

BICIPITAL TENDONITIS SYNDROME

The *biceps brachii* muscle is formed from **two heads** placed along the anterior aspect of the humerus. The **short head** originates as a thick flattened tendon from the apex of the coracoid process that it shares with the *coracobrachialis muscle*. The **long head** originates as a tendon from the supraglenoid tuberosity on the superior margin of the glenoid cavity. This origin occurs within the shoulder capsule and the initial segment of the tendon is enclosed in a synovial sheath. The tendon continues distally, arching over the head of the humerus and running down the **intertubercular groove** (sulcus) under the transverse humeral ligament and a fibrous prolongation from the pectoralis major tendon. It emerges from the shoulder capsule close to the humeral attachment of the capsular ligament, eventually attaching to its muscle belly. Each biceps head maintains a separate identity until they are within approximately 7.5 cm of the elbow joint. At this point, they become confluent and continue to end in a flattened tendon that inserts on the posterior portion of the radial tuberosity. A broad aponeurosis arises from the tendon medially to pass obliquely across the brachial artery, to become continuous with the deep fascia covering the origins of the flexor muscles originating on the forearm.

Historically **bicipital tendonitis** has been defined as an **inflammation** of the **tendon** of the **long head** of the biceps brachii. It occurs most commonly to women in their early forties, but may occur to either gender at any adult age. An acute episode is generally brought on by strenuous activity (skiing, tennis, shoveling) following on the heels of long term wear and tear, degenerative changes in the tendon or the intertubercular groove (roughening of the channel). Recent authorities have suggested that **bicipital tendonitis** is misnamed and is, in fact, a **bicipital tenosynovitis**. They suggest that the inflammation occurs to the tendon sheath within the bicipital groove and not to the tendon itself, and offer as proof the frequent adhesions that form in the tendon's sheath.

Regardless of which structures are involved, **bicipital tendonitis** initially demonstrates itself through pain when the arm is internally or externally rotated and placed either behind the back or above the head. Usually the pain first occurs over the anterior medial region of the shoulder and then **radiates** to the belly of the biceps muscle and distal

to the **flexor surface of the forearm**. Some subjects may complain of additional pain radiating into the deltoid insertion, into the **inferior angle of the scapula**, or to the **base of the neck**. Digital probing of the intertubercular groove will elicit **exquisite pain** as will rolling the tendon between the fingers. The pain is aggravated by active supination of the forearm against resistance and active contraction or passive stretching of the biceps muscle.

The pain produced by **bicipital tendonitis** may limit the subject's ability to use the shoulder. Functional activities may be curtailed insofar as the patient may be unable to put on a shirt or lift anything that requires two hands. Even driving a car or brushing the teeth may be difficult.

It should be noted that in spite of some orthopedic opinions to the contrary, **differential skin resistance (DSR) survey** has demonstrated that inflammation may also occur to the short head's tendon. If it does, it usually occurs along with inflammation of the long head tendon (though exceptions have been found). Generally, the inflamed zone will extend distally two or three inches from the glenohumeral joint, and medially two inches from the lateral margin of the intertubercular groove along the path of the pectoralis major tendon (not pictured).

Treatment

Treatment consists of relieving any **inflammation** and eliminating any **adhesions** that may be present.

Application:

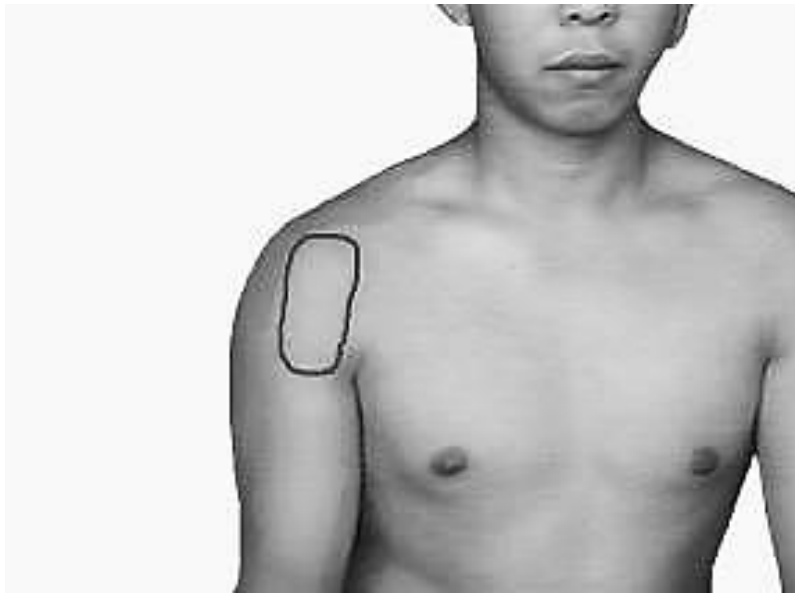
- Place a negative electrode over the inflamed zone and a positive electrode over the lower trapezius muscle, on the same side. Preset an electrical stimulator to deliver a wide-pulsed galvanic current, at six cycles per second (Hz), and then stimulate for a ten-minute period. After turning the machine on, gradually raise the amplitude to produce visible **"bouncing"** contractions of the biceps.
- Next, preset the electrical stimulation unit to provide a **medium frequency waveform**,

with a duty cycle of ten-seconds on and ten-seconds off. Keep the electrodes where they are. Turn the stimulator on and gradually increase the amplitude until brisk ***maintained-contractions*** of the biceps is produced. Stimulate for ten-minutes (refer to **ELECTRICAL STIMULATION**).

- Manipulate the inflamed zone, and adjacent tissues to eliminate any ***adhesions*** that are present. Successful manipulation should provide immediate restoration of normal or near normal ranges of motion in the shoulder joint, without pain (refer to **SOFT TISSUE MANIPULATION**).
- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm². Ultrasound the inflamed zone, utilizing an

effective non-steroidal anti-inflammatory as a coupling agent, for six minutes (refer to **ULTRAHIGH FREQUENCY SOUND**, Precautions).

- Apply mechanical vibration, delivered at 60 to 120 Hz, to the tendon, for two minutes. It should be applied with the amplitude (strength) of the vibration relatively high but tolerably comfortable for the patient. This is performed to increase capillary circulation in the involved tissues.



The high skin resistance pattern commonly associated with Bicipital Tendonitis (of the lateral tendon)

The following treatment forms have also proven to be effective.

Variation:

- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm². Ultrasound the inflamed zone, utilizing an

effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This procedure is designed to soften the adhesions that may be are present.

- Manipulate the tissues in and around the inflamed zone to eliminate any adhesions that may be present.

- Twenty minutes after the first ultrasound, preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.5 W/cm². Ultrasound the inflamed zone utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This is performed to “cool off” the manipulated zone by effectively halting the production of prostaglandins by the stressed tissues.
- Apply mechanical vibration, delivered at 60 to 120 Hz, to the origin, insertion, or tendon of the muscle(s) associated with the inflamed zone, for two minutes. Apply the vibration at a relatively high but tolerably comfortable level for the patient. This is performed to increase capillary circulation in the involved tissues.

Variation:

- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm². Ultrasound the inflamed zone, utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This procedure is designed to soften the adhesions that may be present.
- Manipulate the tissues in and around the inflamed zone to eliminate any adhesions that may be present.
- Apply cold laser (with or without simultaneous electrical stimulation provided by the laser applicator) to the inflamed zone for approximately 6 minutes. This is performed to “cool off” the manipulated zone by effectively halting the production of prostaglandins (or facilitating enzyme destruction of **all** of the inflammatories being produced) by the stressed tissues.

- Apply mechanical vibration, delivered at 60 to 120 Hz, to the tendon, for two minutes. Apply it at a relatively high amplitude (strength) but tolerably comfortable for the patient. This is performed to increase capillary circulation in the involved tissues

If bicipital tendonitis is the only component, the patient should, in most cases, be completely relieved of the **bicipital tendonitis syndrome** in one or two treatment sessions.

Trigger Points

The following **trigger point formations** may, singly or in combination, **refer pain** into the areas usually affected by **bicipital tendonitis**: Levator scapulae, Scalenus, Scalenus (minimus), Infraspinatus, Infraspinatus (abnormal), Medial teres major, Lateral teres major, Coracobrachialis, Lower trapezius [A], Cervical multifidus (C4-C5), Supraspinatus (muscle), Supraspinatus (tendon), Subclavius, Posterior deltoid, Anterior deltoid, Pectoralis major, Pectoralis major (sternal portion), Pectoralis minor, Sternalis, Rhomboids, Biceps brachii, Brachialis, Palmaris longus, Flexor carpi radialis, Brachioradialis, Pronator teres, Multifidus (T4-T5), and Iliocostalis thoracis (T6).