ZIMMER BIOMET
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MS-30® Cemented Hip Stem

with Upgraded Instruments Kit

Surgical Technique

Device Description

The MS-30 Cemented Hip Stem is a highly polished stainless steel stem available as standard and lateral version (Protasul®-S30 (Fe-22Cr-10Ni-3Mn), [ISO 5832-9] Alloy).

MS-30 Stems are used with a distal centralizer and an optional proximal positioner. The MS-30 Stem Centralizers and the optional proximal positioners are ancillaries for implantation of the MS-30 Stem to allow correct positioning of the stem. Both distal centralizers and proximal positioners are manufactured from PMMA.

This Surgical Technique is valid for the following products identified below:

- MS-30 Cemented Hip Stem (Protasul-S30 (Fe-22Cr-10Ni-3Mn), [ISO 5832-9] Alloy)
- MS-30 Distal Centralizers and Proximal Positioners (PMMA-Copolymer)

Intended Purpose

MS-30 Hip Stems are intended to reduce pain and increase hip mobility through long-term cemented fixation of total or hemi hip arthroplasty in the femur of patients with an adequate bone stock to support the component. A complete system consisting of a stem with a distal centralizer and an optional proximal positioner, as well as a ball head and in case of total hip arthroplasty a cup, is used for the treatment of degenerative diseases or trauma of the hip. All MS-30 Cemented Hip Stems are intended to provide connection to articulation with specified ball heads through the 12/14 taper. MS-30 Stems, MS-30 distal centralizers and MS-30 proximal positioners are intended for single use only and provided sterile.

The MS-30 Stem Centralizers are intended to be used in connection with the MS-30 Stem in the femur of patients with adequate bone stock to support the stem. They help centering the stem, which facilitates creation of a cement mantle with uniform thickness around the stem in the course of hip arthroplasty, thereby helping to reduce pain and increase mobility through long term cemented fixation.

Indications and Contraindications

Indications

- Noninflammatory degenerative joint disease (NIDJD), e.g. avascular necrosis, osteoarthritis, and inflammatory joint disease (IJD), e.g. rheumatoid arthritis.
- Failed previous hip surgery (not THA) where pain, deformity, or dysfunction persists.
- Optional use in revision: in some medical conditions (e.g., early revision when healthy and good bone stock exists), the surgeon may opt to use primary implants in a revision procedure..

Contraindications

- Patient's physical conditions that would eliminate or tend to eliminate adequate implant support or prevent the use of an appropriately sized implant, e.g. previous surgery, insufficient quality or quantity of bone resulting from conditions such as cancer or congenital dislocation, metabolic bone disease of the upper femur or pelvis, femoral osteotomy revision, girdlestone revision, osteoporosis, osteomyelitis, neuromuscular compromise or vascular deficiency in the affected limb in sufficient degree to render the procedure unjustifiable (e.g. absence of musculoligamentous supporting structures, joint neuropathy) or other conditions that may lead to inadequate skeletal fixation.
- Active infection of the hip, old or remote infection. This may be an absolute or relative contraindication.
- Allergy to the implanted material, above all to metal (e.g. cobalt, chromium, nickel etc.).
- Local bone tumors and/or cysts.
- Pregnancy.

For more information please refer to IFU D011500324

Table of Contents

Introduction

MS-30 Cemented Hip Stem

The MS-30 stem is designed for cemented anchorage. The three-dimensional tapered design without corners or edges maintains the strength of the cement mantle in the various Gruen zones. The geometry of the cement mantle is established during the preoperative planning.

The highly polished surface, together with the hollow-space design of the distal centralizer, permits debonding in the uninterrupted cement mantle.

To achieve good long-term results with cemented stems, particular attention should be paid to the cementing technique[1]: Fundamental steps during surgery are insertion under pressure and ensuring a sufficiently thick cement mantle, particularly in the calcar region.

Different offset options allow the reconstruction of physiological anatomy and biomechanics as desired. The standard and lateral version of the MS-30 stem offer the surgeon a high intra-operative flexibility.

With the MS-30 stem, one can choose the surgical technique of Professor Morscher or Professor Spotorno. These techniques have been developed for the lateral approach (by Professor Morscher) and the posterior approach (by Professor Spotorno).

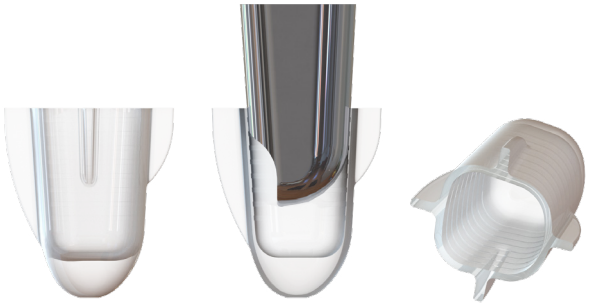
Note: For the sizing chart of the MS-30 Stem, see Appendix 2.

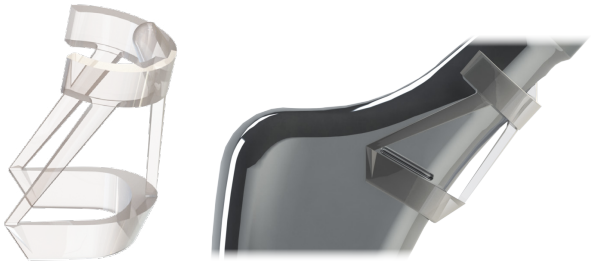
History

The naming of the stem is a combination of the name of the developer surgeons (Prof. Erwin W. Morscher and Prof. Lorenzo Spotorno) and the stem material (Protasul-S30): Morscher Spotorno 30 (or short MS-30).

Hip arthroplasties using the MS-30 stem have been carried out since 1990. The MS-30 stem with a matt surface was introduced on the market in 1992 and was available until 2003. The MS-30 stem with a polished surface[2] was launched internationally in 1994. The current distal centralizer and proximal positioner was launched in 2002.

1. Barrack RL, Mulroy RD, Harris WH: Improved cementing techniques and femoral component loosening in young patients with hip arthroplasty. A 12-year radiographic review. J Bone Joint Surg 74B: 1992: 385–389.
2. Berli B, Elke R, Morscher EW: The cemented MS-30 stem in total hip replacement, matte versus polished surface: minimum of five years of clinical and radiographic results of a prospective study. In: Winters GL, Nutt MJ (ed): Stainless steels for medical and surgical applications. ASTM STP 1438, 2003: 249–261.





MS-30 Distal Centralizers

- Made from PMMA co-polymer which facilitates chemical bonding with bone cement
- Two sizes to choose from for each of the six stem sizes
- Four wings intended to support proper centering of the stem and a cement mantle thickness of more than 1 mm
- The lateral wing is longer than the others, which indicates its position on the lateral side of the stem
- Cavity within the centralizer to allow for subsidence of the stem into the cavity
- Rounded edges to allow good cement flow

Size Range: 12 sizes; two sizes for each stem available; one standard centralizer for most of the femurs, one for larger medullary canals

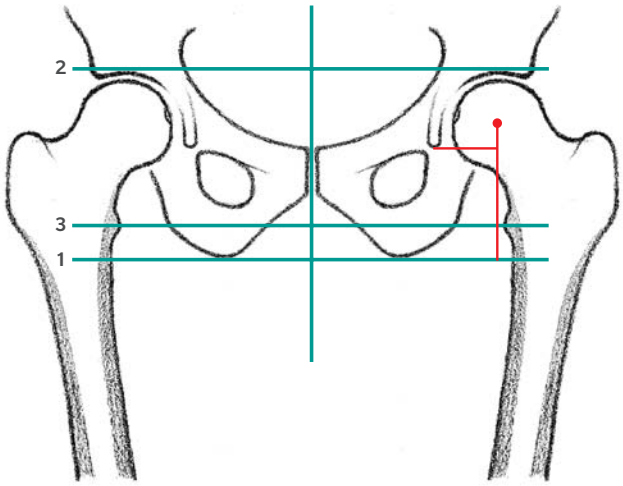
Stem Size	Distal Centralizer
6	01.00356.008, Size 6/8
	01.00356.010, Size 6/10
8	01.00358.010, Size 8/10
	01.00358.012, Size 8/12
10	01.00351.012, Size 10/12
	01.00351.014, Size 10/14
12	01.00351.214, Size 12/14
	01.00351.216, Size 12/16
14	01.00351.416, Size 14/16
	01.00351.418, Size 14/18
16	01.00351.618, Size 16/18
	01.00351.620, Size 16/20

MS-30 Proximal Positioners

- Made from PMMA co-polymer which facilitates chemical bonding with bone cement
- The positioner is put in place by hand. It clicks onto the neck and into the extraction hole. No instruments necessary.
- The U-shaped portion is placed below the resection line
- Centres the femoral stem in the proximal region
- After polymerization of the cement, the upper part of the positioner is removed
- The lower part remains in the cement and generates a cement mantle thickness of at least 3 mm

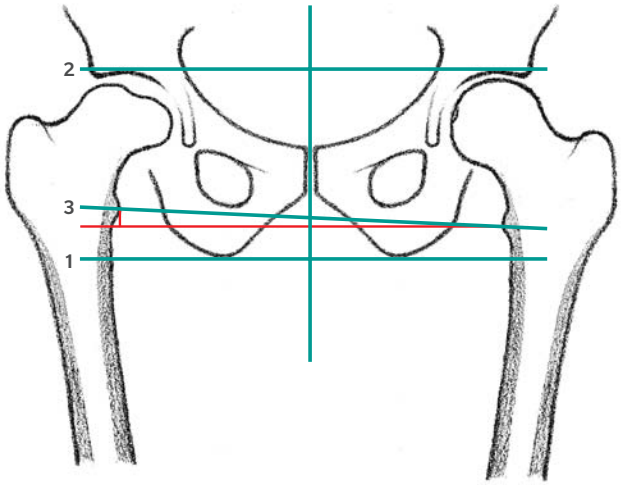
Size Range: 6-6 sizes; one proximal positioner for each stem size and neck offset (standard/lateral)

Stem Size	Proximal Positioner, standard	Proximal Positioner, lateral
6	01.00356.055, Size 6	01.00356.065, Size 6
8	01.00358.055, Size 8	01.00358.065, Size 8
10	01.00351.055, Size 10	01.00351.065, Size 10
12	01.00351.255, Size 12	01.00351.265, Size 12
14	01.00351.455, Size 14	01.00351.465, Size 14
16	01.00351.655, Size 16	01.00351.665, Size 16



Same Leg Length

All three lines run parallel.



Dysmetry Caused by the Femur

The first and second lines run parallel, whilst the bitrochanteric line is divergent towards the longer leg. The leg length difference determined on the X-ray must be compared with the difference that is established clinically.

Pre-operative Planning

A thorough pre-operative planning ensures optimum preparation of the surgery and facilitates the work of the surgical team. It also serves the purpose of self-monitoring. The objectives of pre-operative planning are to determine the stem size, the ideal anchorage of the stem in the medullary cavity, and the optimum position of the acetabular and femoral components for the restoration of leg length.

Planning Objectives

- Choice and size of the implant I Optimum cement mantle in the various Gruen zones
- Position and height of the resection of the neck of the femur
- The offset and, thus, the decision whether to use the standard or lateral version
- Selection of the corresponding prosthesis head
- Size and position of the acetabular component and the center of rotation

Determining Leg Length

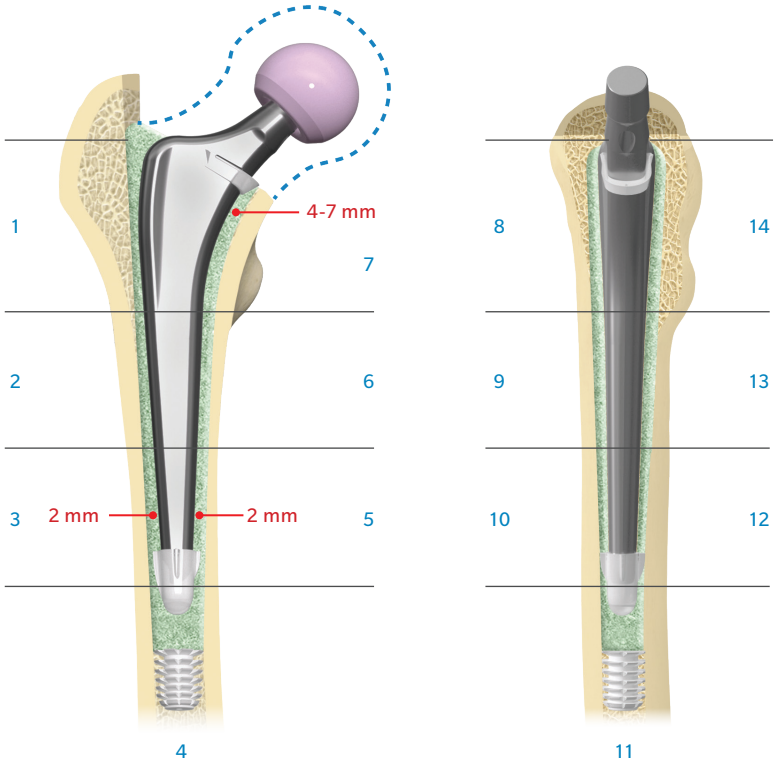
Three horizontal lines are drawn on the AP X-ray of the pelvis: the tangent of both ischia forms the base line.

A second line is drawn over the roofs of the acetabula, and the third between the lesser trochanters.

Using the ischiometer, the center of rotation on the opposite, not to be operated side is established, and the distance to the teardrop figure is measured.

Finally, the pelvic axis is drawn, running through the symphysis and perpendicular to the line.

The difference in the distances measured between the connecting line of the lesser trochanters and the baseline corresponds to the correction needed to obtain equal leg lengths.



Positioning

Optimum positioning of the MS-30 stem in the various Gruen zones

Cement Mantle

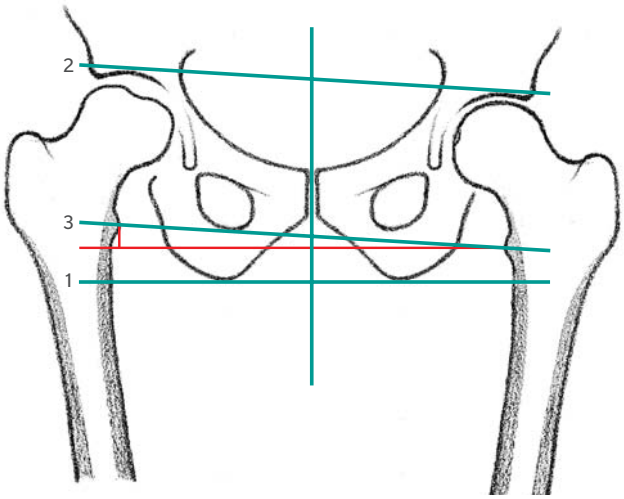
The optimum cement mantle for a highly polished stem without a collar is asymmetrical. It should be stronger or thicker in the area of primary transmission of load, i.e. in the calcar region (Gruen zone 7), as well as in the distal part of the prosthesis (zones 3 and 5). A cement mantle thickness greater than 7 mm, however, should be avoided: this can not only make pressurization more difficult, but also lead to bone necrosis as a result of increased heat during polymerization of the cement. The proximal wing efficiently counteracts rotational forces to prevent early loosening.

The distal centralizer is an integral part of the MS-30 stem and serves to avoid metal/bone contact wherever possible, especially in the crucial zones 3, 5 and 7, that are subject to higher stress. Reaming of the medullary canal, using the distal centralizer and possibly the proximal positioner bring the stem into a neutral position.

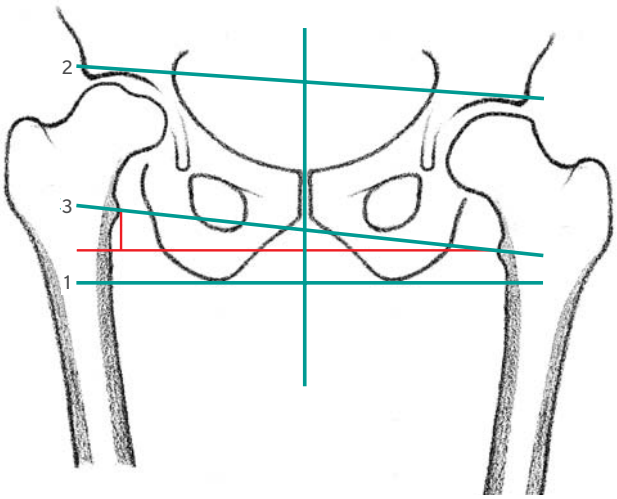
The proximal positioner supports maintaining a cement mantle of at least 4 mm in Gruen zone 7, while the distal centralizer generates a cement mantle of 1–2 mm in both, the anterior/posterior and the lateral/medial aspect.

Note: The Morscher technique creates an average 2 mm cement mantle thickness.

When applying the Morscher technique, and a thicker proximal cement mantle is desired, the awl (72.00.35) with the T-handle can be used to prepare the space in the calcar arch before rasping.



Dysmetry Caused by the Joint
The second and third lines run parallel, the first line deviates.

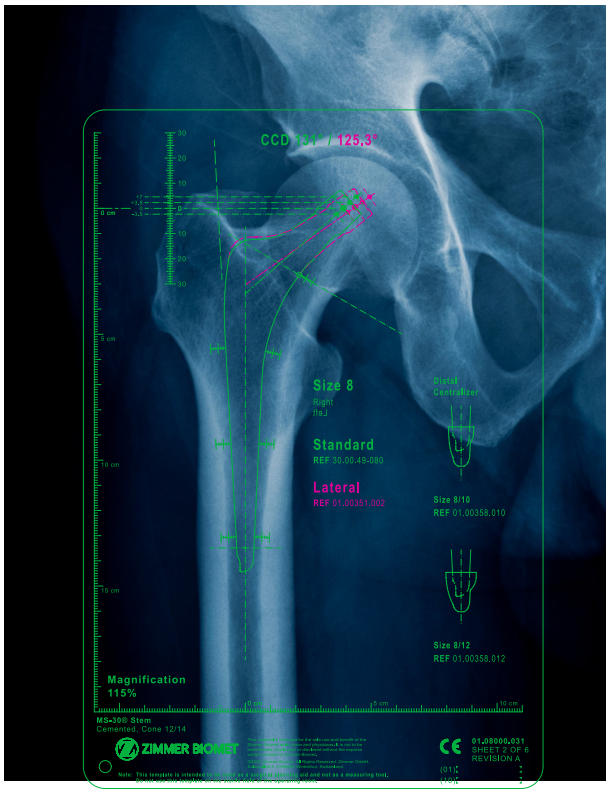


Combined Dysmetry
All three lines are divergent.

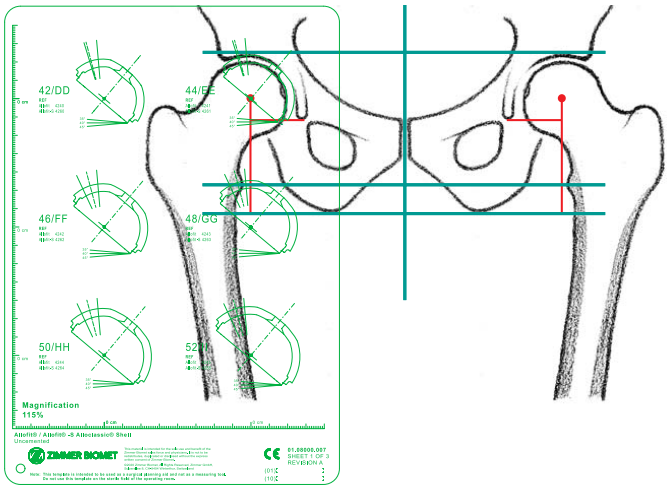
Templates

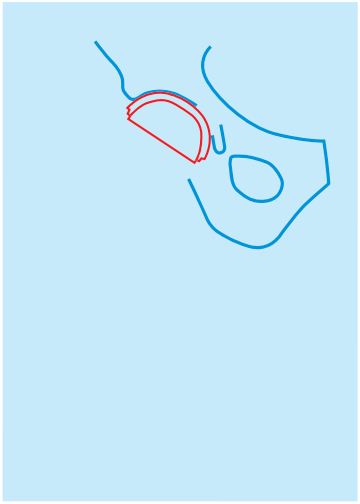
The MS-30 stem templates serve as a planning aid. Templates are held together with a ring to form a template set.

The essential planning information for implantation of the respective size can be found on a planning transparency: Here, the stem contours are shown with the resection line for both the standard and the lateral version of the MS-30 stem. Also shown are the markings for the cement mantle and the respective distal centralizers for each stem size.



X-ray template for the Standard and Lateral MS-30 Cemented Stem
Magnification: 115% (01.08000.031)





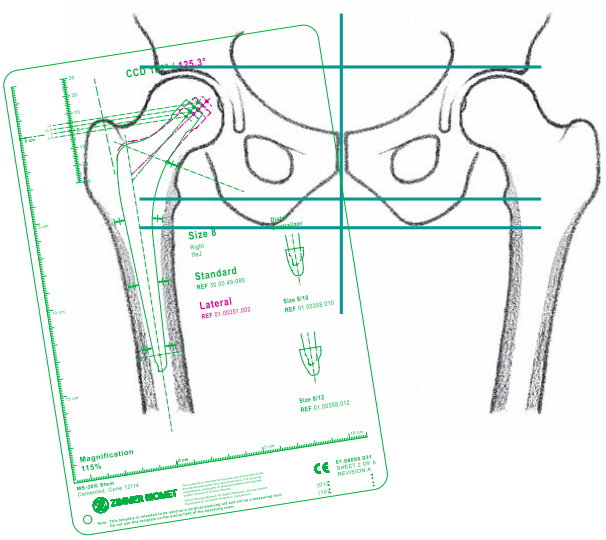
Planning Steps in the Case of Unilateral Coxarthrosis

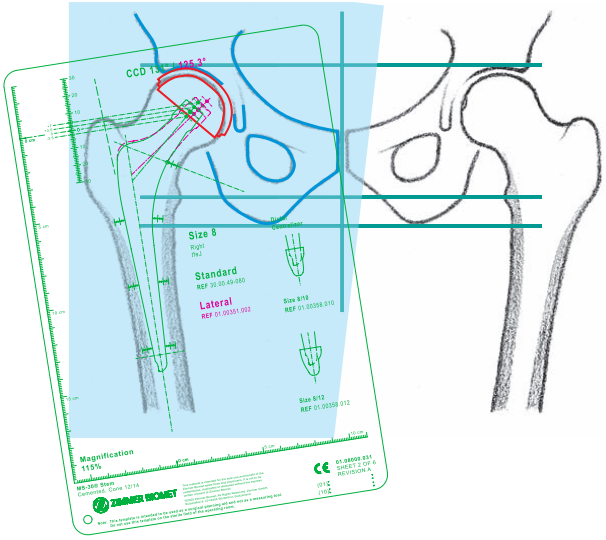
1. Determine the Possible Difference in Leg Length, the Prosthesis Size and the Position of the Cup

The three horizontal lines, the pelvic longitudinal axis (no dysmetry in this example), the center of rotation (measured on the opposite, healthy hip) and the horizontal and vertical distance of the center from the base of the teardrop are drawn in. The template is then placed on top, with the limit of the acetabulum (ideally, as a rule, the subchondral bone layer), the height of the teardrop and the planned inclination of 40–45° being taken into account.

2. Trace the Hemipelvis and the Cup

The tracing paper is placed on the X-ray and the template, with the longitudinal axis parallel to the vertical axis of the pelvis. The hemipelvis and the acetabular implant are drawn in.





3. Determine the Size and Position of the Stem

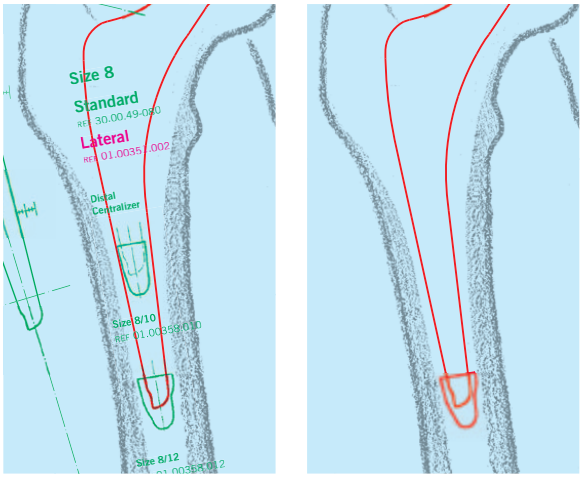
The appropriate template is placed on the femur.

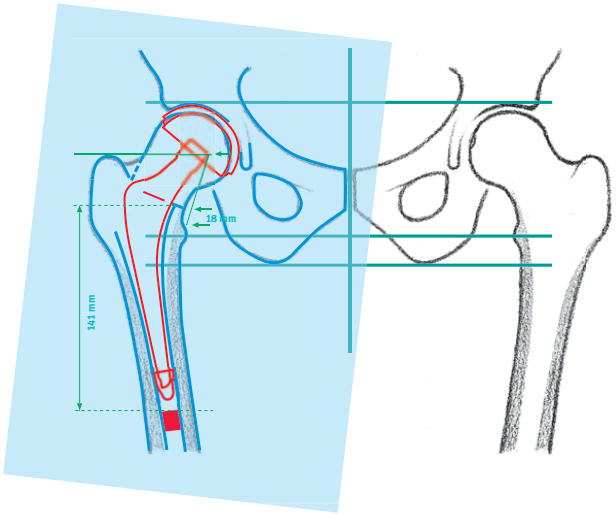
If possible, a space of 4–7 mm proximally (calcar) and 2 mm distally (tip of the prosthesis) should remain between the stem and the inner cortex layer in order to create an optimum cement thickness. This is when the choice of prosthesis size and offset (standard or lateral version) is made. One of the four T-lines that run through the center of rotation should lie at the height of the greater trochanter. As a rule, the osteotomy level of the neck of the femur is 16–20 mm above the tip of the lesser trochanter.

4. Pelvis Level

Without removing the femoral template, the tracing paper used in step 2 is placed so that the inside of the cup corresponds to the mean neck length. The bitrochanteric and ischiatic lines must be parallel.

If, in the case of residual dysmetry, the lines diverge and a leg lengthening is indicated, the following options are available: using a prosthesis head with a long neck, higher femur neck resection, or driving the tip of the prosthesis stem less deeply into the femoral canal.





5. Determine the Size of the Distal Centralizer

When determining the optimum size of the two sketched centralizers on the template, the one that ensures lateral cortical contact when the tip of the prosthesis is centered in the medullary cavity should be selected.

6. Result of the Pre-operative Planning

The femur, femoral stem, distal centralizer and medullary plug are drawn on the tracing paper. The medullary plug should be placed 1–2cm below the tip of the centralizer. The extension of the lateral limit of the stem up to the greater trochanter is sketched in. This line determines the lateral limit of the cancellous bone to be removed in order to avoid positioning in a varus position.

The following dimensions are measured and included in the drawing:

- Lesser trochanter – osteotomy level
- Lesser trochanter – medial edge of the prosthesis neck
- Medullary plug – inner cortex layer of the osteotomy of the femur neck
- Connecting line between the center of rotation and the tip of the greater trochanter

Surgical Technique

Variant 1: Surgical Technique According to Professor E.W. Morscher

The medullary canal is prepared with rasps of ascending size. The last rasp to be used is always one size larger than the stem size that was determined in the pre-operative planning. Through this, sufficient space is created for an uninterrupted, circumferential cement mantle. The rasp also serves as a test prosthesis: The modular handle of the rasp is removed and a corresponding test head is mounted. After trial reduction, the test head and the rasp are removed, the medullary plug is inserted and the medullary canal is filled with cement, under pressure.

An MS-30 stem one size smaller than the last rasp used is inserted.

Variant 2: Surgical Technique According to Professor L. Spotorno

The medullary canal is prepared with rasps of ascending size. The last rasp used, which is driven in as far as the osteotomy level, corresponds to the stem size that was determined in the pre-operative planning. The rasp handle is removed and the test head is placed on the cone of the modular rasp. After trial reduction, the test head is removed and the rasp is driven in deeper, up to the second marking.

This technique creates space for the cement mantle by driving in the rasp deeper after trial reduction.

Figure 1

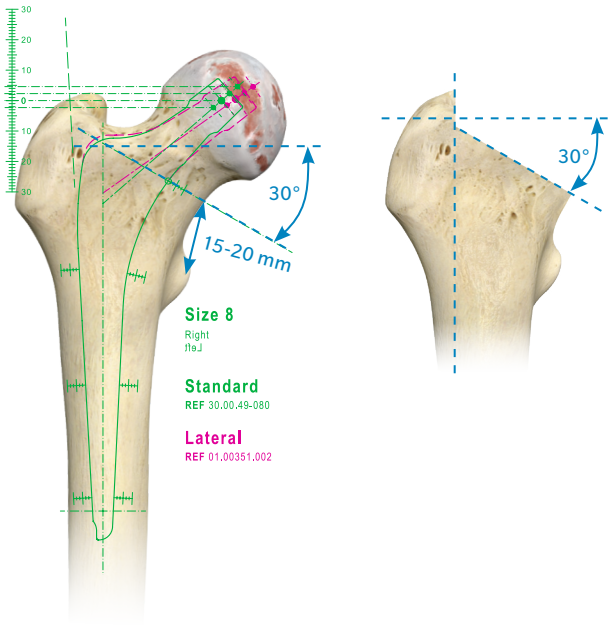


Figure 2

Patient Positioning/Surgical Exposure

The MS-30 Hip stem can be implanted using any standard approaches for total hip arthroplasty (THA) (Figure 1).

The aim of the approach selected is to provide optimal visualization of both the acetabulum and proximal femur in order to help reproduce the hip anatomy and aiming to restore the physiologic center of rotation.

Femoral Neck Resection

Cut the femoral neck. The resection level starts about 15–20 mm proximally of the lesser trochanter. The osteotomy of the femoral neck is performed at an angle of 30° with the leg in external rotation (Figure 2).

Using an osteotome, the femur head is mobilized in the osteotomy and then extracted (e.g. with a femoral head extractor).

Figure 3a

Figure 3b

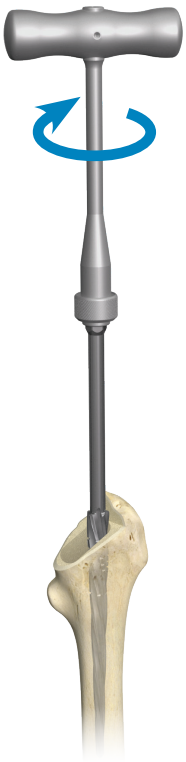


Figure 4

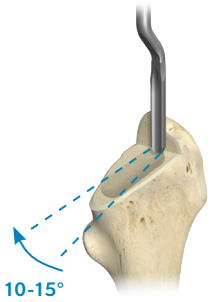


Figure 5

Figure 6

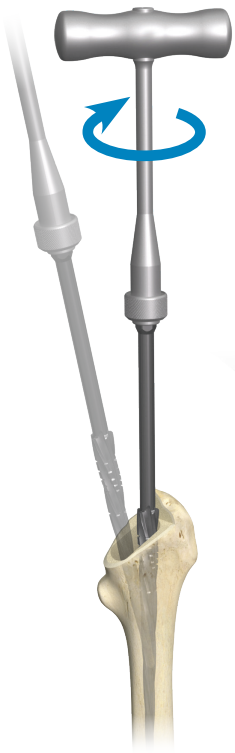


Figure 7

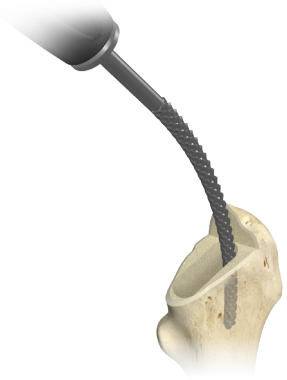


Figure 8

Femoral Canal Opening

Multiple instruments are available to initiate entry into the femoral canal including the boxed chisel or boxed osteotome (Figure 3a, 3b), the MS-30 Awl with T-handle (Figure 4), the double-curved gouge (Figure 5), and the Honey Badger Rasp (Figure 8).

Note: For posterior approach, it is recommended to use the boxed osteotome (with a rasp handle) or the boxed chisel, to remove the trapezoidal segment of the cancellous bone from the bulb as far as the lateral limit, in accordance with the pre-operative planning. This permits correct insertion of the rasp, avoiding a varus position (Figure 3a, 3b).

Open the medullary cavity using the MS-30 awl with the T-handle, and remove the cancellous bone in order to ensure neutral positioning of the femoral shaft (Figure 4).

Note: For lateral approach, during femoral canal opening, an important step is the resection of the craniolateral base of the femoral neck by using the double-curved gouge (Figure 5), in order to gain lateral space. Through this, insertion of the rasp and the prosthesis in a varus position is avoided.

The level of the osteotome neck is assessed by measuring the distance between the tip of the lesser trochanter and the mediodorsal resection edge of the femoral neck. Further resection of the femoral neck may be necessary.

A long curette is inserted into the medullary cavity, in order to correctly establish the rasp direction in a neutral axis. The complete removal of all cancellous bone on the inner side of the medial femoral neck base using a bone curette is very important (Figure 6).

Opening of the medullary cavity using the awl with the T-handle, and removal of the cancellous bone in order to ensure neutral positioning of the femoral shaft (Figure 7).

Note: For cases where accessing the femoral canal found to be difficult, the honey badger rasp can be used for opening the medullary cavity (Figure 8).

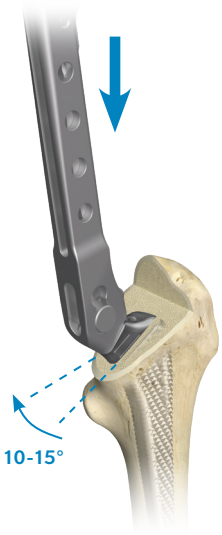


Figure 9

Figure 10

Femoral Canal Preparation I.

Insert of the smallest rasp (size 6), taking account of the desired antetorsion (as a rule, 10–15°) (Figure 9).

Check the resection level, which should lie on the same line of the first marking of the rasp.

Torsional movements must be avoided while impacting the rasps. Progress the expansion of the medullary canal with sequentially larger rasps until reaching the final rasp size.

Spotorno Technique: The final rasp shall be the same size as the pre-operatively templated implant size.

Morscher Technique: The final rasp shall be one size larger than the pre-operatively templated implant size.

The final rasp is impacted as far as the first marking, that corresponds to the osteotomy level (Figure 10).

Once complete stability is achieved with the final rasp, remove the handle from the rasp.

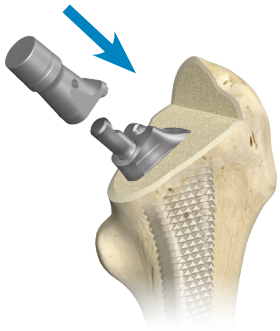


Figure 11

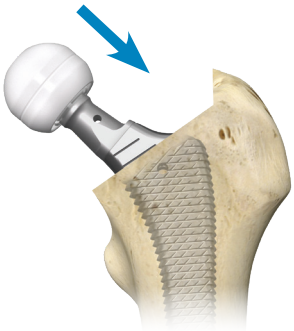


Figure 12

Trial Reduction

With the final rasp in place, select the appropriate trial neck offset (standard or lateral) and size, and place the trial neck onto the rasp (Figure 11).

Once the trial neck is in place, select the correct trial head size and assemble it onto the trial neck attached to the rasp (Figure 12).

The height from the tip of the lesser trochanter to the center of rotation of the trial head is checked. The risk of dislocation is checked by inward and respectively outward rotational movements in flexion and extension. At the same time, the head containment is verified.

Repeat the procedure with different head offsets until reaching joint stability, soft tissue tension and desired leg length.

Note: The through hole on the side of the trial neck can be used with a suture for patients, with larger BMI (Body Mass Index).

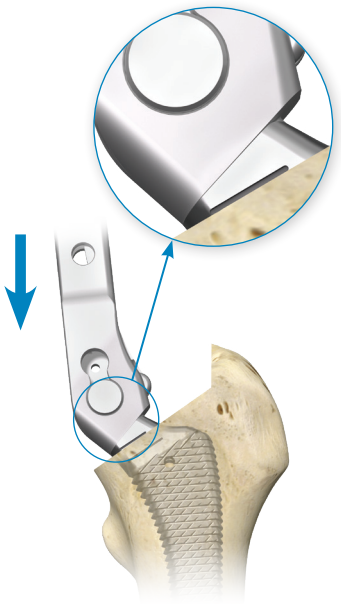


Figure 13

Figure 14

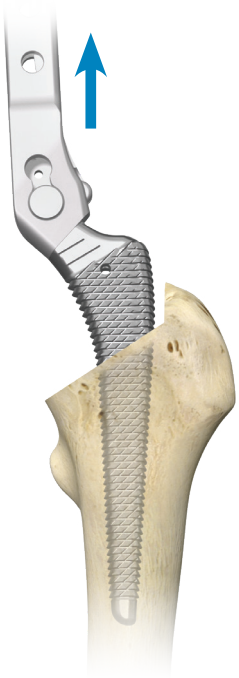


Figure 15

Femoral Canal Preparation II.

Spotorno Technique:

After the trial reduction, the trial head and the trial neck are removed, and the rasp handle is attached again to the rasp.

The rasp is impacted deeper, until the second marking (Spotorno level). The additional space generated by deeper impaction produces proximally a cement mantle thickness of at least 4 mm for the proximal positioner (Figure 13).

In case of inadequate bone quality, the isthmus and the adjacent cancellous bone are removed with a curette (Figure 14).

The femoral canal preparation is completed by removing the rasp from the femur (Figure 15) and rinsing the medullary cavity.

Morscher Technique:

After the trial reduction, the trial head and the trial neck are removed, and the rasp handle is attached again to the rasp.

The femoral canal preparation is completed by removing the rasp from the femur (Figure 15) and rinsing the medullary cavity.

Note: An alternative removal of the rasp is possible with the adapter and a slap hammer (see Appendix 1 for details).

Figure 16

Figure 17

Trialing the Distal centralizer and the Medullary Plug

On the MS-30 prosthesis to be implanted, the measure is taken from the shoulder of the prosthesis with the introducing rod for the position of the medullary plug.

In order to place the plug at the correct depth, the length of the distal centralizer to be mounted is also considered for the measurement (Figure 16). The distance between the tip of the centralizer and the medullary plug should be approximately 1–1.5 cm.

At the same time, the size of the centralizer is established.

Two centralizer size is available for every stem size (e.g. for a size 10 stem, distal centralizer size 10/12 and size 10/14 are available, where the first number indicates the size of the stem). Experience shows, that the first centralizer size is appropriate for most of the femurs, while in case of larger medullary spaces, the second size is used (e.g. for a size 10 stem and a medullary cavity in which a size 12 measuring plug fits, a distal centralizer of size 10/12 should be used. In case of a wider medullary canal, size 10/14 is used).

Insertion of the introducing rod with the measuring plug (Figure 17) to determine the size of the distal centralizer and of the medullary plug (the likely size has already been determined in the course of pre-operative planning).

Figure 18

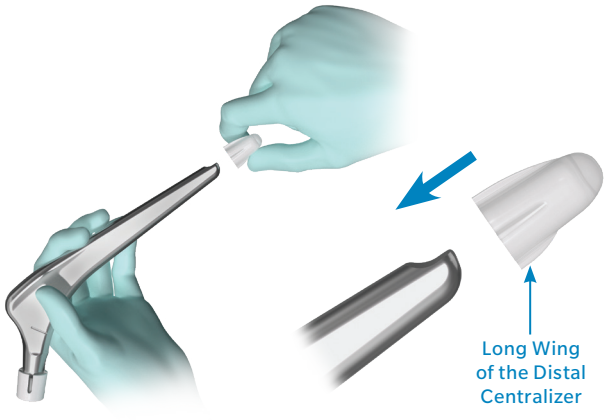


Figure 19a

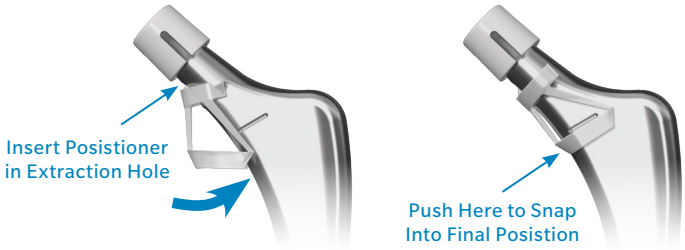


Figure 19b

Medullary Plug Insertion

The medullary plug is inserted (Figure 18). The medullary canal is rinsed and a hemostatic tamponade is inserted. After the tamponade is removed a drain is inserted (if desired).

Assembly with Distal Centralizer and Proximal Positioner

The size of the distal centralizer is determined preoperatively with the help of the x-ray templates. The appropriate distal centralizer is mounted manually on the stem. The distal centralizer must be carefully pushed onto the stem tip until it sits securely. The distal centralizer has four wings, of which one is longer than the others. The long wing must be positioned on the lateral side of the stem (Figure 19a).

If desired proximal positioner is mounted on the stem manually. It is first inserted into the extraction hole and only then brought into its final position (Figure 19b). It is not mandatory to use the proximal positioner. However, it facilitates the generation of the optimum cement mantle thickness in the proximal region. It is particularly recommended in the case of a steep femoral neck, where there is, in general, an increased risk of an insufficient cement mantle in zone 7, as well as a risk of direct bone/metal contact.

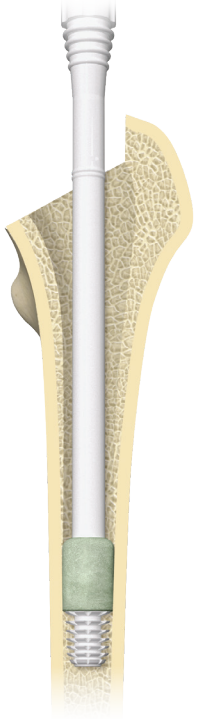


Figure 20

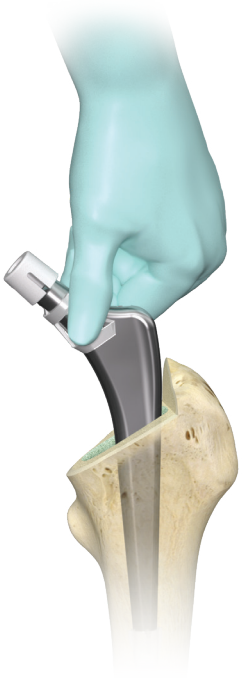


Figure 21

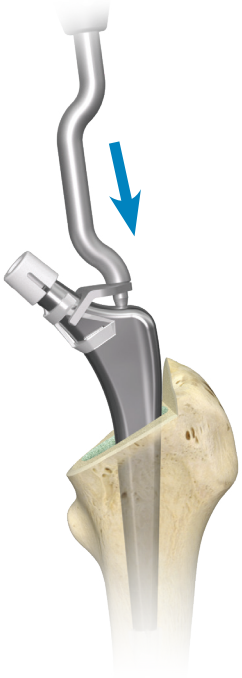


Figure 22

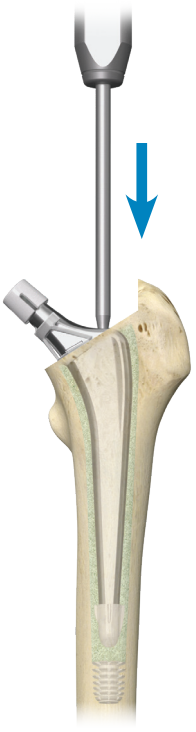


Figure 23

Bone Cement Insertion

The bone cement is introduced slowly and under maximum pressure. The cement is introduced in retrograde fashion (Figure 20).

Note: Please refer to the product usage brochures of the specific bone cement for more details on their usage.

Femoral Implant Insertion

Start inserting the MS-30 stem into the femoral canal by hand (Figure 21) or by using the setting device (Figure 22) in a distal-lateral direction, in order to avoid a varus position, and finish seating with the preferred stem impactor (Figure 23). The drain is removed. Particular care must be taken to ensure a cement layer of 4 - 7 mm medially, at the femoral neck (calcar), between cortex and stem.

Note: When the proximal positioner is used, particular care must be taken that the stem is inserted laterally and not too late in the polymerization process. This ensures the creation of a cement mantle with sufficient medial thickness. In order to achieve this, the impactor is aligned obliquely in a lateral direction (Figure 23), and not strictly axially, during insertion. Until the cement has completely hardened, the pressure must be maintained with the impactor. Immediately before final polymerization, the MS-30 stem must under no circumstances be impacted further, due to the risk of the cement mantle breaking.

Note: In case of an intra-operative extraction, or adjustment of the insertion dept is needed, it can be carried out using the extractor instrument, by inserting the tip of the extractor in the extraction hole that is located on the neck of the stem.

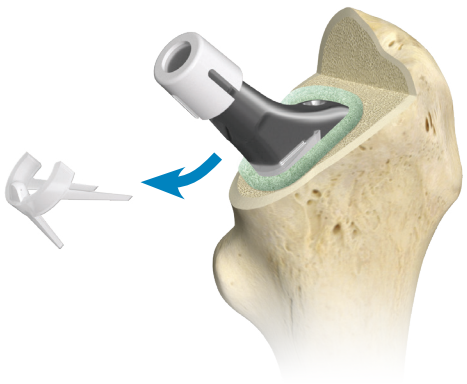


Figure 24

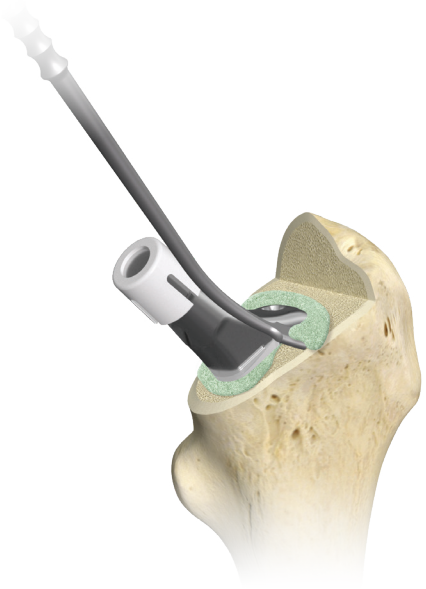


Figure 25

Removal of Proximal Positioner's Legs

As soon as the cement has hardened, all three legs of the proximal positioner are cut off, using the scalpel or Luer pliers (Figure 24).

Removal of Excess Cement

The excess cement is carefully removed as far as the resection level with the help of the cement pusher (Figure 25). The taper protector is removed from the stem taper.

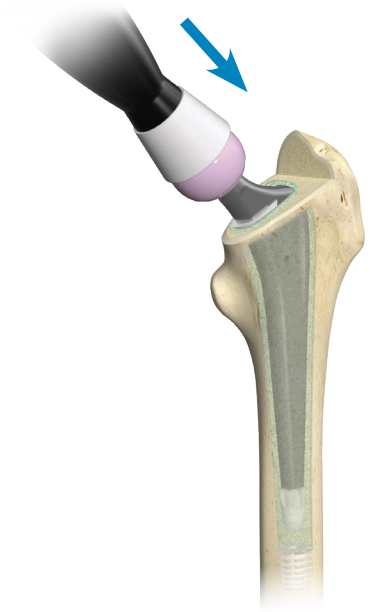


Figure 26

Femoral Head Impaction

If necessary, a trial reduction is carried out with a trial head.

Once the trial head is removed, carefully clean and dry the taper of the stem. Seat the selected femoral head using the head pusher, or the appropriate plastic impactor top assembled with a repositioning lever and mallet (minimum suggested weight: 0.5 kg) on the pole of the femoral head with a minimum of three strikes and ensure full seating on the stem taper. The impact direction should not be more than 20 degrees from the neck axis, otherwise the impact force may have reduced effect in connecting the taper (Figure 26).

Final Reduction and Wound Closure

Final reduction is carried out, and the wound is closed.

Post-operative Treatment

The post-operative treatment depends upon the patient. The surgeon should inform the patient of postoperative restrictions, the acceptable level of physical activity that can be performed and how their lifestyle may be impacted

Implant Removal

The stem can be removed postoperatively by using general femoral stem removal instruments.

Appendix 1 – Alternative Rasp Removal

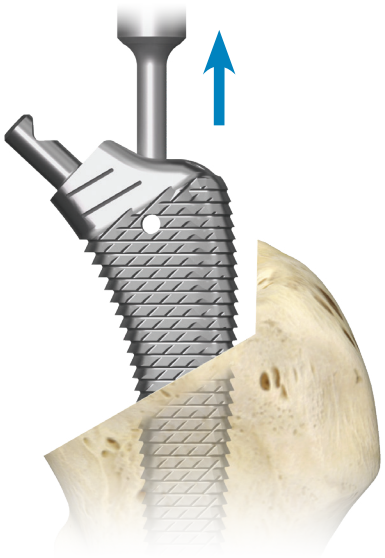
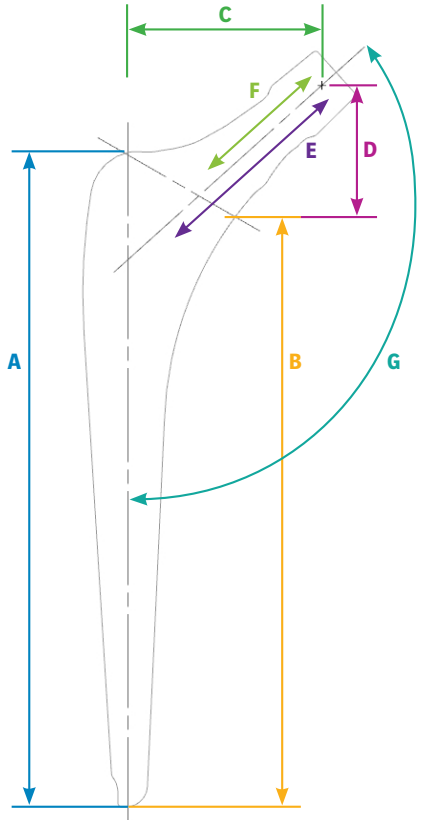


Figure 27

The rasp can be also removed by using a compatible extractor or extractor adapter with slap hammer (Figure 27).

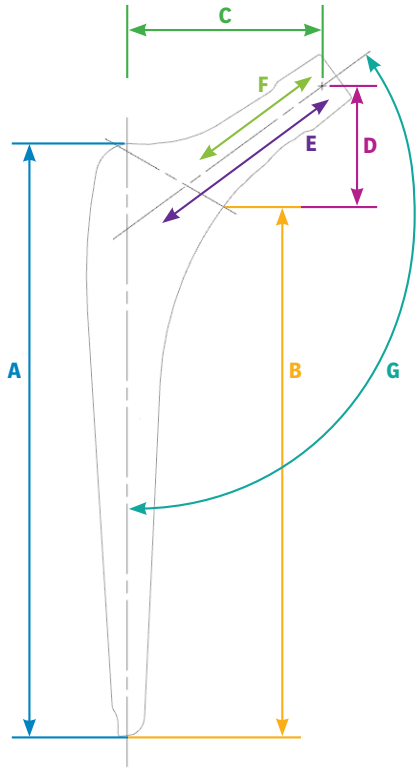
To do this, assemble the Extractor adapter with Rasp, and assemble it with a slap hammer. Pull out the rasp in line with the rasp axis by using the slap hammer.

Appendix 2 – Sizing Charts



Standard Offset Stem Family

Part Number	Size	A Stem Length Lateral Shoulder	B Stem Length Medial Calcar	C Horizontal Offset +0 mm Head	D Vertical Offset +0 mm Head	E Neck Length To Center Line	F Neck Length To Resection	G Neck Angle
30.00.49-060	6	115	94.5	37.7	25.41	53.2	32.53	130
30.00.49-080	8	132	110.5	38.9	26.4	55.6	33.43	131
30.00.49-100	10	136	113.5	40.1	27.25	58	34.25	132
30.00.49-120	12	140.5	117	41.3	28.13	60.4	35.06	133
30.00.49-140	14	146	121.5	42.3	29.1	62.8	35.93	134
30.00.49-160	16	152.5	127	43.3	30.03	65.2	36.79	135



Lateral Offset Stem Family

Part Number	Size	A Stem Length Lateral Shoulder	B Stem Length Medial Calcar	C Horizontal Offset +0 mm Head	D Vertical Offset +0 mm Head	E Neck Length To Center Line	F Neck Length To Resection	G Neck Angle
01.00351.001	6	116	94.5	42.2	25.91	55.1	36.91	124.3
01.00351.002	8	133	110.5	43.6	26.87	57.4	37.82	125.3
01.00351.003	10	137	113.5	44.9	27.89	59.8	38.79	126.3
01.00351.004	12	140.5	116	46.2	28.14	62.1	39.03	127.3
01.00351.005	14	146	120.5	47.3	29.1	63.9	40.08	127.7
01.00351.006	16	152.5	126	48.4	30.02	63.5	41.12	128

Appendix 3 – Additional Information Regarding Instruments

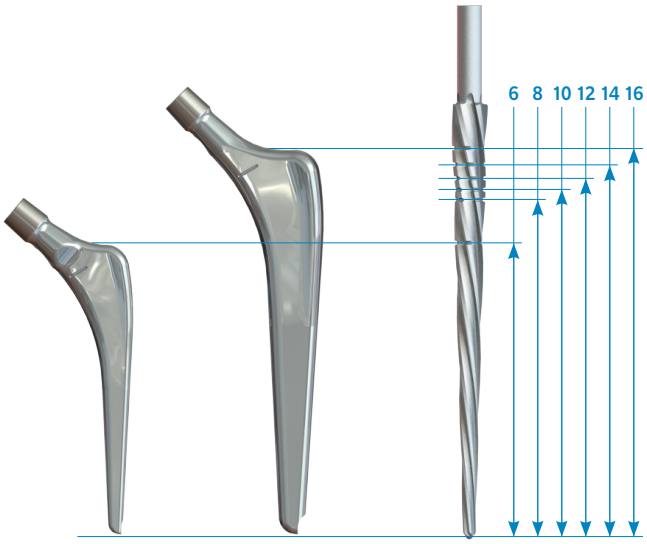


Figure 28

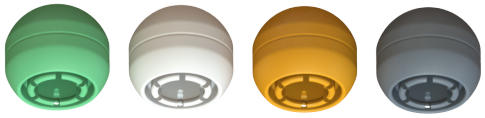


Figure 29

MS-30 Awl

The grooves on the MS-30 Awl indicate the reaming depth for each MS-30 implant size (see Figure 28).

Standard Trial Heads

- Can be used both on trial neck and implant stem
- Color coded per offset: S (Green) , M (Bone), L (Rust) and XL (Black) (see Figure 29)

Figure 30

Figure 31

Introduction rod for medullary plugs

The introduction rod (Figure 30) assembled with a measuring plug can be used to gauge the diameter of the diaphysis, and to place the Weber/Stühmer medullary plug (cement restrictor) in the femoral canal.

Measuring Plugs (for introduction rod)

One measuring plug (Figure 31) is available for each distal centralizer size. The plugs can be assembled with the introduction rod for medullary plugs in order to gauge the diameter of the diaphysis.

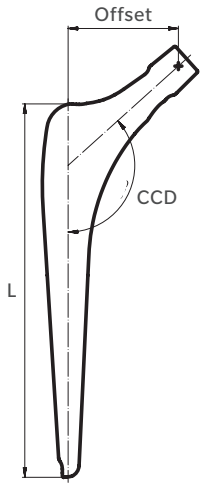
Ordering Information

Implants

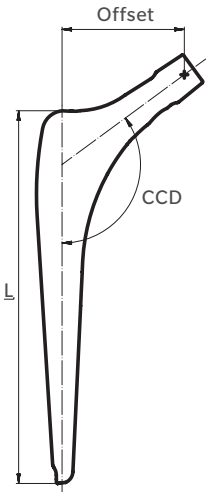
MS-30 Hip Stem
Standard

MS-30 Hip Stem
Lateral

Protasul®-S30
FeCrNiMnMoNNb
Taper 12/14
Cemented



Protasul-S30
FeCrNiMnMoNNb
Taper 12/14
Cemented



STERILE R

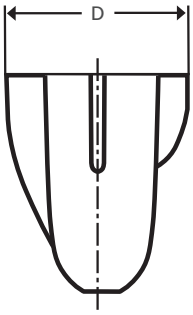
Size	Offset	Length (mm)	CCD	Part Number
6	37.7	115.0	130	30.00.49-060
8	38.9	132.0	131	30.00.49-080
10	40.1	136.0	132	30.00.49-100
12	41.3	140.5	133	30.00.49-120
14	42.3	146.0	134	30.00.49-140
16	43.3	152.5	135	30.00.49-160

STERILE R

Size	Offset	Length (mm)	CCD	Part Number
6	42.2	116.0	124.3	01.00351.001
8	43.6	133.0	125.3	01.00351.002
10	44.9	137.0	126.3	01.00351.003
12	46.2	140.5	127.3	01.00351.004
14	47.3	146.0	127.7	01.00351.005
16	48.4	152.5	128.0	01.00351.006

Implants (cont.)

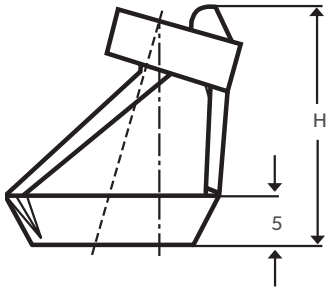
Distal Centralizer



STERILE R

Size	D (mm)	Part Number
6/8	8.1	01.00356.008
6/10	10.1	01.00356.010
8/10	10.1	01.00358.010
8/12	12.1	01.00358.012
10/12	12.1	01.00351.012
10/14	14.1	01.00351.014
12/14	14.1	01.00351.214
12/16	16.1	01.00351.216
14/16	16.1	01.00351.416
14/18	18.1	01.00351.418
16/18	18.1	01.00351.618
16/20	20.1	01.00351.620

Proximal Positioner



STERILE R

Standard

Size	H (mm)	Part Number
6	22.2	01.00356.055
8	23.2	01.00358.055
10	24.2	01.00351.055
12	25.2	01.00351.255
14	26.2	01.00351.455
16	27.2	01.00351.655

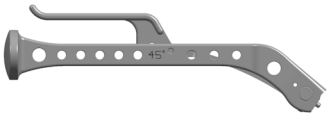
Lateral

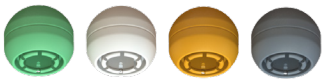
Size	H (mm)	Part Number
6	24.6	01.00356.065
8	25.6	01.00358.065
10	26.6	01.00351.065
12	27.7	01.00351.265
14	28.7	01.00351.465
16	29.7	01.00351.665

Instruments

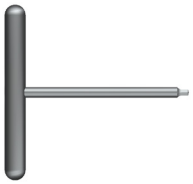
Product	Description	Diameter (mm)	Part Number
	**Handle with Quick Coupling (for 72.00.35 Awl for MS-30)**	–	75.00.25
	Awl for MS-30	–	72.00.35
	**Honey Badger Rasp**	–	110030227
	**Avenir Complete Boxed Osteotome**	–	574777430
	**Gouge, Double Curved**	9	75.09.15
	**MS-30, Setting Instrument**	–	72.00.40
	**Impactor/Extractor**	–	75.00.36
	**Extractor Instrument**	–	75.85.75
	**Cement Pusher, Small**	–	75.00.50
	**MS-30, Modular Rasp, Trunnion**	6.0 8.0 10.0 12.0 14.0 16.0 18.0	01.00360.006 01.00360.008 01.00360.010 01.00360.012 01.00360.014 01.00360.016 01.00360.018
	**MS-30, Trial Neck, Trunnion, Standard**	6.0-10.0 12.0-14.0 16.0 18.0	01.00360.106 01.00360.112 01.00360.116 01.00360.118
	**MS-30, Trial Neck, Trunnion, Lateral**	6.0-10.0 12.0-14.0 16.0 18.0	01.00360.206 01.00360.212 01.00360.216 01.00360.218

Instruments (cont.)

Product	Description	Size (mm)	Part Number
	**Zimmer® MIS™ Hip Instrumentation MIS Anterior Offset Rasp Handle 45°**	–	00-7806-050-00
	**Zimmer M/L Taper Hip Prosthesis Rasp Handle Long Post**	–	00-7712-050-60
	**MIS™ Technology Offset Rasp Handle 45° (Left)** **MIS™ Technology Offset Rasp Handle 45° (Right)**	– –	00-7712-035-01 00-7712-035-02
	**A/S Rasp Handle (Left)** **A/S Rasp Handle (Right)**	– –	00-7808-035-01 00-7808-035-02
	**Ergonomic Head Pusher/Driver**	–	31-399999

Product	Description	Size (mm)	Offset	Color	Part Number
	**Trial Head, 12/14**	Ø 28	-3.5 (S) 0 (M) +3.5 (L) +7.0 (XL)	(Green) (Bone) (Rust) (Black)	803302801 803302802 803302803 803302804
		Ø 32	-3.5 (S) 0 (M) +3.5 (L) +7.0 (XL)	(Green) (Bone) (Rust) (Black)	803303201 803303202 803303203 803303204
		Ø 36	-3.5 (S) 0 (M) +3.5 (L) +7.0 (XL)	(Green) (Bone) (Rust) (Black)	803303601 803303602 803303603 803303604

Instruments (cont.)
Optional Instruments

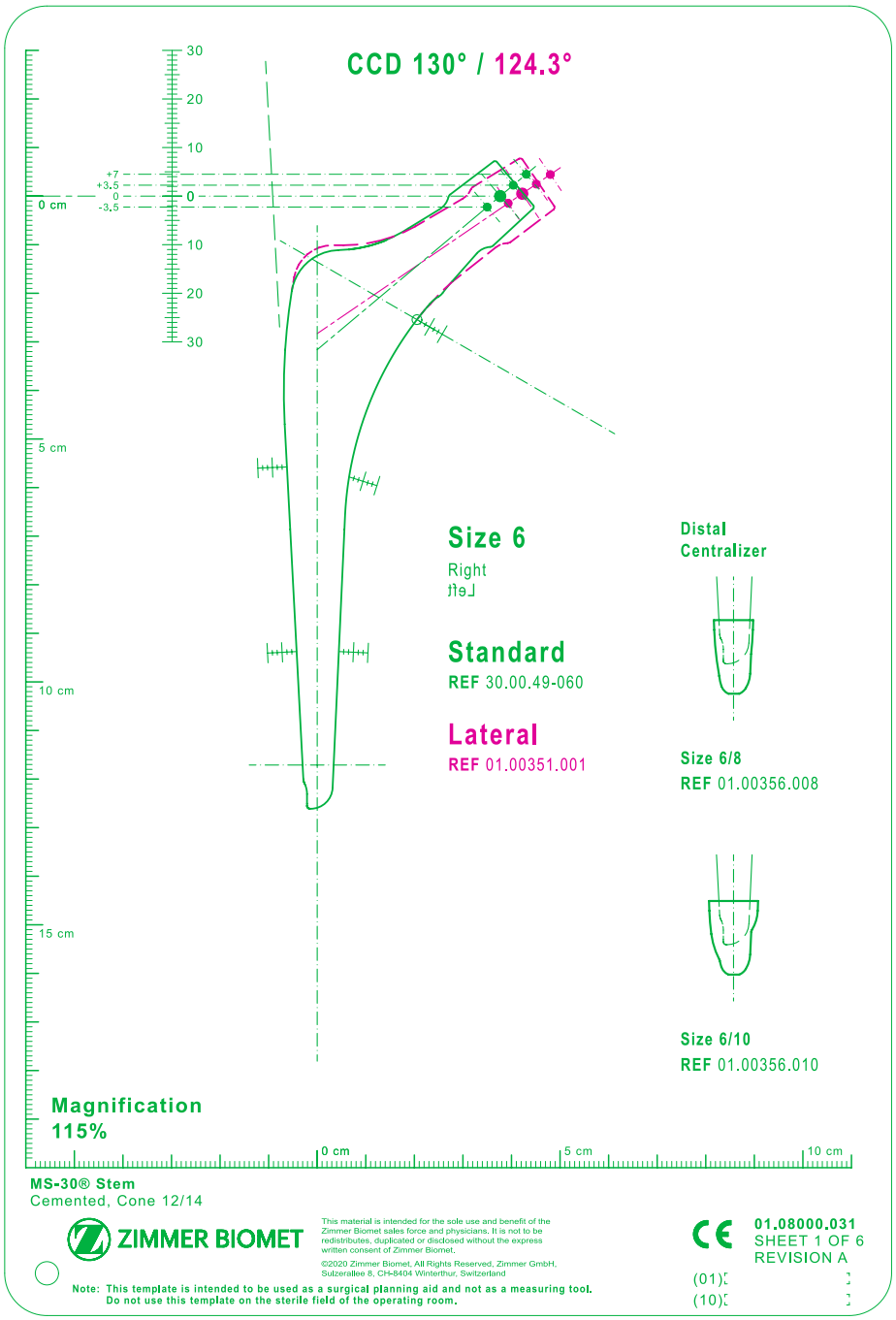
Product	Description	Size (mm)	Part Number
	**Xtended Stroke Slap Hammer**	–	X31-400061
	**Avenir Complete Extractor Adapter**	–	574777110
	**Introducing Rod for Medullary Plug**	–	75.04.56
	**Measuring Plug for Introducing Rod**	Ø 8 Ø 10 Ø 12 Ø 14 Ø 16 Ø 18	75.04.57-080 75.04.57-100 75.04.57-120 75.04.57-140 75.04.57-160 75.04.57-180
	**Hex Wrench** **(for Measuring Plugs and Introduction Rod)**	3,5	79.15.84
	**Boxed Chisel**	–	72.13.02-10
	**Repositioning Tops**	28 32 36	78.00.38-28 78.00.38-32 78.00.38-36
	**Impactor Top**	–	78.00.38
	**Repositioning Lever**	–	75.01.38

Product	Description	Size (mm)	Offset	Color	Part Number
	**Trial Head, 12/14**	Ø 22	-2 (S) 0 (M) +3 (L)	(Green) (Bone) (Rust)	803302201 803302202 803302203

X-Ray Templates

MS-30 Hip Stem X-Ray Templates

Description	MS-30 Hip Stem X-Ray Templates
Magnification	115%
Set Number	01.08000.031 (set of 6 sheets)
Product	



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For Ordering Information please refer to document MS-30 Cemented Hip Stem with Upgraded Instruments Kit Ordering Information 5088.

For Instructions for Care, Cleaning, Maintenance and Sterilization Manual refer to 3455.

For disassembly instructions (where applicable) refer to Disassembly Manual 1258.

If damage or wear detected on instruments, please consult the Reusable Instrument Lifespan Manual 1219.

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