

Posterior Lumbar Interbody Fusion (PLIF) Instruments. Designed for use with the PLIF Spacer.

Technique Guide

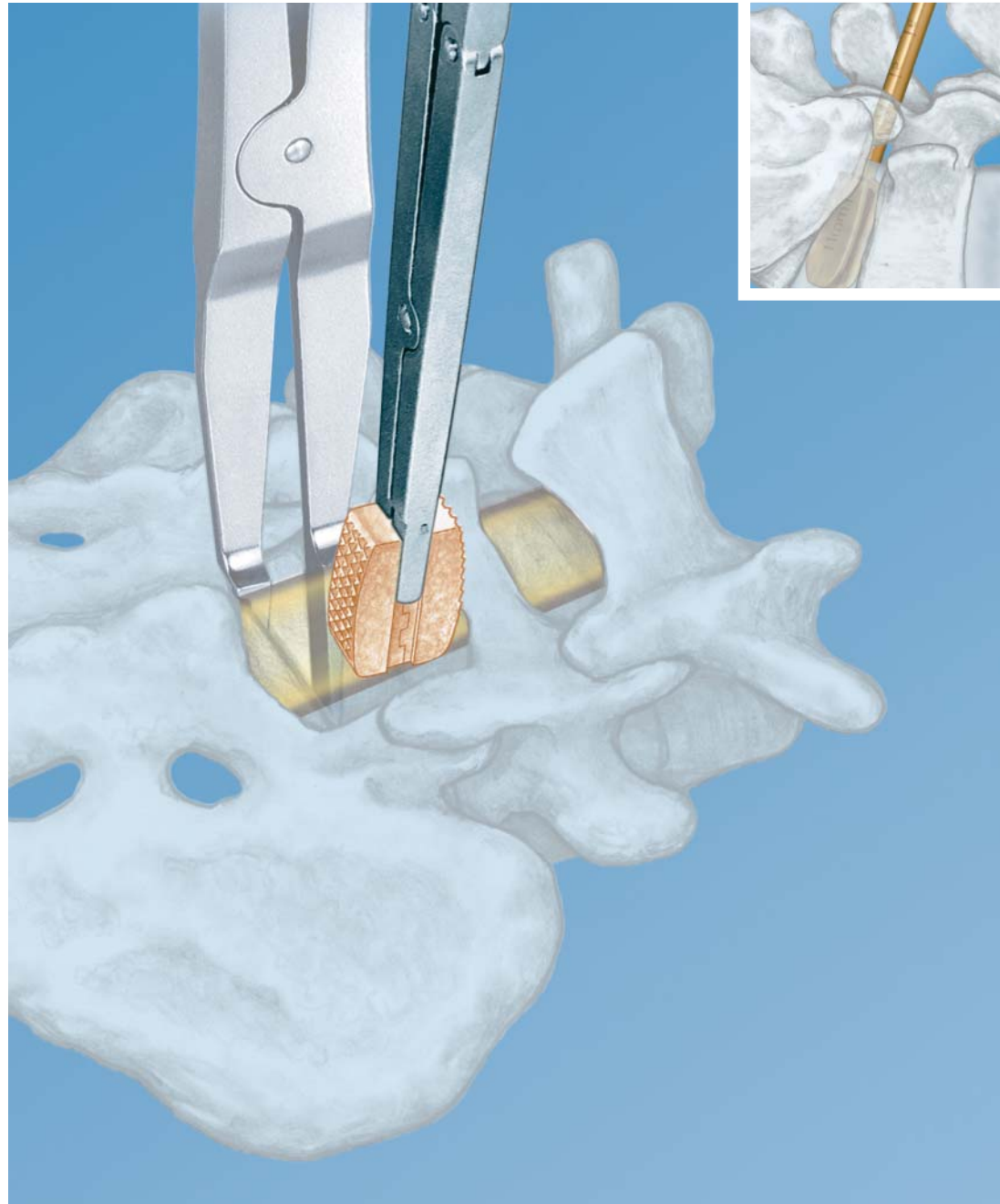


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Posterior Lumbar Interbody Fusion (PLIF) Instruments.

Designed for use with the PLIF Spacer.

The PLIF instruments are designed for use with the PLIF Spacer. The PLIF Spacer can be used for posterior lumbar interbody fusion (PLIF).

Distracting the segment in a posterior lumbar interbody fusion is essential to restore disc height, open the neural foramen, stabilize the spinal segment, and provide anterior column support. The PLIF instruments may be used to distract, size and insert the PLIF implant, while preserving the natural anatomy of the vertebral endplate. The PLIF System offers three different distraction techniques:

- Distraction with the PLIF distractor (Figure 2)
- Distraction with the PLIF detachable trial spacer (Figure 1) or PLIF trial spacer (Figure 3)
- Distraction across pedicle screws (Figure 4)



Figure 1

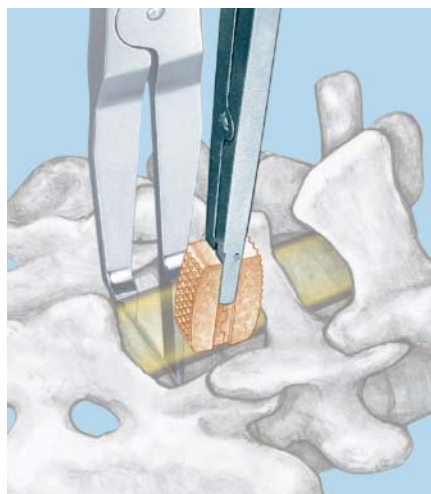


Figure 2



Figure 3

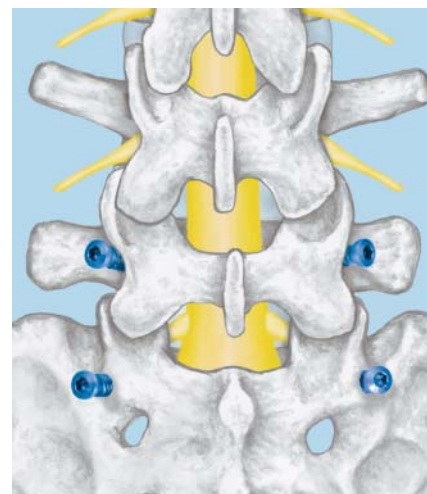


Figure 4

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.¹ They are:

- Anatomic reduction
- Stable internal fixation
- Preservation of blood supply
- Early, active mobilization

The fundamental aims of fracture treatment in the limbs and fusion of the spine are the same. A specific goal in the spine is returning as much function as possible to the injured neural elements.^{2,3}

1. Müller ME, M Allgöwer, R Schneider, and R Willenegger. Manual of Internal Fixation, 3rd Edition. Berlin: Springer-Verlag. 1991.

2. Ibid.

3. Aebi M, JS Thalgott, JK Webb. AO ASIF Principles in Spine Surgery. Berlin: Springer-Verlag. 1998.

Preoperative Planning

Instrument

8201	PLIF Preoperative Planner
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Preoperative planning is recommended for the correct selection of the PLIF spacer. Determine implant height by comparing a lateral view on the radiographic PLIF preoperative planner with the adjacent intervertebral discs on a lateral radiograph.

The implant must be seated firmly with a tight fit between the endplates when the segment is fully distracted. It is essential to use the tallest possible implant to maximize segmental stability.

Due to variability in degrees of magnification, the templates are only an estimate and may not always provide an exact implant measurement.

Approach

1

Approach

Position patient

- Place patient in a prone position on a lumbar frame. Radiographic equipment can assist in confirming the precise intraoperative position of the implant.

Expose and incise disc

Incise and dissect the skin from the midline laterally and locate the spinous process, lamina, dura, and nerve roots of the appropriate level(s). Preserve as much of the facets as possible because they provide stability to the intervertebral segment. Perform a laminotomy to the medial aspect of the facet and retract the dura to expose an approximately 13 mm window to the disc space (Figure 1).

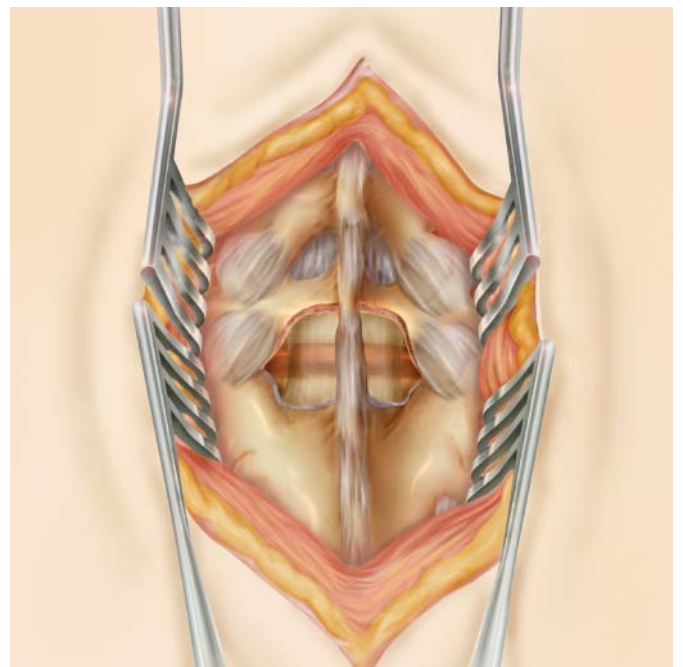
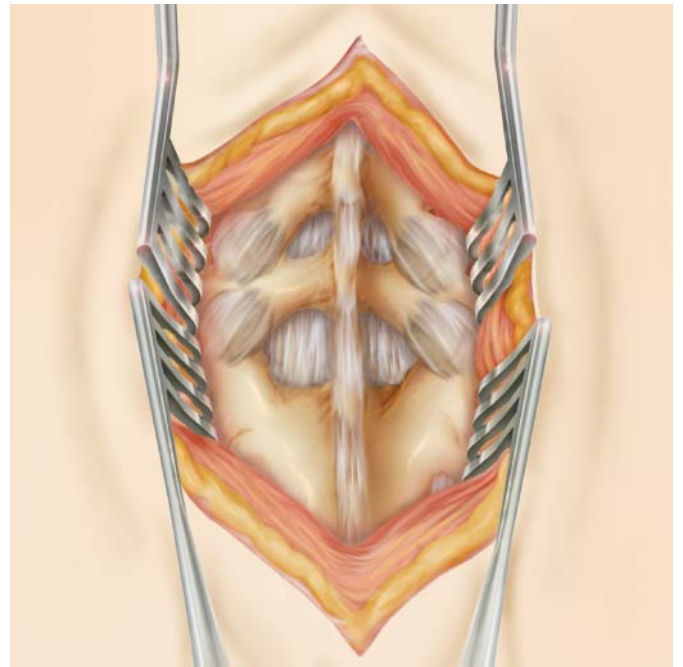


Figure 1

Prepare Disc and Endplates

2

Prepare disc and endplates

Instruments

389.767–
389.777 Intervertebral Disc Shavers
(7 mm–17 mm height)

389.780–
389.785 Intervertebral Disc Excisors
(7 mm–17 mm height)

Remove the disc through the window until only the anterior and lateral annuli remain. The intervertebral disc shavers (Figure 1) and intervertebral disc excisors (Figure 2) assist in the removal of the nucleus pulposus and the superficial layers of the cartilaginous endplates. The superficial layers of the entire cartilaginous endplates are removed to expose bleeding bone.

Note: Removing the superficial layers of the cartilaginous endplates exposes bleeding bone. Adequate preparation of the endplates is important to facilitate vascular supply to the bone graft. Excessive cleaning, however, may weaken the endplates due to removal of bone underlying the cartilaginous layers. Removing the entire endplate may result in subsidence and loss of segmental stability.

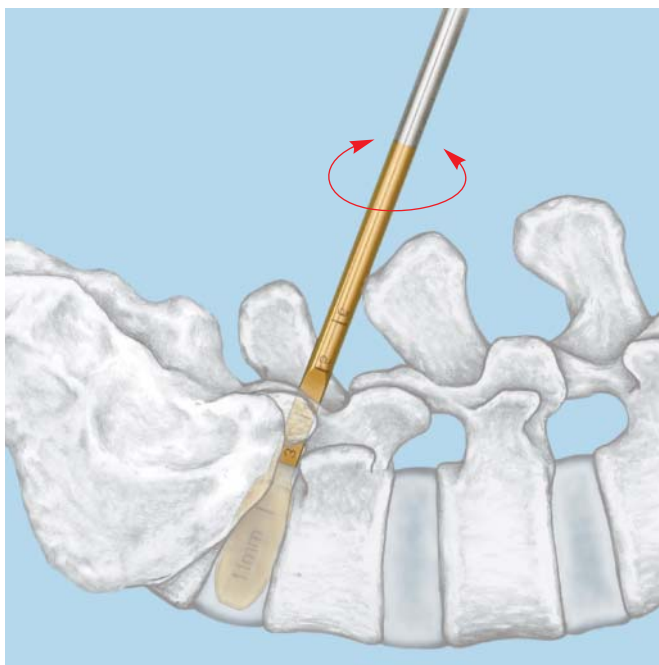


Figure 1

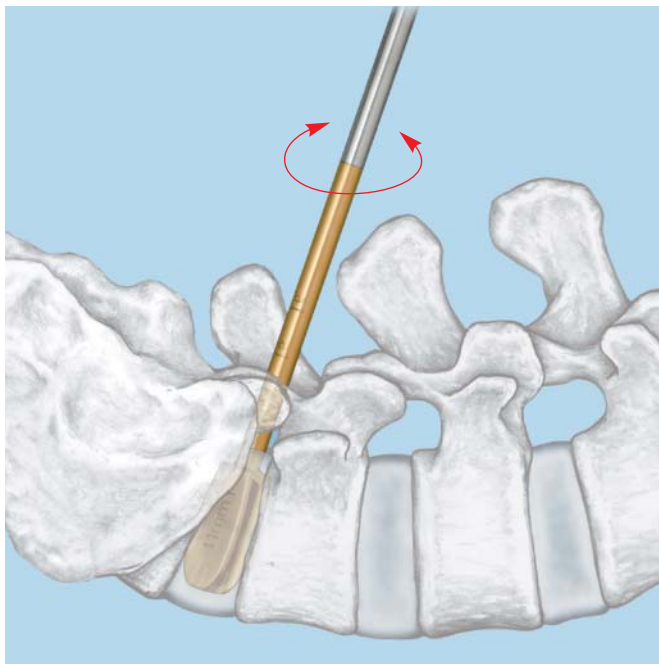


Figure 2

Distraction

3

Distraction

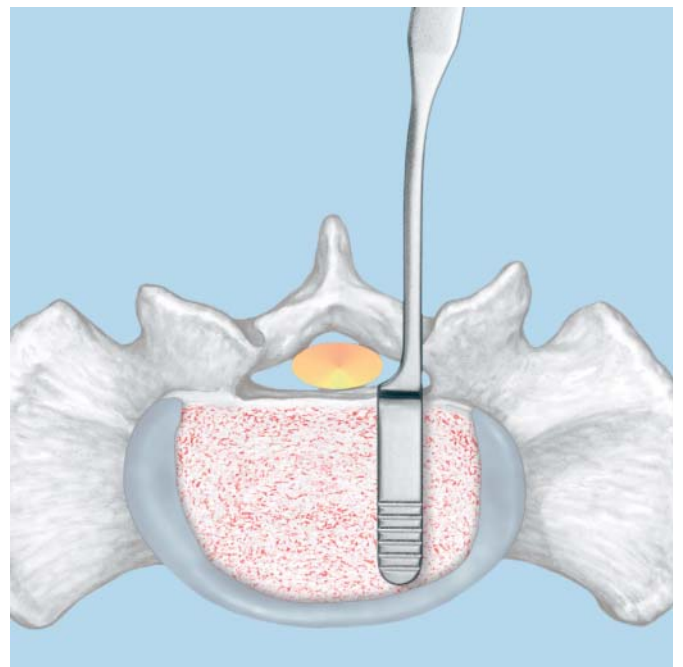
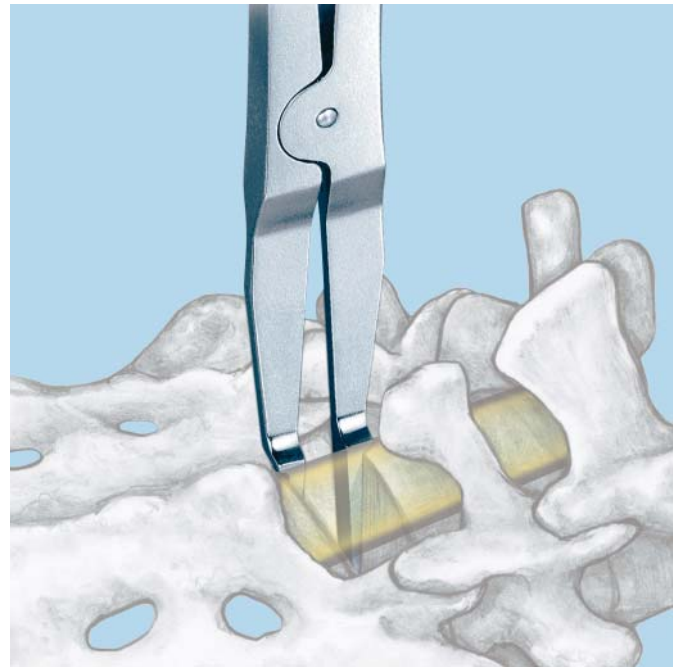
Option A: Distract with PLIF distractor

Instrument

389.101 PLIF Distractor

- 1 Place the PLIF distractor blades into the disc space lateral to the dural sac. The curved recess of the distractor should be oriented toward the midline. Completely insert the distractor blades into the disc space so that the ridges at the end of the blades rest in the vertebral body. Use fluoroscopy to confirm that the distractor blades are parallel to the endplates. Distractor blades will be angled cranially when properly placed, particularly at L5–S1.

Distract the disc space. Tightening the speed nut on the handle secures the distraction.



Option B: Distract with PLIF trial spacer or PLIF detachable trial spacer
Instruments

389.102	PLIF Holder
389.128– 389.137	PLIF Trial Spacers, 8 mm x 22 mm (7 mm–17 mm height)
389.172– 389.177	PLIF Detachable Trial Spacers, 8 mm x 22 mm (7 mm–17 mm height)
394.951	Quick Release T-Handle

Select the size of either PLIF trial spacer or PLIF detachable trial spacer as determined during preoperative planning. The PLIF trial spacer is attached to the quick release T-handle. The PLIF detachable trial spacer is placed in the PLIF holder with the posterior end flush against the neck of the holder. Tighten the speed nut to securely hold the instrument.

- Insert the trial spacer with the contoured sides facing inferior-superior into the disc space. Light impaction may be necessary. Fluoroscopy and tactile judgement can assist in confirming the fit of the trial spacer. If the trial spacer appears too loose or too tight, try the next larger or smaller size until a secure fit is achieved.

Alternatively, the trial spacer may be inserted horizontally and turned vertically to size and distract the disc space (Figure 1).

When using this distraction method, proceed to Step 5, "Insert implant" (page 12).

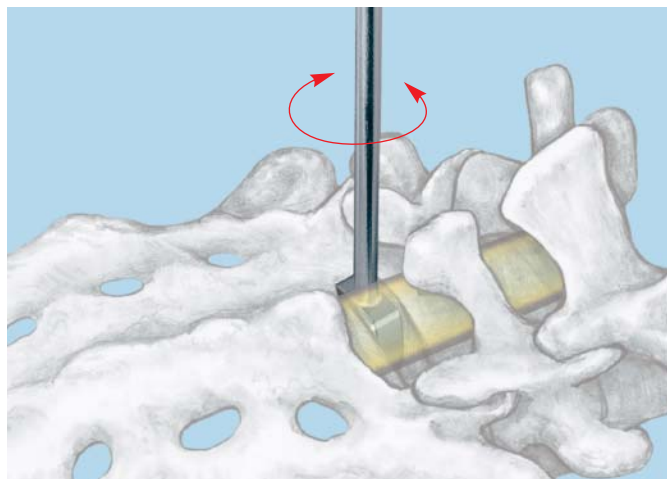
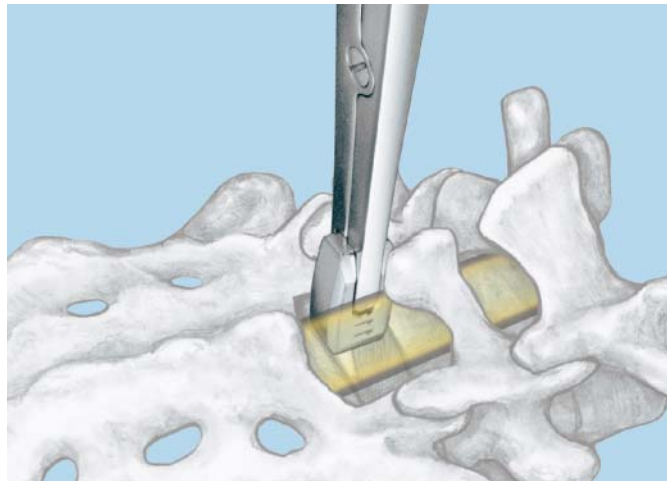
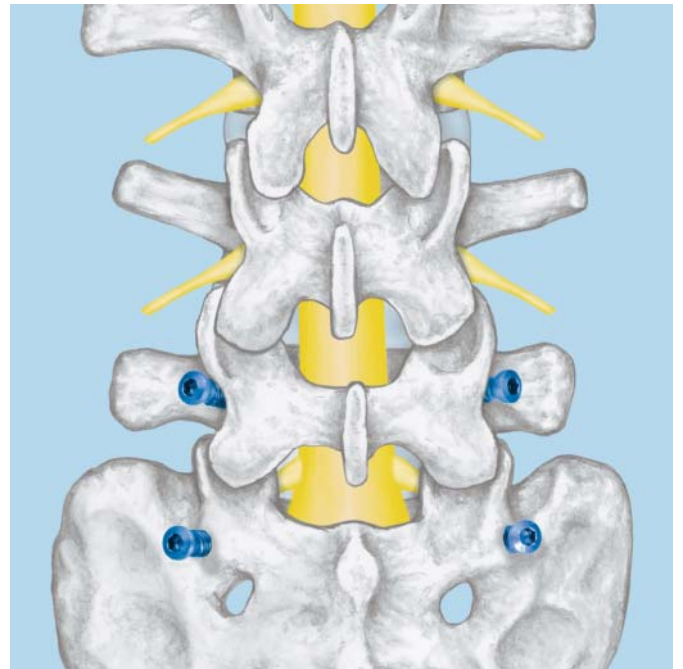


Figure 1

Option C: Distract across pedicle screws

After pedicle screws have been inserted, distraction can be applied between the heads of the inserted screws. This maneuver temporarily opens the posterior disc space and promotes increased exposure for both decompression and delivery of the implant. To avoid inducing a kyphotic curve, care should be taken to ensure proper longitudinal distraction.



Determine Implant Size

4

Determine implant size

Instruments

389.102	PLIF Holder
389.128– 389.137	PLIF Trial Spacers, 8 mm x 22 mm (7 mm–17 mm height)
389.172– 389.177	PLIF Detachable Trial Spacers, 8 mm x 22 mm (7 mm–17 mm height)
394.951	Quick Release T-Handle

- After distraction with the distractor or across pedicle screws, connect an appropriately sized PLIF trial spacer to the quick release T-handle. Alternatively, attach a PLIF detachable trial spacer to the PLIF holder. Insert the trial spacer assembly into the contralateral disc space with gentle impaction. Use fluoroscopy and tactile feedback to confirm the fit of the trial spacer. If the trial spacer appears too loose or too tight, try the next larger or smaller size until a secure fit is achieved.

Select the implant corresponding to the correct trial spacer.
Remove the trial spacer assembly.

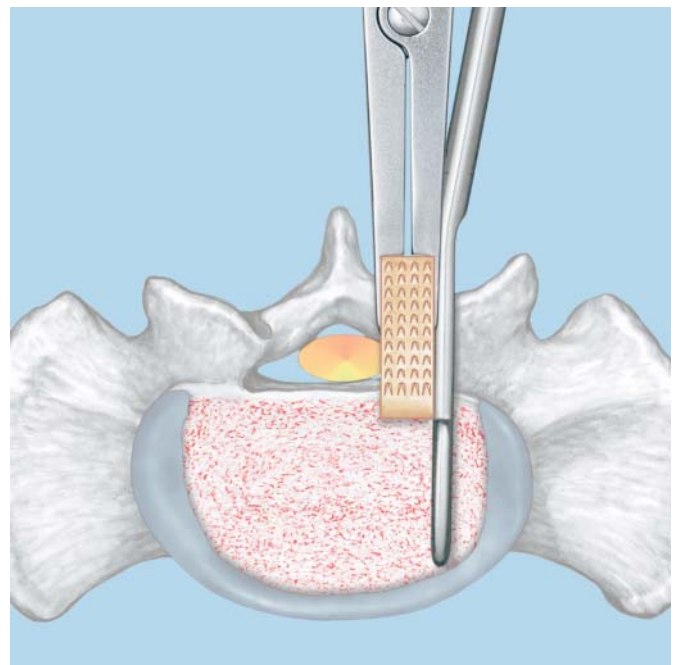
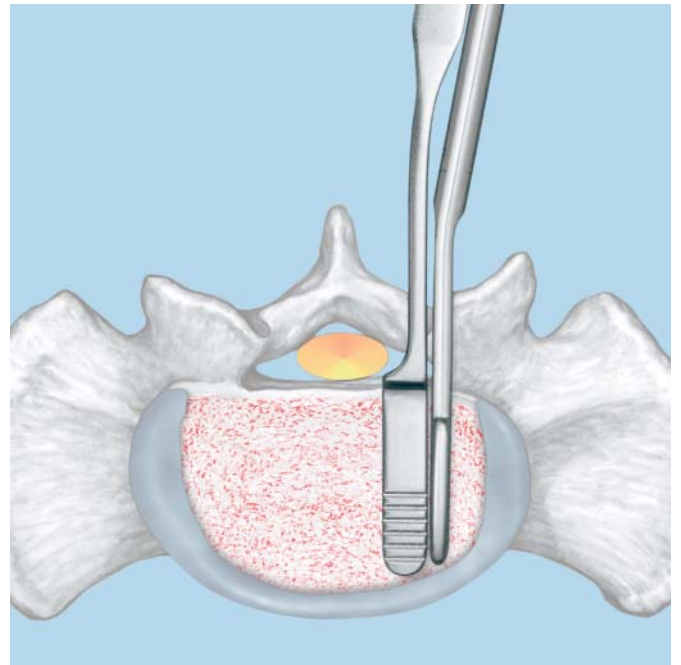


Alternative technique

Instruments

389.101	PLIF Distractor
389.107– 389.117	PLIF Spreaders (7 mm–17 mm height)

Use the PLIF distractor to distract one side of the disc space. Introduce the PLIF spreader connected to a quick release T-handle into the intervertebral disc space on the same side, lateral to the distractor. If the chosen PLIF spreader appears too loose or too tight, try the next larger or smaller size until a secure fit is achieved.



Insert Implant

5

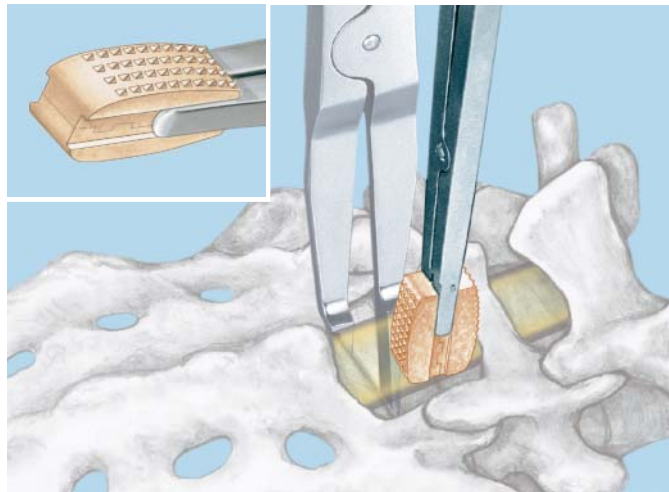
Insert implant

Instruments

389.102	PLIF Holder
389.103	PLIF Impactor

Grasp the selected implant using the PLIF holder. The implant should be held by the slots with the posterior end against the neck of the holder. Tighten the speed nut on the handle to ensure that the implant is held securely in the jaws of the PLIF holder.

Introduce the correctly oriented implant into the contralateral disc space. Slight impaction will be necessary using the PLIF holder and, if necessary, the PLIF impactor. Once the implant is in the desired position, remove the PLIF holder.



Instruments

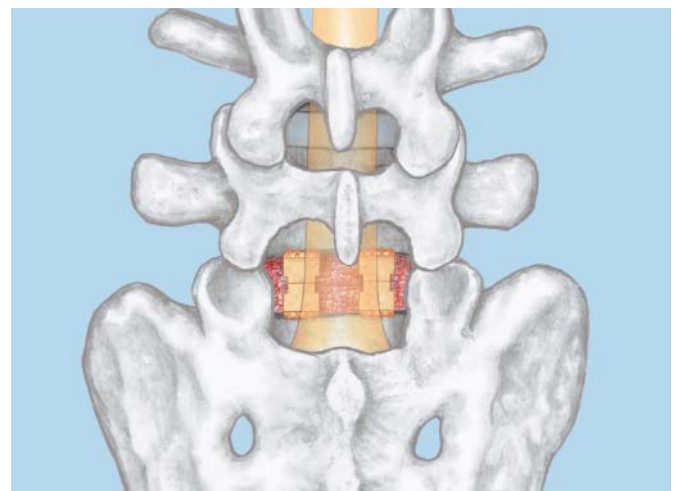
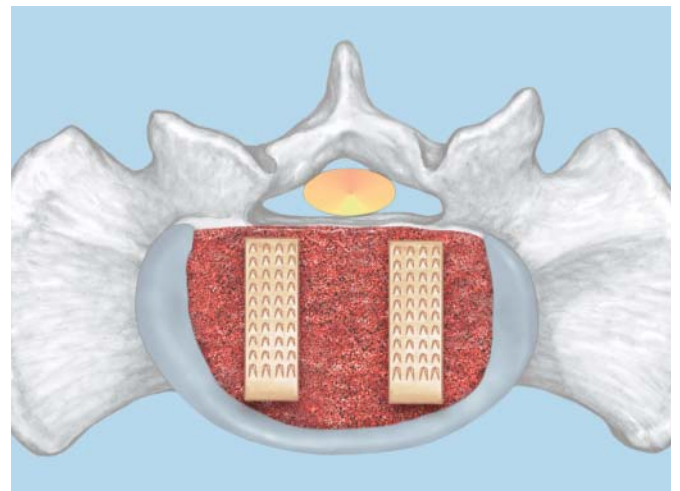
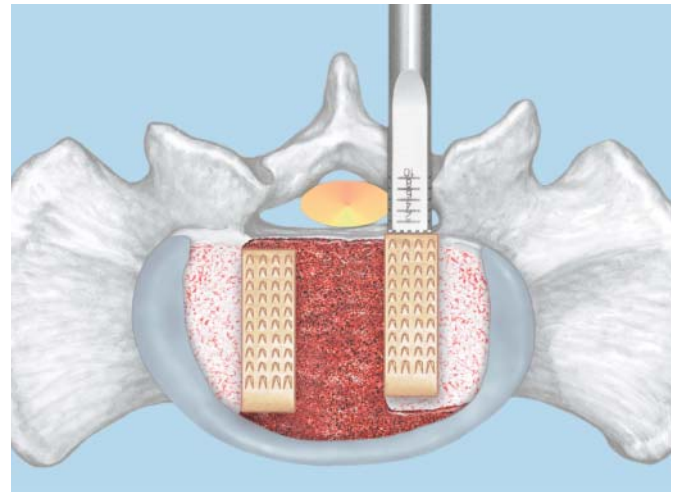
394.562 Graft Funnel, 8 mm

394.572 Graft Pusher, 8 mm

394.579 PLIF Graft Packer

Prior to placement of the second implant, autogenous cancellous bone or a bone graft substitute should be placed in the anterior and medial aspect of the vertebral disc space. The graft funnel, graft pusher and PLIF graft packer can be used for fast and efficient graft placement.

Remove the distractor or trial spacer and insert a second implant of the same height into the available disc space. Use gentle impaction as before. Recessing the implant 2 mm–4 mm beyond the posterior rim of the vertebral body is recommended.



Instruments

389.101 PLIF Distractor



389.102 PLIF Holder



389.103 PLIF Impactor



389.107 PLIF Spreaders
7 mm height
389.109 9 mm height
389.111 11 mm height
389.113 13 mm height
389.115 15 mm height
389.117 17 mm height









389.124 PLIF Rectangular Bone Curette



389.125 PLIF Osteotome, 5 mm width, 140 mm



	PLIF Trial Spacers, 8 mm x 22 mm	
389.128	7 mm height	
389.129	9 mm height	
389.131	11 mm height	
389.133	13 mm height	
389.135	15 mm height	
389.137	17 mm height	
	PLIF Detachable Trial Spacers, 8 mm x 22 mm	
389.172	7 mm height	
389.173	9 mm height	
389.174	11 mm height	
389.175	13 mm height	
389.176	15 mm height	
389.177	17 mm height	
389.714	Bone Rasp, 8 mm width, straight	
389.760	Bone Curette, straight, 5.5 mm width, 140 mm	
389.761	Bone Curette, reverse angle, straight, 5.5 mm width, 140 mm	
	Intervertebral Disc Shavers	
389.767	7 mm height	
389.769	9 mm height	
389.771	11 mm height	
389.773	13 mm height	
389.775	15 mm height	
389.777	17 mm height	

-
- 389.780 Intervertebral Disc Excisors
7 mm height
389.781 9 mm height
389.782 11 mm height
389.783 13 mm height
389.784 15 mm height
389.785 17 mm height



-
- 394.562 Graft Funnel, 8 mm



-
- 394.572 Graft Pusher, 8 mm



-
- 394.579 PLIF Graft Packer



-
- 394.951 Quick Release T-Handle



Posterior Lumbar Interbody Fusion Instrument Set (105.777)

Graphic Case

690.033 PLIF Instrument Set Graphic Case

Instruments

389.101 PLIF Distractor

389.102 PLIF Holder

389.103 PLIF Impactor

PLIF Spreaders

	Height (mm)
389.107	7
389.109	9
389.111	11
389.113	13
389.115	15
389.117	17

389.124 PLIF Rectangular Bone Curette

389.125 PLIF Osteotome, 5 mm width, 140 mm

PLIF Trial Spacers, 8 mm x 22 mm, 2 ea.

	Height (mm)
389.128	7
389.129	9
389.131	11
389.133	13
389.135	15
389.137	17

PLIF Detachable Trial Spacers, 8 mm x 22 mm, 2 ea.

	Height (mm)
389.172	7
389.173	9
389.174	11
389.175	13
389.176	15
389.177	17

389.714 Bone Rasp, 8 mm, straight

389.760 Bone Curette, straight, 5.5 mm width, 140 mm

389.761 Bone Curette, reverse angle, straight, 5.5 mm width, 140 mm



Note: For additional information, please refer to package insert. For detailed cleaning and sterilization instructions, please refer to http://www.synthes.com/sites/NA/MedicalCommunity/Pages/Cleaning_and_Sterilization.aspx or to the below listed inserts, which will be included in the shipping container:

- Processing Synthes Reusable Medical Devices—Instruments, Instrument Trays and Graphic Cases—DJ1305
- Processing Non-sterile Synthes Implants—DJ1304

Intervertebral Disc Shavers

	Height (mm)
389.767	7
389.769	9
389.771	11
389.773	13
389.775	15
389.777	17

Intervertebral Disc Excisors

	Height (mm)
389.780	7
389.781	9
389.782	11
389.783	13
389.784	15
389.785	17

394.562	Graft Funnel, 8 mm
394.572	Graft Pusher, 8 mm
394.579	PLIF Graft Packer
394.951	Quick Release T-Handle, 2 ea.
8201	PLIF Preoperative Planner



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