

# FLEXTEND

## Advanced Research In Rehabilitation Technology

### WHAT ARE THE SYMPTOMS ASSOCIATED WITH CARPAL TUNNEL SYNDROME AND REPETITIVE STRESS INJURIES?

Carpal tunnel syndrome and repetitive stress injuries are caused by repetitive overuse of the wrist and finger flexors, although their symptoms are different.

Symptoms of carpal tunnel syndrome include a combination of pain, numbness and tingling in the wrist and fingers, and hand strength can be severely affected.

The symptoms of repetitive stress injuries consist of a stabbing pain on the front of the wrist and forearm, but without the tingling sensations associated with carpal tunnel syndrome. An overall stiffness, general ache or sharp pain on the back of the hand, forearm or elbow can indicate weak extensor muscles, and possibly the onset of a repetitive stress injury. The symptoms of these debilitating injuries often increase at night.

### WHAT CAUSES THESE PAINFUL AND DISABLING SYMPTOMS?

In most cases, carpal tunnel syndrome and repetitive stress injuries result from a strength imbalance between the flexor muscles which "close" the hand, and the extensor muscles that "open" the hand.

This strength imbalance is quite inevitable since most work and recreational activities require constant flexion of the fingers and wrist against resist-



ance. (Typing, writing, gripping, etc.) Performing these types of continuous and repetitive hand movements can cause the flexor muscles to become stronger than the opposing extensor muscles of the hand. (There are not many activities that require direct pressure to the back side of the hand. Example: Pushing a door open with the back of the hand instead of the palm side of the hand.)

The stronger finger and wrist flexor muscles can compress the front of the wrist and decrease the space within the carpal tunnel. Over time, this excessive pressure will cause irritation, inflammation and damage to the flexor tendons and carpal tunnel, due to the increased friction while performing repetitive hand motions. Eventually, this increased friction will force the body to repair the damaged muscles and tendons with an inelastic substance known as "scar-tissue". An accumulation of scar tissue can cause the wrist and finger flexors to become shorter and tighter than normal, creating additional compressive stresses within and around the carpal tunnel. Ignoring this imbalance will often result in the impingement of the median nerve by these compressive muscles and tendons, thus causing further damage to

the nerves, blood vessels and surrounding soft tissues. Muscle imbalance can inflict just as much pain and inflammation to the finger, wrist and elbow extensors, due to the constant strain of these weak muscles to maintain the wrist in the "functionally correct" neutral position.



## WHAT CAN BE DONE TO CORRECT THIS MUSCLE IMBALANCE ?

### 1-STRETCH THE FLEXOR MUSCLES:

Use FLEXTEND to stretch and lengthen the compressive flexor muscles, fascia and scar-tissue within and around the carpal tunnel. Stretching these restrictive tissues can help alleviate excessive compression around the carpal tunnel and reduce impingement of the nerves and blood vessels.



### 2-STRENGTHEN THE EXTENSOR MUSCLES:

Use FLEXTEND to strengthen the extensor muscles in order to help balance the strength ratio between the flexors and extensors, thus increasing the flexibility, strength and stability of the entire joint.

Strong extensors are necessary to maintain correct balance of the wrist and fingers, and to stabilize the hand and wrist in the correct neutral position while performing everyday activities. Strong wrist extensors are also necessary for precision movements that utilize wrist and finger flexion, because the extensor muscles prepare the flexor muscles for action so that they can act powerfully. The increase in strength to the weak and strained extensor muscles can help reduce compression of the carpal tunnel, prevent additional injury and scarring, and return the joint to its normal functioning position.

### 3-REDUCE REPETITIVE FLEXION:

Most of the exercise devices presently available for the hand, focus on strengthening the finger and

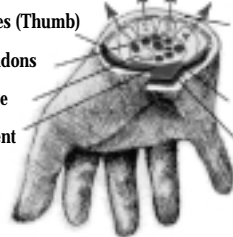
wrist flexors that are already overused on a daily basis. Since most activities involve these muscles to such a large degree, they should already have sufficient strength.

The use of “gripping” devices for the hand can actually increase the painful symptoms associated with repetitive stress injuries by creating additional compressive stress to the wrist and finger flexors, possibly causing more damage to the carpal tunnel.

#### ABNORMAL CARPAL TUNNEL

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1. Weak extensor muscles cannot hold carpal bones 1-4 in place, compressing the carpal tunnel from above.
  2. Flexor tendons inside the carpal tunnel impinge median nerve from above.
  3. Flexor muscles outside the carpal tunnel overlap, compressing the carpal ligament. These overlapping muscles also pull bones 1-4 inward and down as well as compress the carpal tunnel from beneath.

#### NORMAL CARPAL TUNNEL

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- Thenar Muscles (Thumb)
  - Flexor Tendons
  - Median Nerve
  - Carpal Ligament
  - Strong Extensor Muscles Hold Carpal Bones 1-4 Up and Away From Carpal Tunnel.
  - Hypothenar Muscles (Pinky)
  - Fascia from Palmaris Longus Muscle

## FLEXTEND: SUPERIOR PERFORMANCE

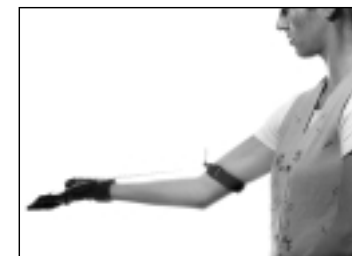
FLEXTEND’s patented technology allows exercises to be performed through a full range of motion without any gripping involved. FLEXTEND provides multiple levels of resistance for finger, wrist and elbow extension, whether the hand is in a pronated, supinated or neutral position. FLEXTEND also performs exercises utilizing radial and ulnar deviation of the wrist, pronation and supination of the wrist and forearm, and abduction (spreading) of the fingers. These incredible features allow greater treatment mobility, especially if the injury being addressed can only be moved through one pain-free motion.

FLEXTEND is intended to assist in the prevention and rehabilitation of injuries associated with direct trauma or overuse of the fingers, wrist and elbow.

www.flextend.com

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**A HIGH QUALITY THERAPETIC PRODUCT DESIGNED TO ASSIST IN THE PREVENTION AND REHABILITATION OF CARPAL TUNNEL SYNDROME AND REPETITIVE STRESS INJURIES OF THE FINGERS, HAND, WRIST AND ELBOW.**



**FLEXTEND**