Your Practice Online

PRESENTS

Cubital Tunnel Syndrome

Multimedia Health Education

Disclaimer

This movie is an educational resource only and should not be used to manage Orthopaedic Health. All decisions about Cubital Tunnel Syndrome must be made in conjunction with your Physician or a licensed healthcare provider.

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MULTIMEDIA HEALTH EDUCATION MANUAL

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INTRODUCTION

The cubital tunnel is a narrow, fixed passageway in the elbow that houses and protects the ulnar nerve. This is the nerve responsible for the sensation you feel when you hit your "funny bone".

Cubital Tunnel Syndrome, also called Ulnar Nerve Entrapment, involves tearing or inflammation of the ulnar nerve.

To learn more about Cubital Tunnel Syndrome, it is important to understand the normal anatomy of the elbow.

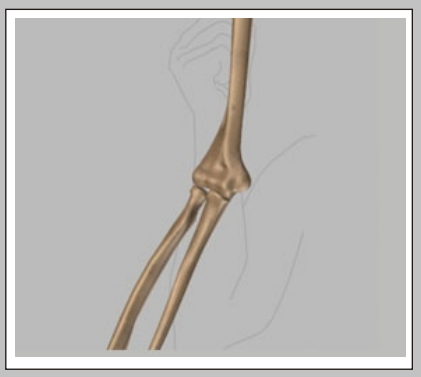
Introduction

The elbow in the human body consists of

- Bones
- Joints
- Muscles
- Ligaments and Tendons
- Numerous blood vessels, nerves, and soft tissue.

Bones

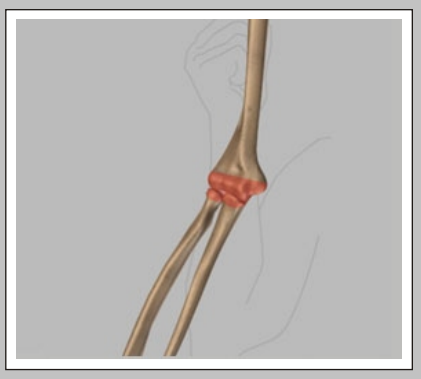
(Refer fig. 1)



(Fig. 1)

Joints

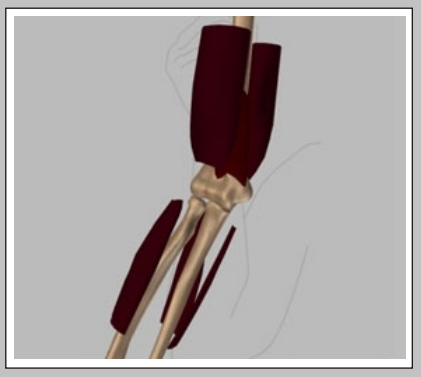
(Refer fig. 2)



(Fig. 2)

Muscles

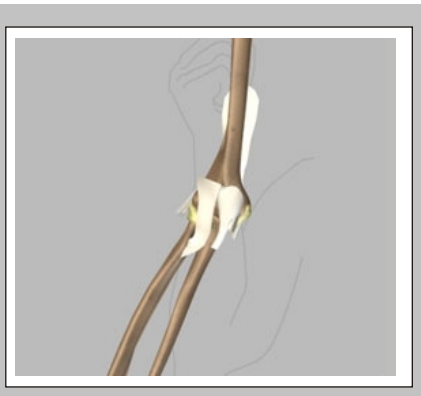
(Refer fig. 3)



(Fig. 3)

Ligaments and Tendons

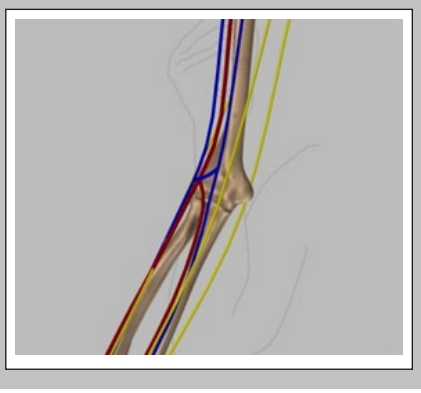
(Refer fig. 4)



(Fig. 4)

Numerous Blood vessels, nerves, and soft tissue.

(Refer fig. 5)



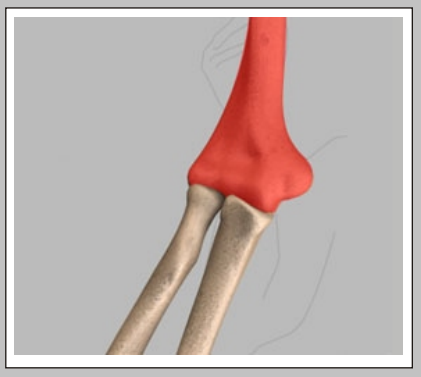
(Fig. 5)

Normal Elbow Anatomy

The arm in the human body is made up of three bones that join together to form a hinge joint called the elbow.

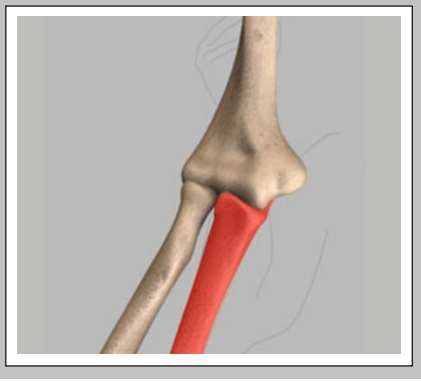
The upper arm bone or humerus connects from the shoulder to the elbow forming the top of the hinge joint. The lower arm or forearm consists of two bones, the radius and the ulna. These bones connect the wrist to the elbow forming the bottom portion of the hinge joint.

The elbow joint is actually three separate joints surrounded by a watertight sac called a joint capsule. This capsule surrounds the elbow joint and contains lubricating fluid called synovial fluid.



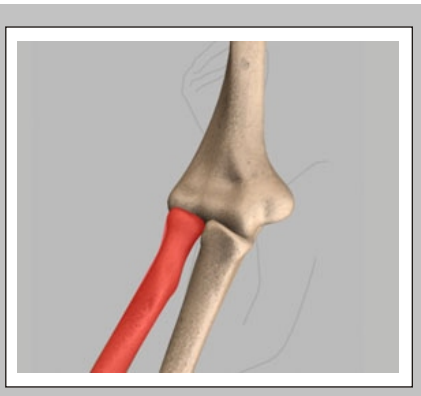
Humerus

(Fig. 6)



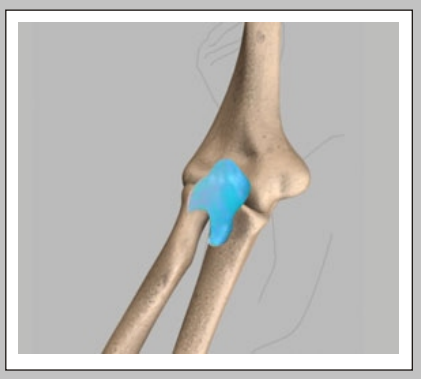
Ulna

(Fig. 7)



Radius

(Fig. 8)

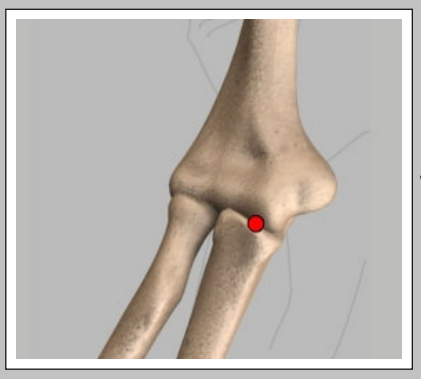


Synovial Fluid

(Fig. 9)

The three joints of the elbow include

- Ulnohumeral joint is where movement between the ulna and humerus occurs.
- Radiohumeral joint is where movement between the radius and humerus occurs.
- Proximal Radioulnar joint is where movement between the radius and ulna occurs.



Ulnohumeral joint

(Fig. 10)

Radiohumeral joint

(Fig. 11)

Proximal Radioulnar joint

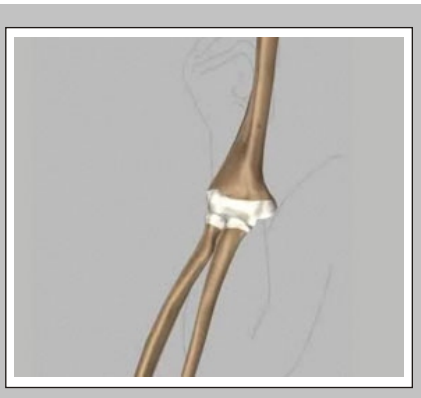
(Fig. 12)

Our elbow is held in place and supported by various soft tissues.

Cartilage

Shiny and smooth, cartilage allows smooth movement where two bones come in contact with each other.

(Refer fig. 13)



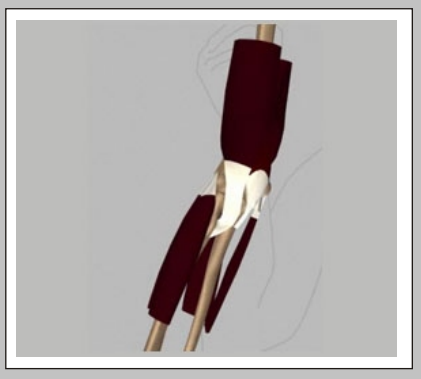
Cartilage

(Fig. 13)

Tendons

Tendons are soft tissues that connects muscles to bones to provide support.

(Refer fig. 14)



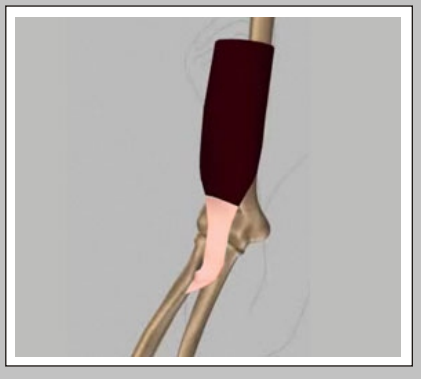
Tendons

(Fig. 14)

Biceps tendon

This tendon attaches the biceps muscle on the front of the arm to the radius allowing elbow suppination, rotation of the elbow.

(Refer fig. 15)



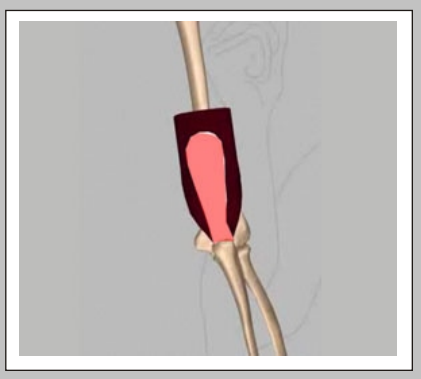
Biceps tendons

(Fig. 15)

Triceps tendon

This tendon attaches the triceps muscle on the back of the arm to the ulna bone allowing the elbow to straighten.

(Refer fig. 16)



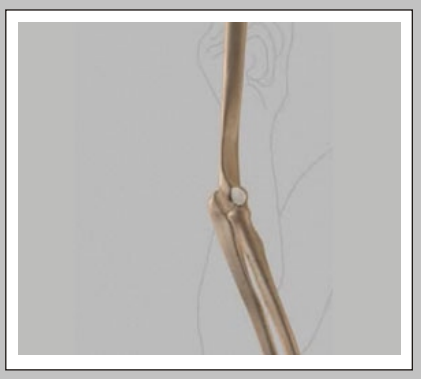
Triceps tendons

(Fig. 16)

Lateral Epicondyle

This bony prominence located just above the elbow on the outside is where the forearm muscles that straighten the fingers and wrist come together in one tendon to attach to the humerus.

(Refer fig. 17)



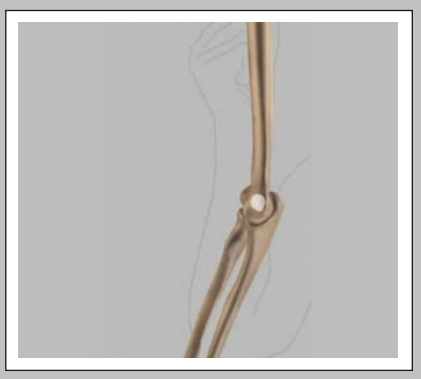
Lateral Epicondyle

(Fig. 17)

Medial Epicondyle

This bony prominence located just above the elbow on the inside is where the muscles that bend the fingers and wrist come together in one tendon to attach to the humerus.

(Refer fig. 18)



Medial Epicondyle

(Fig. 18)

Ligaments

Ligaments are strong rope like tissue that connects bones to other bones and help hold tendons in place providing stability to joints. Ligaments around the elbow join to form a watertight sac called a joint capsule. This capsule surrounds the elbow joint and contains lubricating fluid called synovial fluid.

There are four main ligaments in the elbow.

(Refer fig. 19)

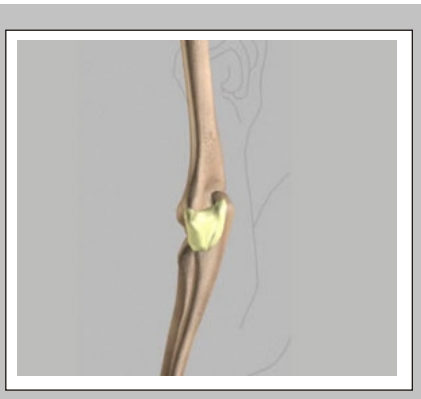
Ligaments

(Fig. 19)

Medial collateral ligament

Located on the inside of the elbow, this ligament connects the ulna to the humerus.

(Refer fig. 19)



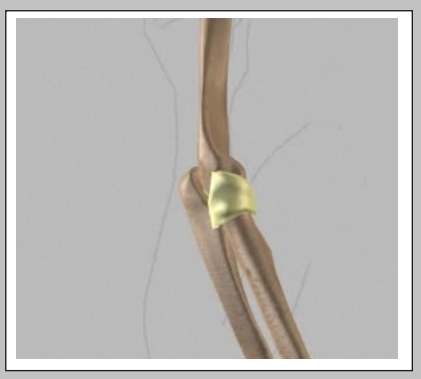
Medial collateral ligament

(Fig. 19)

Lateral collateral ligament

Located on the outside of the elbow this ligament connects the radius to the humerus.

(Refer fig. 20)



Lateral collateral ligament

(Fig. 20)

Annular ligament

This ligament forms a ring around the head of the radius bone, holding it tight against the Ulna.

(Refer fig. 21)

Annular ligament

(Fig. 21)

Quadrate ligament

This ligament also connects the radius to the ulna.

(Refer fig. 22)

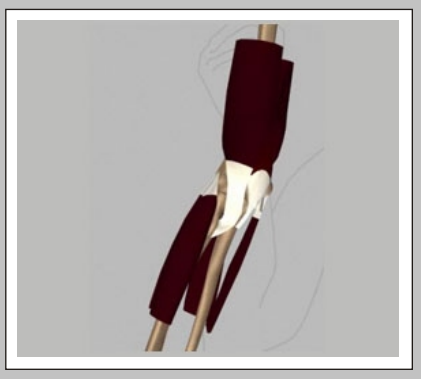
Quadrate ligament

(Fig. 22)

Muscles

Muscles are fibrous tissue capable of contracting to cause body movement.

(Refer fig. 23)



Muscles

(Fig. 23)

Biceps

This is the large muscle on the front of the arm above the elbow that allows elbow flexion, bending of the elbow.

(Refer fig. 24)

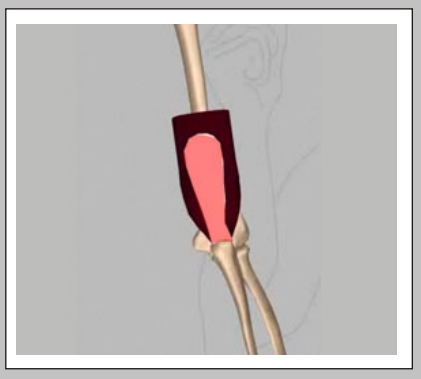
Biceps

(Fig. 24)

Triceps

This is the large muscle on the back of the arm above the elbow enabling elbow extension, straightening of the elbow.

(Refer fig. 25)



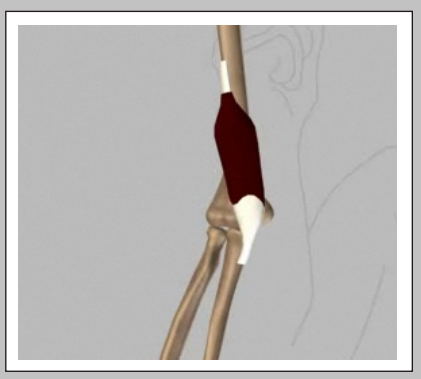
Triceps

(Fig. 25)

Brachialis

This muscle is the primary elbow flexor enabling bending of the elbow. It is located at the distal end of the humerus.

(Refer fig. 26)



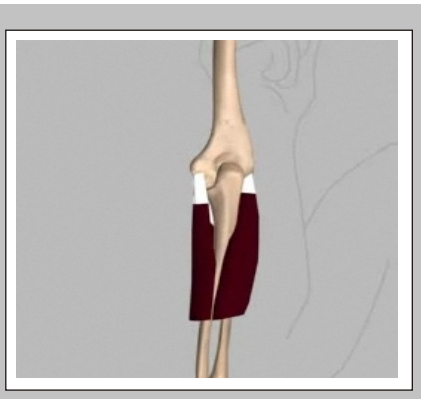
Brachialis

(Fig. 26)

Wrist extensors

These muscles of the forearm attach to the lateral epicondyle enabling extension of the hand and wrist.

(Refer fig. 27)



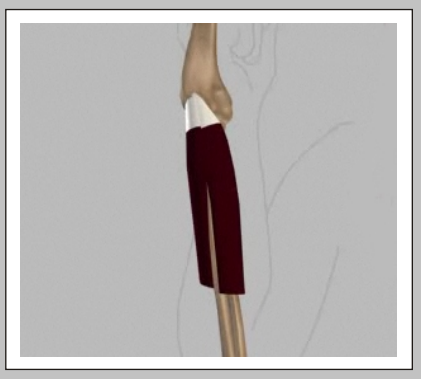
Wrist extensors

(Fig. 27)

Wrist flexors

These muscles of the forearm attach to the medial epicondyle enabling flexion of the hand and wrist.

(Refer fig. 28)



Wrist flexors

(Fig. 28)

Nerves

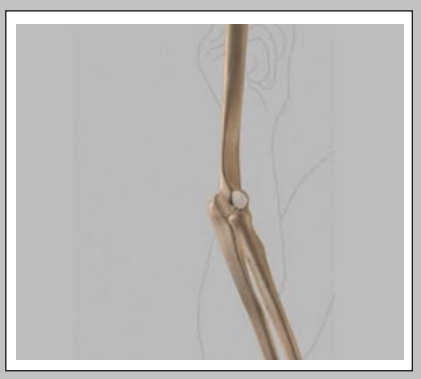
Nerves are responsible for carrying signals back and forth from the brain to muscles in our body, enabling movement and sensation such as touch, pain, and hot or cold.

The three main nerves of the arm are:

- Radial nerve
- Ulnar nerve
- Median nerve

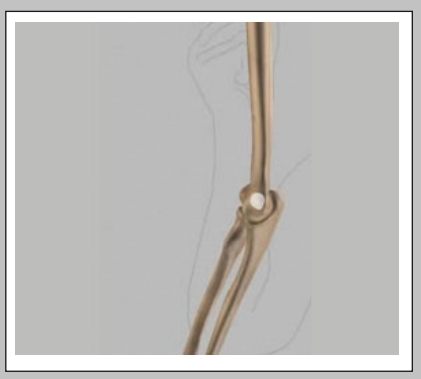
All three nerves begin at the shoulder and travel down the arm across the elbow. The ulnar nerve is responsible for the sensation you feel when you hit your "funny bone". It is this nerve that is housed in the cubital tunnel and is affected by Cubital Tunnel Syndrome.

(Refer fig. 29 to 31)



Radial nerve

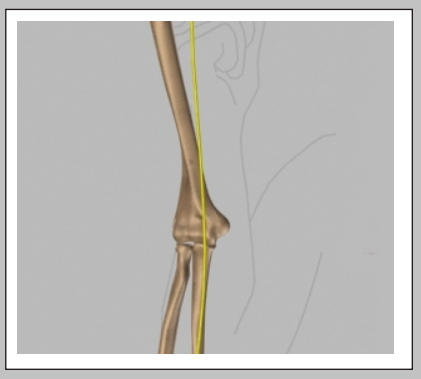
(Fig. 29)



Ulnar nerve

(Fig. 30)

(Refer fig. 29 to 31)



Median nerve

(Fig. 31)

Blood Vessels

The main vessel of the arm is the brachial artery. This artery travels across the inside of the elbow at the bend and then splits into two branches below the elbow.

These branches are

Radial Artery: The radial artery is the largest artery supplying the hand and wrist area. Traveling across the front of the wrist, nearest the thumb, it is this artery that is palpated when a pulse is counted at the wrist.

Ulnar Artery: The ulnar artery travels next to the ulnar nerve through Guyon's canal in the wrist. It supplies blood flow to the front of the hand, fingers and thumb.

(Refer fig. 32)

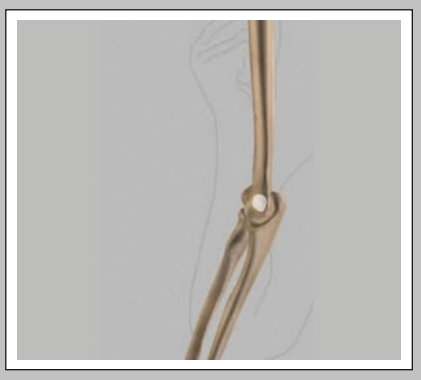
Blood Vessels

(Fig. 32)

Bursae

Bursae are small fluid filled sacs that decrease friction between tendons and bone or skin. Bursae contain special cells called synovial cells that secrete a lubricating fluid. When this fluid becomes infected, a common painful condition known as Bursitis can develop.

(Refer fig. 33)



Bursae

(Fig. 33)

Biomechanics

Flexion

Bending the elbow (bringing the forearm towards the upper arm) occurs at the ulnohumeral and radiohumeral joints.

(Refer fig. 34)

Flexion

(Fig. 34)

Extension

Straightening the elbow (bringing the forearm away from the upper arm) also occurs at the ulnohumeral and radiohumeral joints.

(Refer fig. 35)

Extension

(Fig. 35)

Pronation

This movement is rotation of the forearm that moves the palm to a face down position. It occurs at the articulation between the radius and ulna, the proximal radioulnar joint.

(Refer fig. 36)

Pronation

(Fig. 36)

Suppination

This movement is rotation of the forearm so that the palm faces up. This also occurs at the proximal radioulnar joint.

(Refer fig. 37)

Suppination

(Fig. 37)

What is Cubital Tunnel Syndrome?

Cubital Tunnel Syndrome is a condition that is caused by compression of the ulnar nerve in an area of the elbow called the cubital tunnel.

The ulnar nerve travels down the back of the elbow behind the bony bump called the medial epicondyle and through a passageway called the cubital tunnel. The cubital tunnel is a narrow passageway on the inside of the elbow formed by bone, muscle, and ligaments with the ulnar nerve passing through its center. The roof of the cubital tunnel is covered with soft tissue called fascia. When the elbow is bent, the ulnar nerve can stretch and catch on the bony bump. When the ulnar nerve is compressed or entrapped, the nerve can tear and become inflamed leading to a variety of symptoms.

Signs and Symptoms

Signs and symptoms of Cubital Tunnel Syndrome usually occur gradually, progressing to the point where the patient seeks medical attention. Left untreated, Cubital Tunnel Syndrome can lead to permanent nerve damage in the hand. Commonly reported symptoms associated with Cubital Tunnel Syndrome include the following:

- Intermittent numbness, tingling, and pain to the little finger, ring finger, and the inside of the hand. These symptoms occur more frequently at night, and with elbow bending or prolonged resting on the elbow.
- Aching pain to the inside of the elbow
- Weakness in hand with diminished grip strength
- Diminished sensation and fine motor control in the hand causing the person to drop objects or have difficulty handling small objects.
- Muscle wasting in the hand and permanent nerve damage if left untreated.

Causes

Signs and symptoms of Cubital Tunnel Syndrome usually occur gradually, progressing to the point where the patient seeks medical attention. Left untreated, Cubital Tunnel Syndrome can lead to permanent nerve damage in the hand. Commonly reported symptoms associated with Cubital Tunnel Syndrome include the following:

Trauma

Injury to the elbow such as fractures, dislocations, or a direct blow can cause tissue swelling which can compress the ulnar nerve within the cubital tunnel.

Repetitive Motion

Individuals who perform repetitive elbow flexion movements at work or play are believed to be at high risk for developing cubital tunnel syndrome. Repeatedly bending and straightening the elbow can irritate and inflame the ulnar nerve.

Frequent Pressure

Leaning on the elbow for extended periods of time such as when working at a desk can cause ulnar nerve irritation.

Medical Conditions

Bone spurs, ganglion cysts, or tumors can form in the cubital tunnel leading to pressure and irritation of the ulnar nerve.

Diagnosis

Elbow conditions should be evaluated by an Orthopaedic specialist for proper diagnosis and treatment. Early diagnosis of Cubital Tunnel Syndrome is critical in avoiding permanent nerve damage.

Your physician will perform the following:

- Medical History
- Physical Examination

X-rays

A form of electromagnetic radiation that is used to take pictures of bones. Although x-rays do not show nerves and soft structures in the body, your doctor may order this test to look for bone spurs, arthritis, or other bony areas that could be compressing the ulnar nerve.

Electrodiagnostic Tests

These tests are done to assess the speed and degree of electrical activity in the muscles and nerves. Examples include electromyography and nerve conduction studies. These tests can assist your doctor in determining how well the nerve is functioning and locate areas of muscle wasting and nerve compression.

Conservative Treatment Options

Your physician will recommend conservative treatment options initially to treat the Cubital Tunnel Syndrome symptoms unless muscle wasting or nerve damage is present.

Conservative Treatment Options

Conservative treatment options may include:

- Avoid frequent bending of the elbow.
- Avoid pressure to the elbow by not leaning on it. Elbow pads may be worn to decrease pressure when working at a desk.
- Wear a brace or splint at night while sleeping to keep the elbow in a straight position. You can also wrap the arm loosely with a towel and apply tape to hold in place.
- Avoid activities that tend to bring on the symptoms.
- NSAID's, non-steroidal anti-inflammatory drugs, such as ibuprofen or aspirin, may be ordered to diminish swelling.
- Referral to OT (Occupational Therapy) for instruction in strengthening and stretching exercises may be recommended.

Introduction

If conservative treatment options fail to resolve the condition or if muscle wasting or severe nerve compression is present, your surgeon may recommend you undergo a surgical procedure to treat Cubital Tunnel Syndrome.

There are different surgeries that can be performed to treat your condition.

Medial Epicondylectomy

This surgery involves removing the medial epicondyle, the bony bump on the inside of the elbow, enabling the ulnar nerve to glide smoothly when the elbow is flexed and straightened.

Ulnar Nerve Transposition

This surgery involves creating a new tunnel in front of the medial epicondyle and transposing (moving) the ulnar nerve to the new tunnel.

Your surgeon will decide which options are best for you depending on your specific circumstances.

Surgical Treatment

The goal of Cubital Tunnel surgery is to reduce the pressure on the ulnar nerve by providing more space for the nerve to move freely and to increase blood flow to promote healing of the ulnar nerve.

This surgery is usually performed in an operating room under general or regional anesthesia on an outpatient basis as day surgery.

Surgical Procedure

If your nerve compression is mild your surgeon may recommend a Medial Epicondylectomy:

Your surgeon will make an incision over the medial epicondyle, the bony bump on the inside of the elbow.

The cubital tunnel is cut open through the soft tissue roof exposing the ulnar nerve.

(Refer fig. 38 to 44)

(Fig. 38)

Surgical Procedure

The forearm muscles or flexor muscles are cut and detached from the epicondyle.

Using special instruments, your surgeon will shave away the bump, freeing the ulnar nerve to glide smoothly within the cubital tunnel without pressure from the bump.

The flexor muscles are then reattached to the area of shaved bone with special sutures.

The incision is then closed with sutures and covered with a dressing.

More commonly, your surgeon may recommend an Ulnar Nerve Transposition:

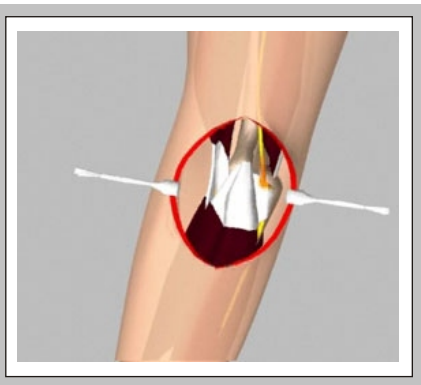
Your surgeon will make an incision over the medial epicondyle.

The cubital tunnel is cut open through the soft tissue roof exposing the ulnar nerve.

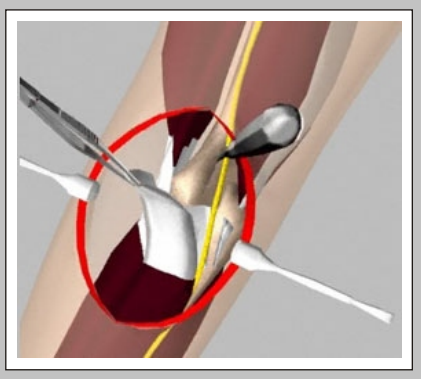
The forearm muscles or flexor muscles are cut and detached from the epicondyle.

The ulnar nerve is transposed or moved from behind the elbow to a new location in front of the elbow. The ulnar nerve may be placed above the flexor muscle, within the muscle, or under the muscle. Your surgeon will decide which option is best for you.

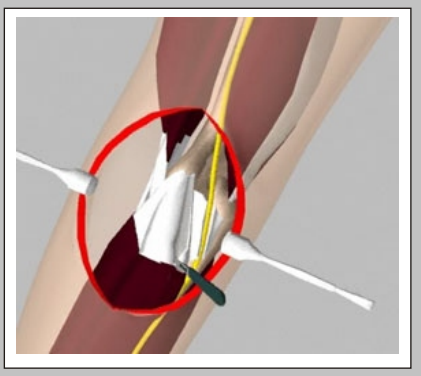
(Refer fig. 38 to 44)



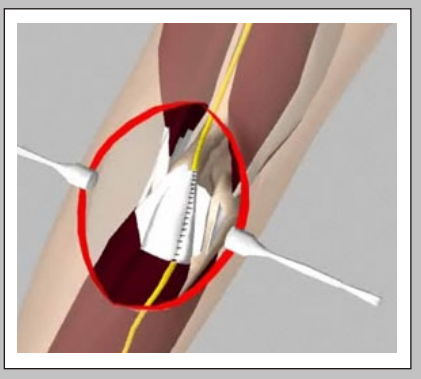
(Fig. 39)



(Fig. 40)



(Fig. 41)



(Fig. 42)

The flexor muscles are then sutured back together and reattached with special sutures to the epicondyle.

The incision is then closed with sutures and covered with a dressing.

(Refer fig. 38 to 44)

(Fig. 43)

(Fig. 44)

Post Operative Care

After surgery, your surgeon will give you guidelines to follow depending on the type of repair performed and the surgeon's preference.

Common Post-operative guidelines include:

- A long arm bulky dressing with a plaster splint is usually applied following surgery for 10-14 days.
- Elevating the arm above heart level and moving the fingers are important to prevent swelling.
- The arm dressing is removed after 10-14 days for removal of the sutures in the incision.
- Elbow immobilization for 3 weeks after surgery is usually indicated, longer depending on the repair performed.
- Ice packs to the surgical area to reduce swelling. Ice should be applied over a towel to the affected area for 20 minutes every hour. Never place ice directly over the skin.
- Keep the surgical incision clean and dry. Cover the area with plastic wrap when bathing or showering.
- Occupational Therapy will be ordered a few weeks after surgery for strengthening and stretching exercises to maximize use of the hand and forearm. Therapy can take several months before unrestricted use of the arm is allowed.
- Eating a healthy diet and not smoking will promote healing.

Risks and Complications

As with any major surgery there are potential risks involved. The decision to proceed with the surgery is made because the advantages of surgery outweigh the potential disadvantages.

It is important that you are informed of these risks before the surgery takes place.

Complications can be medical (general) or specific to elbow surgery.

Medical complications include those of the anesthetic and your general well being. Almost any medical condition can occur so this list is not complete. Complications include:

- Allergic reactions to medications
- Blood loss requiring transfusion with its low risk of disease transmission
- Heart attacks, strokes, kidney failure, pneumonia, bladder infections
- Complications from nerve blocks such as infection or nerve damage
- Serious medical problems can lead to ongoing health concerns, prolonged hospitalization, or rarely death.

The majority of patients suffer no complications following Cubital Tunnel surgery, however, complications can occur following elbow surgery and include:

- Infection
- Nerve damage causing permanent areas of numbness around the elbow or forearm.
- Elbow instability
- Elbow flexion contracture
- Pain at site of scar
- Symptoms are not improved by the surgery

Risk factors that can negatively affect adequate healing after surgery include:

(Fig. 45)

Disclaimer

Although every effort is made to educate you on Cubital Tunnel Syndrome, there will be specific information that will not be discussed. Talk to your doctor or health care provider about any questions you may have.

You must not proceed until you are confident that you understand this procedure, particularly, the complications.

☐ ☐ ☐ **YOUR SURGERY DATE**

☐ **READ YOUR BOOK AND MATERIAL**

☐ **VIEW YOUR VIDEO /CD / DVD / WEBSITE**

☐ **PRE - HABILITATION**

☐ **ARRANGE FOR BLOOD**

☐ **MEDICAL CHECK UP**

☐ **ADVANCE MEDICAL DIRECTIVE**

☐ **PRE - ADMISSION TESTING**

☐ **FAMILY SUPPORT REVIEW**

Physician's Name : _____

Physician's Signature: _____

Date : _____

Patient's Name : _____

Patient's Signature: _____

Date : _____