



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 these 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 will 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 (403 760 2897) to arrange a follow-up appointment before your surgery date.

The Procedure

Described here for a medial opening wedge HTO for the treatment of medial compartment osteoarthritis

- A vertical skin incision 6-8cm 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

- *Infection: less than 3 in 100*
 - Intravenous antibiotics are given before and after 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, the 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 post-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 are not allowed to have anything to eat or drink after midnight (24:00) before to your surgery.
- If you have prescribed medications you need to take each day, the nurse from the Pre-Assessment Clinic will give you instructions before your surgery about if and when to take them.
- Please do not go to the dentist two weeks before, and six weeks after surgery, due to the increased risk of infection.
- You will be admitted to the hospital on the day of your surgery. Your admission time will be approximately 3 hours prior to your actual surgery time. Report to the Front Desk of the Banff Mineral Springs Hospital, unless instructed otherwise. Your surgery will take 1-2 hours.
- You can have an HTO with either a general or spinal anaesthetic. Some of our research suggests that patients have less overall pain and require less pain medication when having spinal anaesthetic. Your anaesthetist will discuss these options with you on the day of surgery.
- Most patients will stay in hospital for 2-3 nights after surgery although you have the option of going home after one night if your pain is well controlled.
- If you have insurance forms please bring them to our office on the day of, or before your surgery. This will ensure your forms are completed and posted back in time. Alberta Health Care does not cover the cost of completing insurance forms and a fee will be charged.

Other Costs

- Crutches can be purchased at the Banff Mineral Springs Hospital. 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 the surgery. This unit can be purchased from our office by ordering at least a week before your surgery. The order form is included in this package
- 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.

Postoperative Pain Control

- Rest, ice, compression, and elevation of your surgery leg
- You will be given a prescription for pain medication (Tylenol #3 or Percocet) and sometimes an anti-inflammatory (Naprosyn) before you leave the hospital. You may take an anti-inflammatory medication along with your pain medication. If you have medication allergies or intolerances, other suitable medications will be substituted.

Postoperative Wound Care

- The nurses will check the dressing on your knee before you go home, and replace it if necessary. You should take this dressing off 4 days after your surgery. If the tensor bandage on your leg rolls-up or causes pressure in one area you should take it off and have someone reapply it for you.
- You may be given an Aquacel dressing, which is kept on for two weeks. You can shower with this dressing on.
- For all other dressings, you may shower 4-days after surgery and should dry your incisions gently with a clean towel. You can peel the steri-strips off 2-weeks after your surgery. You may also cut any clear stitches that can be seen at skin level.
- Due to the risk of infection, do not fully immerse the incisions in bath water for 2-3 weeks after your surgery and do not enter a swimming pool or hot tub for at least 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.
- **If you have concerns please call our office at 403-760-2897 during business hours. Of an evening or weekend please call the Banff Mineral Springs Hospital at 403-762-2222, before seeing your family physician or going to an emergency clinic.**

Discharge from Hospital

- Before noon (12:00) the day of discharge.
- You must have someone to drive you home
- Ensure you have your prescriptions for pain medication, anti-inflammatory medication and physiotherapy
- A hospital physiotherapist will instruct you on brace use and crutch walking. You will be given a rehabilitation protocol to take to your therapist
- 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 with Dr. Heard/ Buchko/ Hiemstra

- Your surgeon will follow you after surgery at: 2-4 weeks, 6 weeks, 3-months, 6-months, 1-year and 2-years. The surgeon's medical office assistant will give you the time, date and location of your first post-operative appointment when they call you before your surgery. You will have x-rays taken at 2-4 weeks, 6-8 weeks and 12-16 weeks postoperatively.

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 about one week after your surgery.
- The hospital physiotherapist will give you the Banff Sport Medicine Post-operative HTO Rehabilitation Protocol. Please take the protocol to your physiotherapist for him/her to follow. If you or your therapist has any questions, please call our office at 403-760-2897.
- Based on your goals and your insurance coverage, you should discuss an appointment plan with your physiotherapist during your first post-operative visit. If you have limited funding for physiotherapy please make sure you space your visits out over the first six months post-surgery.

Return to Full Activities and Sports

- Your surgeon will be able to tell you when you can go back to sport. For most patients, you can start biking on a stationary bike (with a high seat and at minimal resistance) at two weeks and can start impact activities after 6 months after surgery. The type of sport and your level of strength and function (when we test you) 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 use a lot of running, jumping or pivoting. This is important to 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.