

MACI Cartilage Restoration — Patella / Trochlea Rehabilitation Protocol

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Patient: _____ **DOS:** _____

Surgeon Parameters

Graft site: ☐ Patella ☐ Trochlea ☐ Both	Weight bearing in locked brace: ☐ As tolerated ☐ Graded	Tibial tubercle osteotomy: ☐
Other Precautions:		

Parameters above are patient-specific and supersede the general timeframes below. **Patellofemoral shear with knee flexion is the rate-limiting factor: weight bearing is allowed early because the brace is locked in extension, while flexion advances slowly and is not loaded early.** A concomitant osteotomy or ligament procedure overrides this schedule. Therapist to use clinical judgment to individualize exercise selection and pace within each phase.

Phase	Goals	Precautions	Treatment Focus
Phase 1 Weeks 0–6	Goals - Protect the graft; control pain/effusion - Full passive extension from day 1 - Flexion, non-weight bearing: 30° wks 0–2 → 60° wk 3 → 90° wk 4 → 110° wk 5 → 125° wk 6 - Quad activation; SLR without lag	Precautions - Brace locked in full extension for all weight bearing; off only for ROM exercises and CPM - Weight bearing per parameters above: as tolerated, or graded 20–30% body weight wks 0–2 → 50% wk 3 → 75% wks 4–5 → full wk 6 - Do not exceed the weekly flexion limit; no weight bearing on a flexed knee - No active or resisted open-chain knee extension If tibial tubercle osteotomy: toe-touch weight bearing in the locked brace for ≈6 wks; this overrides the schedule above	Treatment Focus - CPM from day 1–2, starting 0–30° and following the flexion schedule - Quad/hamstring/glute isometrics, ankle pumps; SLR in brace until no lag - Heel slides within limits; patellar mobilization - Calf raises and hip abduction/adduction in brace - Pool therapy once wounds are healed - Recumbent bike without resistance, wks 5–6
► Advance to Phase 2 when: wound healed, minimal effusion, full extension, flexion ≥110°, SLR without lag, full weight bearing in the brace pain-free.			
Phase 2 Weeks 6–12	Goals - Discontinue brace at ≈6 wks once SLR has no lag - Full ROM by ≈8 wks - Normal gait off crutches - Restore balance/proprioception	Precautions - Loaded closed-chain work in shallow flexion only (≈0–40°); no deep squats or lunges - No resisted open-chain knee extension - No running, jumping, or twisting If tibial tubercle osteotomy: advance weight bearing from 6 wks only as cleared by the surgeon	Treatment Focus - Gait training; crutch and brace weaning - Balance/proprioception, bilateral → single leg - Shallow closed-chain: weight shifts, mini-squats, bridges, calf raises - Upright bike with low resistance, walking program, pool - Hip/core strengthening; hamstring curls
► Advance to Phase 3 when: full ROM, normal gait without brace, no or trace effusion, shallow closed-chain work pain-free.			
Phase 3 Months 3–6	Goals - Build quad/hip strength and endurance - Unrestricted daily activity - Low-impact recreation (cycling, swimming) from ≈3 months	Precautions - No running, jumping, or pivoting - Keep loaded flexion in a pain-free, shallow arc; deepen gradually - Open-chain quad work light and inner-range only - Anterior knee pain or effusion after a session → reduce load	Treatment Focus - Upright cycling, rowing, elliptical - Inner-range quads; modified (shallow) leg press - Single-leg balance; hip/core strengthening
► Advance to Phase 4 when: no effusion with strengthening, stairs and daily activities pain-free, single-leg squat to ≈40° with good control.			

Phase	Goals	Precautions	Treatment Focus
Phase 4 <i>Months 6–9</i>	Goals - Progress the range of loaded flexion - Single-limb strength and control - Begin jogging progression once cleared by surgeon	Precautions - No cutting, pivoting, or contact sport - Jogging only with surgeon clearance and no effusion	Treatment Focus - Step-ups/downs; modified squats at progressive depth - Controlled mini-trampoline jogging → walk-jog progression
► Advance to Phase 5 when: jogging pain-free without effusion, quad/hamstring strength ≥80% of contralateral.			
Phase 5 <i>Months 9–12</i>	Goals - Running, agility, and sport-specific conditioning - Strength and hop testing ≥90% of contralateral	Precautions - Impact, pivoting, and contact sport not before 12 months (12–18 months in some series) - Clearance is criteria-based once the time minimum is met	Treatment Focus - Lunge and squat work on unstable surfaces - Running progression; agility and sport-specific drills - Strength and hop testing vs. contralateral
► Full Release (typically 12–18 months): full pain-free ROM, no effusion, quad/hamstring strength and hop tests ≥90% of contralateral, sport-specific progression completed, cleared by physician.			

Special Considerations

- Time frames are minimums set by graft maturation (ongoing for 1–2 years); the knee usually feels ready before the graft is. Criteria govern progression beyond each minimum, never ahead of it
- Persistent effusion, catching/locking, or new anterior knee pain with loaded flexion — reduce flexion loading and contact the surgeon

Thank you for taking care of our patient.

This protocol serves as a general guideline and outline only. Our team defers to the clinical judgment and expertise of the treating physical therapist to make appropriate adjustments and modifications based on the individual patient's presentation, progress, and response to treatment. For any questions regarding this protocol, please contact Dr. Wollenman directly at (561) 215 – 0184.