DEPARTMENT OF ORTHOPAEDICS

SPORTS MEDICINE TEAM

ACL Reconstruction Guidebook

FOR PATIENTS

Dartmouth-Hitchcock
MEDICAL CENTER

ACL Reconstruction Guidebook

Date of surgery:

Surgeon:

Date of first follow-up appointment:

Now that you have decided to have ACL reconstructive surgery, we want to help answer some questions that patients often have. Our goal is to provide you with information about what you can expect before, during, and after your surgery.

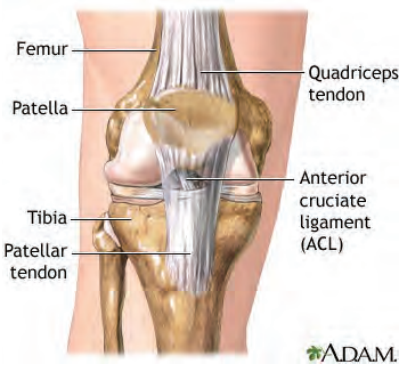
This guidebook is divided into four sections to make it easy for you to find the information you need, no matter which stage of the process you are in. Throughout the book, you will see tips from one of our ACL patients, Sarah Fittro. We hope you will find inspiration and helpful guidance from someone who has been through this surgery and recovery. Please bring this guidebook with you to your appointments and to the hospital on the day of your surgery to use as a reference tool and to make additional notes.

DEPARTMENT OF ORTHOPAEDICS
SPORTS MEDICINE TEAM

On the front cover and this page: Gunnar Shaw, ACL reconstruction by Dr. Michael Sparks

Notes

ACL Reconstruction: **Choosing a Graft Type**

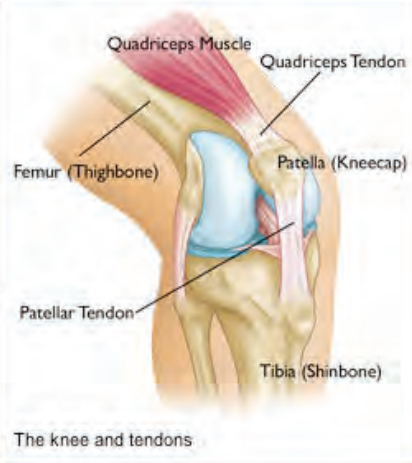


Source: A.D.A.M., Inc.

You have sustained an injury to your knee; this has led to a tear in one of the stabilizing ligaments in your knee, specifically your ACL, Anterior Cruciate Ligament. You are now working toward a decision of treatment for this injury. Should you choose surgery, you need to understand ACLs are reconstructed not repaired; sewing torn ACLs has not been successful in large numbers to date. It is important before you proceed with surgery that you eliminate, as much as possible, any pain and stiffness in the knee. This can be done by working with a physical therapist for up to six weeks.

In our practice, there are three primary choices for graft selection to reconstruct your ACL. You and the surgeon will discuss which graft type is most appropriate for you and your level of activity.

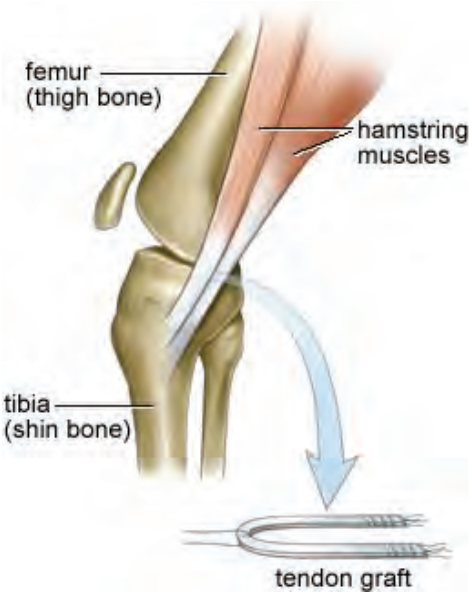
1. **Patellar tendon autograft** (tendon is taken from you)
2. **Hamstring tendon autograft** (tendon is taken from you)
3. **Allograft** (tendon is taken from a cadaver)



The knee and tendons

1. **Patellar tendon autograft:** the middle third of the patellar tendon of the patient, along with a bone plug from the shin and the kneecap is used. This method is often recommended for high-demand athletes and patients whose jobs do not require a significant amount of kneeling. Patients have expressed concern about knee pain when kneeling and pain behind the kneecap. Plus, there may be a slight increase in the risk for postoperative knee stiffness.

Source: American Academy of Orthopaedic Surgeons



Source: ACLSolutions.com

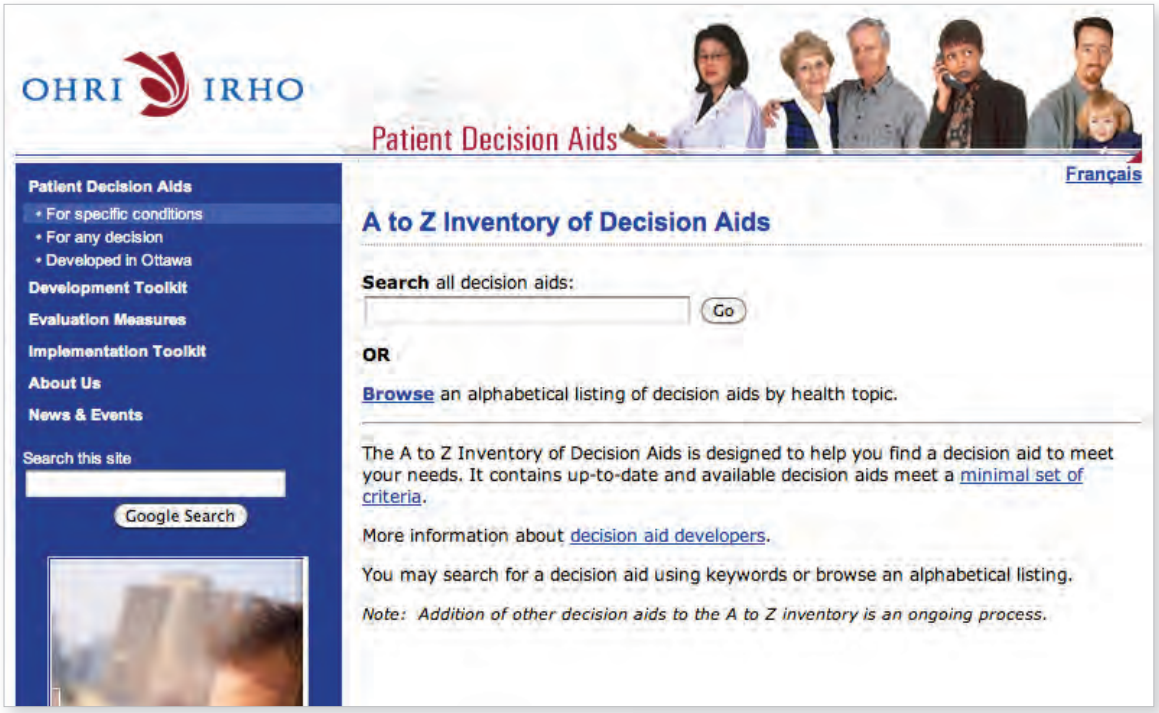
2. **Hamstring tendon autograft:** the semitendinosus and gracilis hamstring tendon on the inner side of the knee are used. There are some reports that patients have fewer problems with anterior knee pain (pain at the front of the knee) or kneecap pain after surgery. Some studies have shown hamstring weakness following this graft choice. This weakness is slight, and is generally imperceptible to most people. Athletes are able to return to high level activity with a hamstring autograft. Hypermobile (joints that stretch farther than normal) and female patients have been shown to have mild increased laxity (looseness) postoperatively when this is used.

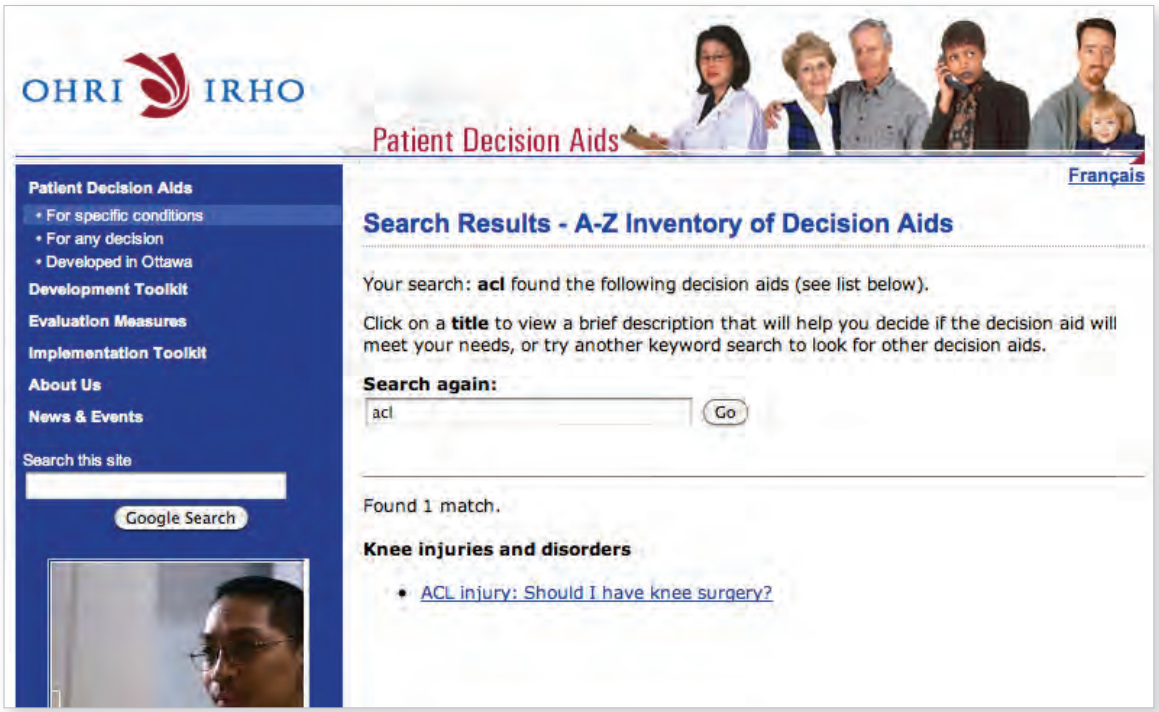
3. **Allografts:** these grafts are taken from cadavers. Advantages of this approach include: decreased pain because graft is not taken from the patient, decreased surgery time, potentially less painful rehabilitation postoperatively, and smaller incisions. This method is often used in patients who have failed ACL reconstruction or need more than one ligament repaired. Disadvantages include a slightly higher rate of infection, risk of transmission of disease, and higher failure rates. There has also been shown a higher re-rupture rate for this graft type in young, very active patients. This graft is not recommended for young people, or those returning to high level activities. We currently purchase our allografts from LifeNet. Please see this website if you would like information about how allografts are processed after harvesting: **www.accesslifenet.org/service/patient_information/**

As you can see, graft choice can be a complex decision that requires a conversation between you and the surgeon, with an understanding of your goals and expectations.

Patient Decision **Aids**

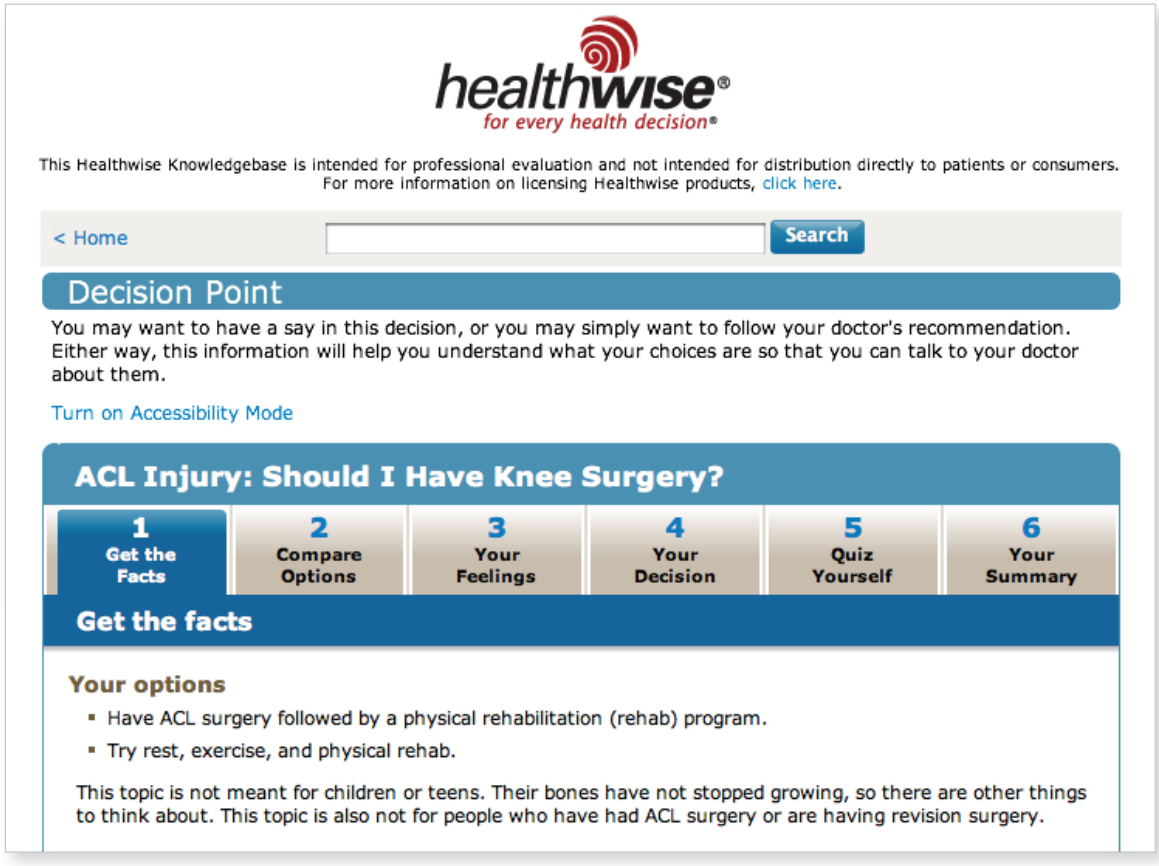
Find this decision aid online at: **decisionaid.ohri.ca/AZinvent.php**
Or, contact the Center for Shared Decision Making at Dartmouth-Hitchcock Medical Center for assistance: (603) 650-5789, **patients.d-h.org/shared_decision_making**





Once you are here, you are ready to go. Please let us know if you have any questions. This tool is meant to assist you with making a decision for surgery, it does not replace the conversation between you and your surgeon.

Your Sports Medicine Team at Dartmouth-Hitchcock



You probably have many questions about how to prepare yourself for surgery. You may also want to know how to prepare your home for your return. The checklists in this section are designed to help guide you through this preparation process. For general information, you may also find our web site helpful:

patients.d-h.org/acl

Getting Ready for Surgery

Prepare Your Body

This tip list can help your body get a healthy start before you head into the operating room:

- eat healthy foods like fruits, vegetables, lean meats, and whole grains
- get plenty of rest
- reduce or quit smoking

Your surgeon may ask you to start doing physical therapy exercises prior to surgery. It is important to do these exercises regularly. The physical therapy is designed to help you achieve near full range of motion in your knee before going into surgery. And, it could greatly improve your rehabilitation after surgery.

You will need crutches to get around after your surgery. If there is any reason you feel you cannot use crutches, please let us know.

PATIENT tips

Meet with your physical therapist before the surgery so you can start to build a relationship.

Be dedicated to your assigned physical therapy before surgery, even if your knee starts to feel better after doing the exercises.

IMPORTANT NOTE: If you happen to become ill within the weeks or days before your surgery, even if it is a simple cold, please contact us right away. We may need to reschedule your surgery until you are healthy again.

Our Billing Policy

If you have questions about billing, insurance, financial assistance or charges for healthcare services, please contact Conifer Health Solutions at **(844) 808-0730**.

Please refer to the page at the back of this guidebook to see the services offered by Patient Financial Services.

What Should I Pack for the Hospital?

Our suggestions include:

- flat, supportive, athletic or walking shoes so that you won't slip
- loose fitting clothes that will fit over a leg brace
- eyeglasses instead of contacts - glasses are easier to take care of and are less likely to be lost
- dental devices (retainers, dentures, etc.) - we can give you a storage container if you need one
- a list of your daily medications, including the dosage and frequency, plus any medications that you stopped taking in preparation for the surgery
- **this guidebook to use as a reference and to make note of special instructions or questions you may have during your stay**

NOTE: leave all jewelry at home, including body piercings

SPECIAL NOTE ABOUT SHAVING:
Please do not shave your surgical area prior to your surgery. Your surgeon will inspect your knee the morning of your surgery and will carefully shave the area at that time. If there are breaks in your skin, your surgery may need to be rescheduled because you may be at risk of developing an infection.

I recommend pillows for the car ride home to keep your leg elevated and provide some padding for road bumps.

PATIENT tip

Checklist for the Day/Night Before Surgery

- Enjoy a regular dinner on the night before your surgery.
- A nurse will call you on the day before surgery (or on Friday if your operation is on Monday) and will leave a message if you are not home regarding:
  - ☐ when to stop having anything to eat or drink (usually midnight),
  - ☐ which medications to take the morning before surgery, and
  - ☐ what time you should plan to arrive.
- You may brush your teeth and rinse out your mouth the morning of your surgery.
- You will be given antibacterial soap called Hibiclens. **You will need to wash with this special soap the night before your surgery and the morning of your surgery to help decrease the chance of infection**.
  If you did not receive the Hibiclens® soap or if you misplaced it, you can find it at most drug stores.
- When you shower the night before and the day of your surgery, use a brush to scrub your nails.
- After your shower the night before surgery use a clean towel, put clean sheets on your bed and wear a clean set of pajamas.

PATIENT tip

I suggest eating something mild for dinner the night before your surgery because you don't know how your stomach will react to anesthesia.

Washing Instructions

Please read the following directions prior to showering before your surgery.

You will receive Hibiclens anti-bacterial soap from our clinic at one of the office visits prior to your surgery. Please use this soap to complete the following steps to wash carefully before your surgery.

Step 1: Wet your entire body.

Step 2: Use half of the bottle of Hibiclens soap to scrub your entire body from your neck to your feet, avoiding your genitals. Be sure to scrub extra at the spot on your body where you will be having surgery. Also scrub under your fingernails and toenails.

Step 3: Rinse all of the soap off of your body.

On the morning of your surgery:
Repeat steps 1-3 once more using the remaining half a bottle of Hibiclens soap. Be sure to rinse all of the soap off of your body.

Please note:

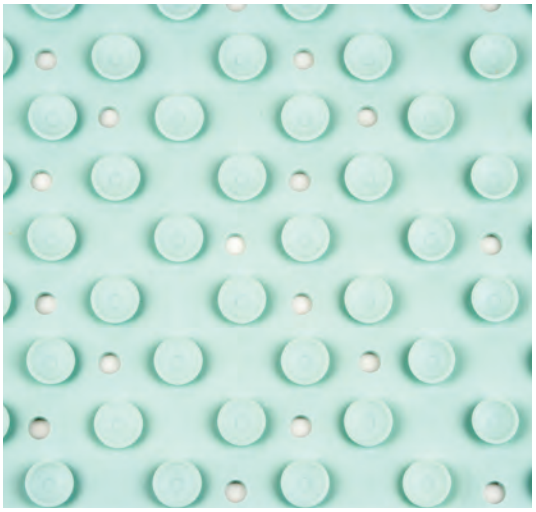
- Do not apply the soap to your head, face, eyes, inside the nose or ears or in the genital area.
- For external use only. Do not use on open wounds.
- Stop using if redness or irritation develops.
- Do not drink the soap. If swallowed, call Poison Control right away: 1-800-222-1222.
- After showering, do not put lotion, cream or powder on your body.
- Be sure to wear clean pajamas after your shower on the evening before your surgery. Also, be sure you are sleeping in clean sheets that night.
- Do not shave the day before or day of your surgery.

Changes Inside My Home

Since you will have limited mobility after surgery, there are many changes that can be made in your home ahead of time to make life easier. Many of these things should be planned well in advance of your surgery date.

Prepare Your Home

- Wearing an apron or backpack with pockets can help you carry items while you are on crutches.
- Place frequently used kitchen items like glasses or a teapot in easy to reach places, such as a countertop or on the lowest shelf in an overhead cabinet.
- Buy or make individual meals that can be frozen and reheated easily.
- Alert family and friends who can help you with your everyday needs.
- Be sure that there is a clear path to the entrance of your home:
    - ☐ shovel snow from sidewalk/stairs
    - ☐ rake leaves
    - ☐ clean out the garage
- Clear clutter from the floors of your home and remove small area rugs so you won't trip and fall.
- Consider making arrangements for a friend or kennel to care for your pets the first few weeks after you return home. You will have limited ability to care for your animals and your pet may cause you to fall.



Prepare Your Shower

- Some patients find that a hand-held shower hose helps. Installing one is fairly easy and does not require a plumber.
- Place your soap, shampoo and other shower items in a spot that you can reach so you don't have to bend or twist to reach them.
- A non-skid shower mat will reduce your chances of falling.
- Consider using a shower seat to make bathing easier and safer.

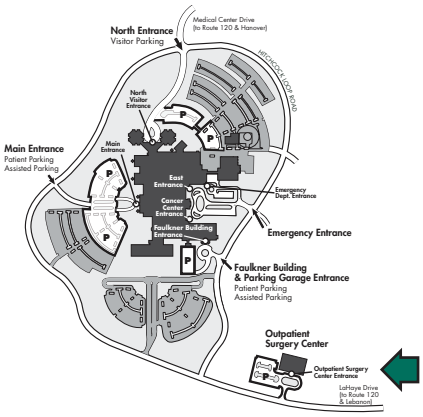
Notes

patients.d-h.org/acl

What to Expect the Day of Surgery

What to Expect the Day of Surgery

1. You should plan to arrive at the time the nurse told you. The Outpatient Surgery Center is located at 36 Lahaye Drive in Lebanon, NH. See a map and directions at the back of this guidebook.



2. For your safety, before the day of your surgery you must have arranged for a responsible adult to:

- accompany you on the day of your surgery
- remain on-site at the Outpatient Surgery Center throughout your stay there
- provide transportation home after your surgery
- remain with you for at least 24 hours after your surgery

We will not be able to proceed with your surgery if these arrangements have not been made.

3. Once there, you will be asked to remove:

- all jewelry except for your wedding band which can be taped to your finger (it is best to leave all jewelry at home, including body piercings)
- dentures, partial plates, or retainers
- contact lenses and eyeglasses
- hair pieces
- cosmetics and nail polish (it is best to remove these the night before)

4. You will be asked to put on a hospital gown.

5. A nurse will check your:

- heart rate
- blood pressure
- temperature
- breathing

6. A nurse will place an IV in your arm. This is removed after surgery, before you leave the hospital.

7. You may go over a permission form, or consent, with your surgeon if you did not do it already.

8. Your surgeon will mark the knee you are having reconstructed with a green marker.

9. An anesthesiologist will meet with you to discuss your options:

- femoral nerve block for post-operative pain reduction, combined with general anesthesia or spinal anesthesia
- general anesthesia: puts you to sleep completely

10. After you decide on your type of anesthesia, a nurse will give you medication to help you relax and feel more comfortable.

11. You will then be taken to the operating room on a stretcher.

What to Expect After Surgery

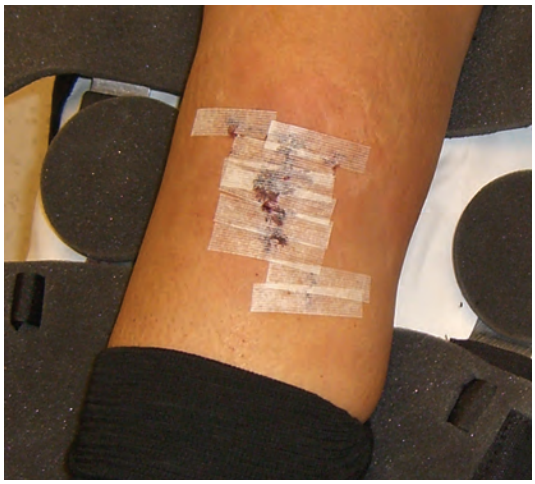
After surgery, you will be taken back to the recovery area. As you are recovering from your anesthesia, your surgeon will talk with your family and friends to let them know that your surgery is over and how things went.

When you first come out of surgery, you will have your knee brace in place. We will place ice bags around your knee to help with pain and swelling. The brace will hold your knee in a locked position.

What is on my leg?
You may have a full length brace on your knee to keep it in the locked extended position. Underneath you will have a soft wound dressing. The amount of time you will be expected to wear these devices depends on your individual recovery, anywhere from ten days to four weeks. We will give you guidelines before you are discharged and at your first post-operative appointment.

Am I going to have pain?
We will ask you what your pain level is on a scale of 0 to 10 (0 being no pain and 10 being the worst you can imagine). It is important that you know that we cannot take away all of your pain. We would like to keep you at a 2 or 3 on the pain level scale. Controlling your pain is a very important part of your recovery. Too much pain will keep you from being able to do your exercises and physical therapy. These exercises are important for getting you back on your feet sooner.

Communicating with your nurse
Be sure to let your nurse know if your pain medications seem to wear off too quickly or if you start to feel sick to your stomach. The sooner the team can help, the better you will feel. Please feel free to talk with your nurse about any other concerns you have.



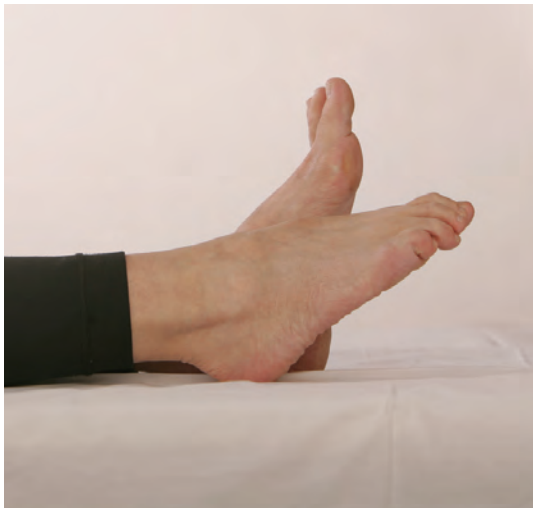
What your leg will look like on the first day after surgery.

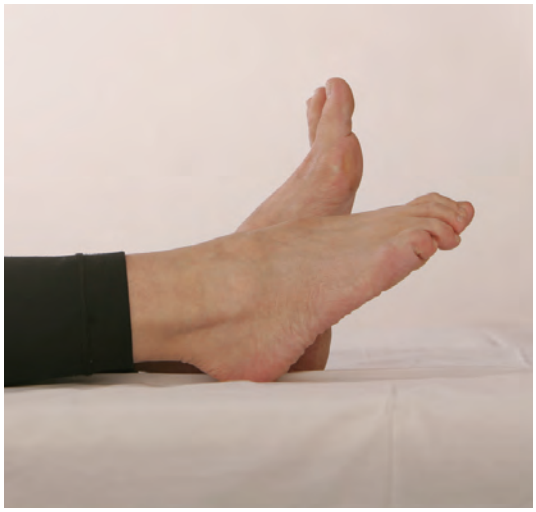
Preventing Blood Clots

The prevention of blood clots in the veins of your legs is an important part of complete and safe post-operative care. You are more likely to develop blood clots after your surgery because you will be resting, not active. There is an increased risk of developing clots if your legs are below the level of your heart.

To decrease the risk of forming a blood clot, we strongly encourage you to:

1. Do the foot and ankle pump exercises, like pushing and lifting away from the accelerator in a motor vehicle (see next page).
2. Use your leg within the guidelines we will give you and participate in your personalized physical therapy program.
3. Make sure your leg is elevated above the level of your heart to encourage blood return and prevent blood from pooling in your legs. Elevating both legs is often more comfortable.
4. Take your prescribed medication - patients over the age of 15 will be prescribed an aspirin regimen in their discharge instructions. Please follow these dosing guidelines carefully. As you become more active and progress through your recovery period, you will be at less risk for clots. You can stop taking aspirin after the first two weeks.
5. Avoid long periods of sitting still while you are at home or while traveling during the six weeks after your surgery. When you ride in a motor vehicle, you should get out every 30 minutes to stretch and have an activity break. Do your ankle pumps while riding. This guideline applies whether you're riding in a vehicle, bus, train, or plane. It is best if you can try to avoid sitting for too long during the first six weeks after surgery.





Ankle pump exercise for preventing blood clots

- While lying down or reclined on the bed, point your toes up to the ceiling and then point down as far as you can go.
- Repeat ten times every hour.

Frequently Asked Questions After Surgery

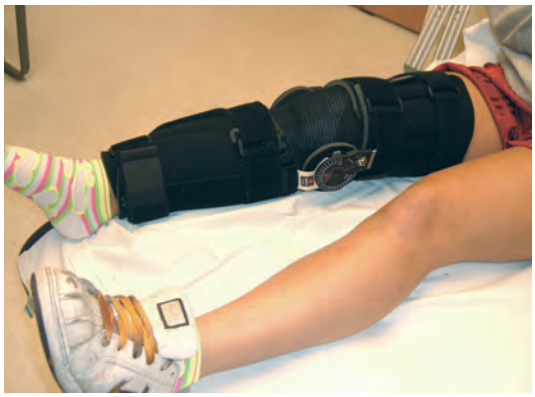
Q. When can I eat?

A. Most patients do not feel hungry right away. Usually by the evening after surgery, they are ready to try solid food. However, it is important that you start out slowly. Try some broth and perhaps plain crackers to start. Always have something to eat when taking your medications. You may feel sick to your stomach but it usually doesn't last long. If your nausea does not go away, call the Orthopaedic and Sports Medicine Clinic at **(603) 650-5133**.

Q. When can I leave?

A. You will get to go home when:

- you can get to the bathroom or a bedside toilet by yourself
- you have urinated
- your vital signs are normal
- you can control your pain with oral medications
- our staff has given you instructions on how to use crutches



The bulk around your leg will dramatically decrease after your first post-op visit (day after surgery).

Q. What happens on the days following surgery?

A. Within the first three days following your surgery, you will have an appointment in the Orthopaedic Clinic with an Athletic Trainer. At this appointment, they will remove your brace and bandages on your surgical leg. Your legs will be examined to check your circulation, wound condition and nerve and muscle condition.

Some people who have ACL reconstructive surgery have a form of pain control called a femoral block. This block makes your leg numb and the muscles do not work normally. This may last for 24 to 48 hours, on average. If you have had this block, you will need to be careful moving around on your crutches as your leg will not be able to hold you. When you go home from having your surgery, you will need to have someone help you to be safe getting in and out of the car. During the appointment following your surgery, your leg may still seem numb and/or weak, similar to when you have anesthesia for a dental procedure. This is normal.

After your leg is examined, your surgical wound will be lightly bandaged. An elastic compression sleeve will be put on your leg to help your circulation and decrease swelling.

The athletic trainer will give you instructions for daily care of your incisions.

No baths, hot tubs, or swimming are allowed until we tell you that it is OK.

If you had another procedure, such as a repair of your meniscus, we will talk with you about how your recovery process will be different. This will include a longer time in the brace and a slower return to putting weight on your leg.

At about two to three weeks after your surgery, you will return to the clinic to have your incision examined and the sutures will be removed or trimmed, depending on how your wound was closed. You may be given a short brace at this time.

Q When do I start physical therapy?

A. During your first post operative visit, within three days of surgery, you will meet with an athletic trainer who will teach you a home exercise program. During this time they will outline restrictions and responsibilities for recovery and rehabilitation. For most patients, physical therapy with your therapist at home should begin two to five days from the date of your surgery.
You should begin your work with the physical therapist two to five days after your surgery. It is best to stay with the same physical therapist throughout your recovery. When you get your progress sheets from your physical therapist we encourage you to put them in this binder and bring it with you to every follow-up appointment for reference. Most patients will have full range of motion by six weeks after surgery.

Q. What is the best way to deal with pain and swelling?

A. You can actively help your body heal by using the RICE technique - Rest, Ice, Compress, Elevate. You should try to rest and elevate your leg as much as possible.
Follow these steps when you want to ice your leg:

- With a thin fabric covering your skin (such as your compression stocking or a thin dish towel), place an ice pack or bag on your leg for 20 to 30 minutes then take off for 30 minutes.
- You may also use bags of frozen vegetables in addition to or in place of the cooling system.
- You may ice behind and on the sides of the knee while you are icing the top of your leg.
- When finished, remove the ice.

If you are given a brace, do not attempt to walk or move around without your brace until we give you clearance to do so. There is a high risk that you will fall when you are working with crutches and a fall or trip may disrupt your surgical reconstruction.

Notes

Now that your surgery is done, your focus should be on healing. If you follow the recommendations listed in this section, you should have a smooth recovery after surgery.

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The First Four to Six Weeks

When you first get home

- Continue to use your crutches as instructed.
- If you received a femoral block, you will start to get feeling back in your leg the morning after your surgery. You will have difficulty controlling your leg as the quadricep muscles are paralyzed until the block wears off.
- If you have been given a brace, wear it at all times, or as instructed by members of our team.
- You should make arrangements to see a physical therapist two to three times per week following your surgery. Don't wait until after your surgery to book these appointments as most physical therapists book out several weeks. Let us know if we can help with this.

PATIENT tip

If you have your surgery in the winter time when there is snow, I suggest getting ice picks to put on the bottom of your crutches.

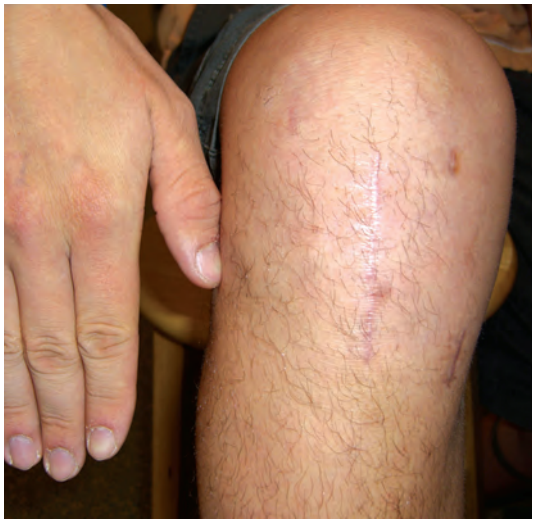
- DO NOT swim, use hot tubs, or take tub baths until your surgeon gives you the go-ahead.
- DO NOT USE ointments, lotions, oils, or vitamin preparations on your surgical incision.
- Use ice packs or bags on your knee for 20 to 30 minutes, six to eight times daily to decrease pain and swelling.
- Be sure to take your pain medication with food to avoid nausea.
- To help your wound heal, continue your healthy eating habits, give up smoking (if you haven't already), and, if you are diabetic, maintain control of your blood glucose level.
- Do not allow pets to share the space where you are sleeping and resting; they can infect your incision.
- To reduce the chance of getting an infection, make sure you and your caregiver wash your hands throughly when:
    - they are visibly soiled
    - before and after care of your incision
    - before eating
    - after going to the bathroom
    - after handling or caring for pets

Exercising

Follow the instructions that we will give you at your first post-operative visit. Our goal is to get you to full range of motion in four to six weeks.

Shin pain and bruising

You may experience shin pain and bruising down your shin. This is normal. If you have questions or concerns about how long you see or feel this happening or the severity of the pain, please call our clinic at **(603) 650-5133**.



Your pain medications
You will likely be given several medications to manage post-op pain. These may include Tylenol and a long acting or short acting narcotic pain medication.

Sometimes your surgeon may have you take non-steroidal anti-inflammatory medication (NSAIDS). However, do not take it if it is not prescribed for you until you discuss it with us at your first follow-up visit.

PLEASE NOTE:
The medications you are prescribed should not cause narcotic addiction. You will only be using them for a short time to relieve surgical pain. However, if you have concerns about addiction, please discuss this with either your surgeon or your primary care physician. Many patients find that taking narcotic medications as directed helps to maintain their pain control. Be sure to always take your pain medication with food to help avoid nausea.

It is important to know that "no pain, no gain" is not our philosophy. Tolerable discomfort is our goal, whether during exercise, daily activities, or at rest.

Be aware that pain medications can cause constipation. Drink plenty of fluids, eat lots of fruits, vegetables, and foods high in fiber (whole grains, cereals, etc.) to avoid constipation.

Please call 2-3 days ahead of time to ensure the refill is managed appropriately and there is no delay in receiving it.

PATIENT tip

Make sure you take your pain medication on time even if you feel like you don't need it - you don't want to wait until the pain does come. If you wait, the medicine will be trying to play catch up and throws off the whole timing.

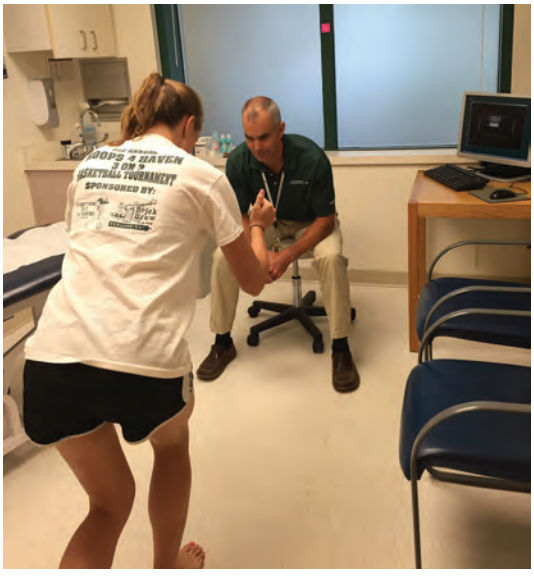
Driving
Narcotics and weak muscles may make it unsafe for you to drive. You should not drive when you are taking narcotics or if your surgeon has restricted weight bearing in your leg. Typically, ACL patients can get back to driving within three to four weeks after surgery.

Your first follow-up appointment
Your first check-up will happen one to three days after your surgery. The exact time and date of your appointment will be noted on your discharge summary sheet. This appointment will be with the athletic trainer.

When to Call

We urge you to contact us if you:

- Experience any unusual calf pain, redness, or swelling.
- Have a fever (temperature above 100.3) lasting longer than 24 hours. Note that mild temperature elevations are normal in the afternoons and evenings.
- Experience increasing redness, swelling, warmth, unpleasant odor or milky liquid coming from the incision.
- Experience increasing knee pain either with walking or at rest.
- Have trouble re-establishing normal bowel habits despite use of stool softeners and increased fluids.
- Have other symptoms you are concerned about.



Six Weeks and On

How you will feel after the first six to eight weeks

You could feel frustrated even at six to eight weeks after surgery. You might think you are going a bit stir-crazy. You will get better. Healing takes time, so be patient with yourself.

It is normal to experience an emotional slump about three weeks after surgery. This slump will pass. Feel free to call us for support - a little reassurance may be just what you need.

Many patients find that they still become tired very easily or are tired most of the time. Some patients find this is true for even longer than that (up to several months after surgery). These feelings are a normal part of your body's recovery from surgery and the healing that you have to do.

Weight-bearing restrictions

Some surgeons will restrict the amount of weight you put on your surgical leg for a period of time after your surgery. Please refer to your discharge summary for your personal surgeon's advice. It is important that you follow your doctor and physical therapist's instructions. The majority of ACL patients are allowed to put weight on their surgical leg, as tolerated with crutches. Follow the instructions of your surgeon. Your specific weight-bearing precautions are in effect until at least 10 to 14 days after your surgery. If you also had another procedure done at the same time, such as a meniscal repair, your weight-bearing may be restricted for up to six weeks.

Walking with a limp

A limp is normal and is usually due to muscle weakness. Work with your physical therapist to restore your normal gait as quickly and safely as possible.

Understand that your progress will be gradual. Please remember that it takes many months to fully heal, so try to be patient. You may continue to see improvements even after 12 months.

It is normal to feel some numbness near the incision on the front of your knee.

Follow-up visits

Our team will schedule regular follow-up visits each time you come to see us. These appointments may be with your surgeon or one of our associate providers (physician assistants and nurse practitioners). These associate providers know your medical history and individual situation as well as your surgeon, so you should feel confident that they will provide you with excellent care.

You can expect to come back for follow-up visits at these intervals:

- **Post-Surgery**
  - 1 to 3 days
  - 2 to 3 weeks
  - 6 to 8 weeks
  - 10 to 12 weeks
  - 6 months
  - 9 to 12 months

This is the short brace you may receive about three weeks after your surgery. For those that also have had a meniscal repair, you will receive this brace in about four to six weeks after surgery.

Notes

In this section you will find our recommendations for exercises over the next several months. Whether you see our physical therapists or arrange to see someone in your local community, this information will provide helpful guidelines for you and your therapist.

We have included these documents:

- general rehabilitation protocol grid for your physical therapist to reference
- week one post-surgery exercises
- phase 1 exercises (1-3 weeks post-surgery)
- phase 2 exercises (3-6 weeks post-surgery)
- phase 3 exercises (6-12 weeks post-surgery)
- Vail Sport Test™ (three months or more post-surgery)

The ultimate goal of your ACL reconstruction is to get you back to sports, work, or activities you enjoy. Participation in your rehabilitation program is essential as your success is based in large part on you. The actual surgery is only a small portion of how well you will do when you return to your pre-injury activities. Your physical therapist will release you to independent activities six to twelve weeks after surgery. You will then have a discussion with your surgeon at the six month mark to talk about a timeline for returning to sports or other activities.

No one will tell you that the rehabilitation portion of your recovery is easy. It will take dedication on your part to achieve the best possible outcome. We are with you every step of the way!

PATIENT tip

Make sure you do the exercises no matter how much you don't want to; they will pay off in the end even if the recovery time seems far too lengthy.

These guidelines are also available online: **patients.d-h.org/acl**

Physical Therapy Protocol: ACL Reconstruction

Courtesy of:
SPORTS MEDICINE
Dartmouth-Hitchcock MEDICAL CENTER

Patient Checklist

Procedure(s) done:
- ☐ ACLR - PT patella tendon
- ☐ ACLR - HS hamstring tendon
- ☐ Allograft
- ☐ Meniscal repair

Weightbearing:
- ☐ PWB x 3 wks (flat foot partial WB)
- ☐ TDWB x 4–6 wks (flat foot touch down WB) for meniscal repair and micro-fx

Bledsoe brace:
- ☐ 0°–110° unlocked
- ☐ MR & Mfx 0° locked

ROM guidelines:
week 1: 0°–95°
week 2: 0°–105°
week 3: 0°–120°
week 4: 0°–135°

Modalities:
E-Stim as needed
Cryo/Cuff: RICE

General guidelines:
- ☐ Supervised PT for 3–4 months
- ☐ PWB for first 3 weeks, then begin to wean off crutches
- ☐ Post-op brace 0–3 weeks
- ☐ Protect graft fixation
- ☐ Minimize effects of immobilization
- ☐ Control inflammation: RICE

Questions?
Orthopaedic and Sports Medicine Clinic:
(603) 650-5133

PHASE I: MOBILITY & PROTECTION	**week**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**16**	**20**	**24**
RICE edema control techniques		●	●	●	●	●	●	●	●						
TDWB-PWB using crutches and p-op brace		●	●	●	●	●	●								
isometric quads/hams		●	●	●											
ankle pumps		●	●	●											
PROM/AAROM/AROM		●	●	●	●	●	●	●	●	●	●	●			
stretch quads/hams/hipflex/ITB/HC		●	●	●	●	●	●	●	●	●	●	●			
SLR 4 ways		●	●	●	●										
multi-hip		●	●	●	●										
stationary cycle (no resistance)			●	●	●										
aquatic pool therapy (flutter kick only)							●	●	●	●	●				
EMS muscle re-education		●	●	●	●	●	●								
physioball for ROM		●	●	●	●	●	●								
patellar mobs/soft tissue mobs			●	●	●	●	●								

PHASE II: STABILIZATION	**week**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**16**	**20**	**24**
core and hip stabilization w/physioball				●	●	●	●	●	●	●	●	●	●	●	
CKC double leg progression w/brace				●	●	●	●	●	●	●	●	●	●	●	
stationary cycle (with resistance)				●	●	●	●	●	●	●	●	●	●	●	
hamstring curls				●	●	●	●	●	●	●	●	●	●	●	
proprioceptive reconditioning				●	●	●	●	●	●	●	●	●	●	●	
dyna disc w/brace							●	●	●	●	●	●	●	●	
foam pad w/brace				●	●	●	●	●	●	●	●	●	●	●	
tilt board w/brace				●	●	●	●	●	●	●	●	●	●	●	
BAPS board w/brace							●	●	●	●	●	●	●	●	
resistive cable or sports cord w/brace							●	●	●	●	●	●	●	●	
total gym CKC				●	●	●	●	●	●	●	●	●	●	●	
resistive cable or sports cord w/brace							●	●	●	●	●	●	●	●	
elliptical machine shallow no ramp									●	●	●	●	●	●	
CKC single leg progression							●	●	●	●	●	●	●	●	
■ balance squats							●	●	●	●	●	●	●	●	
■ lateral and reverse step downs							●	●	●	●	●	●	●	●	
■ single 1/3 knee bends							●	●	●	●	●	●	●	●	

PHASE III: STRENGTHENING	**week**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**16**	**20**	**24**
leg press w/brace double leg 70–30°									●	●	●	●	●	●	
shallow squats w/brace double leg 0–45°												●	●	●	
plyometrics												●	●	●	
trampolene jumps												●	●	●	
lunges w/brace and sports cord												●	●	●	
cycling												●	●	●	
jump rope												●	●	●	
running progression walk 1/4 jog 1/4												●	●	●	
leg press w/brace single leg 70–30°													●	●	
swimming													●	●	

PHASE IV: RETURN TO SPORTS															
functional sport test														●	●
multi-plane agility														●	●
sport specific drills														●	●

MENISCAL REPAIR	**week**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**16**	**20**	**24**
RICE		●	●	●	●	●	●								
TDWB		●	●	●	●	●	●								
ROM		●	●	●	●	●	●								
isometrics and SLR		●	●	●	●	●	●								
PRE hams							●	●	●	●	●	●	●	●	●
CKC quads/vmo/hams DL 1/3 knee bends							●	●	●	●	●	●	●	●	●
proprioceptive reconditioning w/brace							●	●	●	●	●	●	●	●	●
AVOID SQUATTING > 90° 6 months															●
plyometrics 4 months													●	●	●
walk–run progression 4 months 1/4–1/4													●	●	●
EMS electric muscle stim re-education		●	●	●	●	●	●								
Phase II: stabilization double leg w/brace							●	●	●	●	●	●	●		
Phase III: strengthening single leg w/brace									●	●	●	●	●	●	●

ACL Reconstruction: Week One Physical Therapy Exercises

Courtesy of:

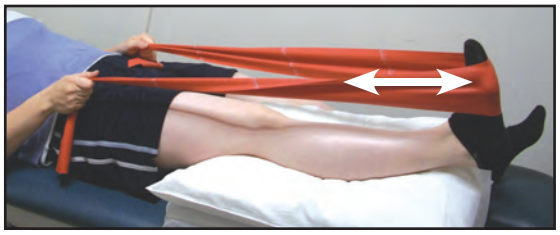
SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

Complete the following exercises during the first week after your ACL reconstruction surgery.

If you have questions, please contact the Orthopaedic and Sports Medicine Team: (603) 650-5133.

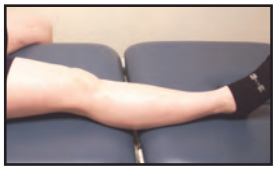
1. Ankle resistance

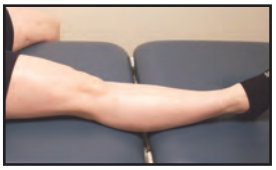
Wrap the elastic band we gave you around the ball of the foot on your healing leg; with your leg straightened, push your toes down and back again. Keep your knee flat, do not hyperextend.
Perform 1 set of 10 repetitions, 3 times a day.



2. Quadriceps isometric setting

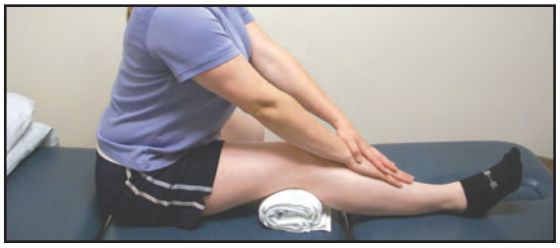
Extend your healing leg with your foot in neutral and push down to contract the quadriceps muscle in your thigh, relax and repeat.
Perform 1 set of 10 repetitions, 3 times a day. Hold the exercise for 6 seconds.


Relaxed position


Contracted position

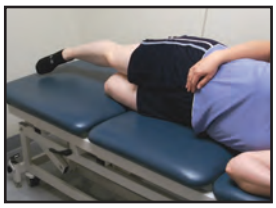
3. Hamstring stretch

Sit with a straight back and your healing leg in an extended position. Place a rolled up towel under your knee. Lean forward from your hips, keeping your back straight, until you feel a stretch in the back of your leg.
Perform 1 set of 5 repetitions, 3 times a day. Hold the exercise for 30 seconds.



4. Hip abduction

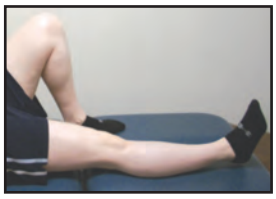
Lay on your side with your healing leg on top. Bend the other leg to a 90 degree angle for support. Keeping your foot in a neutral position, raise your leg.
Perform 1 set of 10 repetitions, 3 times a day. Hold the exercise for 6 seconds.

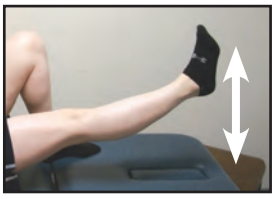

Starting position


Raised position

5. Straight leg raise

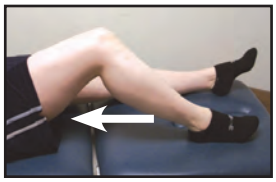
Lay on your back and extend your healing leg. With the foot of your healing leg in neutral and your other knee bent, perform a quadriceps set (see exercise #2 above) and then raise your leg 12" up from the table or bed and hold for 6 seconds.
Perform 1 set of 10 repetitions, 3 times a day. Hold the exercise for 6 seconds.

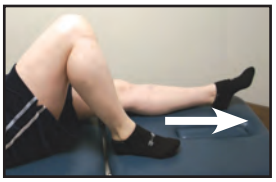

Starting position


Raised position

6. Heel slides

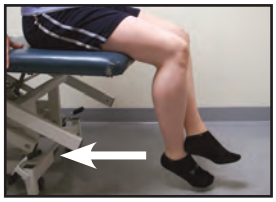
Lay on your back with your healing leg straight and the other leg bent. Slowly slide your heel up to a bent position, then slowly slide your heel back to the starting position.
Perform 1 set of 5 repetitions, 3 times a day.


Starting position


Bent position

7. Sitting knee flex

Sit on the edge of a bed or in a chair. Place your strong leg to the front and push back on the other leg with your heel.
Perform 1 set of 5 repetitions, 3 times a day. Hold the exercise for 30 seconds.



ACL Reconstruction: Phase I Physical Therapy Exercises 1-3 weeks post-surgery

Courtesy of:

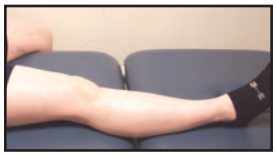
SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

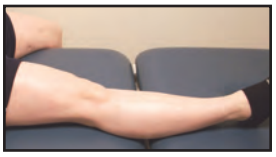
Complete the following exercises during weeks 1-3 after your ACL reconstruction surgery, or however long your therapist recommends. Your therapist will give you additional exercises to do for week four and beyond.

If you have questions, please contact the Orthopaedic and Sports Medicine Team: (603) 650-5133.

1. Quadriceps isometric setting

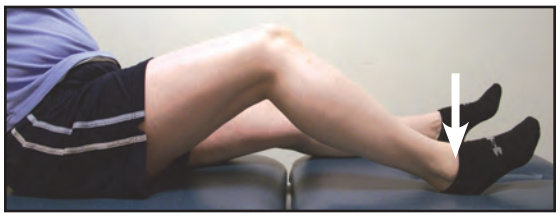
Extend your healing leg with your foot in neutral and push down to contract the quadriceps muscle in your thigh, relax and repeat.
Perform 1 set of 10 repetitions, 3 times a day. Hold the exercise for 6 seconds.


Relaxed position


Contracted position

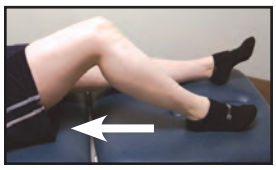
2. Hamstrings isometric setting

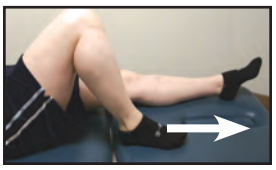
Sit with your strong leg extended and your healing leg bent. Without moving your leg, tighten the muscles on the back of your leg, trying to push your heel down.
Perform 1 set of 10 repetitions, 3 times a day. Hold the exercise for 6 seconds.



3. Heel slides

Lay on your back with your healing leg straight and the other leg bent. Slowly slide your heel up to a bent position, then slowly slide your heel back to the starting position.
Perform 1 set of 5 repetitions, 3 times a day.


Starting position


Bent position

4. Knee flex with ball

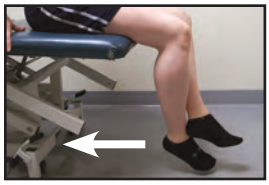
Lie on your back with your heels on top of the ball and legs extended straight. Bend your hips and knees as far as possible then straighten your legs and repeat, keeping your back flat. Be sure to control your movement when straightening your knees.
Perform 1 set of 10 repetitions, 3 times a day.


Starting position


Bent position

5. Sitting knee flex

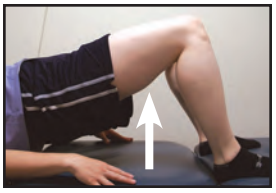
Sit on the edge of a bed or in a chair. Place your strong leg to the front and push back on the other leg with your heel.
Perform 1 set of 5 repetitions, 3 times a day. Hold the exercise for 30 seconds.



6. Lumbar bridge

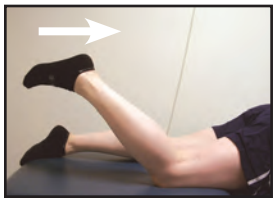
Lie on your back with your knees bent. Lift your buttocks off of the bed/floor. Return to the start position. Be sure to maintain a neutral spine – do not curve your back.
Perform 1 set of 5 repetitions, 3 times a day. Hold the exercise for 30 seconds.

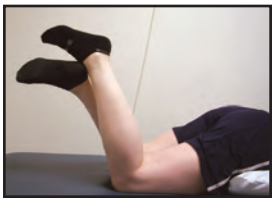

Starting position


Bridge position

7. Face down knee flex

Lie face down with your legs straight. Bend your healing leg upward. To help keep your knee in a fully bent position, you may need to use your other leg for support. Return to the start position. It is important to not let your buttocks or hips raise upward. You may need to put a pillow under your abdomen to help keep your back and hips in a neutral position. Be sure to control your movement when straightening your knees.
Perform 1 set of 5 repetitions, 3 times a day.


Bending begins


Fully bent position

ACL Reconstruction: Phase II Physical Therapy Exercises 3-6 weeks post-surgery

Courtesy of:

SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

Complete the following exercises during weeks 3-6 after your ACL reconstruction surgery, or however long your therapist recommends. Your therapist will give you additional exercises to do for week six and beyond.

If you have questions, please contact the Orthopaedic and Sports Medicine Team: (603) 650-5133.

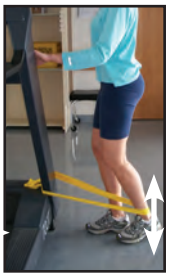
1. Lumbar bridge

Lie on your back with your knees bent. Keep your body in a pelvic tilt position to maintain a neutral spine and proper core stabilization. While holding the pelvic tilt, lift your buttocks off the bed/floor. Remember to breathe normally, do not hold your breath. Perform 1 set of 7 repetitions, 3 times a day. Hold the exercise for 30 seconds.

Starting position Bridge position

2. Four-way hip resistance

Tie the yellow elastic band we gave you around a solid object that will not move. Wrap the other end of the band around your good ankle. With your hinge brace on, stand on your healing leg with a slight bend in the knee. Try to keep your knee over your toes and do not allow your leg to roll in. Avoid extending your knee. Using your good leg, pull back slowly 4-6 inches while keeping your balance. Repeat this same exercise, moving your good leg forward, out to each side and inward. Perform 1 to 3 sets of 7 repetitions in each direction, 3 times a day. Perform 1 repetition every 6 seconds.



3. Knee step ups

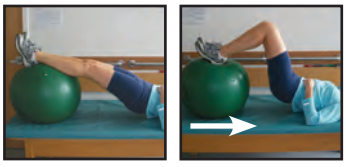
Stand with your healing leg up on a step that is about 6-8 inches high. Shifting your weight over the knee, step up slowly. Be sure to keep your back straight and do not hike your hip. Try to bear the weight equally on your foot and preferably toward the heel and not the ball of your foot. Step back down, leading with your healing leg. Perform 1 set of 7 repetitions, 3 times a day. Perform 1 repetition every 6 seconds.

4. Wall slide with ball – both knees

Place the ball between your back and the wall. Keeping your back in a neutral position, spread your feet shoulder distance apart and out about 6-8 inches from the wall. Lower yourself slowly using both knees about 1/3 of the way down (about 30 degrees) until your knees are over your toes. Hold this position for 5-6 seconds and then return to the starting position by slowly straightening your knees. Perform 1-3 sets of 7 repetitions, 3 times a day. Hold each repetition in the bent position for 5-6 seconds.

5. Lumbar bridge on ball with hamstring

If you can maintain core stabilization without discomfort, you may use the ball to do this exercise. Lie on your back with your legs stretched over the ball. Keep your body in a pelvic tilt position to maintain a neutral spine and proper core stabilization. While holding the pelvic tilt, lift your buttocks off the bed/floor and roll the ball back slowly until you reach a 60-90 degree position at your knees and hips. Return to the starting position. Remember to breathe normally, do not hold your breath. Perform 1-3 sets of 7 repetitions, 3 times a day. Perform 1 repetition every 6 seconds.



Starting position Bent position

6. Wall slide with ball – one knee

Place the ball between your back and the wall. Keeping your back in a neutral position, spread your feet shoulder distance apart and out about 6-8 inches from the wall. Lower yourself slowly using just your healing leg 1/3 of the way down (about 30 degrees) until your knee is over your toes. Hold this position for 5-6 seconds and then return to the starting position by slowly straightening your knee. Perform 1-3 sets of 7 repetitions, 3 times a day. Hold each repetition in the bent position for 5-6 seconds.

7. Standing on foam square

Stand on the foam square with your brace on your healing leg. Lift up your good leg so all of the weight is on your healing leg. Be sure to keep your knee slightly bent. Balance and hold this position for up to 30 seconds before switching legs to compare. If you start to lose your balance, simply step down on your good leg. Do not allow your healing leg to roll in. Avoid hyperextending your knee. Perform 1-3 sets of 7 repetitions, 3 times a day. Hold each repetition for 30 seconds.

Starting position Bent position

ACL Reconstruction: Phase III Physical Therapy Exercises 6-12 weeks post-surgery

Courtesy of:

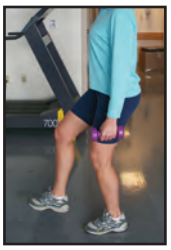
SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

Complete the following exercises during weeks 6-12 after your ACL reconstruction surgery, or however long your therapist recommends. Please note that these activities are meant only as guidelines and your therapist will know if you need modifications and further progressions.

If you have questions, please contact the Orthopaedic and Sports Medicine Team: (603) 650-5133.

1. Knee squat with weights

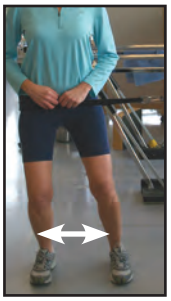
Place 5 pound weights (or more if recommended by your therapist) in each hand. With your brace on, stand on your healing only and lower yourself 1/3 of the way into a shallow single-leg squat. Your leg should be at about a 30 degree angle with your knees over your toes. Hold this position for 6 seconds and then return to the starting position by straightening your leg slowly. Remember to keep your weight evenly distributed on the foot of your good leg, preferably towards the heel and not the ball of your foot. Perform 1-3 sets of 7 repetitions, 1 time every other day. Hold each repetition for 6 seconds.


Starting position


Squatted position

2. Side step resistance

Tie the gray elastic band we gave you around a solid object that will not move. Wrap the other end of the band around your waist. With your brace on, stand with your feet together and a slight bend in the knees. Do not allow your healing leg to roll in toward the midline. Step sideways in 2-3 small steps, pulling against the elastic. Step back in 2-3 steps to the starting position. Repeat this same exercise, to the other side, to the front, and to the back. Remember to maintain good posture and body mechanics. Your knees should be slightly bent during the entire exercise. Perform 1-3 sets of 7 repetitions in each direction, 1 time every other day.



3. Single leg balance on dyna disc

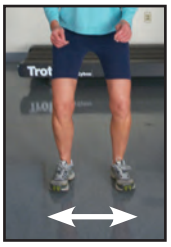
Put your brace on. Stand on the dyna disc (or the equipment recommended by your therapist). Extend your good leg backward so that you are balanced on your healing leg with a slightly flexed knee over your toes. Do not let your leg roll in toward the midline. Hold, balance, and repeat. Perform 1 set of 5-7 repetitions, 1 time every other day day. Rest 1 minute between sets. Perform 1 repetition every 4 seconds.

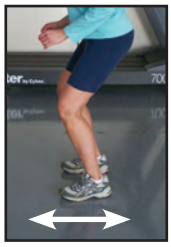
4. Single leg ball catch

Stand on your healing leg with your brace on. Hold a ball in your hands. Throw the ball to a partner. Have the partner throw the ball back to you. Repeat. Be sure to keep your knee slightly flexed over your toes and do not leg your leg roll in toward the midline. Perform 3 sets of 1 minute, 1 time every other day.

5. Plyometric jumps

Stand with your feet together. Jump to left a few inches, with both feet at the same time then jump back. Perform the same kind of jump front to back. Maintain good posture and body mechanics. Be sure to land on your toes with both knees flexing to absorb the jump like a spring. Your landing should be quiet and soft like a feather. Throughout the exercises, keep your knees flexed over your toes and do not let your knees roll in. Perform 3 sets of 1 minute in each direction, 1 time every other day.





6. Jumps on trampoline

Stand on a mini trampoline. Slowly begin to jump up and down with both feet. Keep feet about shoulder distance apart. Start slow and keep jumps small. Be sure to stay in the center of the trampoline. Your therapist will tell you when you are ready to start jumping off of the trampoline onto a soft mat. Perform 5 sets of 1 minute, 1 time every other day.

7. Jogging on trampoline

Put your brace on. Stand on a mini trampoline. Slowly begin to jump up and down alternating with both feet. Keep feet about shoulder distance apart. Start slow and keep jumps small. Be sure to stay in the center of the trampoline. Maintain proper posture and body mechanics throughout this exercise. Perform 5 sets of 1 minute, 1 time every other day.

Return To Running Program - Track

Courtesy of:

SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

Around your three month post-op visit, your surgeon will discuss beginning a return to running program with your physical therapist. Below is a guide to assist you and your therapist in this transition with instructions on how to progress.

Track Running = between 5-7mph. Begin on a local track (soft, even surfaces) or, an open field (must be flat, even surfaces). Before starting the walk/jog program, all individuals should first tolerate 30 minutes of walking.

PREREQUISITES TO BEGIN A WALK/JOG PROGRAM

1. No signs or symptoms of inflammation.
2. Normalized flexibility and joint mechanics particularly in the lower quadrant.
3. Ability to balance on each leg (without wobbling), on a variety of surfaces without shoes and then with shoes.
4. Ability to progress through the big toe while keeping the foot straight during ambulation.
5. Tolerance of closed kinetic chain exercises with good neuromuscular control (single leg squat)
6. Ability to hop on each leg with good frontal plane control of the lower extremity

If you have questions, please contact The Department of Rehabilitation: (603) 650-3600

OR

The Orthopaedic & Sports Medicine Clinic: (603) 650-5133

SORENESS RULES

1. Soreness during the warm-up that continues	2 days off, down 1 level
2. Soreness during warm-up that goes away	Remain at that level
3. Soreness during warm-up that goes away but re-develops during session	2 days off, down 1 level
4. Soreness the day after workout (not muscle soreness)	1 day off, do not advance
5. No soreness present.	Advance 1 level per week

WALK /JOG PROGRAM (TRACK)

- Progression to the next level when there is no increased effusion/swelling at the knee and no knee pain at a rate of no more than 1 level per week.
- Perform jogging no more than 4 times per week.
- Perform jogging no more than every other day.

Level 1	10' Walk warm-up	jog straights/walk curves	2 miles	cool down
Level 2	10' Walk warm-up	jog straights/jog 1 curve every other lap	2 miles	cool down
Level 3	10' Walk warm-up	jog straights/jog 1 curve every lap	2 miles	cool down
Level 4	10' Walk warm-up	jog 1.75 laps/walk curve	2 miles	cool down
Level 5	Jog all laps		2 miles	cool down
Level 6	Jog full 2.5 miles		2.5 miles	cool down
Level 7	Jog full 3.0 miles		3.0 miles	cool down
Level 8	Increase speed on straights/jog curves			

Adapted from:
Adams et al., (2012) Current concepts for anterior cruciate ligament reconstruction: a criterion-based rehabilitation progression.

201706-122a

Return To Running Program - Treadmill

Courtesy of:

SPORTS MEDICINE
Dartmouth-Hitchcock
MEDICAL CENTER

Around your three month post-op visit, your surgeon will discuss beginning a return to running program with your physical therapist. Below is a guide to assist you and your therapist in this transition with instructions on how to progress.

Treadmill Running = between 5-7mph. Begin program on a treadmill with 0% incline. Before starting the walk/jog program, all individuals should first tolerate 30 minutes of walking.

PREREQUISITES TO BEGIN A WALK/JOG PROGRAM

1. No signs or symptoms of inflammation.
2. Normalized flexibility and joint mechanics particularly in the lower quadrant.
3. Ability to balance on each leg (without wobbling) on a variety of surfaces without shoes and then with shoes.
4. Ability to progress through the big toe while keeping the foot straight during ambulation
5. Tolerance of closed kinetic chain exercises with good neuromuscular control (single leg squat)
6. Ability to hop on each leg with good frontal plane control.

If you have questions, please contact The Department of Rehabilitation: (603) 650-3600

OR

The Orthopaedic & Sports Medicine Clinic: (603) 650-5133

SORENESS RULES

1. Soreness during the warm-up that continues.	2 days off, down 1 level
2. Soreness during warm-up that goes away	Remain at that level
3. Soreness during warm-up that goes away but recurs during session	2 days off, down 1 level
4. Soreness the day after workout (not muscle soreness)	1 day off, do not advance
5. No soreness present.	Advance 1 level per week

WALK – JOG PROGRAM (TREADMILL BASED)

- Progression to the next level when there is no increased effusion/swelling at the knee and no knee pain at a rate of no more than 1 level per week.
- Perform jogging no more than 4 times per week.
- Perform jogging no more than every other day.

Level 1	10' Walk warm-up	0.1-mi jog/0.1-mi walk	repeat 10 times	cool down
Level 2	10' Walk warm-up	0.2-mi jog/0.1-mi walk	**2 miles** combined total	cool down
Level 3	10' Walk warm-up	0.3-mi jog/0.1-mi walk	**2 miles** combined total	cool down
Level 4	10' Walk warm-up	0.4-mi jog/0.1-mi walk	**2 miles** combined total	cool down
Level 5	Jog full 2 miles		2 miles	cool down
Level 6	Jog full 2.5 miles		2.5 miles	cool down
Level 7	Jog full 3.0 miles		3.0 miles	cool down
Level 8	Alternate between running/jogging every 0.25 mi			

Adapted from:
Adams et al., (2012) Current concepts for anterior cruciate ligament reconstruction: a criterion-based rehabilitation progression.

201706-122b

Vail Sport Test™

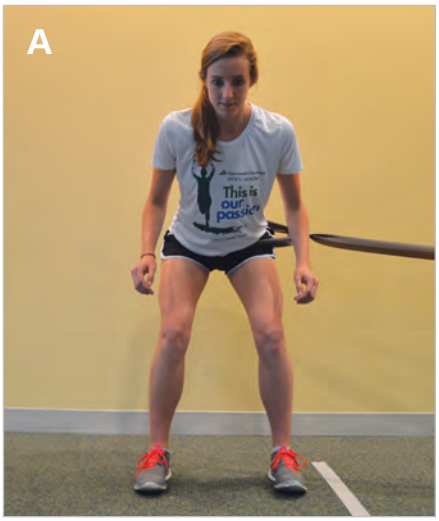
Your doctor may ask your physical therapist to have you complete the following exercises three months or more after surgery. The goal of these exercises is to test if your body is ready to return to your chosen sport(s). Your doctor will receive the results from your physical therapist and will let you know if you are cleared to return to sports.

Single Leg Squats

Purpose:	To test the neuro-muscular control of the athlete's repaired knee when it is fatigued.
Supplies:	Black sport cord, goniometer, a stopwatch and two chairs
Description:	The athlete will perform single leg squats with black cord resistance to **60º of knee flexion at a cadence of one second up and one second down for a goal time of three minutes.** The athlete's knee should never fully extend past 30º throughout the three minutes. Two fingers are allowed for balance on a chair back.
Setup:	**1.** Use a goniometer to measure 60º of knee flexion when standing and place a chair in a position to allow the athlete's buttocks to lightly touch at that depth. **2.** The athlete places the heel of the foot on the cord at a position where the hand is aligned with the knee joint line to remove slack from the cord. **3.** Tension is set by pulling the cord handle to the waist line and holding. Have the athlete hook their thumb around their pant line to maintain tension on the cord. **4.** Two fingers of the opposite hand are allowed to lightly touch another chair back for balance.
Technique:	The athlete must perform each repetition of a single leg squat **with** the following: **1.** Knee flexion angle remains between 30 and 60 degrees **2.** Athlete performs repetitions without dynamic knee valgus **3.** Athlete avoids locking knee during extension **4.** Athlete avoids patella extending past the toe during knee flexion **5.** Athlete maintains upright trunk during knee flexion **Cuing should be provided when compensations are noted. If unable to correct STOP TEST.**
Scoring:	One point is awarded for each technique criterion that is satisfied per minute. A total of 15 points may be awarded for this test. Testing is stopped if and when: ■ Form: once the subject is unable to complete the exercise without compensation ■ Pain: the patient has pain > 3/10 ■ Endurance: the athlete fatigues

Vail Sport Test™

Lateral Agility



Purpose:	To test the ability of the athlete's leg to accept load (absorb) and push off in a lateral direction with power.
Supplies:	Black sport cord, stopwatch and tape
Description:	The athlete will hop laterally with cord resistance from their surgical leg, land momentarily on their non-surgical leg, only to return onto their surgical leg with the cord pulling them back to the starting position for a total test time of 90 seconds. Each repetition of one second includes exploding laterally off the surgical side and then returning to the starting position.
Setup:	**1.** Attach the belt around the waist with one end of the cord attached to the belt. Attach the other end of the cord to a door jam or a secure post to act as an anchor. **2.** Stand sideways with the involved leg toward the anchor. **3.** Step away laterally until tension is reached where the athlete slightly compensates with leaning and place a line with tape on the lateral aspect of the involved foot. **4.** Measure the distance from the greater trochanter to the floor. **5.** Use this measured distance to place a second tape line parallel to the first.
Technique:	The athlete must perform each lateral hop by landing on or inside the first tape line with the **involved** foot (A) and on or outside the second tape line with the **uninvolved** foot (B). Only one foot should be on the ground at the same time and the athlete must land onto the involved side **with** the following criteria: **1.** Knee flexion is at 30 degrees or greater during landing **2.** Athlete performs repetitions without dynamic knee valgus **3.** Athlete performs repetitions within landing boundaries **4.** Landing phase does not exceed one second in duration **5.** Patient maintains upright trunk during knee flexion **Emphasis is on absorbing by bending at the hip and knee with 30 degrees of knee excursion.** **Cuing should be provided when one of the compensations are noted. If unable to correct STOP TEST.**
Scoring:	One point is awarded for each technique criterion that is satisfied per 30 second increment. A total of 15 points may be awarded for this test. **Testing is stopped if and when:** ■ Form: once the subject is unable to complete the exercise without compensation, even with cuing ■ Pain: the patient has pain > 3/10 ■ Endurance: the athlete fatigues

Vail Sport Test™

Forward Running

Purpose:	To test the ability of the athlete's leg to accept load (absorb) and push off in a forward direction.
Supplies:	Black sport cord, stopwatch and tape
Description:	The athlete will hop back and forth from the non-surgical leg onto the surgical leg in a "modified" jogging motion. The cord is attached from behind the athlete to provide a force pulling backwards and a forward trunk lean. There is no significant side-to-side motion but there is more absorption and up and down motion required than would be if performing only a jogging motion. The goal is two minutes total. Emphasis is on absorbing by bending at the hip and knee with 30 degrees of knee excursion. Excursion is defined as the amount of absorption from knee flexion at landing to max knee flexion.
Setup:	**1.** Attach the belt around the waist with one end of the cord attached to the belt. Attach the other end of the cord to the door jam or a secure post to act as an anchor. **2.** Stand facing away from the cord attachment so it is pulling backwards on the athlete. **3.** Step forward until tension is reached where the athlete slightly compensates by leaning forward and place a line with tape behind the heels. It should be the same line as the first line on the lateral agility test.
Technique:	The athlete must perform the "modified" (modified because it is more about the absorption than the actually jogging) jogging motion while staying in front of the line. Only one foot should be on the ground at the same time and the athlete must absorb onto the involved leg with the following: **1.** Knee flexion between 30 and 60 degrees during landing **2.** Athlete performs repetitions within landing boundaries **3.** Athlete performs repetitions without dynamic knee valgus **4.** Athlete avoids locking knee during extension **5.** Landing phase does not exceed one second in duration **6.** Patient maintains upright trunk during knee flexion **Cuing should be provided when one of the following compensations are noted. If unable to correct STOP TEST.**
Scoring:	One point is awarded for each technique criterion that is satisfied per minute. A total of 12 points may be awarded for this test. Testing is stopped if and when: ■ Form: once the subject is unable to complete the exercise without compensation, even with cuing ■ Pain: the patient has pain > 3/10 ■ Endurance: the athlete fatigues

Vail Sport Test™

Backward Running

Purpose:	To test the ability of the athlete's leg to accept load (absorb) and push off in a backward direction.
Supplies:	Black sport cord, stopwatch and tape
Description:	The athlete will hop back and forth from the non-surgical leg onto the surgical leg in a "modified" jogging motion. The cord is attached in front of the athlete to provide a force pulling forwards and a forward trunk lean. There is no significant side-to-side motion but there is more absorption and up and down motion required than would be if performing only a jogging motion. The goal is two minutes total. Emphasis is on absorbing by bending at the hip and knee with 30 degrees of knee excursion. Excursion is defined as the amount of absorption from knee flexion at landing to max knee flexion.
Setup:	**1.** Attach the belt around the waist with one end of the cord attached to the belt. Attach the other end of the cord to the door jam or a secure post to act as an anchor. **2.** Stand facing away from the cord attachment so it is pulling backwards on the athlete. **3.** Step forward until tension is reached where the athlete slightly compensates by leaning forward and place a line with tape behind the heels. It should be the same line as the first line on the lateral agility test
Technique:	The athlete must perform the "modified" (modified because it is more about the absorption than the actually jogging) jogging motion while staying in front of the line. Only one foot should be on the ground at the same time and the athlete must absorb onto the involved leg with the following: **1.** Knee flexion between 30 and 60 degrees during landing **2.** Athlete performs repetitions within landing boundaries **3.** Athlete performs repetitions without dynamic knee valgus **4**. Athlete avoids locking knee during extension **5.** Landing phase does not exceed one second in duration **6.** Patient maintains upright trunk during knee flexion **Cuing should be provided when one of the following compensations are noted. If unable to correct STOP TEST.**
Scoring:	One point is awarded for each technique criterion that is satisfied per minute. A total of 12 points may be awarded for this test. Testing is stopped if and when: ■ Form: once the subject is unable to complete the exercise without compensation, even with cuing ■ Pain: the patient has pain > 3/10 ■ Endurance: the athlete fatigues

Vail Sport Test™: Functional Assessment for Return to Sports

Single Leg Squat (Goal: 3 minutes)

Cadence: 1 squat per 2 seconds (goal: 90 single knee squats in 3 minutes)

1. Knee flexion angle between 30° and 60°
2. Patient performs repetitions without dynamic knee valgus (knee valgus = patella falls medial to the great toe)
3. Patient avoids locking knee during extension
4. Patient avoids patella extending past the toe during knee flexion
5. Patient maintains upright trunk during knee flexion

NOTE: If patient repeats error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1 minute timeframe).

Score 0 / 15

	Minute 1		Minute 2		Minute 3	
	Yes (1)	No (0)	Yes (1)	No (0)	Yes (1)	No (0)
1						
2						
3						
4						
5						

Lateral Bounding (Goal: 90 seconds)

Cadence: 1 second to bound off surgical side, landing momentarily on opposite leg and returning to the starting position

1. Knee flexion angle is 30° or greater during landing
2. Patient performs repetitions without dynamic knee valgus (knee valgus = patella falls medial to the great toe)
3. Patient performs repetitions within landing boundaries
4. Landing phase does not exceed 1 second in duration
5. Patient maintains upright trunk during knee flexion

NOTE: If patient repeats error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1 minute timeframe).

Score 0 / 15

	1st 30 sec		2nd 30 sec		3rd 30 sec	
	Yes (1)	No (0)	Yes (1)	No (0)	Yes (1)	No (0)
1						
2						
3						
4						
5						

Forward Jogging (Goal: 2 minutes)

Cadence: 1 second to bound over to opposite foot and back to starting foot

1. Knee flexion angle between 30° and 60°
2. Patient performs repetitions within landing boundaries
3. Patient performs repetitions without dynamic knee valgus (knee valgus = patella falls medial to the great toe)
4. Patient avoids locking knee during extension
5. Landing phase does not exceed 1 second in duration
6. Patient maintains upright trunk during knee flexion

NOTE: If patient repeats error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1 minute timeframe).

Score 0 / 12

	Minute 1		Minute 2	
	Yes (1)	No (0)	Yes (1)	No (0)
1				
2				
3				
4				
5				
6				

Backward Jogging (Goal: 2 minutes)

Cadence: 1 second to bound over to opposite foot and back to starting foot

1. Knee flexion angle between 30° and 60°
2. Patient performs repetitions within landing boundaries
3. Patient performs repetitions without dynamic knee valgus (knee valgus = patella falls medial to the great toe)
4. Patient avoids locking knee during extension
5. Landing phase does not exceed 1 second in duration
6. Patient maintains upright trunk during knee flexion

NOTE: If patient repeats error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1 minute timeframe).

Score 0 / 12

	Minute 1		Minute 2	
	Yes (1)	No (0)	Yes (1)	No (0)
1				
2				
3				
4				
5				
6				

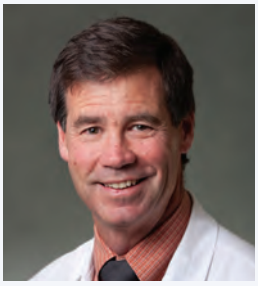
Passing Score:
46 / 54 points

Total Score:

Meet the Dartmouth-Hitchcock
SPORTS MEDICINE TEAM

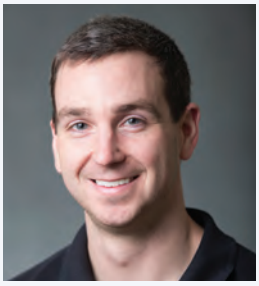
Michael Sparks, MD, Chief, Sports Medicine

James Ames, MD, MS



Charles Carr, MD

Aimee Burnett, MSPT



Jason Godsell, DPT, CSCS

Steven Vincente, PT

Molly Paturzo, M.Ed, N.H.LAT, ATC

Nicole Wasylyk, MSEd, N.H.LAT, ATC

For questions about appointments, medication refills, or any other general questions, please call (603) 650-5133.

Meet the D-H Sports Medicine Team

Directions to the Outpatient Surgery Center
at Dartmouth-Hitchcock Medical Center
36 Lahaye Drive, Lebanon, NH

FROM BOSTON AREA (2.5 HOURS), OR MANCHESTER AIRPORT (1.5 HOURS)
Take I-93 North to I-89 North. Take Exit 18 for Lebanon, NH and turn right onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

FROM MASSACHUSETTS AND CONNECTICUT
Take I-91 North to I-89 South (just before you reach White River Junction). On I-89 South, take Exit 18 for Lebanon, NH. Turn left off the exit ramp onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

FROM BURLINGTON, VERMONT (1.5 HOURS)
Take I-89 South to Exit 18 for Lebanon, NH. Turn left off the exit ramp onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

FROM RUTLAND, VERMONT (1 HOUR)
Take US Route 4 East to the intersection with I-89 between Woodstock and White River Junction. Take I-89 South to Exit 18. Turn left off the exit ramp onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

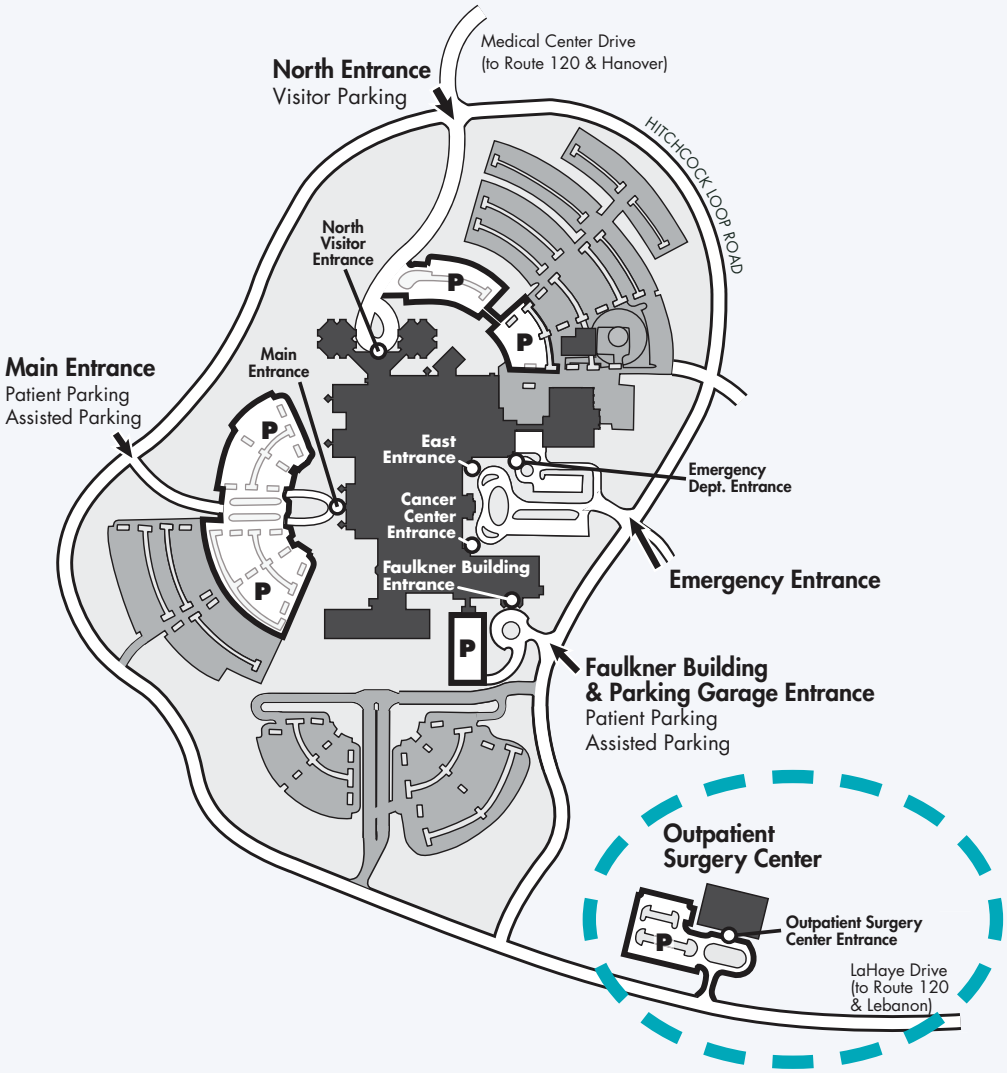
FROM ST. JOHNSBURY, VERMONT (1.25 HOURS)
Take I-91 South to I-89 South (just after the exit for White River Junction). Follow I-89 South to Exit 18. Turn left off the exit ramp onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

FROM CONCORD, NEW HAMPSHIRE
Take I-89 North Exit 18. Turn right off the exit ramp onto Route 120 North. Follow Route 120 for about 1.5 miles to the traffic lights with the "H" sign and make a left turn onto Lahaye Drive. The Outpatient Surgery Center will be on your right (36 Lahaye Drive).

BUS SERVICE
Free bus service is available to and from DHMC. The bus stop at DHMC is located between the Cancer Center and East entrances. Call Advanced Transit at (802)295-1824 or visit www.advancetransit.com for a schedule.

There is parking on-site at the Outpatient Surgery Center.

Directions to OSC at DHMC



Patient **Financial Services**

We have on-site customer service representatives and financial counselors located in the doorway marked "Patient Financial Services" in the main mall at Dartmouth-Hitchcock Medical Center. In-person customer service is available Monday through Friday, 8:00 am to 4:30 pm. Or, you can contact us by email at patient.accounts@hitchcock.org.

Account and billing questions
Conifer Health Solutions: (844) 808-0730

Financial assistance
(603) 650-6222