



PRE-OPERATIVE INSTRUCTIONS

PREPARING FOR SURGERY

1 Month Before:

If you are taking acne medication: Research has shown that Accutane (Isotretinoin) which is used to treat acne can interfere with healing after orthopaedic surgery and may be a factor in tissue and graft stretching or failure. To ensure that your surgery is not cancelled ***please stop taking Accutane at least 1 month prior to your surgery date***. You should not restart Accutane medication for at least 3 months after your surgery.

2 Weeks Before:

Stop taking: Advil, Motrin, and Aspirin as well as all Herbal Supplements for ***10-14 days prior to your surgery date***. This is important because these medications and supplements can increase your risk of bleeding.

Do not go to the dentist 2 weeks before surgery as this can increase your risk of infection.

1 Week Before (approximately):

A nurse from the hospital will contact you approximately one week prior to your surgery date to give you information regarding your surgery. Please let them know about ***any breaks in the skin*** (bites, scrapes, wounds) as these can act as an entry point for bacteria, increasing the risk of infection. If present, your surgery may need to be re-scheduled.

Day/Night Before:

- **CLEAR FLUIDS ONLY** (Gatorade, apple or cranberry juice, water - pulp free, clear) ***from Midnight (24:00) to 3hrs prior to arrival to hospital*** (4 hrs before surgery).
- Do not shave your surgical site the day before or the day of your surgery.
- You may brush your teeth and rinse your mouth but do not swallow any water.

DAY OF SURGERY

- Date and time will be confirmed with you approximately 2 weeks before your surgery.
- Check-in at the Admitting Desk or Emergency Department of the hospital.
- If required for your surgery, please bring your own crutches to the hospital, clearly marked with your name. The hospital has a VERY limited supply of crutches for sale at this time. The hospital does carry braces for purchase if needed after your surgery.
- You **MUST** have someone drive you home from the hospital.

AFTER YOUR SURGERY

- **Do not go to the dentist** up to 6 weeks after surgery as this can increase your risk of infection.
- Your first Follow up Appointment details (if required) will be included in an email from our office which you will receive on or shortly after the day of your surgery.
- If you have any problems or complications after your surgery please refer to the Post-Op Concerns section included in your surgery package or refer to our website - <https://banffsportmed.ca/after-your-surgery/>.



Banff Sport Medicine

High Tibial Osteotomy (HTO)

What is an “HTO”?

A High Tibial Osteotomy is an operation that involves cutting your tibia bone to realign the weight-bearing axis of the leg. The purpose is to take body weight off an arthritic part of the knee. It can also be used in certain cases to treat instability of the knee. When the tibia bone is wedged open, the gap is filled with bone graft. This can come from your pelvis (autograft) or from the bone bank (allograft). Synthetic bone graft can also be used along with, or as an alternative to, the autograft or allograft. Your surgeon will discuss your options with you.

Diagnosis:

- A history of medial or lateral compartment osteoarthritis of the knee.
- Physical examination shows either varus (bow-legged) or valgus (knock-kneed) alignment of the knee
- A three-foot standing x-ray is used to determine the degree of correction that is needed to unload the affected compartment of the knee.

Why perform an “HTO”?

- To alleviate pain and functional limitations from unicompartmental arthritis of the knee
- To prevent increased severity of osteoarthritis and additional damage to the cartilage of the affected compartment of the knee
- To treat certain types of knee instability

Options other than HTO Surgery

- General treatment modalities for osteoarthritis include weight loss, muscle strengthening, physiotherapy, medications, and supportive shoes
- **Knee brace:** some people with osteoarthritis can use a custom-made unloading knee brace to manage pain and symptoms
- **Hyaluronic Acid Injections:** Synvisc, Durolane, Orthovisc, Neovisc etc.
- **Total knee replacement or partial knee replacement:** not all patients with unicompartmental osteoarthritis are candidates for HTO. Other factors such as age, general health and activity level may make full or partial knee replacement surgery a more suitable option

About the Surgery Timing

- We recommended all patients stay as active as possible before surgery by following the pre-surgery rehabilitation program. This will allow you to improve or maintain range of knee motion, improve your strength and balance, and build your endurance by doing non-impact sports (biking, swimming, elliptical). Regaining strength, increasing movement in your knee, and maintaining your fitness will prepare you for surgery and also help you to recover faster after surgery.
- If your knee symptoms improve significantly while you are preparing for surgery and you would like to discuss non-operative management of your knee problem, please call the office to arrange a follow-up appointment before your surgery date.

The Procedure

- Described here for medial opening wedge HTO for the treatment of medial compartment osteoarthritis
- A vertical skin incision 6-8 cm long is made along the inside of the upper shin bone (tibia) just below the knee joint line.
- The medial side, front and back of the upper tibia are carefully exposed to prevent injury to blood vessels, nerves and tendons.
- Under x-ray guidance, the upper tibia is cut from medial to lateral and wedged open to correct the mechanical alignment of the knee.
- The osteotomy is stabilized with a metal plate and screws, and bone graft is inserted into the wedge-shaped opening in the tibia bone to improve healing of the osteotomy.
- Usually, the skin layer is closed with dissolving sutures, but occasionally metal staples, or clips are used, and these must be removed at about 2 weeks after surgery.
- Your surgeon may perform an arthroscopy of your knee at the same time as the HTO to assess all knee structures, remove cartilage debris and smooth out rough joint surfaces.



RISKS OF SURGERY

Infection: less than 3 in 100

- Intravenous antibiotics are given before surgery to help prevent infection.
- If an infection occurs, it will usually happen within 5-7 days of your surgery. Some minor wound infections can be treated with a short course of oral antibiotics, whereas more severe wound or skin infections may require a longer course of intravenous antibiotics. If the osteotomy site becomes infected, surgery is required to wash out the infection, followed by 4-6 weeks of intravenous antibiotics. In less than 1 in 200 cases, a deep infection can occur in the joint or bone. In these cases, surgery is required to wash out the infection, followed by 2-3 months of intravenous antibiotics.

Clot in Leg Veins (deep vein thrombosis): less than 5 in 100

- If severe calf, ankle and foot swelling occurs 3 days to 2 weeks after surgery, you could have a clot in a deep vein of your leg (DVT). See a doctor as soon as possible. Treatment for a blood clot is usually blood-thinning medication (anticoagulants) for 3-6 months.

Clot in Lungs (pulmonary emboli): less than 1 in 500

- It is possible for a blood clot to travel to your lung; this is called a pulmonary embolism. If you suddenly get short of breath or have chest pain, go to the nearest emergency room or call 911. A pulmonary embolism is a medical emergency and can cause death.
- In certain patients with risk factors for a blood clot, preventive blood thinners will be prescribed for a short period of time after surgery.

Injury to Artery or Nerve: less than 1 in 500

- This is a very rare occurrence but can happen if an artery or nerve is stretched too much or cut during surgery.

Non-union: less than 5 in 100

- The gap created in your tibia bone must heal in a similar manner as a fracture. In some people, bone healing may be delayed or not heal at all. This is much more likely if you are a smoker or need to have a larger bony correction of your alignment.
- When non-union occurs, it may require additional surgery with more bone grafting to encourage healing. In some situations, a patient may be required to purchase or rent a bone stimulator machine to enhance healing.

Compartment Syndrome: less than 1 in 100

- Usually occurs 24-48 hours after surgery when severe swelling develops in the muscle compartments below the knee and requires repeat surgery to release the pressure (fasciotomy).

Skin Numbness around Incision

- Every patient gets some numbness around their incision because some small surface nerves are cut during surgery. This can be along the incision or can affect a larger area of the leg (up to 20 sq. cms). This may disappear slowly over time, depending on the patient.

Knee Stiffness: less than 5 in 100

- Some patients have problems with knee stiffness after HTO surgery. These patients will need intensive physiotherapy and may need another surgery to mobilize the joint.

Persistent Swelling and Pain: less than 5 in 100

- The HTO improves the biomechanics of your knee but doesn't change the amount of wear in your knee. Some patients will have ongoing pain and swelling from their osteoarthritis. This can be managed with injections and other non-operative treatments for arthritis.

Your Stay in Hospital

- You will be admitted to the hospital on the day of your surgery. Your admission time will be approximately 3 hours prior to your surgery time. Your surgery will take 1-2 hours. You will be called approximately 5 days prior to your surgery date with your arrival time.
- You can have your HTO with either a general anesthetic (go to sleep) or spinal anesthetic (freeze from the waist down). Your anesthetist will discuss these options with you on the day of surgery.
- Although HTO is usually day surgery, in rare instances, your surgeon or the anesthetist may recommend that you be admitted to the hospital overnight, so be prepared for this.
- Please provide the office with any insurance forms you have prior to the day of your surgery, as it can take up to 2 weeks to have them completed and returned to you. Please note we do charge a fee as completion of forms is not covered by Alberta Health Care.

Medical Aid Products

- **Crutches:** can be purchased at the Banff Mineral Springs Hospital or from our clinic. If you bring your own with you, please make sure they are clearly labeled.
- **Cold Therapy Unit:** is used to help control pain and swelling after surgery. You can order a Cold Therapy Unit, complete with a knee pad, through the Shop found on our website or at our clinic. Alternatively, you can purchase a Cold Therapy Unit from your local healthcare provider or from an online health supply store. For portable use you can purchase a battery pack, which allows you to use your Cold Therapy Unit without an electrical outlet. We recommend that you buy your Cold Therapy Unit at least a week before your surgery to make sure that you have it delivered in time.
- **Brace:** A hinged knee brace may be prescribed by your surgeon to protect your knee for the first 6-12 weeks. This can be purchased from the hospital or from our office.

Postoperative Pain Control and Wound Care

- Rest, ice, compression, and elevation of your surgery leg.
- You will be given a prescription for anti-inflammatory medication (ie Naproxen) and a narcotic analgesic (ie Oxycodone) depending on the surgeon's preference and the patient's history of allergies and drug intolerances, before you leave the hospital.
- Refer to the Post Op Concerns and Opioid Medications sheets included in your surgery package for more information.
- We recommend you wait 4 days before removing your bandages and taking a shower. To minimize the risk of post-operative infection, please do not soak in a bathtub, swim, or go into a hot tub until your incisions are completely healed. This will be a minimum of 3-weeks after surgery.
- Redness and pain along the shin (caused by blood and inflammation in the area) can occur 3-7 days after surgery. This usually goes away 7-10 days after surgery and is not a concern unless your incisions are also red.

Discharge from Hospital

- Ensure you have your prescriptions for pain and anti-inflammatory medications before you leave the hospital.
- You must have someone to drive you home
- A hospital physiotherapist will instruct you on brace use and crutch walking.
- Minimum 1-week resting at home with leg elevated and regularly icing your knee
- No or minimal weight bearing for 4-6 weeks
- Crutches may be used for up to 12 weeks depending on bone healing
- Discuss any travel plans with your surgeon as long trips can increase the risk of blood clots for the first 6-8 weeks after surgery

Follow-up Visits

- Your surgeon will follow you after surgery at: 2-4 weeks, 3-months, 6-months, 1-year and 2-years.
- Our office will provide you with the time, date and location of your first post-operative appointment, usually included in your physiotherapy prescription email approximately one week after your surgery.

Return to Work Guidelines

- Sedentary work: 2-6 weeks- must be able to stay non-weight bearing
- Light manual work: 3-4 months
- Heavy manual work: 6-9 months

Physiotherapy

- See your physiotherapist between 7 – 10 days after your surgery. You will be provided with a physiotherapy prescription via email from our office approximately a few days after your surgery.
- Please note if you reside in Alberta you may be eligible for physiotherapy funding, please refer to the AHS website for more information: <https://www.albertahealthservices.ca/rehab/page17783.aspx>
- The hospital will provide you with the Banff Sport Medicine Post-operative Rehabilitation Protocol, it may also be found on our website: <https://banffsportmed.ca/resources-ortho/#surgeryinfo>

Return to Sport

- The surgeon will be able to tell you when you can go back to sport. For most patients this is between 12 and 18 months after surgery. The type of sport, and your level of strength and function, will help to guide the surgeon's recommendations.
- Some patients who have more damage inside their knee may be told to protect their knee by doing fewer sports and activities that require a lot of running, jumping or pivoting. Doing this will help you avoid too much load on damaged joint surfaces and may help to delay arthritis. Your surgeon will give you advice about return to sport based on the amount of damage seen inside your knee at the time of surgery.

Pre-Surgery Rehabilitation Program

for
High Tibial Osteotomy (HTO)

October 2025

This protocol is designed to assist you with your preparation for surgery and should be followed under the direction of a physiotherapist.



HTO Pre-Surgery Rehabilitation

Scan the QR code to
watch a short video
about the importance of
pre-surgery rehab.



Why are these exercises important?

- Your surgeon recommends that you complete this exercise program to prepare for your upcoming surgery and/or to get the best possible result from your injury rehabilitation.
- Strengthening the muscles at the front of your thigh and around your knee will make your knee more stable and will help with your recovery from surgery.
- You should also incorporate 20-30 minutes of cardio exercises at least 3x/week (all low-impact, straight-line activities, e.g. elliptical trainer, skating, cross-country skiing, biking or hiking).

How often should I do these exercises?

- All exercises should be done **1 - 2 times per day**.
- It is important that you do all of the exercises on both legs (however you will be using the electronic stimulation (EMS) unit on your affected/surgical leg only).
- Carefully follow the instructions for your **EMS unit**.
- Whenever you can, do your exercises in front of a mirror to make sure you are doing them correctly.

How many exercises should I do?

- Each exercise should be done smoothly and slowly.
- Start with one set for each exercise. Your therapist will recommend the number of exercises you should do based on your muscle strength and endurance.
- Once you can comfortably do one set of each exercise, progress to 2 sets and once you are strong enough, then 3 sets. Your physiotherapist might recommend for some exercises to be done until you fatigue or until you lose the form of the original exercise position.
- Aim to challenge yourself when doing your exercises to get the greatest strength and stability improvements.

What if I have increased pain or swelling?

- If you have increased pain that lasts longer than 1 or 2 hours after you have finished your exercises, decrease the amount you are exercising by 20% the next time.
- If you have increased swelling after these exercises please use rest, ice, compression and elevation.
- If symptoms do not improve, or swelling lasts longer than 48 hours, call your physiotherapist to review your program.

Notes for Physiotherapists:

Please teach your patient how to apply and use the EMS unit, and assess the number of sets/repetitions, ranges of motion and theraband for the exercises as applicable. Thank you.

***If you have any questions please contact Sarah Kerslake at:
sarah@banffsportmed.ca or 403 760 2897 ext 6***

Phase 1: Strength Basics

- **Quadriceps Contraction (Quad Sets)**

Tighten your quadriceps (front of thigh muscles) by pushing the back of your knee gently down into the floor or bed to hold the knee straight. If you can't yet straighten your leg enough to achieve this, add a small folded towel underneath and push into it.

Your kneecap should move slightly upward as the muscle tightens, avoiding lifting your leg from the hip.

Sets: 3 Reps: 10 Hold: 8 seconds



Note: The use of **EMS** is recommended for this exercise. Follow the guidelines provided in the EMS document for parameters and pad placement.

- **Straight Leg Raises**

Lying on your back, draw your toes towards you, and tighten your quadriceps (front of thigh) muscles while keeping your knee straight.

Slowly lift your leg off the ground maintaining control throughout.

Hold the leg elevated, focusing on maintaining full knee extension, core engagement, and controlled breathing. Slowly lower your leg back to the floor.

Perform on both legs.

Sets: 2 Reps: 10 Hold: 10 seconds



Note: The use of **EMS** is recommended for this exercise. Follow the guidelines provided in the EMS document for parameters and pad placement.

- **Glute Bridges**

Lie on your back with your knees bent and feet flat on the floor, hip-width apart.

Tighten your buttocks (glutes) and lift your hips off the ground by pushing through your heels. Throughout the movement, engage your core as if bracing for a punch to your abdomen or bearing down. When your knees, hips, and shoulders form a straight line, pause for 5 seconds and slowly lower.

Sets: 3 Reps: 10



- **Hip Adduction**

Lie on your side with your top leg bent and resting in front of the lower leg.

Lift your lower leg upward about 20 - 30 cm, keeping it straight and focusing on inner thigh activation. Hold this position for 10 seconds, relax for 5 seconds.

Sets: 2 Reps: 10



- **Two Legged Calf Raises with Straight Knees**

Hold onto a wall or stable surface for support if needed, with both feet flat on the ground, hip-width apart.

Slowly rise up onto your toes through your full ankle range of motion, lifting your heels off the ground. Slowly lower back to the starting position.

Sets: 3 Reps: 10



- **Squats**

Stand with your feet shoulder-width apart, toes pointing slightly outward.

Keep your chest lifted and your weight evenly distributed.

Tighten your core and slowly lower into a squat by bending at the hips and knees, as if sitting back into a chair.

Keep your knees in line with your toes; do not allow your knees to collapse inward. Descend only to a pain-free depth. Hold briefly at the bottom, then rise back to standing with control.

Sets: 2 Reps: 12



Note: The use of EMS is recommended for this exercise. Follow the guidelines provided in the EMS document for parameters and pad placement.

- **Single Leg Stance**

Hold onto a wall or stable surface for support if needed.

Shift your weight onto one leg by lifting your other leg slightly off the ground, and maintain balance. Focus on keeping your hips level and knee steady.

Sets: 3 Hold: 30 seconds

Note: This exercise should be done on both legs. For an additional challenge, perform this exercise unsupported and/or with your eyes closed.



- **Planks**

Place your elbows directly under shoulders, with your legs extended straight behind you. Make sure your body is lifted off the floor.

Maintain a straight line from shoulders to ankles and engage your core by gently drawing the belly button in toward the spine.

Squeeze your buttocks and lightly tuck the pelvis to prevent excessively arching your back.

Sets: 3 Hold: 20 seconds, increasing to 45 seconds as tolerated



- **Side Planks**

Lie on your side with the elbow of the side you are lying on directly beneath your shoulder. Bend your knees and have them stacked one on top of the other. Maintain a straight line from head to knees and do not let hips sag or rotate.

Engage the core and lift the hips off the ground, forming a straight line from your head to knees. Keep your shoulders and hips stacked vertically to avoid rotating forward or backward.

Sets: 3 Hold: 20 seconds, increasing to 45 seconds as tolerated



Phase 2: Progressive Conditioning

After you have completed 4 - 6 weeks of the first phase you should be reassessed by your physiotherapist and taught the second phase of exercises. Before you start the second phase you must be able to complete 3 sets of ≥ 10 repetitions of the phase one exercises with good control.

- **Single Leg Calf Raises with Straight Knee**

Hold onto a wall or stable surface for support if needed and shift your weight onto one leg. Rise up slowly onto your toes, through your full ankle range of motion, lifting your heel off the ground. Lower slowly with control.

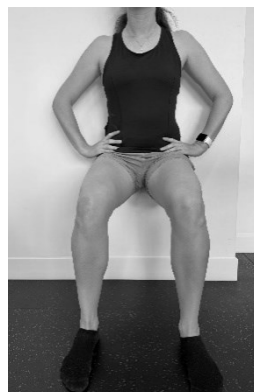
Sets: 3 Reps: 10



- **Wall Sits**

Stand with your back against a solid wall, and place your feet with your heels approximately 30 cm away from the wall, and shoulder-width apart. Ensure your spine is upright and in a neutral position. With your kneecaps pointing straight ahead (in line with your feet and hips), slowly lower into a squat. Descend only to a pain-free depth, not going past a 90 degree angle. Engage your core, glutes, and quadriceps, and press gently into the floor with your feet.

Sets: 3 Hold: 30 seconds

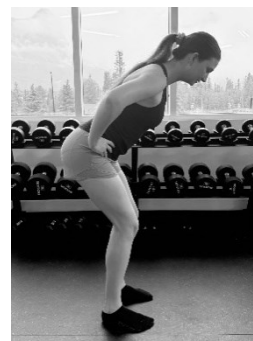


Note: The use of **EMS** is recommended for this exercise. Follow the guidelines provided in the EMS document for parameters and pad placement.

- **Two Leg Hip Hinge**

Stand upright with your feet shoulder-width apart. Keep your knees “soft” (with a slight bend). Hinge forward at the hip joints, keeping your back straight. Stop before you feel your back start to bend. Squeeze your buttocks (glutes) and hamstrings to return to standing.

Sets: 3 Reps: 12



Note: To practice the form, you may want to start by holding a broomstick or straight bar along your spine. It should touch the upper back and tailbone with a small gap where your lower back naturally curves.

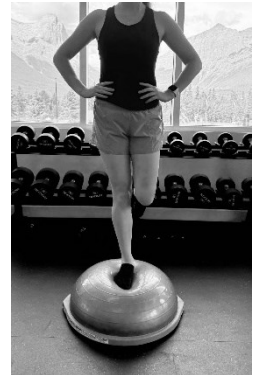
- **Single Leg Balance on BOSU**

Stand with one foot in the middle of a BOSU ball, balance pad, or slightly uneven ground. Hold onto a wall or stable surface for support if needed.

Shift your weight onto the BOSU ball or balance pad, and lift the other foot off the ground. Hold this position, keeping your hips level and knee steady.

Sets: 3

Hold: 30 seconds



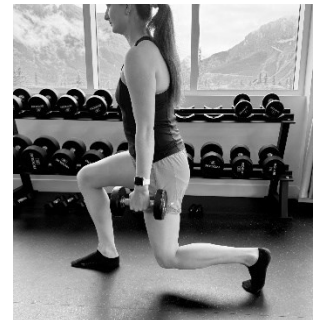
Note: This exercise should be done on both legs, and in both open and closed eyes conditions.

- **Weighted Forward Lunges**

Stand tall with a light dumbbell in each hand (or bodyweight if preferred) and your feet hip-width apart. Step forward into a lunge, lowering your back knee toward the ground while keeping your front knee aligned with your toes and your torso upright. Hold briefly in the lunge position with control, then rise back up to your starting position with control.

Sets: 3

Reps: 10



- **Hamstring Resistance Band Curls**

Anchor a resistance band securely in front of you (e.g., attached to a chair or table leg). In a seated position, wrap the loop of the resistance band around your ankle. Bend your knee against the band resistance, bringing your heel toward yourself. Slowly return to the starting position.

Sets: 3

Reps: 10



- **Knee Extension**

Anchor a resistance band securely behind you (e.g. attached to a heavy chair or table leg). In a seated position, wrap the loop of the resistance band around your ankle. Straighten your leg from the 90 degree position to straight, lifting your leg upwards. Slowly return to the starting position.

Sets: 3 Reps: 12



- **Side Lying Straight Leg Lifts**

Lie on your side with your bottom leg bent and top leg straight, your hips stacked, and pelvis slightly rolled forward. Engage your core. Keeping your top leg straight, slowly lift it upward, leading with your heel and keeping your toes pointing forward or slightly downward. Avoid rotating your hips or leaning backward during the movement. Lower your leg back to the starting position with control.

Sets: 3 Reps: 12



Note: To progress this exercise as your strength improves, use a looped resistance band around your thighs, just above your knees, to increase difficulty.

- **Single Leg Glute Bridge**

Lie on your back with one knee bent and the other leg straight. Press through the heel of the bent leg and lift your hips off the ground, keeping the opposite leg in line with your torso. Engage your glutes and core to maintain alignment. Hold at the top briefly, then lower with control.

Sets: 3 Reps: 10



Note: You can increase the difficulty by abducting and adducting the elevated leg in and out to the side.



Post Surgery Rehabilitation Program for High Tibial Osteotomy (HTO)

This protocol is designed to assist you
with your rehabilitation after surgery
and should be followed under the
direction of a physiotherapist



Covenant Health
Banff Mineral Springs

November 2011



Banff Sport Medicine

Your Personal Rehabilitation Program

Your weight bearing status and brace use will depend on the size of your osteotomy and the type of plate the surgeon used for your surgery. This will differ between patients. Your surgeon will advise you on weight-bearing, brace use and knee range of movement following surgery. You and your physiotherapist will also be able to refer to the following guidelines from your surgeon:

Weight Bearing:

Your weight-bearing status is:

- ☐ Non-Weight bearing with crutches for _____ weeks, then
- ☐ Featherweight bearing (up to 25%) with crutches for _____ weeks, then
- ☐ Partial weight bearing (up to 50%) with crutches for _____ weeks, then
- ☐ Full weight bearing as tolerated (with crutches initially)

Bracing:

Your brace use is:

- ☐ Locked brace use for _____ days, then
- ☐ Unlocked brace use for _____ weeks
- ☐ No brace use

Range of Motion:

Your range of motion goal for the first 6 weeks is:

☐ _____

If you are unsure about any of these instructions call the surgeon's office at: 403 760-2897, or wait until your first post-operative visit with your surgeon to clarify

PHASE 1: Initial Recovery

This phase involves the initial recovery from surgery and usually lasts 3 - 6 weeks. In the first week you should rest and elevate your leg for a significant amount of the time.

Goals

1. Control inflammation and swelling
2. Range of motion 0° to 110°
3. Quadriceps muscles activation
4. Hip strengthening
5. Core strengthening

BRACE

If your surgeon has recommended you wear a locked post-operative brace it should be worn at all times. Once you are allowed to unlock your brace it should be worn whenever you are walking; you may remove the brace to ice your knee, if resting quietly or to sleep.

WEIGHT BEARING

Your surgeon will tell you how much weight you can put through your leg in the first few weeks after surgery. It is important to follow this instruction at all times to protect your knee and to allow healing.

COLD THERAPY & ELEVATION

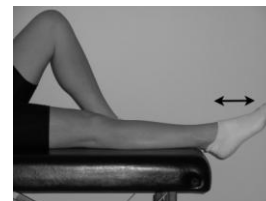
A Cold Therapy Unit or an ice pack should be applied immediately after surgery and used for at least 20 minutes every other hour while you are awake. Your operative leg should be elevated with the knee straight when applying cold therapy and/or when resting.



Exercises:

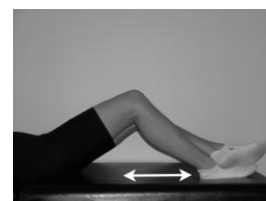
1. Ankle pumps

- The foot and ankle should be actively “pumped” up and down 10-20 times every hour.



2. Range of Motion

- **Flexion** – In lying, bend your knee by sliding your heel towards your buttocks. You can use your other leg to help you as needed. Perform up to 20 times; repeat 2 - 3 times daily.



- **Extension** - In lying, place a roll beneath your ankle to passively (i.e. allow gravity), stretch your knee into extension. Start with 2 minutes at a time and increase as tolerated up to 5 minutes. Perform 2 or 3 times daily. It is very important in this phase to work on straightening your knee.



3. Strengthening

- **Quadriceps Contraction** – In sitting with your knee straight and leg supported, tighten your thigh muscle by pushing your leg downwards. Focus on tightening the muscle and avoid lifting your leg from the hip. Perform exercise 5 - 10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 10 secs, resting for 5 secs in between reps. The use of EMS (Electric Muscle Stimulation) is recommended for this exercise.



- **Quads over roll** – In sitting with your knee resting on a roll, tighten your thigh muscle by pushing your leg downwards. Focus on tightening the muscle and avoid lifting your leg from the hip. Perform exercise 5 - 10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 10 secs, resting for 5 secs in between reps. The use of EMS (Electric Muscle Stimulation) is recommended for this exercise.



- **Straight Leg Raises** – In the position shown, tighten your thigh muscle while keeping your knee straight and lift your leg up 2 inches. Perform exercise 5 - 10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 5-10 secs. The use of EMS is recommended for this exercise.



- **Hip Adduction** – In lying with your knees bent as shown, squeeze a soft ball or a pillow between your thighs. Perform exercise 5 - 10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 10-15 secs, resting for 5 secs between reps.



4. Stretching

- **Calf** - Sitting with your knee straight, wrap a towel around your foot and gently pull your toes and foot towards you. Hold each stretch for at least 30 secs and repeat 4 times.



- **Hamstring stretch** – In lying, place a towel or belt around your foot and bring your leg up until you feel a stretch at the back of your thigh. Hold each stretch for at least 30 seconds and repeat 4 times.



- **Patellar Mobilisations** – It is important to keep your knee-cap mobile; your physiotherapist will assess this and teach you how to do these exercises if needed.

**** Perform all exercises 2-3 times per day to build your strength and endurance. You should perform all the strengthening exercises on both legs****

Also consider:

- Other ROM exercises as tolerated (heel slides on wall/passive flexion in sitting using other leg to push, prone hangs and passive knee extension)
- Core strengthening as tolerated
- Stationary bike – no resistance, start with arc's (swinging) and progress range of motion as tolerated.
- Upper body exercises - weights and arm ergometer

Requirements for progression to Phase 2:

1. Knee Flexion $\geq 110^\circ$ (or equal to pre-op ROM if previously limited)
2. Straight leg raise with no lag
3. Knee Extension = 0° (or equal to pre-op ROM if previously limited)
4. Pain and Swelling levels managed to enable exercise progression

PHASE 2: Muscle Strength and Core Stability

This phase usually starts 4 - 6 weeks post-operative and lasts until 12 weeks. This phase emphasizes progressive activation of the quadriceps muscles with significant core strengthening.

Goals

1. Manage pain and swelling
2. Range of motion 0° - 135° (or equal to pre-operative range if previously limited)
3. Strengthen quadriceps, hip and core muscles
4. Initiate balance and proprioception exercises

WEIGHT BEARING

Follow your surgeon's instructions to protect your knee and ensure the best healing. Continue to use your crutches until you can fully weight-bear and have good quadriceps control.

COLD THERAPY & ELEVATION

Manage your swelling by continuing to use cold therapy and elevation, particularly after exercise or physiotherapy sessions.

Exercises:

Continue increasing the difficulty of the exercises from phase 1 as well as adding the following new exercise into your program

1. **Range of motion** - Progress flexion using active, active-assisted and pain-free passive exercises.
2. **Strengthening:**

*** All closed-chain exercises will be consistent with your instructions for weight bearing while walking ***

- **Leg Press** – This exercise should not be commenced until at least 6 weeks post-operative with approval from your surgeon. Start with lowest resistance 10 reps x 3 sets and increase as strength and weight-bearing status allow.
- **Hamstrings (prone)** – Lying on your stomach, place a resistance band around your ankle and also have it attached to an anchor point as shown. Bend your knee slowly against the resistance of the band pulling your foot towards your buttock. Start with 1 set of 10 reps and increase to 3 sets of 15 reps.



- **Hamstrings (sitting)** – In sitting place a resistance band around your ankle and also have it attached to a chair or table leg in front of you as shown. Bend your knee slowly backwards, pulling against the resistance band using the muscles under your thigh. Start with 1 set of 10 reps and increase to 3 sets of 15 reps.



- **Calf Raises** – Both legs: Start with feet shoulder width apart and toes pointed straight ahead, and raise up onto your toes. Start with one set of 10 reps, holding each raise for 5 secs. Increase the number of reps up to 30 with 5 sec holds. Start by using support at a wall or table and progress to no support as strength and balance improve.



- **Mini squats** – Slowly squat with equal weight on each leg. Bend your knees from 0° to a maximum of 45° of flexion, making sure your knees do not move beyond your toes. Start with one set of 10 reps, holding each squat for 5 secs and increase the number of reps as your strength increases, up to 30 reps x 15 sec holds. EMS can be used with this exercise with the 'contraction' time at least double the 'rest' time.



- **Gluteals** – Lying on your back with your knees bent and your arms by your sides. Squeeze your buttocks together and lift up to create a bridge. Keep equal weight on each leg with your pelvis straight. Be careful not to push down on your neck or shoulders – use your buttocks to do the work. Start with one set of 10, holding for 5 secs and increase the number of repetitions as you get stronger. Once you can complete 20 reps holding for 10 secs each, change to single leg bridges.



3. Proprioception/Balance

- **Weight Shifting** – Start using some support (i.e. hands on a railing or table) and progress to unsupported. Slowly shift weight from your non-operated to your operated leg. Slowly increase the amount of weight supported through your operated leg. Hold with the weight on your operated leg for 5 seconds and then shift back to your other leg. Repeat 10 times.

4. **Stretching**

Hold each stretch for at least 30 seconds and repeat twice on each leg:

- **Hamstrings stretch** – continue from phase 1
- **Calf Stretch** – continue from phase 1
- **Iliotibial band stretch** - or use roller on lateral thigh
- **Quadriceps femoris stretch** - in prone
- **Hip Flexors stretch**
- **Hip Rotators stretch**

Also consider:

- Clam shells
- Abductor with resistance tubing in prone
- Abdominal strengthening (i.e. curl-ups, isometrics, obliques, transversus abdominis, Pilates)
- Isometric exercises (quadriceps, hamstrings, hip flexors/extensors/rotators)
- Gait Retraining
- Outdoor cycling on a smooth, flat surface, if you have good balance and enough ROM (with approval from your surgeon)
- Deep-water walking (only after wounds are healed with approval from your surgeon)

**** Perform exercises each day to improve your strength and range of motion. You should perform all of the exercises on both legs***

Requirements for progression to Phase 3:

- Full range of motion
- Double leg squat with good motor control
- Good control and alignment during hip and core strengthening exercises

PHASE 3: Strength and Control

This phase usually starts around 12 weeks and may continue until 6 months following surgery.

Goals

1. Full weight-bearing with normalized gait
2. Increase quadriceps, hamstrings, gluteal and core strength
3. Improve proprioception and balance
4. Aerobic activity 20 - 30 minutes per day, 3 - 4 times a week

WEIGHT BEARING

In order to stop using crutches, you must be able to fully weight bear on the operated leg with minimal limping.

COLD THERAPY & ELEVATION

Manage your swelling by continuing to use cold therapy and elevation, particularly after exercise or physiotherapy sessions.

Exercises:

1. **Range of motion**: should be full at this stage. Please refer to post-operative information for expected maximum range of motion.

2. **Strengthening**

- **Step-ups** – Do graduated heights, starting at 4" and increasing to 8". Stand in front of a stair or stepping stool and place one foot on the step in front of you. Rise up onto the step by shifting all of your weight onto this leg and tighten your quadriceps muscles. Put all of your weight through this leg and do not step up onto the step with your other leg. Start with one set of 10 reps, holding at the top of the step-up for 5 secs. Increase the number of reps as your strength increases, up to 20 reps with 15 sec holds on each leg. Use of EMS is recommended for this exercise.
- **Step-downs** – Do graduated heights, starting at 4" and increasing to 8". Start with one leg standing on the step and slowly bend your knee to lower your other leg to lightly touch floor. Keep all of your weight through the leg that is on the step. Start with one set of 10 reps, holding at the bottom of the step-down for 5 secs. Increase the number of reps as your strength increases, up to 20 reps with 15 sec holds on each leg.



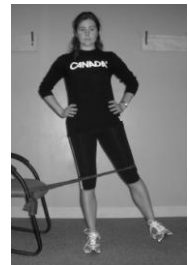
- **Single-leg Calf Raises** – Start on one leg with toes pointed straight ahead, and raise up onto your toes. Start with one set of 10 reps, holding each raise for 5 secs. Increase the number of reps up to 30 with 5 sec holds on each leg. Start by using support at a wall or table and progress to no support as strength and balance improve.



- **Single-leg Squats** - Initially use a chair or railing for support. Stand on one leg and slowly bend your knee from 0° to a maximum of 90° to squat. Bend as far as you can while keeping control. Start with one set of 10, holding the squat for 5 secs; increase the number of repetitions as you get stronger. Work up to performing squats without support with 'contraction' time at least double the 'rest' time on the EMS. (Up to 20 reps x 15 secs each leg).



- **Hip Abduction** – In the position shown, with a resistance band around your outside thigh just above your knee, lift your leg to place slight tension on the band. Move this leg sideways slowly against the resistance of the band using the muscles in your buttock and your hip. Start with 1 set of 10 reps and increase to 3 sets of 15 reps.



- **Hip Extension** - Stand with legs shoulder width apart with a resistance band around one of your thighs just above your knee. Extend your leg to place slight tension on the resistance band. Move the leg backwards slowly against the resistance of the band using the muscles in your buttock and the back of your thigh. Start with 1 set of 10 reps and increase to 3 sets of 15 reps.



- **Lunges** – Standing with feet as pictured, squat down to lunge as shown. Control the descent ensuring your knee that is forward does not move beyond your toes. Start with 1 set of 10, holding each lunge for 5 secs. Increase the number of reps as your strength increases up to 3 sets of 10.



3. Proprioception/Balance

- **Single leg stance** (eyes open, eyes closed)
- **Double leg squats on an unstable surface** (thick carpet → foam block → camping mattress → pillow → BOSU)
- **Single leg stance on an unstable surface** (thick carpet → foam block → camping mattress → pillow)



4. Stretching

- Continue with stretches from phase 2

**** Perform exercises each day to improve your strength and range of motion. You should perform all of the exercises on both legs***

Also consider:

- Wall squats (with/without ball squeeze)
- Hamstring curls in supine lying with a physio ball
- Double leg squats with ball squeeze
- Core stability exercises (i.e. planks, physio ball exercises, Pilates)
- Wobble board balance and weight shift activities
- Stationary bicycle - increasing resistance and duration
- Swimming
- Elliptical Trainer/X-country ski machine
- Weight training – quadriceps, hamstrings, hip abductors and adductors, gluteals, calves (with approval from your surgeon)

Requirements for Progression to Phase 4:

- Single leg squat with good motor control on an unstable surface to 70° flexion
- Ability to demonstrate good core control and posture in single leg stance activities
- Evidence of improvement in strength (hamstrings, hip abductors, hip extensors, hip rotators)

PHASE 4: Optimising Function

Begins as early as 4 months but may not start until 9 months postoperative. Depending on pre-operative knee function this phase may not be completed by all patients. Realistic goals of what is attainable should be discussed with your surgeon.

Goals

1. Improve proprioception and balance
2. Increase aerobic endurance
3. Maximize quadriceps, hamstrings, gluteal and core strength with functional exercises
4. Accurately perform plyometric drills
5. Training with sport specific drills

COLD THERAPY & ELEVATION

Manage any swelling by continuing to use cold therapy and elevation, particularly after exercise or physiotherapy sessions.

Exercises

1. Strengthening / Proprioception

- **Squats on a BOSU** - Slowly squat with equal weight on each leg. Bend your knees from 0° to a maximum of 90° of flexion, making sure your knees do not move beyond your toes. Start with one set of 10 reps, holding each squat for 5 secs and increase the number of reps as your strength increases, up to 30 reps x 15 sec holds.



- **Lunges on a BOSU** – Step forward or back and lunge as shown. Control the descent ensuring your knee that is forward does not move beyond your toes. Start with 1 set of 10 reps, holding each lunge for 5 secs. Increase the number of reps as your strength increases up to 3 sets of 10, for each exercise on each leg.



- **Single leg squats on trampoline** - Standing on one leg, slowly squat bending your knee from 0° to a maximum of 90°, making sure your knee does not move beyond your toes. Start with one set of 10 reps, holding each squat for 5 secs and increase the number of reps as your strength increases, up to 30 reps x 15 sec holds.



- **Single leg stance with ball toss** - Standing on one leg on a BOSU or other unstable surface (i.e. foam block), toss and catch a light ball against a wall. Start with 2 sets of 15 tosses and increase as strength and balance improve.



2. **Cardio** – Maintain or improve aerobic fitness by doing 3 – 4, 30-minute workouts per week. Suggested activities include: walking, hiking, cycling, skating, swimming, cross country skiing, and/or using an elliptical trainer.
3. **Plyometrics** - Depending on goals and surgery results, some patients may not complete this series of exercises. Patient must be able to perform a controlled single leg squat before commencing plyometric exercises.
 - **Agility jumping** - start with straight-line jumping, backward/forward/side-to-side and progress to diagonals and combined patterns. Once speed and agility are good with jumping, progress through activities using single-leg hopping on each leg.

Agility jumping

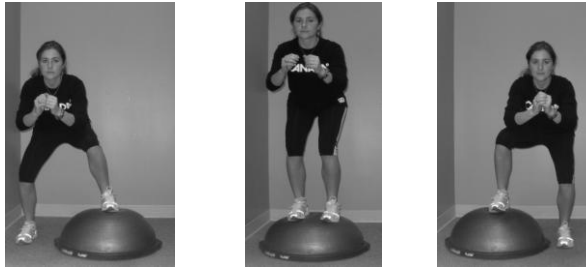


Agility hopping



- **Straight line jumping activities** (vertical jumps, shuttle jumps, standing long jumps).
- **Straight line hopping activities** (single leg hop for distance, timed single leg hop, single leg vertical hop, zig-zag and figure 8 hopping).

- **Side to side steps on the BOSU** – Perform quick steps in both directions over BOSU. Start with 1 set of 10 steps in both directions and progress to 3 sets of 15 steps in both directions as your strength increases.



- **Jogging: recommended return to running progression:**
straight line activity → indoor track → treadmill (walk:run intervals) → outdoor even ground
- **Running:** shuttle runs, wide angle cutting, running and pivoting



**** Perform exercises each day to improve your strength and range of motion. You should perform all of the exercises on both legs***

Also consider:

- Skipping rope – double and single leg
- Cariocas/grapevine
- Box hop up/down (start at 6 inches)
- Tuck jumps

Requirements for Progression to Phase 5:

- Able to perform plyometric exercises with good motor and core control
- Improved aerobic endurance and able to run on even surfaces
- Good strength and endurance of core and bilateral lower extremities

PHASE 5: Sport Readiness

This phase involves return to higher-level functional activities including sports. This phase begins as early as 5 months and continues until 12+ months post-operatively. Depending on pre-operative knee function this phase may not be completed by all patients. Realistic goals of what is attainable should be discussed with your surgeon.

Goals

1. Sport specific proprioception and agility
2. Progress plyometric exercises
3. Return to sport specific training

COLD THERAPY & ELEVATION

Manage any swelling by continuing to use cold therapy and elevation, particularly after exercise.

Exercises:

1. Agility:

- Running figure 8's around cones
- Agility ladder
- Grapevine / Cariocas
- Quick Lateral shuttles from cone to cone



2. Plyometrics:

- Box jumps / Tuck jumps
- Hopping: 6m timed hop, triple hop for distance, crossover hop for distance

3. Running Drills:

- Shuttle sprints/ high knee lifts/ glute kickers/ stop and go drills
- Zig-zag running / sprinting with cutting and pivoting

4. Sport specific drills:

- Basketball:** Lay-up drills, lateral shuttle runs while throwing/catching, run-pivot-vertical jump, dodging drills, defence drills (running/jumping backwards)
- Soccer:** dribble around cones, shooting drills, defence drills, lateral shuttle runs while kicking ball, tackling drills
- Football/rugby:** dodging/deking drills, running and throwing drills (all directions), defence tackling drills
- Hockey:** skating figures, stick handling drills, deking drills



Electrical Muscle Stimulation (EMS)

What is EMS?

EMS (electrical muscle stimulation) uses a device to help stimulate muscle contraction. It is useful pre- and post-surgery to help get the right muscles working at the right time. The machine sends out an electrical signal which helps a muscle contract via pads on the skin that sit on top of your muscles. Typically, the quadricep muscle has the EMS unit pads attached to it, and exercises are completed to coordinate the hip and core muscles being activated at the same time.

Why use EMS?

Using an EMS unit daily helps improve muscle bulk, strength and overall function of the muscles around the knee. Pre-surgery, having better muscle function will help you recover more quickly after surgery. Post-surgery, using the EMS unit will help you restore strength and stability to increase functional improvements and get you back to doing more in your day to day or returning to activity sooner.

Where should I purchase a unit?

You can purchase the machine online or from [BSM](#).

Where should I place the pads?

Each pad placement will be specific to the individual so speak with your physiotherapist to have them help you find the best placements for activating your quadricep muscles.

How often should I use the machine?

You should be doing your exercises *daily* with the EMS unit for 15-20 minutes each day for 8-12 weeks or until you see your doctor again.

What setting should I use?

Common parameters, or settings, for the EMS unit include:

Frequency: 30-50 Hz

Pulse duration: 300 μ sec

Ramp up: 2 -5 seconds

On/Off time: 10/5-10 seconds

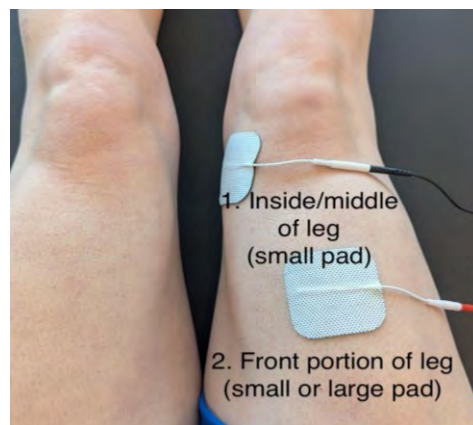
Total time: 15-20 minutes

It is recommended that you bring your EMS unit to your physiotherapist so they can tailor the settings to work best for you.

What can I do if the signal reduces intensity or stops working?

First attempt changing the pads as they typically need replacement within 4-6 weeks. If that does not resolve the issue, try bringing it to your physiotherapist as they may have other troubleshooting suggestions.

Scan the QR code to
watch a short video
about EMS



MANAGING PAIN SAFELY

Pain is an expected part of having surgery.

Managing your pain safely is important to help your recovery.

PAIN AFTER SURGERY

After surgery, a moderate amount of pain is a normal and expected part of the process.

The goal of pain medication is to keep you moving and help you cope with your pain, but these medications *will not eliminate your pain entirely*.

In general, the most painful time is the first 72 hours (3 days) after surgery.

The amount of pain usually decreases after these first few days.



Scan to watch a short video on managing your pain



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Patient education is proudly supported by the Banff Sport Medicine Foundation



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MANAGING PAIN SAFELY

Opioids, such as morphine, oxycodone (Percocet), tramadol, hydromorphone or codeine, are strong pain relief medications that may be prescribed to help you manage the most intense postoperative pain.

Opioids should be used with caution as research shows that up to 1 in 12 patients prescribed an opioid for short-term use after surgery are at risk of becoming chronic users.

The regular use of over-the-counter Tylenol® and Advil, in addition to Cold Therapy*, can effectively manage pain and significantly reduce, or eliminate the need for opioids.

If you are still experiencing intolerable pain after regularly using Tylenol® and Advil in addition to Cold Therapy*, take the opioid in the lowest dose possible.

Also, only use the opioid for the shortest amount of time. No more than 2 - 7 days.



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*Scan for more information on Cold Therapy

CONTACT US

If you have questions about managing your pain, or your pain increases or does not decrease with medication, please contact our team:

- Banff Sport Medicine 403-760-2897 ext 1 (during business hours 8 am - 4 pm Monday to Friday)
- Banff Mineral Springs Hospital 403-762-2222 (for urgent concerns outside of regular business hours)



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Opioid Medication: Pain Control after Surgery

What are my options for safe and effective pain control?

Managing your pain after surgery is important. Combination therapy (using different medications together) along with education can offer the best pain relief. Some of these medications work via different pathways and can be used together. After surgery a moderate amount of pain is a normal and expected part of the process. Pain medications help you function better and cope with the amount of pain you are experiencing, but **these medications will not eliminate your pain entirely.**

Talk to your surgeon about medication options, which can include both prescription strength and over the counter drugs. These medications include:

- **Non-steroidal Anti-inflammatory Drugs (NSAIDs)** can be used to decrease swelling and fever, and to treat mild to moderate pain. (These can be prescription or over-the-counter medications, such as Naprosyn, naproxen: *Aleve*, ibuprofen: *Advil*, *Motrin*).
- **Acetaminophen** is used to decrease mild to moderate pain and fever. (These are over-the-counter medications such as Tylenol or Paracetamol).
- **Local anesthetics** which can be injected near a set of nerves (nerve block) or the surgery wound site. (This option is performed immediately after your surgery at the hospital).
- **Opioids** are used to decrease severe pain. (These are prescription medications such as Morphine, Tramacet, Percocet, OxyContin, Vicodin or Tylenol #3 which contains codeine).
- **Nerve pain medication** used to prevent nerve pain and irritation. (These are prescription medications such as Lyrica and Neurontin).

When should I take pain medication?

The goal is to keep you moving and control your pain. In general, the most painful time is the first 72 hours (3 days) after surgery. The amount of pain usually decreases after these first few days. If your pain increases or does not decrease with medication you should contact your surgeon. Call our office at 403-760-2897 (during regular business hours 8am-4pm Monday to Friday), or the Banff Mineral Springs Hospital at 403-762-2222 (outside of business hours).

Some medication is taken on a schedule (for example, every 4-6 hours) and other medications can be taken when you feel pain. Here is a useful guide:

- I am moving slowly and either have no pain or only a little pain = I don't need any medication.
- I am feeling some pain and having trouble moving around = I could use some over-the-counter medication. (For example, ibuprofen: *Advil/Motrin* or acetaminophen: *Tylenol*).
- I am thinking about my pain all the time and it is painful for me to move = I should take some stronger medication. (For example, a prescription medication such as Morphine, Percocet or Tramacet).

It usually takes 25-40 minutes for the medications to start working effectively so you should take your medication before your pain becomes severe or you are unable to move because of the pain.

Are there ways to reduce my pain besides medication?

Yes! You can do a number of things to help decrease your pain (*continued on next page*)

- Use ice packs or cold therapy to decrease swelling and pain.
- Rest for the majority of time for the first few days after surgery.
- Elevate and support your surgical limb as shown on your rehabilitation exercise protocol.
- Keep moving after the first few days, without over doing it.

- Distraction such as watching movies, listening to music, playing games, or talking to friends and family, has been shown to help reduce pain after surgery.

Why are opioids used?

Opioids are strong medications and when used properly, they can help to relieve short-term pain like the pain experienced after surgery. When opioids are used improperly, they can cause dependence or addiction, overdose and death.

How to use your prescribed opioid medication.

If you have been prescribed an opioid medication, such as Percocet or Tramacet, it should:

- **Only** be taken as prescribed
- **Never** be used by someone for whom it was not prescribed
- **Never** be taken with alcohol or other medications (except as prescribed).
- **Never** to be used while driving or operating machinery

Keep your medication safe to help prevent use by others by:

- **Never** sharing your medication with anyone else. (Sharing opioid medication is illegal and may also cause serious harm or death to the other person).
- **Keeping track** of the number of pills remaining in the package
- **Storing** opioids in a safe and secure place, out of the reach of children and teenagers

Unused portions of opioid medicine should always be:

- Kept out of sight of children and pets
- Stored in a safe place to prevent theft, problematic use or accidental exposure
- **Returned to the pharmacy** for safe disposal when no longer needed or expired. Medications should never be thrown in the trash or flushed down the toilet.
- This will prevent the possibility of illegal use and protect the environment from contamination.

Opioid Side Effects

Short-term side effects	Long-term side effects
Drowsiness	Increased tolerance
Decreased reaction time, which can impair driving and decision-making	Substance use disorder or dependence (addiction)
Constipation	Liver damage
Impotence in men	Infertility in women
Nausea and vomiting	Worsening pain
Difficulty breathing, which can lead to or worsen sleep apnea	Life-threatening withdrawal symptoms in babies born to mothers taking opioids
Euphoria (feeling high)	Overdose
Headaches, dizziness and confusion, which can lead to falls or fractures	

Anyone who takes prescription opioids can become addicted.

If you take opioid medications for more than a few weeks, your body becomes used to that dose. This physical dependence means you may experience withdrawal symptoms if you stop taking the drug.

Withdrawal symptoms include: insomnia, anxiety, racing heartbeat, and headaches. Withdrawal symptoms can be managed by gradually decreasing your medication dose with advice from a health care provider.

**Signs of opioid overdose include small pupils, trouble breathing and unconsciousness.
Call 911 immediately if you think you or a family member took too much pain medication.**



Post-Operative Concerns

Contact us if you have any concerns after your surgery

For Surgery performed at Banff Mineral Springs Hospital (Banff)

- ✓ During regular business hours - 8 am to 4 pm, Monday to Friday (closed Statutory Holidays):

403-760-2897 Ext 1

*Note: Call our office and **not** the hospital. If you get a voice mail response, please leave a detailed message, our office staff will call you back as soon as they are able.*

- ✓ Weekends and after regular hours:

If you have any urgent concerns **after** regular business hours that cannot wait please call the Mineral Springs Hospital at 403-762-2222 and ask for Acute Care.

- ✓ Anytime:

Health Link (811) will connect you to a nurse 24hrs a day who is able to give advice.

For surgery performed at other locations:

- ✓ Golden and District General Hospital (Golden): 250-344-5271
- ✓ Hinton Healthcare Centre (Hinton): 780-817-5019
- ✓ Elk Valley Hospital (Ferne): 250-423-4453

Common Concerns

1. **Uncontrolled pain**, if the prescribed pain medications and cold therapy are not controlling your pain, try loosening the tensor bandage and elevating the leg. If these do not improve the pain, please contact us.
2. **Calf, foot and ankle pain and swelling** within the first 2 weeks after knee surgery is common. If you have calf pain and swelling, you should loosen the tensor bandage around your knee and also elevate your leg so that your knee and ankle are above your heart. (Please see the Cold Therapy and Elevation picture on the first page of your rehabilitation protocol). If this does not improve the pain and swelling, please contact us. *If the pain and swelling is associated with sudden chest pain and/or shortness of breath immediately go to the nearest emergency department.*
3. **Swelling and redness of the shin** after ACL or other knee ligament surgery is not uncommon. Contact us only if the redness extends into the surgical incision sites or if there is persistent drainage of fluid (yellowish or cloudy fluid) after removing your bandage at the recommended time.



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4. **Skin redness above or below the bandages**, when you get home from the hospital, you may notice that the skin is red above or below the bandage. The most likely cause of this is the surgical preparation solution that was used to clean your skin before the operation. This solution has a red dye in it so if you are concerned that the redness may be caused by an infection, try washing that area with soap and water to see if it comes off. If your leg is still red and/or hot to touch after you have washed the area, then you should go to your local doctor or hospital to be assessed.
5. A **fever** is not uncommon within the first 48 hours after surgery. Call us only if the fever continues more than 2 days after surgery and is associated with a feeling of general unwellness. Fevers occurring within the first 48 hours post-operatively can be managed with Tylenol and deep breathing exercises.
6. A small amount of **bleeding** through the bandage can occur within the first 48 hours after surgery. Call the office or hospital if the bandage becomes saturated with blood, or if bleeding continues after removing the bandage at the recommended time.
7. **Swelling of the hand** is common after shoulder and elbow surgery. This swelling can be prevented or reduced by frequent pumping of the fingers (or squeezing a rubber or foam ball) and by taking your arm out of the sling and fully straightening your elbow (as when doing a pendulum exercise).
8. For post-operative **nausea and vomiting** if you can tolerate the pain, try stopping your prescribed painkiller, or take gravol (can be purchased over the counter in pill and suppository form). Sometimes taking the painkiller with food will help. Call us if you have uncontrolled vomiting.
9. Occasionally, an itchy, red, blotchy **skin rash** can occur with the use of ice packs or a cold therapy unit. This is not an infection but is a skin reaction to the cold. This can happen when cold is used for long periods of time, even when a cloth is used to protect the skin. If this happens, stop using the cold therapy until the rash settles down (this may take hours or even a day or two). When you start using cold therapy again, apply it intermittently (20 minutes on, then 20 minutes off).
10. After ACL surgery using your **hamstring tendons**, it is not uncommon to strain or pull the hamstring muscle in the first 6-weeks after surgery. This may occur while pulling on your socks or shoes, or bending over to pick something up. You may feel a sudden painful “pop” in the back of your knee or lower thigh. This does not mean that you have torn your ACL graft and the pain will settle down within a few days. You may also notice some bruising or swelling at the back of your thigh. However, if the pain is not improving after a few days, or is associated with a significant increase in knee swelling, please call our office and not the hospital, as this concern can wait until regular office hours.
11. When you remove your bandage for the first time, you may notice a clear string that looks like fishing line sticking out of the skin near the incision(s). This is a **biodegradable stitch or suture** that is used to close the skin incision. It will eventually fall off. However, you may snip these clear strings off at the level of the skin as early as 2 weeks after surgery, or you can wait to have this done by your surgeon at your first follow-up appointment. After removing your bandage, avoid the temptation to touch your healing incisions as your own hands are the most common source of bacteria which can cause wound infections.
12. **Steri-strips** are white strips of tape that are used to reinforce the stitching of the skin incisions. You may peel these strips of tape off by yourself 2-weeks after surgery, by which time the incision should be healed.



Patient Services

Questionnaires

We aim to provide excellent post-operative care. As such, we ask you to come back for appointments for up to 2-years after your surgery.

In addition to these visits, you may be asked to complete questionnaires, these provide the Surgeon with information regarding your overall function, your ability to participate in recreational or sporting activities, and your social and emotional well-being, both before and after surgery. From each questionnaire a score is generated reflecting your current level of function. Using these scores, the Surgeon can assess your recovery progress.

These questionnaires will be provided to you via an email with a link to a secure site to complete the questionnaire electronically before your appointment.

Online Shop

Our Online Shop (<https://banffsportmed.ca/shop/>) offers medical aids for purchase to help with your recovery and rehabilitation. You may order cold therapy units, range of motion (ROM) and off-the-shelf braces, electric muscle stimulator (EMS) units, and exercise kits from our site. Purchases are made through PayPal or via a secure credit/debit transaction.

The electronic receipt received through the website may be used to submit for insurance claims.

Prescriptions required for Cold Therapy Units will be provided to you by our office.

Some medical aids such as cold therapy units and knee walkers can also be rented for defined periods of time.

Frequently Asked Questions (FAQ)

You can consult our Frequently Asked Questions page on our website (<https://banffsportmed.ca/faq/>) to find answers to questions that are common to many patients in your situation. Answers include what your surgery will involve, how to manage your pain, when you can drive after surgery, how long you should avoid contact with water at the site of your surgical incision, common physical effects after surgery, and what to do if you require medical attention. If your question is not answered on the FAQ page, please contact your surgeon's medical office assistant with your question by phone or email for more information.



Cold Therapy Information

What is Cold Therapy?

Cold therapy is the use of ice or cold to reduce pain, inflammation, swelling and spasm from an injury or after surgery. Cold therapy can be applied with a bag of ice, an ice pack, gel pack, cold compress or by using a specialized Cold Therapy Unit.

Cold therapy is used as part of rehabilitation after knee, shoulder and ankle surgeries, such as arthroscopy, anterior cruciate ligament (ACL) reconstruction, shoulder reconstruction or rotator cuff repair.¹

What does it do?

Cold therapy slows down the blood flow to an injured area. Research has shown that cold therapy decreases pain, inflammation, swelling, blood loss, and medication use after surgery.²

WHEN	WHAT	HOW OFTEN
To Use Cold Therapy	Do We Recommend?	To Use Cold Therapy
> For the first 3 months after surgery	> bag of ice / ice pack / gel pack / cold compress	First 5 - 7 days - minimum 5 x per day for 20 minutes*
> When experiencing pain and swelling	> Kodiak Cold Therapy Unit	After 7 days - as needed
> After therapy and exercise sessions	> Polar Care Wave Compression Cold Therapy Unit	*up to 5 hours if using a Cold Therapy Unit
To prevent skin injury when using cold therapy, it is essential that you protect your skin by using a cloth or towel. Always carefully follow the specific Cold Therapy Unit instructions		

Where can I buy a cold therapy unit?

You can order a Cold Therapy Unit, complete with a knee or shoulder pad, through our website. Visit <https://banffsportmed.ca/shop/> or scan the QR code.

Alternatively, you can purchase a Cold Therapy Unit from your local healthcare provider or from an online health supply store, or rent one from the clinic for a defined period.

We recommend that you buy your Cold Therapy Unit at least two weeks before your surgery to make sure that you have it delivered in time.



¹ Raynor MC, Pietrobon R, Guller U, Higgins LD. Cryotherapy after ACL reconstruction: a meta-analysis. J Knee Surg. 2005 Apr;18(2):123-9.

² Wilke B, Weiner RD. Postoperative cryotherapy: risks versus benefits of continuous-flow cryotherapy units. Clin Podiatr Med Surg. 2003 Apr;20(2):307-22.

OPTIMIZE YOUR RECOVERY

Along with physiotherapy, we offer several services to help you reach your optimal recovery after surgery.

Getting you back to your activities and reducing your risk of another injury.



DIETETICS & NUTRITION

Consulting a Registered Dietitian* prior to surgery can help in many ways. They can:

- Conduct a nutrition pre-screen to ensure optimal surgery outcomes
- Support your increased nutrition needs during the inflammatory and healing phases of surgery
- Provide strategies that help to reduce muscle loss
- Help you manage post-surgical symptoms such as reduced appetite, nausea, and constipation

*Our Registered Dietitian works with clients 18 years and older

STRENGTH & CONDITIONING

Our strength and conditioning coaches (kinesiologists) and physiotherapists work together to help you:

- Prepare for surgery
- Recover after surgery



While our physiotherapists focus on reducing your pain, restoring range of motion, and progressing your rehabilitation exercises, our kinesiologists gradually reintroduce functional exercises to help you return to sport, activity, and performance.

This seamless collaboration is tailored to your surgery and goals to help you optimize your recovery and reduce your risk of another injury.



OTHER SERVICES

Our multidisciplinary team can also provide the following services for your surgery:

- Bracing
- Cold Therapy
- Massage Therapy
- Medical Devices and Equipment
- Blood Flow Restriction Therapy

BOOK A CONSULT



403 760 2897 ext 3



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