

SMS

SHORT MEDACTA STEM



## Surgical Technique

Joint

Spine

Sports Med



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## 1. INTRODUCTION

This document describes the Surgical Technique for the SMS femoral stem.



The SMS femoral stem consists of a bone preserving cementless short stem, which represents a valuable solution for patients with good bone quality and for use with minimally invasive hip replacement techniques.

The main features of the SMS System were determined from the analysis of the anthropometric data of hundreds of 3D models of the femurs collected in the My Hip Database (Medacta International, Castel San Pietro, Switzerland).

For more details about implantation with AMIS approach, please see the dedicated AMIS Surgical Technique.

Please read the instructions for use thoroughly and, should you have any questions concerning product compatibility, contact your Medacta representative.

### 1.1 INDICATIONS OF USE

The SMS stem is a cementless short stem designed for use in total or partial hip arthroplasty for primary or revision surgery.

Total Hip Arthroplasty is indicated in the following cases:

- Severely painful and/or disabled joint as a result of arthrosis, traumatic arthritis, rheumatoid polyarthritis or congenital hip dysplasia
- Avascular necrosis of the femoral head
- Acute traumatic fracture of the femoral head or neck
- Failure of previous hip surgery: joint reconstruction, internal fixation, arthrodesis, partial hip arthroplasty, hip resurfacing replacement or total hip arthroplasty.

### 1.2 CONTRAINDICATIONS

Total or partial hip arthroplasty is contraindicated in the following cases:

- Acute, systemic or chronic infection
- Skeletal immaturity
- Severe muscular, neurological, vascular deficiency or other pathologies of the affected limb that may compromise the function of the implant
- Bone condition that may compromise the stability of the implant

Mental or neuromuscular disorders may create an unacceptable risk to the patient and can be a source of postoperative complications.

It is the surgeon's responsibility to ensure that the patient has no known allergy to the materials used.

### 1.3 PREOPERATIVE PLANNING

Careful preoperative planning is essential. It will help the surgeon to pre-select the femoral implant size in order to recreate, as closely as possible, the patient's anatomy. In addition, using the set of X-ray templates to the scale of 1.15:1 (with an X-ray of the same magnification), it will be possible to determine:

- The implant size
- The prosthetic center of rotation
- The level of the neck cut
- The neck length

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### WARNING

The final implant will be selected intra-operatively, due to possible discrepancies between actual conditions and templating.

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## 2. SURGICAL APPROACH

The choice of surgical approach is determined by the surgeon. The instrumentation has been developed for a conventional approach. Specific instrumentation for the

anterior approach is available upon request (for further information see the AMIS dedicated surgical technique).

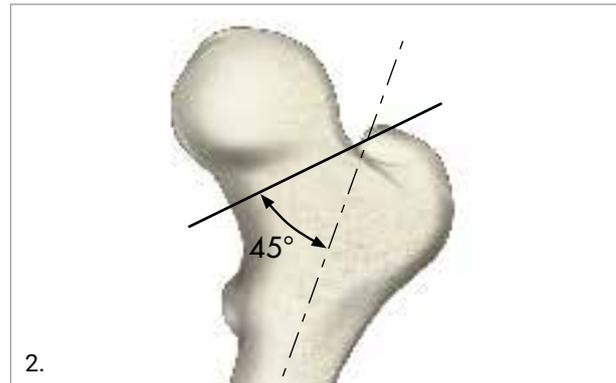
## 3. FEMORAL NECK OSTEOTOMY

The level of the neck cut is determined during preoperative planning using the X-ray templates.

The femoral neck resection should be planned in accordance with the anatomy of the patient. The suggested resection angle for this implant is 45° to the diaphyseal axis of the femur.

The resection is performed with an oscillating saw, taking care to maintain the planned neck resection.

The femoral head is removed using an extractor.

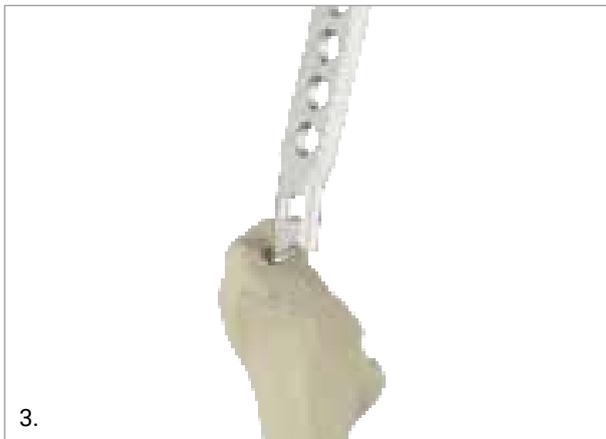


## 4. FEMORAL PREPARATION

For access to the medullary canal, the thigh is held in the position providing the best exposure of the diaphyseal axis, depending on the selected approach.

To avoid undersizing and excessively varus positions of the stem, a box chisel is applied opposite the digital fossa of the femoral neck.

Guide the chisel with the appropriate anteversion: this step is essential for the correct application of the broach and implant.



To prepare the femur, the canal can be opened by utilizing the canal finder. For the AMIS approach, a curved starter rasp is available.

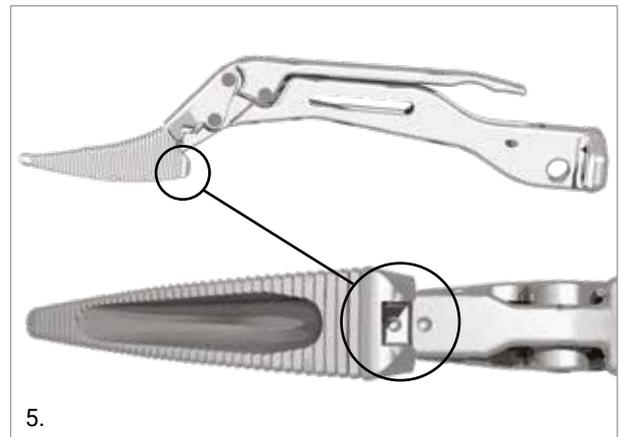


### WARNING

To avoid creating a false canal, never use the hammer to find the femoral canal.

The femur is prepared using sequential broaches.

Assemble the first broach on the broach handle by matching the circular mark on the broach with the one on the broach handle.



**NOTE:** An incorrect assembly of the broach handle with the broach might damage the broach's connection.

The femoral preparation can be done performing one of the two following techniques:

### OPTION A

Option A seeks to progressively increase the size of the lateral bony hump by referencing all broaches on the medial calcar. Each broach expands the medio-lateral dimension of the recess by incrementally increasing the lateral extent of the cavity. This requires constant lateral pressure during broaching.

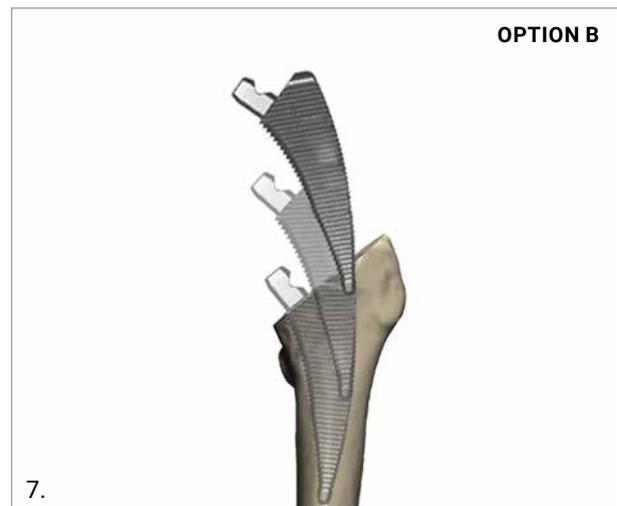
**NOTE:** To effectively preserve the lateral cancellous bone be careful when removing each broach.



### OPTION B

An alternative femoral preparation technique follows the diaphyseal axis when broaching instead of the calcar. This technique is less conservative on the lateral cancellous bone in the proximal femur.

If using this technique, before positioning the final implant, surgeons may choose to fill the hollow on the lateral shoulder of the implant with an appropriate amount of patient's bone tissue.



**NOTE:** Both techniques have the same indications. It is the surgeon's choice to proceed with one or the other technique.

### WARNING

When starting the femoral preparation with one technique, the preparation has to be completed maintaining the same technique.

### TIP

To create space for the shoulder of the implant and help prevent excessively varus position of the stem, remove a suitable amount of cortical bone from the lateral aspect of the femoral neck.

Broaches of increasing sizes are introduced until a satisfactory stability is perceived by the surgeon; the first broach determines the position of the following broaches.

Check the broach anteversion. The final broach should be rotationally stable to assure stability of the implant.

## 5. TRIALING

The broach handle is removed, leaving the broach in place.

A trial neck is fitted to the broach. To lock the trial necks to the broach, press onto the peg; to unlock, pull the neck. Trial necks are held in place by a pin.



The trial neck is correctly coupled to the broach only when the pin is inserted into the dedicated broach housing. A clipping sound indicates that the assembly between trial neck and broach is achieved.



Different trial necks are available for different broach's sizes:

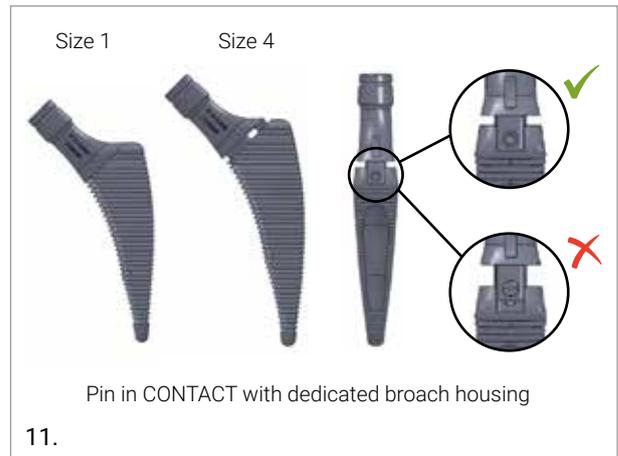
	TRIAL NECK	REFERENCE
For broaches from #1-6	Trial Neck STD	01.36.10.0040
	Trial Neck LAT	01.36.10.0041
For broaches from #7-13	Trial Neck STD	01.36.10.0042
	Trial Neck LAT	01.36.10.0043

**NOTE:** the trial necks were designed with different dimensions to impede the assembly on the wrong broaches. Also, the STD trial necks are sandblasted and the LAT ones mirror polished to distinguish them.



### CAUTION

Depending on the size of the broach, the trial neck might not be in contact with the proximal surface of the broach. The height of the trial neck is defined when the distal surface of the trial neck's pin is in contact with the dedicated broach housing.



Trial heads of different diameters and heights are available to perform the trial reductions. A trial head is fitted to the trial neck by pushing it onto the taper.

### CAUTION

The head sizes XL (for Ø 28 mm and Ø 32 mm) and XXL (for Ø 28 mm, Ø 32 mm and Ø 36 mm) have a collar. This may decrease the Range of Motion in comparison to smaller sizes. Always perform trial reduction with the chosen head.

### TIP

To make head insertion easier wet the head before insertion.

After placement of the trial or final acetabular component, the trial reduction is performed with the help of the head impactor.



**NOTE:** the head impactor must be used only for head impaction and not for the correction of the acetabular shell position.

To remove a trial head, simply pull it.

**TIP**

Wet the trial head and trial neck prior to assembly. This will help when it comes to removal of the trial head and trial neck. After trial reduction - checking and testing mobility, joint stability and lower limb length - turn and pull a little on the trial head to facilitate its extraction. Remove the trial neck and broach.

## 6. FINAL IMPLANTS

Insert the final prosthesis into place. The final prosthesis size corresponds to the size of the last broach.

**WARNING**

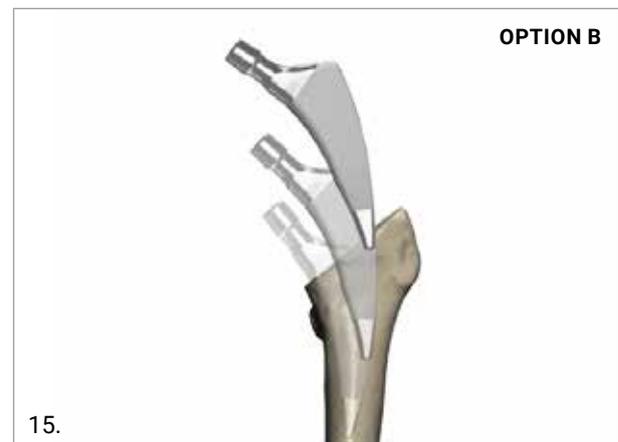
Take care not to damage the taper's micro-thread when positioning the final implant.



If the femur was prepared following the technique Option A, the final implant should be inserted following the calcar, as previously done with the broaches, in order to effectively preserve the lateral bone of the proximal femur.



If the technique describing Option B was followed, the stem can be inserted along the diaphyseal axis.

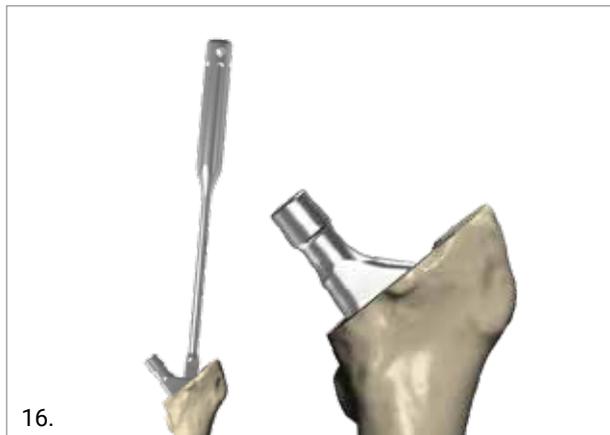


The stem is inserted to the position of the trial implant and matching the beginning of the plasma spray and HA coating.

Carefully perform the final impaction using a dedicated impactor.

**CAUTION**

Under no circumstances should the implant anteversion be changed at this stage.



**WARNING**

Never force impaction when the stem is blocked in the diaphysis.

A further trial reduction can be performed with the trial heads to determine the final neck length.

The stem taper must be thoroughly cleaned before placing the prosthetic head.

Place in position the final head of the chosen size and fix it with the aid of the head impactor.



**WARNING**

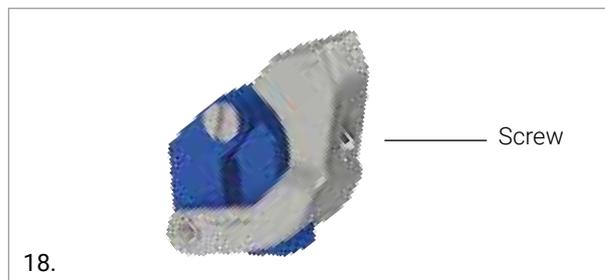
Final impaction of the chosen head must be performed by impacting the plastic head impactor.

The head should not be directly impacted with the mallet.

**NOTE:** for further details about ceramic femoral heads, please refer to the instructions for use for ceramic femoral heads.

**OPTION**

During impaction, if the final stem needs to be repositioned, a specific stem repositioner is available. This repositioner can be used with any hip approach, including the AMIS technique.

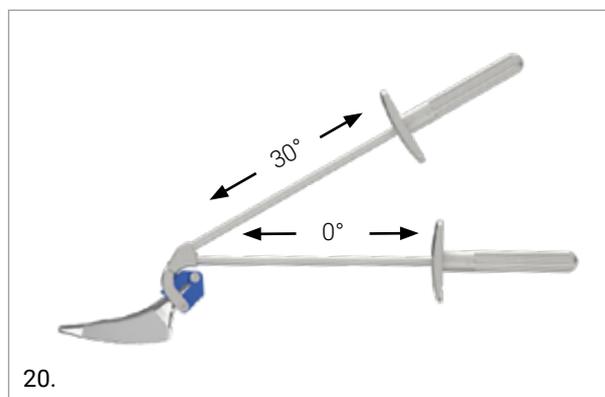


To assemble the stem repositioner untighten the screw (using the 3.5 mm screwdriver) in order to open the plastic clamps to allow the insertion of the cone.

Once opened, place the repositioner onto the taper until it is well seated. Tighten the screw to ensure the connection between the repositioner and the stem. To have a correct positioning, the metal part of the repositioner has to be placed on the medial side of the stem.



Depending on the selected approach, screw the stem extractor M8 onto the broach extractor (30° hole for the anterior approach, 0° hole for other approaches). Pull out the stem in line with the extractor handle.



## 7. INSTRUMENT DETAILS

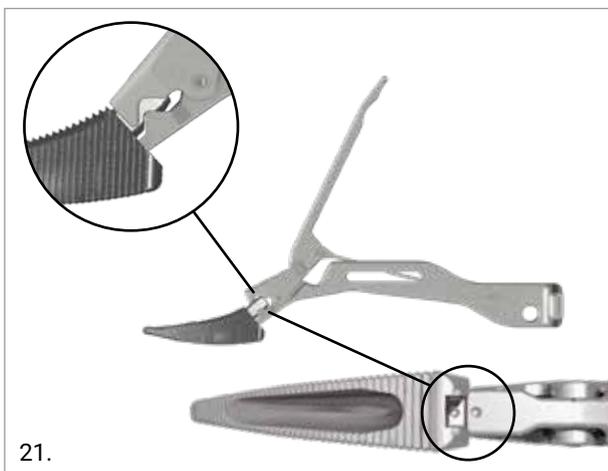
To assemble the SMS broach onto its broach handle follow the instructions given below.

These instructions are valid for the following broach handles:

REFERENCE	DESCRIPTION	
01.36.10.0070	AMIS Pincer broach handle	
01.36.10.0073	Pincer broach handle	
01.39.10.0024	Straight pincer broach handle	
01.10.10.198	Offset 30° pincer broach handle RIGHT	
01.10.10.199	Offset 30° pincer broach handle LEFT	

### 7.1 BROACH HANDLE ATTACHMENT

Assemble the broach by lifting up the lever as shown. The broach is correctly positioned into the triangular locking system when the circular mark on the broach matches the one on the broach handle.



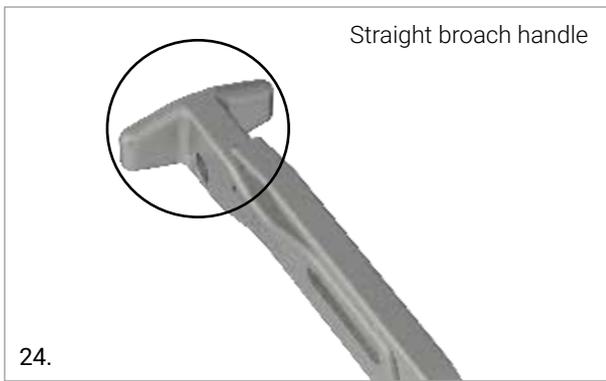
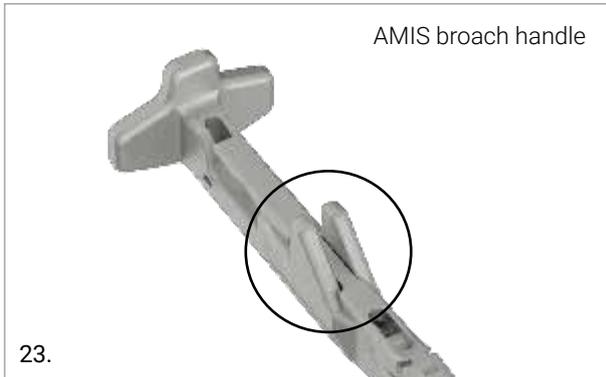
Once assembled, lower the lever and check that it is fully seated on the broach.



The broach is now assembled to the broach handle.

#### TIP

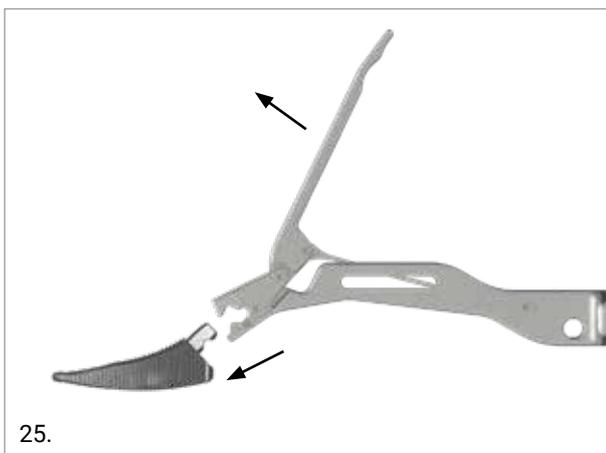
To extract the broach easily from the femoral canal, the surgeon should grip the handle in a way that allows for the user to strike on the suitable anvil.



Never strike on other parts of the handle, especially near the lever.

### 7.2 BROACH HANDLE DETACHMENT

Remove the broach from the handle by lifting up the lever and pulling the broach.



#### **WARNING**

Do not disassemble the broach handles. Their design allows washing without the need for disassembling.

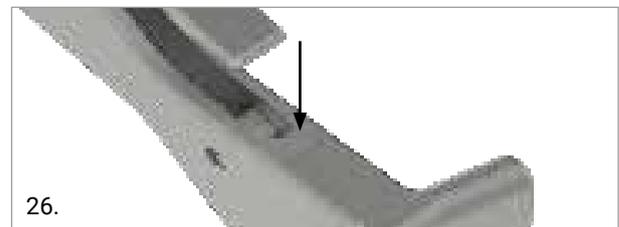
### 7.3 BROACH HANDLE REGULATION

The SMS broach handle grip can be adjusted.

In order to do so, use the 3.5 mm screwdriver (reference 1.113) present in the SMS ancillary set, and follow the instructions here below:

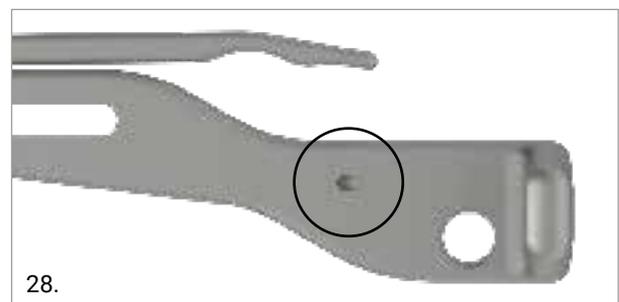
- Hold down the button (Fig.25)
- While holding the button down, insert the screwdriver in the set screw (Fig.26): To increase the handle grip: turn clockwise and the sliding pin will move in the broach's direction. To decrease the handle's grip: turn counterclockwise and the sliding pin will move in the anvil's direction.

**NOTE:** The set screw is sensitive, therefore do not turn more than 45° at a time (quarter turn of screwdriver).



#### **WARNING**

The sliding pin is initially set in a position with a good compromise between functionality and grip. The closer the sliding pin is to the broach the tighter grip it will have.



An excessive grip may damage the broach handle.

After setting the SMS broach handle, assemble it with a broach and check its stability in all directions. The broach should be stable inside the broach handle's locking pincers.

## 8. IMPLANT NOMENCLATURE

### SMS

STANDARD	SIZE	LATERALIZED
01.36.001	1	01.36.021
01.36.002	2	01.36.022
01.36.003	3	01.36.023
01.36.004	4	01.36.024
01.36.005	5	01.36.025
01.36.006	6	01.36.026
01.36.007	7	01.36.027
01.36.008	8	01.36.028
01.36.009	9	01.36.029
01.36.010	10	01.36.030
01.36.011	11	01.36.031
01.36.012	12	01.36.032
01.36.013	13	01.36.033



**FEMORAL HEADS**

DIAMETER	SIZE	STAINLESS STEEL	CoCr	CeramTec BIOLOX delta	CeramTec BIOLOX Option <sup>II</sup>	Mectacer BIOLOX delta
Ø 22 mm	S	01.25.130 <sup>I</sup>	01.25.124 <sup>I</sup>	-	-	-
Ø 22 mm	M	25055.2203 <sup>I</sup>	01.25.123 <sup>I</sup>	-	-	-
Ø 28 mm	S	25055.2801	01.25.011	38.49.7175.445.00	38.49.7176.935.81	01.29.201
Ø 28 mm	M	25055.2803	01.25.012	38.49.7175.455.00	38.49.7176.935.82	01.29.202
Ø 28 mm	L	25055.2805	01.25.013	38.49.7175.465.00	38.49.7176.935.85	01.29.203
Ø 28 mm	XL	25055.2807	01.25.014	-	38.49.7176.935.84	-
Ø 28 mm	XXL	25055.2810 <sup>I</sup>	01.25.015 <sup>I</sup>	-	-	-
Ø 32 mm	S	25055.3201	01.25.021	38.49.7175.665.00	38.49.7176.945.81	01.29.204
Ø 32 mm	M	25055.3203	01.25.022	38.49.7175.675.00	38.49.7176.945.82	01.29.205
Ø 32 mm	L	25055.3205	01.25.023	38.49.7175.685.00	38.49.7176.945.85	01.29.206
Ø 32 mm	XL	25055.3207	01.25.024	38.49.7181.345.00	38.49.7176.945.84	01.29.207
Ø 32 mm	XXL	25055.3210 <sup>I</sup>	01.25.025 <sup>I</sup>	-	-	-
Ø 36 mm	S	-	01.25.030	38.49.7179.275.00	38.49.7176.965.81	01.29.208
Ø 36 mm	M	-	01.25.031	38.49.7179.285.00	38.49.7176.965.82	01.29.209
Ø 36 mm	L	-	01.25.032	38.49.7179.295.00	38.49.7176.965.85	01.29.210
Ø 36 mm	XL	-	01.25.033	38.49.7175.925.00	38.49.7176.965.84	01.29.211
Ø 36 mm	XXL	-	01.25.034 <sup>I</sup>	-	-	-
Ø 40 mm	S	-	-	38.49.7179.885.00 <sup>I</sup>	38.49.7179.815.81 <sup>I</sup>	01.29.212
Ø 40 mm	M	-	-	38.49.7179.895.00 <sup>I</sup>	38.49.7179.815.82 <sup>I</sup>	01.29.213
Ø 40 mm	L	-	-	38.49.7179.905.00 <sup>I</sup>	38.49.7179.815.85 <sup>I</sup>	01.29.214
Ø 40 mm	XL	-	-	38.49.7179.915.00 <sup>I</sup>	38.49.7179.815.84 <sup>I</sup>	01.29.215
Ø 40 mm	XXL	-	-	-	-	-

<sup>I</sup> On demand

<sup>II</sup> Specific for revision cases

**MECTACER BIOLOX OPTION SYSTEM<sup>II</sup>**

HEAD DIAMETER (mm)	REFERENCE
Ø 28	01.29.230H
Ø 32	01.29.231H
Ø 36	01.29.232H
Ø 40	01.29.233H

SLEEVE SIZE	REFERENCE
S	01.29.240A
M	01.29.241A
L	01.29.242A
XL	01.29.243A

<sup>II</sup> Specific for revision cases

## 9. IMPLANT COMBINATIONS

All Medacta implant combinations are represented in the table "Medacta Hip product compatibility" (ref. 99.99.COMC), contact your Medacta representative to receive a copy.

**NOTE:** In the case of a ceramic-on-ceramic bearing it is compulsory to use compatible ceramic femoral heads and liners.

Part numbers subject to change.

### NOTE FOR STERILISATION

The instrumentation is not sterile upon delivery. It must be cleaned before use and sterilised in an autoclave in accordance with the regulations of the country, EU directives where applicable and following the instructions for use of the autoclave manufacturer. For detailed instructions please refer to the document "Recommendations for cleaning decontamination and sterilisation of Medacta International orthopaedic devices" available at [www.medacta.com](http://www.medacta.com).



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SMS  
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ref: 99.72.12  
rev. 02

Last update: June 2018  
**CE 0476**