

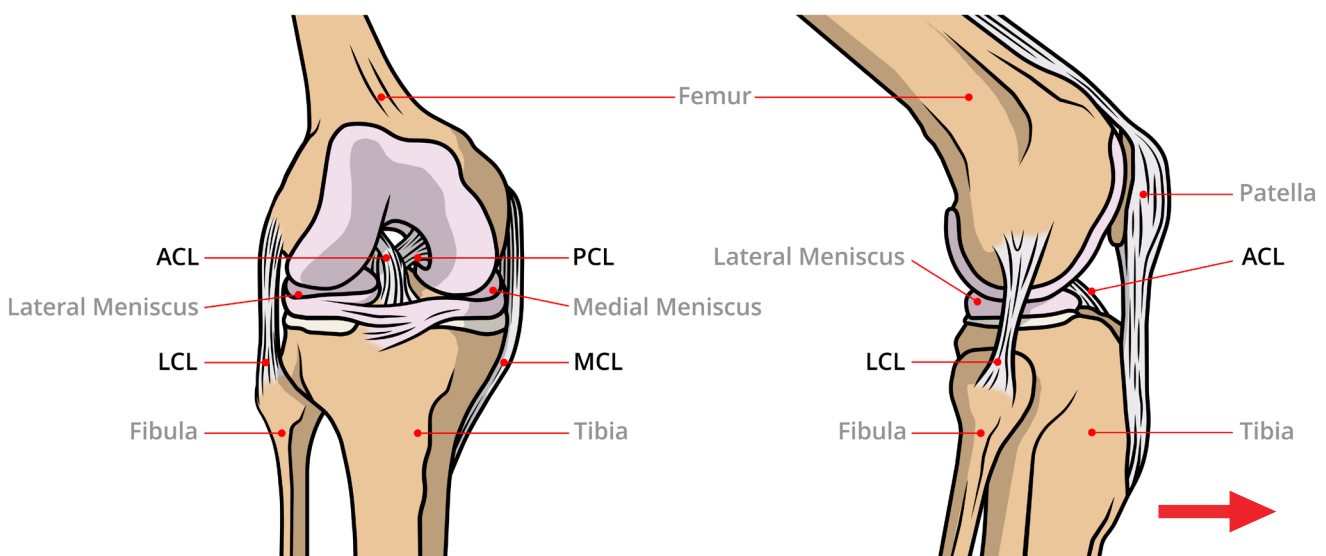
ACL Reconstruction

For a serious knee injury



What is the ACL? And what is a ligament?

- A ligament is a strong band-like structure that is made of a protein called collagen and connects two bones of a joint.
- Four ligaments control the movement of the knee bones and stabilise the joint (see the following image).
- The Anterior Cruciate Ligament (ACL) is one of those four ligaments that connect the knee bones, the Femur (thigh bone) to the Tibia (shin bone).
- The primary function of the ACL is to control/constrain/limit the forward movement of the tibia against the femur (arrow); and so it contributes to the stability of the knee.



ACL injury

- An ACL partial tear or complete rupture is a knee injury that occurs frequently on the sporting field, but also to people from all occupations in road traffic and other accidents.
- As the ACL contributes to the stability of the knee, a tear or rupture requires reconstruction to restore the joint stability.

Statistics

- The true number of ACL worldwide injuries is unclear, but anecdotally, it is estimated that 600,000 ACL reconstruction procedures are performed each year worldwide. The number of injuries will naturally exceed the number of reconstructions.
- It is estimated that there are 75 ACL injuries per 100,000 of the population of which 45 are reconstructed.

Most publications on the subject report local studies i.e. in individual countries. These are easily searchable on the internet.

A speedy return to the activities you love



After an ACL injury, to help your speedy recovery, knee surgery is often the best option. Let's explore this injury and its treatment...

Are you experiencing the following symptoms?

- Shooting pain in your knee joint.
- Swelling of the knee limiting your ability to fully bend it.
- Instability when moving.
- Inability to weight-bear.

These symptoms are likely caused by damage to your Anterior Cruciate Ligament (ACL).

When your ACL is torn, partially or completely, or when one end of the ligament and a bone fragment separate from the rest of the bone, then knee surgery is the best option.

Consequences of ACL rupture

- *The immediate consequence* of ACL rupture is loss of constraint on the forward movement of the tibia with respect to the femur. In other words, the joint becomes more lax (looser) with much play between its two bones.
- *In the long term*, if the injury is not attended to, the laxity of the joint may increase to an extent leading to its instability, and a seriously curtailed quality of life.

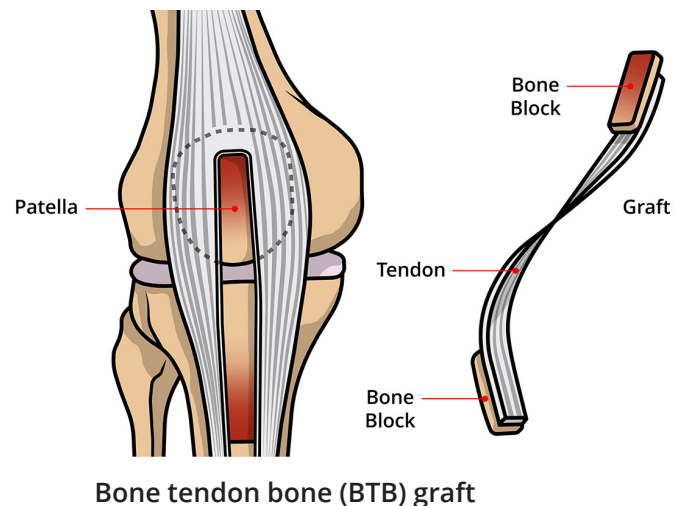
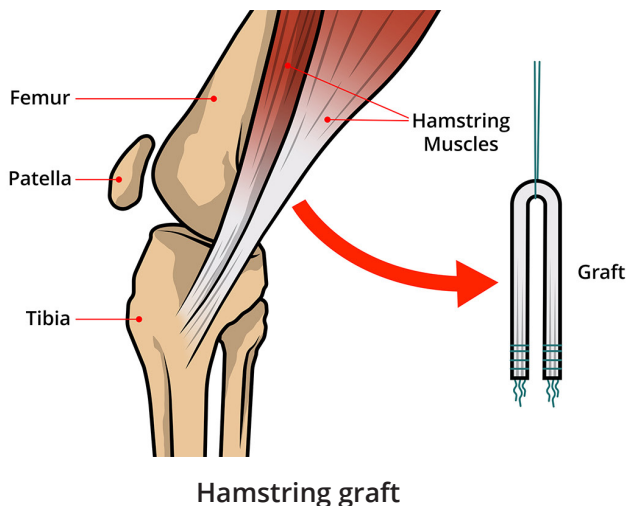
Treatment Options

- **Conservative:** by this we mean no surgery is performed, and you, the patient would be recommended to have physiotherapy and exercise to strengthen the extensor knee muscles, the quads.
- **Surgical:** Reconstruction of the ACL is a well-developed surgical procedure that's frequently performed especially on active individuals, especially in sport or an intense physical job.

Materials surgeons use for ACL reconstruction

You may be the recipient of ACL reconstruction with any of the following materials:

- **Synthetic devices:** The most commonly used devices are made from polyester, which is a biocompatible material i.e. not rejected but well tolerated by the human body.
- **Autologous tissue:** This is the patient's own tissue, which the surgeon 'harvests' during surgery. This can be either two of your hamstrings, or a strip of your patellar ligament (normally the middle third) with two small bone blocks attached to it, one either end of the strip. One of the two bone blocks is taken from the patella (your kneecap), the other from the tibia (your shin bone). This graft is known as a BTB graft. (See the following images).
- **Allograft:** This is tissue similar to the above that has been obtained from a deceased donor (a dead person) and preserved for surgery on a living patient.



So what are the merits of a synthetic ACL graft?

Well, there are a lot!

1. **It eliminates or reduces the need to harvest a patient's own tissue, which means:**
 - Less time under anaesthetic and hence, less risk of infection.
 - You would not experience anterior knee pain or restriction on your ability to kneel, when a BTB graft is your own tissue.
 - Much reduced scarring at harvest site.
 - It eliminates the risk of cross-infection as would be the risk when using an allograft.
 - Our synthetic devices have consistent stable strengths, which permit early movement and faster return to work and sports activities. Unlike autologous tissue, whose initial strength decreases over the first 6 months of implantation before it recovers.
 - The human body responds well to the synthetic graft material and overgrows it with native tissue.
 - The synthetic devices are readily available in abundance (in different strengths) and so permit multi-ligamentous reconstruction. By contrast, autologous tissue available for harvesting is limited.
2. **75% saving in volume of bone removed when preparing tunnels in the knee bones, when reconstructing the ACL with a JewelACL™**

Our solution: The JewelACL™

The JewelACL: The longstanding XIROS synthetic graft solution

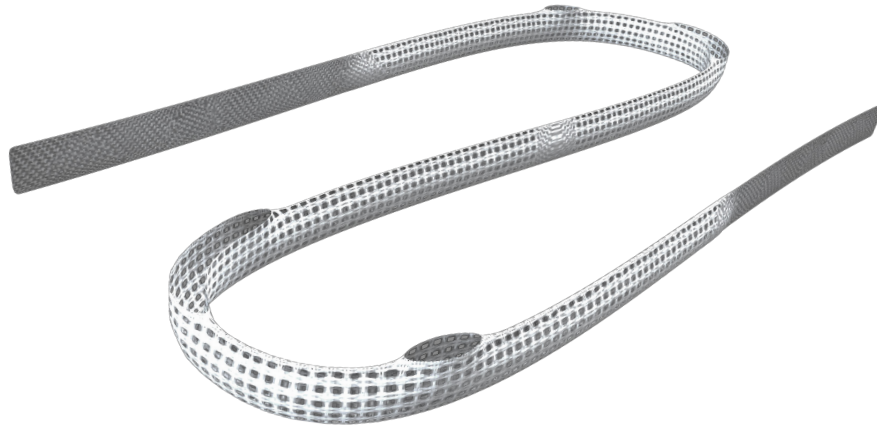
- In use since 2011.
- With similar or better clinical outcomes than those obtained with other types of graft.
- With all the advantages of a synthetic graft listed above.

The JewelACL is the latest generation of our ACL products

- With the same basic structure as the earlier generation, but more easily implanted with a much simpler fixation technique to the bone.

JewelACL Appearance and strength

- A soft flexible open weave tubular structure made from a biocompatible material called Polyethylene Terephthalate (PET), Polyester.
- JewelACL possesses strength matching that of the natural ACL in the body.



How is it used?

- The one-size-fits-all design principle makes surgery simpler and faster.
- If surgeon chooses, the device can be used in conjunction with one hamstring.

What happens to you after surgery?

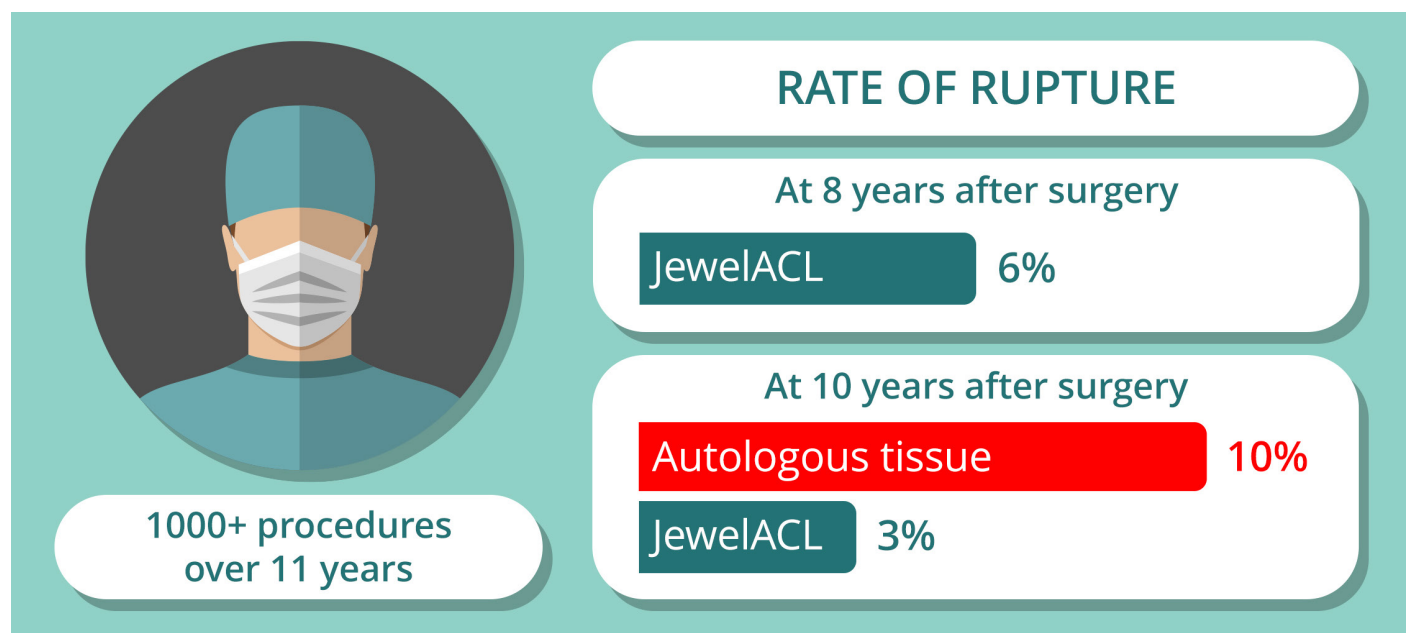
- Your surgeon will prescribe a rehabilitation regime of exercises to follow under the supervision of a physiotherapist.

Number of procedures performed, and complaints received

- Procedures to April 2023: more than 7000
- Number of complaints to that date: 18

Rate of success

- One of our surgeons has performed more than 1000 procedures over the past 11 years.
- In this surgeon's series, the rate of rupture of the JewelACL is 4.8% at eight years after surgery, and 3% at 10 years after surgery.
- Rate of rupture of autologous grafts 10% after eight years (Salmon et al., 2018)



Results are dependent on many factors

- Precise surgical procedure, this is vitally important.
- The patient closely following the prescribed rehabilitation regime.
- The state of the injured joint at the time of surgery; what more may need doing besides ACL reconstruction?
- Timing of the surgery; how soon will the surgery take place after the injury? Frequently, the longer this period the less optimal the results.
- If damage has occurred to the menisci and either or both menisci were removed, damage to the articular cartilage follows and further deterioration of it will occur with time, possibly leading to arthritis of the knee.

Post Surgery Physiotherapy

The JewelACL reassuringly allows for your surgeon and physiotherapist to guide you through the pathway of a standard ACL rehabilitation protocol.

The high strength of the JewelACL and that of its fixation to the joint bones, allow earlier weight bearing and mobility than is allowed when ACL reconstruction is performed with autologous tissue alone.

An example programme developed in conjunction with Ian Horsley MSc, MCSP, Clinical Lead Physiotherapist, English Institute of Sport, BackinAction Physiotherapy and Sports Injury Clinic, Wakefield, UK, is available for download.

The rehabilitation programme should be supervised by a specialist physiotherapist. All mobilisation and exercises should be performed within the pain-free range of movement.

FAQs

Please note that answers to the frequently asked questions featured below have been collated from different surgeons who used the JewelACL for ACL reconstruction.

Responses from Surgeon 1

What can go wrong?

"I think among the things that can go wrong would be: infection, tunnel misplacement, postop knee haemarthrosis (knee swelling). These potential problems can occur with any type of ACL surgery".

How long is the operation?

"In my practice, as the JewelACL surgery does not involve graft harvesting, surgery takes less than an hour".

What is the rate of success of this operation?

"Success rate is close to 94%. My documented results confirm that the failure rate after 10 years is just 6.1 %".

How long will it be until I can become active again?

"My patients mobilise full weight bearing from day one, physiotherapy starting as soon as the pain settles down, which usually takes just a few days, and they are back to normal activities after three months".

Will my joint be as good after surgery?

"As a matter of fact, as the joint becomes stable its function improves, so on the whole the joint should be better after surgery".

Will I have scar tissue?

"This is an absolutely minimally invasive procedure and requires 3 max 4 skin portals (tiny skin incisions which require one suture each to close)".

Will I ever return to normal:

"ACL injury is usually associated with other intraarticular injuries i.e. meniscal injuries and articular cartilage injuries. Some of these injuries are not repairable and can influence successful ACL reconstruction, so the knee may not fully return to normal".

Dr Klaudiusz Kosowski

FAQs continued

Responses from Surgeon 2

What can go wrong?

"[All] the possible complications of standard autograft reconstruction"

How long is the operation?

"Usually it takes about 60 - 90 min. May depend on the need to treat [other existing] injuries."

What is the rate of success of this operation?

"It is high and, according to various statistics, is about 90%".

How long will it be until I can become active again?

"Return to riding a stationary bike and swimming is possible after healing of postoperative wounds, i.e. after about 10 - 14 days. Return to dynamic loads (skiing, football, etc), after rebuilding biomechanics, usually after about 3 months".

Will my joint be as good after surgery?

"The best knee joint was before the injury. According to statistics, the efficiency should be above 90% of the previous efficiency".

Will I have scar tissue?

"After the procedure, there are three small 4 - 7 mm scars, two in the place of insertion of arthroscopic instruments and one in the place of tibial stabilisation".

Will I ever return to normal:

"Not all patients return to their pre-injury level of activity. Over 90% return to the level of amateur activity. The degree of return to a high level of sports fitness is unfortunately lower".

Dr Maciej Kentel