PROCEDURE

Meniscal allograft transplantation

Meniscal allograft transplantation replaces a missing knee meniscus with matched donor tissue.

PURPOSE
Reduce pain and restore cushioning after major meniscus loss

PROCEDURE TYPE
Therapeutic surgery, usually arthroscopic-assisted

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General

HOW LONG IT TAKES
About two to three hours

PREPARATION
Fasting, medication review, transport home, crutches

RECOVERY
Same day or overnight; no driving until cleared

MAIN RISKS
Infection, blood clots, stiffness, graft failure

RESULTS
Symptom improvement assessed over six to twelve months

Overview

The menisci are two C-shaped pads of tough cartilage inside each knee. They distribute weight, absorb shock, and help keep the joint stable.

A meniscus may be mostly or completely removed after a serious tear. Without this cushioning, the affected part of the knee can become painful and may wear down more quickly.

Meniscal allograft transplantation replaces the missing meniscus with human donor tissue. The graft is carefully sized to match your knee. It is secured to the shin bone and joint capsule using sutures and, in some techniques, small plugs or a bridge of donor bone.

This operation is intended to reduce pain and improve function. It cannot make the knee

completely normal or guarantee that arthritis will not develop. Unlike an organ transplant, it does not usually require anti-rejection medication.

Why the procedure is performed

The procedure is mainly considered for ongoing pain after most or all of a meniscus has been removed. The pain should be coming from the same side of the knee as the missing meniscus.

It may help if pain limits walking, work, exercise, or other activities despite rehabilitation and changes to activity. The aim is to restore some load distribution and protect the remaining joint surfaces.

Meniscal transplantation is not usually performed simply because a meniscus is missing. If you have little or no pain, the possible benefits may not outweigh the risks and recovery involved.

Who should and should not have it

You may be considered for transplantation if you:

There is no single age limit that suits everyone. Your activity level, cartilage condition, overall health, and goals are more important than age alone.

The operation may not be appropriate if there is advanced arthritis with major loss of joint space. In that setting, replacing the meniscus is unlikely to solve the main problem.

Surgery may also be avoided or delayed because of:

Instability or poor alignment can sometimes be corrected during the same operation or in a separate procedure. Your surgeon may also treat damaged joint cartilage at the same time.

- Have lost most or all of one meniscus
- Have persistent pain in that part of the knee
- Have little or limited arthritis in the affected compartment
- Have a stable knee with acceptable leg alignment
- Can follow a long rehabilitation programme
- Active infection or broken skin around the knee
- Uncorrected knee instability, such as a torn major ligament
- Significant bow-legged or knock-kneed alignment that overloads the graft

- Inflammatory joint disease that is not controlled
- Medical conditions that make surgery or anaesthesia unsafe
- Inability to protect the graft during rehabilitation

How to prepare

Your treating facility's own instructions take priority because surgical and anaesthetic plans differ.

Before surgery, your team may arrange standing X-rays, an MRI scan, and measurements to select a suitably sized donor meniscus. There may be a waiting period while an appropriate graft is found.

Tell the team about all medicines, supplements, allergies, and health conditions. Blood-thinning medicine can increase bleeding, but stopping it without a plan may be dangerous. Follow the specific instructions given by the clinician who manages it.

You will usually need to stop eating and drinking before general anaesthesia. Follow the exact fasting times provided by the facility.

Arrange for an adult to take you home and, if requested, stay with you after outpatient surgery. Prepare your home for limited mobility. You may need crutches, a knee brace, loose clothing, and help with meals or stairs.

If you develop an illness, fever, skin infection, or wound near the knee before surgery, contact the surgical team.

What happens during the procedure

After general anaesthesia, the surgeon first examines the inside of your knee using an arthroscope. This is a narrow camera passed through a small incision.

Any remaining unstable meniscus tissue is trimmed while preserving a firm outer rim where possible. The surgeon also checks the joint cartilage and ligaments. Findings that were not clear on scans may affect whether transplantation can proceed.

The donor meniscus is prepared to fit your knee. The exact technique depends on which meniscus is being replaced and the surgeon's approach. The graft may include small bone attachments or a bone bridge.

The graft is passed into the knee and positioned where the original meniscus sat. It is anchored

to bone and stitched to the surrounding joint lining. Correct placement and secure fixation are checked before the incisions are closed.

You will then move to a recovery area while the anaesthetic wears off. A brace is often placed around the knee.

Recovery and what to expect afterward

Pain and swelling are expected during the first days. Your team may recommend prescribed pain relief, ice, elevation, and gentle ankle movement. Pain should gradually become easier to manage rather than steadily worsen.

You can usually drink and eat after you are awake and no longer feel sick from the anaesthetic. Start with light food if your stomach feels unsettled.

Activity is restricted to protect the graft while it attaches and heals. You will normally use crutches and a brace. Weight-bearing and knee bending are increased according to your surgeon's protocol; restrictions commonly last several weeks. Physical therapy focuses first on swelling, safe movement, and muscle control, then progresses to strength and balance.

Do not drive while taking sedating pain medicine or while a brace, weakness, pain, or restricted movement prevents safe control of a vehicle. Driving is particularly limited after surgery on the right knee. Resume only when your surgeon has cleared you and you can perform an emergency stop safely.

Return to work is based on the physical demands of your job. Desk work may be possible within a few weeks if you can travel safely and elevate the leg. Work involving prolonged standing, lifting, climbing, or kneeling usually requires more time.

Recovery is measured in months. Running, pivoting sports, and deep loaded squats are introduced only after healing, strength, and movement have been assessed. Some people are advised to avoid repeated high-impact activity to protect the graft.

Risks and possible complications

Possible complications include:

Donor tissue is screened and processed to reduce the risk of transmitting infection, but that risk cannot be removed completely. Anaesthesia also has risks, which the anaesthesia team will discuss with you.

- Infection in the wound or knee joint

- A blood clot in the leg or, less commonly, the lungs
- Bleeding, swelling, or stiffness
- Injury to nearby nerves or blood vessels
- Persistent pain or limited movement
- Graft tearing, shifting, shrinking, or failing to heal
- Further cartilage wear or progression of arthritis
- Need for another arthroscopy or later knee surgery

Results and follow up

Your surgeon can explain what was found and completed soon after the operation. However, the success of the transplant cannot be judged immediately.

Follow-up visits check the wounds, swelling, movement, and stability of the knee. Rehabilitation is adjusted as healing progresses. X-rays may be used to assess bone fixation. MRI is not always routine but may be requested if symptoms continue or a graft problem is suspected.

Improvement in pain and function generally develops over several months. A successful graft may allow more comfortable everyday activity, but it does not recreate an untouched meniscus. Some pain may remain, and future treatment may still be needed if arthritis progresses.

Alternatives

Alternatives depend on the amount of meniscus remaining, the condition of the cartilage, knee alignment, and your goals.

- Physical therapy and activity changes: Avoid surgery and can improve strength and function, but do not replace the missing cushion.
- Pain-relieving medicines: May reduce symptoms but do not restore the meniscus. Anti-inflammatory medicines are not safe for everyone.
- Joint injections: May provide temporary symptom relief, but do not rebuild the meniscus or reliably prevent further wear.

- An unloading knee brace: Shifts pressure away from the painful side and avoids surgery, but can be bulky and only works while worn.
- Alignment surgery, or osteotomy: Moves weight away from the damaged compartment. It may be used instead of or with transplantation but involves bone surgery and a substantial recovery.
- Cartilage repair procedures: Treat a defined area of cartilage damage, not the missing meniscus itself. They may be combined with transplantation.
- Partial meniscal scaffolds: May suit selected partial defects, but are not a direct substitute when the meniscus is largely absent and availability is limited.
- Knee replacement: More suitable for advanced arthritis, but replaces joint surfaces and has implant-related limits. It is not generally chosen for an otherwise well-preserved knee.
- No immediate procedure: Reasonable if symptoms are manageable, with monitoring and changes to activities that trigger pain.

When to call your healthcare team

Contact the surgical team promptly for worsening redness, wound drainage, fever, increasing swelling, pain that is not controlled as expected, or new calf pain or swelling. Also call if the brace causes skin injury or you cannot follow the planned weight-bearing instructions.

Seek urgent assessment for a foot that becomes cold, pale, blue, severely numb, or difficult to move.

Call emergency services for chest pain, sudden shortness of breath, fainting, or coughing up blood. These can be signs of a blood clot in the lungs or another emergency.

Mild swelling, bruising, and discomfort are usually discussed at routine follow-up if they are steadily improving.

Common questions

Will I be asleep?

Yes. Meniscal allograft transplantation is usually performed under general anaesthesia, so you are unconscious during the operation. A nerve block may also be offered to help control pain afterward.

Can I drive home?

No. Anaesthesia, pain medicine, and the operated knee make driving unsafe. Arrange for

someone to take you home. You must also wait until you can control the vehicle safely and your surgeon has cleared you.

How painful is it?

Moderate pain and swelling are common at first. Medication, ice, elevation, and the rehabilitation plan usually help. Pain that is severe, rapidly worsening, or accompanied by marked swelling or fever needs prompt advice.

When will I know whether it worked?

The surgeon can confirm how the operation went immediately, but symptom improvement takes months. A fair assessment usually requires rehabilitation and follow-up over six to twelve months.

Where does the donor meniscus come from?

It comes from a deceased human donor. Tissue banks screen donors and process the graft. Imaging measurements are used to find a meniscus that closely matches your knee.

Can I return to sport?

Some people return to selected sports after rehabilitation, but high-impact and pivoting activities may place the graft at risk. Your return should be based on healing, strength, control, and your surgeon's advice rather than time alone.

Sources

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