MACI - Single Patellofemoral Lesion

Physical therapy protocol

Patient: _____ Surgery / procedure date: _____

This is the full Pacific Bone & Joint postoperative protocol. Patient-specific operative and discharge orders take precedence over this default pathway.

Selected by surgeon _____ PT start _____ Next review _____

Protection and early recovery

Use after implantation of one contained patellar or trochlear graft using matrix-induced autologous chondrocyte implantation (MACI), when the surgeon authorizes immediate loading. Time starts at implantation, not the biopsy. An uncontained graft requires the protected patellofemoral schedule.

Document graft site, size and containment, plus the permitted loaded arc. A tibial-tubercle osteotomy, stabilization procedure or other repair may require slower loading or motion; follow those individual orders.

Loading and motion schedule

Table week 1 = days 0-6; week 2 = days 7-13. Other time intervals are elapsed time after surgery. Weight bearing as tolerated means the amount comfortable and controlled while using crutches and the brace. Keep the knee locked straight during initial walking; permission to bear weight does not authorize loaded bending.

Time after implantation: Maximum load on operated leg - Unloaded motion and brace

Week 1: Weight bearing as tolerated - 0-45 deg passive; brace locked straight for gait

Week 2: Same - 0-60 deg passive or assisted; keep brace locked for gait

Week 3: Same - 0-75 deg; gentle active motion begins on day 14

Week 4: Same - 0-90 deg; keep brace locked for gait

Weeks 5-6: Same - 105 deg, then 120 deg; staged brace unlocking if cleared

Weeks 7-9: Full as tolerated - Toward full motion; wean brace and aids by criteria

Protect the graft

- Keep the brace locked at 0 deg for standing, walking and transfers for the first 4 completed weeks. Remove it for supported hygiene or prescribed exercise; night use follows the discharge order.
- After 4 completed weeks, unlock for gait gradually only after surgeon/PT clearance, a straight-leg raise without lag and no buckling. Start with a small authorized arc. Wean brace and crutches after 6 weeks only when gait remains controlled.
- Passive motion begins immediately within the table limits. Gentle active motion begins after 2 completed weeks (day 14); develop full active control after about 6 weeks, within the permitted flexion ceiling.

- Avoid early resisted knee extension, deep squatting, kneeling and step-down loading. These can load the repair despite being possible to perform.
- If the graft is uncontained, if both patella and trochlea were treated, or if another repair limits weight bearing, stop progression and obtain the correct protocol.

Bracing and the exact unlocking steps above are proposed clinic defaults. The surgeon may change them based on graft location, stability and accompanying surgery. Increasing pain, effusion or catching calls for a slower progression and clinical review.

Therapy and home exercises

First 2 weeks after surgery

Start outpatient physical therapy during the first week. Initial visits teach safe transfers, crutch use, the permitted load and the brace setting. Suggested frequency is 1-2 visits weekly initially, adjusted to deficits and progress; complete the home program daily.

- Perform ankle pumps regularly while awake. Practice gentle quadriceps and gluteal tightening, with 5-10 second holds for 10 repetitions, 3-5 times daily.
- Use supported passive or assisted bending within the weekly ceiling. Support the heel and calf to regain extension; avoid forceful hyperextension or prolonged support directly behind the knee.
- If continuous passive motion (CPM) is prescribed, start within 12-24 hours at 0-45 deg. A proposed initial dose is 60 minutes daily in tolerable sessions for 3 weeks, then reassess. Follow the same weekly flexion ceiling.

2 to 6 weeks after surgery

Begin gentle active knee motion after 2 completed weeks (day 14), within the permitted range. Straight-leg raises keep the knee straight; use the locked brace if needed to prevent lag. Add hip and trunk work without twisting or loading the operated knee. Therapist-directed neuromuscular electrical stimulation may help quadriceps recruitment.

A stationary cycle may start at 3-4 weeks after surgery for gentle motion only. Use partial revolutions if needed; never force the knee past its flexion limit. Delay resistance until approved. Avoid resisted knee-extension machines during this protection phase.

6 to 12 weeks after surgery

After full loading is authorized, restore an even gait and progress balance. Introduce low-load mini-squats and leg press in the documented graft-safe arc, initially shallow. Add controlled calf and hip strengthening. Begin resisted knee-extension work only after the surgeon specifies its safe arc and timing.

3 to 6 months after surgery

Progress strength, step control and low-impact conditioning. Increase resistance gradually; movement quality and the next-day knee response guide dosing. Deep loaded flexion and terminal extension loading require lesion-specific clearance.

- Keep exercise discomfort mild and stop for sharp joint pain, catching or new swelling. Do not stretch through a mechanical block.
- No running, jumping, twisting, loaded deep squats or forceful kneeling during early rehabilitation. Permission for passive knee bending does not authorize bending under body weight.
- Pool exercise starts only after wounds are fully closed, dry and cleared. Follow the separate surgical instructions for dressings, medicines and blood-clot prevention.

Progression and return to activity

Progress by healing time and measured function

- Advance loading only when the current level causes no increase in pain, knee fluid or limp through the following morning. If symptoms increase, return to the last comfortable level and contact the therapist.
- Wean crutches or brace only after the surgeon allows the load, full active extension is present, 20 straight-leg raises show no lag, and walking is smooth without buckling. Do not remove aids needed to maintain a loading limit.
- Before running: painless full motion, stable gait, no reactive swelling, and measured quadriceps and hamstring strength at least 80% of the opposite limb. Perform landing or hopping assessment only after impact testing is cleared.

Running and sport

Assess running readiness around 6 months. If the graft, examination and functional tests support progression, the usual running window is 7-9 months. Begin level walk-jog intervals; increase one variable at a time and monitor the next-day response.

For unrestricted sport, require surgeon clearance, at least 90% quadriceps and hamstring strength symmetry, at least 90% symmetry on the approved hop battery, controlled sport-specific movement, and no pain or swelling after progressive practice. Compare absolute strength and endurance as well as limb symmetry; both legs may be weak.

This clinic schedule reserves pivoting, cutting and contact sport until at least 12 months; complex repairs may need 12-18 months. These are review windows, not automatic clearance. Return to physical work also requires the lifting, kneeling and climbing demands to be demonstrated safely.

When to contact the office

- Request prompt review for new locking, loss of extension, a painful pop with swelling, instability, wound drainage, spreading redness or fever.
- Seek urgent assessment for new calf pain or swelling. Call 911 for chest pain, shortness of breath or fainting.

Schedule note: exact weekly loading percentages, brace steps and the 12 month contact-sport floor are proposed clinic defaults within published guidance; surgeon orders may modify them.

Sources: Vericel. MACI Rehabilitation Manual, PP.US.MAC.1310 v5.0 (2024), https://www.maci.com/pdf/MACI-Rehabilitation-Manual.pdf. Flanigan DC et al. Cartilage 2021; doi:10.1177/1947603520968876. Ohio State University. Autologous Chondrocyte Implantation Clinical Practice Guideline, April 2023. Review date October 23, 2026.