheaths and muscles of the upper extremity are the most frequently reported sites. Examples would be Carpal Tunnel Syndrome, Tendinitis and Tenosynovitis at wrist and in forearm. Other names for this syndrome are Cumulative Trauma Syndrome and Overuse Syndrome.

- Work related high risk factors for repetitive motion syndrome include:
  - 1) Repeated and sustained exertions
  - 2) Forceful exertions
  - 3) Localized contact stress
  - 4) Vibration
  - 5) Prolonged specific posture
  - 6) Low temperatures

### Physical Examination Findings:

Characteristics of three types of disorders resulting from repetitive motion:

#### 1. Tendinitis and Tenosynovitis

##### Subjective:

- Localized pain
- Swelling

##### Objective:

- Pain on resisted motion
- Weakness and crepitation of the tendon

2. **Nerve Compression Syndromes** - Symptoms may be vague (Carpal Tunnel Syndrome, for example) but usually involve some combination of :

**Subjective:**

- pain
- numbness
- tingling
- weakness

3. **Myofascial Pain** - should be considered when there is localized soft tissue pain with or without referral. More distal site when compressed. The focal point of myofascial pain is the trigger point as a result of overuse of muscle.

**Resources:**

- Schuchmann, J.A.  
Occupational Rehabilitation  
in Braddom, R.L. (ed)  
Physical Medicine and Rehabilitation  
W.B. Saunders (1996)  
pp. 938-954
- Armstrong, T. and Ulin, S.  
Analysis and Design of Jobs for Control of Work Related Upper Limb Disorders  
Rehabilitation of the Hand: Surgery and Therapy  
Hunter, J.M., Mackin, E.J. and Callahan, A.D. (eds)  
Mosby (1995)  
pp 1705-1723

## Glossary Of Signs and Tests

### **Drop Arm Test**

The arm is placed passively in 90 degree of shoulder abduction. In a complete tear of the rotator cuff, the arm will slowly descend in spite of strong deltoid action. This can be considered a positive drop arm test.

### **Drawer's sign**

The knee is flexed to a 90 degree angle; at the femoral-tibial junction, if the tibia can be drawn to far forward there is a rupture of the anterior ligaments and if it can be drawn back too far back there is a rupture of the posterior ligaments .

### **Finkelstein Test**

This test is considered positive when the thumb is clenched firmly within the fist and then the wrist is forced into ulnar deviation producing pain.

### **Hawkins Impingement Sign**

The test is considered positive when the examiner forcibly internally rotates the 90 degree forward flexed arm, impinging the rotator cuff against the coracoacromial ligament.

### **Lachman's test**

An anterior drawer test for cases of severe knee injury, performed at 20 degree flexion.

### **McMurray's sign**

Occurrence of a cartilage click during manipulation of the knee; indicative of meniscal injury.

### **Median Nerve Compression Test**

This test is performed by placing the thumb over carpal tunnel, apply pressure for 30 seconds. Test is considered positive if paresthesia or numbness occurs in median nerve distribution. It is a useful test in patients that cannot flex the wrist.

### **Neer Impingement Sign**

The examiner stabilizes the scapula with one hand and with the other grasps the patient's elbow and passively elevates it fully with the arm in full internal rotation. The test is considered positive when pain is produced by the greater tuberosity impinging the rotator cuff against the acromium.

### **Phalen Test**

Test is performed by flexion of the wrist. Numbness or paresthesia occur within 60 seconds is diagnostic of CTS.

### **Speeds Test**

Speeds Test is done with elbow extended and the forearm supinated. Forward flexion of the arm is resisted. Pain at the proximal portion of the long head of the biceps in the bicipital groove indicates a positive test for the bicipital tendonitis, which is recognized as a component of Impingement Syndrome.

### **Spurling Sign**

The neck is stressed in lateral flexion and rotation with some compression to elicit pain. Positioning the neck in this manner causes encroachment on cervical nerve roots as they exit the neural foramina; it also stresses the facet joints.

### **Tinel's Sign**

This sign is elicited by a direct median nerve percussion just proximal to volar aspect of wrist. The nerve is tapped lightly from proximal to distal watching for paresthesia in the median nerve distribution indicating a positive test.

### **Valsalva Maneuver**

Forcible exhalation effort against a closed glottis; the resultant increase in intrathoracic pressure interferes with venous return to the heart. Forcible exhalation effort against occluded nostrils and a closed mouth; the increased pressure in the eustachian tube and middle ear causes the tympanic membrane to move outward.

## Bibliography

Acute Low Back Problems in Adults: Assessment and Treatment, Agency for Health Care Policy and Research, U.S. Department of Health and Human Services, Rockville, Maryland, (1994).

Armstrong, T. and Ulin, S.: Analysis and Design of Jobs for Control of Work Related Upper Limb Disorders, Rehabilitation of the Hand: Surgery and Therapy, Hunter, J.M., Mackin, E.J., and Callahan, A.D. (eds), Mosby pp. 1705 - 1723 (1995).

Borenstein, DG, Wiesel, SW, and Boden, SD: Low Back Pain: Medical Diagnosis and Comprehensive Management, W.B. Saunders Company, Philadelphia, (1995).

Bruckman RZ and Rasmussen H: Healthcare Management Guidelines: Workers Compensation, Volume 7, Milliman & Robertson, Inc., (1996).

“BWC ICD-9-CM Coding Policies and Guidelines”, Medical Services Division, March (1994).

Crenshaw, A.H.: Campbell’s Operative Orthopaedics, Eighth Edition, Mosby - Year Book, Inc. (1992).

Dorland’s Medical Dictionary, W.B.Saunders, Philadelphia, (1974).

Fallia, Joseph M.: Differential Diagnosis of Hand Pain: Tendinitis, Ganglia and other Syndromes, in Peimer, C. (ed), Surgery of the Hand and Upper Extremity, McGraw-Hill pp. 1223 - 1249 (1996).

Field, L.D. and Altchek, D.W.: Chronic Elbow Pain, Overuse, Tendonitis in Peimer, C. (ed), Surgery of the Hand and Upper Extremity, McGraw-Hill pp. 499 - 503 (1996).

Gatterman, Meridel: Chiropractic Management of Spine Related Disorders (1990) and Foundation of Chiropractic - Subluxation (1995).

Greenman, Philip: Principles of Manual Medicine (1989).

Hawkins, R.J. and Bokor, D.J.: Clinical Education of Shoulder Problems in Rockwood Jr., C.A. and Matsen III, F.A. (eds), The Shoulder, W.B. Saunders Co. Pp. 149 177 (1990).

Hennessey, W.J. and Johnson, E.W.: Carpal Tunnel Syndrome, Johnson, E.W. and Pease, W.S. (eds), Practical Electromyography - Third Edition, Williams and Wilkins pp. 195 - 215 (1997).

Herington, TN and Morse, LH: Occupational Injuries: Evaluation, Management, and Prevention, Mosby Publishing Co., St. Louis, (1995).

ICD-9-CM, Fifth Edition, 1997, Practice Management Information Corporation, Los Angeles, (1996).

Matsen III, F.A. and Arntz, C.T.: Rotator Cuff Tendon Failure in Rockwood Jr., C.A. and Matsen III, F.A., (eds), *The Shoulder*, W.B. Saunders Company pp. 647-677 (1990).

Masear, VR: *Primary Care Orthopaedics*, W.B. Saunders Company, Philadelphia, (1996).

North, E.R. and Kaul, M.P.: *Compression Neuropathies - Median in Peimer, C. (Ed) Surgery of the Hand and Upper Extremity*, McGraw-Hill pp. 1307 - 1336 (1996).

Omer G.: *Median Nerve Compression at the Wrist in Ragan, G. (ed) Nerve Compression Syndromes Head Clinics*, W.B. Saunders Co. pp. 317 - 324 (1992).

Osterbauer: *Topics in Clinical Chiropractic Journal*, 'Back to Basics: Technology Assessment of the Chiropractic Subluxation', (1996).

Pope, MH, et.al.: *Occupational Low Back Pain: Assessment, Treatment, and Prevention*, Mosby Publishing Co., St. Louis, (1991).

Posner, M.: *Differential Diagnosis of Wrist Pain and Tendinitis, Ganglia, and Other Syndromes*, Peimer, C. (ed), *Surgery of the Hand and Upper Extremity*, McGraw-Hill pp. 838 - 839 (1996).

Rockwood Jr., C.A. (et al) *X-ray Evaluation of shoulder problems in Rockwood Jr., C.A. and Matsen III, F.A. (eds), The Shoulder*, W.B. Saunders Co. pp. 178 - 200 (1990).

Schuchmann, J.A., *Occupational Rehabilitation in Braddom, R.L. (ed), Physical Medicine and Rehabilitation*, W. B. Saunders pp. 938 - 954 (1996).

Smolinski, R.J., Leddy, J.L. and Stegemann, P.M.: *Rotator Cuff Disease in Peimer, C. (ed), Surgery of the Hand and Upper Extremity*, McGraw - Hill pp. 321 - 349 (1996).

Stern, P.J.: *Tendinitis, Overuse Syndromes and Tendon Injuries in Amadia, P.C. (ed), Hand Injuries in Sports and Performing Arts Hand Clinics*, W.B. Saunders Co. pp. 467 - 476 (1990).

Waylonis, George: *Fibromyalgia: A Perspective for Patients* (1995).

Waylonis, George and Ronan, Patrick, and Gordon Chrisanne: *A Profile of Fibromyalgia in Occupational Environments*, *American Journal of Physical Medicine and Rehabilitation*, Williams and Wilkins, (1994).

Weinstein, SL and Buckwalter JA: *Turek's Orthopaedics: Principles and Their Application*, Fifth Edition, J.B. Lippincott Company, Philadelphia, (1994).