

# Tennis Elbow (Lateral Epicondylitis)

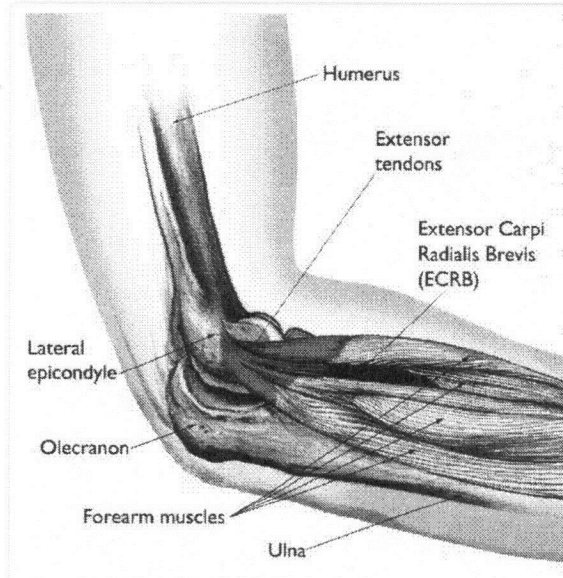
Tennis elbow, or *lateral epicondylitis*, is a painful condition of the elbow caused by overuse. Not surprisingly, playing tennis or other racquet sports can cause this condition. However, several other sports and activities can also put you at risk.

Tennis elbow is an inflammation of the tendons that join the forearm muscles on the outside of the elbow. The forearm muscles and tendons become damaged from overuse – repeating the same motions again and again. This leads to pain and tenderness on the outside of the elbow.

There are many treatment options for tennis elbow. In most cases, treatment involves a team approach. Primary doctors, physical therapists, and, in some cases, surgeons work together to provide the most effective care.

## Anatomy

Your elbow joint is a joint made up of three bones: your upper arm bone (humerus) and the two bones in your forearm (radius and ulna). There are bony bumps at the bottom of the humerus called epicondyles. The bony bump on the outside (lateral side) of the elbow is called the lateral epicondyle.



The ECRB muscle and tendon is usually involved in tennis elbow.

*Reproduced and modified from The Body Almanac. © American Academy of Orthopaedic Surgeons, 2003.*

Muscles, ligaments, and tendons hold the elbow joint together.

Lateral epicondylitis, or tennis elbow, involves the muscles and tendons of your forearm. Your forearm muscles extend your wrist and fingers. Your forearm tendons – often called extensors – attach the muscles to bone. They attach on the lateral epicondyle. The tendon usually involved in tennis elbow is called the Extensor Carpi Radialis Brevis (ECRB).

## **Cause**

### ***Overuse***

Recent studies show that tennis elbow is often due to damage to a specific forearm muscle. The extensor carpi radialis brevis (ECRB) muscle helps stabilize the wrist when the elbow is straight. This occurs during a tennis groundstroke, for example. When the ECRB is weakened from overuse, microscopic tears form in the tendon where it attaches to the lateral epicondyle. This leads to inflammation and pain.

The ECRB may also be at increased risk for damage because of its position. As the elbow bends and straightens, the muscle rubs against bony bumps. This can cause gradual wear and tear of the muscle over time.

### ***Activities***

Athletes are not the only people who get tennis elbow. Many people with tennis elbow participate in work or recreational activities that require repetitive and vigorous use of the forearm muscle.

Painters, plumbers, and carpenters are particularly prone to developing tennis elbow. Studies have shown that auto workers, cooks, and even butchers get tennis elbow more often than the rest of the population. It is thought that the repetition and weight lifting required in these occupations leads to injury.

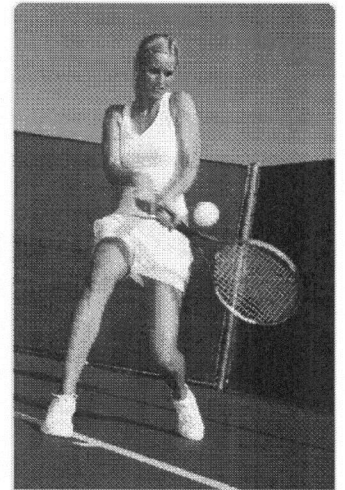
### ***Age***

Most people who get tennis elbow are between the ages of 30 and 50, although anyone can get tennis elbow if they have the risk factors. In racquet sports like tennis, improper stroke technique and improper equipment may be risk factors.

### ***Unknown***

Lateral epicondylitis can occur without any recognized repetitive injury. This occurrence is called "insidious" or of an unknown cause.

## **Symptoms**



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The symptoms of tennis elbow develop gradually. In most cases, the pain begins as mild and slowly worsens over weeks and months. There is usually no specific injury associated with the start of symptoms.

Common signs and symptoms of tennis elbow include:

- Pain or burning on the outer part of your elbow
- Weak grip strength

The symptoms are often worsened with forearm activity, such as holding a racquet, turning a wrench, or shaking hands. Your dominant arm is most often affected; however both arms can be affected.

## Doctor Examination

Your doctor will consider many factors in making a diagnosis. These include how your symptoms developed, any occupational risk factors, and recreational sports participation.

Your doctor will talk to you about what activities cause symptoms and where on your arm the symptoms occur. Be sure to tell your doctor if you have ever injured your elbow. If you have a history of rheumatoid arthritis or nerve disease, tell your doctor.

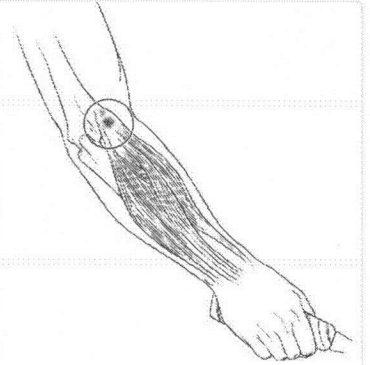
During the examination, your doctor will use a variety of tests to pinpoint the diagnosis. For example, your doctor may ask you to try to straighten your wrist and fingers against resistance with your arm fully straight to see if this causes pain. If the tests are positive, it tells your doctor that those muscles may not be healthy.

## Tests

Your doctor may recommend additional tests to rule out other causes of your problem.

- **X-rays.** These tests provide clear images of dense structures like bone. They may be taken to rule out arthritis of the elbow.
- **Magnetic resonance imaging (MRI) scan.** If your doctor thinks your symptoms are related to a neck problem, an MRI scan may be ordered. MRIs scans show details of soft tissues, and will help your doctor see if you have a possible herniated disk or arthritis in your neck. Both of these conditions often produce arm pain.
- **Electromyography (EMG).** Your doctor may order an EMG to rule out nerve compression. Many nerves travel around the elbow, and the symptoms of nerve compression are similar to those of tennis elbow.

## Treatment



Location of pain in lateral epicondylitis.

*Reproduced from Griffen L (ed): Essentials of Musculoskeletal Care, Third Edition. © American Academy of Orthopaedic Surgeons, 2005.*

## ***Nonsurgical Treatment***

Approximately 80% to 95% of patients have success with nonsurgical treatment.

**Rest.** The first step toward recovery is to give your arm proper rest. This means that you will have to stop participation in sports or heavy work activities for several weeks.

**Non-steroidal anti-inflammatory medicines.** Drugs like aspirin or ibuprofen reduce pain and swelling.

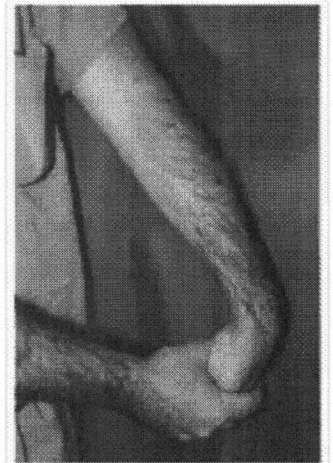
**Physical therapy.** Specific exercises are helpful for strengthening the muscles of the forearm. Your therapist may also perform ultrasound, ice massage, or muscle-stimulating techniques to improve muscle healing.

**Brace.** Using a brace centered over the back of your forearm may also help relieve symptoms of tennis elbow. This can reduce symptoms by resting the muscles and tendons.

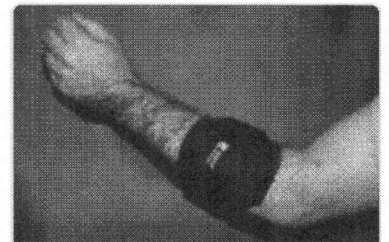
**Steroid injections.** Steroids, such as cortisone, are very effective anti-inflammatory medicines. Your doctor may decide to inject the painful area around your lateral epicondyle with a steroid to relieve your symptoms.

**Extracorporeal shock wave therapy.** Shock wave therapy sends sound waves to the elbow. These sound waves create "microtrauma" that promote the body's natural healing processes. Shock wave therapy is considered experimental by many doctors, but some sources show it can be effective.

**Equipment check.** If you participate in a racquet sport, your doctor may encourage you to have your equipment checked for proper fit. Stiffer racquets and looser-strung racquets often can reduce the stress on the forearm, which means that the forearm muscles do not have to work as hard. If you use an oversized racquet, changing to a smaller head may help prevent symptoms from recurring.



Wrist stretching exercise with elbow extended.



Counterforce brace.

## ***Surgical Treatment***

If your symptoms do not respond after 6 to 12 months of nonsurgical treatments, your doctor may recommend surgery.

Most surgical procedures for tennis elbow involve removing diseased muscle and reattaching healthy muscle back to bone.

The right surgical approach for you will depend on a range of factors. These include the scope of your injury, your general health, and your personal needs. Talk with your doctor about the options. Discuss the results your doctor has had, and any risks associated with each procedure.

**Open surgery.** The most common approach to tennis elbow repair is open surgery. This involves making an incision over the elbow.

Open surgery is usually performed as an outpatient surgery. It rarely requires an overnight stay at the hospital.

**Arthroscopic surgery.** Tennis elbow can also be repaired using miniature instruments and small incisions. Like open surgery, this is a same-day or outpatient procedure.

**Surgical risks.** As with any surgery, there are risks with tennis elbow surgery. The most common things to consider include:

- Infection
- Nerve and blood vessel damage
- Possible prolonged rehabilitation
- Loss of strength
- Loss of flexibility
- The need for further surgery

**Rehabilitation.** Following surgery, your arm may be immobilized temporarily with a splint. About 1 week later, the sutures and splint are removed.

After the splint is removed, exercises are started to stretch the elbow and restore flexibility. Light, gradual strengthening exercises are started about 2 months after surgery.

Your doctor will tell you when you can return to athletic activity. This is usually 4 to 6 months after surgery. Tennis elbow surgery is considered successful in 80% to 90% of patients. However, it is not uncommon to see a loss of strength.

## **New Developments**

Platelet-rich plasma (PRP) is currently being investigated for its effectiveness in speeding the healing of a variety of tendon injuries. PRP is a preparation developed from a patient's own blood. It contains a high concentration of proteins called growth factors that are very important in the healing of injuries.



An injection of PRP is used to treat tennis elbow.

*Courtesy of Allan K. Mishra, MD, Menlo Park, CA.*



Current research on PRP and lateral epicondylitis is very promising. A few treatment centers across the country are incorporating PRP injections into the nonsurgical treatment regimen for lateral epicondylitis. However, this method is still under investigation and more research is necessary to fully prove PRP's effectiveness.

### **Last Reviewed**

July 2015

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## **Therapeutic Exercise Program for Epicondylitis (Tennis Elbow / Golfer's Elbow)**

*To ensure that this exercise program is safe and effective for you, it should be performed under your doctor's supervision. Talk to your doctor or physical therapist about which exercises will best help you meet your rehabilitation goals.*

Both tennis elbow (lateral epicondylitis) and golfer's elbow (medial epicondylitis) are painful conditions caused by overuse. Over time, the forearm muscles and tendons become damaged from repeating the same motions again and again. This leads to pain and tenderness around the elbow.

### ***Purpose of Program***

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Specific exercises to stretch and strengthen the muscles attached to the injured tendon will help with the healing process. The early goal of a therapeutic exercise program is to promote muscle endurance and improve resistance to repetitive stress.

Following a well-structured conditioning program will help you return to daily activities, as well as sports and other recreational pastimes.

**Length of program:** This exercise program for epicondylitis should be continued for 6 to 12 weeks, unless otherwise specified by your doctor or physical therapist. After your recovery, your doctor or physical therapist can instruct you in how these exercises can be continued as a maintenance program for lifelong protection and health of your elbows.

**Do not ignore pain:** You should not feel pain during an exercise, however, some degree of discomfort is normal. Talk to your doctor or physical therapist if you have any pain while completing this program.

**Ask questions:** If you are not sure how to do an exercise, or how often to do it, contact your doctor or physical therapist.

### **Additional Notes from Your Clinician**

Introduction 1

## **Exercise Program for Epicondylitis STRETCHING EXERCISES**

### **Repetitions**



reps, 4x a  
day

## 1. Wrist Extension Stretch

Equipment

needed: None

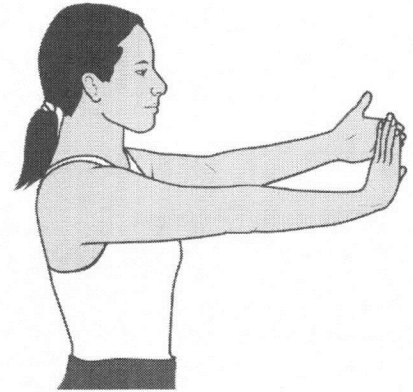
**Additional instructions:** This stretch should be done throughout the day, especially before activity. After recovery, this stretch should be included as part of a warm-up to activities that involve gripping, such as gardening, tennis, and golf.

Days per week

to 7

### Step-by-step directions

- Straighten your arm and bend your wrist back as if signaling someone to “stop.”
- Use your opposite hand to apply gentle pressure across the palm and pull it toward you until you feel a stretch on the inside of your forearm.
- Hold the stretch for 15 seconds.
- Repeat 5 times, then perform this stretch on the other arm.



**Tip** Do not lock your elbow.

## 2. Wrist Flexion Stretch

Repetitions

reps, 4x a  
day

Equipment needed: None

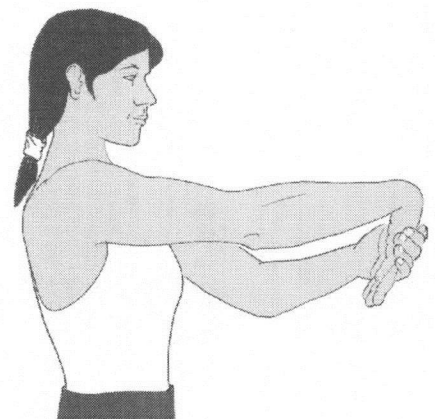
**Additional instructions:** This stretch should be done throughout the day, especially before activity. After recovery, this stretch should be included as part of a warm-up to activities that involve gripping, such as gardening, tennis, and golf.

Days per week

to 7

### Step-by-step directions

- Straighten your arm with your palm facing down and bend your wrist so that your fingers point down.
- Gently pull your hand toward your body until you feel a stretch on the outside of your forearm.
- Hold the stretch for 15 seconds.
- Repeat 5 times, then perform this stretch on the other arm.



**Tip** Do not lock your elbow.

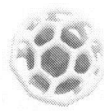
## 3. Wrist Extension (Strengthening)

Repetitions

30 reps,  
1x a day

Equipment needed: Dumbbell hand weights (1 lb., 2 lbs., 3 lbs.)





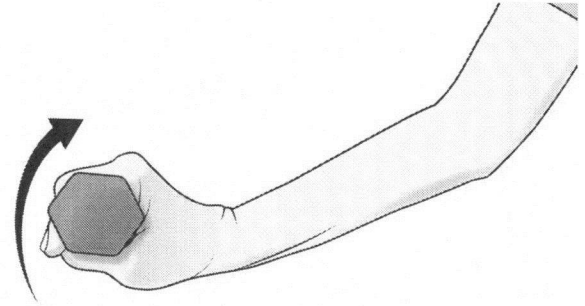
## Exercise Program for Epicondylitis **STRENGTHENING EXERCISES**

**Additional instructions:** This exercise should be performed in stages. Begin each stage with no weight. When you are able to complete 30 repetitions on 2 consecutive days with no increase in pain, move forward in the program by increasing weight (begin with 1lb., advance to 2 lbs., end with 3 lbs.).

**Days per week**

5 to 7

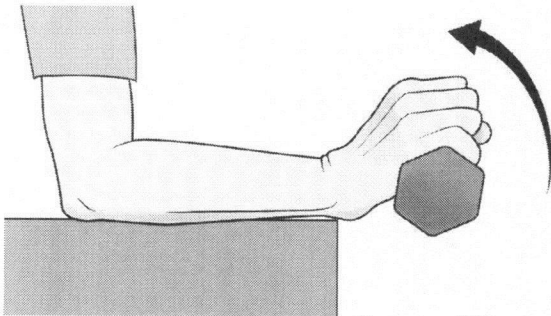
Stage 1 using 1lb. weight



**Stage 1:** Bend your elbow to 90 degrees and support your forearm on a table with your wrist placed at the edge.

**Stage 2:** Straighten your elbow slightly. Continue to support your arm on the table.

Stage 3 using 1lb. weight



**Stage 3:** Fully straighten your elbow and lift your arm so that it is no longer supported by the table.

### Step-by-step directions to be followed for each stage

- With palm down, bend your wrist up as far as possible.
- Hold up for 1 count, then slowly lower 3 counts.
- Begin without using a weight and increase the repetitions until you can complete 30.
- When you can perform 30 repetitions on 2 consecutive days without increasing pain, begin performing the exercise using a 1 lb. weight.
- Follow the same steps above to continue to increase repetitions and weight until you are using a 3 lb. weight and can perform 30 repetitions on 2 consecutive days without increasing pain.

**Tip** Do not let the weight pull your hand down too quickly.

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## Exercise Program for Epicondylitis **STRENGTHENING** **EXERCISES**

### 4. *Wrist Flexion (Strengthening)*

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<b>Repetitions</b>	<b>Equipment needed:</b> Dumbbell hand weights (1 lb., 2 lbs., 3 lbs.)
30 reps, 1x a day	<b>Additional instructions:</b> This exercise should be performed in stages. Begin each stage with no weight. When you are able to complete 30 repetitions on 2 consecutive days with no increase in pain, move forward in the program by increasing weight (begin with 1lb., advance to 2 lbs., end with 3 lbs.).
<b>Days per week</b>	
5 to 7	

**Stage 1:** Bend your elbow to 90 degrees and support your forearm on a table with your wrist placed at the edge.

**Stage 2:** Straighten your elbow slightly. Continue to support your arm on the table.

**Stage 3:** Fully straighten your elbow and lift your arm so that it is no longer supported by the table.

**Step-by-step directions to be followed for each stage**

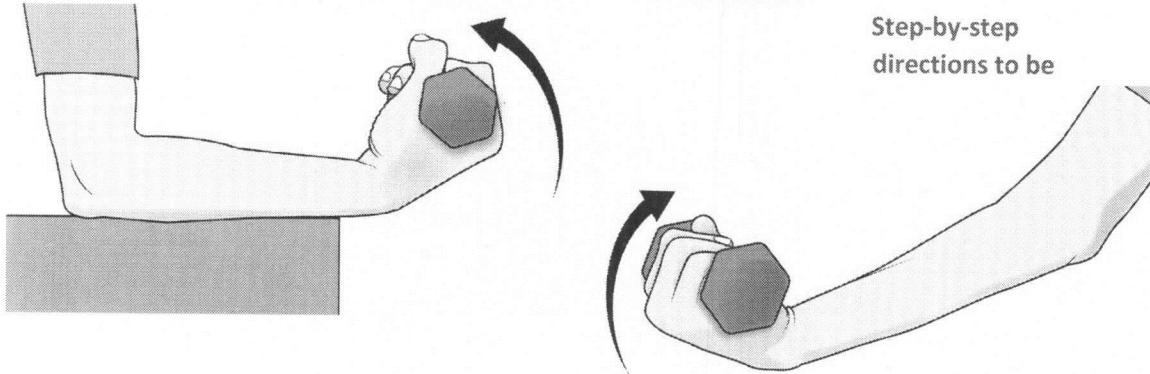
- With palm up, bend your wrist up as far as possible.
- Hold up for 1 count, then slowly lower 3 counts.
- Begin without using a weight and increase the repetitions until you can complete 30.
- When you can perform 30 repetitions on 2 consecutive days without increasing pain, begin performing the exercise using a 1 lb. weight.
- Follow the same steps above to continue to increase repetitions and weight until you are using a 3 lb. weight and can perform 30 repetitions on 2 consecutive days without increasing pain.

<b>Tip</b>	Do not let the weight pull your hand down too quickly.
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## Exercise Program for Epicondylitis

### STRENGTHENING EXERCISES



Step-by-step  
directions to be

Stage 1 using 1lb. weight

followed for each  
stage

#### 5. Forearm Supination & Pronation (Strengthening)

<b>Repetitions</b>	<b>Equipment needed:</b> Dumbbell hand weights (1 lb., 2 lbs., 3 lbs.)
30 reps, 1x a day	<b>Additional instructions:</b> This exercise should be performed in stages. Begin each stage when you are able to complete 30 repetitions on 2 consecutive days with no increase forward in the program by increasing weight (begin with 1lb., advance to 2 lbs., end
<b>Days per week</b>	Stage 3 using 1lb. weight with 3 lbs.).
5 to 7	<ul style="list-style-type: none"> <li>• Begin with palm facing the side. Slowly turn the palm facing up.</li> <li>• Slowly return to the start position, then slowly turn the palm down.</li> <li>• Slowly return to start position. This completes one repetition.</li> <li>• Begin without using a weight and increase the</li> </ul>

**Stage 1:** Bend your elbow to 90 degrees and support your forearm on a table with your wrist placed at the edge.

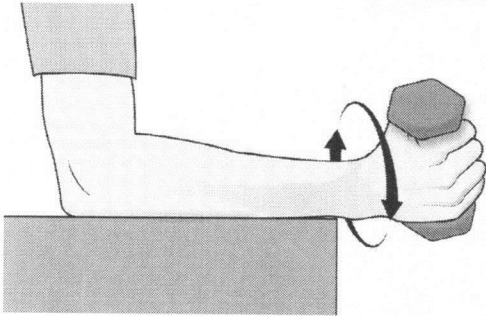
**Stage 2:** Straighten your elbow slightly. Continue to support your arm on the table.

**Stage 3:** Fully straighten your elbow and lift your arm so that it is no longer supported by the table.

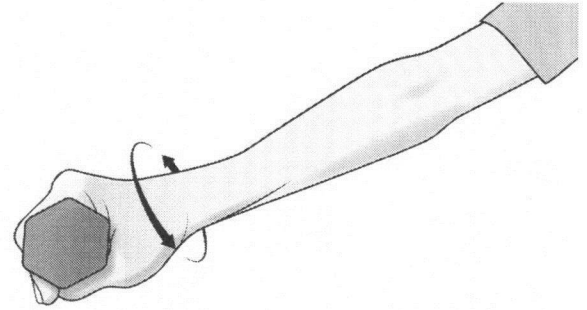
**Tip** When using a dumbbell, try to let the weight pull your forearm in either direction as far as possible.



## Exercise Program for Epicondylitis STRENGTHENING EXERCISES



Stage 1 using 1lb. weight



Stage 3 using 1lb. weight

repetitions until you can complete 30.

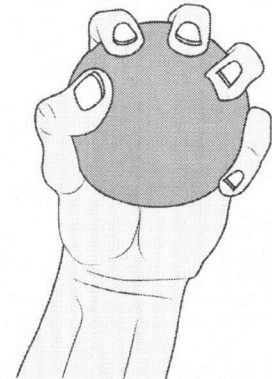
- When you can perform 30 repetitions on 2 consecutive days without increasing pain, begin performing the exercise using a 1 lb. weight.
- Follow the same steps above to continue to increase repetitions and weight until you are using a 3 lb. weight and can perform 30 repetitions on 2 consecutive days without increasing pain.

### 6. *Stress Ball Squeeze*

<b>Repetitions</b>
reps, 1x a day
<b>Days per week</b>
to 7

**Equipment needed:** Rubber stress ball

**Additional instructions:** This exercise should be performed after completing the above staged strengthening exercises. Your arm and elbow position for this exercise should match the stage you are completing.





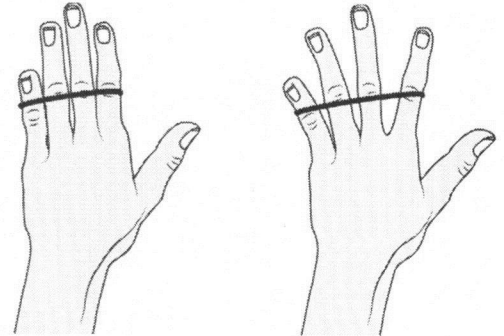
## Exercise Program for Epicondylitis STRENGTHENING EXERCISES

### 7. Finger Stretch

<b>Repetitions</b>
reps, 1x a day
<b>Days per week</b>
to 7

**Equipment needed:** Elastic band

**Additional instructions:** This exercise should be performed after completing the above staged strengthening exercises. Your arm and elbow position for this exercise should match the stage you are completing.



**Exercises Page**

5 Last reviewed: October 2018