

A PRACTICE OF COPLEY HOSPITAL

ACL Reconstruction

Thank you for choosing Copley Hospital and Mansfield Orthopaedics for your knee surgery. Our mission is to provide the highest quality orthopaedic services with an individualized, personal touch. Our team and everyone at Copley Hospital is here to make your stay as pleasant and as brief as possible.

This booklet was developed to provide you with general information concerning your ACL reconstruction. It explains the steps that you will need to take in preparation for your surgery. Although the booklet reviews the most common scenarios, each individual is unique and therefore specific instructions may vary depending upon your needs. There are numerous details that go into planning a successful surgical experience and we suggest that you read the entire booklet carefully.





A PRACTICE OF COPLEY HOSPITAL

Table of Contents

What is the Anterior Cruciate Ligament?	Page 3
Anterior Cruciate Ligament Injuries	Page 3
Knee Anatomy	Page 3
Cause of an ACL Tear	Page 5
Imaging	Page 5
Anesthesia	Page 6
Treatment	Page 6
- Non-Surgical & Surgical	
Risks of Surgery	Page 7
Reasonable Expectations after ACL Reconstruction	Page 8
Preparing for Surgery	Page 8
Discharge Time	Page 8
Time of Surgery	Page 8
Arriving at the Hospital	Page 8
SURGERY	Page 10
Recovery & Rehabilitation	Page 10
Warning Signs	Page 11
Outcome	Page 11
FAQ's	Page 13
ACL Reconstruction Protocol	Page 15

What is the Anterior Cruciate Ligament?

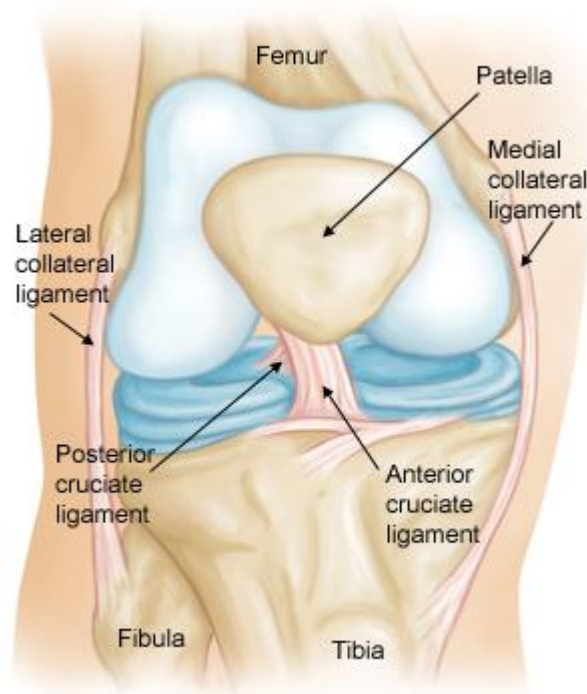
The ACL is one of the four main ligaments within the knee that connect the femur to the tibia. The ACL runs diagonally in the middle of the knee, preventing the tibia from sliding out in front of the femur, as well as providing rotational stability to the knee.

Anterior Cruciate Ligament Injuries

One of the most common knee injuries is an anterior cruciate ligament sprain or tear.

Athletes who participate in high demand sports like soccer, football, and basketball are more likely to injure their anterior cruciate ligaments.

If you have injured your anterior cruciate ligament, you may require surgery to regain full function of your knee. This will depend on several factors, such as the severity of your injury and your activity level.



Normal knee anatomy, front view

Three bones meet to form your knee joint: your thighbone (femur), shinbone (tibia), and kneecap (patella). Your kneecap sits in front of the joint to provide some protection.

Bones are connected to other bones by ligaments. There are four primary ligaments in your knee. They act like strong ropes to hold the bones together and keep your knee stable.

Collateral Ligaments

These are found on the sides of your knee. The medial collateral ligament is on the inside and the lateral collateral ligament is on the outside. They control the sideways motion of your knee and brace it against unusual movement.

Cruciate Ligaments

These are found inside your knee joint. They cross each other to form an "X" with the anterior cruciate ligament in front and the posterior cruciate ligament in back. The cruciate ligaments control the back and forth motion of your knee.

The anterior cruciate ligament runs diagonally in the middle of the knee. It prevents the tibia from sliding out in front of the femur, as well as provides rotational stability to the knee.

Description

About half of all injuries to the anterior cruciate ligament occur along with damage to other structures in the knee, such as articular cartilage, meniscus, or other ligaments.

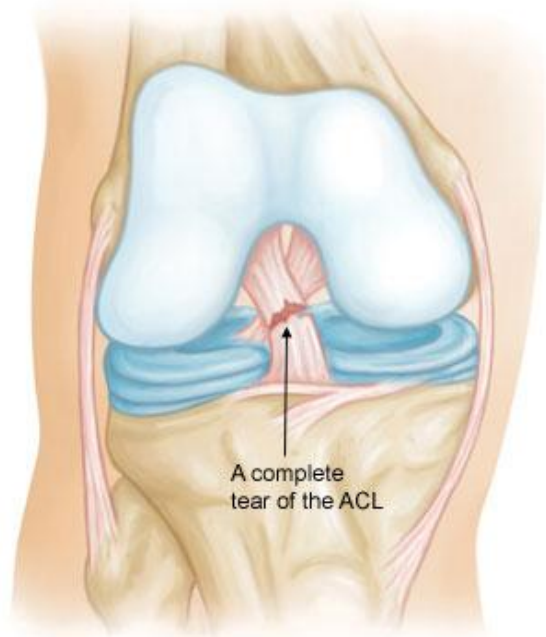
Injured ligaments are considered "sprains" and are graded on a severity scale.

Grade 1 Sprains. The ligament is mildly damaged. It has been slightly stretched, but is still able to help keep the knee joint stable.

Grade 2 Sprains. Stretches the ligament to the point where it becomes loose. This is often referred to as a partial tear of the ligament.

Grade 3 Sprains. This type of sprain is most commonly referred to as a complete tear of the ligament. The ligament has been split into two pieces, and the knee joint is unstable.

Partial tears of the anterior cruciate ligament are rare; most ACL injuries are complete or near complete tears.



Cause of an ACL Tear

The anterior cruciate ligament can be injured in several ways:

- Changing direction rapidly
- Stopping suddenly
- Slowing down while running
- Landing from a jump incorrectly
- Direct contact or collision, such as a football tackle

Several studies have shown that female athletes have a higher incidence of ACL injury than male athletes in certain sports. It has been proposed that this is due to differences in physical conditioning, muscular strength, and neuromuscular control. Other suggested causes include differences in pelvis and lower extremity (leg) alignment, increased looseness in ligaments, and the effects of estrogen on ligament properties.

Symptoms

When you injure your anterior cruciate ligament, you might hear a "popping" noise and you may feel your knee give out from under you. Other typical symptoms include:

- Pain with swelling. Within 24 hours, your knee will swell. If ignored, the swelling and pain may resolve on its own. However, if you attempt to return to sports, your knee will probably be unstable and you risk causing further damage to the cushioning cartilage (meniscus) of your knee.
- Loss of full range of motion
- Tenderness along the joint line
- Discomfort while walking

Imaging Tests

Other tests which may help your doctor confirm your diagnosis include:

X-rays. Although they will not show any injury to your anterior cruciate ligament, X-rays can show whether the injury is associated with a broken bone.

MRI. This study creates better images of soft tissues like the anterior cruciate ligament. However, an MRI is usually not required to make the diagnosis of a torn ACL.





Anesthesia

When you first arrive for surgery, a member of the anesthesia team will talk with you. Arthroscopy can be performed under local, regional, or general anesthesia.

- Local anesthesia numbs just your knee
- Regional anesthesia numbs you below your waist
- General anesthesia puts you to sleep

There are several anesthetic techniques utilized for knee surgeries. You and your Anesthesiologist or CRNA (Certified Registered Nurse Anesthetist) will decide on the day of your surgery which anesthetic technique or which combination of anesthetic techniques is most appropriate for you, based on your health history and surgery type. The anesthetic techniques, risks and benefits as they apply to you and your surgery will be explained in greater detail by a member of our anesthesia team on the day of your surgery.

Regardless of your anesthetic, a member of the anesthesia team will be in the operating room with you the whole time with extensive monitoring to ensure that you are safe and comfortable.

Treatment

Treatment for an ACL tear will vary depending upon the patient's individual needs. For example, the young athlete involved in agility sports will most likely require surgery to safely return to sports. The less active, usually older, individual may be able to return to a quieter lifestyle without surgery.

Nonsurgical Treatment

A torn ACL will not heal without surgery. But non-surgical treatment may be effective for patients who are elderly or have a very low activity level. If the overall stability of the knee is intact, your doctor may recommend simple, non-surgical options.

Bracing. Your doctor may recommend a brace to protect your knee from instability. To further protect your knee, you may be given crutches to keep you from putting weight on your leg.

Physical therapy. As the swelling goes down, a careful rehabilitation program is started. Specific exercises will restore function to your knee and strengthen the leg muscles that support it.

Surgical Treatment

Rebuilding the ligament. Most ACL tears cannot be sutured (stitched) back together. To surgically repair the ACL and restore knee stability, the ligament must be reconstructed. Your doctor will replace your torn ligament with a tissue graft. This graft acts as a scaffolding for a new ligament to grow on.

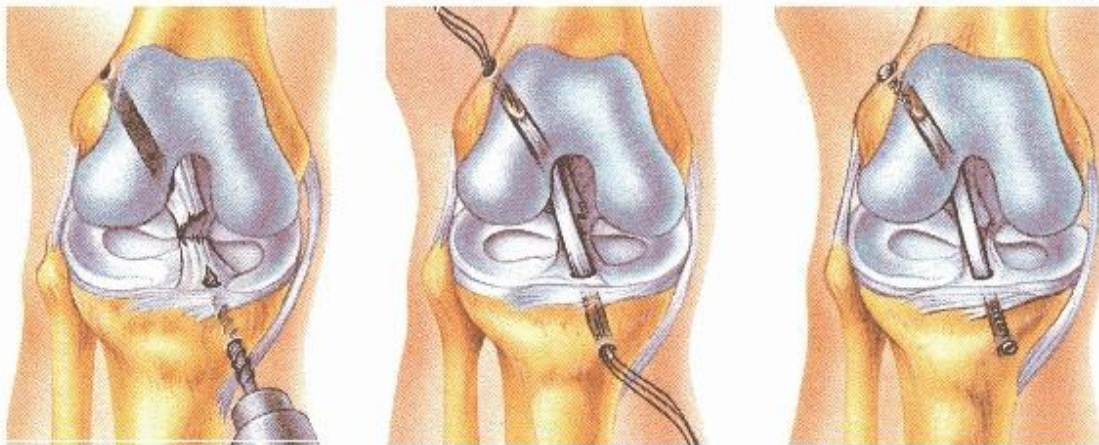
Grafts can be obtained from several sources. Often they are taken from a cadaver, an allograft. Also, the patellar tendon, which runs between the kneecap and the shinbone can be used (autograft).

There are advantages and disadvantages to all graft sources. You should discuss graft choices with your own orthopaedic surgeon to help determine which is best for you.

Because the regrowth takes time, it may be six months or more before an athlete can return to sports after surgery.

Procedure. Surgery to rebuild an anterior cruciate ligament is done with an arthroscope using small incisions. Arthroscopic surgery is less invasive. The benefits of less invasive techniques include less pain from surgery, less time spent in the hospital, and quicker recovery times.

Unless ACL reconstruction is treatment for a combined ligament injury, it is usually not done right away. This delay gives the inflammation a chance to resolve, and allows a return of motion before surgery. Performing an ACL reconstruction too early greatly increases the risk of arthrofibrosis, or scar forming in the joint, which would risk a loss of knee motion.



Risks of Surgery

Potential postoperative problems with ACL Reconstruction include infection, blood clots, and an accumulation of blood in the knee. These occur infrequently, and are minor and treatable. The risk of infection at Copley Hospital is less than 1%.

Reasonable Expectations after ACL Reconstruction

After ACL Reconstruction, you will have a knee brace and crutches. You will NOT be able to put weight on your leg for the first weeks after surgery. You can gradually put more weight on your leg as the protocol states at the end of this booklet

Physical exercise and rehabilitation will play an important role in your final outcome. A formal physical therapy program will be initiated after surgery.

Most people are able to return to office work within a month.



Preparing for Surgery

If you decide to have knee arthroscopy, and if you have a history of Heart or Lung issues, you will need to have a pre-op visit or phone call with a Nurse and member of the Anesthesia staff at Copley Hospital.

Before surgery, tell your orthopaedic surgeon about any medications or supplements that you take. He or she will tell you which medicines you must stop taking before surgery.

Time of Surgery

Although the date of your surgery is prescheduled, the time will not be determined until the day before surgery.

The day before your surgery, please call Copley's Operating Room Scheduler between 1:00pm and 3:00pm Monday through Friday at 802-888-8255 to confirm your arrival time for surgery. Please call on Friday for Monday surgery.

Discharge Time

Almost all arthroscopic knee surgery is done on an outpatient basis. This means you can go home the same day of Surgery.

Make sure you have arranged for someone to pick you up at the hospital that afternoon.



Arriving at the Hospital

Registration

Upon arrival go to the Registration Desk located in the Main Lobby. Please bring with you your health insurance cards, along with any co-payment you are responsible for. Once registered, you, and one family member or one friend, will be directed to the Pre-Operative area.

For your convenience, you can complete a pre-registration form online at copleyvt.org. You must still stop by Registration in the Main Lobby, but only to show your insurance card, confirm information and sign your forms.

Visitors and Waiting Information

We welcome you as you are an important part of your loved one's recovery process. We understand that waiting for someone to have surgery can be a stressful time and want to make you as comfortable as possible. We have provided a comfortable space for you in the Reception Area located in the Main Lobby. For your convenience, the Area offers a television, magazines and wireless access (WIFI). You may also choose to wait in the Cafeteria located on the second floor, which also has WIFI access.

During registration, you, as the accompanying family member or friend, will be asked how you prefer to be reached: by Copley pager or your cell phone. If you prefer that we contact you by cell phone let us know the number. The surgeon will contact you after the surgery. As soon as medically appropriate, you will be contacted by our staff to join your relative or friend in the recovery room. Pagers work only while on Copley's campus. If you plan to leave the campus we ask that you let us know, and if you have a Copley pager, please leave it with the volunteer at the Information Desk. Upon your return please check-in at the Information Desk. The Desk is staffed Monday – Friday 8:00am-4:00pm.

The cafeteria is open daily for breakfast from 6:30-10:30am; lunch 11:30am – 1:30pm and dinner from 4:00-6:30pm. Drinks, snacks, fruit, soup and salad are available throughout the afternoon. The Copley Hospital Gift Shop is located adjacent to the main lobby and is open Monday through Friday 9:30am-3:30pm. You can reach the Gift Shop by calling 888-8229. You are also invited to use our Health Sciences Library, located on the first floor, across from Administration. Computers for public use are available in the Library.

Please be aware that, for confidentiality and patient care reasons, only one visitor will be allowed into the pre-operative area or recovery room at a time. We ask that visitors silence their beepers and cell phones while visiting.

Pre-Operative Area

- First, you will be asked to put on a hospital gown, and remove any make up, contact lenses, glasses, hair pieces and hair pins. These will be given to your family members, or placed in a personal belongings bag.
- Your preoperative assessment will take at least one hour. This will include having you use the restroom, listening to your lungs, checking your blood pressure, blood sugar (if you are diabetic), and skin condition.
- A sequential compression device will be placed on your leg to aid in circulation. This will continue to be used during your hospital stay until you are walking regularly.
- Your intravenous (IV) will be started by the nurse.

- Your surgeon or their assistant will visit you to mark your operative limb and discuss any questions.
- Your surgeon or their assistant will review the information on the consent form for your surgery. We will have you sign it at that time.
- Your anesthesiologist will visit you in pre-op and discuss your health, the type of anesthesia you will need.
- Lastly, a nurse will transport you to the operating room.

SURGERY

Post Anesthesia Care Unit (Recovery Room)

You will be taken to the Post Anesthesia Care Unit (PACU) to recover from anesthesia.

- Your vital signs, including heart rate, blood pressure, temperature and respiratory rate, will be frequently monitored.
- Your dressing, the circulation and movement in your toes and leg will also be checked.
- During this time, your surgeon will meet with your family.
- Once you have fully recovered from anesthesia, you will be able to go home.

Recovery

Recovery from ACL Reconstruction is not easy. It is important to follow your orthopaedic surgeon's instructions carefully after you return home. You should ask someone to check on you the first evening you are home.



Swelling

Keep your leg elevated as much as possible for the first few days after surgery. Apply ice as recommended by your doctor to relieve swelling and pain.

Dressing Care

You will leave the hospital with a dressing covering your knee. Keep your incisions clean and dry. Your surgeon will tell you when you can shower or bathe, and when you should change the dressing.

Your staples will be removed at Mansfield Orthopaedics 1 week after surgery.

Driving

Typically, you can drive one week post-op if you have an automatic car and you had left leg surgery.

If you have a standard car, or had right leg surgery, you can typically drive 3-4 weeks post-op.

Medications

Pain is unique to each individual. You will go home with a prescription for two medications to help with pain. Most people are able to stop taking their pain medications after 2+ weeks.

Warning Signs

Call Mansfield Orthopaedics at (802) 888-8405 or to the Emergency Room if you experience any of the following:

- Fever 102°F or above
- New or unusual drainage on your dressing
- Redness, swelling, or drainage from your incisions
- Swelling or pain in your calf of your affected leg
- Chest pain or shortness of breath
- Pain not relieved by taking prescribed pain medicine, raising your leg, or applying ice
- Discoloration, numbness, or tingling in the affected leg

Rehabilitation

Whether your treatment involves surgery or not, rehabilitation plays a vital role in getting you back to your daily activities. A physical therapy program will help you regain knee strength and motion.

If you have surgery, physical therapy first focuses on returning motion to the joint and surrounding muscles. This is followed by a strengthening program designed to protect the new ligament. This strengthening gradually increases the stress across the ligament. The final phase of rehabilitation is aimed at a functional return tailored for the athlete's sport.



Outcome

It takes 8+ weeks for the ACL graft to completely revascularize. It is extremely important to use the brace to protect your new ACL during this time. Supervised Physical Therapy will take place for 3-9 months.

With full dedication to Physical Therapy, most people can return to full activity in 6+ months.



The use of this information by Mansfield Orthopaedics has been granted from the American Academy of Orthopaedic Surgeons (AAOS).



FREQUENTLY ASKED QUESTIONS (FAQ'S)

When will I go home?

You will be ready for discharge from the hospital a few hours after your surgery.

When do I start Physical Therapy?

You can start PT after your 1st post-op appointment.

Where can I go for Physical Therapy?

There are many places in the greater Stowe area with excellent PT services. Some include, Copley Rehabilitation, Personalized PT, Pinnacle PT, and Choice PT. Your PT referral form will have a complete list with phone numbers.

When should I return for my first visit after surgery?

You will be prescheduled for your first post-op appointment 1 week after surgery. You will have another appointment 4 weeks after surgery.

When should I change my bandage?

Your dressing will be changed one week after surgery at your first post-operative appointment.

When will my staples be removed?

At approximately 7-10 days from your surgical date. Mansfield Orthopaedics will perform this for you.

Is swelling of my knee, leg and ankle normal?

Yes, it is normal for your leg to be swollen for many weeks. To decrease swelling, elevate your leg as often as possible (four to five times a day) and apply ice for 15 minutes each time.

Do I have to wear the brace all the time?

You should wear the brace full-time for the first few weeks after surgery. Your Doctor or Physician Assistant will let you know when you can start using your brace part-time.

May I bear full weight after surgery?

No. You will transition to full weight bearing over a one-month period.

How do I adjust my pain medication?

Pain medicine is unique to each individual. Most patients will be off of their pain medication within a few weeks.

How long will I need to use assistive devices (crutches, walker or a cane)?

You will need to use crutches in order to follow the weight bearing protocol for ACL Reconstruction.

May I go outdoors prior to my first follow-up appointment?

Yes, we encourage you to do so. Don't forget your brace!

May I ride or drive in a car prior to my first follow-up appointment?

You may begin driving when walking without assistive devices and off pain medications.

Why is my leg bruised?

It is common to see bruising on the skin. It is from the normal accumulation of blood after your surgery.



A PRACTICE OF COPLEY HOSPITAL

ACL Allograft Reconstruction Protocol

- General Guidelines
 - Assume 8 weeks for complete graft revascularization
 - Supervised physical therapy may take place for 3-9 months
 - Gentle hamstring stretching at 1 week
 - Active prone knee flexion at 1 week, hamstring sets 3-4 weeks. Gentle progressive strengthening

- General Progression of Activities of Daily Living
 - Showering without brace after staple removal with caution. Refrain from bathing or submerging the leg in water for 2 weeks after surgery
 - Sleep with brace locked in full extension for 1 week
 - Driving
 - 1 week for automatic cars, left leg surgery
 - 4-6 weeks for standard cars, or right leg surgery
 - Braced locked in extension for 1 week for walking
 - Use of crutches for 2-4 weeks (per surgeon), follow page 2 for weight bearing progression. Brace for ambulation for 6 weeks

Physical Therapy Attendance:

Phase I	0-6 weeks	1-2 visits per week
Phase II	6-8 weeks	2-3 visits per week
Phase III	2-6 months	2-3 visits per week
Phase IV	6-9 months	1 visit each 1-2 weeks
Phase V	9+ months	Discharge from PT

Rehab Progression:

The following is a general guideline for progression of rehabilitation following ACL allograft reconstruction. Progress through each phase should take into account patient status (e.g. healing, function) and physician advisement. Please consult the physician if there is any uncertainty concerning advancement of a patient to the next phase of rehabilitation.

The first two follow-up appointments are at 1 & 4 weeks at Mansfield Orthopaedics.



Phase I:

Begins immediately post-op through approximately 6 weeks

Goals:

1. protect graft fixation
2. minimize effects of immobilization
3. control inflammation
4. full extension range of motion
5. flexion to 90°
6. normalize gait mechanics
7. educate patient on rehabilitation progression

Brace:

1. post-op brace 0-6 weeks
2. 1st week: locked in full extension for ambulation and sleeping
3. 1-6 weeks: brace removed for rehab and sleeping
4. 6-12 weeks: to be worn in situations where the patient may be at risk for fall (crowds, walking on uneven surfaces)
5. after 12 weeks brace is optional

Weight bearing Status: (unless with meniscal repair*)

1. 0-1 weeks: egg shell touch down weight bearing with 2 crutches
 2. 1-2 weeks: partial weight bearing, 50%
 3. 2-3 weeks: wean crutches
 4. 4-6 weeks: wean brace
- with meniscal repair, weight bearing is one week slower

Therapeutic Exercises:

1. immediate leg curls only if non-painful
2. heel slides
3. quad sets
4. patellar mobilization
5. non-weight bearing gastroc/soleus stretching, begin hamstring stretches at 4 weeks
6. pool therapy after 2-3 weeks (once incisions have healed)
7. at 4 weeks post-op add biking, deep well pool running with aqua vest (if pool available), leg press, quadriceps stretching
8. partial weight bearing closed chain knee extension 0-45°
 - a. theraband
 - b. leg press
 - c. pool mini-squats



Phase II:

Begins at approximately 6 weeks post-op and extends to approximately 8 weeks

Criteria for advancement to Phase II:

1. good quad set, SLR without extension lag
2. approximately 90° flexion
3. full extension
4. no signs of active inflammation

Goals:

1. restore normal gait
2. protect graft fixation
3. initiate closed kinetic chain exercises

Brace/Weight bearing status:

1. discontinue the use of the brace and crutches as allowed by physician when the patient has full extension and can SLR without extension lag
2. patient may exhibit antalgic gait pattern. Consider using single crutch or cane until gait is normalized

Therapeutic exercises:

1. wall slides 0-45°, progressing to mini-squats
2. 4-way hip
3. stationary bike (begin with high seat, low tension to promote ROM, progress to single leg)
4. closed chain terminal extension with resistive tubing or weight machine
5. toe raises
6. balance exercises (e.g. single-leg balance, KAT)
7. hamstring curls
8. aquatic therapy with emphasis on normalization of gait
9. continue hamstring stretches, progress to weight bearing gastroc/soleus stretches

Phase III:

Begins at approximately 8 weeks and extends through approximately 6 months

Goals:

1. full range of motion
2. improve strength, endurance and proprioception of the lower extremity to prepare for functional activities
3. avoid overstressing the graft
4. protect the patellofemoral joint



A PRACTICE OF COPLEY HOSPITAL

Therapeutic Exercises:

1. continue and progress previous flexibility and strengthening activities
2. stairmaster (being short steps, avoid hyperextension)
3. nordic trac, elliptical
4. knee extensions 90°-45°, progress to eccentrics
5. advance closed kinetic chain activities (leg press, one-leg mini squats 0-45° of flexion, step-ups begin at 2" progress to 8", etc.)
6. progress proprioception activities (slide board, use of ball, racquet with balance activities, etc.)
7. progress aquatic program to include pool running, swimming (no breaststroke)
8. progressive hamstring exercises
9. running between 4 and 4 ½ months

Phase IV:

Begins at approximately 6 months and extends through approximately 9 months

Criteria for advancement to Phase IV:

1. full, pain-free ROM
2. no evidence of patellofemoral joint irritation
3. necessary joint ROM, strength, endurance, and proprioception to safely return to work or athletics
4. physician clearance to resume partial or full activity

Goals:

1. safe return to athletics
2. maintenance of strength, endurance, proprioception
3. patient education with regards to any possible limitations

Therapeutic Exercises:

1. functional progression including, but not limited to:
 - a. walk/jog progression
 - b. forward/backward running, ½, ¾, full speed
 - c. cutting, crossover, carioca, etc
 - d. plyometric activities as appropriate to patient's goals
 - e. sports-specific drills
2. safe, gradual return to sports after successful completion of function progression
3. maintenance program for strength and endurance

Bracing:

1. function brace may be recommended by the physician for use during specific sports after surgery