Managing Patellofemoral Pain in Primary Care

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Disclosures

I have no relationships to disclose.



Opening Case

Patient Presentation

16-year-old runner with gradual anterior knee pain

- Worse with stairs, squats, sitting
- No trauma; normal radiographs

Audience Poll

Best next step?

A. MRI
B. Rest
C. Steroid injection
D. Exercise therapy

Why This Matters[1,2]

One of the most common knee diagnoses in primary care, **and often undertreated.**

11–17%

of Knee Pain in Primary Care

40%

of Sports Knee Complaints

25%

Lifetime Prevalence

29%

Adolescent Prevalence

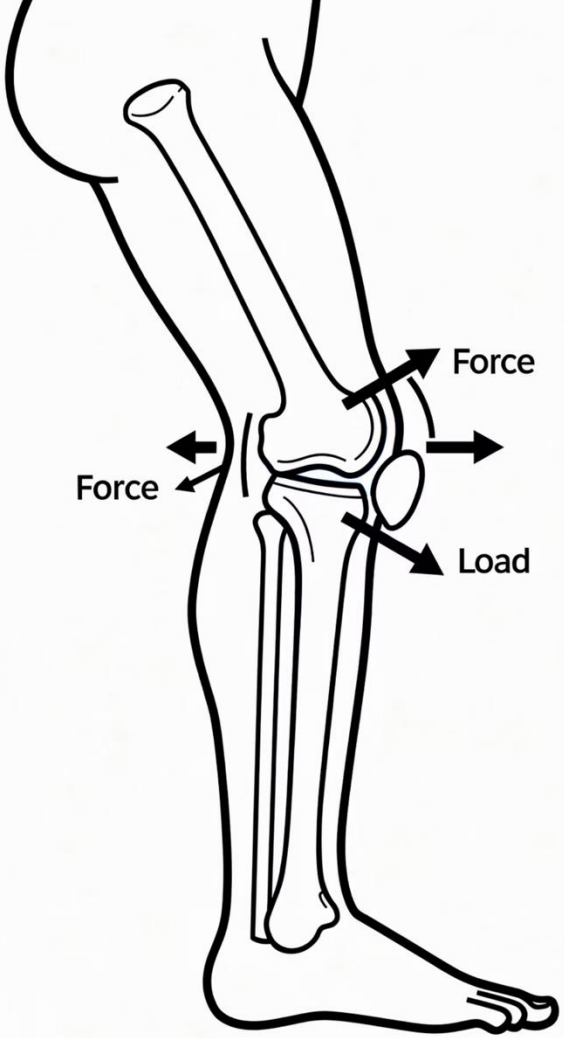
Myth vs. Reality[2,5,13]

✕ The Myth

"It's benign and goes away with rest."

☑ The Reality

- **57%** of adults: unfavorable recovery at 5–8 years
- **~2 in 3** adolescents still in pain at 2 years
- **May progress** toward patellofemoral OA



Modern Understanding of PFP[2]

A **load-management problem**, not a structural disease.

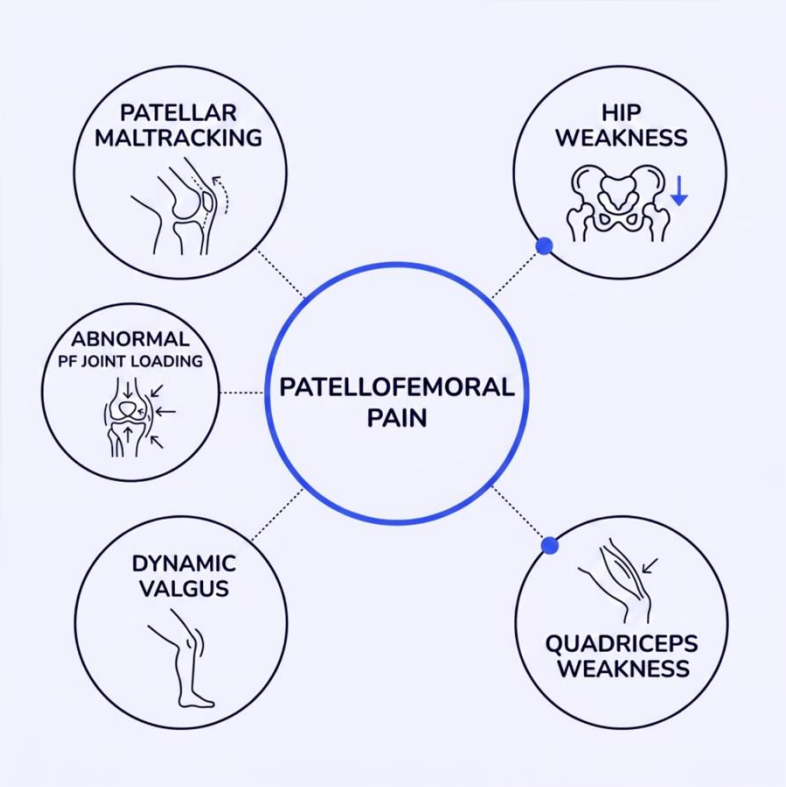
Not This

"Chondromalacia," wear and tear, MRI findings

But This

Load intolerance, training errors, weakness

Pathophysiology at a Glance[2]



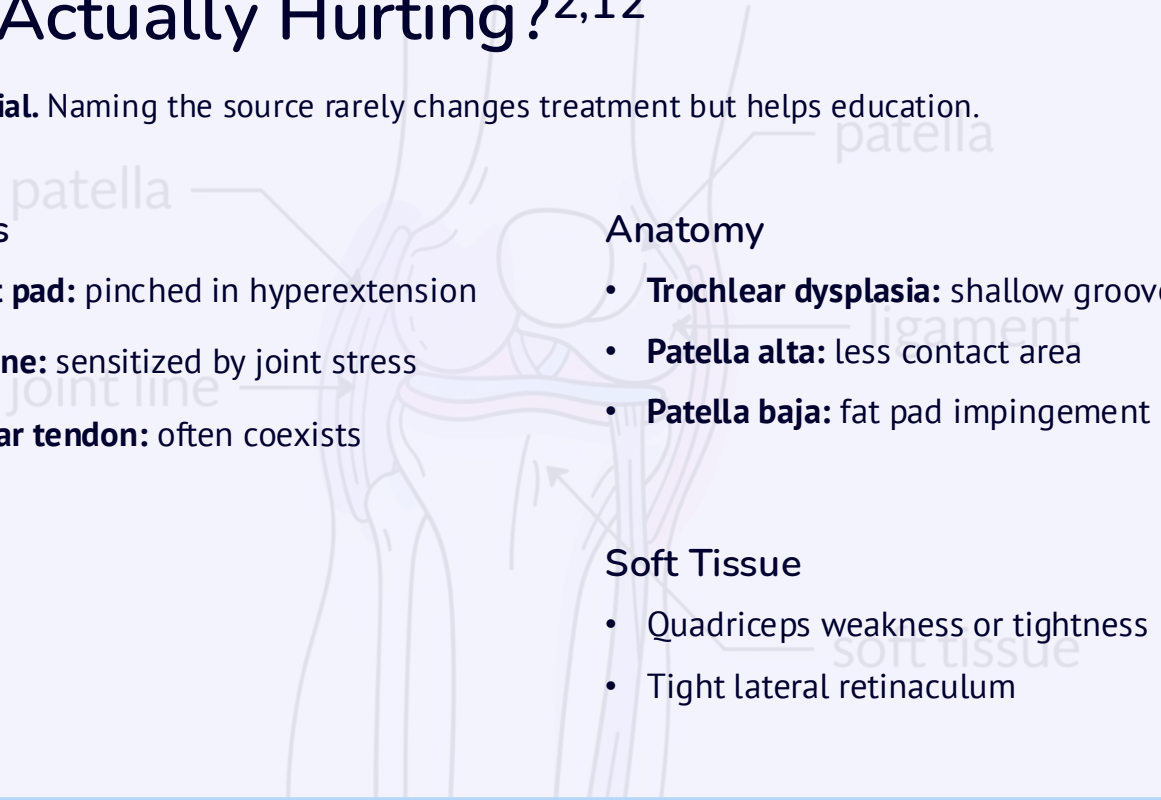
Clinical Pearl

Pain ≠ cartilage damage. Chondral changes on MRI are common in people without pain.

Treat the drivers, not the imaging.

What Is Actually Hurting?[2,12]

Usually multifactorial. Naming the source rarely changes treatment but helps education.



Pain Generators

- **Infrapatellar fat pad:** pinched in hyperextension
- **Subchondral bone:** sensitized by joint stress
- **Proximal patellar tendon:** often coexists

Anatomy

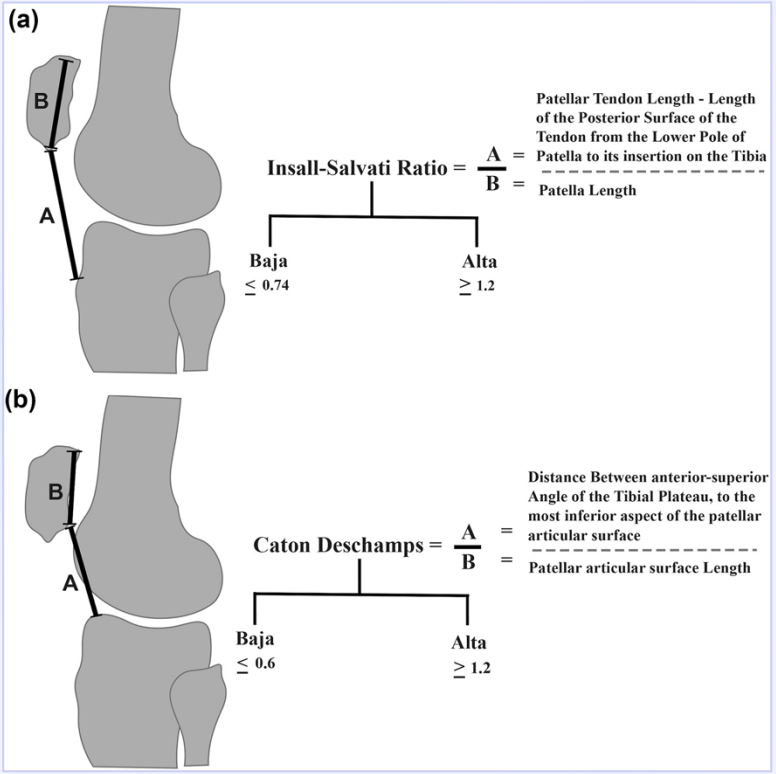
- **Trochlear dysplasia:** shallow groove
- **Patella alta:** less contact area
- **Patella baja:** fat pad impingement

Soft Tissue

- Quadriceps weakness or tightness
- Tight lateral retinaculum

Anatomy loads the gun; training load pulls the trigger.

Patellar Height: Which Index, Which Age[14,15]



It's a ratio, so choose the index by age and imaging.

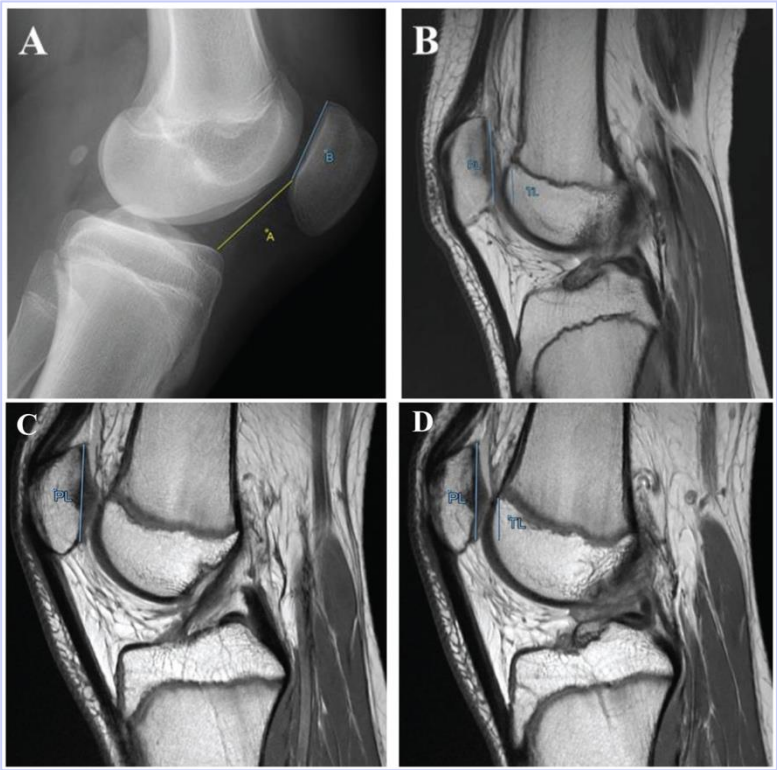
Index	Measures	Normal	Alta	Baja
Insall-Salvati	Tendon ÷ patella length	0.8–1.2	**>1.2**	**<0.8**
Caton-Deschamps	Articular margin to plateau ÷ articular length	0.6–1.2	**>1.2**	**<0.6**
Blackburne-Peel	Articular height above plateau ÷ articular length	0.5–1.0	**>1.0**	**<0.5**

Kids & teens: use Caton-Deschamps

- **Uses the articular surface,** not the hard-to-define tendon insertion
- **Insall-Salvati runs falsely high** until the patella ossifies (~age 12)
- **Pediatric alta >1.2, baja <0.6;** mean ~1.06, nearing adult values by 15–18

Illustration: Patella height ratios diagnose the same healthy knees differently. Sci Rep. 2025. doi:10.1038/s41598-024-83663-2. Used under license from Springer Nature. Thresholds vary by source.

Patellar Height: X-ray vs. MRI[16–20]



Start with a radiograph (A)

- True lateral at ~30° flexion
- **CDI for kids;** ISI or CDI for adults

MRI adds cartilage engagement (B–D)

- **PTI and SPE:** how much patella engages the trochlea
- Also shows dysplasia and cartilage

Radiographic alta ≠ functional alta

- Of CDI-alta knees, **40% normal SPE, 97% normal PTI**
- Yet CDI best separates instability **(sens/spec >73%)**

Reserve MRI for surgical planning or when ossification limits the X-ray.

Figure: Beltrame et al. Am J Sports Med. 2026;54(6):1444-1451. Used under license from SAGE Publications.

Risk Factors[2,8]



Patient Factors

- Female sex
- Prior knee injury
- Quadriceps weakness
- Hip weakness *(often a result, not a cause)*



Training Factors

- Sudden jumps in volume or intensity
- Running load errors
- Early sport specialization

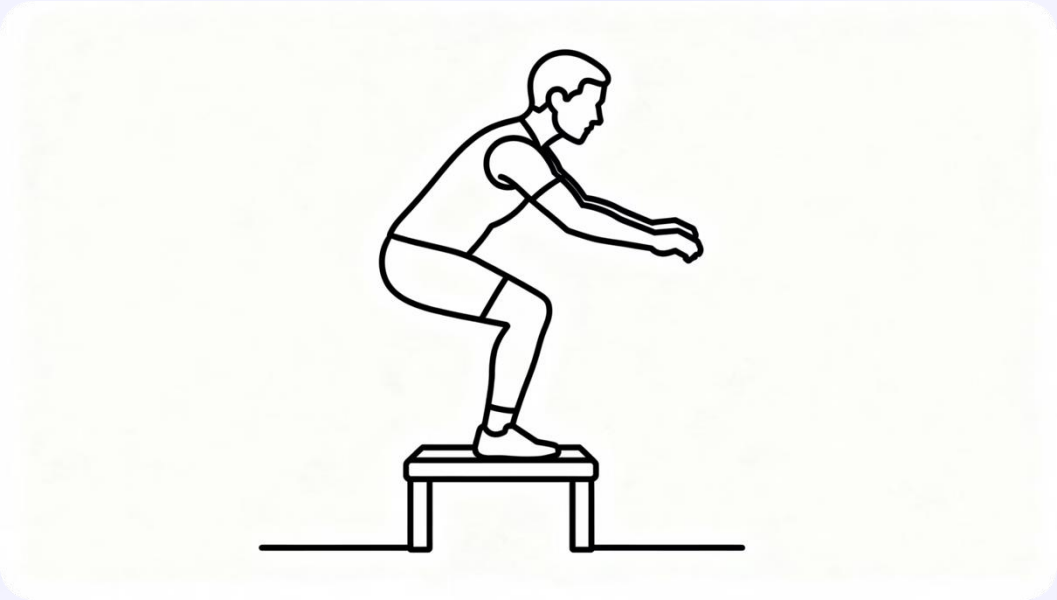
Clinical Diagnosis[1,2]

Pain around or behind the patella, reproduced by loading activities.

- Stairs
- Squats & Lunges
- Running
- Prolonged Sitting

Pain eases when PF joint load is reduced.

The Most Important Exam Finding[1,2]



Squatting Reproduces Pain

The most useful single maneuver

Progression of Challenge

1. Double-leg squat
2. Single-leg squat
3. Step-down

Sensitivity ≈ 91%, specificity ≈ 50%

No pain with squatting? Reconsider the diagnosis.

Physical Examination[2]

Key Tests

- **Single-leg squat:** valgus, pain, control
- **Hip abductor strength**
- **Patellar mobility:** tilt and glide
- **Palpation:** medial facet, fat pad
- **Grind / inhibition tests:** often painful, low specificity

Rule Out

- **Effusion**
- **Meniscus:** McMurray, Thessaly
- **Ligaments:** Lachman, varus/valgus
- **IT band:** Noble compression test

Differential Diagnosis[2]

In young athletes, a focused exam sorts out most of these.

Patellar Tendinopathy

Inferior pole pain; worse with jumping

Patellar Instability

Apprehension; prior subluxation

Osteochondroses

Tibial tubercle (Osgood-Schlatter) or inferior pole (Sinding-Larsen-Johansson)

Osteochondral Lesion

Effusion; mechanical symptoms

Plica Syndrome

Tender medial parapatellar band

Inflammatory Arthritis

Bilateral; systemic signs

Imaging: When Is It Warranted?[1,2]

Radiographs — Obtain When

- Trauma
- Effusion
- Concern for OA or OCD
- Persistent or atypical symptoms

MRI — Reserve For

- Failed structured rehab
- Locking or catching
- Suspected cartilage injury

Default Approach

Classic PFP needs **no imaging** to start treatment.

Don’t Start With MRI

It delays treatment, adds cost, and finds incidental changes.



Evidence-Based Treatment

Three Pillars of PFP Management[1,3,4]

Education

Set expectations; explain load

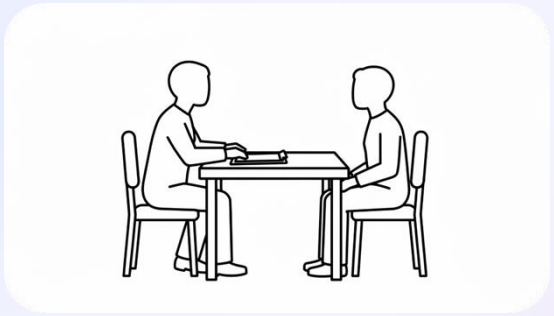
Load Management

Modify, don’t stop, activity

Exercise Therapy

Hip + knee strengthening

Education Matters[5,6]



What to Tell Your Patients

Recovery Takes Time

Expect months, not weeks. Say so early.

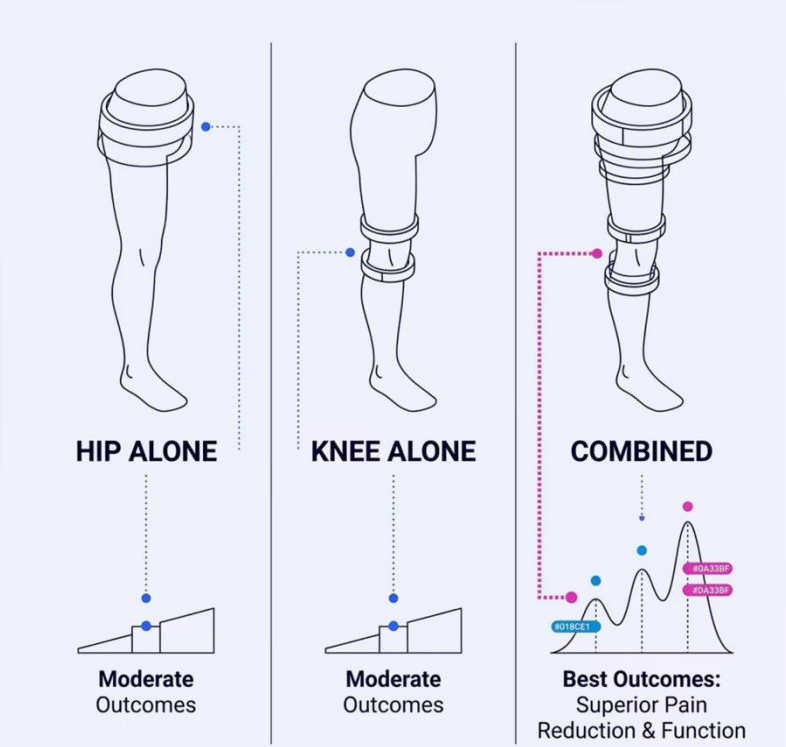
Rest Is Not the Answer

Full rest deconditions. Modify activity instead.

Active Participation Is Required

Engagement in exercise drives outcomes.

Exercise Is the Prescription[1–3]

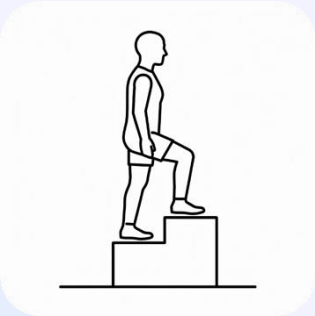


What the Evidence Shows

Hip + knee strengthening beats knee-only exercise for pain and function.

Bottom line: prescribe combined hip + knee exercise first-line.

Practical Exercise Program[1]



Step-Downs

Plus single-leg squats; progressive PF loading



Split Squats & Lunges

Quads and hips together, one leg at a time



Band Walks & Leg Press

Hip abductors; low-impact loading

Dosing: consistent, high-volume work for 6–12 weeks.

Adjuncts That May Help[1,2,9,10]

Use with exercise, **never instead of it.**

Patellar Taping

Short-term pain relief to enable exercise

Prefabricated Orthoses

Short-term relief; consider with pronated feet

Gait Retraining

Raise cadence 5–10% to cut PF joint load

What Not to Routinely Recommend[1,2,7]

Little or no evidence. Don't reach for these before exercise.

Knee Braces

No benefit over exercise alone

NMES

No added benefit

Dry Needling

Insufficient evidence

Corticosteroid Injections

Not supported for PFP

Hyaluronic Acid

No evidence of benefit

Exercise is the foundation.

Managing the Running Athlete[1,10,11]

Load Management Principles

01

Cut volume

Cut weekly mileage 20–30%

02

Avoid spikes

Keep pain ⩽3/10 during and after

03

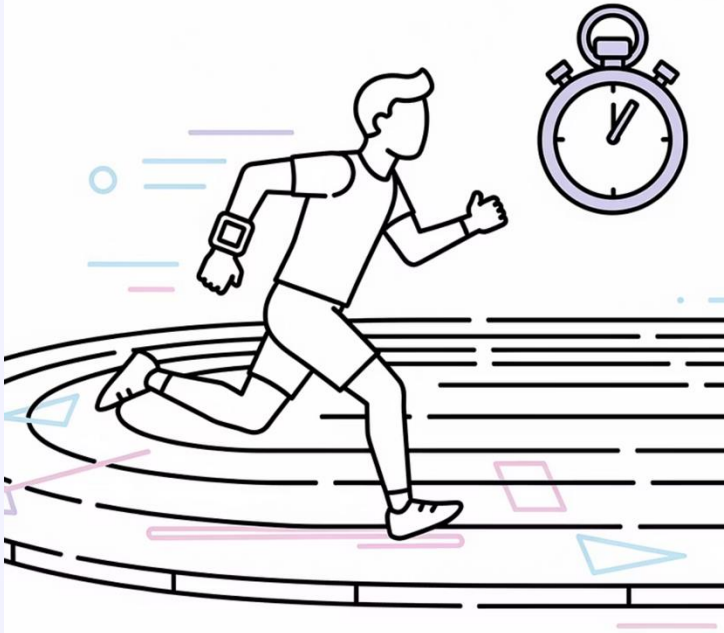
Raise cadence

+5–10% steps per minute

04

Gradual return

Build ⩽10% per week once pain-free



Prognosis: PFP Often Persists[5,6,13]

Persistent, not self-limiting, in adults and adolescents.

57%

Adults: unfavorable recovery at 5–8 years

Only moderate improvement, or worse

~2 in 3

Adolescents still in pain at 2 years

65% of 153 teens with PFP

Poor prognostic indicators

Longer symptom duration · Lower baseline function · Higher baseline pain

Key message: start exercise and load management early to improve the odds.

When to Refer[2,4]

1

Diagnose

Clinical diagnosis; start exercise

2

Reassess

At 6–8 weeks

Improving? Continue rehab

Not improving? Refer to Sports Med / Ortho

Refer after 6–12 weeks of structured rehab without meaningful improvement, **or sooner for red flags**: effusion, locking, instability, or systemic symptoms.



Case Revisited

Our 16-Year-Old Runner

Classic PFP: stairs, sitting, no trauma, normal radiographs.

What would you do?

Answer: D, Exercise

- **Educate:** load model, realistic timeline
- **Modify:** cut running, don't stop
- **Strengthen:** hip + knee program
- **Reassess:** at 6–8 weeks

Five Things PCPs Should Remember

1

PFP Is Common

Up to 17% of primary care knee pain

2

Not Always Benign

57% unfavorable outcome at 5–8 years

3

Diagnosis Is Clinical

Squat reproduces pain; no imaging needed to start

4

MRI Is Rarely Needed Initially

Only after failed rehab or mechanical symptoms

5

Exercise Therapy Works

Combined hip + knee strengthening



Clinical Takeaway

Diagnose clinically → prescribe exercise → manage load → reassess → refer if needed

Questions?

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