

MACI KNEECAP CARTILAGE REPAIR WITH TIBIAL TUBERCLE OSTEOTOMY

Before Your Surgery

YOUR SURGERY AT A GLANCE

SURGERY	MACI: your own cartilage cells, grown in a lab, are implanted into the defect on the kneecap or trochlea. A tibial tubercle osteotomy (TTO) moves the kneecap tendon attachment
HOW LONG	About 1–1.5 hours , depending on defect size and any added procedures
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	Brace locked straight through 6 weeks , crutches, toe-touch only for 6 weeks . PA visit at 2 weeks . X-ray at 6 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

Your knee has a cartilage defect that cannot repair itself. Cartilage has no blood supply. Imagine trying to fill a pothole in a road with no trucks to deliver asphalt. Without treatment, the defect will get bigger and lead to arthritis.

Your imaging shows a cartilage defect on the **patella (kneecap)** or **trochlea** (the groove on the thigh bone), along with a kneecap that does not line up well. The **tibial tubercle** is the bump below the kneecap where the kneecap tendon attaches. Its position may make the kneecap track poorly over the damaged cartilage. A **tibial tubercle osteotomy (TTO)** moves this attachment point so the kneecap glides better over the repaired surface.

Two structures heal at the same time: the MACI graft (cartilage repair over 12–18 months) and the TTO bone cut (healing 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. If you have a meniscus tear, ligament injury, or alignment problem, it may be treated during the same surgery.

Risks specific to MACI with TTO

- Delayed bone healing at the TTO, hardware irritation (about **20%** of patients may need the screws removed later), or a fracture through the bone cut.
- **Do not smoke or use nicotine.** Nicotine severely impairs bone and soft-tissue healing.

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

Right after surgery, you will be in a hinged knee brace **locked straight (0°)** and on crutches. The brace stays locked straight for all walking and sleep **through week 6**, then is opened a little at a time over weeks 7–8. You come off crutches first (around **weeks 8–10**), and the brace stops after that.

You will be **toe-touch weight bearing for 6 weeks**. Your foot rests on the floor for balance only, about 10–15 lb. The TTO bone must heal before you can add weight, so weight is not increased until **a 6-week X-ray** shows the bone is healing.

Why this differs from a TTO alone: the new cartilage on the kneecap also needs protection, so bending climbs in smaller steps and you sleep with the brace locked straight.

Bending on a step-by-step schedule

Bending increases step by step to protect the TTO hardware. **Do not force it past the target:** 45° by day 5, 60° by week 1, 75° by week 3, then up to **90° (no more) until the 6-week X-ray**. Avoid bending with weight on the leg (squatting, lunging, climbing stairs) in the 45–90° zone for the first 3 months. This protects both the cartilage graft and the TTO hardware.

Physical therapy starts 5–7 days after surgery, 2× a week. The focus is on quad activation, kneecap mobilization, and gentle progress in bending.

When	What to expect
Weeks 0–4	Toe-touch weight bearing, about 10–15 lb, for balance. Brace locked straight for walking and sleep. Step-by-step bending (45° by day 5, 60° by week 1, 75° by week 3, then up to 90° until the 6-week X-ray). Stationary bike after week 3, rocking within the bending limit only. Quad sets, straight-leg raises, heel slides, and kneecap mobilization from day 1; NMES at PT.
Weeks 4–6	Toe-touch continues until the 6-week X-ray. Bending stays at 90° or less. Brace stays locked straight for walking and sleep. Deep-water pool walking once the incisions are healed.
Week 6	X-ray to confirm the TTO bone is healing. If it is, you begin adding weight, and the brace is opened a little at a time over weeks 7–8.

Weeks 6–10	Move to full weight. Two crutches, then one, then no crutch by weeks 8–10 . The brace stops after you are off crutches. Full bike revolutions once bending past 90° is allowed; pool therapy begins. Mini-squats (0–45° only). Straightening exercises in the 90° to 40° arc only, once the TTO has healed.
Months 3–5	Progressive strengthening. Squats progress to 90° by month 4, full depth after month 5. No loaded deep bending past 90° until month 5. Straightening exercises progress to the full arc after month 5.
Months 9–12	Walk-jog running program. Plyometrics at month 12.
Months 12–18	Return to sport after meeting all criteria and with my clearance. MRI at 12 months. TTO 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 8–10 weeks.
- **Left leg (automatic car):** typically 2–4 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)

Starting physical therapy before 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.**

Stop smoking

Smoking greatly impairs cartilage healing and increases the risk of infection. **Stop smoking at least 2 weeks before surgery**, and ideally much longer.

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