# HRC Locking Cage™ PLIF

Surgical Technique

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## Surgical Technique

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## Implant Description

The *HRC Locking Cage* PLIF device is designed to restore the height loss between two vertebral bodies. Two implant are used to fuse a single level. The HRC cage consists of two components; the load bearing part of the device is made from radiolucent PEEK-OPTIMA® Polymer and the blade is made from titanium alloy. The blade can be turned after insertion of the device to offer immediate stability and to prevent the cage from shifting after placement.
Moreover, the impacting force applied during insertion is distributed over the titanium blade, thus avoiding a weakening of the polymer. At the same time the blade serves as an x-ray marker.

The HRC cage is available in different heights and lengths in a lordotic and a non-lordotic version, with smooth or toothed surface.

The HRC cage is an internal implant, dedicated to the following indications: a) Interbody fixation through posterior approach for the treatment of degenerative and traumatic spine or the treatment of spondylolisthesis of the sacral, lumbar or thoracic levels. b) Interbody fixation associated to a posterior or anterior instrumentation.

## Pre-Operative

Pre-operatively, the surgeon must decide which intervertebral level to fuse. This may be done by using a variety of diagnostic techniques such as MRI, myelography, discography, patient history and physical examination.

## Patient Positioning

The patient is positioned in the 90° kneeling-sitting position on an Andrews frame or similar apparatus. This maintains lumbar lordosis and affects abdominal decompression to reduce epidural and venous pressure. A table should be used that accommodates both lateral and anterior-posterior radiographs.

## Exposure

The skin and fascia incised in the midline at the level(s) to be fused. The paravertebral muscles are retracted laterally, beyond the edge of the facet joints.

## Identify Location

To identify the correct disc level(s), needle(s) are inserted into the intervertebral disc(s) as markers, and the location(s) determined by means of fluoroscopy or lateral C-arm radiograph.

## Incision

Make an incision over the spinous process of the segment concerned. Perform a lateral preparation of the muscles, exposing the laminae and ligaments.

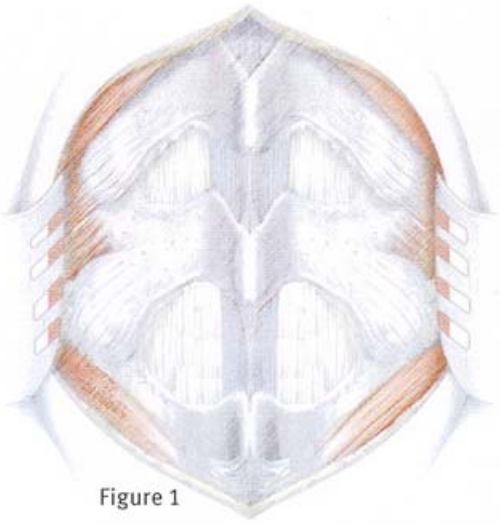

Figure 1

## Preparation

Perform a bilateral opening of the canal using the punch and rongeur. Locate the interspinal roots. Afterwards, locate the annulus fibrosus. When indicated, remove any prolaps and/or sequestrations. Open the intervertebral space.

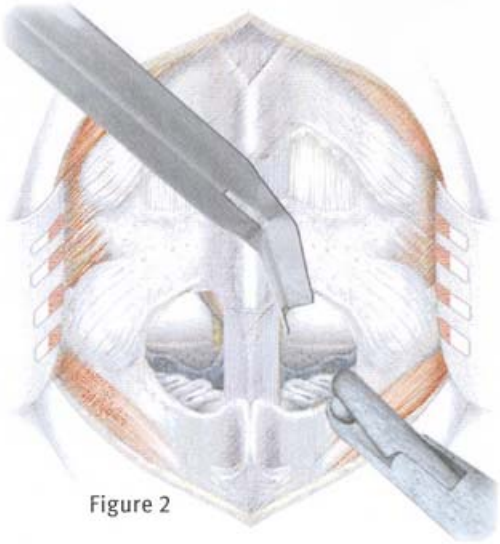

Figure 2

## Nucleotomy

Prepare the intervertebral space bilaterally and resect the remaining nucleus pulposus using the rongeur.

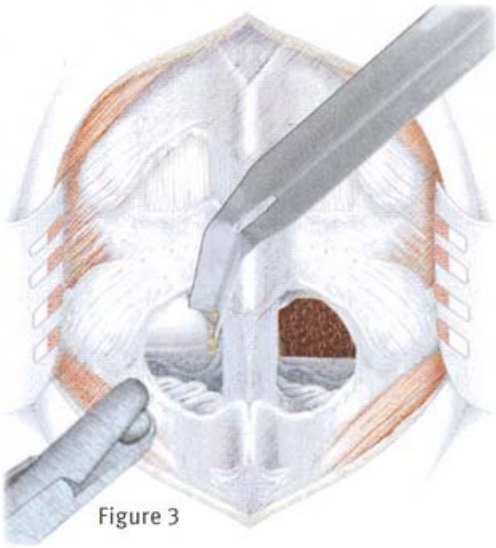

Figure 3

## Curettage

Perform a bilateral curettage of the intervertebral space using the curette and score the end plates of the vertebrae. When indicated, resect the osteophytes while still preserving the dorsal cortex.

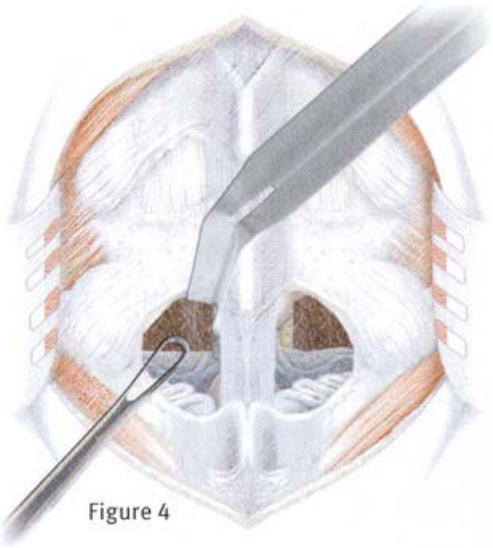

Figure 4

## Distraction

Expand the intervertebral space using a distractor (Fig. 5, bottom left). The distractor is coupled with the T-handle and then introduced on its flat side to one side of the intervertebral space. Then rotate it 90 degrees to distract the intervertebral space, then remove the T-handle. Leave the distractor in the intervertebral space. Same procedures on the opposite side.

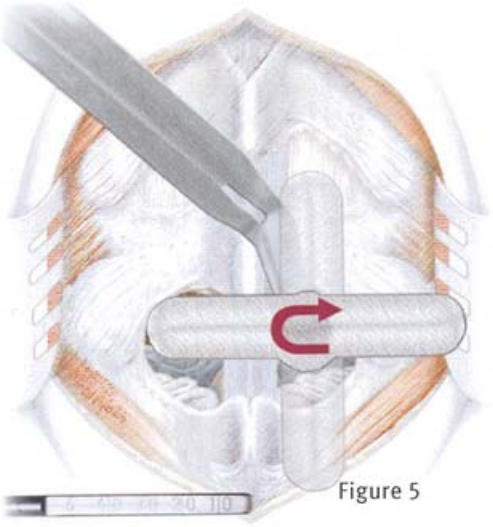

Figure 5

## Trial Cage

If the height of the contra-lateral side is adequate, the trial cage can be used (Fig. 6, bottom left). Use the same procedure as illustrated in Fig. 5. Using the distractors and trial cages alternately, increase the space until the desired height is achieved.

*Note: The intervertebral spaces should be of equal height in order to prevent incorrect positioning.*

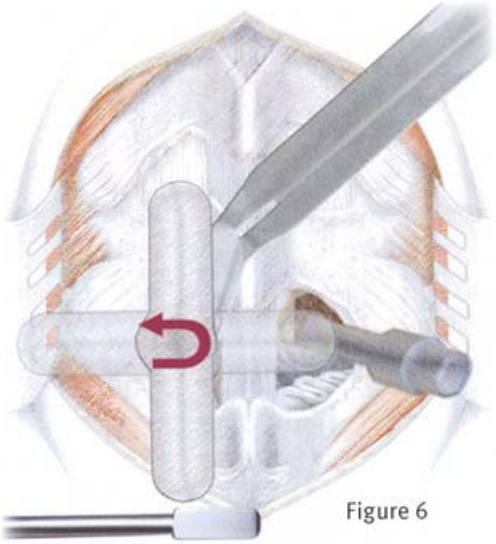

Figure 6

Select corresponding bilateral implants of equal size. By using a lordotic implant, one may achieve the desired lordosis-angle for the intervertebral space, if necessary.

Assembly of the impactor (a + b): Initially, the implant holder (a) is introduced into the guide (b). Thereafter, the cage is to be set in such a way, that the blade is enclosed by the guide (b), thus the guide has direct contact to the PEEK material (see Fig.7). Now the cage can be screwed onto the implant holder.

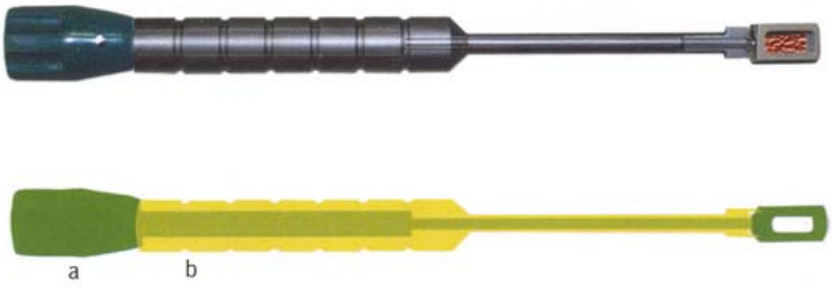


Figure 7

## Preparation of the implant

The impactor, together with the attached cage, is inserted into the correct section of the spongiosa filling base instrument and filled with bone or auto- and/or allograft material by means of the introducer.

Figure 8

## Insertion of the implant

Replace the trial cage with the prepared implant in the intervertebral space.

**Caution: Intraspinal roots and vessels have to be carefully identified and must be protected by the nerve retractor before inserting the implant.**

**Caution: After implanting the cage, remove the impactor without turning the blade.**

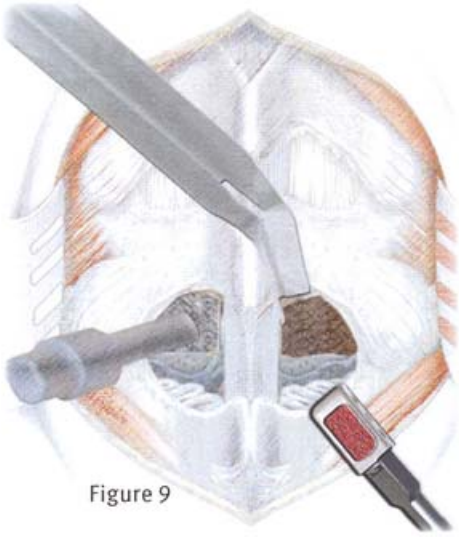

Figure 9

Put the T-handle of the contra-lateral side on the trial cage, then set it free with a 90 degree turn and extract it.

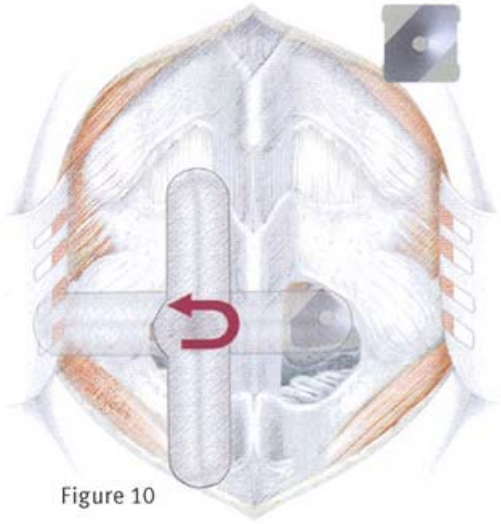

Figure 10

In the meantime, the second cage is prepared with the bone graft and can now be applied through the contra-lateral channel. Proceed as illustrated in Fig. 9, then remove the impactor without turning the blade.

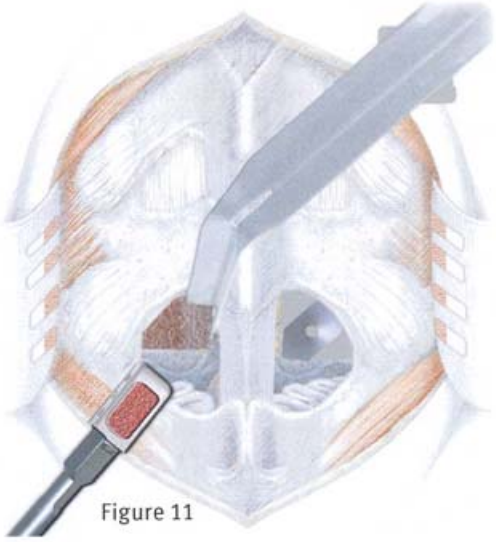

Figure 11

## Assessment

The cages must be placed symmetrically in the disc space. The blade must stand at least 5 mm anterior to the posterior cortex.

Examine the position of the implants with an image intensifier. At this stage, it is still possible to correct the positioning of the locking cage. The blade also serves as a x-ray marker.

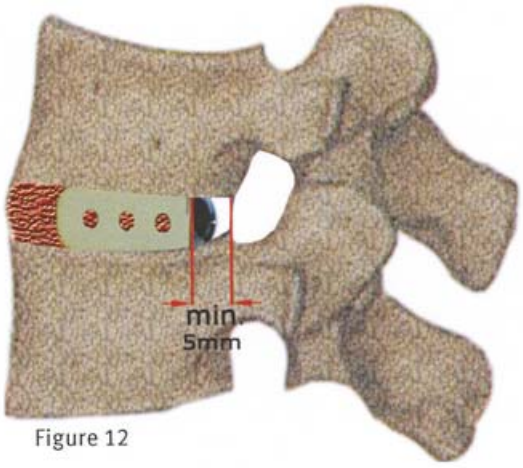


Figure 12

## Locking

The cages can be locked after their correct positioning has been assessed. Fundamentally has the locking of the blade after compression of the dorsal stabilization to follow: Put the locking instrument on the first cage and turn it counter-clockwise, until the handle lies perpendicular (about 45 degrees) to the end-plates of the vertebrae. The direction of rotation is indicated on the handle of the locking instrument. The same procedure is then carried out for the opposite side.

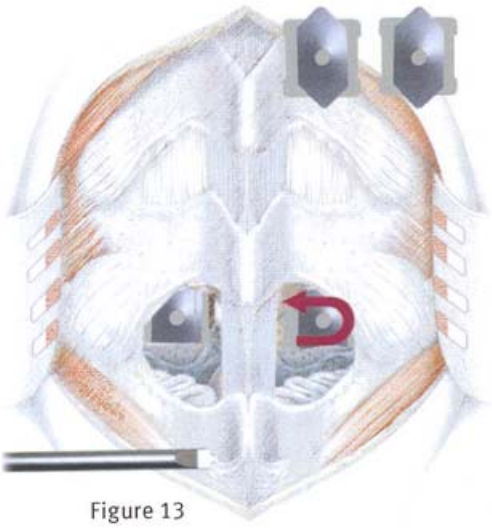

Figure 13

*Note: The HRC Locking Cage implants are no stand-alone devices. Dorsal fixation is necessary.*

## Post-Operative Management

Post-operative regimens may include the following:

1. Bracing at the discretion of the surgeon.
2. Avoidance of repetitive back bending and heavy lifting until advised by their surgeon.
3. Avoidance of non-steroidal anti-flammatory and steroidal drugs for at least 45 days post-operatively.

## Instruments

HRC Nerve Retractor HRCIPR

HRC Curette
5 mm HRCICUR1
8 mm HRCICUR2

HRC T-handle HRCIPU


HRC Distractor
6 mm HRCIDO6
7 mm HRCIDO7
8 mm HRCIDO8

HRC Distractor/Trial Cage
6/9 mm HRCID6/9
7/10 mm HRCID7/10
8/11 mm HRCID8/11
9/12 mm HRCID9/12
10/13 mm HRCID10/13

HRC Implantholder HRCIP

HRC Guide HRCIR

HRC Locking Instrument HRCITV

HRC Introducer HRCIIMP

HRC Filling Base HRCIE
(Has to be disassembled and cleaned after use)