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Wrist Pain and Carpal Tunnel Syndrome

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Treatment of Wrist Pain: Carpal Tunnel Syndrome, Cubital Tunnel and Guyon's Canal

Introduction

In this course, we will examine treatment of wrist pain with TCM. In particular, we will address some common causes of wrist pain: median nerve compression and ulnar nerve entrapment at the cubital tunnel and Guyon's canal. Of the three disorders, median nerve compression (carpal tunnel syndrome) is more widely known. However, ulnar nerve compression is also a major cause of wrist pain. Therefore, TCM practitioners should understand how wrist pain arises from both median and ulnar nerve injury.

By the end of this course, you will know how to:

- Identify various causes of wrist pain
- Develop treatment of plans using both acupuncture and herbs.

Pathophysiology/Mechanism

The Brachial Plexus—The brachial plexus is the network of spinal nerves supplying innervation for the shoulder, arms and upper extremities. Damage to specific portions of the brachial plexus can result in dysfunction of the foreman, hand, and fingers and cause such disorders as wrist drop and clawhand. The brachial plexus has three major trunks, which further divide into anterior and posterior divisions. These two divisions branch into 16 nerves extending from C5 to T1.

The three nerves which are the focus for our discussion include the median, radial, and ulnar nerves. These nerves directly affect the wrist and fingers.

The radial nerve originates from brachial roots leaving C5 – T1. Injury to the radial nerve can result in in wrist drop, or inability to extend the wrist. The radial nerve emanates from the posterior division of brachial plexus. Its distribution includes the:

- Extensor muscles of the arm and forearm including the triceps brachii
- Skin covering the posterior arm and forearm
- Lateral two-thirds of the dorsal surface of the hand
- Proximal and middle phalanges

The median nerve originates from brachial roots leaving C5 – T1 just like the radial nerve. However, the median nerve emanates from the anterior division of the brachial plexus. The median nerve's distribution includes the:

- Flexors of the forearm (except for the flexor carpi ulnaris)
- Some flexors of the palm
- Skin of the lateral two-thirds of the palm and fingers

The median nerve runs through the anatomical structure called the carpal tunnel. Compression of the nerve through this structure results in pain, weakness, numbness, tingling in the palm, wrist, and fingers, or what we commonly refer to as carpal tunnel syndrome (CTS).

The ulnar nerve originates from brachial roots leaving C8 – T1. Injury to the ulnar nerve causes clawhand and sensory loss over the fifth (little) finger. Like the median nerve, the ulnar nerve also emanates from the anterior division of the brachial plexus. The ulnar nerve's distribution includes:

- most of the muscles of the hand, flexor carpi ulnaris
- flexor digitorium profundus
- · skin on the medial side of the hand
- medial half of the ring finger
- skin of the fifth finger.

Median nerve compression (Carpal Tunnel Syndrome).

The carpal tunnel is a rigid, "closed compartment." The carpal tunnel is formed by the transverse median ligament. Compression of the median nerve at the wrist by this ligament results in carpal tunnel syndrome, which can be either of acute or chronic etiology. Common signs of median nerve compression are pain, paresthesias, numbing, and tingling in the palmar aspect of the thumb, second and third (index and middle fingers), and radial half of the fourth finger.

Often, median nerve compression is a cumulative traumatic injury. Sudden trauma, wrist fracture, crushing injuries, and burns can all lead to acute carpal tunnel. Chronic carpal tunnel can be caused by constriction from casts, handcuffs, tight gloves, repetitive and forceful gripping as well as anatomical anomalies, tenosynovium and scarring.

A topic of controversy is whether occupational use of vibratory tools or intense, repetitive gripping leads to carpal tunnel. Some experts tend to believe these actions are not responsible for carpal tunnel syndrome. While other researchers assert that repetitive motions do indeed cause compression and injury resulting in CTS.

There are three common stages of compression in CTS:

- Stage 1 (early compression) Involves impaired blood flow. The
 patient may report intermittent symptoms. No structural changes are
 apparent.
- **Stage 2 (moderate compression)** Involves impaired blood flow, edema, thenar weakness, and abnormal sensation. There may also be intraneural fibrosis.
- **Stage 3 (severe compression)** Involves chronic edema, fibrosis, loss of muscle fibers, persistent sensory changes, thenar atrophy.

Ulnar nerve entrapment (Cubital Tunnel and Guyon's Canal).

Ulnar nerve entrapment can occur anywhere between the axilla and the hand. For instance, at the elbow the nerve may runs through the bony cubital tunnel, which is a prime location for compression due to overuse, poor body mechanics, or trauma.

The cubital tunnel is formed by the ulnar collateral ligament, the trochlea, medial epicondylar groove, and triangular arcuate ligament. As the ulnar nerve passes through the cubital tunnel, it provides innervation for the fifth and ulnar portion of the fourth finger as well as ulnar instrinsics to muscles such as the flexor carpi ulnaris. Severe compression of the ulnar nerve at the cubital area can also lead to a condition commonly referred to as clawhand" Clawhand is characterized by:

- Inability to adduct or abduct the fingers
- Hyperextension of the metacarpophalangeal joints
- · Flexion of the interphalangeal joints
- Atrophy of the interossesous muscles

Like compression of the ulnar nerve at the cubital area, compression of the nerve at Guyon's canal may lead to motor and sensory problems in the hand and wrist. Guyon's canal is also a bony canal. It is formed by the hamate, the hook of the hamate, and the volar carpal ligament. The ulnar nerve and ulnar artery both pass through Guyon's canal. Pain at Guyon's canal can result from trauma as well as space-maintaining lesions or a decrease in the tunnel size.

Generally, Guyon's canal is divided into three anatomic zones:

- Zone 1 Located at the wrist and proximal to the canal. Affects both motor and sensory function.
- Zone 2 Located at the exit of the canal. Affects only the deep motor branch.
- Zone 3 Located at the exit of the canal. Affects only the sensory branch.

Assessment

TCM practitioners should evaluate the patient when nerve impairment is suspected to determine the cause of the symptoms, and when necessary make the appropriate referrals. A number of evaluation methods are available to help diagnose both median nerve and ulnar nerve compression. With *median nerve compression*, the practitioner should check to see if the patient is affected in the *thumb through radial half of the fourth fingers*. With *ulnar nerve compression*, the practitioner should check to see if the *fourth and fifth fingers are affected*.

Tests for confirming median nerve compression include the following:

- Phalen maneuver (60 seconds)
- Tinel sign at the carpal tunnel (also known as percussion test)
- Compression of the wrist/carpal tunnel (60 seconds)
- Sensory testing using the Semmes-Weinstein monofilament test
- Electromyography

Tests for diagnosing cubital tunnel and Guyon's canal include the following:

Sensory tests

- Froment sign
- Tinel sign at the elbow or Guyon's canal (also known as percussion test)
- Range of motion tests
- Manual muscle tests

Testing Methods for Carpal Tunnel Evaluation

Test	Condition Measured	Method Used	Positive Result and Interpretation
Phalen manuever	Paresthesias	The patient should hold his or her wrist in the flexed position for 30 – 60 seconds	Numbness or tingling on in the thumb and/or radial digits indicates probable carpal tunnel syndrome
Percussion test (Tinel's sign)	Site of Nerve lesion	Practitoner lightly taps the median nerve at the wrist (proximal to distal)	Tingling in the fingers indicates probable carpal tunnel syndrome
Carpal tunnel Decompression	Paresthesias	The practitioner applies direct compression to the median nerve	Paresthesias within 30 seconds indicates probable carpal tunnel syndrome

*Source: Brotzman and Wilk.

Grading of Carpal Tunnel Syndrome

Degree	Symptoms/Findings
Dynamic	Mostly asymptomatic; activity may induce symptoms
Mild	Intermittent symptoms; decreased sensibility to light- touch; digital compression positive, may not have a positive Tinel sign or Phalen's manuever
Moderate	Frequent symptoms; weakness in thenar muscles; decreased perception to vibration; positive Tinel's sign, digital compression, and Phalen's maneuver; increased two-point discrimination
Severe	Persistent symptoms, thenar muscle atrophy; may be absence of two-point discrimination

^{*}Source: Brotzman and Wilk.

Comparison of Wrist and Hand Conditions

Condition	Symptoms
Carpal Tunnel Syndrome	 Median nerve compression Phalen's test (abnormal) Tinel sign Abnormal sensation in the median nerve distribution Atrophy of thenar eminence in severe cases Weakened thumb opposition or no opposition in severe cases
Rheumatoid Arthritis	 Swelling in multiple joints Swelling of the tenosynovium and flexor tendons of the volar surface of the wrist/hand Swelling of the tenosynovium and extensor tendons on the dorsal surface of the wrist/hand Secondary deformities, such as ulnar deviation on the MCP joints, swan-neck and boutonniere deformities Secondary rupture of the flexor and extensor tendons
Ulnar Nerve Entrapment at Guyon's Canal	 Compression of the ulnar nerve at Guyon's canal causes pain or other symptoms Tinel sign (abnormal in some cases) Muscle weakness (adduction/abduction) Atrophy of the interossei and hypothenar eminence (severe cases) Sensation (abnormal in some cases) Froment sign (abnormal in some cases)
Scapholunate Instability	 Swelling over the radial wrist Tenderness over the scapholunate ligament Popping and pain with Scaphoid test
Ganglion Mass	 Soft or hard palpable mass Commonly located at the flexion wrist crease or dorsal wrist

^{*}Source: Brotzman and Wilk.

Incidence— Carpal tunnel syndrome (CTS, median nerve compression) affects about 1% of the population. The condition is more common in middle and advanced age individuals and among women. Workers involved in occupations or athletes requiring excessive flexion or use of the wrist may also be prone to CTS. Next to median nerve entrapment, ulnar nerve entrapment is the second most common type of nerve compression in the upper extremity.

Western Treatment— The Western biomedical approach commonly begins with having the patient wear a splint and avoid activities that increase pain in the affected area. For mild cases of carpal tunnel syndrome, the patient may benefit from wearing a splint at nighttime to prevent wrist flexion and further injury. The pressure of the splint may also help reduce swelling. Non-steroidal anti-inflammatory drugs (NSAIDs) are often administered as a first approach for wrist pain. Further pharmacologic treatment may include corticosteroid injections, such as prednisolone.

Some forms of **non-pharmacological** Western treatment for wrist pain include the following:

- Surgical decompression
- Physical therapy
- Massage therapy
- Ultrasound
- Acupuncture

TCM Treatment of Wrist Pain

While more documented studies and randomized clinical trials are needed, several recent studies and clinical trials point to acupuncture as an effective treatment of wrist pain/carpal tunnel pain. Iranian researchers published an abstract in the January 2012 issue of the *Journal of Research in Medical Sciences* stating: "Our findings indicated acupuncture can improve overall subjective symptoms of carpal tunnel syndrome." A 2009 Taiwan study showed acupuncture provided relief comparable to oral steroids for mild to moderate carpal tunnel. In another study conducted in 2006, researchers concluded that acupuncture exerts a therapeutic effect by a "coordinated limbic network including the hypothalamus and amygdale."

TCM Mechanism —

From the TCM perspective, wrist pain, or more commonly carpal tunnel syndrome, is attributed to several patterns with some form of painful obstructive syndrome the prevailing factor in many cases. Painful obstructive syndrome, or *bi* syndrome, is due to wind, cold, dampness or heat, which subsequently obstruct blood and qi flow. Wrist pain may also be caused by direct trauma or chronic injury resulting in qi stagnation and blood stasis. Basic patterns for wrist pain may include:

- Qi and blood stasis due to direct trauma (die da) or chronic overuse.
- Damp-heat bi: This pattern is easy to identify because there will be swelling and redness.
- Cold (wind-cold-damp) bi: This may be a major factor for some patients--especially those who work outdoors, in cold offices, or chilly warehouses/freezers.
- Wind (wind-damp) *bi*: This pattern involves pain that seems to move. For example, one day the inside (palmar side) of the wrist hurts. Then, the next day, the top (dorsal side) of the wrist hurts.

Bi syndrome can further be divided into acute episodes and chronic episodes. In the case of chronic injury or *bi* syndrome, the persistent

obstruction of qi and blood may also lead to atrophy, or muscle wasting. Atrophy may occur in the tissues of the thenar eminence. As a result, the patient may have limited strength in both the thumb and wrist of the affected hand. In the case of carpal tunnel, however, soft tissue swelling is more common than muscle atrophy.

TCM Diagnosis —

Differentiation is the key to successful treatment with wrist pain or carpal tunnel. Carpal tunnel can be difficult to treat—especially in chronic cases. The practitioner should do a thorough intake of the patient's medical history and physical examination as described earlier in this course. Any exercises or movements that alleviate or exacerbate the pain should be noted for reference during the course of treatment. If the TCM practitioner has access to any Western diagnostic results, he or she should include this information in the patient's file (Some patient's may want to file insurance claims for carpal tunnel or joint pain complaints, so be certain to maintain thorough records.)

The following chart may be used to differentiate basic wrist pain patterns:

Wrist Pain Patterns

Qi and Blood Stasis (Trauma)

Significant pain, limited range of motion, atrophy (chronic injury cases), may or may not have swelling and/or redness

T: Thin white coating, purplish body, purple spots

P: Wiry or choppy (may be fast if there is swelling and redness)

Damp-heat bi

Skin may feel damp and hot/warm, swelling, redness, aching pain

T: May have a greasy or thick yellow coat, red body

P: Slippery, fast

Cold (Wind-cold) bi

Severe pain, skin may feel cold, limited range of motion or movement, patient may complain that they feel "cold in the bone"

T: Thick white coating, normal body color or moist, white coating

P: Tight or slow, slippery

Wind-damp bi

Pain and soreness changes location

T: Thin, white coat and normal body color

P: Floating, slightly slow

TCM Treatment—

TCM treatment for wrist pain may include:

- Acupuncture
- Tuina (massage)
- Electro-acupuncture
- Herbs

Acupuncture:

The following are some potential patterns you may see in patients. While sometimes we tend to associate swelling with inflammation (heat), note that with CTS cases cold and/or dampness are major causes of the pain and swelling. Treat according to whether the condition is **acute** or **chronic**.

1. Qi and Blood Stasis – Move qi and blood

- GB 34 Unblocks channel, promotes smooth qi flow, benefits tendons
- SP 10 Moves qi, invigorates blood
- LI 10 Unblocks channel, major point for treating musculoskeletal issue in the forearm or hand

+ Local Points

- SI 4 Unblocks channel, treats wrist pain and limited range of motion in the fingers
- HT 5 Relieves pain in the wrist and elbow
- SJ 4 Relaxes tendons, unblocks the channels, relieves carpal tunnel pain
- LU 8 Relieves pain in the wrists
- LI 3 Swelling of fingers and dorsum of the hands
- LI 4 Unblocks the channel, releases exterior relieves pain (major pain point)
- LI 5 Relieves painful obstruction in the wrist

 Baxie (fingers) – Relieves pain and swelling in the hand, clears heat

- **2. Cold (wind-cold-damp)** *bi* **–** Warm channels, expel cold, eliminate wind. **Note**: Use moxabustion with acupuncture to treat this pattern.
 - ST 36 Expels wind and damp, relieves pain, raises yang
 - LI 10 Unblocks channel, major point for treating musculoskeletal issues in the forearm or hand

+ Local Points

- SI 3 Eliminates both wind-cold and wind-heat
- HT 5 Relieves pain in the wrist and elbow
- SJ 4 Relaxes tendons, unblocks the channels, relieves carpal tunnel pain
- LU 8 Relieves pain in the wrists
- LI 3 Swelling of fingers and dorsum of the hands
- LI 4 Unblocks the channel, releases exterior relieves pain (major pain point)
- LI 5 Relieves painful obstruction in the wrist
- Baxie (fingers) Relieves pain and swelling in the hand
- **3. Wind (wind-damp)** *bi* Dispel dampness, unblock channels, relieve pain, eliminate wind
 - ST 36 Expels wind and damp, relieves pain, raises yang
 - Du 14 -- Releases exterior, expels wind
 - LI 10 Unblocks channel, major point for treating musculoskeletal issues in the forearm or hand

+ Local Points

- SI 3 Eliminates both wind-cold and wind-heat
- HT 5 Relieves pain in the wrist and elbow
- SJ 4 Relaxes tendons, unblocks the channels, relieves carpal tunnel pain

- LU 7 Releases exterior, treats problems in the wrist joint
- LU 8 Relieves wrist pain
- LI 4 Unblocks the channel, releases exterior relieves pain (major pain point)
- LI 5 Relieves painful obstruction in the wrist
 Baxie (fingers) Relieves pain and swelling in the hand

4. Damp-heat bi – eliminate dampness, clear heat, unblock channels

- LI 10 Unblocks channel, major point for treating musculoskeletal issues in the forearm or hand
- GB 34 Unblocks channel, promotes smooth qi flow, benefits tendons, resolves damp-heat

+ Local Points

- SI 4 Unblocks channels, clears damp-heat
- SJ 4 Relaxes tendons, unblocks the channels, relieves carpal tunnel pain
- LI 3 Relieves pain and swelling in fingers and dorsal surface of the hand
- LI 4 Unblocks the channel, releases exterior relieves pain (major pain point), clears heat
- LI 5 Relieves painful obstruction in the wrist
- Baxie (fingers) Relieves pain and swelling in the hand, clears heat

Herbs:

Many patents are available in tincture, powder, and pill form for various types of pain. Topical remedies applied with Tuina are also effective. Some TCM formulas the author of this course suggests include the following:

- **Juan Bi Tang** Eliminates wind-damp, relieves pain (Note: This formula is good for early stage bi syndrome and when the pain is worse with cold, better with warmth)
- **Xuan Bi Tang** Clears damp-heat, unblocks the channels, relieves pain. This formula may be used in cases where there is redness and swelling prominent.
- Shen Tong Zhu Yu Tang (Mo Yao Jian) Moves blood and qi especially in extremities and muscles. Shen Tong Zhu Yu Tang is marketed under many product names. It is a popular formula for moving qi and blood stasis anywhere in the body.
- Wu Tou Tang Expels wind, warms the channels, relieves pain. This formula may be used for chronic cold painful obstruction.
- Die Da Wan Strongly moves blood, reduces swelling, and relieves pain. This formula is usually administered following a traumatic injury, fracture, or sprain. It is mentioned here as an option for wrist pain due to direct trauma, such as in the case of a fall or fracture.

Analysis of Wu Tou Tang (Aconite Decoction):

Carpal tunnel or chronic wrist pain can be a challenge to treat. For chronic, severe cases of wrist or hand pain due to wind, dampness and cold, Wu Tou Tang is one formula to consider. This formula works well in cases of long-term wind-damp-cold retention. Wu Tou Tang's actions include:

Disperses cold and wind

- Warms channels
- · Nourishes qi and blood
- Tonifies yang
- · Relieves pain

Wu Tou Tang has a very warming effect; it releases the exterior, and dispels wind, dampness and cold blocking the channels and causing pain. With this formula, the presentation for the tongue and pulse may be as follows:

- Tongue may be moist with a white coat
- Pulse may be slow and slippery

NOTE: Chuan Wu (*Radix Aconitum Preparata*) is considered toxic. The prepared form of Chuan Wu (Zhi Chuan Wu) should be used. Decoct Chuan Wu for 1 hour with honey prior to adding the other herbs. *Wu Tou Tang should NOT be used during pregnancy.*

The following is a breakdown of the herb amounts and the functions of the herbs in Wu Tou Tang:

- Zhi Chuan Wu, Radix Aconitum Preparata, 6 15 g.
 - Zhi Chuan wu is the chief herb. Zhi Chuan Wu dispels dampness, disperses cold, warms and invigorates the channels. It works with Bai Shao and Ma Huang to reduce joint pain and restriction (bi syndrome) caused by windcold. Note: Use only the prepared form of Chuan Wu, as this herb is considered toxic.
- Huang Qi, Radix Astragalus, 6 12 g.
 - Strengthens the spleen, tonifies qi, tonifies blood, fortifies wei qi, stabilizes the exterior
- Ma Huang, Herba Ephedra, 6 9 g.
 - Releases the exterior, promotes sweating and urination, disperses cold.
- Bai Shao Yao, Radix Paeoniae Alba, 6 9 g.
 - Relieves pain, tonifies and moves blood. Works with Gan Cao to relieve muscle spasms.
- Gan Cao, Radix Glycyrrhiza, 3 6 g.
 - Tonifies spleen, tonifies qi, relieves pain, harmonizes and balances the actions of the other herbs in the formula.

Wrist Pain Protocols

Qi and Blood Stasis (Trauma)

Treatment principle: Move qi and blood, relieve pain **Point Prescription:** LI 4, GB 34, Baxie, HT 5, SP 10

Tongue: Purple Pulse: Wiry

Formula/Herbs: Shen Tong Zhu Yu Tang

Damp-heat bi

Treatment principle: Move qi and blood, relieve pain **Point Prescription:** SJ 4, SJ 5, SI 4, LI 4, LI 10, Baxie **Tongue:** May have a greasy or thick yellow coat, red body

Pulse: Fast, slippery

Formula/Herbs: Xuan Bi Tang

Cold (Wind-damp-cold) bi

Treatment principle: Warm channels, expel cold (possibly eliminate

wind)

Point Prescription: SI 3, SJ 4, LI 5, ST 36 (with moxa), Baxie

Tongue: Thick white coating, normal body color or moist, white coating

Pulse: Tight or slow, slippery

Formula/Herbs: Juan Bi Tang (early stage obstruction), Wu Tou Tang

(severe pain, late stage obstruction)

Wind-damp bi

Treatment principle: Move qi and blood, relieve pain

Point Prescription: SI 3, SJ 4, SJ 5, SI 5, LI 4, Du 14, Baxie

Tongue: Thin, white coat and normal body color

Pulse: Floating, slightly slow Formula/Herbs: Juan Bi Tang

Case Study

A 32 year old male patient came to the acupuncture clinic for elbow and wrist pain. He had been having low level wrist pain for 6 weeks following a skiing trip. Prior to seeking acupuncture, he had tried ultrasound. The pain radiated from the inner elbow, down the radial forearm to the thumb and first few fingers. Pain was more noticeable with use of the hand and ranged from dull to sharp. The pain was usually worse with the cold. The patient found that heat and rest significantly helped. Besides elbow/wrist pain, the patient had a history of a broken leg from rock climbing. His tongue had a white coating. His pulse was slippery.

Acupuncture points used included:

- LI 10
- LU 5
- LI 5
- LU 9
- SI 3

The patient was given a tincture of Juan Bi Tang.

SELF-REVIEW PRE-QUIZ

1. Which point combination is BEST for treating wrist pain due to wind bi?

- a. SJ 5 + BL 60
- b. SI 3 + Baxie
- c. Du 14 + Lu 7
- d. Baxie + LI 3
- 2. Which of the following diagnostic tests involves TAPPING the area of a nerve?
- a. Tinel's sign
- b. Phalen's manuever
- c. Electromyography
- d. Froment's sign
- 3. Which herbal formula treats damp-heat wrist pain?
- a. Xiao Yao San
- b. Xue Fu Zhu Yu Tang
- c. None of the above
- d. Xuan Bi Tang

Read the following case for questions 4 and 5.

Case Study: A 51 year old female patient has had wrist pain for the past 10 years. She works as an administrative assistant. The pain is in her right

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hand and includes the thumb, index, and middle finger. The pain is worse during the damp-cold season and is typically worse at night. She wears a wrist compress, which seems to help. Her tongue has a white coating. Her pulse is slow and slippery.

- 4. What is the TCM diagnosis for the above case?
- a. Blood and qi stagnation
- b. Wind-damp bi
- c. Damp-cold bi
- d. Heat bi
- 5. Which points are the BEST to use for this case?
- a. LV 3, GB 34, Baxie, BL 60
- b. Baxie, DU 14, SP 9, Sp 6, SJ 5
- c. SP 10, LV 3, LI 4, Baxie
- d. ST 36 + moxa, LI 5, Baxie, SJ 4

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ANSWERS TO SELF-REVIEW PRE-QUIZ

Key

- 1. b
- 2. a
- 3. d
- 4. c
- 5. d

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Additional Resources for Carpal Tunnel Syndrome

American Massage Therapy Association 820 Davis Street Evanston, IL 60201 www.amtamassage.org

National Institute of Arthritis and Musculoskeletal and Skin Disease National Institutes of Health 1 AMS Circle Bethesda, MD 20892-3675 www.niams.nih.gov

National Center for Complementary and Alternative Medicine www.nccam.nih.gov

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