



# Operating Instruction

## Müller Hip Stem

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## Introduction and product description

For decades the Müller Straight Stem has been an established hip endoprosthesis for cemented fixation. Manufactured of a CoCrMo alloy (ISO 5832-4) and equipped with a 12/14 taper the stem can be combined with both metallic and ceramic femoral heads.

There are a total of 11 sizes available in standardized as well as in lateralized design. The stems vary in length and offset. The CCD-angle of 135° is equal for all stems. The precise groove-structure enables a great cement adherence. Optional cement restrictors delimit the cement penetration depth. The sinkings for impaction and extraction provide an easy handling.

The version with the additional TiNbN-coating is furnished with a particular biocompatible coating that encapsulates the parent material from the tissue. It is available on request.

Besides the classical dual anchoring there exists the possibility to use the all-cemented anchoring. The all-cemented anchoring fastens the stem in an entire circumferential cement mantle (Figure 1) whereas the dual anchoring provides a cement mantle dorsal and ventral and jams the stem medial and lateral in the implant bed (Figure 2).

➤ **Advice:**

Compared to the stems, the rasps are oversized according the anchoring mode.

➤ **Advice:**

For both anchoring methods different rasps are available.

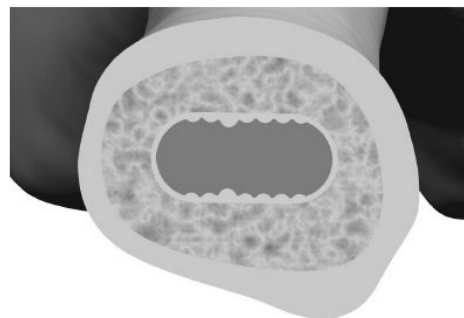


Figure 1: Circumferential cement mantle of the all-cemented anchoring

➤ **Advice:**

The last rasp size represents the actual size of the implant.

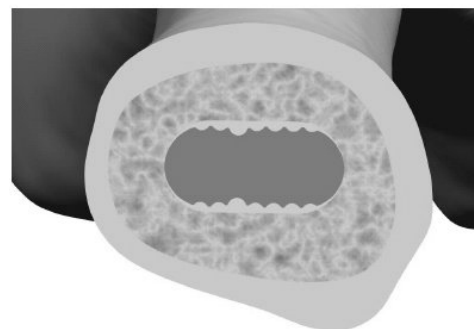


Figure 2: Divided cement mantle of the classical dual anchoring

The stem exhibits a wide range of indications and offers the possibility of an individual adaptation in the surgical care of patients of advanced age.

### **Indications for the insertion of Müller Straight Stem**

- Advanced wear of the hip joint due to degenerative, post-traumatic or rheumatoid arthritis
- Fracture or avascular necrosis of the femoral head
- State following previous operations, e.g. internal fixation, joint reconstruction, arthrodesis
- Hemiarthroplasty or total hip replacement

### **Contraindications for the insertion of Müller Straight Stem**

- Acute or chronic infections, local or systemic
- Severe muscle, nerve or vascular diseases, which endanger the affected limb
- Lack of bone substance or defective bone quality, which endangers stable sit of the prosthesis
- Any concomitant disease that can endanger the function of the implant
- Hypersensitivity to the materials used
- The use of skirted femoral heads reduces the range of motion (ROM) by about 30°, flexion and extension obtain values between 80° and 100°

## Surgical Technique

### Preoperative planning

For preoperative planning X-ray templates with 15% magnification are available (Figure 3). They help to

- detect the resection plane
- determine the expected implant size
- reconstruct the biomechanical rotational centre
- detect the size and position of the cement restrictor

The definitive implant size is specified intraoperatively by the surgeon. This size can possibly deviate from the size planned on the X-ray.

➤ **Advice:**

For both anchoring methods different X-ray templates are available.

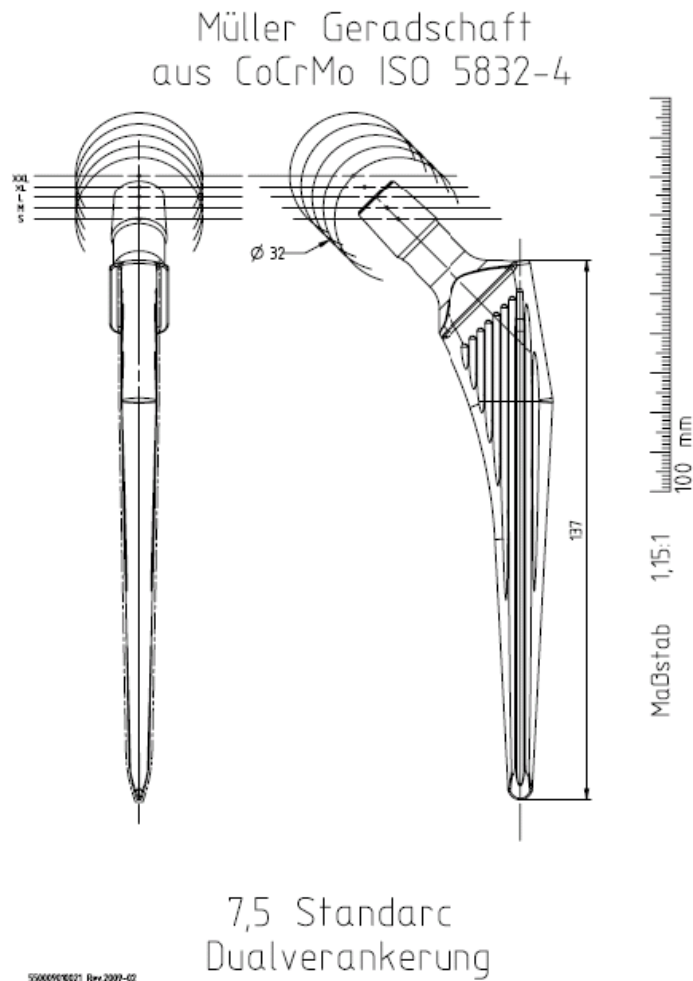


Figure 3: X-ray template Müller Straight Stem Size 7,5  
Standard

### Approach to the hip joint

Any approach to the hip joint deemed appropriate by the surgeon is possible. The surgeon should have a sufficient view on the anatomical structures so that precise working with the instruments will not be handicapped.

### Resection of the femoral neck

- After opening and luxation, the femoral neck is resected in accordance to the preoperative planning.
- The femoral neck is resected entirely.

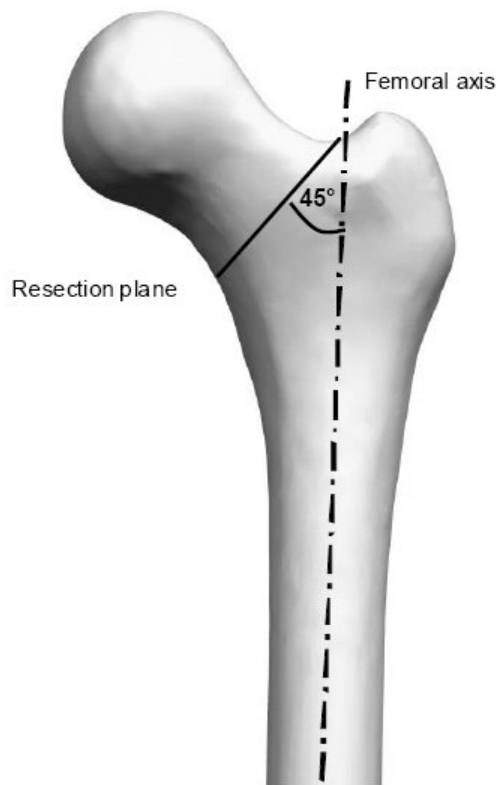


Figure 4: Resection of the femoral neck

## Opening of the medullary cavity

- Open the medullary cavity using a box chisel.

### \*\* Advice:

- It should be started far dorsally and laterally making it easier to drive the rasps in the direction of the axis of the femur later.
- Any fracture of the greater trochanter must be avoided.
- Use the box chisel according to the required anteversion of the stem.

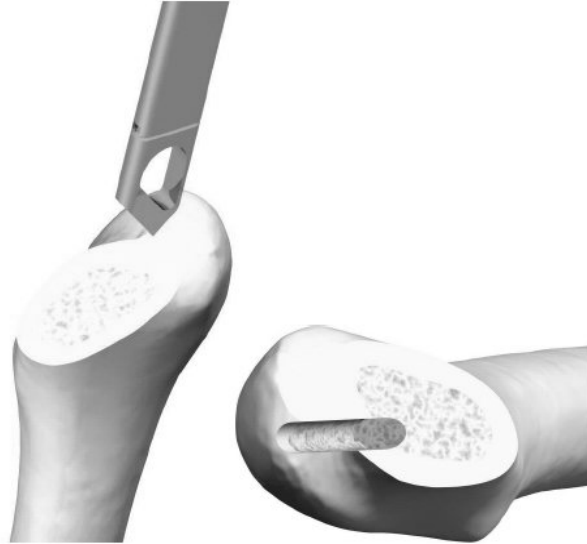


Figure 5: Opening of the medullary cavity using a box chisel

### \*\* Advice:

The femoral rasp can be used to expand the medullary cavity opening.

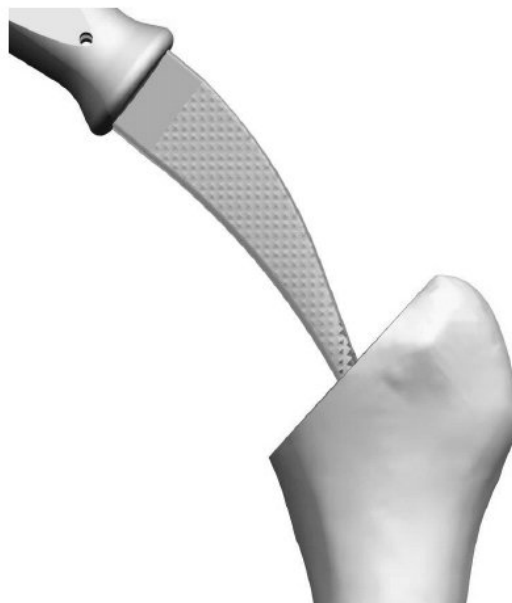


Figure 6: Femoral rasp to expand the medullary cavity opening

## Preparation of the femoral shaft

Once the medullary cavity has been opened, rasping to open the femoral shaft can be started (Figure 7).

- The smallest rasp size mated with the rasp handle should be used initially.
- Then the other rasps are used in ascending order until the final size is achieved.
- The sizes of the rasps match that of the implant sizes.
- The correct seat of the rasp in the femur can be monitored by an image converter.

**\*\* Advice:**

If the planned size or depth of the rasp cannot be achieved, the reason may be that the direction of the rasps is not parallel to the axis. In this case, proximal space can be achieved with the femoral rasp which enables further rasping.



Figure 7: Rasping the Femur

### Trial repositioning

The rasps are also designed for trial repositioning. Using rasps with cylinder coupling, the leg length and the range of motion can be checked by fitting both trial tapers versions and the trial heads.

- Remove the handle from the rasp which remains in the femur.
- Fit the trial taper onto the rasps cylinder.
- Fit the trial head onto the trial taper placed before.

**\*\* Advice:**

For trial repositioning trial heads are available in different diameters with neck lengths from S to XXL.



Figure 8: Trial repositioning using a rasp with cylinder coupling, Standard version



Figure 9: Trial repositioning using a rasp with cylinder coupling, Lateral version



### Implantation of the cement restrictor

The cement restrictor is placed depending on the measured diameter of diaphyseal medullary cavity. For controlled insertion into the optimal depth a special inserting instrument is available. For diameters of the medullary cavity between 14 mm and 19 mm a cement restrictor size 1 is recommended, for diameters from 18 mm to 22 mm size 2.

- Screw the cement restrictor on the threaded rod of the inserting instrument and insert it into the medullary cavity.

**\*\* Advice:**

The insertion depth can be identified from the scale onto the threaded rod.

**\*\* Advice:**

The insertion depth should exceed the stem length of the implanted hip stem prosthesis at least about 5 mm but not more than 20 mm.

**\*\* Advice:**

The location of the cement restrictor within the femoral shaft can be checked within an X-ray examination by means of the position of the contrast ring.

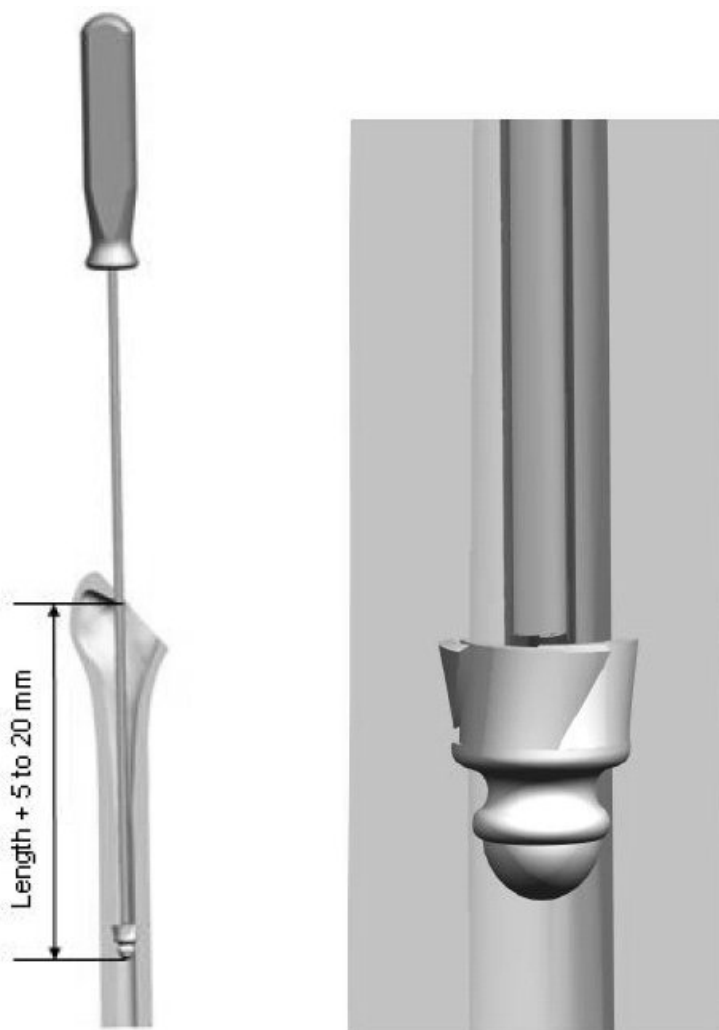


Figure 10: Implantation of the cement restrictor

- Afterwards remove the inserting instrument by turning it counterclockwise.

**\*\* Advice:**

The implantation of the cement restrictor definitively should be finished before mixing the bone cement.

- After inserting the cement restrictor the implant bed needs to be rinsed and dried.
- Thereafter the implantation of the Müller Straight Stem can be continued.

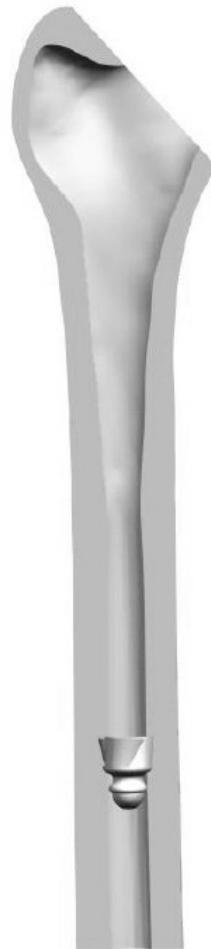


Figure 11: Remaining cement restrictor after removing the insertion instrument

## Stem implantation

### \*\* Advice:

The Müller Straight Stem is intended for implantation only in conjunction with bone cement.

- Insert the cement according to modern cementation techniques
- Directly after cement injection the prosthesis has to be inserted into the implant bed until the collar rests on the resection plane.
- It is necessary to apply light pressure while waiting for the cement hardening (Keep in mind the manufacturers guidelines).
- Thoroughly clean and dry the prosthesis cone.
- Fit the original femoral head with the required neck length (S to XXL).
- Reposition the stem with the femoral head into the cup.
- Control the range of motion and the leg length.
- Suture the wound in the standard way according to the surgeon's preference.

### \*\* Attention:

Femoral heads with longer necks than XXL (+12 mm) must not be used!

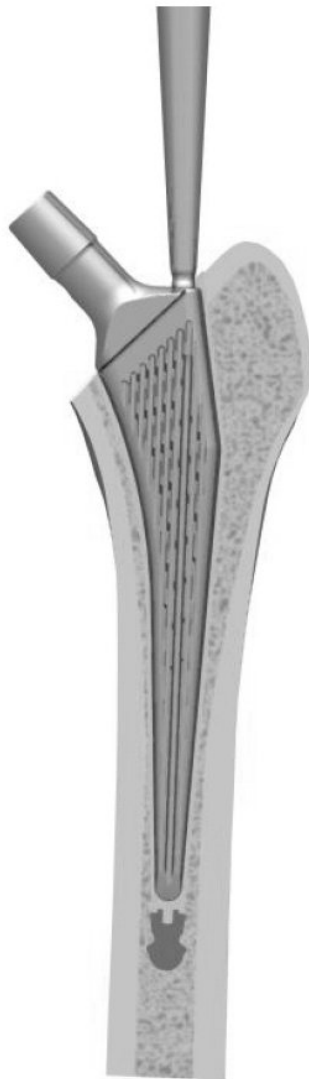
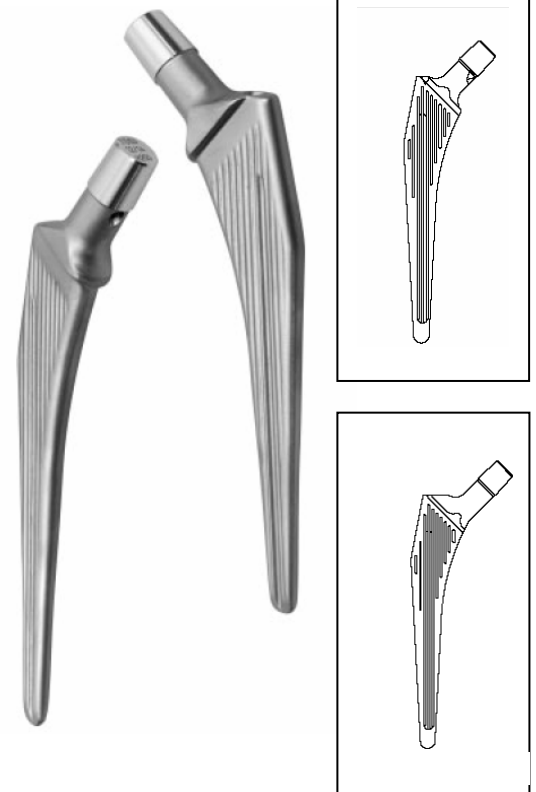


Figure 12: Implantation of the stem. Here: all-cemented anchoring

**Straight Hip System  
Geradschaft System  
Vástago recto**

CoCrMo (ISO 5832/4)  
Cone – Konus – cono 12/14

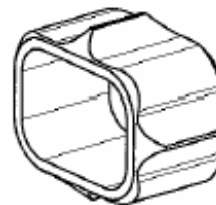
Size Größe Tamaño	Standard Standard estándar	Lateralized laterlisiert lateralizado
6,25 / 137 mm	4001-4-0006	
7,50 / 137mm	4001-4-0007	4001-4-0107
8,75 / 139 mm	4001-4-0008	4001-4-0108
10,00 / 142 mm	4001-4-0010	4001-4-0110
11,25 / 146 mm	4001-4-0011	4001-4-0111
12,50 / 147 mm	4001-4-0012	4001-4-0112
13,75 / 151 mm	4001-4-0013	4001-4-0113
15,00 / 152 mm	4001-4-0015	4001-4-0115
16,25 / 154 mm	4001-4-0016	4001-4-0116
17,50 / 157 mm	4001-4-0017	4001-4-0117
20,00 / 162 mm	4001-4-0020	4001-4-0120



**Centralizer for Straight Hip Stem  
Zentralisierer für Geradschaft  
Centralizador para vástago recta**

UHMWPE (ISO 5834-2)

Size Größe Tamaño	Standard Standard estándar
6,25/7,5	4901-4-0101
8,75/10,0	4901-4-0102
11,25/12,5	4901-4-0103
13,75/15,0	4901-4-0104
16,25/17,5	4901-4-0105
20,0	4901-4-0106



**Cement Stopper  
Zementstopper  
Tapón de cemento**

UHMWPE (ISO 5834-2)

Size Größe Tamaño	Standard Standard estándar
1 24 mm	4999-0-0001
2 29 mm	4999-0-0002

