

OSTEOCHONDRAL ALLOGRAFT OF THE FEMORAL CONDYLE

Physical Therapy Protocol

PATIENT

SURGEON

Andrew L. Merritt, MD

DATE OF SURGERY

PT START DATE

For the patient

A donor plug of cartilage and bone replaced the damaged area on your thigh bone. It heals **bone to bone**, so most people return to sport at about 6 months. **For the first 6 weeks, your crutches carry your weight** while the plug grows into your bone, even though it is pressed firmly in place. You move to each phase when your knee meets the goals, not just because weeks have passed.

PROTOCOL AT A GLANCE

WEIGHT BEARING	Toe-touch only for 6 weeks (about 10 to 15 pounds, for balance). Weight added from week 7; off crutches by 8 to 10 weeks
BRACE	Hinged, unlocked for walking from day 1. Off for sleep. Worn until you are off crutches (8 to 10 weeks)
MOTION GOALS	Bending 90° by 2 weeks . Don't force it; keep progressing gently after that
PHYSICAL THERAPY	Starts 5 to 7 days after surgery, 2 times a week at first
KEY PRECAUTIONS	No anti-inflammatory medicines for 6 weeks , including creams and gels. No standing exercises until week 7
RUNNING · SPORT	Running around 14 to 16 weeks , after a step-down test. Sport after 6 months , once cleared

Recovery Timeline

Phase	When	PT visits	Focus
1	Weeks 0–6	2× a week	Toe-touch, quad activation, 90° by week 2
2	Weeks 7–12	2× a week	Weight added, off crutches and brace, early strength
3	Weeks 13–16	1–2× a week + home program	Strength, step-downs, plyometrics, running
4	Weeks 17–26	As needed	Cutting from 22 weeks, testing, return to sport

For the Therapist

Check the surgeon notes first. They override anything else in this protocol. Questions or setbacks: call (425) 656-5060.

Surgeon notes and special instructions

General principles

- **Osseous integration.** The press-fit plug unites bone to bone with the host condyle: immediate fixation and a faster return to sport (about 6 months) than MACI (12–18 months).
- **Toe-touch × 6 weeks** (about 10–15 lb, for balance only). Axial loading before early osseous union risks subsidence, micromotion, or delayed union, despite press-fit stability.
- **No standing weight shifts during toe-touch.** Weight shifts and bilateral stance start at week 7.
- **Motion, no CPM.** Active and active-assisted ROM. Flexion 90° by week 2; do not force; progress gradually after that.
- **Brace:** hinged, unlocked from day 1; off for sleep and ROM exercises; worn until off crutches (weeks 8–10).
- **No NSAIDs for 6 weeks, including topical** (e.g., diclofenac gel). They can slow bone and cartilage healing.
- **NMES** at PT visits from the first visit; no home unit. **Cold therapy:** 20 min on, 20 min off.
- **Criteria-based.** Strength, hop testing, and surgeon clearance decide advancement. Reactive effusion means reduce the load.

Procedures done at the same time

Meniscal repair

- The meniscal repair's weight-bearing limits apply if more conservative; follow the surgeon's milestones.

ACL reconstruction

- Use the OCA with ACL reconstruction protocol; OCA loading precautions stay in effect. Confirm the timeline with the surgeon.

PHASE

1

Protection

Weeks 0–6

For the patient: what to expect

Toe-touch only: your foot rests on the floor for balance (about 10 to 15 pounds); crutches carry your weight. Brace unlocked for walking, off for sleep. Bend gently to 90° by 2 weeks, without forcing it. No standing exercises yet.

WEIGHT BEARING	Toe-touch × 6 weeks (about 10–15 lb, for balance); crutches for all walking
BRACE	Hinged, unlocked for walking from day 1. Off for sleep and ROM exercises
MOTION	Active and active-assisted, no CPM. 90° by week 2, not forced; then progress gradually

Goals

- Protect osseous integration: toe-touch × 6 weeks
- Flexion 90° by week 2, without forcing
- SLR without extensor lag by weeks 2–3
- Swelling and pain controlled; PT started 5–7 days after surgery

Move on when

- ☐ Toe-touch maintained × 6 weeks
- ☐ Flexion ≥90° and progressing
- ☐ SLR without extensor lag
- ☐ Pain and swelling decreasing

Exercises

Exercise	How
NMES	Quadriceps, 20–30 min at PT visits, from the first visit
Quad sets · ankle pumps	Quad sets 3 × 15 every waking hour (VMO priority); ankle pumps hourly
Straight-leg raise	Hip flexion first, then all 4 planes; 3 × 10 each
Heel slides	Active-assisted flexion, 3 × 15; toward 90° by week 2, do not force
Hamstring curls	3 × 12
Hip and calf	Hip abductors, adductors, gastrocnemius; 3 × 15
Recumbent bike	Once flexion ≥100° (typically weeks 4–6); low resistance, 10–15 min
Pool deep-water walking	Weeks 4–5, incisions healed, surgeon approval; forward, backward, sideways
Conditioning · ice	Other-leg cardio and upper body as tolerated. Ice and elevate after each session

Precautions

- Toe-touch × 6 weeks; no partial or full weight bearing before week 7
- No standing weight shifts or bilateral stance exercises until week 7
- No squatting, lunging, loaded knee flexion, or resisted open-chain extension
- Reactive effusion means less load

Why: Axial loading before early osseous union risks micromotion, subsidence, or delayed union, despite press-fit stability.

PHASE

2

Return to Loading

Weeks 7–12

For the patient: what to expect

Weight bearing starts at week 7, once your therapist confirms your quad control. Over about 2 weeks you go from 2 crutches to 1, then none. Keep the brace on until you are off crutches. Ice after every session.

WEIGHT BEARING	Partial from week 7, once quad control is confirmed. 2 crutches → 1 → none by weeks 8–10, guided by pain and effusion
BRACE	Unlocked for walking; stop once off crutches with good quad control (weeks 8–10)
MOTION	Full, unrestricted

Goals

- Quad control confirmed before weight bearing
- Full weight bearing without crutches by weeks 8–10
- Normal gait on level ground and stairs
- Quad strength 50–60% of the other leg
- Resisted open-chain extension established
- Cycling and closed-chain work without pain

Move on when

- ☐ Off crutches, near-normal gait
- ☐ Squat 0–90° × 15 without pain
- ☐ 20 min bike without reactive swelling
- ☐ Quad strength ≥55% of the other leg

Exercises

Exercise	How
Weight shifts	Bilateral stance, no resistance; from week 7
Open-chain knee extension	5 lb at week 7; add 2–3 lb a week as tolerated; 3 × 15
Bike · elliptical	Bike: build to 20–30 min with more resistance. Elliptical once off crutches
Mini squats	0–60°, 3 × 15; to 0–90° by week 12, watching for effusion
Leg press	Both legs, 0–90°, 3 × 12; add resistance; single leg by week 12
Step-ups · stairs	4–6-inch step, 3 × 10. Stairs, reciprocal pattern, weeks 10–12
Calf raises	Standing; both legs, then single leg; 3 × 15
Hip strengthening	All 4 directions with progressive resistance; 3 × 12
Hamstring curls	With resistance, 3 × 12
Single-leg balance	Firm surface, 3 × 30 sec; foam or unstable surface from week 10
Aquatherapy	Shallow-water walking, heel raises, gentle squats

Precautions

- Confirm quad control before advancing weight bearing (delay if inhibition persists); let pain and effusion guide it
- No running, jumping, or impact
- Check effusion and ice after every session

PHASE

3

Return to Function

Weeks 13–16

For the patient: what to expect

This phase adds jumping drills and gets you ready to run. Running starts when you can step down from an 8-inch step with good control, usually at 14 to 16 weeks. Squats and leg press go deeper and heavier. If the front of your knee hurts with squats or leg press, stop those and tell your therapist.

WEIGHT BEARING	Full, unrestricted
MOTION	Full, unrestricted
RUNNING	Walk-jog intervals once the 8-inch step-down is satisfactory, not before 14 weeks

Goals

- Quad strength $\geq 80\%$ of the other leg
- 8-inch step-down with symmetric mechanics and no pain
- Start bilateral plyometrics
- Start walk-jog intervals at 14–16 weeks
- Better strength, flexibility, endurance, and neuromuscular control

Move on when

- ☐ Quad strength $\geq 80\%$ of the other leg
- ☐ 8-inch step-down with symmetric mechanics (required before running)
- ☐ Running ≥ 10 min continuously without pain or effusion
- ☐ Bilateral plyometrics without pain

Exercises

Exercise	How
Phase 2 program	Continue with progressive resistance and duration
Squats	Progressive depth (full depth when tolerated) and resistance
Leg press	Progress to single leg; add resistance. If patellofemoral pain, stop and return to isometrics
Step-down program	4 → 6 → 8-inch step; eccentric quad control and symmetric mechanics
Balance board squats	Both legs, then single leg
Plyometrics	From weeks 13–14: bilateral jump and land, progressing to single-leg hops
Conditioning	Bike, StairMaster, elliptical; progressive resistance and duration
Walk-jog intervals	Once the 8-inch step-down is satisfactory (after 14–16 weeks); flat surface, short intervals
Agility	Ladder, lateral shuffles, change of direction at low intensity

Precautions

- Running not before 14 weeks and not before the 8-inch step-down is met; both are required
- No cutting, jumping, or pivoting sports before 22 weeks (Phase 4)
- Patellofemoral pain with squats or leg press: stop the movement and return to isometrics; do not push through it
- Reactive effusion after loading: reduce intensity and reassess

PHASE

4

Return to Impact Activities

Weeks 17–26

For the patient: what to expect

Running builds toward steady, sport-level running. Cutting, jumping, and agility drills start, but not before 22 weeks. Return to sport is gradual and cleared by Dr. Merritt, usually after 6 months once you meet all the goals.

WEIGHT BEARING	Full, unrestricted
MOTION	Full, unrestricted
CUTTING · JUMPING	Not before 22 weeks; criteria-based only

Goals

- Isokinetic quad strength $\geq 90\%$ of the other leg
- Isokinetic hamstring strength $\geq 100\%$ of the other leg
- Single-leg hop $\geq 90\%$ LSI
- Full return to sport or recreation

Move on when

- ☐ Quad $\geq 90\%$ and hamstring $\geq 100\%$ LSI (isokinetic)
- ☐ Single-leg hop $\geq 90\%$ LSI
- ☐ Running 20 min continuously without pain or reactive effusion
- ☐ Functional knee scores done (IKDC, KOOS, Lysholm, Tegner)
- ☐ Surgeon clearance: gradual return to sport after 6 months

Exercises

Exercise	How
Running program	From walk-jog intervals to continuous running; increase duration, then pace
Cutting · jumping · agility	Not before 22 weeks after surgery
Sport-specific program	Agility and skill work of increasing difficulty
Plyometric progression	Bilateral jump and land → single-leg hops → reactive drills
Hop testing	Single hop, triple hop, crossover hop, timed 6-meter hop
Maintenance	Quad and hip program 3–4× a week

Precautions

- Cutting, jumping, and pivoting not before 22 weeks, and only when criteria are met
- Gradual return to full sport after 6 months, directed by Dr. Merritt; do not rush on subjective readiness
- Knee pain or effusion with running needs imaging before progressing

Return to Activity

All criteria must be met, and Dr. Merritt must clear the patient, before cutting, jumping, or pivoting sports.

Measure	Target
Isokinetic quadriceps	≥90% LSI
Isokinetic hamstrings	≥100% LSI
Single-leg hop testing	≥90% LSI (single, triple, crossover, timed)
Range of motion	Full and pain-free, equal to the other knee
Effusion	None after functional activity
Functional knee scores	IKDC, KOOS, Lysholm, Tegner completed
Earliest running	14–16 weeks, after the 8-inch step-down is met
Earliest cutting · jumping	22 weeks
Clearance	Dr. Merritt; gradual return to sport after 6 months

Clinical Timeline Summary

SUPERVISED PT	Starts 5–7 days after surgery
TOE-TOUCH	Weeks 0–6 (about 10–15 lb, for balance)
WEIGHT BEARING ADDED	Week 7, after quad control is confirmed
OFF CRUTCHES	Weeks 8–10
BRACE	Unlocked from day 1; stops once off crutches (weeks 8–10)
NO NSAIDS	Weeks 0–6, including topical
OPEN-CHAIN RESISTANCE	From week 7 (5 lb, +2–3 lb a week)
BIKE · ELLIPTICAL	Bike once flexion ≥100°; elliptical once off crutches
PLYOMETRICS	Weeks 13–14
RUNNING	14–16 weeks, after the 8-inch step-down
CUTTING · JUMPING · AGILITY	Not before 22 weeks
RETURN TO SPORT	After 6 months; criteria-based, cleared by Dr. Merritt

OCA bone-to-bone healing supports a faster return to sport than MACI. Progression is criteria-based: strength, hop testing, and surgeon clearance decide advancement.