



GHADIALI

General Surgery

P R E S E N T S

Dr. Mufa T. Ghadiali is skilled in all aspects of General Surgery.
His General Surgery Services include:

- General Surgery
- Advanced Laparoscopic Surgery
- Surgical Oncology
- Gastrointestinal Surgery
- Hernia Surgery
- Endoscopy

Elbow Arthroscopy

Multimedia Health Education

Disclaimer

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

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GHADIALI

MULTIMEDIA HEALTH EDUCATION MANUAL

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INTRODUCTION

Elbow Arthroscopy, also referred to as keyhole surgery or minimally invasive surgery, is performed through very small incisions to evaluate and treat a variety of elbow conditions. In order to understand elbow arthroscopy, it is important to understand the normal anatomy of the elbow.

Introduction

The elbow in the human body consists of:

Bones

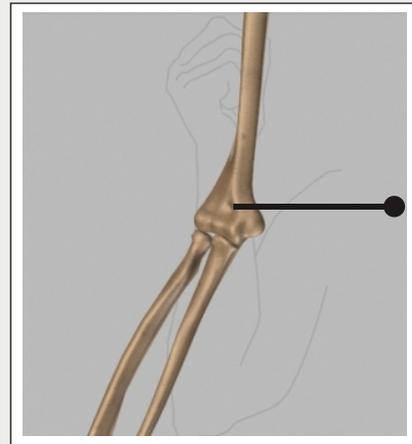
(Refer fig. 1)

Joints

(Refer fig. 2)

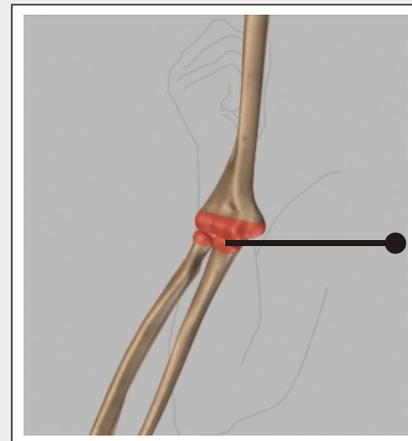
Muscles

(Refer fig. 3)



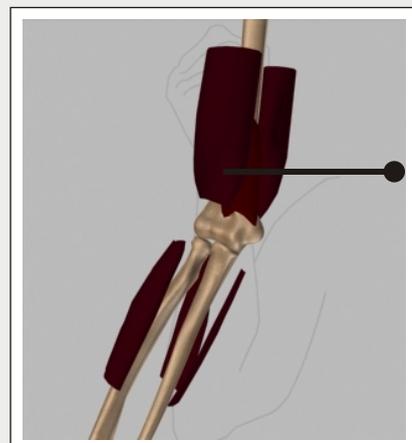
Bones

(Fig.1)



Joints

(Fig.2)



Muscles

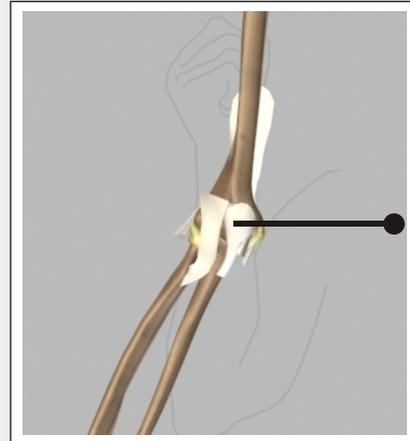
(Fig.3)

Unit 1:

Introduction

Ligaments and tendons

(Refer fig. 4)

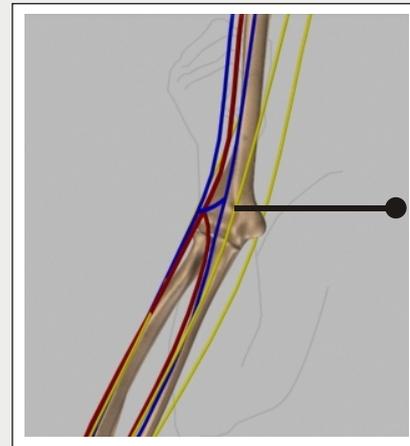


Ligaments and tendons

(Fig.4)

Numerous Blood vessels, nerves, and soft tissue

(Refer fig. 5)



Numerous Blood vessels, nerves, and soft tissue

(Fig.5)

Normal Elbow Anatomy

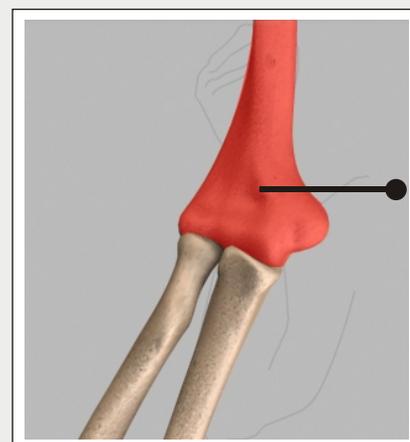
The arm in the human body is made up of three bones that join together to form a hinge joint called the elbow. The upper arm bone or humerus connects from the shoulder to the elbow forming the top of the hinge joint.

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.

(Refer fig. "6 to 9")

Humerus

(Refer fig. 6)



Humerus

(Fig.6)

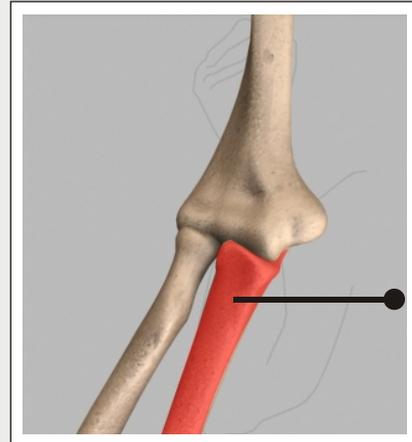
The elbow joint is actually three separate joints surrounded by a watertight sac called a joint capsule. This capsule surrounds the elbow joint and contains lubricating fluid called synovial fluid.

- Humerus
- Ulna
- Radius
- Synovial fluid

(Refer fig. "6 to 9")

Ulna

(Refer fig. 7)

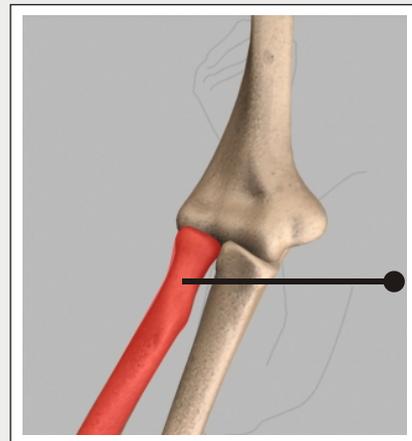


Ulna

(Fig.7)

Radius

(Refer fig. 8)

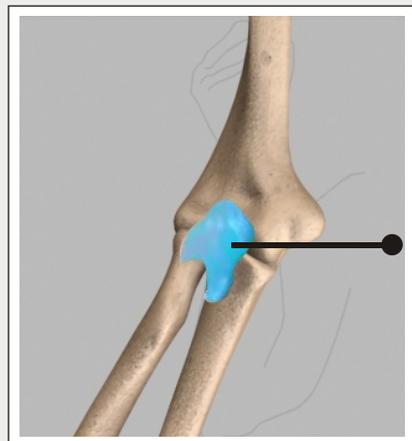


Radius

(Fig.8)

Synovial fluid

(Refer fig. 9)



Synovial fluid

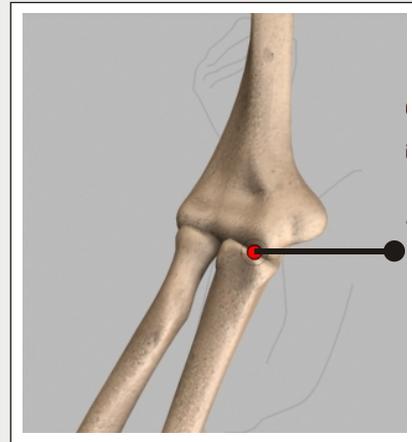
(Fig.9)

Normal Elbow Anatomy

The three joints of the elbow include:

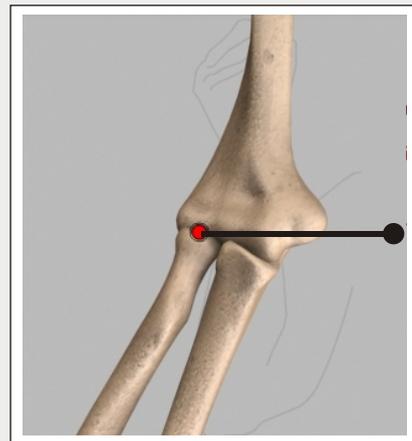
- Ulnohumeral joint is where movement between the ulna and humerus occurs.
- Radiohumeral joint is where movement between the radius and humerus occurs.
- Proximal Radioulnar joint is where movement between the radius and ulna occurs.

(Refer fig. "10 to 12")



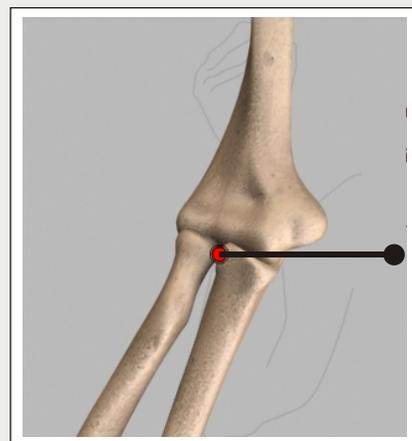
Ulnohumeral joint

(Fig.10)



Radiohumeral joint

(Fig.11)



Proximal Radioulnar joint

(Fig.12)

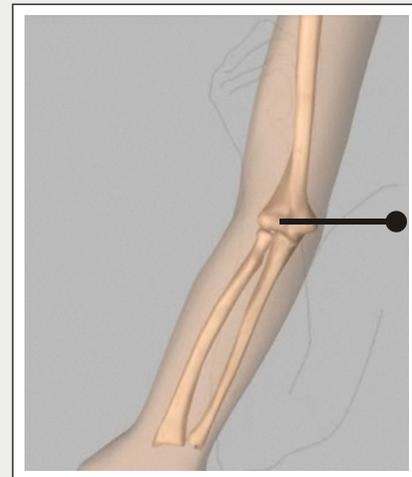
Unit 1:

Introduction

Normal Elbow Anatomy

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

(Refer fig.13)



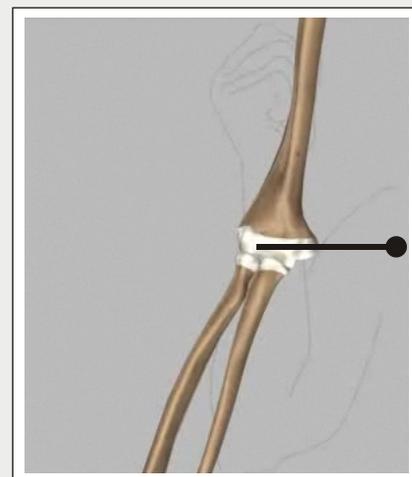
Normal Elbow Anatomy

(Fig.13)

Cartilage

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

(Refer fig.14)



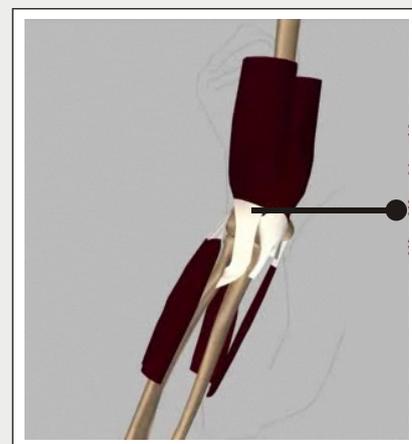
Cartilage

(Fig.14)

Tendons

Tendons are soft tissue that connects muscles to bones to provide support. The main tendons of the elbow include:

(Refer fig.15)



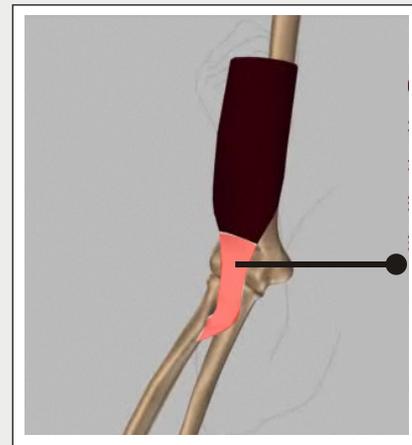
Tendons

(Fig.15)

Biceps Tendon:

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

(Refer fig.16)



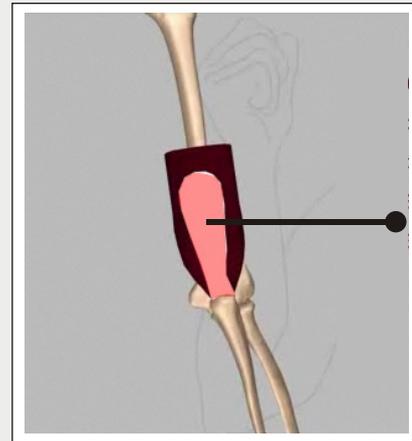
Biceps tendon

(Fig.16)

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.17)



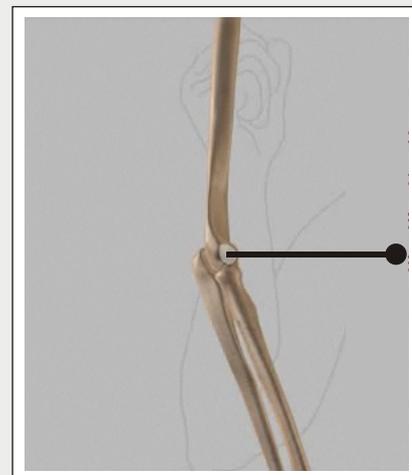
Triceps tendon

(Fig.17)

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. It is this tendon that becomes inflamed in Tennis Elbow.

(Refer fig.18)



Lateral Epicondyle

(Fig.18)

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.19)

Ligaments

Ligaments are strong rope like tissue that connects bones to other bones and help hold tendons in place providing stability to joints.

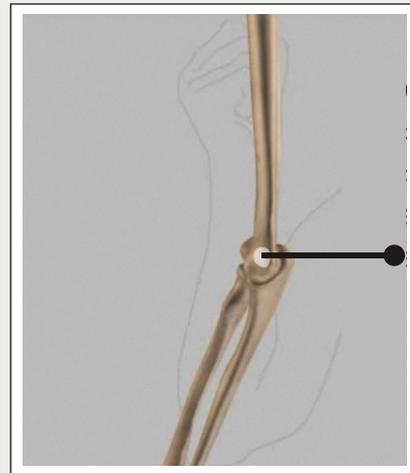
Ligaments around the elbow join to form a watertight sac called a joint capsule. This capsule surrounds the elbow joint and contains lubricating fluid called synovial fluid. There are four main ligaments in the elbow:

(Refer fig.20)

Medial collateral ligament:

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

(Refer fig.21)



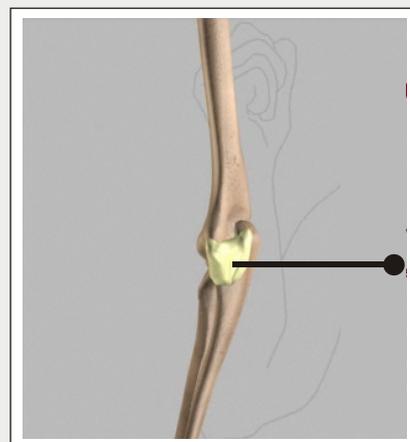
Medial Epicondyle

(Fig.19)



Ligaments

(Fig.20)



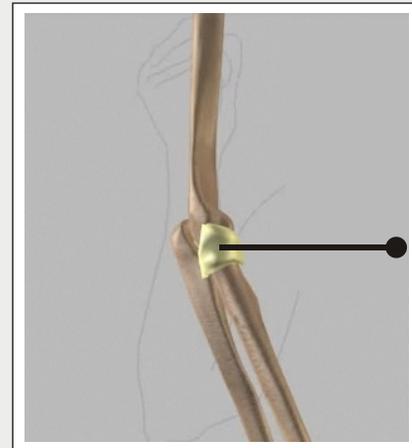
Medial collateral ligament

(Fig.21)

Lateral collateral ligament:

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

(Refer fig.22)



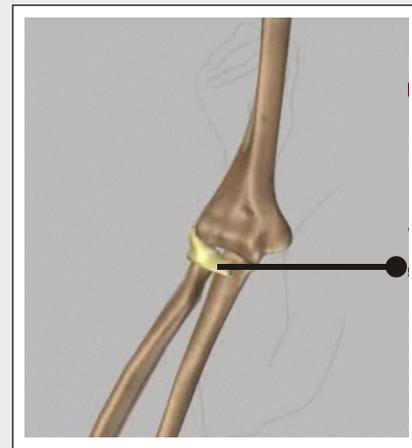
Lateral collateral ligament

(Fig.22)

Annular ligament:

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

(Refer fig.23)



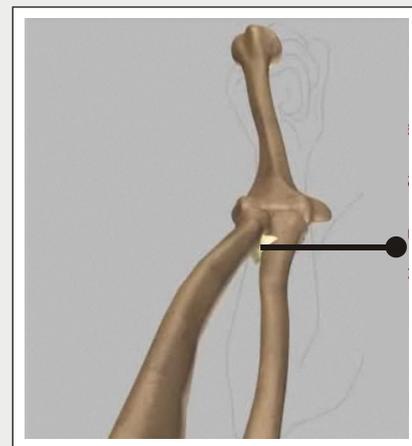
Annular ligament

(Fig.23)

Quadrate ligament:

This ligament also connects the radius to the ulna.

(Refer fig.24)



Quadrate ligament

(Fig.24)

Muscles

Muscles are fibrous tissue capable of contracting to cause body movement. The main muscles of the elbow include:

(Refer fig.25)

Biceps:

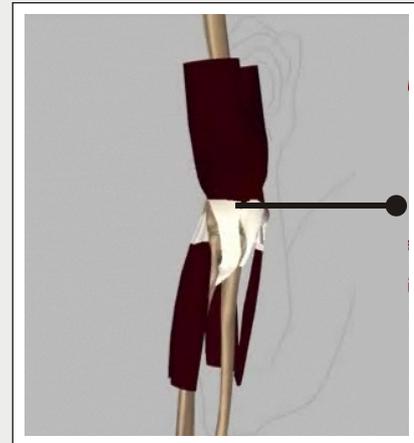
This is the large muscle on the front of the arm above the elbow that allows elbow supination, rotation of the elbow

(Refer fig.26)

Triceps:

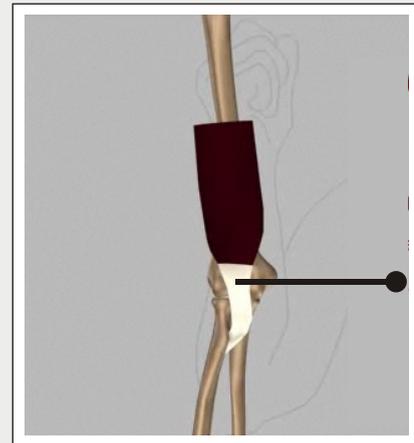
This is the large muscle on the back of the arm above the elbow enabling elbow extension, straightening of the elbow.

(Refer fig.27)



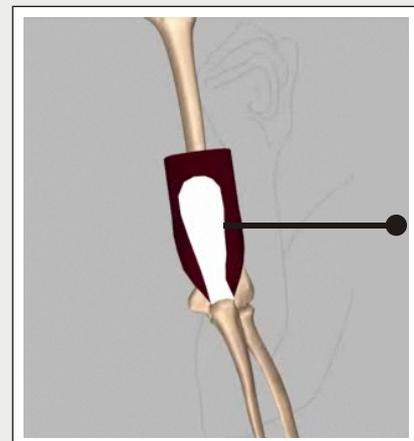
Muscles

(Fig.25)



Biceps

(Fig.26)



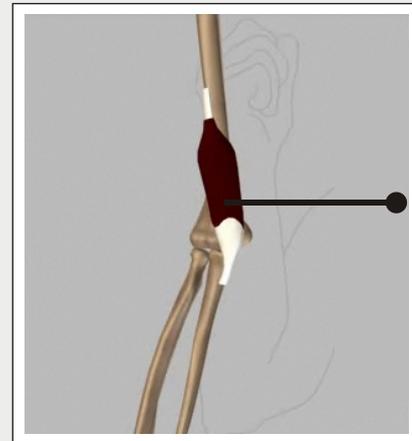
Triceps

(Fig.27)

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.28)



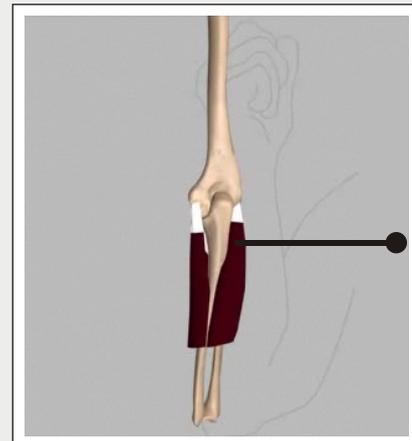
Brachialis

(Fig.28)

Wrist extensors:

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

(Refer fig.29)



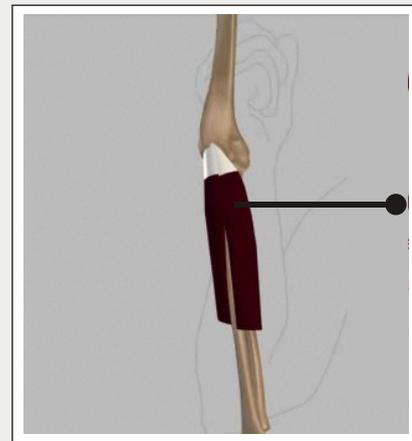
Wrist extensors

(Fig.29)

Wrist flexors:

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

(Refer fig.30)



Wrist flexors

(Fig.30)

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:

(Refer fig.31)

- Radial nerve
- Ulnar nerve
- Median nerve

(Refer fig. "32 to 34")

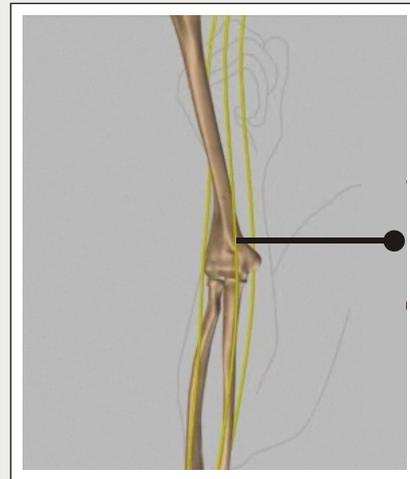
All three nerves begin at the shoulder and travel down the arm across the elbow.

Radial Nerve

(Refer fig.32)

Ulnar Nerve

(Refer fig.33)



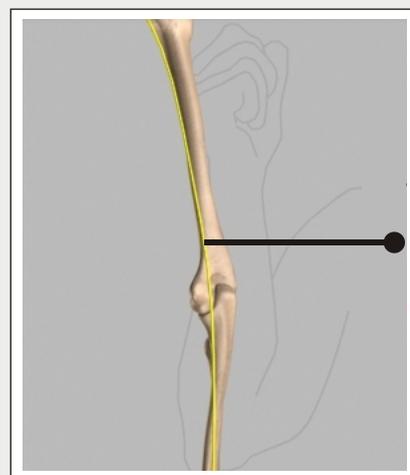
Nerves

(Fig.31)



Radial nerve

(Fig.32)



Ulnar nerve

(Fig.33)

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:

(Refer fig.35)

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:

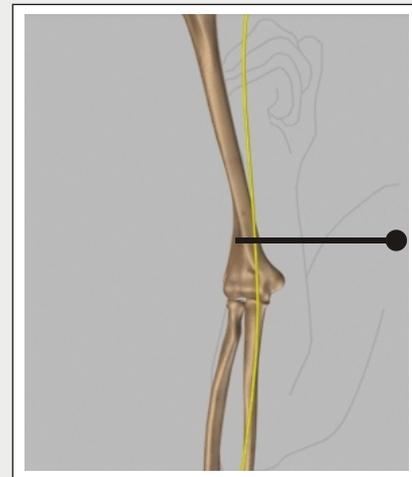
The ulnar artery travels next to the ulnar nerve through Guyon's canal in the wrist. It supplies blood flow to the front of the hand, fingers and thumb.

Bursae

Bursae are small fluid filled sacs that decrease friction between tendons and bone or skin.

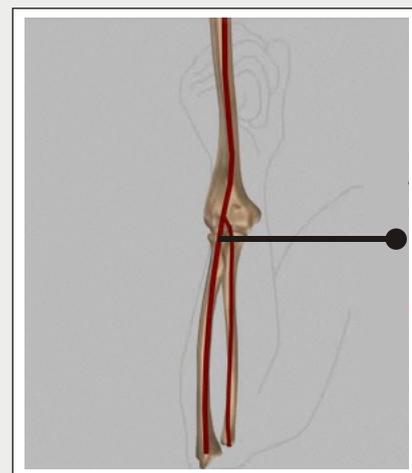
Bursae contain special cells called synovial cells that secrete a lubricating fluid. When this fluid becomes infected, a common painful condition known as Bursitis can develop

(Refer fig.36)



Median nerve

(Fig.34)



Blood Vessels

(Fig.35)



Bursae

(Fig.36)

Elbow Arthroscopy - Indications

Elbow Arthroscopy may be indicated for the following reasons:

Debridement of loose bodies:

Bone chips or torn cartilage debris removal

Removal of adhesions or scar tissue:

Removal of bone spurs:

Extra bone growth caused by injury or arthritis that damages the ends of the bone causing pain and limited joint mobility.

Debridement of joint surfaces:

Conditions such as arthritis can cause the breakdown of tissue or bone in the joint

Repair of fractures or torn ligaments caused by trauma:

Treatment of Arthrofibrosis:

Arthrofibrosis is a condition following trauma or surgery causing thick, fibrous scar tissue to form in the joint.

Treatment of Osteochondritis Dissecans:

Osteochondritis Dissecans is a painful condition in which bone or cartilage fragments break off the end of a bone. It is usually caused by loss of blood supply to bone.

Osteochondral Fractures:

Osteochondral Fractures are torn articular cartilage usually resulting from trauma.

Evaluation and Diagnosis:

Patients with unexplained pain, swelling, stiffness and instability in the elbow that is unresponsive to conservative treatment may undergo elbow arthroscopy for evaluation and diagnosis of their condition.

Elbow Arthroscopy - Diagnosis

Elbow conditions should be evaluated by an Orthopaedic surgeon for proper diagnosis and treatment.

Your surgeon will perform the following:

- Medical History
- Physical Examination

Diagnostic Studies may include:

X-rays:

A form of electromagnetic radiation that is used to take pictures of bones.

(Refer fig.37)

MRI:

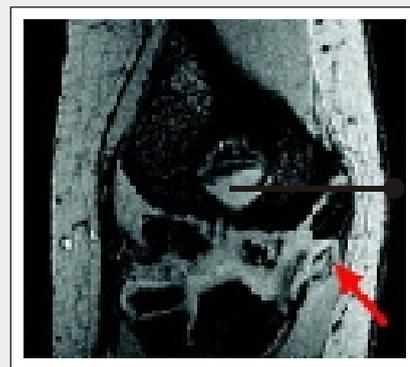
Magnetic and radio waves are used to create a computer image of soft tissue such as nerves and ligaments.

(Refer fig.38)



X-rays

(Fig.37)



MRI

(Fig.38)

Unit 3:

Surgical Procedure

Surgical Procedure

Introduction:

Arthroscopy is a surgical procedure in which an arthroscope, a small, soft, flexible tube with a light and video camera at the end, is inserted into a joint to evaluate and treat a variety of conditions.



(Fig.39)

The benefits of arthroscopy compared to the alternative, open elbow surgery, include:

- Smaller incisions
- Minimal soft tissue trauma
- Less pain
- Faster healing time
- Lower infection rate
- Less scarring
- Earlier mobilization
- Usually performed as outpatient day surgery

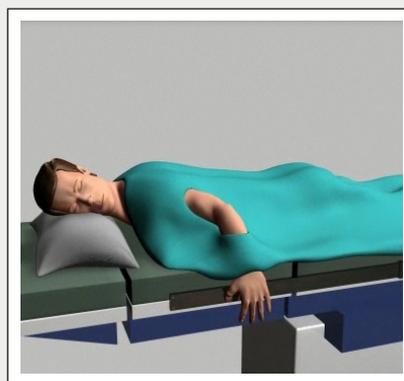
(Refer fig.39)

Surgical Procedure

Elbow Arthroscopy is performed in a hospital operating room under general or local anesthesia and rarely takes longer than an hour.

The arthroscope is a small fiber-optic viewing instrument made up of a tiny lens, light source and video camera. The surgical instruments used in arthroscopic surgery are very small (only 3 or 4 mm in diameter) but appear much larger when viewed through an arthroscope.

(Refer fig. "40 to 42")



(Fig.40)



(Fig.41)

Unit 3:

Surgical Procedure

The television camera attached to the arthroscope displays the image of the joint on a television screen, allowing the surgeon to look throughout the elbow joint at cartilage, ligaments, and bone.

The surgeon can determine the amount or type of injury, and then repair or correct the problem as necessary.

(Refer fig. "40 to 42")

Management - Surgical Treatment

In elbow arthroscopy surgery, the surgeon injects a sterile solution into the elbow to expand the viewing area of the elbow joint giving the surgeon a clear view and room to work.

(Refer fig.43)

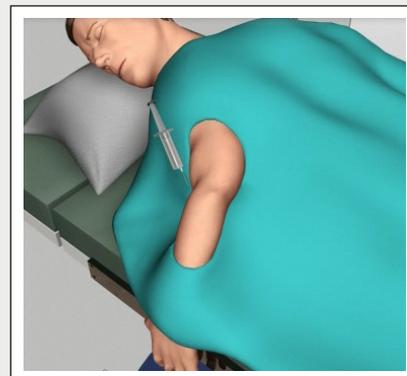
The surgeon makes several small incisions, about ¼ inch each, to the elbow area. Each incision is called a portal. These incisions result in very small scars, which in many cases are unnoticeable.

A blunt tube, called a Trocar, is inserted into each portal prior to the insertion of the arthroscope and surgical instruments. With the images from the arthroscope as a guide, the surgeon can look for any pathology or anomaly.

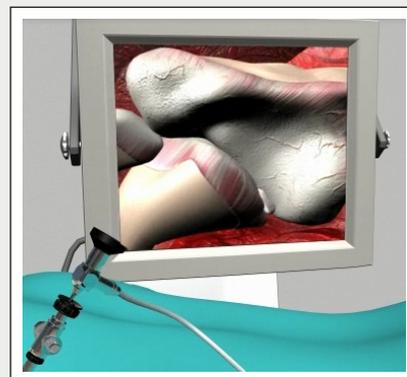
(Refer fig. "44 & 45")



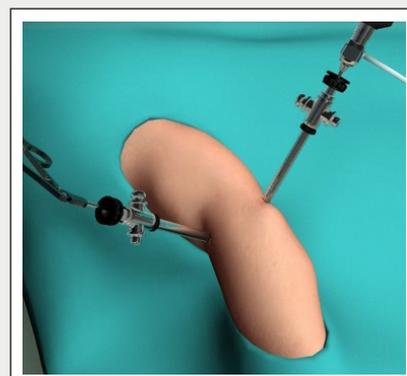
(Fig.42)



(Fig.43)



(Fig.44)



(Fig.45)

Unit 3:

Surgical Procedure

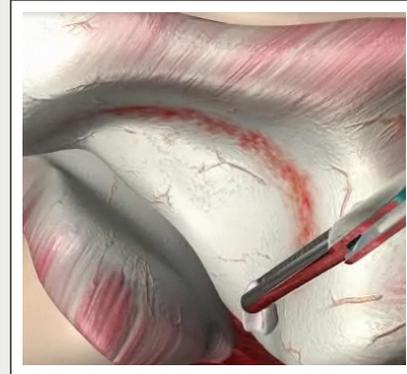
The large image on the television screen allows the surgeon to see the joint directly and to determine the extent of the injuries, and then perform the particular surgical procedure, if necessary. The other portals are used for the insertion of surgical instruments.

A surgical instrument is used to probe various parts within the joint to determine the extent of the problem. If the surgeon sees an opportunity to treat a problem, a variety of surgical instruments can be inserted through the portals.

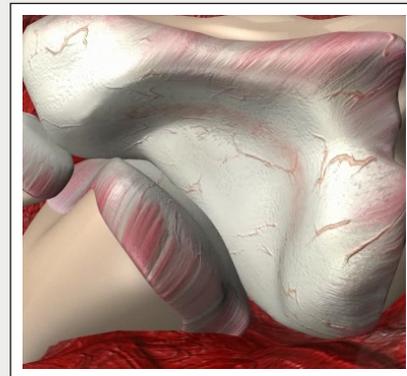
(Refer fig. "46 & 47")

After treating the problem, the portals (incisions) are closed by suturing or by tape. Arthroscopy is much less traumatic to the muscles, ligaments, and tissues than the traditional method of surgically opening the elbow with long incisions.

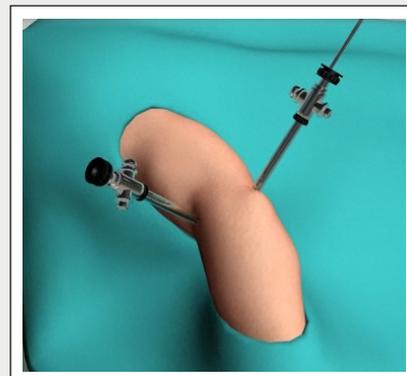
(Refer fig. "48 & 49")



(Fig.46)



(Fig.47)



(Fig.48)



(Fig.49)

Management - 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:

- Elevating the elbow on pillows above the level of the heart is the most important thing you can do to reduce swelling.
- Flexing and opening your hand will also help to reduce swelling.
- Keep the incision area clean and dry. You may shower once the dressings are removed unless otherwise directed by your surgeon. If the arm is in a cast, cover the cast with plastic bags and tape to your skin above the cast to keep it dry when bathing.
- A compressive stocking may be applied from the armpit to the hand once the dressing is removed to decrease swelling and pain, and increase range of motion.
- You will be given specific instructions regarding activity and rehabilitation.
- Occupational Therapy will be ordered to restore normal elbow function and strength.
- Your surgeon will prescribe pain medications to keep you comfortable at home.
- Eating a healthy diet and not smoking will promote healing.

Management - 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 Elbow Arthroscopy, however, complications can occur following elbow surgery and include:

Infection

Infections can occur superficially at the portal insertion sites or in the joint space of the elbow, a more serious infection.

Nerve Damage

The median, ulnar, and radial nerves pass closely over the elbow joint and lie very close to the incision site. Transient numbness and tingling of the fingers is not unusual after surgery and usually goes away in a few days. On rare occasions however, a nerve may be injured due to pressure from retractors or if the nerve is severed during the surgery. Trauma to the nerves can cause numbness, tingling, pain, and weakness.

Hemarthrosis

A condition caused by excess bleeding into the joint after the surgery is completed. This may require additional arthroscopic surgery to irrigate the joint and evacuate the blood.

Compartment Syndrome

This is a rare but dangerous condition that occurs when pressure inside the tissues is higher than the blood pressure of the vessels supplying nutrients to the tissues. This condition leads to diminished healing from decreased nutrients and can lead to necrosis, death of the tissues. Causes include swelling and improperly applied wraps or casts to the joint that are too tight. Symptoms include pain and swelling, numbness and tingling, skin color changes, and coldness to the elbow. Call your surgeon immediately should you experience these symptoms.

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



(Fig.50)

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

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 : _____

Patient's Name : _____

Physician's Signature: _____

Patient's Signature: _____

Date : _____

Date : _____