

LATERAL LUMBAR INTERBODY FUSION (LLIF)

Lateral - Side
Lumbar - Lower back
Interbody - Between vertebrae
Fusion - Joining together of vertebrae

DEFINITION:

The LLIF procedure is a minimally invasive keyhole approach to perform thoracic and lumbar interbody fusions. The LLIF procedure is a newer alternative to the more traditional anterior (*from the front*) and posterior (*from the back*) lumbar interbody fusions.

The LLIF procedure permits distraction of narrowed disc spaces, decompression of nerves, relief of pain and correction of deformities. The keyhole minimally invasive approach reduces postoperative pain, reduces blood loss, minimises scarring, shortens hospital stay and provides more rapid recovery from surgery. Additionally, the LLIF approach avoids scar tissue if a patient has had previous abdominal surgery, anterior or posterior spinal operations.

RISKS OF THE OPERATION:

The specific risk of this procedure with the lateral keyhole approach is possible damage to the psoas muscle or surrounding structures including the bowel and lumbar plexus nerves. Hence the main risk with the LLIF procedure is weakness, numbness and a burning sensation affecting the front of the right thigh, which is usually temporary and improves over 2-3 weeks. The risk is reduced by the use of nerve monitoring performed during the procedure. However, despite the utmost care, the patient may experience pain/numbness, and this should be notified to Mr Malham who will treat the symptoms with steroid tablets or injection, nerve dampening tablets called Lyrica or pain medication Endone/Oxycontin.

General risks of surgery and general anaesthetic are approximately 3% and include infection, bleeding, drug allergy, heart attack, stroke, DVT/PE, urinary tract infection and pneumonia.

BEFORE SURGERY:

Tell Mr Malham about any medical conditions or previous operations. If you have a medical condition such as diabetes, heart problems, high blood pressure or asthma, Mr Malham may arrange for a specialist physician to see you for a pre-operative assessment and medical care following the neurosurgery.

Inform Mr Malham of medication that you are taking and/or have allergies to medications. Patient must stop using the following, 10 days pre-operatively:

- Aspirin
- Plavix
- Isocover
- Asasantin

Patient must stop using blood thinning medication (*such as Warfarin*), 3-5 days pre-operatively.

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BEFORE SURGERY: Preoperative Investigations will include:

- MRI lumbar spine scan to assess damage/disease to intervertebral discs (*shock absorbers between the vertebrae*) and any nerve compression;
- CT lumbar spine scan to assess bone anatomy of vertebrae, facet joints and any spine deformity;
- Flexion extension and lateral bending x-rays to exclude instability (*abnormal movement of spine*);
- Bone scan to identify any “hot spots” in facet joints or between vertebrae indicating painful joints;
- DEXA (*bone density*) scan to exclude osteoporosis;
- Preoperative and postoperative physician care if patient has any medical conditions such as high blood pressure, heart and lung disease, diabetes.

THE OPERATION:

The LLIF procedure is performed with the patient positioned usually on his/her right side, with the operating table slightly flexed to open up the space between the lower 12th rib and the iliac crest (*hip bone*). Then an image intensifier (*intra operative x-ray*) is taken to visualise the exact location of the damaged/diseased disc level.

A small incision is made in the right side to allow a small dilator tube to be inserted through the muscles down to the spine.

Then larger tube dilators are inserted over the guidance dilator, which safely separates the side muscle over the spine (*the psoas muscle which flexes the hip*). Using image intensifier guidance and nerve monitoring, this permits the tubes to be inserted down onto the spine, minimising the risk of any damage/bruising to any nerves. With the tubes in place a keyhole retractor is then placed over them, locked in position to the surgical table and opened to provide keyhole visibility and instrument access to the disc space.

With the intervertebral disc visible, Mr Malham can safely remove the disc, decompress any nerves, remove disc prolapses and any bony narrowing/compression. Any deformity in the sagittal (*front/back*) or coronal (*sideways*) plane can be corrected with safe, careful distraction (separation) of the damaged disc level.

Then a new replacement disc made of PEEK (*Poly Ether Ether Ketone; a space age plastic*) or titanium expandable cage, filled with artificial bone (*bone morphogenic protein, BMP-2 Infuse*), to avoid harvesting of iliac crest hip bone, is then inserted into the exposed empty disc space to restore proper disc height and support the loads on that spine segment. The cage may be fixed with a titanium lateral plate and screws to the above and below vertebrae. Once the new cage (*replacement disc*) is in position and confirmed by image intensifier, the retractor is then closed and slowly and safely removed allowing the separated muscles of the patient's side to return to their normal position.

Final check x-rays are taken.

The one (*or two*) small skin incision is then closed in three layers with dissolvable sutures in the skin and a wound dressing applied.

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- AFTER SURGERY:** The patient is gently mobilised with the physiotherapist the next day after (*post-operative*).
- Patients can sit, stand or walk for no more than 30 minutes in duration, maintaining a straight back and avoiding bending/twisting activities.
- Mr Malham will assess your progress on the ward. A post-operative CT Lumbar Spine Scan is taken day 2-3, to assess the cage position and whether a second stage posterior instrumented fusion to stabilise the spine, is required. This will have been discussed prior to any surgery and if the LLIF procedure was performed for deformity or instability (*abnormal movement*) of the spine, then a second stage posterior screw/rod fixation will be undertaken to reinforce the spine. If the LLIF procedure has been performed for spinal narrowing (*stenosis*) or nerve root compression, then it may need to be augmented with a second stage laminectomy with posterior instrumented fusion if leg pain persists on a walking test.
- A customised Low-Taylor Lumbar Corset Brace may be fitted to wear for back support for 12 weeks (*only when out of bed*).
- Car travel as a passenger only until post-operative review approximately 4-6 weeks following discharge from hospital.
- Return to car driving, initially for local distance driving 6 weeks post-operatively.
- Maintain a straight back and bend knees for 6 weeks post-operatively.
- No heavy lifting of greater than 5 kilograms for 6 weeks.
- Mr Malham may organise for post-operative inpatient rehabilitation to optimise recovery if needed.