LINK®

LCU® – Hip System

cementless

Presented by:

Waldemar Link GmbH & Co. KG

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LCU® – Hip System
cementless

*BIOLOX® delta and BIOLOX® forte are made by CeramTec GmbH, Plochingen, Germany

System Description

Philosophy

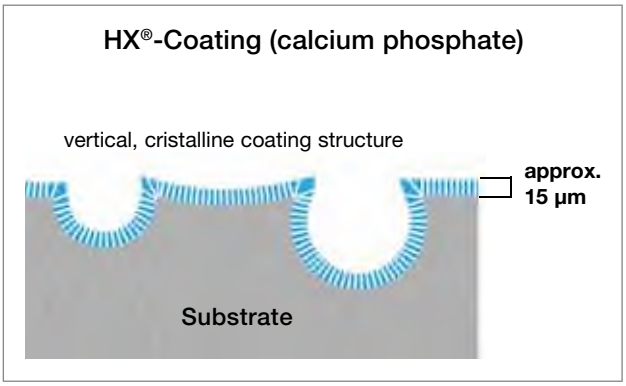
The LCU® hip system employs a straight stem with tapered lateral shoulder and coating. The profile is straight with a rectangular cross-section to give the implant proximal stability.
Two stem types allow for optimal adaption to the patients anatomy:

- Standard stem type with a CCD angle of 130°
- Lateralizing stem type with a CCD angle of 125°

Materials

The following materials and coatings are used for LCU® hip stems:

- The stem is made from forged Ti6Al4V alloy.
- The micro-roughness of the stem's surface is created by corundum-blasting.
  This produces a regular and uniform surface micro structure with sufficient roughness for bone integration.
- A calcium phosphate layer (about 15 µm thick) is applied over the whole length of the prosthesis stem.



1
Frontal view showing
100 mm radius of curvature

2
Lateral view reflecting
metaphyseal V shape

3
Taper of the
distal tip

4
Characteristic
proximal and
distal ribs

Biomechanical properties

- Large medial curvature (radius 100 mm) provides metaphyseal support, fixation and load transfer. Additionally it ensures good anatomical fit, essential for primary and long term stability (Fig. 1).
- Characteristic metaphyseal V shape (Fig. 2) gives the implant its primary stability.
- Rectangular cross-section acts to neutralize torsion forces.
- Tapered distal end prevents bone contact and facilitates introduction of the stem into the medullary cavity (Fig. 3).
- The horizontal ribs on the proximal section oppose subsidence and promote primary stability. The distal area is equipped with vertical ribs promoting rotational stability (Fig. 4).
- Flattened tapered neck increases the range of motion between stem and acetabular cup. The 12/14 taper is designed to be used with LINK ceramic or metal prosthesis heads of different lengths and diameters.
- The highly polished neck area reduces the abrasion of the polyethylene insert if contact should occur.

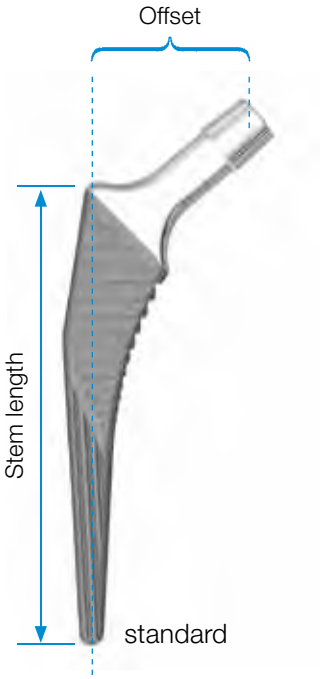
Note: For specific indications/contraindications, see page 18.

Implants

Sizes
The LCU® hip prosthesis types standard and lateralized are available in 11 sizes each.
The dimensions of the stems and the offset increase proportionately with increasing size.

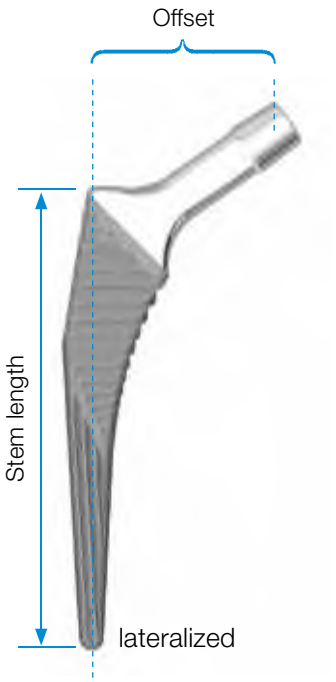
The CCD angles are:
- 130° in standard stem type
- 125° in lateralized stem type

LCU® HX® Hip Stems, cementless



LCU® Hip Stems, cementless, **standard type**
Material: Ti6Al4V, HX® Coating, taper 12/14, CCD angle 130°

Item no.	Size	Length mm	Offset mm
165-012/26	8	115	38,0
165-013/26	9	130	38,5
165-014/26	10	140	39,2
165-015/26	11	145	40,0
165-016/26	12	150	40,7
165-017/26	13	155	41,5
165-018/26	14	160	42,0
165-019/26	15	165	43,0
165-020/26	16	170	43,5
292-126/26	18	180	44,5
292-127/26	20	190	45,0



LCU® Hip Stems, cementless,
lateralized type, + 7 mm offset
Material: Ti6Al4V, HX® Coating, taper 12/14, CCD angle 125°

Item no.	Size	Length mm	Offset mm
165-112/26	8	115	45,0
165-113/26	9	130	45,5
165-114/26	10	140	46,2
165-115/26	11	145	47,0
165-116/26	12	150	47,7
165-117/26	13	155	48,5
165-118/26	14	160	49,0
165-119/26	15	165	50,0
165-120/26	16	170	50,5
292-186/26	18	180	51,5
292-187/26	20	190	52,0

Prosthesis Heads

Prosthesis heads A - ceramic
Material: BIOLOX® forte*

Item no.	Head Ø mm	Taper mm	Neck length mm	
128-928/01	28	12/14	short	-3.5
128-928/02	28	12/14	medium	0.0
128-928/03	28	12/14	long	+3.5
128-932/01	32	12/14	short	-4.0
128-932/02	32	12/14	medium	0.0
128-932/03	32	12/14	long	+4.0
128-936/01	36	12/14	short	-4.0
128-936/02	36	12/14	medium	0.0
128-936/03	36	12/14	long	+4.0
128-940/01	40	12/14	short	-4.0
128-940/02	40	12/14	medium	0.0
128-940/03	40	12/14	long	+4.0

Prosthesis heads A - ceramic
Material: BIOLOX® delta*

All BIOLOX® forte* and BIOLOX® delta* components are compatible with each other.

Item no.	Head Ø mm	Taper mm	Neck length mm	
128-791/01	28	12/14	short	-3.5
128-791/02	28	12/14	medium	0.0
128-791/03	28	12/14	long	+3.5
128-792/01	32	12/14	short	-4.0
128-792/02	32	12/14	medium	0.0
128-792/03	32	12/14	long	+4.0
128-792/04**	32	12/14	extra long	+7.0
128-793/01	36	12/14	short	-4.0
128-793/02	36	12/14	medium	0.0
128-793/03	36	12/14	long	+4.0
128-793/04**	36	12/14	extra long	+8.0
128-794/01	40	12/14	short	-4.0
128-794/02	40	12/14	medium	0.0
128-794/03	40	12/14	long	+4.0
128-794/04**	40	12/14	extra long	+8.0

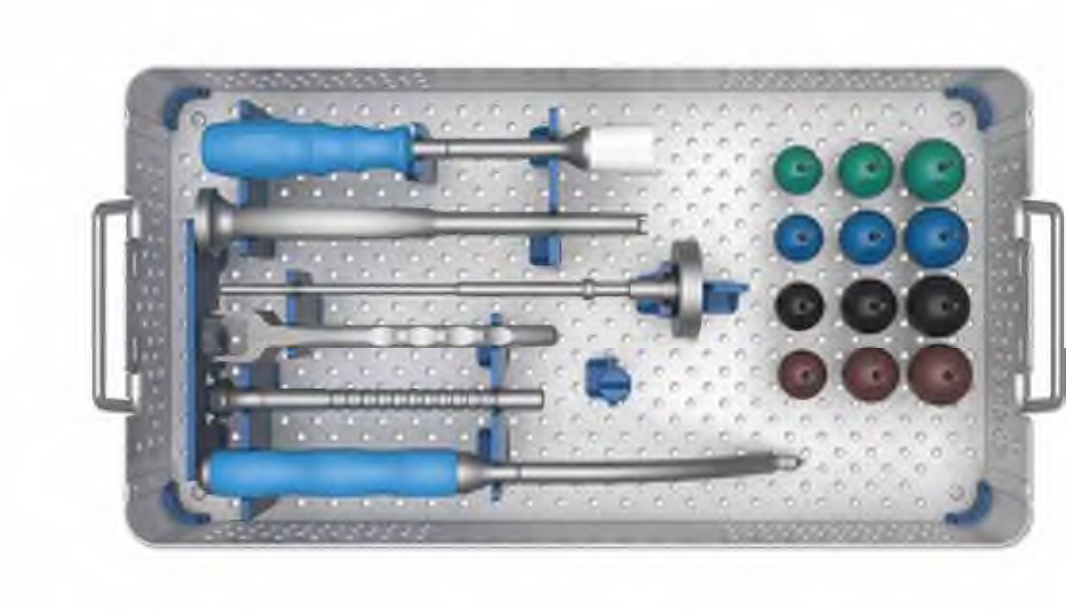
Prosthesis heads B
Material: CoCrMo alloy

Item no.	Head Ø mm	Taper mm	Neck length mm	
128-828/01	28	12/14	short	-3.5
128-828/02	28	12/14	medium	0.0
128-828/03	28	12/14	long	+3.5
128-828/04**	28	12/14	extra long	+10.5
128-832/01	32	12/14	short	-4.0
128-832/02	32	12/14	medium	0.0
128-832/03	32	12/14	long	+4.0
128-832/04**	32	12/14	extra long	+8.5
128-836/01	36	12/14	short	-4.0
128-836/02	36	12/14	medium	0.0
128-836/03	36	12/14	long	+4.0
128-836/04**	36	12/14	extra long	+8.0

* BIOLOX® forte and delta are made by CeramTec GmbH, Plochingen, Germany
** On request

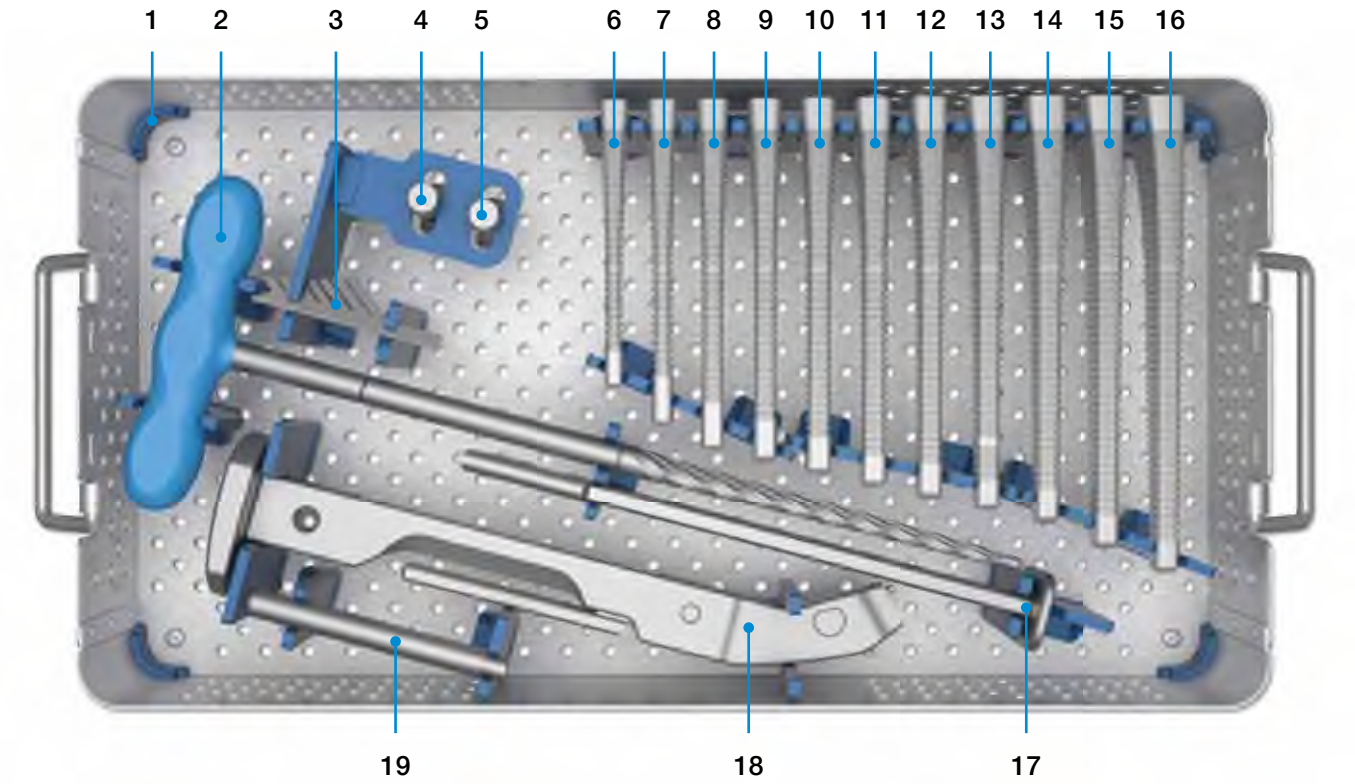
Instrument Sets for LCU® Hip Prosthesis Stems

Item no.	Instrument Set for LCU® Hip Prosthesis System
165-100/30	**Instrument Set 1,** complete



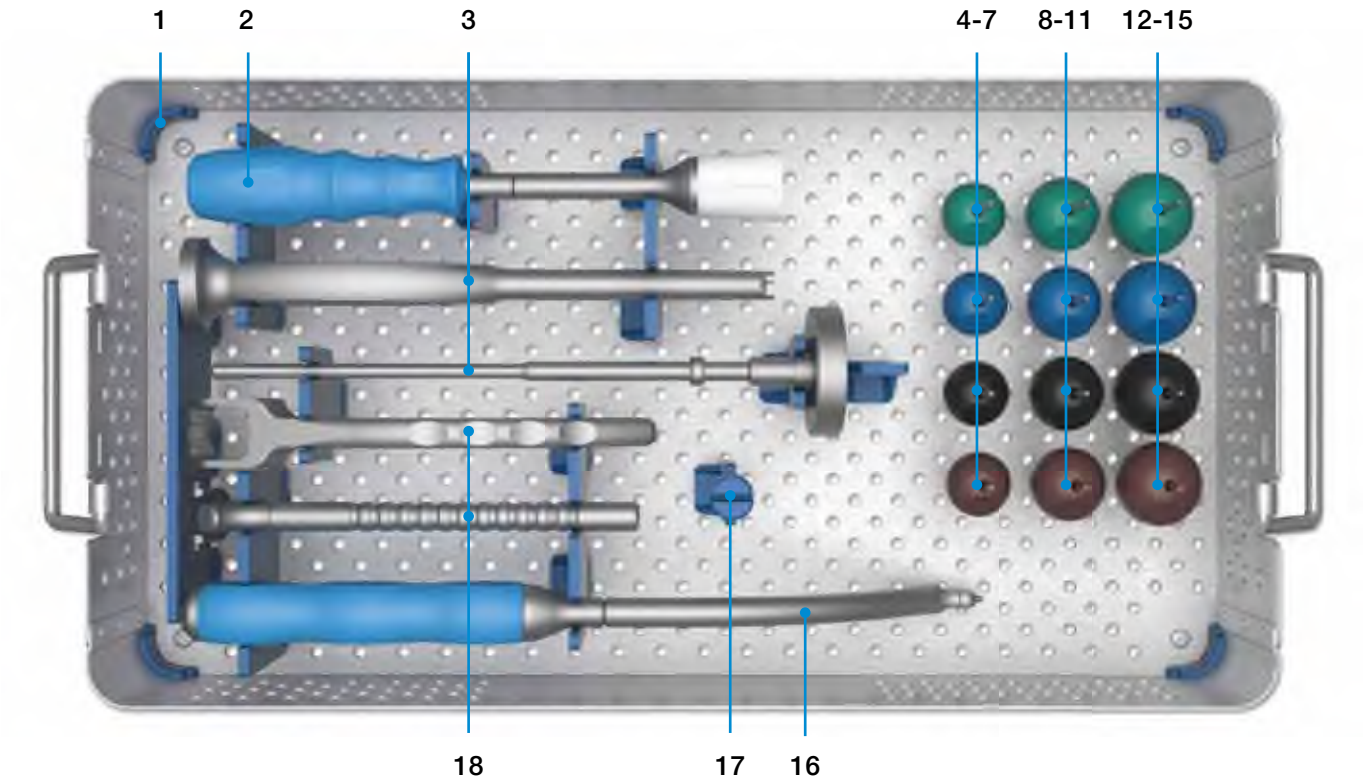
Item no.	Instrument Set for LCU® Hip Prosthesis System
165-100/31	**Instrument Set 2,** complete

165-100/30 **Instrument Set 1,** complete



1	165-100/10	**Instrument Tray,** empty, stainless steel, with lid
2	130-617	**Femoral Canal Opener,** stainless steel, 365 mm
3	175-310/05	**Resection Guide,** stainless steel, 77 mm
4	165-110/25	**Trial Neck Segment,** stainless steel, Taper 12/14, CCD 125 °, lateralizing
5	165-110/30	**Trial Neck Segment,** stainless steel, Taper 12/14, CCD 130 °, standard
6	165-111/08	**Bone Compressor,** stainless steel, Size 8
7	165-111/09	**Bone Compressor,** stainless steel, Size 9
8	165-111/10	**Bone Compressor,** stainless steel, Size 10
9	165-111/11	**Bone Compressor,** stainless steel, Size 11
10	165-111/12	**Bone Compressor,** stainless steel, Size 12
11	165-111/13	**Bone Compressor,** stainless steel, Size 13
12	165-111/14	**Bone Compressor,** stainless steel, Size 14
13	165-111/15	**Bone Compressor,** stainless steel, Size 15
14	165-111/16	**Bone Compressor,** stainless steel, Size 16
15	165-111/18	**Bone Compressor,** stainless steel, Size 18
16	165-111/20	**Bone Compressor,** stainless steel, Size 20
17	130-716	**Box Chisel,** stainless steel, 244 mm
18	130-394/01	**Rasp Handle** with quick coupling, stainless steel, straight
19	130-393/81	**Positioning Guide** for aligment of anteversion, stainless steel, 110 mm

165-100/31 **Instrument Set 2,** complete



1	165-100/11	**Instrument Tray,** empty, stainless steel, with lid
2	175-360	**Head Impactor** with exchangeable plastic head, stainless steel / silicone, 242 mm
3	130-711	**Positioner,** stainless steel, 259 mm
4	132-928/01	**Plastic Trial Head,** PPH, Taper 12/14, Ø 28 mm, Neck length short, green
5	132-928/02	**Plastic Trial Head,** PPH, Taper 12/14, Ø 28 mm, Neck length medium, blue
6	132-928/03	**Plastic Trial Head,** PPH, Taper 12/14, Ø 28 mm, Neck length long, black
7	132-928/04	**Plastic Trial Head,** PPH, Taper 12/14, Ø 28 mm, Neck length extra long, brown
8	132-932/01	**Plastic Trial Head,** PPH, Taper 12/14, Ø 32 mm, Neck length short, green
9	132-932/02	**Plastic Trial Head,** PPH, Taper 12/14, Ø 32 mm, Neck length medium, blue
10	132-932/03	**Plastic Trial Head,** PPH, Taper 12/14, Ø 32 mm, Neck length long, black
11	132-932/04	**Plastic Trial Head,** PPH, Taper 12/14, Ø 32 mm, Neck length extra long, brown
12	132-936/01	**Plastic Trial Head,** PPH, Taper 12/14, Ø 36 mm, Neck length short, green
13	132-936/02	**Plastic Trial Head,** PPH, Taper 12/14, Ø 36 mm, Neck length medium, blue
14	132-936/03	**Plastic Trial Head,** PPH, Taper 12/14, Ø 36 mm, Neck length long, black
15	132-936/04	**Plastic Trial Head,** PPH, Taper 12/14, Ø 36 mm, Neck length extra long, brown
16	130-622/01	**Impactor,** curved, stainless steel / silicone
17	179-122/01	**Taper Cap,** PPSU, Assignment for 134-141/00, blue
18	134-141/00	**Inserting Forceps** with exchangeable taper cap, stainless steel, 200 mm

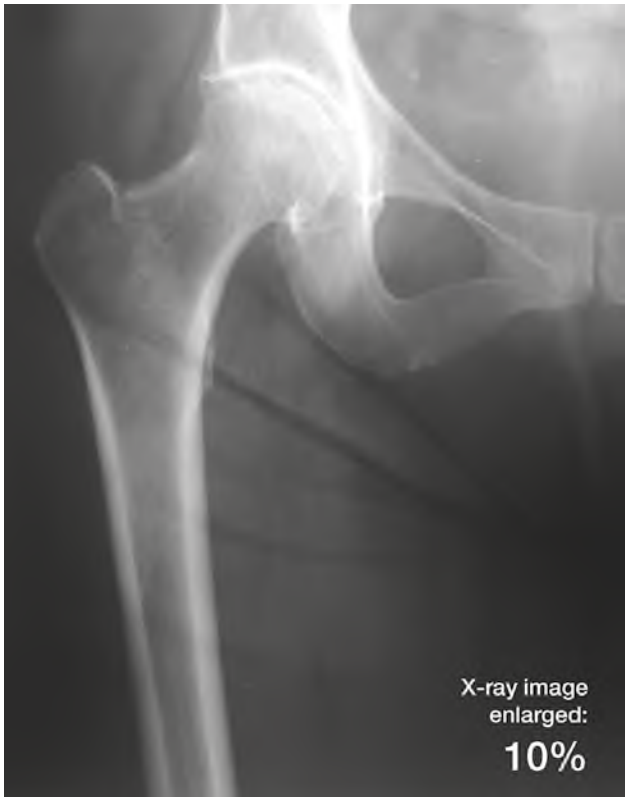
Plastic Trial Heads for taper 12/14 mm

Image may differ from original

Item no.	Neck length	Ø mm	Neck length mm	Color
132-926/01	short	26	-3.5	green
132-926/02	medium	26	0.0	blue
132-926/03	long	26	+3.5	black

On request

Preoperative Planning



For optimal results the surgery should be planned in advance using the appropriate templates.
The templates are enlarged by a factor of 110%.

The implant size should be choosen using good quality AP and ML X-rays with adequate contrast. Each X-ray should be large enough to apply the whole template.

Choice of stem size and stem type

The stem size is selected in a way that, in frontal plane, the outline fills as much of the proximal femoral metaphysis as possible. In the sagittal plane it must be ensured that the stem is suited to the anterior bow of the femur.

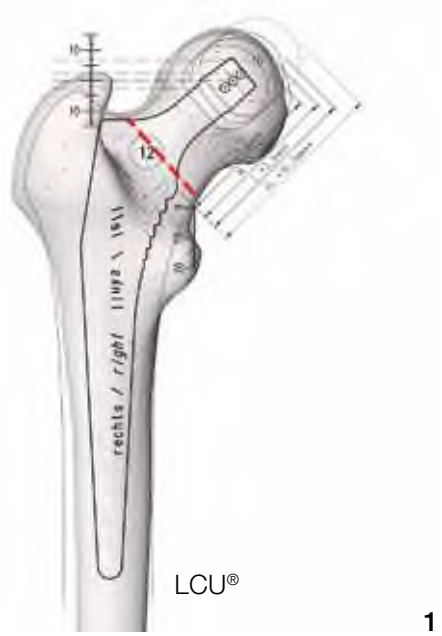
The stem is fixed proximally and therefore does not need to fit closely in the distal area. The size of prosthesis should be chosen so that the center of rotation is correctly situated in the middle of the head respectively at a level with greater trochanter. Anteversion must be checked in the sagittal plane.

The stem size and the level for resection of the femoral neck should be selected such that the tip of the greater trochanter is level with the center of the head of the prosthesis.

Lateralizing stems are available to achieve an anatomical reconstruction, even in case a high offset (+7 mm compared to standard stem) is required.

The templates for the LCU® stem show the centers of rotation for different head-neck-lengths (Fig. 1).

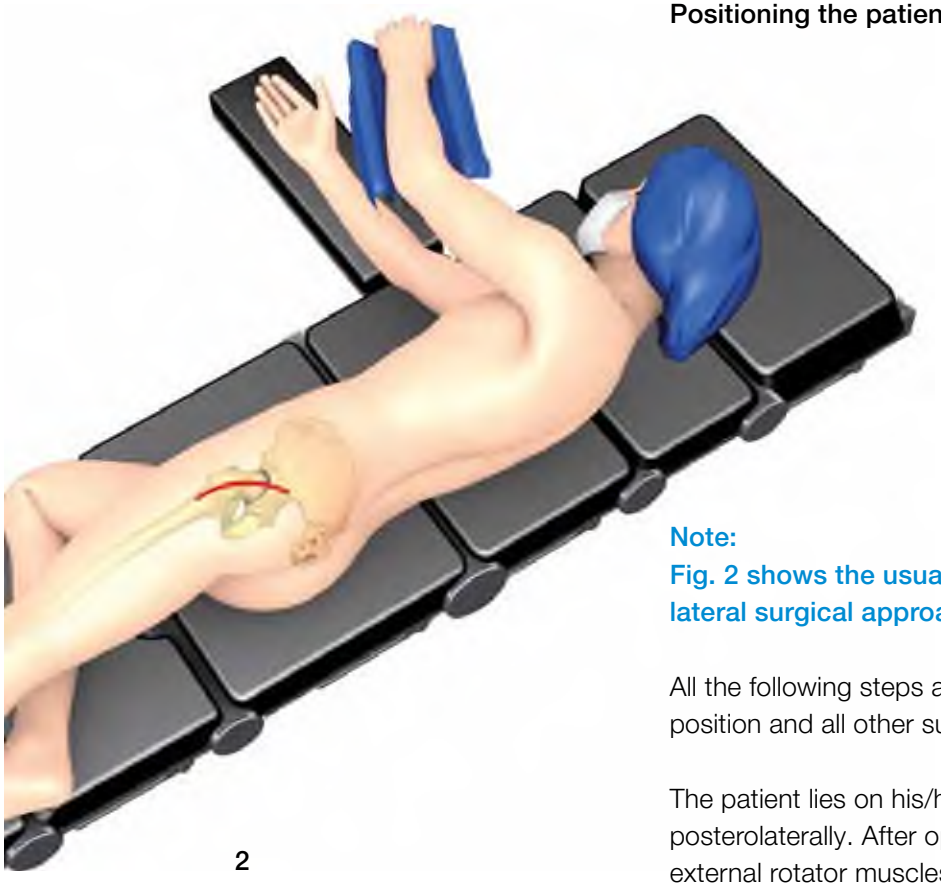
Note:
Preoperative planning gives an initial estimate but cannot conclusively determine the size of stem to be used. This is decided intraoperatively.



LCU®

1

Preparation and Implantation



2

Positioning the patient

Note:
Fig. 2 shows the usual position for postero-lateral surgical approach.

All the following steps also apply for the supine position and all other surgical access routes.

The patient lies on his/her side. The incision is done posterolaterally. After opening of the fascia lata, external rotator muscles are resected and the joint capsule is incited. Then, the femoral head is dislocated in dorsal direction so that it lies free.

3

Determination of the resection level

The standard osteotomy plane is normally at 45° to the axis of the femoral stem.
For purposes of orientation the resection guide can be placed on the lesser trochanter parallel to the longitudinal axis of the femur (Fig. 3). Resection can then be carried out along the slit corresponding to the level selected in preoperative planning.
The guide indicates both the level and the angle of resection. Care should be taken to ensure that resection is also carried out at 90° to the axis of the femoral neck in the a-p plane.
Alternatively, a bone compressor can be used to determine the resection level.

4

Resection of the femoral neck

Resection is carried out at the planned level (Fig. 4).

5

In most cases, the acetabulum is prepared before the femur.

Preparation of the proximal femur

The medullary canal is opened with the box chisel (Fig. 5).
This is done as laterally as possible to prevent varus positioning of the femoral component.

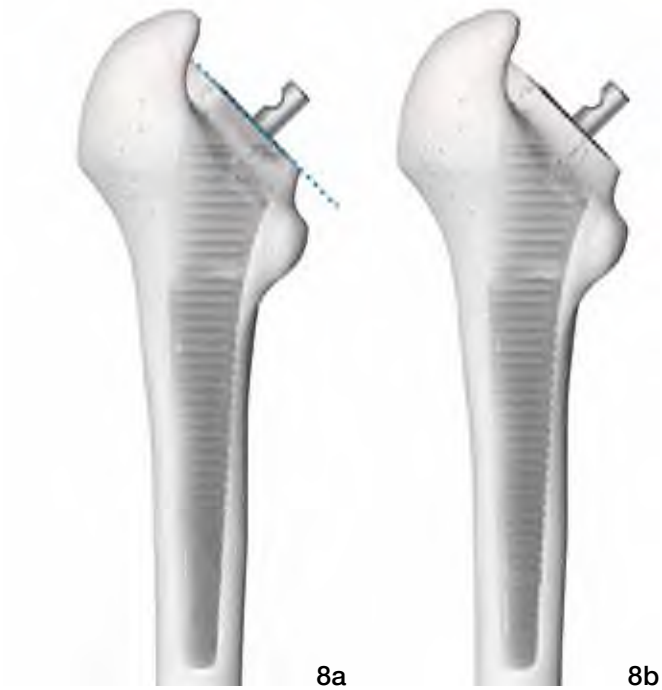
6

To position the bone compressor in the center of the canal, preparation is performed with the opening awl (Fig. 6).

7

To fix the bone compressor in the handle open the lever and insert the bone compressor with the medial side in the direction of the lever.

Close the lever. Start with the smallest bone compressor. Take into account the anteversion of the stem required (usually 15°).
Lateral compressive stress (which may lead to thigh pain later on) in the distal femur is avoided by inserting the bone compressor in an axial direction (Fig. 7).

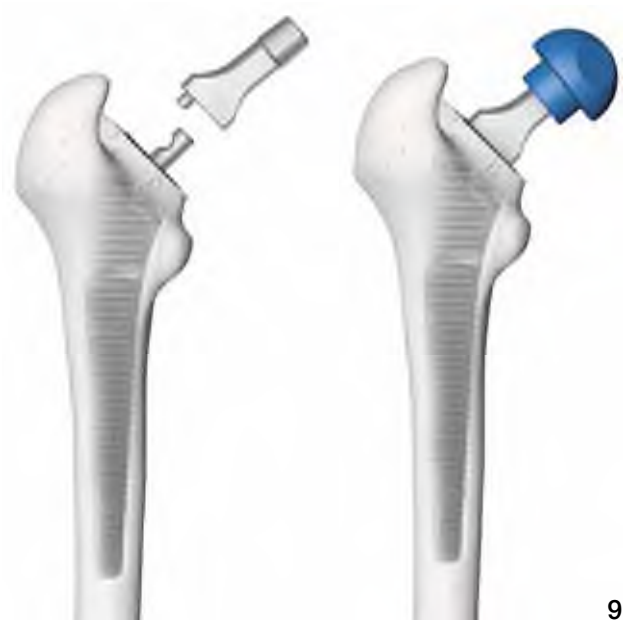


8a 8b

Drive in the bone compressor until the junction surface of the compressor is flush with the resected neck surface.

Note:
The resection level is determined during preoperative planning with the aid of the templates. Any deviations must now be taken into consideration (Fig. 8a and 8b).

Continue with progressively larger compressor sizes until the bone compressor is optimally seated in the femur (rotational stability, axial stability, implant level (height of centre of rotation)). When the optimal compressor size is reached (which is not necessarily the same as planned preoperatively) remove the handle and leave the compressor in place.



9

Trial reduction

The acetabular cup is usually implanted before the stem. Trial reduction can then be carried out.

The inserted bone compressor serves as a trial prosthesis on which the trial neck is inserted. Select the appropriate trial neck segment according to the pre-op planning (stem types standard and lateralizing). The trial head is then placed on the trial neck (Fig. 9).

10

The stability and range of motion of the joint are examined with the help of the trial components (Fig. 10).

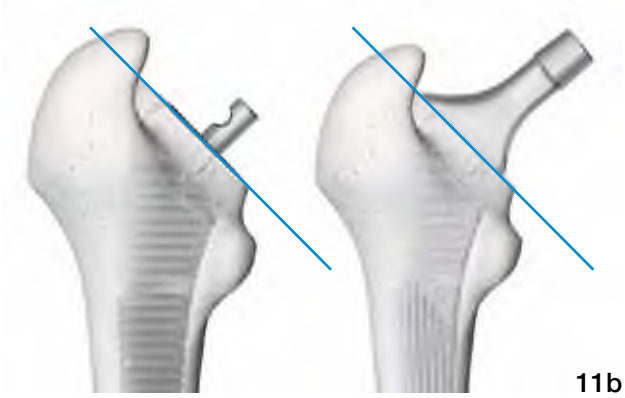
Finally, the trial head and neck segment are removed by hand and the bone compressor is removed with the help of the handle.

11a

Inserting the final stem

Select the appropriate LCU® hip prosthesis stem (standard and lateralizing type) of the same size as the final bone compressor and remove it from the sterile packaging. Screw the stem positioner onto the final stem (Fig. 11a).

Drive in the stem with careful and controlled hammer blows until the transition line between the HX® Coating and the polished neck area corresponds to the profile of the last bone compressor used (Fig. 11b).



11b

Remove the positioner.

The impactor can also be used instead of the positioner to introduce the stem.

12

Final trial reduction

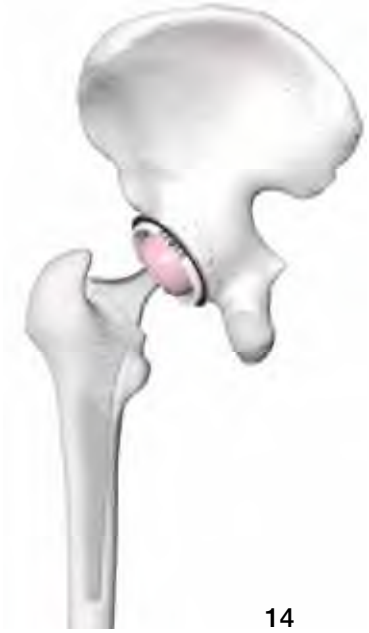
At this point the correct head-neck-length can be checked again with the trial heads (Fig. 12).

Remove the appropriate prosthesis head (diameter, length, material) from the sterile packaging.

13

Clean and dry the taper of the stem thoroughly. This is particularly important with ceramic heads.
Mount the head by hand using axial pressure and a turning motion.

Impact the head lightly if necessary (Fig. 13) using the impactor for prosthesis heads.



14

Clean the joint surfaces thoroughly and then finally reduce the joint (Fig. 14).

Removing the components

Each of the prosthesis components can be removed if necessary.
The prosthesis head can be removed in an axial direction using a rod which is placed at the base of the head.

The positioner can be used to extract the femoral component.

Caution:
If a ceramic head has to be replaced with another ceramic head, only ceramic revision heads (with a metal inner taper) should be used.

Accessories

X-ray Templates for LCU® Hip Stems, cementless
CCD angle 125°/130° (lateralized and standard type)
Material: Ti6Al4V, HX® Coating, taper 12/14 mm, 110% actual size, set of 11 sheets

Item no.	X-ray templates for lateralizing and standard type
165-141/35	**LCU® Hip Stems,** cementless, for prosthesis heads of Ø 28 mm
165-142/35	**LCU® Hip Stems,** cementless, for prosthesis heads of Ø 32 mm
165-143/35	**LCU® Hip Stems,** cementless, for prosthesis heads of Ø 36 mm
165-144/35	**LCU® Hip Stems,** cementless, for prosthesis heads of Ø 40 mm

Instructions for Cleaning and Maintenance

Specific instructions for instruments are available on request from customer@linkhh.de

Indications/Contraindications

Products	Hip stems	Prosthesis heads	
	LCU® – Hip System cementless	BIOLOX® forte* + delta* Prosthesis Heads A	Prosthesis Heads B
General Indications			
Mobility-limiting hip diseases, fractures or defects which cannot be treated by conservative or osteosynthetic procedures.	X	X	X
Indications			
Primary and secondary coxarthrosis	X	X	X
Primary and secondary coxarthrosis with narrow dysplastic femora		X	X
Osteoarthritis	X	X	X
Necrosis of the femoral head	X	X	X
Femoral neck fractures	X	X	X
Revision after implant loosening		X	X
Contraindications			
Poor general state of health	X	X	X
Acute and chronic infections, local and systemic	X	X	X
Allergies to (implant) materials	X	X	X
Distinctive muscular, nerve, vascular or other diseases which put the affected limb at risk.	X	X	X
Insufficient / inadequate bone mass- or quality which prevents a stable anchor of the prosthesis.	X	X	X
Relative Contraindications			
Adiposity	X	X	X
Lacking or foreseeable not assured compliance	X	X	X
Foreseeable overload/overstressing of the joint prosthesis	X	X	X
Osteoporosis	X		

The stems are indicated for cementless use only.

Please note:
These indications/contraindications refer to standard cases. The ultimate decision on whether or not an implant is suitable for a patient must be made by the surgeon based on his/her individual analysis and his/her experience.

*BIOLOX® delta and BIOLOX® forte are made by CeramTec GmbH, Plochingen, Germany

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Important Information

Please note the following regarding the use of our implants:

1. **Choosing the right implant is very important.**
   The size and shape of the human bone determines the size and shape of the implant and also limits the load capacity. Implants are not designed to withstand unlimited physical stress. Demands should not exceed normal functional loads.

2. **Correct handling of the implant is very important.**
   Under no circumstances should the shape of a finished implant be altered, as this shortens its life span.
   Our implants must not be combined with implants from other manufacturers.

   The instruments indicated in the Surgical Technique must be used to ensure safe implantation of the components.

3. **Implants must not be reused.**
   Implants are supplied sterile and are intended for single use only. Used implants must not be used again.

4. **After-treatment is also very important.**
   The patient must be informed of the limitations of the implant. The load capacity of an implant cannot compare with that of healthy bone!

5. **Unless otherwise indicated, implants are supplied in sterile packaging.**
   Note the following conditions for storage of packaged implants:

- Avoid extreme or sudden changes in temperature.
- Sterile implants in their original, intact protective packaging may be stored in permanent buildings up until the “Use by” date indicated on the packaging.
- They must not be exposed to frost, dampness or direct sunlight, or mechanical damage.
- Implants may be stored in their original packaging for up to 5 years after the date of manufacture. The “Use by” date is indicated on the product label.
- Do not use an implant if the packaging is damaged.

6. **Traceability is important.**
   Please use the documentation stickers provided to ensure traceability.

7. **Further information** on the material composition is available on request from the manufacturer.

Follow the instructions for use!

Waldemar Link GmbH & Co. KG, Hamburg

The Surgical Technique described has been written to the best of our knowledge and belief, but it does not relieve the surgeon of his/her responsibility to duly consider the particularities of each individual case.

This publication is intended for distribution only in the U.S. market.

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