

## Patellar Dislocation – Conservative and Operative Rehabilitation

### Surgical Indications and Considerations

*Anatomical Considerations:* Patellar stability is dependent upon two components: bony (trochlear groove) and soft tissue structures. There are multiple soft tissue layers that surround the patellofemoral joint. Medially, the superficial layer consists of the fascia over the sartorius muscle, the second layer contains the medial patellofemoral ligament (MPFL) and the retinaculum, and the third layer contains the medial collateral ligament and joint capsule. The MPFL provides 50-80% of total restraining force medially. Fascial interconnections between fibers of the iliotibial band, lateral hamstrings, lateral collateral ligament, and lateral quadriceps comprise the lateral retinaculum.

*Pathogenesis:* Patellar instability can be correlated with one or more of the following anatomical risk factors: tightness of lateral structures, patella alta, patella or femoral dysplasia, increased Q-angle, increased sulcus angle, generalized laxity, increased femoral anteversion, increased external tibial torsion, lateral position of the tibial tuberosity, abnormal foot pronation, and a vertical vastus medialis oblique (VMO) insertion. Patella dislocation can occur from indirect, twisting or rapid change of direction with the foot planted, or direct trauma to patella.

*Epidemiology:* A higher incidence of patellar dislocations occur in females ages 10 to 17 years of age and the athletically active, with less incidence over age 30. Lateral dislocations are very common and will be the topic of discussion in this guideline. Medially dislocations are typically rare and result from direct trauma, an excessive lateral release or overcorrection of a realignment procedure. Redislocations occur more frequently in patients younger than 20 and tend to decrease with advancing age.

### *Diagnosis*

- History of dislocation with giving way
- Effusion
- Positive apprehension test (Fairbank sign)
- Medial retinacular tenderness
- Other clinical findings may include:
  - Patellar mobility (Sage test for lateral retinacular tightness – positive if medial patellar excursion is less than ¼ of greatest patellar width)
  - Patellar maltracking
  - Abnormal Q angle (normal = males – 8-10 degrees, females – 10-20 degrees)
  - Abnormal sulcus angle (normal = <150 degrees)
- Imaging studies help confirm the diagnosis

*Nonoperative Versus Operative Management:* Conservative treatment includes bracing and taping to restore proper patellar alignment and physical therapy to regain strength and range of motion. Conservative treatment is most often attempted first, especially with a first-time dislocation. Operative treatment is recommended in the presence of anatomical abnormalities or osteochondral fractures. It is more effective in preventing recurrence of dislocations and is often only considered after conservative treatment has been unsuccessful.

*Surgical Procedure:* Many different procedures are performed to correct patellar instability. Proximal realignment procedures include lateral release, medial reefing, advancement of the vastus medialis oblique (VMO), and Galleazzi's procedure. Lateral release involves an incision of the lateral retinaculum. Medial reefing involves tightening the medial structures and is often done in conjunction with a lateral release. VMO realignment involves reattaching the VMO insertion more distally and laterally on the patella. The Galeazzi procedure is seldom performed however involves attaching the semitendinosus tendon to the medial side of the patella. Distal realignment consists of transferring the patellar tendon and tibial tubercle medially. Soft tissue distal realignment involves transferring the medial 1/3 of the patellar tendon to the tibial collateral ligament. Evidence has shown that lateral release is more effective when combined with another procedure (i.e. proximal or distal realignment) and for many investigators would only be used if there was a residual patellar tilt after repair/reconstruction of the medial retinacular structures.

## CONSERVATIVE REHABILITATION (**Acute**)

Note: The following rehabilitation progression after a first-time acute lateral patellar dislocation is a summary of the guidelines provided by D'Amato and Bach, published in *Clinical Orthopaedic Rehabilitation* by S. Brent Brotzman and Kevin E. Wilk.

### **Phase I**

Goals: Decrease pain and swelling

Limit range of motion and weight-bearing to protect healing tissues

Return muscle function

Avoid overaggressive therapy that may lead the patient into a patellofemoral pain syndrome

Intervention:

- Bracing: set at 0 degrees initially with ambulation, lateral buttress pad in brace
- Ice
- McConnell taping; light compressive bandage
- Instruction in partial weight-bearing with crutches
- Electrical stimulation for activation of the VMO

- Supine straight leg raise (SLR) with minimal to no pain
- Ankle pumps if edema is present
- Isometric hamstrings

## **Phase II**

*Criteria:* no significant joint effusion, no quadriceps extension lag, minimal to no pain with activities of daily living

Goals: Full ROM – pain-free  
 Improve quadriceps strength  
 Low-level functional activities  
 Initiate conditioning  
 Avoid patellofemoral symptoms or instability

Intervention:

- Continue patellar bracing or taping
- Weight-bearing as tolerated; discard crutches when extension lag is no longer present
- Continue electrical stimulation and modalities as needed
- Continue supine SLR and add adduction and abduction SLRs
- Toe raises with equal weight bearing
- Closed kinetic chain exercises
- Low-level endurance and pool exercises

## **Phase III**

*Criteria:* full active ROM, good to normal quadriceps strength, full weight-bearing with normal gait pattern

Goals: Improve function  
 Gradual return to high-level activities

Intervention:

- Bracing: wean from bracing and taping as quadriceps function improves
- Four-way hip exercises
- Pool therapy – walking with progression to running
- Sport and skill-specific training
- Proprioceptive training
- Patient education

*Criteria for Return to Full Activity (8-12 weeks)*

- Equal ROM between lower extremities
- No pain or edema
- 85% strength compared with uninvolved limb
- Satisfactory 1-minute single leg hop test, two-legged hop test
- Patellar stability with clinical tests

*Preoperative Rehabilitation:*

**Acute Phase:** PRICE - protection, rest, ice, compression, elevation (if acute)  
 Maintain quadriceps strength and flexibility of the hamstrings  
 Patellar bracing and taping to restore proper alignment

## POSTOPERATIVE REHABILITATION Distal and/or Proximal Realignment Procedures

Note: The following rehabilitation progression is a summary of the guidelines after a distal and/or proximal realignment procedure provided by D'Amato and Bach, published in *Clinical Orthopaedic Rehabilitation* by S. Brent Brotzman and Kevin E. Wilk. The same rehabilitation protocol is used for both distal and proximal realignment procedures, with a few exceptions noted below. For a combined distal and proximal realignment, the protocol for distal realignment is used.

### Phase I for Immediate Postoperative – Weeks 1-6

Goals: Control inflammation  
 Protect fixation  
 Activation of quadriceps and VMO  
 Full knee extension and minimize adverse effects of immobilization

Intervention:

- ROM: 0-2 wks – 0-30 degrees of flexion, 2-4 wks – 0-60 degrees, 4-6 wks – 0-90 degrees
- Brace: 0-4 wks – locked in full extension 24 hours 7 days a week except for therapeutic exercises and continuous passive motion use, 4-6 wks – unlocked for sleeping, locked for ambulation
- Weight-bearing: Proximal realignment – as tolerated with two crutches, Distal realignment – 50% with two crutches
- Quadriceps sets and isometric adduction with electrical stimulation for VMO (\* no electrical stimulation for 6 wks with proximal realignment procedure)

- Heel slides 0-60 degrees (proximal), 0-90 degrees (distal)
- Non-weight bearing gastrocnemius/soleus, hamstring stretches
- 4-way SLR with brace locked in full extension
- Resisted ankle ROM
- Patellar mobilization (when tolerable)
- Aquatic therapy at 3-4 wk – gait training

## **Phase II – Weeks 6-8**

*Criteria for progression:* Good quadriceps set, ~90 degrees of flexion, no signs of active inflammation

Goals: Increase flexion

Avoid overstressing fixation

Control of quadriceps and VMO for proper patellar tracking

Intervention:

- Brace: discontinue use for sleeping, unlock for ambulation as per physician's orders
- Weight bearing: As tolerated with crutches
- Progress to weight-bearing gastrocnemius/soleus stretching, full flexion with heel slides
- Aquatic therapy
- Balance exercises
- Stationary bike – low-resistance, high seat
- Wall slides 0-45 degrees of flexion progress to mini squats

## **Phase III Week 8-4 months**

*Criteria for progression:* No quadriceps extensor lag with SLR, nonantalgic gait, no evidence of lateral patellar tracking or instability

Intervention:

- Discontinue crutches when: no extensor lag with SLR, full extension, nonantalgic gait pattern
- Step-ups - 2 inches progress to 8 inches
- Stationary bike – moderate resistance
- Endurance – swimming, Stairmaster
- Gait training
- 4-way hip exercise
- Leg press 0-45 degrees of flexion
- Toe raises, hamstring curls
- Continue balance activities

- Hamstrings, gastrocnemius/soleus, add quadriceps and iliotibial band stretches

#### **Phase IV 4-6 months**

*Criteria for progression:* Good to normal quadriceps strength, no soft tissue complaints, no evidence of patellar instability, clearance from physician to progress closed-chain exercises and resume full or partial activity.

Intervention:

- Progression of closed-kinetic chain exercises
- Jogging/running in pool with resistance
- Functional progression, sport-specific training

Selected References:

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