

# Conservative Treatment of Patellofemoral joint injury

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## Patellofemoral Pain Syndrome(PFPS) ; anterior knee pain

: diffuse, achy pain in the anterior knee symptoms increase with activities such as squatting, stair climbing, and running

### Clinical presentation

#### History

- chronic or overuse mechanism
- achy, diffuse pain in anterior knee
- pain in the medial or lateral popliteal space

#### Observation

- patellar malposition(baja, alta or suinting positions) may be noted
- bilateral or unilateral pronation of the foot

#### Functional status

- activities that increase patellofemoral joint reaction forces such as running, squatting, jummping and stair climbing, may be impaired
- prolonged flexion of the knee may increase pain(movie or theater sign)

#### Physical evaluation findings

- crepitation may be present
- no definitive, reliable special or ligamentous test exist

### Immediate management

- stopping the activity and applying ice

### Injury-specific treatment and rehabilitation concerns

- specific concerns
  - control pain and inflammation
  - restore normal patellar biomechanics
- initial treatment
  - controlling pain and inflammation with cryotherapy and therapeutic exercise

- hyperpronation of the feet - corrective foot orthotic device
- functional rehabilitation brace(Protonics knee brace)
  - enhance proper positioning the pelvis and lower extremity
  - resistance applied by brace
- quadriceps muscle - dynamic patellar stability
  - initial quadriceps strenghtening - isolation with electrical stimulation
  - strenghtening exercise of lower extremity
    - restoring synergistic control of patella
- estimated amount of time lost
  - pain tolerable, no swelling - activity continue
  - rehabilitation 1~4wk
- return-to play criteria
  - pain resolved, normal flexibility strength restore

## Patellar Malalignment and Subluxation

- instability of the patellofemoral joint in the absence of dislocation
  - Malalignment - the improper tracking of the patella within the femoral trochlear groove
  - Subluxation - involve greater instability
  - normal tracking requires proper balance in the strength and contraction timing of the medial and lateral anterior muscles of the knee

## Clinical presentation

### History

- insidious onset
- pain - diffuse, along the medial and/or anterior aspect of the joint
- “clunk” as the patella subluxates and relocates

### Observation

- swelling, especially after activity
- hyperpronation of the feet
- excessive femoral anteversion

### Functional status

- decreased ROM, especially flexion,
- decreased with greater degrees of subluxation(weight bearing)
- inhibition of the quadriceps mechanism

### Physical evaluation findings

- positive patellar apprehension test result
- hypermobile lateral glide of the patella

### Definitive diagnosis

- apprehension test

### Immediate management

- decreased activity, ice apply
- immobilizer and crutches

### Post-injury management

- acute episode of suluxation - ice apply
  - patella unstable - immobilizer
  - pain-free : quadriceps-setting exercise
- subluxation caused an effusion - aspiration
  - fat droplets - osteochondral lesion
  - immobilize the knee in full extension with compressive dressing along the lateral aspect of the patella
  - evaluated every 2wk
  - begin femoral rehabilitation - medial patellar structure pain ↓

### Injury-specific treatment and rehabilitation concerns

- Specific concerns
  - minimize early stresses on the medial patellar restraints
  - control inflammation
  - encourage proper realignment of healing tissues
  - tighten lax tissues
  - lengthen shortened tissues
  - restore normal patellar mobility
- initial conservative treatment
  - knee ROM progress as tolerated with active-assisted or passive ROM
  - all other strengthening exercises for the lower extremity
    - restoring synergistic control of the patella during extremity movement (excepts for quadriceps-setting exercise)
  - leg-raising activity in all directions early begin
    - quadriceps and VMO contracted (during hip exercise)
  - progress open and closed kinetic chain strengthening
  - proprioception exercises and agility and sport-specific drills

### Estimated amount of time lost

- 3-6wk of rehabilitation
- return to competition - pain resolved, ROM full,

quadriceps strength restored

- functional brace  
knee sleeve
  - place a medially directed force on the patella
- used for the return to activity(fig 7-7)

## Patellar dislocation

: the most extreme outcome of patellar instability

- predispose factor
  - patella alta, shallow trochlea, increased Q angle tight lateral retinaculum, genu valgum, femoral anteversion, pronated feet, general ligamentous laxity
  - combination of malalignment of the extensor mechanism

## Clinical presentation

### History

- strong quadriceps contraction
- a valgus force to the knee may be described
- pain radiate from the knee and the surrounding restraints
- a "pop" may be reported
- the patient may describe the patella dislocation and possibly relocating
- the patient may have a history of patella alta, genu valgum, femoral anteversion pronated feet, and/or a large Q angle

### Observation

- if the patella remains dislocated obvious deformity is noted, including the presence of the medial femoral condyle
- the knee is usually positioned in slight flexion
- medial effusion may be present

### Functional status

- motion and weight bearing are not possible while the patella is located
- after spontaneous reduction, knee motion may be inhibited by pain and swelling
- if the patient can flex and extend the knee the end ROM(especially flexion) are painful

### Physical evaluation findings

- the physical evaluation should not be performed while the patella is still dislocated
- positive patella apprehension test result
- hypermobile lateral patella glide

### Definitive diagnosis

- history of the patella subluxation and reduced
- direct visualization of the dislocated patella
- apprehension test

### Immediate management

- attempt to relocate the patella
- active reduction
  - extend the knee by contracting the quadriceps while a slight lateral to medial pressure is exerted on the patella
- passive reduction
  - patient relaxed, supine position
  - one hand - stabilized thigh, the other hand passively extends the knee
  - medication - short acting muscle relaxant (IV)

### Injury-specific treatment and rehabilitation concerns

#### ■ Specific concerns

- minimize early stresses on the medial patellar restraints
- control inflammation
- encourage proper realignment of healing tissues
- tighten lax tissues
- lengthen shortened tissue
- restore normal patellar mobility

### Conservative management

- quadriceps muscle provide dynamic stability of the patella
- strengthening exercise for the lower extremity restoring synergic control of the patella
- trunk-and pelvic-stabilization exercise and leg raising activities in all direction
- open and closed kinetic chain strengthening

### Patellar tendinitis : jumper' s knee

; overuse injury of the knee' s extensor mechanism  
(basketball, volley ball, soccer, dancer)

forceful extension exerted during jumping and eccentric forces during landing create microtrauma and inflammation in the patellar tendon

## Clinical presentation

### History

- repetitive running, jumping or other activities that produce large concentric and eccentric forces from the extensor mechanism
- pain at the inferior pole of the patella
- pain begin after exercising for a period and then subsides with rest
- pain may become constant and involve sitting and ascending and descending stairs

### Observation

swelling and redness at inferior pole of the patellar tendon

### Functional status

- antalgic gait
- ROM full painful with active and resisted extension and/or passive flexion

### Physical evaluation findings

- pain with resisted extension
- pain with passive stretch of the extensor mechanism
- pain with palpation of the inferior pole of the patella

## Definitive diagnosis

- pain - during activity, resisted knee extension, passive stretch of the extensor mechanism  
palpation of the tendon(just below the inferior pole)

## Pathomechanics and functional limitations

- jumping activity - first limitation
- running, ascending, descending stairs, walking
- weakness of the knee extensor mechanism or patellar maltracking

## Immediate management

- ceasing activity, apply ice
- phonophoresis & iontophoresis

## Injury-specific treatment and rehabilitation concerns

### ■ specific concerns

- control inflammation
- restore normal muscle firing pattern
- restore strength of the quadriceps and hamstrings
- emphasize proper biomechanics

### ■ immediately gentle stretching exercise



### Pathomechanics and functional limitations

- partial tear - unable to bear weight without pain and the sensation of giving way
- complete rupture - unable to generate forces in the quadriceps mechanism cannot maintain body weight against gravity

### Immediate management

- straight-leg immobilizer, crutch

### Postinjury management

- hinged knee brace locked in extension until surgery

### Surgical intervention

- surgical repair performed within 7–10days
- simple end-to-end suturing of patellar defect alone or in conjunction with cerclage suture
- suture anchor frequently used

### injury-specific treatment and rehabilitation concerns

- specific concerns
  - control loads placed on the extensor mechanism
  - delayed the onset of atrophy
  - prevent arthrofibrosis secondary to decreased ROM during the immobilized period
- weight bearing
  - 4wk progress
  - full weight bearing - 6wk locked brace (brace off - flexion 120 °)
- passive ROM
  - initial - full extension to 45 ° (increasing flexion 30 ° /wk)
  - 6wk - begin prone stretching for quadriceps mechanism
  - 2wk - begin leg raising in all plane
  - 3wk- active knee extension
  - superior glide - not recommended until at least 4 to 6wk postoperatively
  - heavy load - 8wk
- exercise
  - closed kinetic chain strengthening exercise - 50% weight on the injured leg
  - stationary bicycle - sufficient ROM
  - treadmill - full weight bearing

swimming - 6-8wk

running - 4mo

■ return-to-play criteria

pain free, ROM full, quadriceps strength restore