

# MEGASYSTEM-C<sup>®</sup>

## Tumor and Revision Surgery

Presented by:



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# MEGASYSTEM-C®

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Important Information about the use of our implants

Specified indications and contraindications:

|                                                                                                                                                                                                                                                                                                                                       |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Product                                                                                                                                                                                                                                                                                                                               | MEGASYSTEM-C® |
| <b>General Indications</b>                                                                                                                                                                                                                                                                                                            |               |
| <ul style="list-style-type: none"> <li>• Mobility-limiting diseases, fractures or defects of the hip joint, the proximal and distal femur through the proximal tibia (only in combination with Endo-Model® Rotational and Hinge Knee SL® or modular) which cannot be treated by conservative or osteosynthetic procedures.</li> </ul> | X             |
| <b>Indications</b>                                                                                                                                                                                                                                                                                                                    |               |
| <ul style="list-style-type: none"> <li>• Revision arthroplasty due to juxta-articular bone defects</li> </ul>                                                                                                                                                                                                                         | X             |
| <ul style="list-style-type: none"> <li>• Revision of loosened femoral prosthesis components involving extensive bone resorption of the proximal femur and widening of the medullary cavity</li> </ul>                                                                                                                                 | X             |
| <ul style="list-style-type: none"> <li>• Revision of loosened femoral prosthesis components by peri-/sub-prosthetic fracture</li> </ul>                                                                                                                                                                                               | X             |
| <ul style="list-style-type: none"> <li>• Deformed proximal femur due to fractures or osteotomies</li> </ul>                                                                                                                                                                                                                           | X             |
| <ul style="list-style-type: none"> <li>• Correction of bone deficiencies, e.g. due to tumors</li> </ul>                                                                                                                                                                                                                               | X             |
| <ul style="list-style-type: none"> <li>• Large post-revision and post-trauma segmental bone defects</li> </ul>                                                                                                                                                                                                                        | X             |
| <ul style="list-style-type: none"> <li>• Oncological and revision surgery from tibial to hip area (in conjunction with Endo-Model® SL® Rotational and Hinge Knee Prostheses)</li> </ul>                                                                                                                                               | X             |
| <b>Contraindications</b>                                                                                                                                                                                                                                                                                                              |               |
| <ul style="list-style-type: none"> <li>• Acute or chronic infections, local and systemic</li> </ul>                                                                                                                                                                                                                                   | X             |
| <ul style="list-style-type: none"> <li>• Allergies to (implant) materials</li> </ul>                                                                                                                                                                                                                                                  | X             |
| <ul style="list-style-type: none"> <li>• Revision in septic environment</li> </ul>                                                                                                                                                                                                                                                    | X             |
| <ul style="list-style-type: none"> <li>• For preparation of the prosthesis bearing insufficient length of intact diaphysis (less than 80 mm)</li> </ul>                                                                                                                                                                               | X             |
| <ul style="list-style-type: none"> <li>• Distinctive muscular, nerve, vascular or other diseases which put the affected limb at risk</li> </ul>                                                                                                                                                                                       | X             |
| <ul style="list-style-type: none"> <li>• Insufficient bone integrity which prevents a stable anchorage of the prosthesis</li> </ul>                                                                                                                                                                                                   | X             |
| <b>Relative Contraindications</b>                                                                                                                                                                                                                                                                                                     |               |
| <ul style="list-style-type: none"> <li>• Adiposity</li> </ul>                                                                                                                                                                                                                                                                         | X             |
| <ul style="list-style-type: none"> <li>• Lacking or foreseeable not assured compliance</li> </ul>                                                                                                                                                                                                                                     | X             |
| <ul style="list-style-type: none"> <li>• Foreseeable overload/overstressing of joint prosthesis</li> </ul>                                                                                                                                                                                                                            | X             |

**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.

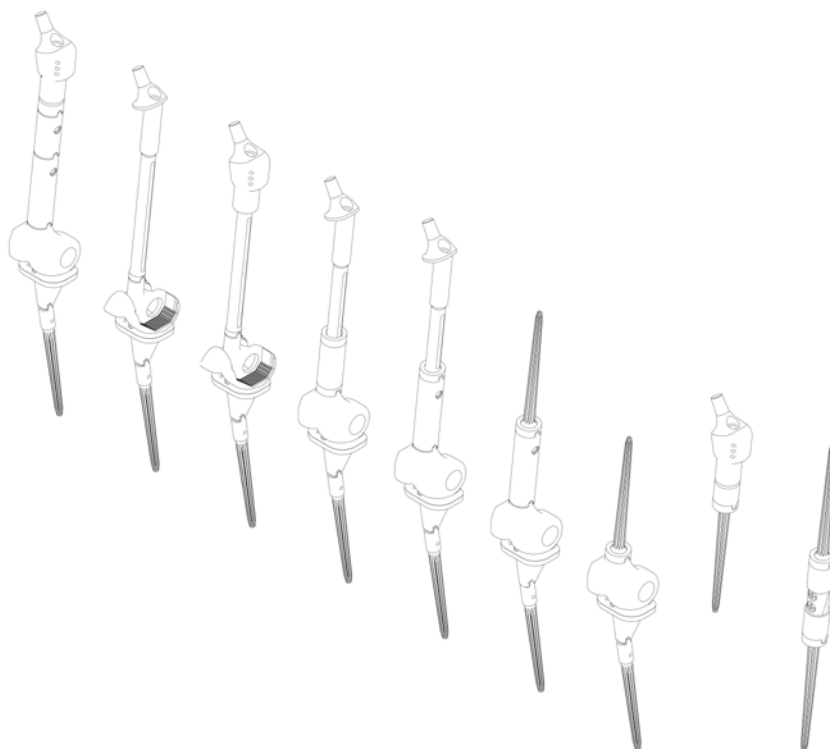
## ■ Preoperative Planning

Measurement tables and x-ray templates are available for the preoperative planning of revision and tumor surgery with the MEGASYSTEM-C® modular components, which enable the surgeon to plan precisely the implants that will be used.

True-to-scale radiographs or precise knowledge of the actual magnification factor are the foundation for exact preoperative planning. LINK x-ray templates show the implant illustrations in 110% magnification as standard. If different scales are desired, we will meet these wishes as far as technically possible. We provide data for digital planning on request to providers of digital planning software in the current formats.

Despite good preoperative planning, unforeseeable extensive bone loss in tumor and revision cases often presents a challenge for the surgeon. The high degree of modularity and flexibility demonstrates the user-friendliness of the MEGASYSTEM-C® especially in these cases as the implants can be adapted to the resected bone in 10 mm steps.

In contrast to the use of normal hip and knee joint prostheses, management of extensive bone loss depends on the conditions in each individual situation. Structural changes in the muscles and ligaments, fixation conditions etc. increase the operative demands of tumor prostheses. Accordingly, management of extensive bone loss presents particular problems and is therefore subject to greater risk compared with the use of normal joint prostheses.

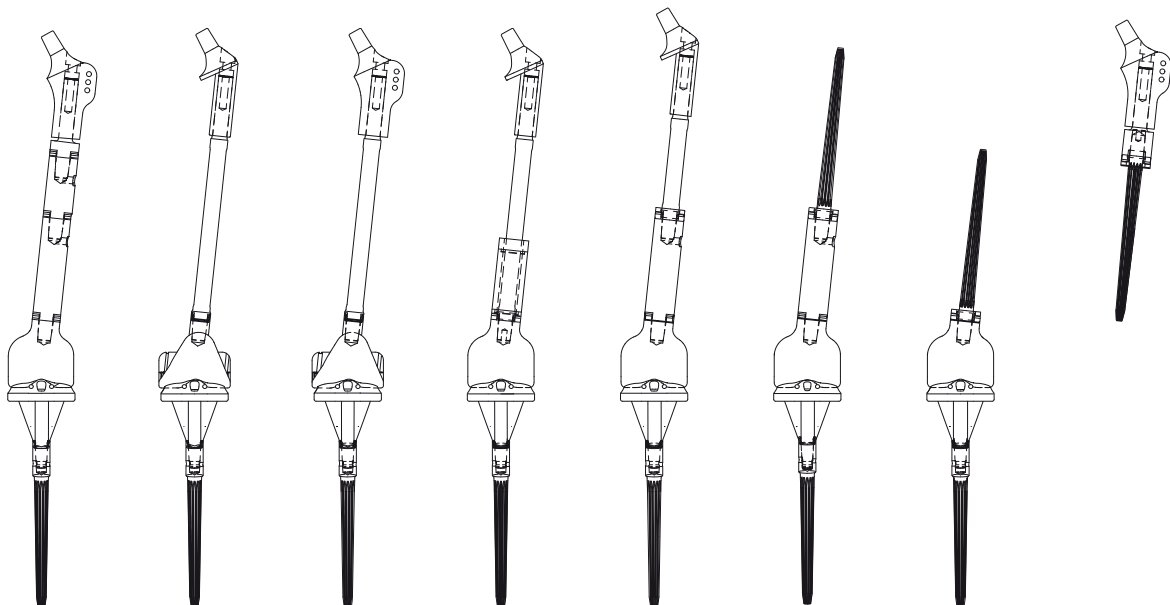


The design of the modular Bone and Joint Revision System **MEGASYSTEM-C®** for tumor surgery has been developed in collaboration with Prof. Dr. Capanna of the Centro Traumatologico Ortopedico in Florence.

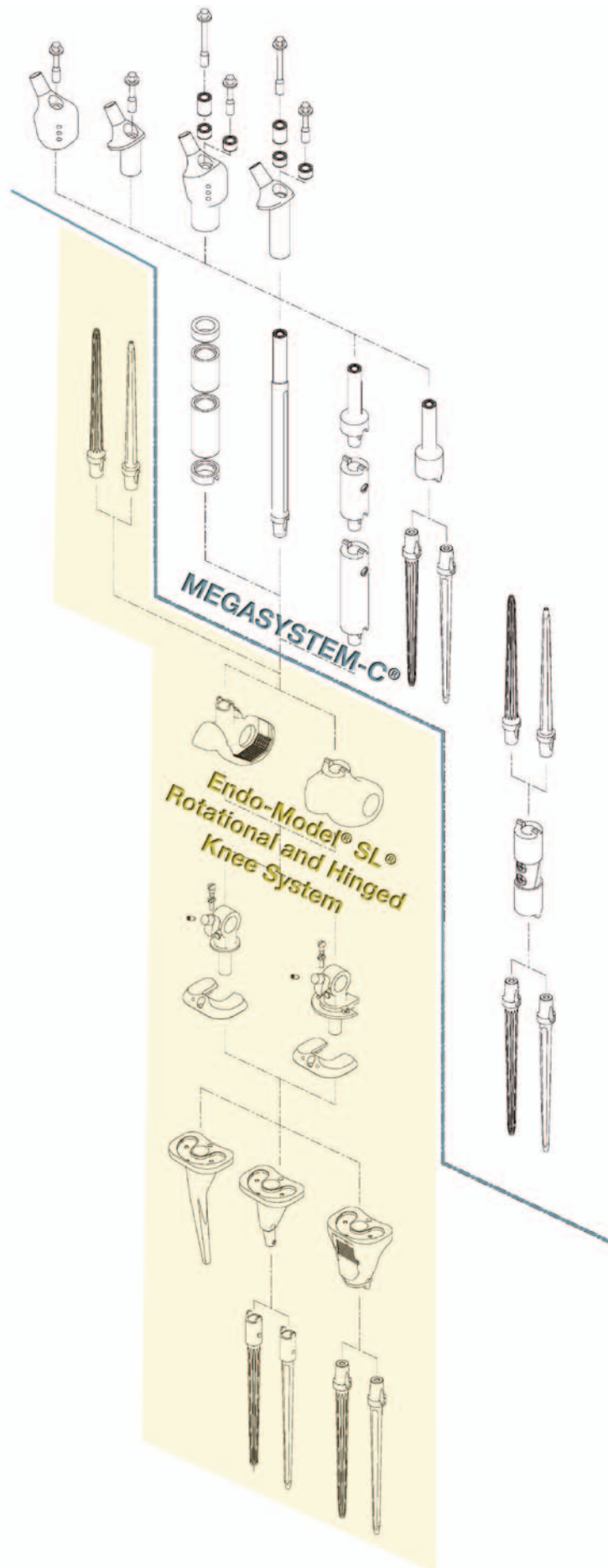
Due to its high modularity, the system allows partial bone replacements both in the proximal and distal femur in small increments as well as a total replacement of the femur. For the knee joint components, the **Endo-Model® SL®** Rotational Knee is used in the **MEGASYSTEM-C®**. The modularity of the system helps to successfully address intraoperative problems.

Observation of biomechanical load and anchoring principles and the application of proven implant components successfully tested over a long period allow utmost safety of the system and thus good prospects for the surgical outcome.

- Maximum intraoperative flexibility using highly modular implant components, thus reducing costs for true custom-made implants
- System-integrated components compatible with standard implant systems such as the MP® Reconstruction Hip System and Endo-Model® Total Knee Joint Prosthesis System
- Knee joint components based on long-term clinical experience with the Endo-Model® Rotational Knee Prosthesis
- Coupling mechanics clinically tested over a long period
- Cementable and cementless stem components
- Length adjustment in 10 mm increments intraoperatively
- Microporous implant surfaces support bone ongrowth
- Easy to handle system-integrated instrumentation



## ■ Modular Overview



**Endo-Model® SL®**  
**Rotational and Hinged**  
**Knee System**

Indications  
 Contraindications

Preoperative Planning

System Description  
 System Overview

Examples of Applications  
 Important Information  
 Mega-C Components

Surgical Technique

Additional Information

Important Information



## ■ Important Information to Mega-C components

### Important information on implantation of MEGASYSTEM-C® components

- 1) In comparison with primary hip and knee implantation, the bone conditions for anchoring the prosthetic components are often very difficult when mega prostheses are indicated and often necessitate compromise solutions. The useful life of the prostheses cannot be compared with that of primary joint arthroplasty.
- 2) Compensation of large bone defects is often associated with weakening of the soft tissues. The resulting alteration in biomechanics can also have a negative effect on the durability and function of the prosthesis.
- 3) The infection risk is usually much greater with tumor or revision surgery than with primary procedures.
- 4) Prior to use of MEGASYSTEM-C® implants, detailed preoperative planning is essential.
- 5) Correct leg length adjustment reduces the stresses on the implant components, the tapered connections and the bone/implant connections.
- 6) The assembly instruments for MEGASYSTEM-C® must always be used to join the implant tapered connections.
- 7) Whenever possible, the tapered connections should be joined outside the patient on the MEGASYSTEM-C® operating table.
- 8) Before securing the tapered connection with the locking screw, the connection must first be made using the appropriate assembly instruments (see instructions for use) (the components must be hammered together before being screwed).
- 9) The cones must be clean and dry before they are joined.
- 10) The locking screw should generally be used from the medial side. When the operative access is difficult, the implants provide the option of using the screw from the lateral side. Only one screw should be used.
- 11) When changing the locking screw, a new screw must always be used.
- 12) In revision operations, a new implant component should always be used as far as possible. Should an implant remain in the body, the cone must be protected from damage.
- 13) If a tapered connection is separated by means of the distraction instrument (15-8506/42) or the cone surfaces are damaged, the two implant components involved must not be reused.

## ■ Standard Preparation of the Tibia



### Intramedullary alignment

#### 01

Mark the entry site with the awl (317-658/01) and open the tibial canal with the conical drill (16-3202/00).



#### 02

Mount the awl in the planned length (100, 130 or 160 mm) in the handle (16-3210/00). The impaction plate (16-3203/00) latches into the slot on the shaft of the awl.

When uncemented modular stems are used, ream with an increasing diameter until the awl makes cortical contact over a continuous distance of approx. 50 mm. The uncemented implant that will be used must correspond in length and diameter to the last awl used.

For cemented modular stems, the awl should be at least 2 mm bigger than the planned stem diameter.

#### Important notes:

**The position of the impaction plate represents the level of the joint line. Using the awls with a drive motor is not permitted.**

## ■ Surgical Technique



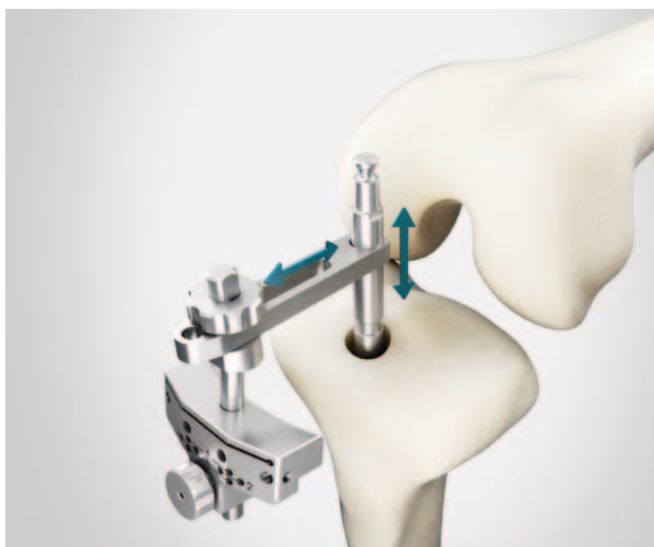
03

After the desired stability is achieved, the handle (16-3210/00) and the impaction plate (16-3203/00) are removed.



04

Attach the connector (16-3212/08) to the shaft of the awl.



05

Attach the tibial saw guide (16-3241/00) to the anterior shaft of the connector and fix provisionally by tightening the knurled screw.

**■ Standard Preparation Tibia**

**06**

Attach the stylus for the tibial saw guide (317-802/52), preferably medially. The stylus tip marked 10 marks the resection level in the primary procedure (10 mm resection level). The stylus tip marked 2 can be used in revision surgery and marks a resection level of 2 mm. Alternatively, the stylus can be omitted and the resection level can be set using the cutting template (317-607/50).


**07**

The tibial saw guide (16-3241/00) is fixed to the proximal tibia by means of two wire pins (317-585/65 or /95) through the lower row of parallel holes.


**08**

The bone is resected following removal of the stylus, connector and awl. The resection can be extended distally by 2- or 4 mm by shifting the tibial saw guide.



**09**

The last-used awl is inserted into the medullary cavity again. By placing the drill template (16-3198/02, /03, /04) that corresponds exactly to the implant size, the definitive implant size is determined. It is important that the implant covers the resection surface as much as possible. Projection over the cortical margin of the tibia must be avoided.



**10**

The alignment gauge (16-3266/00) is placed over the shaft of the awl and connected to the cylindrical elevations of the drill template. After rotational alignment of the drill template, it is fixed to the resection surface with at least two wire pins.



**11**

Remove the alignment gauge and awl.

■ **Standard Preparation Tibia**



**12**

Attached 16 mm diameter drill guide (16-3267/00) and drill the proximal tibia (manually or machine-operated) with the 16 mm drill (16-3207/16) as far as it will go.



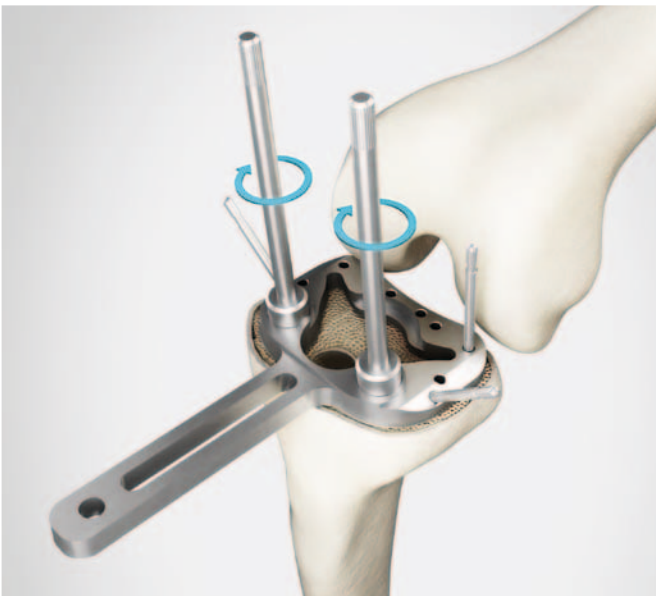
**13**

After removing the 16 mm drill guide, the drill guide (16-3270/18, /20, /22) is attached to drill the central tibial opening. The drill guide must correspond to the size of the drill template.



**14**

Drill the central tibial opening with the drill corresponding in diameter to the drill guide (16-3208/18, /20, /22) as far as it will go.



**15**

Screw the guide rods (16-3211/00) into the anterior threaded holes of the drill template.

■ **Standard Preparation Tibia**



**16**

Screw the stem compressor (16-3201/02, /03, /04) to the corresponding compressor (16-3199/02, /03, /04) for the proximal contour. Attach the handle (16-3197/00).



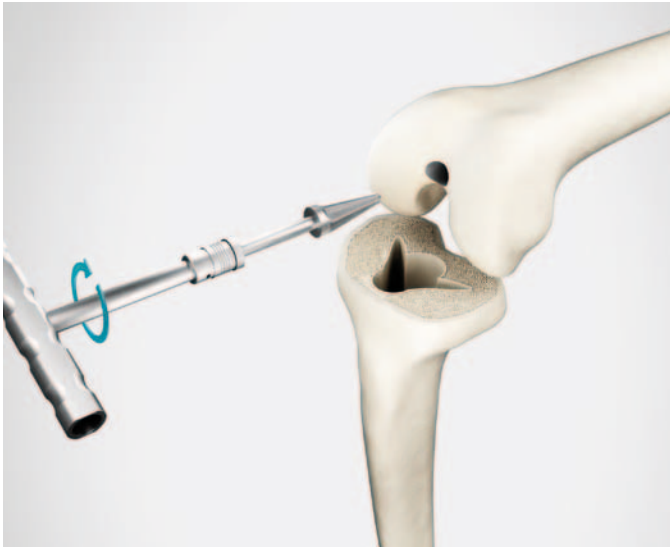
**17**

Drive in the compressor over the guide rods until the upper surface of the compressor has reached the level of the tibial resection.



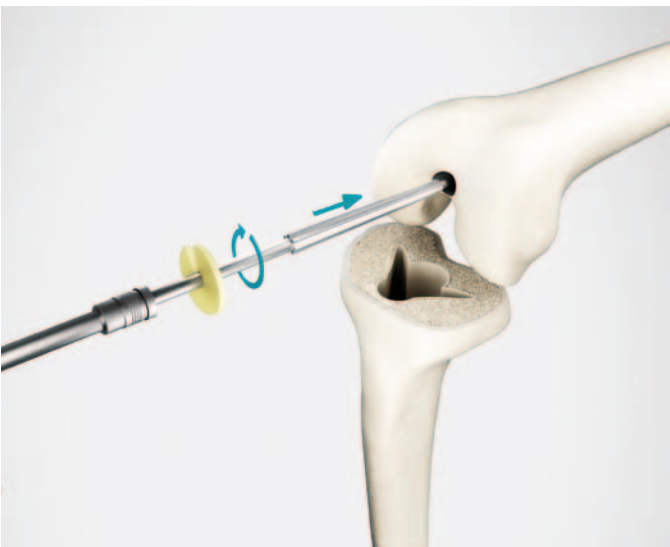
18  
Preparation of the tibia is now complete.

■ **Standard Preparation Femur**



**19**

Mark the entry site with the awl (317-658/01) and open the femoral canal with the conical drill (16-3202/00).



**20 + 21**

Mount the awl in the planned length (100, 130 or 160 mm) in the handle (16-3210/00). The impactation plate (16-3203/00) latches into the slot on the shaft of the awl.

When uncemented modular stems are used, ream with an increasing diameter until the awl makes cortical contact over a continuous distance of approx. 50 mm. The uncemented implant that will be used must correspond in length and diameter to the last awl used.

For cemented modular stems, the awl should be at least 2 mm bigger than the planned stem diameter.



**Important notes:**

The position of the impactation plate represents the level of the joint line. Using the awls with a drive motor is not permitted.



22

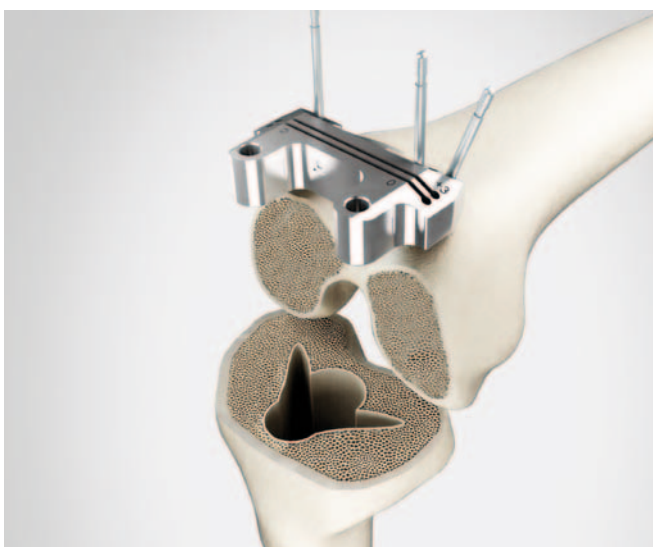
Remove the impaction plates and attach the alignment instrument for valgus angulation (16-3275/00). Ensure that the correct instrument for the right or left side is attached. The word "Left" or "Right" must face upward.



23

The appropriate saw block (16-3228/02, /03, /04) for the distal saw cut – for the previously determined size – is fixed to the valgus alignment instrument using the clamp. The cut can be simulated with the cutting template (317-607/50).

There is a +3 mm slot for proximal offset of the cut or the instrument can be moved by +2 mm after it is fixed by wire pins.



24

After fixing the saw guide by means of two parallel and one oblique wire pins, the valgus alignment instrument and the awl are removed and the distal cut is made.

## ■ Standard Preparation Femur



**25**

With the alignment instrument for determination of external rotation (16-3276/00), the selected femoral size is first set and fixed with a pin.

The alignment instrument allows external rotation to be set to 0°, 3° and 5° with reference to the posterior condylar tangent. Alternatively, external rotation can also be aligned using the Whiteside line with the small dipstick in the center of the instrument. Small alignment rods can be attached medially and laterally for orientation to the epicondylar line (Insall line).



**26**

Once the correct position is set, the instrument is fixed with two wire pins through the medial and lateral holes.



**27**

After the wire pins and alignment instrument have been removed, the dovetail adapter (317-802/36) is inserted in the depressions created by the wire pins.



**28**

The cutting block for chamfer cuts (16-3250/02, /03, 04) is pushed onto the side of the dovetail adapter and the central hex screw is fixed in the selected position with the hex screwdriver, wrench size 2.5 mm (10-5373/01). 2 wire pins can then be inserted for additional fixation. The anterior cut is made first, then the dorsal and finally the anterior and posterior oblique cut.



**29**

Before the trochlea is prepared with the chisel (317-802/32) for the patellar gliding groove, the cutting block for chamfer cuts is aligned somewhat lateral to the center. The trochlea is then prepared with the chisel. To do this, the chisel is connected to the handle (16-3197/00).



**30**

Following preparation of the distal femur, the last-used awl is inserted into the medullary cavity again.

■ **Standard Preparation Femur**



**31**

The condyle cap (16-3240/02, /03, /04) is placed on the prepared bone surfaces. The shaft of the awl forms the center.



**32**

A drill cap of the same size (16-3213/02, /03, /04) is placed on the pins of the condyle cap. The word "Left" or "Right" must face upward.



**33**

Using the center sleeve (16-3281/00), the instruments are aligned and centered on the shaft of the awl.

## ■ Surgical Technique



34

Following alignment, the drill cap is fixed to the condyle cap with the holding clamp (16-3279/00). The condyle cap is fixed to the bone with 2 wire pins. The center sleeve and awl are removed. If necessary, the drill cap must also be removed briefly and then put on again.



35

The drill for femur Ø 20 mm (16-3206/20) is inserted as far as it will go.



36

After removing the holding clamp, the drill cap is removed, the saw attachment matching the selected prosthesis size (e.g. 16-3223/02) is attached and secured again with the holding clamp. The femur box is then prepared with an oscillating saw.

■ **Standard Preparation Femur**



**37**

Preparation of distal femur is complete.



**38**

The tibial trial stem and trial prosthesis are joined by screwing them together and inserted into the prepared tibia.



**39**

The femoral trial stem and trial prosthesis are joined by screwing them together and inserted into the prepared femur.



40

The cylindrical part of the trial prosthesis for connection components (16-3196/00) is inserted in the tibial trial prosthesis. The transverse axle of the femoral trial prosthesis is then inserted in the opened clamp of the connection components. The connection is secured by tightening the knurled screw.



41

By extending, flexing and rotating the treated limb, it is possible to estimate the leg length and degrees of rotation and flexion.

In the case of existing tibial or femoral defects, the joint line can be reconstructed by using femoral segments and/or proximal tibial spacers. **It is not permissible to combine several segments or spacers.** All femoral segments and the proximal tibial spacers of polyethylene are fixed to the implant with bone cement. The Tilastan® spacers are fixed by means of fastening screws included in the supply (see sterile packaging for description).

## ■ Assembling the Tibial Implant Components



### 42 + 43

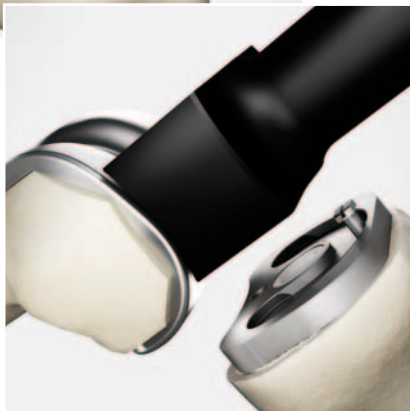
The tibial stems are fixed through a tapered connection on the tibial component. It should be ensured that the lugs of the prosthetic stems are inserted into the intended slots. The stem is then screwed to the tibial component.

After the underside of the tibial prosthetic component has been coated with a thin layer of bone cement, the prosthesis is inserted into the tibia with the impactor (16-0018/02).



### 44 + 45

The cementing screw remains in place until the bone cement has set, thus protecting the thread of the prosthesis. After the cement has set, the screw is removed with the screwdriver (322-145/01).



The prosthetic component coated with bone cement is placed on the femur with light blows of the impactor (317-646/01) until it fits snugly.

## ■ Surgical Technique



### 46 + 47

After the bone cement has set, the transport lock is removed. The screw joint is loosened with the screwdriver (10-5373/01) and the lock is withdrawn with slight rotation.



The PE plateau is placed on the tibial metal carrier with the insertion instrument (15-8035/03).



### 48 + 49

The connector with the rotation axle is put on the tibial component, and the PE plateau is then inserted and screwed.



To obtain better access to the screw, the connector is rotated slightly.

**■ Assembling the Tibial Implant Components**

**50**

The connecting component is inserted into the intracondylar slot of the femoral component and the axle lock is removed. Move the component slightly until the axle is heard to click into the joint box.


**51 + 52**

Check the position of the holes.

When the prosthetic axle is fully expanded, the holes are at the level of the arrow marks. If this is not the case, the connecting and separating forceps (16-0020/01) can be used.





### 53 + 54

Following expansion of the prosthetic axle, this must be locked by means of a screw. The screw enclosed in the pack is inserted and hand tightened in the connector using the hex screwdriver (64-1181/16)



Situation following assembly.



### 55 + 56

If use of a hinged knee version is planned, the screws in the tibial plateau must first be removed with the hex screwdriver (64-1181/16).



The connector with hinge axle is placed on the tibial component.

The connector is then screwed in place using the hex screwdriver (10-5373/01) and the PE plateau is inserted.

■ **Assembling the Tibial Implant Components**



**57 + 58**

Connecting the components and loosening the lock are performed as in the rotation knee version.



Screwing the plateau.



**59**

Locking the axle by means of a screw.

## ■ Surgical Technique

### ■ Proximal Tibial Replacement



60

Resection of the proximal tibia at the planned site.



61

Mount the awl in the planned length (100, 130 or 160 mm) in the handle (16-3210/00). When uncemented modular stems are used, ream with an increasing diameter until the awl makes cortical contact over a continuous distance of approx. 50 mm. The uncemented implant that will be used must correspond in length and diameter to the last awl used.

For cemented modular stems, the awl should be at least 2 mm bigger than the planned stem diameter.

#### Important notes:

Using the awls with a drive motor is not permitted.

■ **Proximal Tibial Replacement**



**62**

When use of a recess ring is planned as a flat attachment of the extramedullary part of the implant to the bone, the awl is inserted deeply into the medullary cavity until the cutting edges of the awl are at the same level as the resection level. The handle is removed and connected to the reamer (16-3205/30). Mechanised drive optional.



**63**

The resection surface is reamed flat with the reamer, which is placed over the shaft of the awl.



64

The reamer and awl are removed.



65

The trial stem and trial prosthesis for proximal tibial replacement are joined by screwing them together and inserted into the prepared tibia.



66

The femoral trial stem and trial prosthesis are joined by screwing them together and inserted into the prepared femur.

**■ Proximal Tibial Replacement**

**67**

The femoral trial prosthesis is assembled, inserted and connected as described under “Standard preparation of the femur”. By extending, flexing and rotating the treated limb, it is possible to estimate the leg length and degrees of rotation and flexion.

**■ Distal Femoral Replacement**

**68**

Depending on the indication, the distal femoral replacement can be extended in 10 mm steps after an initial further resection of 30 mm. Bone preparation is as described above.

## ■ Surgical Technique



69

In this situation, trial prostheses for stem elements (e.g. 16-3100/00) are assembled between the trial stem and trial prosthesis for distal femoral replacement. Depending on the resection length, different trial prostheses for stem elements can be combined together to represent the desired leg length.

## ■ Bone Preparation without using a recess ring (optional procedure)



70

Resection of the bone at the desired site. The cutting edges of the awl are then inserted in the medullary cavity 10 mm deeper than the resection level and the resection level is prepared with the step reamer (16-3204/18 up to a stem diameter of 18 mm, 16-3204/24 for 19 mm or more).



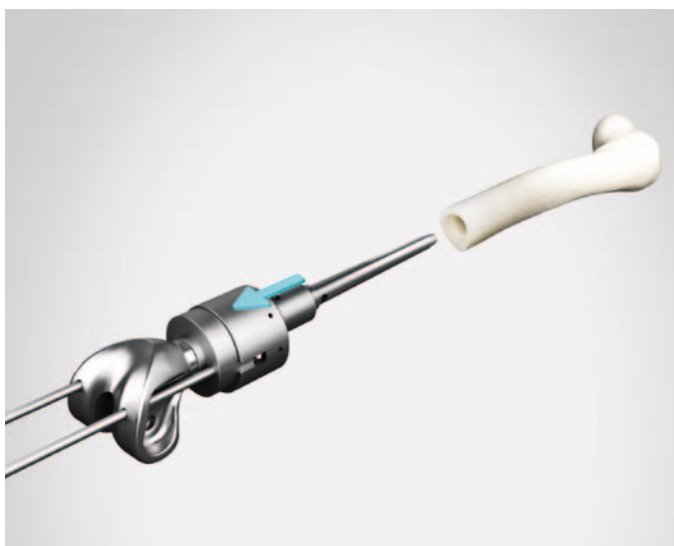
71

Assembling the selected trial prostheses.

**■ Bone Preparation without using a recess ring (optional procedure)**

**72**

The two guide rods (16-3235/00) are screwed into the adapter ring (16-3237/00) and placed from proximal to distal (vice versa in the tibia) through the two holes of the trial joint component.


**73**

The saw guide for notching (16-3236/00) is placed on the adapter ring in such a way that the notch and spring engage.


**74**

The trial prosthesis is inserted into the bone as far as its final position. It is essential to ensure correct rotational alignment of the trial prosthesis. The adapter ring must sit on the resection surface.



75

The saw guide for notching is fixed with two wire pins. The trial implant with the adapter ring is then removed.



76

Preparing the notches with the oscillating saw.



77

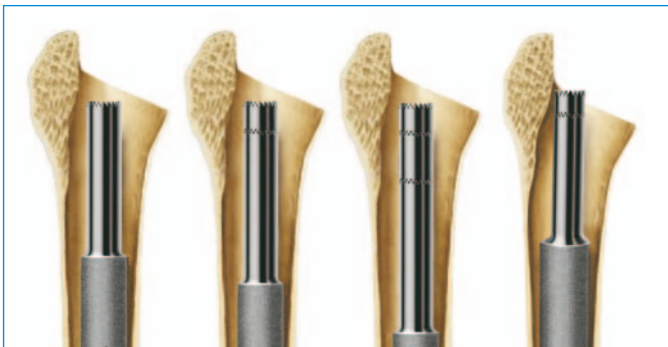
Preparing the notches with the oscillating saw.

**■ Push-through Prosthesis**

**78 + 79**

Prior to implantation of the push-through stems for total femoral replacement, the medullary cavity is reamed with ball reamers or flexible medullary drills approx. 1 – 2 mm bigger than the diameter of the selected prosthesis (available in 14 mm or 16 mm).

The length of the push-through prosthesis and the level of the femoral shaft resection should be chosen so that the sprocket for accepting the neck components is approximately 15 – 20 mm above the lesser trochanter. If it is necessary to correct the length, this can be done by means of the proximal spacers (172-950/10-20).


**80 + 81**

The push-through stems can be inserted directly with the femoral components, as described in example 4 in the brochure “Implants and Instruments“, or, as shown here, in combination with shaft elements. Fixation at the resection site is again optional (recess ring or notches).



The proximal part of the push-through prosthesis after implantation.

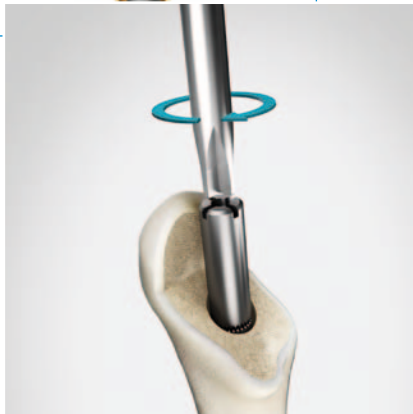




### 82 + 83

The tubular reamer (131-384/01) is used to prepare the metaphyseal medullary cavity, in the selected length after screwing on the drill guide with stop as illustrated. The drill guide with stop acts as a drill stop and at the same time prevents damage to the push-through prosthesis.

Screw on the drill guide with stop (131-383 or /90) using the cross-slot screwdriver (16-3290/00).



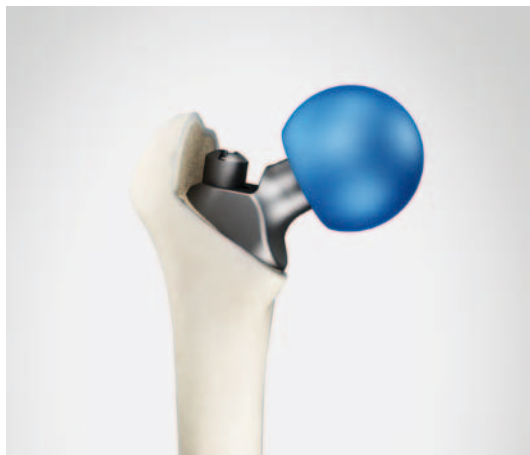
### 84 + 85

With the tubular reamer (131-384/01) the implant bed is prepared for the neck component.

The selected neck component is then put on the sprocket of the push-through stem, the desired anteversion is obtained and the neck component is fixed with the trial fixation screw (131-397/38 or /58) using the hex screwdriver (64-8008/02).



## ■ Push-through Prosthesis



**86**

Colored plastic trial heads (131-928/01-04, 131-932/01-04, 131-936/01-04) in diameters 28, 32 or 36 mm and neck lengths short, medium, long and extra long are used for trial reduction.

If leg lengthening is necessary, spacers can be used in the illustrated combination when using neck components with a length of 65 mm. Trial spacers (131-398/10 or /20) are available for trial reduction.

**87**

**Fixation screws** (trial + implant)

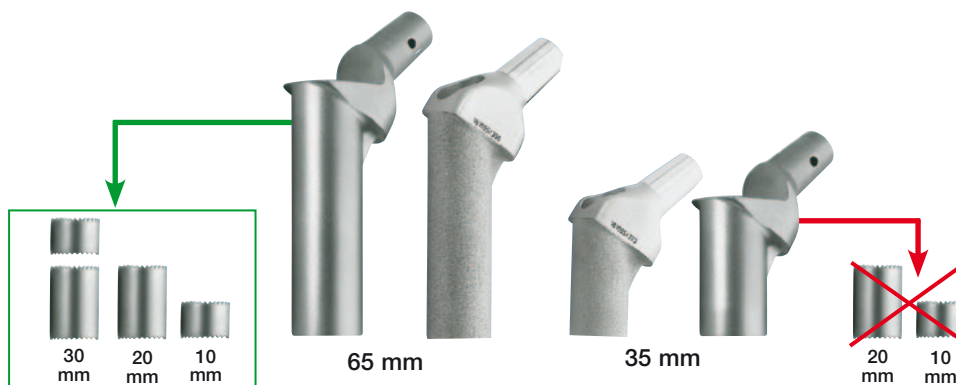
**Spacers** (trial + implant)



**88**

**Neck components** (trial + implant)

**Spacers** (trial + implant)



## ■ Surgical Technique



### 89 + 90

After final alignment of the neck component, the guide rod with ruler is screwed into the upper part of the push-through stem through the shoulder of the neck component using the hex screwdriver (64-8008/02).

The go/no go guide (131-376) is then passed over the guide rod as far as the shoulder, as illustrated. The toothings of the neck component and push-through stem then engage correctly when the edge of the go/no go guide is exactly on one of the lines of the ruler (0, 10, 20 or 30).

### 91 + 92

Expansion bolts (172-947/38 or /58) are used for finally joining the neck component to the push-through stems. A precise description of use of the screws with their instruments (131-340/04) is given on page 42.

With loss of the proximal femur, the push-through stems can be combined with the neck elements (solid) as described in example 6 of the brochure "MEGASYSTEM-C® Implants and Instruments". The correct position of the implant and fixation with expansion bolts are checked as described previously.

■ **Proximal Femoral Replacement**



**93 + 94**

Resection of the proximal femur at the planned site and preparation of the medullary cavity to accept the selected modular stem as described under "Proximal tibial replacement".

After implantation of the modular stem, attachment of stem elements is optional.



**95 + 96**

Attach the coupling component for proximal femur replacement, short or long (15-8512/28 or /30).

Attach the neck (solid). Fix the implant as described under "push-through prosthesis".



## ■ Surgical Technique

### ■ Interposition Implant

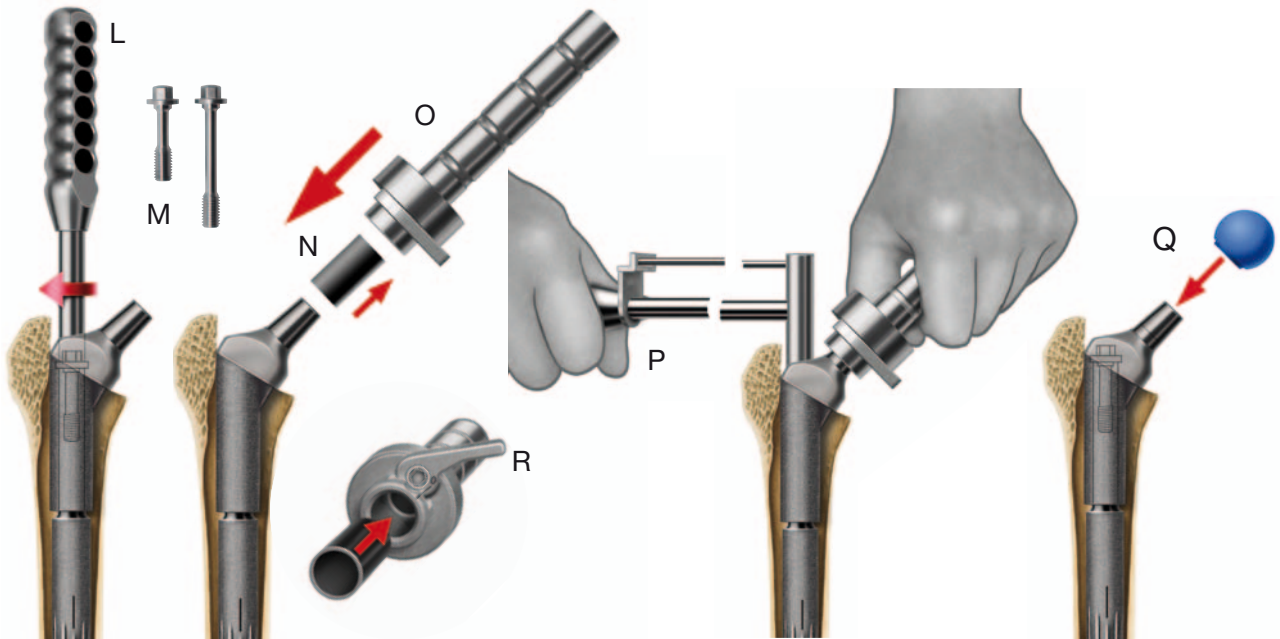


#### 97 + 98

Resection of the femoral diaphysis at the planed sites and preparation of the medullary cavity to accept the selected modular stems as described under “Proximal tibial replacement”.

Situation after implantation of the interposition parts as described in example 8 of the brochure “MEGA-SYSTEM-C® Implants and Instruments”. The two interposition parts are joined with the aid of the cross-slot screwdriver (16-3290/00) and enclosed screws.



**■ Instruction of Expansions Bolts**


The stem, any spacers and the neck segment are connected with either a 41 mm or 61 mm expansion bolt (M), depending on the neck segment length and the number of spacers. The expansion bolts securely fix the MP® neck segments to the modular MP® stems.

Two bolt lengths are available: 41 and 61 mm

- The 41 mm bolt is used if no spacer or one 10 mm spacer is used.
- The 61 mm bolt is used if one 20 mm spacer is used or a 10 mm spacer is used in conjunction with a 20 mm spacer (overall height: 30 mm)

Using the screwdriver (L), the expansion bolt is screwed in as far as it will go and lightly tightened. Then the holder (O) with plastic sleeve (N) is attached to the taper of the neck segment and fastened by operating the lever (R).

Using the torque wrench (P) the inserted expansion bolt is tightened twice as far as short mark 1 on the scale. While tightening, it is important to keep a firm grip on both the holder and the torque wrench to ensure that the neck segment remains in situ without rotation. Tightening the expansion bolt as far as short mark 1 on the scale corresponds to a tightening torque of 14.5 to 16.3 Nm. The resulting elastic expansion of the bolt effectively fastens the connection.

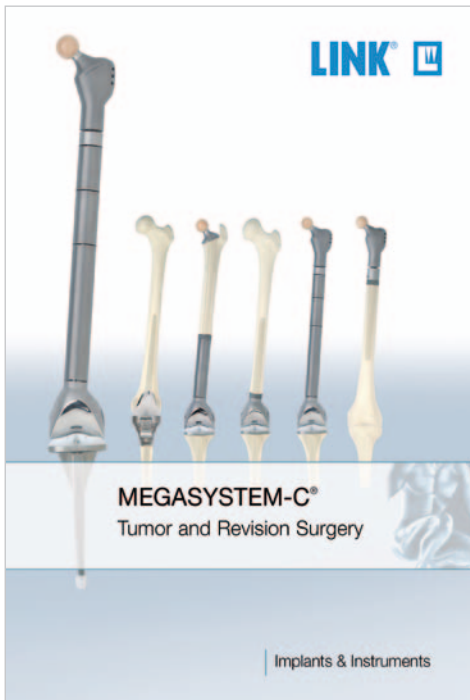
The trial head (Q) is placed on the taper of the neck segment and a final trial reduction is performed to check ante-version.

**Caution!**

LINK® implants and expansion bolts are solely designed for single use. They cannot be reused. The torque wrench is supplied with a calibration certificate. The torque wrench must be sent to WALDEMAR LINK GmbH & Co. KG for testing after 250 applications.

The torque wrench must never be used to undo screw connections, since this could damage it. Plastic-sleeve integrity must be checked prior to use.

## ■ Additional Information



### MEGASYSTEM-C® Tumor and Revision Surgery

Catalog:

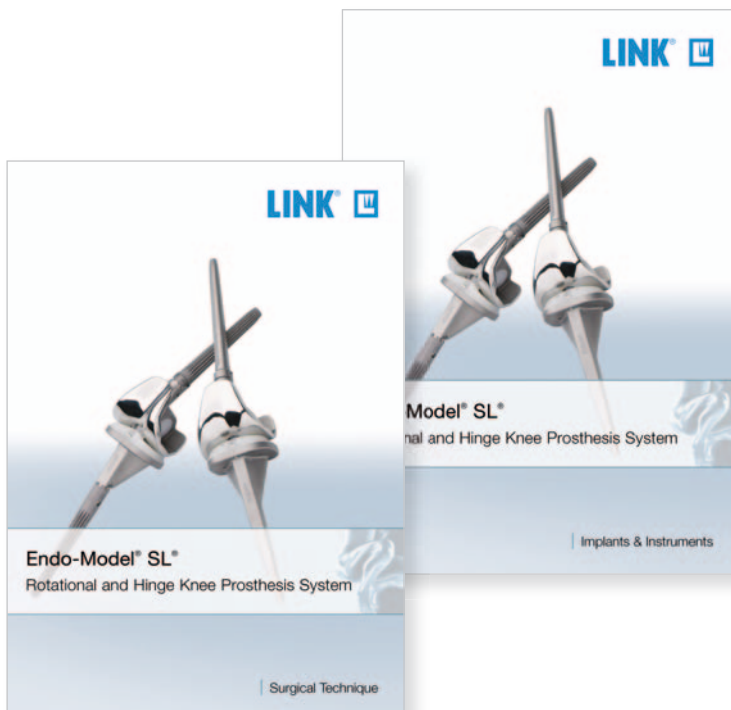
- 910en\_Implants & Instruments  
available on request.



### MEGASYSTEM-C® Tumor and Revision System, Assembling Instruments

Catalog:

- 910en\_Assembling & Application  
available on request.



### Endo-Model® SL® Rotational and Hinge Knee Prosthesis System

Catalogs

- 733en\_Implants & Instruments
- 733en\_Surgical Technique

available on request.



## ■ 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 determine the size and shape of the implant and also limit 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 reused.
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

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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.

Unless otherwise indicated, all instruments are made of surgical stainless steel.



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