

MACI CARTILAGE REPAIR WITH HIGH TIBIAL OSTEOTOMY

Before Your Surgery

YOUR SURGERY AT A GLANCE

SURGERY	MACI: your own cartilage cells, grown in a lab, are implanted into the cartilage defect. A high tibial osteotomy (HTO) is done at the same time to shift weight off the damaged area
HOW LONG	About 2 hours
ANESTHESIA	The anesthesia team will review their plan with you, including a nerve block for pain after surgery
WHERE	Proliance Surgery Center at Valley (PSCV) or Valley Medical Center (VMC), both in Renton. We will tell you which. You go home the same day
AFTER SURGERY	Hinged knee brace, unlocked, and crutches. Toe-touch only until the 6-week X-ray. PA visit at 2 weeks
PHYSICAL THERAPY	Starts 5–7 days after surgery, 2 times a week . Schedule it before surgery

Do these now, before surgery

- **Schedule physical therapy** for 5–7 days after surgery.
- **Arrange a driver** and someone to stay with you for the first 24 hours.
- **Get your handicap placard** at a DMV office, using the application from your clinic visit, so you do not have to deal with it while recovering.
- **Get fitted for an ice machine** and stock up on bags of ice.

About Your Injury

Cartilage has no blood supply and cannot heal on its own. Unlike bone, which can break, bleed, and knit back together, damaged cartilage is stuck as a permanent "pothole." The best way to address this is **cartilage restoration**, a surgical option that works best in younger, active patients who want to restore function and avoid a joint replacement years later.

Your imaging shows a cartilage defect on the end of the thigh bone (femoral condyle), along with **malalignment of the leg**. When the leg is bow-legged (varus), the weight-bearing line passes right through the damaged area and loads it with every step. Without correcting this alignment, cartilage surgery has a much higher chance of failing. A **high tibial osteotomy (HTO)** corrects this by cutting and repositioning the shin bone (tibia) to shift weight away from the damaged area. This gives the graft the protected environment it needs to heal.

Two separate structures must heal at the same time: the MACI cartilage graft (12–18 months for full maturation) and the tibial bone cut (healing usually confirmed by a 6-week X-ray).

About Your Surgery

MACI (Matrix-Assisted Chondrocyte Implantation) is an FDA-approved procedure done in two stages:

- **Stage 1 (biopsy):** during an arthroscopic procedure, a small sample of healthy cartilage is taken from an area of your knee that does not bear weight.
- **Stage 2 (implantation):** over 4–6 weeks, a lab grows your cells into millions of new cells. In the second surgery (your upcoming procedure), the cells are implanted into your cartilage defect using fibrin glue. This stage is generally done open, but can occasionally be done arthroscopically.

This is a very precise surgery. The new cartilage cells are carefully placed into the defect. Over time, while the knee is protected, the new cartilage grows into the bone. Because these are your own cells, the goal is to recreate the normal cartilage you had before the injury.

Healing occurs in four stages

- **Weeks 1–2:** the graft integrates.
- **Weeks 2–12:** the cells develop and build new cartilage (matrix).
- **Months 3–12:** the tissue matures and bonds.
- **Month 12 and beyond:** ongoing maturation and remodeling, up to 24 months.

85% of MACI implants are still intact at 5 years, making this one of the most successful cartilage restoration procedures available.

The high tibial osteotomy (HTO) is done at the same time as the MACI implantation. **A CT scan and a NewClip 3D-printed custom cutting guide** let us plan the exact correction. This maximizes precision and shortens the operation.

Risks of surgery

- Infection, blood clots, numbness, stiffness, delayed bone healing or non-union (especially in smokers), over- or under-correction, hardware irritation, and continued pain.
- **Smoking greatly impairs bone healing.** You must stop smoking at least 2 weeks before surgery and not smoke for at least 3 months afterward.

Learn more and watch the videos

My website covers cartilage injuries, MACI and other cartilage restoration options, and recovery in more detail. merrittsurgery.com/surgeries/cartilage-repair-restoration



Scan to learn more
and watch videos

The Day of Surgery

What to expect, step by step.

1 | A couple of days before

The nursing staff will call to confirm your check-in time and when to stop eating and drinking.

2 Check in

Check in at the front desk at your assigned time. In the pre-op area, with your family, our nurses will help you change, start an IV, and review your health history.

3 Meet the team

I will meet with you to review the plan, and the anesthesia team will explain their approach.

4 Surgery

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 medicines at the pharmacy (next to the surgery center at PSCV, or near the operating rooms at VMC).

5 Recovery room and going home

You will be monitored until you are awake, have some crackers and juice, and are comfortable. Then you will change into your clothes and be wheeled to your car. **You need someone to drive you home and stay with you for the first 24 hours.**

After Surgery: What to Expect

After surgery, pain, swelling, and limited motion are expected. You will be in a hinged knee brace and on crutches. The brace is **unlocked from day 1**, for walking and for sleep. The hinge is set 0–90° in week 1, 0–105° in week 2, then fully open. When weight bearing starts at week 6, the brace stays unlocked if you can do a straight-leg raise without a lag. Otherwise it is locked for walking until you can. The brace stops after you are off crutches, around **weeks 10–12**.

Two structures are healing at the same time: the MACI graft and the tibial bone cut. The osteotomy drives the early weight-bearing limits. **Weight is not increased until a 6-week X-ray shows the bone is healing.** Toe-touch weight bearing (about 10–15 lb, for balance) for 6 weeks also protects the cartilage, whichever way the bone was cut. For pain, Tylenol (acetaminophen) and your prescribed narcotic are safe to use.

Physical therapy starts 5–7 days after surgery, 2× a week. **Bending is pushed faster than after MACI alone**, to prevent stiffness (arthrofibrosis). Goals are **90° by week 1, 105° by week 2, 115° by week 3, and 125° by week 4**.

No hamstring curls for 6 weeks

No hamstring curls (bending the knee against resistance) for the first 6 weeks. They pull on the healing bone cut.

When	What to expect
Week 0–1	Toe-touch weight bearing from the day of surgery, about 10–15 lb, for balance. Hinged brace unlocked (0–90°) for walking and sleep. No hamstring curls for 6 weeks. Bending goal 90° by week 1 . Quad sets, straight-leg raises, heel slides, ankle pumps, and kneecap mobilization from day 1; NMES at PT.
Weeks 1–5	Toe-touch continues strictly until the 6-week X-ray . The osteotomy must heal before weight can increase. Brace hinge 0–105° in week 2, then fully open. Bending goals 105° by week 2, 115° by week 3, 125° by week 4. Active straightening exercises (90° to 40° arc, no resistance).

Week 6	X-ray to check that the bone cut has healed. If it has, begin adding weight in steps (about 25% at week 6). The brace stays unlocked if your straight-leg raise has no lag; otherwise it is locked for walking until it does. If not, toe-touch continues until follow-up imaging clears you to add weight.
Weeks 6–12	Weight steps: 25% at week 6, 50% at week 8, 75% at weeks 9–10, full weight at weeks 10–12. Off crutches around weeks 10–12; the brace stops after you are off crutches. Recumbent bike and pool therapy begin.
Months 3–5	Progressive strengthening. Low-impact conditioning. No loaded deep bending past 90° until month 5.
Months 9–12	Walk-jog running program. Plyometrics at month 12. Sport-specific training.
Months 12–18	Return to cutting, pivoting, and impact sports after meeting all criteria and with my clearance. MRI at 12 months. HTO hardware reviewed.

Driving

- **Right leg:** you must be off crutches, have the brace unlocked or off, be off narcotic pain medicine, and be able to brake hard. Usually about 10–12 weeks.
- **Left leg (automatic car):** usually about 4 weeks, once you are off narcotic pain medicine.

Preparing for Surgery

Medicines and supplements before surgery

- The pre-op nurse will tell you when to stop eating and drinking.
- **Stop fish oil, vitamin E, and herbal supplements 5 days before surgery.**
- **Tell us** if you take a blood thinner (such as Eliquis, Xarelto, warfarin, or Plavix) or a weekly diabetes or weight-loss injection (such as Ozempic, Wegovy, or Mounjaro). These may need to be stopped earlier.
- **No anti-inflammatory medicines.** Stop ibuprofen (Advil, Motrin), naproxen (Aleve), meloxicam, celecoxib (Celebrex), diclofenac, and anti-inflammatory creams and gels such as Voltaren **7 days before surgery**, and do not take them for **6 weeks after surgery**. They can slow bone and cartilage healing. The low-dose (81 mg) aspirin we prescribe after surgery is different: take it as directed.

Physical therapy before surgery (prehab)

The stronger you are going into surgery, the stronger you come out of it. **Good quad strength and knee motion make recovery easier.**

Nutrition

What you eat has a direct effect on how well you heal. Start good nutrition before surgery and continue through your recovery. Our nutrition guide explains what to take and how much: merrittsurgery.com/surgeries/nutritional-optimization



Scan for the nutrition guide

Ice machine: my #1 recovery recommendation

An ice machine is the single best investment you can make for your recovery. It makes icing **20 minutes on, 20 minutes off** easy, without the risk of frostbite, and is far easier than 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 use a bag a day. **Scan the code to learn more or buy one.**



Scan for recovery tools

Get your home ready

- Remove throw rugs or obstacles that might catch a crutch and cause a fall.
- Have clean sheets and comfortable clothes ready.
- Stock the refrigerator with healthy food, and buy bags of ice for the ice machine.

Day-of-Surgery Checklist

- ☐ Verify your check-in time and follow the instructions on when to stop eating and drinking
- ☐ Physical therapy scheduled for 5–7 days after 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 jewelry or leave it at home
- ☐ Ice machine and bags of ice ready at home for when you return
- ☐ A driver, and someone to stay with you for the first 24 hours
- ☐ If you are under 18: one family member must stay at the surgery center or hospital during the entire surgery

Contact Information

Questions about your surgery	(425) 656-5060
PSCV Surgery Center	(425) 226-2041
Surgery scheduling	(425) 528-7155
Pre-op nurse	(425) 291-1465
Billing	(425) 291-1414
PSCV address	4009 Talbot Rd S, Ste 200, Renton, WA 98055
VMC address	400 S. 43rd Street, Renton, WA 98055