

High Tibial Osteotomy (Opening Wedge) Pre-Operative Information

About Your Condition

A knee osteotomy is a surgical procedure that corrects the alignment of the leg by precisely cutting and repositioning bone, shifting where body weight travels through the knee. It is one of the most powerful joint-preservation tools available.

Picture the mechanical axis of the leg — a straight line from the center of the hip to the center of the ankle. In a well-aligned knee, that line passes through the center of the joint, distributing load evenly. When the leg is bow-legged (varus alignment), that line shifts toward the inside of the knee, concentrating body weight on the medial (inner) compartment with every step.

Over years and decades, this imbalance wears down the cartilage and meniscus on the overloaded side. The result is pain, swelling, and arthritis — not because something failed catastrophically, but because the alignment was slowly wearing out one side of the knee.

A high tibial osteotomy (HTO) changes this by cutting the bone at the top of the shin (tibia) and opening a wedge to shift the weight-bearing axis toward the healthier outer compartment. **The knee isn't replaced — it's mechanically rebalanced.** This is a joint-preservation procedure designed to reduce pain, slow the progression of arthritis, and delay or prevent the need for knee replacement.

[Learn more at merrittsurgery.com](http://merrittsurgery.com) or [youtube.com @merrittsurgery](https://www.youtube.com/@merrittsurgery)

About Your Surgery

Opening wedge HTO is performed through an incision on the inner side of the knee, just below the joint line. A precise cut is made through the tibia, and the bone is gradually opened to create a wedge-shaped gap. This gap is filled with bone graft material and secured with a low-profile plate and screws. The plate holds the correction while the bone heals.

Before every osteotomy, a CT scan of your full leg is obtained and sent to a specialized engineering team (NewClip). They digitally plan the exact correction angle, cut location, and plate position. A custom 3D-printed cutting guide is manufactured specifically for your anatomy — ensuring millimeter-level precision that is not achievable with standard surgical techniques alone.

If additional procedures are needed (ACL reconstruction, cartilage surgery, meniscus repair), they can be performed at the same time through the same or additional small incisions.

Surgery typically takes about 2 hours. This is an outpatient surgery generally performed at Valley Medical Center. You will go home the same day.

Risks of surgery include infection, blood clots, numbness around the incision, stiffness, delayed bone healing or non-union (especially in smokers), overcorrection or undercorrection, lateral hinge fracture (a fracture on the outer side of the bone cut that is identified and managed during or after surgery), hardware irritation, and continued pain. Smoking significantly impairs bone healing and is

one of the most common reasons osteotomies fail to heal properly. **If you smoke, you must stop at least two weeks before surgery and not smoke for at least three months afterward.**

What happens on the day of surgery: A couple of days before surgery, the nursing staff will call you to confirm your check-in time and when to stop eating and drinking. On the day of surgery, check in at the front desk at your assigned time. You will go to the pre-op area with your family where our nurses will help you get changed, start an IV, and review your health history. You will meet with me to review the plan, and the anesthesia team will explain their approach. When the operating room is ready, you will walk back with a nurse. After anesthesia is given, you will not remember anything until the recovery room.

While you are in surgery, your family can pick up your post-operative medications at the pharmacy next to the surgery center. If you are under 18, one family member must stay at the surgery center during the entire surgery. In the recovery room, you will be monitored until you are awake, have some crackers and juice, and be made comfortable. Once ready, you will change into your clothes and be wheeled to your car. **You will need someone to drive you home and stay with you for the first 24 hours.**

After Surgery — What to Expect

After surgery it is normal to experience pain, swelling, and limited motion. You will be in a hinged knee brace and will use crutches.

The most important rule of your recovery: toe-touch weight bearing for 6 weeks is mandatory.

In an opening wedge osteotomy, the bone gap is filled with graft material but there is no direct bone-to-bone contact yet. Your toes can touch the floor for balance, but crutches must carry your weight. No weight-bearing advancement is allowed until your 6-week X-ray confirms early bone healing (bridging callus).

Quad activation from Day 1 is essential. After surgery near the knee, the quadriceps muscle often shuts down due to swelling (arthrogenic muscle inhibition). Electrical muscle stimulation (NMES) and quad sets every hour are the most effective way to combat this. The faster your quad wakes up, the better your recovery.

Ice every 2 hours during the first two weeks. Aggressive swelling control is critical — swelling directly inhibits your quad from firing. An ice machine is highly recommended.

Full knee straightening must be maintained from Day 1. Do not rest with a pillow under your knee. A flexion contracture (inability to fully straighten the knee) that develops during the immobilization period is very difficult to correct later.

Physical therapy should start within the first week, typically 2–3 times per week. Schedule PT before surgery.

The timeline below answers the most common questions about recovery. Your recovery may be faster or slower depending on your overall fitness and any additional injuries. The key message is that protecting your bone healing is essential while you work hard during every phase of recovery.

Timeframe	What to Expect
Weeks 1–6	Strict toe-touch weight bearing with crutches — this is non-negotiable. Brace worn for support. Quad sets every hour with electrical stimulation from Day 1. Ice every 2 hours. Range of motion 0–90°. PT 2–3x/week. Week 6 X-ray determines when weight bearing can advance.
Weeks 6–12	After X-ray confirms early bone healing, weight bearing advances progressively. Wean from crutches as quad control and gait improve — goal is crutch-free by

	Weeks 10–12. Stationary bike and closed-chain strengthening begin. Range of motion progresses beyond 90°.
Months 3–5	Full weight bearing. Progressive strengthening — leg press, squats, step-ups, balance training. Walking program, cycling, swimming, and elliptical cleared. Limb symmetry testing guides progression.
Months 5–6	Return to low-impact recreational sport as strength and X-rays allow. Running begins at 6 months with a structured walk/jog program after radiographic confirmation of solid bone healing.
Months 9–12	Return to higher-demand and cutting/pivoting sports with surgeon clearance and passing strength and hop testing ($\geq 90\%$ limb symmetry). Most patients reach full function by 9–12 months.

Driving: Right leg 6–8 weeks, left leg 4 weeks. Off narcotics before driving.

Hardware note: The plate and screws can remain permanently for most patients. Roughly 20% experience hardware irritation (usually the plate pressing against the skin or tissue). If bothersome, hardware removal is a straightforward outpatient procedure typically done after 12–18 months once the bone is fully healed.

Preparing for Surgery

Pre-surgical physical therapy (prehab): Starting physical therapy before your surgery helps you recover faster afterward. Focus on decreasing swelling, activating the quadriceps, restoring range of motion, and improving overall strength. Start prehab as soon as possible.

Nutrition: A good diet with increased protein and collagen supplementation helps speed your recovery and prevent muscle weakness after surgery. Vitamin C can help with inflammation and stiffness. Start these before surgery and continue through your recovery.

Smoking cessation: If you smoke, you must stop completely at least two weeks before surgery and not resume for at least three months. Smoking is the single biggest modifiable risk factor for non-union (failure of the bone to heal). We generally will not perform elective osteotomies in active smokers.

Ice Machine — My #1 Recovery Recommendation

I highly recommend purchasing an ice machine to help your recovery. An ice machine is the single best investment you can make — it allows for continuous icing without the risk of frostbite and is far easier than using ice bags or gel pads. Our clinic staff can fit you for one before surgery and show you how to get the most out of it. Stock up on bags of ice — the machine can go through a bag a day when used regularly.

Prepare your home: Remove throw rugs or obstacles that might catch a crutch and cause a fall. Make sure you have clean sheets and comfortable clothes ready. Stock the refrigerator with healthy food and buy bags of ice for the ice machine.

Handicap placard: You will be given a handicap parking pass application at your clinic visit. Get this at a DMV office before your surgery so you do not have to deal with it while recovering.

Day-of-Surgery Checklist

- ☐ Verify your check-in time and follow instructions on when to stop eating and drinking
- ☐ Schedule Physical Therapy for 5–7 days after surgery (do this before surgery)
- ☐ Bring your brace — you will be fitted at your pre-operative visit
- ☐ Wear comfortable clothes that fit over a brace (sweatpants work well)
- ☐ No perfume or lotion on your skin
- ☐ Remove or leave jewelry at home
- ☐ Have the ice machine and bags of ice ready at home for when you return

Contact Information

Questions about your surgery:

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