

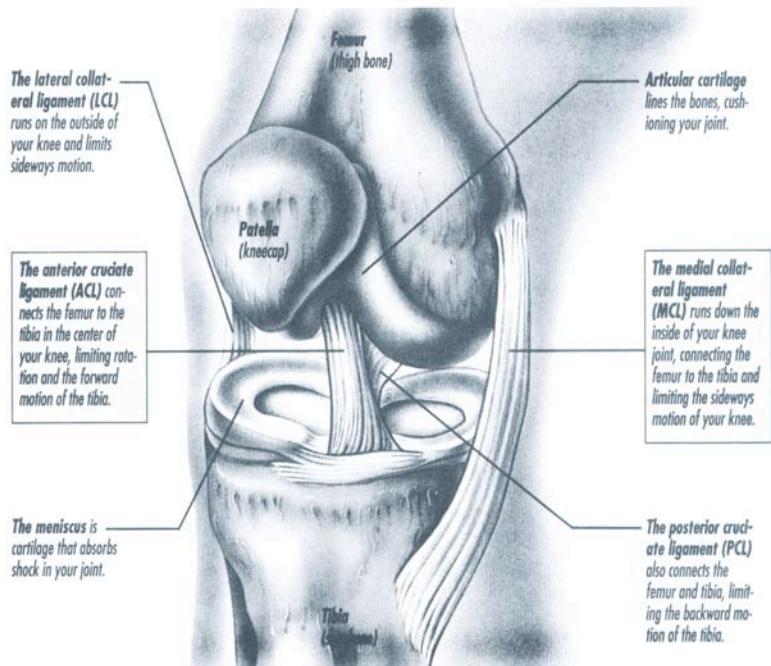
ACL RECONSTRUCTION

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ACL

It is easy to take your knees for granted. Without giving it a second thought, you walk, climb, sit, or kneel thanks to the mobility of your knees. Ligaments play a big role in bracing your knee joints for these activities. When you injure a ligament you may feel as though your knees won't allow you to move or even hold you up. Fortunately, you and your health care team can make a joint effort to return you to an active lifestyle.

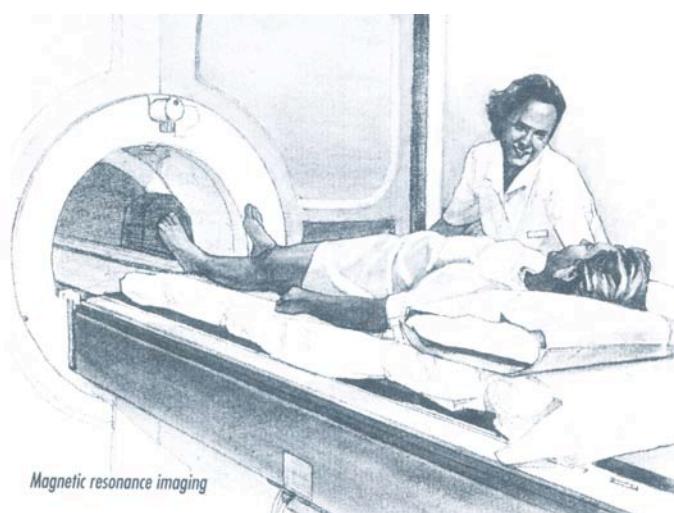
Ligaments; Natural braces for your knees



causing a variety of symptoms. If left untreated, serious problems such as arthritic changes may develop.

Torn Ligaments

Two ligaments in your knees are more prone to injury. The Anterior Cruciate Ligament (ACL), in the center of your knee, is commonly injured in a twisting motion. Losing control of your skis or landing improperly in basketball are a few examples. The Medial Collateral Ligament (MCL), on the inside aspect of your knee is vulnerable to blows from the side, common in contact spots such as football where the knee is hit from the side by a large force. Either injury may weaken your knee joint,



An Early Evaluation

The doctor will ask you a few questions about your injury and symptoms to reach a diagnosis. An X-ray is taken of your knee to rule out any fractures or bony abnormalities. A physical examination is done using different maneuvers, which allows the doctor to pinpoint the location of your problem. An MRI (magnetic resonance imaging) may be required

to rule out other problems and to confirm the diagnosis. After these tests, you must decide whether to continue playing sports, in which case a surgical procedure often yields the highest success rate. Proper care can restore your joint's stability. It takes teamwork: you, your orthopaedist, and your physical therapist working together. A great prognosis depends mainly on you post-operatively.

Pre-Aadmission Testing

When you elect to have the ACL Reconstruction procedure, you will need to have a thorough physical exam, blood work, urine analysis, chest X-ray, and EKG. Once you have chosen a date for surgery, the hospital will set up an appointment for you for pre-admission testing (P.A.T.). Once the hospital makes this appointment they will contact the doctor's office. The doctor's office will then call you to confirm the date and time of your appointment. Please be prepared to outline your past medical history, medications you are taking, if any, and allergies (i.e. to drugs, latex, etc.) Your medical record will be reviewed after all the test results are in. If you have a private internist with whom you would rather have the tests done, have him/her do the above listed exams at least two weeks prior to the surgery. The results on your doctor's stationery must be faxed over immediately to our office at (805) 496-6816. The lab results along with a complete history and physical and letter of medical clearance (dated within 30 days of surgery) must be received no later than 4 days prior to surgery to avoid automatic cancellation. Consent forms for the procedure must be signed by you and they can be either dropped off or mailed to our office. Our office must receive the signed consents no later than 4 days prior to surgery. Failure to comply will lead to cancellation of surgery. You will be contacted by the medical equipment company who will measure you for a post-op brace as well as coordinate a date for delivery of a continuous passive motion (CPM) machine to your home. If you have not heard from them by the day prior to surgery, call Team Post-op (818.706.3915) and tell them you will be undergoing ACL Reconstruction. They will know what to do.

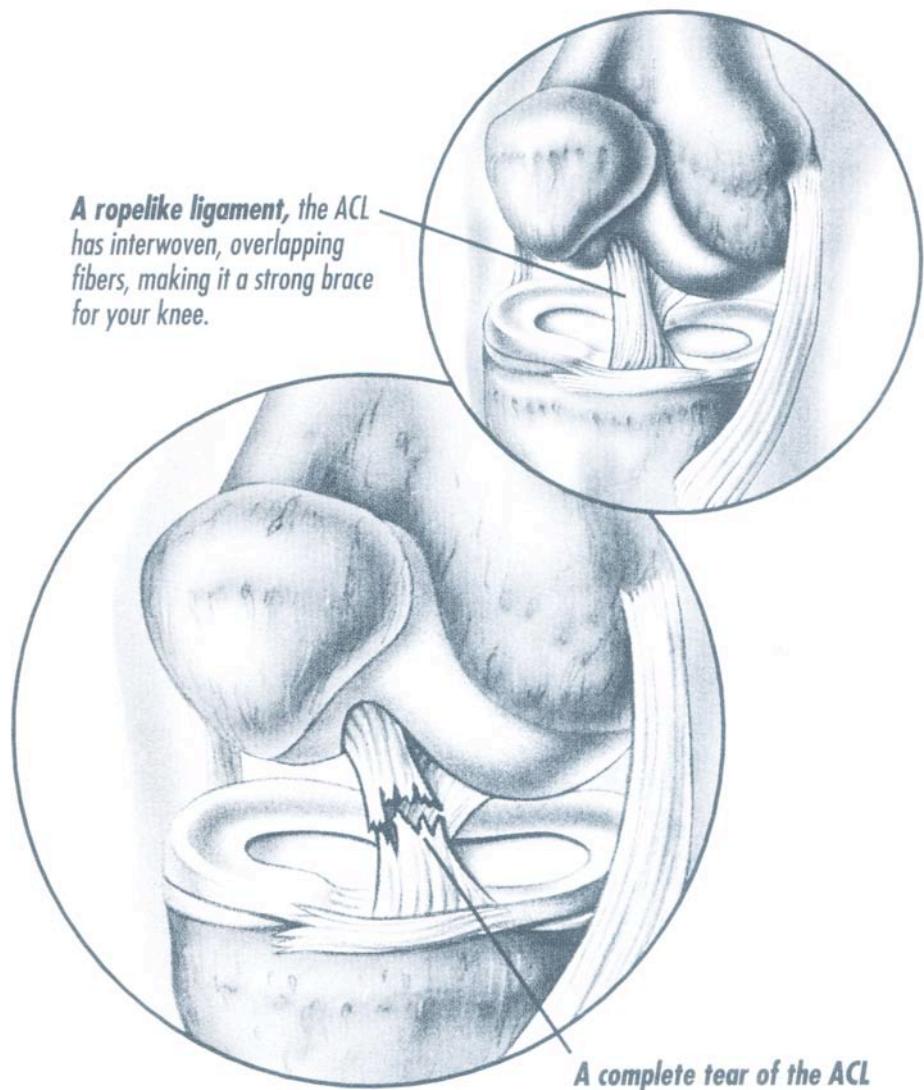
Swelling

Different types of treatment increase range of motion and reduce pain and swelling. Your doctor may use a continuous passive motion (CPM) machine to gently move your joint and help drain fluids from it. The CPM machine can be used in the hospital and at home. Ice, elevation, and pain medications may also be prescribed.

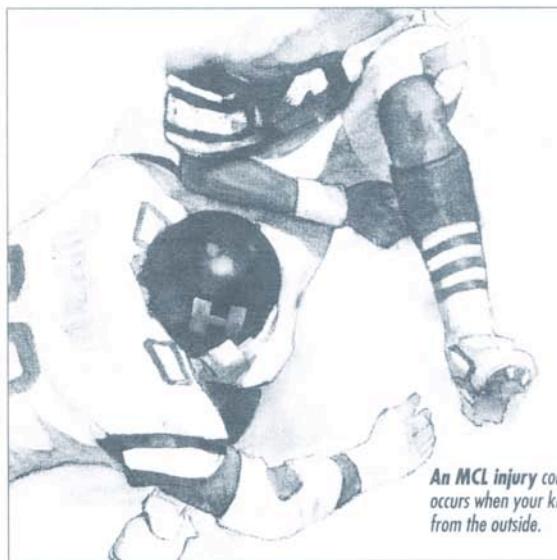


A CPM machine can help increase range of motion.

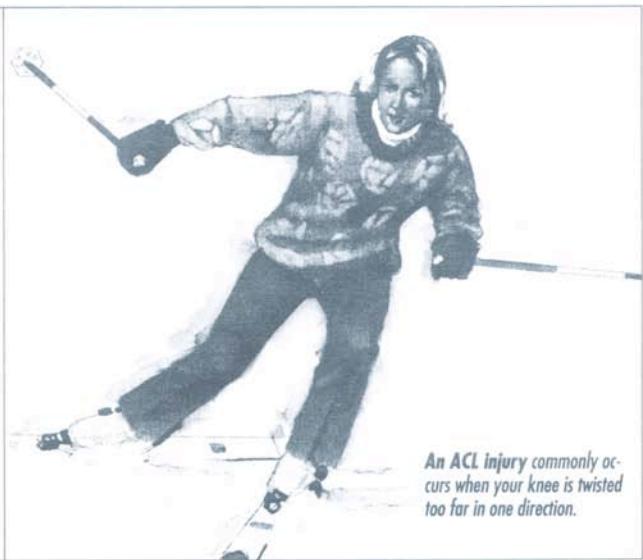
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A complete tear of the ACL



An MCL injury commonly occurs when your knee is hit from the outside.

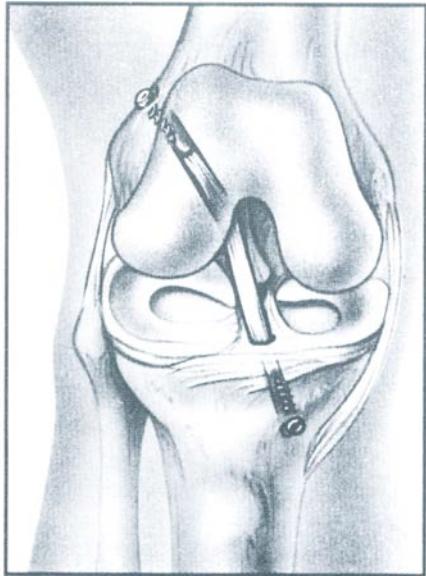


An ACL injury commonly occurs when your knee is twisted too far in one direction.

Anterior Cruciate Ligament Reconstruction

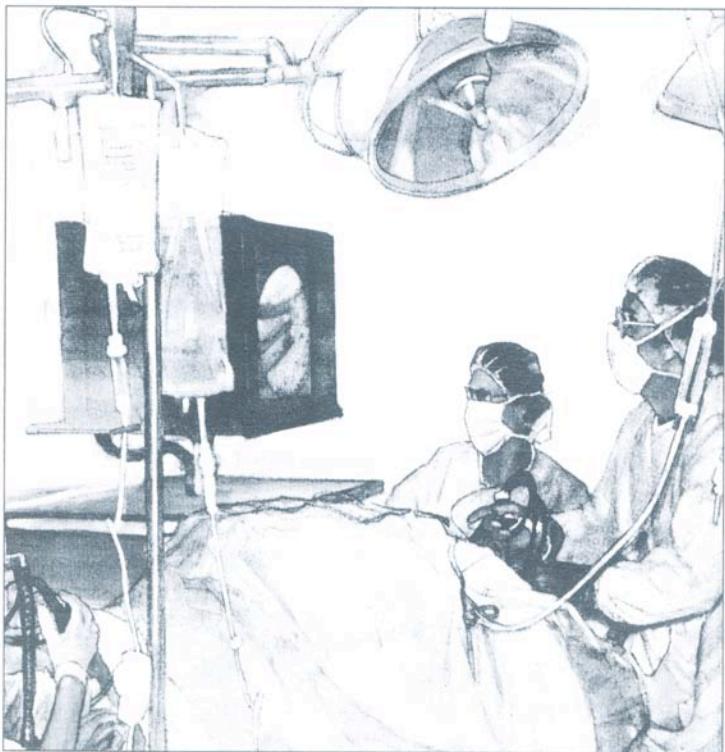
The most common type of surgery for an ACL injury is a reconstruction, which involves replacing the torn ligament with a tendon (graft) from your own knee. The initial portion of the procedure is done through an arthroscope to confirm the ACL has been torn. After verifying the ACL is torn, a small 4-5 cm. incision is made to harvest the graft. The graft is usually an autograft and is taken from the central one-third of your own patella tendon, which is located just below your kneecap. Depending on your age and activity level the doctor may also recommend an allograft, which is a graft taken from a cadaver. The doctor inserts and attaches your new ACL to your knee by two small screws. These screws are usually not removed and in time become covered by bone. In a very small percentage of patients, one of the screws might become tender to touch and require removal. This is typically not done for at least one year after surgery. These metal screws are a temporary fixation until your own bone fills and becomes the permanent anchors in the knee.

Risks and Complications



The risks and complications are relatively small, but by law the doctor must inform you of them. Complications include infection (approximately 1%), peroneal nerve palsy which would cause loss of foot function (less than 1%), fracture of the patella (less than 1%), loss of screw fixation at either the tibial or femoral tunnels (less than 1%), rupture of the remaining patella tendon (less than 1%), and fracture of the tibia where the bone graft was harvested (less than 1%). Other rare complications include Reflex Sympathetic Dystrophy (RSD), which means the patient has pain, which is totally out of proportion with the findings and the surgery that has been done. This requires multiple manipulation procedures in physical therapy and can become an over-bearing part of the patient's life for years. Many of the manipulations may have to be performed with an associated arthroscopy in the operating room.

Infrapatellar contracture syndrome is also another rare complication where the patient has limited extension and flexion due to scarring. This is also a very difficult experience for the patient often requiring multiple surgical procedures, arthroscopies, manipulations, and sometimes an arthrotomy.



Anesthesia

Many patients often ask, "Why can't my surgery be done under local anesthesia?" The reason we do not like to use local anesthesia is two-fold: We use a tourniquet for the arthroscopic procedure to minimize blood loss and local anesthesia will not eliminate the significant discomfort from the tourniquet. The second reason is the local injection cannot guarantee total elimination of pain during the surgery. There are often "blind spots" which do not get anesthetized during local injections resulting in inadequate pain control. As for the preferred choice of anesthesia- it is general anesthesia, but you are not usually intubated. You are given a light intravenous sedation and

anesthetic agents, which minimize any adverse response to general anesthesia. We once again encourage you to call the anesthesia department at (805) 370-4440 with any questions regarding anesthesia.

Recovery Room

After surgery, you will spend about two hours in the recovery room. A large bandage will be on your elevated knee. You will soon be placed on a CPM machine. You will have an I.V., which allows for an antibiotic to flow for about 24 hours. Your pain will be managed by oral and I.V. pain medications. When the nurses feel you are awake and alert, you will be transferred to your room.

Family Members

Your family members and friends should be aware that the time required for pre-op check-in, nursing assessment, induction of anesthesia, prep and draping of the knee, the actual surgical time, and recovery room time can result in them not seeing you for about 4 hours. One of the members of the surgical team will inform your family when the surgery is over. Your family will not be able to see you in the recovery room, but will see you when you are transferred to your room. Family members are not allowed in the recovery room because we wish to respect the privacy of the other patients.

After Surgery

You will most likely stay no more than 24 hours in the hospital. Physical therapy will guide you on bending as well as teaching you to ambulate with crutches. You may full weight bear the next day. You should elevate your leg as much as possible on two pillows under the ankle. **Never place anything under the knee!** Ice the knee as much as possible to bring the swelling down and alleviate the discomfort. Icing often works better than the pain medication in relieving your discomforts. The sooner you bring the swelling down, the easier it will be for you to rehabilitate and control the pain. You may experience night sweats and your temperature may go up to 101 degrees for the next few days. This is a normal reaction due to the blood in your knee and your temperature will come down gradually when you begin to ambulate more. You can accelerate this by taking two Tylenol. Your dressing will be removed the day after surgery. You will notice some strips of tape and sutures on your wound **do not touch them or allow the physical therapist to cut them.** Make sure you have an appointment for outpatient physical therapy near your home prior to surgery. If you don't know of a therapy center you can call our office at (805) 495-3687 for a list. You may use any physical therapist you chose that accepts your insurance. You will be given a copy of our ACL rehabilitation protocol to take to your physical therapist. They must abide by our protocol, if they don't, please change therapists. Remember that the physical therapy is only there as a guide for you. Your strength and motion is accomplished by you working hard with the therapist and on your own.

Follow-up Visit

As soon as you get home, please call the doctor's office at (805) 495-3687 to schedule a post-op appointment, which takes place three weeks after surgery. Your sutures will be removed at that time. X-rays will be taken at your appointment. Leave plenty of time for your appointment with the doctor.

At Home

Ice your knee when you wake in the morning as well as when you are being driven to physical therapy sessions. Always have a tray of ice cubes in the refrigerator. Be prepared to experience some swelling for the first few weeks. This is normal and a reflection of the fluid in your knee at the time of the surgery.

Wound Care: Keep the scar covered if you are going to be in the sun for prolonged periods of time for the first 12 months after surgery. Scar tissue has a tendency to tan darker than normal skin and sometimes can aggregate keloid formation. You may shower, but wrap the knee in plastic wrap (ex. -Saran Wrap) to keep the Steri-Strips and suture dry. Any bleeding or drainage from the wound should be brought to the doctor's attention. Do not permit the physical therapist to massage the wound.

WHAT TO EXPECT AND WHAT IS NORMAL AFTER ACL RECONSTRUCTION

- You may experience a low-grade fever for 4-5 days after surgery. While this is normal, if your temperature should rise above 101 degrees, notify your surgeon immediately.
- You may notice a “numb” area next to the scar. It may persist for an indefinite period of time and is normal.
- You may experience “clicking” noises in your knee. These could persist indefinitely and are normal.
- There may be areas of “black-and-blue”, soreness, and swelling that travels down your leg to your foot. This is usually seen within the first week or two after surgery as a result of gravity and the bleeding that occurred during the surgery. This is nothing to be concerned about.
- You may bear full weight on the operated limb immediately after surgery unless otherwise instructed by your surgeon.
- You can shower immediately after surgery; however, wrap the knee in plastic wrap for showering until the sutures are removed. While showering is OK, taking a bath or swimming is not allowed until the sutures are taken out.
- As you begin to ambulate, you may notice your knee “catches”, i.e. it gets “stuck” when you try to straighten it out. You will tend to “shake” your leg to get the knee straight. This is temporary and may be related to muscle weakness that is typical after surgery. It usually dissipates 6-8 weeks after surgery.
- If you have a C.P.M. machine at home, use it until you can bend your knee to a right angle (90 degrees) by yourself.
- Ice your knee as often as you would like, alternating 15 minutes with the ice on and 15 minutes with it off several times a day.
- At 5-6 months after surgery, you will undergo various functional tests to evaluate the status of your knee. These tests will determine if you are able to return to active sports. You will need sneakers, shorts, and a t-shirt. Plan to spend 45 minutes to one hour for the testing. The evaluation will include: KT 2000 (to test the strength of the new ACL ligament), Cybex 6000 (to test the strength of your knees), and various “Hopping Tests” (to test the performance of your knees).

PREOPERATIVE INSTRUCTIONS

FOR INPATIENTS

1. Please inform our office of any **ALLERGIES** you may have, especially allergies to LATEX!
2. **DO NOT EAT** solid foods or drink liquids after midnight prior to your surgery. You must have **NOTHING** by mouth; this includes water and coffee. These instructions are for your safety.
3. Please bathe or shower the night before or morning of your surgery.
4. Get a good night's rest before your surgery.
5. Wear loose, casual clothing; leaving all jewelry and valuables such as watches, rings, cash, cellular telephones, etc., at home. Los Robles Medical will not be responsible for the loss of any valuables. If possible wear glasses instead of contact lenses.
6. Notify your physician if there is any change in your physical condition prior to your surgery day, such as a cold, fever, or infection. **If you are on any prescription or non prescription medications please discuss taking them prior to surgery with your Primary Care Physician.**
7. Please avoid **aspirin, anti-inflammatories and vitamin supplements 1-2 weeks PRIOR to surgery.**
8. The Admitting Office **will call you the evening before your admission date to reconfirm the time of your surgery and admission. If you do not hear from the Admitting Office, or you will not be home in the evening, please call (805) 370-4440 by 9:00pm to confirm your admission.**
9. On the day of your procedure you should go to the **Admitting Reception Desk located on the 1st floor. Friends and family can wait on either the 1st floor, depending where you are taken for surgery. There is a cafeteria on the lower level.**
10. You will need a responsible escort to take you home once you are discharged.
11. Please remember to call the doctor's office **the day after surgery** to schedule your 10 days post-op visit.

All patients anticipating surgery must stop the use of all sources of aspirin. Aspirin is a very strong anticoagulant, which causes profound bleeding problems in normal individuals. Therefore, you must not take aspirin or any aspirin-containing product for 2 weeks before surgery and 2 weeks after surgery.

The following are only a few of many aspirin-containing compounds to be avoided:

Alka Seltzer	Coricidin	Percodan
Anacin	Darvon Compound	Pabrin Buff. Tabs
A.P.C.	Dristan	Panalgesic
Ascodeen-30	Duragesic	Persistin
Ascriptin	Ecotrin	Robaxisal
Aspirin	Emprazil	Sine-Aid
Aspirin Suppositories	Empirin	Sine-Off
Bayer Aspirin	Equagesic	SK-65-Compound
BC Powders	Excedrin	Stendin
Buff-a-Comp	Fiorinal	Stero-Darvon ASA
Buffadyne	Indocin	Supac
Bufferin	Measurin	Synalogos Caps.
Butalbital	Midol	Synalogos D.C.
Cama-Inlay Tabs	Monacet with Codeine	Tolectin
Cheracol Capsules	Motrin	Triaminicin
Congespirin	Naprosyn	Vanquish
Cope	Norgesic	Zomax
	Pepto Bismol	

If you must take something for headache, menstrual cramps or other aches and pains, you may take TYLENOL (as directed) for the two weeks prior to and after your surgery.

The following are some aspirin-containing topical medications to be avoided:

Absorbent Rub	Braska	Neurabalm
Absorbine Arthritic	Counterpain Rub	Oil-O-Sol
Absorbine Jr.	Dencorub	Omega Dil
Act-On-Rub	Doan's Rub	Panalgesic
Analbalm	Emul-O-Balm	Rid-A-Pain
Analgesic Balm	End-Ake	Rumarub
Antiphlogistine	Exocaine Plus	Sloan's
Arthralgan	Exocaine Tube	Soltice Hi-Therm
Aspercreme	Heet	Soltice Quick Rub
Banalg	Icy Hot	SPD
Baumodyhne	Infra-Rub	Stimurub
Ben Gay	Lini-Balm	Surin
Ben Gay Ex. Str. Balm	Mentholatum &	Yager's Liniment
Ben Gay Gel	Deep Heating	Zemo Liquid
Ben Gay Greaseless/	Minit-Rub	Zemo Liquid Ex. Str.
Stainless Ointment	Musterole Deep Strength,,	Zemo Oitment
Ben Gay	Reg., Extra &	
	Children's	

Your cooperation can help us avoid bleeding complications.

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION POST-OPERATIVE REHABILITATION PROTOCOL

AUTOGRAFT BONE-PATELLA TENDON-BONE And ALLOGRAFT PROTOCOL

PHASE I-EARLY FUNCTIONAL (WEEKS 1-2)

Goals:

1. Educate re: the proper use of continuous passive motion (CPM) machine and home exercise and program (HEP).
2. Decrease pain and effusion.
3. Educate re: the importance of icing.
4. Independent donning, doffing, adjusting hinges, and use of knee brace.
5. Safe ambulation with assistant device and knee brace **WEIGHT BEARING AS TOLERATED (WBAT)** on the involved leg.
6. Promote normal gait mechanics.
7. Early balance control.
8. Attain full extension and functional flexion of the involved knee.
9. Obtain baseline values for the uninvolved limb (isokinetic testing.)
10. Initiate early neuromotor control of all muscle groups.

Day of Surgery:

- Ambulate WBAT with knee brace range from 0° to tolerated active flexion (maximum 60°) on level surfaces with auxiliary crutches. The brace will initially be set by the physical therapist.
- CPM will be set at 0° to 60° unless otherwise documented.
- Brace **SHOULD NOT** be worn while the operated limb is in the CPM. Brace is required only when ambulating and while performing straight leg raise (SLR) exercises outlined below.

Post-operative Day #1:

- Ambulate as above on level surfaces and stairs.
- CPM progression can be 10°-20° daily but should not exceed 5° every 3 hours.
- Review of patient ACL (**BONE-PATELLA TENDON-BONE GRAFT**)

Home Instructions.

- KNEE BRACE MUST BE WORN WITH THE STRAIGHT LEG RAISE (SLR)
EXERCISES
LOCKED AT 0°.
- ankle strengthening for all planes with theraband.
- quad set with towel roll under the ankle to promote full extension.
- heel slides.
- hamstring sets.
- seated hip flexion.
- seated active assisted knee extension.
- standing terminal knee extension.
- straight leg raises (SLR) in all 4 planes with **BRACE LOCKED AT 0°**.

**** If patient does not achieve active range of motion to 60° upon discharge,
the surgeon/physician should be notified.****

Post-operative Day #2-7:

- Continue with above ambulation and exercise guidelines.
- Increase knee brace setting with active knee motion.
- Continue CPM until 90⁰ active knee flexion is achieved. CPM progression can be 10⁰-20⁰ daily but should not exceed 5⁰ every 3 hours.
- BAPS – in sitting.
- Stationary Bicycle – start with a low, comfortable seat height to promote flexion, most force through non-operated limb – increase seat height in subsequent sessions.
- Supine wall slides – allow gravity to assist with knee flexion. **DO NOT perform wall slides in the upright or stance position.**
- Home stretching – for quadriceps, hamstrings, and gastrocnemius.
- Balance activities – begin with bilateral stance activities and progress to unilateral on the ground.
- Bilateral standing modified knee bends (0-30⁰) – begin with body weight and then add light extrinsic weight accordingly.
- Marching in place – begin in sitting and progress to standing.
- Sidestepping –
- Multi hip – to involved lower limb. Be sure weight is applied proximal to the knee. (flexion, extension, abduction, adduction, terminal knee extension)
- Retro walking – begin with body weight then progress to pulling a weighted sled. Increase the load as tolerated.
- Quadriceps isometrics – at varied degrees of knee flexion.
- Active knee extension – of the involved knee (full) as tolerated.
- Active knee flexion – full.
- Rolling chair activity – active hamstring/quad activity by performing forward propulsion/retropulsion of rolling chair using alternating lower extremities (90⁰-0⁰).
- Proprioceptive training: static stabilizing technique – at various degrees of knee flexion using therapeutic ball. Begin in supine with legs on the ball then progress to sitting on the ball (90⁰-0⁰).
- Heel Raises – begin with bilateral lower limbs then progress to unilateral.

****IN ALL CLOSED CHAIN KNEE FLEXION EXERCISES, DO NOT ALLOW THE ANTERIOR ASPECT OF THE KNEE TO PASS THE TOES****

BY THE END OF WEEK:	AROM:	PROM:
1	0-80 ⁰	0-90 ⁰
2	0-105 ⁰	0-120 ⁰
3	0-120 ⁰	0-125 ⁰

**** DO NOT PUSH >125⁰ WITH PASSIVE RANGE OF MOTION. CONTINUE TO CHECK RANGE OF MOTION PERIODICALLY TO MAKE SURE RANGE IS MAINTAINED. ****

Post-operative Day #8-14:

- Continue as above.
- Straight leg raises – without the brace if the patient demonstrates good quad control, with resistance applied proximal to the knee. Use the brace locked at 0° if an extension lag still exists.
- Standing leg curl – begin in standing with no added weight. The patient must demonstrate easy effort prior to adding weight.
- Multi-hip – to bilateral lower limbs (30°-0°). Begin with low extrinsic weight (10-50% maximum of the patient's body weight) and progress weight if the patient demonstrates good quad control during terminal knee extension. The patient at this time may begin unilateral leg press (10-30% maximum of the patient's body weight).
- Balance activities – progress to bilateral activities on the disc then unilateral.
- Discontinue crutches at POD #14 if proper gait mechanics are obtained.

PHASE II – PROGRESSIVE FUNCTIONAL (WEEKS 3-9)

Goals:

1. Decrease pain and effusion.
2. Discontinue the postoperative brace when the patient demonstrates good quad control.
3. Continue the development of neuromotor control of all muscle groups.
4. Retrain for proprioception and normalize responses to dynamic challenges.

Weeks 3 through 4:

- Continue as above.
- Cable column – should be performed once the patient is able to straight leg raise with resistance distal to the knee with good quad control. Begin with flexion and extension followed by abduction. Be more cautious with those patients who have meniscal, medial or lateral collateral involvement.
- Unilateral modified knee bends (0-30°) – Stand erect. Extend hip and flex the knee and place the dorsum of the foot on a bench or box behind you. With support to the upper limb, lower the torso, allowing your stance knee to flex to 45°. ****DO NOT ALLOW THE ANTERIOR ASPECT OF THE KNEES TO PASS THE TOES.**** Begin with body weight and progress with light extrinsic weight.
- Step ups – begin with body weight then add weights and step height gradually. Discontinue if the patient has any complaints of pain.
- Posterior lunges (0-45° max) – begin with involved limb as the lead leg.
- Balance activities – incorporate multi task activities, i.e. unilateral modified knee bend while performing arm curls while balancing on a disc.
- Closed chain step machine (0-30°) – begin with low resistance and maintain short steps throughout.
- Swimming – the patient may perform side stroke or flutter kick initiating motion from the hip.

Weeks 5 through 6:

- Continue as above.
- Progressive resisted knee extension – perform activity with a slow controlled

motion. Begin with cuff weights for the involved leg and continue to do so until the patient can comfortably lift 20lbs. Do not allow the activity to begin with $>80^{\circ}$ of knee flexion.

- Advanced hamstring activity - with the trunk flexed perform hip extension with upper extremity support, with the hip extended to midrange perform a hamstring curl, in the supine position perform bridging on the ball with hip flexion, and relaxed knee dead lifts if there is no history of low back problems.
- Cross friction massage to scar.

Weeks 7 through 8:

- Continue as above.
- Lateral activities - begin by increasing the speed with lateral stepping progressing to lateral shuffles, ski simulator, modified slide board activities (side lunges, restricted distance slide board) to full range slide activities. ****WITH ALL OF THESE EXERCISES BE AWARE OF VALGUS STRESSES****
- Cable column simulated running - once the patient exhibits good control with single plane motion progress to multi joint motion.
- Crossover stepping - progress to cariocas as tolerated.
- BAPS - in standing. Be aware of rotation occurring at the knee and valgus/varus stresses.

Weeks 8 through 10:

- Continue as above.
- Lunges - initiate anterior, anterior-lateral, lateral and posterior-lateral lunges. Start with body weight and then add extrinsic weight, then sport cord. Be sure to not allow the anterior aspect of the knee to pass the toes.
- Standing bicycle - with high resistance, may progress to a bike spectrum.
- Plyometrics - begin with mini jumps on the leg press at approximately 30% of body weight.

PHASE III - FUNCTIONAL (WEEKS 10-16)

Goals:

1. Master functional tasks of desired physical activity.
2. Optimize force production and absorption with various activities.

Weeks 10 through 12:

- Continue as above.
- Lateral shuffles weighted, Stop and Go.
- Slide board with the patient wearing a weighted vest (or holding a hand dumbbell) incorporating a ball toss.
- Begin dynamic skill progression - (jumping, hopping and leaping).
- Agility drills -
- May initiate light jogging program if the patient demonstrates good force production (i.e. jumping) and absorption (i.e. landing), especially when leaping from uninvolved to the involved limb.
- 10RM testing at 12 weeks: begin heavy, moderate and light workout days

according to strength assessment guidelines.

Weeks 16+:

- Continue as above.
- May initiate running if the patient demonstrates good force production and absorption, especially when leaping from uninvolved to involved.

Functional Testing: KT 2000, Isokinetic Testing, Patient Questionnaire, Hop & Stop and Noyes.

Performed at 4, 6, 12 months and every year thereafter.

**** Do not perform Hop & Stop at 4 months if <90% quad/hamstring symmetry. ****

The patient may return to activity without a derogation brace if:

Subjective:

1. Pain free with ADL and rehab. Activities including agility and sport specific drills.
2. No c/o stiffness during or after all above activities.
3. No c/o giving way during all above activities.

Objective:

1. Full AROM and PROM (0-135°).
2. No quad lag.
3. Isokinetic Testing: 10% difference in quads, equal in hamstrings.
4. KT 2000 (<3mm).
5. Functional Testing: 90% symmetry.