# How do outcomes compare between treatments?

## What outcomes are similar between treatment options?

Studies have shown that there is very little difference in outcomes between ACL reconstruction surgery and rehab without surgery. Both treatment options result in similar levels of:[1 - 3]

- Knee function ( like using stairs, running)
- Knee strength
- Activity levels
- Quality of life
- Knee pain
- Knee symptoms (like stiffness, swelling
- Additional meniscus* surgeries
- Additional injury to the meniscus*

*meniscus = C-shaped fibrocartilage structures in the knee joint that play a role in shock absorption in the knee

## What outcomes differ based on treatment choice?

### ACL reconstruction surgery

ACL surgery may cause worse knee proprioception (the brain's ability to know where the knee is in space).[4] It can also lead to more swelling in the knee joint and more changes in the cartilage within two years of injury[5] compared to rehab without surgery.

Studies have found that after ACL surgery, there are more signs of knee osteoarthritis (OA) seen on x-ray than with rehab without surgery.[6 - 8] However, not everyone with OA seen on x-ray experiences knee pain and symptoms. There are not yet enough studies to say if rates of painful knee OA differ between ACL surgery and rehab without surgery.

### Rehab without surgery

Rehab without surgery may result in more laxity of the knee (increased movement in the knee joint when a clinician or machine applies force to the knee) compared to ACL surgery.[9]

But studies that found an increase in knee laxity also found no difference in knee function or stability (if a person feels their knee is stable during activities) between surgical and non-surgical groups.

## Can my ACL heal without surgery?

People used to think that the ACL could not heal without surgery, but new research suggests that healing is possible. This new research shows that after rehab without surgery, at least one in three people experience some healing of their ruptured ACL.[10] It is possible that this healing can lead to better function and better quality of life compared with ACL surgery, but this needs further research.[10 11]

Scientists are also currently testing new treatments to help more people heal their ACL naturally without needing surgery.[12]

# Can the surgical graft rupture?

Graft rupture is when the graft that has been used to surgically rejoin the thigh bone to the shin bone tears. This is also known as graft failure.

About one in five people have a second ACL injury in either knee after ACL surgery,[13 - 15] and this risk increases to one in four who return to sport.[15]

### What can happen if the surgical graft ruptures?

People who rupture their ACL graft and people who have another ACL surgery are more likely to experience poor outcomes, including:[16 - 19]

- Poor function
- Long-term pain
- More damage to the meniscus and the cartilage in the knee
- Reduced chance of returning to sport
- High rates of another graft rupture after a second ACL surgery
- A higher risk of knee osteoarthritis (OA)

### Who is at risk of rupturing an ACL graft?

The risk of graft rupture after ACL surgery can vary. People with a high risk of rupturing their ACL graft may include those who:[20 - 25]

- Return to sports that involve quick changes in direction or sudden turns
- Are less psychologically ready to return to sport
- Have an early ACL surgery, within one year of injury
- Have a family history of ACL injury
- Are young at the time of ACL injury
- Are male
- Report knee issues (like swelling, pain, reduced movement) before ACL surgery
- Have a medial collateral ligament (MCL) injury
- Have weak thigh muscles and still find it hard to hop when they return to sport
- Return to sport earlier than 9 months after ACL surgery

Many surgical factors also impact the likelihood of graft rupture. These include the placement and technique used to drill the bone tunnels, the choice of graft, the size and tension of the graft, surgical errors and complications including infection.

# Returning to sport

About half of all people with an ACL injury will return to sport, and this is the same whether they choose ACL surgery or rehab without surgery.

### What are the stats?

- On average, only 55% of people return to competitive sport after ACL surgery[26]
- The average time that it takes people to return to sport after surgery is 17 months[27]
- 37% of people who do return to sport after ACL surgery are unable to perform at their previous level[27]

### Which treatment option is better in terms of returning to sport?

On average, people are just as likely to return to sport if they choose surgery or rehab without surgery.[28 - 30]

### What might stop me returning to sport?

The most common reason people don't return to sport after ACL surgery is a fear of injuring their knee again.[27 31-32]

People with low confidence in their knee, ongoing pain and swelling, poor knee function, a loose ACL graft, and weak thigh muscles may also be less likely to return to sport after ACL surgery.[33 - 34]

We know less about barriers to returning to sport after rehab without surgery.

# Risk of further knee surgery or injury

There is a risk of going on to have further knee surgery or other knee injuries after an ACL injury.

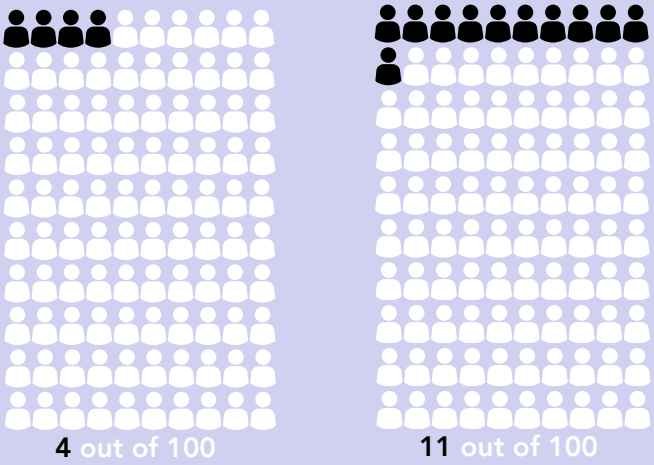
### What is the chance of having further knee surgery?

- At least 10% of people (1 in 10) are likely to have additional knee surgery, such as meniscus surgery, after an ACL tear. [35]

### What is the chance of having further knee injury?

Further knee injury (i.e. the knee giving way and injuring other structures like the meniscus, ACL graft or cartilage) can occur after ACL reconstruction surgery and after rehab without surgery.

There are not many studies that compare the rates of further knee injuries between treatments. One study of 275 people with ACL injury who tried rehab for around 3 months before considering ACL surgery, found that 4% of people (4 out of 100) managed without surgery had a new knee injury within 2 years. In comparison, 11% of people (11 out of 100) who decided to have ACL surgery had a new knee injury after surgery.[65]




# Strength and function

There is less strength in the muscles around the knee after ACL surgery, and this can take years to recover. There is less known about muscle recovery after rehab without surgery.

### Muscle strength after ACL surgery

- ACL surgery can cause weakness in the thigh muscles (quadriceps) and can change muscle control of these muscles. These changes can affect how much force goes through the knee during activities such as walking, running, jumping, or going up stairs and can last several years. [36 - 50]
- Studies have found that only a small number of people (less than 25%) have the same muscle strength in their injured knee as in their other knee one year after surgery, and it can take around five years for the strength to recover.[37]

### Knee function after ACL surgery

Knee proprioception (the brain's ability to know where the knee is in space) is reduced after surgery, compared to the other knee and compared to management with rehab without surgery.[4 51]

# Psychological impacts

There can be long-term psychological impacts of ACL injury, and these tend to be similar for people treated with ACL surgery or rehab without surgery.

**What are the possible long term impacts?**

ACL injury can have long lasting psychological impacts, such as:[20 52-56]

- a fear of injuring the knee again
- symptoms of depression (which are common within 6 weeks of surgery)
- Low confidence in the knee
- Poor long-term quality of life

People who don't go back to sports or who exercise less after an ACL injury tend to have a higher fear of re-injuring their ACL and worse long-term quality of life.[20 57]

**Which treatment option has better psychological outcomes?**

Whether you have ACL surgery or rehab without surgery, it is likely that your quality of life in the long run will be similar.[54]

# Knee osteoarthritis

Osteoarthritis (OA) is a disorder that can affect any moveable joint of the body. It can cause breakdown of tissues and changes to the knee joint. OA can cause pain, stiffness and loss of movement. People with ACL injury have an increased risk of developing OA in their injured knee.

**How likely am I to develop osteoarthritis after ACL injury?**

- Someone with an ACL injury is 7 times more likely to get OA compared to people with no ACL injury.[58]
- The chances of developing OA increase even more for people who have ACL surgery who are around 8 times more likely than someone without an ACL injury.[58]
- The knee that has had surgery is 3 to 4 times more likely to get OA than the knee that hasn't.[59 - 60]
- OA is common 10 years after an ACL injury and the risk goes up over time.[61]
- More than 20 years after ACL surgery, 73% of people have signs of OA in their knee on X-ray. Of these, 26% have moderate to severe OA and 13% will have severe OA.[59 62]
- It is important to remember that not everyone who has signs of OA on X-ray will have symptoms of OA - some people experience no pain or swelling at all.

**Who is most at risk of osteoarthritis?**

If you have had an ACL injury, certain things may increase your risk of going on to have knee OA. These include:[59 62-64]

- Damaged cartilage at the time of ACL surgery
- Removal of all or part of the meniscus at the time of ACL surgery
- Non-ideal drill tunnel placement during surgery
- Use of a specific surgical drilling technique (transtibial drilling)
- Returning to certain sports after ACL surgery
- Inability to fully straighten or fully bend the knee after ACL surgery

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