

PATELLA FRACTURE REPAIR (COMMINUTED)

Physical Therapy Protocol

PATIENT

SURGEON

Andrew L. Merritt, MD

DATE OF SURGERY

PT START DATE

For the patient

Your kneecap was broken into several pieces, so the repair needs extra protection. **You can walk from day 1 with the brace locked straight. No bending for the first 2 weeks** while the bone starts to knit. Then bending increases slowly, only while sitting or lying down.

PROTOCOL AT A GLANCE

WEIGHT BEARING	Full weight as tolerated from day 1, brace locked straight . Crutches as needed for balance
BRACE	Locked straight at all times, including sleep, for 6 weeks , except to bend while sitting or lying from week 2. Weaned after the 6-week visit
MOTION GOALS	No bending for 2 weeks. 0–50° in weeks 2–4, then about 10° a week to 90° by weeks 8–9 . Full motion by weeks 14–16
PHYSICAL THERAPY	Starts 5 to 7 days after surgery, 2 times a week at first
KEY PRECAUTIONS	Never bend the knee while it holds weight. No resisted leg extension until the X-ray shows healing
RUNNING · SPORT	Running around weeks 18–22 . Cutting and jumping sports around 6 to 8 months

Recovery Timeline

Phase	When	PT visits	Focus
1	Weeks 0–2	2× a week	Brace locked at all times; no bending; quad activation
2	Weeks 2–4	2× a week	Bending starts, 0–50°; kneecap mobilization
3	Weeks 5–9	2× a week	Bending 10° a week to 90°; brace weaned after week 6
4	Weeks 10–16	2× a week	Full motion; strengthening once the bone has healed
5	Week 17 to month 6	2× a week	Strength, jumping and landing, running from weeks 18–22
6	Months 6–8+	As needed	Sport drills, 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

- **Conservative progression** for comminuted fractures with more complex ORIF; the construct may be less robust than a simple two-fragment repair. Published average return to sport is 7 months; this protocol targets 6–8 months, protecting the fixation and bone healing before impact.
- **ROM delayed 2 weeks** for early periosteal healing and to lower the risk of hardware failure or displacement. Then 0–50° in weeks 2–4 and 10° a week from week 4 (standard protocols advance about 15° a week).
- **WBAT locked in extension for 6 weeks.** No weight bearing with the brace unlocked until surgeon clearance.
- **Patellar mobilization:** gentle superior glides by the therapist only in weeks 0–2; all 4 directions from weeks 2–3.
- **Open-chain extension deferred to weeks 10–12**, once union is more advanced. Start in a 90–45° arc; advance per surgeon.
- **Quad activation during immobilization.** NMES at each PT visit, starting at the first visit; no home unit is needed. Quad sets every waking hour.
- **Return to sport.** Running at weeks 18–22; no cutting or jumping before months 6–8; union confirmed by Dr. Merritt.

ROM progression schedule

When	ROM target	Notes
Weeks 0–2	0° (locked)	No ROM exercises; brace locked at all times; quad sets and NMES
Weeks 2–4	0–50°	Heel slides to the 50° limit; WBAT locked
Week 5	0–60°	Bike: rocking or partial revolutions within the limit
Week 6	0–70°	Surgeon review; WBAT locked through week 6
Week 7	0–80°	Brace wean per surgeon; aquatherapy once the incision is healed
Weeks 8–9	0–90°	90° goal; surgeon confirms fracture union status
Weeks 9–14+	10° a week → full	120–130°+ by weeks 13–14, then full; open-chain extension from weeks 10–12

PHASE

1

Immobilization

Weeks 0–2

For the patient: what to expect

Walk with the brace **locked straight**, and keep it locked at all times, including sleep. **No bending yet.** Tighten your thigh muscle every hour you are awake and pump your ankles to help circulation.

WEIGHT BEARING	WBAT with the brace locked in extension at all times; crutches as needed for comfort
BRACE	Locked at 0° for all walking and sleep; no ROM exercises
MOTION	0° (none): the knee stays in full extension; no flexion ROM exercises

Goals

- Full passive extension (0°), equal to the other knee
- Quad activation despite immobilization
- Effusion and pain controlled
- DVT prevention: ankle pumps hourly
- Gentle superior patellar glides (therapist only)

Move on when

- ☐ 2 weeks after surgery
- ☐ Wound healed (dissolving stitches; nothing to remove)
- ☐ SLR without extensor lag, or progressing toward it
- ☐ Pain and effusion controlled

Exercises

Exercise	How
Quad sets · ankle pumps	Isometric VMO activation against a towel roll and ankle pumps, every waking hour; even a small contraction limits atrophy
NMES	At each PT visit, starting at the first visit: 20–30 min, 10–15 reps × 10 sec contraction, 50 sec rest
Straight-leg raise	Once the quad can hold extension against gravity; hip flexion first, then all 4 planes as tolerated
Patellar mobilization	Gentle superior glides by the therapist only (other directions in Phase 2)
Heel prop (supine)	Heel on a towel roll, nothing under the knee, 10–15 min, 2× a day
Hip · conditioning	Side-lying abduction, adduction, external rotation, extension, 3 × 15; other leg and upper body throughout
Cryotherapy	20 min on, 20 min off after each session; elevate the knee above heart level

Precautions

- No knee flexion ROM: brace locked at 0° at all times; no gravity-assisted or active-assisted flexion
- No resisted knee extension or flexion
- Patellar mobilization: gentle superior glides by the therapist only
- Monitor for wound problems; comminuted fractures often need more extensive dissection

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Early ROM

Weeks 2–4

For the patient: what to expect

Bending starts after your PA visit, **up to 50°**, only while sitting or lying down. You can do heel slides at home as well as at PT. The brace stays **locked straight for walking and sleep**.

WEIGHT BEARING	WBAT with the brace locked in extension; crutches as needed
BRACE	Locked at 0° for walking and sleep. Unlocked only for ROM: supervised PT, and home heel slides to the limit, seated or lying
MOTION	0–50°: active-assisted and active ROM to the limit; do not push beyond 50°

Goals

- 0–50° without pain or reactive effusion
- Quad activation with full 4-plane SLR
- Full patellar mobilization (all 4 directions)
- Crutch wean toward walking unaided in the locked brace

Move on when

- ☐ ROM 0–50° without pain
- ☐ SLR in all 4 planes without extensor lag
- ☐ Patellar mobility started in all planes

Exercises

Exercise	How
Heel slides	Active-assisted, to the 50° limit, 3 × 15; do not force beyond the limit
Quad sets · NMES	Quad sets daily; NMES at PT visits
Straight-leg raise	All 4 planes, with progressive resistance as tolerated
Patellar mobilization	All 4 directions from weeks 2–3; 2–3 min each, 1–2× a day
Stationary bike	Seat high, no load; rocking or partial revolutions within the 50° limit, once ROM allows
Hip · calf · ankle	Band hip abduction, external rotation, extension, 3 × 15; calf raises, both legs, 3 × 15; ankle pumps hourly
Cryotherapy	20 min on, 20 min off after every session

Precautions

- ROM strictly limited to 50°; do not use gravity or body weight to force flexion
- No resisted knee flexion against gravity; no resisted open-chain extension
- Brace locked at 0° for all weight-bearing walking
- Reactive effusion after ROM: stay within pain-free limits

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Progressive ROM

Weeks 5–9

For the patient: what to expect

You'll add about 10° of bending a week, reaching 90° by weeks 8 to 9. The brace stays **locked for walking and sleep** until your 6-week visit, then Dr. Merritt decides when to wean it. Don't push past the weekly limit.

WEIGHT BEARING	WBAT with the brace locked in extension through week 6; surgeon review at week 6 for brace wean
BRACE	Locked at 0° for walking and sleep through week 6; unlock per surgeon at the week 6–8 review as quad control and gait normalize
MOTION	10° a week from week 4: 60° (week 5), 70° (week 6), 80° (week 7), 90° (weeks 8–9)

Goals

- 90° by weeks 8–9
- Normal gait in the locked brace; crutch wean progressing
- SLR with progressive resistance; quad 40–50% LSI
- Stationary bike, partial revolutions within the weekly limit

Move on when

- ☐ ROM 0–90° by weeks 8–9
- ☐ Surgeon clearance for brace wean and walking unlocked
- ☐ Quad activation; SLR with resistance
- ☐ Normal gait in the locked brace, progressing to unlocked

Exercises

Exercise	How
Heel slides	Active-assisted, to the weekly limit; do not push beyond the prescribed arc
Stationary bike	Rocking or partial revolutions within the weekly limit; adjust seat height as ROM improves. Full revolutions only once ROM reaches about 100–110°
Straight-leg raise	All 4 planes with progressive resistance
Patellar mobilization	All 4 planes, progressive pressure; inferior glides are essential to prevent an extension lag
Hip · calf	Standing band hip abduction, external rotation, extension, progressing weekly; calf raises, both legs → single leg
Aquatherapy	From weeks 6–7, once the incision is fully healed: deep-water walking forward and backward
Cryotherapy	20 min on, 20 min off after every session

Precautions

- Advance ROM only 10° a week; do not advance if swelling is worsening
- No weight bearing with the brace unlocked until surgeon clearance at weeks 6–8
- No resisted open-chain extension until fracture union is confirmed (weeks 10–12)
- No resisted knee flexion against gravity

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Return to Loading

Weeks 10–16

For the patient: what to expect

The brace comes off once you walk normally without it. Once the X-ray shows the bone has healed, your therapist adds leg-extension strengthening. If your knee swells after exercise, back off and ice.

WEIGHT BEARING	Full; brace wean per surgeon
BRACE	Discontinue once walking symmetrically without support
MOTION	Progress to full ROM: 120–130°+ by weeks 14–16

Goals

- Full ROM, equal to the other knee
- Open-chain extension with progressive resistance (weeks 10–12)
- Quad strength 55–65% LSI
- Normal gait without a device or brace
- Closed-chain exercise without reactive effusion

Move on when

- ☐ Full ROM (0–130°+), equal to the other knee
- ☐ Quad strength $\geq 60\%$ LSI
- ☐ 8-inch step-down with symmetric mechanics and no pain
- ☐ Normal gait without brace or crutch
- ☐ Minimal effusion; open-chain extension established

Exercises

Exercise	How
Open-chain knee extension	Weeks 10–12, once the surgeon confirms union: 90–45° arc, 3 lb, adding 2 lb a week; advance the arc per surgeon
Mini squats · leg press	Mini squats 0–60°, both legs, 3 × 15, to 0–90° by week 14. Leg press, both legs, 0–60°; widen the arc as ROM improves
Step-ups	4-inch step, forward and lateral, 3 × 10; from week 11
Bike · elliptical	Bike: full revolutions once ROM reaches about 100–110°; more resistance and time (30+ min). Elliptical from week 13, low resistance
Balance · stairs	Single-leg balance: firm → eyes closed → perturbation. Stairs reciprocal without the rail from week 12
Calf · BFR	Calf raises, both legs → single leg; BFR optional for quad hypertrophy
Aquatherapy · patellar mobs	Shallow-water walking, squats, forward and backward; patellar mobilization until full ROM

Precautions

- Open-chain extension: confirm fracture union first; limited arc only
- No running until the Phase 5 criteria are met; no jumping or plyometrics
- Monitor for reactive effusion and anterior knee pain

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Advanced Strengthening and Return to Running

Week 17 to month 6

For the patient: what to expect

You'll build strength and learn to jump and land. **Running starts around weeks 18 to 22**, once you pass the tests below and Dr. Merritt clears you. No cutting or pivoting yet.

WEIGHT BEARING · BRACE	Full, unrestricted; brace discontinued
RUNNING	Walk-jog intervals from weeks 18–22, when all running criteria are met (below)

Goals

- Quad strength ≥ 70 –80% LSI
- Start and progress a return-to-run program
- Double-leg plyometrics progressing to single-leg
- Sport-specific movement preparation

Move on when

- ☐ Running without pain or effusion for 4+ sessions in a row
- ☐ Quad strength $\geq 75\%$ LSI
- ☐ Single-leg hop $\geq 75\%$ LSI
- ☐ At least months 5–6 after surgery

Exercises

Exercise	How
Squats · leg press	More depth and resistance; single-leg squat; single-leg press
Step-downs	8-inch step; eccentric quad emphasis; symmetric mechanics
Nordic hamstring curls	Eccentric loading
Double-leg plyometrics	Vertical, broad, and box jumps with controlled landing, from week 18
Walk-jog program	After a running mechanics screen (knee valgus, pelvic drop, trunk lean): 60 sec walk / 60 sec jog on a flat surface; progress weekly
BFR	Continue for muscle hypertrophy

Running criteria: all required before the walk-jog program

- 8-inch step-down with symmetric mechanics and no pain
- Full ROM (0–130°+), equal to the other knee
- Quad strength $\geq 70\%$ LSI
- Minimal to no reactive effusion
- Surgeon clearance for running
- At least weeks 18–22 after surgery

Precautions

- No cutting, pivoting, or lateral agility before month 6
- Monitor for anterior knee pain with more loading

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Return to Sport

Months 6–8+

For the patient: what to expect

Cutting, jumping, and full sport usually return after **6 to 8 months**, once you pass strength and hop tests and the X-ray shows full healing. Dr. Merritt must clear you first.

TIMELINE

Full weight bearing. No cutting or jumping before month 6; pivoting sport after months 6–8, when all criteria are met

Goals

- Quad strength $\geq 90\%$ LSI
- Single-leg hop battery $\geq 90\%$ LSI
- Full sport-specific movement at speed
- Radiographic union confirmed by Dr. Merritt

Move on when

- ☐ All return-to-activity criteria met (next page)
- ☐ Clearance from Dr. Merritt

Exercises

Exercise	How
Sport training	Drills, conditioning, scrimmage
Change of direction	Cutting, deceleration, and direction change at progressive speed
Single-leg plyometrics	Hop progressions, reactive drills
Strength maintenance	2–3× a week
Eccentric quad program	Nordic drops, depth landing, high step-downs

Precautions

- Radiographic union required before clearance for cutting or jumping sport
- Full return to sport requires Dr. Merritt's clearance
- Anterior knee pain or effusion at any phase: contact Dr. Merritt's office

Return to Activity

All criteria must be met before clearance.

Measure	Target
Quadriceps strength (isokinetic)	≥90% LSI
Hamstring strength (isokinetic)	≥90% LSI
Single-leg hop testing	≥90% LSI (single, triple, crossover, timed)
Motion	Full, pain-free, equal to the other knee; no extension deficit
8-inch step-down	Symmetric mechanics, no knee pain, no valgus collapse
Effusion	None after functional activity
Radiographic union	Confirmed by Dr. Merritt before return to impact
Minimum time: running	Weeks 18–22 (quad ≥70% LSI, full ROM, 8-inch step-down, surgeon clearance)
Minimum time: cutting and jumping	Months 6–8 (radiographic union, ≥90% LSI strength, hop testing)
Clearance	Required; gradual, criteria-based return directed by Dr. Merritt

Clinical timeline summary

SUPERVISED PT	Starts 5–7 days after surgery
ROM	None weeks 0–2; 0–50° from week 2; 90° at weeks 8–9; full by weeks 14–16
PATELLAR MOBILIZATION	Gentle superior glides (therapist) weeks 0–2; all directions from weeks 2–3
WBAT LOCKED	Weeks 0–6; week-6 surgeon review: brace unlock, fracture status, ROM about 70°
OPEN-CHAIN EXTENSION	Weeks 10–12, once union is confirmed (90–45° arc to start)
BIKE · ELLIPTICAL	Bike from weeks 2–3, seat high, partial revolutions within the weekly limit; full revolutions at about 100–110°. Elliptical from week 13
RUNNING	Weeks 18–22, after the 8-inch step-down gate, quad ≥70% LSI, full ROM, and surgeon clearance
PLYOMETRICS	Double-leg from week 18, once running is established
CUTTING · JUMPING · SPORT	Months 6–8: radiographic union and ≥90% LSI; criteria-based, directed by Dr. Merritt

All progressions are criteria-based. ROM advances 10° a week but should not be forced if there is reactive effusion. Hardware prominence or irritation with kneeling is common after patellar ORIF; discuss hardware removal with Dr. Merritt if anterior knee pain persists. Contact Dr. Merritt's office if effusion worsens, an extension lag develops, or ROM fails to progress on schedule.