

## ANTERIOR LUMBAR INTERBODY FUSION (ALIF)

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**Anterior-** Front  
**Lumbar-** Lower back  
**Interbody-** Between vertebrae  
**Fusion-** Joining together of vertebrae

**DEFINITION:** An operation performed from the front of the spine, where a damaged disc (*or discs*) is removed and replaced by a new plastic disc (*cage filled with bone*).

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**INDICATIONS:**

- Symptomatic Degenerative Disc Disease (DDD);
- Discogenic pain;
- Foraminal stenosis;
- Grade 1 spondylolisthesis.

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### SUCCESS OF THE OPERATION:

70 - 80% of patients report significantly improved pain, function and reduced analgesic requirements. 20% of patients will be the same after the operation and approximately 5% will be worse with increased pain and reduced function.

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### RISKS OF THE OPERATION:

The total risk of surgical complications is 3%. The medical risks of any operation are infection, bleeding drug allergy, heart attack, DVT, pulmonary embolus, pneumonia, urinary tract infection, general anaesthesia and death.

Specific risks from the front are:

- Bowel and ureter damage;
- Blood vessel injury and bleeding, especially from the left iliac vein;
- Distal emboli (*small pieces of blood clot can break off from the retracted left iliac artery and cause clots in the left leg*);
- Retrograde ejaculation in males (*during sex when a man ejaculates, the sperm goes back up into the bladder rather than out of the penis. This is due to damage to the inferior hypogastric nerve plexus*). Risk is 2% and highest at L5/S1 disc level. Hence the recommendation of men of child producing age donating a sperm sample preoperatively.

Blood transfusion is uncommon and the need for this is reduced by the use of the "Cell-Saver", which is a machine used during the operation. Any blood loss from the patient is filtered and returned to the patient, thus minimising the risk of blood transfusion.

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**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.

Pre-operative investigations may include:

- Flexion extension lumbar x-rays - to exclude instability (*abnormal movement*);
- CT Lumbar Scan to assess bone anatomy and the posterior facet joints;
- MRI lumbar scan to assess soft tissue and especially disc injury, prolapse, nerve root and thecal sac compression, ligament damage, vertebral endplate oedema, tumour and infection;
- Bone scan to exclude cancer, infection, fracture, severe degenerative (*wear and tear*) changes. (*Identifies pain generators, especially facet joints*);
- DEXA (*bone density scan*) to assess for osteoporosis;
- Assessment by a vascular surgeon, who will assist with the 'Anterior Abdominal' approach in surgery.

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**THE OPERATION:** General anaesthetic with endotracheal (*breathing*) tube inserted. Intravenous drip, arterial line and indwelling urethral (*bladder*) catheter inserted. Oxygen saturation monitor is placed on the left great toe to monitor lower limb blood supply and detect any leg emboli (*blood clots*) when left iliac artery is retracted during the operation.

A "Cell-Saver" machine is used to clean the recycled and any lost blood back to you during the operation.

Positioned supine in lithotomy position.

Image intensifier identification and marking of disc level on skin. Right lower transverse abdominal skin incision for L5/ S1 disc level, or vertical lower abdominal skin incision (*midline*) for L4/S disc level.

Opening of anterior and then posterior rectus sheath. The left rectus muscle is then retracted to the right. Dissection in retroperitoneal plain. Bowel moved to right. Psoas muscle identified. Left ureter protected and swept to right. Identification of left common iliac artery, then underlying left common iliac vein.

To approach L4/5 disc, dissection lateral to iliac vein identifying, ligating and then dividing ascending lumbar vein. This enables the iliac artery and vein to be moved to the right, exposing the L4/5 disc.

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### THE OPERATION (CONT):

To approach L5/S1 disc, dissection medial to iliac vein. The inferior hypogastric plexus is swept to the right, exposing the L5/S1 disc between the left and right iliac vein and artery.

Special retractors are then used to carefully hold “out of the way and protect” the bowel, ureter, iliac arteries and veins. These retractors are connected to a frame, which is connected to the operating table.

Lateral image intensifier is used to confirm the disc level and AP image intensifier to mark the midline.

Discectomy is performed, removing the entire damaged disc.

The posterior osteophytes (*bony spurs*) are removed.

The exiting nerve roots are decompressed.

The posterior longitudinal ligament may be opened.

The upper and lower vertebral endplates are cleaned of any soft tissue.

Trial implant enables the correct size “cage” implant to be chosen. The cage is trapezoid in shape and wider at the front than behind, restoring the normal lumbar curve or lordosis. The cage is made with ‘Space Age Plastic’, PEEK (*Poly Ether Ether Ketone*), with an attached titanium plate enabling three titanium screws to fix the cage to the above and below vertebrae, and is filled with bone morphogenic protein (*Infuse, BMP-2*) to avoid the need of harvesting iliac crest (*hip*) bone graft. The cage is then impacted into the disc space and the optimal position confirmed with image intensifier.

The retractor blades are then carefully removed. The bowel, iliac arteries and veins are then carefully inspected to exclude any damage.

The wound is closed in layers with suturing of posterior and then anterior rectus sheath, subcutaneous layers and dissolving sutures to the skin.

You are then woken from general anaesthesia and the breathing tube removed.

A CT Scan will be required on Day 2.

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### AFTER SURGERY:

- Nil by mouth until return of bowel sounds and passing flatus. (*The bowel goes to sleep after lumbar surgery and if you eat too soon, you risk nausea or vomiting*);
- A post-operative CT Scan will be performed Day 2 or 3
- No sitting greater than 30 minutes each episode:
- Keep your back straight;
- Stand and walk for 30 minutes each time;
- Lie down as often as you wish;

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### AFTER SURGERY (CONT) :

- Remember to bend your knees;
- Sleep on your back, side or front (*whatever is comfortable*);
- Avoid bending and twisting at the waist;
- Sit for meals only for 20 – 30 minutes maximum in a straight chair. Ensure that the height of the chair is correct for you, with the level of your hips above your knees;
- Walk four equal walks per day rather than one long walk. Aim initially for 5 and then 10 minutes, building up over 4 – 6 weeks to 30 minutes 4 times per day;
- Car travel as a passenger only for short distances (*less than 30 minutes*) in the first 4 weeks