Warning
This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.
Indications / Contra-indications

**Indications**

Lumbar and lumbosacral degenerative pathologies indicated for segmental spondylodesis including:

- Degenerative disc diseases and instabilities:
  - Primary surgery for certain advanced disc disease or extensive decompression (laminectomy, facetectomy, foraminotomy)
  - Revision surgery for failed disc operation, recurrence of disc herniation, postoperative instability
- Degenerative spondylolisthesis grade I or II
- Isthmic spondylolisthesis grade I or II
- Pseudarthrosis of failed spondylodesis

**Contra-indications**

- Severe osteoporosis
- Unstable burst fractures and compression fractures
- Destructive tumours
- Involvement of 3 or more levels
- Spondylolisthesis grade III and IV
- Acute infections
- Extensive peridural scarring

---

Pre-operatively
Female patient 60 years old, spondylolisthesis L4/L5

Post-operatively
Spondylosis with CONTACT Fusion Cages and additional fixation with pedicle screws (USS)
System description

The CONTACT Fusion Cage is an implant system for posterior lumbar interbody fusion (PLIF). It was designed to:

- allow for interbody fusion in an optimum anatomical position
- allow distraction of the disc space to be bridged and permit consequent restoration of disc height, lordosis and widening of the foramen
- maintain the integrity of the endplates
- allow for bone growth through the cage

Design

The CONTACT Fusion Cages have a rectangular cross section. They are introduced on the flat side and turned clockwise in order to spread the disc space and to bring the cage to the vertical position. When viewed from the side, the cages have a “compact” lenticular form that conforms to the sagittal section of the average lumbar disc (L4–L5, L5–S1).

The posterior edges of the endplates are left intact which prevents the cage from posterior migration. The choice of seven implant sizes enables the optimum disc height and natural lordosis to be restored.

The cage is filled with milled bone graft. The graft is compressed firmly against the endplates by a compression insert which is screwed into the centre of the cage after implantation. The open inferior and superior surfaces allow for bone growth through the cage.

The CONTACT Fusion Cages are manufactured of high-strength titanium alloy (TAN) which provides MRI/CT compatibility.
Surgical technique

1

Position patient

The PLIF procedures have to be performed in natural lordosis, either in the prone position or in a "relaxed" knee-chest position.

Radiographic equipment is recommended for intraoperative control.

2

Approach and decompression of nerve roots

Perform a midline incision.

Do not strip the muscles farther laterally than the lateral aspect of the facet joints unless a posterolateral bone graft mass on the transverse processes is to be added.

If necessary, carry out decompression at this stage of the operation.

3

Insert of pedicle screws

Pedicle screws for additional posterior instrumentation can be inserted now or after having implanted the cages. The rods, however, are mounted on the screws only after insertion of the cages.
4

Expose epidural space

If maintained, the spinous and transverse processes and the attached ligaments provide additional stability. However, if resection is required, the bone can be used as bone graft material. In this case, the spinous and transverse processes of the vertebrae to be fused have to be carefully freed of all soft tissue and stored in a container under a moistened gauze.

- Perform a partial inferior laminotomy (1/3) of the upper adjacent vertebra.
- The medial half of the facet joints should always be removed. Use a gouge and perform a partial resection of the overlying inferior facet and lateral part of the laminar edge.
- At the L5–S1 level, you will find that the distal half of the lamina of L5 has to be removed in order to assure instrument access to the disc space.
- The underlying superior facet of S1 is then nibbled away to the level of the medial aspect of the pedicle.

It is essential to make sufficient room laterally to avoid excessive retraction on the neural tissue, with great care being taken to protect the nerve root inside the foramen.

5

Prepare disc space

Open the posterior anulus (Anulus fibrosus) and carefully remove the nucleus (Nucleus pulposus).

To prevent an accidental perforation of the anterior anulus, use a curette neither too small nor too sharp (389.023). It is essential that the endplate be scraped free of all cartilage, however the bone should not be perforated. Great care should be taken to protect the nerve root and the dura.

(It will be easier to complete the cleaning of the endplates later, when the disc space has been opened with spreaders [389.009–015].)
6 Open disc space

Introduce a small Disc Space Opener (4/8 mm 389.006 or 5/9 mm 389.007) into the opposite side of the intervertebral space (1).

Separate the posterior edges of the vertebral bodies, which may be in very close contact, by turning the instrument 90° clockwise (2).

7 Spread disc space

Protect the nerve root and dura with a root retractor.

Introduce the smallest Vertebral Body Spreader (7/9 mm 389.009) on your side until the laser marks behind the head of the spreader are flush with the posterior edge of the vertebral body (1), and turn it 90° clockwise in order to spread the disc space (2).

If the vertebral body spreader is not seated firmly between the vertebral bodies, replace it with the next biggest Vertebral Body Spreader (8/10 mm 389.010), inserting it in the same way.

Repeat spreading the disc space by introducing the next biggest spreader until you feel by resistance of the tended anulus that the disc space has been enlarged to its natural height.

This last spreader should remain in place until the first cage is introduced on the other side.
8 Select appropriate cage size

Choose a CONTACT Fusion Cage (495.009-015) of the same height as the largest accepted vertebral body spreader.

9 Pick up cage

Position the Implant Holder (389.024) on the cage (1). Turn the knob as far as it will go thus screwing the implant holder onto the cage (2).

Pick up the second cage in the same manner.

10 Fill cages with bone graft

Pack the cages with finely milled autologous bone (the resected bone from the spinous processes and the facet joints will generally be sufficient). Use the Bone Compression Forceps (388.492) to compress the bone within the cages.
11  
**Fill anterior disc space**  
To create optimal conditions for the fusion fill the anterior disc space with cancellous bone graft before introducing the cages.

12  
**Introduce cage**  
Introduce the flat side of the cage into the disc space with gentle hammer blows. The handle should always point away from the midline at introduction (in order to avoid interfering with the handle on the other side when the cage is turned). The nerve roots and dura must be protected by a retractor. Introduce the cage to the appropriate depth, 3 to 4 mm beyond the posterior edge of the vertebral body. When the shoulder of the implant holder tip is flush with the posterior edge of the vertebral body, the cage is advanced enough. Although the anterior anulus is resistant in most patients, be aware that the resistance of the anterior anulus can be lost in a very degenerated disc.

If in doubt, check optimum positioning of the cages with a lateral X-ray.

13  
**Turn cage to upright position**  
Turn the cage clockwise. When the handle of the implant holder is parallel to the body axis, the cage is positioned vertically. Should it be necessary to turn the cage back on its side again, this must be done in a **counter-clockwise** direction.
14
Loosen knob slightly

Loosen the knob by slightly turning it.

15
Retract sleeve and screw in compression insert

Holding it by its flange, retract the sleeve as far as it will go (1). This releases the internal locking mechanism of the compression insert. In this position, the compression insert can be screwed in thus compressing the bone graft (2).

16
Remove implant holder

Unscrew the compression insert (1) and disengage the implant holder from the cage (2).

Option
If there is ample space on both sides of the dura, the handle may be left connected to the first cage during the insertion of the second cage.
17
Introduce second cage

Repeat the steps 9 to 16 on the other side.

Ensure that the second cage does not displace the first when introduced. It should be introduced clear from the first, and inserted as lateral as possible.

Fill in the space between the cages with cancellous bone, too, to achieve, as far as possible, a solid fusion.

18
Posterior stabilisation

Additional internal fixation with a pedicle screw fixation system is recommended.

Perform an additional posterolateral fusion if necessary.

Close the wound over a suction drain.
1
Insert shaft into cage
If necessary, the cage can be removed using the Emergency Holder (389.021). Screw the inner shaft of the Emergency Holder (389.021.002) into the thread of the cage.

2
Slide sleeve on shaft
Mount the Sleeve of the emergency holder on the shaft and ensure that the coupling part of the sleeve fits into the slot of the cage.

3
Mount L-handle
Mount the L-Handle (389.018) onto the sleeve of the emergency holder by pressing the coupling forward.
Mount knob

Mount the Knob (389.021.003) onto the threaded shaft and firmly tighten it.

Remove cage

Turn the cage counter-clockwise (1) and remove it carefully (2) with gentle taps of the Slotted Hammer (359.035).


