Aesculap® Metha®

Short Hip Stem System
Evolving the State of Arthroplasty.

Aesculap Orthopaedics

B BRAUN
SHARING EXPERTISE

Metha®. Evolving the State of Arthroplasty.

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36-12/14M

Metha®. Short Hip Stem System.

SYSTEM


Metha 135°


Metha 130°

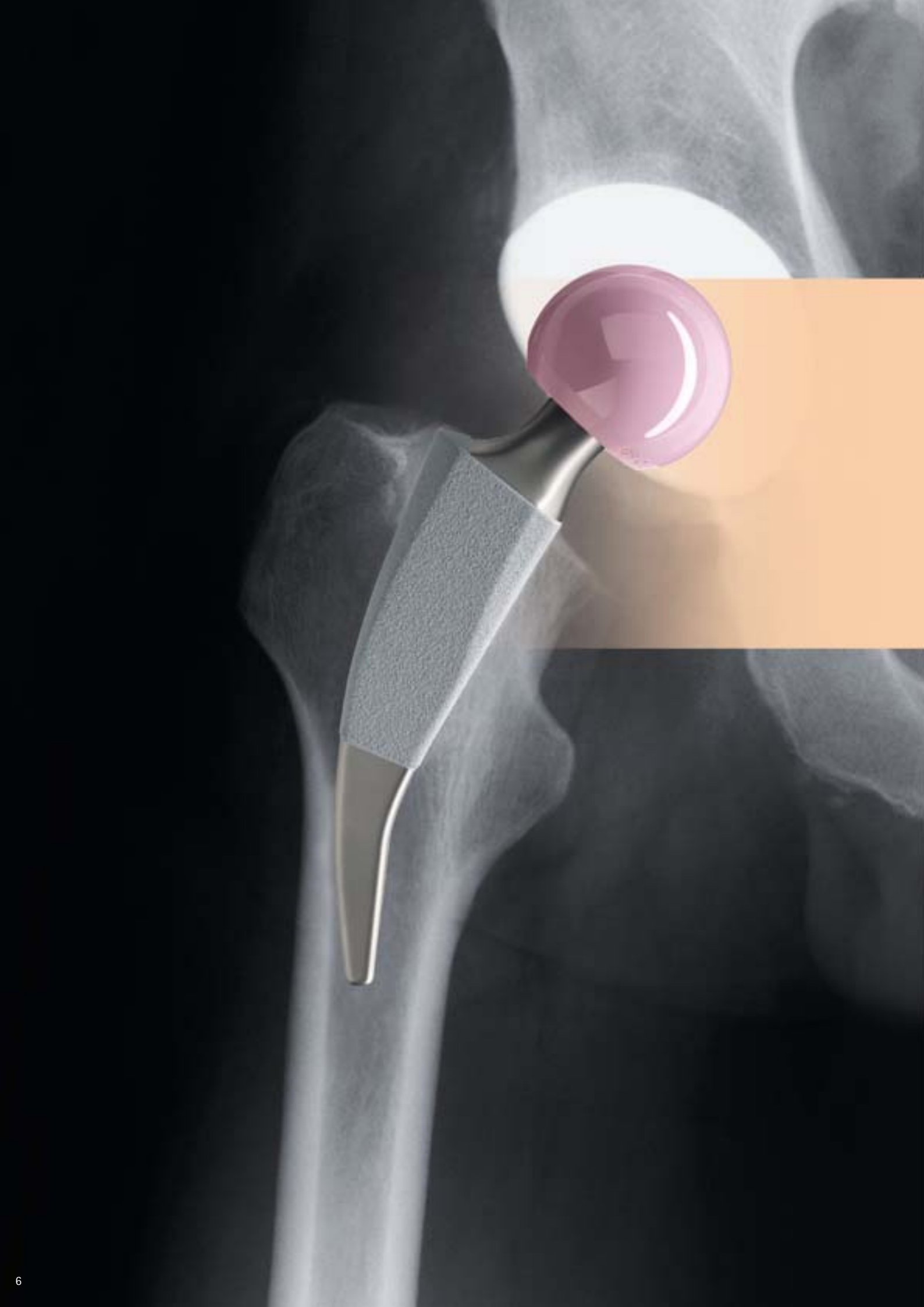

Metha 120°

The Metha Short Hip Stem prosthesis represents a new generation of implants for hip endoprosthesis. It combines two advantages: minimal stem size and a circumferential coating. As a result, it enables minimally invasive procedures. It is particularly suitable for young patients with good bone quality.

The design continues on the positive experience with non-cemented stems fixated by metaphyseal anchoring. The prosthesis concept allows implantation via the base of the femoral neck, with conservative treatment of the bone in the femoral neck and in the greater trochanter region, preserving the bone, soft tissue and muscle. While the position of the Metha stem ensures primary load stability, the Plasmapore® µ-CaP coating of the entire proximal surface supports rapid secondary fixation.

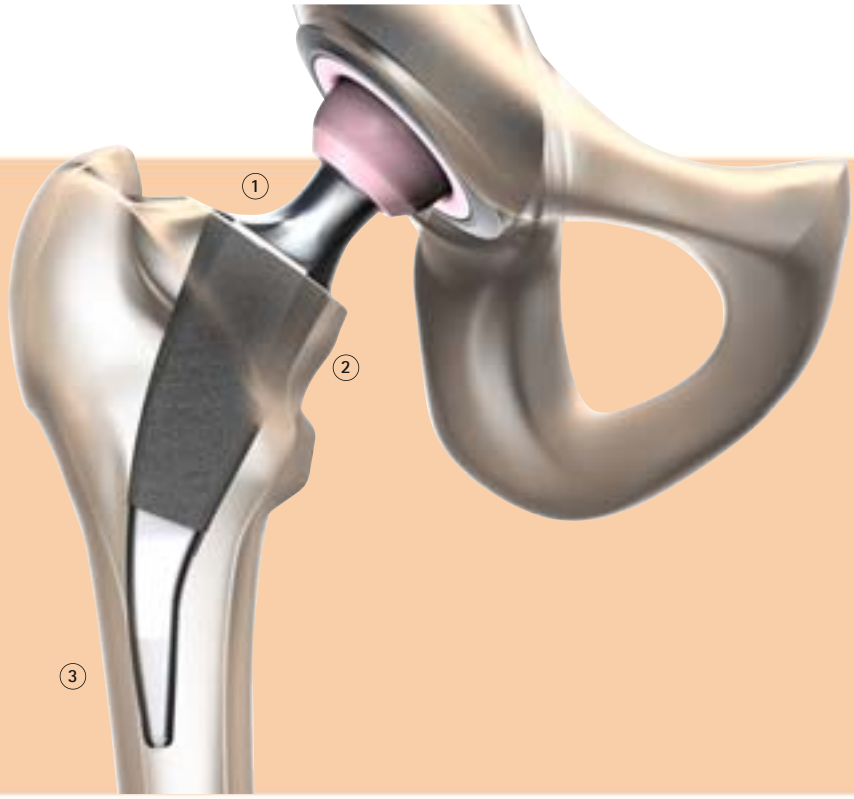
The implantation instruments are as sophisticated as they are simple. Metha is at the leading edge of technology. Combining the modular stem with the OrthoPilot® navigation technology expands the possibilities for hip replacement surgery even further. The sequential order of cup and stem implantation can be chosen by the surgeon.

The Plasmacup articular cup system allows 36-mm ceramic-on-ceramic and ceramic-on-polyethylene large head articulation with Biolox delta and highly cross-linked polyethylene components.



Metha®. Short Stem Anchoring Concept.

METAPHYSEAL



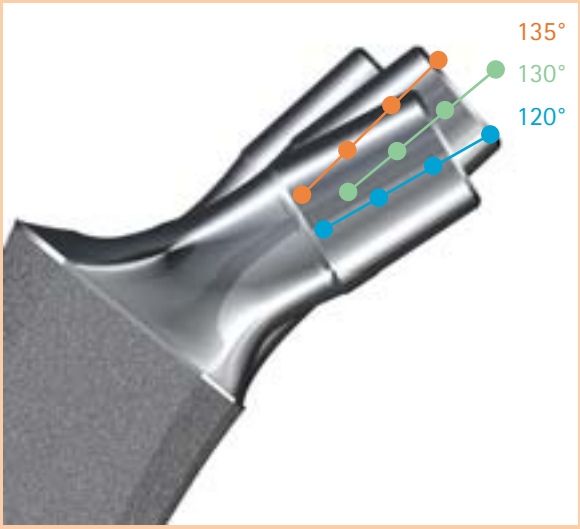
To support osteointegration, the Metha Stem carries a circumferential Plasmapore® µ-CaP coating. Through a special process, a thin 20 µm layer of very pure calcium phosphate, µ-CaP, is applied on the proven micro-porous titanium Plasmapore® surface. This additional layer has an osteoconductive effect and accelerates contact between the bone and the prosthesis stem.

The non-cemented stem is fixated by metaphyseal anchoring within the closed ring of the femoral neck. (1)
The greater trochanter region remains completely untouched. Bone and muscle structures are preserved – a particular bonus for young and active patients with good bone structure. The conical shape supports primary stability and proximal force transfer. (2)
The high primary stability is further enhanced by the rounded tip of the stem guided along the dorso-lateral cortex. (3)

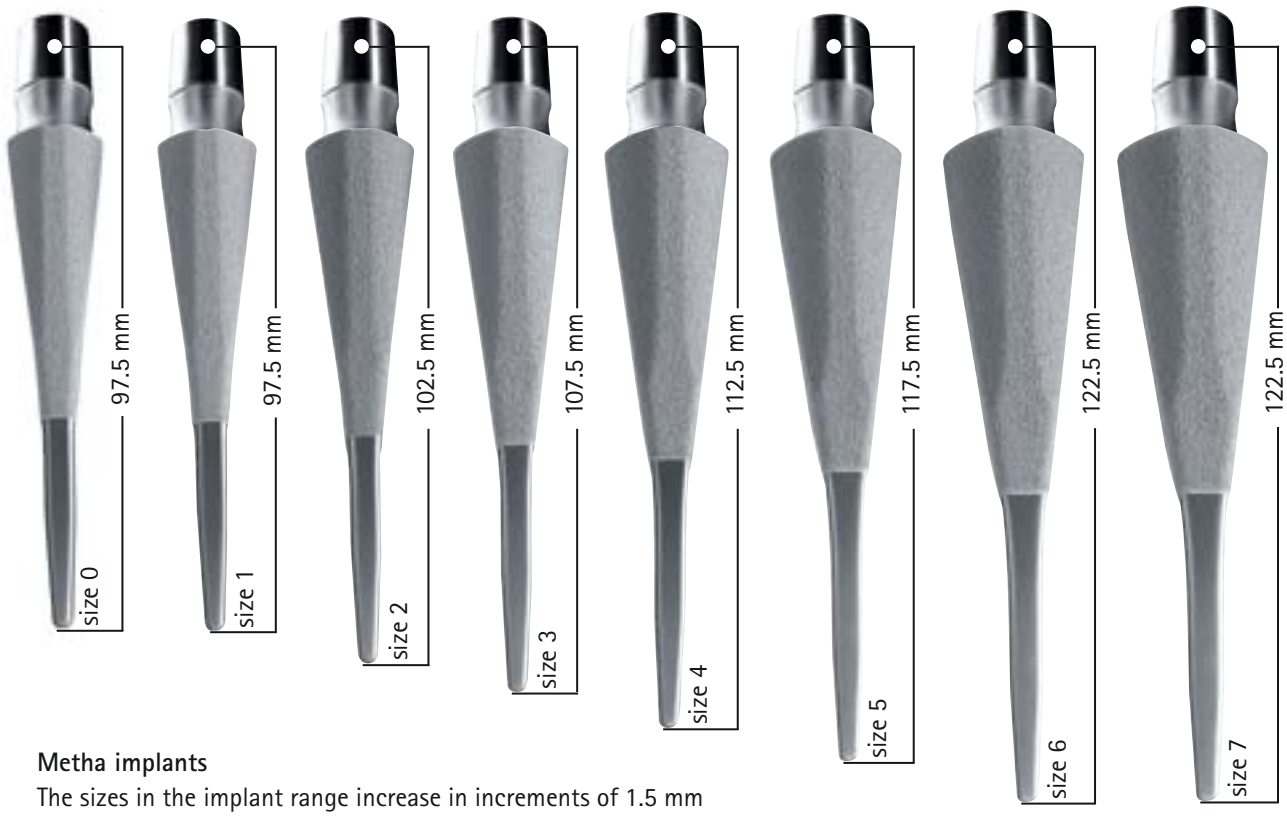

135°
130°
120°

Metha®. Variable Implant Options.

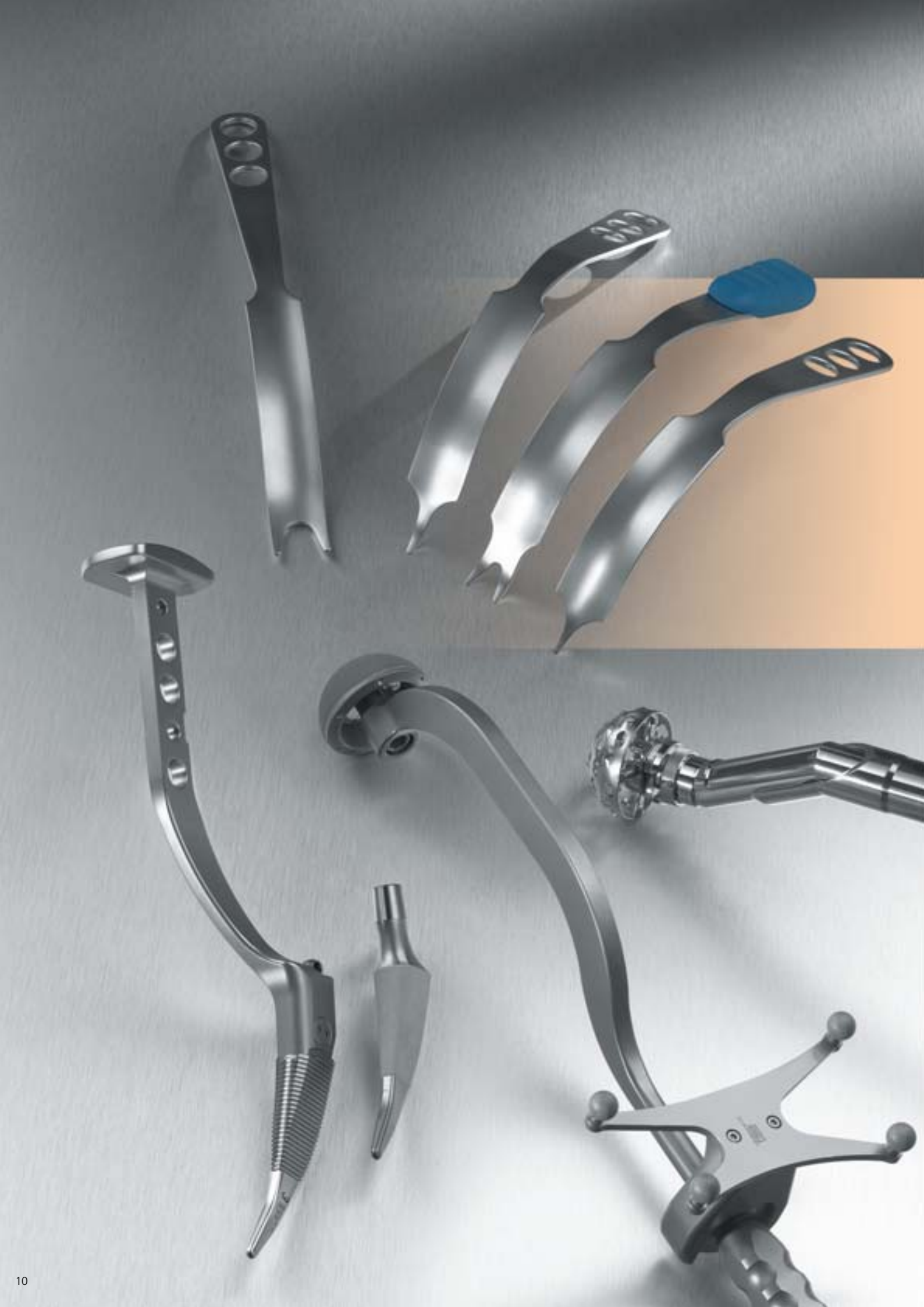
IMPLANTS



Metha variability.
The three CCD angle specifications of 135°, 130° and 120° of the Metha system provide a variety of offset options for the stem implantation. The varus-valgus variability of the Metha Stem position of approximately 20° allows further optimization of the patient-specific hip joint reconstruction.

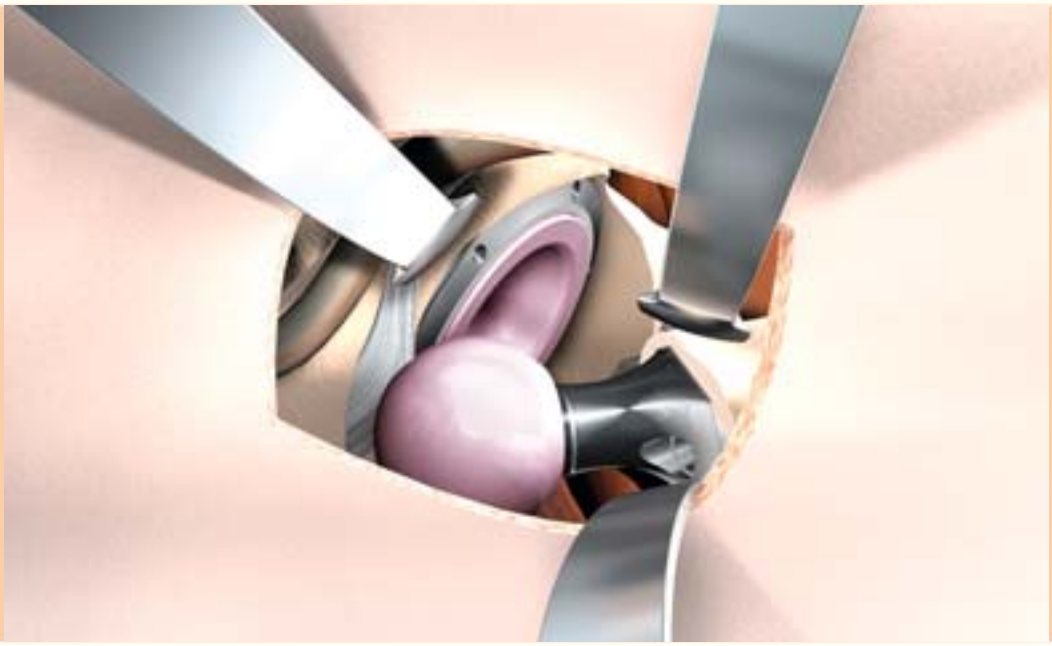


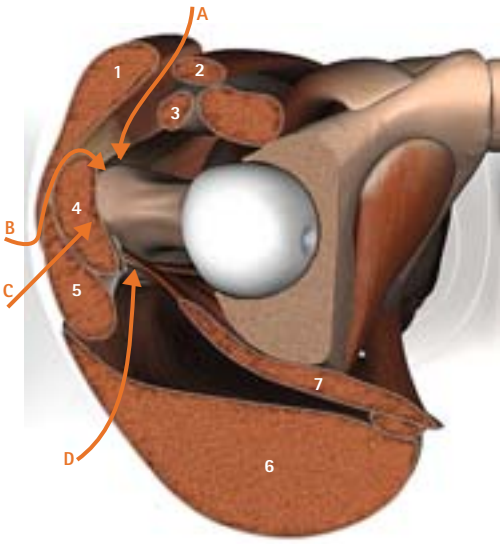
Metha implants
The sizes in the implant range increase in increments of 1.5 mm in the A/P projection and 1.2 mm in the lateral projection. Anchorage in the closed femoral neck is supported by the conical shape in the lateral view. The difference in nominal length between the smallest and largest implant is only 25 mm.



Metha®. Less Invasive Surgery.

INSTRUMENTS





1 *M. tensor fasciae latae*
2 *M. sartorius*
3 *M. rectus femoris*
4 *M. glutaeus minimus*
5 *M. glutaeus medius*
6 *M. glutaeus maximus*
7 *M. piriformis*

A *Direct anterior*
B *Antero-lateral*
C *Direct-lateral, transgluteal*
D *Posterior*

Simple and clear instrumentation is a distinguishing feature of the Metha Stem. Because of the more medial location of the femur opening and the medially tilted insertion angle, the Metha prosthesis is ideally suited for minimally invasive and less invasive implantation techniques.

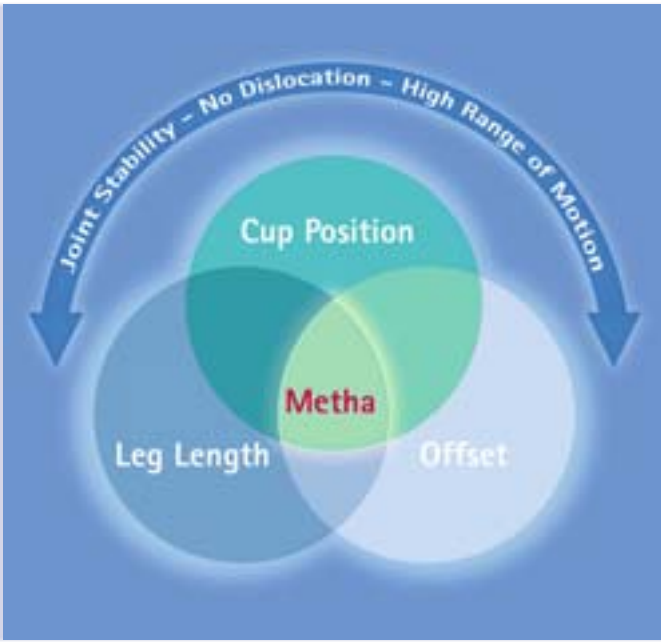
The MIOS (Minimally Invasive Orthopaedic Solutions) instrument range has been specially designed for less invasive procedures and for Metha. MIOS special retractors, curved instrument profiles and the Metha rasp handles (see page 23) facilitate all widely used approaches to the hip joint.

In supine position the direct lateral approach, the antero-lateral approach and the direct anterior approach are possible. The lateral position allows the direct lateral, antero-lateral and posterior approaches.


OrthoPilot
Shortening
Lengthening
Medial
Lateral
Stem Simulation
OrthoPilot

Metha®. Navigation with OrthoPilot®.

NAVIGATION



Naturally, Metha can be implanted using the OrthoPilot® navigation system. The clinically proven standard navigation software THA 3.2 allows complete navigation of the articular parameters of the cup and stem components to optimize the range of movement.

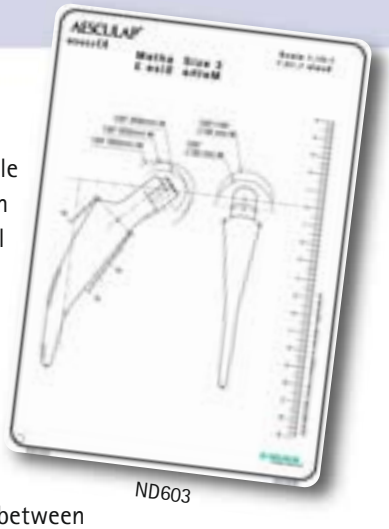
The variability of the Metha system and the varied choice of CCD angle in combination with the OrthoPilot® supports the optimized intraoperative positioning of the implant for a patient-specific reconstruction of the hip.

The new THAplus software only needs one transmitter on the pelvis for the entire navigation procedure, and it supports all minimally invasive approaches. The functions of the kinematic cup navigation are extended by leg length and offset controls. The position of the femur is palpated intraoperatively to register the leg length and offset parameters for optimal implant selection.

The new OrthoPilot® system platform is ready for the future of navigation. As the leading navigation system, it even supports ultrasound technology for the precise registration of the anatomic orientation points on pelvis and femur.

Metha®. Planning and Surgical Technique.

OP. TECHNIQUE



ND603

Indications and bone morphology

The Metha Stem is a modern, cementless implant. The spectrum of indications includes degenerative coxarthrosis and femoral head necrosis. Good bone quality is a prerequisite for a successful implantation.

A significant coxa vara and dysplastic coxarthroses with extreme coxa vara or a short femoral neck are less suitable bone shapes for this therapy.

The preoperative assessment should also look out for a wide femoral neck, especially in the presence of other concerns regarding the osteotomy level or the implant size. An undersized stem could lead to reduced primary stability. The preoperative assessment with the planning template is of particular importance.

Any strong antetorsion of the femoral neck can complicate the implantation even for short stems. Therefore, the preoperative planning must also include a lateral X-ray.

Preoperative planning

X-ray templates at a scale of 1.15:1 are available in printed as well as digital format for planning the size of the Metha Short Hip Stem prosthesis. In addition to filling the femoral neck area, the aim is to achieve support on the calcar as well as surface contact between the distal end of the stem and the lateral cortex.

In addition to the position of the joint centre and the leg length, the planning of the resection height also takes into account the preservation of the approx. 2 - 10 mm thick ring of cortex around the femoral neck that is important for anchorage. The osteotomy of the femoral neck is performed ideally at an angle of 50° to the femoral shaft axis. For intraoperative orientation, the distance from the lesser trochanter can be measured medially.

In the lateral X-ray, the objective is to wedge firmly in the proximal femur. The Metha Short Hip Stem is guided by the femoral neck and positioned according to this, almost parallel to the antetorsion angle of the femur.

Metha®. Femoral Osteotomy.

Flat osteotomy (A) and optimum stem position at the level of the osteotomy

Steep osteotomy (B) and higher stem position with lateral contact at the osteotomy

Steep osteotomy (B) and stem inserted too deeply, without lateral contact at the osteotomy

Femoral osteotomy

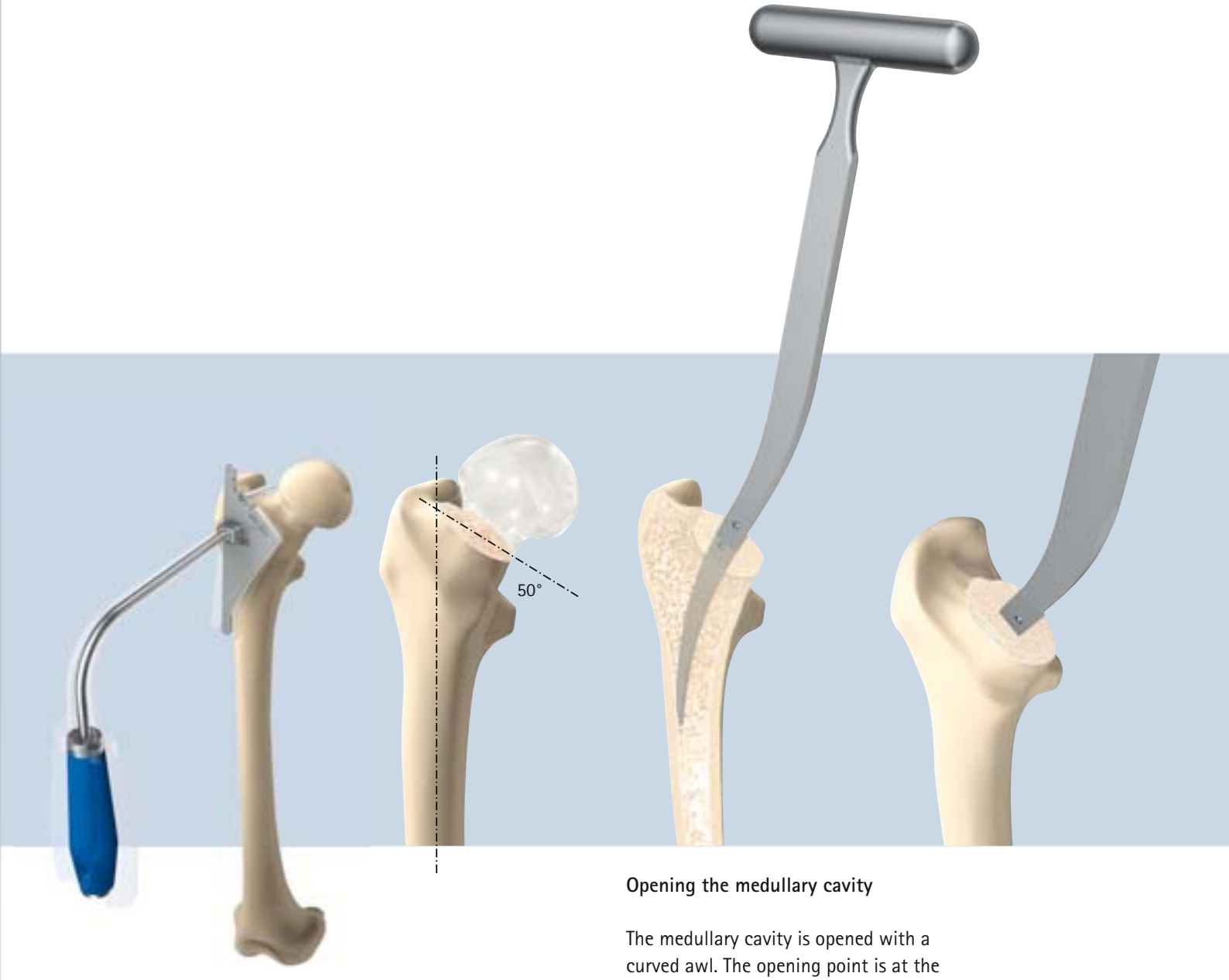
The femoral neck resection is performed according to preoperative planning, usually starting approx. 10 mm above the junction of the greater trochanter and the femoral neck, and is ideally carried out at an angle of 50° to the femoral axis. Care must be taken that a closed cortical ring of the femoral neck of at least 2 mm lateral width is left intact.
Any lower resection than described above, can compromise the prosthesis anchoring and therefore demonstrates a contraindication against the implantation.

If the osteotomy is applied too low medially or, in other words, the osteotomy is too steep, the stem will have to rest on a smaller medial bone surface. For this stem position, the primary stability arises from the cortical lateral support in the closed ring of the femoral neck.

If the osteotomy is too steep, and there is insufficient support on the proximal lateral cortex, then there is a risk that the stem moves into valgus. The orientation of the implantation depth on a too deep calcar osteotomy can increase the risk of a stem position without lateral support. This can result in a tendency to move the rasp or prosthesis stem into valgus.

Proper osteotomy level may be achieved through two osteotomies

The typical Metha position in the lateral view



To achieve an optimum osteotomy position, a Metha resection guide or a double osteotomy technique can be used.

The Metha resection guide is placed from anterior direction onto the proximal femur and is guided by the guide rod onto the trochanteric fossa, which needs to be received. The attached handle is parallel to the resection guide and should be oriented so that it is also parallel to the axis of the femur. In this position, the osteotomy can be performed.

Alternatively or additionally, a double osteotomy can also be performed. A first, subcapital osteotomy can be carried out in situ. The second osteotomy is guided by the planned implantation depth and stem position. A trapezoidal second osteotomy (higher at the posterior side ① than at the anterior side ②, see illustration on page 16) allows the influence of the antetorsion position and facilitates the insertion of the rasps.

Opening the medullary cavity

The medullary cavity is opened with a curved awl. The opening point is at the center of the osteotomy plane. The awl is advanced to the lateral cortex with light twisting movements. It can be helpful to insert the awl in a slightly varus first, then straighten it on reaching the lateral cortex before pushing it distally along the lateral cortex. The marker dots on the awl are for depth orientation and correspond to the resection height for the small (size 0) or larger (size 7) Metha stem. The curvature of the awl resembles the lateral profile of the implant, so that it produces a first impression of the subsequent implant bed. The awl also defines the working direction for the rasps.

A second awl with a thicker anterior-posterior profile is available for easier bone preparation in harder structures.
As a general rule, the awls are for manual application only and must **not** be impacted with a mallet.

Metha®. Implant and Rasp Position.

Valgus / Varus variability

The Metha Short Hip Stem can be implanted at various relative valgus or varus positions to fit the respective bone shape and implant size. The neutral position is defined as parallel to a 50° femoral osteotomy.

Other implant positions are up to 15° relative valgus or 5° relative varus. Please be aware that the varus / valgus variation of the stem influences respectively the offset situation of the femur.

When preparing the medullary cavity, a position change of the rasp can be detected by intraoperative comparison with the osteotomy plane.

Femur preparation

The implant bed is prepared in stages, beginning with the smallest rasp. The rasp is introduced centrally into the opening in the medullary canal, observing the antetorsion. During insertion the tip of the rasp should touch the lateral cortex and run along it.

To control the tendency towards valgus of the instrument, it helps to apply slight varus pressure when inserting the rasps. The position and alignment of the osteotomy can be checked after inserting the first rasp. Valgus positioning of the rasp can cause unintended leg lengthening. This has to be considered when carrying out the preoperative planning and during the intraoperative selection of the next rasp size.

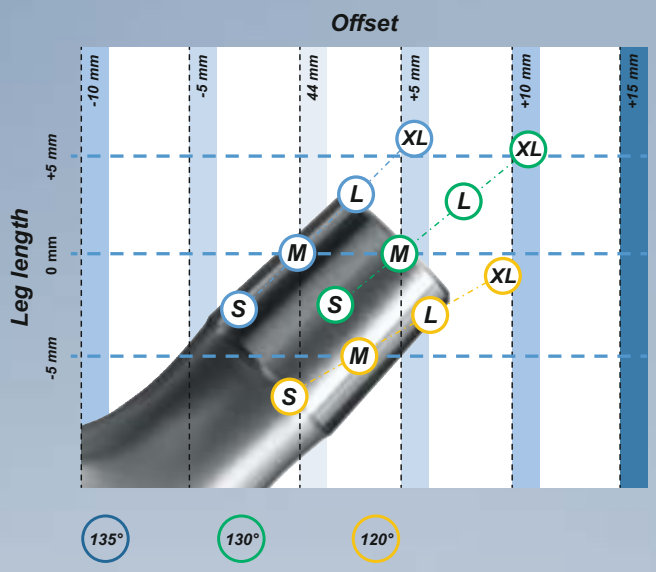
The lateral boundary of the osteotomy must never be removed by any additional resection. To assess such a resection, a proper visibility of the lateral femoral neck is essential.

The implant bed is of the correct size as soon as the rasp touches the lateral cortex, sits firmly in the femoral neck, and can not rotate anymore. The teeth of the rasp should be ideally aligned to the resection level, but never below the osteotomy plane.

The position of the rasp can be checked with the image intensifier.

If the rasp is not in contact with the dorsolateral cortex in any plane (I.l. radiography with internal rotation), the position should be corrected by carefully inserting a bigger rasp under slight varus pressure.

Metha®. Trial Reduction and Stem Implantation.



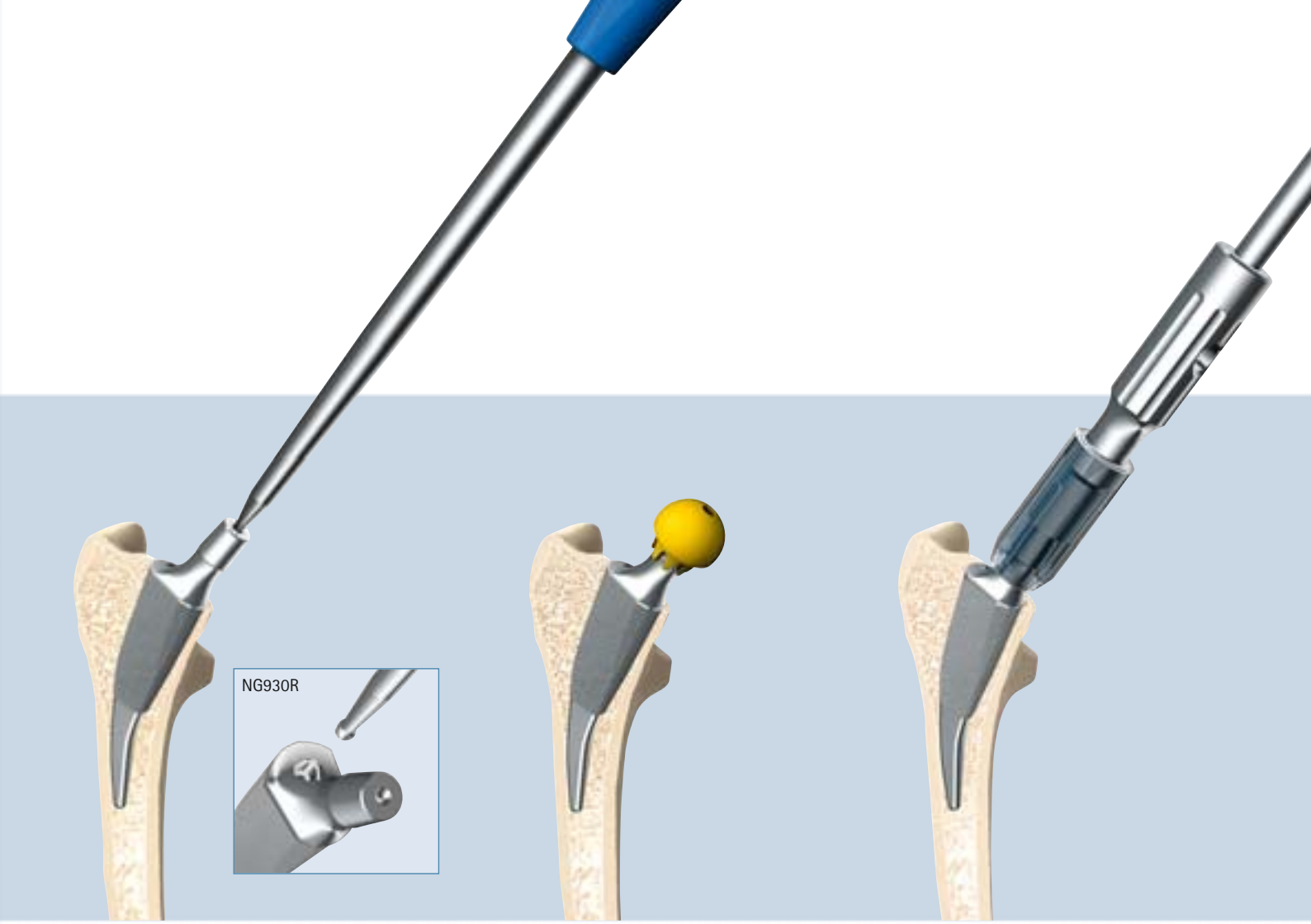
Trial reduction

The trial reduction is carried out with modular trial neck adapters, which are clipped on the rasp. There are three neck adapters available with various CCD angles (130°, 135°, 120°).

While the different CCD angles of 135° and 130° allow the offset to be changed by -5 mm / +5 mm without changing the leg length, the 120° angle helps the leg length to be adjusted without changing the offset. The neutral offset is 44 mm.

The appropriate neck adapter is selected by assessing the possibility of a dislocation tendency, the range of movement and the soft tissue or ligamentary tension. The leg length is corrected by choosing a prosthesis head of the required neck length.

The OrthoPilot® navigation system helps you select the best possible implant combination and adapt it to the individual articular situation. The system computes and displays the parameters of mobility, any implant impingement, the antetorsion position and any changes in offset and leg length associated with each of the possible combinations.



Inserting the Metha Stem

The prosthesis stem to be implanted is chosen according to the last used rasp size.

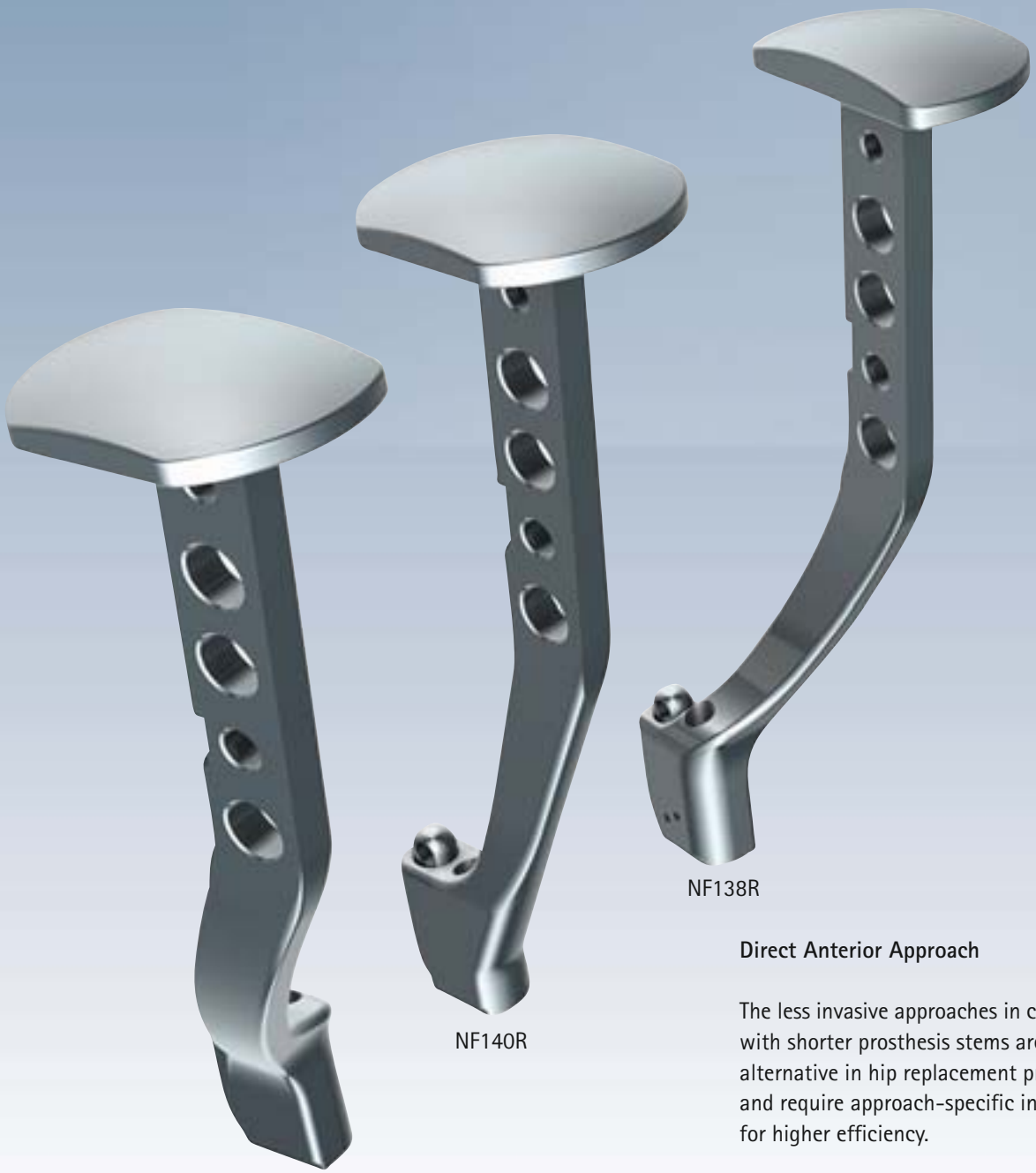
The Metha Short Stems are available with CCD angles of 135°, 130° and 120°. The implantation starts with the manual insertion of the stem, which is implanted as deep as possible in the femur. Then, the ND401R stem impactor is applied in the adapter recess in the load direction of the implant, or the ND930R stem impactor is applied, until the final, secure implantation of the implant is achieved. The prosthesis does not need to be guided here, because it aligns itself accordingly with the position of the rasp. The ND930R stem impactor can be used for slight valgus positioning of the prosthesis.

Trial reduction with Metha Stem

If necessary, an additional trial reduction can be carried out even after the implantation of the Metha Stem, using the color-coded trial heads.

Extraction of the Metha Stem

The ND656R instrument can be used for any necessary intraoperative extraction of the Metha Stem. This instrument grips around the 12/14 prosthesis cone and is connected to the ND655R extraction instrument. The prosthesis stem must not be reused after an extraction procedure, because the cone could be damaged during this procedure. The revision of a strongly ingrown Metha Stem is carried out using a standard stem extractor for the 12/14 cone, as with standard hip endoprosthesis stems. This instrument is not included in the Metha instrument set.



NF139R

NF140R

NF138R

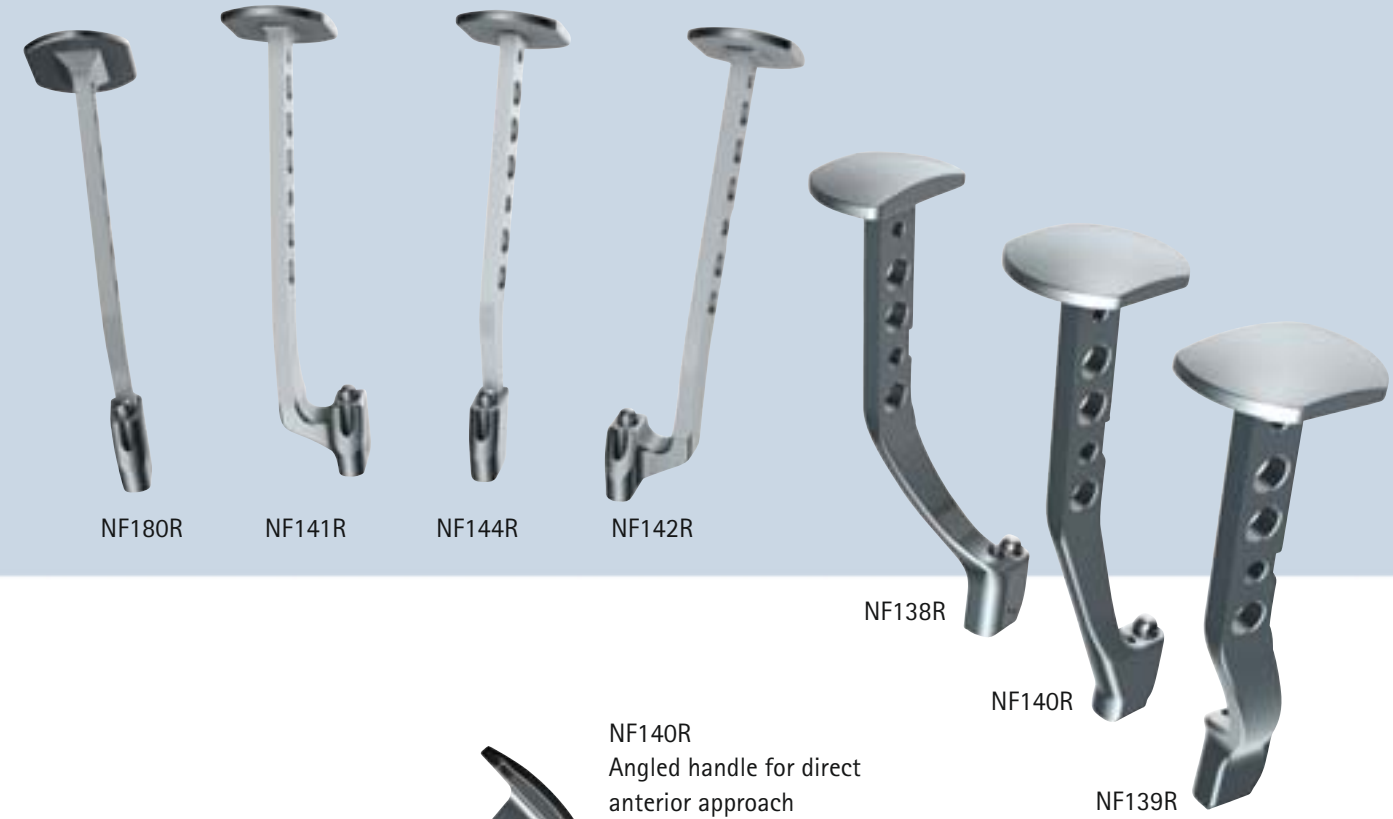
Direct Anterior Approach

The less invasive approaches in combination with shorter prosthesis stems are a good alternative in hip replacement procedures and require approach-specific instruments for higher efficiency.

The Metha system offers various instruments optimized for all common approaches.
For the direct anterior approach, specific handles are available with single or double offset.

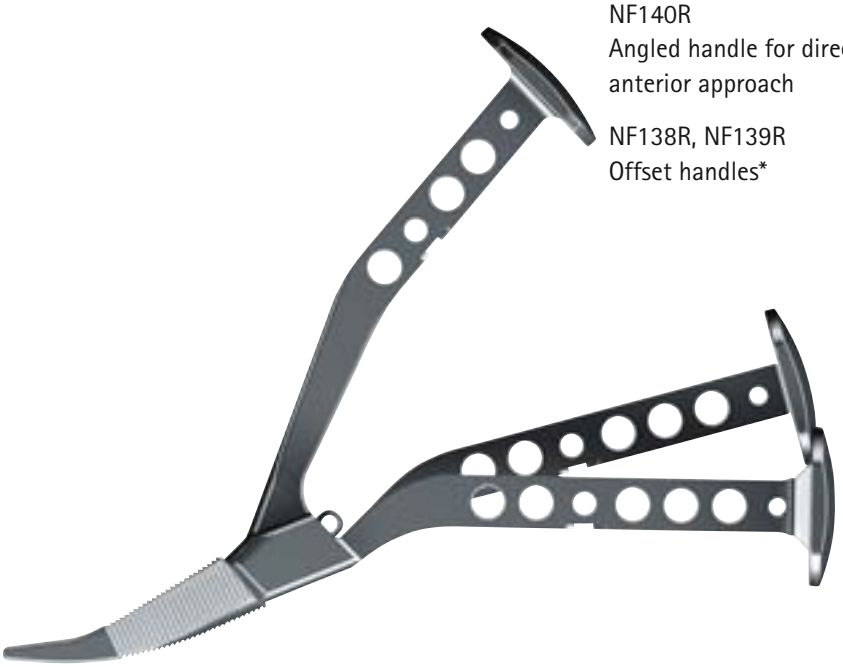
Metha®. Handles.

Handles for different approaches



NF140R
Angled handle for direct anterior approach

NF138R, NF139R
Offset handles*



NF180R
Straight handle for lateral and anterolateral approaches

NF141R, NF142R
Offset handles*

NF144R
Curved handle for posterior approach

* Note:
NF138R for the left hip (direct anterior approach)
NF139R for the right hip (direct anterior approach)
NF141R for the left hip (lateral and anterolateral approaches) or right hip (posterior approach) respectively
NF142R for the right hip (lateral and anterolateral approaches) or left hip (posterior approach) respectively

Metha®. Instruments and Implants.

ND608
Metha Mono set (135° / 130° / 120°)

comprising:

ND609R	Perforated tray for Mono set (489 x 253 x 74 mm)
TE931	Packing template for Mono set
JH217R*	Lid
ND607R*	Metha resection guide
ND644R	Metha awl narrow
ND645R	Metha awl wide
ND654R*	Metha awl narrow, anterior approach
ND672R*	Metha awl wide, anterior approach
ND656R	Metha extraction instrument for 12/14 trunnion
ND655R	Metha impactor/extractor instrument
NG930R	Metha Mono stem impactor
ND401R*	Metha Standard impactor

Metha rasps

Size	0	1	2	3
	NF090R*	NF181R	NF182R	NF183R
Size	4	5	6	7
	NF184R	NF185R	NF086R	NF087R*

ND718R	Rasp trial neck adapter 120°/0°
ND715R	Rasp trial neck adapter 130°/0°
ND725R	Rasp trial neck adapter 135°/0°

Trial heads 12/14

	28 mm	32 mm	36 mm
Head length S	NG296*	NG306*	NG326*
Head length M	NG297*	NG307*	NG327*
Head length L	NG298*	NG308*	NG328*
Head length XL	NG299*	NG309*	NG329*

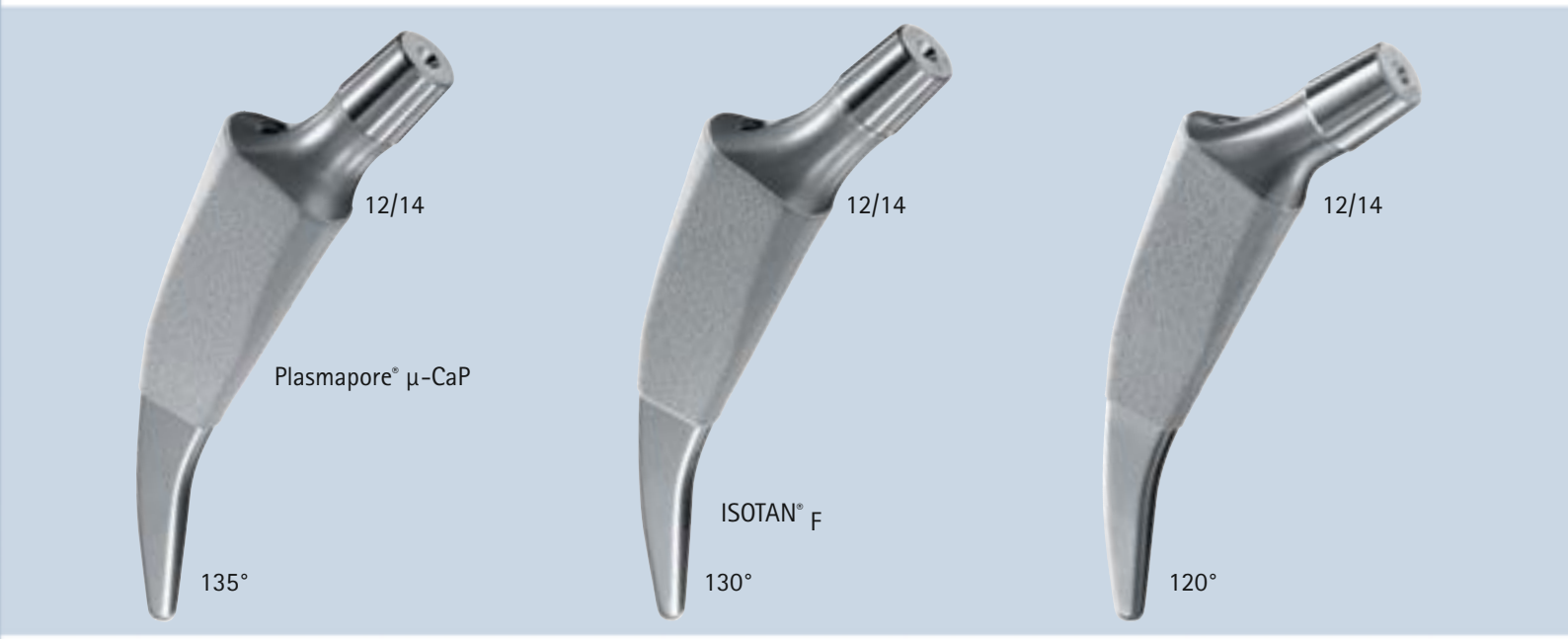
Metha rasp handles, also for navigation

NF180R*	straight, lateral approach
NF144R*	curved, posterior approach
NF141R*	offset, left/right (also see page 25)
NF142R*	offset, right/left (also see page 25)
NF140R*	angled, anterior approach
NF139R*	offset right/left, anterior approach
NF138R*	offset left/right, anterior approach

The Metha Mono tray can store 2 rasp handles

Items marked with * must be ordered separately

Recommended container for ND608
Aesculap Basic container 592 x 274 x 90 mm



Metha Stems
with 12/14 trunnion

Stem size	CCD = 135°	CCD = 130°	CCD = 120°
0	NC280T	NC270T	NC290T
1	NC281T	NC271T	NC291T
2	NC282T	NC272T	NC292T
3	NC283T	NC273T	NC293T
4	NC284T	NC274T	NC294T
5	NC285T	NC275T	NC295T
6	NC286T	NC276T	NC296T
7	NC287T	NC277T	NC297T

ND603 Metha X-ray templates

Implant materials:

ISOTAN® F	Titanium forged alloy (Ti6Al4V / ISO 5832-3)
Plasmapore® µ-CaP	Pure titanium surface with 20-µm coating dicalcium phosphate dihydrate ($CaHPO_4x2H_2O$)
Plasmapore®	Pure titanium (Ti / ISO 5832-2)
Biolox forte	Aluminum oxide ceramics (Al_2O_3 / ISO 6474-1)
Biolox delta	Al_2O_3 matrix composite ceramics
ISODUR® F	Cobalt-Chromium forged alloy (CoCrMo / ISO 5832-12)
UHMWPE	Ultra-high molecular weight polyethylene (ISO 5834-2)

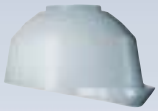
Plasmacup®. Implants.

	Plasmacup® SC	Plasmacup® NSC	Plasmacup® MSC	Screw cup SC
				
40 mm	NH040T	NH340T	NH140T	–
42 mm	NH042T	NH342T	NH142T	–
44 mm	NH044T	NH344T	NH144T	NH444T
46 mm	NH046T	NH346T	NH146T	NH446T
48 mm	NH048T	NH348T	NH148T	NH448T
50 mm	NH050T	NH350T	NH150T	NH450T
52 mm	NH052T	NH352T	NH152T	NH452T
54 mm	NH054T	NH354T	NH154T	NH454T
56 mm	NH056T	NH356T	NH156T	NH456T
58 mm	NH058T	NH358T	NH158T	NH458T
60 mm	NH060T	NH360T	NH160T	NH460T
62 mm	NH062T	NH362T	NH162T	–
64 mm	NH064T	NH364T	NH164T	NH464T
66 mm	NH066T	NH366T	NH166T	–
68 mm	NH068T	NH368T	NH168T	NH468T

ISOTAN®F

Plasmacup® SC Polyethylene cup liners





	symmetric			posterior wall			asymmetric	
	ø 22.2 mm	ø 28 mm	ø 32 mm	ø 22.2 mm	ø 28 mm	ø 32 mm	ø 28 mm	ø 32 mm
40 mm 42 mm	NH170	–	–	NH300	–	–	–	–
44 mm 46 mm	NH171	NH191	–	NH301	NH401	–	NH471	–
48 mm 50 mm	NH172	NH192	NH202	NH302	NH402	–	NH472	–
52 mm 54 mm	NH173	NH193	NH203	NH303	NH403	NH413	NH473	NH323
56 mm 58 mm	NH174	NH194	NH204	NH304	NH404	NH414	NH474	NH324
60 mm 62 mm	NH175	NH195	NH205	NH305	NH405	NH415	NH475	NH325
64 mm 66 mm 68 mm	NH176	NH196	NH206	NH306	NH406	NH416	NH476	NH326

UHMWPE

Plasmacup® delta

		Liner
48 mm	NH648D	ø 36 mm
50 mm	NH650D	ø 36 mm
52 mm	NH652D	ø 36 mm
54 mm	NH654D	ø 36 mm

BIOLOX delta

Plasmacup delta implants complete the Plasmacup SC program with 36 mm ceramic liners. These liners **can not be combined with Plasmacup SC components** and are **only** supplied together with the Biolox delta cup component. Special liners with shoulder are available for revision operations.

Plasmacup® delta
Cup liner for revisions

	posterior wall		symmetric	
	ø 28 mm	ø 32 mm	ø 32 mm	ø 36 mm
44 mm 46 mm	NH407	–	NH632D	–
48 mm	–	NH417	–	NH636D
50 mm 52 mm 54 mm	–	NH418		

UHMWPE — BIOLOX delta

Plasmacup® SC ceramic liners

	symmetric		
	ø 28 mm	ø 32 mm	ø 36 mm
40 mm 42 mm	–	–	–
44 mm 46 mm	NH091D	–	–
48 mm 50 mm	–	NH102D	–
52 mm 54 mm	–	NH103D	–
56 mm 58 mm	–	NH104D	NH109D
60 mm 62 mm	–	NH105D	NH110D
64 mm 66 mm 68 mm	–	NH106D	NH111D

BIOLOX delta

Heads

12/14

12/14

	28 mm	32 mm	28 mm	32 mm	36 mm
short	–	NK560	NK460D	NK560D	NK650D
medium	NK461	NK561	NK461D	NK561D	NK651D
long	NK462	NK562	NK462D	NK562D	NK652D
x-long	–	–	–	NK563D	NK653D

BIOLOX forte — BIOLOX delta

12/14

	22.2 mm	28 mm	32 mm
short	–	NK429K	NK529K
medium	NK330K	NK430K	NK530K
long	NK331K	NK431K	NK531K
x-long	–	NK432K	NK532K
xx-long	–	–	NK533K

ISODUR®F

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Brochure No. 044902 1211/2/1