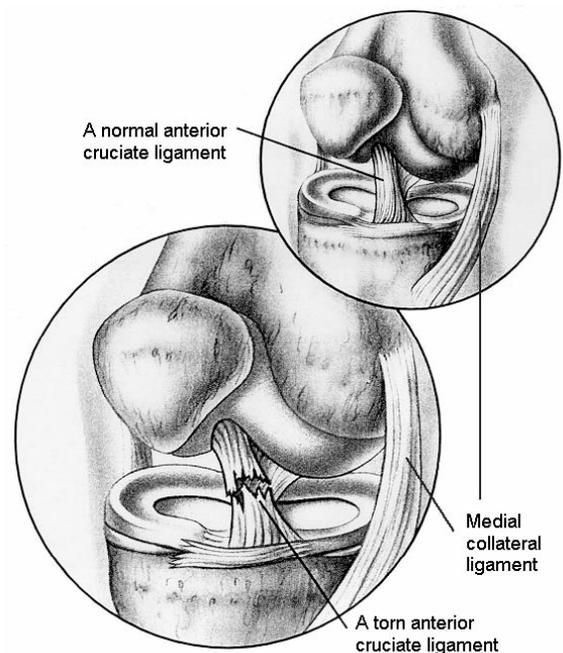




INFORMATION SHEET FOR PATIENTS WHO HAVE RUPTURED THEIR ANTERIOR CRUCIATE LIGAMENT

The anterior cruciate ligament (ACL) is a 38mm long band of fibrous tissue that connects the femur (thigh bone) to the tibia (shin bone). Its function is to control and limit the amount of forward movement of the outer side of the joint when performing twisting actions. The cruciate ligament is usually not required for normal daily living activities, however, it is essential in controlling the rotation forces developed during side stepping, pivoting and landing from a jump.

THE CLASSIC HISTORY The ACL is commonly injured whilst playing running ball sports or skiing. Whilst playing ball sports momentum is developed and upon attempting a pivot, side step or propping maneuver, the knee gives way. When skiing, rupture may occur at low or high speeds. Commonly the binding fails to release as the ski twists the leg resulting in a tearing sensation. Patients frequently hear or feel a snap, or crack accompanied by pain. Swelling commonly occurs within the hour, but is modified by ice or compression. Frequently pain is felt on the outer aspect of the knee as the joint dislocates. This dislocation may be felt to reduce with a clunk. Frequently with ski injuries the medial ligament of the knee joint may also be disrupted resulting in severe pain and swelling about the inner side of the joint. It is an ominous sign of major ligament injury when little or no swelling occurs as the swelling is able to leak into the soft tissues of the leg. Initial treatment of any knee ligament injury should consist of ice packs, compression bandages and crutches. It is difficult to weight bear for several days, however, after seven to ten days the swelling settles and walking is possible with the joint gradually regaining a full range of motion. By four weeks following injury the knee becomes almost normal. Patients who return to sport following injury usually notice a weakness or instability. Further episodes of instability result in multiple injuries to the cartilages and the joint surfaces. Damage to these structures eventually leads to osteoarthritis.



RATIONALE FOR TREATMENT

The goal of treatment of an injured knee is to return the patient to their desired level of activity without risk of further injury to the joint. Each patient's functional requirements are different. Treatment may be without surgery (conservative treatment) or with surgery (surgical treatment). Those patients who have a ruptured ACL and are content with activities that require little in the way of side stepping (running in straight lines, cycling and swimming) may opt for conservative treatment.

Those patients who wish to pursue competitive ball sports, or who are involved in an occupation that demands a stable knee are at risk of repeated injury resulting in tears to the menisci, damage to the articular surface leading to degenerative arthritis and further disability. In these patients, surgical reconstruction is recommended.



TREATMENT OPTIONS

Conservative Treatment

Conservative treatment is by physical therapy aimed at reducing swelling, restoring the range of motion of the knee joint and rehabilitating the full muscle power. Proprioceptive training to develop the necessary protective reflexes are required to protect the joint for normal daily living activities. As the cruciate ligament controls the joint during changes of direction, it is important to alter your sports to the ones involving straight line activity only. Social (non-competitive) sport may still be possible without instability as long as one does not change direction suddenly.

Surgical Treatment

Patients who are unable (generally young adults) or those unwilling to lower their level of activity, are at risk of causing further damage to their knee should they return to sporting activity and are advised to undergo surgical reconstruction. Studies have shown that this is best carried out on a pain free, healthy joint with a full range of motion. Patients are referred to their physiotherapists who supervise their knee rehabilitation. When the knee returns to its normal healthy state it is strongly advised to refrain from playing competitive sport prior to surgical reconstruction as this may lead to irreparable damage to the joint cartilage or menisci.

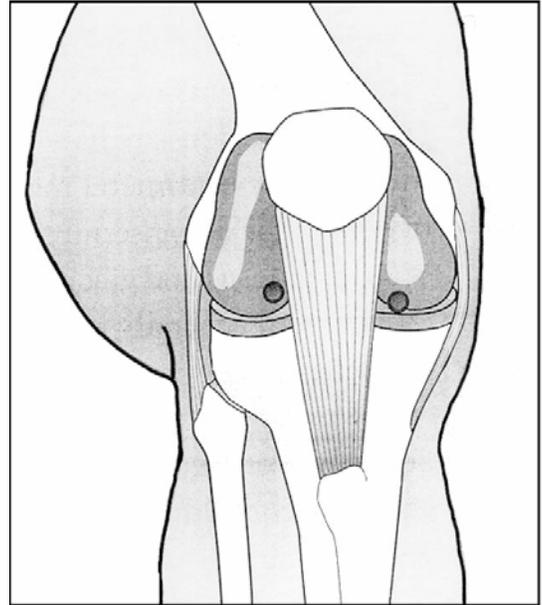
All reconstructive procedures for the ACL require a graft. Our reconstructive technique involves grafting the torn ACL with segments of your hamstring tendons. This technique utilizes specially designed screws allowing secure immediate fixation of the tendon within the joint allowing for a rapid rehabilitation, dispensing the need for a brace or plaster. The surgery is frequently carried out as a day surgery procedure. A >95% success rate is normal with some deterioration over time depending upon other damage within the joint. Our long term results suggest that stabilizing the joint protects menisci and thus lessening later osteoarthritis degenerative change. Although ACL reconstruction surgery has a high probability of returning the knee joint to near normal stability and function, the end result for the patient depends largely upon a satisfactory rehabilitation and the presence of other damage within the joint. Advice will be given regarding the return to sporting activity, dependant on the amount of joint damage found at the time of reconstructive surgery. It is important to preserve damaged joint surfaces by restricting impact loading activity to delay the onset of degenerative osteoarthritis later in life.

Arthroscopy: Using an arthroscopy through the two small incisions the surgeon will remove the torn ACL and perform required meniscal surgery.

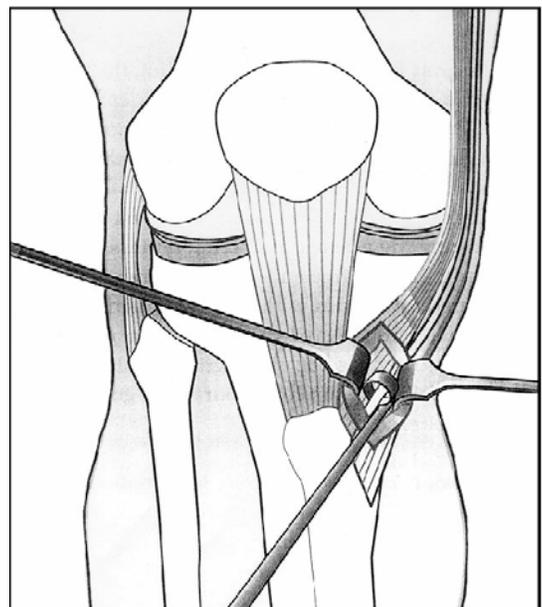
Graft Harvest: Through a single incision the hamstring tendons are removed to be used for the graft.

Tunnel Drilling: Small tunnels are drilled in the bone to prepare for graft fixation.

Graft Fixation: The graft is inserted into the drilled tunnels and fixed in place with screws. Depending on bone quality, supplementary fixation, in the form of a staple may also be required. A temporary drain may be inserted into the joint to keep it free of excess fluid.



Arthroscopy: Using an arthroscope through the two small incisions the surgeon will remove the torn ACL and perform required meniscal surgery.

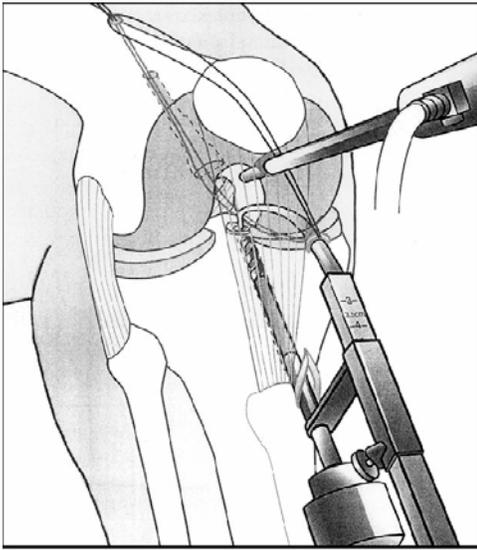


Graft Harvest: Through a single incision the hamstring tendons are removed to be used for the

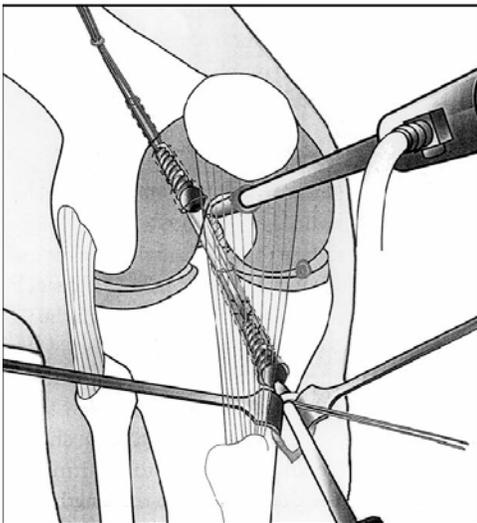


LYMAN ORTHOPEDICS

JEFFREY LYMAN, M.D.



Tunnel Drilling: Small tunnels are drilled in the bone to prepare for graft fixation.



Graft Fixation: The graft is inserted into the drilled tunnels and fixed in place with screws. Depending on bone quality, supplementary fixation, in the form of a staple may also be required. A temporary drain may be inserted into the joint to keep it free of excess fluid.

WHY DOES THE ANTERIOR CRUCIATE LIGAMENT FAIL TO HEAL?

Unlike other ligaments about the joint, the ACL passes through the joint and is surrounded by joint fluid. Other ligaments heal by scar formation, however due to the unique location of the ACL the bleeding is uncontained, filling the joint causing pain and swelling. The blood irritates the knee joint's lining to produce synovial fluid. This fluid is designed to dissolve and prevent blood clotting within the joint. The result is that the ACL rarely heals in continuity.

The medial collateral ligament (MCL) however will heal extremely well by scar tissue with the brace immobilization as this ligament is external to the joint lining and synovial fluid. Rarely does the ACL heal, most likely with partial tears only.

WHAT IS INVOLVED FOR YOU AS THE PATIENT

- Healthy patients are admitted on the morning of their surgery. You should inform your surgeon and anaesthetist, of any medical conditions or previous medical treatment as this may affect your operation.
- It is extremely important that there are no cuts, scratches, pimples or ulcers on your lower limb as this greatly increases the risk of infection. Your surgery will be postponed until the skin lesions have healed. You should not to shave or wax your legs for one week prior to surgery.
- Patients should cease smoking and taking the oral contraceptive pill one week prior to surgery as this increases the risk of thrombo-embolism (life threatening blood clots).
- After the operation you will be required to stay in hospital for the day. Overnight stay may be required due to the affects of the anesthetic or an inability to manage crutches.
- Physiotherapy is commenced immediately post operatively. Your own physiotherapist will supervise muscle contractions, crutch walking and weight bearing. Physiotherapy will continue on a daily basis following your surgery until the dressings are removed 7-10 days following surgery. By this time you should be able to walk without crutches. Sedentary and office workers may return to work approximately 3-5 days following surgery. Most patients should be walking normally 14 days following surgery although there is considerable patient to patient variation.
- Should the left knee be involved then driving an automatic car is possible as soon as pain allows. You must not drive a motor vehicle whilst taking severe pain killing medications. Should the right knee be involved driving is permitted when you are able to walk without crutches.



- Physiotherapy is continued intensively until 4 to 6 weeks when jogging under controlled conditions is commenced.
- Solo sport as part of a comprehensive rehabilitation program commences at approximately 6-10 weeks. Ideal solo sports are shooting basket balls, solo squash or hitting a tennis ball against a wall.
- Playing sport non-competitively or training is possible at 4 to 6 months. Training may commence when an adequate rehabilitation of the thigh musculature has occurred. A return to competitive sport is permitted at 9-12 months following surgery, again provided that there has been a complete rehabilitation and the joint is demonstrated to be stable.

Complications related to surgery

- **Pneumonia:** Patients with a viral respiratory tract infection (common cold or flu) should inform the surgeon as soon as possible and will have their surgery postponed until their chest is clear. Patients with a history of asthma should bring their inhalers to hospital.
- **Deep vein thrombosis and pulmonary embolus:** Although this complication is rare following arthroscopic surgery, a combination of knee injury, prolonged transport and immobilization of the limb, smoking and the oral contraceptive pill or hormonal replacement therapy all multiply to increase the risk. Any past history of thrombosis should be brought to the attention of the surgeon prior to your operation. The oral contraceptive pill, hormonal replacement therapy and smoking should cease one week prior to surgery.
- **Excessive bleeding resulting in a haematoma** is known to occur with patients taking aspirin or nonsteroidal anti-inflammatory drugs -such as Voltaren, Naprosyn or Indocid. They should be stopped at least one week prior to surgery and probably should not be taken at all.

Complications specifically related to your knee reconstruction surgery.

- Postoperative bleeding & marrow exuding from the bony tunnel may track down the shin causing red inflamed painful areas. Characteristically when standing up the blood rushes to the inflamed area causing throbbing this should ease with elevation and ice packs. This may end with a bruise and slight swelling around the ankle usually lasting about 1 week. This is a normal postoperative reaction and only delays short term recovery.

Due to the skin incision patients may notice a numb patch on the outer aspect of their leg past the skin incision. This is of no functional significance and is unavoidable. The numb patch tends to shrink with the passage of time and does not affect the result of the reconstructed ligament.

- Your hamstring musculature will recover quickly and tendon re-growth may be felt at 14 days following surgery. However scar tissue forms around the reformed tendons. This may tear and is felt as a pop or tear behind the knee on the inner side. This will usually set your rehabilitation back a few days only. Scar tissue may tear more than once but does not usually occur after 6-8 weeks post operative.
- Graft failure due to poorly understood biologic reasons occurs in approximately 1% of grafts and a further 1% of grafts rupture during the rehabilitation program.
- Surgery is carried out under strict germ free conditions in an operating theatre. Antibiotics are administered intravenously at the time of your surgery. Any allergy to known antibiotics should be brought to the attention of your surgeon or anesthetist. Despite these measures, following arthroscopic ACL reconstructive surgery there is a less than 1 in 400 chance of developing an infection within the joint. This may require treatment with antibiotics or may require hospitalization and arthroscopic draining of the joint with intravenous antibiotics. Subsequent to such procedures prolonged periods of antibiotics are required and the post operative recovery is slowed. Do not shave or wax your legs prior to surgery and report any skin abrasions or cuts to your surgeon.

As with all operations if at any stage anything seems amiss it is better to call for advice rather than wait and worry. A fever, or redness or swelling around the line of the wound, an unexplained increase in pain should all be brought to the attention of the surgeon. You can contact Dr Lyman by telephoning his personal assistant during business hours or the answering service after hours. They will then contact Dr Lyman and arrange for immediate treatment.

For any questions please do not hesitate in contacting our staff:

(602)903-1824 DIRECT LINE
WWW.LYMANKNEEMD.COM
(602)903-1814 FAX LINE