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## PATIENT GUIDE · SCOLIOSIS SURGERY

# Scoliosis surgery: your operation explained

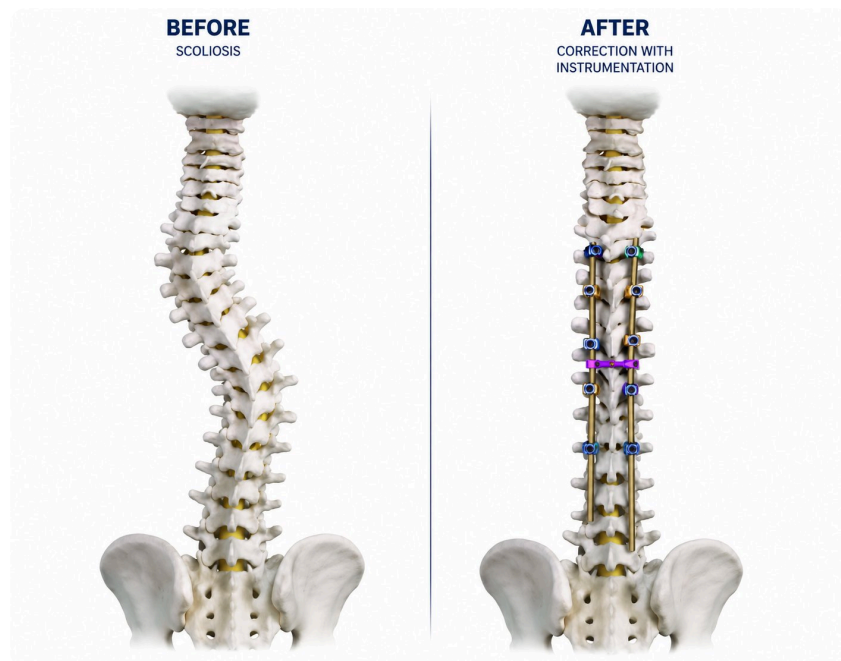
These notes explain the specific operations we may use to correct scoliosis, to support the discussion we have in clinic. Once an idiopathic curve passes about  $50^\circ$  in a skeletally mature patient, it tends to keep progressing into adult life (around  $1^\circ$  a year), and bracing and exercises no longer prevent this — which is why surgery is considered at this size.

### THE AIM OF SURGERY

## To control the deformity — not to treat pain

Scoliosis surgery is undertaken to control the deformity, prevent long-term progression, and optimise the alignment and balance of the spine. It is **not** an operation for back pain.

Some people do find their back feels more comfortable once the spine is straighter and better balanced — but pain relief cannot be the primary reason to proceed.



*Before and after — a scoliotic curve (left) corrected and stabilised with instrumentation (right).*

### The four approaches in this guide

- Single-stage **posterior spinal fusion**
- Two-stage **anterior thoracic release**, then posterior spinal fusion
- Single-stage **anterior (thoracolumbar) instrumented fusion**
- Two-stage **anterior (thoracolumbar) fusion**, then posterior spinal fusion

*Which operation is right for you depends on the size, stiffness and pattern of your curve — a decision we make together.*

### Keeping these operations safe

Across all of these operations we use the same safeguards: **continuous neuromonitoring** of the spinal cord and nerves throughout surgery, **cell salvage** to recycle your own blood, **antibiotics** and sterile technique, a **pre-operative MRI** where needed, and **physiotherapy on the ward** to get you moving and breathing well early.

## 1 Single-stage posterior spinal fusion

### When this is used

The standard operation for idiopathic curves of surgical size that can be adequately corrected from the back in a single procedure.

### The aim

To correct the alignment safely, restore balance, reduce rib prominence where appropriate, and fuse the involved vertebrae so the curve cannot continue to worsen over life.

### What the operation involves

You are positioned on your front, and a midline incision exposes the spine. **Screws are placed into the vertebrae and connected with rods**, and the curve is carefully straightened and balanced.

We then place **bone graft** to fuse the treated vertebrae — partly your own bone, taken from the small facet joints at the back of the spine, mixed with a processed **demineralised bone-matrix** scaffold that stimulates healing. The spine strengthens over the following months as the fusion heals.

### Possible risks

- **Neurological injury to the spinal cord or nerve roots** — weakness, numbness or, rarely, paralysis (new deficits in well under 1% of cases; permanent cord injury rarer still)
- **Infection** (reported in around 1–2% of cases)
- **Bleeding / blood loss**
- **Implant problems** — such as screw malposition or rod breakage
- **Failure of fusion (pseudarthrosis)**, which can need further surgery
- **Residual deformity or shoulder imbalance**
- **Gradual wear of the unfused levels** above and below the fusion over many years
- **Temporary effects on breathing** after a thoracic fusion
- **General risks of major surgery** — bleeding, scarring, wound-healing problems, blood clots and anaesthetic risks

*Large series report overall complication rates around 6%; contemporary series report major complications of 1–2%, neurological events below 1%, and infection 1–2%.*

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## Two-stage anterior thoracic release, then posterior fusion

### When this is used

For a thoracic curve that is both **large and structurally stiff**, with significant rotation and rib prominence, where posterior correction alone may not straighten the rigid spine adequately.

### The aim

A safer, more controlled correction of a large, stiff curve than is possible in one operation — restoring balance and reducing rib prominence.

## What the operation involves

**Stage one — anterior thoracic release.** We reach the front of the spine through the side of the chest and loosen the tight discs on the convex side of the curve. This makes the spine flexible enough for a balanced correction and reduces the forces needed to straighten it. Where appropriate, we also re-contour the prominent ribs (a **costoplasty**).

**Stage two — posterior spinal fusion.** A few days later, we straighten the spine from the back with screws and rods, and fuse it with bone graft (your own bone plus a demineralised bone-matrix scaffold).

### First-stage risks (anterior release)

- **Chest and breathing problems** — temporary lung-function changes, lung collapse on the operated side, and a small risk of pneumonia (a chest drain is placed where needed)
- **Injury to chest structures** (lung, major vessels, oesophagus) — rare
- **Temporary numb patches on the chest wall** — from rib dissection
- **General risks of major surgery** — bleeding, scarring, wound-healing problems, blood clots and anaesthetic risks

### Second-stage risks (posterior fusion)

- **Neurological injury to the spinal cord or nerve roots** — weakness, numbness or, rarely, paralysis (new deficits in well under 1% of cases; permanent cord injury rarer still)
- **Infection** (reported in around 1–2% of cases)
- **Implant problems** — such as screw malposition or rod breakage
- **Failure of fusion (pseudarthrosis)**, which can need further surgery
- **Residual deformity or shoulder imbalance**
- **Gradual wear of the unfused levels** above and below the fusion over many years

### ABOUT THE TWO-STAGE STRATEGY

Two operations carry a slightly higher overall risk than a single posterior fusion. But for very large or stiff thoracic curves, the staged approach gives a safer, more controlled correction, reduces the forces placed on the spinal cord, and lowers the chance of a significant residual deformity.

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## Single-stage anterior (thoracolumbar) instrumented fusion

### When this is used

When the thoracolumbar part of the curve is **large, rotated and stiff**, and we want to **preserve as many mobile lumbar segments as possible** — a posterior-only operation would often need to fuse lower than we would wish.

### The aim

To correct the curve effectively while preserving lower-back movement — with the understanding that a posterior fusion is occasionally needed afterwards.

## What the operation involves

Through an incision on the **side of the abdomen or lower chest**, we gently move the abdominal contents (and, in some cases, the diaphragm) aside to reach the front of the spine. The **discs on the convex side** are removed, and the segment is corrected and stabilised from the front. At the lower lumbar levels, an **interbody cage** may be placed for extra support.

This corrects the deformity at the apex of the curve **without extending the fusion further down the lumbar spine**, preserving movement low in the back.

## Possible risks

- **Chest and breathing problems** — pneumothorax (air around the lung) and lung collapse on the operated side, so a **chest drain** is placed routinely; temporary breathing changes and a small pleural effusion can also occur
- **Vascular or visceral injury** (major vessels or abdominal structures) — rare in specialist centres, and repaired at the time if it occurs
- **Dural tear / CSF (spinal-fluid) leak** — uncommon in anterior surgery
- **Insufficient correction or imbalance once upright** — occasionally needing a posterior fusion at a later stage (uncommon but recognised)
- **Implant problems** — such as screw malposition or rod breakage
- **Failure of fusion (pseudarthrosis)**, which can need further surgery
- **Gradual wear of the unfused levels** above and below the fusion over many years
- **General risks of major surgery** — bleeding, scarring, wound-healing problems, blood clots and anaesthetic risks

### THE ADVANTAGE

This approach corrects the curve while preserving lumbar mobility — with the understanding that a posterior fusion may occasionally be required afterwards.

*An interbody cage placed from the front helps correct alignment and support the lower back, shown here after surgery.*

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## Two-stage anterior (thoracolumbar) fusion, then posterior fusion

### When this is used

When the curve has **structural involvement extending into the lumbar spine** — a rotated, stiff, structurally significant lumbar component — and we want to **preserve mobile lumbar segments** rather than fuse low from the back alone.

### The aim

A balanced, lasting correction of a stiff lumbar curve while preserving as much lower-lumbar movement as possible, across two controlled stages.

### What the operation involves

**Stage one — anterior thoracolumbar fusion.** Through the side of the abdomen or lower chest, we move the abdominal contents and (where needed) mobilise the diaphragm to reach the front of the spine. The **convex-side discs are removed**, the segment is corrected, and an **interbody cage** may be placed at the base of the curve. This corrects the lumbar component and avoids fusing unnecessarily low.

**Stage two — posterior spinal fusion.** A few days later, screws and rods straighten and balance both the thoracic and lumbar portions of the curve from the back, and bone graft fuses the spine — preserving motion segments lower in the lumbar spine.

### First-stage risks (anterior fusion)

- **Abdominal-approach effects** — temporary slowing of the bowel, and numbness or weakness of the abdominal wall (usually temporary)
- **Vascular or visceral injury** (major vessels or abdominal organs) — rare, and repaired at the time if it occurs
- **Chest and breathing problems** — if the diaphragm is mobilised, temporary breathing changes or a small pleural effusion; a **chest drain** is placed for a few days to help the lung re-expand
- **General risks of major surgery** — bleeding, scarring, wound-healing problems, blood clots and anaesthetic risks

### Second-stage risks (posterior fusion)

- **Neurological injury to the spinal cord or nerve roots** — weakness, numbness or, rarely, paralysis (new deficits in well under 1% of cases; permanent cord injury rarer still)
- **Dural tear / CSF leak**
- **Infection** (reported in around 1–2% of cases)
- **Implant problems** — such as screw malposition or rod breakage
- **Failure of fusion (pseudarthrosis)**, which can need further surgery
- **Residual deformity or shoulder imbalance**
- **Ongoing back pain, and gradual wear of adjacent levels** over many years

### ABOUT THE TWO-STAGE STRATEGY

As with all of these operations, large series report overall complication rates around 6%; contemporary series report major complications of 1–2%, neurological events below 1%, and infection 1–2%. A two-stage procedure carries a slightly higher overall risk than a single posterior fusion, but for stiff, structural lumbar curves it allows a safer, more controlled correction while preserving lower-back movement.

## The key message

Which operation is right for you depends on the size, stiffness and pattern of your curve, your stage of growth and your goals — and is decided together in clinic. Whichever approach is chosen, the purpose is the same: to control the deformity and protect the long-term health and balance of your spine.

### A note before you decide

This information is provided to support the discussion we have in clinic and does not replace it. Throughout, please remember that scoliosis surgery is undertaken to control deformity and prevent long-term progression and to optimise alignment — not as a treatment for back pain.

For further information, reliable resources include the Scoliosis Research Society (SRS) at [www.srs.org](http://www.srs.org) and, in the UK, the Scoliosis Support & Research (SSR) charity at <https://ssr.org.uk>.



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