

Take a walk with us...



 **implantcast**

Revision Systems
Hip & Knee

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Nota Bene: The indications stated in this brochure refer only to revision procedures. Please refer to the respective surgical techniques and instructions for use to determine whether the use in primary cases is also indicated. Ultimately, however, every surgeon has to decide which implant to use for which indication and which patient. The operating surgeon has to decide which implant is considered to be most sensible and effective.

Endoprothesenregister Deutschland (EPRD)

Jahresbericht 2019

Mit Sicherheit
mehr Qualität

joint	primary surgery	following surgery	total
hip	150.284	17.081	167.365
knee	119.131	13.378	132.509
total	269.415	30.459	299.874

Data from the German Endoprostheses Registry (EPRD) on primary and following surgeries on hip and knee joint in 2018³

Introduction

The primary implantation of an endoprosthesis on the hip joint was the sixth most common surgery in German hospitals in 2018 with 239.204 procedures. Compared to 2008, the number increased by 29.717 surgeries. The implantation of a knee endoprosthesis was in 14th place with 190.427 procedures. In comparison to 2008, there was an increase of 35.705 surgeries.^{1,2}

With the increasing number of primary interventions, the revision of endoprostheses is also coming into focus. Since 2010, according to the Federal Health Monitoring, between 35.000 and 37.000 revisions, changes and removals of a hip endoprosthesis have taken place in Germany every year. In the same period, between 24.000 and 26.000 knee endoprostheses per year were revised, changed or removed.² The German Endoprostheses Registry (EPRD) provides more detailed information on the revision procedures.³ In 2018, a total of 17.081 following surgeries on the hip joint and 13.378 following surgeries on the knee joint were registered. The median age of the patients was 75 and 70 years, respectively.

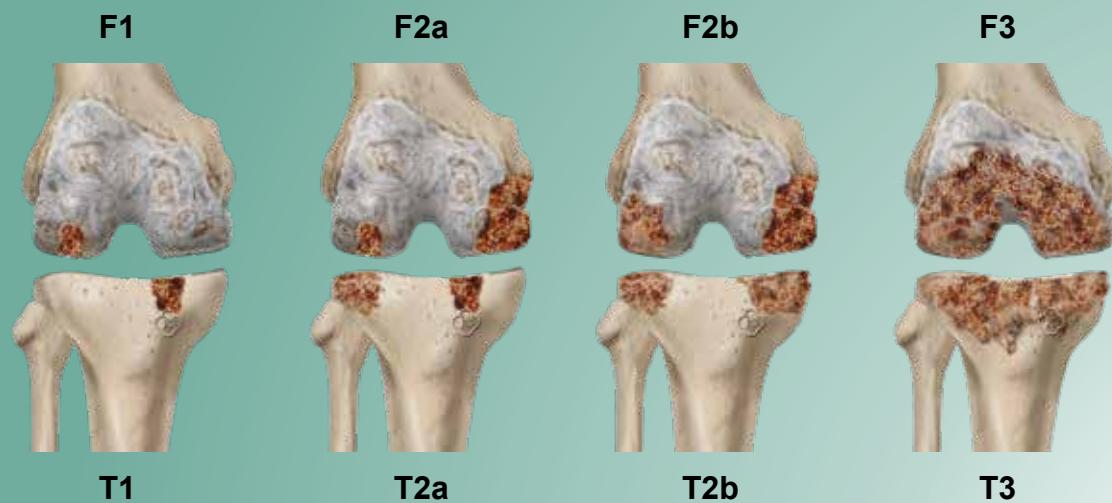
The most common cause of a following surgery on the hip joint was the loosening of one or more implant components with a share of 29,8%. The cup was primarily affected. Other reasons for revision were infections (15,2%), luxations (11,7%) and periprosthetic fractures (10,9%).

Most of the following procedures (25,6%) changed the head, cup and cup insert. All components (stem, head, cup and insert) were changed in 23,4% of the revision procedures. In the majority of the surgeries (74,1%) the bone-anchored components stem and/or cup were replaced.

Most of the following surgeries on the knee joint were also due to loosening of one or more components (25,0%) or an infection (14,7%). Bone-anchored components were replaced in 60,7% of the cases, the insert was changed exclusively in 21,6% of the surgeries.

implantcast offers you a broad product portfolio to supply your revision cases. An allergy or infection prophylaxis is also possible thanks to innovative implant coatings. As developer of the MUTARS® system, implantcast has many years of experience in revision and tumor arthroplasty and can also offer the right implant for your revision.

Bone Defects according to Andersen Orthopedic Research Institute (AORI)⁴



Defects of the Ligaments



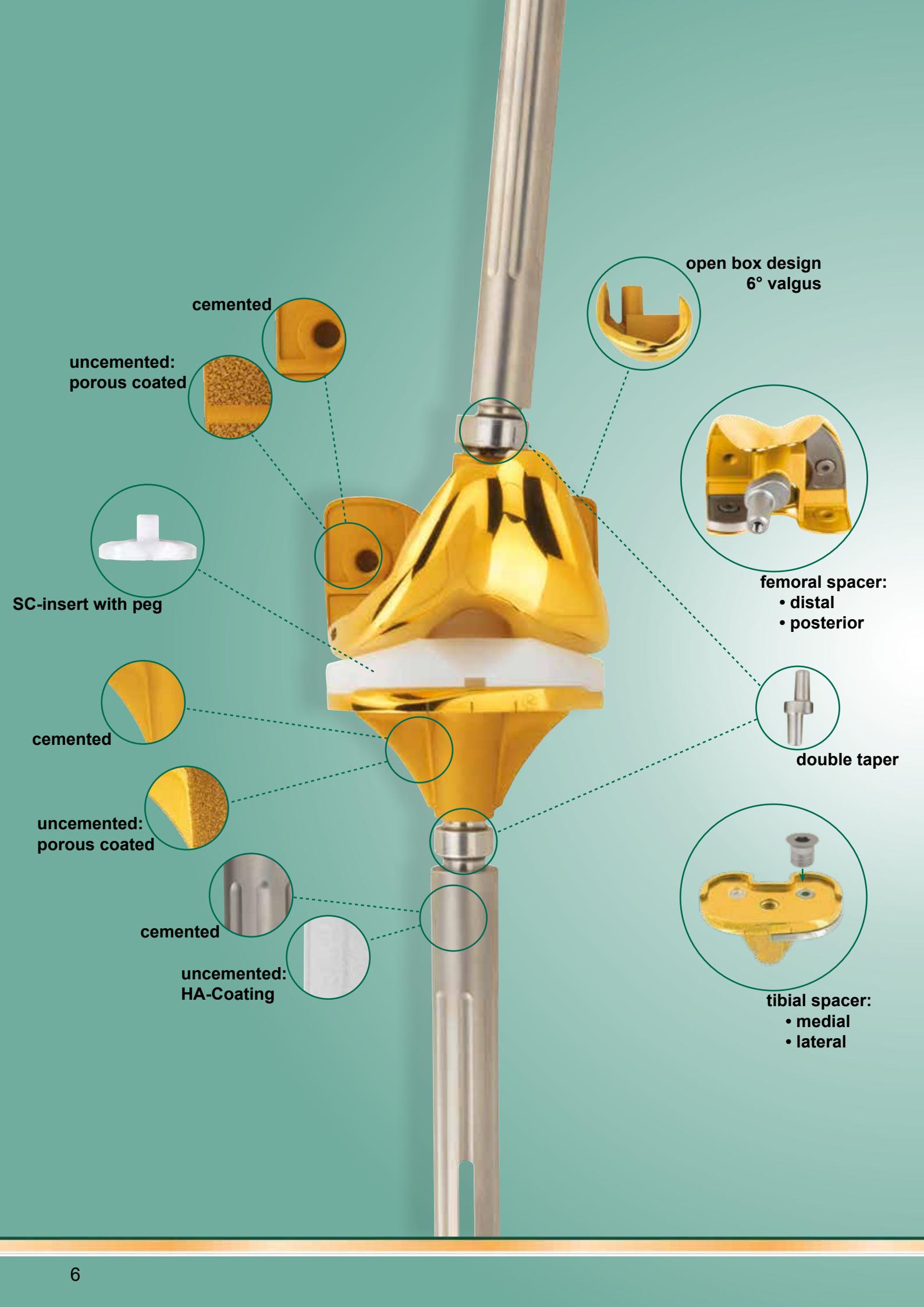
Knee Revision

ACS® SC Fixed Bearing

ACS® SC Mobile Bearing

MUTARS® GenuX® MK

MUTARS® KRI MK



ACS® SC Fixed Bearing

Indications

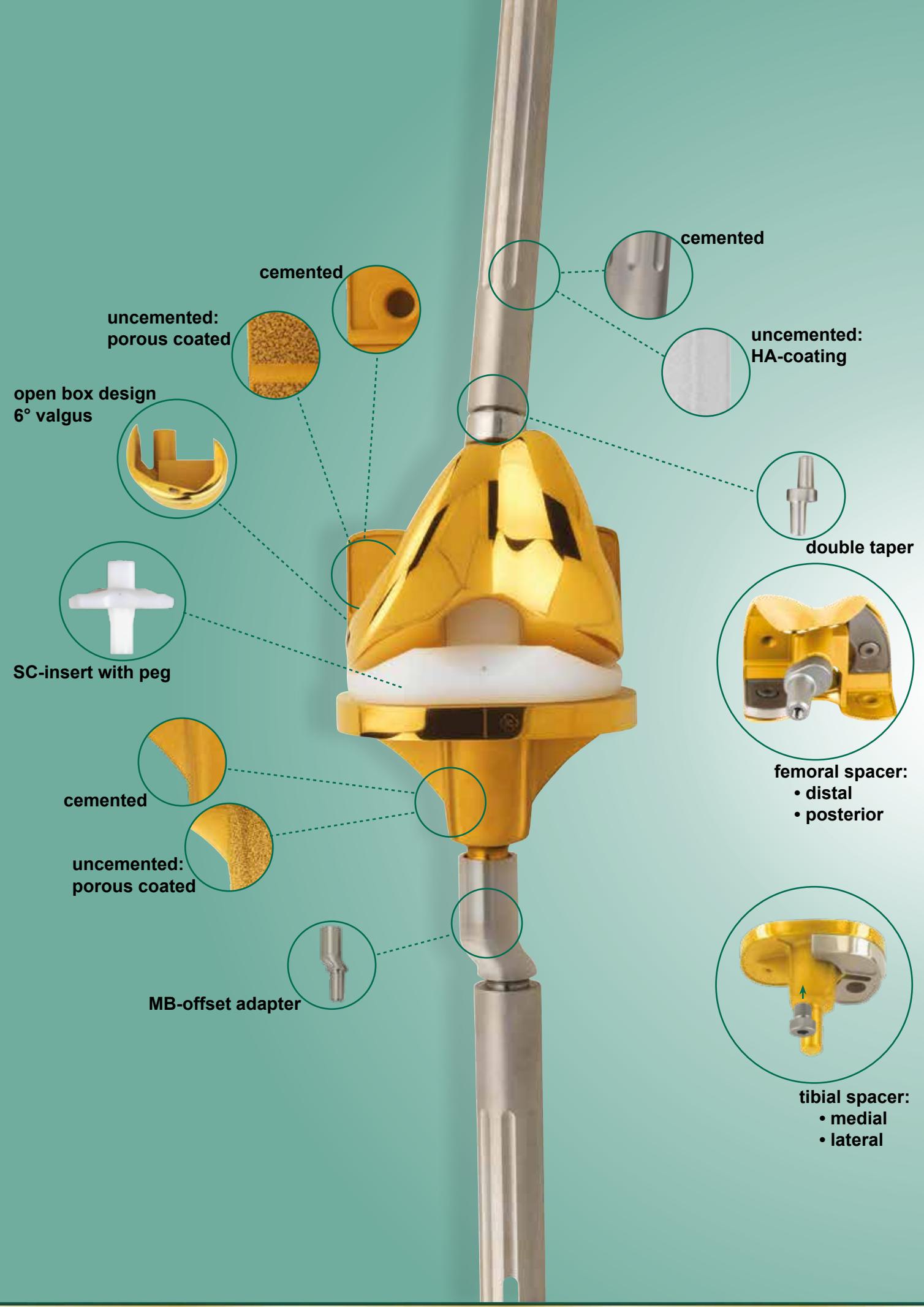
- loss/defect of both cruciate ligaments
- instabilities of the collateral ligaments
- femoral and/or tibial bone defects

Product details

The ACS® FB SC system is a semi-constrained knee system that allows the use of offsets, stems and spacer. For the treatment of large bone defects, the system can be combined with EPORE® Cones and metaphyseal components. During articulation the peg of the PE-insert is guided in the femoral box between the femoral and tibial components as well as stabilized by the femoral spindle.

- cemented and uncemented version
- 6 femoral sizes
- 5 sizes PE-inserts in heights of 10 to 20mm
- 6 tibial sizes
- 4 offset adapter: 0, 2, 4, 6mm
- 16 stems: uncoated or with HA-coating; length: 100, 150, 200mm; ø 12-22 mm
- spacer: femoral (distal and posterior, 5 and 10mm); tibial (5 and 10mm)





ACS® SC Mobile Bearing

Indications

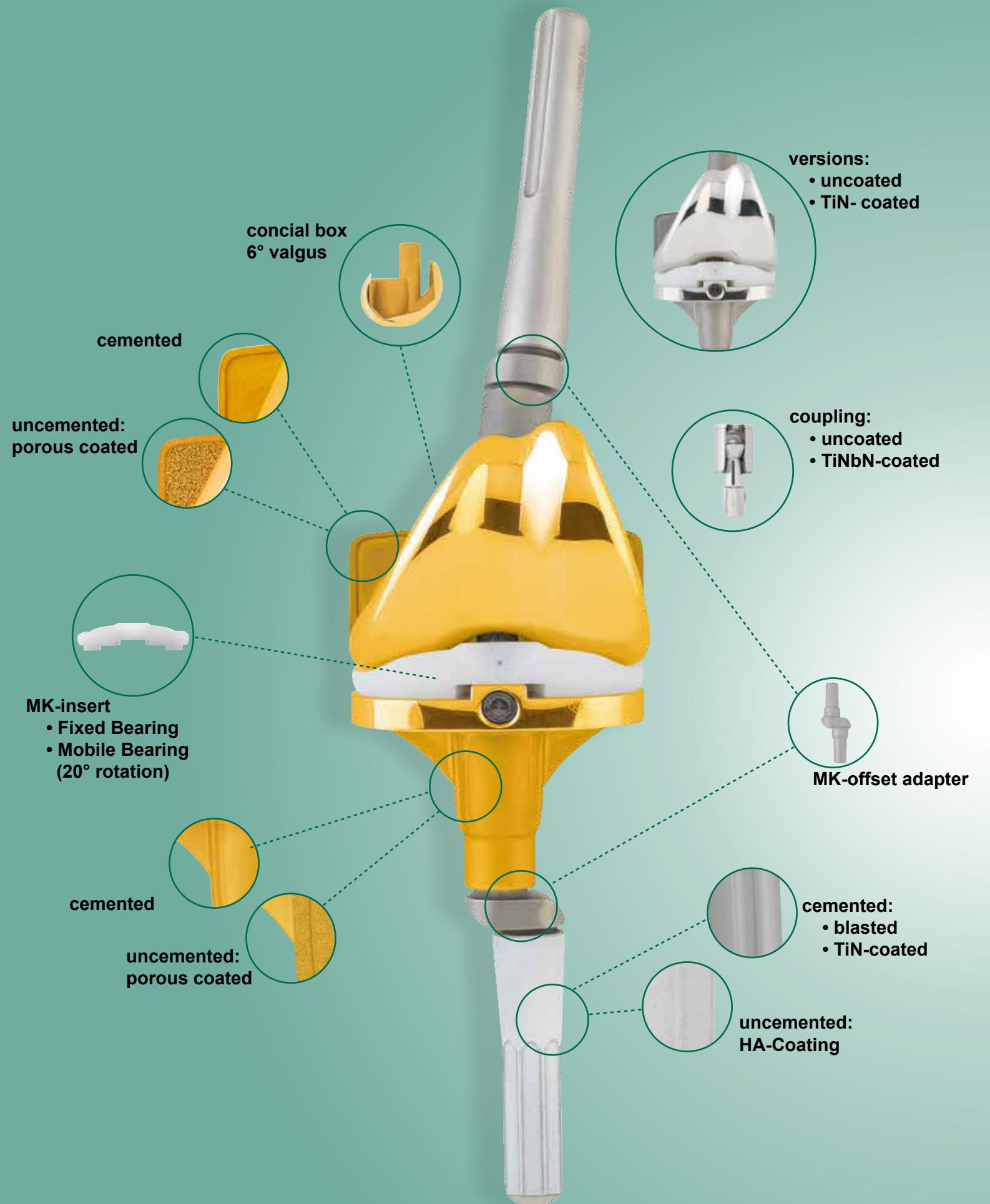
- loss/defect of both cruciate ligaments
- instabilities of the collateral ligaments
- femoral and/or tibial bone defects

Product details

The ACS® MB SC system is a semi-constrained knee system that allows the use of offsets, stems and spacer. For the treatment of large bone defects, the system can be combined with EPORE® Cones and metaphyseal components. During articulation the peg of the PE-insert is guided in the femoral box between the femoral and tibial components as well as stabilized by the femoral spindle. The mobile bearing design allows for a free rotation of the PE-insert.

- cemented and uncemented version
- 6 femoral sizes
- 5 sizes PE-inserts in heights of 10 to 20mm
- 5 tibial sizes
- 4 offset adapter: femoral: 0, 2, 4, 6mm
tibial: 2, 4mm
- 16 stems: uncoated or with HA-coating;
length: 100, 150, 200mm; Ø 12-22 mm
- spacer: femoral (distal and posterior, 5 and 10mm);
tibial (5 and 10mm)





MUTARS® GenuX® MK

Indications

- large bone defects
- loss/defect of both cruciate ligaments and the collateral ligaments

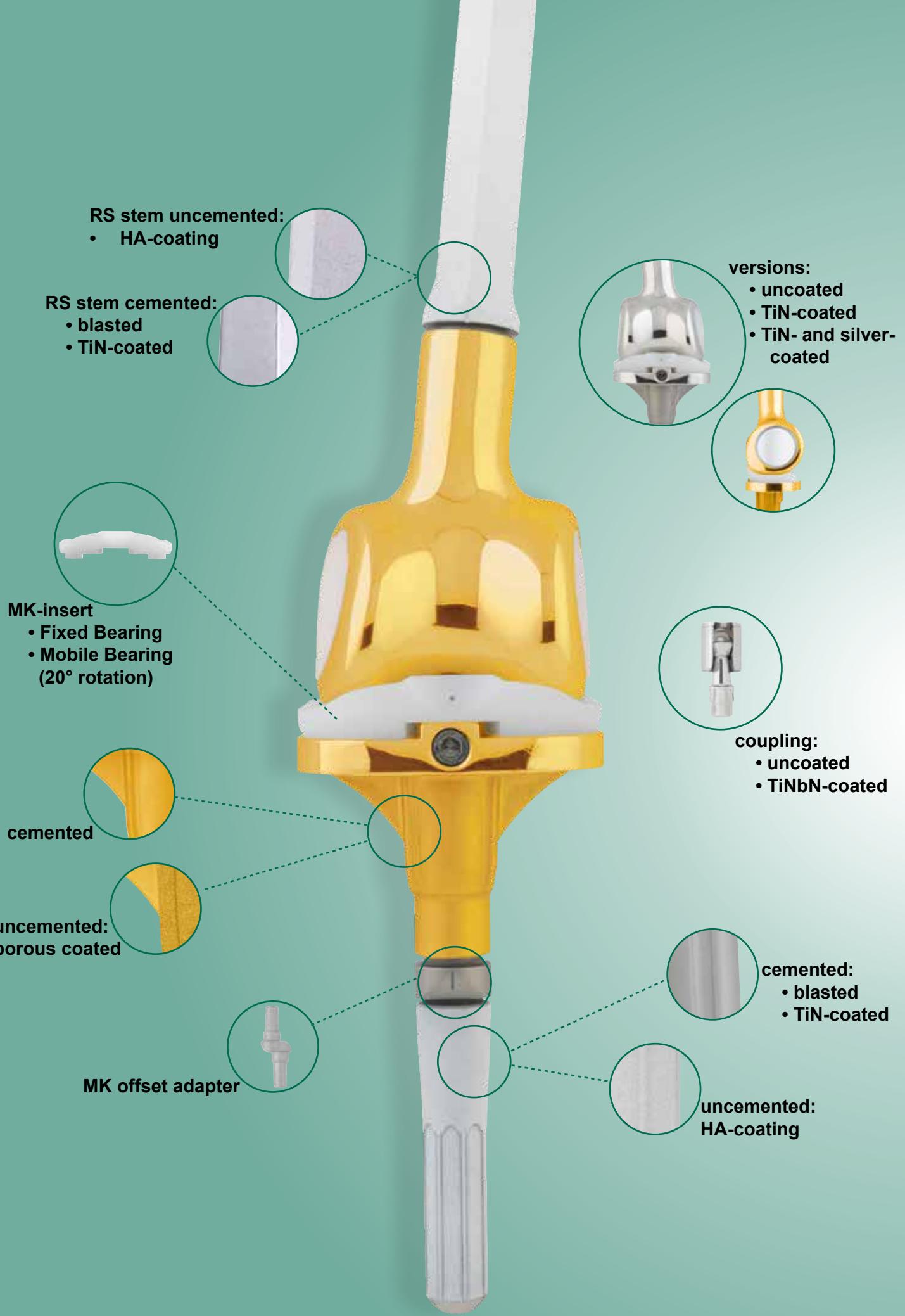
Product details

The MUTARS® GenuX® MK revision knee system is a constrained system that allows the use of offsets, stems and spacer. For the treatment of large bone defects, the system can be combined with EPORE® Cones and metaphyseal components. The coupling between femur and tibia stabilizes the knee joint in all axes.

- cemented and uncemented version
- Mobile Bearing and Fixed Bearing option
- 5 femoral sizes*
- 5 sizes PE-inserts in heights of 12,5 to 17,5mm*
- 5 tibial sizes*
- 4 offset adapter: 0, 2, 4, 6 mm
- MK stems: uncoated, TiN-coating or with HA-coating length: 125, 150, 200, 250 mm; ø 11-28 mm
- spacer: femoral (distal and posterior: 5-10mm); tibial (5-45mm)



*Please request availability



MUTARS® KRI MK

Indications

- loss of the distal femoral condyles
- no stabilizing ligament structures

Product details

The MUTARS® KRI MK revision system is a constrained knee system that completely replaces the femoral condyles. Apart from the femoral component, the individual components of the system are identical to the GenuX® MK revision knee, making it easy to switch between the two joint replacements during surgery. This system can also be combined and expanded with EPORE® Cones and metaphyseal components for the treatment of large bone defects.

- cemented and uncemented version
- Mobile Bearing and Fixed Bearing option
- 1 femoral size
- 5 sizes PE-inserts in heights of 12,5 to 17,5mm*
- 5 tibial sizes*
- 4 offset adapter: 0, 2, 4, 6 mm
- RS stems: uncoated, TiN-coating or with HA-coating length: 120, 150, 200, 250 mm; ø 12-22 mm
- spacer: tibial 5-45mm



*Please request availability



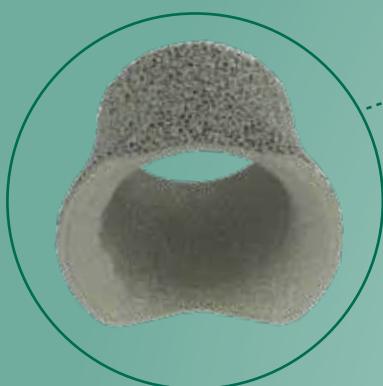
EPORE® Defect Filler

EPORE® Cones KRI & RS Arthrodesis

EPORE® Cones Metaphyseal

EPORE® Metaphyseal Components

EPORE® Cones Cortical



femoral and tibial



EPORE® Cones KRI & RS Arthrodesis

Indication

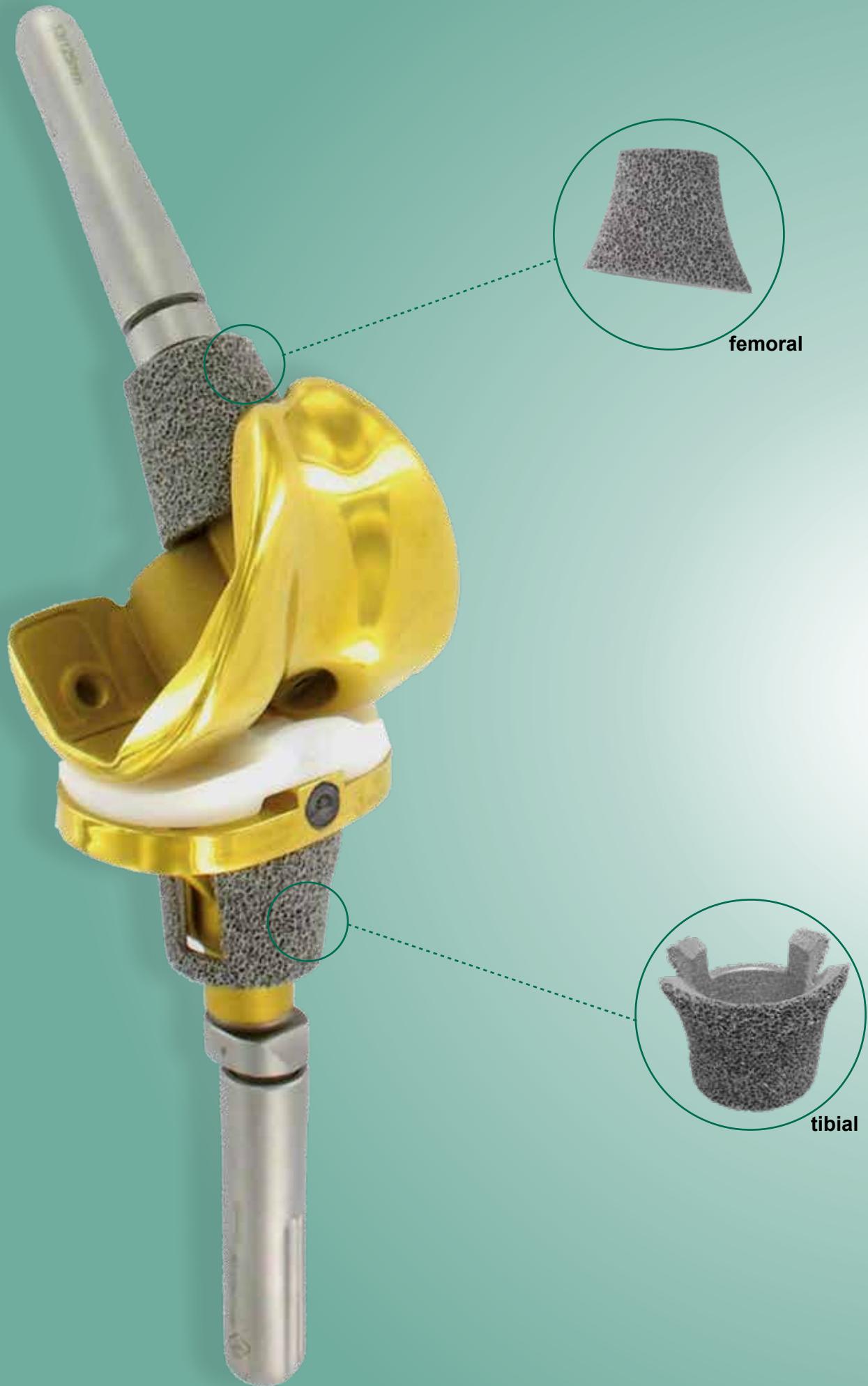
- large bone and cavity defects within the proximal tibia and distal femur

Product details

The EPORE® Cones KRI & RS Arthrodesis offer the possibility of treating large bone defects with standard implants. Their porous surface structure is supposed to stimulate the bone to grow into the implant, which results in very good secondary stability.

- cemented connection between cone and implant
- EPORE® Cones KRI and RS Arthrodesis for central metaphyseal defects
- system-specific for MUTARS® KRI and RS Arthrodesis
- defect-guided surgery technique
- 3 sizes
- identical cone for femoral and tibial treatments





EPORE® Cones Metaphyseal

Indication

- large bone and cavity defects within the proximal tibia and distal femur

Product details

The EPORE® Cones metaphyseal offer the possibility of treating large bone defects with standard implants. Their porous surface structure is supposed to stimulate the bone to grow into the implant, which results in very good secondary stability.

- cemented connection between cone and implant
- EPORE® Cones metaphyseal for central, metaphyseal bone defects without cortical damage
- reconstruction of load bearing surface
- intramedullary guided surgery technique
- system-unspecific
- 4 femoral sizes
- 4 tibial sizes





EPORE® Metaphyseal Components

Indication

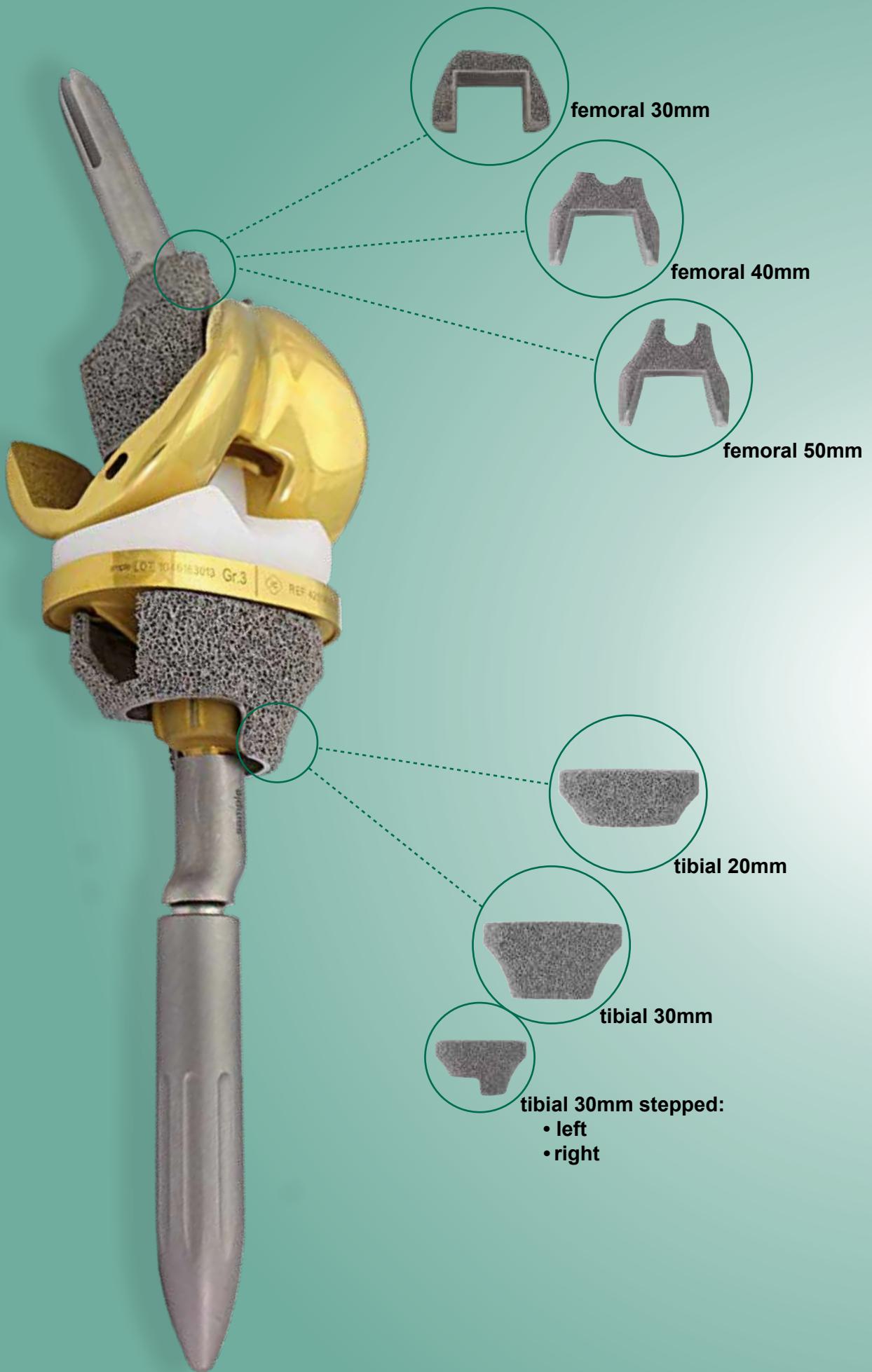
- large, central bone and cavity defects within the proximal tibia and distal femur

Product details

The EPORE® metaphyseal components offer the possibility of treating large central bone defects with the standard implants ACS® SC and GenuX® MK. Their porous surface structure is supposed to stimulate the bone to grow into the implant, which results in very good secondary stability.

- uncemented connection between metaphyseal component and implant
- EPORE® metaphyseal components for central metaphyseal bone defects without cortical damage
- intra- and extramedullary guided surgery technique
- system-specific for
 - GenuX® MK
 - ACS® SC MB
 - ACS® SC FB
- 4 femoral sizes each
- 4 tibial sizes each
- 14 sizes of metaphyseal components tibial with spacer +5mm/+10mm





EPORE® Cones Cortical

Indication

- Large bone and cavity defects within the proximal tibia and distal femur

Product details

The EPORE® Cones cortical offer the possibility of treating large bone defects with standard implants. Their porous surface structure is supposed to stimulate the bone to grow into the implant, which results in very good secondary stability.

- cemented connection between cone and implant
- EPORE® Cones cortical for central and decentralized bone defects of the metaphysis with cortical damage
- reconstruction of the joint line
- defect-guided surgery technique
- system-unspecific
- 4 femoral sizes per height
- 4 tibial sizes per height



Paprosky Classification Femur



Hip Stem Revision

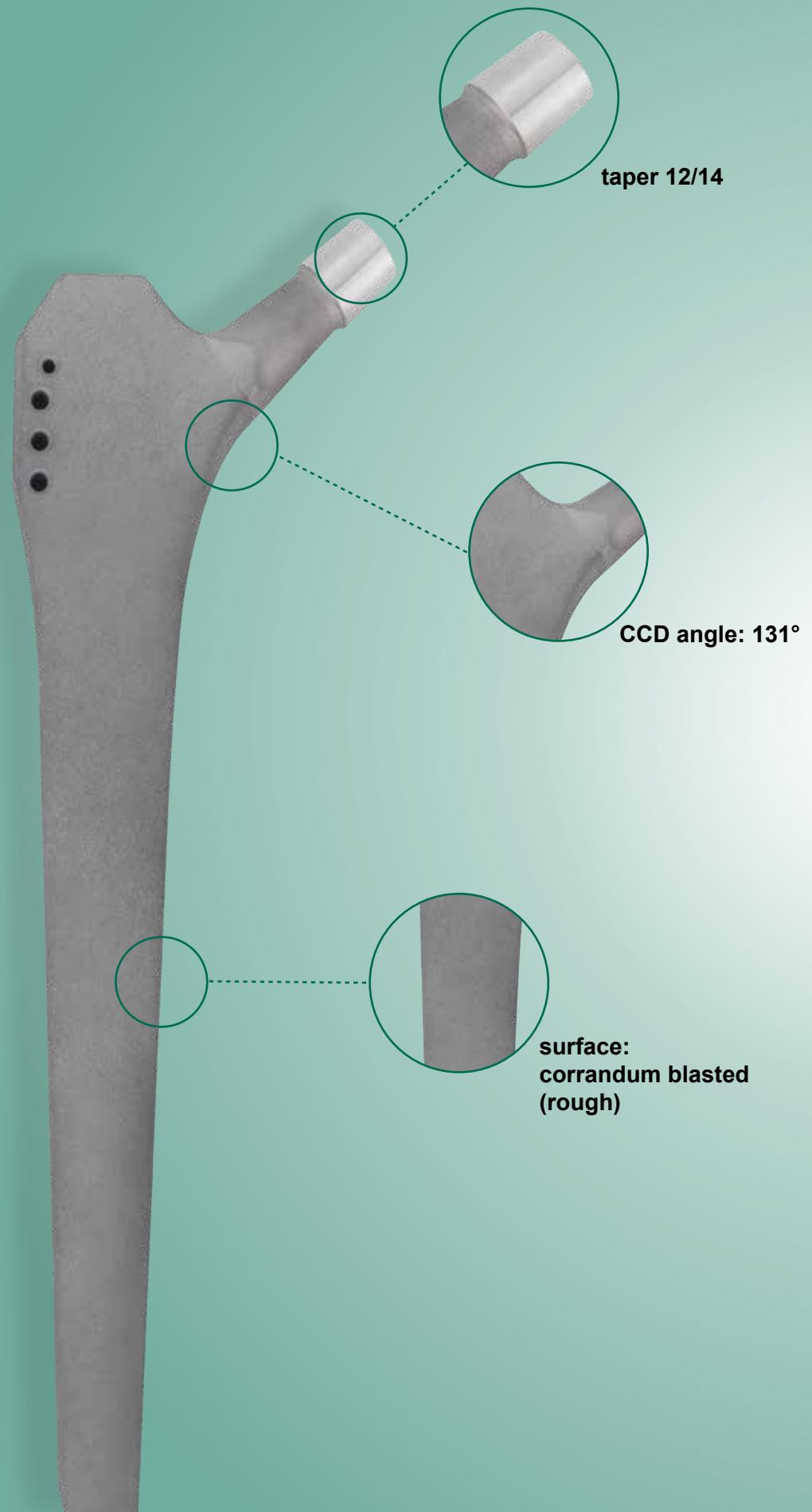
DiaLoc® RS Hip Stem

Bicana® Hip Stem

Cortina Hip Stem

MUTARS® RS Hip System

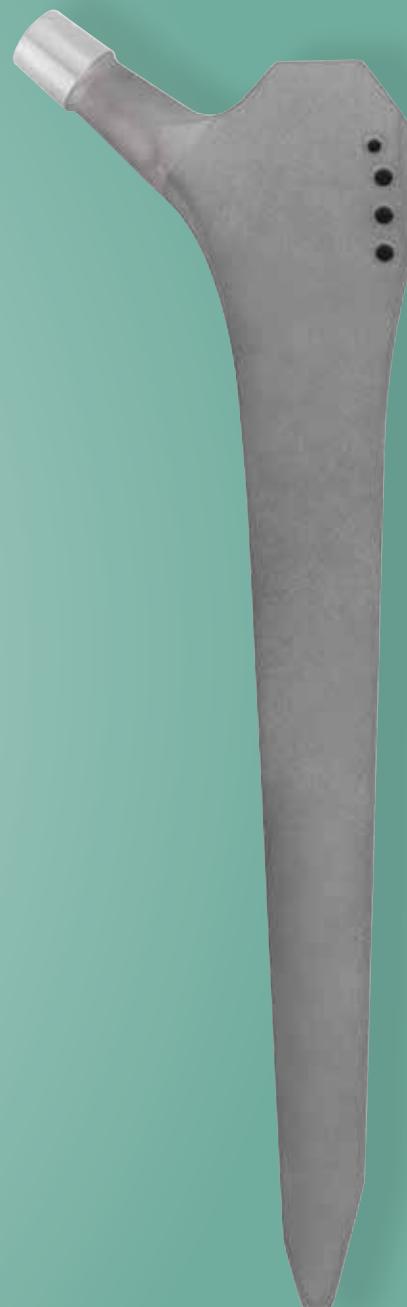
Stem extractors are available.



DiaLoc® RS Hip Stem

Indication

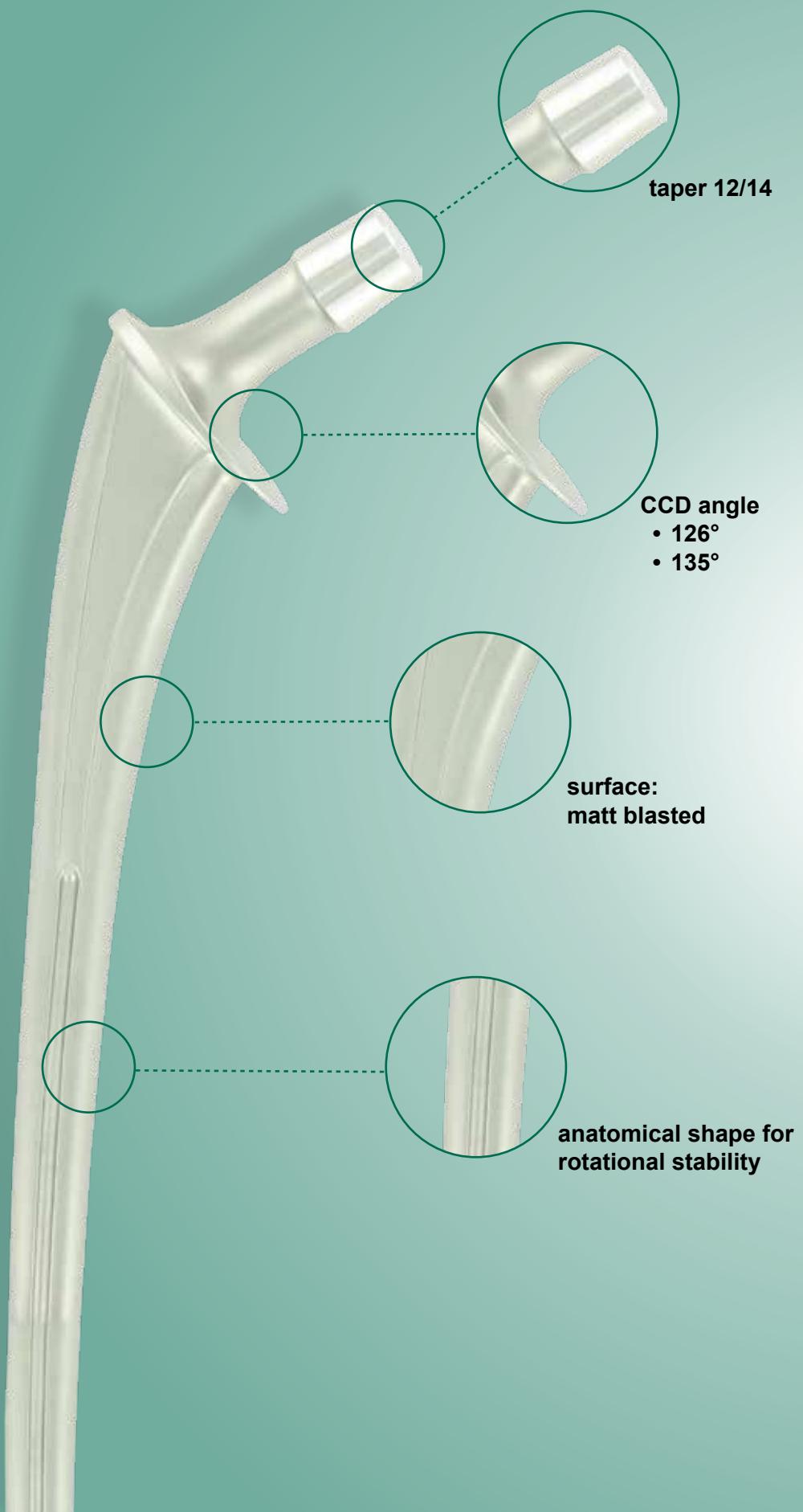
- revision hip arthroplasty



Product details

cementless revision stem in Zweymüller design based on the DiaLoc® stem

- material: implanan®; TiAl₆Nb₇ acc. to ISO 5832-11
- coating: none; rough surface
- CCD angle: 131°
- length: 181-221mm
- size spectrum: 8 sizes
- tapered, rectangular design provides high rotational and primary stability



Bicana® Hip Stem

Indication

- revision hip arthroplasty

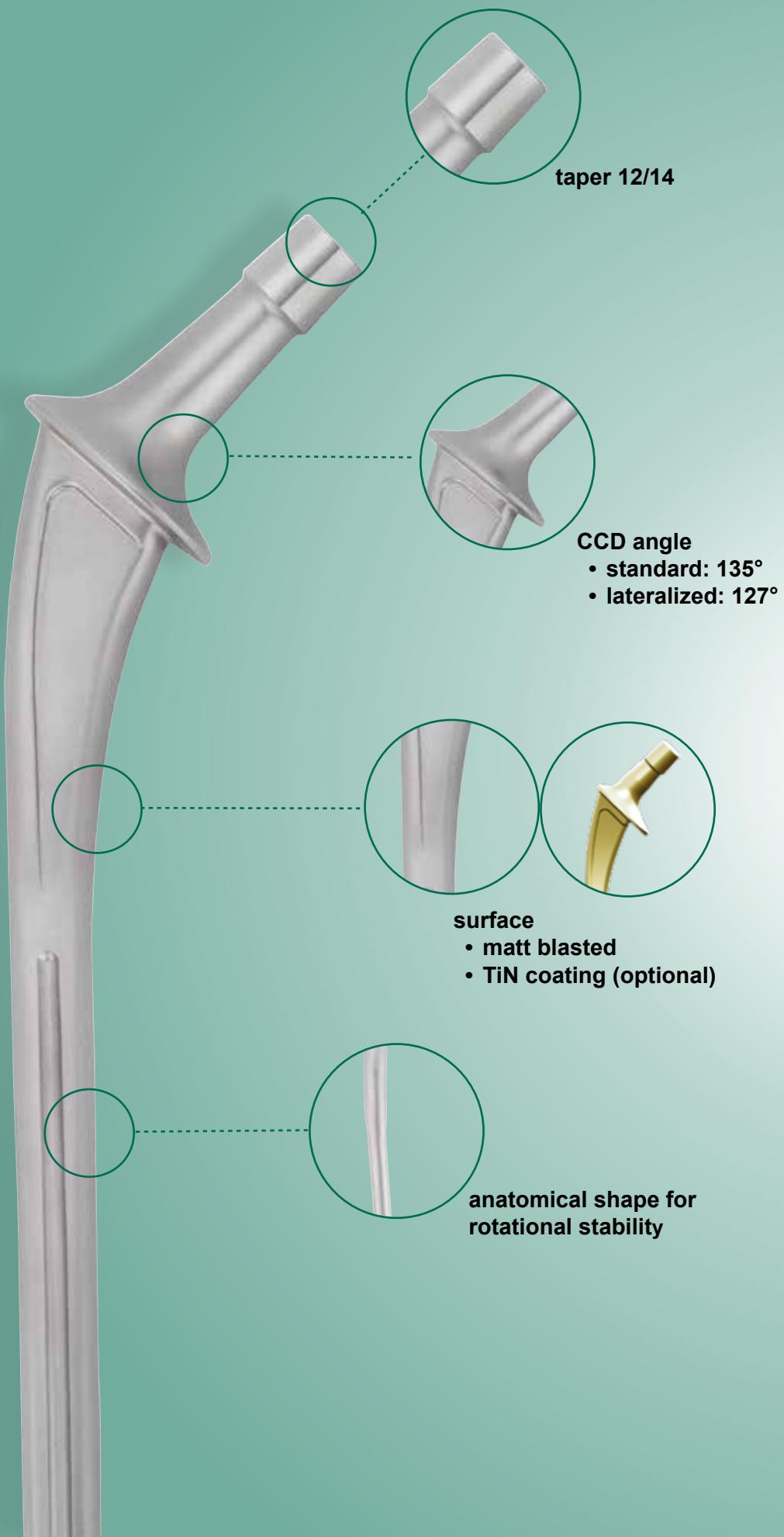


Product details

cemented, anatomical hip stem with collar

- material: implavit®; CoCrMo acc. to ISO 5832-4
- coating: none; surface matt blasted
- CCD angle: 126° and 135°
- length: 200-300mm
- size spectrum: 9 sizes 126°; 6 sizes 135°
- double curvation (S-shape) stabilises the implantat against rotational forces

- for primary procedures, the Bicana® hip stem is also available in lengths of 130 and 150mm



Cortina Hip Stem

Indication

- revision hip arthroplasty



Product details

cemented, anatomical hip stem with collar

- material: implavit®; CoCrMo acc. to ISO 5832-4
- coating: TiN (optional)
- CCD angle: 135° standard; 127° lateralized
- length: 200-300mm
- size spectrum: 9 sizes standard; 9 sizes lateralized
- anatomical, S-shaped stem shape provides additional rotational stability

- for primary procedures, the Cortina hip stem is also available in lengths of 130-170mm



proximal component

- CCD angle: 135° / 127°
- length: 32mm / 42mm
- material: implatan®; TiAl₆V₄
- coating: silver (optional)



metaphyseal component

- length: 40mm / 50mm
- size: standard / small
- material: implatan®; TiAl₆V₄
- coating: HA (optional)



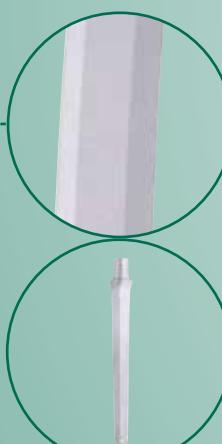
extension piece

- length: 25mm
- material: implatan®; TiAl₆V₄
- coating: HA (optional)



RS stem cementless

- length: 150, 200 and 250mm
- Ø 12-22mm (in 1mm steps); for length 250mm: Ø 14-22mm
- material: implatan®; TiAl₆V₄
- coating: HA (optional)



RS stem cemented

- length: 120, 150 and 200mm
- Ø 12-18mm (in 2mm steps)
- material: implavit®; CoCrMo
- coating: TiN (optional)
- surface: matt blasted



interlocking screw holes for cementless stems

- 200mm: Ø 15-22mm
- 250mm: Ø 17-22mm

MUTARS® RS Hip System

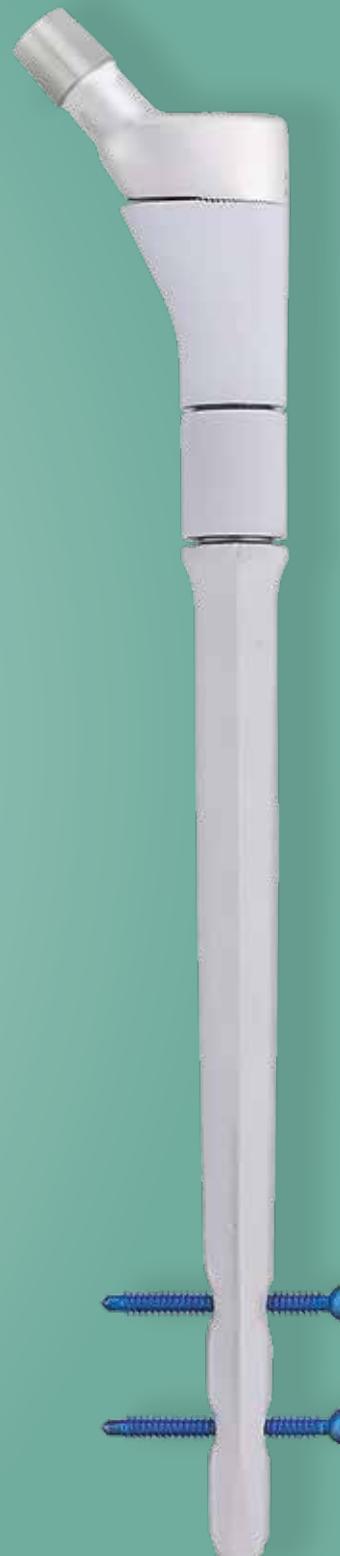
Indications

- revision surgery in cases of femoral implant component loosening with extended calcar resorption of the proximal femur and enlarged medullary canal or with a large lytic area of the proximal femoral cortex
- revision surgery in cases of femoral implant component loosening due to peri/subprosthetic fractures
- revision cases of extensive comminuted fractures of the proximal femoral segment in elderly patients with indicated prostheses, in whom, however, a sufficient fixation of a standard-arthroplasty cannot be performed

Product details

revision system according to the modular principle

- cementless and cemented treatment possible
- curved stems
- for cementless revision: two distal interlocking screw holes
 - 200mm: Ø 15-22mm
 - 250mm: Ø 17-22mm
- system allows implant lengths of 192-417mm



Paprosky Classification Acetabulum



1



2a



2b



2c



3a



3b

Hip Cup Revision

EcoFit® Hip Cup EPORE®

EcoFit® 2M Hip Cup

EPORE® Acetabular spacer

ic Acetabular Ring

ic Reinforcement Cage

MUTARS® PRS

MUTARS® RS Cup

MUTARS® LUMiC®



EcoFit® Hip Cup EPORE®

Indication

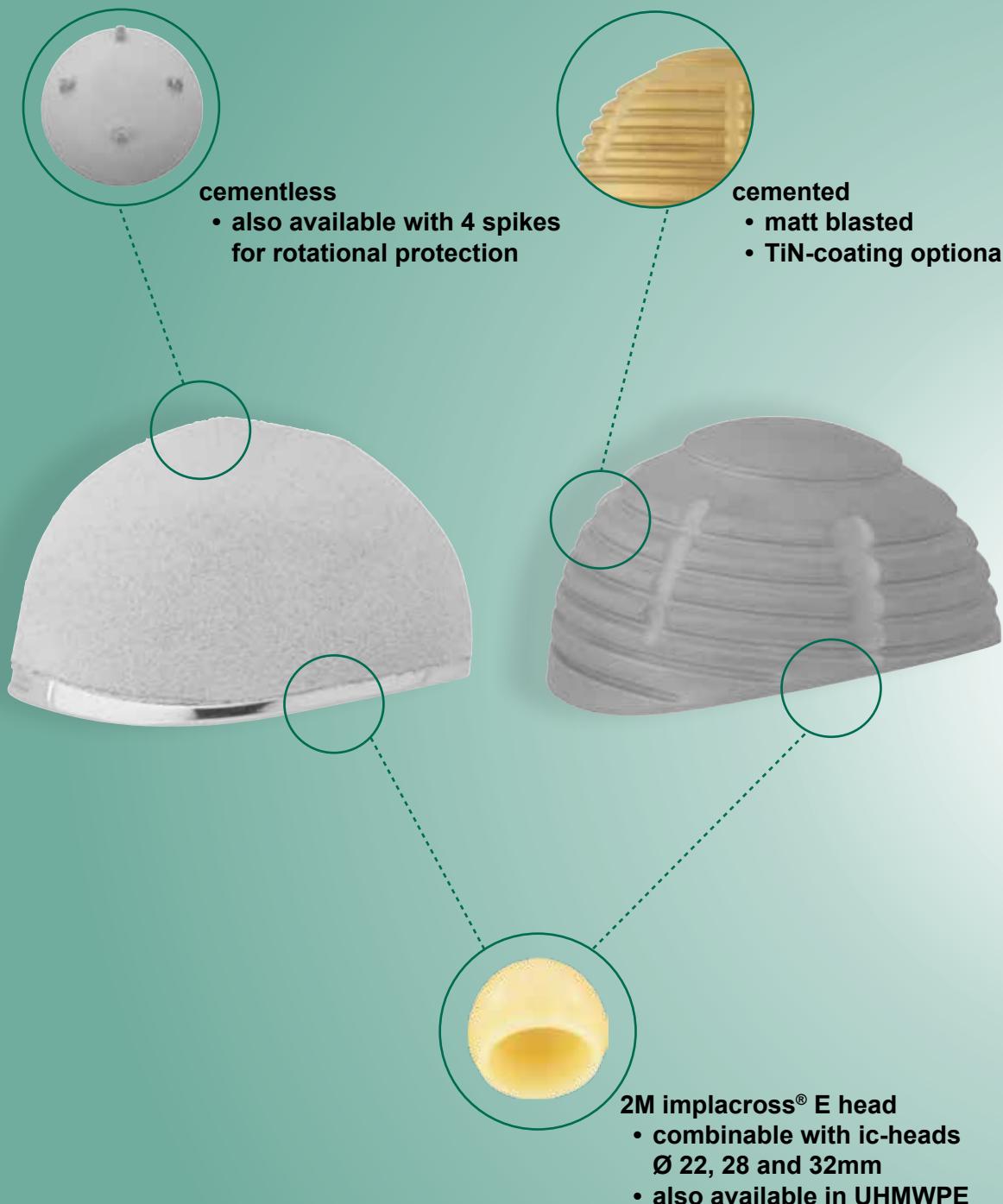
- revision hip arthroplasty



Product details

cementless cup with highly porous structure EPORE®

- material: implanan®; TiAl₆V₄
- coating: TCP (optional)
- size spectrum: Ø 42-72mm (in 2mm steps)
- screw holes: three, seven (Multihole)
with sufficient bone quality: NH version without screw holes
- insert options
 - PE cup insert 0° and 10°
 - implacross® PE cup insert 0° and 10°
 - implacross® E PE cup insert 0° and 10°
 - ceramic cup insert BIOLOX® delta



EcoFit® 2M Hip Cup

Indication

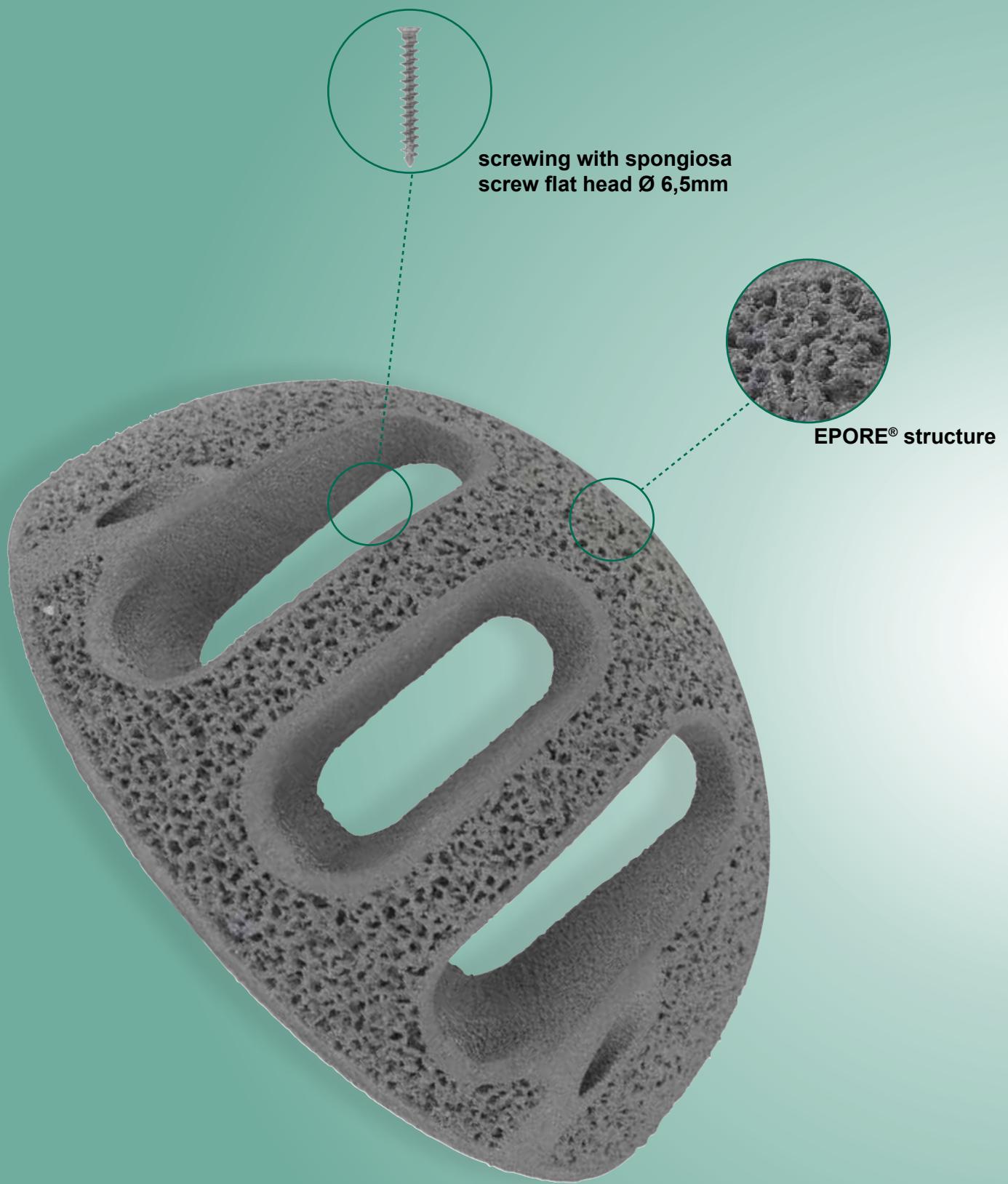
- revision hip arthroplasty with increased risk of dislocation



Product details

tripolar cup system

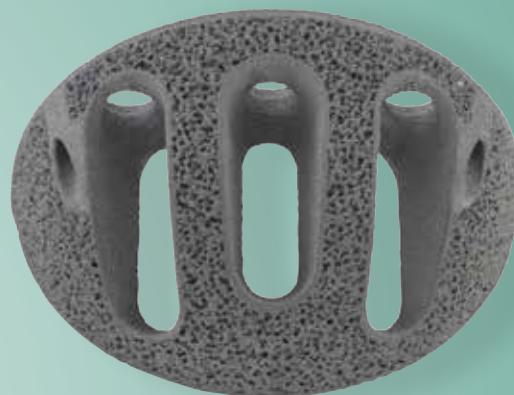
- cementless and cemented version
- material: implavit®; CoCrMo acc. to ISO 5832-4
- coating
 - cementless: cpTi + HA
 - cemented: TiN (optional)
- size spectrum
 - cementless: Ø 42-64mm (in 2mm steps); (version with spikes Ø 44-62mm)
 - cemented: Ø 44-64mm (in 2mm steps)
- 2M-head options
 - 2M implacross® E head (crosslinked UHMWPE with vitamin E)
 - EcoFit® 2M head (UHMWPE)



EPORE® Acetabular spacer

Indication

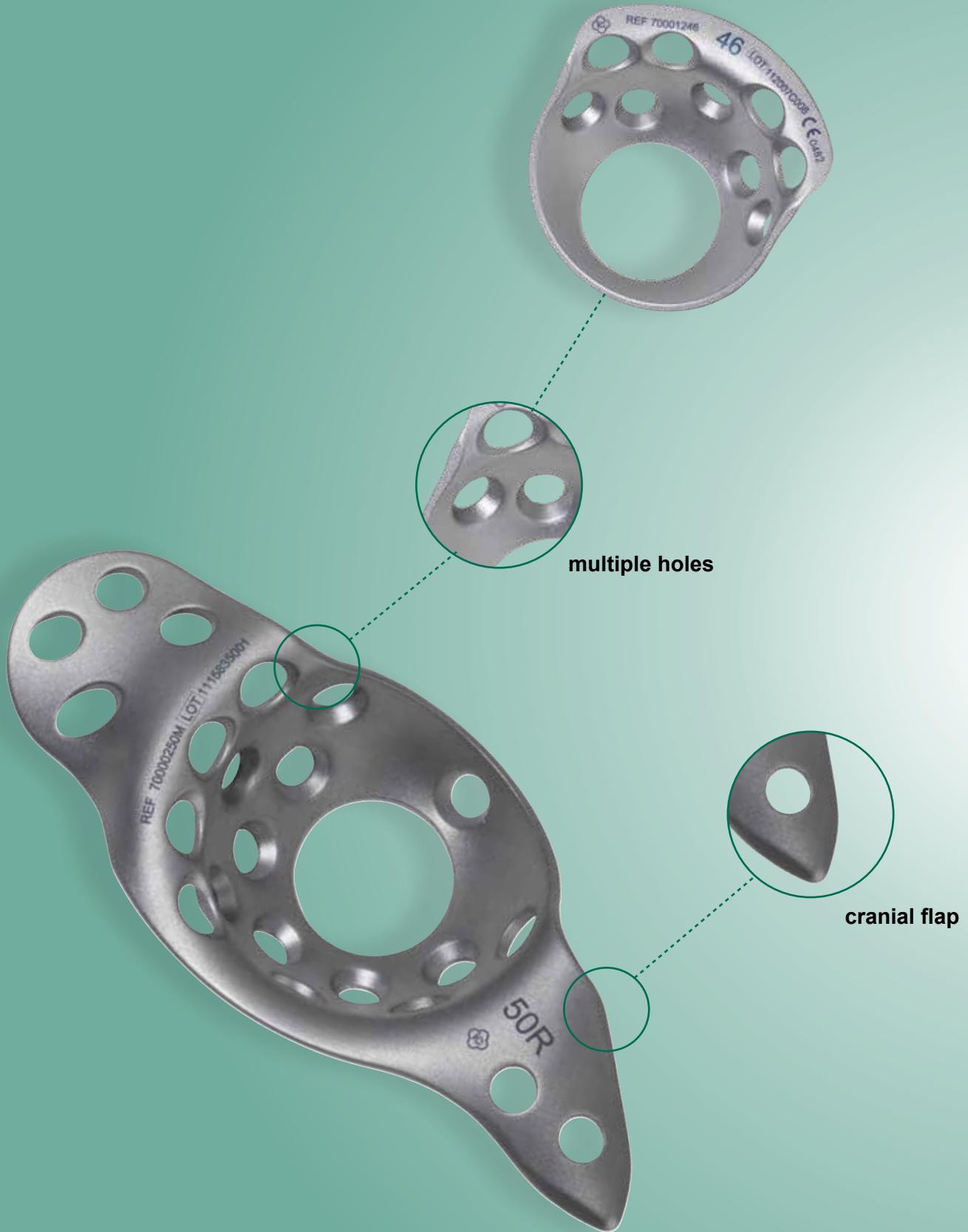
- bone defects in the acetabulum



Product details

cementless spacer with highly porous structure EPORE®

- material: implanan®; TiAl₆V₄
- size spectrum: Ø 54-66mm (in 4mm steps)
- height: 10, 15 and 20mm
- screw holes for fixation
- combination with implantcast hip cup systems



ic Acetabular Ring

ic Reinforcement Cage

Indication

- revision hip arthroplasty



Indication

- revision hip arthroplasty



Product details

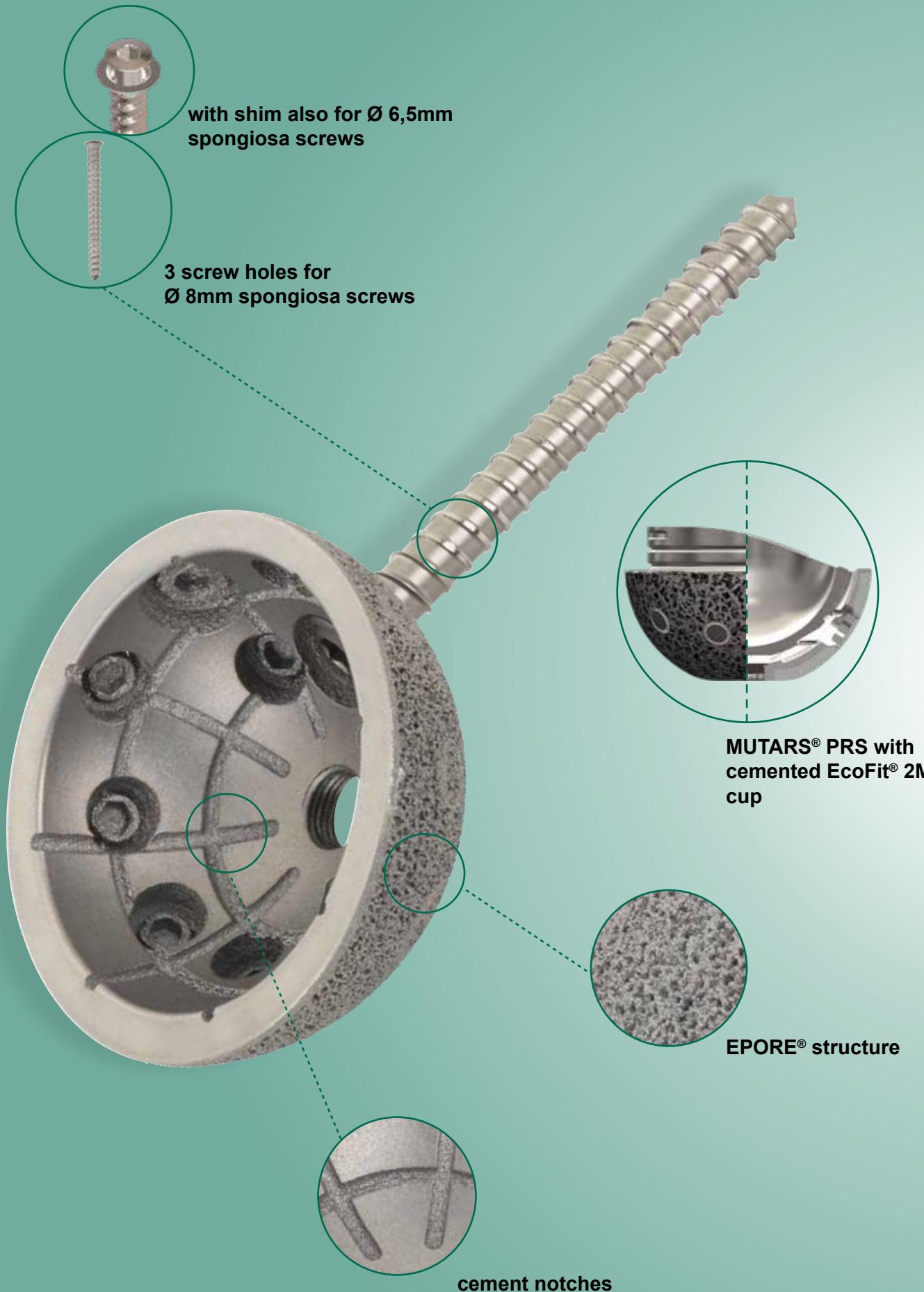
cementless reconstruction implant

- material: pure titanium acc. to ISO 5832-2 Grade 1
- size spectrum: Ø 42-58mm (in 2mm steps)
- anchorage drill holes for fixation
- combination with a cemented cup (Mueller PE cup or EcoFit® 2M cup)

Product details

cementless reconstruction implant

- material: pure titanium acc. to ISO 5832-2 Grade 1
- size spectrum: Ø 44-62mm (in 6mm steps); right and left respectively
- hemispherical cup with distal flange and proximal plate
- anchorage drill holes for fixation
- combination with a cemented cup (Mueller PE cup or EcoFit® 2M cup)



MUTARS® PRS

Indication

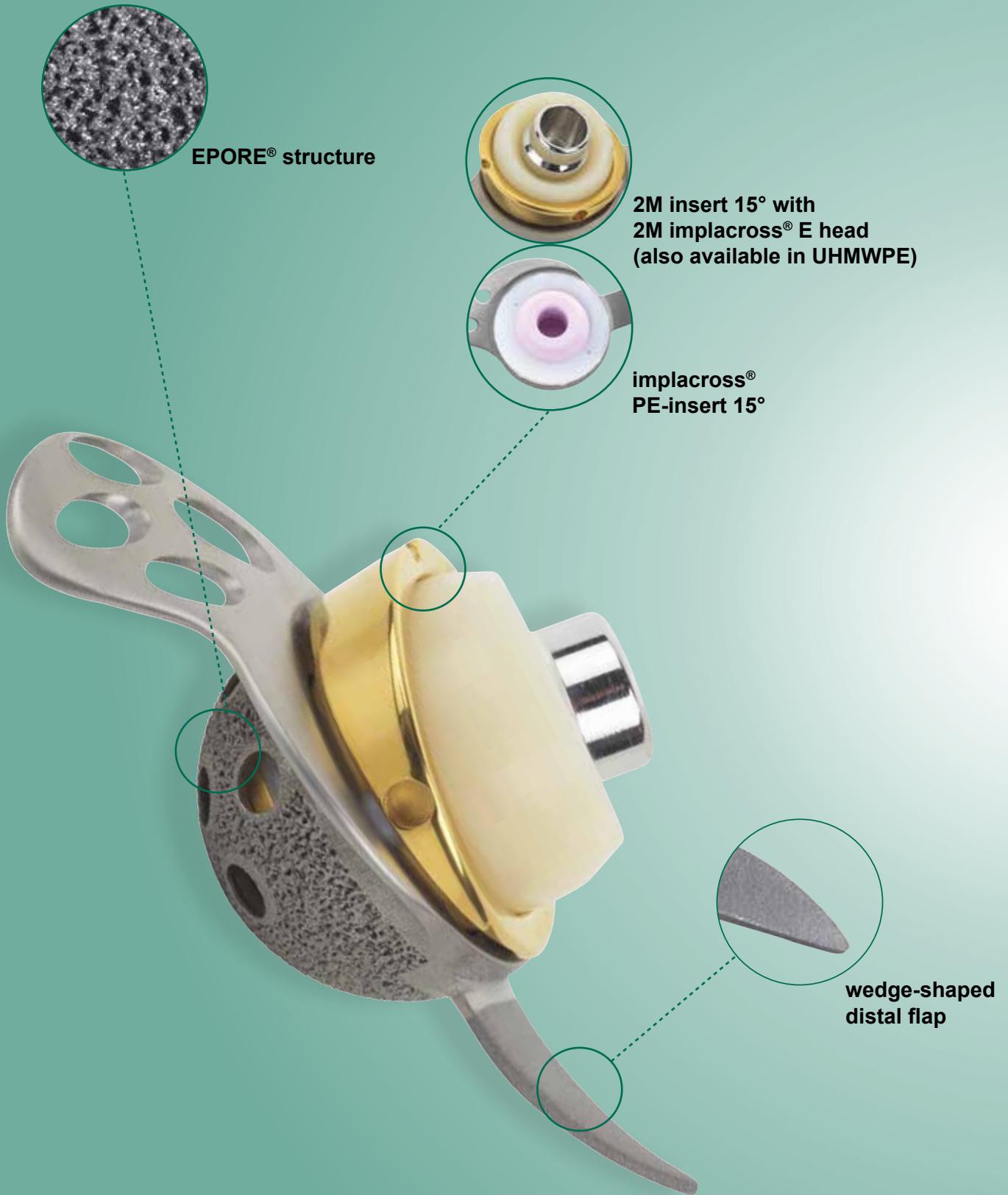
- large cavitary/segmental acetabular defects



Product details

cementless reconstruction shell with highly porous structure EPORE®

- material: implanan®; TiAl₆V₄
- size spectrum: Ø 52-72mm (in 4mm steps)
- screw holes for fixation (10x Ø 6,5mm; 3x Ø 8mm)
- combination with EcoFit® 2M cup cemented or PE-cup Mueller II



MUTARS® RS Cup

Indication

- large cavitary/segmental acetabular defects



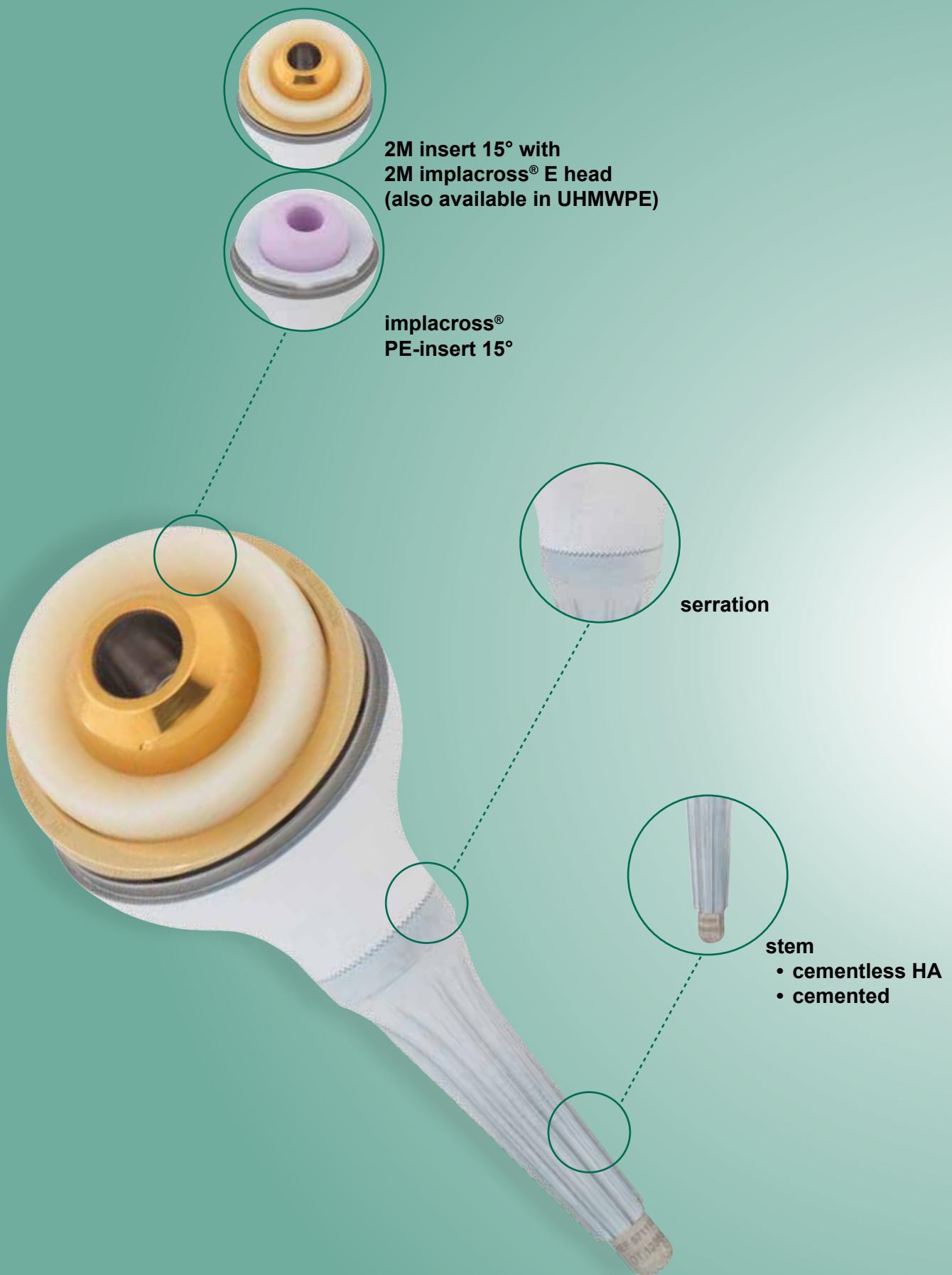
Product details

cementless revision cup with highly porous structure EPORÉ®

- material: implanan®; TiAl₆V₄
- size spectrum: Ø 46-62mm (in 4mm steps); right and left respectively
- anatomically shaped caudal and cranial flaps
- screw holes for fixation
- insert options

implacross® PE-insert 15° neutral 0mm and Offset 4mm

2M insert 15° and 2M implacross® E head (also available in UHMWPE)
for tripolar treatment



MUTARS® LUMiC®

Indication

- partial pelvic replacement in complex or repeated revisions or very large bone defects of the hip

type II pelvectomy according to Enneking



Product details

modular pedestal cup

- material: implatan®; TiAl₆V₄ acc. to ISO 5832-3
- coating: HA (optional), silver (sz. Ø 60mm, optional)
- size spectrum: Ø 50, 54 and 60mm
- stem options
 - cementless HA: Ø 8mm and 10mm; length 65, 75 and 85mm (implatan®; TiAl₆V₄)
 - cemented: Ø 8mm; length 65, 75 and 85mm (implavit®; CoCrMo)
- insert options
 - implacross® PE-insert 15° neutral 0mm and Offset 4mm
 - 2M insert 15° and 2M implacross® E head (also available in UHMWPE) for tripolar treatment



Revision Products

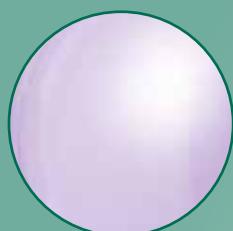
ic-head Revision BIOLOX® delta

Trochanter Plate

ic-Cerclage

implabond 1G and 3G

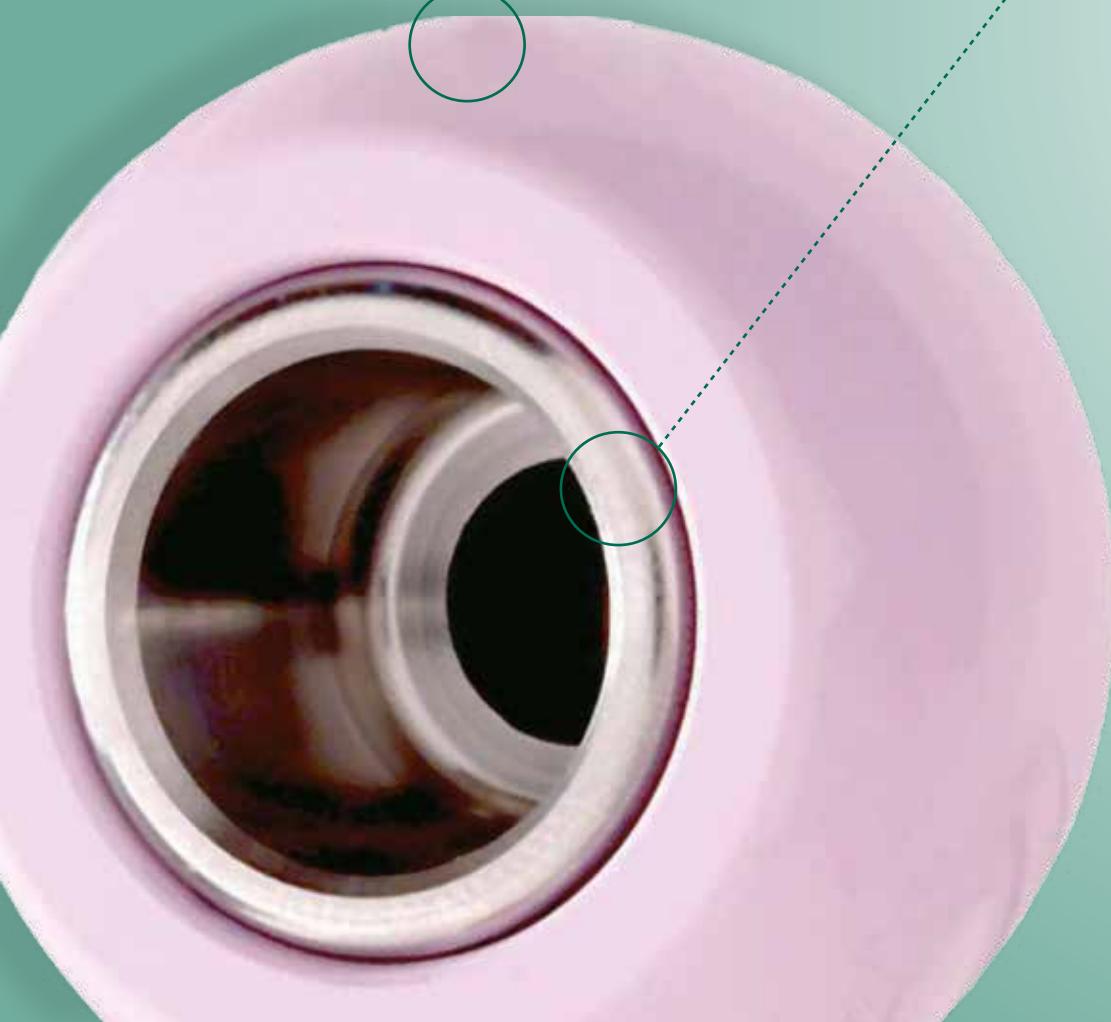
CERASORB® Bone Replacement Material



**BIOLOX® delta
revision head**
• Ø 28, 32, 36, 40 and 44mm



taper adapter
• neck length S-XL



ic-head Revision BIOLOX® delta

Indication

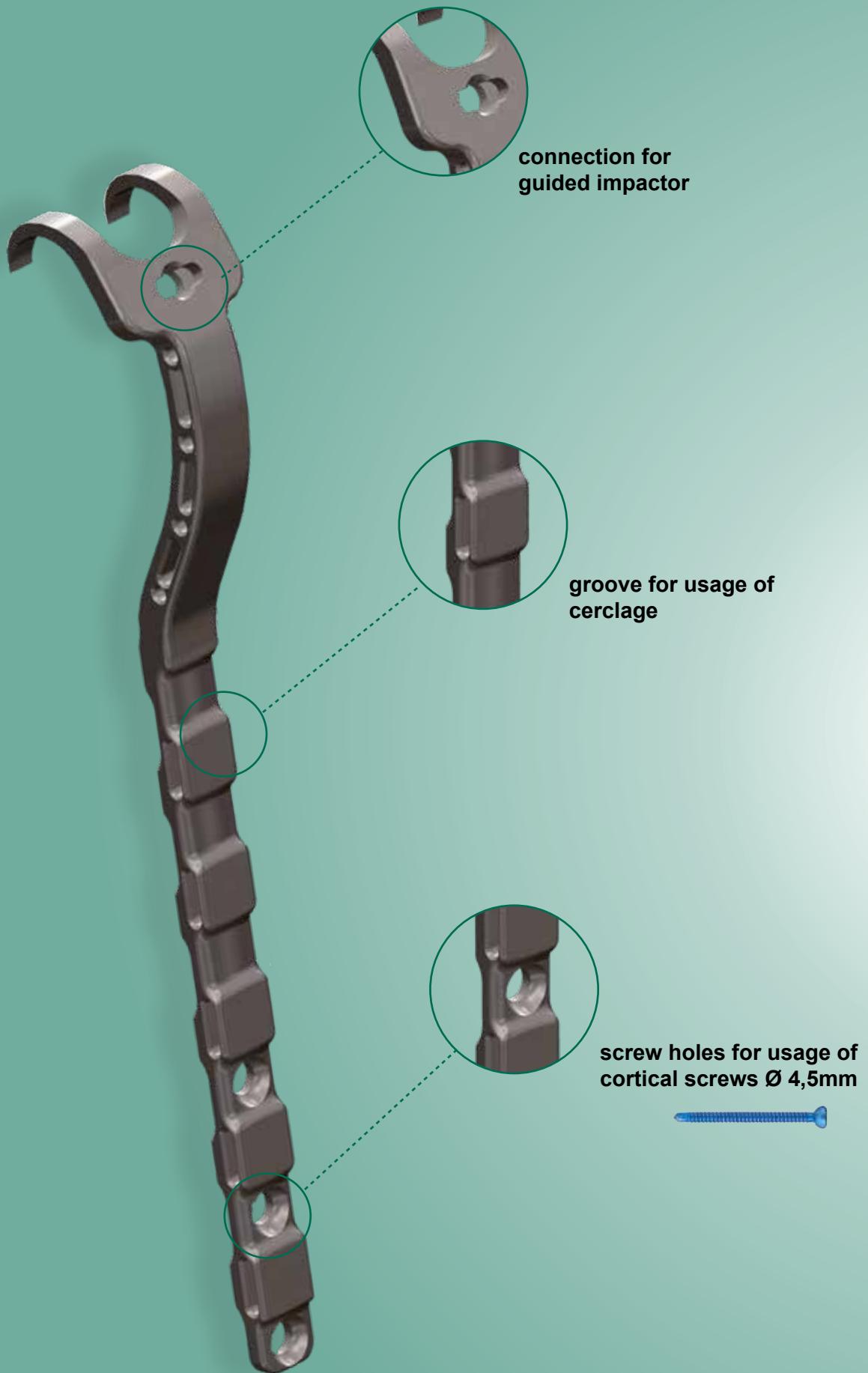
- cup revision or replacement of a ball head onto a prosthesis stem left *in situ*



Product details

revision head with taper adapter

- material: head made of zirconia and alumina (zirconia toughened alumina (ZTA)); taper adapter made of $TiAl_6V_4$ acc. to ISO 5832-3 and ASTM F136
- size spectrum: Ø 28, 32, 36, 40 and 44mm S-XL
- use with only minor damaged taper
- tapers which are flattened, crushed or chamfered require a revision of the hip stem



Trochanter Plate

ic-Cerclage

Indications

- osteotomy of the Greater Trochanter
- stable fractures of the proximal femur

Indication

- bone fractures of large hollow bones



Product details

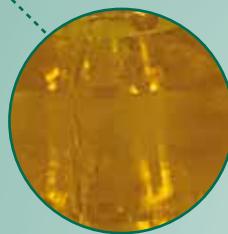
osteosynthesis implant

- material: implantan®; TiAl₆V₄ acc. to ISO 5832-3
- size spectrum: 120, 160, 200, 240mm
- three screw holes for usage of Ø 4,5mm cortical screws
- grooves for usage of cerclage

Product details

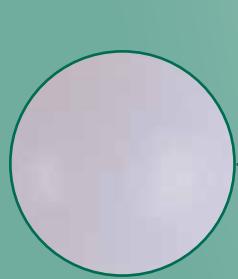
osteosynthesis implant

- material: pure titanium acc. to ISO 5832-2 Grade 1
- ic-cerclage: 8mm; surface matt blasted on both sides
- ic-cerclage band titanium 2R: 8mm; surface roughly blasted on the bone side
- ic-titanium cerclage wire: Ø 1,4mm; length 50cm or 5m



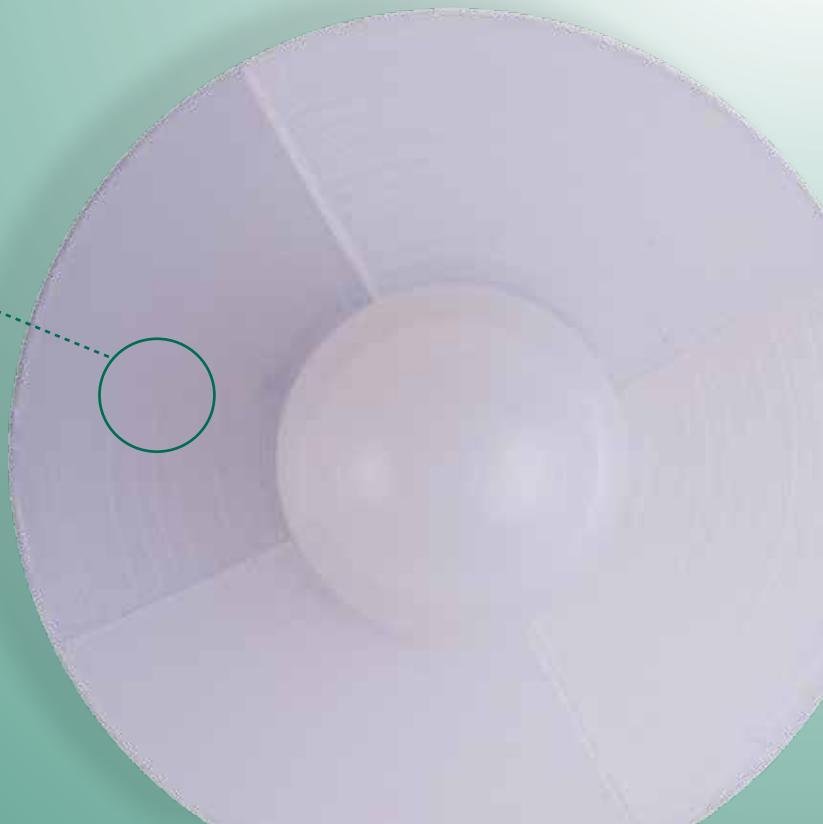
material

- Gelantine (porcine-based)
- Glycerol
- Water
- Methylparahydrobenzoate



material

- UHMWPE
- x-ray wire: $TiAl_6V_4$ acc. to ISO 5832-3



implabond 1G implabond 3G

CERASORB®

Indications

- septic revisions
- increased risk of infection

Indication

- bone defects



Product details

bone cement with gentamicin

- standard and low viscosity
- intramedullary plug UHMWPE
 - size spectrum: small (\varnothing 24mm), large (\varnothing 27mm)
- ic cement restrctor resorbable
 - size spectrum: \varnothing 8-18mm (in 2mm steps)

Product details

bone replacement material

- resorbable, pure-phase β -tricalcium phosphat-ceramic matrix
- available as granulate, foam or block form (cube, cuboid, cylinder, wedge)





Further interesting case studies on patient specific implants and instruments can be found in the C-Fit 3D® brochures.

Custom-made Implants

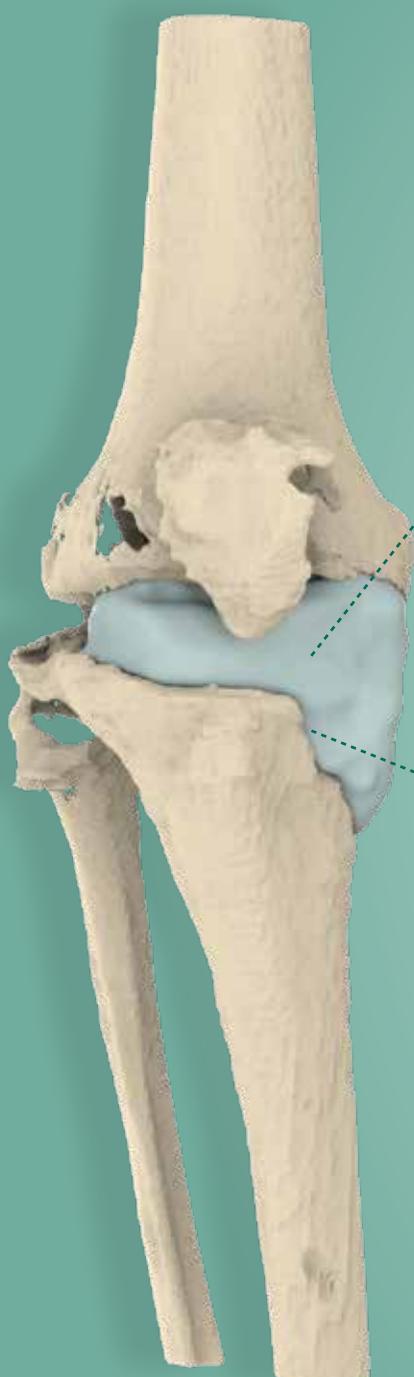
The demand for custom-made implant components increases continuously in revision endoprosthetics.

Complex bone defects after single or multiple revision often do not tolerate treatment with standard implant components. A dedicated software enables us to generate a 3D model of the bone or joint to be reconstructed from high-resolution CT or MRI data. It is possible to segment the body-section radiographs in transversal, saggital and frontal plane. Thus, relevant bones can be reproduced and separated from remaining tissue. Finally, it is exported as a 3D model, which is the basis for constructive implementation of the custom-made implant component. That procedure allows for exact adaptation of the implant to the individual anatomical situation of the patient. Additive manufacturing (3D printing) makes it possible to realize almost any geometry.

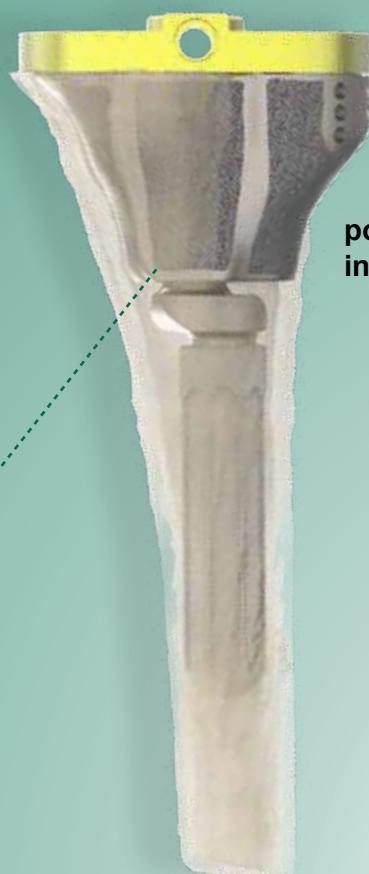
If there is no suitable standard product available for your revision case, we will be happy to design and manufacture patient-specific implants and instruments for you according to your wishes and the patient's needs.

Simply contact our C-Fit 3D® team via email: cfit3d@implantcast.de

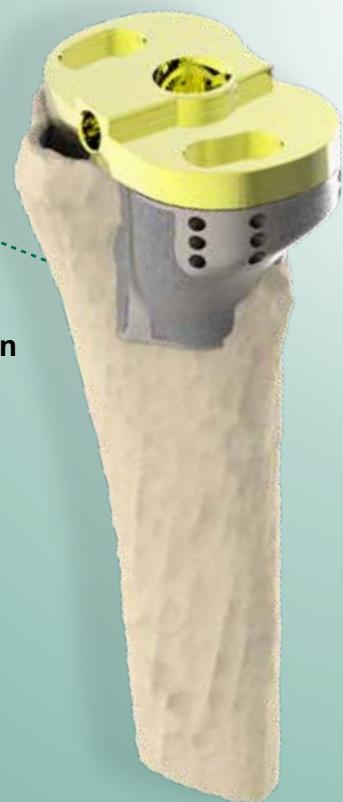
Further information can also be found at www.implantcast.de



preoperative situation
in anterior view



postoperative situation
in anterior view



postoperative situation
in isometric view

Knee Revision

Indication

- two-stage revision after infection of a primary knee endoprosthesis

Standard treatment

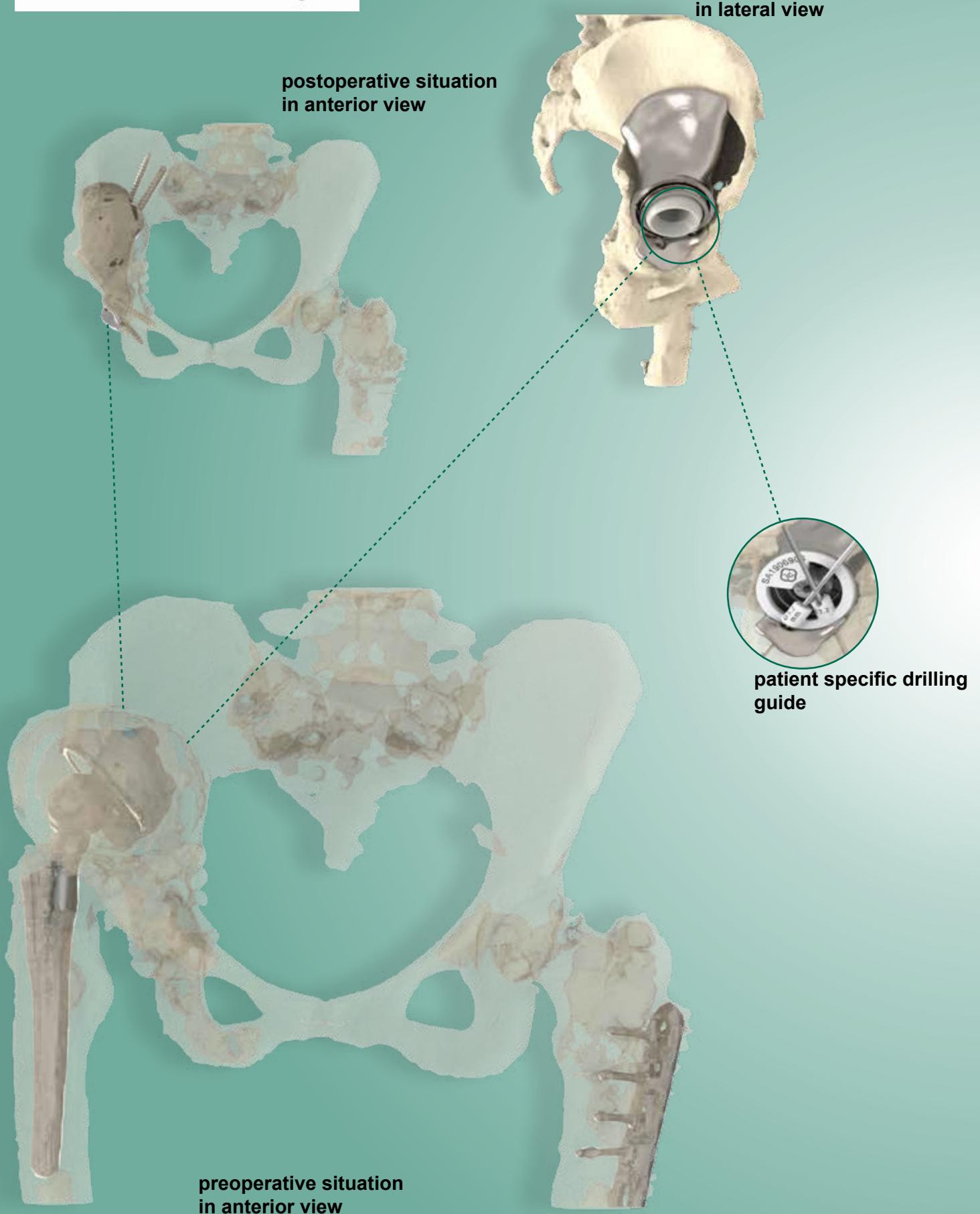
- not possible
- augmentation in given extent not possible
- improved soft tissue attachment due to EPORE® structure desired



Product details

cemented GenuX® MK revision knee (standard) with offset adapter and cementless stem in combination with a custom-made EPORE® cone tibial

- material of the custom-made implant: implanan®; TiAl₆V₄
- coating: none; EPORE® structure
- fixation of the tibial component with bone cement in the EPORE® defect filler
- cementless fixation in the bone
- EPORE® structure is supposed to stimulate the bone to grow into the implant



Hip Revision

Indication

- revision of a primary hip endoprosthesis due to massive osteolysis

Standard treatment

- not possible
- augmentation in given extent not possible



Product details

cemented EcoFit® 2M cup, 2M implacross® E head with a custom-made partial pelvic replacement with EPORE® structure

- material of the custom-made implant: implatan®; $TiAl_6V_4$
- coating: none; EPORE® structure
- cementless fixation
- four screw holes for use of cortical screws
- EPORE® structure is supposed to stimulate the bone to grow into the implant



Materials

Materials Science

Coatings

Materials Science

implavit® - CoCrMo acc. to ISO 5832-4

The basic material for the manufacturing of femoral and tibial components as well as cemented hip stems is cobalt chromium molybdenum alloy. The investment casting manufacturing process is used. The final shape geometry is realized by machining. The final steps of the manufacturing: grinding, polishing and barrel finishing. Depending on the implant, an additional coating can be applied.

implatan® - TiAl₆V₄ acc. to ISO 5832-3

Those knee components that do not have to articulate with each other such as stems and spacers are made from titanium aluminium vanadium alloy. In hip arthroplasty this titanium alloy is used for cementless hip stems and cups. This material is not only strong but it is also inert due to the formation of an extremely stable oxide outer layer which makes it corrosion resistant and extremely biocompatible. The raw material is milled and drilled for the basic implant shape before surface finishing via grinding, polishing and grit-blasting. Again, coating of the implant is also possible.

EPORE® porous osseointegrative surface structure

EPORE® is a surface structure based on titanium alloy (TiAl₆V₄). Due to the excellent material properties, such as formability, corrosion resistance and high fatigue strength, EPORE® is ideal as a framework structure for new bone formation. Manufacturing by means of additive manufacturing enables the creation of highly complex porous structures.

Polyethylene

In knee arthroplasty the components which have gliding articulating surfaces (i.e. patellae and tibial inserts) are made of polyethylene. This material is also used for cup inserts in hip arthroplasty. Polyethylene is available in the following variants:

UHMWPE acc. to ISO 5834-2 - ultra high molecular weight polyethylene

implacross® - crosslinked UHMWPE

implacross® E - crosslinked UHMWPE with vitamin E

Coatings

implaFix® cpTi

cpTi (commercially pure titanium) is applied to the implant surface to provide a rough and porous area which promotes bone growth onto the implant. The porous cpTi layer is applied via a plasma spraying process.

implaFix® HA acc. to ISO 13779-2

Hydroxyapatite belongs to a group of chemicals called calcium phosphates and is a natural component of healthy bone. It is an osteoconductive and thus bioactive material which promotes the growth of bone onto and/or into the surfaces of an implant.

TCP - Tricalcium phosphate

From a chemical point of view, the TCP layer is a composite of brushite and hydroxyapatite. Brushit is an early stage of the bone mineral HA and supports the natural ingrowth process of the implant. TCP is resorbed within 6 to 12 weeks via a controlled mechanism and is completely replaced by new bone tissue. Thus the coating remains only until the implant has ingrown and a solid connection between the implant surface and the surrounding bone tissue has been achieved.

pc - porous coating

This type of coating is made up of cobalt chromium molybdenum alloy (CoCrMo) beads each with a diameter of $\sim 300\mu\text{m}$. A layer of these beads is sintered to the implant fixation surfaces. Then a second layer is sintered on top of the first layer before a third and final layer is applied. This results in a porous structure that aids osseointegration.

TiN - Titanium nitride

The ceramic TiN-coating is applied to the implant components via a process called physical vapour deposition (PVD). The surface coating is wear-reducing, biocompatible and reduces the risk of allergic reactions to metal components.

Silver

Silver, especially free silver ions, are known for their large antimicrobial spectrum. The properties of silver are used in the coated components to reduce the risk of infection and to increase the implant survivorship.

References

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- 4 P. Henle, S. Eggli: What Do Radiographs Tell Us?; in: M. T. Hirschmann und R. Becker (Hrsgg.): The Unhappy Total Knee Replacement. A Comprehensive Review and Management Guide. Springer 2015.



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