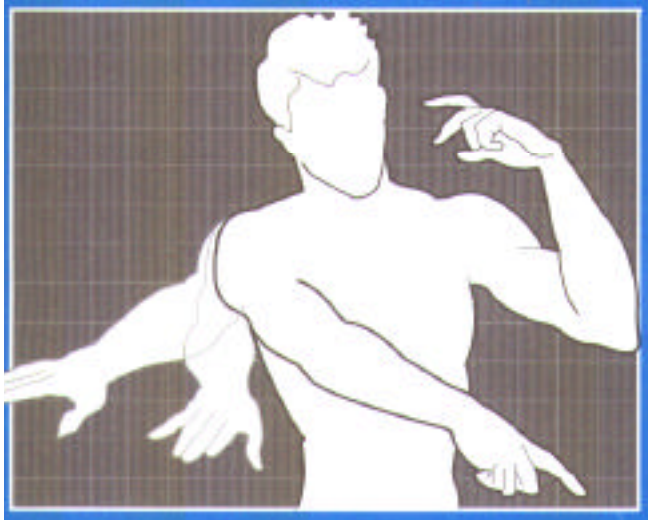
Taking Care of Your

HAND, WRIST, and ELBOW

A Physical Therapist's Perspective



American Physical Therapy Association

Taking Care of Your Hand, Wrist, and Elbow

A vast range of human activities—from playing the piano, to laying bricks, to opening a can of soda—would be impossible without the healthy functioning of the elbow, wrist, and hand. And yet this area is one of the most intricate—and one of the most vulnerable to injury—in the human body.

In this booklet you will learn about:
—the basic anatomy of the elbow, wrist, and hand;
—common ailments;
—ways to reduce risk and injury;
—exercises to do at home; and
—physical therapy treatments.

Sometimes all it takes is some simple preventive measures and exercises to keep your hand, wrist, and elbow in good shape.

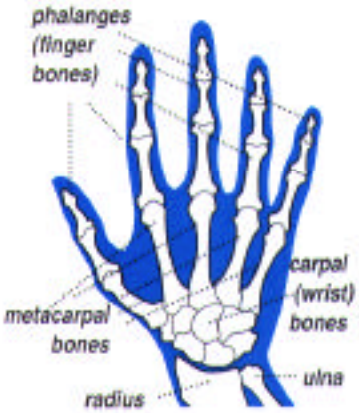
Anatomy of the Hand, Wrist, and Elbow

The elbow is a hinge joint connecting the upper arm bone **(humerus)** with the bones of the forearm **(the radius and the ulna).** It consists of three joints enclosed within a capsule and held together by muscles, tendons, and ligaments. **Tendons** are strong fibrous cords that attach muscles to bones. **Ligaments** are bandage-like sheaths of fibrous tissue that keep the joints and bones in alignment.

The wrist and hand are far more complex than the elbow. The eight wrist bones are known as **carpals,** and they support the **carpal tunnel,** a "tube" which

runs through the wrist. The carpal tunnel contains tendons and the **median nerve,** and it is covered by the **transverse carpal ligament** (a flat, bandage-like ligament).

The hand itself is more intricate. The **metacarpals** form the structure for the "body" of the hand, and the **phalanges** are the finger bones. There are three phalanges in each finger, except for the thumb, which has two.



Each finger is supplied with two types of tendons: an **extensor tendon** on top, which straightens the finger, and a **flexor tendon** on bottom, which bends it.

The interphalangeal (IP) joints are the joints between the different sections of the finger. **Metacarpal phalangeal (MP)** joints connect the fingers and the hand.

In all, there are 27 bones in the hand, including the wrist. In addition, the hand contains an intricate network of muscles, tendons, nerves, and blood vessels, all packed into a very tight space.

Traumatic Injuries vs. Repetitive Motion Injuries

Physical therapists deal with two main groups of hand, wrist, and elbow injuries—traumatic injuries and repetitive motion injuries.

Traumatic injuries—fractures, lacerations, amputations, etc.—always require immediate medical intervention. Repetitive motion injuries develop over time

and are often the result of computer work, assembly line tasks, or other tasks which require the repetitive use of the arms and hands. Physical therapists can treat repetitive motion injuries by developing long-range plans of treatment which address muscle and joint stress and weakness. Many physical therapists are also involved in preventing repetitive motion injuries by helping redesign workstations and tools.

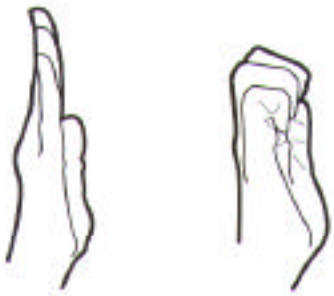
Repetitive Motion Ailments

One example of a repetitive motion injury is "**trigger finger,**" a form of tendinitis brought on by repeatedly grasping an object. This condition is an inflammation of the flexor tendon in any of the fingers (including the thumb). This swelling makes it difficult for the flexor tendon to glide easily through the tendon sheath which surrounds it. As a result, there may be a popping or clicking sensation when moving the finger. At times the finger locks in a curled position. If the finger locks, surgery will probably be required. If, however, the joint can be palpated (very gently examined) and mobilized (passively moved), the condition can often be treated with anti-inflammatory injections (administered by a physician), splinting, and other therapies.

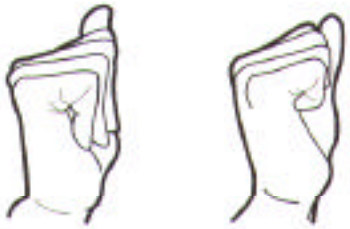
DeQuervain's Disease is a painful condition that

Simple exercises to maintain flexibility

These tendon-gliding exercises are often prescribed by physical therapists.



Make a straight palm...then a hooked fist...



...now make a "straight" fist...and a full fist

involves the tendon of the thumb and the **distal radius.** (The distal radius is the end of the forearm bone that lines up with your thumb.) As with trigger finger, the tendon swells and is unable to move freely within the sheath located at the wrist near the base of the thumb.

DeQuervain's falls into the repetitive motion category of problems, though it can also be brought on by traumatic injury or aging. Options for treating DeQuervain's are similar to those for trigger finger.

Traumatic Injuries

Physical therapists regularly see patients who have suffered traumatic injuries—such as in a car collision—in addition to less severe injuries such as sprains and fractures. In the more serious cases the physician and physical therapist will work together to plan a course of therapy for the patient after his or her condition has stabilized.

Common Elbow Ailments

Tennis elbow does not occur only in tennis players. In fact, whatever the activity involved, there's a potential for tennis elbow developing anytime you twist your elbow repeatedly so that the radius and the ulna (the lower arm bones) criss-cross each other.

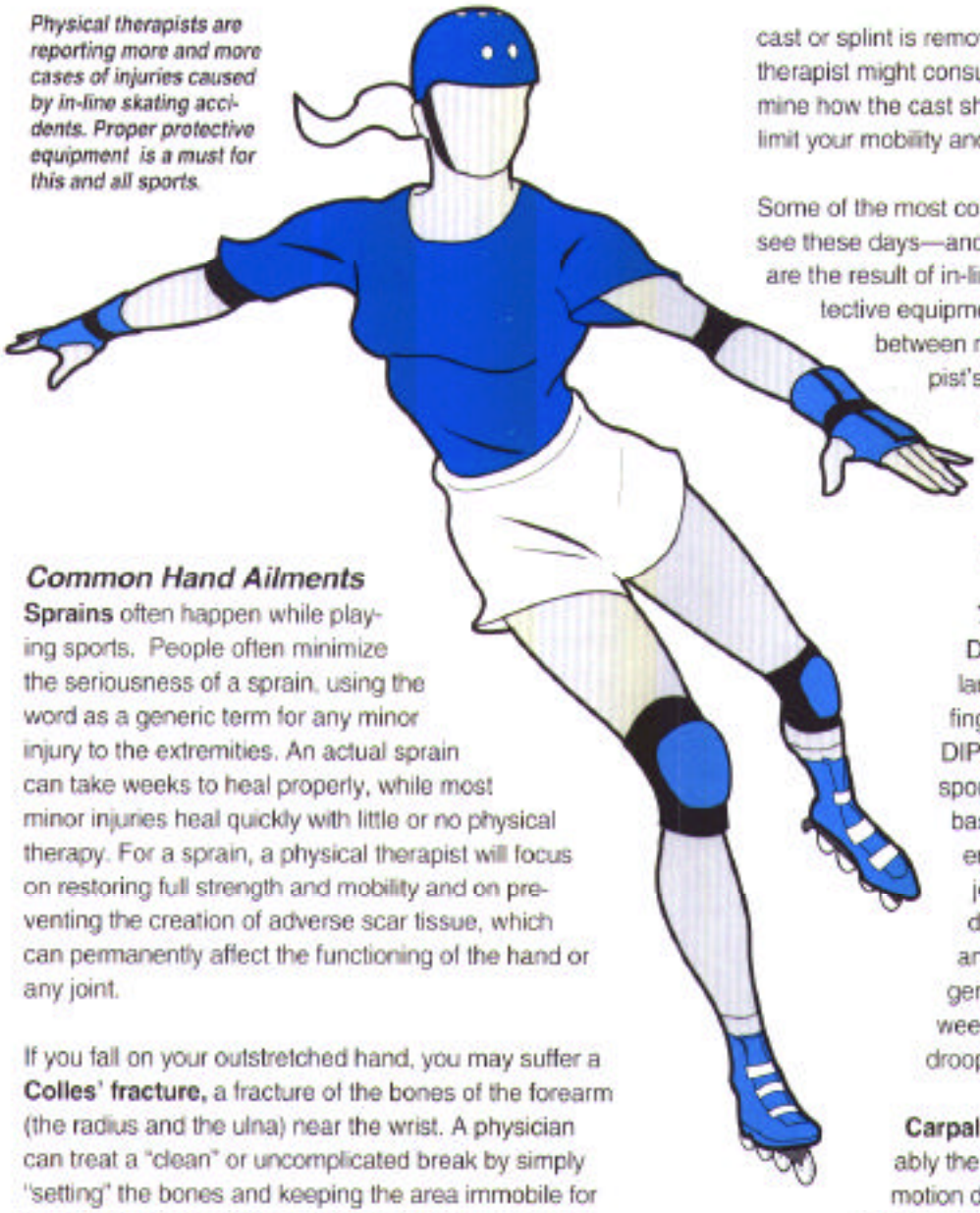
This repetitive motion puts strain on the cartilage, ligaments, and tendons surrounding the elbow joint and can lead to swelling, inflammation, or tissue damage. Inflammation of the tendons, or tendinitis, is a common problem in these conditions. Physical therapists can treat tennis elbow and tendinitis with a variety of modalities, including ice, and exercises.

A **sprain** occurs when a ligament is stretched beyond its normal limits. Sometimes the ligament tears. The most common hand sprain is the ulnar collateral ligament sprain, in which the ligaments at the base of the thumb (the MP joint) are torn or partially torn.

Wrist flexion exercises:

Top—while holding hand straight, bend wrist down as shown.

Bottom—Lay hand on a flat surface and extend upward.



Physical therapists are reporting more and more cases of injuries caused by in-line skating accidents. Proper protective equipment is a must for this and all sports.

Common Hand Ailments

Sprains often happen while playing sports. People often minimize the seriousness of a sprain, using the word as a generic term for any minor injury to the extremities. An actual sprain can take weeks to heal properly, while most minor injuries heal quickly with little or no physical therapy. For a sprain, a physical therapist will focus on restoring full strength and mobility and on preventing the creation of adverse scar tissue, which can permanently affect the functioning of the hand or any joint.

If you fall on your outstretched hand, you may suffer a **Colles' fracture,** a fracture of the bones of the forearm (the radius and the ulna) near the wrist. A physician can treat a "clean" or uncomplicated break by simply "setting" the bones and keeping the area immobile for a period of time by means of a cast or splint. In other cases, surgery may be required, with pins inserted around the fracture site before the arm is immobilized. In either case, a physical therapist will be an integral part of the rehabilitation program, before and after the cast or splint is removed. For example, your physical therapist might consult with your physician to determine how the cast should fit so that it does not unduly limit your mobility and thus slow your recovery.

Some of the most common injuries physical therapists see these days—and not just in children and teens—are the result of in-line skating accidents. Simple protective equipment can mean the difference between many hours in a physical therapist's office and many hours zipping around town. So take some good advice: if you participate in in-line skating, wear wrist protectors, elbow pads, knee pads, and a helmet.

The DIP Joint

DIP joint stands for "distal interphalangeal joint"—in other words, the finger joints closest to the fingernails. DIP joint injuries are common in sports, occurring most often when a baseball or basketball jams into the end of the finger, injuring the DIP joint and causing the finger to droop. This tearing of the tendon and subsequent drooping of the finger usually requires splinting for 6-8 weeks; otherwise, the finger may droop permanently.

Carpal tunnel syndrome (CTS) is probably the best-known of the repetitive motion disorders.* Briefly, CTS is an ailment caused by the swelling of the tendons within the carpal tunnel, a narrow channel running

*Carpal tunnel syndrome is discussed in more depth in APTA's brochure, *What You Need to Know About Carpal Tunnel Syndrome*. To order this brochure, see the last page in this booklet.

Splints allow the patient to maintain mobility and build on improvements while protecting the injured area

through the wrist. The carpal tunnel also contains the median nerve, which transmits impulses directly from the brain, or the spinal cord, to the hand. When the tendons swell and put pressure on the median nerve, the result can be symptoms of numbness, weakness, tingling, and burning in the fingers and hands.

Some people seem to be genetically inclined to CTS, but others at risk include those who work at computer keyboards for long periods, assembly-line workers, and jackhammer operators. Prevention is paramount in dealing with CTS: regular rest breaks, on-the-job exercises, posture, and ergonomically correct tools and instruments are all crucial.

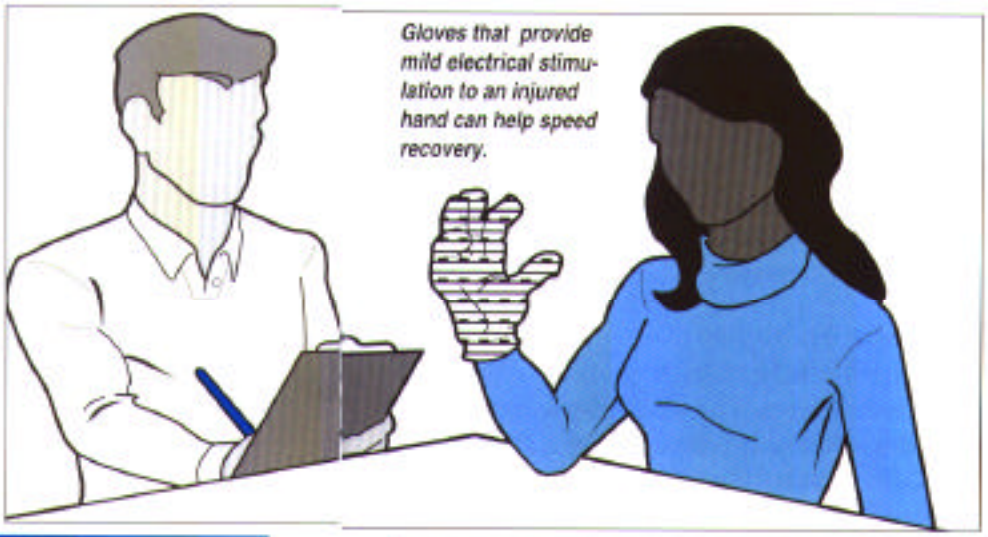
The cubital tunnel is a bony tunnel in the inside of the elbow which contains the ulnar nerve. Because there is very little room for movement within the cubital tunnel, inflammation of the ulnar nerve can cause tingling or pain that radiates from the elbow down to the fingers. These symptoms are often seen in people who habitually rest their elbow on the window edge in a car or prop their elbow up on their desk at work, thus putting pressure on the ulnar nerve.

The "Funny Bone"

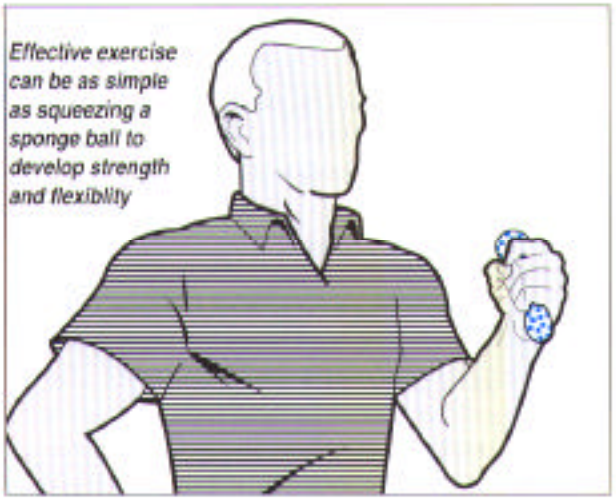
The "funny bone" is not a bone at all, but rather the ulnar nerve, which runs along the outer edge of the elbow. This nerve is close to the surface of the skin, and even a minor blow can cause sharp pain and tingling. This sensation usually subsides after a few seconds and almost never requires professional attention.

The Role of the Physical Therapist

Your physical therapist can help you regain function in your elbow, wrist, or hand as quickly as possible through a combination of manual techniques such as exercise, massage and mobilization, and training to help you use your hand for maximal function. Physical therapists emphasize the need to get the affected area moving as quickly as is safe after an injury. The longer a joint remains immobile, the greater



Gloves that provide mild electrical stimulation to an injured hand can help speed recovery.



Effective exercise can be as simple as squeezing a sponge ball to develop strength and flexibility

the possibility that excess swelling may lead to decreased use of the area.

It is especially important to minimize **edema** (swelling) in the hand. The hand is so compact, and so intricately constructed with its many small bones and joints, that the natural swelling that accompanies an injury can be a serious problem in itself. The back of the hand is the most common place for swelling to occur, and if the fluid that accompanies the edema is not displaced, the tissue inside the hand can become almost like glue in texture. When scarring sets in, the capsules around the joints shrink and the ligaments tighten, causing loss of function in the hand.

Moving the hand as soon as is safely possible displaces the fluid that causes swelling. It also lessens the chance that the hand's range of motion will be permanently diminished.

Traditional Therapies and High-Tech Horizons

Your physical therapist has many options available to treat your condition, from ice packs and splints to the most advanced technology. Often working in consultation with a physician, your physical therapist will design

a treatment regimen tailored to your individual problem, working to restore flexibility and ease discomfort. Treatment may emphasize exercises for relaxation, conditioning, restoring range of motion, strength, endurance, and coordination. Specialized treatments, or **modalities,** include heat, cold, massage, ultrasound, electrical stimulation, and traction.

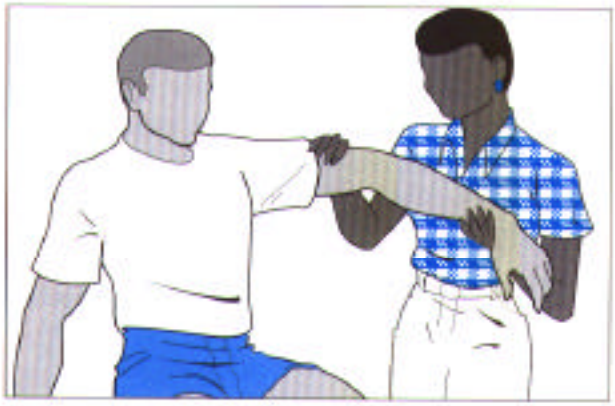
Medical technology today can often diagnose ailments without surgery. Using a process called arthroscopy, orthopedic surgeons can now insert miniature video cameras into the affected area (the wrist, for example). This can allow the physician to pinpoint the problem and treat it immediately. This procedure is far less traumatic to the patient than is surgery, and it allows the patient to begin sessions with the physical therapist days or weeks earlier than might have been possible before.

Prevention

Many of the problems that physical therapists see every day could have been easily prevented with a little education and awareness. For instance, virtually all repetitive motion disorders can be avoided through rest breaks, exercise, proper posture, proper technique, use of protective equipment, and properly designed work stations.

Overuse is certainly the most avoidable cause of hand, wrist, or elbow problems. Taking regular breaks from your computer keyboard—or your tennis game, or your electric drill, or your sewing machine—for a few minutes each hour can go a long way in preventing common overuse injuries.

Exercise builds strength and increases your mobility and range of motion. Depending on how it's used, exercise can prevent problems or bring them on: the key is proper form and moderation. We've included some simple hand and wrist exercises in this brochure



to get you started. In addition, **correct posture** is essential to healthy, harmonious functioning of the elbow, wrist, and hand. The muscles and tendons of the wrist and hand are not designed to carry a great deal of weight. The position and alignment of your body when you carry heavy objects can make the difference between developing a chronic, painful condition and years of trouble-free use. You can learn more about posture by ordering APTA's brochure *The Secret of Good Posture* (listed below).

About APTA

The American Physical Therapy Association (APTA) is a national professional organization representing more than 67,000 physical therapists, physical therapist assistants, and physical therapy students throughout the United States. APTA serves its members and the public by increasing the understanding of the physical therapist's role in the health care system and by fostering advancements in physical therapy education, research, and practice.

Other APTA Brochures

- ❑ What You Need To Know About Carpal Tunnel Syndrome
- ❑ The Secret Of Good Posture
- ❑ Taking Care Of Your Shoulder
- ❑ Taking Care Of Your Back
- ❑ Fitness: A Way Of Life
- ❑ Taking Care Of Your Knees
- ❑ Women Of All Ages
- ❑ What Young People And Their Parents Need To Know About Scoliosis
- ❑ Fit Kids
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Bulk quantities are available. Send for the:
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