

ACL SURGERY HANDBOOK



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Introduction

Having ACL surgery is a big event for most people. In choosing Dr. Campbell, you choose a surgeon who has performed nearly 2000 ACL Reconstructive Surgeries and is regarded as a leading authority in his field. This is nevertheless a big step for you and can be stressful at times. This handout is designed to ease you through the process of ACL surgery. You'll find answers to many of the commonly asked questions and concerns you may have from today through the next 6 months.

Preparing for Your ACL Surgery

The best way to prepare for surgery and a quick recovery is to help your injured knee be as strong and flexible as it can be. Gentle exercise like riding a stationary bike and lifting weights (leg extension machine, leg press, hamstring curls) are excellent ways to help you increase your knee's range of motion, soothe the injured area, and help decrease the chance of scarring after surgery. During your workouts, strive to gain the same range of motion in your injured knee as your uninjured knee.

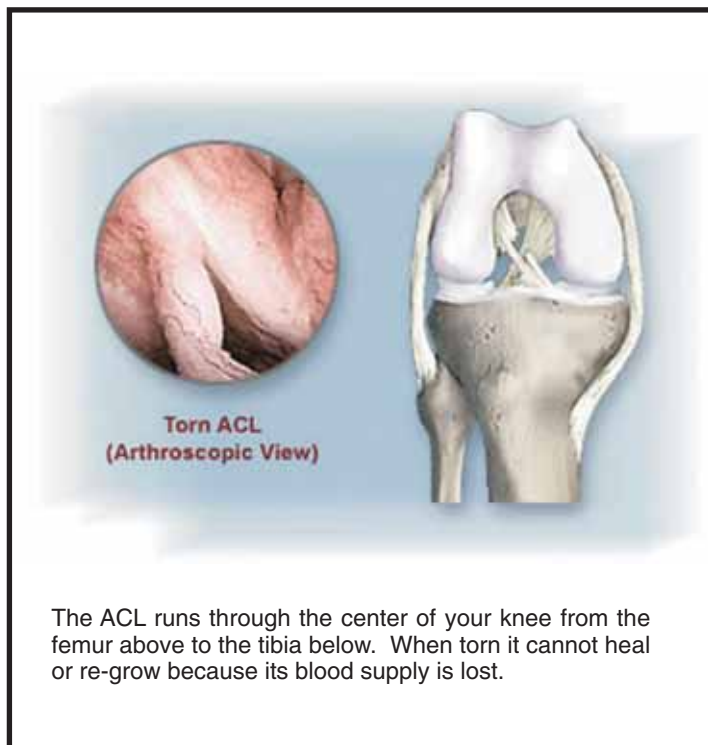
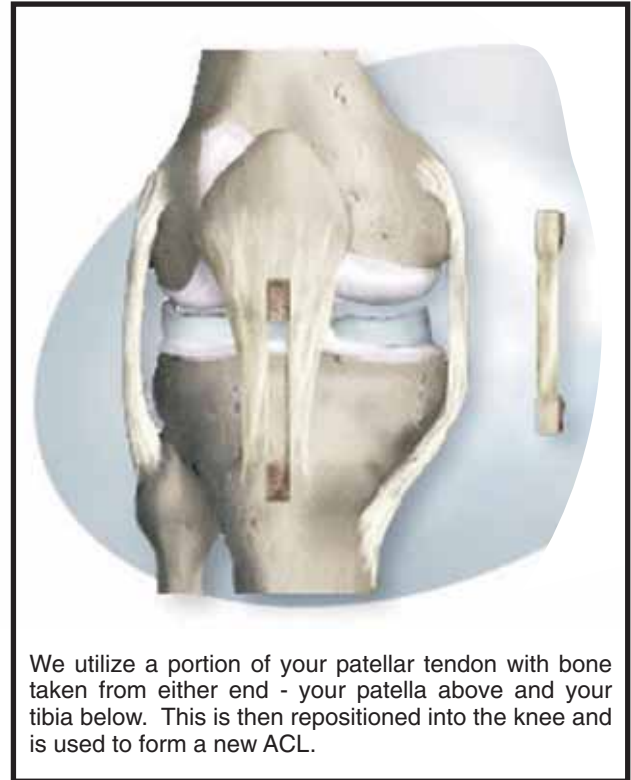
Your pre-surgery workouts should be gentle. If your knee is more swollen the morning after your workout than the morning before, then your workout was too hard. Even if your injured knee's motion and strength start to improve after 2-3 weeks, remember that your knee is *not* back to normal. We caution you not to return to high level exercise (skiing, basketball or other cutting sports); this can expose your unstable knee to irreversible injuries such as tears in your meniscus cartilage or damage to the smooth cartilage which coats the bones within the joint (articular cartilage).



Additional exercises you may find helpful are provided at the end of this brochure.

Reconstructing Your Torn ACL

Our goal is to return stability to your knee. We do this by using a living tissue substitute in place of your torn ACL. Currently the most common graft we use is a portion of your patellar tendon (which runs from the bottom edge of your knee cap down onto your tibia or shin bone). We remove a portion of this tendon and a portion of the bone it attaches to on both ends to form your new ACL graft. We then make tunnels into your knee starting below the joint and up into your knee and up into your femur bone. These tunnels are drilled through the attachment sites for your original ACL on both the tibia and femur bones. Finally we slide your new ligament into place and the bony ends of your ACL graft will grow into your surrounding bone and allow your new graft to become permanent. We use a titanium screw on each end to lock it in place until the bony healing is complete (roughly 4-6 weeks).



As with all surgery there are some risks:

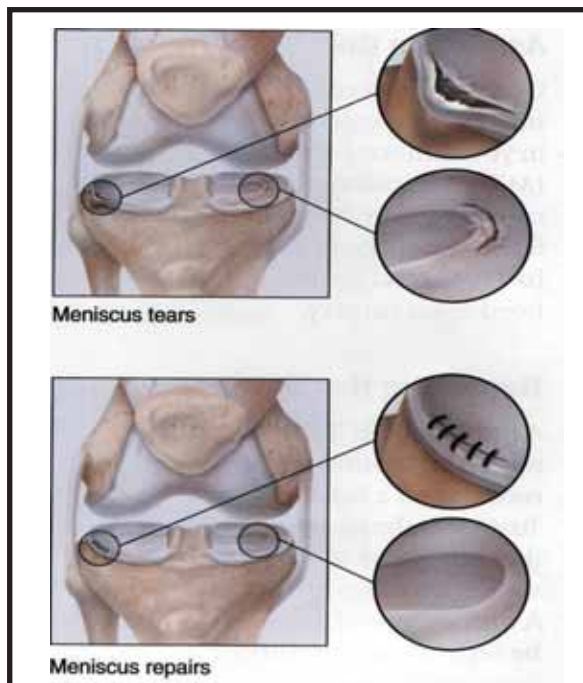
- Risk of infection,
- Risk of neurovascular injury,
- Risk of blood clot in your leg which may travel to your lungs,
- Risk of failure of your new ligament,
- Risk of stiffness in your knee due to extra scarring in your knee.

Details of these potential problems and others will be explained to you in depth as we prepare for your surgery.

Meniscal Injuries

Another injury we commonly encounter at the time of arthroscopy is that of a meniscal tear. A meniscal tear often occurs in association with a twisting injury and therefore occurs approximately 30% of the time in association with an ACL tear.

Meniscal tears if left untreated can cause premature arthritis to the articular cartilage. Tears occur in two types: outer rim tears or “bucket-handle” tears (see picture to right) can sometimes be repaired using a suture. Tears which involve the innermost tapered edge have poor blood supply and so attempting repair is rarely successful. Therefore in these situations we remove the damaged meniscal tissue and preserve the outer rim. This is highlighted in the lower circle of each image to the right.



Articular Cartilage Injuries

We often see injuries to the smooth cartilage which coats the ends of the bones (articular cartilage). Sometimes this is traumatic and occurs when you tear your ACL, but sometimes it results from long term instability. The articular cartilage is responsible for keeping the joint relatively free of friction. Wear in the articular cartilage represents the first phase of arthritis known as *chondromalacia*. When this wear pattern begins, knee pain, swelling and occasionally loose pieces of cartilage can result. This represents another reason for knee arthroscopy and ACL repair: to limit progression of arthritis and thereby decrease symptoms of pain.

Micro fracture Rehabilitation Protocol

Some articular cartilage damage is severe enough to cause breakdown to the underlying bony surface. When this is widespread or involves touching surfaces of the femur and tibia or the femur and patella we generally shave the rough edges around this damage and do nothing more. In some instances though, we encounter an isolated area of breakdown to the bone and in this instance we can do a microfracture which means we take a sharp tipped probe and poke holes into the bone in order to encourage extra blood flow to enter the area. This is the first step in allowing fibrocartilage (scar cartilage) to fill into this defect and the hope is that this will diminish any symptoms caused by this arthritis and slow the rate of wear and tear to your knee. In order to maximize your ability to heal this defect we ask you to follow the following protocol.

- You will go home with a machine called a CPM which stands for Continuous Passive Motion. This device provides a cradle for your leg to rest in and slowly bends your knee back and forth. The purpose is to mold the fibrocartilage into the defect of your knee.
- You will need to use the CPM for 6-8 hrs/day for a total of 6 weeks. People will often adapt to sleeping in the CPM so as not to take as much of their day.
- You will also need to be on crutches for 6 weeks following your surgery.

Scheduling Your Surgery

Our surgery coordinator will help to schedule your surgery at Rocky Mountain Surgery Center or at Bozeman Deaconess Hospital. You will have a pre-operative phone appointment and talk either with a pre-op nurse or your anesthesiologist. This will be your opportunity to get to know the surgical staff and ask any questions about your surgery. We are happy to address any questions or concerns that remain after your pre-op visit. This phone visit occurs anywhere from 2-4 days before your surgery. The staff will let you know when you may eat and drink for the last time prior to surgery. They will also give you a time to arrive the day of your surgery.

What to Expect in Your First Week at Home

Pain Medication:

Regardless of which type of anesthesia you had for your surgery (general or spinal), once your sensation to your legs returns you will begin to experience pain. It is best to take your pain medications regularly (every 3-4 hours) for the first 48 hours. This even means waking yourself up 3-4 hours after you go to sleep in order to take your medications again. ***Do not wait until morning.*** You run the risk of getting behind on your pain control and then struggling to get caught back up. Within three to four days after your surgery, you can begin to wean from your pain pills and just take them when you are experiencing pain.

We recommend supplementing your pain pills with either Tylenol (you may take 1000mg every 6 hours), and / or Ibuprofen (you may take 800mg every 8 hours with food).

On the second day after your surgery, begin taking an aspirin (325mg) one tablet daily for three weeks. This will thin your blood slightly and help limit your risk of getting a blood clot.

Wound Care

24 hours after surgery you will remove your drain tube from within your knee. You will do this by folding back your ACE bandage, removing the piece of tape from your upper thigh and gently pulling the drain tube out. There will be some bloody drainage on the tip of this. Please wrap in plastic bag before discarding to trash. Some people experience an increase in their pain when the drain is removed. Therefore, plan to remove drain approximately 1 hour after you take your pain pills.

48 hours after your surgery you may remove your dressings. You may then clean the skin with hydrogen peroxide to remove any dry drainage. At this point it is OK for you to shower and let water run over your incision. After showering, put on the compressive stocking (TED hose) and wear this on your operative leg at all times for the next 2 to 3 weeks. It helps reduce your swelling and also limits your risk of blood pooling in your calf which could lead to a blood clot.

You can expect the region just to the inside of your incision to become quite painful and bruised 4-5 days after your surgery. Often times this bruising will extend along your calf down towards your ankle and even on your inner thigh up towards your groin. This begins to subside 1-2 weeks after your surgery.

You can expect the region just to the outside of your main incision to be numb after surgery. This is a normal result as there is a small skin nerve which is disrupted when we make your primary incision. Initially this may seem like a large area as other nerves to the skin are stretched with your swelling after surgery. As your swelling decreases, so does the region of numbness. You can expect to have an area about the size of a half-dollar which remains numb permanently.

You will also be sent home with a cold-wrap called a **Cryo-Cuff**. Use this at all times for the first 7-10 days (also at night as the compression will help reduce the swelling). Change the ice water in the cooler every 3-4 hours (at the same time you're taking your pain medications). Circulate new cold water from the cooler into the cuff every 20 minutes or more frequently if the cuff water becomes warm. You can remove the **Cryo-Cuff** during exercise or range of motion exercises. Your **Cryo-Cuff** will also be helpful to you after your physical therapy sessions.

Chemical Cellulitis

Some patients experience an increase in pain and tenderness 5-7 days after surgery along the front of their tibia and next to their main incision. This is a result of inflammation in the soft tissue where your maximum bruising is seen. Moist heat to this area will help this pass more rapidly and less painfully.

Early Motion and Activity

For the first 48 hours you should put only a slight amount of weight on your operative leg. We also encourage you to remain on bed-rest except for bathroom/shower breaks for the first 72 hours. You should plan to bring crutches with you the day of surgery (most people will rent from medical supply locations here in Bozeman such as Highland Park Pharmacy, Price Rite Drug or Medical Arts Pharmacy - \$3 - \$5/week), and most people need them for at least the first 3-4 days. You may begin to wean off of your crutches after three to five days and weight bear as tolerated. Almost all of our patients are off of crutches by 10 days after surgery.



Once you are home, it is important to keep your leg elevated at a level higher than your heart and completely straight (hyper-extended with 2 pillows under your ankle and nothing under your knee).

You should begin bending your knee gently starting the first day after surgery. Begin by letting it hang off the side of your bed, supporting it with your opposite leg. Treat this like an exercise and work on it at least 4 times/day with each period lasting 10 - 15 minutes. Our goal for you is 90-120 degrees of bend at the time your first post-op visit (8-10 days after your surgery).

Hyperextension

You will also be sent home with a special device to work on straightening your knee ([Full Extension Knee Device](#)). Studies have shown that if you have trouble regaining your straightness or hyperextension that you may be at risk for developing post-traumatic arthritis. The [Full Extension Knee Device](#) serves to assist you in regaining this portion of your motion.



Yardstick exercise:



You will be given a yardstick to take home to use as a guide to improve your bending motion. With your leg out straight, place the yardstick beneath your leg with the "0" mark down by your heel of your surgery knee. Three times each day for 10-15 minutes, work to bend your knee by sliding your heel along the ruler drawing your heel towards your buttock. You may wrap a towel around your ankle, pulling on the ends to bring your heel towards you. Your goal should be to see a gain of 1 inch or 2-3 cm of flexing motion each day, and reach at least 95-100 degrees of flexion by your first office visit after surgery.

Other exercises you can do include:

Ankle pump exercises:



Ankle pumps - this involves moving your foot back and forth like you are pushing on a gas pedal (this is another activity which can help to decrease your risk of forming a blood clot in your leg).

Straight leg raises:



Leg raises - lying flat on your back, your knee locked out straight, use your thigh muscles to lift your heel off of the bed 8-10 inches; repeat this exercise in 3 sets of 6-10 repetitions. Perform these in similar frequency to the knee bending exercise noted above.

Your First Post Operative Evaluation

This visit typically occurs 8-10 days after your surgery. At this time we will check your incision, remove stitches and evaluate your swelling and motion. We will also go over the findings from the arthroscopy portion of your surgery including a review of the photos during surgery. In addition we will take an x-ray of your knee to assess the placement of your new ACL. This is a time to address any problems or concerns you may have. At this visit, we will also arrange for Physical Therapy. This is discussed later - ***What You Can Expect During Your Physical Therapy.***

Your Six Week Follow-Up Evaluation

At this appointment we will check your knee motion and strength. If everything is going well, we can stop your formal physical therapy and start you on a program that you can continue at home. We recommend that our patients join a gym or have access to weights and a bicycle to continue their home program.

We hope by this point that your knee motion is nearing normal. It is common to still experience swelling by the end of each day but for it to resolve overnight. **Any increase in swelling that persists the next morning is a signal to you that you may have slightly “overdone it” and the degree to which you exercised, walked or stood on the previous day was more than your knee was ready to handle.**

It is very important for you to be spending approximately one hour per day on your knee rehabilitation. Activities such as biking, weightlifting and other exercises as prescribed by your physical therapist should be included in this routine. The speed of your recovery greatly depends on your dedication to your knee rehabilitation during the next 6-8 weeks.

Your 3-Month Follow-Up

By this time your knee usually feels much better. Strengthening and endurance remain important, but now agility work will be stressed. By now your motion should be equal to your other knee and your strength should be improving. You can now begin to make the transition to begin more cutting sports activities. Listen to your body. If it is still difficult to jog or to run in a straight line, your knee isn't ready for planting or cutting as required by activities such as basketball or skiing. We will advise you on sport specific exercises and activities based on your interests or goals.

Your 6-Month Follow-Up

By this time you're chomping at the bit to return to your regular activities and your new ACL should be ready too. This visit is our chance to test your graft compared to your other knee to gauge the degree of stability from your reconstruction. It is also the point at which we clear you to return to all activities and answer any final questions you may have. If everything is fine, we will release you to follow-up on an as needed basis.

What You Can Expect During Your Physical Therapy

You should expect your physical therapy to go through two or three phases:

Phase I - Restoration (10-40 days after your surgery) this involves similar activities as your early post-operative period, such as regaining your knee motion, swelling reduction and early quadriceps and hamstring strengthening. Your physical therapist will review with you a home program of exercises and then build upon this through your guided sessions, which generally occur 2-3 times per week. It is the therapist's job to see that your motion and strength are progressing on schedule. If not, they will let us know and as a team we can re-evaluate your therapy plan.

Phase II - Strength (weeks 5-12 after surgery) At this point we expect your motion to be near normal and for you to be walking normally as well. It's not uncommon for you to still have some end-of-day swelling, which should resolve by the next morning. Your therapist will now give you some specific exercises such as weight-lifting (leg extensions, hamstring curls, and leg press machines) for you to do. You can now work much harder at aerobic exercises like cycling, walking and light running. When you first start running, take small strides so that you don't limp. As your strength increases, you will be able to speed up your pace and lengthen your stride. It is still too early to do planting or cutting sports, but your knee is almost ready to practice these motions in a controlled fashion. Your therapist will guide you in these activities, but you'll do most of this work on your own. Your discipline during these two months will determine how strong and flexible your knee will be and when you are ready to return to unrestricted exercise and competition.

Phase III - Completion (weeks 12-26) this is the final phase in which you are getting your balance and proprioception skills back before you return to performance and unrestricted exercise. You can now transition to more sports-specific motor skills and activities - planting and cutting drills but no scrimmage activity. As you near the 6-month mark your confidence with your knee will increase. You'll know that you are ready to return to cutting sports because you'll no longer wonder if your knee is OK. Your ACL is ready now, and at 6 months we give you the green light to return to all activity!!

More specific therapy questions related to each of these phases are best answered by your therapist on a case by case basis.

Accelerated Rehabilitation

For those who strive for a more rapid return to sports and competition, we are strong proponents that your knee is ready as soon as your strength and confidence have returned. We routinely have high level athletes back to competition in 3-4 months. This requires a higher level of commitment and dedication on your part. We will use a **CPM** machine the day of surgery to accelerate your motion. We expect you to stay in formal Physical Therapy for a full 10 weeks post operatively and then have you strength test with your PT between 3 and 4 months out from surgery. When you can demonstrate 85-90% strength on the operative knee compared to the healthy knee, we will release you to practice and compete in an ACL protective brace.

Frequently asked questions

Will I need a brace after surgery?

We typically do not require or prescribe a brace post-operatively unless there are special circumstances such as injury to another ligament besides the ACL such as MCL or LCL. The other scenario for a post-operative brace is if you wish to accelerate your rehab as listed above.

Why do you use the patellar tendon to make a new ACL instead of other choices?

The patellar tendon graft has proven to be the most consistent graft option for the last 10 years as reviewed by leading ACL experts from around the world. Other options would include use of a portion of your hamstring tendons to make a new ACL. While this technique is becoming more common, studies suggest long term weakness to the hamstrings can result. Using *allograph* tissue (cadaver graft) is another option. However we tend to use this as a second or third choice except in special circumstances.

What are my options for anesthesia?

1 - General anesthesia: your anesthesiologist will use medications to put you completely to sleep and they will do the breathing for you and wake you up when your surgery is completed.

2 - Spinal anesthesia: your anesthesiologist will place some medication in your lower back which will make you numb from the waist on down. You then can choose to stay awake or have a mild sedative so that you take a nap.

When can I take a shower?

When you remove your dressings 48 hours after surgery, you may then shower and let water run across your knee and stitches. You should not submerge your leg until 3-4 days after your first post-operative visit (10-12 days after surgery).

When can I return to work?

If you do desk or more sedentary work you will likely be able to return in 7-10 days time. If you perform heavy labor work it is often two or three months before you can safely return to such work. We will therefore write out specific work restrictions to protect you during this period.

Exercise supplement:

What follows is a set of exercises which you can use preoperatively to prepare your knee for surgery and postoperatively to prepare for your physical therapy to begin. Use the intermediate and advanced exercises to **prepare** for surgery. The initial and intermediate exercises can be used **during your first one to two weeks after surgery**.

Knee Arthroscopy Exercise Guide

Regular exercise to restore your knee mobility and strength is necessary. For the most part this can be carried out at home. Your orthopaedic surgeon may recommend that you exercise approximately 20 to 30 minutes two to three times a day. You also may be advised to engage in a walking program. Your orthopaedist may suggest some of the following exercises. The following guide can help you better understand your exercise or activity program that may be supervised by a therapist at the direction of your orthopaedic surgeon. As you increase the intensity of your exercise program, you may experience temporary set-backs. If your knee swells or hurts after a particular exercise activity, you should lessen or stop the activity until you feel better. You should Rest, Ice, Compress (with an elastic bandage), and Elevate your knee (R.I.C.E.) Contact your surgeon if the symptoms persist.

Initial Exercise Program



Hamstring Contraction, 10 Repetitions - No movement should occur in this exercise.

Lie or sit with your knees bent to about 10 degrees. Pull your heel into the floor, tightening the muscles on the back of your thigh.

Hold 5 seconds, then relax.

Repeat 10 times.



Quadriceps Contraction, 10 Repetitions - Lie on stomach with a towel roll under the ankle of your operated knee. Push ankle down into towel roll. Your leg should straighten as much as possible.

Hold for 5 seconds. Relax.

Repeat 10 times.



Straight Leg Raises, 10 Repetitions - Lie on your back, with uninvolved knee bent, straighten your involved knee. Slowly lift about 6 inches and hold for 5 seconds. Continue lifting in 6-inch increments, hold each time. Reverse the procedure, and return to the starting position.

Repeat 10 times.

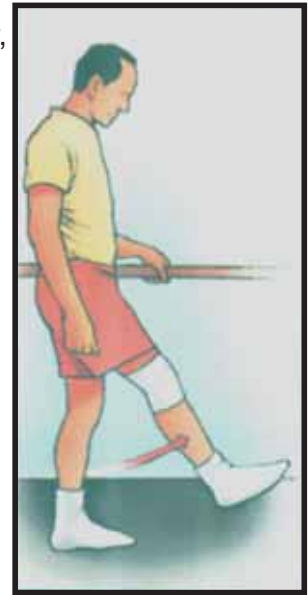
Advanced: Before starting, add weights to your ankle, starting with 1 pound of weight and building up to a maximum of 5 pounds of weight over 4 weeks.



Buttock Tucks, 10 Repetitions - While lying down on your back, tighten your buttock muscles. Hold tightly for 5 seconds. Repeat 10 times.

Straight Leg Raises, Standing, 10 Repetitions - Support yourself, if necessary, and slowly lift your leg forward keeping your knee straight. Return to starting position. Repeat 10 times.

Advanced: Before starting, add weights to your ankle, starting with 1 pound of weight and building up to a maximum of 5 pounds of weight over 4 weeks.



Intermediate Exercise Program



Terminal Knee Extension, Supine, 10 Repetitions - Lie on your back with a towel roll under your knee. Straighten your knee (still supported by the roll) and hold 5 seconds. Slowly return to the starting position. Repeat 10 times.

Advanced: Before starting, add weights to your ankle, starting with 1 pound of weight and building up to a maximum of 5 pounds of weight over 4 weeks.



Straight Leg Raises, 5 Sets 10 Repetitions - Lie on your back with your uninjured knee bent. Straighten your other knee with a quadriceps muscle contraction. Now, slowly raise your leg until your foot is about 12 inches from the floor. Slowly lower it to the floor and relax.

Perform 5 sets of 10 repetitions.

Advanced: Before starting, add weights to your ankle, starting with 1 pound of weight and building up to a maximum of 5 pounds of weight over 4 weeks.



Partial Squat, with Chair, 10 Repetitions - Hold onto a sturdy chair or counter with your feet 6-12 inches from chair or counter. Do not bend all the way down. **DO NOT** go any lower than 90 degrees. Keep back straight. Hold for 5-10 seconds. Slowly come back up. Relax Repeat 10 times.

Quadricep Stretch - Standing, 10 Repetitions - Standing with the involved knee bent, gently pull heel toward buttocks, feeling a stretch in the front of the leg.
Hold for 5 seconds.
Repeat 10 times.



Advanced Exercise Program

Knee Bend, Partial, Single Leg - Stand supporting yourself with the back of a chair. Bend your uninvolved leg with your toe touching for balance as necessary.
Slowly lower yourself, keeping your foot flat. Don't overdo this exercise. Straighten up to the starting position. Relax and repeat 10 times.





Step-ups, Forward, 10 Repetitions, - Step forward up onto a 6-inch high stool, leading with your involved leg. Step down, returning to the starting position. Increase the height of the platform as strength increases. Repeat 10 times.



Step-ups, Lateral, 10 Repetitions, - Step forward up onto a 6-inch high stool, leading with your involved leg. Step down, returning to the starting position. Increase the height of the platform as strength increases. Repeat 10 times.

Terminal Knee Extension, Sitting, 10 Repetitions, - While sitting in a chair, support your involved heel on a stool. Now straighten your knee, hold 5 seconds and slowly return to the starting position. Repeat 10 times.



Hamstring Stretch, Supine, 10 Repetitions, - Lie on your back. Bend your hip, grasping your thigh just above the knee. Slowly straighten your knee until you feel the tightness behind your knee. Hold for 5 seconds. Relax and repeat 10 times. Repeat with other leg. If you do not feel this stretch, bend your hip a little more, and repeat. No bouncing! Maintain a steady, prolonged stretch for the maximum benefit.



Hamstring, Stretch, Supine at Wall, 10 Repetitions -

Lie next to a doorway, with one leg extended.

Place your heel against the wall, and, with your knee bent, move your hips toward the wall.

Now begin to straighten your knee.

When you feel tightness behind your knee, hold for 5 seconds.

Relax and repeat 10 times.

The closer you are to the wall, the more intense the stretch.

Repeat with other leg.



Exercise Bike -

If you have access to an exercise bike, set the seat high so your foot can barely reach the pedal and complete a full revolution.

Set the resistance to “light” and progress to “heavy”.

Start pedaling for 10 minutes a day.

Increase the duration by one minute a day until you are pedaling 20 minutes a day.

Walking-

An excellent physical exercise activity in the middle stages of your recovery from surgery (after 2 weeks).

Running should be avoided until 6-8 weeks because of the impact and shock forces transmitted to your knee. Both walking and running activities should be gradually phased into your exercise program.

We hope that this handout serves as a helpful resource as you consider ACL reconstructive surgery. It isn't designed to answer *all* of your questions, but will hopefully give you a sense of what is to come. If you have any questions that aren't addressed by the information in this handout, please call us at (406) 587-0122.

We appreciate you choosing Bridger Orthopedic and Sports Medicine for the care of your knee.

Sincerely,

Timothy J. DeVries PA-C