

Differential Diagnosis of DeQuervain's Syndrome and Carpal Tunnel Syndrome

K. Jeffrey Miller DC, DABCO

Introduction

The rule of the golden hammer states, "When your only tool is a hammer, everything begins to look like a nail". Doctors of all types fall prey to this law of human nature. Typically, it occurs with types of treatment, surgery, prescriptions, adjustments, etc. However, it can also occur with diagnoses. A common example is carpal tunnel syndrome (CTS). Many clinicians diagnose CTS for any problem involving the radial side of the wrist or hand. Carpal tunnel syndrome is common. However, it is not the only problem to affect the radial side of the wrist and hand. It has been the author's experience that close history and examination of many patients previously diagnosed with CTS actually have DeQuervain's Syndrome.

Differential Diagnosis

DeQuervain's syndrome, also known as Paddler's Wrist and Hoffman's disease is the most common form of tenosynovitis in the wrist. The condition evolves from trauma (micro or macro) to the abductor pollicis longus and extensor pollicis brevis tendons in the first dorsal compartment of the wrist. Trauma leads to inflammation of the tendons. Inflammation in turn leads to friction between the tendons and the tendon sheath. Inflammation and friction result in pain. Classic presentation occurs with the patient reporting sharp pain in the dorsal radial side of the wrist and thumb with all movements especially, thumb flexion or adduction and wrist ulnar deviation. Static palpation typically reveals tenderness of the tendons. In some cases, palpation while the wrist and thumb are in motion reveals crepitus between the tendons and the tendon sheath. Instructing the patient to place the thumb inside the closed fist and ulnar deviate the wrist usually reproduces the patient's chief complaint (Finkelstein's Test).

Carpal tunnel syndrome has a similar yet distinct presentation. Patients present with a constellation of symptoms and signs that is dependent on the duration of nerve compression. The condition can evolve directly from trauma (micro or macro) to the structures of the carpal tunnel or indirectly from inflammatory diseases, endocrine conditions or pregnancy. These etiologies cause compromise of the median nerve. The patient with CTS reports pain and numbness in the radial side of the wrist and thumb. These symptoms also affect the second and third digits. In some cases, all digits are reported to be symptomatic. The numbness will eventually dominate as the condition advances. Movement increases symptoms but symptoms are generally worse at night and interfere with sleep. Palpation may or may not

reveal tenderness.

There is a wide variability of the sensitivity and specificity of several CTS tests in the medical literature. Flick maneuver (flicking motion of hands and wrists when most symptomatic), Phalen's and Tinel's tests (table 1) may be positive but these tests are not always reliable. Hansen, Micklesen, and Robinson evaluated sensitivities of these clinical maneuvers in relation to electro diagnostic severity of CTS; Flick, Tinel, and Phalen signs were 37%, 27%, and 34% respectively. False-positive results ranged from 8% (Tinel) to 26% (Flick and Phalen). Positive predictive values for the Flick, Tinel, and Phalen maneuvers were 74%, 87%, and 73% respectively, and negative predictive values were 37%, 39%, and 35%. The research concluded that Flick sign was of limited utility when diagnosing CTS, with low sensitivity and specificity.

Kuhlman and Hennessey evaluated six signs used to determine the presence or absence of CTS compared with the results of standard nerve conduction studies (NCSs). The findings concluded that CTS signs are not very sensitive but are fairly specific in detecting CTS. A square—shaped wrist was the most sensitive (69%) and had a good specificity (73%). The square shaped wrist has been described as the anteroposterior and mediolateral dimension as measured at the distal flexor wrist crease using a standard sliding caliper. If the wrist ratio (anteroposterior dimension divided by the mediolateral dimension) was ≥ 0.70 , the sign was considered positive. Abductor pollicis brevis (APB) weakness has fair to good sensitivity (66%) and specificity (66%), and should be tested in patients with suspected CTS. Median nerve hypesthesia and the Phalen sign both have fair sensitivity (51%) but good specificity (85% and 76%, respectively), and their presence could support the diagnosis of CTS. The median nerve compression and the Hoffmann—Tinel sign have good specificity (74% and 87%) but very poor sensitivity (28% and 23% respectively), and thus they are less helpful for evaluating subjects with suspected CTS.

Electro diagnostic studies are useful in confirming median nerve entrapment. The standard nerve conduction studies (NCSs) are the most definitive tests used to diagnose CTS; they are the only tests used to diagnose CTS, and only testing to objectively confirm median nerve dysfunction within the carpal tunnel. The key finding here is delayed nerve conduction velocity (NCV) involving the median nerve at the wrist. While CTS is diagnosed on the basis of the patients' history and clinical examination, imaging is usually not useful while electro diagnostic studies confirm the diagnostic compression. In advanced cases, muscle atrophy and weakness of the thenar region can be detected by inspection, needle insertion EMG, pinch strength testing and grip strength testing. Table 2 compares and contrasts the clinical findings for DeQuervain's and CTS.

Nerve root irritation in the cervical spine may simultaneously compromise nerve fibers contributing to the median nerve. This theory termed double crush syndrome (typically nerve irritation in the IVF and carpal tunnel) may contribute significantly to the patient's condition and symptom complex. The double crush theory may not be limited to irritation within the IVF in conjunction with irritation at the carpal tunnel. It

may also occur as a result of nerve irritation at other points along the course of the median nerve or its root fibers and/or irritation within the carpal tunnel.

Treatment

DeQuervain's syndrome responds well to conservative care. Three weeks of reduced activity, pulsed ultrasound (25-50%) under water, a thumb spica splint, soft tissue manipulation and over the counter anti-inflammatory medication are effective in relieving most episodes. Initial usage of pulsed ultrasound is preferred to continuous as continuous increases tissue temperature which can irritate this inflammatory condition. Stretching and strengthening the involved muscles and their tendons can also contribute to recovery. A variety of devices are now available for achieving the desired results of increased flexibility and strength. Care must be taken initially to make sure the patient is no longer in an inflammatory stage when providing rehabilitation exercise. The term "episode" is emphasized as the condition tends to be repetitive. Recurrence results from returning to the environment and activity that initiated the condition. Advanced and persistent cases may require medical care consisting of prescription anti-inflammatory medication and steroid injection.

Carpal tunnel syndrome is responsive to conservative care but treatment may be a prolonged process. Treatment depends on the etiology, duration of symptoms and intensity of nerve compression. If the syndrome is secondary to endocrine, or other systemic disease, the primary disease should be treated. CTS like DeQuervain's are usually repetitive and it is a more serious condition. Reduced activity, or repetitive actions, manipulation, a cock-up/forearm splint, traction, modalities, rehabilitation exercises and over the counter anti-inflammatory medication are recommended. Splint use initially should be constant. Nocturnal application is especially useful as conscious control of hand position decreases symptoms that typically increase during sleep. Day time use can be tapered as the condition improves. Nocturnal use should be sustained for a longer period of time. Rehabilitative hand exercises aimed at increasing flexibility and strength are also recommended for carpal tunnel patients. Beginning rehabilitative exercise once the patient has moved from the inflammatory stage applies as it does in DeQuervain's Syndrome. Starting with early dorsi flexion stretching has been shown to be of value. A number of useful devices to accomplish the process are available. If cervical nerve root irritation or irritation at another site along the course of the median nerve or its root fibers is suspected, cervical manipulation and other modalities will be necessary in order to achieve positive clinical results. Suspected cases that develop thenar atrophy and motor weakness may require surgical decompression.

Table 1
<p>Tinel sign at the wrist</p> <ul style="list-style-type: none"> • Examiner taps over the carpal tunnel at wrist • A positive test causes tingling in the thumb, index finger, forefinger, and the middle and lateral half of the ring finger (along the median nerve distribution). • The tingling and paresthesia must be felt distal to the point of pressure for a positive test. • The test is an indication of the rate of regeneration of the sensory fibers of the median nerve. • The more distal point at which abnormal sensation is felt represents the limit of nerve regeneration.
<p>Phalen sign</p> <ul style="list-style-type: none"> • The patient flexes the wrists maximally and holds this position for one minute by pushing both wrists together. • A positive test is indicated by a tingling sensation that radiates into the thumb, the index finger, and the middle and lateral half of the ring finger. • The presence of this sensation indicates carpal tunnel syndrome caused by pressure on the median nerve. • The duration of time to produce symptoms provides an indication as to severity and can objectively measure improvement / degradation as performed over time.

Table 2	DeQuervain's Syndrome	Carpal Tunnel Syndrome
Symptoms	<p>Sensory Pain with use Location usually dorsal radial side of wrist and thumb</p>	<p>Sensory Hypesthesia Hyperesthesia Numbness Burning</p>

	<p>Motor Generalized weakness of wrist and thumb upon movement - secondary to pain</p>	<p>Pain - night Stiffness Location - radial side of wrist and hand – first 3 digits may be affected Motor Hypotrophy Weakness (grip loss) Atrophy Trophic Ulcers Edema</p>
Orthopedic Findings	Positive Finkelstein's Test	Positive Tinels Positive Phalens
Electrodiagnostic Test	Negative	Positive NCV at median nerve at wrist Advanced case positive needle insertional activity
Signs	Edema Pain with all movements of wrist and thumb, especially ulnar deviation. Tenderness on palpation. At times crepitus felt between tendon and sheath	Trophic Ulcers Edema
Etiologies	Trauma (micro and/or macro)	Trauma (micro and/or macro), Pregnancy Rheumatoid Arthritis Arthritis Degenerative Metabolic (hypothyroidism, gout, diabetes mellitus) Alcoholism (polyneuritis) Connective Tissue Disorders

Bold = Differences between DeQuervain's and CTS

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Author

Dr. Jeff Miller is a native of Shelby County, Kentucky. He received his Bachelor of Science and Doctor of Chiropractic degrees from Palmer College of Chiropractic in 1987. After graduation, he completed post doctoral orthopedic training through Parker College of Chiropractic. He is a Fellow of the Academy of Chiropractic Orthopedists (FACO). In 1997 Dr. Miller was designated as a specialist (CSCS) given by the National Strength and Conditioning Association (NSCA) and America Council on Exercise. He received his CCSP in 2002. In private practice for 16 years, he has published more than one hundred articles in twenty five publications and has written a manual on occupational health. Dr. Miller, his wife Kimberly and their children; Andrew, Benjamin, Emily and Katie reside in Shelbyville KY.

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