**Management of Acute Patellar Dislocation**

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**Introduction**

Patellar dislocation occurs when the patella completely disengages from the trochlear groove. The patella may spontaneously reduce or may require reduction. Dislocation is almost always to the lateral side causing injury to the medial structures. It most commonly occurs as a sporting injury or in association with physical activity and is the second most common cause of traumatic haemarthrosis after ACL injury. Acute first time dislocations rupture the previously intact medial parapatellar structures with haemarthrosis being a common feature in all these cases. There has been an ongoing debate and some controversy surrounding the management of acute first time dislocators and we present the current status on the management of such patients.

**Incidence**

The incidence of patellar dislocation is between 5.8-7.0 per 100,000 person years in the general population, 29 per 100,000 in 10-17 year olds and 69 per 100,000 in military personnel undergoing rigorous training. Younger people are at more risk with the incidence declining gradually through the spectrum with age. Although the literature tends to favour women over men, our database with over 400 patients shows a much higher incidence in males. The risk of recurrence is increased six times in case of an ipsilateral/contralateral dislocation. Osteochondral injuries which contribute to a haemarthrosis are seen in 25% of dislocations.

**Biomechanics**

The medial patella-femoral ligament (MPFL) contributes 50-80 percent of the lateral stability of the patella. Compared with other ligaments round the knee, it is relatively weak with a force to failure of 200 newtons. The MPFL works in conjunction with the vastus medialis obliquus muscle- an important dynamic stabiliser. Patello-tibial, patella-meniscal and superficial medial retinaculum make lesser contributions.

**Mechanism Of injury**

Whilst the patellar may dislocate in sporting activities, these injuries also commonly occur in simple activities of daily living. The injury occurs with the knee in some degree of flexion with a valgus force and no direct contact with the patella in over 90% of the cases. External rotation of the foot relative to the knee increases the Q angle and this combined with contraction of the quadriceps pulls the patella laterally. If the bony and soft tissue constraints are insufficient to resist the lateralising forces, the patella will dislocate. The injury does occur with direct lateral pressure on the patella although this is rare. Spontaneous relocation frequently occurs when the knee is straightened. The patient presents with pain, tenderness, swelling and possibly deformity if not relocated.
Predisposing factors

1. Trochlear Dysplasia: Dejour & Lecoultre classification\textsuperscript{11}

![Diagram of Trochlear Dysplasia Types A to D](image)

2. Increased TT-TG distance: >16±4mm in flexion and >9±4mm in extension\textsuperscript{12}

![Diagram showing TT-TG measurement in flexion and extension](image)

3. Patella alta: Caton Deschamps index >1.2\textsuperscript{13, 14, 15} (ratio of the length of the orange line: the length of the blue line in the radiograph below)
4. Patellar tilt: Normal is 10-20 degrees (parallel blue lines indicating a severe tilt, and blue lines inclined at 20-30 degrees indicating normal tilt)

5. Increased Q angle, genu valgum and tibial tubercle lateralisation\textsuperscript{16, 17}

‘Q’ Angle
6. Possibly ligamentous hyperlaxity\textsuperscript{18, 19}
7. Possibly hypoplastic vastus medialis
8. Possibly increased femoral anteversion with lateral tibial torsion\textsuperscript{20}

**Diagnosis**

The diagnosis of patellar dislocation is relatively straightforward provided it is considered by the treating doctor. The history often helps with the patient describing the patella coming out and spontaneously relocating and there may be a description of the deformity associated with the dislocation. It is a more difficult diagnosis if the patient doesn’t appreciate the dislocation and can be missed if not considered. It is important to rule out other potential causes of acute pain with a haemarthrosis such as an ACL injury with a careful examination. Typical clinical features include the patella lying more laterally and this can be seen both clinically and on a skyline radiograph. The most consistent sign in patellar dislocation, even after reduction is a positive apprehension sign. Local tenderness over the course of the MPFL is often present from the medial patellar border to the medial epicondyle.

**Radiographs**

A Merchant view can be difficult to obtain due to pain but can be diagnostic. A bony avulsion from the medial patella can be seen but is rare\textsuperscript{21}. The patella on an AP view can be seen to lie laterally. Most of the times the patella is reduced on presentation.

**MRI**

This is the most useful imaging modality to confirm the diagnosis. Disruption of the MPFL, VMO, medial retinaculum, chondral damage and bone bruising can be visualised. The most common location of an MPFL disruption is from the femoral end with an incidence between 87-94\textsuperscript{\%}\textsuperscript{22, 23}. Osteochondral fractures of the infero-medial patellar facet and anterolateral femoral condyle that indicate that a recent patellar dislocation with associated bony oedema. A concave deformity of the inferomedial patella is a pathognomonic sign of lateral patellar dislocation\textsuperscript{24, 25}. MRI is also useful to assess any bony abnormality predisposing to the dislocation such as trochlear dysplasia, increased TT-TG and patellar height. Surgery to prevent recurrence, if appropriate can be planned.
**CT**

This has a limited role in an acute setting as soft tissue damage and bony oedema patterns are not well visualised. Whilst CT is useful to measure TT: TG ratio, this has now largely been replaced by MRI\(^26\).

**Reduction**

Whilst this is only occasionally necessary, if required, the patellar is relocated in the emergency department by the treating doctor passively extending the knee and occasionally applying medial pressure on the prominent lateral lying patella with the knee in full extension. Spontaneous reduction usually occurs but 20\% may present with a dislocation\(^27\). A tense haemarthrosis may be aspirated and the presence of fat globules in the aspirate (lipohaemarthrosis) is diagnostic of an osteochondral fracture.

**Management**

The care of a patient with an acute patellar dislocation has two considerations.

1. Recovery from the initial injury
2. Prevention of recurrence

**Factors to be considered:**

**Age:** Open physes reduces the range of surgical options and non-operative management is usually favoured\(^4,28\).

**Sporting activity:** return to collision sports increases incidence of recurrence in patients undergoing surgery as well as with non-surgical management.

**Injury Mechanism:** contact injuries are less likely to recur than with non-contact\(^29-31\).

**History of contralateral dislocation** increases chances of recurrence\(^29\).

**Lateral patellar dislocation** with greater short term disability have lower recurrence rates.

**Family history** is associated with failure of surgical treatment as is the presence of anatomical factors known to contribute to a higher incidence of dislocation\(^30-36\).

**Care following dislocation**

Most patients with a patellar dislocation are managed initially with some form of immobilization and crutches followed by a graduated rehabilitation programme aimed at reducing swelling and restoring range of motion and strength. There is no conclusive evidence to show that various
physiotherapy interventions and the use of a brace is superior to early mobilisation in terms of recurrence and progress\textsuperscript{37-40}.

One of the goals of physiotherapy is to strengthen the quadriceps so that the dynamic patellar stabiliser is activated\textsuperscript{41}. Physiotherapy interventions used range from strengthening exercises, manual therapy, taping and electrotherapeutic modalities. Studies have shown that taping improves subjective symptoms and that restricting flexion with a brace does not reduce recurrence rates at 2 years\textsuperscript{42,43}. Whilst there is no consensus on when to start ROM and this could vary from 0-6 weeks, it is established that early ROM helps maintain the articular cartilage\textsuperscript{44}.

An acute tense haemarthrosis may be aspirated for pain relief so that a proper clinical examination can take place along with imaging\textsuperscript{45}. However, there is no evidence that this improves outcomes or influences recurrence rates. NSAID’s are used to reduce pain and inflammation and there is no literature to contradict its usage.

A metaanalyses by Smith et al has shown no added advantage in either non operative or surgical management (repair of medial capsular damage) of acute dislocations. Recurrence rates range from 10-30 % in the operative group and 13-52 % in non-operative treatment\textsuperscript{46}. A survey of National Football League team physicians indicates that most do not recommend immediate surgical management in the absence of a loose body.

**ISAKOS Guidelines**

A consensus statement was released by the ISAKOS Orthopaedic Sports Medicine Committee in 2014 on the “Guidelines for the Evaluation, Management and Safe Return to Sport after Lateral Patellar Dislocation or Surgical Stabilization in the Athletic Population” and gave the following recommendations for the non-operative management of acute first time dislocations of the patella:

1. The knee should be protected with crutches and/or limited motion as required until a normal gait pattern is restored.

2. The initial management should be focused at reducing swelling and restoring lower limb muscle function. Ideally, this is carried out under the guidance of a physiotherapist, certified athletic trainer or other trained professional. The goal is to restore the envelope of tissue function before progressing to the next phase of rehabilitation.

3. Following a new injury, recurrent dislocators with minimal trauma and swelling can be accelerated in the early management phase

4. The use of a knee sleeve for comfort, control of swelling and confidence proprioception is optional.
5. There is no evidence to support using specific patellar stability braces for preventing recurrent dislocation\textsuperscript{47,48}.

6. There is no ideal or correct time for an athlete to return to sport; return to sport is patient and sport specific, dependent on the athlete’s function as assessed by the physiotherapist and surgeon.

7. Adequate performance in Physical Therapy with sport specific drills which simulate the intensity and body movement patterns of the athlete’s given sport / activity prior to return to play is recommended.

\textit{Role of Operative Treatment in acute setting}

1. Chondral and osteochondral fractures: Presence of an osteochondral fracture involving >10% of the patella or lateral femoral condyle should be fixed via open or arthroscopic surgery if feasible using resorbable pins. Micro fracture of the defect is an option if the fragments are not suitable for reattachment.

2. Dislocation in association with multi-ligament knee injury

The literature suggests arthroscopic and minimally invasive techniques including arthroscopic medial plication and medial reefing have similar recurrence rates to the natural history of untreated patellar dislocation\textsuperscript{46}. Accordingly, we see no role for retinacular repair in preventing recurrence.

A recent meta-analysis has shown that the incidence of osteoarthritis is higher in cases treated operatively\textsuperscript{39}. 
References


