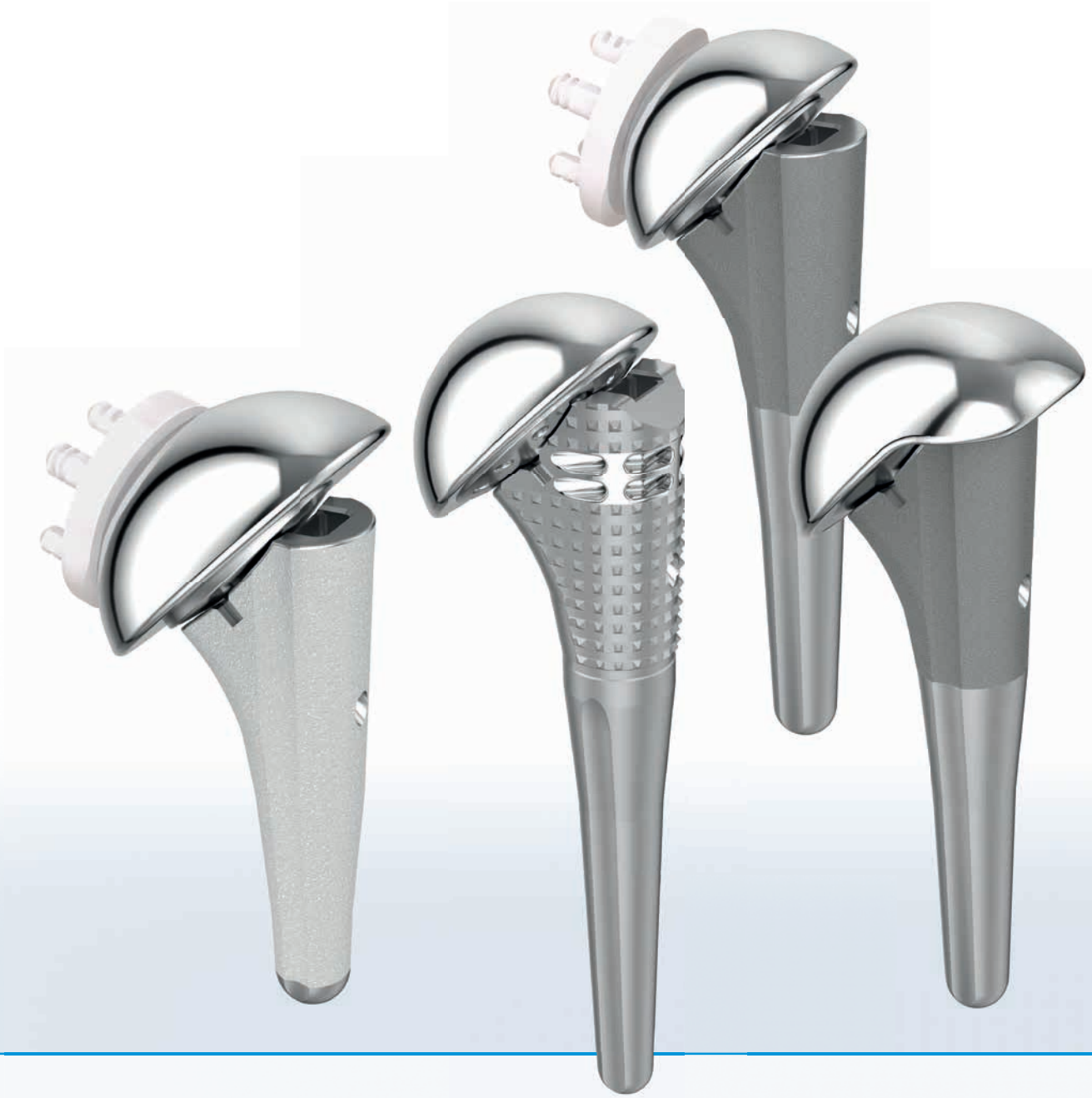
LINK®



LINK Embrace

Shoulder System Anatomic Configuration

Explanation of Pictograms			
	Manufacturer	REF	Article number
MAT	Material (number)	Rx only	Caution: Federal law restricts this device to sale by or on the order of a physician

LINK Embrace
Shoulder System Anatomic Configuration

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1. Pre-Op Planning

The operation is planned with the assistance of standard X-rays with normal AP-view in internal and external rotation as well as an axillary view. For implantation of a glenoid component and in fracture cases a CT scan is recommended to better assess the glenoid configuration. Additionally, MRI may be indicated for assessment of the degree of bone deficiency as well as soft tissue and capsule quality. Neurological exams should be performed in post-traumatic and disabling shoulder cases.

LINK Embrace X-ray templates are available for pre-op planning of osteoarthritic cases, and they may also be used in fracture and revision cases as far as applicable. LINK Embrace X-ray templates have a 105% scale. Several digital planning platforms are supported.

2. Surgical Approaches and Patient Positioning

2.1 Surgical Approaches

The LINK Embrace Shoulder System is suitable for implantation using the existing surgical approaches. The instrument set supports the two most popular surgical approaches to the shoulder joint, delto-pectoral and lateral approach. Usually, the selected approach depends on the surgeon's experience and preferences, furthermore, the diagnosis and planned surgical treatment have to be taken into account. With the patient under anesthesia, glenohumeral ROM is evaluated in order to assess the extent of capsular release needed to restore the ROM postoperatively.

2.2 Patient Positioning

It is recommended to perform shoulder arthroplasty in a beach-chair position. This allows for full access to the shoulder joint which is necessary to intraoperatively assess the joint function, stability and range of motion. To facilitate access to the joint and, if required, the use of fluoroscopy, the patient should be positioned as lateral as possible to the affected side on the OR table. The head needs to be securely fixed.

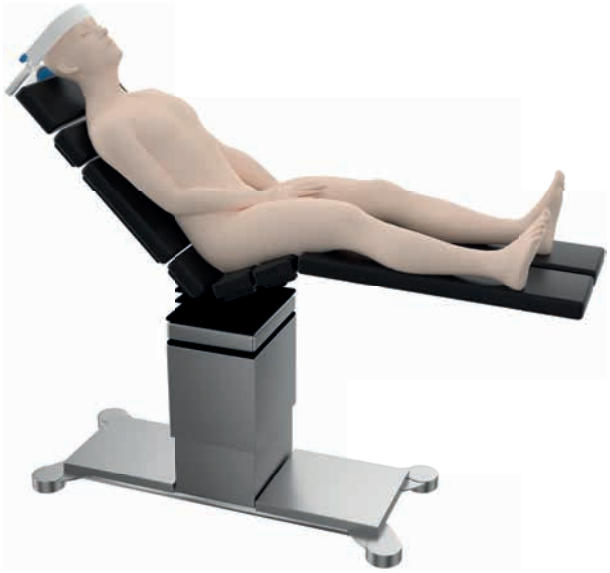


Figure 2.1

3. Color Coding

The LINK Embrace Shoulder System offers diverse fixation and biomechanical options. The options offered by each implant are indicated by a color-coding matrix on each component package. Color-coding matrix 1 (figure 3.1) is applied on all implant components except Bone Screws, for which color-coding matrix 2 is used (figure 3.2). Matrix 1 (figure 3.1) consists of seven cells in total. The first line contains product related information, such as component size, length or assignment. The left column indicates the possible biomechanical configurations the component can be used for. The right column indicates the fixation options to anchor the implant in the bone. The meaning of each cell is explained in table 3.1 below. Available options are highlighted by a specific color, and options not available are indicated by a grey cell (figure 3.2, right matrix).

L 100	Ø 13
Anatomical	Cementless
Reverse	Cemented
CTA	Hybrid

Figure 3.1 Example Color Coding Matrix 1

Color-coding matrix 2 (Figure 3.2) consists of four cells in total. The left column indicates the possible biomechanical configurations the component can be used for. The meaning of each cell is explained in table 3.1. Available options are highlighted by a specific color, options not available are indicated by a grey cell (figure 3.2, right matrix). The central cell contains the screw length L (in mm) in the first line and the screw diameter Ø (in mm) in the second line. The right cell indicates the screw type according to the three symbols explained in table 3.1.

Anatomical	L20	
Reverse	Ø 6.0	

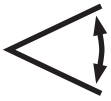
	L20	
Reverse	Ø 6.0	

Figure 3.2 Example Color Coding Matrix 2

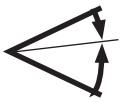
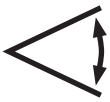
Anatomical	Indicates the component can be used for anatomical configurations (TSA). Please note this code also applies to Hemi Shoulder Arthroplasty (HEMI) when the glenoid is left native.
Reverse	Indicates the component can be used for reverse configurations (RSA).
CTA	Indicates the component is a CTA head or can be combined with a CTA head.
Cementless	Indicates cementless component fixation in the bone.
Cemented	Indicates cemented component fixation in the bone.
Hybrid	Indicates simultaneous cemented and cementless component fixation in the bone. Please refer to the surgical technique for further information.
	Indicates a central Bone Screw to be applied with the Convertible Metal-Back* or Reverse Glenoid Baseplate.
	Indicates a peripheral angle-stable Bone Screw to be applied with the Reverse Glenoid Baseplate.
	Indicates a peripheral non angle-stable Bone Screw to be applied with the Reverse Glenoid Baseplate.

Table 3.1 *** not available in the US**

4. Humeral Resection and Preparation

Surgical technique for Hemi Shoulder Arthroplasty and Total Shoulder Arthroplasty in Anatomic (Anatomic Elective), Fracture and CTA Head configuration (Hemi only) using:

- Humeral Short Stems
- Humeral Standard Stems
- Humeral Fracture Stems
- Humeral Heads
- CTA Heads (in Hemi)
- Cemented All Poly Glenoids

4.1 Humeral Head Resection

4.1.1 Intramedullary Alignment

Figure 4.1

Expose and mobilize the humeral head and luxate it from the glenoid.

Figure 4.2

Open the medullary canal with a suitable instrument in line with the humeral axis.

Using the T-Handle, insert the Starter Awl into the medullary canal until the depth stop is reached. Make sure that the blue Depth Stop Disk rests in the Starter Awl shaft recess.

Figure 4.3

Prepare the Resection Guide depending on the surgical approach, i.e. selection of the Resection Block for delto-pectoral or for lateral approach.

NOTE: The LINK Embrace Instrument Set supports different surgical approaches. In the surgical technique described here, the delto-pectoral approach is used.

For lateral techniques use the Resection Block for lateral approaches and follow the workflow correspondingly.

Figure 4.4

Slide the Resection Guide down on the Starter Awl placed in the medullary canal by applying light pressure to the instrument spring clamp.

Figure 4.5

Connect the desired Resection Block and the Resection Guide Connector with the laser marks on both Connector Bar and Resection Block in line. The Resection Block is fixed to the Connector Bar by means of a magnetic connection.

Figure 4.6

Considering the side to be treated, insert the Resection Guide Connector into the fork of the Resection Guide. A slight initial resistance prevents the instrument from slipping out of the fork.

Figure 4.7

According to the desired retroversion, screw the Alignment Rod into the corresponding hole (0°, 10°, 20°, 30°) in the Alignment Rod Connector. Make sure to select the correct set of holes for treatment of the left or right side respectively, corresponding to the laser marking on the Alignment Rod Connector.

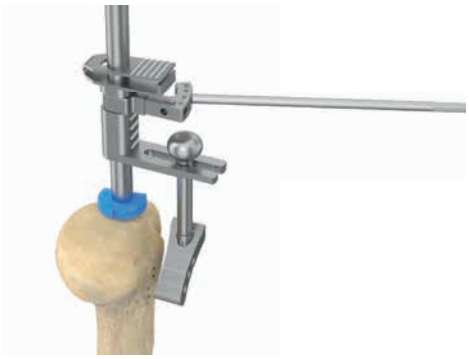


Figure 4.8

Place the Alignment Rod Connector in the required orientation (Left or Right) on the Resection Guide.

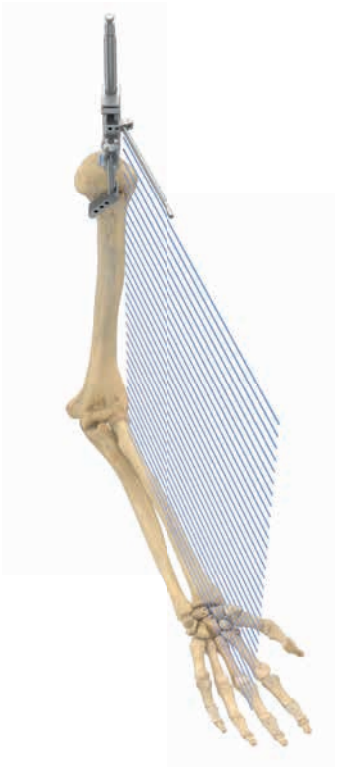


Figure 4.9

Set the desired retroversion by axially rotating the Resection Guide on the Starter Awl, adjusting the Alignment Rod parallel to the forearm which is held flexed at approx. 90°.

Adjust the Resection Guide to the desired resection level (to change the instrument level, press the instrument spring). The spring locks the instrument when released.

Finally determine the resection level with respect to the anatomical neck of the humeral head.

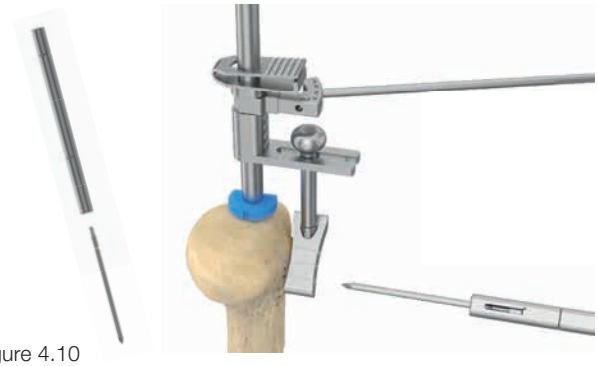


Figure 4.10

Side the Resection Block together with the Resection Guide Connector within the fork until it makes contact with the bone.

Fix the Resection Block with at least two Fixation Pins (3.0 mm) using the Universal Pin Inserter.

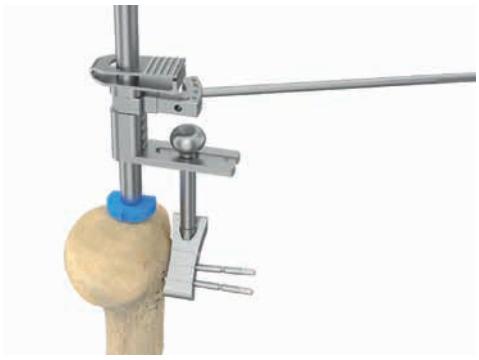


Figure 4.11

The medial and lateral pin axis are parallel to each other and will allow sliding of the resection block. The central pin axis is oblique and will fix the block in place

The orientation of the pinholes is marked accordingly on the block. Take note that the most lateral pin might interfere with the intramedullary Starter Awl.

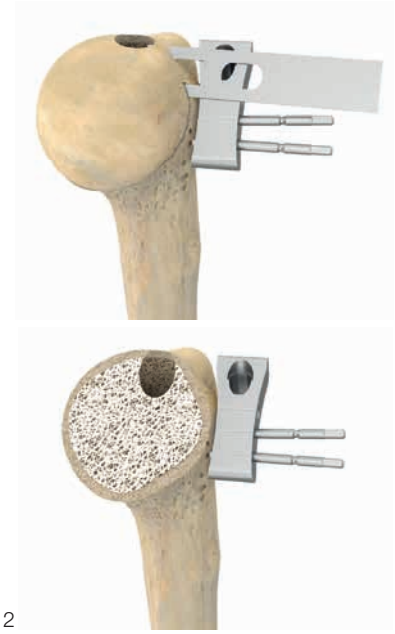


Figure 4.12

After a final check of the resection level and retroversion, the humeral head is resected with an oscillating saw blade on top of the Resection Block at 135° (defined by the instrument).

For this purpose, all instruments except the fixed Resection Block can be removed by pulling them upwards. To do so, press the spring on the Resection Guide, and slide the Resection Guide upwards over the Starter Awl. Then remove the Starter Awl using the T-Handle.

For more stability, e.g. in case of poor fixation, the Resection Guide can also be left in place. When sawing, make sure to avoid any instrument interference.

Figure 4.13

The required Humeral Head diameter is now estimated using the Humeral Trial Heads, aiming at optimal coverage of the resection surface with the Trial Head.

Figure 4.14

Alternatively, the required head diameter and height can also be determined with the Sizing Gauge for Humeral Heads.

When using the Sizing Gauge, take into account any possible deformities of the natural head.

When selecting the suitable Humeral Head diameter in TSA, it is important to note that only certain Humeral Head and Glenoid Component sizes may be combined as shown in chapter 5.1, table 5.1.

Figure 4.15

Remove all instruments. Pins can be removed with the Pin Inserter/Extractor.

4.1.2 Extramedullary Alignment

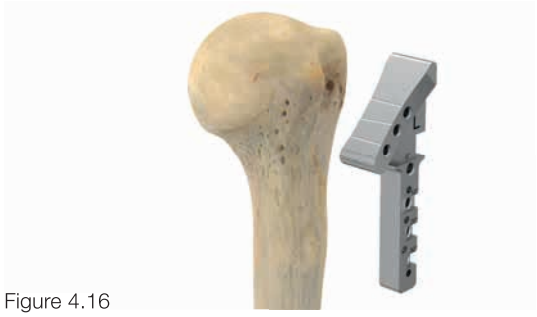


Figure 4.16

Alternatively to intramedullary alignment, use the Resection Guide for extramedullary alignment. The extramedullary Resection Guide has a built-in angle of 135°.

Figure 4.17

According to the desired retroversion, screw the threaded end of the Alignment Rod into the corresponding hole (0°, 10°, 20°, 30°) on the vertical Resection Guide bar. The guide has two opposing sets of holes for left and right application.

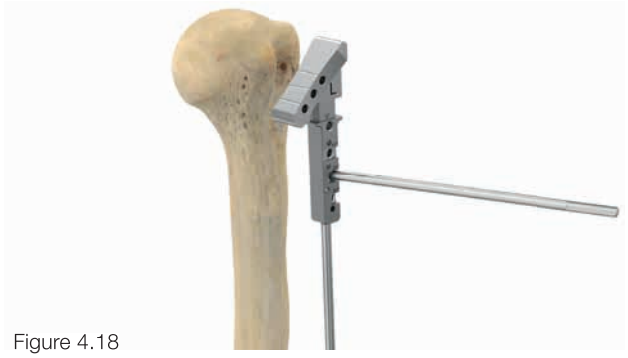


Figure 4.18

Align the rod-shaped neck of the instrument along the humeral shaft axis. A second Alignment Rod may be screwed into the hole at the distal guide end, prolonging the instrument axis for easier positioning.

Figure 4.19

Set the desired retroversion by internal or external rotation of the Guide, adjusting the Alignment Rod parallel to the forearm which is held flexed at approx. 90°.

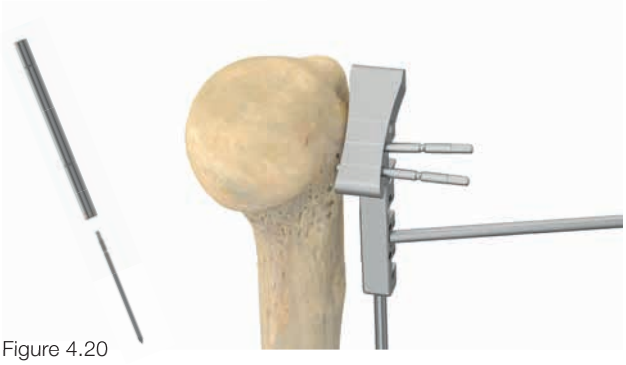
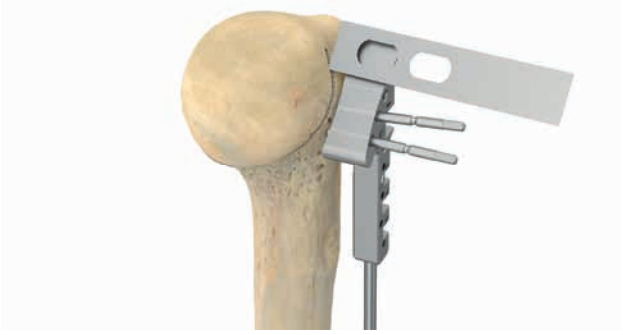


Figure 4.20

Determine the final resection level with respect to the anatomical neck of the humeral head. Fix the Resection Guide with at least two Fixation Pins (3.0 mm) using the Universal Pin Inserter. The medial and lateral pin axes are parallel to each other and will allow sliding of the resection block. The central pin axis is oblique and will fix the block in place.

The orientation of the pinholes is marked accordingly on the block.



After a final check of level and retroversion, resect the humeral head with an oscillating saw blade on top of the Resection Guide.

Figure 4.21

4.1.2.1 Alternative Retroversion Determination

Figure 4.22

The LINK Embrace Instrument Set supports an alternative way to determine the retroversion, using the Alignment Rod and the Alignment Rod Connector.

According to the desired retroversion, place the Alignment Rod into the corresponding hole (0°, 10°, 20°, 30°) in the Alignment Rod Connector. Make sure to select the correct set of holes for treatment of the left or right side respectively.

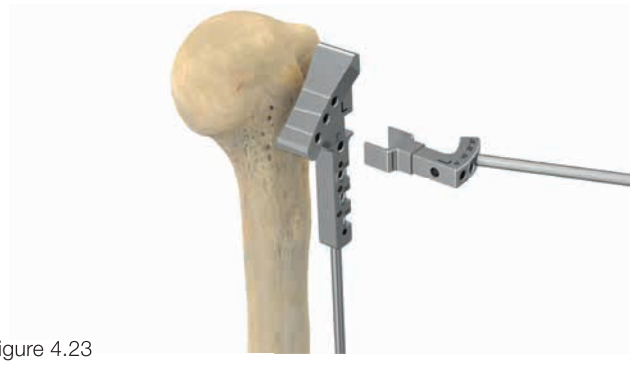


Figure 4.23

Place the Alignment Rod Connector with the Alignment Rod in the required orientation on the Resection Guide.

Go on as described in 4.1.2

5. Glenoid Preparation, Trialing and Implantation (for Cemented All Poly Glenoids)

5.1 Glenoid Sizing and Positioning

Relocate the humerus posterior-caudally with the help of a double fork retractor or a Fukuda retractor. Excise labrum and osteophytes to expose the glenoid.

Select the Glenoid Sizer according to the required glenoid size (small (S), medium (M), large (L), each in left and right version) and connect it to the Guide Handle for K-Wire so that the two Guide noses click into the grooves of the Glenoid Sizer (magnetic connection).

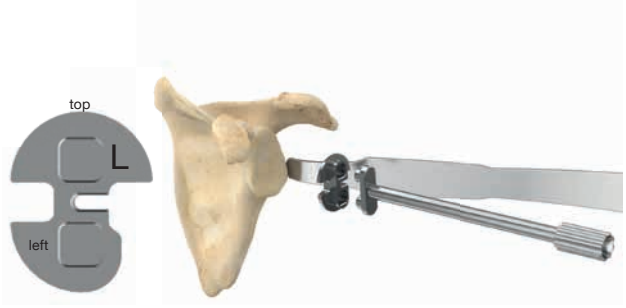


Figure 5.1

NOTE: When determining the required glenoid size with the Sizer, select a suitable Head-Glenoid pairing according to the following table

Glenoid Size	Curvature Diameter	Head Size					
		38	41	44	47	50	53
small	52	✔	✔	✔	✔	✖	✖
medium	58	✔	✔	✔	✔	✔	✔
large	64	✖	✖	✔	✔	✔	✔

Table 5.1: Allowed Head-Glenoid combinations are marked in green. Red combinations are not allowed. Numerical data in mm.

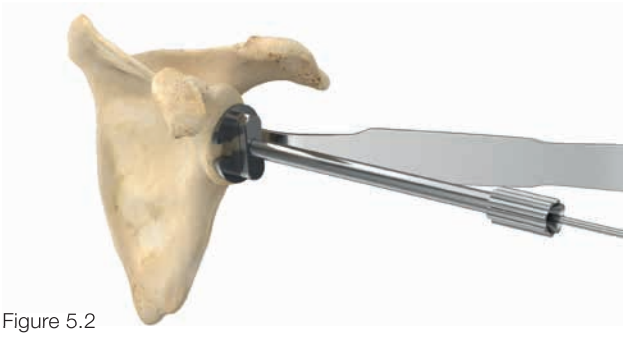


Figure 5.2

Place the Glenoid Sizer of the appropriate side and size on the glenoid. Position the Sizer according to your preferences and check the size. The Sizer must not overlap the glenoid rim.

With a power tool, place a K-Wire for glenoid preparation (Ø 2.5 mm) through the central Guide hole into the glenoid bone.

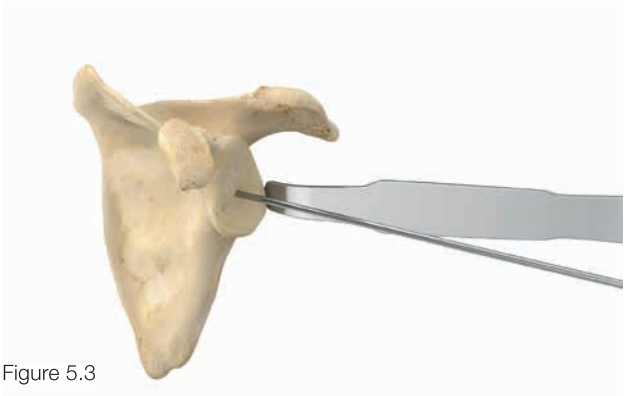


Figure 5.3

After removal of the Sizer, visually check the correct position of the K-Wire.

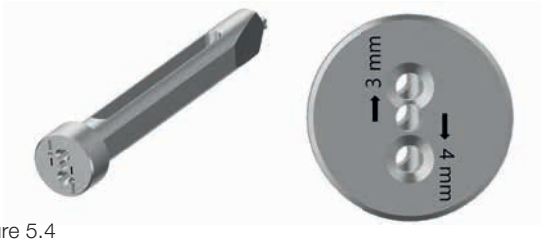


Figure 5.4

In case repositioning is necessary, use the Repositioner for K-Wires.

The Repositioner for K-Wires allows for parallel shifting the K-Wire in 3, 4 and 7 mm distance. Depending on the required offset, slide the Repositioner over the K-Wire through the corresponding hole down to the glenoid and align the offset.

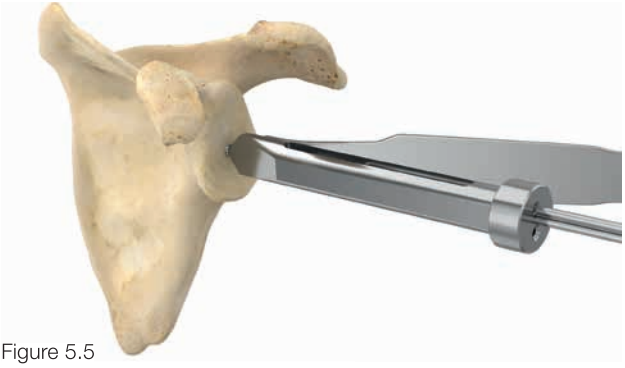


Figure 5.5

Insert a second K-Wire through the specified lumen.

After removal of the Repositioner, visually check the correct position of the K-Wire. Remove the initially positioned K-Wire with the Pin Inserter/Extractor.

5.2 Glenoid Reaming

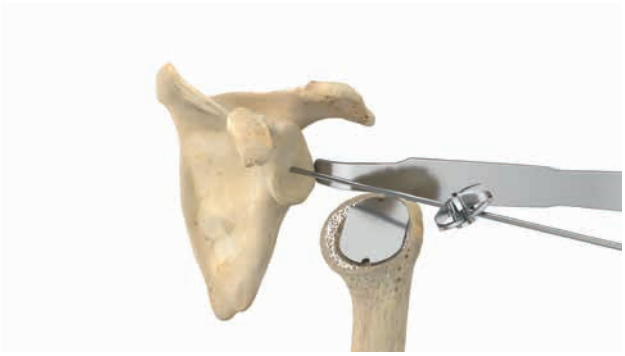


Figure 5.6

Corresponding to the three sizes of the Glenoid Sizers, four sizes of the Glenoid Reamers are provided. The bony preparation of the glenoid is carried out with the Glenoid Reamers of the corresponding size (S, M, L).

NOTE: LINK Embrace Glenoid Reamers have a slotted central hole, allowing for slightly tilting the Reamer on the K-Wire. A cut out at the outer Reamer ring facilitates passing the surrounding soft tissue and, thus, pushing the Reamer down to the glenoid.

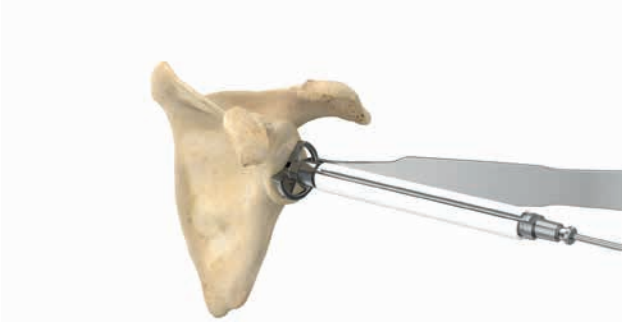


Figure 5.7

Select the Glenoid Reamer of the appropriate size. Tilt and slide it over the K-Wire down to the glenoid. Slide the cannulated Drive Shaft for glenoid preparation (with the Tissue Protection Sleeve installed) over the K-Wire and insert it into the situs. Connect the Drive Shaft to the Glenoid Reamer in situ. To do this, insert the external hexagon of the Drive Shaft into the internal hexagon of the Reamer (magnetic connection).

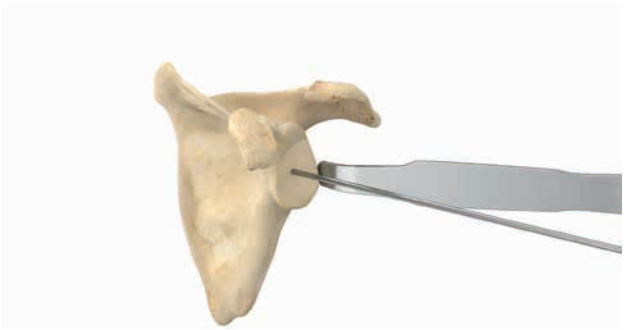


Figure 5.8

Carefully ream the glenoid. For manual reaming, connect the T-Handle to the Drive Shaft employing the Hudson fitting.

NOTE: Take into account the stability of the bone. Avoid applying excessive forces and overreaming of the glenoid. It is recommended to carefully place the reamer onto the glenoid. When using a power tool, have it already rotating before contact.

After reaming, remove Drive Shaft and Glenoid Reamer in reverse order. The K-Wire remains in situ.

5.3 Cemented All Poly Glenoid

5.3.1 Cemented All Poly Glenoid Preparation

NOTE: LINK Embrace Cemented All Poly Glenoids come in three sizes. They have identical back radii, peg diameters and peg positions. This allows for uncomplicated change of the initially planned glenoid size without changing the bone preparation. When changing from smaller to larger sizes, avoid the implant overlapping the native glenoid edges.

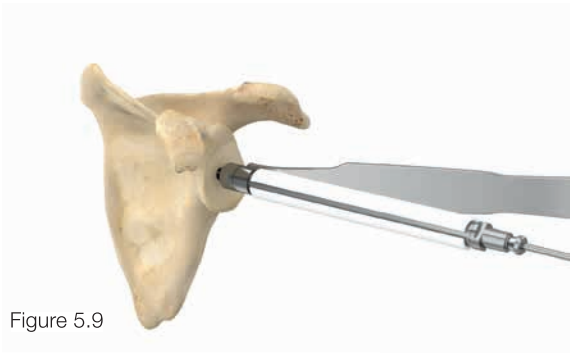


Figure 5.9

Drill the central hole for the Central Glenoid Peg. To do so, fit the Drill for Central Pegs of Cemented Glenoids on the Drive Shaft (hexagonal magnet connection) and slide it over the K-Wire down to the glenoid. Drill until the depth stop is reached.

Remove the Drill and the K-Wire.

Figure 5.10

Connect the Handle for Glenoid Sizers and Drill Templates to the Drill Template for Peripheral Pegs of Cemented All Poly Glenoids and insert it into the situs.

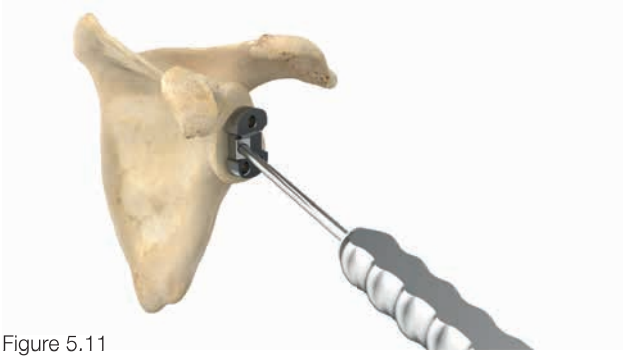


Figure 5.11

Introduce the rear central peg of the Drill Template into the central hole within the glenoid.

Figure 5.12

NOTE: LINK Embrace Cemented All Poly Glenoids have 1 central and 3 peripheral pegs: two inferiorly and one superiorly (figure). Glenoid Drill Templates and PE Glenoid components must be aligned accordingly.

NOTE: LINK Embrace Cemented All Poly Glenoids have a chamfered inferior rim to reduce the risk of impingement in close adduction of the arm. When implanting, make sure the All Poly Glenoid is aligned in the correct way (with the chamfer and the 2 peripheral pegs inferiorly).

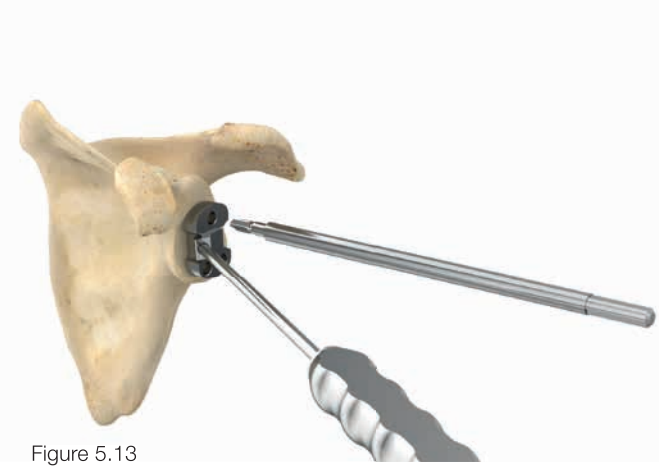


Figure 5.13

Align the Drill Template, i.e. to ensure complete seating and correct inferior-superior alignment.

Drill the superior peripheral hole for the superior Glenoid peg. To do so, fit the Drill for Peripheral Glenoid Pegs on the Drive Shaft (hexagonal magnet connection) and drill through the superior hole of the Drill Template until the depth stop is reached.

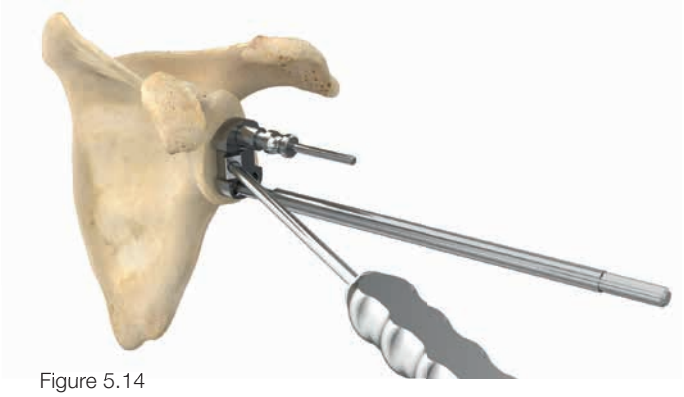


Figure 5.14

Remove the Drill and insert the Fixation Pin for Drill Templates with the Pin Inserter. Fixation Pin and hole have a tight fit. Drill the two inferior peripheral holes.

Figure 5.15

Remove all instruments.

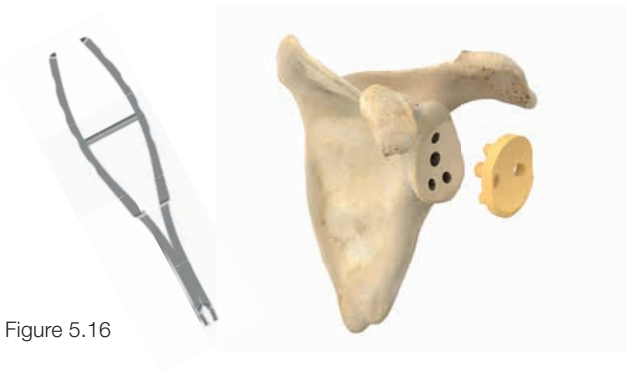


Figure 5.16

Insert the Trial for Cemented All Poly Glenoids in the desired size using the Insertion Forceps. Final check of the complete seating and alignment.

A trial reduction can be performed (with completed humerus preparation and trial components in place).

5.3.2 Cemented All Poly Glenoid Implantation

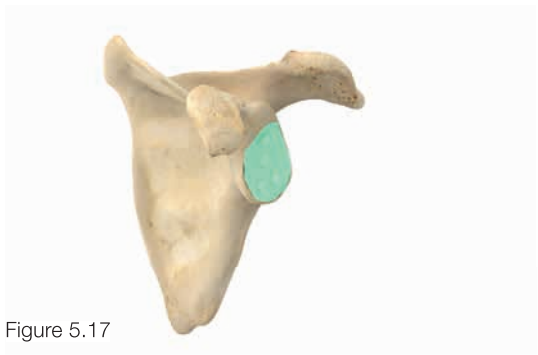


Figure 5.17

Clean the central and peripheral drill holes for Glenoid Pegs using pulse/jet lavage and dry the bone surface in the drill holes, e.g. with a compress pressed into the drill holes using tweezers.

Press the prepared, high viscosity bone cement into all drill holes.

Apply cement on the reamed glenoid surface.

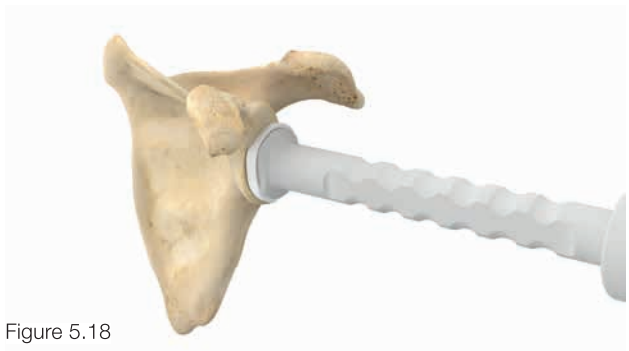


Figure 5.18

Implant the desired Cemented All Poly Glenoid with the convex Impactor for Reverse Inserts and PE Glenoids.

In case excessive bone cement appears, remove it. With the convex Impactor, hold the glenoid component in position until the cement is cured.

6. Humerus Preparation

6.1 Humeral Standard and Short Stem Preparation

NOTE: The LINK Embrace System offers Humeral Stems in two different lengths: Humeral Standard Stems with 100 mm and Humeral Short Stems with 75 mm length. For both ranges dedicated humeral Compressors are used. Compressors are 5 mm longer than the corresponding Stems.

Figure 6.1

Medullary canal preparation is started with the smallest Compressor (size 12) in the required length (75 mm or 100 mm).

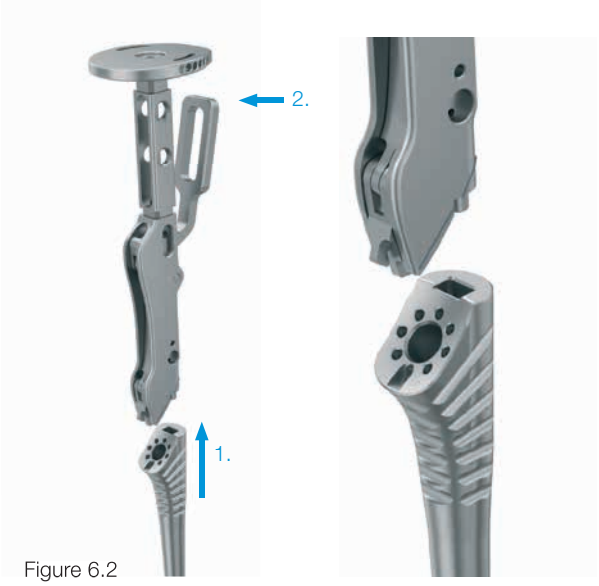


Figure 6.2

Connect the Compressor to the Handle for Compressors and Proximal Bodies by opening the Handle lever and inserting the nose piece at the end of the Handle into the Compressor's groove located laterally. Close the Handle lever, locking the Compressor firmly to the Handle.

Figure 6.3

According to the desired retroversion, screw the threaded end of the Alignment Rod into the corresponding hole (0°, 10°, 20°, 30°) in the rim of the Handle impaction plate. Make sure to select the correct set of holes for treatment of the left or right side respectively.

Figure 6.4

Alternatively, the Alignment Rod may be used together with the Alignment Rod Connector to determine the desired retroversion as described in 4.1.1.

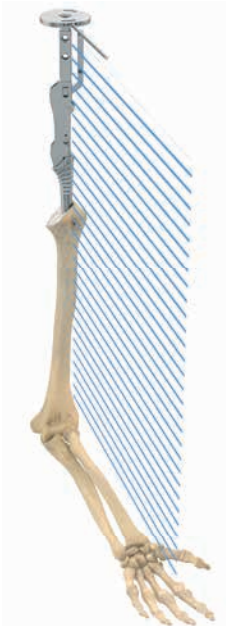


Figure 6.5

Insert the Handle with the Compressor into the humeral shaft. Set the desired retroversion by axially rotating the Handle, adjusting the Alignment Rod parallel to the forearm which is held flexed at approx. 90°.

Figure 6.6

Gradually prepare the humeral canal until the size determined in the preoperative planning is reached. The Compressor has to be stable and the line mark on the Handle has to be flush with the resection surface (red circle). The Compressor is now slightly recessed within the bone.

Figure 6.7

Remove the Handle, leaving the last Compressor in situ. Connect the Finishing Reamer with the T-Handle (Hudson fitting).

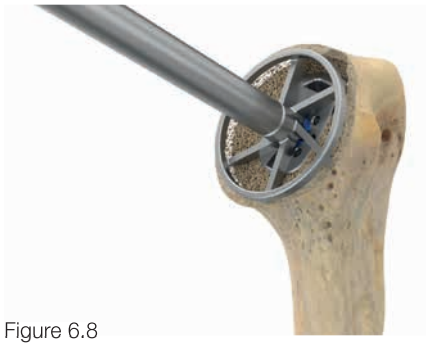


Figure 6.8

Ream the humeral resection surface with the Finishing Reamer and create a concave front face. To do so, insert the blue Reamer guide tip into the female taper of the humeral Compressor and align axially.

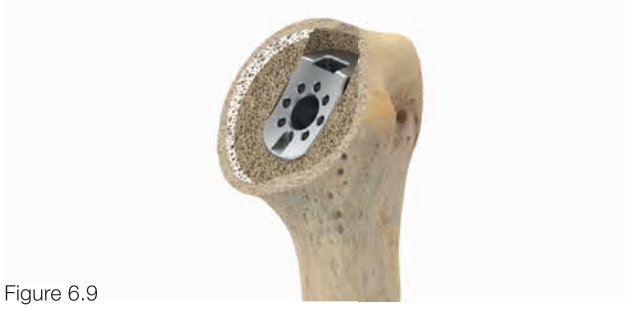


Figure 6.9

Ream manually until the depth stop is reached. Remove the Reamer.

Figure 6.10

Depending on the posterior head offset, chose the appropriate Humerus Protection Plate from two options: neutral or 6 mm offset version.

Place the selected Humerus Protection Plate on the resection surface with its peg in the central hole of the humeral component.

Depending on the preferred workflow, glenoid preparation can be performed immediately after humeral head resection. The Humerus Protection Plates can also be placed directly onto the bone and be fixed with the aid of the backside pins.

Go on with chapter 7.1.

6.2 Humeral Fracture Stem Preparation (FX)

NOTE: The following steps are shown for the Modular Stems (not available in the U.S.), but apply equally to the Humeral Fracture Stems.

Figure 6.11

After removing the bone fragments, the required head diameter and height are determined using the head fragment and the Sizing Gauge for Humeral Heads.

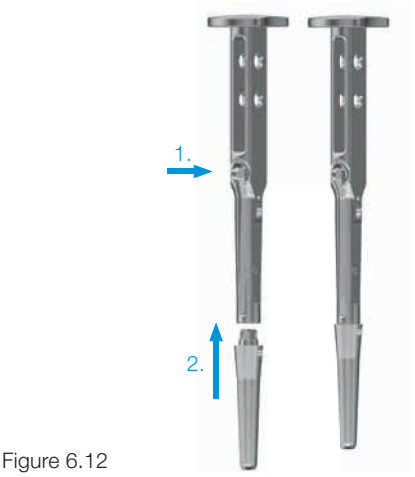


Figure 6.12

Determine the appropriate diameter and length of the Modular Stem/Modular Revision Stem using the Modular Trial Stems, which are coupled to the Handle for Modular Trial Stems. To attach the Modular Trial Stem to the Handle, press the Handle lever.

Place the Trial Stem on the Handle and release the lever. For disassembly, press the lever again and remove the Trial Stem.

Figure 6.13

The selected Modular Trial Stem is carefully driven into the bone until good stability is achieved.

A Template for Proximal Bodies is used to determine the required Proximal Body height.

NOTE: The Template is used for both left and right side. To adapt the Template to the appropriate side, slide the Template plate on the Template bar into the circumferential recess. Rotate the Template plate by 90° and detach it from the Template bar.

Depending on the side to be treated, flip the plate so that the front marking reads “left” or “right”. Reattach the plate to the bar by sliding it over the flattened bar end into the recess. Rotate the plate by 90° and slide it on the Template bar.

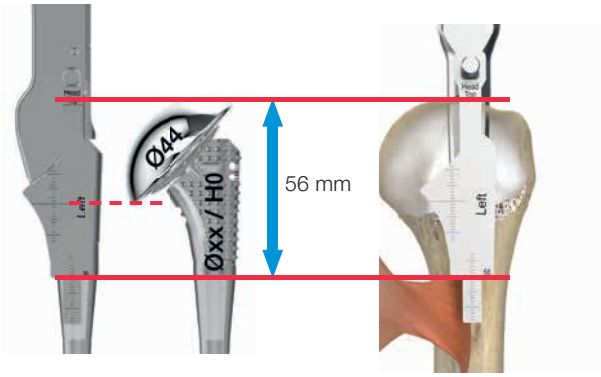


Figure 6.14

NOTE: To determine the required height of the Humeral Fracture Stem, the Template references to the proximal insertion of the Pectoralis Major m., which is approximately 56 mm below the highest point of the humeral head. The Template contour corresponds to the Proximal Body of height “0” and size “S”. The upper line mark on the Template indicates the height of a Humeral Head with a diameter of 44 mm and a height of 16 mm. The lower end of the scale is 56 mm below the upper line mark. The position of the scale end relative to the insertion can be used to determine if a different Humeral Fracture Stem has to be used.

Figure 6.15

Check the correct height level of the Stem considering the required height of the Proximal Body. To do so, attach the Template to the Handle for Modular Trial Stems by inserting the Template bar and pin into the corresponding grooves located on the Handle. A magnetic connection fixes the Template bar to the Handle.

Figure 6.16

Connect the Handle to the Trial Stem in situ and refer to the insertion of Pectoralis Major m. as described. In case the required level cannot be achieved with the different Proximal Body heights available, adapt the level of the Modular Trial Stem. To do so, it may be necessary to select a Modular Trial Stem of a different size.

Figure 6.17

Once an appropriate Trial Stem has been inserted, remove the Handle for Modular Trial Stems.

Connect the Proximal Trial Body with height “0” and size “M” to the Handle for Compressors and Proximal Bodies.

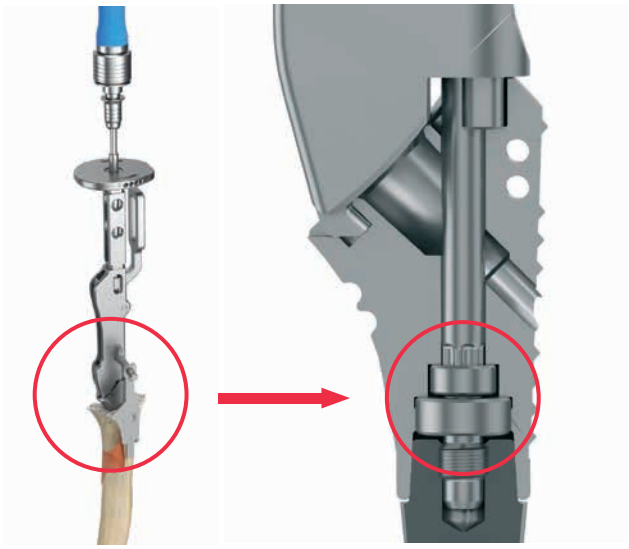


Figure 6.18

Place the Proximal Trial Body on the Modular Trial Stem located in situ.

Connect the Torx 25 Screwdriverbit to the Ratchet and push it through the cannulated Handle into the Proximal Trial Body. Make sure the Screwdriverbit fully engages into the head of the preassembled locking screw within the trial component.

Figure 6.19

Tighten the locking screw slightly with the Ratchet to create the connection between Modular Trial Stem and Proximal Trial Body.

According to the desired retroversion, screw the threaded end of the Alignment Rod into the corresponding hole (0°, 10°, 20°, 30°) in the rim of the Handle impaction plate. Make sure to select the correct set of holes for treatment of the left or right side respectively.

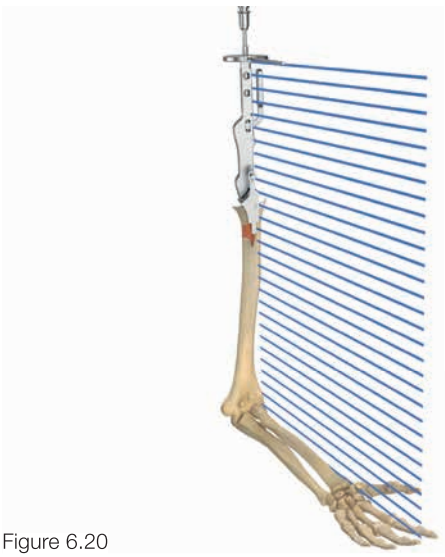


Figure 6.20

Alternatively, use the Alignment Rod together with the Alignment Rod Connector to determine the desired retroversion as described in 4.1.1.

Set the desired retroversion by axially rotating the Handle, adjusting the Alignment Rod parallel to the forearm which is held flexed at approx. 90°. To do so, slightly loosen the locking screw within the Proximal Trial Body.

Once the desired retroversion has been adjusted, tighten the screw and remove both Screwdriver and Handle.

Go on with chapter 7.2.

7. Humeral Components: Trialing

7.1 Humeral Standard & Short Stem Trialing

Figure 7.1

Remove the Humerus Protection Plate. Select the suitable Humeral Trial Head (diameter and height).

NOTE: The LINK Embrace System includes Humeral Heads and trial components in various diameters and heights. Furthermore, different Head Adapters and trial components with different offsets (eccentricities) are available for reconstruction of the individual anatomy. It is recommended to start with a neutral Head Trial Adapter and a medium height Trial Head.

NOTE: Please refer to table 13.2 on page 56 for Range of Motion: Compatible Humeral Heads, Stems, and Adapter Combinations.

Figure 7.2

Firmly push the neutral Head Trial Adapter (0 mm offset) into the Compressor. A spring loaded clamp connection fixes the Adapter to the Compressor.

Figure 7.3

Place the Trial Head onto the Head Trial Adapter. These are fixed to each other by a magnetic connection. Assess the coverage of the resection plane.

Figure 7.4

NOTE: If required, coverage can be optimized by selecting a Head Trial Adapter with offset (available in 2, 4 and 6 mm offset). Head Trial Adapters (alike the final Head Adapters with offset, refer to figure) have a rear pin that is inserted into one of the holes in the humeral component front face and allows adjustment in 45° steps.

Figure 7.5

Head Trial Adapters and final Head Adapters have a dial-like ring, used to precisely determine and reproduce the selected position. For this purpose, the most laterally located digit on the Head Trial Adapter is noted and the final Head Adapter is later on positioned accordingly with the same digit most laterally (e.g. in the figure the most laterally digit is “3” in a 4 mm offset Head Trial Adapter/Head Adapter). For easier identification of the Head Trial Adapter position, Trial Heads have the same dial-like ring at the rim.

Check the required Head height referring to the anatomical landmarks and, if necessary, correct with more suitable Head heights.

With the Trial Head in place, perform a trial reduction to check the stability, tension and function of the joint. If necessary, adjust the configuration using a more suitable Head Trial Adapter and/or Trial Head. In case a Head Trial Adapter with offset is used, the laterally located digit on the Adapter is to be noted as described above in order to identically reproduce the position with the final component later on. Remove the trial components manually. Remove the Compressor using the Handle.

Go on with chapter 8.1.

7.2 Humeral Fracture Stem Trialing (FX)

NOTE: The following steps are shown for the Modular Stems (not available in the U.S.), but apply equally to the Humeral Fracture Stems.

Figure 7.6

NOTE: It is generally recommended to start the trial reduction with a neutral Head Trial Adapter combined with Humeral Trial Head determined with the Sizing Gauge for Humeral Heads.

NOTE: Neutral Head Adapters (offset 0 mm) are provided with (figure) and without circular holes to allow for tuberosities reattachment depending on surgeon's preference.

Figure 7.7

Firmly press the neutral Head Trial Adapter (0 mm offset) into the Humeral Fracture Trial Stem (monoblock).

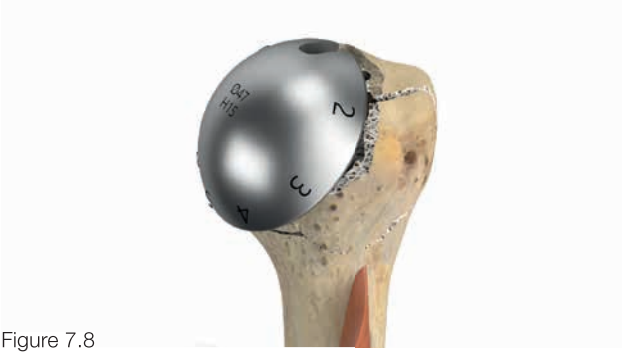


Figure 7.8

Place the required Humeral Trial Head on the Head Trial Adapter.

Figure 7.9

Perform a trial reduction and, if necessary, adjust the selected trial components and the alignment.

Both the Head Trial Adapter and the Trial Head have a cut out. Align both cut outs in lateral position to change the retroversion using the Screwdriver without removing the trial components. To do this, push the long Screwdriverbit, Torx 25, connected to the Ratchet, through the cut outs into the preassembled locking screw within the Proximal Trial Body and untighten it slightly. The retroversion can now be adjusted. Finally, retighten the locking screw and remove the Screwdriver. Repeat the trialing.

Figure 7.10

If no further adjustments are required, the selected retroversion can be marked on the bone, e.g. with electric cautery, according to the line markings on the Proximal Trial Body.

The implantation level can now also be transferred from the Template to the bone for orientation when implanting the final component.

7.3 Humeral Fracture Stem Trialing (continued)

NOTE: The LINK Embrace System offers monoblock Humeral Fracture Stems in sizes 12, 13, ..., 24 for simple and fast treatment of humeral fractures. The proximal shape of these monoblock Stems corresponds to a Proximal Body of height 0, whereby the proximal diameter grows harmoniously with increasing size. Distally, monoblock Fracture Stems correspond to a Modular Stem of the same size with 75 mm length.

Trial components for sizes 12 and 13 come as a monoblock. For all other sizes, the humeral trial component is assembled using the corresponding size of the 75 mm Modular Trial Stem and the Proximal Trial Body with height 0 and size M.

- Prepare the humerus and determine the required diameter of the Modular Stem as described in 6.2.
- For sizes 12 and 13, perform trial reduction with the Humeral Fracture Trial Stems (monoblock) provided.
- For sizes 14 - 24, combine Modular Trial Stems L 75 mm of the required diameter with the Proximal Trial Body with height 0 and size M. Assemble the components as described in 6.2.
- Determine the required height of the component. To do so, connect the Template for Proximal Bodies to the Handle for Compressors and Proximal Bodies and attach the Humeral Fracture Trial Stem to the Handle. Go on as described in 6.2.
- Assemble Head Trial Adapter and Humeral Trial Head as described in 7.2.
- Perform the trial reduction as described in 7.2 correspondingly.
- Go on with chapter 8.2.1 (cementless implantation) or chapter 8.2.2 (cemented implantation).

8 Humeral Components: Implantation

8.1 Humeral Standard and Short Stem Implantation

8.1.1 Cementless Humeral Standard and Short Stem Implantation

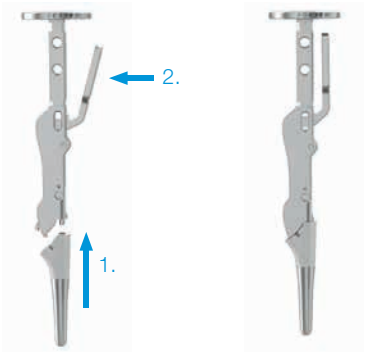


Figure 8.1

NOTE: For cementless implantation, the Humeral Standard or Short Stem of the same size as the last Compressor is used. Compressors and Stems with the same size designation have identical dimensions (Compressors have + 5 mm length).

Remove the transportation lock (white plastic cover) from the selected Humeral Stem. Connect the Humeral Stem to the Handle.

Figure 8.2

Impact the Humeral Stem taking into account the desired retroversion. For this purpose, the Alignment Rod is screwed into the appropriate hole in the Handle impaction plate rim. Make sure to select the correct set of holes for left and right side treatment.

Figure 8.3

Alternatively, place the Alignment Rod Connector on the Handle and insert the Alignment Rod in the appropriate hole. Make sure to select the correct position of the Alignment Rod Connector for left and right side treatment.

At first, the Humeral Stem should not be completely impacted but protrude slightly from the humerus. This facilitates the complete coupling of the taper connection between Head Adapter and Humeral Head.

Figure 8.4

Place the required Head Adapter, reproducing the configuration selected in the trial reduction. For Head Adapters with offset, the same digit as the digit determined with the trial prosthesis must be aligned laterally.

Figure 8.5

Insert the Fixation Screw into the Head Adapter (supplied with the Head Adapter).

Figure 8.6

Connect the Torx 25 Screwdriverbit to the 3 Nm Torque Wrench and slide it through the Counter Sleeve with the small Sleeve pin at the lower end.

Figure 8.7

Introduce the prepared Screwdriver into the Adapter Fixation Screw and position the Sleeve pin in the small hole in the Head Adapter.

Figure 8.8

Tighten the Screw by turning the Screwdriver clockwise while holding the Sleeve firmly in place with your other hand. The required torque of 3 Nm is reached when a clicking noise can be heard.

Figure 8.9

Place the Humeral Head with the required diameter and height on the Head Adapter.

Impact the Humeral Head with the concave Impactor for Humeral Heads. The entire prosthesis is carefully impacted into the humerus until the underside of the Head Adapter rests on the bone surface. Check the Head fixation manually.

Figure 8.10

Perform reduction and final check.

If adjustments are necessary, both Humeral Head and Head Adapter can be removed.

For further information on component removal, refer to chapter 9.

8.1.2 Cemented Humeral Standard Stem Implantation

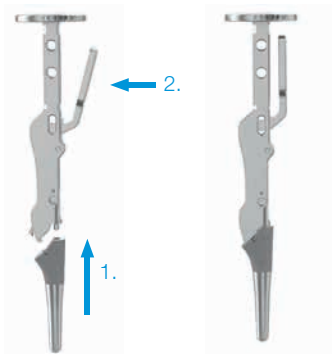


Figure 8.11

NOTE: For cemented implantation, select the Humeral Standard Stem one or two sizes smaller than the last Compressor used. When selecting the Humeral Stem one size smaller than the last Compressor, a cement mantle thickness of approx. 0.5 mm is achieved.

NOTE: Alternatively to assembling the component in situ as described here, the component can be completely assembled on the sterile table and impacted s a whole afterwards. In this case, follow the workflow described here correspondingly.

The use of high viscosity cement is recommended for cementation.

Remove the transportation lock (white plastic cover) from the selected Humeral Stem. Connect the Humeral Stem to the Handle.

Figure 8.12

Clean the bone using jet or pulse lavage and apply the cement.

Insert the Humeral Stem into the soft cement taking into account the desired retroversion. For this purpose, the Alignment Rod is screwed into the appropriate hole in the Handle impaction plate rim. Make sure to select the correct set of holes for left and right side treatment.

Figure 8.13

Alternatively, place the Alignment Rod Connector on the Handle and insert the Alignment Rod in the appropriate hole. Make sure to select the correct position of the Alignment Rod Connector for left and right side treatment.

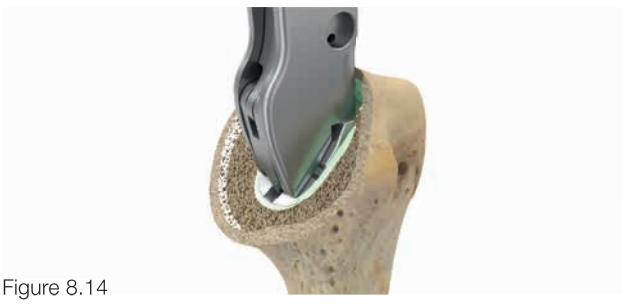


Figure 8.14

Manually press down the Stem into the soft cement until it is positioned at the same level as the last Compressor used. Remove excessive bone cement. With the Handle, the prosthesis is held in position until the cement is cured.

Align and fix both Head Adapter and Humeral Head as described in 8.1.1.

8.2 Humeral Fracture Stem Implantation (FX)

8.2.1 Cementless Humeral Fracture Stem Implantation (FX)

NOTE: Humeral Fracture Stems have a monoblock design and therefore do not need to be assembled. In order to implant Humeral Fracture Stems, connect the required Stem to the Handle for Compressors and Proximal Bodies and follow the workflow described in this chapter correspondingly.

Figure 8.15

Attach the Template for Proximal Trial Bodies to the Handle. Introduce the Humeral Fracture Stem into the humerus and impact until good stability is achieved. Using the Template for Proximal Trial Bodies, check the position of the final Humeral Fracture Stem.

NOTE: Another trial reduction can be performed at this stage (suggested in case the final Stem position differs from the Trial Stem position).

Remove the Handle and Template. Remove the transportation lock (white plastic cover) from the final Humeral Fracture Stem determined with the trial reduction.

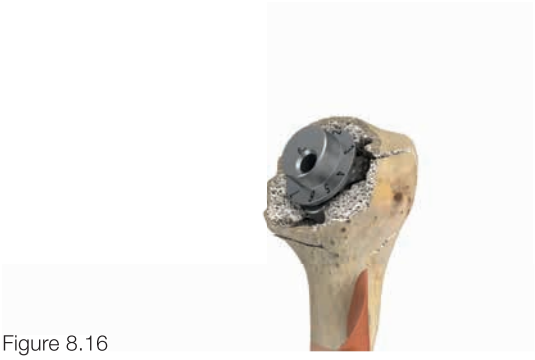


Figure 8.16

Align the required retroversion using the Alignment Rod screwed into the appropriate hole in the Handle impaction plate.

Alternatively, align the retroversion with the Alignment Rod screwed into the appropriate hole of the Alignment Rod Connector which is connected to the Handle.

Optionally, you may now perform another trial reduction with a Head Trial Adapter and Humeral Trial Head. Adapt the configuration if necessary.

Place the required Head Adapter, reproducing the configuration selected in the trial reduction. For Head Adapter with offset, the same digit as the digit determined with the trial prosthesis must be aligned laterally.

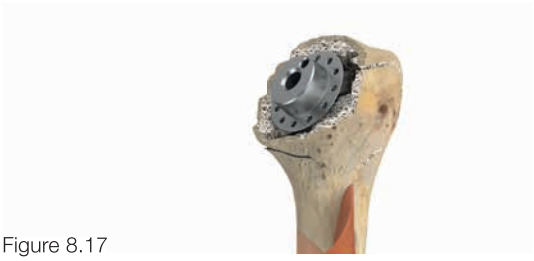


Figure 8.17

NOTE: Neutral Head Adapters (offset 0 mm) are provided with and without circular holes to allow for tuberosities reattachment depending on surgeon's preference.

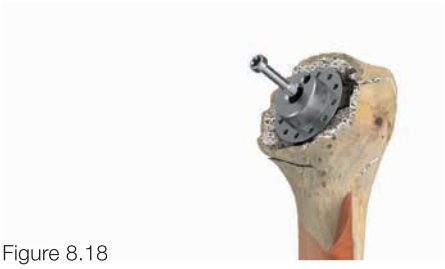


Figure 8.18

Insert the Fixation Screw into the Head Adapter (supplied with the Head Adapter).

Figure 8.19

Connect the Torx 25 Screwdriverbit to the 3 Nm Torque Wrench and slide it through the Counter Sleeve with the small Sleeve pin at the lower end.

Figure 8.20

Introduce the prepared Screwdriver into the Adapter Fixation Screw and position the Sleeve pin in the small hole in the Head Adapter.

Figure 8.21

Tighten the Screw by turning the Screwdriver clockwise while holding the Sleeve firmly in place with your other hand. The required torque of 3 Nm is reached when a clicking noise can be heard.

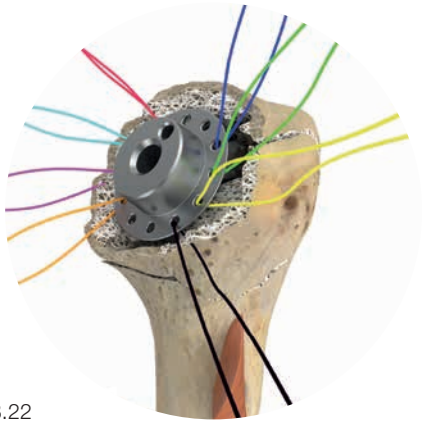


Figure 8.22

If required, attach sutures for tuberosities reattachment to the (neutral) Head Adapter at this stage.

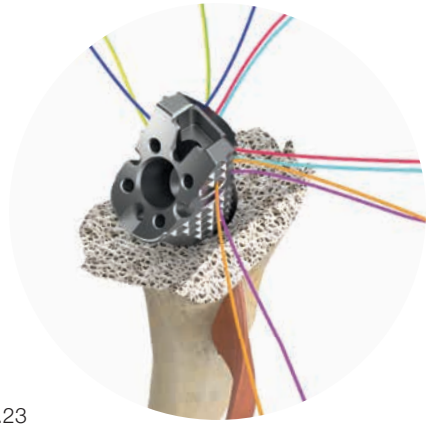


Figure 8.23

If required, sutures can also be attached using the m-l and a-p holes of the Humeral Fracture Stem.

Figure 8.24

Place the final Humeral Head with the required diameter and height onto the Head Adapter. Impact lightly using the concave Impactor for Humeral Heads and check the Head fixation manually.

Figure 8.25

Reduce the joint. If adjustments are necessary, both Humeral Head and Head Adapter can be removed with the Separator Wrench. When removing the Head Adapter, remove the Fixation Screw first.

For further information on component removal, refer to chapter 9.

Go on with chapter 8.2.3.

8.2.2 Cemented Humeral Fracture Stem Implantation (FX)

NOTE: For cemented implantation, select the Modular Stem/Modular Revision Stem or the Humeral Fracture Stem (monoblock) one or two sizes smaller than the last Trial Stem or Humeral Fracture Trial Stem used. Modular Trial Stems/Fracture Trial Stems and final Modular Stems/final Humeral Fracture Stems with the same size designation have identical intramedullar stem dimensions. When selecting the final component one size smaller than the corresponding trial component, a cement mantle thickness of approx. 0.5 mm is achieved.

NOTE: Humeral Fracture Stems have a monoblock design and therefore don't need to be assembled. In order to implant Humeral Fracture Stems, connect the required Stem to the Handle for Compressors and Proximal Bodies and follow the workflow described in this chapter correspondingly.

Figure 8.26

The use of high viscosity cement is recommended for cementation.

Remove the transportation lock (white plastic cover) from the final Humeral Fracture Stem determined with the trial reduction.

Connect the Humeral Fracture Stem to the Handle for Compressors.

Connect the Template to the Handle. Clean the bone using jet or pulse lavage and apply the cement.

Insert the assembled humeral component into the soft cement taking into account the desired retroversion.

For this purpose, the Alignment Rod is screwed into the appropriate hole in the Handle impaction plate rim. Make sure to select the correct set of holes for left and right side treatment.

Figure 8.27

Alternatively, place the Alignment Rod Connector on the Handle and insert the Alignment Rod in the appropriate hole. Make sure to select the correct position of the Alignment Rod Connector for left and right side treatment.

Figure 8.28

Manually press down the humeral component into the soft cement until the Template for Proximal Bodies indicates the previously defined component level. Remove excessive bone cement. With the Handle, the prosthesis is held in position until the cement is cured.

Remove the Handle. Align and fix both Head Adapter and Humeral Head as described in 8.2.1.

Go on with chapter 8.2.3.

8.2.3 Tuberosity Refixation

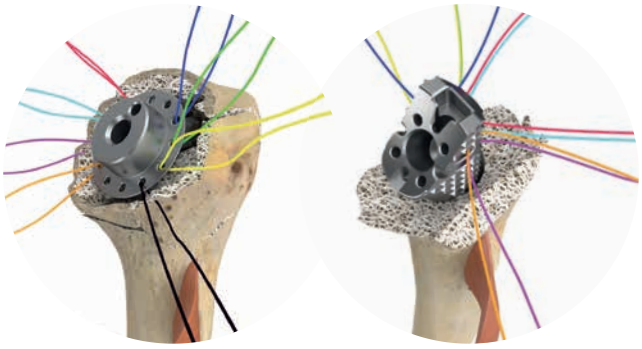


Figure 8.29

For the refixation of the tuberosities with surgical sutures, the circular drill holes of the neutral Head Adapter (0 mm offset) can be used.

All Proximal Bodies have holes for tuberosity refixation using suture material on the anterior and posterior side in m-l orientation, additionally lateral in a-p orientation. Medially, the suture material is positioned and held in recesses.

Tuberosity refixation is carried out according to the requirements defined by the surgeon.

8.3 CTA

8.3.1 CTA Head Preparation and Implantation

NOTE: LINK Embrace System CTA Heads have a male taper allowing for direct connection to Humeral Standard Stems, Humeral Short Stems and Humeral Fracture Stems:

CTA Head	
Size	Height
44	16
47	17
50	18
53	19

Table 8.1: CTA head sizes and heights

Figure 8.30

The resection level for the extended articulating surface of the CTA Heads is determined with an appropriate Humeral Trial Head of the above mentioned diameter/height combinations. Slots in the Trial Head indicate the resection level.

Place the neutral Head Trial Adapter on the humeral trial component or the already implanted humeral component with the cut, straight edge parallel to the humeral component surface. In case other components, e.g. a Head Adapter with offset or a Reverse Tray, have been connected to the humeral component beforehand, remove these as described in chapter 9.

Remove the locking screw first.

Figure 8.31

Place the appropriate Trial Head selected acc. to table 8.1 on the neutral Head Trial Adapter.

Figure 8.32

Perform a trial reduction and adapt the configuration if necessary.

Mark the resection level for the lateral humerus by means of the horizontal Trial Head slots, e.g. using electro cautery.

Figure 8.33

Remove the Trial Head and the Head Trial Adapter. Resect the bone as marked with an oscillating saw.

Figure 8.34

Place the required CTA Head on the humeral component and impact.

Perform final reduction and check. If adjustments are necessary, the CTA Head can be removed.

For further information on component removal, refer to chapter 9.

9. Component Removal

In cases of conversion or revision, all LINK Embrace components can be removed by means of specifically designed instruments.

9.1 Removal of Humeral Heads and Head Adapters

Figure 9.1

Slide a small chisel into the gap between Humeral Head and Head Adapter or Stemless Ring Cage Head Adapter respectively.

Detach the Humeral Head by circumferential gentle levering with the chisel within the gap.

Figure 9.2

Connect the Torx 25 Screwdriverbit to the Ratchet and slide it through the Counter Sleeve with the small Sleeve pin at the lower end.

Figure 9.3

Introduce the prepared Screwdriver into the Adapter Fixation Screw and position the Sleeve pin in the small hole in the Head Adapter.

Figure 9.4

Untighten the Screw by turning the Screwdriver counterclockwise while holding the Sleeve firmly in place with your other hand.

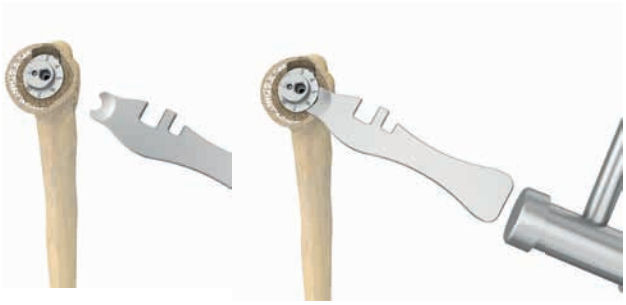


Figure 9.5

Remove all instruments and the Fixation Screw. Slide the Separator Wrench into the gap between Head Adapter and Humeral Component.

Impact the Separator Wrench with light mallet blows. Repeat this procedure at another position in case the component cannot be removed.

Figure 9.6

In case the taper connection of the components cannot be released with the Separator Wrench, apply the Extraction instruments as described subsequently.

Slide the Head Adapter Extraction Bolt (M8 thread) through the Counter Sleeve.

Connect the T-Handle to the Extraction Bolt fitting.

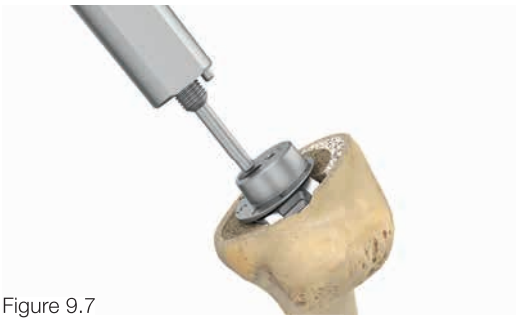


Figure 9.7

Position the prepared instrument on the Head Adapter, introducing the threaded tip into the central Head Adapter hole and the Sleeve pin into the small Adapter hole.

Slightly pretighten the Extraction Bolt by turning it clockwise. Remove the T-Handle and axially impact the Extraction Bolt with a hammer. Reconnect the T-Handle to the Extraction Bolt.

Figure 9.8

Detach the Head Adapter from the humeral component by turning the T-Handle clockwise, holding the Counter Sleeve with your other hand as a countertorque, until the Adapter is completely separated from the humeral component.

In case of conversion surgery, visually check the female humeral component taper for integrity. Mount the required reverse components as described in the surgical technique of the LINK Embrace Shoulder System – Reverse Configuration.

9.2 Removal of Humeral Standard and Short Stems and Humeral Fracture Stems

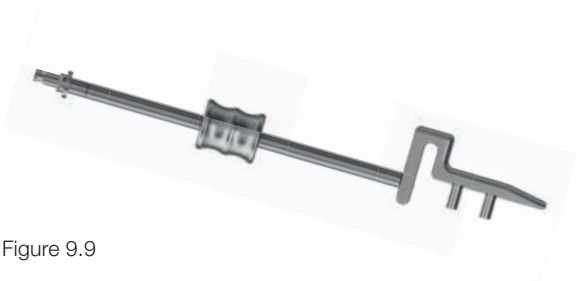


Figure 9.9

For removal of Humeral Standard and Short Stems as well as Humeral Fracture Stems, connect the Handle for Compressors to the humeral component in situ.

Assemble the Extraction device by sliding the Slaphammer over the Stem for Slaphammer. Screw the Extraction device into the threaded hole of the Extraction Hook.

Figure 9.10

Attach the Extraction device to the Handle by sliding the two Hook bolts into the holes at the Handle.

Remove the humeral component by applying appropriate blows with the Slaphammer.

9.3 Removal of Cemented All Poly Glenoids

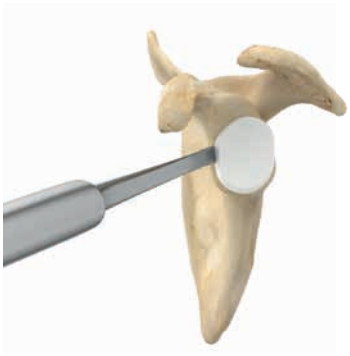


Figure 9.11

In order to remove a PE Glenoid, gently push an appropriate instrument, e.g. a small chisel, into the gap between the cemented PE Glenoid and the bone and loosen the component by carefully levering with the chisel.

Remove the component and bone cement residuals. In case it is intended to implant a new component, check if the remaining bone stock is sufficient to host the respective component.

NOTE: When replacing a Cemented All Poly Glenoid with a Reverse Glenoid Baseplate or in other revision scenarios, it may be recommended to use a Reverse Glenoid Baseplate with a long peg for increased stability.

10. Implants

Humeral Short Stems

MAT Tivastan-S, Fixation: cementless

REF	Length (l) mm	Diameter (d) mm	Coating/Surface
640-175/12	75	12	CaP-coating
640-175/13	75	13	CaP-coating
640-175/14	75	14	CaP-coating
640-175/15	75	15	CaP-coating
640-175/16	75	16	CaP-coating
640-175/17	75	17	CaP-coating
640-175/18	75	18	CaP-coating
640-175/19	75	19	CaP-coating
640-175/20	75	20	CaP-coating

Humeral Standard Stems

MAT Tivastan -S, Fixation: cemented/cementless

REF	Length (l) mm	Diameter (d) mm	Coating/Surface
640-100/12	100	12	-
640-100/13	100	13	-
640-100/14	100	14	-
640-100/15	100	15	-
640-100/16	100	16	-
640-100/17	100	17	-
640-100/18	100	18	-
640-100/19	100	19	-
640-100/20	100	20	-
640-100/21	100	21	-
640-100/22	100	22	-
640-100/23	100	23	-
640-100/24	100	24	-

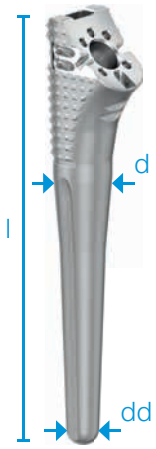
Humeral Standard Stems

MAT Tivastan-S, Fixation: cementless

REF	Length (l) mm	Diameter (d) mm	Coating/Surface
640-110/12	100	12	CaP-coating
640-110/13	100	13	CaP-coating
640-110/14	100	14	CaP-coating
640-110/15	100	15	CaP-coating
640-110/16	100	16	CaP-coating
640-110/17	100	17	CaP-coating
640-110/18	100	18	CaP-coating
640-110/19	100	19	CaP-coating
640-110/20	100	20	CaP-coating
640-110/21	100	21	CaP-coating
640-110/22	100	22	CaP-coating
640-110/23	100	23	CaP-coating
640-110/24	100	24	CaP-coating

Humeral Fracture Stems

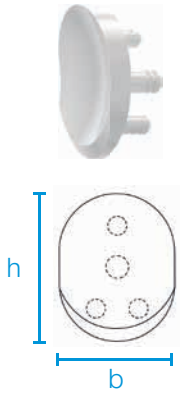
MAT Tivastan-S, Fixation: cemented/cementless



REF	Length (l) mm	Diameter (d) mm	Distal Diameter (dd) mm
641-120/12	120	12	5
641-120/13	120	13	6
641-120/14	120	14	7
641-120/15	120	15	8
641-120/16	120	16	9
641-120/17	120	17	10
641-120/18	120	18	11
641-120/19	120	19	12
641-120/20	120	20	13
641-120/21	120	21	14
641-120/22	120	22	15
641-120/23	120	23	16
641-120/24	120	24	17

Cemented All Poly Glenoids

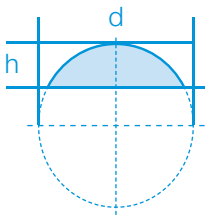
MAT UHMWPE



REF	Size	Height (h) mm	Width (b) mm	Material
645-001/52	small	28	22	UHMWPE
645-002/58	medium	32	25	UHMWPE
645-003/64	large	36	28	UHMWPE
645-021/52	small	28	22	UHMWPE/E-DUR
645-022/58	medium	32	25	UHMWPE/E-DUR
645-023/64	large	36	28	UHMWPE/E-DUR

Humeral Heads

MAT EndoDur-S (CoCrMo)



REF	Diameter (d) mm	Height (h) mm	Material
642-038/12	38	12	EndoDur-S
642-038/14	38	14	EndoDur-S
642-041/13	41	13	EndoDur-S
642-041/15	41	15	EndoDur-S
642-041/17	41	17	EndoDur-S
642-044/14	44	14	EndoDur-S
642-044/16	44	16	EndoDur-S
642-044/18	44	18	EndoDur-S
642-047/15	47	15	EndoDur-S
642-047/17	47	17	EndoDur-S
642-047/19	47	19	EndoDur-S
642-050/16	50	16	EndoDur-S
642-050/18	50	18	EndoDur-S
642-050/20	50	20	EndoDur-S
642-053/17	53	17	EndoDur-S
642-053/19	53	19	EndoDur-S
642-053/21	53	21	EndoDur-S

Head Adapters

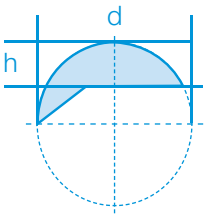
MAT Tilastan-S, Fixation Screw included (Tilastan-S)

REF	Version
642-010/00	neutral
642-010/01*	neutral
642-010/02	2 mm offset
642-010/04	4 mm offset
642-010/06	6 mm offset

* with suture holes

CTA Heads

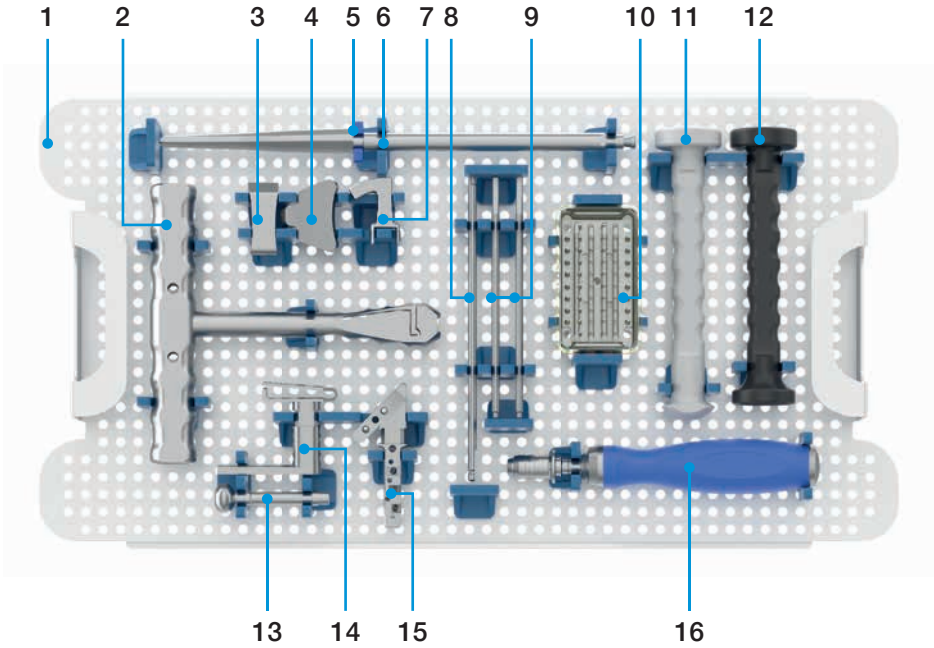
MAT EndoDur-S (CoCrMo)



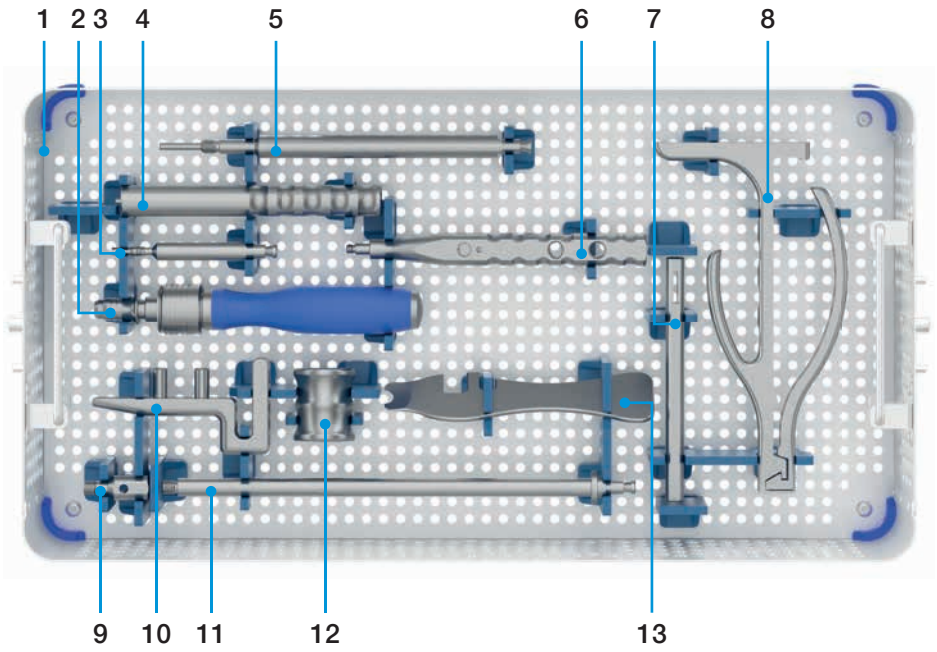
REF	Diameter (d) mm	Height (h) mm	Material
647-044/16	44	16	EndoDur-S
647-047/17	47	17	EndoDur-S
647-050/18	50	18	EndoDur-S
647-053/19	53	19	EndoDur-S

11. Instruments

650-001/00 General Set



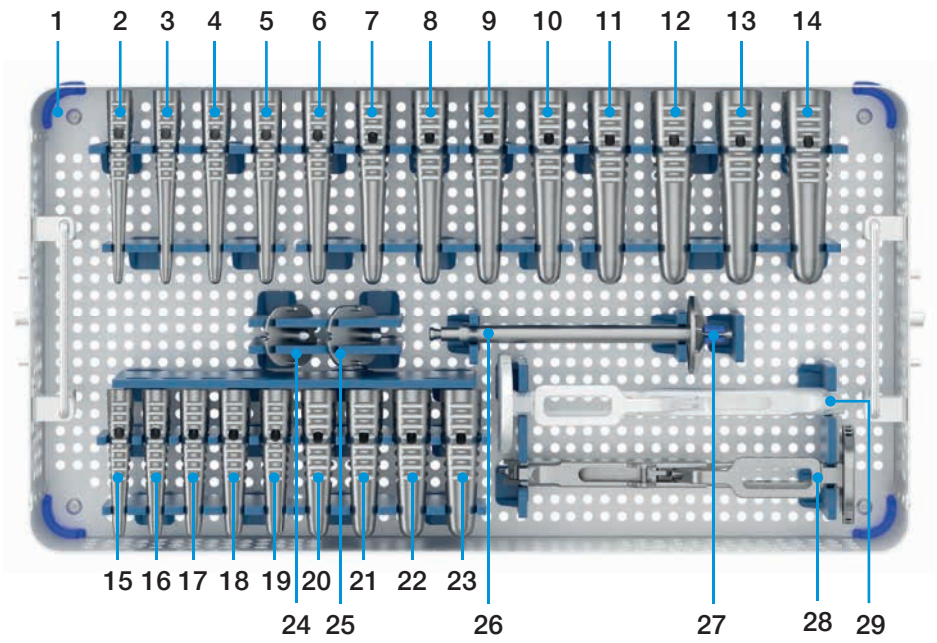
1	650-011/00	**General Set Tray**
2	15-6053/00	**T-Handle** (Hudson fitting)
3	632-005/02	**Resection Block** (for Delto-Pectoral Approach)
4	632-005/07	**Resection Block** (for Lateral Approach)
5	630-001/11	**Depth Stop Disk**
6	630-001/10	**Starter Awl**
7	632-005/09	**Alignment Rod Connector**
8	630-001/06	**Screwdriverbit** (T25, for Bone Screws)
9	632-005/08 × 2	**Alignment Rod**
10	319-601/30	**Sterilizing Box**, contains:
	632-005/65 × 4	**Fixation Pin**
11	643-001/01	**Impactor** (for Reverse Inserts and PE Glenoids)
12	632-001/01	**Impactor** (for Humeral Heads)
13	632-005/01	**Resection Guide Connector**
14	632-005/00	**Resection Guide** (for Humeral Head)
15	632-005/10	**Extramedullary Resection Guide**
16	134-220/03	**Torque Wrench, 3 Nm** (AO fitting)



1	650-011/00	**General Set Tray**
2	80-2014	**Ratchet Handle** (AO fitting)
3	645-090/13	**Reverse Tray Extraction Bolt**
4	645-090/11	**Counter Sleeve** (for Head Adapter Extraction Bolt)
5	645-090/09	**Head Adapter Extraction Bolt**
6	631-001/01	**Impactor** (for Modular Stems)
7	445-121/00	**Pin Inserter, universal**
8	445-120/00	**Pin Inserter/Extractor, universal**
9	645-090/07	**Extraction Adapter** (for Convertible Metal-Back* and Reverse Baseplate)
10	645-090/01	**Extraction Hook**
11	645-090/03	**Stem for Slaphammer**
12	645-090/05	**Slaphammer**
13	645-090/21	**Separator Wrench**

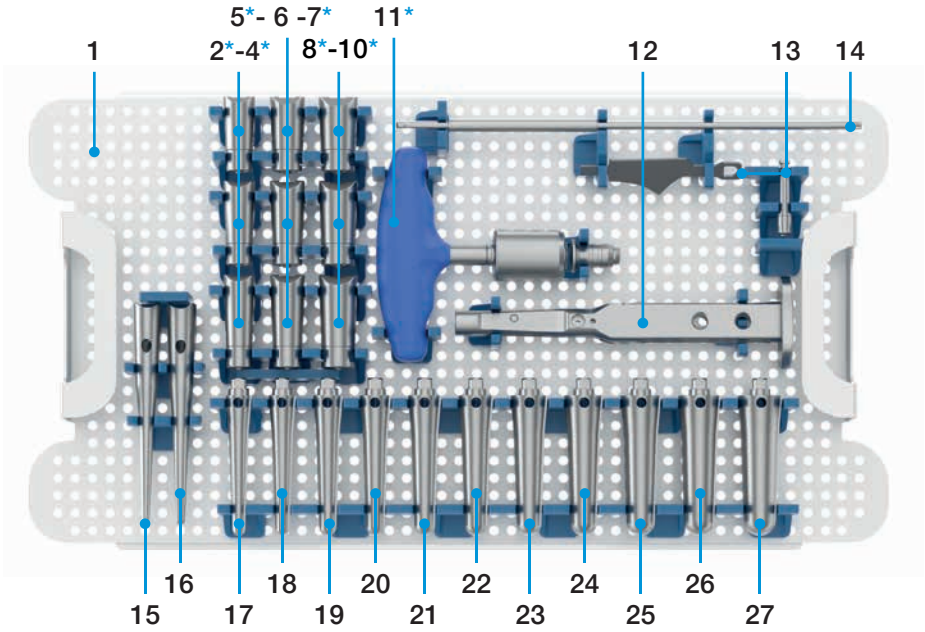
* not available in the US

650-003/00 Short & Standard Stem Set



1	650-013/00	**Short & Standard Stem Set Tray**
2	630-100/12	**Compressor** (for Humeral Standard Stems), **Ø 12**
3	630-100/13	**Compressor** (for Humeral Standard Stems), **Ø 13**
4	630-100/14	**Compressor** (for Humeral Standard Stems), **Ø 14**
5	630-100/15	**Compressor** (for Humeral Standard Stems), **Ø 15**
6	630-100/16	**Compressor** (for Humeral Standard Stems), **Ø 16**
7	630-100/17	**Compressor** (for Humeral Standard Stems), **Ø 17**
8	630-100/18	**Compressor** (for Humeral Standard Stems), **Ø 18**
9	630-100/19	**Compressor** (for Humeral Standard Stems), **Ø 19**
10	630-100/20	**Compressor** (for Humeral Standard Stems), **Ø 20**
11	630-100/21	**Compressor** (for Humeral Standard Stems), **Ø 21**
12	630-100/22	**Compressor** (for Humeral Standard Stems), **Ø 22**
13	630-100/23	**Compressor** (for Humeral Standard Stems), **Ø 23**
14	630-100/24	**Compressor** (for Humeral Standard Stems), **Ø 24**
15	630-075/12	**Compressor** (for Humeral Short Stems), **Ø 12**
16	630-075/13	**Compressor** (for Humeral Short Stems), **Ø 13**
17	630-075/14	**Compressor** (for Humeral Short Stems), **Ø 14**
18	630-075/15	**Compressor** (for Humeral Short Stems), **Ø 15**
19	630-075/16	**Compressor** (for Humeral Short Stems), **Ø 16**
20	630-075/17	**Compressor** (for Humeral Short Stems), **Ø 17**
21	630-075/18	**Compressor** (for Humeral Short Stems), **Ø 18**
22	630-075/19	**Compressor** (for Humeral Short Stems), **Ø 19**
23	630-075/20	**Compressor** (for Humeral Short Stems), **Ø 20**
24	630-001/14	**Humerus Protection Plate, 6 mm Offset**
25	630-001/15	**Humerus Protection Plate, neutral**
26	630-001/07	**Finishing Reamer**
27	630-001/09	**Sleeve** (for Finishing Reamer)
28	630-001/01	**Handle** (for Compressors and Proximal Bodies)
29	630-001/01	**Handle** (for Compressors and Proximal Bodies, on request)

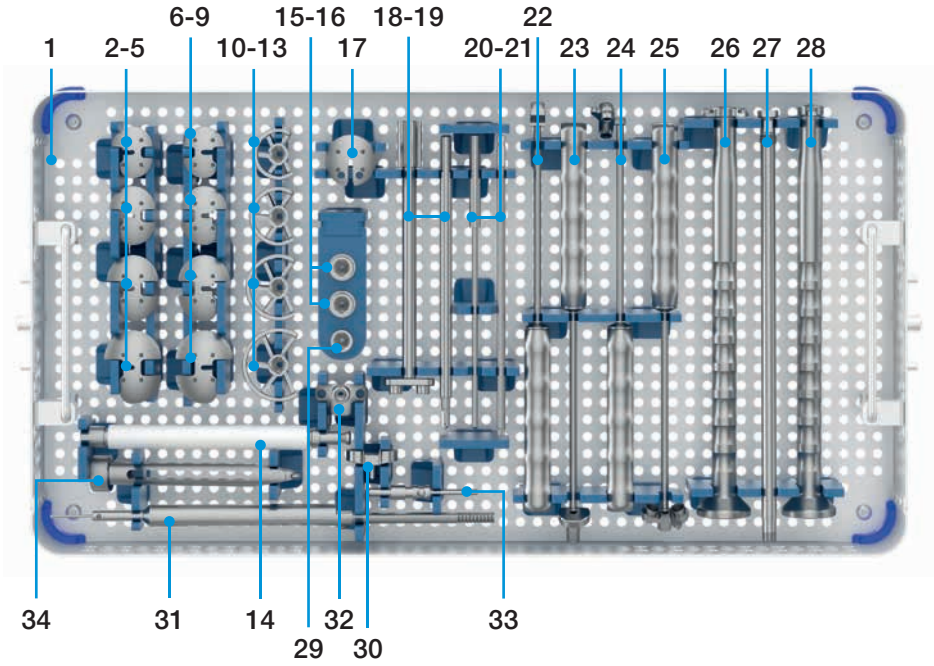
650-004/00 Modular Stem & Modular Revision Stem Set



1	650-014/00	**Modular Stem & Modular Revision Stem Set Tray**
2	631-040/14*	**Proximal Trial Body, S, - 5**
3	631-045/14*	**Proximal Trial Body, S, ± 0**
4	631-050/14*	**Proximal Trial Body, S, + 5**
5	631-040/16*	**Proximal Trial Body, M, -5**
6	631-045/16	**Proximal Trial Body, M, ± 0**
7	631-050/16*	**Proximal Trial Body, M, + 5**
8	631-040/18*	**Proximal Trial Body, L, - 5**
9	631-045/18*	**Proximal Trial Body, L, ± 0**
10	631-050/18*	**Proximal Trial Body, L, + 5**
11	630-001/04*	**Torque Wrench, 5 Nm** (AO fitting)
12	631-001/03	**Handle** (for Modular Trial Stems)
13	631-001/05	**Template** (for Proximal Bodies)
14	630-001/05	**Screwdriverbit** (T25, for Handle f. Compr. a. Prox. Bodies)
15	631-010/12	**Humeral Fracture Trial Stem, Ø 12**
16	631-010/13	**Humeral Fracture Trial Stem, Ø 13**
17	631-075/14	**Modular Trial Stem, Ø 14, L75 mm**
18	631-075/15	**Modular Trial Stem, Ø 15, L75 mm**
19	631-075/16	**Modular Trial Stem, Ø 16, L75 mm**
20	631-075/17	**Modular Trial Stem, Ø 17, L75 mm**
21	631-075/18	**Modular Trial Stem, Ø 18, L75 mm**
22	631-075/19	**Modular Trial Stem, Ø 19, L75 mm**
23	631-075/20	**Modular Trial Stem, Ø 20, L75 mm**
24	631-075/21	**Modular Trial Stem, Ø 21, L75 mm**
25	631-075/22	**Modular Trial Stem, Ø 22, L75 mm**
26	631-075/23	**Modular Trial Stem, Ø 23, L75 mm**
27	631-075/24	**Modular Trial Stem, Ø 24, L75 mm**

* not available in the US

650-005/00 Glenoid Set



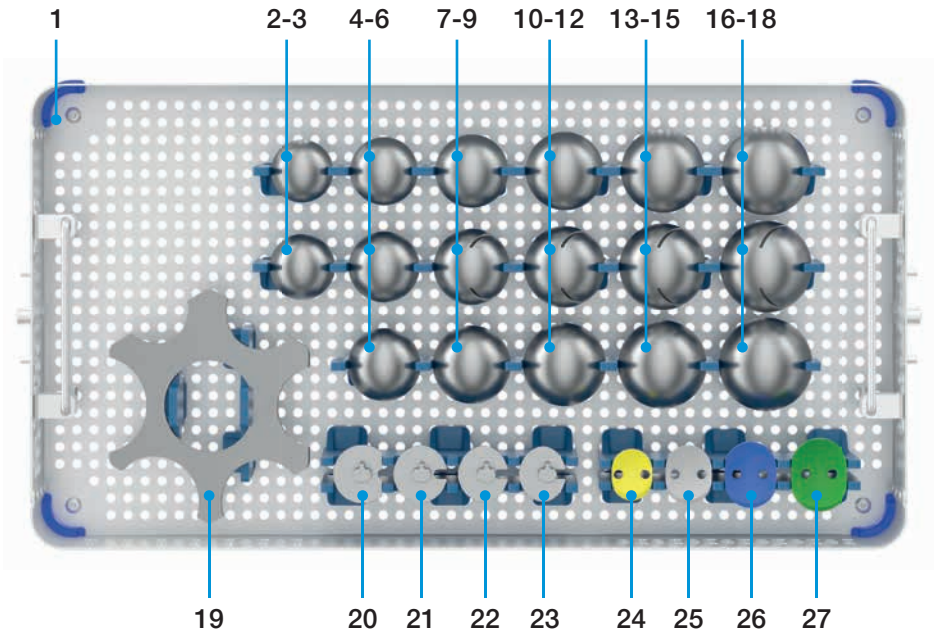
1	650-015/00	**Glenoid Set Tray**
2	645-001/09	**Glenoid Sizer, left, small**
3	645-001/11	**Glenoid Sizer, left, medium**
4	645-001/13	**Glenoid Sizer, left, large**
5	645-001/15	**Glenoid Sizer, left, x-large**
6	645-001/10	**Glenoid Sizer, right, small**
7	645-001/12	**Glenoid Sizer, right, medium**
8	645-001/14	**Glenoid Sizer, right, large**
9	645-001/16	**Glenoid Sizer, right, x-large**
10	645-001/28	**Glenoid Reamer, small** (Ø 28)
11	645-001/32	**Glenoid Reamer, medium** (Ø 32)
12	645-001/36	**Glenoid Reamer, large** (Ø 36)
13	645-001/40	**Glenoid Reamer, x-large** (Ø 40)
14	645-001/01	**Drive Shaft** (for Glenoid Preparation, cannulated, Hudson fitting)
15	645-002/03	**Drill, standard** (for Reverse Glen. Baseplate a. MB f. Convertible Glen.*, for Central Peg)
16	645-002/05	**Drill, long** (for Reverse Glenoid Baseplate, for Central Peg)
17	645-002/28	**K-Wire Positioner for Reverse Baseplate**
18	645-002/12	**Guide Handle** (for K-Wire)
19	645-002/07	**Drill** (for Glenoids, for Peripheral Pegs)
20	64-8022	**Twist Drill, Ø 3.2**
21	80-2030	**Screwdriverbit** (T20, for Glenospheres)
22	645-080/50	**Handle** (for Glenoid Sizers and Drill Templates)
23	645-080/60	**Drill Guide** (for Central Screws)
24	645-080/52	**Drill Guide A/P monoaxial**
25	645-080/54	**Drill Guide "S/I" polyaxial**
26	645-080/56	**Impactor** (for Reverse Baseplate)

* not available in the US

27	645-080/59	**Shaft for Impactor** (for Convert. MB* and Reverse Baseplate)
28	645-080/58 *	**Impactor** (for Convertible Metal-Back)
29	645-002/01	**Drill** (for Cemented All Poly Glenoids, for Central Peg)
30	645-002/09	**Drill Template** (for Cemented All Poly Glenoids, for Peripheral Pegs)
31	645-080/64	**Depth Gauge** (for Bone Screws)
32	645-003/09 *	**Drill Template** (for Convertible Metal-Back, for Peripheral Pegs)
33	645-002/08	**Fixation Pin** (for Drill Templates)
34	645-002/15	**Repositioner** (for K-Wire)

* not available in the US

650-006/00 Anatomical Set



1	650-016/00	**Anatomical Set Tray**
2	632-038/12	**Humeral Trial Head, Ø 38, H12 mm**
3	632-038/14	**Humeral Trial Head, Ø 38, H14 mm**
4	632-041/13	**Humeral Trial Head, Ø 41, H13 mm**
5	632-041/15	**Humeral Trial Head, Ø 41, H15 mm**
6	632-041/17	**Humeral Trial Head, Ø 41, H17 mm**
7	632-044/14	**Humeral Trial Head, Ø 44, H14 mm**
8	632-044/16	**Humeral Trial Head, Ø 44, H16 mm**
9	632-044/18	**Humeral Trial Head, Ø 44, H18 mm**
10	632-047/15	**Humeral Trial Head, Ø 47, H15 mm**
11	632-047/17	**Humeral Trial Head, Ø 47, H17 mm**
12	632-047/19	**Humeral Trial Head, Ø 47, H19 mm**
13	632-050/16	**Humeral Trial Head, Ø 50, H16 mm**
14	632-050/18	**Humeral Trial Head, Ø 50, H18 mm**
15	632-050/20	**Humeral Trial Head, Ø 50, H20 mm**
16	632-053/17	**Humeral Trial Head, Ø 53, H17 mm**
17	632-053/19	**Humeral Trial Head, Ø 53, H19 mm**
18	632-053/21	**Humeral Trial Head, Ø 53, H21 mm**
19	632-001/05	**Sizing Gauge** (for Humeral Heads)
20	632-010/00	**Head Trial Adapter** (neutral)
21	632-010/02	**Head Trial Adapter** (2 mm offset)
22	632-010/04	**Head Trial Adapter** (4 mm offset)
23	632-010/06	**Head Trial Adapter** (6 mm offset)
24	645-004/09	**Trial for Cemented All Poly Glenoid, small**
25	645-004/11	**Trial for Cemented All Poly Glenoid, medium**
26	645-004/13	**Trial for Cemented All Poly Glenoid, large**
27	645-004/15 *	**Trial for Cemented All Poly Glenoid, x-large**

* not available in the US

12. X-ray Templates

X-ray Templates

1	650-030/01	Humeral Short & Humeral Standard Stems
2	650-030/02	Proximal Bodies* & Modular Stems/* Modular Revision Stems* & Humeral Fracture Stems
3	650-030/03	Humeral Heads & Head Adapters, CTA Heads
4	650-030/04	Cemented All Poly Glenoids & Convertible Glenoids*

* The corresponding implants not available in the US

13. System Compatibility

This chapter comprises all tables showing component compatibility and restrictions within the LINK Embrace Shoulder system. For further information refer to the specified chapter.

Humeral Heads and Glenoids Combinations

Chapter 5.1 Glenoid Preparation (for cemented All Poly)

Glenoid Size	Curvature Diameter	Head Size					
		38	41	44	47	50	53
small	52	✔	✔	✔	✔	✖	✖
medium	58	✔	✔	✔	✔	✔	✔
large	64	✖	✖	✔	✔	✔	✔

Table 13.1: Allowed Head-Glenoid combinations are marked in green. Red combinations are not allowed. Numerical data in mm.

Range of Motion: Compatible Humeral Heads, Stems, and Adapter Combinations

	Stem Size												
Head Size	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
19	2 mm	2 mm	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	✖	✖	✖	✖	✖
20.5	4 mm	2 mm	2 mm	2 mm	2 mm	2 mm	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	✖
22	6 mm	4 mm	4 mm	4 mm	4 mm	2 mm	2 mm	2 mm	2 mm	2 mm	2 mm	Neutral	Neutral
23.5	6 mm	6 mm	6 mm	6 mm	6 mm	4 mm	4 mm	4 mm	4 mm	2 mm	2 mm	2 mm	2 mm
25	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	4 mm	4 mm	4 mm	4 mm
26.5	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm	6 mm

Adapter Compatibility Legend
Not advised
Compatible with Neutral
Compatible with Neutral and Offset (2 mm)
Compatible with Neutral and Offset (2 & 4 mm)
Compatible with Neutral and Offset (2, 4 & 6 mm)

Table 13.2: ROM – Compatible Humeral Heads, Stems, and Adapter Combinations

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

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