POSTERIOR LUMBAR INTERBODY FUSION

PLIF with Instrumentation

Posterior – In human anatomy, referring to the back surface of the body or the position of one structure relative to another

Lumbar – Relating to the loins or the section of the back and sides between the ribs and the pelvis. In the spinal column, the last five vertebrae (from superior to inferior, L1-L5)

Interbody – Material inserted between two vertebral bodies to reestablish and maintain disc height

Fusion – Surgically induce union or healing of bone

Basic Anatomical Landmarks: Posterior View Lumbar Spine

- Transverse Process
- Spinous Process
- Facet Joint
- Lamina
- Sacrum

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Basic Anatomical Landmarks:
Lumbar Spine

Lumbar Spine
Posterior View

Vertebral Body, Endplate and Disc
Anterior View

Lumbar Vertebrae
Superior View

Basic Anatomical Landmarks:
Lumbar Spine

Vertebral Body
Lateral View

Lumbar Vertebrae
Superior View

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MICHELSON TECHNOLOGY AT WORK
Basic Anatomical Landmarks

The posterior elements of the spine lie under these muscles.

The motion segment (outlined in black) is the functional unit of the spinal column. Motion is achieved through the intervertebral disc and the two facet joints.

A motion segment of the spine consists of the intervertebral disc and facet joints connecting any two adjacent vertebrae.

The motion segment is referred to as the "functional unit of the spine" because a combination of adjacent motion segments allows the spine to move in six degrees of freedom.
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Approach/Patient Positioning

Posterior Midline PLIF
Muscle Cutting (Open Technique)

Posterior Transmuscular PLIF
Muscle Splitting (Minimally Invasive Technique)
Both techniques require the patient to be in the prone position on an Andrews or Jackson table.
PLIF WITH INSTRUMENTATION

Technique: Posterior Midline (Open)

The patient is positioned on the operating table in the prone position. A spine surgery frame should be used which will avoid any pressure on the abdomen; thereby, avoiding vena cava compression. The surgical approach is carried out through a standard midline incision.

Patient in Prone Position

Andrews Table

Jackson Table

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Technique: Posterior Midline (Open)

Lamina – Flat portion of bone on the back of each vertebral body
Dura – Membrane containing the spinal cord
Annulus – Outer layer of the disc

Posterior Exposure of L3 to Sacrum through a Midline Incision

Removal of Lamina and Facet Capsules to expose the Dura and Disc Annulus
PLIF WITH INSTRUMENTATION

Technique: Posterior Midline (Open)

With the Dura and Disc Annulus exposed the Disc is incised and removed

A discectomy is performed by incising the annulus with a scalpel lateral to the dural sac. This is done bilaterally (on both sides).

The main goal of this step is to remove extruded disc fragments and to provide entry to the disc space.
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Technique: Posterior Midline (Open)

The disc space is then prepared with the surgeon's choice of instrumentation. The goal is to achieve parallel endplates on each vertebral body (level surface) to ensure good contact with the allograft. Once the disc space is prepared, the surgeon will insert allograft with autograft bone packed between and around them. The autograft bone is typically local bone removed during the laminectomy.

PLIF with Autograft Bone
(Autograft is the patient’s own bone)

Stabilization of the grafted interspace is then performed with internal fixation (screws and a rod or plate) to aid in the fusion process. This is achieved by placing screws in the pedicles at the levels above and below the grafted interspace and connecting them with either rods or plates.
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Technique: Posterior Midline (Open)

Pedicle Screw Insertion

PLIF with Instrumentation

Transverse Process

Implants

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Technique: Transmuscular (Muscle Splitting)

The patient is positioned in the prone position.
PLIF WITH INSTRUMENTATION

Technique: Transmuscular (Muscle Splitting)

The skin incision is made slightly off midline. The intramuscular approach enables the surgeon to access the spine in a less invasive fashion than a midline incision. It’s considered minimally invasive because it preserves the posterior musculature of the spine.

Incision Created for a Midline Approach

Incision Created for a Transmuscular Approach
PLIF WITH INSTRUMENTATION

Technique: Transmuscular (Muscle Splitting)

This approach utilizes a technique of muscle splitting to access the spine. Essentially, a 20-gauge needle is inserted at the operative site and a series of tubular dilators are advanced over it to create an exposure large enough to perform the procedure through the appropriate size tube.
PLIF WITH INSTRUMENTATION

Technique: Transmuscular (Muscle Splitting)

Once the tubular retractors are in place, the surgeon will perform the same procedure done through a midline incision.
PLIF WITH INSTRUMENTATION

Technique: Transmuscular (Muscle Splitting)

Pedicle Screws at L5-S1 with a DYNA-LOK CLASSIC® Spinal System
Viewed Through a Tubular Retractor