







Surgical Technique with TLIF SG Instrumentation

 Deformity - Degenerative

 **Interbody Fusion**

 Tumour - Trauma

 Cervical

 Emerging Technology

Consulting Surgeons

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LEOPARD™ SURGICAL TECHNIQUE

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First described by Professor Jürgen Harms, the transforaminal lumbar interbody fusion (TLIF) technique has gained wide acceptance in recent years. An adaptation of the posterior lumbar interbody fusion (PLIF) technique first described by Cloward, the TLIF technique employs a uni-lateral approach to the disc space through the intervertebral foramen. In doing so, the TLIF procedure provides a single posterior approach to a “360°” fusion, with some of the following inherent advantages compared to a PLIF.

- Uni-lateral facet resection
- Preservation of the lamina arch and contra-lateral facet
- Minimal dural retraction
- Reduced risk of intra-dural scarring
- Revision strategy - only uni-lateral scarring

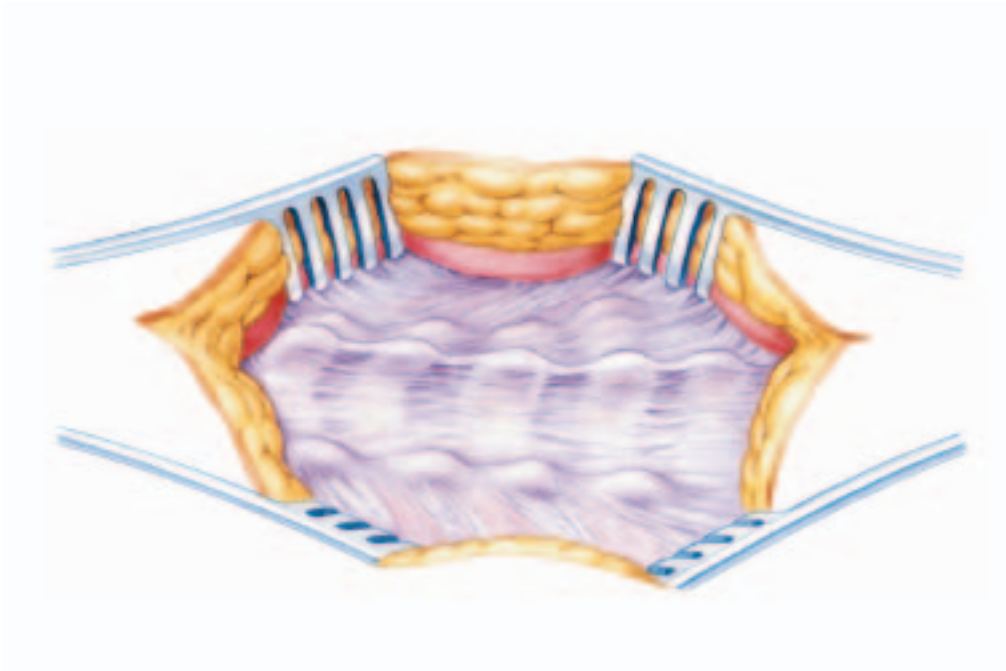
The unique uni-lateral TLIF approach requires specific implants and instrumentation to facilitate thorough disc space preparation and accurate cage placement.

The following technique describes the use of the Leopard™ CFRP Cage with the TLIF SG instrumentation set. The Leopard™ CFRP Cage offers an optimised area for bone graft material with a bullet nose to aid insertion and minimise nerve root retraction.

Manufactured from CFRP the Leopard™ Cage allows you to visualise the position of the cage in-situ, with 4 tantalum beads. This allows the surgeon to view the implant in-situ from the sagittal, coronal and axial plane.

The Leopard™ Cages are available in incremental heights from 7 - 13 mm in both 0° and 5° Lordosis.

Leopard™ Cages are designed to be used with supplementary posterior instrumentation, the following surgical technique details the use of the Monarch™ Spinal System

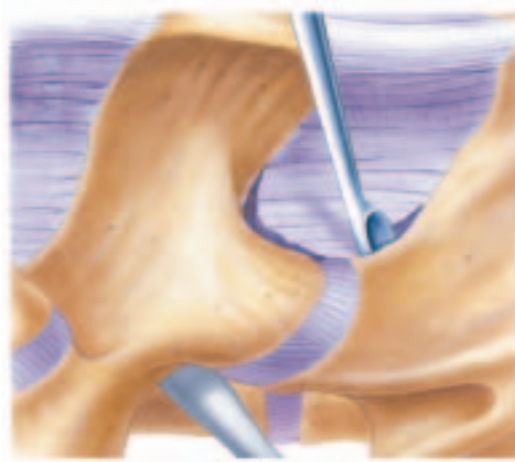


To access the L5 / S1 disc space, incise the midline of the lumbar spine under general anaesthesia and perform subperiosteal dissection of the musculature from the spinous processes.

Bilateral subperiosteal dissection is

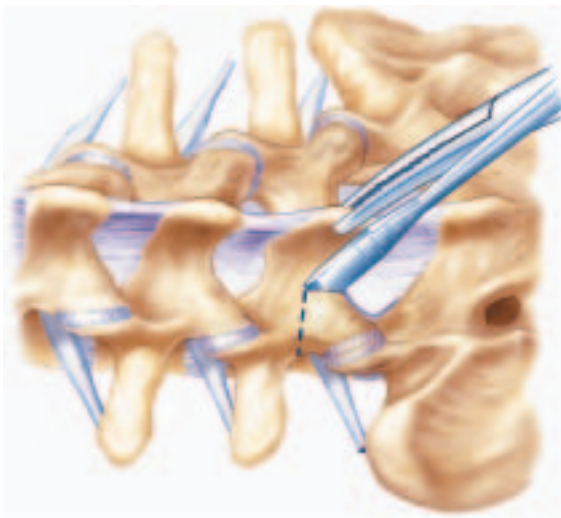
carried out to the level of the transverse processes in the region of the intended fusion and to the lateral mass of the sacrum. Meticulously retract the musculature and the periosteum in the region of the segment to be fused.

Step 2 Facetectomy and Annulotomy

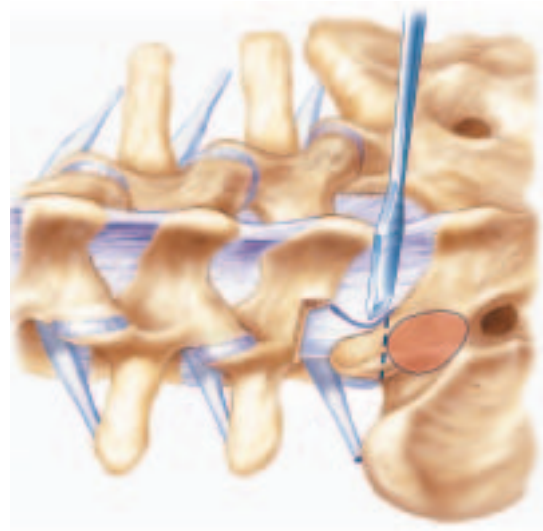


In order to gain transforaminal access to the disc space, a uni-lateral facetectomy is performed. The side chosen for the approach is often determined by the location of the

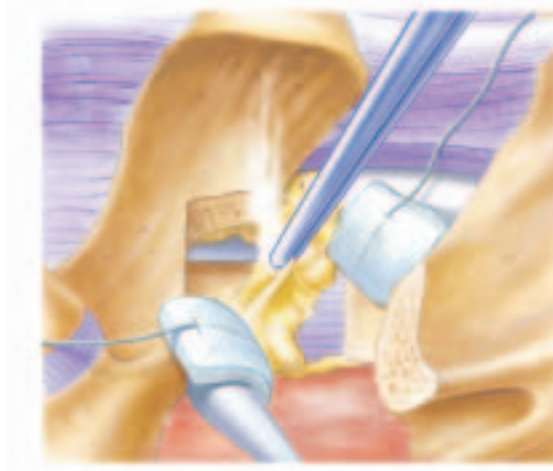
pathology or the presence of scar tissue. Resect the ligamentum flavum from the anterior surface of the lamina with a curette.



Resect the inferior articular process of L5 with a Straight Osteotome or a Kerrison. The capsular part of the ligamentum flavum is now visible and can be resected.

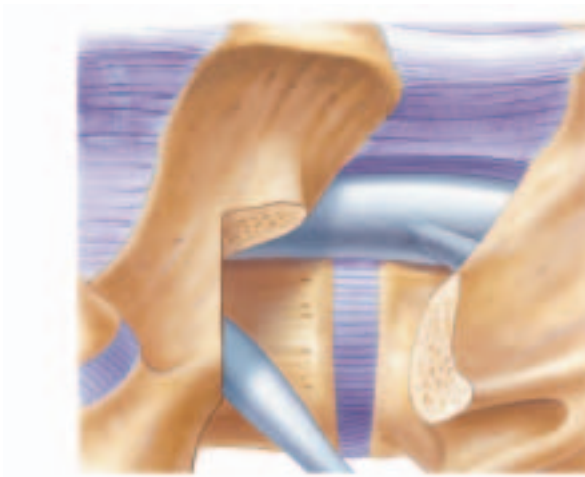


Resect the superior articular process of S1 with a Straight Osteotome or a Kerrison to expose the intervertebral foramen.



Expose the S1 pedicle by removing the overhanging superior articular process with a Kerrison Punch to gain final access to the L5 / S1 disc.

Complete meticulous hemostasis at entry point of the disc space.

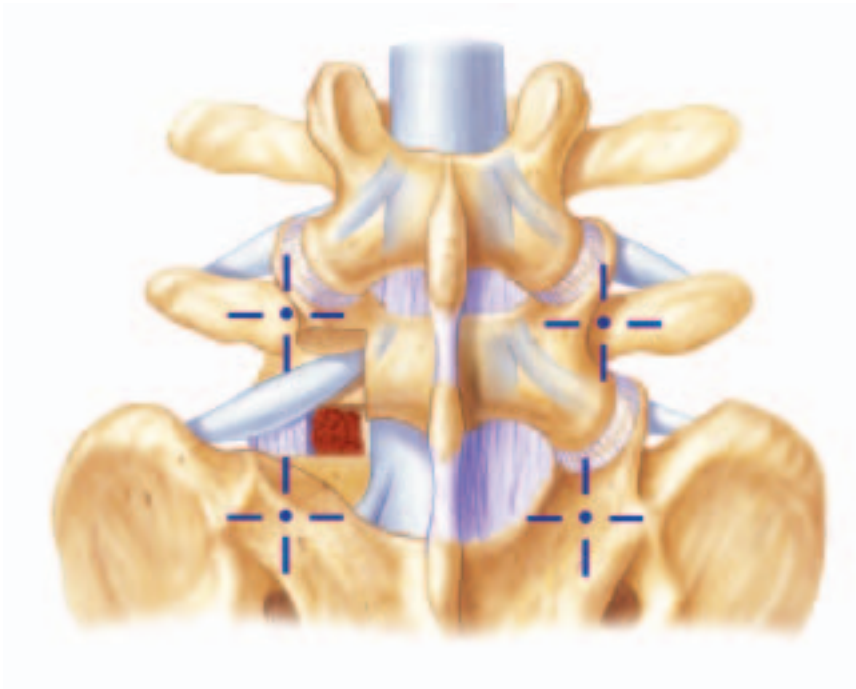


Care should be taken to observe the exiting nerve root and lateral part of the dural sac. A Dissector or Nerve Root Retractor may be used to ensure the



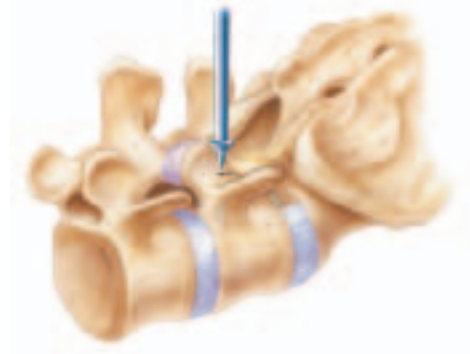
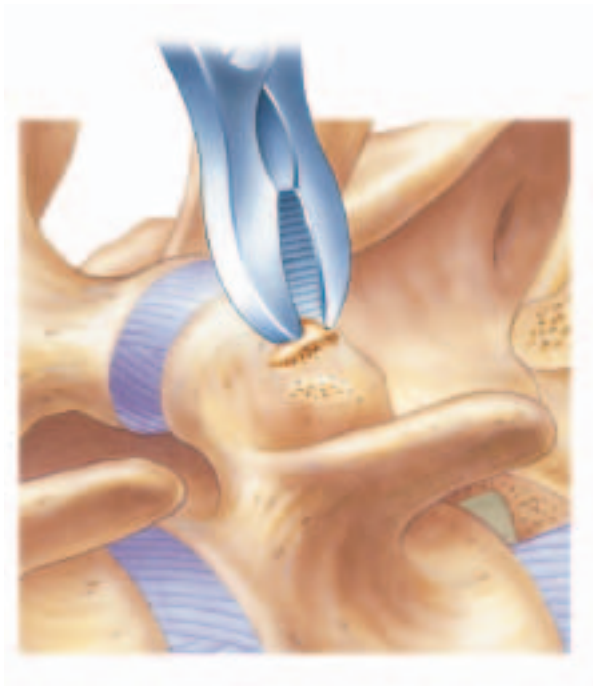
protection of these structures at every step of the procedure. Perform a box annulotomy to create a window to the disc space.

Step 3 Pedicle Screw Insertion

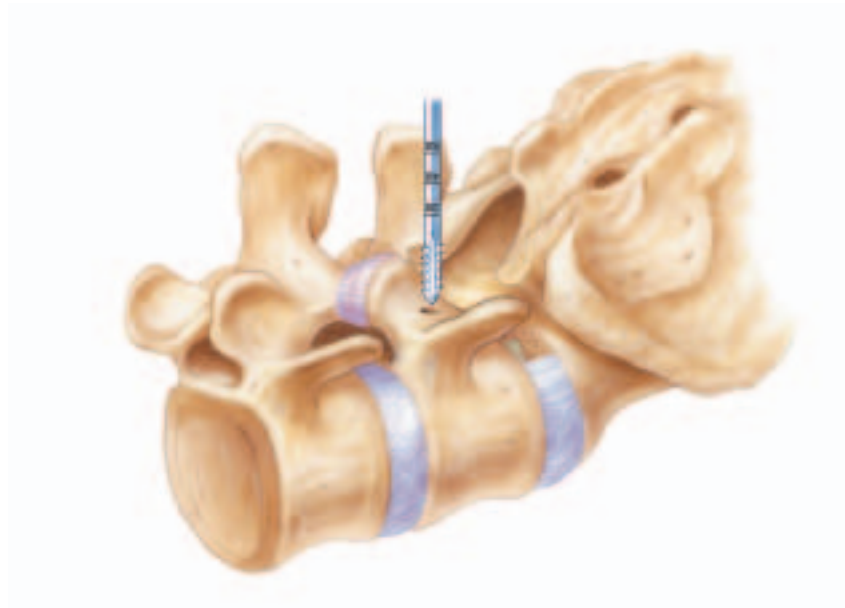


Identify pedicle insertion points.
The optimal insertion point is at the intersection of the transverse process and pars interarticularis.

Consult the Monarch™ Spinal System Surgical Technique (Cat No: 9081-57-000) for additional details on Pedicle Screw Insertion.



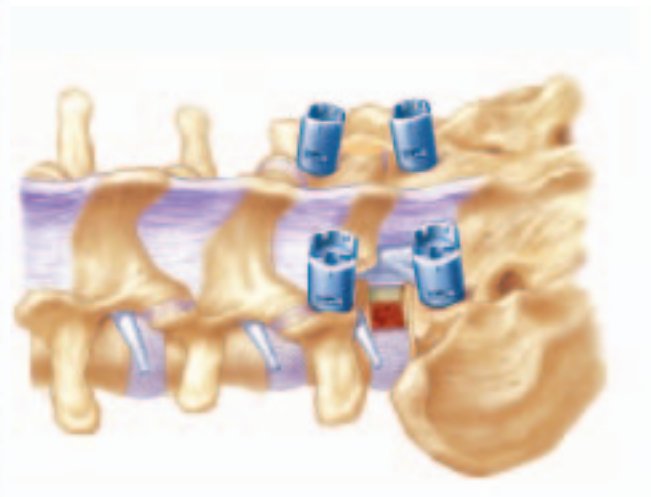
After cortical bone in this area is prepared with a Rongeur, an Awl and Pedicle Probe are used to create the pathway and trajectory for the pedicle screws.



The pedicle is tapped according to size estimates.

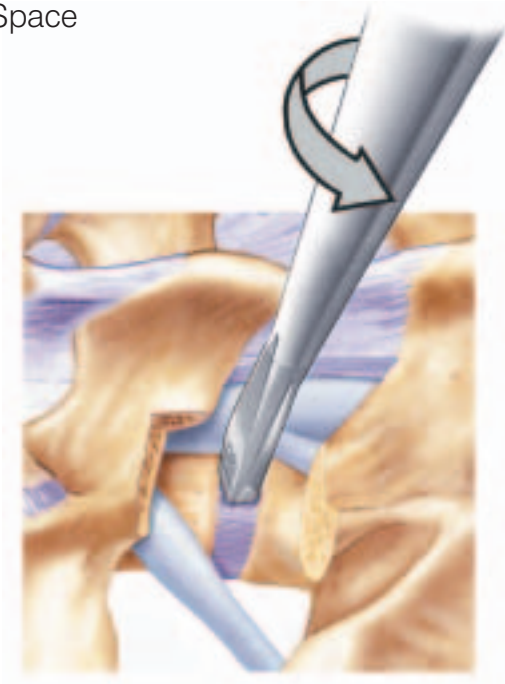


A sounding probe is used to confirm that the walls of the pedicle are still intact.



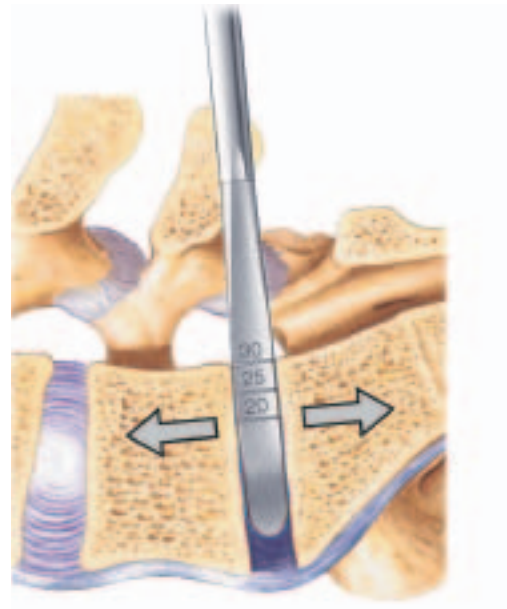
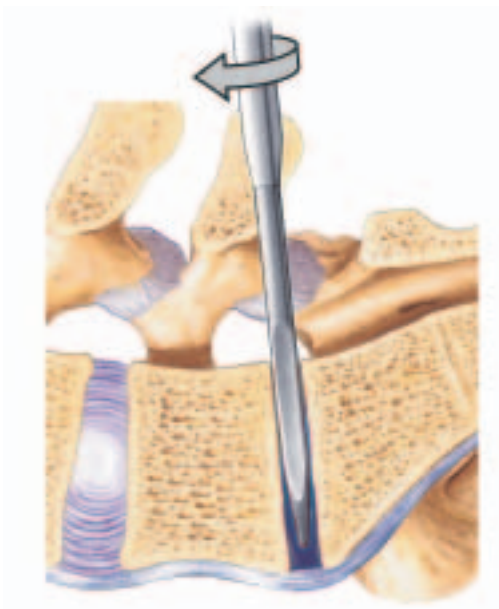
Monarch™ Polyaxial Screws are inserted and an optional X-ray is taken to verify their position.

Step 4 Initial Distraction of Disc Space

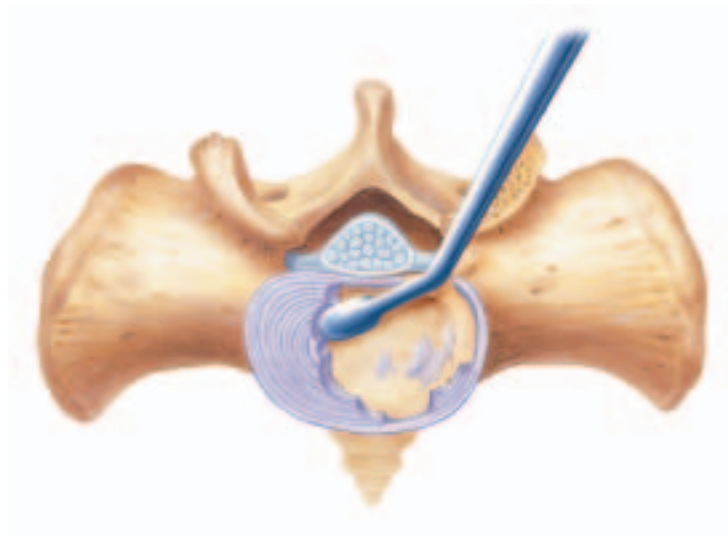


Initial distraction of the disc space is necessary in order to access the disc for a thorough discectomy. Distraction can be achieved using one of the following methods:

- Distraction between Pedicle Screws
- Distraction between the spinous process
- Use of a Starter Dilator (8 mm) or a disc spreader from the Saber™ Instrument Set, as described below.



A Starter Dilator (8 mm) or a spreader from the Saber™ Instrument Set is inserted horizontally into a collapsed disc space and then rotated 90° to achieve distraction.



A thorough discectomy is performed using a combination of Currettes, Chondrotomes and Ronguers. Care should be taken to maintain the integrity of the endplates. A variety of straight, angled, and offset Cup, Ring, and Down Biting Currettes are available

from the TLIF SG Set to facilitate further disc removal. Double angled cup currettes (Left and Right) can also be utilised to remove disc material from the contra-lateral side of the disc space, these will specifically address the inferior and superior endplates.

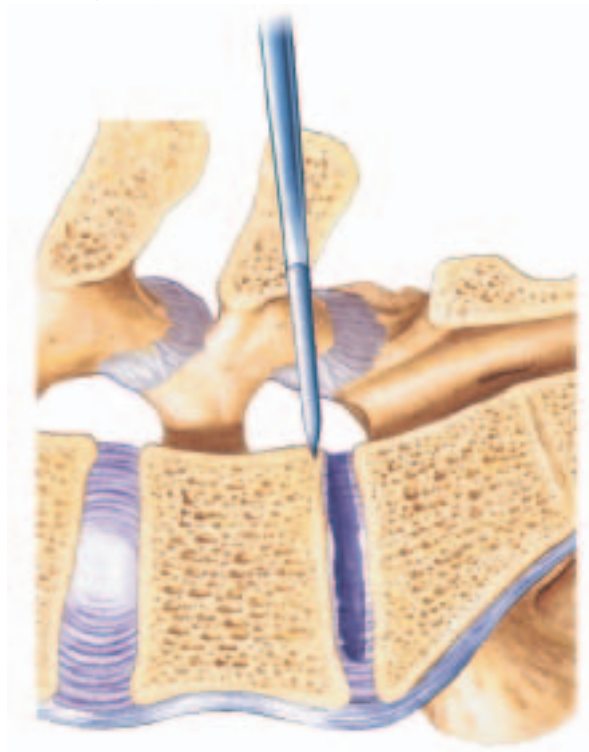


In order to ensure the disc material is removed from the contralateral posterior corner of the disc space, an offset down biting curette can be used (TLIF SG set).



A Chondrotome or a Rasp from the Leopard™ Set can be used in a scraping fashion to separate and remove any remaining disc and cartilage from the bony endplates.

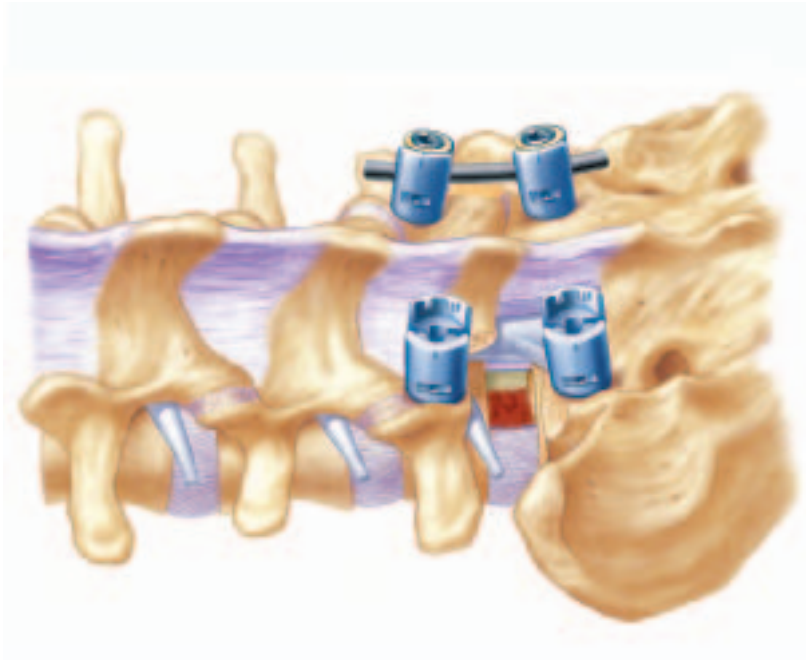
A Straight or Angled Rongeur is then utilised to remove any loose disc material.



Note: Care should be taken to preserve the integrity of the endplates when resecting the posterior lips.

If necessary, a straight Osteotome can be used to resect the posterior lip of the superior and inferior endplates to facilitate entry for the cage.

It is important that a flat parallel surface is achieved in preparation for the insertion of the interbody device.



Further distraction of the disc space prior to cage insertion can be achieved by utilising the range of spreaders from the Saber™ Instrument Set. These are used sequentially until the appropriate annular tension has been achieved.

In order to maintain this distraction, the rod and typhoon caps can be inserted and locked on the contralateral side.

Step 7 Placement of Bone Graft



In order to achieve a solid interbody fusion, the disc space should be filled with as much bone graft material as possible.

Fill the anterior third and contralateral side of the disc space with bone graft material using a variety of Straight and Curved Bone Tamps from the TLIF SG Set.

Step 8 Trial Cage



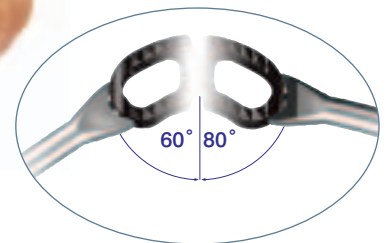
A trial cage can be used prior to insertion of the implant to verify cage placement and required disc height.

The trial cage can be used for both the parallel and the lordotic cage to verify placement. This is attached to the Universal Inserter and should not be disassembled in-situ.

Step 9 Cage Insertion - Leopard™ Cage



Note: The inserter should not be used to torque the implant whilst it is attached to the inserter, as this may cause breakage of the cage.



Select the inserter tip that is most suitable to your approach. Load the implant on the inserter, ensuring that it is loaded into the correct insertion hole on the implant. Care should be taken not to over tighten the inserter when loading the cage. Once the implant is

loaded on to the inserter, pack the cage with bone graft material using the filler block.

The implant size refers to the anterior height minus the teeth. The teeth will add approximately 1 mm in height.

60° - Medial Approach
80° - Lateral Approach



An inserter guide rail is available to assist with placement into the intradiscal space.

Step 10 Cage Manipulation



Once in place the implant can be detached from the inserter and the straight impactor utilised to further position the implant.

When impacting the implant, care should be taken to ensure that the broad surface of the impactor is fully seated against the implant.

Step 11 Final Positioning

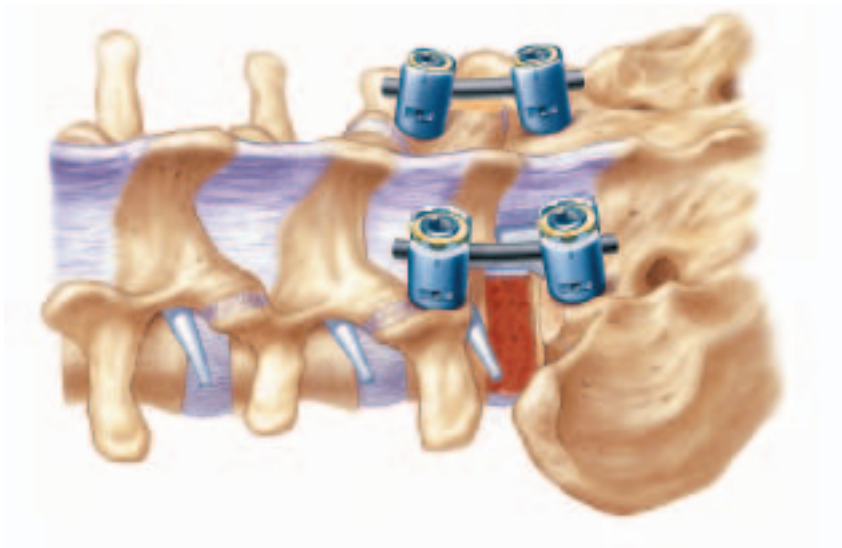


Note: Ideal placement of the Cage is in the anterior aspect of the disc space.

The implant can be impacted into its final position using the curved impactor.

An X-ray should be taken to verify final cage placement. The placement of 4 tantalum beads will identify the position of the cage in the sagittal, coronal and axial planes

Step 12 Final Compression



The appropriate length pre-cut pre-lordosed rod is selected to match the appropriate lordosis of the patient's lumbar spine.

Rods are seated into the screw heads and captured by inserting the Typhoon Cap.

Active compression can also be applied to the Monarch™ Screw System. To achieve this, tighten the

caudal Typhoon set screws to securely lock the rod in place and provide an anchor for the final compression.

With the cephalad set screws loosened, use the compressor to perform final compression. Lock the compression in place by tightening the cephalad set screws.

Revisit all screws for a final tightening.

Instruments

<i>Catalogue No.</i>	<i>Description</i>
2864-01-700	Inserter
2864-11-060	Medial Tip
2864-11-080	Lateral Tip

Inserter



<i>Catalogue No.</i>	<i>Description</i>
2864-01-000	Trial Inserter

Trial Inserter



<i>Catalogue No.</i>	<i>Description</i>
2864-02-000	Guide

Guide



<i>Catalogue No.</i>	<i>Description</i>
2864-03-000	Curved Impactor

Curved Impactor



Straight Impactor

Catalogue No. *Description*

2864-04-000 Straight Impactor



Filler Block

Catalogue No. *Description*

2864-09-000 Filler Block



T-Bar

Catalogue No. *Description*

2731-22-201 T-Bar



Rasp

Catalogue No. *Description*

2864-10-000 Rasp



Remover

Catalogue No. *Description*

2728-02-500 Remover



<i>Catalogue No.</i>	<i>Description</i>	<i>Length</i>
2864-08-007	Trial	7 mm
2864-08-008	Trial	8 mm
2864-08-009	Trial	9 mm
2864-08-010	Trial	10 mm
2864-08-011	Trial	11 mm
2864-08-012	Trial	12 mm
2864-08-013	Trial	13 mm

Trials



<i>Catalogue No.</i>	<i>Description</i>
2864-06-000	Case/Tray System

Case & Trays

<i>Catalogue No.</i>	<i>Description</i>	<i>Length</i>	<i>Width</i>	<i>Anterior Height</i>
1864-48-007	5 Degree Lordotic	28 mm	10	7
1864-48-008	5 Degree Lordotic	28 mm	10	8
1864-48-009	5 Degree Lordotic	28 mm	10	9
1864-48-010	5 Degree Lordotic	28 mm	10	10
1864-48-011	5 Degree Lordotic	28 mm	10	11
1864-48-012	5 Degree Lordotic	28 mm	10	12
1864-48-013	5 Degree Lordotic	28 mm	10	13

Implants



<i>Catalogue No.</i>	<i>Description</i>	<i>Length</i>	<i>Width</i>	<i>Anterior Height</i>
1864-48-107	Parallel	28 mm	10	7
1864-48-108	Parallel	28 mm	10	8
1864-48-109	Parallel	28 mm	10	9
1864-48-110	Parallel	28 mm	10	10
1864-48-111	Parallel	28 mm	10	11
1864-48-112	Parallel	28 mm	10	12
1864-48-113	Parallel	28 mm	10	13

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