

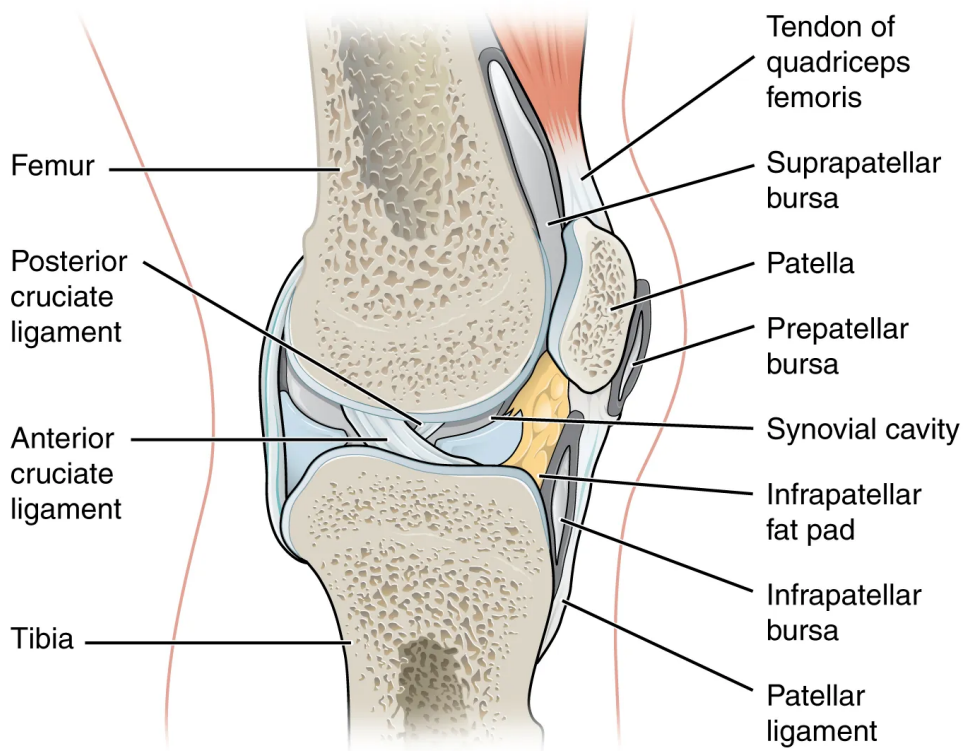
ACL Reconstruction

Patient Information Sheet

What is the ACL?

The anterior cruciate ligament (ACL) is one of the main stabilising ligaments inside the knee. It runs diagonally through the middle of the joint, connecting the thigh bone (femur) to the shin bone (tibia), and its main role is to prevent the shin bone from sliding forward relative to the thigh bone and to control rotational (twisting) stability of the knee.

The ACL is particularly important during activities that involve pivoting, cutting, jumping and sudden changes of direction — common movements in sports such as football (soccer and AFL), netball, basketball and skiing.



Sagittal (side-on) view of the knee joint, showing the anterior and posterior cruciate ligaments, patella, and surrounding bursae.

Image: Betts et al., Anatomy and Physiology (OpenStax), Fig. 9.19a — licensed under CC BY 4.0. Access for free at openstax.org/books/anatomy-and-physiology/pages/1-introduction

What Are the Causes?

ACL injuries usually occur through one of the following mechanisms:

- Non-contact pivoting injury — the most common mechanism, where the foot is planted and the body rapidly changes direction or decelerates, causing the knee to twist
- Landing awkwardly — from a jump, with the knee buckling inward (valgus collapse)
- Direct contact — a blow to the outside of the knee, such as a tackle, forcing the joint to buckle inward
- Sudden deceleration or hyperextension — of the knee during rapid stopping

Certain factors increase the risk of ACL injury, including:

- Participation in pivoting/cutting sports (football codes, netball, basketball, skiing)
- Female sex — female athletes have a higher rate of ACL injury than male athletes in comparable sports, related to anatomical, hormonal and neuromuscular factors
- Previous ACL injury — to either knee

- Poor neuromuscular control or landing mechanics
- Playing surface, footwear and level of fatigue

Non-Operative Treatment

Not every ACL injury requires surgery. Non-operative (rehabilitation-based) management may be appropriate for patients who:

- Do not participate in pivoting or high-demand sport
- Have a low level of instability or giving-way with daily activities
- Are able to regain good dynamic knee control through structured physiotherapy (sometimes called being a 'coper')
- Have other factors (such as significant medical comorbidities) that make surgery a higher risk than the benefit it would provide

Non-operative management centres on physiotherapy (quadriceps/hamstring strengthening, neuromuscular control, balance training), sometimes with bracing. Patients with ongoing instability despite good rehabilitation, or who wish to return to pivoting sport, are generally better served by reconstruction — repeated instability risks further meniscal/cartilage damage.

Role of Physiotherapy in Preparation for Surgery

'Prehabilitation' before ACL reconstruction is strongly supported by evidence and is one of the most important predictors of a smooth recovery. Benefits include:

- Settling swelling and inflammation in the knee — operating on a 'quiet' knee significantly reduces the risk of post-operative stiffness (arthrofibrosis)
- Restoring full range of motion, particularly full knee extension, before surgery
- Restoring quadriceps activation and strength, which is one of the strongest predictors of early functional recovery after surgery
- Normalising your walking pattern and reducing any limp
- Learning the exercises and movement patterns you will use immediately after surgery

Patients who go into surgery with a calm, well-moving knee and good quadriceps control generally progress through rehabilitation more quickly and with a lower risk of stiffness.

Indications for Surgery

ACL reconstruction is generally recommended when:

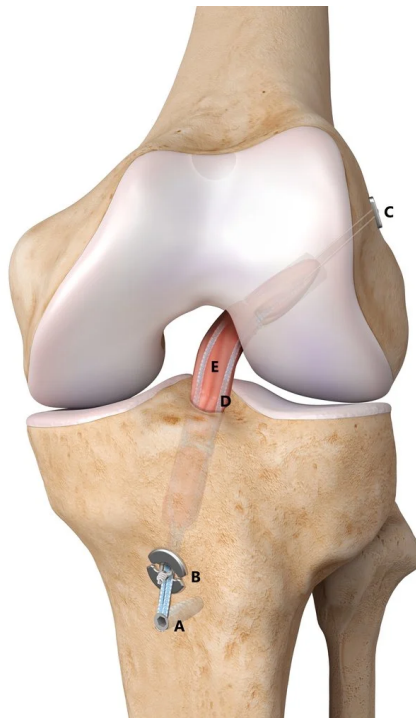
- There is confirmed ACL rupture on clinical examination and MRI
- The patient wishes to return to pivoting, cutting or high-demand sport
- There is ongoing instability or episodes of the knee 'giving way' during daily activities, despite rehabilitation
- There is an associated meniscal or cartilage injury that would benefit from a stable knee to protect it going forward
- The patient is medically fit for surgery and understands the substantial rehabilitation commitment involved (typically 9–12 months to return to sport)

The decision to proceed with reconstruction is individual and is made jointly between you and your surgeon, taking into account your age, sporting goals, occupation, and the presence of any associated knee injuries.

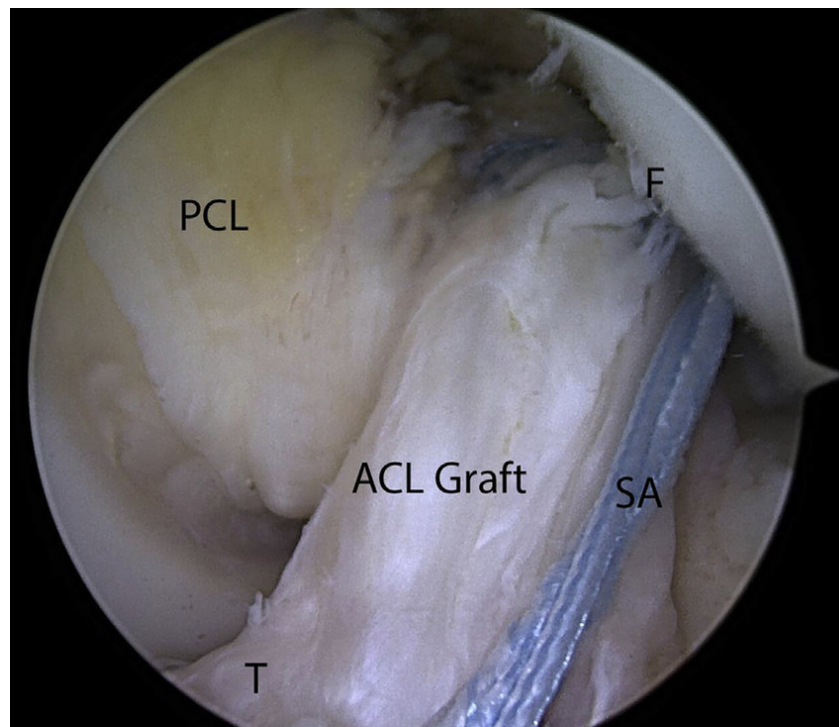
What is ACL Reconstruction?

ACL reconstruction is a keyhole (arthroscopic) operation to replace the torn ligament with a new graft, since the ACL does not reliably heal on its own once torn. The graft is threaded through tunnels drilled in the tibia and femur,

in the same position as the original ACL, and fixed in place with screws, buttons or other fixation devices to allow it to heal into the bone over time.



Example ACL graft fixation: the graft (E) runs through tunnels in the femur and tibia, in the position of the native ACL (D), secured with a suspensory button on the femoral side (C) and an interference screw and washer on the tibial side (A, B).



An arthroscopic (keyhole camera) view of a completed ACL graft in place, shown alongside the posterior cruciate ligament (PCL), the femur (F) and tibia (T), with a surgical probe (SA) used to assess graft tension and integrity.

Several graft options are available, each with its own advantages and trade-offs:

- Hamstring tendon autograft — uses the patient's own hamstring tendons (semitendinosus ± gracilis); avoids anterior knee pain but can cause some hamstring weakness
- Patellar tendon (bone–patellar tendon–bone) autograft — uses the central third of the patient's own patellar tendon; historically associated with slightly lower re-rupture rates in young athletes, but with a higher rate of anterior (front of) knee pain and kneeling discomfort

- Quadriceps tendon autograft — an increasingly popular option, using a strip of the patient's own quadriceps tendon
- Allograft (donor tissue) — occasionally used, particularly in revision surgery or older, lower-demand patients; avoids donor-site morbidity but carries a higher re-rupture rate in young, active patients

The most appropriate graft depends on your age, activity level, sporting goals and any previous surgery, and will be discussed with you individually.

What is the Recovery?

Recovery from ACL reconstruction is a structured, criteria-based process, and full return to pivoting sport typically takes 9–12 months (sometimes longer). The following is a general guide:

Timeframe	What to expect
0–2 weeks	Day surgery or one-night stay. Crutches used for comfort (weight-bearing as tolerated unless otherwise instructed), knee brace if prescribed, focus on reducing swelling, achieving full knee extension, and regaining quadriceps control ('switching the quad back on') with physiotherapy.
2–6 weeks	Wound review. Progressive weaning off crutches as swelling settles and quadriceps control improves. Physiotherapy focuses on restoring full range of motion, normal walking pattern, and gentle strengthening.
6–12 weeks	Return to most daily activities and light gym-based strengthening (stationary bike, closed-chain exercises). Many patients return to desk-based work within this window; driving once off crutches and confident with braking (surgeon clearance required).
3–6 months	Progressive strength and control work, introduction of running (typically from around 3–4 months once specific strength criteria are met), agility drills and sport-specific movement preparation later in this phase.
6–12+ months	Structured return-to-sport testing (strength, hop and agility tests comparing the operated and non-operated leg) guides a graded return to pivoting or contact sport. Most surgeons and physiotherapists recommend return to high-risk pivoting sport only after 9–12 months, and only once objective criteria are met — not by time alone.

Supervised Physiotherapy: A Non-Negotiable Part of Recovery

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

- **Structured, supervised physiotherapy:** regular, criteria-based physiotherapy — progressing through clearly defined strength and control milestones rather than by time alone — is strongly associated with better outcomes and lower re-injury rates. This should continue through to formal return-to-sport testing before resuming pivoting sport.
- **Unsupervised or minimal rehabilitation:** relying on a generic exercise sheet without regular hands-on review is associated with slower recovery of strength, a higher risk of returning to sport before the knee is truly ready, and a higher risk of re-injury.

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

Risks of Surgery

As with any surgery, ACL reconstruction carries risks. Your surgeon will discuss these with you in detail, and they include (but are not limited to):

- Graft rupture (re-tear) — particularly with early or premature return to pivoting sport
- Infection (superficial or deep)
- Blood clots (deep vein thrombosis or pulmonary embolism)
- Stiffness or reduced range of motion (arthrofibrosis)
- Persistent instability or a feeling that the knee is not 'quite right'
- Donor-site symptoms — anterior knee pain and kneeling discomfort (patellar tendon graft), or hamstring weakness (hamstring graft)
- Numbness over the outer shin — from irritation of a small sensory nerve (infrapatellar branch of the saphenous nerve) near the incision
- Growth plate injury — a specific consideration in skeletally immature (still-growing) adolescent patients, managed with modified surgical techniques
- Longer-term risk of osteoarthritis in the knee, particularly if there is associated meniscal or cartilage damage
- Risks of anaesthesia, and medical complications such as cardiac or respiratory events
- The possible need for further (revision) surgery

Expected Outcomes

ACL reconstruction has good overall success rates, but outcomes vary considerably with age, sport and rehabilitation quality. It is important to have realistic expectations:

Proportion	Outcome	What this means
~80–90%	Return to sport	Return to some level of sport participation after surgery and rehabilitation
~55–65%	Return to pre-injury level	Return to the same level, intensity and type of sport as before the injury (higher in elite/professional athletes)
~10–15%	Persistent symptoms	Ongoing instability, swelling or reduced confidence in the knee despite a technically well-performed reconstruction

A note on younger athletes: patients under 25 years of age who return to high-risk pivoting or cutting sport have a substantially higher combined risk of a second ACL injury (either graft re-rupture or a new injury to the opposite knee) — reported at up to around 1 in 4 in this group. This is not a reason to avoid sport, but it is an important conversation to have when planning your rehabilitation timeline and return-to-sport testing, since passing objective strength and control testing (rather than returning by time alone) meaningfully reduces this risk.

Outcomes — Evidence and Registry Data

ACL reconstruction predominantly affects younger, active patients, so the most informative data comes from large surgical cohorts, national knee ligament registries (Swedish and Norwegian) and systematic reviews/meta-analyses, rather than joint replacement registries.

Measure	Evidence
Overall graft rupture (re-tear) rate	Approximately 6–8 in every 100 patients over the first decade after surgery
Contralateral (opposite knee) ACL injury	Approximately 6–8 in every 100 patients — a reminder that the underlying risk factors (strength, control, sporting demands) affect both knees
Combined second ACL injury risk in young athletes returning to pivoting sport	Up to around 1 in 4 (23%) in patients under 25 years of age who return to high-risk pivoting/cutting sport

Measure	Evidence
Effect of age	Patients under 25 (and particularly adolescents) have a substantially higher risk of graft rupture than older patients, likely reflecting higher activity demands and ongoing sporting exposure
Effect of criteria-based return to sport	Passing objective return-to-sport testing (rather than returning by time alone) is associated with roughly a one-third reduction in re-rupture risk

In practical terms, the great majority of patients who undergo ACL reconstruction do not experience a further ACL injury, and most regain a stable, functional knee. The main modifiable factors that improve these odds are completing a full, structured rehabilitation program, delaying return to pivoting sport until at least 9–12 months, and passing objective return-to-sport testing rather than returning based on time or how the knee ‘feels’ alone.

Figures above are approximate, rounded values based on published systematic reviews, meta-analyses and cohort/registry data, and may vary between studies and patient populations; your surgeon can discuss the figures most relevant to your age, sport and graft choice.