BRIGHAM AND WOMEN'S HOSPITAL
A Teaching Affiliate of Harvard Medical School
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Department of Rehabilitation Services
Physical Therapy

Standard of Care: Patellofemoral Pain Syndrome (PFS)

Case Type / Diagnosis: Patellofemoral Pain Syndrome (719.46)

Patellofemoral Pain syndrome – A general category of anterior knee pain from patella malalignment. Also termed anterior knee pain, Patellar malalignment, and Patellofemoral anthralagia.

Chondromalacia – Softening and fissuring of the underside of the patella (1). Chondral lesions themselves are asymptomatic unless worn down to subchondral bone (2). Chondromalacia can only be diagnosed by X-ray (Merchant, sun rise, or skyline view) or surgery.

Presentation
PFS usually presents as an insidious onset of peripatellar or retropatellar pain. Commonly patients are young, active, and females are affected more than males (9). PFS can also be caused from a traumatic injury to the patella.

Indications for Treatment:
Knee pain believed to be musculoskeletal in origin, primarily from muscle imbalances and/or poor biomechanics. Patients report symptoms as general knee pain or ache surrounding the patella.

Contraindications / Precautions for Treatment:
Avoid activities that cause excessive patellofemoral joint reaction forces.

Examination:

Medical History: Review patient's medical history questionnaire and medical history reported in LMR computer system. Review any diagnostic imaging, tests, or work up listed under longitudinal medical record and centricity. Ask about possible lower extremity trauma, injury, or history of fractures.

History of Present Illness – Most often insidious onset (1), symptoms are worse with prolonged sitting, squatting, and descending stairs (2,4). Review footwear history and training schedule. Patient may have a subjective report of anterior knee pain with running, negotiating stairs, jumping, or prolonged sitting. Information should be gathered regarding what increases or decreases symptoms.

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Social History - Young women effected more often than men due to having a wider pelvis and an increased Q-angle (9).

Examination -

A. Muscle length – Hamstrings, Iliotibial band, Quadriceps, and Gastrocnemius. Tight hamstrings will result in the knee remaining in flexion for a longer period of time during gait and running. The increased amount of time in knee flexion will result in increased patella femoral joint reaction forces patellofemoral joint reaction forces (PFJRF)(1,2). A tight illiotibial band will result in a lateral pull of the patella, and increased PFJRFs (1,2). Quadriceps tightness will also result in increased PFJRFs (1,2). A tight gastroc will result in decreased dorsiflexion at
the talocural joint. The foot will compensate by pronating (1,2).

B. Patella mobility – Very frequently the lateral retinaculum is tight, therefore limiting medial glide of the patella. This results in abnormal mechanics at the patellofemoral joint, and alters the actin myosin length tension relationship.

C. Lower Extremity Posture – Hip anterversion, Patella alta, Patella baja, medial patella, lateral patella, tibial varum, knee valgum, and foot pronation.

D. Gait – The foot remaining in pronation through push off can contribute to patellofemoral pain syndrome(1).

E. Over Pronation – Pronation causes internal rotation of the femur and tibia, resulting in a lateral pull of the patella (1,2).

F. Hip Strength – Gluteus Medius and Maximus. Glut medius and maximus work eccentrically during gait to control internal rotation of the femur and pronation at the foot(6).
Able to assess this through a single leg squat(5). The femur should not internally rotate while performing single leg squat or step down.

G. Quad Strength – Vastus Medialis Oblique development and density. Observe and measure atrophy. Test with single leg squat, step down, or manual muscle test.

H. Patella tracking – The patella should move superior, superomedial, and at terminal knee extension move lateral as the tibia externally rotates (6).

I. Special tests – Patella apprehension, grind test, lateral tilt test (10). Ober test, Faber test.

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Differential Diagnosis: Referred pain from the low back or hip, osteochondritis dessicans, Osgood-Schlatter disease, bone tumor, osteoarthitis, inflammatory joint disease, meniscal pathology, and synovial plica (9).

Evaluation / Assessment:

1. Establish Diagnosis and Need for Skilled Services.

2. Problem List
   - Impaired muscle length: Tight hamstring, Iliotibial band, lateral retinaculum, and quadriceps.
   - Pain: goal to increase joint protection and self-management of sx's.
   - Impaired muscle performance: Muscle imbalance between hip internal rotators and external rotators. VMO atrophy. Weak quadriceps, hamstrings, and hip abductors.
   - Impaired joint mobility: Lateral tracking of the patella.
   - Loss of function: Intolerance to…
   - Impaired posture: Poor foot/knee/ hip posture during gait/functional activity.

Prognosis – The patient's prognosis is very dependant upon a through history and examination to determine predisposing faults contributing to the condition. Approximately 70% of patellofemoral disorders improve from conservative treatment and time (10).

Goals (with measurable parameters and with specific timelines)

1. Normal muscle length of hamstrings, quadriceps, and iliotibial band in 6-8 weeks.
2. 5/5 hip abd, hip external rotators, knee flexion, and knee extension strength in 6-8 weeks.
3. Normal medial glide of the patella in 3-4 weeks.
4. Determine need for orthotics 4 weeks.
5. Descending stairs unlimited in 8 weeks.
6. Return to sports or premorbid activity 8-12 weeks.
7. Independent home exercise program in 3-4 weeks.
8. Independent self-management of symptoms/ Independent with home exercise program.

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Treatment Planning / Interventions

Established Pathway	___ Yes, see attached.	_X__ No
Established Protocol	___ Yes, see attached.	_X_ No

Interventions most commonly used for this case type/diagnosis. – Stretching, strengthening, patella joint mobilization, electrical stimulation, biofeedback, and patella taping. It is important to work within a pain free ROM or the vastus medialis oblique will be inhibited (1,6).

Strengthening – Strengthening the gluteus maximus and medius, quadriceps, and hamstrings are needed. Specifically strengthening hip external rotators eccentrically will help with gait and stability. Strengthening of the quadriceps needs to be in a pain free ROM. This can be done with lateral step-ups and limited ROM squats.

Stretching of tight structures – Iliotibial band, Lateral retinaculum.

Stretching of shortened muscles – Hamstrings, quadriceps, hip flexors, and gastroc soleus complex.

Stabilization – Stabilization/balance/proprioceptive exercises for the hip and knee.

Frequency & Duration 2-3x/wk for 8-12 wks

Patient / family education – HEP, flexibility trg, strength trg, footwear, and patella taping.

Recommendations and referrals to other providers.
Orthotics
Orthopedics
Protonics

Re-evaluation / assessment

Standard Time Frame – At least once every 30 days.

Discharge Planning

Commonly expected outcomes at discharge – Improved or normalized muscle length, normal patella mobility, normal VMO density, normalized muscle imbalances at the hip and knee, and correct shoe wear.

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Transfer of Care – D/C to independent HEP.

Patient's discharge instructions – Continue with stretching, strengthening, patella mobilizations, and patella taping if needed.

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