



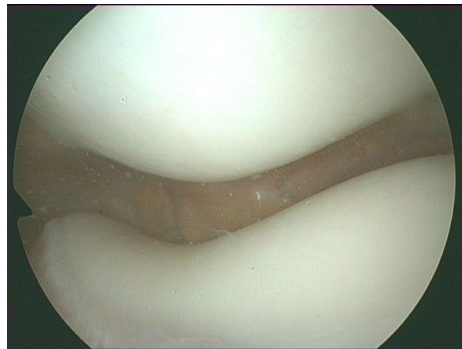
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Medial Patello Femoral Ligament (MPFL) Reconstruction

Patient information

Introduction

The kneecap (patella) usually runs up and down the centre of a groove (trochlea) on the front of the thigh bone (femur). This coordinated movement is controlled by the hip and thigh muscles and various ligaments.



Normal patella (above) on the front of the femoral groove (below)

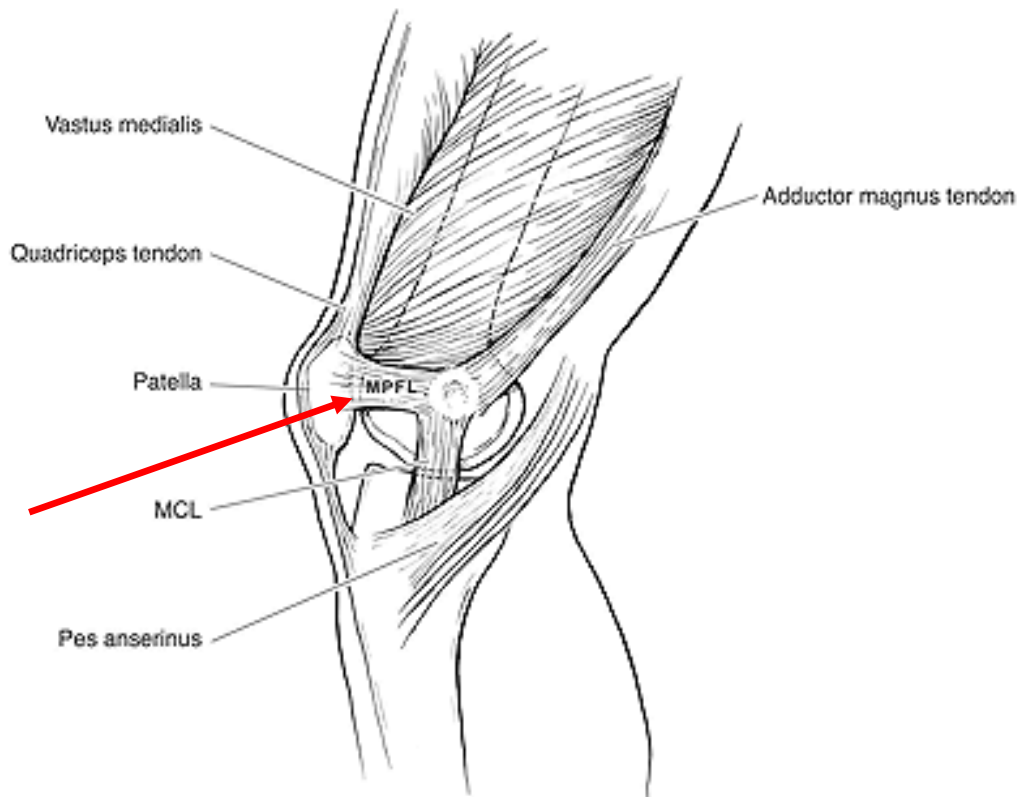
Sometimes the patella does not track down the centre of this groove ('mal tracking') and/or it may have a tendency to slip out of the groove (dislocate). This may cause some 'anterior knee pains' and episodes of giving way. This may be the result of the joint anatomy (the 'way you have been made'), previous injury causing ligament tears and/or weakness of the quadriceps (thigh) muscle. Not infrequently more than one factor is involved.

When a patella dislocates the normal restraining structures (ligaments) on the inner aspect of the patella may be stretched or torn, which can predispose to similar episodes when stressing the knee in the future.

If a non-operative approach has not been successful – strengthening programme, strapping the knee cap, balance exercises etc – then an operation may be recommended. The particular operation will depend on the underlying bony anatomy and integrity of the ligaments which is often detailed on x-ray, CT and/or MRI scans.

What is the medial patello femoral ligament (MPFL)?

The inner (medial) aspect of the patella has attachments to both ligaments (the MPFL) and part of the quadriceps muscle (the vastus medialis obliquus or VMO). The MPFL provides approximately 60% of the restraint to lateral patella movement at the start of knee flexion (0-30°). This tends to be the position of the knee when the patella dislocates. The ligament attaches to the upper third of the patella and the inner aspect of the femur (thigh bone) as shown below.



The MPF ligament is approximately 55mm long and approximately 28mm wide with obvious variations depending on the patient size and local anatomy.

How is the MPFL injured?

Patella dislocation typically occurs when turning or twisting on the leg. When the patella dislocates it usually moves towards the outside (lateral aspect) of the knee. The result is usually a stretching and/or tearing of the inner supporting structures, including the MPFL. The ligament may either tear off of the bony attachments or 'fail' in the middle of the ligament itself.

How is the tear diagnosed? What are the treatment options?

Following a patella dislocation and MPFL tear there will be some healing/scarring of the supporting structures. However, following such injury there is (typically) some increased laxity ('glide') of the patella joint which can be detected on clinical examination. If the patient becomes aware of some movement or slipping of the patella after a suitable strengthening programme then this is referred to as instability of the patella joint. Operations should only be done for 'symptomatic instability' – a patient's awareness of the patella slipping / moving sideways.

Investigations will include x-rays of the knee and knee cap and an MRI scan to better delineate the soft tissue elements (ligaments and cartilages) around the knee. This may show the MPFL although it is often difficult to clearly visualise. If the instability is more complex then assessment may include CT scans - to investigate the hip and ankle anatomy - and arthroscopy of the knee joint.



Patella sitting towards the outer (lateral) aspect of the femoral groove

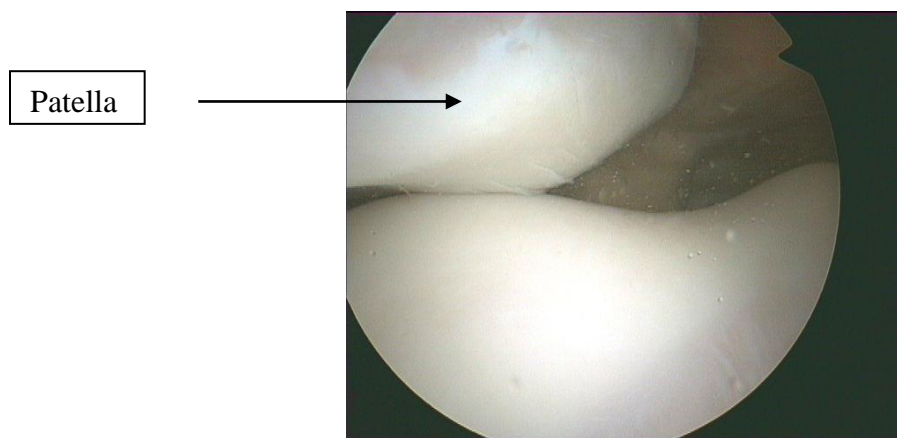
Unless the initial dislocation causes a fracture of the patella an early operation is not recommended. At present there is no evidence that an early 'repair' of the torn structures improves the longer term patella stability. However up to 50% of patients will experience recurrent instability (depending on age and activities) and some may require operative treatment.

Initial treatment should always be 'non operative' - usually coordinated by a physiotherapist – and will include strengthening of the quadriceps and gluteal muscles, patella strapping and proprioceptive (balance) exercises. If symptoms persist operative stabilization may be considered.

Surgical treatment

If problems persist, 'delayed' ligament repair is not recommended and the MPFL will need to be replaced by an alternative structure, either re-routing a piece of a nearby tendon or by obtaining a graft from another area. The hamstring tendons from the back of the knee are commonly used grafts and the gracilis tendon tends to be an appropriate size to use for the MPFL. This is harvested through a 3cm wound on the upper, inner aspect of the tibia.

Following anaesthesia a tight inflatable band (tourniquet) is wrapped around your thigh which restricts bleeding into and around the knee during the operation. A telescope with a camera (arthroscope) is then introduced into your knee through 3 small incisions – 2 on the front and one above - which allows a thorough examination of the knee joint and assessment of the patella tracking (movements).



View through the arthroscope (from above) before reconstruction.
Patella 'sitting' towards the outer (lateral) aspect of the femoral groove.

Once the arthroscopy has been done the graft (hamstring tendon) is harvested, usually from the same leg.

Two small tunnels are created in the patella with a drill and both ends of the tendon are passed and fixated into these tunnels with small absorbable screws. The key to success is establishing the correct point of fixation for the femoral end of the graft. An incision is made over the inner aspect of the knee and a blind ending tunnel is created with a drill. The graft is fed into the tunnel and fixed with a screw 'jamming' the tendon against the tunnel walls. The patella movements are then reassessed by arthroscopy.

The wounds are closed with sutures and a wool / crepe dressing applied to the knee.

What should I expect from the surgery?

The aim of the surgery is to prevent further episodes of dislocation and allow you to return to normal function including sports, with confidence. However, the knee may still feel permanently 'different' from the unoperated knee and some people may never regain the confidence required for vigorous sports activity.

All surgical procedures on the front of the knee cause some post-operative discomfort, which will cause some wasting of the thigh muscle. The early post operative period will be focused on controlling this pain, regaining a full range of movement and restoring the strength of the quadriceps.

The new ligament is stronger than the original but further injury may still occur, although this is uncommon. As with all ligament reconstructions, physiotherapy (strengthening) is essential to ensure the best outcome.

Because this is a relatively 'new' operation there are few reports which have used outcome scores to demonstrate the benefits and timescale of recovery following operation. All persons undergoing this procedure have outcome scores recorded at various times but these numbers are not sufficient to be of any significant value as yet.

Potential risks and complications of MPFL reconstruction

- **Post-operative bruising**

Due to the nature of the operation some bruising of the lower leg is inevitable and there may be discomfort on the posterior aspect of the thigh where the hamstring is taken from.

- **Altered wound healing / sensation**

There are at least 3 wounds on the front of the knee and 3 smaller stab incisions. This may cause some alteration of the sensation on the front of the knee which improves with time but may never fully recover.

- **Wound infection**

Despite the routine use of antibiotics wound infections may occasionally occur. Another operation may be required to wash out the infected wound.

- **Anterior knee pain / Quadriceps wasting**

Surgery involving the patella frequently causes anterior knee pain, with subsequent wasting of the quadriceps muscle. This may cause some difficulty with kneeling, squatting etc. Your physiotherapist will use techniques to reduce this pain and strengthen the muscles.

Approx. 1-5 / 100 patients

- **Blood clots (Deep Vein Thrombosis)**

These can occur in the lower legs following such surgery and can occasionally enlarge and move through the blood stream to the lungs (pulmonary embolus). Having drilled bony tunnels the use of blood thinning agents will also significantly increase the risk of post-operative bruising and are avoided.

- **Swelling / Bleeding into the knee**

Post operatively blood can collect in the knee joint. In most cases it will be absorbed by the joint itself. Occasionally excess fluid/blood may require an operation to drain the joint.

Approx. 1-5 /1000 patients

- **Damage to the skin under the tourniquet**

There may be numbness of the skin which is usually temporary.

- **Graft rupture**

Although not a surgical complication, the graft may rupture after further trauma.

- **Loss of balance / proprioception**

Despite it being functionally stable, the knee may feel different for quite sometime. Regular balance exercises and a tubigrip may reduce this feeling.

- **Stiff Knee**

Although rare, stiffness may occur following surgery. In some patients a manipulation and arthroscopy may be required to restore knee movement.

- **Severe pain**

Pain, stiffness and loss of use of the knee (complex regional pain syndrome) is rare and the cause is unknown. If this happens you may need further treatment including painkillers and physiotherapy. The knee can take months or years to fully recover.

Post-operative rehabilitation (guidelines)

Day of operation / Day 1

Return with wool / crepe dressing. Change dressing to Tubigrip prior to discharge

Encourage full active extension

Static quads exercises, proceed to SLR (assist to prevent lag)

Mobilise FWB with crutches (brace if poor quads control)

Week 1

Goals: Protect fixation and surrounding tissues
Diminish swelling / inflammation
Regain active quadriceps / VMO control
Regain / maintain full knee extension & hyperextension
At least 45° knee flexion
Patient education regarding rehab process

2 weeks: Suture removal / assess quads control and active ROM

Weeks 2-4

Goals: Control swelling / inflammation
Gradual increase in ROM (within limits of pain)
At least 90° knee flexion by end of week 2
At 120° knee flexion by end of week 4
Quadriceps strengthening (especially VMO)

Weeks 5-6

Goals: Full flexion
Good activation of quadriceps and SLR with NO lag

Week 6 clinic review.

Weeks 7-12

Goals: Eliminate any joint swelling
Increase quadriceps and VMO control for restoration of proper patella tracking
Improve muscular strength / control / endurance without exacerbation of symptoms
Avoid overstressing fixation site
Normal gait pattern
Functional exercise

Week 12 clinic review: Outcome scores & 'Functional check'

Weeks 12–16

Goals: Work towards symmetrical knee extension strength & endurance of leg musculature
Functional activity drills
Good active patella control with no evidence of lateral tracking or instability

Weeks 16+

Goals: Full painfree ROM
Continued improvement in quadriceps strength (80% or greater of contra lateral leg)
Improve functional strength and proprioception
Maximise patient confidence in returning to appropriate activity level
Functional return to work / sport

** Return to sports dictated by particular sport, ability, fitness and confidence – minimum 4 months (with guidance from physiotherapist and surgeon)

Week 24 clinic review: Outcome scores / Sport return discussion

Week 52 clinic final review: Outcome scores, discussion re outcome and future