# CLS® Spotorno® Hip Cup

## Surgical Technique

Nature as Model

zimmer
Confidence in your hands®

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# Surgical Technique CLS Spotorno Cup

Developed in cooperation with
**Prof. Lorenzo Spotorno**
Finale Ligure, IT

## Table of Contents

## Indications for the CLS Spotorno Cup
### Bone Quality as the Deciding Factor

The indications for this acetabular cup are rather varied. The *CLS* Expansion cup is indicated in practically all forms of idiopathic coxarthrosis, ischaemic necrosis, rheumatoid arthritis and – with very good results – in protrusive forms. It is also suitable in replacement implantations following arthrodesis and after fractures of the acetabulum.

With an adequate surgical technique, the Expansion cup can also be used for revisions in cases with major defects of the floor of the acetabulum; for primary implantations in cases with moderate osteoporosis; and for slightly dysplastic hips.

Insufficient peripheral anchorage constitutes a contraindication for the *CLS* cup.

In order to achieve an adequate press-fit in the region of the equator, sufficient peripheral anchorage is essential. The absence of a rim segment of the acetabulum constitutes a contraindication. If the defect involves ¼ of the acetabular rim or more, then the contraindication is absolute, whereas a defect involving less than ⅙ of the circumference is well compensated and does not require any special precautions. The *CLS* cup can also be used in cases with a defect of the acetabular rim of more than ⅙ and less than ¼. In these cases, special attention has to be paid to the flanges. All six flanges must be supported by bone.

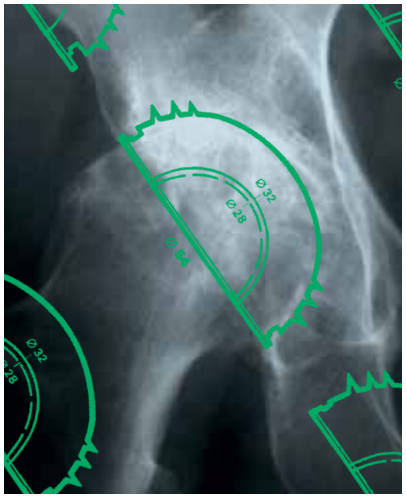
Due to the biomechanics of the pelvis, when changing from the sitting to the standing position, peak loading is exerted in the postero-superior quadrant. In the presence of inadequate bone structure, this zone has to be treated with special care. In the latter case, the lack of support at the rim of the acetabulum must not involve more than ⅙ of the circumference.

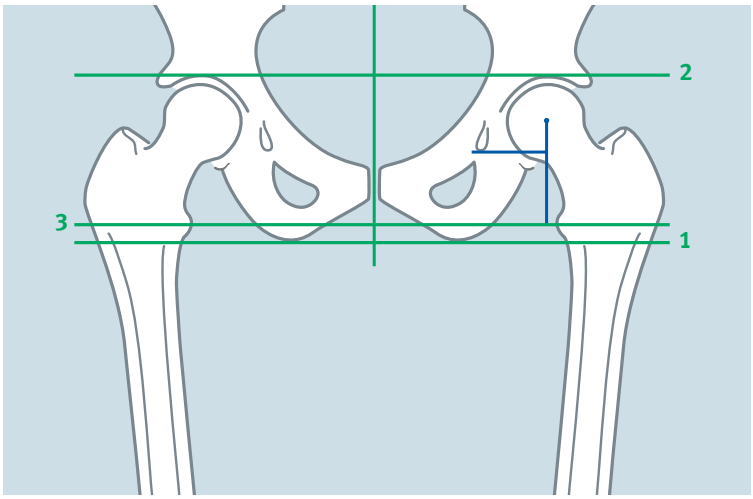
## Preoperative Planning

### Systematic Preparation with Suitable Methods of Measurement and Practical Planning Benefit Correct Implantation

Within the framework of the preoperative planning, the stem size, the optimal anchorage of the stem in the medullary cavity and the correct position of the acetabular and femoral components are determined in order to ensure equal leg length.

At the start of the preoperative planning, three lines are drawn on the X ray picture: The tangent of the two ischia forms the baseline. A second line is drawn through the floors of the two acetabulae, and a third between the lesser trochanters. On the side that is not to be operated on, the center of rotation of the joint is determined. Then the distances between the joint, baseline and “teardrop” are drawn. In addition, the longitudinal axis of the pelvis is also drawn.

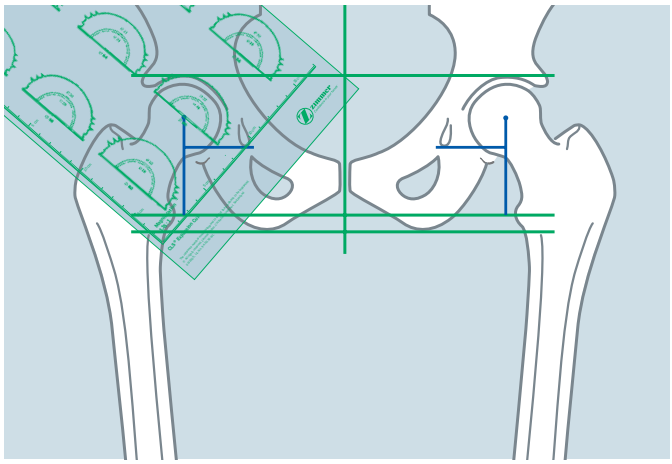





Equal leg length: all lines are parallel

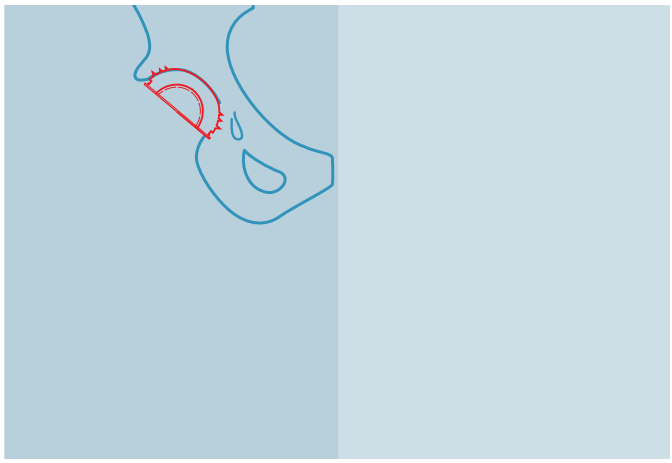
## Determination of Size and Position of the Cup

The center of rotation of the joint to be operated on is determined by transposing the two lines that have been drawn on the opposite side. The cup template is then placed on the side that is to be operated on. The position of the acetabular component is determined by the outline of the cup, the center of rotation that was determined, the level of the “teardrop” and the required inclination of 40–45°.



## Drawing in of Pelvis and Cup

The tracing paper is placed on the X ray picture and the template. The longitudinal edge must run parallel to the vertical axis of the pelvis. The pelvis and the cup are drawn in and then the tracing paper is removed from the X ray.



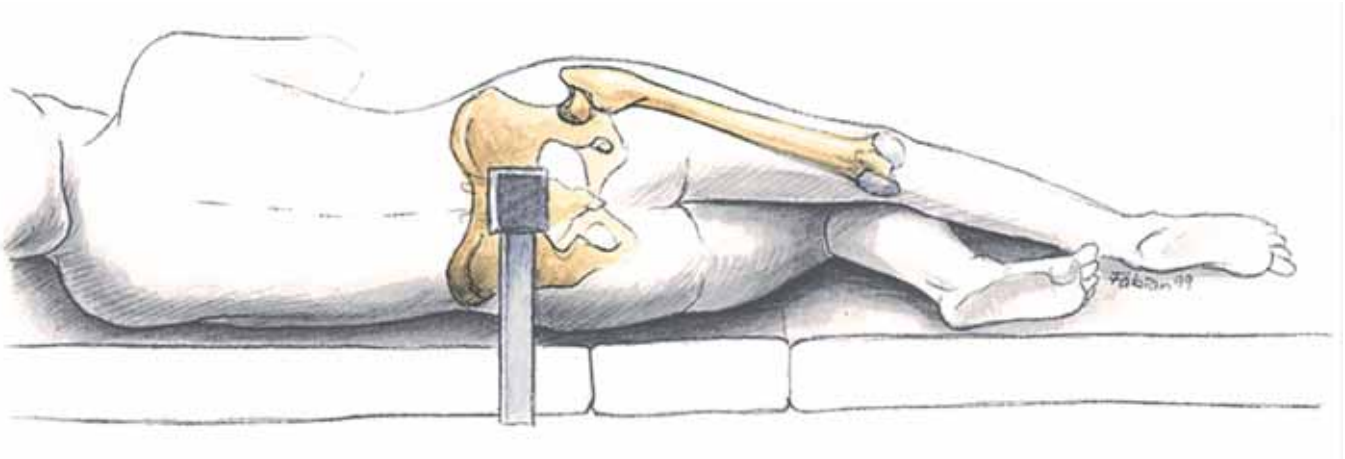
## Preoperative Planning of the Stem

For a detailed description of the planning steps on the femoral side, please refer to the surgical technique of the femoral implant of your choice.

# Surgical Technique
## Based on the Suggestion by the Designing Surgeon

### Positioning of the Patient: Placement in the Lateral Position*

The patient is positioned on the operating table with one pressure pad on the pubic bone and one on the sacrum. In the subsequent positioning, it is important that the pelvis is not lowered, either sideways or in the caudal direction, and that it is fixed securely. The leg on the opposite side is bent 45° at the hip and 90° at the knee, which helps to stabilize the position of the patient.



* Different surgical approaches are possible. The following describes the author's recommended approach.

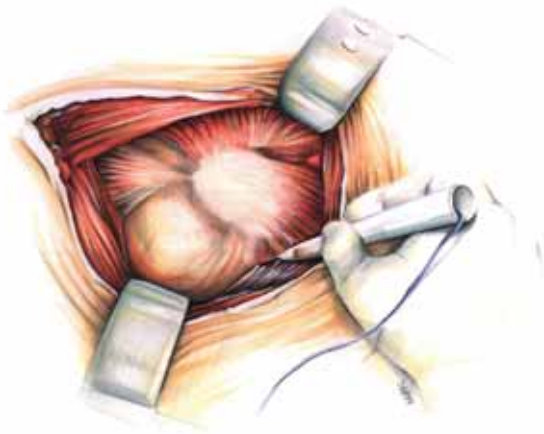
## Surgical Approach to the Hip: Incision

The posterolateral approach is recommended. The joint is bent at an angle between 30° and 40°. A rectilinear incision is made to the tip of the greater trochanter and is then continued for about 6 cm on the diaphysis. After transection of the subcutis, the fascia lata is exposed.

## The Approach to the Deeper Layers

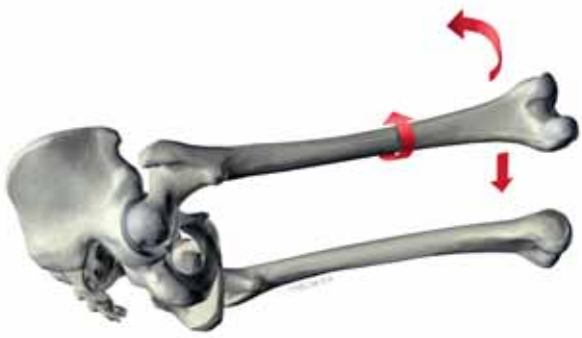
The fascia lata is incised and dissociated of the fibers of the M. gluteus maximus, and the Charnley wound retractor is placed directly on the fascia.

In this way, the plane of the external rotator muscles and the tendon attachment of the M. gluteus maximus are exposed on the linea aspera of the femur. The tendon attachment is partly released in order to relax the soft parts. This favors the displacement of the femur in the ventral direction and also its internal rotation.



## Transection of the External Rotator Muscles and Dislocation of the Hip

After inserting a bent Hohmann retractor under the M. gluteus medius, the tendon of the M. piriformis is located and transected, as are some of the tendons of the external rotator muscles. The joint capsule is then opened from the dorsocranial direction. With a combined flexion, adduction and internal rotation movement, the head of the femur can now be dislocated from the acetabulum.



## Osteotomy of the Neck of the Femur

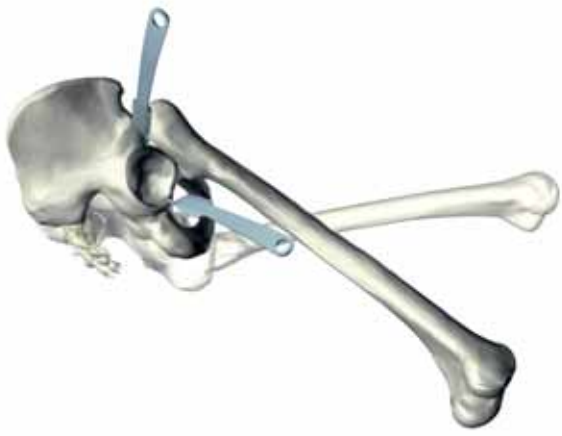
The lesser trochanter serves as reference point for the osteotomy plane on the neck of the femur, which was already included in the preoperative planning. The level of the osteotomy is influenced by the anteversion of the neck of the femur: the greater the anteversion, the lower the level of the osteotomy. Normally, it proves an advantage to retain 1 to 1.5 cm of the neck of the femur. This creates a sheath into which the proximal, ribbed part of the stem can fit.
The next step is the osteotomy with the reciprocating saw. Starting from the medial mark, the upper edge of the neck of the femur is reached at the point where it rises from the mass of the trochanter. It may be necessary to continue the osteotomy with a cut continued further upwards, parallel to the axis of the femur.

## Exposure of the Acetabulum

After the leg has been moved back into the neutral position, the anterior and lower Hohmann levers are applied. The anterior lever, on the upper front rim of the acetabulum below the 2 o'clock position, immediately under the tendon of the M. rectus femoris, moves the femur in the ventral direction and allows a broad view into the acetabulum.

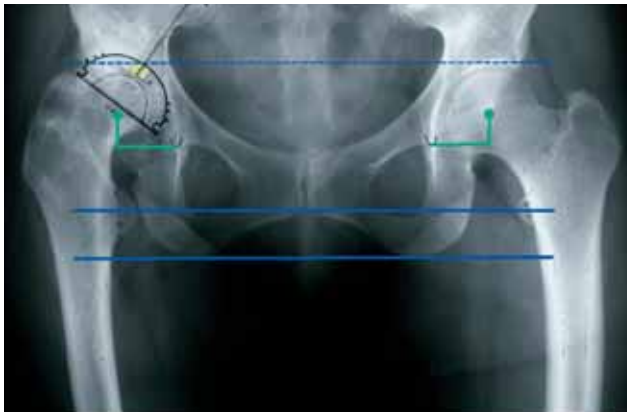
This maneuver is facilitated by the partial transection of the tendon of the M. gluteus minimus and of the fasciculus of fibers, which strengthens the capsule, above, and fuses with the M. gluteus medius.

The lower wound retractor, which is applied under the pulvinar acetabuli, corresponds to the upper edge of the foramen obturatum. It smoothes the remaining joint capsule and facilitates its removal. This provides an optimal view of the acetabular rim.

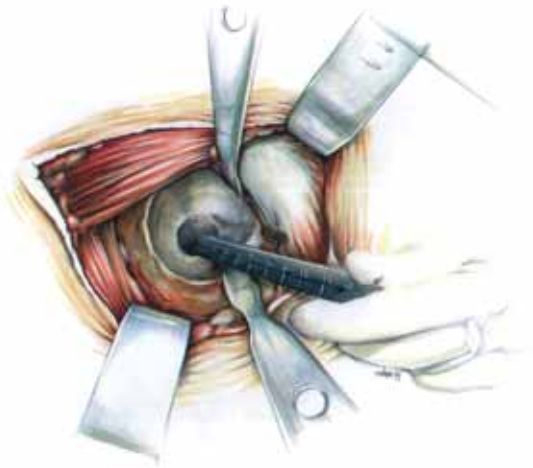


## Preparation of the Acetabulum and Determination of the Center of Rotation

The correct positioning of the center of rotation creates the necessary conditions for restoring the hip's "physiological" function. However, with the altered anatomical characteristics associated with the different pathological conditions, the position of the cup prosthesis always remains a challenge. With the reaming of the acetabulum, depending on the available bone, it is possible to optimize the position of the center of rotation.



The center of rotation is established in the course of the preoperative planning. The measurement of the planned countersink must be reproduced in the patient as accurately as possible.



Starting from the reference point in the floor of the acetabulum, the fossa acetabuli is notched in the center of the acetabulum, using the smallest reamer, or better, the gouge.
At the same time, part of the subchondral bone, corresponding to the planned countersink, is removed. Normalization of the acetabulum (or geometrical rounding, with disappearance of the reference point on the roof of the acetabulum) is achieved by using reamers of increasing diameter until the planned measurement is reached.

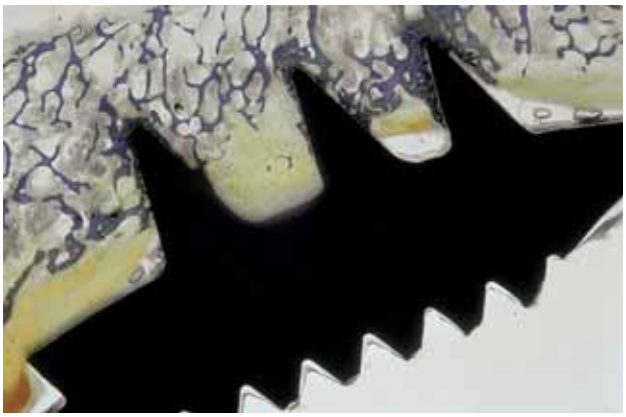
## Peripheral Anchorage of the Expansion Cup

Fixation by means of expansion was developed on the basis of a precursor of the original press-fit system, the principal feature being the peripheral anchorage obtained through a push button effect. This idea was combined with the modern press-fit concept and optimized in the Expansion cup:

**1** On the one hand, it is a true press-fit, because the anchorage cusps of the cup are slightly overdimensioned, compared with the reamed acetabulum.

**2** On the other hand, the peripheral anchorage is accentuated by the position of the anchorage cusps along the circumference as well as by the mechanism of the expansion: as the cup is relaxed and expands when releasing the insertion instrument, the load is shifted from the area of the pole to the equator of the cup.
The reaming must be sufficiently deep to allow complete fixation of all three rows of cusps. The fixation by three rows of fixation cusps is optimal, although clinical experience shows that fixation of only the first two rows of cusps is required.
Possible bone cysts in the area of the acetabular rim are filled with bone chips produced by the deep reaming. Care must also be taken to ensure that no eccentricity is created through the final work with the reamer.
It is therefore advisable to carry out the final reaming work by hand, in addition, it is recommended to align the axis of the reamer according to the assumed definitive orientation of the cup.

**Important:** It is essential that all flanges of the *CLS* shell are in contact with the acetabular wall at all times. This should also be considered when positioning the shell with reference to the transverse ligament notch. A single flange should never bridge this notch alone; the latter should rather be shared by two flanges in order to significantly reduce the risk of implant fracture.



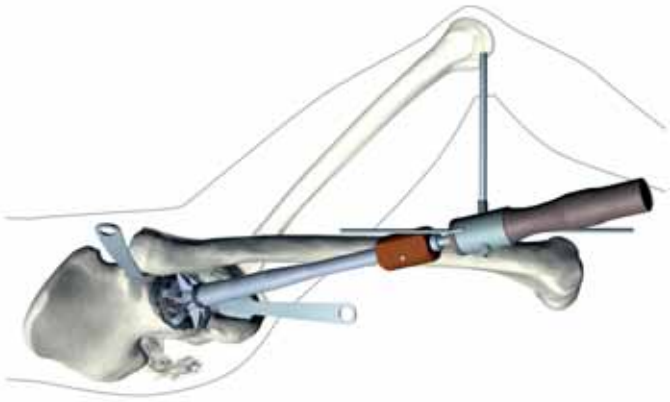
## Positioning of the Acetabular Cup

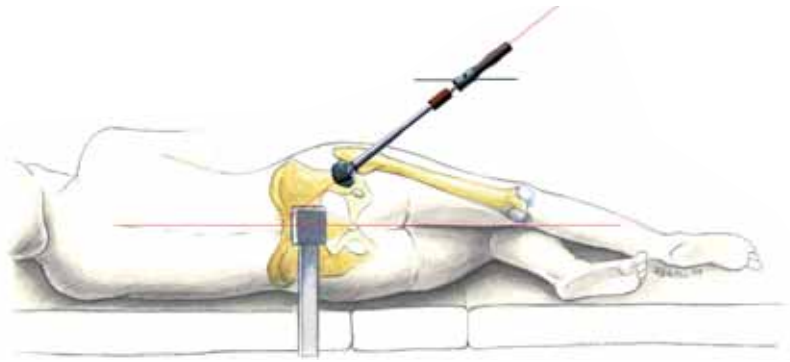
Only after creation of a regular hemisphere the cup can be inserted.
If during reaming the lamina has been reached, the floor of the acetabulum is lined with bone chips produced by the reamer.

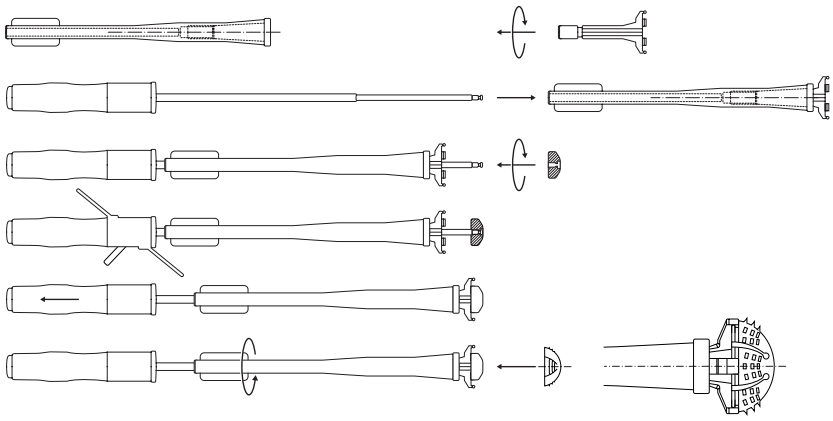
The size labeling on the *CLS* titanium shells corresponds to the size of the reamers. The shell is now compressed with the appropriate cup positioning instrument until the individual segments are in contact with one another at the equator. This is how the desired underdimensioning is obtained, in order to be able to place the implant in the acetabulum without driving it in.

Using the handle of the instrument, the optimal position, with an inclination of 45° and 15–20° anteversion, can easily be obtained. Before relaxing the positioning instrument, the definitive position can be checked with a special orienting instrument. By turning the locking sleeve, while at the same time firmly holding the handle, the compression on the shell is released. The pressure decreases and, by expanding the cup, achieves a firm fit. By turning the chuck through 30°, the hooks of the compression forceps disengage from the petals of the cup and release them.

**Important:** In order to retain the strength of the cup, it should not remain under compression for longer than 1 minute. It is advisable to anchor the implant in the acetabulum, using the cup positioning instrument, immediately after compression. The titanium *CLS* shell may only be compressed twice.







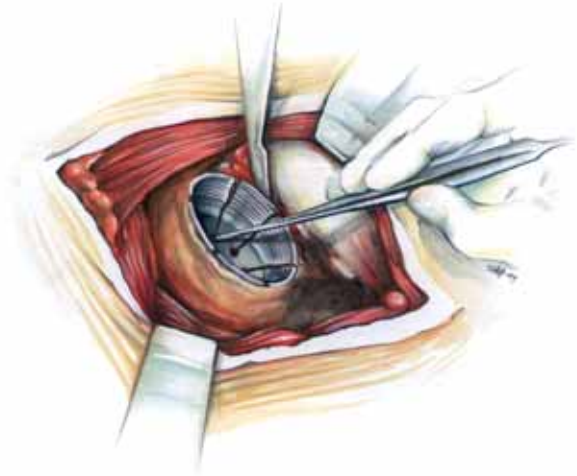
Assembly of the setting instrument

## Expansion of the CLS Spotorno Shell

The positioning of the shell and the possible gap between implant and bone behind the shell must be checked: a space of a few millimeters is within the acceptable range, and the acetabulum may be filled in with reamed-out cancellous bone to fill any void behind the cup. If any osteophytes are pushing against the implant, it is advisable to remove them before the final expansion is carried out.

By turning the expansion cone in the counterclockwise direction, the screw canal can be correctly filled without applying force. Then, maximum expansion is achieved by turning in the clockwise direction, while keeping the knob on the handle pressed. By turning in the counterclockwise direction, the instrument can be removed.

It can be clearly seen how the cusps that are pressed into the surrounding bone ensure a high level of primary stability.



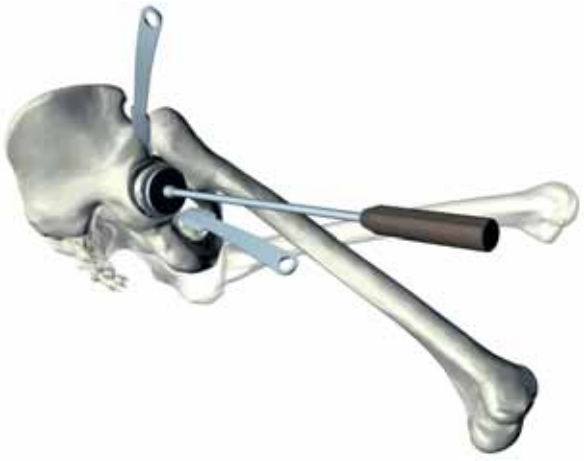
## Fixation of the Insert

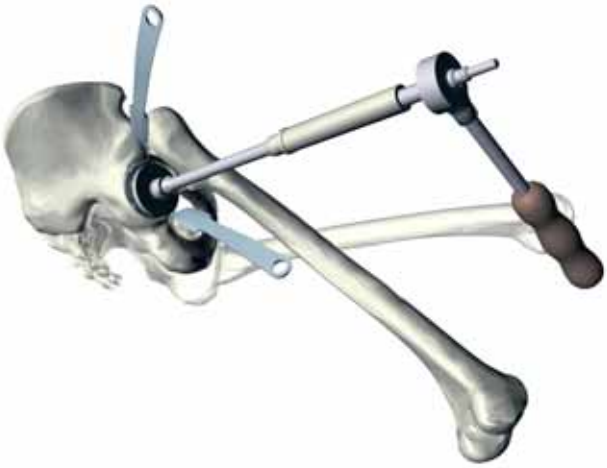
Before the insert is placed, it must be checked whether marginal osteophytes in the acetabulum and/or possible remains of the capsule can interfere with the correct positioning of the insert. The *Sulene*®, *Durasul*® or *Metasul*® insert is mounted on the setting instrument and, in this way, can be correctly positioned in the cup.

By turning in a counterclockwise direction, the thread takes purchase, and by turning in the opposite direction, the insert is then screwed in as far as possible manually.

The setting instrument is then withdrawn and the insert is finally screwed in using the wrench and the insertion instrument. Finally, the parallel positioning and the contact between the rim of the acetabular insert and the metal shell must be checked.

After careful rinsing, the cup is protected with a gauze swab and the Hohmann retractor removed. Now the stem component can be implanted.





incorrectly positioned insert

correctly positioned insert

## Case Study

*CLS Spotorno* System

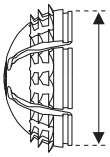
Preoperative

Postoperative 15.8 years

## Ordering Information – Implants

CLS® Spotorno® Shell

Protasul®-100
uncemented
L. Spotorno

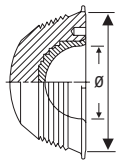


STERILE R

| Size | REF |
|---|---|
| 46 | 94.46.19 |
| 48 | 94.48.19 |
| 50 | 94.50.19 |
| 52 | 94.52.19 |
| 54 | 94.54.19 |
| 56 | 94.56.19 |
| 58 | 94.58.19 |
| 60 | 94.60.19 |
| 62 | 94.62.19 |

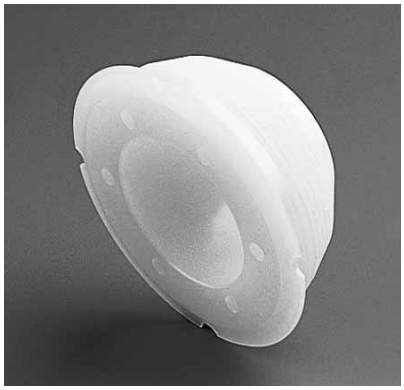
Metasul® CLS® Spotorno® Insert

Sulene® PE/
Protasul®-21 WF
uncemented
L. Spotorno



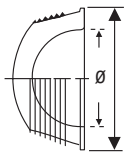

STERILE R

| Size | ∅ mm | REF |
|---|---|---|
| – | | |
| 48 | 28 | 60.13.28-48 |
| 50 | 28 | 60.13.28-50 |
| 52 | 28 | 60.13.28-52 |
| 54 | 28 | 60.13.28-54 |
| 56 | 28 | 60.13.28-56 |
| 58 | 28 | 60.13.28-58 |
| 60 | 28 | 60.13.28-60 |
| 62 | 28 | 60.13.28-62 |



Durasul® CLS® Spotorno® Insert

Durasul® PE
uncemented
L. Spotorno




STERILE R

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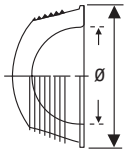
| 48 | 28 | 01.00307.348 |
| 50 | 28 | 01.00307.350 |
| 52 | 28 | 01.00307.352 |
| 54 | 28 | 01.00307.354 |
| 56 | 28 | 01.00307.356 |
| 58 | 28 | 01.00307.358 |
| 60 | 28 | 01.00307.360 |
| 62 | 28 | 01.00307.362 |
| 50 | 32 | 01.00307.450 |
| 52 | 32 | 01.00307.452 |
| 54 | 32 | 01.00307.454 |
| 56 | 32 | 01.00307.456 |
| 58 | 32 | 01.00307.458 |
| 60 | 32 | 01.00307.460 |
| 62 | 32 | 01.00307.462 |

Metasul® may only be paired with Metasul® heads.
Sulene® may not be sterilized in autoclaves!
Durasul® may not be sterilized in autoclaves!

PE CLS® Spotorno® Cup Insert

Sulene® PE
uncemented
L. Spotorno




STERILE R

| Size | ∅ mm | REF | Size | ∅ mm | REF |
|---|---|---|---|---|---|
| 46 | 22 | 68.13.22-46* | – | | |
| 48 | 22 | 68.13.22-48* | – | | |
| 50 | 22 | 68.13.22-50* | 50 | 32 | 68.13.32-50 |
| 52 | 22 | 68.13.22-52* | 52 | 32 | 68.13.32-52 |
| 54 | 22 | 68.13.22-54* | 54 | 32 | 68.13.32-54 |
| 56 | 22 | 68.13.22-56* | 56 | 32 | 68.13.32-56 |
| 58 | 22 | 68.13.22-58* | 58 | 32 | 68.13.32-58 |
| 60 | 22 | 68.13.22-60* | 60 | 32 | 68.13.32-60 |
| 62 | 22 | 68.13.22-62* | 62 | 32 | 68.13.32-62 |
| 46 | 28 | 68.13.28-46 | | | |
| 48 | 28 | 68.13.28-48 | | | |
| 50 | 28 | 68.13.28-50 | | | |
| 52 | 28 | 68.13.28-52 | | | |
| 54 | 28 | 68.13.28-54 | | | |
| 56 | 28 | 68.13.28-56 | | | |
| 58 | 28 | 68.13.28-58 | | | |
| 60 | 28 | 68.13.28-60 | | | |
| 62 | 28 | 68.13.28-62 | | | |

* On request

## Ordering Information – Instruments

Tray (empty)
REF 72.00.20-02

Insert for tray (empty)
REF 72.00.20-20

Standard container cover
REF 01.00029.031

Handle

REF
72.40.01

Compression cylinder

REF
72.40.02

Compression pliers

| ∅ mm | REF |
|---|---|
| 46 | 72.46.00 |
| 48 | 72.48.00 |
| 50 | 72.50.00 |
| 52 | 72.52.00 |
| 54 | 72.54.00 |
| 56 | 72.56.00 |
| 58 | 72.58.00 |
| 60 | 72.60.00 |
| 62 | 72.62.00 |

Top

REF
72.40.03

All instruments not sterile

Positioning guide

REF
75.85.19

Positioning bar

REF
75.85.00

Handle

REF
72.30.12

Knob

REF
73.10.06

Ratched wrench

REF
73.10.05

Extraction sleeve

REF
76.00.08

Expansion cone

| ∅ mm | REF |
|---|---|
| 46 | 72.30.03 |
| 48 | 72.30.04 |
| 50 | 72.30.05 |
| 52 | 72.30.06 |
| 54 | 72.30.07 |
| 56 | 72.30.08 |
| 58 | 72.30.09 |
| 60 | 72.30.10 |
| 62 | 72.30.11 |

Screw-in attachment

| ∅ mm | REF |
|---|---|
| 22 Polyethylene | 72.30.28 |
| 28 Polyethylene | |

Screw-in attachment

| ∅ mm | REF |
|---|---|
| 28 Metasul® | 72.28.15 |
| 32 Polyethylene | |

Setting device

| ∅ mm | REF |
|---|---|
| 28 Metasul® | 72.28.05 |
| 32 Polyethylene | |

Setting device

| ∅ mm | REF |
|---|---|
| 22 Polyethylene | 72.30.29 |
| 28 Polyethylene | |

Screw-in attachment (old)

| Size in mm | ∅ mm | REF |
|---|---|---|
| 46–62 | 22 | 72.30.18* |
| 46–48 | 28 | 72.30.14* |
| 50–62 | 28/32 | 72.30.15* |

Contact your Zimmer representative or visit us at www.zimmer.com

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Lit. No. 06.01296.012 – Ed. 06/2006 WL

7 611814 758891