

Note regarding the reading material: After searching PubMed, the faculty reviewer did not find a good article covering outpatient upper extremity topics. The following excerpts from MDConsult seem to be the best reputable and concise sources available.

Firestein: Kelley's Textbook of Rheumatology, 8th ed.

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COMMON ETIOLOGIES FOR HAND AND WRIST PAIN

WRIST PAIN—PALMAR

Carpal Tunnel Syndrome

Carpal tunnel syndrome is the most commonly diagnosed compression neuropathy in the upper extremity. It usually occurs as an isolated phenomenon, but symptoms of carpal tunnel syndrome can accompany many systemic diseases, such as congestive heart failure, multiple myeloma, and tuberculosis.^{[25] [26] [27] [28]} More commonly, carpal tunnel syndrome is associated with conditions such as pregnancy, diabetes, obesity, rheumatoid arthritis, and gout.^{[29] [30] [31] [32] [33] [34] [35] [36] [37] [38] [39]}

The classic constellation of symptoms consists of weakness or clumsiness of the hand; paresthesias or hypesthesias in the thumb, index, and long fingers; and nocturnal paresthesias in the affected digits. Patients often may complain of forearm and elbow pain that is aggravated by activities, but is poorly localized and aching in nature. Occasionally, more proximal symptoms, such as shoulder pain, are the main presenting complaint.^[40] Past reports have indicated a 3:1 prevalence of carpal tunnel syndrome in women. Approximately half of patients are 40 to 60 years old, although carpal tunnel syndrome occasionally has been diagnosed in children.^{[41] [42]}

The diagnosis of carpal tunnel syndrome is usually clinical. Tinel's sign, shown by radiating paresthesias in the median nerve distribution with gentle percussion over the volar wrist, indicates nerve irritation. Reproduction of symptoms with wrist flexion, as described by Phalen,^[43] and with the carpal compression test, as described by Durkan,^[44] has been shown to be more specific.^[45] Decreased sensibility and thenar atrophy are late signs seen in advanced median nerve entrapment. Bilateral electrodiagnostic tests, specifically nerve conduction velocity testing, should be used to confirm the diagnosis, particularly in patients claiming a compensable injury or in patients with atypical signs or symptoms. Prolonged motor and sensory latencies across the carpal canal confirm pathologic compression of the median nerve.^{[46] [47] [48]} In patients with classic clinical findings, a study found that carpal tunnel syndrome could be diagnosed with a high degree of accuracy on clinical grounds alone, and that the addition of electrodiagnostic tests did not increase the accuracy.^[49] When attempting to differentiate carpal tunnel syndrome from more proximal nerve entrapments such as cervical root compression or thoracic outlet syndrome, the addition of electromyography of the cervical paraspinal muscles and proximal conduction tests (H reflex, f waves) can be useful.^[50]

Conservative treatment for carpal tunnel syndrome consists of splinting of the wrist in neutral position and consideration of oral nonsteroidal anti-inflammatory drugs (NSAIDs) for pain control. Splinting should be used sparingly during the workday to

prevent secondary muscle weakness and fatigue, but is best prescribed to prevent provocative wrist positioning at night. The splint should not hold the wrist in extension beyond 10 degrees. Although splinting may be beneficial for relief of symptoms in cases of mild compression, its long-term effectiveness is limited.^[51] The use of vitamin B₆ (100 to 200 mg/day) has been helpful in some cases, but its efficacy has not been confirmed in a randomized trial. The popularity of injections of corticosteroid in the treatment of carpal tunnel syndrome has waxed and waned over the last half century. Although it has been shown to be quite effective in the short-term, the long-term efficacy is mixed.^{[52][53]}^[54] Also, injections have been associated with exacerbation of the condition and permanent median nerve injury if performed incorrectly.^{[55][56]} For these reasons, injections are most often indicated in cases when the condition is thought to be temporary, such as with pregnancy, or if surgery has to be deferred because of a medical condition or major life event.

Surgical release is indicated for patients with confirmed carpal tunnel syndrome who have failed a course of conservative treatment. In patients who exhibit late findings of objective sensory loss or thenar atrophy, early surgery should be recommended.

WRIST PAIN—DORSAL

Ganglion

Ganglia account for 50% to 70% of all soft tissue tumors of the hand and wrist. Of these, 60% to 70% occur around the dorsal wrist. These mucin-filled cysts usually arise from an adjacent joint capsule or tendon sheath. The most common site of origin is the scapholunate ligament, and the main body of the cyst may be located elsewhere on the dorsum of the wrist and attached to this ligament by a long pedicle. Although most ganglia occur as a well-circumscribed and obvious soft mass, some are subtler and are evident only with the wrist in marked volar flexion. As a result of their characteristic appearance, ganglia are not often misdiagnosed, but should be differentiated from the less well-demarcated swelling of extensor tenosynovitis, lipomas, and other hand tumors. Plain radiographs are usually normal, but occasionally show an intraosseous cyst or an osteoarthritic joint. Some ganglia may not be clinically apparent and are known as “occult” ganglia. Ultrasound and MRI have been shown to be useful in the diagnosis of these ganglia.^{[79][80]}

Not all ganglia are painful, and the tendency is for smaller ganglia to be more painful. Patients may present with complaints of wrist weakness or simply because of the cosmetic appearance of the cyst. In approximately 10% of cases, there is evidence of associated trauma to the wrist. The ganglia may appear suddenly or develop over many months. Intermittent complete resorption followed by reappearance months or years later is common.

Most conservative measures, such as splinting and rest, have only a temporary effect on ganglia. They tend to diminish in size with rest and enlarge with increased activity. Spontaneous rupture is common, and at one time attempting to rupture the cyst with a heavy object, such as a large book, was recommended as treatment. Aspiration can be performed, but has mixed results because of the thick gelatinous nature of the fluid within

the cyst. Even if adequate decompression of the cyst can be achieved, reaccumulation of the fluid usually occurs. Aspiration in conjunction with irrigation or injection of corticosteroids can be effective in alleviating the symptoms for varying periods of time. [12] [13] [81]

Occasionally, a ganglion can become so large that it can interfere with the function of the wrist by limiting the motion, especially in extension. Pressure of the mass on the terminal branches of the posterior interosseous nerve may be painful. Excision is generally curative, but may result in short-term stiffness and some loss of terminal flexion secondary to surgical scarring. Occasionally, a patient desires excision of the cyst for cosmetic reasons. With proper excision, recurrence is less than 10%, [82] [83] [84] but if the dissection is incomplete and fails to identify the origin of the cyst, recurrence rates can be 50%. Arthroscopic resection has been shown to be a safe and effective method of treating dorsal wrist ganglia. [23] [24]

WRIST PAIN—RADIAL AND BASE OF THUMB **de Quervain's Disease and Intersection Syndrome**

One of the most common sites of tendon irritation around the wrist is in the first dorsal extensor compartment, a phenomenon known as de Quervain's disease. The tendons involved are the extensor pollicis brevis and the abductor pollicis longus. At the level of the radial styloid, these two tendons pass through an osteoligamentous tunnel composed of a shallow groove in the radius and an overlying ligament. Anatomic studies have shown that a high percentage of patients have a divided first dorsal compartment, and this can account for failure of conservative treatment and injections. [117] [118] [119]

Patients with de Quervain's disease are typically women in their 30s and 40s, although men and women can develop the condition at any age. This is the most common tendinopathy to develop in women in the postpartum period because of the specific hand and wrist position requirements in the care of an infant. Any activity requiring repeated thumb abduction and extension in combination with wrist radial and ulnar deviation can aggravate this problem. Patients complain of pain along the course of these tendons with grasping activities. Clinically, there is tenderness along the affected compartment, and there may be swelling over the radial styloid. In severe cases, a creaking sound can be elicited with movement of the involved tendons. Finkelstein's test of forced ulnar deviation of the wrist with the thumb clasped in the fist on the palm is pathognomonic of the condition [120] [121]

A less common condition that may occur in the same general location in the wrist is intersection syndrome. Although initially attributed to friction between the first and second dorsal compartment tendons, Grundberg and Reagan [122] subsequently showed that the condition represented a tendinopathy of the radial wrist extensors within the second dorsal compartment.

The primary treatment for de Quervain's disease and intersection syndrome is rest with splinting. For de Quervain's disease, the wrist should be held in slight extension and the thumb abducted in a thumb spica splint to the level of the interphalangeal joint. Immobilization of the wrist alone, in approximately 15 degrees of extension, is usually

adequate for intersection syndrome. The addition of a 2- to 4-week course of anti-inflammatory medication also can be helpful. Phonophoresis with a cortisone cream and injection of the compartment with cortisone are second-line treatments if immobilization alone fails to give adequate relief. Injection of corticosteroid into the affected first dorsal compartment is curative for de Quervain's disease in approximately 75% of patients.^[123] Surgery may be indicated for patients who do not respond to a course of conservative treatment. For de Quervain's disease and intersection syndrome, surgery consists of releasing the stenotic retinacular sheath of the involved compartment.

PALM

Trigger Finger

Painful clicking and locking of the digits in flexion is one of the most common causes of pain in the hand. This condition, caused by a thickening of the A1 retinacular pulley in the palm, is commonly known as trigger finger. The thumb is the most commonly affected digit, followed by the ring and long fingers.^[129] Patients may present with isolated activity-related pain in the proximal interphalangeal joint without frank clicking or locking. Early clicking is felt as a snapping sensation during digital motion and is frequently worst on awakening. As the condition progresses, the digital range of motion can be reduced and secondary proximal interphalangeal joint contractures develop. The final stage is a locked trigger finger that cannot be straightened actively.

Primary trigger finger is the most common type, found most often in middle-aged individuals. Triggering of the thumb is four times more frequent in women than in men.^[5] Secondary triggering is seen in association with such diseases as rheumatoid arthritis, diabetes, and gout. In this type, trigger fingers are often multiple and can coexist with other stenosing tendinopathies, such as de Quervain's disease or carpal tunnel syndrome. Congenital or developmental triggering can be identified in children and is much less common. Similar to in adults, the thumb is most commonly affected, but in contrast to adults, these often present with the interphalangeal joint locked in flexion.

Nonoperative treatment of this condition consists primarily of splinting and local steroid injections. In adults, injection of steroid into the tendon sheath has been shown to be quite effective.^{[5] [6] [130]} Injection is used infrequently in infants or children. When nonoperative treatments fail to give lasting relief, surgical treatment consists of longitudinal division of the A1 pulley at the level of the metacarpal head. It is a simple procedure that yields reliable and permanent results with few complications.

Frontera: Essentials of Physical Medicine and Rehabilitation, 2nd ed.

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Chapter 19 – Epicondylitis

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Synonyms

Tendinosis^[1]
Lateral epicondylitis
Medial epicondylitis
Tennis elbow
Pitcher's elbow
Golfer's elbow

ICD-9 Codes

726.31	Medial epicondylitis
726.32	Lateral epicondylitis

DEFINITION

Epicondylitis is a general term used to describe inflammation, pain, or tenderness in the region of the medial or lateral epicondyle of the humerus. The actual nidus of pain and pathologic change has been debated. Lateral epicondylitis implies an inflammatory lesion with degeneration at the origin of the extensor muscles (the lateral epicondyle of the humerus). The extensor carpi radialis brevis is the muscle primarily affected. Other muscles that can contribute to the condition are the extensor carpi radialis longus and the extensor digitorum communis. In medial epicondylitis, the flexor muscle group is affected (flexor carpi radialis, flexor carpi ulnaris, flexor digitorum superficialis, and palmaris longus).

Although the term *epicondylitis* implies an inflammatory process, inflammatory cells are not identified histologically. Instead, the condition may be secondary to failure of the musculotendinous attachment with resultant fibroplasia,^[2] termed tendinosis. Other postulated primary lesions include angiofibroblastic tendinosis, periostitis, and enthesitis.^[3] In children, medial elbow pain may result from repetitive stress on the apophysis of the medial epicondyle ossification center (little leaguer's elbow).^[4] Overall, the focus of injury appears to be the muscle origin. Symptoms may be related to failure of the repair process.^[5]

Repetitive stress has been implicated as a factor in this condition.^[6] Poor throwing mechanics and excessive throwing have been implicated in little leaguer's elbow. Overuse from a tennis backhand (especially a one-handed backhand with poor technique) can frequently lead to lateral epicondylitis (hence, the term *tennis elbow* is frequently used synonymously with lateral epicondylitis, regardless of its etiology). Repetitive wrist flexion as in the trailing arm in a golf swing can cause a medial epicondylitis (hence, the term *golfer's elbow* is frequently used for medial epicondylitis, also regardless of etiology).

SYMPTOMS

Patients usually report pain in the area just distal to the lateral epicondyle (lateral epicondylitis) or the medial epicondyle (medial epicondylitis). The patient may complain of pain radiating proximally or distally. Patients may also complain of pain with wrist or hand movement, such as gripping a doorknob, carrying a briefcase, or shaking hands. Patients occasionally report swelling as well.

PHYSICAL EXAMINATION

On examination, the hallmark of epicondylitis is tenderness over the extensor muscle origin (lateral epicondylitis) or flexor muscle origin (medial epicondylitis). The origin of the extensor or flexor muscles can be located one fingerbreadth below the lateral or medial epicondyle, respectively. With lateral epicondylitis, pain is increased with resisted wrist extension, especially with the elbow extended, the forearm pronated, the wrist radially deviated, and the hand in a fist. The middle finger test can also be used to assess for lateral epicondylitis. Here, the proximal interphalangeal joint of the long finger is resisted in extension, and pain is elicited over the lateral epicondyle. Swelling is occasionally present. With medial epicondylitis, pain is increased with resisted wrist flexion. In cases of recalcitrant lateral epicondylitis, the diagnosis of radial nerve entrapment should be considered. The radial nerve can become entrapped just distal to the lateral epicondyle where the nerve pierces the intermuscular septum (between the brachialis and brachioradialis muscles). There may be localized tenderness along the course of the radial nerve around the radial head. Motor and sensory findings are usually absent.

FUNCTIONAL LIMITATIONS

The patient may complain of an inability to lift or to carry objects on the affected side secondary to increased pain. Typing, using a computer mouse, or working on a keyboard may re-create the pain. Even handshaking or squeezing may be painful in both lateral and medial epicondylitis. Athletic activities may cause pain, especially with an acute increase in repetition, poor technique, and equipment changes (frequently with a new racket or stringing).

DIAGNOSTIC STUDIES

The diagnosis is usually made on clinical grounds. Magnetic resonance imaging, which is particularly useful for soft tissue definition, can be used to assess for tendinitis, tendinosis, degeneration, partial tears or complete tears, and detachment of the common flexor or common extensor tendons at the medial or lateral epicondyles, respectively.^[7] Magnetic resonance imaging is rarely needed, however, except in recalcitrant epicondylitis, and it will not alter the treatment significantly in the early stages. The medial and lateral collateral ligament complexes can be evaluated for tears as well as for chronic degeneration and scarring. Arthrography may be beneficial if capsular defects and associated ligament injuries are suspected. Barring evidence of trauma, early radiographs are of little help in this condition but may be useful in cases of resistant tendinitis and to rule out occult fractures, arthritis, and/or osteochondral loose body.

Differential Diagnosis

Posterior interosseous nerve syndrome
Bone infection or tumors
Median or ulnar neuropathy around the elbow
Osteoarthritis
Acute calcification around the lateral epicondyle^[8]
Osteochondral loose body
Anconeus compartment syndrome^[9]
Triceps tendinitis
Degenerative arthrosis^[10]
Elbow synovitis
Lateral ligament instability^[11]
Radial head fracture
Bursitis
Collateral ligament tears
Hypertrophic synovial plica^[12]

TREATMENT

Initial

Initial treatment consists of relative rest, avoidance of repetitive motions involving the wrist, activity modification to avoid stress on the epicondyles, anti-inflammatory medications, and thermal modalities such as heat and ice for acute pain. Patients who develop lateral epicondylitis from tennis should modify their stroke (especially improving the backhand stroke to ensure that the forearm is in midpronation and the trunk is leaning forward) and their equipment, usually by reducing string tension and enlarging the grip size.^[6] Frequently, a two-handed backhand will relieve the stress sufficiently. Patients who develop medial epicondylitis from golf should consider modifying their swing to avoid excessive force on wrist flexor muscles. Biomechanical modifications may help reduce symptoms if the medial epicondylitis is thought to be due to poor pitching technique.

In addition, a forearm band (counterforce brace) worn distal to the flexor or extensor muscle group origin can be beneficial. The theory behind this device is that it will dissipate forces over a larger area of tissue than the medial or lateral attachment site. Alternatively, the use of wrist immobilization splints may be helpful. A splint set in neutral can be helpful for either medial or lateral epicondylitis by relieving the tension on the flexors and extensors of the wrist and fingers. A splint set in 30 to 40 degrees of wrist extension (for lateral epicondylitis only) will relieve the tension on the extensors, including the extensor carpi radialis brevis muscle as well as other wrist and finger extensors.^{[13][14]} Dynamic extension bracing has also been proposed.^[15]

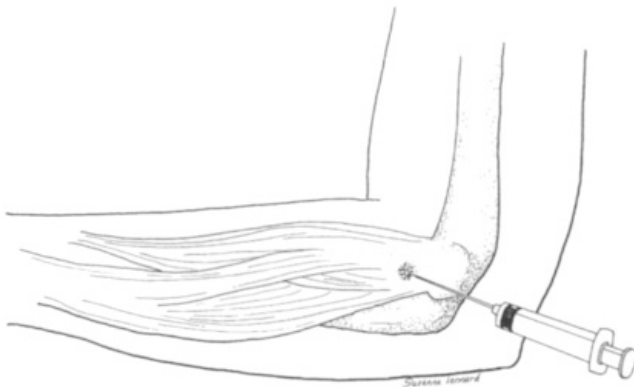
Rehabilitation

Rehabilitation may include physical or occupational therapy. Therapy should include two phases. The first phase is directed at decreasing pain (ultrasound, electrical stimulation, phonophoresis, heat, ice, massage) and decreasing disability (education, reduction of repetitive stress, and preservation of motion). When the patient is pain free, a gradual program is implemented to improve strength and endurance of wrist extensors (for lateral epicondylitis) or wrist flexors (for medial epicondylitis) and stretching. This program must be carefully monitored to permit strengthening of the muscles and work hardening of the tissues, without itself causing an overuse situation. The patient should start with static exercises and advance to progressive resistive exercises. Thera-Band, light weights, and manual (self) resistance exercises can be used.

Work or activity restrictions or modifications may be required for a time.

Procedures

Injection of corticosteroid, usually with a local anesthetic, into the area of maximum tenderness (approximately 1 to 5 cm distal to the lateral epicondyle) has been shown to be effective in treatment of lateral epicondylitis (Fig. 19-1).^[16] To confirm the diagnosis, a trial of lidocaine alone may be given. An immediate improvement in grip strength should be noted after injection. Postinjection treatment includes icing of the affected area both immediately (for 5 to 10 minutes) and thereafter (a reasonable regimen is 20 minutes two or three times per day for 2 weeks) and wearing of a wrist splint (particularly for activities that involve wrist movement). The wrist splint should be set in slight extension for lateral epicondylitis and neutral for medial epicondylitis. Exacerbating activities are to be avoided.



Injection of botulinum toxin into the extensor digitorum communis muscles to the third and fourth digits has been reported to be beneficial in treating chronic treatment-resistant lateral epicondylitis.^{[17] [18]}

Injections for medial epicondylitis must be used cautiously because of the risk of injury to the ulnar nerve (either by direct injection or by tissue changes that may promote nerve injury). There are studies that support acupuncture as an effective modality in the short-term relief of lateral epicondylitis.^{[19] [20] [21]}

Surgery

Surgery may be indicated in those patients with continued severe symptoms who do not respond to conservative management. For lateral epicondylitis, surgery is aimed at excision and revitalization of the pathologic tissue in the extensor carpi radialis brevis and release of the muscle origin.^[22] Pinning may be done if the elbow joint is unstable.^[4]

POTENTIAL DISEASE COMPLICATIONS

Possible long-term complications of untreated epicondylitis include chronic pain, loss of function, and possible elbow contracture. Medial epicondylitis may lead to reversible impairment (neurapraxia) of the ulnar nerve.^[23] In general, epicondylitis is more easily and successfully treated in the acute phase.

POTENTIAL TREATMENT COMPLICATIONS

Analgesics and nonsteroidal anti-inflammatory drugs have well-known side effects that most commonly affect the gastric, hepatic, and renal systems. Local steroid injections may increase the risk for disruption of tissue planes, create high-pressure tissue necrosis, rupture tendons,^[1] damage nerves, promote skin depigmentation or atrophy, or cause infection.^[24]