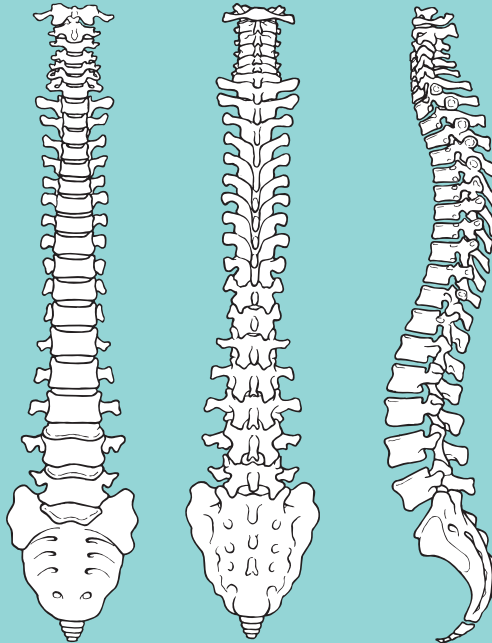




B A S S

British Association of Spine Surgeons

Lumbar Decompression and Stabilisation for Spondylitic Spondylolisthesis



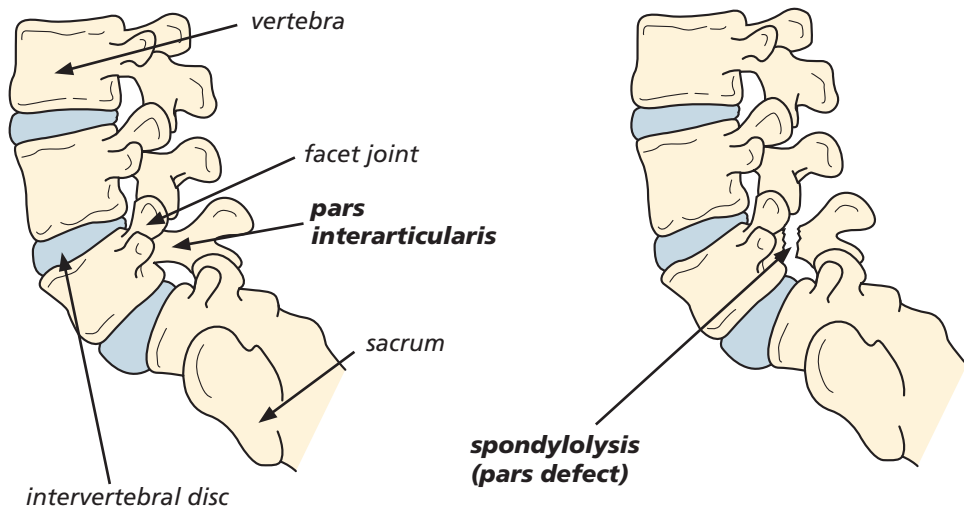
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Following your recent investigations and consultation with your spinal surgeon, it has been confirmed that your symptoms are caused by **lumbar spondylolysis**.

This is a stress fracture of the narrow bridge of bone between the facet joints (*pars interarticularis*) at the back of the spine, commonly called a **pars defect**. There may be a hereditary aspect to spondylolysis, for example an individual may be born with thin vertebral bone and therefore be vulnerable to this condition; **or** certain sports, such as gymnastics, weight lifting and football can put a great deal of stress on the bones through constantly over-stretching the spine. Either can result in a stress fracture on one or both sides of the vertebra (bone of the spine).

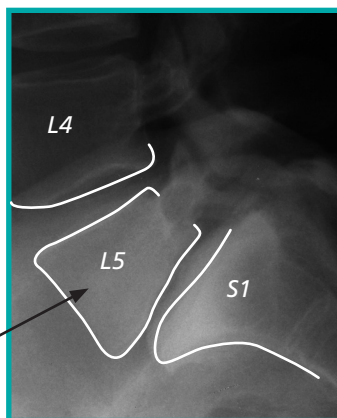
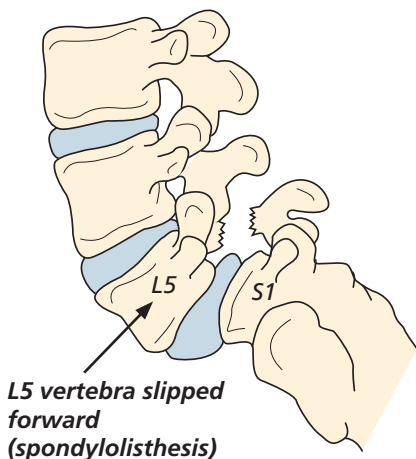
Many people are not aware of their stress fracture or experience any problems but symptoms can occur including lower back pain, pain in the thighs and buttocks, stiffness, muscle tightness and tenderness. The diagnosis is often confirmed with an injection of an anti-inflammatory drug into the *pars defect*, when it is followed by successful relief from pain (even if only temporary).



If the stress fracture weakens the bone so much that it is unable to maintain its proper position, the vertebra can start to shift out of place. This condition is called **spondylolisthesis**.

There is a forward slippage of one lumbar vertebra on the vertebra below it. The degree of spondylolisthesis may vary from mild to severe but if too much slippage occurs, the nerve roots can be stretched where they branch out of the spinal canal. This can cause pain, numbness, increased sensitivity or even weakness of the muscles, in the part of the leg where that particular spinal nerve supplies (a condition known as sciatica).

X-ray showing spondylolisthesis at L5/S1



Treatment varies depending on the severity of the condition. Most patients only require treatment such as physiotherapy, medication and manipulative therapy, combined with some lifestyle changes, like avoiding contact sports, weight lifting and leaning too far backwards (hyperextension).

For patients whose pain does not settle with treatment, surgery may be necessary. The actual procedure may differ depending on the severity of the condition. For patients who have no, or minimal slippage, surgery may simply involve directly repairing the pars defect with a screw and bone graft.

But for patients where slippage (spondylolisthesis) occurs resulting in nerve pain (sciatica), surgery needs to address both the problem with the nerves, as well as the instability of the spine. A decision then needs to be made whether an internal system of screws, rods and bone graft is needed to hold together the vertebra.

Occasionally, the surgeon will remove the intervertebral disc, the structure between the bones of the spine (vertebra) and fuse that space with a cage and bone graft (lumbar interbody fusion). This can enable the surgeon to heighten the channel that the nerve root travels through and to achieve an all round (360°) spinal fusion. The most common way of performing this is to remove the facet joint on one side of the spine to gain access to the disc (transforaminal lumbar interbody fusion [TLIF]). Sometimes, the exact extent of surgery can only be decided during the procedure.

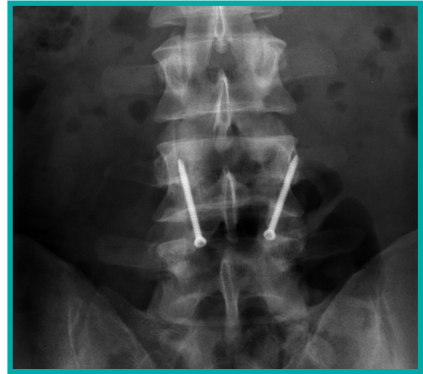
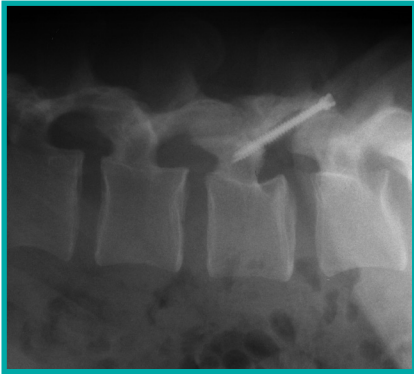
The operation

The operation is performed under general anaesthetic so you are fully asleep. First, an incision is made in the midline of your back and the muscles are lifted off the bony arch (lamina).

For patients undergoing direct repair of the pars defect, the fractured bone is identified and a screw passed directly across from one side to another, joining it together. A bone graft is also sometimes used. There are several techniques to get the bone graft needed for spinal fusion:

- **patient's own bone (autograft bone).** The bone that is removed during surgery can be used as a bone graft. If more is needed then it is usually taken from the pelvis (iliac crest) but this can result in complications including chronic pain from the bone graft site, infection and pelvic fractures so, for the most part, artificial bone is now used;
- **donor bone (allograft bone).** This eliminates the need to use your own bone. The donor bone graft acts as a calcium scaffolding which your own bone grows into and eventually replaces; or
- it is also possible to use **artificial bone (bone substitutes).**

X-ray showing direct repair using screws, side and front views

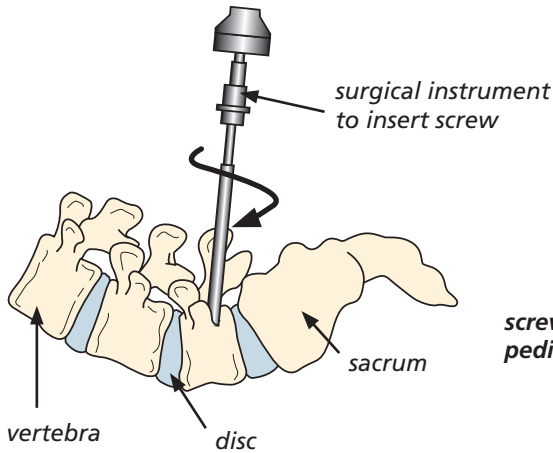


If there is pressure on the nerve roots, a high-speed burr (like a dentist's drill) can be used to drill through the bone at the back of the spine, to gain entry into the spinal canal. A small amount of bone is then clipped away to relieve the pressure on the nerves (decompression). The stability of the spine is then assessed at this point.

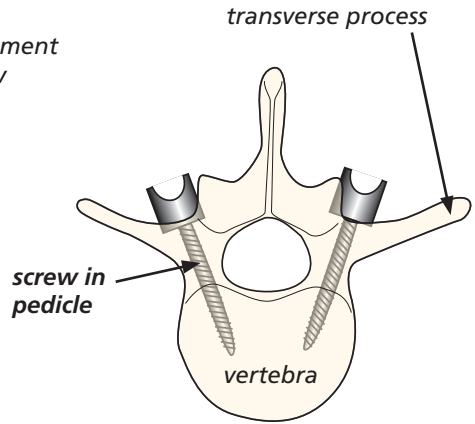
When there is concern about the stability and continued slippage of the vertebra, an internal system of screws and rods would be necessary. These are called pedicle screws because they are placed into the part of the vertebral body of the same name, which goes directly from the back of the spine to the front. They are placed on both sides of the vertebra, above and below the unstable spinal segment. These screws then act as firm anchor points to which rods can be connected.

This construction prevents movement at the segment that is being fused. Bone graft is then laid between the outer segments of the spine in between the transverse process (the inter-transverse region).

Side view of pedicle screw placement

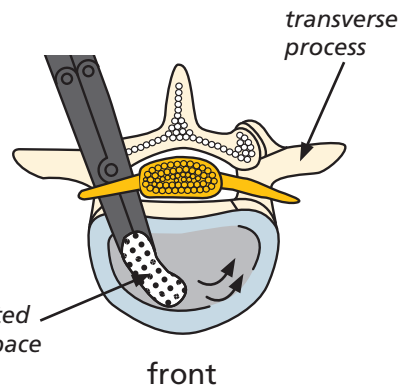
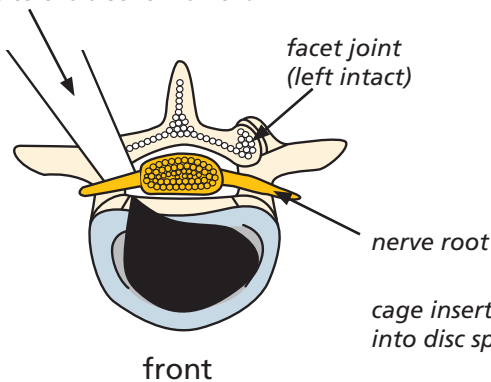


Overhead view of pedicle screw in vertebral body



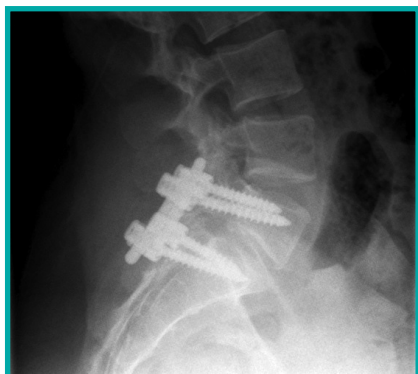
Transforaminal lumbar interbody fusion (TLIF)

facet joint removed to gain access to the disc for removal



After the bone graft grows and fuses to the spine (after many months), the rods and screws are no longer needed for stability. However, most surgeons do not recommend removing them except in rare cases.

X-rays showing the stabilisation system in place, side and front views



X-ray showing the cage in place, side view



Risks and complications

As with any form of surgery, there are risks and complications associated with this procedure.

These can include:

- damage to the nerve root and the outer lining or covering which surrounds the nerve roots (the dura). This is reported in < 5% (fewer than 5 out of 100) cases. It may occur as a result of the bone being very stuck to the lining and tearing it as the bone is lifted off. Often the hole or tear in the dura is repaired with stitches or a patch. This could result in neck or arm pain, weakness or numbness, leaking from the wound, headaches or, very rarely, meningitis;

- recurrent leg pain as a result of scarring;
- problems with positioning during the operation which might include skin injuries or pressure problems. Special gel mattresses and protection are used to minimise this;
- infection. Superficial wound infections may occur in 2–4% (up to 4 out of 100) cases. These are often easily treated with a course of antibiotics. Deep wound infections may occur in < 1% (fewer than 1 out of 100) cases. These can be more difficult to treat with antibiotics alone and sometimes patients require more surgery to clean out the infected tissue. This risk may increase for people who have diabetes, a reduced immune system or are taking steroids;
- blood clots (thromboses) in the deep veins of the legs (DVT) or lungs (PE). This occurs when the blood in the large veins of the leg forms blood clots and may cause the leg to swell and become painful and warm to the touch. Although rare, if not treated this could be a fatal condition if the blood clot travels from the legs to the lungs, cutting off the blood supply to a portion of the lung. It is reported as happening in fewer than 1 in 700 cases. There are many ways to reduce the risk of blood clots forming. The most effective is to get moving as soon as possible after your operation. Walk regularly as soon as you are able to, both in hospital and when you return home. Perform the leg exercises illustrated in the 'Preventing Blood Clots' leaflet and keep well hydrated by drinking plenty of water. Ladies are also advised to stop taking any contraceptive which contains the hormone oestrogen four weeks before surgery, as taking these during spinal surgery can increase the chances of developing a blood clot;
- difficulty with screw placement can cause injury to the nerves or screw breakage;
- bleeding. Tablets used to thin the blood such as warfarin, aspirin and clopidogrel increase the risks of bleeding. You must inform your consultant if you are taking these as it is likely you will need to stop taking them before your surgery;
- bone graft non-union or lack of solid fusion (pseudoarthrosis). This can occur in up to 5% (5 out of 100) cases. See page 9 for factors which can affect fusion;

- cage/implant movement can occur in up to 2 out of 100 cases, with 1 out of 100 requiring an operation. In extremely rare cases, cage movement can cause severe damage and cauda equina syndrome (paralysis, bladder or bowel incontinence);
- although rare, the surgery may make your symptoms worse than before; and
- there are also very rare but serious complications that in extreme circumstances might include: damage to the cauda equina and paralysis (the loss of use of the legs, loss of sensation and loss of control of the bladder and bowel. This can occur through bleeding into the spinal canal after surgery (a haematoma). If an event of this nature was to occur, every effort would be made to reverse the situation by returning to the operating theatre to wash out the haematoma. Sometimes however, paralysis can occur as a result of damage or reduction of the blood supply of the nerves or spinal cord and this is unfortunately not reversible; a stroke, heart attack or other medical or anaesthetic problem, including death which is reported as happening in 1 in 250,000 cases under general anaesthetic.

Factors which may affect spinal fusion and your recovery

There are a number of factors that can negatively impact on a solid fusion following surgery, including:

- smoking;
- diabetes or chronic illnesses;
- obesity;
- malnutrition;
- osteoporosis;
- post-surgery activities (see section on recreational activities on page 11); and
- long-term (chronic) steroid use.

Of all these factors, the one that can compromise fusion rate the most is smoking. Nicotine has been shown to be a bone toxin and inhibit the ability of the bone-growing cells in the body (osteoblasts) to grow

bone. Patients should make a concerted effort to allow their body the best chance for their bone to heal by not smoking.

What to expect after surgery

Immediately after the operation you will be taken to the recovery ward where nurses will regularly monitor your blood pressure and pulse.

Oxygen will be given to you via a face mask for a period of time, to help you to recover from the anaesthetic. You will have an intravenous drip for about 24 hours, or until you are able to drink adequately again after the anaesthetic.

A drain (tube) may come out of your wound if there has been significant bleeding during the operation; this prevents any excess blood or fluid collecting underneath. This will be removed when the drainage has stopped, usually after 24 hours. You will have some discomfort or pain after surgery but the nursing staff will give you appropriate medication to control this.

Usually, on the first day after your operation, the physiotherapist will help you out of bed. They will also show you the correct way to move safely.

Going home

You will normally be able to leave hospital when you and your physiotherapist are happy with your mobility. This is usually 1–2 days after your operation.

Please arrange for a friend or relative to collect you, as driving yourself or taking public transport is not advised in the early stages of recovery. If you will need hospital transport please inform one of the nurses as soon as possible.

Wound care

Your wound will usually be closed with clips. You may shower, if you are careful, when you get home but baths should be avoided for two weeks, until the wound is completely dry. Please do not remove your wound dressing, unless it accidentally gets wet, until your clips are removed. If a new dressing is required apply a simple dry dressing obtained from a pharmacist (chemist).

Please contact your GP if you have:

- redness around the wound;
- wound leakage; or
- a high temperature.

The ward staff will tell you if a community (district) nurse has been arranged to come to your home to remove the clips, or ask you to make an appointment with your GP practice nurse for the clips to be removed. This will usually be 10 days after your surgery.

Date of clip removal: / /

Recreational activities

Walking is the best activity to do after your surgery. You should avoid activities which involve repetitive bending or twisting in the first few months. Sports should also be avoided until you can discuss them with your consultant during your follow-up appointment. A gradual return to sport is then advised.

Driving

Sitting for prolonged periods is not advisable after your surgery, and this includes driving a car. If you have no altered sensation or weakness in your legs then you may return to driving when you feel safe to do so, but don't travel long distances without taking regular breaks to stretch your legs. Please discuss driving with your surgeon before you leave hospital.

Lifting and carrying

Please refer to the physiotherapy advice sheet and other advice from your physiotherapist. You should avoid heavy lifting and carrying for several weeks.

Follow-up

You will be sent a clinic appointment for 8–12 weeks after your surgery. If you have any queries before this appointment please contact the nurse specialist for your consultant's team.

If you have any questions about the information in this booklet, please discuss them with the ward nurses or a member of your consultant's team.

Produced, researched and revised by spinal nurse specialist Helen Vernau at The Ipswich Hospital NHS Trust, in association with and on behalf of the BASS Consent and Patient Information Committee.

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