VIBEMOTION LABS · ATHLETE RECOVERY

SPECIFIC INJURY PROGRAMME

Knee Injury
Recovery Programme

Free

Complete programme for patellofemoral pain syndrome and patellar tendinopathy — from acute pain management to unrestricted elite athletic performance. Covers: pain reduction, VMO strengthening, tendon loading, plyometric reintroduction, and sport-specific return.

RECOVERY TIMELINE

PHASE	TIMELINE	FOCUS	GOAL
Phase 1	Weeks 0–3	Pain control, quad activation	Pain ≤ 2/10 at rest
Phase 2	Weeks 3–8	VMO strength, tendon loading	Single-leg squat 10 reps pain-free
Phase 3	Weeks 8–16	Progressive load, bilateral strength	LSI ≥ 70%
Phase 4	Weeks 12–20	Plyometrics, running	Hop test LSI ≥ 90%
Phase 5	Month 5+	Full sport return	Full clearance

SAFETY RULES

1. Pain during exercise must stay ≤ 3/10. Stop if it exceeds this. 2. Never skip pain monitoring — knee pain that increases day-on-day = reduce load. 3. Avoid deep squatting (>90°) until Phase 3 clearance. 4. Avoid running or jumping until Phase 4 — tendon healing requires progressive load, not rest. 5. Always ice the kneecap area for 15 min after exercise in Phases 1–2.

PHASE 1

Pain Control and Quad Activation

Timeline: Weeks 0–3 · Goal: Reduce pain to ≤ 2/10, re-establish VMO neural drive

01 VMO Isometric Wall Sit

VMO / Quad Activation

SETS	REPS/TIME	LOAD	TEMPO	REST
3	45 sec hold	Bodyweight	Static hold	60 sec

HOW TO PERFORM

1. Stand with your back against a smooth wall, feet 18 inches out, hip-width apart.
2. Slide your back down the wall until your knees reach 60° — thighs above parallel.
3. Keep your weight evenly distributed. Do not go deeper than 60° in Phase 1.
4. Hold for 45 seconds. Focus on feeling the inner quad (VMO) engage just above the kneecap.
5. If pain increases during the hold, rise slightly to reduce the knee angle.
6. Breathe steadily throughout — do not hold your breath.

COACHING CUES

→ *VMO activation at 60° knee bend is optimal for patellofemoral pain management.*

→ *Feel for contraction just above and inside the kneecap — that is your target muscle.*

→ *Equal weight through both feet — resist the urge to shift onto the unaffected side.*

PROGRESS WHEN

When 3×45 sec at 60° is pain-free for 3 consecutive sessions — increase to 75° bend.

02 Short Arc Quad Extension

Terminal Quad Strength

SETS	REPS/TIME	LOAD	TEMPO	REST
3	15 reps	Bodyweight → 1 kg ankle weight	2 sec up / 2 sec down	60 sec

HOW TO PERFORM

1. Sit on a chair or lie on your back. Place a rolled towel under the knee — creates a 40° bend.
2. Slowly straighten the knee from 40° to full extension — do not go past straight.
3. Hold at full extension for 2 seconds, feeling the quad contract fully.
4. Lower slowly back to 40° over 2 seconds.
5. This exercise works the terminal range of the quad — the range most lost with knee pain.

COACHING CUES

→ *The towel height matters — too low reduces the therapeutic range, too high increases pain.*

→ *Do not hyperextend the knee — stop at neutral.*

→ *If you feel pain under or around the kneecap, reduce the ankle weight.*

PROGRESS WHEN

When 3×15 with 2 kg ankle weight is pain-free — begin TKE with resistance band.

03 Isometric Spanish Squat (Patellar Tendon Load)

Patellar Tendon
Isometric Load

SETS	REPS/TIME	LOAD	TEMPO	REST
4	5 reps × 45 sec hold	Bodyweight — band behind knees optional	Static hold at 70°	2 min

HOW TO PERFORM

1. Loop a band or rope around a fixed point at hip height. Stand facing the anchor.
2. Step into the band so it sits behind your knees — this encourages a vertical shin position.
3. Lower into a squat with a near-vertical shin until knees reach approximately 70°.
4. Hold this position for 45 seconds — you should feel a strong ache in the patellar tendon.
5. An ache (4–6/10) during this exercise is acceptable and expected — it signals tendon loading.
6. If pain is above 7/10 or sharp, reduce to 60° bend.
7. Stand up, rest 2 minutes, repeat.

COACHING CUES

→ *Isometric exercise is currently the strongest evidence-based treatment for patellar tendinopathy.*

→ *The ache is the tendon adapting — distinguish it from sharp, electric pain which means stop.*

→ *Perform in the morning — isometrics have an analgesic effect that lasts several hours.*

PROGRESS WHEN

When 4×45 sec produces only mild ache (≤ 4/10) — begin slow eccentric loading (Phase 2).

■ *Do not perform if you have a partial or full patellar tendon rupture — seek assessment first.*

PHASE 2

Progressive Tendon Loading and VMO Strengthening

Timeline: Weeks 3–8 · Goal: Single-leg control, tendon tolerance to slow eccentric load

04 Slow Eccentric Step-Down

Eccentric Quad / Tendon Load

SETS	REPS/TIME	LOAD	TEMPO	REST
3	10 reps per leg	Bodyweight → hold 5 kg dumbbell	4 sec eccentric lower / step up fast	90 sec

HOW TO PERFORM

1. Stand on a 6–8 inch step on your affected leg only. Other foot hangs in the air.
2. Slowly lower your body down over 4 seconds by bending the standing knee.
3. Lower until the non-standing heel just touches the floor — do not fully stand on it.
4. Tap the floor gently and immediately push back up to standing using the step leg.
5. The eccentric (lowering) phase does the work — the concentric (rising) can be assisted.
6. This exercise simulates the load pattern that occurs during running and landing.

COACHING CUES

→ 4 seconds is the minimum lowering time — count out loud if needed.

→ Watch your knee in a mirror — it must track over the second toe throughout.

→ Mild tendon ache during this exercise (≤ 5/10) is acceptable. Sharp pain is not.

PROGRESS WHEN

When 3×10 with 5 kg dumbbell is pain-free — increase step height or load.

05 Single-Leg Squat

VMO / Glute / Knee Stability

SETS	REPS/TIME	LOAD	TEMPO	REST
3	10 reps per leg	Bodyweight → 10 lb dumbbell	3 sec down / 1 hold / 2 up	90 sec

HOW TO PERFORM

1. Stand on the affected leg. Hold fingertip contact on a wall for initial balance only.
2. Slowly lower by bending the standing knee — aim for 60° in weeks 3–5, 90° in weeks 6–8.
3. Keep the knee tracking over the second toe — this is your primary quality marker.
4. Hold for 1 second at the bottom.
5. Drive back up to standing over 2 seconds.

6. Remove wall support as soon as balance allows — aim for hands-free by week 6.

COACHING CUES

→ *If the knee dives inward (valgus), strengthen your glute med first (lateral band walks).*

→ *Depth is secondary to alignment — perfect shallow squats before deep imperfect ones.*

→ *Compare depth and quality between legs every session — note any asymmetry.*

PROGRESS WHEN

When 3×10 at 90° depth is pain-free and symmetric — add light load.

PHASE 3

Bilateral Strength and Functional Movement

Timeline: Weeks 8–16 · Goal: Squat to full depth, RDL, LSI ≥ 70%

06 Goblet Squat

Full Bilateral
Quad / Glute

SETS	REPS/TIME	LOAD	TEMPO	REST
4	12 reps	15 lb → 35 lb dumbbell or kettlebell	3 down / 1 hold / 2 up	90 sec

HOW TO PERFORM

1. Hold a dumbbell or kettlebell vertically at your chest. Feet slightly wider than hip-width, toes out 15°.
2. Brace your core (light 20% contraction) and sit straight down between your heels.
3. Lower for 3 seconds until thighs are parallel — or deeper if pain-free.
4. Hold for 1 second at the bottom. Knees tracking over toes.
5. Drive through heels and balls of feet to return to standing over 2 seconds.
6. Breathe out on the way up. Re-brace before each rep.

COACHING CUES

→ *The weight counterbalances your body — use it to stay upright, not to strain your back.*

→ *Monitor kneecap area for pain at depth — reduce load if it appears.*

→ *Equal effort through both legs — check by feeling both quads during the lift.*

PROGRESS WHEN

When 4×12 with 35 lb is pain-free — begin single-leg leg press for LSI testing.

PHASE 4

Plyometrics and Running Reintroduction

Timeline: Weeks 12–20 · Goal: Pain-free plyometrics, running at 75%, hop test LSI ≥ 90%

■ *Begin running only when single-leg squat 3×10 at 90° is pain-free for 2 consecutive weeks.*

07 Pogo Jumps (Bilateral)

Ankle Stiffness / Tendon Reactivity

SETS	REPS/TIME	LOAD	TEMPO	REST
3	15 reps	Bodyweight	Minimal ground contact	90 sec

HOW TO PERFORM

1. Stand with feet hip-width apart, arms at your sides.
2. Begin bouncing on the spot using only your ankles and calves — knees remain almost straight.
3. The goal is to minimize ground contact time — like jumping on a hot surface.
4. Keep jumps small and fast rather than high and slow.
5. Progress from 10 reps to 20 reps over 4 weeks before moving to single-leg.
6. Single-leg pogo: same technique, one foot only, 10 reps per side.

COACHING CUES

→ *Quick and stiff through the ankles — this is a tendon reactivity drill.*

→ *If kneecap pain increases during or after, return to phase 3 loading for 2 more weeks.*

→ *This exercise prepares the patellar tendon for the reactive demands of running.*

PROGRESS WHEN

When 3×20 bilateral and 3×10 single-leg are pain-free — begin box jumps.

PHASE 5

Return to Elite Athletic Performance

Timeline: Month 5+ · Goal: Full sport clearance, prevention programme in place

08 Heavy Slow Resistance Squat (Barbell)

Maximum Tendon Strength

SETS	REPS/TIME	LOAD	TEMPO	REST
3	6 reps	70–80% 1RM barbell back squat	4 sec down / 2 hold / 2 up	3 min

HOW TO PERFORM

1. Set the barbell at upper chest height. Step under and position it across your upper traps.
2. Feet shoulder-width, toes out 15–20°. Unrack and step back.
3. Take a full breath and brace 360° through your core.
4. Lower for 4 seconds — below parallel if pain-free.
5. Hold at the bottom for 2 seconds — maximum tendon load occurs here.
6. Drive explosively to standing over 2 seconds.
7. Heavy Slow Resistance (HSR) protocol is the gold standard for long-term patellar tendon health.

COACHING CUES

→ *HSR training produces the greatest tendon collagen remodelling of any loading strategy.*

→ *Always train inside a power rack with safety pins set at the correct height.*

→ *Monitor the day after: mild soreness is fine. Pain above 4/10 means reduce load 10%.*

PROGRESS WHEN

When 3×6 at 80% 1RM is pain-free and consistent — maintain as weekly prehab.

RETURN TO SPORT — FINAL CLEARANCE CHECKLIST

- ■ Pain 0/10 during all sport-specific movements for 3+ consecutive weeks
- ■ Single-leg squat: 3×10 at full depth, pain-free, symmetric to unaffected side
- ■ LSI ≥ 90% on single-leg hop for distance — tested on 2 separate days
- ■ Running at 80% speed — pain-free during and 24 hours after
- ■ Pogo jumps (single-leg): 3×15 pain-free
- ■ Heavy slow resistance squat programme integrated into weekly training
- ■ Clearance from physiotherapist or sports medicine physician