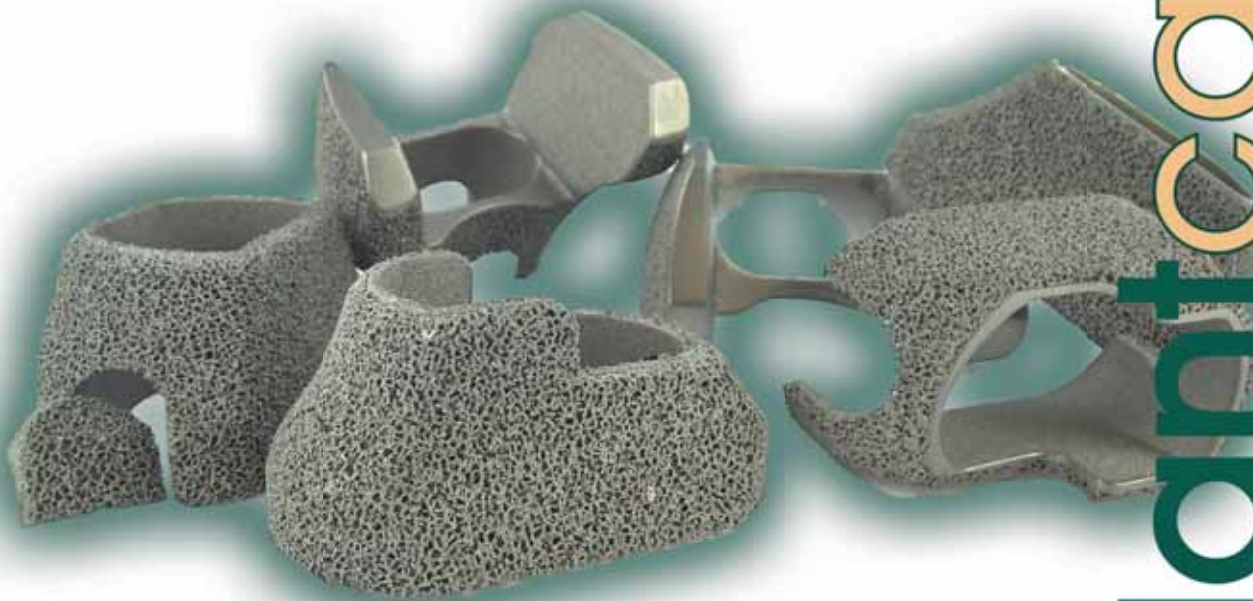


# EPORE<sup>®</sup>



implantcast

**EPORE<sup>®</sup>**  
**Cones**  
surgical technique



# EPORE®

## EPORE® Cones Surgical Technique

The EPORE® Cones were developed  
in co-operation with  
MB ChB, MSc (Ortho. Engin), FRCS (Tr & Orth) Lee Jeys  
(Ortho UK, Midland Hip and Knee Clinic, Royal Orthopaedic Hospital NHS Foundation Trust).

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**Note:** The described surgical technique is the suggested treatment for the uncomplicated procedure. In the final analysis the preferred treatment is that which addresses the needs of the individual patient.

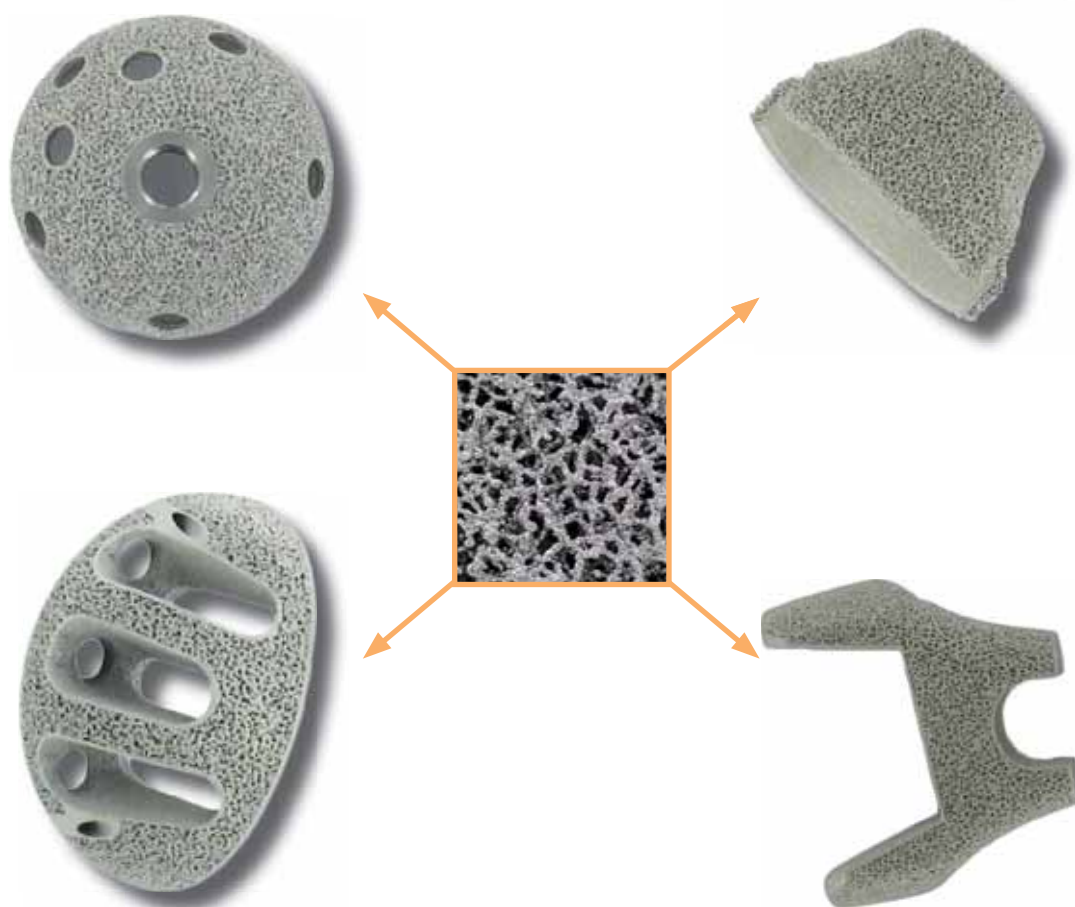
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# EPORE® Cones

## EPORE® - highly porous osteointegrative structure

The new manufacturing method of EBM® Electron Beam Melting used by implantcast GmbH offers a rapid, flexible and cost-effective production directly from the patients own 3D digital data. This new innovative manufacturing process offers cost-effective manufacturing of complex customized implants and high-quality manufacturing of medical devices of almost any complex form. Additive manufacturing accelerates product production time scale for custom prosthesis offers design freedom and allows for a high degree of primary and secondary fixation.



<b>Mechanical properties EPORE®</b>	
<i>porosity</i>	60%
<i>rod thickness</i>	330 - 390 $\mu\text{m}$
<i>rel. modulus of elasticity</i>	3 GPa*

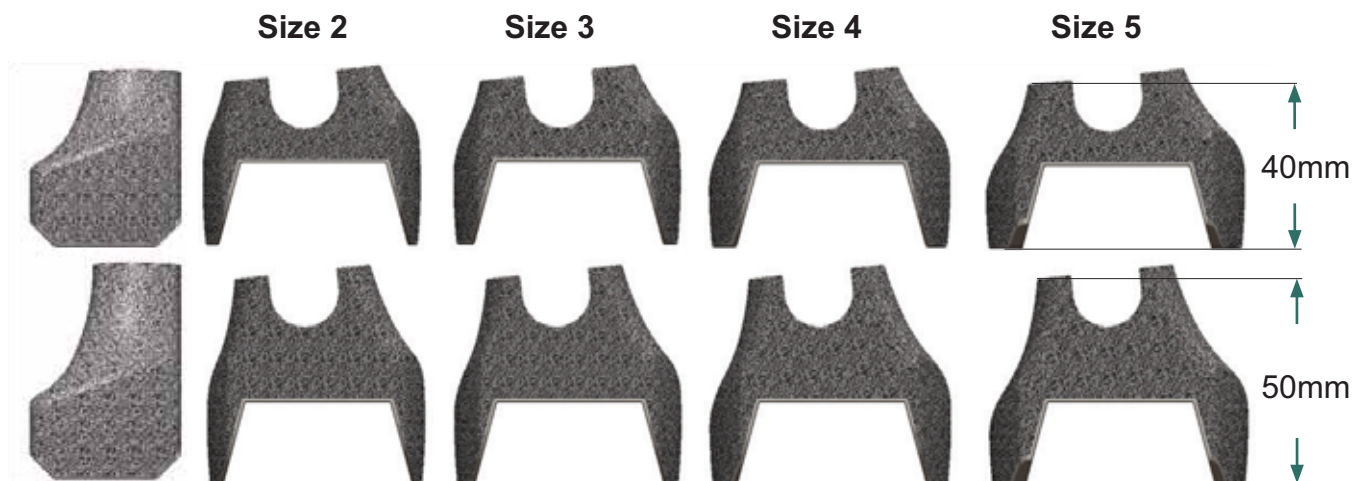
\*tensile measurement

EPORE® is a highly porous structure made of titanium alloy ( $\text{TiAl}_6\text{V}_4$ ). Titanium alloy is an excellent material for use as a porous in-growth structure as it is biologically inert, ductile, corrosion resistant and has a high fatigue strength. implantcast GmbH has designed EPORE® to have a high porosity and a low modulus of elasticity so it can enhance biological in-growth. The structure is characterized by rods of 330-390  $\mu\text{m}$  thickness which are arrayed in a way that mimics cancellous bone structures.



## System Overview

### EPORE® Cones femoral



	M/L	A/P
Size 2	53mm	27mm
Size 3	55mm	28mm
Size 4	58mm	33mm
Size 5	63mm	37mm

The intended purpose of EPORE® Cone implants is to fill and reconstruct large bone deficiencies and cavitory defects and to provide a stable platform for the support of the GenuX® MK or ACS® SC components. Furthermore the Cones can be used universally with competitor products, as long as the compatibility is given.

The EPORE® Cone femoral implant that is selected needs to:

1. fit into the damaged area of the femoral bone without unnecessary removal of viable bone
2. enable the positioning of the femoral component in connection with the offset adapter and the stem
3. ensure the proximal positioning according to the femoral component box and to properly fill the defect, without affecting the intended joint line.

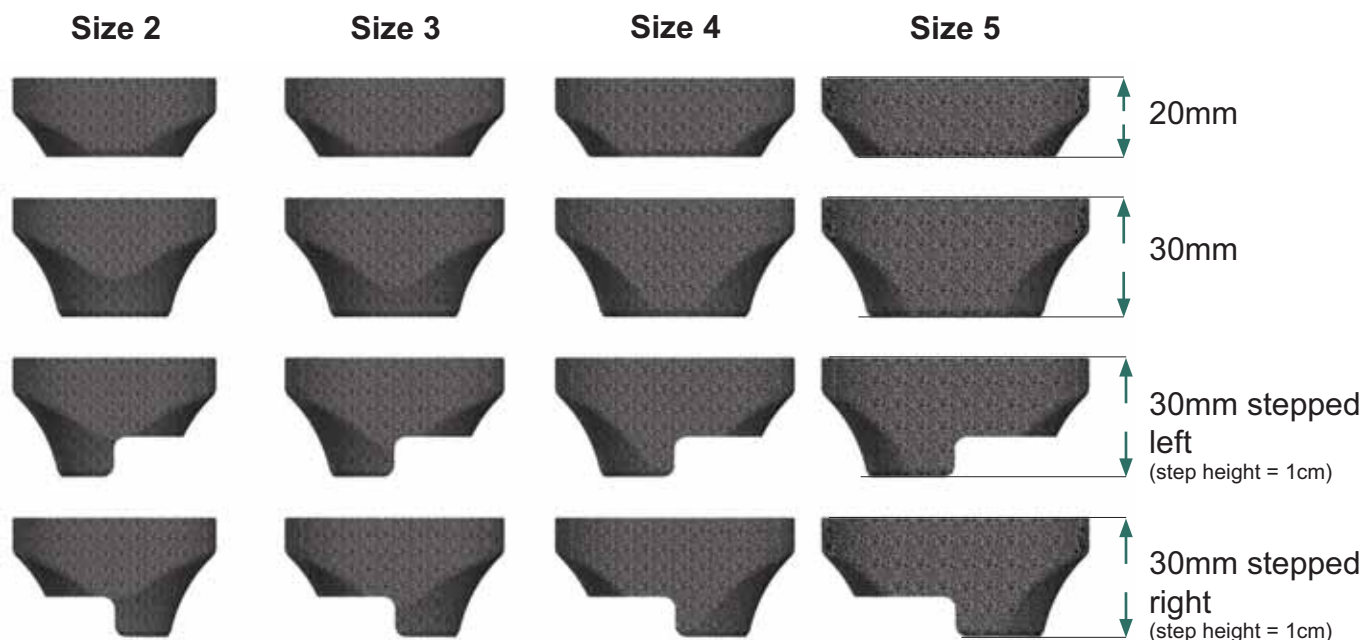
The EPORE® Cone femoral implants have an asymmetrical design. There are left and right configurations in four sizes available with a height of 40mm and 50mm.



# EPORE® Cones

## System Overview

### EPORE® Cones tibial



	M/L	A/P
Size 2	51mm	34mm
Size 3	55mm	36mm
Size 4	60mm	36mm
Size 5	67mm	38mm

The intended purpose of EPORE® Cone implants is to fill and reconstruct large bone deficiencies and cavitory defects and to provide a stable platform for the support of the GenuX® MK or ACS® SC components. Furthermore the Cones can be used universally with competitor products, as long as the compatibility is given.

The EPORE® Cone tibial implant that is selected needs to:

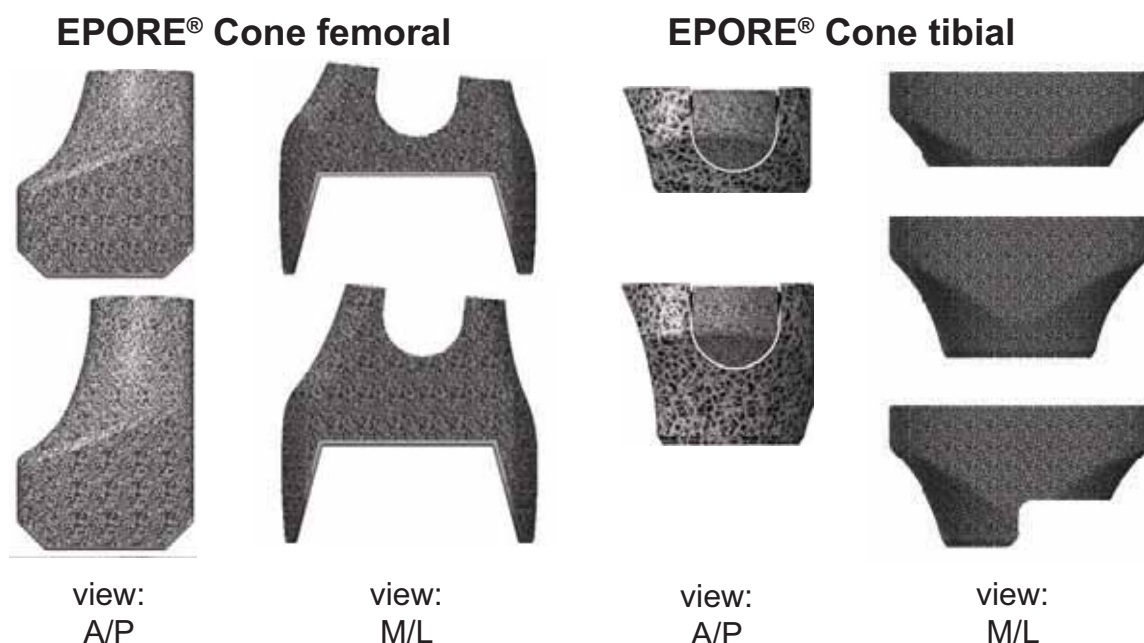
1. fit into the damaged area of the tibial bone without unnecessary removal of viable bone
2. enable the positioning of the tibial component in connection with the offset adapter and the stem
3. ensure the proximal positioning according to the tibial component and to properly fill the defect, without affecting the intended joint line.

The EPORE® Cone tibial implants have a symmetrical design. Four sizes with a height of 20mm or 30mm are available. A stepped version with a left and a right configuration in a height of 30mm completes the system.

## Preoperative Planning

Preoperative planning and precise surgical techniques are mandatory for optimal results. The instructions and the procedure described in this surgical technique must be adhered to. Familiarity with the recommended surgical technique and its careful application is essential to achieve the best possible outcome.

Before surgery a surgical planning with regard to the dimensions of the prosthesis and the positioning of the implant components in the bone has to be carried out by the surgeon. Please consider the compatibility tables shown on the next pages (9-13) if using EPORE® Cones.



Further, prior to surgery, the following should be ensured:

- All needed components must be available. An adequate number of various implant sizes needs to be present for every surgery.
- All Instruments for the implantation must be available and correspond to the implants. The implants may only be used with the instruments provided by implantcast GmbH. An exception are exclusively the standardized instruments used during surgery.



## EPORE® Cones

The tables on the next pages show the compatibility of the tibial and femoral components in combination with an 0mm offset adapter and the maximal stem diameter for each EPORE® Cone size. If there is one combination not presented, a pre-operative planning is necessary.

### Compatibility table GenuX® MK tibia



tibial size	cone size	max. stem diameter	remove inserts
2	2	18	No
2	3	20	No
2	4	20	No
2	5	-	-
3	2	18	Yes
3	3	20	Yes
3	4	20	No
3	5	24	No
4	2	18	Yes
4	3	20	Yes
4	4	20	Yes
4	5	24	No
5	2	18	Yes
5	3	20	Yes
5	4	20	Yes
5	5	24	No



**Compatibility table ACS® SC MB tibia**



tibial size	cone size	max. stem diameter	remove inserts
2	2	18	No
2	3	20	No
2	4	22	No
2	5	-	-
3	2	18	Yes
3	3	20	Yes
3	4	22	No
3	5	22	No
4	2	18	Yes
4	3	20	Yes
4	4	22	Yes
4	5	22	Yes
5	2	-	-
5	3	20	Yes
5	4	22	Yes
5	5	22	Yes
6	2	-	-
6	3	20	Yes
6	4	22	Yes
6	5	22	Yes

# EPORE® Cones

## Compatibility table ACS® SC FB tibia



tibial size	cone size	max. stem diameter	remove inserts
2L/R	2	16	Yes
2L/R	3	18	No
2L/R	4	18	No
2L/R	5	-	-
3L/R	2	16	Yes
3L/R	3	18	Yes
3L/R	4	18	No
3L/R	5	20	No
3,5L/R	2	16	Yes
3,5L/R	3	18	Yes
3,5L/R	4	18	No
3,5L/R	5	20	No
4L/R	2	16	Yes
4L/R	3	18	Yes
4L/R	4	18	Yes
4L/R	5	20	No
5L/R	2	16	Yes
5L/R	3	18	Yes
5L/R	4	18	Yes
5L/R	5	20	No
6L/R	2	16	Yes
6L/R	3	18	Yes
6L/R	4	18	Yes
6L/R	5	20	No



Compatibility table ACS® SC femur

**NOTE:** Cones were aligned concentrically to the stem!

\*Reach the compatibility by moving the cones in ML direction!

**NOTE:** The Cone is not concentric to the stem any more after having been moved in ML direction!



femoral size	cone size	max. stem diameter	ML and AP compatibility
1	2	18	Not ML compatible*
1	3	18	Not ML compatible
1	4	18	No
1	5	18	No
2	2	18	Yes
2	3	18	Yes
2	4	18	Not ML compatible*
2	5	18	Not ML compatible
2,5	2	18	Yes
2,5	3	18	Yes
2,5	4	18	Not ML compatible*
2,5	5	18	Not ML compatible
3	2	18	Yes
3	3	18	Yes
3	4	18	Yes
3	5	18	Not ML compatible*
4	2	18	Yes
4	3	18	Yes
4	4	18	Yes
4	5	18	Yes
5	2	18	Yes
5	3	18	Yes
5	4	18	Yes
5	5	18	Yes
6	2	18	Yes
6	3	18	Yes
6	4	18	Yes
6	5	18	Yes

# EPORE® Cones

## Compatibility table GenuX® MK femur



**NOTE:** Cones were aligned concentrically to the stem!

femoral size	cone size	max. stem diameter	ML and AP compatibility
2	2	18	Yes
2	3	18	Yes
2	4	18	Not ML compatible*
2	5	18	Not ML compatible
3	2	18	Yes
3	3	18	Yes
3	4	18	Yes
3	5	18	Not ML compatible*
4	2	18	Yes
4	3	18	Yes
4	4	18	Yes
4	5	18	Yes
5	2	18	Yes
5	3	18	Yes
5	4	18	Yes
5	5	18	Yes

\*Reach the compatibility by moving the cones in ML direction!

**NOTE:** The Cone isn't concentric to the stem any more after having been moved in ML direction!

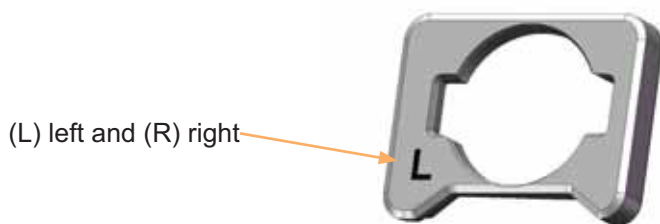
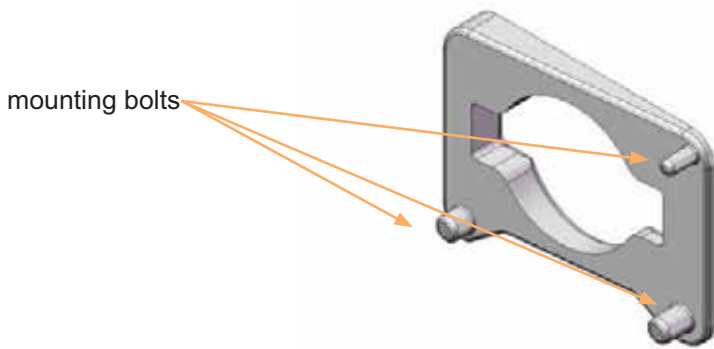
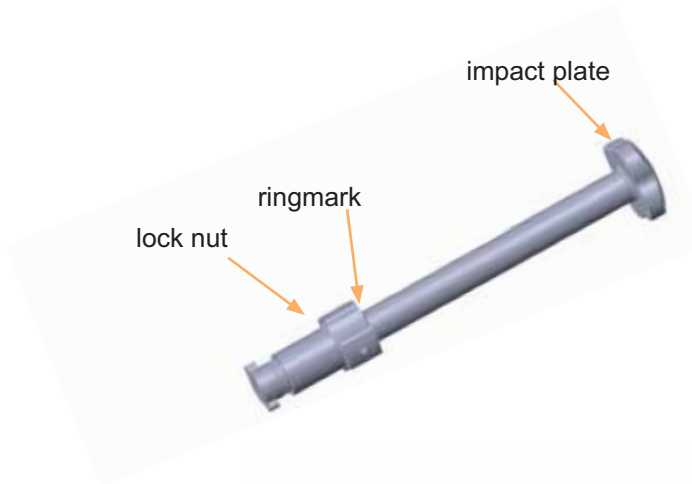
## Technical description femoral instruments

The femoral instruments consist of three parts: an EPORE® Cone punch femoral, an EPORE® Cone adapter femoral and the EPORE® Cone rasp femoral in different sizes.

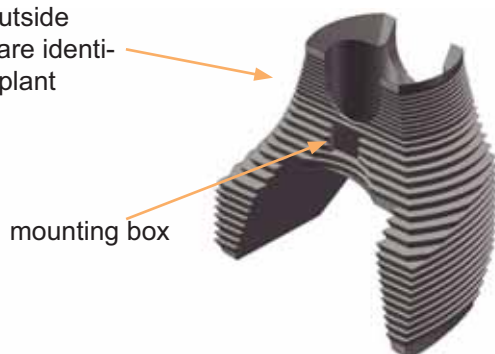
The EPORE® Cone punch has an impact plate on one side and a mounting connection on the other side. A ringmark on the impactor shows the initial position of the lock nut. Please screw the lock nut on to the same level as the ringmark, directly after removing it from the instrument container.

As the EPORE® Cones femoral are anatomically shaped, there are two different EPORE® Cone adapters femoral for the left and right side available. The side is marked at the top of the EPORE® Cone adapter femoral with L (left ) and R (right). The EPORE® cone adapter femoral fits to all sizes of the EPORE® Cone rasp femoral.

The EPORE® Cone rasp femoral can also be used as trial component.



inside and outside dimensions are identical to the implant sizes



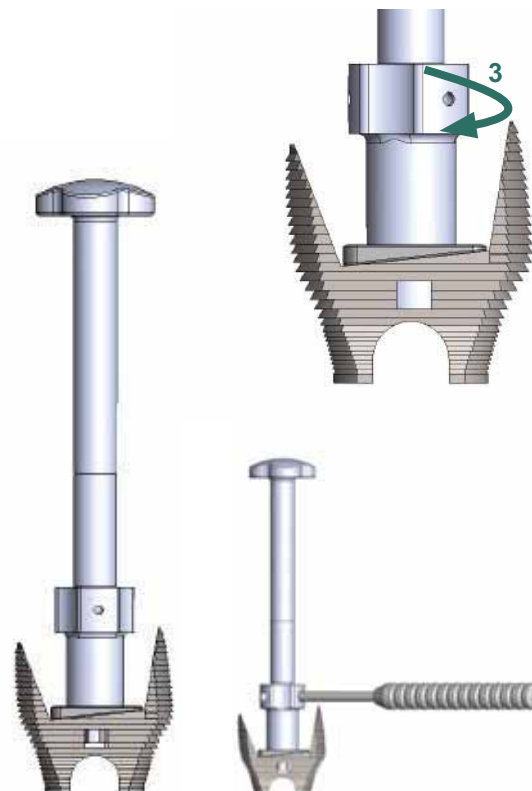
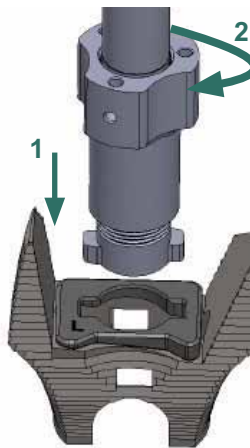
# EPORE® Cones

## Assembling the femoral instruments

Combine the determined size of the EPORE® Cone rasp femoral with the EPORE® Cone adapter femoral by placing it from distal.



Afterwards please attach the EPORE® Cone punch femoral to the EPORE® Cone rasp femoral like the before assembled EPORE® Cone adapter femoral from distal (1) and lock it by turning the EPORE® Cone punch femoral quarter clockwise (2). Screw the lock nut clockwise until the setup is fixed (3).



**Note:** Please use the MUTARS® counter instrument  $\varnothing$  6mm to tighten the lock nut finally.

## Surgical technique femoral cones

**The distal cut needs to be prepared finally before you start rasping.**

It is recommended to start always with the smallest rasp size.

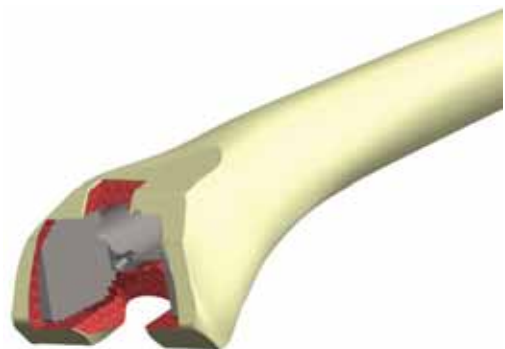
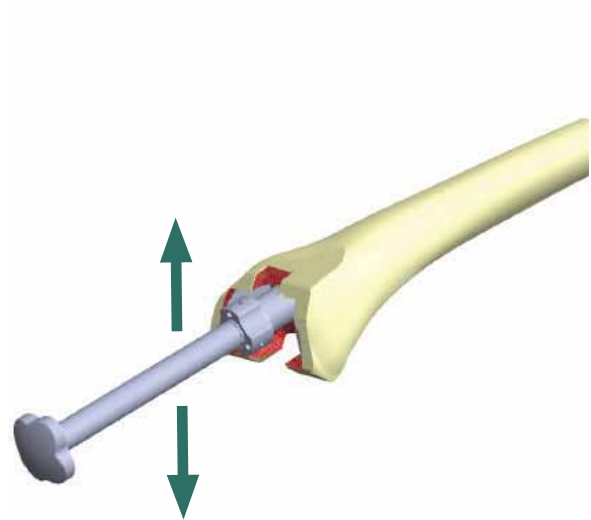
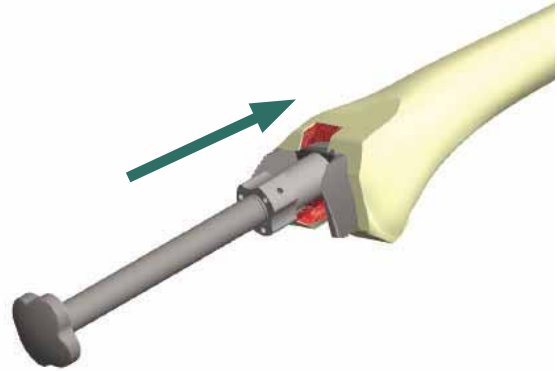
Start to rasp the intramedullary cavity of the femur with the before assembled setup.

Prepare the femoral metaphyseal part with the rasp by using the slot hammer.

After reaching the correct implant depth, check the stability of the rasp by moving the punch handle in AP and ML direction.

If the rasp is still loose, assemble the next bigger rasp size to the handle and proceed similar.

When a good stability of the rasp is achieved, disassemble the handle and the punch adapter and leave the rasp inside for trialing.





# EPORE® Cones

## Offset Tester

Reinsert the lastly used rigid drill (together with the corresponding drill sleeve if applicable) to the medullary cavity.

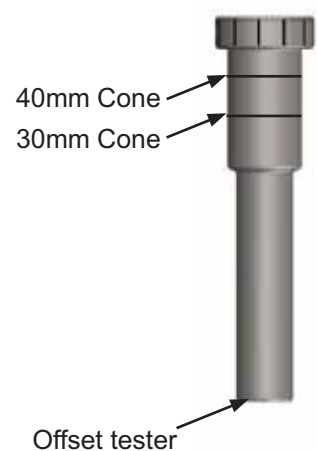
**Note:** Ensure an adequate femoral drill depth. Consider „GenuX® MK or ACS® SC surgical technique“.

After each resection the drill needs to be inserted deeper. Make sure that the correct mark reaches the resection plane. In cases of using stems with a length of 150mm and longer, the drill sleeve must be removed for the subsequent preparation.

Connect the 4in1 femoral cutting block of the afore determined size and the long stem sleeve offset over the rigid drill. In doing so the etching for the affected side „left“ respectively „right“ of the long stem sleeve offset should be legible anteriorly in case of topview on the cutting block. Attach the cutting block and the sleeve to the rigid drill till the cutting block rests flat on the distal femur. For an easy positioning, handles can be fixed to the 4in1 cutting block.

If the femur is prepared for use of a femoral spacer the magnetic distal distance adapters of the corresponding thickness (5mm or 10mm) can be attached for stabilization.

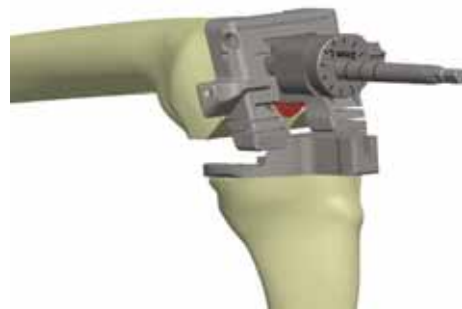
**Note:** In cases of 30mm and 40mm Cones are used the femoral offset adapters will stand out respectively to the reference mark of the offset tester. This is not an user error. Use the Resectionscheck to locate the position.



Check the anterior and posterior resection plane with the resection check.

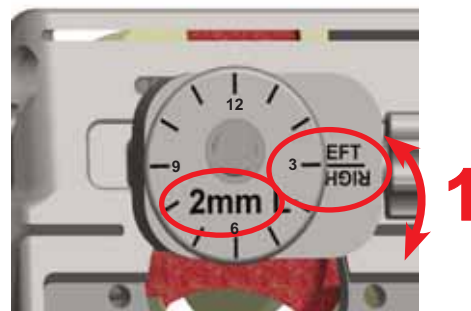
With the femoral positioner the rotational alignment is adjusted in relation to the resected tibia. Attach the spacer shim 12,5mm to the femoral positioner and insert it into the posterior resection slot of the cutting block. Additional spacer shims are available if the tibia shows tibial defects.

These can be fixed to the femoral positioner.



Is the optimal position of the 4in1 cutting block defined, fix the set-up with the lateral screw of the long stem offset sleeve **1**. Keep in mind the position of the offset and the offset sleeve (in the shown case 2mm offset sleeve and position 3) for assembling the trial as well as the implant components.

**Please proceed further with the final steps of the GenuX® MK or ACS® SC preparation as described in the particular surgical technique.**



## EPORE® Cones

Check again the position of the rasp. Combine the femoral trial implants as discribed. (GenuX® MK or ACS® SC)

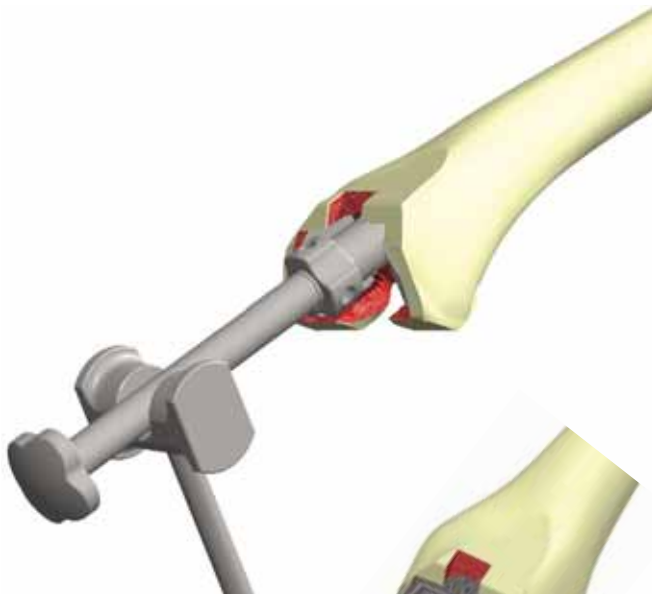


Insert the femoral trial components into the femoral bone.

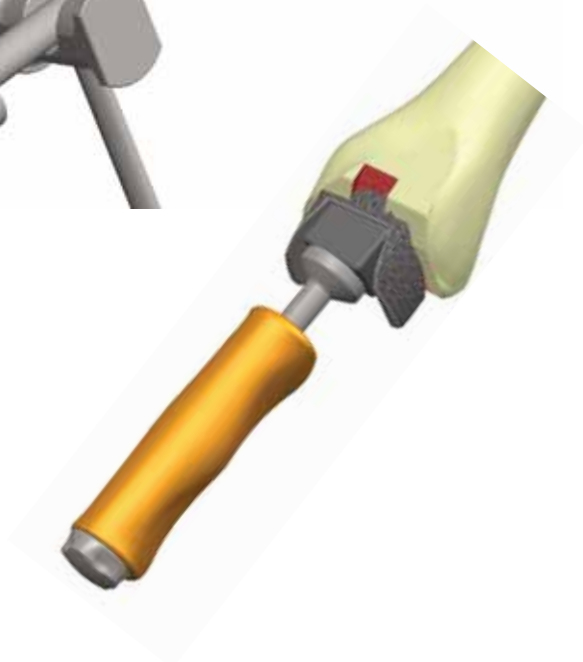


When a correct fit of the trial implant is achieved, remove the trial implants by use of the extractor for femoral components in combination with the slap hammer.

To remove the femoral rasp, assemble the punch adapter and the handle to the rasp and extract the rasp by using a slot hammer.



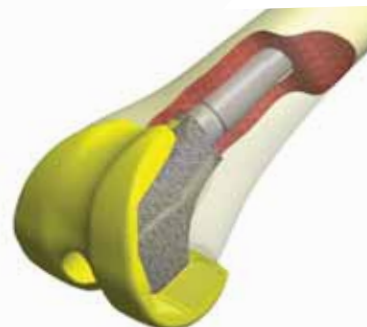
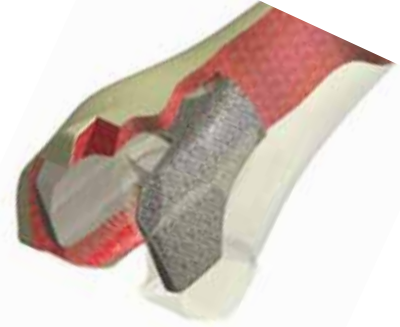
Impact the femoral Cone of the same size as the lastly used rasp by use of the femoral Cone impactor. The Cones have a pressfit design of 0,3mm.





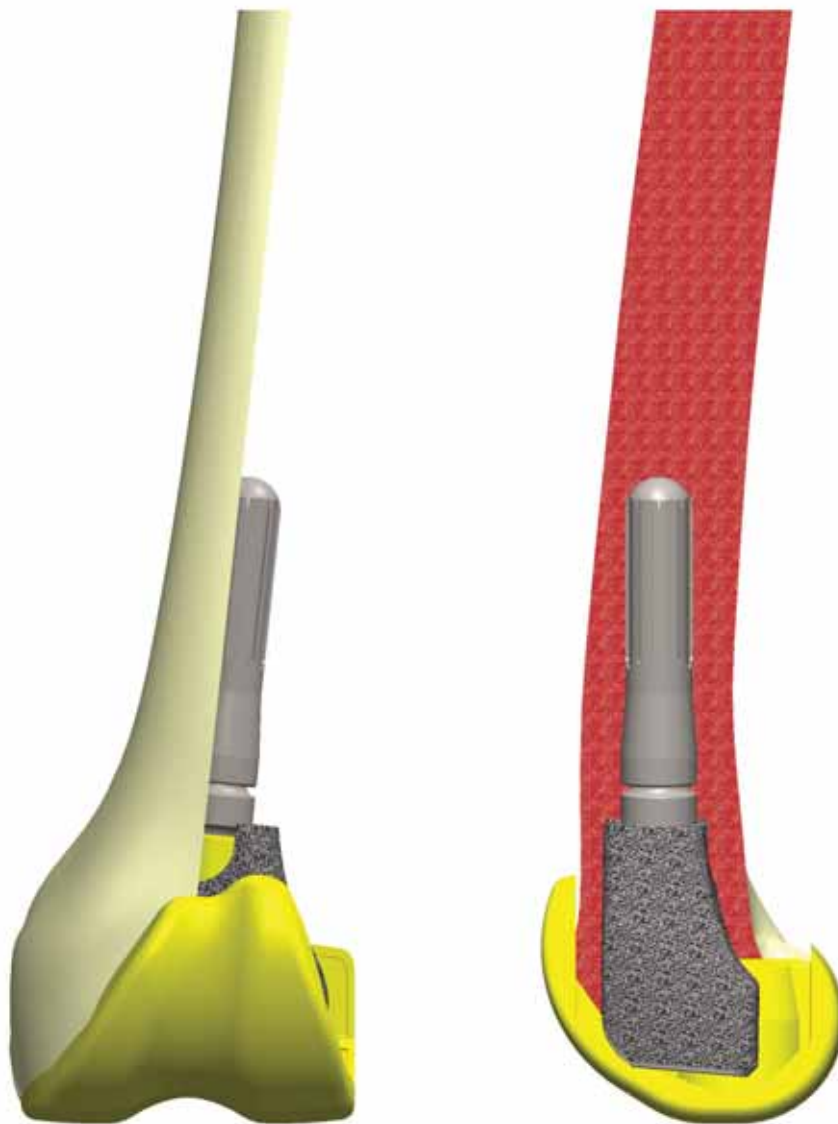
Start to assemble the correct femoral component to the offset adapter and needed stem.

Fill the inner contour of the femoral component and the EPORE® Cone femoral with bone cement, implabond bone cement is recommended, and impact the femoral implant by the use of the femoral impactor.



# EPORE<sup>®</sup> Cones

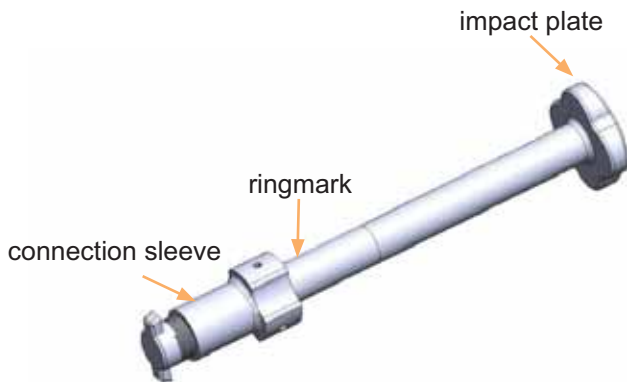
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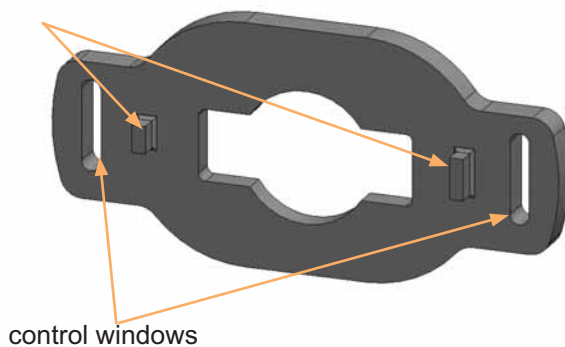
## Technical description tibial instruments

The tibial instruments consist of three parts: an EPORE® Cone punch tibial, an EPORE® Cone adapter tibial and the EPORE® Cone rasp in different sizes.

The EPORE® Cone punch tibial has an impact plate on one side and a mounting connection on the other side. A ringmark on the impactor shows the initial position of the lock nut. Please screw the lock nut on to the same level as the ringmark, directly after removing from the instrument container.



different mounting fins  
prevent incorrect position



As the EPORE® Cones tibial are anatomically shaped, we have one EPORE® Cone adapter tibial for each rasp size with different mounting fins to prevent incorrect positioning. The control windows are used to control the position. Through the control window cortical bone should not be visible.

The outer contour of the EPORE® Cone adapter tibial is similar to the implants. They could be used as a template to determine the correct implant size.



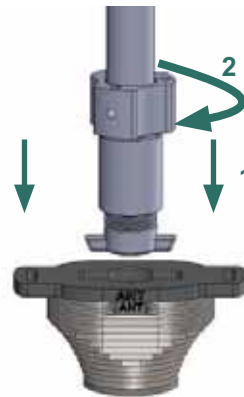
The EPORE® Cone rasps are anatomical shaped and can be used as trial component.

inside and outside  
dimensions are identical  
to the implant sizes

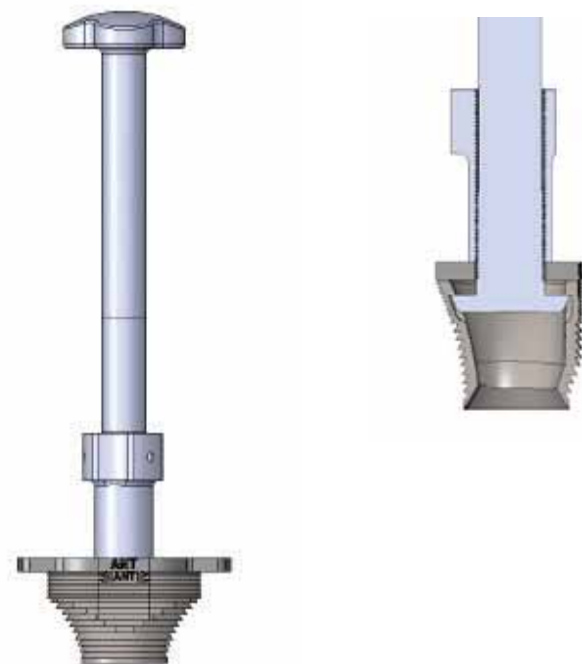
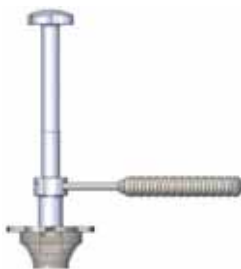
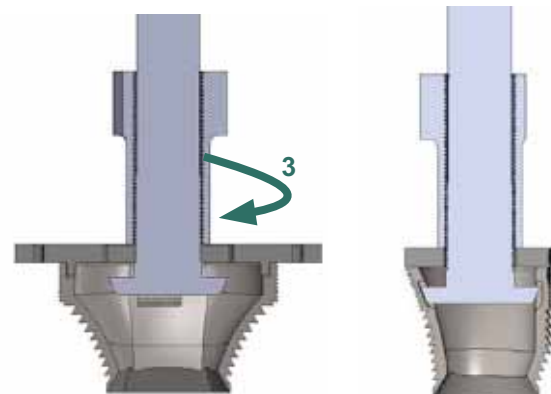
# EPORE® Cones

## Assembling the tibial component

Use the smallest rasp first.  
 Combine the determined size of the EPORE® Cone rasp tibial with the EPORE® Cone adapter tibial by placing it from proximal.



Afterwards, attach the EPORE® Cone punch tibial to the EPORE® Cone rasp like the before assembled EPORE® Cone adapter tibial from proximal (1) and lock it by turning the handle quarter clockwise (2). Screw the lock nut clockwise until the setup is fixed (3).



**Note:** Please use the MUTARS® counter instrument Ø6mm to tighten the lock nut.

## Surgical technique tibial Cones

If necessary, refresh the tibia with a minimal resection.

Start rasping the intramedullary cavity of the tibia with the instruments you assembled before.

Always start with the smallest rasp size.

Prepare the tibial bone with the rasp by the use of a slotted hammer.



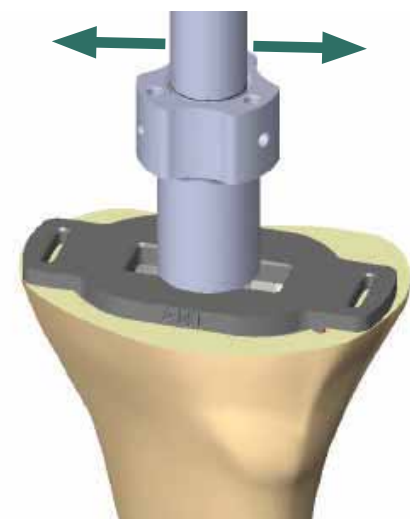
After reaching the correct implant depth, the rasp fits with the tibia when the adapter plate rests flat. Check the stability of the rasp by moving the punch handle in M/L and A/P direction.



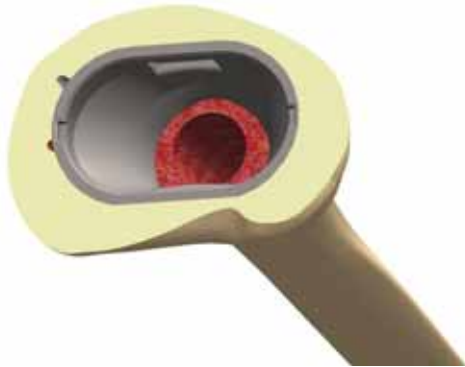
If the rasp is still loose, assemble the punch adapter to the next bigger rasp size and handle and proceed similar.

When a good stability of the rasp is achieved, disassemble the handle and the punch adapter and leave the rasp inside the bone for trialing.

**Note:** Please use the MUTARS® counter instrument Ø6mm to release the lock nut.



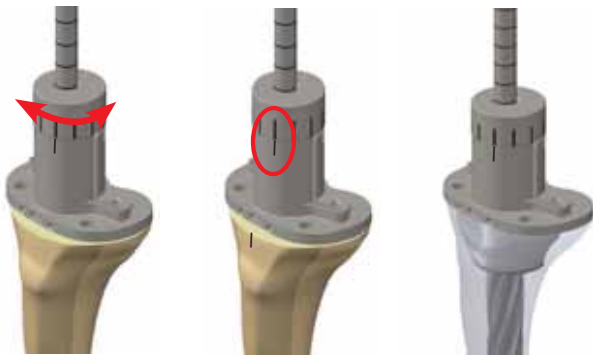




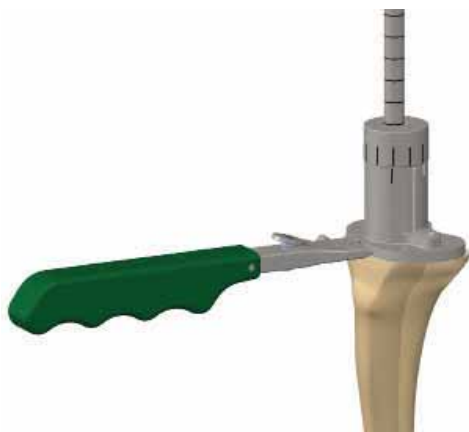
Insert the lastly used rigid drill (together with the corresponding drill sleeve if applicable) in the tibial medullary cavity again.



Determine the size of the tibial component by means of tibial reaming guide (the outer contour of the reaming guide corresponds to the outer contour of the tibial component). Attach the tibial reaming guide of the corresponding size to the tibia via the rigid drill.



Use the tibial offset tester (0mm, 2mm, 4mm, 6mm) to evaluate a potential tibial offset. By turning the respective offset tester in the tibial reaming guide the optimal position of the reaming guide on the proximal tibia is determined. Keep in mind the used offset alignment and the offset position, which is read off the anterior edge of the reaming guide (see marking). These are necessary for the correct assembling of the trial as well as the implant components. Tibial trial spacer can be attached to the reaming guide if needed.



When the optimal position is determined, mark the centre of the tibial reaming guide (corresponds later to the centre of the implant) at the anterior edge of the tibia. The rotational alignment can be checked by use of the tibial alignment handle combined with the external alignment rod.

## EPORE® Cones

Assemble the trial implants (GenuX® MK or ACS® SC).

Insert the trial components into the tibial bone.



When a correct fit of the trial implant is achieved, remove the trial implants by the use of the tibial extractor in combination with the slotted hammer.

To remove the tibial rasp, assemble the punch adapter and the handle to the rasp and extract the rasp by using a slotted hammer.

Impact the tibial cone of the same size as the lastly used rasp by use of the tibial cone impactor. The cones have a 0,3mm pressfit design.



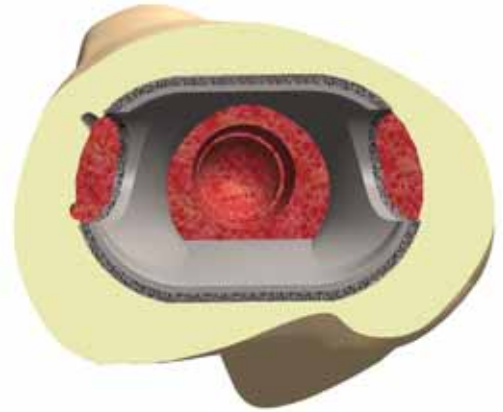


## EPORE® Cones

Insert the EPORE® Cone tibial of the size as the last rasp.

Impact the tibial Cone by using the impactor and a slotted hammer.

If you use the Cones in combination with competitor tibial plates, please check if the inner contour of the Cone fits to the implant.

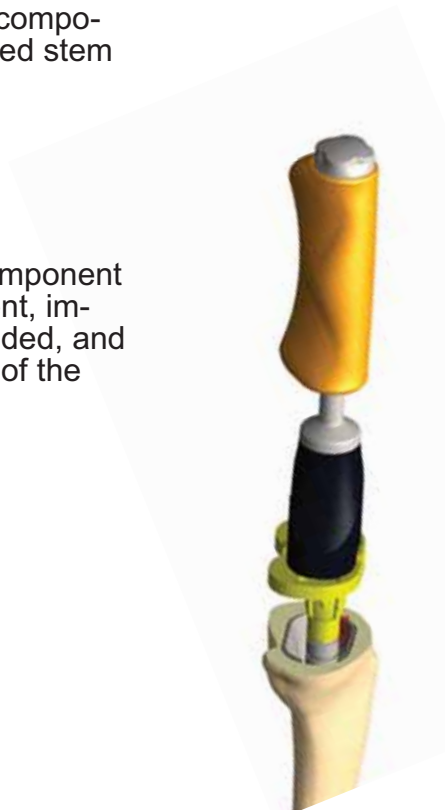


Click mechanism to remove the inserts to get more space for larger fins.



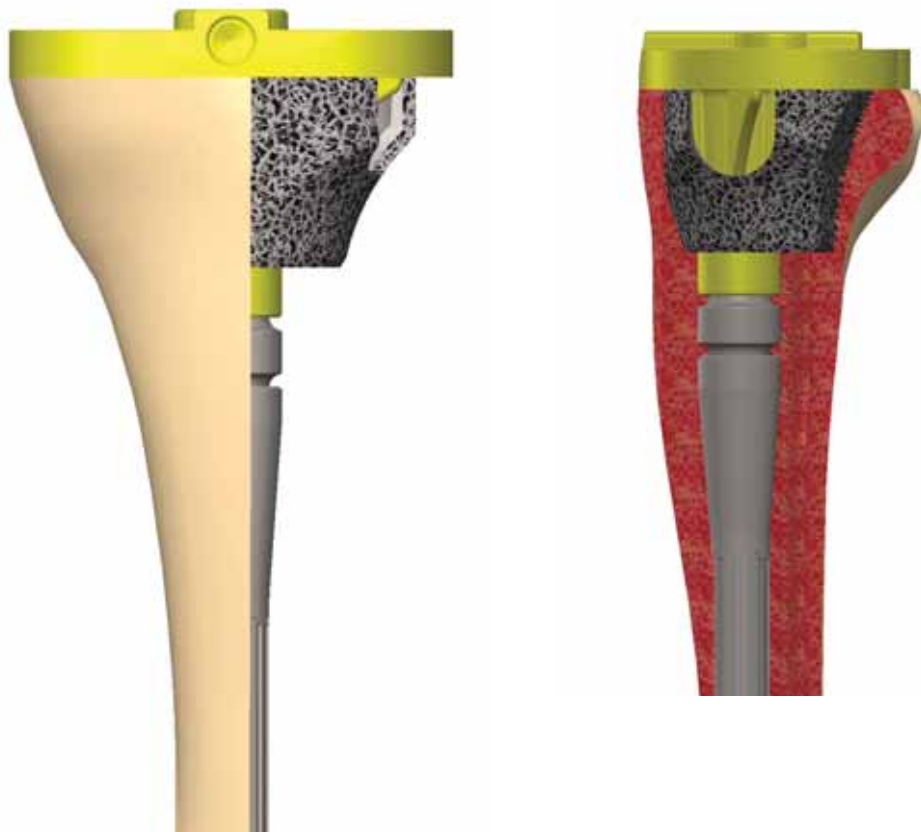
Start to assemble the correct tibial component to the offset adapter and needed stem (GenuX® MK or ACS® SC).

Fill the inner contour of the tibial component and the tibial Cone with bone cement, im-plabond bone cement is recommended, and impact the tibial implant by the use of the femoral impactor.



# EPORE<sup>®</sup> Cones

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## IMPLANTS

### EPORE® Cone femoral 40mm

mat.: implatan® acc. to ISO 5832-3

- 4217-4020 size 2 right
- 4217-4025 size 2 left
- 4217-4030 size 3 right
- 4217-4035 size 3 left
- 4217-4040 size 4 right
- 4217-4045 size 4 left
- 4217-4050 size 5 right
- 4217-4055 size 5 left



### EPORE® Cone femoral 50mm

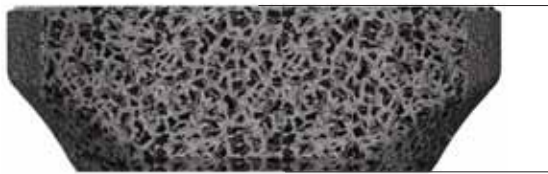
mat.: implatan® acc. to ISO 5832-3

- 4217-5020 size 2 right
- 4217-5025 size 2 left
- 4217-5030 size 3 right
- 4217-5035 size 3 left
- 4217-5040 size 4 right
- 4217-5045 size 4 left
- 4217-5050 size 5 right
- 4217-5055 size 5 left



# EPORE® Cones

## IMPLANTS



20mm

### EPORE® Cone tibial 20mm

mat.: *implatan*® acc. to ISO 5832-3

4217-0022	size 2
4217-0023	size 3
4217-0024	size 4
4217-0025	size 5

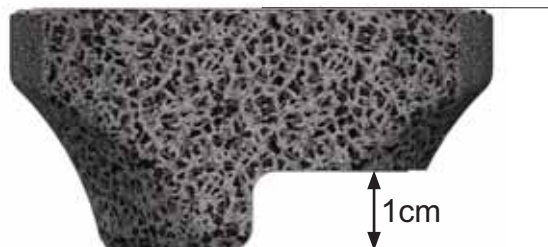


30mm

### EPORE® Cone tibial 30mm

mat.: *implatan*® acc. to ISO 5832-3

4217-0002	size 2
4217-0003	size 3
4217-0004	size 4
4217-0005	size 5



30mm  
stepped

1cm

### EPORE® Cone tibial stepped

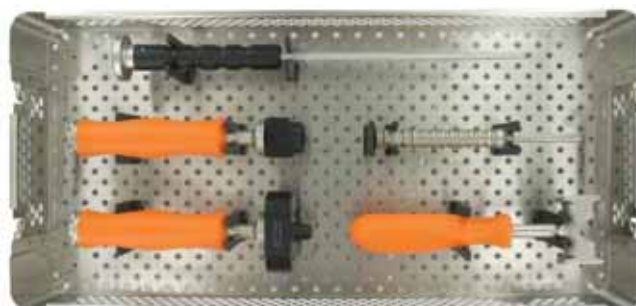
mat.: *implatan*® acc. to ISO 5832-3

4217-0012	right size 2
4217-0013	right size 3
4217-0014	right size 4
4217-0015	right size 5
4217-0032	left size 2
4217-0033	left size 3
4217-0034	left size 4
4217-0035	left size 5

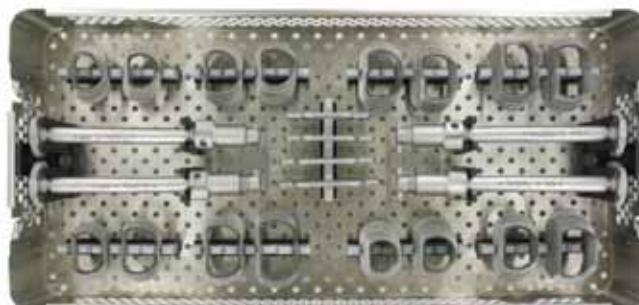


**INSTRUMENTS**

**EPORE® Cone basic container**  
7295-2001



**EPORE® Cone tibia container**  
7295-2002



**EPORE® Cone femur container left**  
7295-2003



**EPORE® Cone femur container right**  
7295-2004







# EPORE® Cones

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## INSTRUMENTS



**EPORE® Cone offset tester femoral  
GenuX® MK container**  
7295-2005



**EPORE® Cone offset tester tibial  
container**  
7295-2007



## INSTRUMENTS

EPORE® Cone basic container  
7295-2001

**EPORE® Cone impactor femoral**  
7295-1020



**EPORE® Cone impactor tibial**  
7295-1010



**slotted hammer**  
7295-1028



**MUTARS® Counter instrument Ø6mm**  
7420-0001



**universal broach 5mm straight**  
8005-1600





# EPORE® Cones

## INSTRUMENTS

### EPORE® Cone tibia container 7295-2002



### **EPORE® Cone punch tibial**

- 7295-1002 size 2
- 7295-1003 size 3
- 7295-1004 size 4
- 7295-1005 size 5



### **EPORE® Cone adapter tibial**

- 7295-1012 size 2
- 7295-1013 size 3
- 7295-1014 size 4
- 7295-1015 size 5



### **EPORE® Cone rasp tibial**

- 7295-1102 size 2 20mm
- 7295-1103 size 3 20mm
- 7295-1104 size 4 20mm
- 7295-1105 size 5 20mm



- 7295-1072 size 2 30mm
- 7295-1073 size 3 30mm
- 7295-1074 size 4 30mm
- 7295-1075 size 5 30mm



### **EPORE® Cone rasp tibial stepped**

- 7295-1082 size 2 left
- 7295-1083 size 3 left
- 7295-1084 size 4 left
- 7295-1085 size 5 left
  
- 7295-1092 size 2 right
- 7295-1093 size 3 right
- 7295-1094 size 4 right
- 7295-1095 size 5 right



## INSTRUMENTS

### EPORE® Cone femur container left 7295-2003

### EPORE® Cone punch femoral 7295-1022



### EPORE® Cone adapter femoral 7295-1023 left



### EPORE® Cone rasp femoral

7295-1052 size 2 left 40mm  
7295-1053 size 3 left 40mm  
7295-1054 size 4 left 40mm  
7295-1055 size 5 left 40mm

7295-1032 size 2 left 50mm  
7295-1033 size 3 left 50mm  
7295-1034 size 4 left 50mm  
7295-1035 size 5 left 50mm





# EPORE® Cones

## INSTRUMENTS

### EPORE® Cone femur container right 7295-2004



### **EPORE® Cone punch femoral** 7295-1022



### **EPORE® Cone adapter femoral** 7295-1024 right



### **EPORE® Cone rasp femoral**

7295-1062	size 2 right	40mm
7295-1063	size 3 right	40mm
7295-1064	size 4 right	40mm
7295-1065	size 5 right	40mm

7295-1042	size 2 right	50mm
7295-1043	size 3 right	50mm
7295-1044	size 4 right	50mm
7295-1045	size 5 right	50mm



**INSTRUMENTS**

**EPORE® Cone offset tester femoral**  
**GenuX® MK container**  
**7295-2005**

**EPORE® Cone offset tester femoral**  
**for GenuX® MK**

- 7295-1200 0mm
- 7295-1202 2mm
- 7295-1204 4mm
- 7295-1206 6mm



**EPORE® Cone offset tester tibial container**  
**7295-2007**

**EPORE® Cone offset tester tibial**

- 7295-2200 0mm
- 7295-2202 2mm
- 7295-2204 4mm
- 7295-2206 6mm







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