

# MPFL Reconstruction

## *Patient Information Sheet*

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### What is the MPFL?

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The medial patellofemoral ligament (MPFL) is the primary soft-tissue restraint that keeps the kneecap (patella) correctly positioned within the groove at the end of the thigh bone (trochlea). It runs from the inner (medial) side of the patella to the inner side of the femur, and acts as the main 'checkrein' preventing the patella from slipping outward (laterally) out of its groove.

When the patella dislocates — usually slipping out to the outer side of the knee — the MPFL is torn or stretched in almost all cases. Once injured, the MPFL often does not heal back to its original length and tension, leaving the patella vulnerable to further episodes of instability or dislocation.

### What Are the Causes?

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Patellar instability and MPFL injury usually result from a combination of an inciting event and underlying anatomical risk factors:

- Direct trauma — a blow to the inner side of the knee forcing the patella outward
- Non-contact pivoting or twisting injury — the most common mechanism, particularly with the knee bent and the body rotating over a planted foot
- Trochlear dysplasia — a shallow or abnormally shaped groove that provides less bony containment for the patella
- Patella alta — a kneecap sitting higher than normal, engaging later with the trochlear groove and providing less early stability
- Increased tibial tubercle–trochlear groove (TT-TG) distance — a measure of how far laterally the shin bone's attachment point pulls the kneecap
- Generalised ligamentous laxity — including conditions such as hypermobility spectrum disorders
- Rotational or alignment abnormalities of the leg (femoral anteversion, tibial torsion)
- Previous patellar dislocation — a strong risk factor for further episodes, particularly in adolescents

### Non-Operative Treatment

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Many first-time patellar dislocations are managed non-operatively in the first instance, particularly where there is no loose fragment of bone or cartilage (osteochondral fracture) in the joint. Non-operative management includes:

- A period of bracing or immobilisation to allow initial healing and settle swelling
- Physiotherapy — focusing on quadriceps (particularly VMO) strengthening, hip and core control, and patellar taping or bracing for higher-risk activities
- Activity modification while stability and control are being restored

Redislocation rates after non-operative treatment are considerably higher than after early MPFL reconstruction — particularly in adolescents and knees with significant risk factors. Surgery is generally recommended after a second dislocation, and often after a first dislocation with a loose osteochondral fragment, a torn MPFL avulsed from the femur, or significant anatomical risk factors.

### Role of Physiotherapy in Preparation for Surgery

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'Prehabilitation' before MPFL reconstruction helps optimise your knee ahead of surgery. Benefits include:

- Settling swelling and irritability in the joint before surgery
- Restoring full range of motion, particularly full extension

- Improving quadriceps strength and control, and correcting any patellar tracking abnormalities that can be addressed with exercise
- Improving hip and core control, which contributes to overall lower-limb alignment during dynamic activity
- Learning the brace use, weight-bearing status and early exercises you will use immediately after surgery

Patients who go into surgery with a settled, well-moving knee and good quadriceps control generally progress through rehabilitation more smoothly.

## Indications for Surgery

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MPFL reconstruction is generally recommended when:

- There has been a second (or subsequent) patellar dislocation
- A first-time dislocation is associated with a loose osteochondral fragment, or the MPFL is torn from its femoral attachment with poor healing potential
- There is ongoing symptomatic instability, apprehension or subluxation despite a course of physiotherapy
- Significant underlying anatomical risk factors are present (trochlear dysplasia, patella alta, elevated TT-TG) that make further instability likely without surgical stabilisation
- The patient wishes to return to sport or activities that provoke a sense of instability

The decision to proceed with surgery, and whether any additional (adjunct) procedures are needed alongside MPFL reconstruction, is individualised based on your knee's specific anatomy, imaging findings and instability pattern.

## What is MPFL Reconstruction?

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MPFL reconstruction replaces the torn or stretched ligament with a new graft, recreating a stable checkrein that holds the patella centred within the trochlear groove. The graft is fixed to the patella and routed to a carefully chosen point on the femur (the 'isometric point') so it works correctly through the full range of knee movement.

Graft options include:

- Autograft gracilis tendon — the most commonly used graft, taken from the patient's own gracilis tendon (a hamstring tendon). Avoids donor-tissue risks and has the largest body of long-term evidence.
- Allograft (donor tissue) — used where indicated: revision surgery, unsuitable/previously used autograft, or patient preference to avoid a second surgical site. Broadly comparable outcomes to autograft, though the evidence base in adolescents is smaller.

The choice is individualised, taking into account your age, prior surgery and anatomy. As part of assessment, Dr Calligeros specifically examines for constitutional (generalised) ligamentous laxity (e.g. Beighton hypermobility score) — patients with significant laxity have higher autograft attenuation (stretching) over time, so are more likely to be offered an allograft.

## Addressing Underlying Anatomical Risk Factors: PFJ Adjunct Procedures

In some patients, MPFL reconstruction alone is not enough, because an underlying bony or alignment abnormality keeps pushing the patella out of its groove. Where indicated, it may be combined with:

- Tibial tubercle osteotomy (TTO) — the tibial tubercle is surgically detached, repositioned (medially, distally, or both) and re-fixed with screws. Considered when TT-TG distance is significantly elevated (commonly  $\approx 15$ – $20$ mm) and/or significant patella alta is present.
- Trochleoplasty — reshapes a severely dysplastic trochlear groove; reserved for high-grade dysplasia not addressed by soft-tissue/TTO procedures alone.
- Lateral retinacular release or lengthening — used selectively where a tight lateral retinaculum contributes to patellar tilt.

Need for an adjunct procedure is determined by careful pre-operative assessment (TT-TG distance, patellar height, trochlear morphology). Combining procedures adds complexity and recovery time, but durably corrects the underlying problem in appropriately selected patients.

## What is the Recovery?

Recovery from MPFL reconstruction follows a structured, criteria-based progression, and is somewhat slower when a tibial tubercle osteotomy is performed alongside it (to protect bone healing). The following is a general guide:

| Timeframe   | What to expect                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0–2 weeks   | Day surgery or one-night stay. A hinged knee brace is typically worn, often locked in extension for walking initially. Weight-bearing as tolerated with crutches. Focus on swelling control, achieving full knee extension, and gentle quadriceps activation.                                                                                                                          |
| 2–6 weeks   | Wound review. Brace gradually unlocked to allow increasing flexion as guided by your surgeon/physiotherapist. Progressive weaning off crutches as quadriceps control improves. Physiotherapy focuses on regaining range of motion and normal walking pattern.                                                                                                                          |
| 6–12 weeks  | Brace usually discontinued for daily activities around this time (longer if a tibial tubercle osteotomy has been performed, to protect bone healing). Progressive strengthening, return to most daily activities, and return to desk-based work.                                                                                                                                       |
| 3–6 months  | Progressive strength, balance and control work. Introduction of jogging and light agility work once specific strength criteria are met — typically later (around 4–5 months) if a tibial tubercle osteotomy was performed, to allow bony union.                                                                                                                                        |
| 6–12 months | Structured return-to-sport testing (strength, hop and patellar control tests comparing both legs) guides a graded return to pivoting or contact sport. Isolated MPFL reconstruction typically allows return to sport from around 4–6 months; when combined with a tibial tubercle osteotomy, return to sport is generally delayed to 6–9 months to allow the osteotomy to fully unite. |

## Supervised Physiotherapy: A Non-Negotiable Part of Recovery

MPFL reconstruction is almost always day surgery or a single overnight stay, so there is no ‘inpatient rehabilitation’ equivalent. Instead, the quality of your outpatient physiotherapy is the key factor:

- **Structured, supervised physiotherapy:** regular, criteria-based physiotherapy — progressing brace weaning, range of motion and strengthening according to clearly defined milestones rather than by time alone — supports the best functional recovery and lowest risk of stiffness or re-injury. This should continue through to formal return-to-sport testing before resuming pivoting or contact sport.
- **Unsupervised or minimal rehabilitation:** relying on a generic exercise sheet without regular hands-on review increases the risk of persistent quadriceps weakness, stiffness, and returning to activity before the patella is truly stable.

Dr Calligeros strongly recommends a structured rehabilitation program with a physiotherapist experienced in patellofemoral rehabilitation, including formal strength and control testing before clearance to return to pivoting sport.

## Risks of Surgery

As with any surgery, MPFL reconstruction (with or without adjunct procedures) carries risks. Your surgeon will discuss these with you in detail, and they include (but are not limited to):

- Recurrent instability or redislocation — uncommon, but can occur, particularly if underlying anatomical risk factors are not adequately addressed
- Infection (superficial or deep)

- Blood clots (deep vein thrombosis or pulmonary embolism)
- Stiffness or reduced range of motion
- Patellar fracture — a rare but recognised risk related to the tunnel drilled in the patella for graft fixation
- Overcorrection or undercorrection — leading to excessive tightness (restricting movement or overloading the joint) or residual looseness (persistent instability)
- Numbness around the incision — from irritation of small sensory nerve branches near the surgical sites
- Donor-site symptoms — mild hamstring weakness if an autograft gracilis tendon is used
- Specific risks of tibial tubercle osteotomy, where performed — delayed union or non-union of the osteotomy site, hardware (screw) irritation sometimes requiring removal, and a small risk of fracture through the osteotomy site
- Risks of anaesthesia, and medical complications such as cardiac or respiratory events
- The possible need for further surgery

### Expected Outcomes

MPFL reconstruction has good overall success rates in restoring patellar stability. It is important to have realistic expectations:

| Proportion | Outcome                | What this means                                                                                                           |
|------------|------------------------|---------------------------------------------------------------------------------------------------------------------------|
| ~85–90%    | Excellent/good outcome | Restored patellar stability, meaningful improvement in knee-related quality of life, and return to desired activity level |
| ~5–10%     | Moderate outcome       | Improved stability but with some residual anterior knee discomfort, mild apprehension, or activity modification           |
| ~3–6%      | Recurrent instability  | Further dislocation or persistent subluxation despite surgery                                                             |

**A note on graft and procedure selection:** the small proportion of patients who experience recurrent instability after MPFL reconstruction most often do so because an underlying anatomical risk factor (significant trochlear dysplasia, a markedly elevated TT-TG distance, or significant patella alta) was not fully addressed at the time of the original surgery. This is why careful pre-operative assessment — and, where indicated, combining MPFL reconstruction with a tibial tubercle osteotomy or other adjunct procedure — is important for durable stability, rather than treating every patient with an isolated soft-tissue reconstruction alone.

### Outcomes — Evidence Summary

Patellofemoral instability predominantly affects younger, active patients, so the most informative data comes from systematic reviews, meta-analyses and long-term surgical cohort studies, rather than a joint replacement registry.

| Measure                                                                                | Evidence                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Re-dislocation rate after isolated MPFL reconstruction                                 | Approximately 3–6 in every 100 patients across long-term follow-up studies                                                                                                                                        |
| Re-dislocation/subluxation rate in adolescent series                                   | Approximately 5–7 in every 100 patients at short-to-medium term follow-up                                                                                                                                         |
| Redislocation rate without surgery (rehabilitation alone) after first-time dislocation | Considerably higher — pooled estimates around 30 in every 100 patients, compared to around 7 in every 100 with early MPFL reconstruction                                                                          |
| Reoperation rate                                                                       | Low — well under 5 in every 100 patients in long-term follow-up studies                                                                                                                                           |
| Autograft vs allograft outcomes                                                        | Current evidence suggests broadly comparable redislocation and functional outcomes between autograft and allograft, though the evidence base for allograft in adolescents remains more limited than for autograft |

In practical terms, MPFL reconstruction is reliable and durable, with redislocation rates comparing very favourably to non-operative management. Key modifiable factors: accurate identification of anatomical risk factors before surgery, appropriate use of adjunct procedures where indicated, and completing structured rehabilitation before return to pivoting sport.

*Figures above are approximate, rounded values based on published systematic reviews, meta-analyses and cohort studies, and may vary between studies and patient populations; your surgeon can discuss the figures most relevant to your specific anatomy and circumstances.*