# Patellofemoral Strengthening Program

A staged home program for kneecap joint chondromalacia, early arthritis and patellofemoral pain.

> **The goal is not to "push through" kneecap pain.** The goal is to build the quadriceps, hip and trunk muscles so the patella tracks more smoothly and the joint tolerates everyday loads with less irritation.

## Why strengthening helps

### 1 Better patellar tracking

The quadriceps, gluteals and hip rotators help guide the kneecap in the groove. Strengthening can reduce sideways collapse and improve control on stairs.

### 2 Less joint overload

Patellofemoral arthritis and chondromalacia are sensitive to load. A stronger leg spreads force more evenly instead of asking the kneecap joint to absorb every step.

### 3 Safe, graded exposure

Research-supported programs start with tolerable loads, then gradually add resistance, depth and single-leg control only when symptoms remain settled.

### 4 Movement quality first

Move slowly. Keep the kneecap pointing over the second toe. Avoid hip hiking, knee cave-in and rushed repetitions.

## The pain-monitoring rule

### Green light

0-3/10 discomfort during exercise that settles back to baseline within 24 hours.

### Yellow light

4-5/10 pain, limp, or soreness the next day. Reduce depth, resistance or repetitions.

### Red light

Sharp pain, swelling, giving way, locking, or pain that keeps increasing. Stop and seek advice.

This guide is general education. Your physiotherapist or surgeon may change the program for your knee shape, arthritis severity, maltracking, surgery history, balance, hip strength or pain pattern.

# How to use this program

### Weekly rhythm

MOST PATIENTS

- **Strength:** 3-4 days per week.
- **Light mobility:** 5-10 minutes most days.
- **Cardio:** cycling, flat walking or pool work if it stays green-light.
- **Progress:** add only one variable at a time.

### Alignment checklist

EVERY REPETITION

- Knee points over the second toe.
- Pelvis stays level; do not hike the hip.
- Heel stays down during sit-to-stand and step work.
- Move slowly on the way down.

# Phase 1: Calm the knee and wake up the muscles

Use this phase if the knee is flared, stairs are painful, or you have not exercised for a while. Stay in a shallow, comfortable range.

### Quad set + straight leg raise

Tighten the thigh, straighten the knee fully, then lift the leg slowly. Lower with control.

**2-3 sets of 8-12**

### Side-lying hip abduction

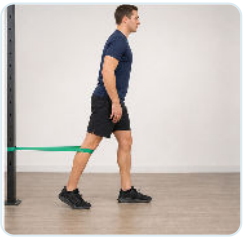
Keep hips stacked. Lift the top leg slightly behind you without rolling backwards.

**2-3 sets of 10-15**

### Glute bridge

Push through the heels and lift the hips. Keep ribs down and knees hip-width apart.

**2-3 sets of 10-12**



### Standing band terminal knee extension

With a band behind the knee, gently straighten from a slight bend. Do not snap back.

**2 sets of 12-15**

**Phase 1 target:** exercises feel controlled, no swelling reaction, walking is not worse the next day. Then progress.

# Phase 2: Build strength without irritating the kneecap

Start when Phase 1 is comfortable. The best exercise is the one you can repeat consistently without a flare. Use a shallow range at first.

### Sit-to-stand

Stand from a chair, then sit slowly. Keep knees over toes and avoid dropping into the chair.

**2-3 sets of 8-12**

### Low step-up

Use a low step. Push through the whole foot. Step down slowly with control.

**2-3 sets of 8-12 each side**

### Band side steps

Small steps sideways. Keep feet pointing forward and pelvis level.

**2-3 rounds of 8-12 steps**

### Mini wall squat

Slide only a short way. Stop before pain, pinching or grinding increases.

**2 sets of 8-10**

# Phase 3: Stairs, single-leg control and return to activity

### Eccentric step-down

WHEN READY

Stand on a 5-10 cm step. Slowly lower the other heel to the floor, then return. Keep the pelvis level and the knee over the second toe.

**Dose:** 2-3 sets of 6-10 each side.

### Backward walking

OPTIONAL CARDIO

Use a safe flat surface or treadmill rails. Short backward walking intervals can train quadriceps control with lower kneecap stress for many patients.

**Dose:** 3-5 minutes, build gradually.

**Progression rule:** only make one thing harder at a time: more repetitions, more resistance, a deeper range, a lower chair, or a higher step.

# What to avoid during a flare

### Reduce for now

- Deep squats, deep lunges or kneeling.
- Repeated stairs or steep hills.
- Jumping, running or sudden direction changes.
- Heavy leg extension through the last 30 degrees if it hurts.
- Exercises that cause swelling or next-day limping.

### Use instead

- Shorter stride and flatter routes.
- Bike with light resistance and comfortable seat height.
- Pool walking or gentle swimming if comfortable.
- Smaller exercise range and slower tempo.
- Ice or simple pain relief as advised by your doctor.

# Stretches and mobility

### 30s Hamstring stretch

Gentle stretch at the back of the thigh. Hold 30 seconds, repeat 2-4 times.

### 30s Calf stretch

Keep heel down and knee straight. A flexible ankle helps stairs and squats feel smoother.

### 30s Quadriceps stretch

Use a gentle range only. Do not force deep knee flexion if it compresses the kneecap joint.

### 5m Easy warm-up

Light cycling, flat walking or marching before strength work helps the knee accept load.

# When to seek review

Arrange review if pain is worsening despite reducing load, swelling persists, the knee locks or gives way, you cannot walk normally, or symptoms are not improving after 6-8 weeks of consistent graded strengthening.

# Clinical basis

This brochure is based on contemporary patellofemoral rehabilitation principles: hip and knee targeted strengthening, activity/load modification, pain-guided progression, attention to lower-limb alignment and movement quality, and selected short-term adjuncts such as taping or orthoses when clinically appropriate.

Key sources reviewed include AAOS OrthoInfo patient guidance, the 2019 Academy of Orthopaedic Physical Therapy/JOSPT patellofemoral pain guideline, JAAOS reviews on anterior knee pain and patellofemoral arthritis, and Fowler Kennedy rehabilitation protocols emphasising quality of movement, hip/pelvic control, low-step progression and avoidance of compensatory hip hiking.

**Remember:** cartilage change on imaging and pain are not always perfectly matched. The program is about building a knee that tolerates life better, not about forcing the joint through pain.