

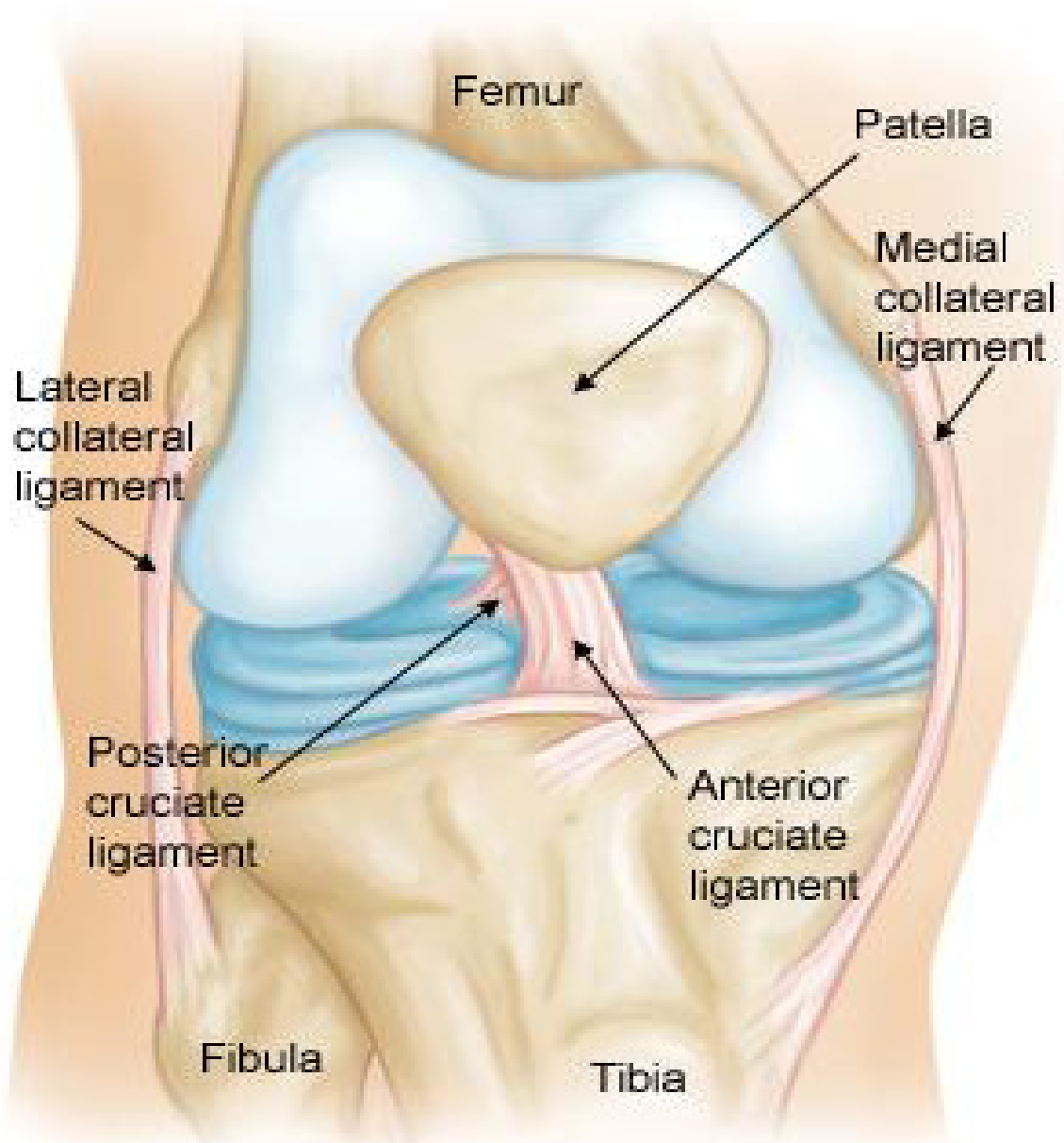
# ACL TREATMENT

## Title

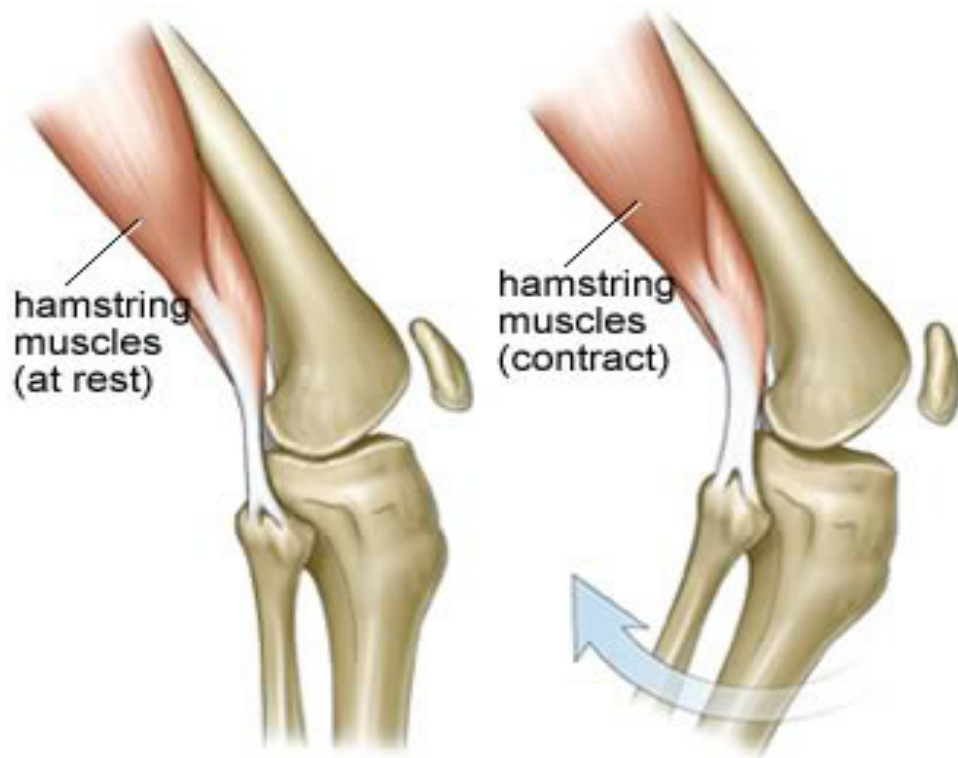
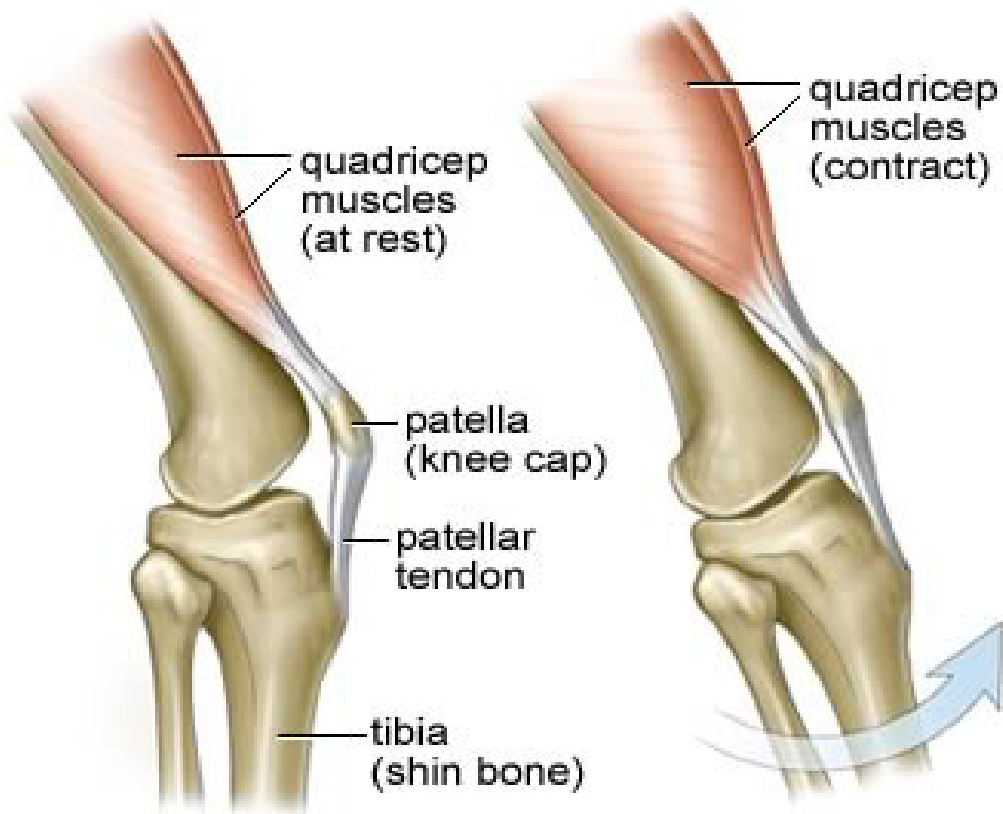
1. Stability of Knee.
2. Anatomy of the ACL.
3. Functions of ACL.
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# Stability of Knee

- The knee joint is a hinge joint formed by bones – femur, tibia and patella and is held together by ligaments.
- There are four ligaments and they are: MCL (medial collateral), (LCL) lateral collateral, (ACL) anterior cruciate and (PCL) posterior cruciate ligament.

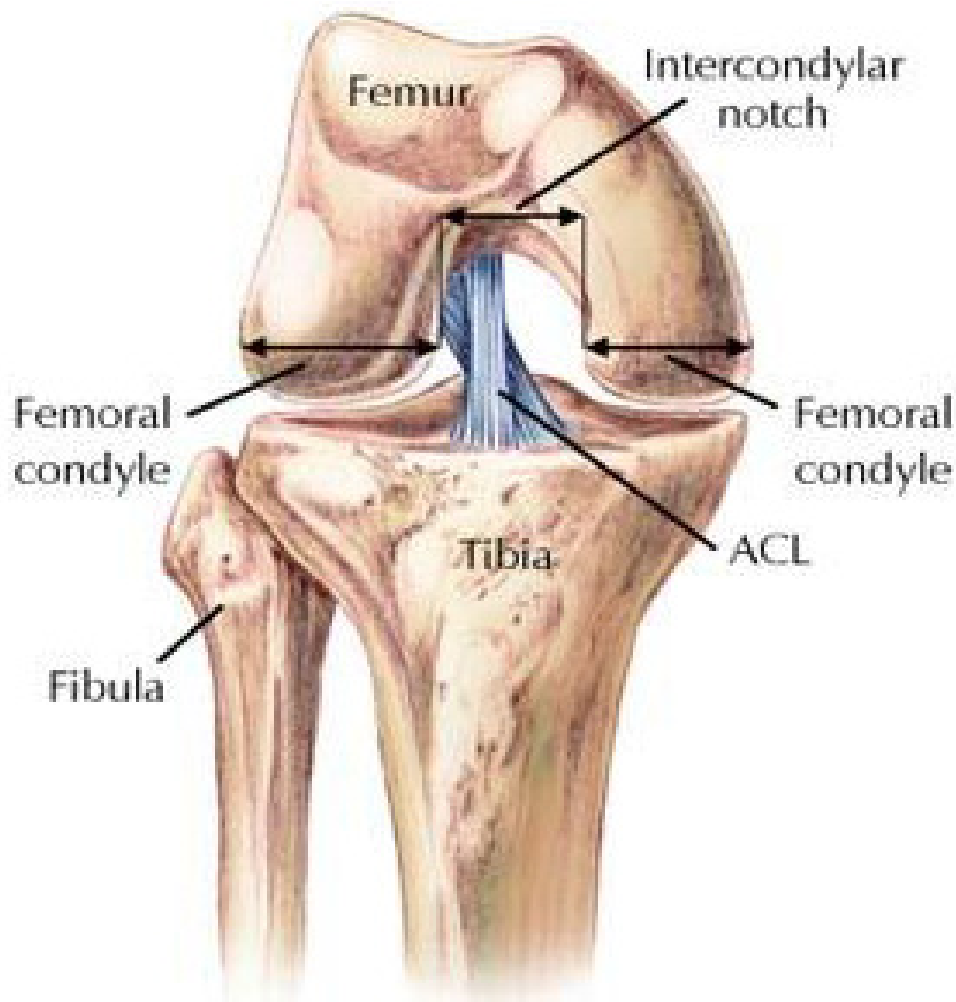


# Movement of Knee



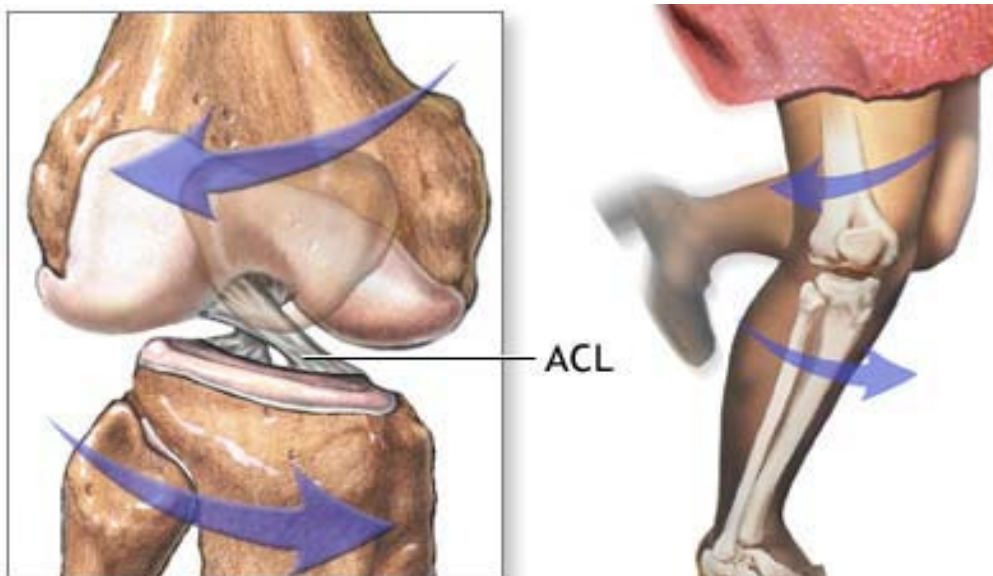
# Anatomy of the ACL

- ACL i.e Anterior Cruciate Ligament is a ligament joining the leg bone to the thigh bone. It is located inside the center of the knee joint.
- The ACL is composed of densely organized, fibrous collagenous connective tissue that attaches the femur to the tibia.



## How is the ACL torn ?

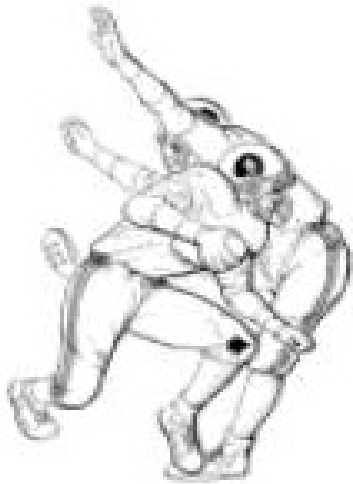
- It can be torn in sports, falls, two wheeler accidents.
- A twisting injury to the knee is the commonest mechanism of ACL injury. It occurs when the leg is planted on the ground and the thigh rotates inwards.
- Another mechanism is when the knee turns forward excessively.
- A sudden stop, twist
- Extreme hyperextension
- Direct contact



ACL injuries occur when bones of the leg twist in opposite directions under full body weight



## Pattern of Injury



A twisting and hyperextension injury commonly causes an ACL +/- PCL tear.



A hyperextension injury in a nonweight bearing leg can cause an ACL or PCL tear.



A hyperflexion injury such as a fall in skiing causes an ACL tear.



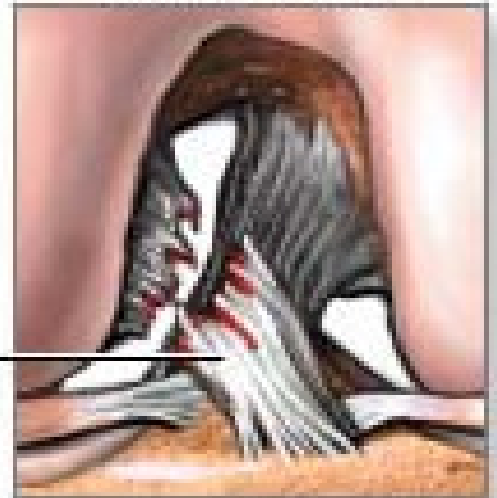
# Severity of Injury

- **Grade I** A mild injury that causes only microscopic tears in the ACL. Although these tiny tears may stretch the ligament out of shape, they do not affect the overall ability of the knee joint to support your weight.
- **Grade II** A moderate injury in which the ACL is partially torn. The knee can be somewhat unstable and can "give away" periodically when you stand or walk.
- **Grade III** A severe injury in which the ACL is completely torn through and the knee feels very unstable.

Partial



Complete

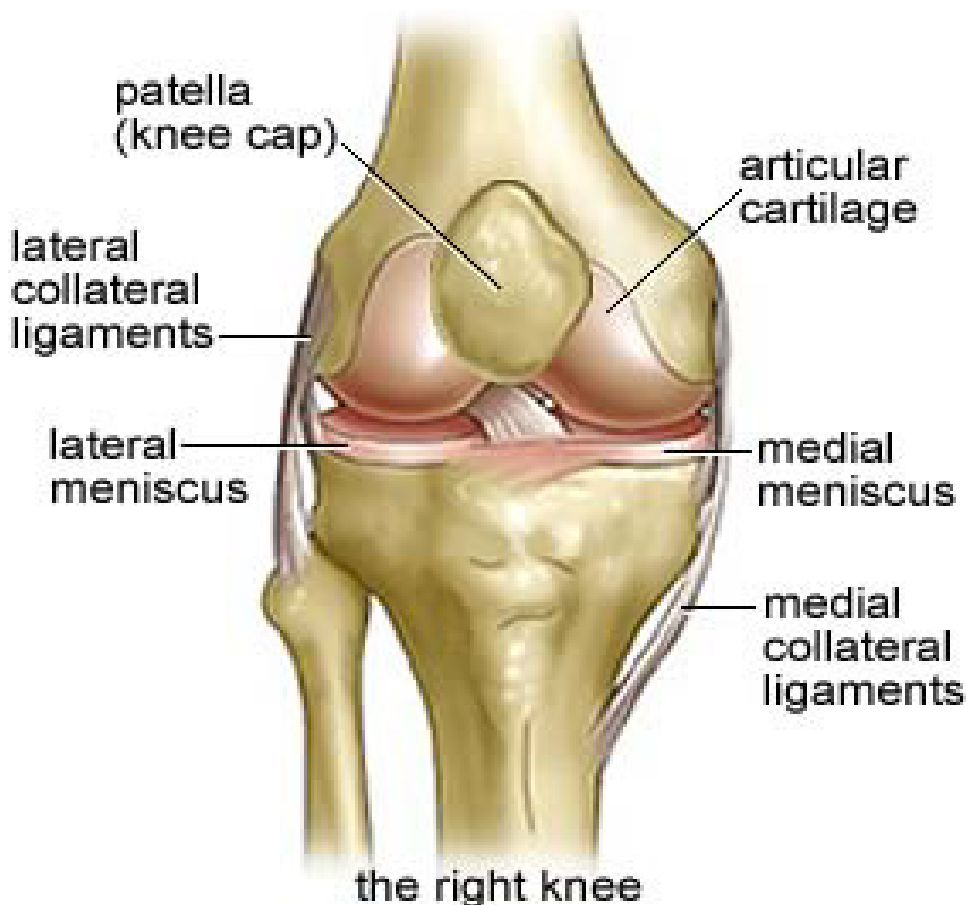


*Most ACL injuries are severe Grade III  
10% - 28% being either Grade I or Grade II.*



# ACL injuries are usually combined

- With the menisci (50 %)
- With articular cartilage (30 %),
- With collateral ligaments (30%),
- In football players and skiers, consists of injuries to the ACL, the MCL and the medial meniscus.



*In cases of combined injuries, surgical treatment may be warranted and generally produces better outcomes*





# What are the Symptoms of an ACL injury?

- Hear a "pop" from inside the knee
- Feel the knee give away at the time of injury
- Severe pain can not continue play
- There is immediate swelling as shown below.
- Pain may accompany.
- The knee may feel loose.
- Bruising may be present.

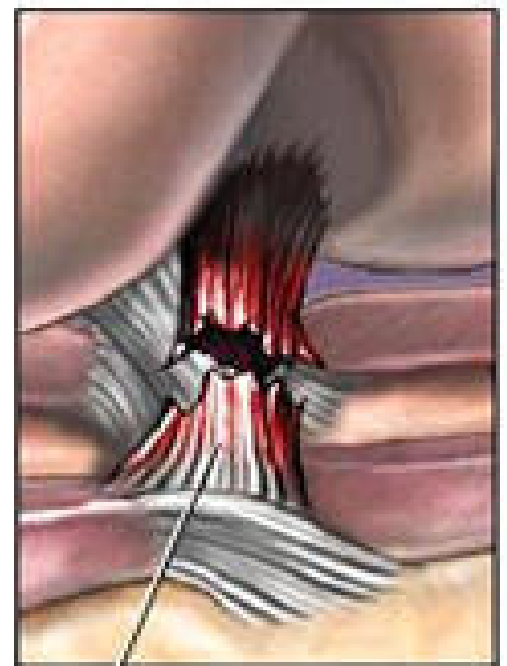


# What are the Outcomes of ACL injuries?

- The knee feels unstable and may give away repeatedly while coming downstairs or running
- Damage can result to the cartilages and menisci within the knee
- Early **osteo-arthritis** may set in.



Viewed  
Through  
Arthroscope



Torn anterior  
cruciate ligament

## What are the Risk Factors to ACL tear ?

- High-risk sports like : football, baseball, soccer, skiing, and basketball
- Females at more risk than male
- Certain types of Footwear:



# What Examinations are done ?

## 1. Inspection:

-immediate effusion >> intra-articular trauma.

## 2. Assess ROM:

Lack of complete extension.

## 3. Palpation:

Any meniscus or collateral tears or sprain.

- **Lachman test: most sensitive test**



## Examinations 2

- **Pivot shift test:**



- **Anterior drawer test : least reliable**



# What Investigations are done ?

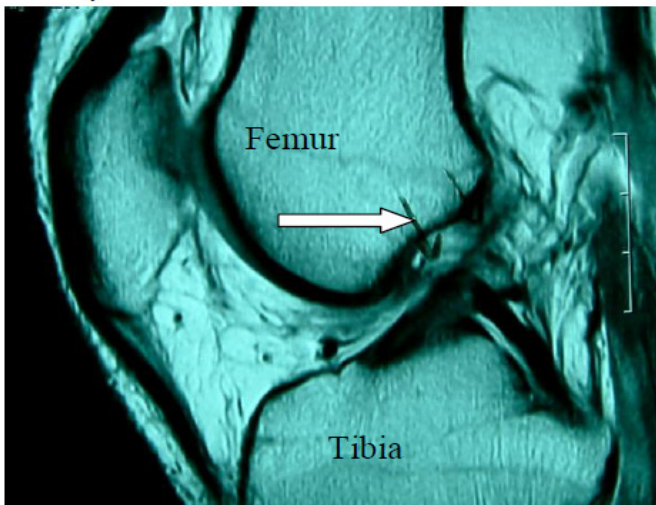
- **Laboratory Studies**
- **Imaging Studies**
- **Other Tests**

**Laboratory Studies : Arthrocentesis (rarely performed)**

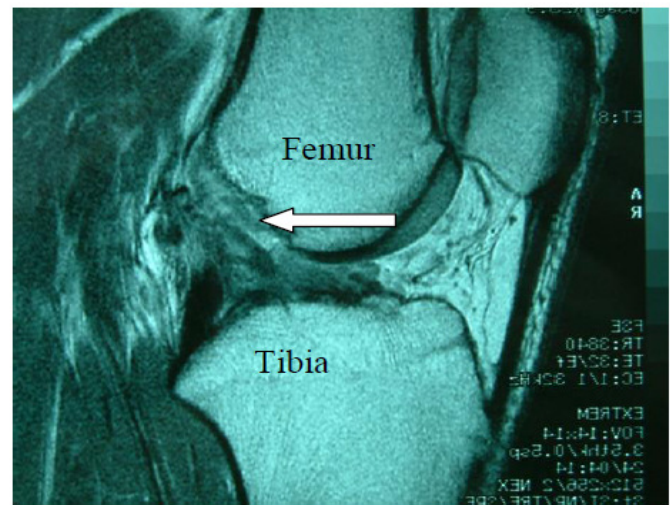


## Imaging Studies:

- Plain radiographs. Usually -ve
- Arthrograms replaced by MRI
- MRI
  - \* *Gold standard,*
  - \* *90-98% sensitivity.*
  - \* *identify bone bruising.*



MRI scan shows the ACL torn from its attachment to the femur



MRI scan shows the ACL has 'blown out'



## Other Studies:

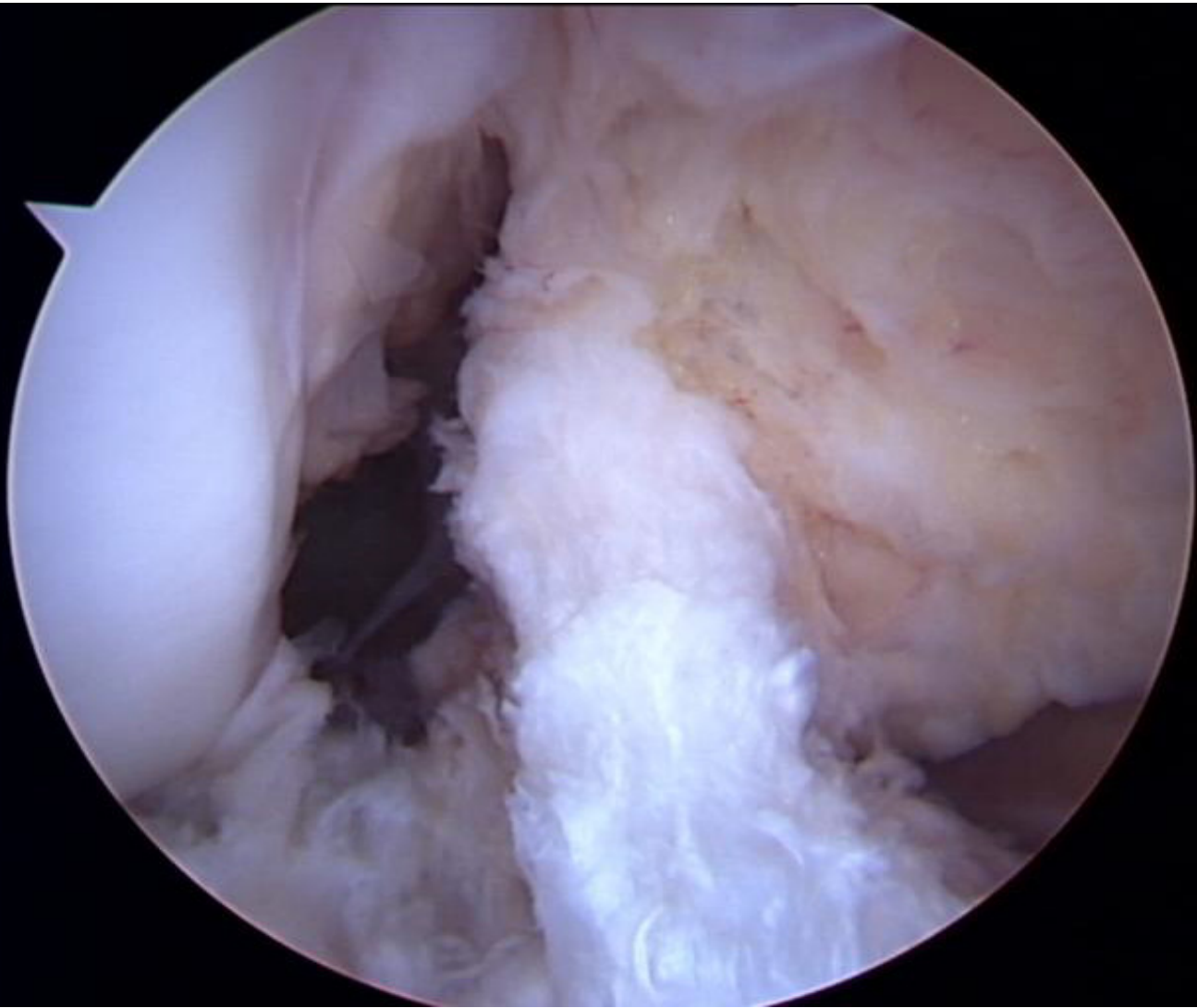
### KT-1000

greater than 3 mm as measured by the KT-1000 is classified as pathologic.





# Arthroscopic View



Arthroscopic view of a torn ACL. Note that the ligament has detached from the femur



# What are the modes of treatment ?

- If the patient has repeated symptoms, then surgical reconstruction is the best form of treatment.
  - Non operative treatment may be indicated in older patients.
  - Surgical treatment is known as ACL reconstruction. The ligament cannot be repaired at present and has to be reconstructed.
- 

## Treatment Options At A Glance

- Immediately after injury
  - **R.I.C.E ( Rest Ice Compression Elevation )**
- Non surgical treatment
  - **Exercise (after swelling decreases and weight-bearing progresses)**
  - **Braces**
    - **Rehabilitation Brace**
    - **Functional Brace**
- Surgical treatment



# Patient Consideration

- For Active adult patients: consider surgical treatment
- For Young children or adolescents: delay ACL surgery until the child is closer to skeletal maturity.
- If necessary, one should modify the ACL surgery technique



# Rehab Total Range of Motion

- **Ideal for total knees, meniscus repairs, regenerative chondroplasty, ligament surgeries and patella realignments,**
- **Range of motion control and short cuffs for extended rehabilitation.**



# Hinge Functional Knee Braces

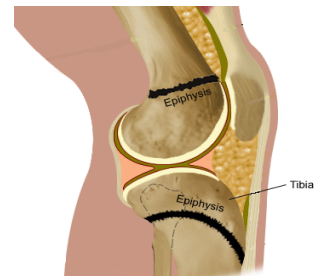
- **Have rigid metal supports down the sides of the brace to reduce knee instability following injury.**



# Non Surgical Treatment

- **Isolated ACL tears**

- With partial tears and **NO** instability symptoms
- With complete tears and **NO** symptoms of knee instability during low-demand sports who are willing to give up high-demand sports
- Who do light manual work or live sedentary lifestyles
- Whose growth plates are still open (children)



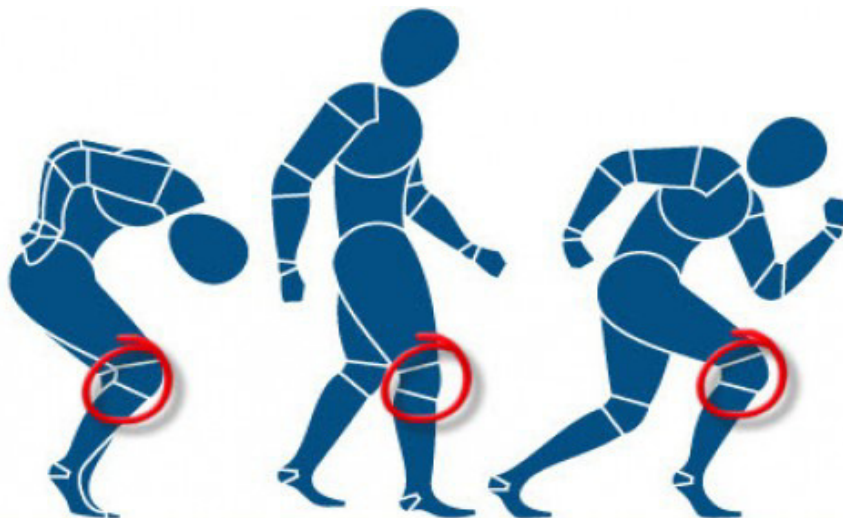
## Non surgical Precautions

- Modification of active lifestyle to avoid high demand activities
- Muscle strengthening exercises for life
- May require knee brace
- Despite above precautions, secondary damage to knee cartilage & meniscus leading to premature arthritis



# Surgical Intervention and Considerations

- ACL tears are not repaired using suture
- Replaced by a graft made of tendon
- The goal is
  - prevent instability
  - restore the function of the torn ligament
  - allows the patient to return to sports
- Not performed until several weeks after the injury
  - To allow the swelling to decrease, inflammation to subside, and range of motion to improve



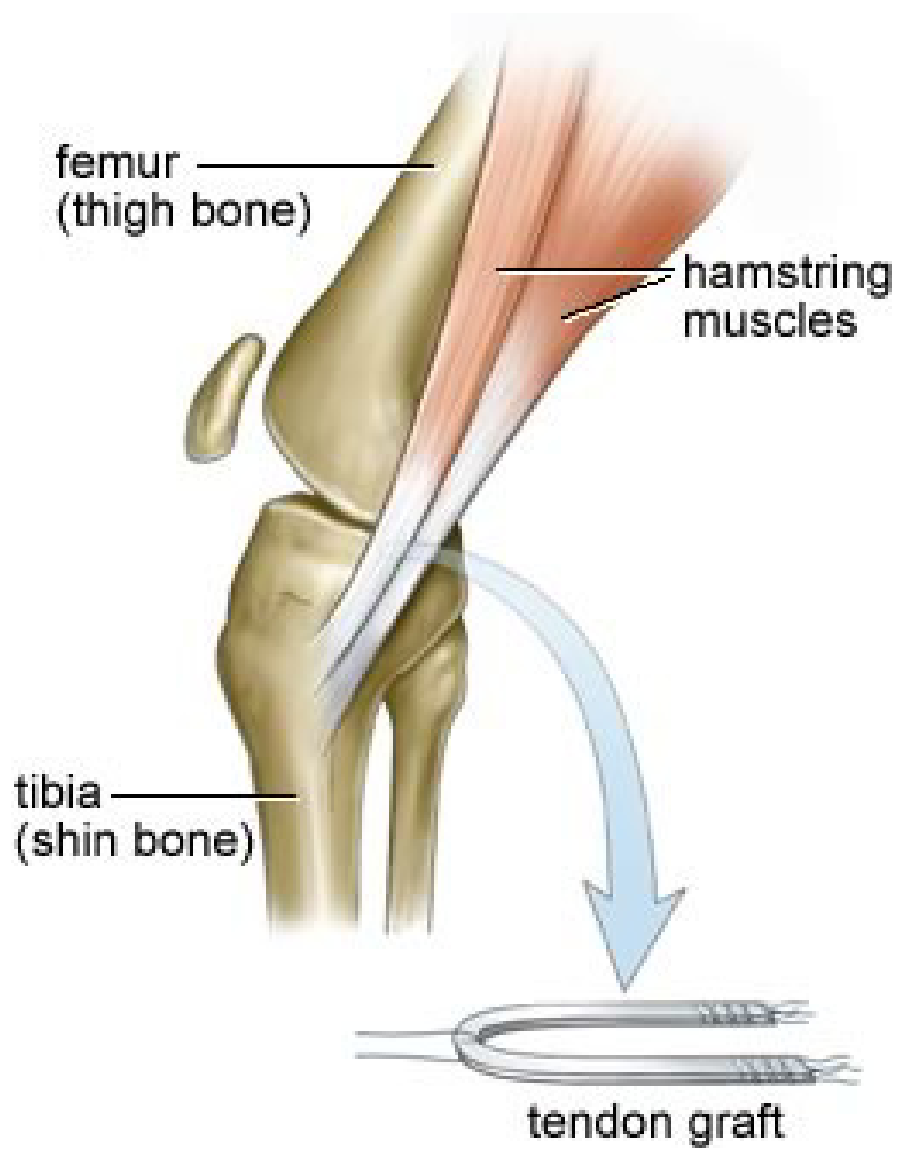
## How is the Surgery done?

- A piece of tissue either taken from your own body or a cadaver is used to reconstruct the ACL.
- It is commonly done through key hole surgery to prepare and position the tissue ( graft)
- The procedure is a day care procedure
- The patient follows the physical therapy program





# Surgical Technique



# Grafts Choices

When a patient is undergoing **ACL reconstructive surgery**, there are a variety of options available. Most of these graft choices have a high success rate and allow patients to return to their pre-surgery condition. The difference in graft harvesting techniques, not so much the outcomes of the reconstruction, is what determines an orthopedic surgeon's choice regarding which graft to use.

The same graft may not be appropriate for two different patients with the same type of injury, so the choice of graft is very much a case by case basis. Patients who understand a bit about graft choices can see what their options are when it comes to ACL reconstruction surgery.

## ACL Surgery Graft Choices

Once the patient decides to proceed with anterior cruciate ligament reconstruction, he/she must then choose which graft to use to recreate the new ligament. Several options exist including:

**Autograft** – Tendon taken from the patient's own body at time of surgery

**Allograft** – Donor tissue prepared and stored in a certified tissue bank

**Synthetic graft** -Largely historical (and possibly an option in the future)

Autologous tendon grafts (autografts) are portions of tendon taken from around the knee that are used to reconstruct the injured ligament. Recall that ligaments connect bone to bone but tendons connect muscle to bone. ACL surgery takes advantage of the body's ability to incorporate tendon tissue into the anatomic anterior cruciate ligament attachments and convert it to healthy ligament tissue over time (typically 12-18 months). The body completes this transformation somewhat more reliably using autologous tissue. For this reason, many surgeons still consider this type of reconstruction as the "gold standard." However, as mentioned elsewhere, in many athletic populations the outcome of surgery is no different using autografts or allografts.



# Grafts Used in ACL Surgery

- **Autograft**
  - Hamstring tendon
  - Patellar tendon
  - Quadriceps tendon
- **Allograft (from a cadaver)**
  - Patellar tendon,
  - Achilles tendon,
  - Semitendinosus,
  - Gracilis, or posterior tibialis tendon



Hamstring Tendon



# FACILITIES

State of the art Equipments & Advanced Diagnostic & Surgical Facilities are available here



# Revision ACL Reconstruction

Revision ACL surgery is an operation that reconstructs a previous failed ACL reconstruction. Because more and more people, especially young athletes, are tearing their ACLs and choosing to have them reconstructed, revision ACL surgery is becoming a more common procedure. A primary ACL surgery is about 85-90% successful, meaning that roughly 15% of patients experience unsatisfactory results such as pain, stiffness, inability to return to desired activities, or a re-tear of the reconstructed ligament.

Sub-optimal outcomes after ACL reconstruction may occur for a variety of different reasons: improper placement or fixation of the first ACL graft, failure of the graft to heal into the bone, or another injury that tears the reconstructed ligament. Additionally, a patient's anatomy or biomechanics may predispose him or her to increased risk of failure of ACL surgery.

When pursuing a revision ACL reconstruction it is important to determine why the previous ACL graft failed in order to minimize the probability of repeat failure. Revision ACL reconstruction is not as successful as primary ACL reconstruction because tunnels have already been made in the bones in order to affix the initial graft. For this reason, it is very important to take a step-by-step approach to revision surgery by first determining why the previous surgery failed. This process will likely involve additional MRIs, standing x-rays, and in some cases, surgery prior to the reconstruction. Arthroscopic surgery may be necessary to remove screws and other fixation devices from the previous ACL surgery, and a bone graft may be needed to fill in the tunnels so a new graft can be strongly affixed within the bone. In some cases, an osteotomy (realignment of the leg bones) or reconstruction of other knee ligaments may be recommended to maximize stability of the knee. Although these staged surgeries create a lengthy process, it is important to remember that the diagnosis of ACL failure is critical to the goal of a successful revision surgery.

Dr. Santosh kumar has over decades of experience performing revision ACL surgeries and believes in crafting an individualized treatment approach that gives you the best possible chance at returning to all your desired life activities. If you are struggling with a failed ACL and want to discuss your options for a successful revision procedure, make an appointment today



## How long does it take to recover?

- You should be able to go home the same day or the day after.
- It takes **six months** to recover sufficiently to return to running
- And **one year** to return to sports.



# Physical Therapy & Rehabilitation

## Physical Therapy Before Surgery

- Physical therapy plays a crucial role in successful ACL surgery
- Usually patients are sent to a physical therapist. The main goal of the therapy session is to attain the full range of motion. Patients who have stiff, swollen knee during surgery may have problems regaining motion post surgery. It takes 3 or more weeks to gain full range of motion after the initial injury. Braces are recommended during this time so that the injury may heal before the surgery

## Physical Therapy After Surgery

- After the surgery, precautions are taken to keep the wound dry and clean. Initially, physical therapy sessions emphasis on straightening knee and resorting quadriceps control.
- Ice is used to reduce swelling and pain. Physician determines if crutches and post operative braces should be used.
- The primary goal of physical therapy is to attain full range of motion as well as strengthening quadriceps and hamstring muscles while keeping swelling and pain under control.



# Rehabilitation

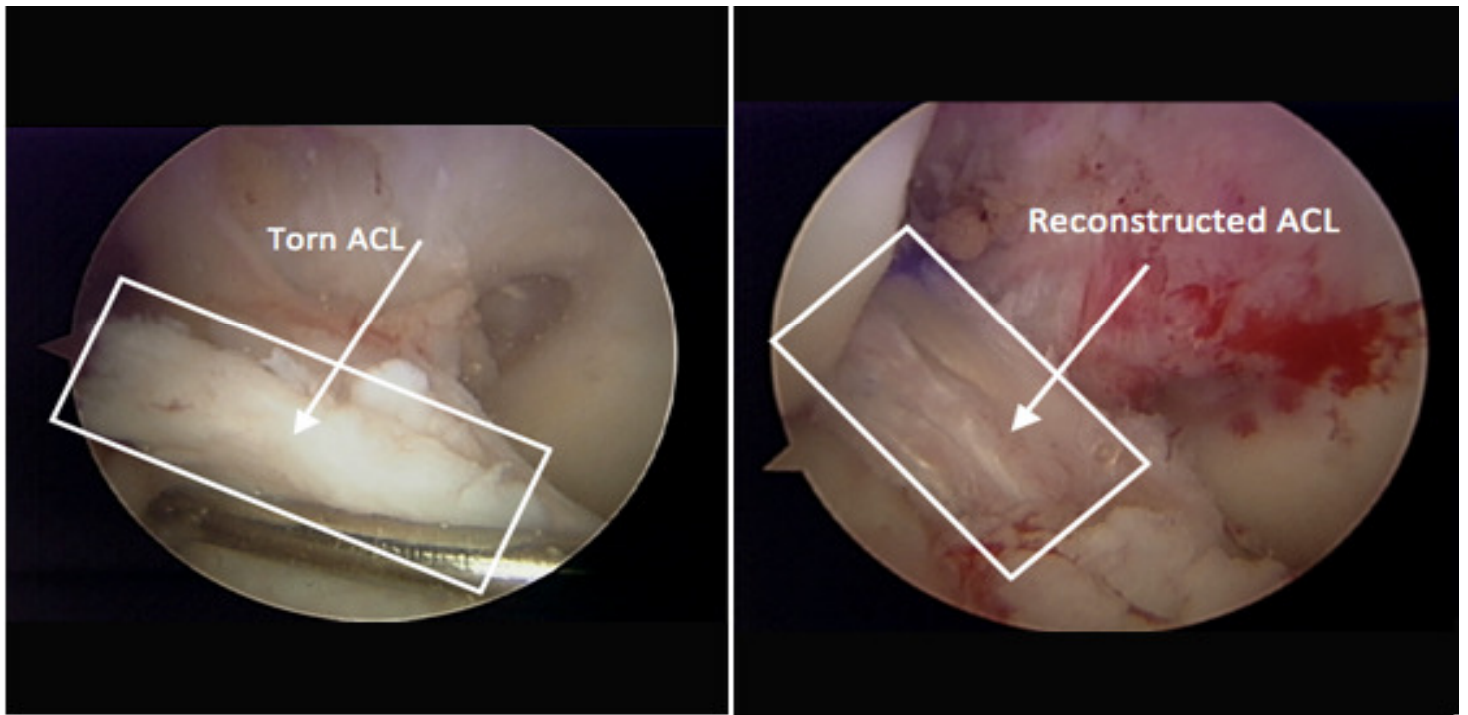
After you have been treated for your condition, we want to ensure that you heal properly and regain strength. Our rehabilitation team will work with you in a private setting, at your own pace and comfort level, so that you can return to your daily lifestyle. Through exercises and training, our certified physical therapy team is here to help you get back to the things you love.

**Your post operative care takes place here**





# Before & After – ACL Surgery



**Success Rate of ACL surgery**

**Success rate of ACL  
reconstruction is  
up to 95 %.**

