PATIENT INFORMATION

Anterior lumbar interbody fusion

Why · The operation · The risks

You have been offered an anterior lumbar interbody fusion. This leaflet explains in simple terms **why, how the operation is carried out and what its risks are**. It supplements your consultation and does not replace it: write down your questions and we will answer them together. Take your time to think before deciding.

CHAPTER 1

1 Why a fusion?

The disc, a shock absorber. Between two vertebrae lies a disc, made of a soft central core surrounded by a strong fibrous ring. It allows the spine to move and absorbs shocks. The lowest disc, between the last lumbar vertebra and the sacrum (**L5-S1**), bears the heaviest loads: it is the one most often operated on.

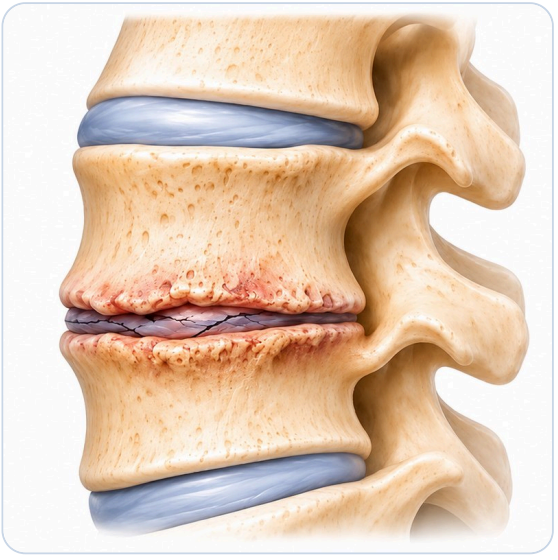
What is a fusion? It means **joining two vertebrae together**. The diseased disc is removed and replaced by a cage filled with bone graft. Over a few months, bone grows through the cage and the two vertebrae become a single block. The painful movement disappears. When only one level is fused, at the very bottom of the back, the loss of mobility usually causes little inconvenience in daily life.

We mainly offer it in two situations.

Situation 1 — The worn, inflamed disc (degenerative disc disease)

Over time, the disc dries out, collapses and develops cracks. In some people, this damaged disc itself becomes painful. The MRI then often shows inflammation of the bone of the vertebrae on either side of the disc ("**Modic changes**"): this is called inflammatory disc disease.

Disc wear is very common and is part of normal ageing, even without pain[3]. Seeing a worn disc on an MRI is therefore not enough: this disc must really be the cause of your pain. That is the whole point of the assessment.



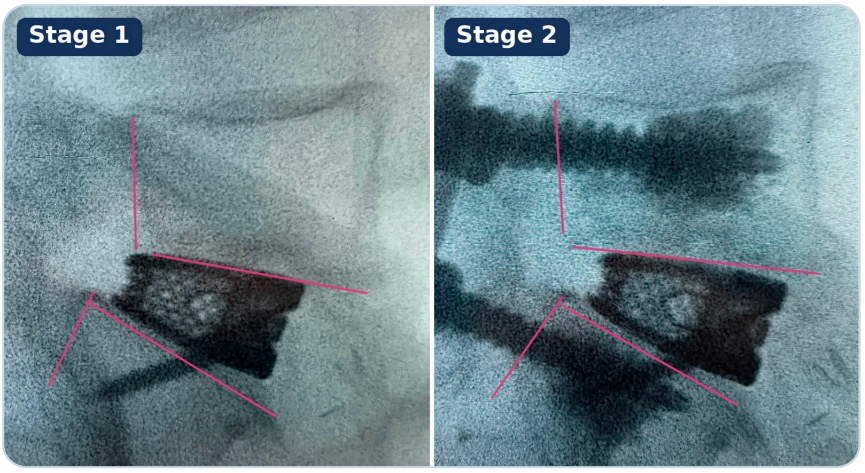
Worn, collapsed disc: the bone of the neighbouring vertebrae is inflamed ("Modic changes").

Situation 2 — Vertebral slip due to a pars defect (isthmic spondylolisthesis)

At the back of each vertebra, a small bony bridge, the **pars**, connects the different parts of the vertebra. It can break, most often in childhood or adolescence, without the person noticing: this is called **spondylolysis**. It is common: it is found on CT scans in **6 to 11% of adults**[1,2], often without any pain.

Without this connection, the vertebra (most often L5) can slip forwards over the one below: this is **spondylolisthesis**. The disc below the slipping vertebra then wears out faster, and the nerves leaving the spine at that level can be compressed.

If the slip is significant, an **additional correction from the back** may be needed, during a second surgical stage. We will tell you in advance at your consultation.



Example of L5 slipping on the sacrum due to a pars defect, side view during surgery. Stage 1: the cage is inserted through the abdomen. Stage 2: an additional correction reduces the slip; the lines show the alignment of L5 on the sacrum.

Possible symptoms

Type	What you may feel
Back pain	Lower back, “like a bar”, sometimes spreading to the buttocks or upper thighs
Pattern	Worse when sitting for a long time, bending forward, standing for long periods or carrying loads; relieved by changing position or lying down
Leg pain	Possible, especially with a slip: a nerve is compressed where it leaves the spine. **By restoring the height of the disc, the operation often frees this nerve.**
Impact	Difficulty sitting, working, sleeping

> **Before offering surgery, we check** that well-conducted non-surgical treatment for at least 6 months (physiotherapy, medication, appropriate physical activity, sometimes injections) has not been enough, and that the disc really is the cause. Tests: lumbar MRI and standing X-rays, including flexion and extension views, supplemented by other tests if needed.
>
> The decision to operate rests mainly on **the impact of your pain on your quality of life**, not only on the test results.

Why through the abdomen? This route reaches the disc from the front, **without touching the back muscles or the nerves**. The disc can be removed completely, which makes it possible to insert a large cage, restore the

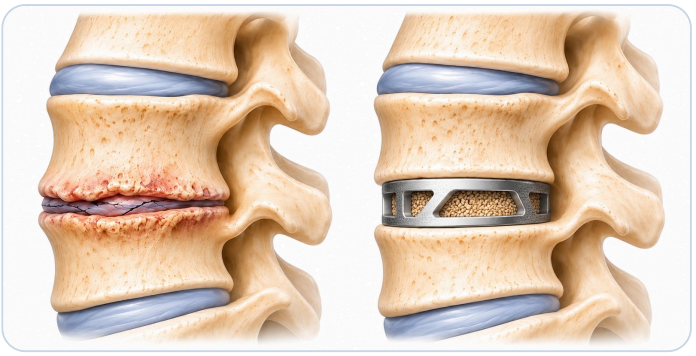
height of the disc and re-establish the natural curve of the lower back. The contact area between bone and graft is large, which helps the fusion.

Fusion and disc replacement in the same operation. When the disc above (L4-L5) is also damaged but still suitable for a disc replacement, both techniques can be combined through the same incision: a **disc replacement at L4-L5** to preserve movement, and a **fusion at L5-S1**. This is called a "hybrid" construct.

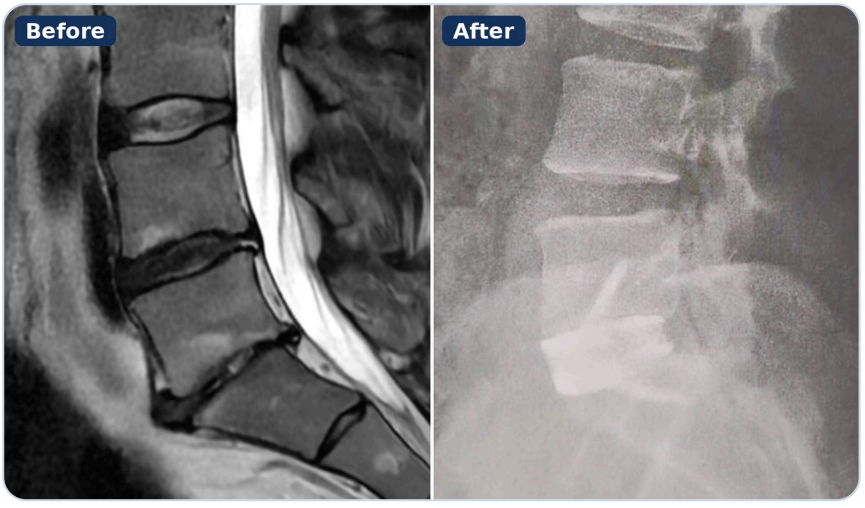
2 CHAPTER 2 The operation

The cage and the graft. The cage is a small hollow titanium implant placed where the disc was. It is fixed to both vertebrae by **built-in screws**, which makes it stable from the time of surgery, without any screws inserted from the back. It is filled with a graft combining three elements:

- **bone marrow** taken from your pelvis (the iliac crest) with a simple needle aspiration during the operation, most often on the left side, without an incision;
- **bone powder** from a tissue bank: this is donor bone, tested and processed according to strict safety rules;
- a **protein that stimulates bone formation**, to promote fusion.



Before: the diseased disc has collapsed and the neighbouring bone is inflamed. After: the cage filled with graft restores the disc height; bone will grow through it to fuse the two vertebrae.

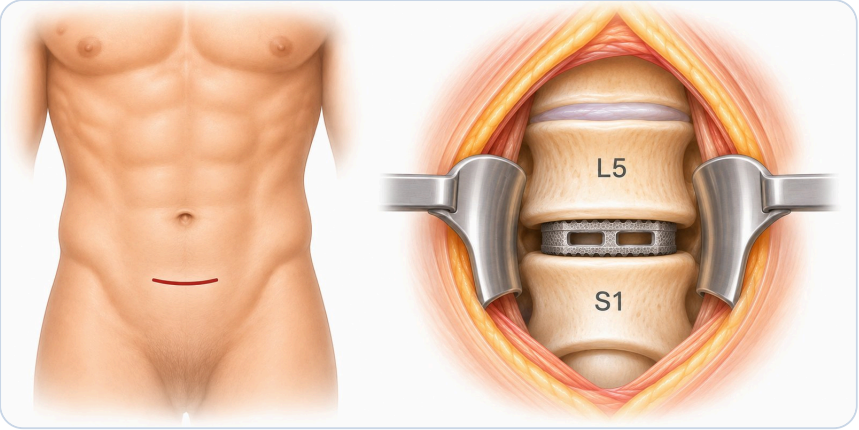


Before: on the MRI, the diseased disc is worn and collapsed; it looks dark, whereas a healthy disc looks bright. After: on the X-ray, the screwed cage is in place and has restored the disc height.

How the operation is carried out (1 to 2 hours)

Step	What happens
1	**General anaesthesia.** You lie on your back.
2	**Horizontal incision in the lower abdomen**, along the underwear line, in the midline.

Step	What happens
3	The surgeon passes behind the lining of the abdomen (the peritoneum), **without opening it**, and gently moves aside the bowel, the ureter and the large blood vessels (aorta, vena cava, iliac vessels) that lie in front of the spine.
4	The level to be operated on is **identified by X-ray** during surgery.
5	The diseased disc is **removed completely** and the surfaces of the vertebrae are prepared to receive the graft.
6	**Bone marrow aspiration** with a needle from the pelvis, most often on the left, to prepare the graft.
7	The **cage, filled with graft**, is inserted and then fixed with its screws. Its position is checked by X-ray.
8	The blood vessels and organs return to their place. **Closure** of the abdominal wall and skin, without a drain.



Left: the horizontal incision, in the midline of the lower abdomen. Right: the cage in place between L5 and S1, with the organs and blood vessels held aside.

> **Your safety:** the approach is performed by your surgeon. A vascular surgeon is always present in the hospital and can step in immediately if needed.

With a hybrid construct, the disc replacement (at L4-L5) and the cage (at L5-S1) are inserted during the same operation, through the same incision. Recovery then follows the disc replacement protocol, with a back brace.

> **Smoking and fusion.** Smoking clearly increases the risk that the vertebrae will not fuse (pseudarthrosis). If you smoke, **stopping is the best thing you can do for the success of your operation**. Your GP or a smoking cessation specialist can help you.

After the operation

When	What happens
Day of surgery	About 1 hour in the recovery room, then back to your room. **First time out of bed 3 hours after surgery.** A urinary catheter is rarely needed.
Day 1 – Day 2	Discharge from hospital, usually **within 48 hours**. Treatment to prevent blood clots is prescribed if needed, depending on your medical history.

When	What happens
Up to 1 month	**No back brace** (except with an associated disc replacement). No driving, and avoid car journeys even as a passenger, except when necessary. Daily walking encouraged. No lifting of heavy loads.
1 month	Start of physiotherapy sessions.
2 months	**Check-up X-rays and consultation.**
3 to 6 months	Return to work and sport, depending on your job, your activity and your recovery.
6 months	**CT scan** to check that the vertebrae have fused.

Expected progress. In the first weeks, your abdomen may be bloated, your bowels slower, and your back may remain painful: this is normal. The goal is an improvement of **about half at 2 months**, of **at least 70% at 6 months**, and progress usually continues for up to 2 years after surgery.

Intimate life · Fertility · Pregnancy

- **Sexual intercourse:** wait until **the skin has fully healed** before resuming. After that, there is no restriction: simply choose positions that are not painful.
- **Fertility (men):** there is a rare risk of retrograde ejaculation (see chapter 3). If you plan to have children, even in the distant future, consider **sperm banking before the operation**, available in specialised centres. The decision is yours: let's discuss it together.
- **Pregnancy:** it is entirely possible after a fusion, and an **epidural** is not contraindicated. If you have previously had lower back surgery from behind, mention it to the anaesthetist who will perform the epidural.

CHAPTER 3

3 The risks of the operation

Every operation carries risks, even when it is performed well. For anterior lumbar fusion, complications are **uncommon**. They are **usually temporary** and heal without after-effects. Serious and permanent complications are rare.

Risks common to all surgery

Risk	Frequency	In practice
Anaesthesia	—	Its specific risks are explained by the anaesthetist during your consultation.
Infection	≈ 1 to 1.5%[5]	Usually superficial, at the scar: local care and antibiotics. More rarely deep, it may require cleaning in the operating theatre.
Haematoma	Rare	A collection of blood at the operation site, which usually resolves on its own. Rarely, further surgery is needed.
Deep vein thrombosis, pulmonary embolism	≈ 1%[9]	Prevented by getting up early and, depending on your history, anticoagulant treatment. Pulmonary embolism is rarer.

Risks related to the approach through the abdomen

Risk	Frequency	In practice
Injury to a blood vessel	≈ 2 to 3%[4,5] (mostly venous)	Repaired immediately during the operation. A blood transfusion is rarely needed.
Warmer left leg	< 1% at L5-S1; up to 15% at higher levels[6]	Caused by moving aside a small nerve (the "sympathetic" nerve) that regulates blood flow in the leg. The left leg feels warmer, and sometimes it is the right leg that feels cold. Not serious; it usually fades within a few months.
Slow bowel function	≈ 1.5 to 2.5%[4,5]	Bloated abdomen and slow bowels for a few days. Resolves with simple treatment.
Retrograde ejaculation (men)	≈ 2%[7]	At orgasm, semen goes into the bladder instead of coming out. Erection and pleasure are preserved, but **natural fertility is reduced**. In nearly half of cases, it improves over time (see the "Intimate life · Fertility · Pregnancy" box).
Vaginal dryness (women)	Poorly documented[11]	Described after this approach, due to involvement of the small nerves of the lower abdomen. A study following women before and after surgery found no impact on sexual function.
Ureter dysfunction	Very rare[10]	The tube carrying urine from the kidney to the bladder, moved aside during surgery, may not work properly: a small internal tube (stent) is then inserted temporarily.
Weakness of the abdominal wall	≈ 0.5 to 1%[5,8]	Bulge or hernia at the scar.
Thrombosis of a leg artery, bowel injury	< 0.5%[4]	Treated as an emergency.

Risks specific to fusion

Risk	Frequency	In practice
Pain at the aspiration site	Tenderness common; complication < 0.1%[12]	Tenderness of the pelvis for a few days, sometimes a small bruise.
Leg pain or weakness	≈ 1.5 to 2%[4,5]	Irritation of a nerve, usually temporary. Lasting weakness or loss of sensation is rare. Very rarely, a leak of the fluid surrounding the nerves.
Failure to fuse (pseudarthrosis)	≈ 5 to 10%[13,14]	The vertebrae do not fuse completely. This is not always painful. With the protein, fusion is achieved in about 94% of cases. **Smoking clearly increases this risk.** If the pseudarthrosis is painful, it can be treated with additional stabilisation from the back.
Cage sinking into the bone	6 to 23% on X-ray[15]	Usually without consequence for the result. Monitored on the 2-month X-ray.

Risk	Frequency	In practice
Effects of the protein	< 1% with symptoms[16]	Bone forming outside the intended area, or small areas of bone resorption around the cage. Often visible only on CT, and usually temporary.
Wear of neighbouring discs	≈ 2% per year[18]	The disc above the fusion works harder and may wear in turn. This wear is also part of the natural ageing of the spine.
Further surgery	≈ 1% in the first year[17]	Most often for a painful pseudarthrosis or a damaged neighbouring disc.
Pain not relieved	Possible	Even without complications, the operation may not relieve the pain sufficiently.

With a hybrid construct, the risks specific to the disc replacement (see the "Lumbar disc replacement" leaflet) are added to those of the fusion.

These risks are higher in cases of **excess weight** or **previous abdominal surgery**. We will discuss them according to your situation.

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INFORMED CONSENT

I, the undersigned _____ , confirm that I have received from Dr _____ clear and understandable information about the **anterior lumbar interbody fusion** I have been offered: its aims, how it is carried out, the recovery, its risks and the other possible treatments. I have read this leaflet, I have been able to ask all my questions and I have had enough time to think it over.

I agree to the proposed operation.

Signed at _____

on _____

Patient's signature

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